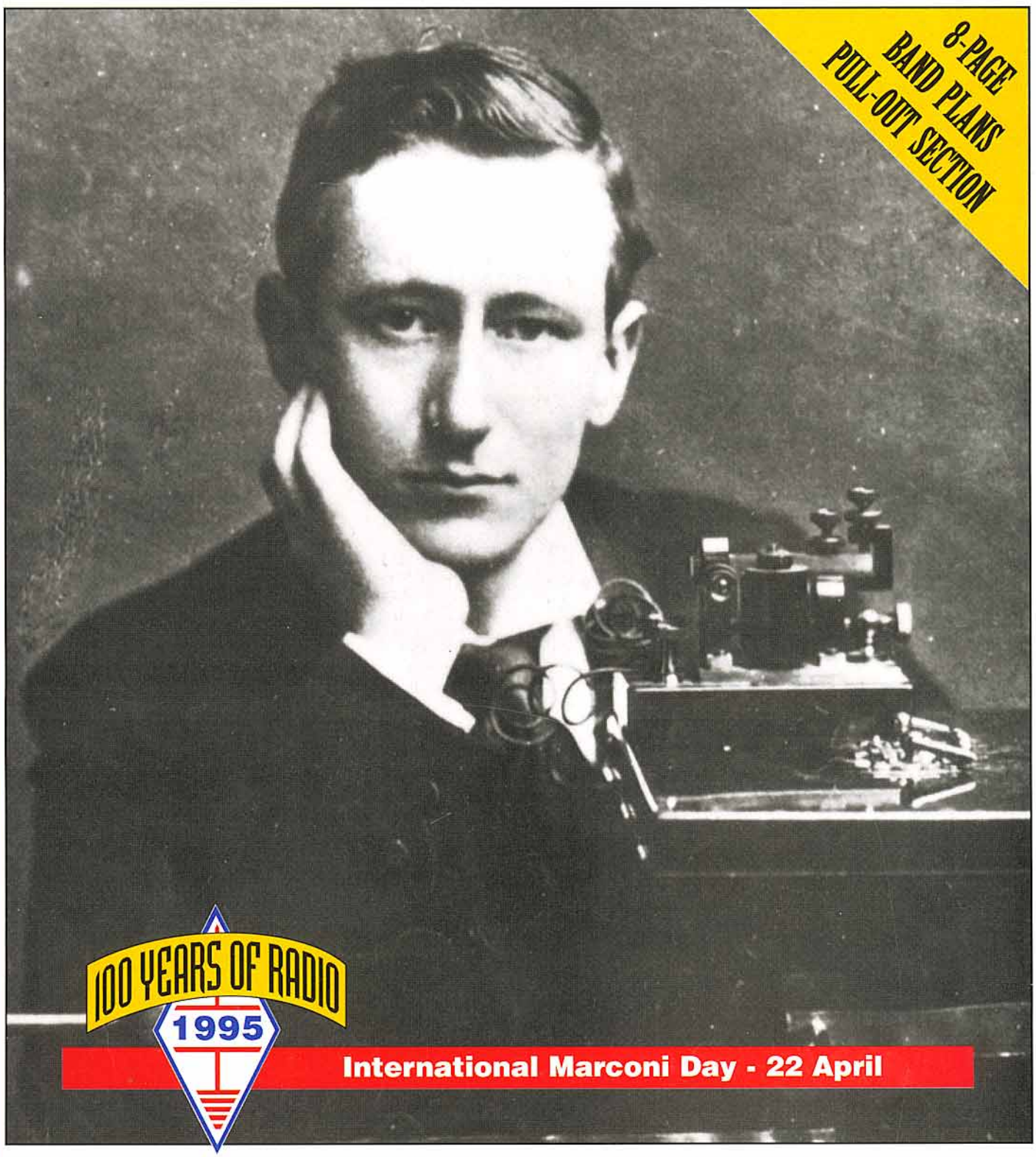
Volume 71 No 4 April 1995

RadCom

Radio Communication

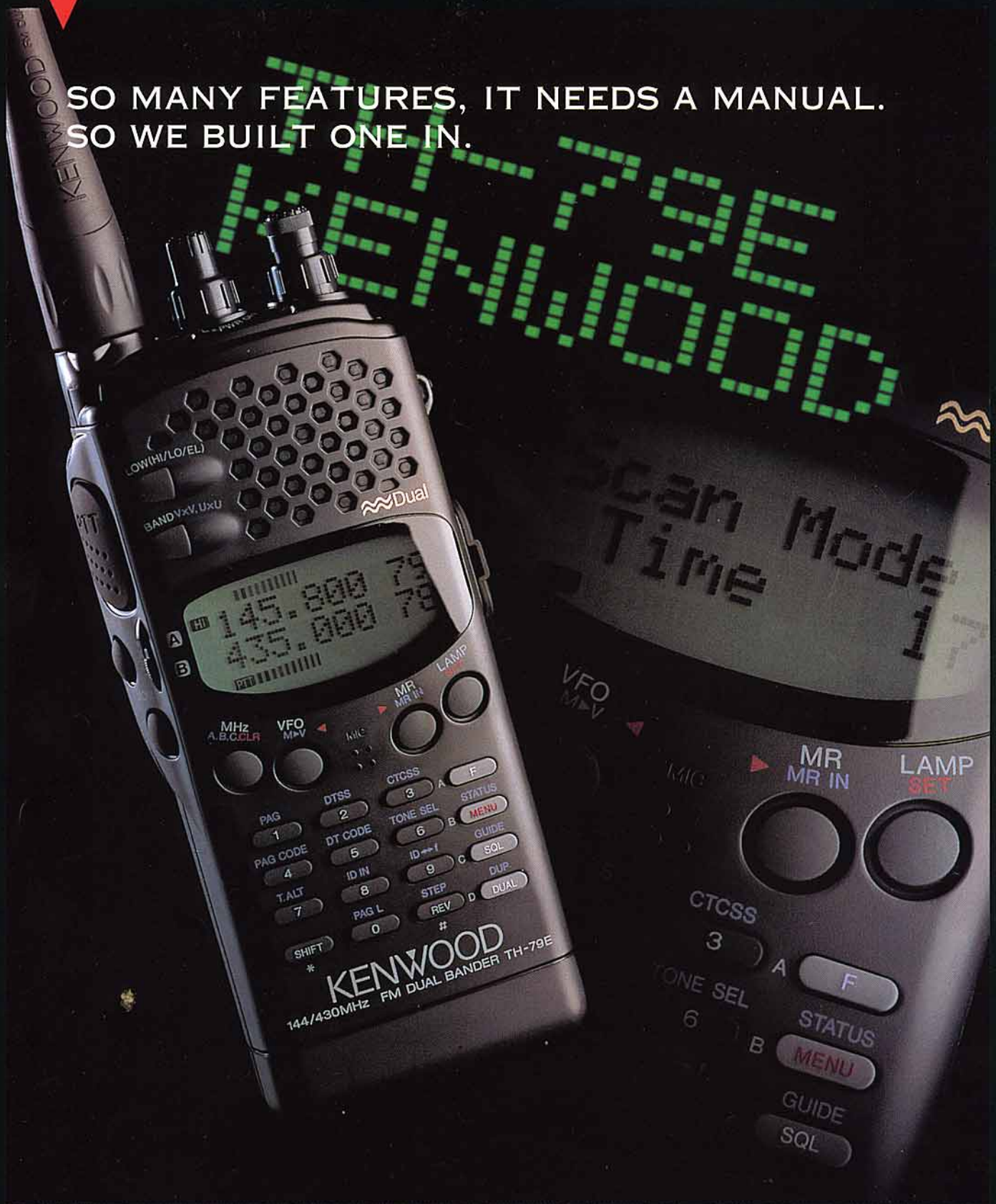
The Journal of the Radio Society of Great Britain

THE VOICE OF AMATEUR RADIO FOR 82 YEARS



THE THREE POINTS OF THE KENWOOD TRIANGLE REPRESENT ADVANCED TECHNOLOGY, QUALITY AND STYLE

SO MANY FEATURES, IT NEEDS A MANUAL. SO WE BUILT ONE IN.



Kenwood's TH-79E marks a new high in user-friendly handheld tranceivers. This slim-line FM dual-bander features a dot matrix LCD menu, which helps you to access the many class-leading features of this stylish unit.

Features that include an FET power module for longer battery life, 82 memory channels with ID, DTSS and pager functions, Automatic Band Change and DTMF memory function for auto-dial operation. Confused? You won't be. Just call up the menu. Or ring 0923 816444 for a full information pack.

KENWOOD

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RadCom

COVER PICTURE:
This month we honour 'the first radio amateur' Guglielmo Marconi. Feature: page 16.
PHOTOGRAPH: GEC-MARCONI

NEWS AND REPORTS

TECHNICAL FEATURES

REGULARS

PRODUCTS

IMPORTANT NOTICE TO ALL READERS

Twelve months ago, Lynchy was telling you why an extra 1 year warranty really wasn't necessary. Things are more reliable, blah, blah, why don't we all give 10 years, blah, blah and loads more. You still persisted in asking for longer warranties so we think you will approve of this one.

ENTER THE *FIVE YEAR* UK WARRANTY FOR AMATEUR RADIO!

No joke. This is serious. Purchase a new piece of gear from Martin Lynch and he'll offer you the chance of a whole FIVE YEARS WARRANTY, covering parts & labour but excluding "dial lights"; (you mean you can't change a bulb??). In the event of a break down, the warranty also includes COLLECTION & DELIVERY on the U.K. mainland.

Furthermore, buy a USED piece of gear from him and he could offer you a staggering FIFTEEN months warranty. For the cynics amongst you, it does cost. But before you pooh-pooh it, think about this. Three chaps in February bought FT-1000's from him. All three wanted FIVE YEARS. (They probably got it when their wives saw the invoice). For less than the cost of ONE HOURS labour per year, they now have TOTAL PEACE of MIND. That new Dual Band Handie you've just bought could have had FIVE YEARS WARRANTY for under £14 a year. Oh, and another thing. If you sell on your equipment before the FIVE YEARS has expired, the new owner can have the warranty transferred, at no extra cost. That instantly increases the "re-sale" value. Good isn't it? Think about it next time you buy a new or used piece of kit.

If you would like more details or have purchased equipment from MARTIN LYNCH within the last SIX MONTHS, then hurry. The extended warranty could still be available to you.

5 Year UK Warranty for Amateur Radio Products

5

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and ask about

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... This Month we've a special offer for mobile enthusiasts. Take a look at the Ten Tec Scout Transceiver & PRO-AM Mobile Ants below. I have cut the price to the bone - and you can take three month's to pay! Happy Mobiling

73 -

Mike Devereux G3SED

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Simply divide the price into 3 equal payments. Write 3 cheques dated in consecutive months starting with today's date. Write your TELEPHONE NUMBER, CHEQUE CARD NUMBER & EXPIRY DATE on the back of each cheque. Post them to us with your order remembering to include your full postal address. When we receive your order/cheques correctly completed - subject to status we will send the goods immediately. *.....The hardest part is deciding what to buy!*

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Special Price.....Save £50.....**£449**

FT900AT	Save £170	Master Price	**£1379**
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FT890AT	Save £220	Master Price	**£1279**
FT736R	Save £290	Master Price	**£1499**
FT 5100	Save £100	Master Price	**£529**
FT11R	Save £30	Master Price	**£269**
FT41R	Save £40	Master Price	**£299**
FT530	Save £125	Master Price	**£375**
FT290R	Save £80	Master Price	**£459**
FT690R	Save £80	Master Price	**£459**
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TS50S.....Save £110.....Our Price.....**£889**

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TS-450SAT	Save £170	Our Price	**£1379**
TS-790E	Save £200	Our Price	**£1649**
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NEW ANTENNA PRODUCTS

LONGWIRE BALUN (DLB)

Matches end fed long wires to 50 ohm coaxial cable, helps on receive reduce noise and interference and allows transmit up to 100Watts. Fully moulded for full weather protection.....**£39.95**

END FED WIRE (EFW)

The EFW is a complete 20mtr long short wave receive & TRANSMIT end fed wire antenna. Balun fed to reduce noise and interference pick up. Uses high quality "Flex Weave" copper wire & handles up to100 Watts RF (with ATU).Cvrs 1 - 30MHz....**£59.95**

Trade & **Commercial** enquiries welcome. Contact Phil Jefferies in our commercial dept. for further Details

TIMEWAVE AUDIO FILTERS

Digital Signal Processing technology gives random noise reduction, elimination of heterodynes automatically and razor sharp CW reception without ringing. These filters really help you hear and work rare DX under marginal conditions.

DSP 9 MkII...Basic CW/SSB model	**£189**
DSP 9 Plus...CW/SSB/DATA modes w/AGC	**£239**
DSP 59 Plus.All modes 320 filter	**£299**

AKD - TRANSCEIVERS

A range of British made low cost transceivers - that offer outstanding value for money. At these prices we just can't keep up with the demand!

2001 2mtr 25/5W FM	**£193.95**
4001 4mtr 25/5W FM	**£193.95**
6001 6mtr 25/5W FM	**£193.95**
7003 70cm 3W FM	**£193.95**

TEN TEC SCOUT - SPECIAL DEAL!

For this month only we are giving away these superb mobile H.F. rigs at silly prices! Ideal for mobile and QRP these rigs are packed with features. Fully adjustable output power 5 to 50 Watts, variable bandwidth filter, electronic keying, full break in on CW & plug in band modules.

Ten Tec Scout (with 40m module)	£469
Extra Modules	£39.95
Noise Blanker	£24.95
Mobile Mounting Bracket	£24.95

PRO-AM MOBILE ANTENNAS - SPECIALS

AB5 10/15/20/40/80m Ant	~~£79.95~~	**£69.95**
160 metre whip	~~£54.95~~	**£49.95**
10/12/15/17 Whips	~~£19.95~~	**£17.95**
20/30/40/75 Whips	~~£19.95~~	**£17.95**

Quality Used Equipment

All Safety Tested & Guaranteed For 3 Months

SHORTWAVE RECEIVERS

AR2002 - Wide band base receiver	**£225**
Kenwood R1000 - Digital S/W Receiver	**£350**
Trio R2000 RX	**£395**
Yaesu FRG100 - Excellent S/wave RX	**£475**
Yaesu FRG7700 + VHF Conv. - G.Con	**£425**
Yaesu FRG8800 + VHF Convertor	**£495**

HF TRANSCEIVERS

Icom IC707 HF - Add FM if needed (1only)	**£775**
Icom IC728 - HF 100W Fitted AM/FM board	**£750**
Icom IC730 - 100W Mobile H.F	**£499**
Kenwood TS120S + VFO120S - Filtered	**£495**
Kenwood TS140S - Boxed Excellent Con	**£695**
Kenwood TS520SE - Good Faithful H.F	**£385**
Tokyo H.P. - 15m H.F. Mono Bander	**£175**
Trio TS900 - H.F. Cheap but works well!	**£275**
Yaesu FR70G - Military style HF transceiver 10W	**£395**
Yaesu FT77 - Nice condition, Good starter HF	**£475**
Yaesu FT747GX - Fitted FM, A1 Condition	**£545**

HANDHELDS

Icom IC-P4E - 2m Handie Boxed	**£215**
Icom IC 2SRE - 2m Handie Boxed	**£195**
Kenpro KT220 - 2m Handies, K.Pad+LCD	**£165**
Yaesu FT530 - Dual Handies. Last 1 as new	**£375**
Yaesu FT709 - 70cm Handie.Ideal for novice	**£150**
Yaesu FT709 - 70cm Handie, Good	**£140**

MOBILE/BASE TRANSCEIVERS

Alinco DR130 - 2m FM 45 Watts	**£299**
Alinco DR599E - Dual Band 50W Mobile	**£495**
Alinco DJ580 - Dual Band Handie, Boxed	**£399**
Icom IC290 + 40W P.A. - 2m m/mode	**£425**
Kenwood TM255 - 2m m/mode (1 only)	**£775**
Kenwood TM732 - Dual Band, 1 Only	**£595**
Trio TS700S + VFO+Spk, Mutek F. End	**£595**
Yaesu FT-290 Mkl - Choice of 3 models From	**£285**
Yaesu FT290(Mk II) - Good 2m m/mode VGC	**£395**
Yaesu FT-690(Mk II) - 6m m/mode. Boxed VGC	**£395**

STATION ACCESSORIES

Tokyo HP HX640 - 6m to HF Transvertor	**£225**
Vectronics VC300DLP - Bargain A.T.U.	**£95**

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- 6 Channel steps
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ONLY
£169.95

We have the power

The Manson is back! We've increased our orders once again for these superb power supplies but you just keep on buying them! Sorry to keep so many of you waiting. If you don't yet know what all the fuss is about check this out! The EP925 is a variable voltage PSU that gives a continuous 25A current, peaking on 30A. Twin meters give you current and voltage readout and the thermostatically controlled fan keeps things cool, ideal for powering any of todays HF transceivers. When you check out the price of a matching power supply for your rig, you'll see just what great value it is at just £99.95.
If you don't need all that power then the EP815 may be the one for you.

New!

Half catalogue, half price list -why not get your copy of our new CataList! Just send us four first class stamps and we'll send you one by return. Crammed full of interesting new products and some good old favourites as well.

BNOS VHF and UHF linears - for the serious Dxer

What's the difference between a power amplifier and a linear? Try a BNOS and compare it with some of the other products that call themselves linear and you'll soon find out! If you are going to work that DX you need to be loud and clear and BNOS linears will give you both. Models available with or without pre-amps and all can be RF switched or hard switched depending on how you like to work. Full specs available on request.

CLP14410100	2m Linear with pre-amp; 10W drive; 100W output	***£255.00***
CLP1441050	2m Linear with pre-amp; 10W drive; 50W output	***£169.95***
CLP1443100	2m Linear with pre-amp; 3W drive; 100W output	***£289.00***
CLP144350	2m Linear with pre-amp; 3W drive; 50W output	***£289.00***
CLP43210100	70cm Linear with pre-amp; 10W drive; 100W output	***£439.00***
CLP4321050	70cm Linear with pre-amp; 10W drive; 50W output	***£255.00***
CLP432150	70cm Linear with pre-amp; 1W drive; 50W output	***£289.00***
CLP43225100	70cm Linear with pre-amp; 25W drive; 100W output	***£375.00***
CLP5010100	6m Linear with pre-amp; 10W drive; 100W output	***£289.00***
CLP501050	6m Linear with pre-amp; 10W drive; 50W output	***£169.95***
CLP50350	6m Linear with pre-amp; 3W drive; 50W output	***£169.95***
CLP7010100	4m Linear with pre-amp; 10W drive; 100W output	***£289.00***
CLX14410100	2m Linear; 10W drive; 100W output	***£219.00***
CLX1443100	2m Linear; 3W drive; 100W output	***£255.00***
CLX43210100	70cm Linear; 10W drive; 100W output	***£399.00***
CLX4321050	70cm Linear; 10W drive; 50W output	***£219.00***
CLX432150	70cm Linear; 1W drive; 50W output	***£255.00***
CLX43225100	70cm Linear; 25W drive; 100W output	***£345.00***

If you'd like all the secrets of the top Dxers, we've a great book written by the experts themselves. It's called the VHF UHF DX Book and contains chapters on propagation, antennas, transceivers, transverters, linears, pre-amps, accessories and most importantly, the techniques you should use to get the most out of VHF and UHF operating.
Its bang up to date.

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H THE WORLD

Great New Wire Antenna Systems From

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Chelcom's CAHFV1 h.f. vertical antenna (see last month's ad) has become the fastest selling h.f. vertical in the UK, with over 250 happy users. Hot on the heels of this wonderful antenna, Chelcom have now produced a superb range of new wire aerial systems and components. Once again they've chosen to use only the highest quality components, from specially designed balun cases and dipole centres to the wonderful new FlexWeave™ antenna wire. Just wait 'till you see FlexWeave™ - a multi standard wire so flexible you can tie knots in it and undo it time and time again. It is used in all their ready to hang antennas and also available on its own for those who like to roll their own!

Chelcom Windoms - Ready To Hang!

Two Windom antennas, one covering 80 to 10m and 133 feet long and a shorter version just 66 feet long covering 40 to 10m for those with smaller gardens! Both made from the same high quality components including FlexWeave™ antenna wire and a 4:1 balun. Supplied ready to hang. Both antennas will let you loose with a whole 1000W p.e.p.!
CA80W for 80m is just £65.00 and the CA40W for 40m is just **£55.00**.

Chelcom G5RV's

These G5RV's really need to be seen to be appreciated. You really need to check out the quality compared to other cheaper varieties - there is no comparison! Again the components used are of the highest quality, specially designed for heavy duty use and built to last. For most people, erecting antennas is a major problem - better to do it just once! Chelcom offer the largest range of G5RV's catering for most installation requirements.

CAG5RVH Quality half size G5RV using FlexWeave™ and 300 Ohm slotted ribbon feeder. Supplied ready to hang at just **£35.00**.
CAG5RVF Quality full size G5RV FlexWeave™ and 300 Ohm slotted ribbon feeder. Supplied ready to hang at just **£45.00**.
CAG5RVHP Quality half size G5RV with FlexWeave™ balun and 450 twin feeder. Supplied ready to hang at just **£65.00**.
CAG5RVFP Quality full size G5RV with FlexWeave™ balun and 450 twin feeder. Supplied ready to hang at just **£75.00**.

End-Fed Antenna. For those that like the simple life or don't like feeders hanging about, the Chelcom end-fed design offers a simple, unobtrusive solution. Just 66 feet long, the CA66EF will fit nicely into many smaller gardens and costs just **£55.00**, ready to hang.
Chelcom MultiSystem Aerial Components For DIY Aerial Systems

CABALUN11 1 to 1 balun **£30.00**
CABALUN41 4 to 1 balun **£30.00**
CAINS Insulator (pair) **£1.50**
CABALUN51 5 to 1 balun **£30.00**
CADIPOLE Dipole centre.....**£3.95**
CAFLEX FlexWeave multistranded antenna wire 20m pack ..**£16.00**

Plus
CAHFV1 HF vertical antenna resonant on 80m.....**£119.00**

Lowe also stock a wide range of books covering all aspects of antenna design and construction. A full range can be seen in all of our branches. We also stock a superb range of quality test equipment that anyone building antennas really needs to have, including Diamond power and s.w.r. metres, MFJ antenna, s.w.r. analysers and AEA analysers.
Just send us four first class stamps for our complete Antenna Fact Pack which includes Chelcom's MultiSystem components and verticals, Hygain, Butternut, Vargarda and the full range of rotators from Hygain, Yaesu and Emotator.

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Member society of the International Amateur Radio Union

PATRON: HRH PRINCE PHILIP, DUKE OF EDINBURGH, KG

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Corporate (Concessionary): £27.00 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): £16.00 (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

RSGB Main Switchboard:
01707-659015

The RadCom Leader

A Day to Remember

THE FRONT COVER of this month's *RadCom* features Senatore Guglielmo Marconi. 1995 sees the start of the Marconi centenary celebrations and as a tribute to the great man, who was elected an Honorary Member of the Society in 1920, we intend to fully participate in his centenary.

This year we have moved the Headquarters Annual Open Day forward to Saturday, 22 April, to coincide with International Marconi Day. During the day the HQ station will be taking part in the world-wide net of special event stations, using the callsign GB100IMD. We look forward to meeting you on-air.

We have again expanded our Open Day. Featured this year will be a number of trade stands, SSL, the RA Hobby Radio Section, RNARS London Group and various RSGB committees. I hope you can join us. Details and a map are shown on the opposite page.

For a trial period the Headquarters is also open between 10am to 4pm on the third Saturday of each month, including April. If this proves popular it is our intention to extend this weekend opening facility.

You will find in this month's news pages an announcement regarding the issue of 'G' prefix number plates. I am sure a large number of amateurs will be disappointed at this announcement by the DVLA. However, the Society will continue with its dialogue with DVLA which will hopefully lead, at some time in the future, to the early release of 'G plates'.

Peter A Kirby, G0TWW
General Manager

RadCom NEWS

- THE ROYAL NAVAL Amateur Radio Society HMS Belfast London Group will be active using the callsign GB2RN during the week from 15 to 23 April. Operation will be on the HF, VHF and UHF bands using CW, SSB and digital modes and a colour QSL card of *HMS Belfast* is available for those making contact with GB2RN. Further details may be obtained from Bob Wilson, G0FEK, QTHR or telephone: 0181 220 0388.

- THE ROYAL SIGNALS amateur radio society will have a stand at the following events in Wales: Swansea 16 April, Colerne 22 July, Blackwood 1 October, Llandudno 4 / 5 November, Bridgend 26 November. Would members who can assist on the RSARS stand at any of these events please contact Dennis Egan, GW4XKE, on 01222 512959 (*not* QTHR).

- NEIL CLARKE, G0CAS, has taken over the compilation of solar data and propagation information from Charlie Newton, G2FKZ. Charlie (who remains as Chairman of the Propagation Studies Committee) started the service, which is broadcast on the weekly *GB2RS* news, 18 years ago.

- RUMOURS OF G4EMZ going QRT are premature. He does not appear in the 1995 *RSGB Call Book*, but he is still active. Mr K F Maplesden, G4EMZ, resides at 55 The Heights, Northolt, Middx UB5 4BP.

- THE LATEST CALLSIGNS issued by SSL as of 8 March were in the G*0VU*, G*7UP*, 2*0AJ* and 2*1DU* series.

AMSAT-UK's Ron Broadbent was presented with his MBE at Buckingham Palace on 14 February

Ron Broadbent Collects his MBE

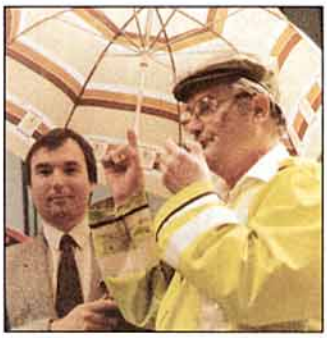
RON BROADBENT, G3AAJ, is one of Britain's best known amateurs. This is not only within his specialist field of amateur satellites but across the whole Amateur Service due to his tireless work as an ambassador for the satellite cause. It was, therefore, pleasing to see his name in the New Year Honours List, having been made a Member of the Order of the British Empire (MBE) for his services to amateur radio.

Ron Broadbent, G3AAJ, with his MBE.

From Lights to Satellites

AN EMPLOYEE of Trinity House (responsible for lighthouses and lightships), Ron became involved with the burgeoning amateur satellite interest in the 1970s, volunteering to co-ordinate the activities of those involved in building and using the new 'birds'.

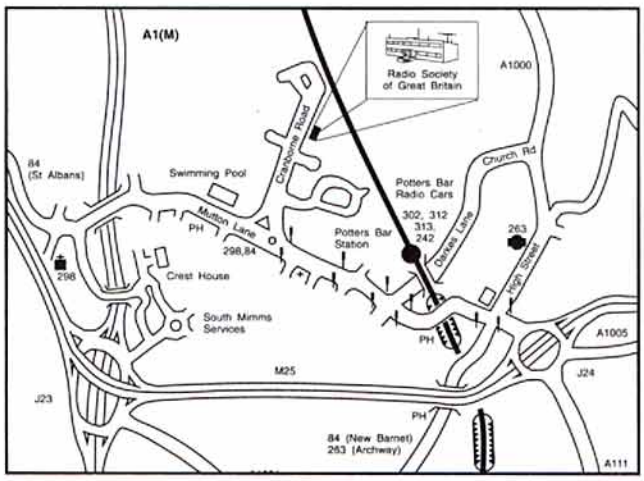
Though not one of the boffins, Ron's skill has been to bring together everyone's efforts, cajoling if necessary, to make AMSAT-UK one of the foremost independent amateur radio societies in the World. A notable achievement has been the organisation, of AMSAT-UK's Colloquium which for nearly ten years has attracted satellite experts from all continents.



Demonstrating the sense of humour which keeps him going, Ron donned weatherproofs and an umbrella to introduce TV weatherman Jim Bacon, G3YLA, at the RSGB Convention raffle draw in 1991.

Ron has worked full time, but unpaid, since retiring from Trinity House in the 1980s and few RSGB members will not know of him and his efforts as Mr AMSAT-UK. His current project is to raise funds for the new Phase 3-D Satellite. He was awarded the rare honour of Vice-Presidency of the RSGB last year and the MBE is yet another token of recognition of the hard work which Ron Broadbent puts in for the benefit of amateur radio.

12



Visit Your Headquarters: Saturday 22 April

OUR ANNUAL Open Day takes place on Saturday, 22 April. This year we will be celebrating 100 years of radio.

- *Meet the staff*
- *See the QSL Bureau*
- *Use the shack*
- *Tour the Museum*
- *See how* RadCom *is produced*
- *Make use of the Bookshop*
- *Browse round the library*
- *Trade Stands*
- *Marconi Exhibition*
- *GB100IMD special event station*
- *Radiocommunications Agency*
- *Subscription Services Ltd*
- *Local Radio Clubs*
- *Refreshments*

HOW TO GET THERE

Open 10.30 am to 4.30 pm

RSGB Annual Meeting

Saturday 3 December 1994

ROYAL SOCIETY OF CHEMISTRY, LONDON

THE MEETING WAS IN THREE PARTS: the Annual General Meeting as required by the Companies Act, an Extraordinary General Meeting, and an Open Meeting comprising the President's speech, presentation of awards and a question and answer session. The minutes of the first two meetings are reproduced below. The minutes of the Open Meeting will appear at a later date.

Minutes of the 68th Annual General Meeting of the Radio Society of Great Britain.

THE PRESIDENT I D Suart, GM4AUP, introduced the rostrum party as R P Horton, G4AOJ, Honorary Treasurer of the Society; D Langley representing the Society's Auditors; C N Trotman, GW4YKL, Executive Vice-President; J C Hall, G3KVA, Company Secretary; and P Kirby, G0TWW, General Manager.

Council Members present were: J Allaway, G3FKM; J Bazley,G3HCT; G Benbow,G3HB; M H Claytonsmith, G4JKS; D A Evans, G3OUF; J N Gannaway, G3YGF; J E Greenwell, G3AEZ; F D Hall, GM8BZX; I J Kyle, GI8AYZ; N Lasher, G6HIU; T I Lundegard,G3GJW; N Roberts, G4IJF and P R Sheppard, G4EJP.

Apologies had been received from G3NCL, G4HES, G3RZP, GI3USS, G3HZL, GW4HWR, G4HPU, GM3CFS, G3JKS and G6JNS.

The President announced there were more than 50 members present (the total attendance was 108).

The requirement to read the notice convening the meeting was waived by agreement of those members present.

Minutes of the 67th AGM.

The president drew members attention to the first item on the agenda which was to receive and, if approved, confirm the minutes of the 67th Annual General Meeting circulated to members with the March 1994 edition of Radio Communication.

There were no comments or questions and the minutes were confirmed as published.

Accounts of the Society.

The president moved on to Item 2 on the agenda which was to receive and consider the accounts for the year ending 30 June 1994 and reports to Council and Auditors thereon. The Society's auditor then read the report which had previously been circulated to all members with the November 1994 edition of Radio Communication.

The Honorary Treasurer then presented the accounts and drew attention to a number of issues contained in them. These were that the Society's finances were satisfactory, subscription income remained reasonably buoyant, the new handbook and call book had boosted book revenue somewhat and costs remained under tight control.

D Koopman, G1TLH, submitted a number of written questions on the Headquarters computer system which were answered by the Honorary Treasurer. A summary of the position was that the Society was at implementation stage in providing Headquarters with a new information technology system using proprietary hardware and software costing approximately £70,000. Previous delays in the project had meant that the Society had been restricted in what services it could provide for members but it was impossible to quantify the cost involved. The IT project was being supervised by the Executive Committee and it it was difficult to foresee the need for a separate IT Committee once implementation was complete. Once the project was up and running the Society would look at electronic mail services available to Headquarters. Finally, although some of the hardware from previous IT systems was being utilised, none of the software was capable of being salvaged.

I McLuskie, G8ORG, then asked a series of questions on Society expenditure on Council and Committees, the IARU levy (based on membership figures) and the computer system which were answered by the Honorary Treasurer verbally and later by a written reply. Mr McLuskie considered that, whilst he had no quibble with any specific expenditure, he felt strongly that those who incurred expenses should be accountable and the amounts involved set out fully in the accounts.

P W Tucker, G4DWZ, asked about utilisation of the various legacy funds and the lack of mention in the accounts that sums in respect of prizes had been paid out of them. The Company Secretary explained that the funds were now under much tighter control, that the possibility of an RSGB bursary was being examined by the Executive Committee and that, in future, income and expenditure relative to the funds would be shown in the accounts.

1995 Council.

The president then moved on to Item 3 and announced the names of those members to serve on Council for 1995 and to call for volunteer scrutineers for the 1995 Council Elections

The results were as follows:

Election for four Ordinary Members:

N Roberts	G4IJF	1629 Votes
G R Morris	GW1ATZ	721 Votes
R Horton	G3XWH	1532 Votes
M G Shread	GM6TAN	1098 Votes
D B Glover	G1VJP	881 Votes
E J Allaway	G3FKM	1626 Votes

The following were declared elected as Ordinary Members: N Roberts, G4IJF; R Horton, G3XWH; M G Shread, GM6TAN; E J Allaway, G3FKM.

Election for Zone A:

P R Sheppard, G4EJP, was elected unopposed

Election for Zone E:

E P Essery	GW3KFE	93 Votes
M J Adcock	GW8CMU	48 Votes

E P Essery was declared elected to represent Zone E.

Election for Zone F:

I J Kyle, GI8AYZ, was declared elected unopposed.

There were 110 invalid votes cast made up as follows:

Received too late	14
Unidentified Votes	65
Subscription in Arrears	16
Invalid Category	10
Spoilt Ballot Paper	5
Total	110

The 1995 Council would be as follows:

ORDINARY MEMBERS		
C N Trotman	GW4YKL	President
J Allaway	G3FKM	
J Bazley	G3HCT	
D A Evans	G3OUF	
J E Greenwell	G3AEZ	
R Horton	G3XWH	
T I Lundegard	G3GJW	
N Roberts	G4IJF	
M G Shread	GM6TAN	
I D Suart	GM4AUP	Immediate Past President
R P Horton	G4AOJ	Honorary Treasurer
ZONE MEMBERS		
P R Sheppard	G4EJP	Zone A
N Lasher	G6HIU	Zone C
J N Gannaway	G3YGF	Zone D
E P Essery	GW3KFE	Zone E
I J Kyle	GI8AYZ	Zone F
F D Hall	GM8BZX	Zone G

There is a vacancy in Zone B.

The scrutineers were thanked for their work. They were: A Gard, G4LWA; B Bower, G3COJ; G Stancey, G3MCK; I Brothwell, G4EAN; J Crabbe, G3WFM; H Bellfield, G3SBV; and A Butcher, G3FSN. Special thanks went to Alan Butcher for acting as Chief Scrutineer.

The following members put themselves forward as scrutineers: R Broadbent, G3AAJ; G Benbow, G3HB; R Hughes, G3TDR and P A D Manning, G1LKJ.

Auditors

The last item on the agenda was to reappoint the auditors Peter Goddard and Co for the financial year 1995 - 96 and to authorise Council to fix their remuneration. This was proposed by the President, seconded by T I Lundegard, G3GJW and carried unanimously on a show of hands.

The President then closed the Annual General Meeting.

Extraordinary General Meeting

THE REQUIREMENT to read the notice convening the meeting was waived by agreement of those members present.

The President drew members' attention to the following items on the agenda, which were:

Special Resolution 1

That the Articles of Association of the Company be altered in the following manner:

(a) The deletion of Article 10 and replacement with a new article 10 to read:

"The President shall be any Corporate Member who has rendered outstanding service to the Society or who has made acknowledged eminent contribution to Radio Research, Experimentation, Communication or a related subject and who can in the opinion of Council fittingly represent the Society in such office. Upon taking office the President shall forthwith relinquish any other office he or she may then hold in the Society and may chair Council and shall serve for a period of one year from the 1st day of January immediately following his or her appointment. On the expiry of that year the Council may reappoint the serving President for a further term of one year and may thereafter reappoint such person as President for successive terms of one year each provided that no person shall serve in office as President for a continuous period longer than five years. On termination of the period of office as President, the person concerned shall be a member of the Council for a period of 1 year as Immediate Past President. On completion of that period the person will be eligible for election to the Council. The Council shall publish in the Society's Journal in October of each year the name of the member appointed to fill the office of President on the following first day of January. If the person concerned is a member of the Council at the time of the appointment, his or her previous position on the Council shall become vacant on the following 31st December."

P Mayer, G0KKL, was concerned because, in his opinion, the proposed amendment was grammatically incorrect and, in addition, he felt a Presidential term of 5 years was too long. R Peggram, G7RUH, made a similar point about the length of time a President could be allowed to serve. The Company Secretary explained that all the amendments had been subject to scrutiny by the Society's legal advisers. However, the Articles needed a considerable amount of work on them if they were to reflect contemporary thinking. The proposed alterations were an attempt to clear up some anomalies and to enable Council to do certain things if it was thought the Society would benefit from them. For example, it would be helpful in certain circumstances for the Society to have continuity in the office of President. However, it was not envisaged that any person would serve for as long as 5 years. The Honorary Treasurer pointed out that the Articles needed a complete revision but such a radical step might be more than most members would be prepared to accept. I Mcluskie, G8ORG, considered it was time for a Warwick-style conference to discuss and assess what was required in the Articles.

This special resolution was carried on a show of hands.

Special Resolution 2

The deletion of Article 11 and replacement with a new Article to 11 read:

"Any Executive Vice President shall be a member of the Council, other than the President, who shall be appointed Executive Vice President at the first meeting of the Council held after the first day of January in each year and shall serve in such capacity, and may chair the meetings of Council in the absence of the President or when otherwise resolved by Council, until the 31st day of December in such year. Such appointment to the position of an Executive Vice President shall not terminate his or her membership of Council or necessitate his or her relinquishing any office he or she may hold in the Society."

Three new council members were introduced: (left to right) Richard Horton, G4AOJ, E Paul Essery, GW3KFE and Mike Shread, GM6TAN.

J Bluff, G3SJE, asked why it was necessary to appoint more Executive Vice-Presidents. The Company Secretary explained that it gave Council the opportunity to appoint members to deal with specific areas of responsibility such as membership liaison, EMC and Licensing Advisory work.

This special resolution was carried on a show of hands.

Special Resolution 3

The deletion of Article 25 and replacement with a new Article 25 to read:

"The affairs of the Society shall be managed by the Council which shall consist of the President, the Immediate Past President for the first year after vacating the office of President, the Honorary Treasurer and not more than fifteen Ordinary Members of whom not more than seven shall be elected on a zonal basis. The zones and zone boundaries shall be determined by the Council and may be changed from time to time. Where there is no Immediate Past President in office then Council shall consist of the President, the Honorary Treasurer and not more than sixteen Ordinary Members of whom not more than seven shall be elected on a zonal basis. In order to fill the vacancy caused by the absence of an Immediate Past President, one Council member shall be co - opted in accordance with the requirements set out in Article 27."

D Howe, G4WRW, wondered why it was necessary to co-opt members and it was explained that there were, on occasions, unforeseeable vacancies on Council which needed to be filled by co-opting.

This special resolution was carried on a show of hands.

Special Resolution 4

The deletion of Article 33 and replacement with a new Article 33 to read:

"The Chair at a General Meeting shall be taken by the President or, in his or her absence, by an Executive Vice President. In the absence of the President and an Executive Vice President, or in the event that none of them wish to take the Chair at such a meeting, then the chair shall be taken by any Council member present who is selected by the Members present. Failing this, the Members present may elect any Corporate Member as Chairman."

This special resolution was carried on a show of hands.

Special Resolution 5

Amending Article 65 by inserting after the words "as it thinks fit" the words:

"The members of Council shall elect either the President or one of the Executive Vice Presidents to take the chair at meetings of Council. In the absence of the person so elected or if he or she does not wish to take the chair at a meeting, then the chair shall be taken by any Council member present who is selected by the other Members present."

This special resolution was carried on a show of hands.

Special Resolution 6

Amending Article 27 at sub paragraph (b) by deleting the opening word "the" and replacing it with "an".

This special resolution was carried on a show of hands.

The President then declared the Extraordinary General Meeting closed. ♦

Car Callsign Plates - "Not Yet"

OVER THE LAST eighteen months, agents of the Society had four meetings with officials of the Sale of Marks division of the Driver and Vehicle Licensing Agency (DVLA) in Swansea and London, including on two occasions the Head of that division, in an attempt to set up the much-discussed scheme to offer radio amateurs in general, and RSGB members in particular, an opportunity to purchase a vehicle registration mark corresponding to their radio callsign.

We have received from DVLA a letter in which they inform us that they have now concluded their study into the feasibility of a specific and exclusive early release of the 'G' prefix marks to radio amateurs. Most regrettably, they have for the moment decided that such a scheme is not justified.

Their reasons for deciding not to proceed at this time are as follows: firstly, they advise us that, to issue the 'G' prefix marks early and exclusively to radio amateurs would require an Act of Parliament, and they have been advised that the Secretary of State for Transport would not, at present, consider presenting such an Act. Secondly, they also make the point that their scheme was originally set up by the Department of Transport with the express objective of generating the maximum possible revenue from the sale of such marks. The potential represented by the release next, for example, of the 'B' prefix marks is of the order of 24 million qualifying vehicles, whereas the 'G' prefixes would offer them a potential maximum market of well under half that number. On commercial, as well as legal grounds, therefore, they feel unable at this time to countenance any release of the 'G' prefix marks - even a general release.

They confirm that they remain fully aware of radio amateurs' desire to acquire such marks, as well as of the need to protect amateurs from exploitation by unscrupulous dealers in such marks. They conclude their letter by confirming that, as and when they are ready to consider the release of the 'G' prefix marks, they will be in touch with the Society again to discuss how best the legitimate interests of radio amateurs may be served.

Members of the Hereford Amateur Radio Society present George Belsey, G4PX, with a silver salver to commemorate his 60 years as a radio amateur and member of the RSGB.

Easter Cave Radio operations

THE CENTRAL LANCS Amateur Radio Club, in conjunction with the Cave Rescue Organisation and the Cave Radio Electronics Group will be operating from 900m (3000ft) underground in White Scar cave during Easter weekend.

A 'Molephone' radio using a 1m loop antenna and operating on 87kHz SSB [see Jan *RadCom - Ed*] will be used in the cave, to a similar unit on the surface. The signal will then be fed via a specially-designed interface to a normal HF transceiver and 400W linear amplifier operating semi-VOX on 3720, 3775, 7075, 14220 or 21250kHz (all frequencies plus or minus QRM). The station, which will be using the callsign GB4CRO, plans to start operation on Thursday evening, 13 April, and thereafter should be on the air from approximately 0600 - 2400 on 14 - 17 April.

There will also be a second station, GB2CRO, run by the Mid-Glamorgan Amateur Radio Group and the Cave Radio Electronics Group (Wales), which will operate from the Dan Yr Ogov caves, and possibly a third station operating from southern England, though this is yet to be confirmed.

The intention will be to work from cave to cave which, if successful, will be a world first. An award will be available to anyone contacting both (or all) cave stations. When calling GB4CRO or GB2CRO please note that you *must* allow 2 - 3 seconds delay after each transmission to allow time for the relays in the interface to change over. If you do not, the operators in the cave will invariably miss your callsign!

Round the World /MM

IN DECEMBER this year two ketches from the Ocean Youth Club Fleet, *James Cook* and *John Laing*, are setting sail on a voyage which will take them round the world. Crew changes are planned in the Canary Islands, the Caribbean, Panama, Tahiti, Auckland, Sydney, Darwin, Fremantle, Madagascar, Cape Town, Dakar, and the Azores, with the boats returning to the UK in March 1997.

So far there are already two licensed amateurs among the young people who have volunteered as crew. If you would like to take advantage of this rare opportunity to do some exciting maritime mobile operation and participate as a trainee mate, write for further information to: 'Round the World Voyage', OYC Head Office, The Bus Station, South St, Gosport PO12 1EP.

Preference will be given to those between 16 - 23 years of age, although older people of both sexes may also have a chance of getting a place on one of the boats.

We have been reliably informed that the voyage will be made by 72ft ketches and not coaches, despite the address!

New RLOs

FOUR NEW RSGB Liaison Officers have recently been appointed.

They are: **Derbyshire** - Ken Frankcom, G3OCA, 1 Chesterton Road, Spondon, Derbyshire DE21 7EN, tel: 01332 662818; **Nottinghamshire** - John Coates, G4GYU, 30 Abbott Road, Mansfield, Nottinghamshire NG19 6DD, tel: 01623 27257; **Shropshire** - Tony Colton, G0UYE, 9 Pineway, Lodge Farm, Bridgnorth, Shropshire WV15 5DS, tel: 01746 761203. **South Gwynedd** - Gordon Rogers, GW0RJV, Maesgwersyl, Garthmyl, Newtown, Powys SY15 6RS, tel: 01686 640611. He is presently RLO for Powys, and has also been appointed RLO for South Gwynedd. RLOs hold a wide range of information and are available to help RSGB members in their county.

GM4ZUK receives the Tartan Trophy on behalf of Aberdeen VHF Group and North of Scotland Contest Group.

Some of the presentations at the VHF Convention: The Northern Lights Contest Group (left) collected several Trophies. The Harold Rose Trophy was awarded to the JY7SIX DXpedition Group.

HF National Field Day

HF NATIONAL FIELD DAY will be held as usual over the first weekend in June: this year that is 3/4 June. There is a small change to the rules this year - a second receiver will be allowed in both the Open and Restricted sections. That is, you will be allowed to use one transmitter and one receiver (or one transceiver) **plus** an additional receiver. Note that a transceiver with a built-in second receiver, such as the FT-1000, counts as two receivers. Groups wishing to compete must register by sending details of the site to be used to David Hill, G4IQM, QTHR to arrive no later than 6 May. The full rules are published in *Contest Classified* in this edition of *RadCom*.

RSGB HF Awards Check at HQ Open Day

IF YOU HAVE always wanted to apply for some of the RSGB's HF awards, but have not wanted to trust your valuable QSL collection to the postal service, why not come along to the Annual Open Day at RSGB HQ on 22 April. RSGB HF Awards Manager Fred Handscombe, G4BWP, will be in attendance to check QSL cards and to issue awards.

In addition to the RSGB's own awards, Fred can also check cards for the IARU's Worked All Continents (WAC) and ARRL's Worked All States (WAS) awards. Application forms for all awards will be available on the day or may be obtained in advance by sending an SAE to G4BWP (QTHR).

Friedrichshafen 'Hamfest'

JULIAN MAYFIELD, G0LXX, is organising a trip to Friedrichshafen, the largest hamfest in Europe, for the fourth time. The 1995 trip will leave from Nottingham on Tuesday 20 June, picking up passengers at pre-arranged points and arriving the following day. Travel will be by luxury coach complete with refreshments, WC, video and reclining seats. The cost is £199, which includes four nights, bed and breakfast accommodation in twin rooms at a first-class hotel in Lindau. There are only a few places remaining, so to book please contact Julian, G0LXX, *as soon as possible* on tel: 0115 921 1069.

Anniversary of Radio Broadcasting

ON 23 FEBRUARY, Yeovil Amateur Radio Club held an event to commemorate the 75th anniversary of the first radio broadcast in Britain. [See page 10 of February *Radio Communication - Ed*] The event was an outstanding success with the room filled to capacity, not only with Yeovil Amateur Radio Club members, but also with a number of guests, including G4NQI, the RSGB RLO for Somerset, and the local press. G3MYM and G7LNJ had also given an interview on local radio about the commemorative event.

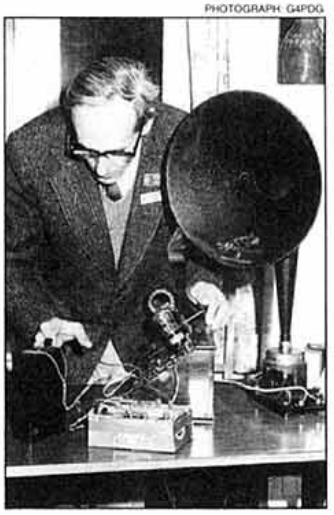
The main programme of the evening was in two parts. First, a talk by G3MYM describing the history and technology of the 1920 event, and then a demonstration of working early 1920s radio receivers, which was given by G7LNJ and G7SDD.

Yeovil Amateur Radio Club, which was founded in 1946, currently has 65 members, and meets every Thursday.

PHOTOGRAPH: G4PDG

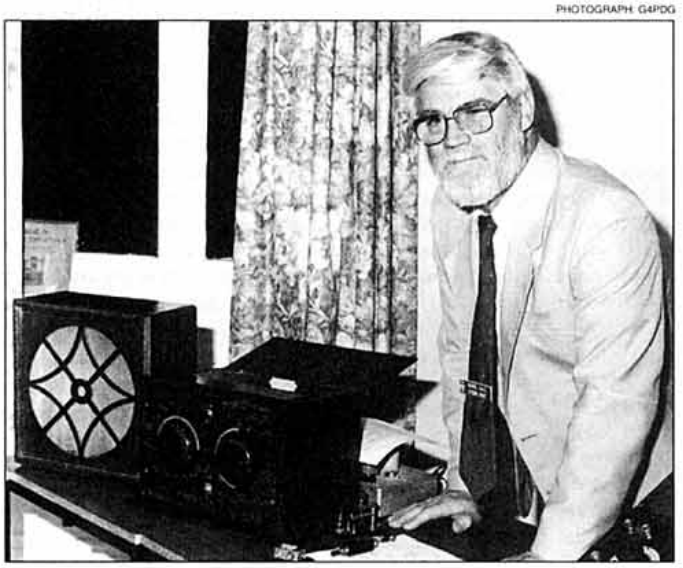
G7LNJ demonstrating a working early receiver from the 1920s using the club's 80m dipole aerial.

PHOTOGRAPH: G4PDG



Mike, G7SDD, demonstrating more early receiving equipment at the Yeovil Amateur Radio Club.

PHOTOGRAPH: G4PDG



Rob Micklewright, G3MYM, talking about the history and technology behind the original 1920 broadcast.

Stolen equipment

THERE APPEARS to have been a spate of thefts of amateur radio equipment in Devon recently.

During the night of 22 January the following equipment was stolen from the shack of G3BVW: Kenwood TS-860AT [TS-680? - *Ed*] fitted with SSB and CW filters S/N 21200695, Kenwood TH-25E 2m handheld S/N 9051693, FC-920 ATU and a Chinnon VC-1500 video camcorder. Any information to G3BVW, QTHR (Moretonhampstead), or to the police on 01626 833435.

Stolen from the shack of G3HFG during the night of 29 January: Kenwood TS-450SAT S/N 30700182 and MC-60A microphone S/N 176. Any information direct to G3HFG, QTHR (Teignmouth).

Stolen on 1 February from the QTH of G3VTG: Kenwood TS-950SD S/N 10890010. Any information to Kingsbridge police, tel: 01548 852326.

G3HFG commented that he believed there to have been five such burglaries in his area during the one weekend. Members in Devon, you have been warned!

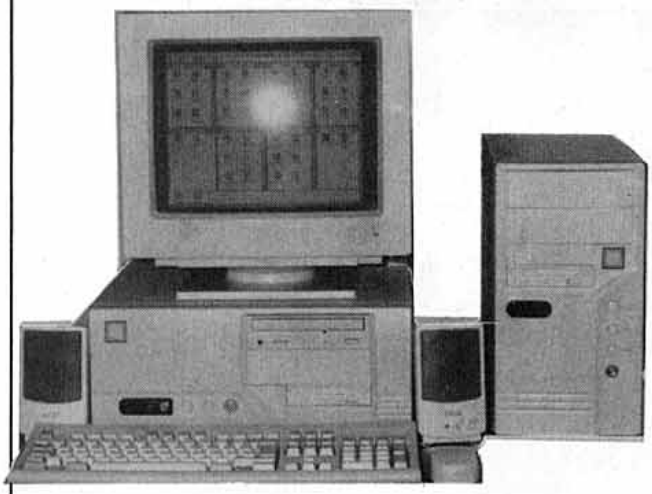
New Novice licence in Sweden

THE SWEDISH licensing authority, PTS, has allowed the RSGB's sister organisation in Sweden (SSA) to issue a new form of novice licence. Called the "training certificate", it will permit beginners to transmit telephony and telegraphy in the 3.5, 7, 21, 28, 144 and 432MHz bands with a power limit of 100W. Callsigns will consist of the prefix SH, followed by a digit representing the call-district (0 - 7), followed by letters in the series AAA - CZZ.

The 'training certificate' will be issued to SSA members who have passed the required test. In order to have access to the HF bands, there is a 5WPM Morse test. The new licence is seen as a first step towards gaining a full licence and its period of validity will therefore be limited.

The new licence comes about following a decision by PTS to stop issuing the entry-level 'C' and 'N' licence classes, leaving only CEPT class 1 and 2 licences (ie similar to the full British 'A' and 'B' licences) available. SSA believed that a novice licence was also necessary and worked closely with PTS for over a year in order to come to the agreement to start the new scheme. SSA hopes to start issuing SH-callsigns before 1 July, after which the present 'C' and 'N' licences will no longer be available.

Siskin PC's ?



So many of our customers have asked why we don't sell computers, well, now we do! In conjunction with a leading local computer supplier we now have a selection of very high quality PC based systems to our own spec. at sensible prices. We know you'll be able to find slightly cheaper systems elsewhere but as our Packet radio customers already know we try much harder than most to offer a second to none backup and after sales service. When comparing prices please take note of the small print (I.E. ram size, the amount of video ram, disk cache, upgrade ability, etc.), these are the areas where we do NOT skimp. We also pre-load all machines for amateur radio/SWL use with a healthy selection of useful radio software and a very easy to use menu system. All you need to do is plug the machine into the mains and switch it on! Whatever you want we can build it to your specification including Tape streamers, dual ,triple or quad speed cd roms, sound cards etc. etc....All our machines have our usual 12 month warrantee parts and labour. Here is just one example .....

Siskin 486dx250
A choice of either a Desktop or Mini tower case including 200 watt psu, 486/50Mhz processor, 256Kb Cache, 4Mb Ram (expandable to 128Mb) 540Mb Hard drive, 1Mb VL-Bus Windows Accelerator SVGA Graphics card VL-Bus IDE Accelerated Disk Controller, 14" .28 pixel SVGA LOW RADIATION Colour Monitor 3 Button Mouse, 102 (UK) Keyboard, 2 serial ports, 1 parallel port, 1 games port, MS DOS 6.2 and Windows 3.1 fully installed complete with all manuals and lots of ham software and utils packed on the hard drive. **£1,129.95 inc VAT.**

Please call or write for our PC price list.

MULTI-CAT INTERFACE UPDATE ....

When we first launched the Siskin MultiCat controller back in September we really didn't appreciate just how popular this product was going to become. In just 6 months over 500 units have been purchased. We've now taken things a stage further and added a CW keyer to the Multi-CAT enabling CW to be sent direct from the keyboard and/or from a pre-prepared computer text file. Of course the Multi-CAT is still the only CAT control available to cater for all THREE major brands (Kenwood, ICOM and Yaesu). What's more the Multi-CAT is supplied with DOS and Windows software and an evaluation sample of the excellent LOG-EQF logging/DX Cluster program suite (which also has a CW keyer built-in utility built-in). **£69.95 incl. leads and software.**

PACKET RADIO....

Yes, Siskin still offers the WIDEST selection of Data radio controllers backed free software and ready-made cables in most cases. Please call or write for out latest catalogue.

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Unit 1A, Hampton Lane,
Blackfield, Nr. Southampton SO45 1WE.
Tel: 01703 243400. Fax: 01703 847754

RSGB AMERICAN EXPRESS VISA

This month's antennas from Vine

THE *FORCE 12* RANGE

This month we feature ***Force 12*** HF Yagi Antennas from the USA. There are over 50 models in the range from the 8 element 10m monobander to a duoband 40/80m yagi.

Force 12 do tribanders and WARCbanders too. None of the ***Force 12*** range uses lossy traps. This makes for **low weight, low visual impact,** but **HIGH performance** with no compromise. Successfully used by Dxpeditions, Dxer's and contesters the world over. G3SXW (of 9G5AA fame) said **"Excellent in all respects"**. W2GD/P40GD – "Print whatever you like for a testimonial. These antennas are that good they are **like turning on another amplifier."**

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VISA

Cabot City College Opening

PHOTOGRAPH: G4ZBT

Nicola Dadds making her first amateur radio contact, watched by Robert Sims and Tom Genge.

TO MARK THE official opening of Bristol's John Cabot Technology College by Lord Young of Graffham, the Bristol ARC put on a demonstration station, GB0JCS.

This was an opportunity to present amateur radio to youngsters. It also served to show how a local group could demonstrate the practical application of some of the technical subjects covered by the college.

Using equipment for HF, VHF and UHF, some interesting QSOs were made. The main QRM was from the Chemistry Dept demonstrating their big bangs! BARC members involved were: G7HYS, G7TLN, G2FQP, G7NSZ, G3ZKI, G7EUO, RAE student Terry and Avon RLO G4ZYF.

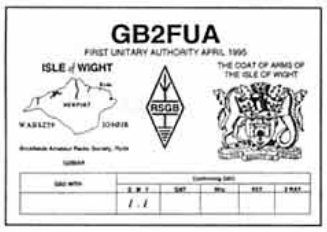
Most of the students visiting GB0JCS were aged 11 or 12 and they already knew of E-Mail and computers.

The packet station was, therefore, a good introduction to radio. It was notable that the students very rapidly overcame their initial nervousness at handling the microphone and became confident in seconds.

First Unitary Authority

TO MARK THE formation of the first Unitary Council Authority in England, the Brickfields Amateur Radio Society will be operating special event stations GB2FUA and GB0FUA from the Brickfields Equestrian Centre, Newnham Road, Binstead, Ryde, Isle of Wight from 1 to 28 April. The callsigns stand for 'First Unitary Authority'.

An open day will be held during the latter half of April to which all amateurs and the general public are welcome. A QSL card with information about the IoW and the formation of the new council has been produced with the co-operation of the present Isle of Wight County Council and will be sent out through the RSGB bureau.



• CORRECTION: in the March *RadCom* we said that the RSGB HF Committee had a vacancy following G3SQX's emigration to USA. We should have said the **HF Contest Committee**, of course. Apologies to all.

Calling Christians

WACRAL, the World Association of Christian Radio Amateurs and Listeners, will be holding their 1995 conference at the Highbury Hotel at Weston-Super-Mare over the weekend of Friday 29 September - Sunday 1 October. A full programme of events has been organised including the WACRAL AGM and operation of the club station, G3NJB.

The cost is £70 including full-board accommodation and further details may be obtained from Dr Geoff Petersen, G4EZU, 124 Darnley Road, Gravesend DA11 0SN.

Memorial Lecture

THE G3PAO MEMORIAL Lecture is the highlight of the Verulam Amateur Radio Club's annual calendar. This year it will be given by Dick Ganderton, G8VFH, on the subject of 'Radio Publications'.

The lecture will take place on Tuesday 25 April at the RAF Association HQ, New Kent Road (off Marlborough Road), St Albans, Herts. Arrive at 7.30 pm for 8.00 pm start.

The Memorial Lecture commemorates the late George Slaughter, G3PAO, a founder member, past chairman, secretary and treasurer of the club. Visitors are welcome.

News from the VHFCC

THE RSGB VHF CONTEST Committee has recently undergone a period of considerable change in an attempt to increase accountability with the membership and to encourage newcomers into contesting, as well as attempting to attract lapsed contesters with a series of short events. Both the individual and General Rules have been revised to reduce ambiguity and to bring them more up to date. These will be published during the course of this year and will come into effect in 1996. As readers may already be aware, the 1995 rules have already been published in this year's *Call Book* and so major changes this year are, unfortunately, impractical. There are, however, some amendments to the dates of one or two contests and these will be published in *Contest Classified*.

To ease sending in an entry, the VHFCC now has its own P O Box number which can be used throughout 1995 alongside the published adjudicator's address. By 1996 all entries will be sent to this one address: P O Box 29, Bridgend CF35 5YA.

In order to promote contesting further and facilitate this increased accountability, members of the VHFCC are willing to give talks to local groups and clubs on all aspects of contesting. Secretaries are asked to contact the committee member nearest to their club to make the appropriate arrangements. All are QTHR:

G4DHF,	Chairman, Lincolnshire;
G4WKN,	Vice-Chairman, Northamptonshire;
G0FCT,	Secretary, Berkshire;
G4PIQ,	Essex;
G4OUT,	Staffordshire;
G4XUM,	Cheshire and
GW8GSQ,	Mid Glamorgan.

In order to promote VHF contesting in general, the VHFCC have produced a VHF *Contesting Handbook* which is aimed at both the newcomer and more experienced contester. Many of the points which have been mentioned in the Backpackers article [on pages 82-83-*Ed*] are developed further and expanded to include a wide range of useful information, including sections on choosing a site, equipment, antennas, the recently-revised rule changes, and blank contest stationery ready for you to photocopy. It is hoped that these will be on sale from RSGB HQ soon and also at various meetings and rallies throughout the year courtesy of members of the VHFCC.

PhONEday

A REMINDER that Sunday 16 April is 'Phoneday', when all telephone area codes starting with **0** will change to **01**. So the new number for RSGB HQ in Potters Bar is 01707 659015. Five cities will receive entirely new codes and an extra digit in front of the local number: **Leeds** 0532 becomes **0113 2**, **Leicester** 0533 becomes **0116 2, Nottingham** 0602 becomes **0115 9**, **Sheffield** 0742 becomes **0114 2** and Bristol 0272 becomes **0117 9**. The international access code also changes, from **010** to **00**, as part of a programme to standardise it throughout Europe. However, Freefone 0800, Lo-call 0345, premium rate numbers such as 0891, 0839 etc and mobile numbers do *not* change.

6m Repeaters

THE REPEATER management group of the RSGB has presented a paper to the RA detailing the request for repeaters in the 51MHz portion of the 6m band in line with IARU Region 1 recommendations. This request is being reviewed at a meeting with the RA at the end of March.

G0RDI/P HAS BEEN authorised as an NBFM beacon on 50.83MHz at Amersham for a limited period of six months. The current power level is 1W and identification is by keyed tone.

After extensive consultation that took place with regard to the 4m or 6m contest debate earlier in the year and at the VHF Convention in February, the VHFCC is pleased to announce that there will be no changes with respect to 4m in this year's Field Day, and he would like to thank all correspondents for their input. As a result of this feedback, the VHFCC is currently looking at ways of promoting new 6m and 4m events.

The VHFCC presently has vacancies for one Full committee member and two Corresponding members. For further information, please send an SAE to the Chairman, G4DHF, QTHR.

The Committee has been extremely pleased by the steadily increasing numbers of entries received during 1994 and looks forward to even greater numbers throughout 1995-96. The VHFCC Chairman, David Johnson, G4DHF, can be contacted on 01778 425367 between the following times to deal with any enquiries: 12.15 - 12.45pm and 5.00 - 7.00pm.

THIS MONTH'S LEADING FEATURE

100 years ago: Marconi's first experiments

International Marconi Day: 22 April

Photographs: GEC-Marconi

GUGLIELMO Marconi was born on 25 April 1874. His mother was Annie Jameson, of the famous Irish distillery family and his father Guiseppe Marconi, a wealthy widower with a town house in Bologna and a country house, Villa Griffone, where the young Marconi was to carry out his early experiments. Marconi's early education was somewhat rudimentary; he spent lengthy periods accompanying his mother on her travels to fashionable resorts or visiting friends and relatives in Britain. Although he failed the qualifying examination for the Naval Acadamy, he did show a considerable aptitude for physics, and was particularly fascinated by a series of experiments carried out by Heinrich Hertz in 1887 - 88.

MARCONI CHRONOLOGY

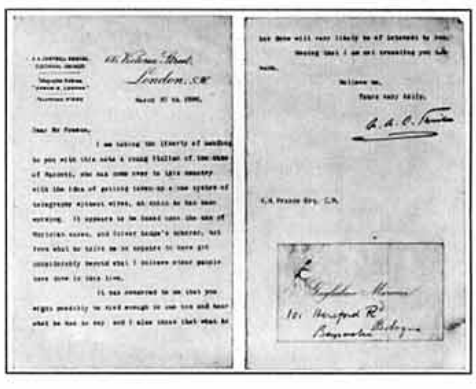
25 April 1874	Guglielmo Marconi born in Bologna, Italy
August 1894	Marconi's first experiments using 'Hertzian waves' at Villa Grifone
September 1894	Marconi starts HF and VHF experiments using a sensitive coherer
Spring 1895	Marconi moves his experiments into the grounds of Villa Grifone
August 1895	Marconi invents the 'Marconi antenna' system and transmits over a distance of 2.4km
February 1896	Marconi and his mother move to England
5 March 1896	Marconi presents his first patent request in London
30 March 1896	Marconi given letter of introduction to PO Chief Engineer Preece by A A Campbell Swinton
2 June 1896	Marconi receives patent no. 12039
27 July 1896	First public demonstration from the Post Office roof at St Martin's-le-Grand to the Savings Bank in Queen Victoria Street (1km)
2 September 1896	The start of experiments on Salisbury Plain over a distance of about 3km
10 - 14 May 1897	Experiments from Lavernock Point near Cardiff to Flat Holme Island in the Bristol Channel
10 - 18 July 1897	Demonstrations in the Gulf of La Spezia, Italy, over a distance of 16km
6 December 1897	First experiment from Royal Needles Hotel, Alum Bay on Isle of Wight, to a ship in the Solent and later to Bournemouth
3 July 1898	Start of the first public service radio telegraphy between Bournemouth and the Isle of Wight (26km)
3 August 1898	Wireless communication between Queen Victoria at Osborne House, Isle of Wight, and the Prince of Wales on board Royal Yacht in the Solent
March 1899	First cross-channel message transmitted from Wimereux near Boulogne to South Foreland
1899	World's first radio factory established at Hall Street, Chelmsford with Marconi major shareholder
1900	Marconi's Wireless Telegraphy Company formed
1901	First experiments with mobile radio from a steam-driven wagon over a distance of 50km
1901	World's first wireless school at Frinton opens
12 December 1901	First trans-Atlantic transmission from Poldhu, Cornwall to Signal Hill, Newfoundland
1905	Marconi marries Hon. Beatrice O'Brien
December 1909	Marconi shares Nobel Prize for Physics
August 1910	First message from aeroplane to ground, using a Marconi spark transmitter
1911	Marconi Company launches *The Marconigraph*, later renamed *Wireless World*
1912	*Titanic* sinks: survivors owe their lives to wireless distress calls
April 1913	Marconi Company publishes first *Wireless World* magazine
April 1914	Marconi appointed Senator in Rome
July 1914	King George V gives Marconi honorary title of GCVO
1914	First longwave station for direct communication with USA; transmitter at Caernarfon and receiver in Tywyn.
1919	Marconi buys yacht *Elettra*, which he fits out as floating laboratory
February 1922	2MT - '2 Emma Toc' - starts test broadcasts from Marconi Company's Writtle, Essex, laboratories
May 1922	2LO starts broadcasts from Marconi House in London and British Broadcasting Company formed by Marconi and five other companies
1924	Marconi divorced from Hon. Beatrice O'Brien
1927	Marconi marries Maria Christina Bezzi-Scali
June 1930	Marconi's daughter Maria Elettra Elena Anna (now Princess Elettra) born
February 1931	Marconi personally supervises installation of Vatican Radio shortwave broadcast transmitter
20 July 1937	Marconi dies in Rome

Early Experiments

HERTZ WAS THE FIRST to demonstrate the existence of electromagnetic waves in space, but his work was purely academic: it is probably true to say that he never envisaged any practical use for his discovery. Marconi, however, believed that these 'Hertzian waves', as they were then known, could be used as a basis for communicating without wires.

Encouraged by his mother (but opposed by his father) he began his experiments in a spare attic room at Villa Griffone - the first 'radio shack'! - in 1894 when he was 20 years of age, shortly after hearing of Hertz's death. He started by repeating Hertz's experiment whereby an electric spark could be shown to induce another, much weaker, spark across a gap in a receiving circuit a short distance - not more than one or two metres - away. Three years before Marconi's experiments, Sir Oliver Lodge (who later became the second Honorary Member of the Radio Society of Great Britain) had invented the 'coherer', which he described as "the most astonishingly sensitive detector of Hertzian waves".

Marconi used a coherer and improved on Oliver Lodge's design to the extent where the range he achieved meant that in the spring of 1895 he was obliged to move from the attic into the grounds of the Villa.



Marconi's letter of introduction from A A Campbell Swinton to William Preece.

Marconi's first demonstration to the armed services on Salisbury Plain, 2 September 1896.

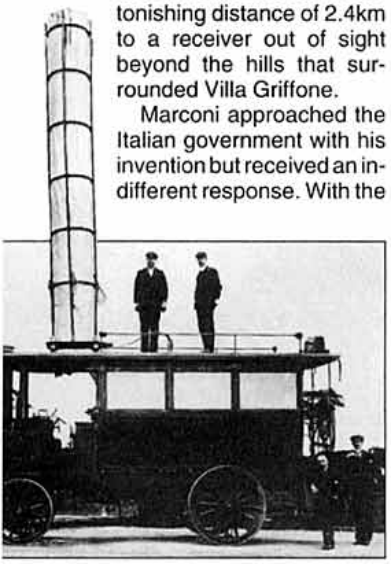
Success

THIS WAS THE point when radio moved from the laboratory into the real world and can truly said to have been invented - 100 years ago this year. Marconi was obsessed with increasing the range of his transmissions: in many ways he can be thought of as being the first DXer. Later in 1895 he discovered, quite probably by chance, that by using a sheet of iron high in the air and one on the ground he was able to increase the range of transmission considerably. In effect he had invented the vertical aerial fed against ground which to this day is still called a 'Marconi antenna'. By using the same aerial / earth combination at the receiver as well as the transmitter, he was able to transmit over the astonishing distance of 2.4km to a receiver out of sight beyond the hills that surrounded Villa Griffone.

Marconi approached the Italian government with his invention but received an indifferent response. With the benefit of one hundred years' hindsight it is perhaps difficult for us to understand this point of view, but it must be borne in mind that Marconi was still only 21, had no qualifications and was probably thought of as being merely a wealthy eccentric. Furthermore, telegraphic communication using wires and over much greater distances than Marconi was able to demonstrate was already a well-established practice.

After being snubbed by the Italian authorities, Marconi's mother Annie, still highly supportive of her son's endeavours, travelled to England with him early in 1896. Helped by his cousin, Henry Jameson-Davis, Marconi filed an application for the world's first patent for a system of telegraphy using Hertzian waves. The patent, number 12039, was granted three months later.

Marconi was fortunate that Jameson-Davis was an engineer who was able to interest Alan Campbell Swinton in his invention. A A Campbell Swinton was a successful electrical engineer in his own right who was later licensed as 2HK and became the first President of the RSGB, a position he held from 1913 to 20.



The first /M operation in 1901. Aerial is a 25ft zinc cylinder . . .

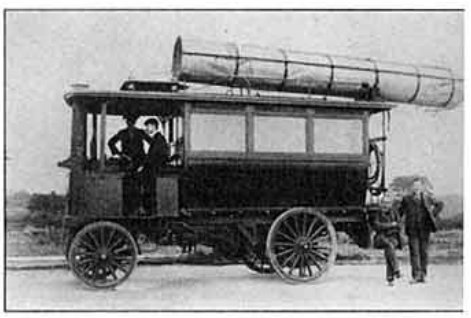
Early Demonstrations in England

CAMPBELL SWINTON was sufficiently impressed by Marconi's demonstration of radio transmission in March 1896 to write a letter of introduction for Marconi to take to William Preece, the Post Office's Engineer-in-Chief. Preece gave Marconi every encouragement and arranged for him to give a series of demonstrations to influential groups.

Starting on 2 September 1896 a series of tests took place on Salisbury Plain before the armed services, and these proved to be a great success. In March of the following year, Marconi wrote to the GPO in London about the experiments, describing his invention of what is now known as the Marconi antenna: "When using a modified form of Hertzian radiator, ie a Righi radiator, having one of its external spheres connected to earth and the other connected to an insulated conductor as transmitter, and employing one of my receivers having also one end of its sensitive contact grounded and the other end connected to an insulated conductor, I noticed that the distance from the transmitter at which the receiver would work increased very rapidly by increasing the height from earth of one or both of the insulated conductors in communication with the instruments."

Marconi went on to establish numerous other firsts [see Marconi chronology opposite for details] and was given many honours: in 1909 he shared the Nobel Prize for Physics, in 1914 he was appointed a Senator in Rome and was made an honorary Knight Grand Cross of the Royal Victorian Order by King George V, while in 1920 he followed Sir Oliver Lodge by becoming only the third Honorary Member of the RSGB.

The RSGB would like to thank GEC-Marconi, and in particular Mr Roy Rodwell, for their assistance in the production of this short history.

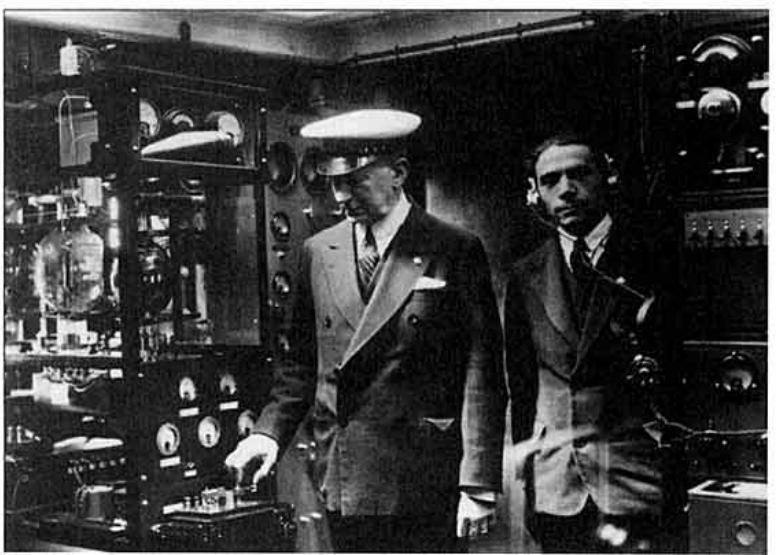


. . . which collapsed to allow low bridges to be negotiated. Marconi is standing far right.

Marconi Day: 22 April

INTERNATIONAL MARCONI DAY (IMD) takes place each year on the Saturday nearest Marconi's birthday. This year will be the 8th IMD and by far the biggest event yet, with over 40 special event stations from locations around the world expected to be on the air during the 24 hours of 22 April. This year, for the first time, a station at RSGB HQ (GB100IMD) will be on the air for International Marconi Day, which co-incides with the RSGB HQ Annual Open Day.

IMD is organised by the Cornish Radio Amateur Club, who are offering an award for stations contacting at least 12 of the special event stations active on the day. A new award based on the original Marconi stock certificate design is available for SWLs this year, who must also log 12 of the IMD stations. Note that logging the same station on a different band or mode will not count: 12



Right: Marconi sending a message by Morse from on board his yacht, *Elettra.*

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different callsigns must be contacted or heard.

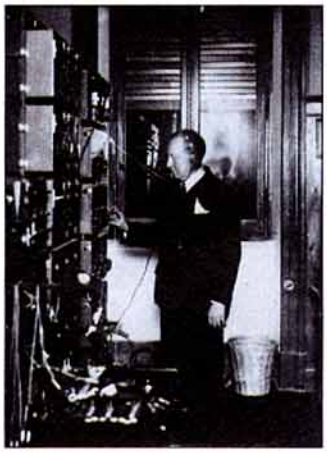
To claim the award send a full extract of your log entries to Sue Thomas, G0PGX, Cornish Radio Amateur Club IMD Awards Manager, PO Box 100, Truro, Cornwall TR1 1RX. The cost is £3.50.

The impressive certificate awarded by the Cornish Radio Amateur Club for contacting 12 IMD stations.

Radio Austria International Celebrates Marconi Day

MARCONI DEVELOPED a shortwave broadcast transmitter for Vatican Radio and when in February 1931 it first went on the air, an experimental transmitter in Vienna re-broadcast the opening programme to the whole of Europe. It was the first shortwave relay broadcast in the history of radio.

To celebrate International Marconi Day, radio amateurs at Radio Austria International will operate the special event station OE1M. On the same day, Radio Austria International's broadcasts will feature programmes devoted to IMD, amateur radio and the special event station. A special QSL card has been printed which will be used to confirm SWL reports on Radio Austria International broadcasts on 22 April, as well as for OE1M contacts and reports - the first such joint shortwave broadcast and amateur radio QSL card. Radio Austria International's broadcasts (which include programmes in English) can be heard on 5.945, 6.155 and 13.730MHz, among other frequencies.



Marconi making adjustments at Vatican Radio transmitter, Feb. 1931.

Prince and Princess Visit GB2GM

PRINCESS ELETTRA AND Prince Guglielmo Marconi, the daughter and grandson of the great man, visited Poldhu in Cornwall on 15 January to lay wreaths at the Marconi memorial at the site of his first trans-Atlantic radio transmissions. The Prince and Princess were part of a delegation from Sasso Marconi visiting their twin town of Helston. Following the wreath-laying ceremony, they visited the Poldhu Amateur Radio Club, GB2GM, and, following a CQ call for any Italian stations by Carolyn Rule, G1ZPC, they were able to talk to IK4UNI in Bologna.

Riccardo Baldassarri, IK4UNI, wrote, "You may imagine my emotion when the operator, a very professional lady, told me that Princess Elettra Marconi wanted to speak to me . . . My wife told me that my face suddenly assumed the following colours in a repetitive sequence: deep red, white, yellow (and then started again!) during the 15 minutes of the QSO . . . To understand my feeling you must know that I've been studying and working in Villa Griffone. During that time I have seen Princess Elettra visiting the villa a couple of times, but only 'far away'. I've also operated several times IY4FGM, the memorial station located there."

The visit to Poldhu by the Princess marked the beginning of a world tour to many of the locations associated with her father's pioneering work in the field of radio communication.

Anyone interested in becoming an associate member of the Poldhu ARC should write for details to Mrs Carolyn Rule, G1ZPC, The Kiteshop, Meaver Road, Mullion, Cornwall TR12 7DN. ♦

IMD STATIONS

CT1TGM	Coimbra, Portugal
DA0IMD	Borkum Island, Germany
ED7IMD	Cadiz, Spain
EI2IMD	Crookhaven, Ireland
EI3MD	Dublin Bay, Wicklow Wireless Society
EI3MFT	Crookhaven, Ireland
EI4IMD	Galway, Ireland
EI4JAM	Whiskey Corner, Dublin
EI5IMD	Cork, Ireland
GB1IMD	Leicester (Satellites)
GB2GM	Poldhu Cove, Cornwall
GB2IMD	Rathlin Island, N Ireland
GB2MDI	Salisbury Plain
GB2MID	Sandbanks, Poole, Dorset
GB2SFL	South Foreland Lighthouse
GB4IMD	Truro, Cornwall
GB4JAM	Isle of Wight
GB4MD	Old Caernarfon Stn, Waunfawr, Wales
GB0IMD	Isle of Wight
GB0MAR	Isle of Wight
GB0MWT	Chelmsford
GB100IMD	Potters Bar (RSGB HQ)
I????	Caselecchio di Reno, Italy
IY1TTM	Sestri Levante, Genova
IY1MR	Repallo, Genova
IY4FGM	Villa Griffone, Pontecchio
IY0GA	Sardinia
IY0ORP	Rocca di Pappa, Rome
IY0TCI	Civitavecchia, Italy
K1VV/IMD	Cape Cod, Massachusetts
KK6H/IMD	Marshall, California
OE1M	Radio Austria International, Vienna
PQ1MD	Rio de Janeiro, Brazil
PR1MD	Rio de Janeiro, Brazil
PS1MD	Rio de Janeiro, Brazil
PT1MD	Rio de Janeiro, Brazil
PU1MD	Rio de Janeiro, Brazil
PV1MD	Rio de Janeiro, Brazil
PW1MD	Rio de Janeiro, Brazil
PX1MD	Rio de Janeiro, Brazil
VE1IMD	Glace Bay, Nova Scotia
VK2IMD	Wahroonga, NSW, Australia
VO1IMD	St John's, Newfoundland
ZS6IMD	Johannesburg, South Africa
ZW1TTO	Rio de Janeiro, Brazil
ZW1USK	Rio de Janeiro, Brazil

PHOTOGRAPH: POLDHU AMATEUR RADIO CLUB

Prince Guglielmo and Princess Elettra Marconi during their visit at the Poldhu Amateur Radio Club, GB2GM. Princess Elettra spoke to IK4UNI in Bologna, her father's birthplace.

PHOTOGRAPH: POLDHU AMATEUR RADIO CLUB

Cllr Bree Thomas, Chairman of Mullion Parish Council; Princess Elettra; Prince Guglielmo; and Cllr Brenda Banfield, Mayor of Helston, at the MarconiMemorial, Poldhu, Cornwall.

HF F-LAYER PROPAGATION PREDICTIONS FOR APRIL 1995

The time is represented vertically at two-hour intervals UTC 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 00000111112 02468024680	18MHz 000001111122 024680246802	14MHz 000001111122 024680246802	10MHz 000001111122 024680246802	7MHz 000001111122 024680246802	3.5MHz 000001111122 024680246802
** EUROPE								
MOSCOW	....	....	....11111.	...123334 3..	...566667 75.	21455545 6785	76432222 3588	+42.....25+
MALTA	....	....	....111122.	...133444 52.	...576677 871	43475555 6897	98743222 3689	++42.....3++
GIBRALTAR	....	....	.....1..	....111224 2.	...155556 86.	11166655 6895	87664333 3689	+++3.....3++
ICELAND	....	....	.....1..	.....1333 454.	....155556 785	63354333 3567	+++3.....245
** ASIA								
OSAKA	....	....	.....1....	....1221....	...244331 .1.	...132112 461	1351	.....2.
HONGKONG	....	....	....1111....	...123332 1..	...144345 42.	....111135 72	1363	.....3.
BANGKOK	....	....	...12222....	...234441 1..	..122434 442.	1....111136 73	2.....1366	43
SINGAPORE	....	....1.....	...12322231..	...234445 4..	..123446 74.	1....111368 5	1.....1366	43
NEW DELHI	....	....1.1...	...123232...	...334445 1..	..122346 42.	211..111367 5	51.....1367	2.....45
TEHERAN	....	....11111...	...233334 2..	...445556 51.	..343344 6751	5331..11368 7	841.....1368	5.....45
COLOMBO	....	....11111...	...224333...	...335555 .1.	..122346 351	22...11358 7	51.....1368	2.....45
BAHRAIN	....	...112222...	...234452...	...445567 51.	1.3322346 762	7431..11368 8	841.....1368	+2.....45
CYPRUS	.....1111...	...112222 2..	...345556 51.	...567777 84.	2146666 67884	8664333 34799	97411.11 2478	+4.....24+
ADEN	.....1111...	...113333 2..	...334566 5..	...444567 72.	3123223 46864	8641...13 688	861.....1368	+3.....45
** OCEANIA								
SUVA/S	....	....	....	.....11.1..	....222314 2.	...332112 53.	...21....3..	....
SUVA/L	.........1.	.........4.	.....1.....6.	11.53111.262	.125311115 31	...2.....21.	....
WELLINGTON/S	....	....	.....111....	...133232 21.	..143211354 1	..121....32.	....
WELLINGTON/L	....	....	..........1.	11.31.....42	122531...142	..121....22.	....
SYDNEY/S	....	....	....12.....	...2341..1..	..155422 342.	..133111 3561	...1....1351	.....2.
SYDNEY/L	....	....	.....1.....1	....4.....34	1.1231....63	...11....241	....
PERTH	....11.....	...2342.....	...4553.....	..135431 111.	2111311 12562	1.....1365	42
HONOLULU	....	....	.....1..	....11..342.	...122113 31.	..121.....	....
** AFRICA								
SEYCHELLES	.....11111..	...113333 2..	...235566 51.	...445667 73.	3123223 46884	853...11368 8	851.....1368	+2.....45
MAURITIUS	.....12221..	....134443..	...245667 61.	...445667 83.	3.232334 6885	8431..11368 8	851.....1368	+2.....45
NAIROBI	.....12332..	....234554..	...245677 72.	...445567 841	4224222 46885	8752...13689	883.....368	+5.....45
HARARE	.....13443..	....235665..	...245678 82.	...455578 851	4215323 46885	9853...13689	884.....368	++.....35
CAPETOWN	.....13551..	....226773..	...145778 6..	...365678 81.	21.653346 863	8625211 13588	8852.....368	++3.....35
LAGOS	.....13555..	....225777 1.	....446789 4.	...265558 97.	33.552225 894	88452...2588	8862.....368	5+3.....35
ASCENSION Is	.....12451.	....112467 2.	....446678 6.	....654568 8.	22..632247 94	783231..1488	88621....268	++3.....35
DAKAR	.....13341.	....113556 3.	....345678 6.	....555568 8.	1212642 23695	785531...378	88631....158	5+3.....25
LAS PALMAS	.........2..	....111224 1.	....334557 5.	....666678 71	1113766 66895	776654 33468 9	9974211 11368	++42.....3+
** S. AMERICA								
Sth SHETLAND	.....1332..	.....25541.	.....57774.	....256786.	1...133457 74	754321 112457	78631....235	4+3.....2
FALKLAND Is	.....12231.	.....24463.	....146786.	....356788 1	1112143 45675	776531 112357	88631.....25	++3.....2
R DE JANEIRO	.....1231.	....123453.	....345576.	....555578 1	1112243 22575	776531 1.258	88631.....27	++3.....5
BUENOS AIRES	.....1121.	....112353.	....345576.	....556577 1	1111.433 3465	775422 11.147	88631.....15	++3.....2
LIMA	....	.....122.	.....22244.	344452	1...213 42245	753331 11..14	78631.....2	4+3.....
BOGOTA	....	.....11.	.....12234.	....133345 2	1...133 32235	742222 1...14	68631.....2	4+3.....
** N. AMERICA								
BARBADOS	....	.....112.	....222244.	....433346 2	1...143 22256	753332 1...26	88631.....3	++3.....
JAMAICA	.........1.	.....11123.	233341	1....133 32235	631112 11...14	58531.....1	2+3.....
BERMUDA	.........1.	.....11123.	....123245 2	1....333 32355	631122 1...25	68531.....2	4+3.....
NEW YORK	....	.....112.	.....22234 1	1....233 33354	52..121 1.124	57421.....2	2+3.....
MEXICO	....	.....1112.	22231	1....232 22223	31..1.11....1	26421.....	.33.....
MONTREAL	....	.....112.	.....12224 1	1....233 33354	51..121 11124	57421.....2	2+3.....
DENVER	....	....	..........1.	.....222 22	21....11 2112	2442.....	.23.....
LOS ANGELES	....	....	..........1.	.....132 21	1.....121 .1	1342.....	..3.....
VANCOUVER	....	....	....	1111	1..1...12 111	12421.....	..2.....
FAIRBANKS	....	....	....	.....11 11..	...221 112221	.1221....1..	....

The provisional mean sunspot number for February 1995 issued by the Sunspot Data Centre, Brussels was 29.9. The maximum daily sunspot number was 47 on 22 February and the minimum was 12 on 8 February. The predicted smoothed sunspot numbers for April, May and June, are respectively: (classical method) 18,17, 16 (±4); (SIDC adjusted values) 11,10, 9 (±2). January 95 SESC: solar flux 82.7 Ap 11.0 Smoothed July 94 solar flux 84.0 Ap 17.4

HF NEWS

JOHN ALLAWAY G3FKM
10 Knightlow Road, Birmingham B17 8QB

THE ARRL HAS given more details of the Colvin Award - devised to preserve the memory of the late Lloyd Colvin. This will be given only to groups and not individual amateurs and will consist of grants "in support of amateur radio projects that promote international goodwill in the field of DX". The Grants Committee comprises three senior members of the ARRL HQ staff - at present the Executive Vice President, Membership Services Manager, and the DXCC Branch Manager. Those groups who consider themselves eligible will have to meet stringent criteria.

MARTIN HAASEN

IT IS WITH GREAT sadness that I report the death of Martin Haasen, OY7ML, at the age of 67. He was first licensed in 1950 as OZ7ML and moved to the Faroe Islands to start his own business as a watchmaker in 1954 and to become OY7ML. He was the first Faroese amateur on 21 and 28MHz and also the first to use RTTY.

Martin was a great DXer with 310 DXCC countries confirmed on the mixed list and 290 on CW. He was a founding member of FRA (his national society) and for many years was a member of the FRA board. At the time of his death he was FRA's HF Manager and was also a member of FOC. About five years ago Martin's callsign was pirated by a British amateur with a two letter callsign who lived in the south of England and operated extremely badly - and this caused him great distress since Martin himself was accused of this in letters and over the air. He was a quiet, gentle but humorous man always ready to help others and, of course, an excellent operator.

ZL ON TOP BAND

TREVOR, G4XPL, TELLS me that - according to stations in New Zealand (ZL4WA in particular) - he is the only UK station working ZLs over the southern path (between 160 and 180°) between 1830 and 1930. Trevor has only been working this path on Friday nights but the ZLs would like more UK stations to be available. Over the last six months signal strengths have varied between S6 and S9+20dB.

DXPEDITIONS

RSGB DX NEWS SHEET reports that there will be an expedition to **Navassa Island** late this month or early in May. KB4VLO, W5IJU, and K0IYF are likely to go (the first two visited the island last year). The operation is expected to last about one week and plenty of LF activity is anticipated. AB4JI's application to operate from **Desecheo Is** last year was refused and the same thing has happened this year. It seems that it might be quite a long time until the next operation from there takes place.

The Royal Omani Amateur Radio Society has received permission to operate from **Tunisia**. The time is not yet known but it might be between June and October.

NI6T, OH1RY, SM6CAS, and SM7PKK will be on **Conway Reef** between 24 March and 3 April (including the CQ WPX SSB Contest). They will have three stations and intend to keep two active at all times. They will have beams for the HF bands (including 18 and 24MHz) and verticals for LF operation. They will concentrate on LF, the WARC bands, and RTTY and they will make special efforts to work into Europe. Preferred frequencies will be: (CW) 1.823, 3.503/3.523, 7.003/7.023, 10.103, 14.003/14.023, 18.071, 21.003/21.023, 24.893, and 28.023MHz. (SSB) 1.843, 3.785, 7.085, 14.195, 18.115, 21.295, 24.935, and 28.495MHz. (RTTY) 7.030/7.082, 10.120, 14.082, 18.100, 21.082, and 28.082MHz. They will always listen up. The preliminary budget for the expedition is estimated at US $15,000 (more than half is needed to pay for the hire of the boat) - and excludes personal travel and hotel costs. Donations would be very welcome and should be sent to SM7PKK (the RSGB DXpedition Fund and the CDXC have already made donations).

VK9NS, writing in *RSGB DX NEWS SHEET*, reveals that the recent demonstration of amateur radio in Bhutan was a great success. The Deputy Minister of Communications has accepted that the A51MOC station may solve many problems as it would reflect Bhutanese activity and not that of foreigners. Things could move quite quickly and JA1BK and VK9NS might just possibly return this month.

DX NEWS

A *DXAC NEWS RELEASE*, dated 2 February, reports that "the DX Advisory Committee voted 8 to 7 to reject a petition to add Pratas Island to the DXCC Countries List based on Point 2(a), separation by water. Some of those voting cited concerns over the possibility of intervening rocks. Others cited what they perceived as disputed ownership of the island." A second release on the same day said that the DXCC Desk had received 434 applications (36,903 QSLs) for endorsements and new awards during January. The number of unprocessed applications at the end of the month was 178 (17,510 QSLs) and applications being answered at the end of the month had been received less than a week earlier. It is understood that Garth Hamilton, VE3HO, is the new Chairman of the DXAC.

F5FHI, who has been on the

BAND REPORTS

THANKS THIS TIME for input from G2HKU, G3GVV, GW4KGR, and the UK DX Cluster via G4PDQ. The HF bands have been rather poor as is to be expected but to make up for this anyone with good 1.8MHz equipment has been having a great time. As usual callsigns of stations using CW are shown in italics:

1.8MHz

0000	*A51/JH1AJT, EW8EV, JW5NM, KP2A, KL7RA, KV4FZ, P49I, TU2MA, ZB2EO, ZF1DX, W0BXR.*
0100	*A71CW, FM5BH, J6/K9BG, N5OK* (Ok), *NK7U* (Ore), *SU2MT*, TU4EX, *VP2EC, VP9AD, VQ9QM, WS7W*(Wy), *ZA1AJ, ZS6NW, 5T5JC, 5Z4FO.*
0200	*A22MN, FG5BG, N6SS, W7XR* (Wash), *XE2/W7WA,, 5B4OG.*
0300	*K0PP/7* (Mt), *N6DX, VE5SF, VP8SGP, XQ8ABF.*
0700	*KL7RA, KL7Y, KI7W* (Wash), *W7LR, K0RF* (Colo), *6D2X, ZL2JR.*
1700	*JAs, KH6CC, ZL1HY, XX9X.*
1900	*JAs, SU2MT, VK3IO, VK4YB, 4S7VK, 9M8FC.*
2100	*JAs, R1FJL, T5AR, VK6HD, VQ9TP, 9M2AX.*
2200	*JAs, S92SS, VS6BG, 4S7RPG, 9X5EE.*

3.5MHz

0000	A92FZ, *FS5DL, P49I, UA0SR, 5T5JC, 5Z4DU.*
0100	A61AN, *VP8COS*, VU2DVP, *ZS6QU*, 8R1AK.
0700	*KL7KJ*, NZ7E (Nev), *R1FJL*, TU4EX, *VE7CC, VP2EWW, XE2XW/1*, XQ8ABF, *ZL2SQ.*
0800	JAs, V44KBJ.
1600	JAs, SU2MT, VK6APZ, XX9AS, ZL1HU.
1700	A45ZZ, JA6BGT, VK4SGP, YK1AO, *ZL2AGY.*
1900	*SM0CNS/DU7, T5AR, VK2OI, VK9CR, VK9XY*, ZL4KF, 9Q5TT.
2000	H44MS, VK, YC2BQF, 9X5EE.
2300	FG5FC, HL1IUA, JA4KPA, *PJ9JT*, VS6WV, *ZS1JK.*

14MHz

0800	BV4AS, BV8BC, BY3AK, H44MS, TN2M, VP8CIL.
0900	FK8GT, FO5JV, KH2/VP9BP, KL7/KF7S, V63AO, VK9NS, VR2KF, WH0AAV, ZD7JP, ZL7ZB.
1000	A51/JH1AJT, T31BB, XX9AS.
1300	ET3AA, FJ/OZ7SM, V85BG, VP8SGP, VK6RQ, *VK9XY.*
1400	ST2AA, *T32DP*, VP8SGP, ZL1BUS.
1600	A61AN, *D2RU*, FS5PL, FT5XK, S79KMB, *TN4U, VI0ANT*; VK9CR, W6- W7.
1700	AH8A, D68UY, HS1NGR/8, KL7XD, 3XY0A.
2000	*D68UY*, H5ANK, KH6WW.

Award issued for working 10 members of the MDXG.

air as 9U/F5FHI, is now said to have a 'valid' **Burundi** licence and he should have returned to 9U during March. This raises the possibility that previous QSOs may not have been valid for DXCC purposes! *DXPRESS* states that J55UAB is active from **Guinea Bissau** on all bands and modes and will be there until January 1996. ON4QM was expected to be in the **Comoro Islands** for two months from 20 February. Paul Wyse, 5Z4FO, is going to be in **Uganda** for about a year from July. He will be using the callsign 5X1MW and using CW and SSB with the emphasis on the LF bands.

RSGB DX NEWS SHEET reports a rumour that VU2JPS is currently active from the **Andaman Islands** and might be there for two years. In February he was said only to be active on SSB on 7MHz but hoped to be on other bands soon. It is not known whether VU2JPS is using his home callsign or another one from Andaman. A later *RSGB DX NEWS SHEET* said that F5PYI had worked many Indian stations recently but none had any knowledge of VU2JPS.

K5TNP was expected to return to **Chagos** for a further two month spell as VQ9TN. Timo, OH1NOA, will be in **Lebanon** until August. He uses his home call/OD5 on bands between 3.5 and 28MHz and prefers CW. According to *DXPRESS* PA3BTQ is in **Afghanistan** and on the air as YA/PA3BTQ. He was expected to be there for about two months but may still be on the air. He only has verbal operating permission. VS6CT is now QRT for a prolonged period and will probably be active again in October. He is keeping his P O Box open and mail will be forwarded. XU7VK's new licence allows him to use the XU95 prefix for special events, contests, and **Cambodian** and Hungarian celebrations throughout the year.

RSGB DX NEWS SHEET reports that the UK is closing its Faraday Base in **Antarctica** and it is to be handed over to the new Ukrainian Antarctic Research Centre. *Long Island DX Bulletin* says that VP8CID and VP8CGE will be in South Georgia until the end of April.

If you come across PJ9JT in **Curacao** this is W1BIH and he will be there until the middle of April.

'OX3GL' has seemingly been very active on 1.8 and 3.5MHz CW. However, the authorities say that the call is not valid and that OZ3GL (who holds the call) has not been in Greenland since 1959!

28 MHZ COUNTRIES TABLE

G0AEV	109
G4OBK	101
G0DNV	83
G0MCT	55
G3XBM	32
GJ4GG	27
G0NQC	20
GM4CHX	16
G2FQR	14
G3ING	14

SLOVAKIA

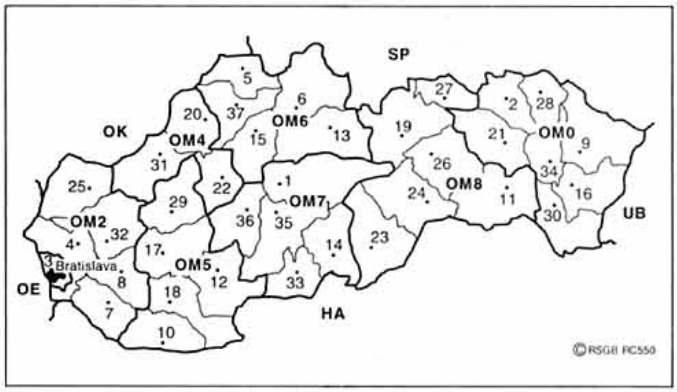
G4FDC HAS SENT detailed information about prefixes in Slovakia. The prefixes which give an indication of location are as follows: OM1 = Bratislava (metropolitan county); OM2 = Bratislava (district county); OM3 = all counties; OM4 = Povazska Bystrica, Prievidza, Trencin; OM5 = Komarno, Levice, Nitra, Nove Zamky, Topolcany; OM6 = Cadca, Dolny Kubin, Liptovsky Mikulas, Martin, Zilina; OM7 = Banska Bystrica, Lucenec, Velky Krtis, Zvolen, Ziar nad Hronom; OM8 = Kosice, Poprad, Rimavska Sobota, Roznava, Spisska Nova Ves, Stara Lubovna; OM9 = all counties; OM0 = Bardejov, Humenne, Michalovce, Presov, Svidnik, Trebisov, Vranov.

The OM callsign allocation is further separated into series indicating types of stations: OM1X - OM0X = contest stations (regardless of location); OM1XX - OM8XX, and OM0XX = licence classes A and B (CEPT Class 1); OM3XX - OM3XXX = existing callsigns carried over from the OKs era. The suffix KAA - KZZ or RAA - RZZ denotes a club station; OM9XX = special event stations; OM9AAA - OM9SZZ = foreign visitors; OM1XXX - OM8XXX and OM0AAA - OM0JZZ licence classes C and D (CEPT Class 2); OM0MAA - MZZ are beacons; OM0NAA - NZZ = packet; OM0PAA - PZZ = BBS packet; OM0OAA - OZZ = repeaters; OM0SAA - SZZ = BBS, Amtor, Pactor, Clover.

The numbers marked on the map denote the county towns which are as follows: 1. Banska Bystrica, 2. Bardejov, 3. Bratislava MC, 4. Bratislava DC, 5. Cadca, 6. Dolny Kubin, 7. Dunajska Streda, 8. Galanta, 9. Humenne, 10. Komano, 11. Kosice, 12. Levice, 13. Liptovsky Mikulas, 14. Lucenec, 15. Martin, 16. Michalvoce, 17. Nitra, 18. Nove Zamky, 19. Poprad, 20. Povarska Bystrica, 21. Presov, 22. Prievidza, 23. Rimavska Sobota, 24. Roznava, 25. Senica, 26. Spisska Nove Ves, 27. Stara Lubovna, 28. Svidnik, 29. Topolcany, 30. Trebisov, 31. Trencin, 32. Tmava, 33. Velky Krtis, 34. Vranov, 35. Zvolen, 36. Ziar nad Hronom, 37. Zilina.

1995 WARC BANDS TABLE

	10MHz	18MHz	24MHz	Total
G4YVV	41	44	19	104 (CW)
GJ4GG	25	28	11	64
G4FVK	2	7	2	11



Prefixes for Slovakia. The numbers denote the county towns.

There will be a Slovak QRP and Construction Convention held at Vrutky on 27 and 28 May 1995. This might be very interesting and I have full details available. The closing date for registrations is 1 May.

CONTESTS

HELVETIA CONTEST

1300 29 April - 1300 30 April

CW and SSB. 1.8 to 28MHz CW, 3.5 to 28MHz SSB. No WARC bands. Follow IARU Region 1 recommended band plans. Mixed mode only, single- and multi-operator and listener sections. Exchange RS/T and serial number starting from 001. Swiss stations will send two letters indicating their canton. Three points per QSO. A station may only be worked once on each band - either CW or SSB. Multipliers are one for each canton on each band. (The canton designators are: AG, AI, AR, BE, BL, NS, FR, GE, GL, GR, JU, LU, NE, NW, OW, SG, SH, SO, SZ, TG, TI, UR, VD, VS, ZG, and ZH). Use separate log sheets for each band and note that more than one per cent of duplicates will mean disqualification. Logs must reach Nick Zinsstag, HB9DDZ, Salmendorfli 568, CH-4338 Rheinsulz, Switzerland. I can supply copies of the rules (SASE please).

In the **1994 ARI Contest** the UK was represented by G4IQM who scored 551,210 points in the single operator mixed mode section and GM0GNT who entered the CW section and scored 1,200 points.

YU DX CONTEST

1200 22 April - 1200 23 April

1.8 to 28MHz (no WARC bands). CW and SSB and a station may be worked on both modes on a band. Exchange RS/T and ITU zone. QSOs with same zone count one point, with different zone in own continent two and with different continent five. The multipliers are the Yugoslav prefixes and ITU zones on each band - note that they may only be counted once per band. Those making 250 QSOs or more (including 25 different YU stations) will receive a certificate. Entries must be postmarked no later than 30 days after the contest, marked 'YU DX Contest' and mailed to Savez radio-amatera Jugoslavije, YU DX Contest, P O Box 48, 11001 Beograd, Yugoslavia. I have copies of the rules (SASE please).

DANISH SSTV CONTEST

0000 6 May - 2400 7 May

3.5 - 144MHz following IARU Region 1 SSTV band plans. Two points for the first contact with a DXCC country, one for additional QSOs. One bonus point for working Danish stations. Mail logs before 3 June 1995 to Carl Emkjer, Soborghus Park 8, DK 2860 Soborg, Denmark. I have copies of the rules (SASE please).

EUROPEAN SPRINT CONTESTS

1500 - 1859 15 April (Phone)

1500 - 1859 20 May (CW)

Single operator only and European stations work each other on 3.5, 7, and 14MHz. Exchange both callsigns on every contact, plus serial number from 001 and name (minimum three letters). RS/T is not required. Special QSY rule - a station soliciting a contact (by sending CQ, QRZ? etc) may only make one contact there and then must QSY at least 2kHz before calling an-

QTH CORNER

AA5K/AH2 and **AA5K/AH0**	JA3JM, Akio Shimizu, 3-6-22, Kasugaoka, Fujiidera,Osaka 583,Japan.
A92BE	(new) Sheridon Street, P O Box 26844, Adliya, Bahrain.
EI7M	via EI Bureau or to EI6BA,Denis O'Flynn, Ladysbridge, P O , Castlemartyr, Co. Cork, Ireland.
K1EM	P O Box 12, Pequabuck, CT 06781, USA.
KC6AS	via JA3JM (see above).
P40MR	(see P40TR)
P40TR	VE3MR, M Rosenthal, 4 Cachet Parkway, Markham, ON L6C 1G8, Canada.
PJ9JT	via Roger Corey, W1AX, 60 Warwick Drive, Westwood, MA 02090, USA.
3D expedition	(SSB) G4WFZ, 28 Orcheston Rd, Bournemouth, BH8 8SR.
3D expedition	(CW & RTTY) Mats Persson, SM7PKK, Zenithgatan 24 #5, S-212 14 Malmo, Sweden.

other station or 'CQ'. Recommended sub-bands are 3.530 - 3.570, 7.010 - 7.040, and 14.030 - 14.070MHz on CW and 3.680 - 3.780, 7.040 - 7.090, and 14.220 - 14.280MHz on SSB. One point per QSO. Keep a simple chronological log - not separate logs for each band. Mail entries no later than 15 days after the contest to (Phone) Dave Lawley, G4BUO (QTHR) or (CW) to Paolo Cortese, I2UIY, P O Box 14, 27043 Broni (PV), Italy. Full rules and further details are available from G4BUO (01892 870400).

In the **1994 WAEDC Contest** (CW) G0LII scored 133,104 points followed by G3TXF with 97,695, G6QQ with 18,032, G5MY with 16,170, and G0AOL with 220.

Results of the **1994 IARU HF Championship** list the following British stations: (Single-operator mixed mode): GI0NWG - 647,520 points. (Single-operator phone): G4JVG - 1,025,208; GM0ECO - 763,715; G0OHW - 63,329; G0NIF - 781. (Single-operator CW): G0LII - 543,972; G3SWH - 258,064; G3TRF - 117,728; G3DFV - 102,256; G0DEZ - 82,288; GM3CFS - 45,280. (Multi-op): GW3CSA - 416,990.

AWARDS

THE HELVETIA AWARD

SINCE THE HELVETIA Contest takes place this month and this is one of the most attractive awards, readers might like to take the opportunity to work stations operating portable in otherwise hard-to-work cantons. The requirements are to have confirmed contact with all 26 cantons since 1.1.1979. There are Mixed, Phone, CW, RTTY or SSTV categories and applicants should send a list of contacts accompanied by the QSLs to: Kurt Bindschedler (HB9MX), Strahleggweg 28, CH-8400 Winterthur, Switzerland. There is no fee but it would be appreciated if some return postage could be included.

THE MACEDONIA DX AWARD

ISSUED BY THE MACEDONIAN DX Group to licensed amateurs and listeners. For Europeans it is necessary to work or hear 10 members of MDXG since 1 January 1990. Send list of QSOs certified by two active amateurs with five IRCs (or US $3) to MDXG Award Manager, Box 55, Stip 92000, Former Yugoslav Republic of Macedonia.

PROPAGATION

G8KG's COMMENTS THIS month are as follows: "We are now at the stage in the sunspot cycle when we must be thankful for small mercies but should also bear in mind that superimposed on the generally downward trend there will be shorter term upward movements. This has been the case in the early part of the year with the 27-day average solar flux rising slowly from 78 to 87sfu and a spell in the third week of January when the daily values almost touched the 100 mark as they did back in mid-December. During this spell the geomagnetic field was quiet, giving some quite good conditions on the higher bands but during the first half of February there were a number of disturbed days."

THANK YOU

TO ALL WHO HAVE provided input for this month's column and to the authors of the following: *DXPRESS* (PA3FQA), *LYNX DX BULLETIN* (EA2KL), *LONG ISLAND DX BULLETIN* (VP2ML) and *RSGB DX NEWS SHEET* (G4DYO). Please send everything for **June** issue to reach me no later than **20 April**. ♦

VHF/UHF NEWS

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

A SUCCESSION of depressions and associated fronts did little to enhance VHF propagation in February, but it wasn't all gloom. The 50MHz propagation mode discussion continues. VHF Convention was the main event of February.

VHF CONVENTION

BY 1000 ON 19 FEBRUARY the queue of visitors waiting to go through the turnstiles at the Sandown Park Racecourse was the longest I could recall, reaching well out into the road. In spite of the early date of the VHF Convention, the weather was reasonable, but the grass was so saturated by previous rain that some cars had to be pulled out by tractor later on. Based on the gate takings, the paid attendance was around 2,650.

TRADE SHOW

As always, the trade show was well supported by the regular exhibitors. In the morning period, you had to push and shove to reach some of the stands. Many traders reported brisk business and were well satisfied with the results. The RSGB bookstall was very busy throughout the day.

The various RSGB committee booths were informally arranged around the bookstall and were quite crowded at times. The VHF Contests Committee posted the results of several events which had yet to be published in *RadCom*.

Many readers of *VHF/UHF News* called into the VHF Committee section and it was a great pleasure to see them, especially the newer contributors. I was particularly pleased to meet Bo Nillson, SM7FJE, with whom I had a long chat about general VHF matters. Most keen VHF DXers will have his call in their logs from auroral and meteor scatter contacts over the years.

CONVENTION

In his opening address, RSGB President Clive Trotman, GW4YKL, reminded us that this was the 40th VHF Convention. He remarked how different the VHF scene was back in 1955 although some of the problems have not changed. Commenting on Malcolm Sadler's, 2E1DLC, difficulties in finding QSO partners - February *RadCom* page 23 - he noted similar remarks in this journal 26 years ago.

In the February 1969 issue, the late Tom Douglas, G3BA, expressed concern that users of the then new SSB and NBFM modes seemed unwilling to communicate with those using other modes. The President stated: "It is a matter of some regret that VHF activity has fragmented into so many distinct and mutually exclusive types of operation..."

He also referred to the work of the VHF Committee, and of the Society, in negotiating with the Radiocommunications Agency. The president commented on the need to "keep quiet" until sensitive matters were resolved so as to avoid rumours and misinformation. Other topics dealt with were the proposals for band plan changes on 144 and 430MHz, the suggestion that novice licensees might be granted limited access to 144MHz and members' reactions to these ideas.

In conclusion he reminded the audience that: " . . . the amateur radio side of the Society is almost entirely run by volunteers in their own spare time. Many of them have professional and family commitments, some even like to go on the air occasionally. Without its volunteers . . . the Society would be little more than a small publisher. Perhaps it would be a better business but it would do far less for amateur radio."

THE LECTURES

The presentation of the various trophies followed the President's address, after which the assembly divided into the three lecture streams. VHF Committee Chairman Peter Burden, G3UBX, chaired Stream A and reported that the VHF Contesting and Jordan DXpedition talks attracted audiences of 50-60 people. However, the forum was poorly attended. In the B stream, Mike Gibbings, G3FDW, gave an interesting talk on log periodic antennas, followed by Ron Livesey of the British Astronomical Association who dealt with the Sun and auroras.

PUBLICATIONS

THE FEBRUARY EDITION of *CQ-TV*, the quarterly journal of

the British Amateur Television Club (BATC), comprises 88 pages packed with very interesting articles. The 'Who to write to' page is an excellent idea - some club magazines give little clue as to which committee members are responsible for what.

The back cover features a photograph of about two dozen boxes of the journal, awaiting stuffing into envelopes, guarded by the family cat, and a picture of many sacks of *CQ-TV* in the back of a Post Office van. An eight-page supplement lists BATC members' services and shows scores of PCBs for numerous projects.

There is also a reminder about the 1995 rally at the Sports Connexion in Coventry on 30 April. Contact Mike Wooding, G6IQM, for details. He is QTHR; tel 01788 890365, fax 01788 891883. The new editor is Chris Smith, G1FEF, who is QTHR; tel 01933 676054, fax 01933 274367, BBS 01633 614764 and via the Internet to chris@batc.demon.co.uk. The membership secretary is Dave Lawton, G0ANO, who is QTHR; tel 01494 528899.

The January issue of *Six News*, the journal of the UK Six Metre Group (UKSMG), comprises 52 pages of useful information for 6m folk. Geoff Brown, GJ4ICD, describes plans for his proposed operation from the Cape Verde Islands, D4 - see March *RadCom* page 24. 'The Solar Myth' is a reprint of a 1994 article by Nancy Crooker in the scientific journal *Nature*. More of that in the Propagation paragraphs.

During last year's Jordan operation, DL7AV noted difficulty in contacting stations in the 2,400-2,800km range from Amman. Tom publishes a map showing the 5,000km radius area around KM71WX to illustrate this phenomenon. An explanation could be that these distances are too great for single-hop Es and too short for double-hop. He ends with: "Propagation experts, comments please!" For details of the UKSMG contact Chris Gare, G3WOS (QTHR). *Six News* is edited by Neil Carr, G0JHC (QTHR), whose new receive-only fax number is 01772 642015.

Does anyone know what has happened to the *VHF-UHF DXer*? The last copy received was August & September 1994 and editor Dave Hardy, G8ROU, has not replied to my inquiry.

CONTESTS

DAVID WHITAKER, BRS25429 (YSN), is the UKSMG's contest manager. He sent the rules for the 24-hour Summer Contest which starts at 0000UTC on 10 June. There are four UK sections, single-op fixed, SWLs, Novice stations and All-other, such as portables and multi-op. There are two further sections, Rest of Europe and Rest of the World.

Exchanges to be RS(T), membership number if applicable, and Maidenhead grid, eg IO91, JN37. Serial numbers are not required. All QSOs within your own continent must be outside the 50.100-50.120MHz DX window. You may use the packet radio DX Cluster, but anyone heard 'self-spotting' to solicit contacts will be disqualified. Scoring is one point per contact, with a bonus point if you work a UKSMG member. Multiply the total by the number of countries worked, including your own, and that sum by the total of grids worked. Send logs, postmarked 17 July at the latest, to The Contest Manager UKSMG at 57 Green Lane, Harrogate, HG2 9LN, UK.

PROPAGATION

SOLAR MATTERS

'The Solar Myth' is the title of a contribution in *Six News* #44. It is a reprint from an article by Nancy Crooker which was published in the 17 February 1994 issue of the magazine *Nature*. It concerns Jack Gosling of the Los Alamos National Laboratory: "... whose year-long efforts to spread a new gospel of solar-terrestrial lore culminated with the publication of his article 'The solar flare myth' in *the J. Geophys. Res 98*, 18937-18949; 1993."

This was followed by a meeting in December 1993 in which Gosling and others delivered a paper, 'The solar-terrestrial connection'. Crooker writes: "The article and session conveyed a revolutionary message - solar flares do not cause magnetic storms and attendant auroral displays, nor do they cause most of the associated hazardous fluxes of solar energetic particles; coronal mass ejections do."

She continues: "The session's lead speaker, Steve Kahler, of the Air Force Phillips Laboratory, traced the history of studies that established a clear, although far from perfect, correlation between flares and auroras, or more commonly between flares and magnetic storms that accompany auroras. The reason that the misconception about flares is so entrenched in solar-terrestrial physics is that correlation was mistaken for cause - a textbook case of the famous logical fallacy."

LOCATOR SQUARES TABLE
STARTING DATE: 1-1-1979

Callsign	50MHz	70MHz	144MHz	430MHz	1.3GHz	Total
G3XDY	-	-	226	160	105	491
GJ4ICD	628	1	264	121	75	1089
G4RGK	183	-	333	211	74	801
G6HKM	481	-	248	120	64	913
G4DEZ	235	-	255	74	63	627
G3IMV	460	15	525	125	52	1177
GW4LXO	499	37	261	109	48	954
G4MUT	200	26	159	97	34	516
G0FIG	200	-	212	69	25	506
G8TOK	167	25	131	51	21	395
G8LHT	225	20	210	95	20	570
G1SWH	286	37	200	67	11	601
G3FIJ	61	26	85	34	6	212
G4IGO	565	-	250	-	-	815
G4TIF	352	28	213	112	-	705
G0CUZ	199	-	394	80	-	673
G0EVT	286	-	278	71	-	635
G0JHC	543	-	48	-	-	591
GW6VZW	399	-	143	6	-	548
G0GMB	135	-	226	108	-	469
G6RAF	129	19	172	117	-	437
G0HVQ	328	-	71	-	-	399
G4YTL	-	43	300	54	-	397
G1UGH	239	-	124	-	-	363
G0EHV	-	38	195	87	-	320
GW8JLY	-	-	284	36	-	320
G8XTJ	183	-	129	-	-	312
G1AWF	62	-	173	14	-	249
G3FPK	-	-	246	-	-	246
GW4FRX	-	-	239	-	-	239
G7CLY	102	-	122	2	-	226
G7LIJ	24	-	181	-	-	205
GI1CET	100	-	79	12	-	191
GW0PZT	-	-	188	-	-	188
GJ7LJJ	102	-	54	12	-	168
G0SOO	115	-	41	-	-	156
G6ODT	-	3	62	73	-	138
GM0GLV	102	-	35	-	-	137
G4OUT	-	23	106	-	-	129
G4OBK	83	-	1	-	-	84
GU4HUY	-	-	84	-	-	84
G0HIK	1	1	59	17	-	78
G3UOL	11	-	66	-	-	77
GW7SMV	9	-	55	-	-	64
G3NKS	2	44	2	2	-	50

No satellite, repeater or packet radio QSOs. If no updates received for a year entries will be deleted. Band of the Month is 1.3GHz. Next deadline is 27 April.

Crooker, who is at the Center for Space Physics, Boston University, USA, concludes: "Although solar flares are intrinsically interesting phenomena, and predictions of their occurrence are important for protecting space travellers from potentially lethal X-Ray doses, we now understand that they do not cause auroras, magnetic storms or major particle events."

THE PUZZLE REVISITED

In the January *Report* published by the Six and Ten Reporting Club, editor Ray Cracknell, G2AHU (HWR), published a further contribution to the propagation puzzle discussed over recent months in this column. It was submitted by Peter Martinez, G3PLX (HPH), who monitored a French broadcast station on 21.580MHz on 5 October 1994. A weak carrier was received, but no ionospheric propagation or modulation sidebands were present. He produced a computer printout representing 250 seconds of reception. The weak carrier is shown as a thin line, crossed by scores of slightly sloping vertical lines.

Peter states: "My interpretation is that these (vertical lines) are meteor reflections, as opposed to meteor trail reflections. More correctly, perhaps, they are reflections from the 'nose' of the meteor trail as it is actually being formed, as opposed to reflections from the 'sides' of the stationary trail. These nose reflections are much weaker than the usual trail echoes and much more numerous. They have the same Dop-

pler shift as the meteor particle itself. The scattering angle will be quite wide, which explains why there are more of them than pings."

According to the International Meteor Organization's (IMO) *1994 Meteor Shower Calendar*, the Sigma Orionids shower peaked on that day which probably accounts for the higher than average count. Nevertheless, G3PLX's recording suggests that sporadic meteors are far more numerous than the number of pings would indicate.

Commenting in the article and in correspondence with G3FPK on the observed background scatter signal, Ray writes: "Each meteor will produce some ionization before passing out of the region of 90-105km where low levels of sporadic-E ionization will be present. The impression that sporadic-E is produced by blobs of ionization is incorrect. Ionograms show that it exists more or less permanently throughout the night although the critical frequency, foEs, is low (it usually drops to around 1MHz).

"Against that, one must consider that foEs seldom exceeds 5MHz which, from a smooth layer, would provide an MUF up to 25MHz. The maximum foEs from Britain is about 10MHz, which would only just have produced propagation at 50MHz once or twice in a decade.

"Within the sporadic-E layer, where high velocity winds are blowing in different directions, rapid recombination of free electrons is unlikely to occur and localised areas of increased electron density are likely to occur. A large number of them will result in a very effective scattering medium for signals in the 30-100MHz region.

"The significant feature of this early morning background scatter is its ability to scatter signals back from the ionosphere. At amateur power levels, only ground backscatter is normally detectable, with meteor scatter being the only usual exception."

METEOR SCATTER

THE LYRIDS STREAM should peak on 22 April at 1500UTC, according to the IMO calendar, or 1530 using the OH5IY program. Maximum rate is only attained for an hour or two at best. The ZHR is usually 15 - 25, but about 90 meteors per hour were reported for a short period in the 1982 visit. The radiant is above a mid-UK horizon from 1830, through midnight, to 1430. Best times are: NE/SW 2300 - 0400 and 0700 - 1130; E/W 0230 - 0600: NW/SE 2100 - 0100 and 0530 - 1130; N/S 2100 - 0100 and 0530 - 1100.

MOONBOUNCE

FIRST A REMINDER that the second leg of the European EME Contest is on the 8/9 April weekend - see last month's column for details. From London, moonset is at 0120 on the 8th, then rising at 1100 and setting at 0200 on the 9th. Moonrise on the 9th is at 1210, all times UTC. The mean declination is +15.26°and the average 432MHz sky temperature 23° K. Average degradation is -1.58dB, all data derived from the VK3UM program.

Stefan Heck's, JW0BY (JQ88AD), antennas suffered gale damage in January and his 4-Yagi array was reduced to two 13-ele and two 17-ele. Nevertheless, new stations worked (initials) were W0WRH, JA9BOH, VK3AMZ (1st JW-VK), DK9OY, DF7KF, LU7DZ (1st JW-LU), W7HAH, WG8Q, ZS6ALE (1st JW-ZS), W9XQP, UT4EQ and IK1FJI. He hopes to be QRV on 144.155MHz in April as follows: 8/9th 0600-1930 and 2200-2030; 10th 1500-2100; 11th 1500-2200 and 12th 1900-2300, all times UTC. Sked proposals may be made via E-mail to stefan@eiscat.no or through VE7BQH.

Graham Daubney, G8MBI returned from several years in Hong Kong last September and moved to his French QTH (JN04FT) in mid-December. He is QRV on 2m with an IC970H transceiver, DSP filter, single 4CX350A PA and single 17-ele M² Yagi with GaAsFET preamp. On 21 January he completed with W5UN and next day with VE7BQH. On 11 February he completed with SM5MIX and heard JL1ZCG who was 539, and on the 18th LA8YB was a random success.

50MHZ

IAIN PHILIPS, G0RDI (BUX), has a limited permit from the RA to run an unattended beacon on 50.830MHz. The site is 238m ASL at locator IO91MP, output 10dBW ERP and the antenna a vertical dipole 33m AGL. It sends 110s of Morse code in F2A then 15s of AX25 level 2 1200bd packet at 2.5kHz peak deviation. *No TNC is installed, so don't try to use it as a digipeater.* This experiment is to evaluate the likely coverage for future mobile operation through a repeater. Iain stresses this is *only* a beacon and the frequency (QRG) is *not* that of the proposed voice repeater. Please send reception reports to G0RDI@GB7DEO or G0RDI@GB7DXH. He is QTHR.

Ted Collins, G4UPS (DVN), reports that Bo Christensen, OZ1DJJ, will be QRV from Greenland again this year as OX3LX. From 18 April through 22 May he will be in Sisimiut (GP35) and Sukkertoppen (GP36) from 1800UTC during the week and from 1500 at weekends. Operating QRG is 50.135MHz when the band is open, otherwise QRX on 50.110MHz.

Ross Wilkinson, G6GVI (LNH), wrote to correct some details published on page 25, February *RadCom*. The 6m Bristol calling frequency is 51.51MHz and the Manchester Sunday morning FM net is on 51.53MHz at 1100 local time, following the GB2RS broadcast. Jamie Ashford, GW7SMV (GWT), is now permanently QRV with an FT690R Mk2 running 2.5W to an HB9CV antenna. On 15 January he caught a small opening to the east working an SP7 in KO01BW.

144MHZ

ON 17 JANUARY, F/G8MBI completed on random MS with DL7GJW and PA3FJY. Graham works Paul Pasquet, G4RRA (SRY), almost every Sunday morning between 0800 and 0930UTC on 144.285MHz; call in if you need JN04. His packet route is FG8MBI@F6KNL.FAQI.FRA.EU. Tropo on 6 February was best for longer contacts in the afternoon. Best DX included OZ8ZS (JO55) and DF8LC (JN54). Many Gs, PAs and ONs were contacted in the 800-1000+km range.

Jeff McKernan, G1JDM (SXW), was out portable on 5 February on the South Downs and experienced the effects of tropo ducting and backscatter propagation. The weather was misty with hill fog all day with heavy condensation at times. Gerry Schoof, G1SWH (MCH), worked EA2AWD and EA2ADJ (IN93), F1CYB (JN17), F1UJK (JN05) and F/G8MBI in the 6 February tropo lift.

Andy Stafford, G4VPM (SOM), worked GM0GFV (IO85) in flat conditions on 29 January, signals varying from nil to S9+20dB. Next day brought GU3EJL (ALD), Stan reporting antenna storm damage. GD4XTT was contacted on 4 February but the big event was on the 6th. By the end of the evening Andy had worked 15 stations in DL, EA, F and PA. In February, GW7SMV worked F1JGN (JN19) on the 3rd, GU3EJL on the 4th and on the 6th, seven Fs in IN93 and 98, JN06, 17, 19 and 35, plus EB1DNK (IN73).

Brian Higton, GM0VBE (SCD), is ex-GM8HVB. He will be QRV in Cornwall from IO70NN as G0VBE/P from 30 June to 12 July on SSB and CW. The WAB reference is SW97. Skeds can be arranged by telephoning 01560 320553. He is also QRV most Sunday mornings on 80m at 0900 local time around 3,700kHz.

430MHZ UP

F/G8MBI IS QRV FROM the Dordogne on 70cm. Graham uses an IC970H, 100W transverter, single long M² Yagi - 10m boom - and GaAsFET preamp with half-inch Heliax feeder. He finds 70cm and 23cm activity better in France than in the UK. On 7 February he copied G0FIG's 25W carrier but did not contact Alec who could not find his Morse key at the time.

G1SWH writes that he and Erik Gedvilas, G8XVJ (CHS), use the packet cluster to indicate when they are QRV on 23cm. They have regular skeds on the band with GM4LBV (IO75) and GM0USI/P (IO76) and complete under all conditions. Gerry runs an Icom IC1271E, 10W to a 55-ele Yagi fed with LDF4-50 cable.

John Quarmby, G3XDY (SFK), got one new square on 70cm on 6 February, TN04, thanks to F6FSK. Signals on 23cm were rather weak but he did contact F6CTW (JN18), F6CBH (JN19), F6ANQ (IN94) and F6CRP (IN96). He was QRV in the contest the previous day and was called by HB9AMH/P (JN37) for best DX. G4VPM also operated in the contest but found conditions from south Somerset to be "pretty lousy". Andy worked 27 stations in nine squares.

SIGN OFF

THE **MAY** DEADLINE is **30 March**, the **June** date is **27 April** and the **July** one is **1 June**. Please send in reports, even if conditions have been only average. The CompuServe ID is 70630,603 and my Internet address is 70630.603@compuserve.com. The telephone answering and fax machine is on 0181 763 9457 and the Telecom Gold mailbox is 87:CQQ083. ♦

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YAESU	FT51R	LIST £499.....	ML PRICE £419
YAESU	FT290R	LIST £539.....	ML PRICE £439*
YAESU	FT690R	LIST £539.....	ML PRICE £439*
YAESU	FT790R	LIST £639.....	ML PRICE £499*
YAESU	FT736R	LIST £1789.....	ML PRICE £1389*
YAESU	FT5200	LIST £679.....	ML PRICE £579
YAESU	FT5100	LIST £629.....	ML PRICE £529
YAESU	FT2500M	LIST £369.....	ML PRICE £329
KENWOOD	TS790E	LIST £1849.....	ML PRICE £1629
KENWOOD	TM255E	LIST £899.....	ML PRICE £799
KENWOOD	TM455E	LIST £999.....	ML PRICE £889
KENWOOD	TM742E	LIST £829.....	ML PRICE £739
KENWOOD	TM733E	LIST £739.....	ML PRICE £649
KENWOOD	TM251E	LIST £389.....	ML PRICE £349
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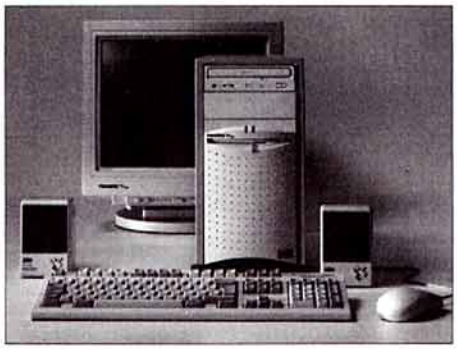

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SWL NEWS

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

MY SWL CHALLENGE - which took place at the same time as the SSB leg of the *CQ* Worldwide DX Contest - attracted a record 85 entries from 17 countries. Perhaps the most pleasing aspect of this was that 33 entries were received from Britain. The full listings, reproduced in the table (right), show that Jean-Jacques Yerganian, ONL383, won the event but by the much smaller margin of 194,000 points. British Isles entrants filled the next five places. Arthur Miller was second, Robert Small third and Paul Crankshaw fourth.

Greater publicity certainly led to increased participation. Indeed, it was good to receive so many logs from listeners who have not corresponded to *SWL NEWS*. I hope that some of them might consider providing regular news for this page now that they have broken the ice. There were several youngsters among the entries, including an 11 year old, plus an Old Timer in his 87th year. It was also pleasing to receive entries from Spain for the first time, but disappointing that no entries came in from Italy after participation from there in 1993.

Next year, I am hoping to receive more than 100 entries. Many favourable comments were received and it is clear that the SWL Challenge has quickly established itself as the primary listener contest. Further publicity this year will, hopefully, lead to first time entries from Asia and North America. When this happens, the Challenge will become a truly Worldwide event.

I have produced a 20 page results booklet, which costs 2 IRCs or £1 to cover P&P. This, apart from giving the results, looks at All Time leading scores, details of all countries heard by band, results by country, two pages devoted to both a full write-up and your quotes, plus photographs and QSL cards. The 1995 Rules are also included, together with a sample log and multiplier check sheet. This is an attempt to standardise the format of the entries next time.

The very impressive QSL used by Peter Destoop, ONL5923. He took the photo himself and the card is a tribute to the three pilots and 47 spectators who died as a result of an accident at the Ramstein Air Force Base ,West Germany, during a 1988 flying demonstration by the Italian 'Frecce Tricolori' team.

INTERNATIONAL MARCONI DAY

THE 8TH INTERNATIONAL Marconi Day will take place between 0000 and 2359 on Saturday 22 April. There will be an increased number of special event stations active, but the requirement to claim the Award is still to log 12 special stations. There is a new award certificate for SWLs this year. The price of the award for SWLs has increased to £3.50 because of an upgrade in the quality. Nonetheless, this represents good value for money. Besides which, it is encouraging that yet another organisation has introduced a certificate for listeners to chase. Award claims should be sent to Cornish Radio Amateur Club, IMD Awards Manager, PO Box 100, Truro, Cornwall TR1 1RX.

DX ROUND-UP

THE 'STAR' BAND in January seems to have been 1.8MHz. Most of the DX was on CW, but some interesting stations were heard on SSB. During the *CQ* Worldwide 160m contest, conditions were very good. Some of the countries heard in Britain included A22, FG5, J6, SU, VP5, VP9, VS6, XX9, 5T5, 5Z4 and 9K2. There were certainly a few listeners hoping that the SSB leg at the end of February produced half as much DX!

Elsewhere on the spectrum, talking points included expeditions to Bhutan (A51/JH1AJT), Cocos-Keeling (VK9CR), South Georgia (VP8SGP) and Congo (TN2M). Others of interest included 9Q5TT, J37ZY and VP2E/VK3AJJ, but reporters found HF quite poor in January. 21MHz was perhaps the best, but 18MHz proved poor and nothing was reported on 24 or 28MHz.

FINALE

CONTRIBUTIONS FOR the **June** column must be with me **no later than 5 April.** ♦

SWL CHALLENGE 1994 - RESULTS

SWL NO	TOTAL	MULTS	28	21	14	7	3.5	1.8	SCORE
1.	ONL383	565	104	125	111	95	84	46	998,355
2.	G-5218	523	83	112	106	96	72	44	804,897
3.	BRS8841	485	94	109	104	86	62	30	720,225
4.	GM-SWL/Crankshaw	427	69	103	83	67	57	48	513,254
5.	BRS32525	426	51	96	92	84	62	41	496,715
6.	BRS52543	416	73	94	85	62	64	38	491,296
7.	ONL3647	392	82	100	79	76	55	-	451,584
8.	BRS94761	405	70	86	77	71	67	34	415,125
9.	ONL4335	389	84	83	80	63	45	34	406,116
10.	G-20736	325	83	94	77	71	67	34	336,700
11.	URE-1033-A	348	65	94	77	63	49	-	325,380
12.	RS95258	345	58	97	64	44	47	35	316,365
13.	F-13145	333	53	74	78	63	37	28	308,358
14.	BRS91529	355	67	78	66	60	52	32	296,780
15.	G-15151	327	44	82	76	59	37	29	260,619
16.	PA-3342	311	56	66	65	53	43	28	260,307
17.	GI-20325/P	307	49	61	61	61	55	20	246,521
18.	ONL3997	280	48	79	78	33	22	20	215,040
19.	HE9JAT	309	66	49	49	49	42	44	208,575
20.	SP-0142-JG	290	30	82	52	42	52	32	205,900
21.	CXN-020	220	48	68	53	40	10	1	201,080
22.	NL-10175	275	55	64	54	52	50	-	192,225
23.	EI-1016	249	50	53	56	56	34	-	170,814
24.	OH2-836	268	52	67	39	39	41	30	149,912
25.	F-14368	225	38	52	45	29	33	28	121,725
26.	NL-455	235	37	54	39	47	38	20	120,320
27.	SP-0189-GD	217	2	66	56	53	40	-	119,133
28.	SP9-4936-KA	208	-	80	82	-	46	-	113,568
29.	F-10371	209	43	57	51	31	15	12	111,188
30.	G-20048	221	25	67	47	34	27	21	108,511
31.	BRS88887	216	19	51	57	35	36	18	103,680
32.	DE7TXL	221	49	53	47	41	31	-	100,997
33.	BRS25209	215	26	43	42	35	36	33	96,965
34.	F-10046	187	41	40	31	28	28	19	94,061
35.	EC50617	204	40	41	53	35	27	8	82,212
36.	G-SWL/Clare	171	25	58	46	20	15	7	75,069
37.	BRS93500	207	23	43	49	26	41	25	72,864
38.	OE1-0140	187	36	54	50	27	20	-	72,182
39.	F-10095	173	41	44	37	26	25	-	66,432
40.	G-16741	182	23	47	36	32	31	13	61,516
41.	ONL2372	162	29	34	39	37	24	-	55,566
42.	F5JBF	153	27	36	47	18	20	5	55,233
43.	OE-527	213	36	62	47	46	22	-	54,700
44.	F-13063	146	29	32	45	12	19	9	54,020
45.	SP-3003-LG	159	23	46	50	17	23	-	49,131
46.	BRS1257	153	18	31	39	25	25	15	48,501
47.	URE-882-GI	116	36	29	17	7	18	9	47,792
48.	SM0-7730	134	10	36	43	14	18	13	39,396
49.	EA1ATL	145	25	35	28	36	21	-	39,150
50.	SP4-208	144	29	24	30	20	25	16	38,736
51.	ZS-SWL/Duffy	90	9	36	38	7	-	-	38,610
52.	SP4-189-LE	145	6	38	46	22	33	-	37,990
53.	G6RJZ	136	-	44	31	23	32	6	36,992
54.	DL-SWL/Kropf	124	-	97	41	12	15	9	35,712
55.	BRS25429	107	107	-	-	-	-	-	35,310
56.	OE-934/ADXB	151	15	39	39	29	29	-	32,465
57.	G-2013	135	8	30	29	21	27	20	31,455
58.	SP4-0411-JG	134	13	29	35	24	33	30	30,552
59.	F-10370	101	13	18	43	7	13	7	29,997
60.	G-20501	113	-	33	33	30	17	-	29,380
61.	F-13376	119	-	27	28	39	25	-	27,727
62.	BRS96018	112	13	25	43	24	4	3	27,552
63.	EB5HRX	119	31	4	23	34	25	2	26,775
64.	F-10298	118	1	37	44	17	14	5	26,496
65.	URE-1133-V	120	32	20	27	16	15	10	25,440
66.	F-11734	164	22	37	48	26	21	10	22,365
67.	F-12382	117	8	9	27	26	25	22	22,113
68.	G7RSK	99	-	22	23	22	17	15	14,949
69.	F-12082	99	16	16	18	13	24	12	13,266
70.	RS96000	84	8	27	17	14	16	2	13,104
71.	F-14671	84	12	20	27	12	7	6	12,096
72.	RS96917	77	-	32	30	15	-	-	10,857
73.	SP9-4696-KA	84	-	25	26	16	17	-	10,416
74.	BRS95977	67	-	15	21	21	10	-	10,117
75.	F-14846	71	-	27	20	-	24	-	8,449
76.	G7NBQ	58	-	-	46	12	-	-	8,352
77.	BRS95363	64	-	4	32	15	13	-	5,120
78.	BRS96394	49	-	5	16	11	14	3	4,802
79.	BRS20249	46	6	12	13	15	-	-	3,772
80.	BRS94634	52	-	13	26	10	2	1	3,692
81.	F-15115	43	-	7	9	18	9	-	2,881
82.	RS95726	45	-	6	14	12	13	-	2,205
83.	BRS62088	32	-	11	21	-	-	-	1,988
84.	URE-1109-PM	23	-	3	18	2	-	-	897
85.	RS94702	13	-	-	-	-	13	-	169

NOVICE NEWS

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

INTERNATIONAL Marconi Day 1995 falls on Saturday 22 April, the nearest weekend to Marconi's birthdate. As usual there will be many stations to hear and work, with the possibility of earning a handsome certificate if you can either work or hear the required number.

Operation will take place from midnight to midnight and there will be upwards of 40 stations if all of them participate. All 12 of the GB stations are confirmed and four of the five EI stations also.

With the high level of interest in this event, Novices may struggle to be heard with their low power transmissions, but I am assured that stations will make a special effort to hear you. The number of awards issued doubled in two years to 260 last year. SSB will be used mainly but with periods of CW or digital modes also.

To qualify, you need a minimum of 12 two-way contacts with different stations by any means, but each station counts once only. If, however, you cannot make yourself heard all is not lost. There is a Listeners award. For this, you must have logged 12 two-way QSOs, with again, each station counting once only. If you cannot achieve the transmitting award, there is every chance that you will be able to qualify for the SWL award due to your efforts for the first one.

To claim your certificate, send a full extract of your log and £3.50 to Sue Thomas, G0PGX, Cornish Amateur Radio Club, IMD Awards Manager, PO Box 100, Truro, Cornwall TR1 1RX.

KIDLINK '95

I HAVE BEEN ASKED to give longer advance notice of this event to give amateurs more time to approach schools, arrange callsigns, organise equipment and browbeat fellow amateurs into giving a hand.

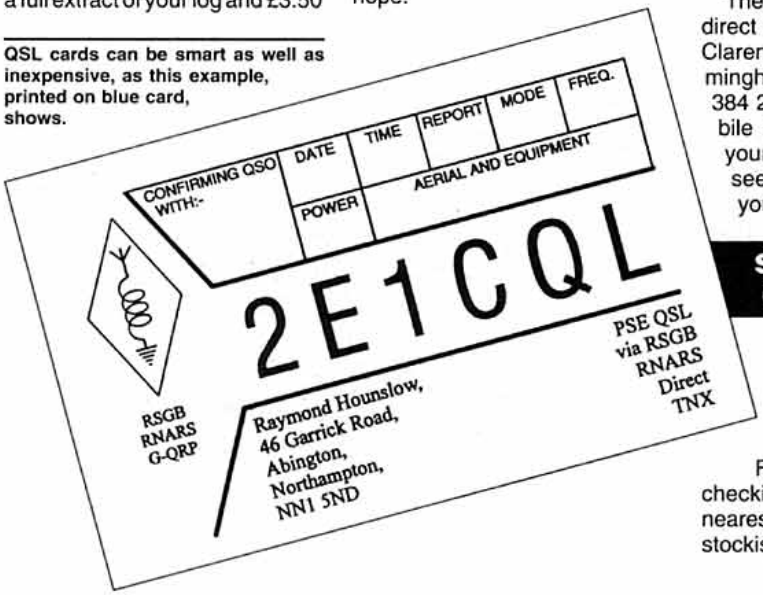
The Kidlink connections are to be made on Thursday, Friday and Saturday 4, 5, and 6 May. Hopefully, by having more time to prepare for it, more stations will be on the air, more contacts made, and more friendships forged.

I have a list of schools who have participated in the past and I have sent a copy of it to each one. The packet address is also given where known. If you have not received a copy and would like to join in - or if you think you would like to involve a school for the first time - write to the address above and I will send you a copy. An SASE would be appreciated of course.

Conditions were not good last year but I feel that school stations simply were not there. Timetabling an event such as this can be difficult, which is where radio clubs can help. Members who have retired and have time to spare might like to get involved. What better way of giving the hobby some publicity than showing youngsters a working radio station and perhaps pointing some of them in the direction of a Novice training course when they are securely hooked.

I will include a reminder and more details next month. And, after the event, I would like to be able to report massive interest and great activity between schools - suitably illustrated, I hope.

QSL cards can be smart as well as inexpensive, as this example, printed on blue card, shows.



CHEAP BYTES

"I HAVE A JOB FOR YOU," John Badger told me recently, "It won't take you long." He produced a small kit and asked me to make it up and give my view as to whether it could be confidently tackled by an inexperienced Novice. He arranged to collect it the following week at the Barnsley rally, plug it into his PC and use it for demonstrating throughout the day.

It took me around half an hour to complete the soldering and evaluate the instructions although I could not test it as my PC and shack are on different floors. I delivered it to John at Barnsley and he plugged it into the PC. It worked as he said it would and ran all day, demonstrating what it could do.

It links the computer to the transceiver and interprets the messages between them, showing the result on the screen. All forms of communication modes are covered including Morse, packet, SSTV and Weather Fax. It is suitable for HF, VHF and UHF applications.

I challenge even the most ham-fisted constructor to fail to follow the comprehensive instructions - which even give the individual resistor colour bands making identification easy. John has given plenty of thought to the presentation of the instruction sheet. He also guides the user into connecting it into the system and being up and running in minimum time.

Is it expensive? Judge for yourself; £21.00 plus £2.00 p/p and 30 minutes work, at most, and your communications system is second to none. For an extra £4.00 you can have it ready-made but if you have completed the Novice course construction exercises, you can tackle this without an Instructor guiding you.Honest!

The HamFax unit is available direct from Badger Boards, 80 Clarence Road, Erdington, Birmingham B23 6AR, phone 0121 384 2473. John is at most mobile rallies - if there is one in your area coming up, you can see the board in action before you buy.

SCROOGE'S CORNER

STAN, G6NUO, has brought to my attention some useful money-saving hints which I feel are worth passing on.

For instance, he advises checking in *Yellow Pages* for the nearest aluminium tube and sheet stockist. If there is one near you, ask if you can inspect their offcuts bin. For a very modest sum, you should find material there for that antenna you would like to build. Also, *Yellow Pages* may tell you of other companies who would be willing to part with their unwanted bits and pieces. If you ask, you may be surprised at the response.

If you want Latitude and Longitude details to help you to work out your Locator, a letter to the local Ordnance Survey office could bring the information you want - the address is in the telephone book. Alternatively, the local authority Architect or Engineer's department could help. All they will ask in return is a letter of thanks for their help.

Stan sent me a small tool which he uses to clear solder bridges on stripboard. It is a piece of a junior hacksaw blade - about four inches long. The pin from the end of the blade is easily removed by placing it over the hole of a medium sized nut and tapping it sharply so that it can be removed with pliers. With one end wrapped with insulating tape to make it easier to grip, the business end can easily be sheathed for safety when not in use.

AND FINALLY

WITH ALL THESE new Novice licensees, there is an ever-growing fund of stories waiting to be told. And I am waiting to tell them.

Novice News exists to bring news to Novices and to bring Novice's news to all readers.

If you would like to make this columnist very happy, how about sparing a few moments to write to me at the address at the top of the page? This tells your story to others and maybe inspires someone else to get in touch. In the past, one story has often led to another. What is more, I promise an early reply.

What brought you into the hobby? How did you get started? Does the hobby live up to your expectations? Have you any advice to pass on? If you have any suggestions I will try to pass them to the right person. Or even, Heaven forbid, any complaints. This hobby is about communication in its many diverse forms, so how about communicating with all those other amateurs through me? If you have an appropriate photograph too, it would enhance your story.

My postman retired last year but his successor claims he is more than willing to deliver. I have told him about all the interesting postmarks - and the diverse spelling of my name! Please don't disappoint him - or me! ♦

IARU

JOHN ALLAWAY, G3FKM
and
TIM HUGHES, G3GVV

IT WAS WITH DEEP regret that we learned of the death of Jaap Dijkshoorn, PA0TO, Chairman of the Common Licence Group of IARU Region 1. For several years he worked tirelessly for the cause of amateur radio, gathering and disseminating information about licence conditions throughout all three Regions. The fact that we now have arrangements for temporary operation with no formalities with more than 30 countries, via the provisions of CEPT TR61-01, is due in no small measure to his efforts.

At the end of 1994 he was circulating questionnaires relating to Type Approval of Amateur Equipment, and Harmonising the Power Levels for Amateur Transmitters. With the information obtained from this research, he was planning to attend meetings in Helsinki in January, and in Paris in February. Known and respected throughout the World, he will be missed by his many friends and particularly by those of us in the UK who had enjoyed his company and benefited from his industry.

STARS***

THE RSGB HAS provided membership to two senior officials in the Ministry of Communications in the Kingdom of Bhutan, together with copies of some of the Society's books. This represents the RSGB's continued participation in the STARS*** programme (Support to the Amateur Radio Service in Region III). A request from Hans Welens, ON6WQ, Chairman of the Region 1 STARS programme, has resulted in copies of the *RAE Manual* being dispatched to Ghana and The Gambia. Throughout Africa, apart from South Africa, there are only about a thousand amateurs, most of whom are expatriates. A new society - the Uganda Amateur Radio Society - held its inaugural meeting on 4 February 1995. The Chairman is 5X1C and it is expected that charter members of the Society will number 17 which includes some Ugandans.

MEMBERSHIP

TWO MORE MEMBER Societies were elected recently - the Belarus Federation of Radioamateurs and Radiosportsmen (BFRR) and the Latvian Radio Amateur League (LRAL). Voting is under way on the admission of the Turkmenistan Radio Amateur League (TRAL) and the Association des Radioamateurs du Burkina Faso and will be completed on 19 June 1995. Total membership of IARU Region 1 is now 76.

IARU has been admitted to membership of the ITU Development Sector (ITU-D). ITU-D has formed two study groups - SG1 and SG2. IARU hopes to work mainly with SG2 as this deals with human resource development for telecommunications in developing countries.

MEETINGS

THE MEETINGS OF THE Region 1 HF and VHF/UHF/Microwave committees were due to take place over the last weekend in February. Agenda items included proposals for the installation of facilities to enable VHF contesters to generate a standard output file from their program which would enable contest managers to receive logs via data transfer systems. Also to be discussed were the appointment of a VHF/UHF Monitoring System co-ordinator, and operating frequencies of manned space stations. Subjects scheduled for discussion included: HF SSTV allocations; the future of the Region 1 Contest Sub-Group; better co-ordination between the VHF and HF contest organisers when fixing contest dates and the new 160m Inter-regional CW contest.

The 1995 meeting of the ITU Radiocommunication Advisory Group (RAG) took place in Geneva from 23 to 25 January. The group was originally established by the 1993 Radiocommunication Assembly (RA) just prior to WRC-1993 and the 1995 meeting was chaired by Mr M Goddard of the UK. IARU was invited to attend as a "duly authorised entity participating in the work of the Radiocommunication Sector" and IARU President Dick Baldwin, W1RU, asked Larry Price, W4RA, to be attend to represent amateur radio. The object of the meeting included monitoring the work of the Conference Preparatory Meetings (CPM) which are preparing for WRC 95, due to take place in Geneva this October.

Some 30 countries took part in the RAG meeting, with more than 115 delegates and six international organisations in attendance including IARU. There were a number of licensed amateurs present within national delegations and the Bureau Director is now Robert Jones, VE3CTM. Though most issues discussed did not directly relate to the amateur services, IARU agreed that certain items would need monitoring. The IARU plans - devised to promote support for amateur service spectrum allocations - outline the role of amateurs in providing communications to mitigate the effects of disasters. It is hoped that there may be amateur issues of real importance on the agenda at WRC 99 and/or 2001. In light of this, the next development conference WTDC 98 might be a target to work on to generate support for our goals.

David Wardlaw, VK3ADW, attended meetings of the ITU-R Task Group 2/2 and Working Party 8A at the beginning of December. Again, there were several licensed amateurs taking part in their professional capacity. Of special interest was the growing threat to the amateur and amateur satellite service allocations in the 1 to 3GHz band. The MSS will be pressing for additional spectrum and this in turn will increase pressure on the present secondary allocations to the amateur services above 438MHz and below 20GHz. IARU will prepare material highlighting the needs and requirements of the amateur services in the bands from 435MHz to 20GHz with the objective of informing decision makers of the value of amateur radio.

ADMIN COURSES

ANOTHER AMATEUR RADIO Administration Course took place in mid-January in Quito, Ecuador. W1RU said that it proved an outstanding success and was attended by 24 students - 22 from Ecuador and two from Venezuela. The course began with an address by the Superintendent of Communications for the Republic of Ecuador. These courses are run not to train amateurs but to instruct administrators how to run amateur radio in their country and how valuable the presence of radio amateurs can be to their communities.

A report has been received from Tafa Diop, 6W1KI, who assisted W1RU at one of these courses in Lesotho last November. This was attended by six Lesotho Telecom agents and was most productive. He and Meg Gibson, 7P8CO, and Rick Atherton, 7P8EB, also visited the Superstars project at the National University of Lesotho. Six Lesotho students have passed their examinations and are licensed as 7P8FI, 7P8FJ, 7P8FK, 7P8FM, 7P8FN, and 7P8FQ. If you hear any of them please give them a call! ♦

AP2MYC VISITS RSGB HQ

ALONG WITH PETER KIRBY, G0TWW, we were pleased to welcome Yunus Chaudhry, AP2MYC, secretary of the Pakistan Amateur Radio Society, who paid a visit to HQ during a brief business trip to the UK. During the course of an interesting conversation, we learned that there are some 150 licensed amateurs in Pakistan, of whom about a half are members of PARS; the minimum age to hold a licence is 21 and activity is confined to the HF bands.

Yunus Chaudhry, AP2MYC, secretary of the Pakistan Amateur Radio Society with *IARU* columnist Tim Hughes, G3GVV at RSGB HQ.

PROJECT YEAR FEATURE

Young Amateur of the Year Award '95

THE RSGB IS pleased to announce that the hunt is on for the 1995 Young Amateur of the Year, which is being supported by the Radiocommunications Agency and the communications industry. This prestigious award, initiated by the RSGB in 1988, is open to anyone under the age of 18 who has an interest in amateur radio. It is awarded to the applicant showing the most outstanding achievement in the amateur radio hobby. He or she need not be a licence holder.

Who can you Nominate?

YOU CAN NOMINATE any youngster who has shown promise in the following activities:

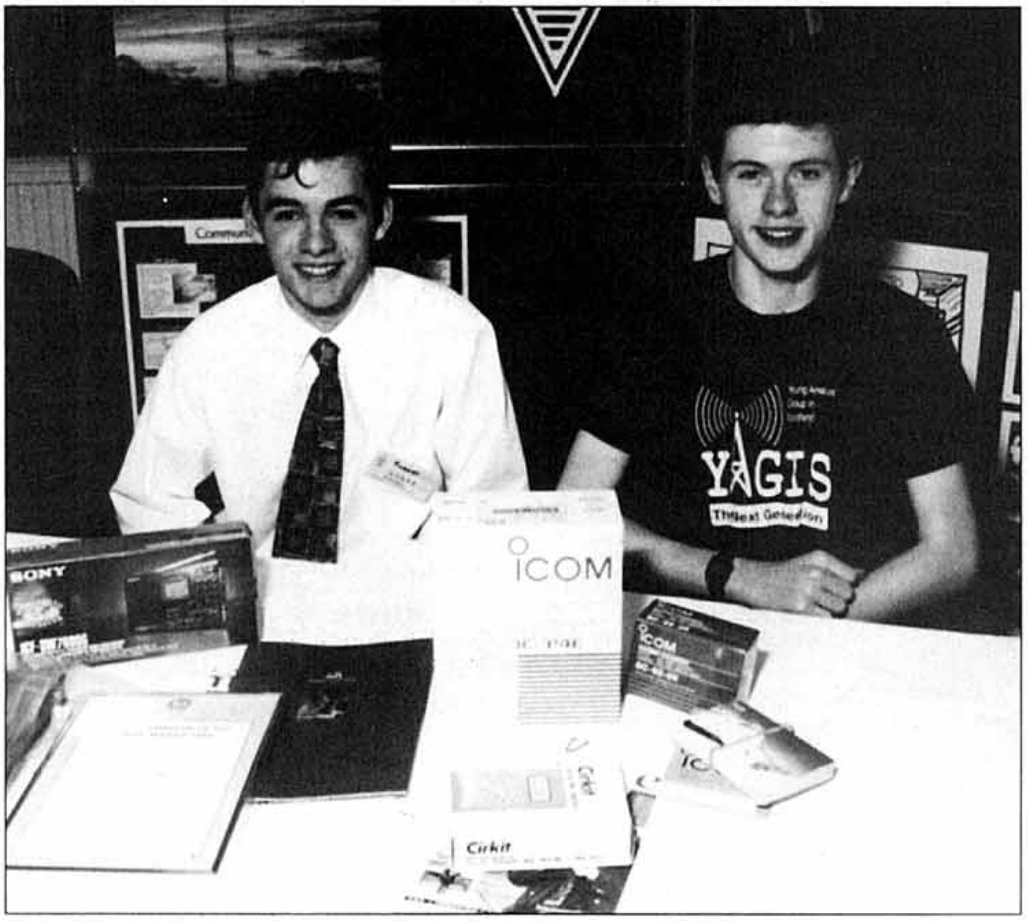
- Radio construction
- Radio operating
- Community service (eg helping in emergency communications or helping the disabled).
- Encouraging others (eg through the Novice licence scheme, or RAE courses)
- School projects (eg helping to organise an amateur radio club at school, or in organising an amateur radio project).

One of the aims of the scheme is to reward those youngsters who put something back into amateur radio, and to encourage others through their activities.

Each applicant will be presented with an RSGB Amateur Radio Log Book.

Prizes

THE £300 CASH PRIZE for the most outstanding achievement between 1 August 1994 and 31 July 1995, will be awarded by the Radiocommunications Agency and presented at the RSGB's HF Convention in September. The runner-up will receive a £50 cash prize from the RA. Both the winner and the runner-up will also be invited to visit the Agency's Radio Monitoring Station at Baldock, Hertfordshire.



Last year's winner Robert Aley, G7SRR and runner up Stephen Connor, GM0TET at the HF Convention in October.

Additional prizes will be awarded by the RSGB and, as in the past, the radio communications industry has been very supportive of this Award (see the display of goodies in the photograph above).

The closing date for applications is 31 July 1995. The Award is open to any resident of the UK, the Channel Islands or the Isle of Man, who has not reached his or her 18th birthday by the closing date. Entrants must be nominated by an adult. There is no requirement for entrants (or nominees) to hold an amateur radio licence. Nominations should be sent to: Young Amateur of the Year Award 1995 (Attn Marcia Brimson) Radio Society of Great Britain, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE.

This Year's Prizes

The winner of the prestigious Young Amateur of the Year Award will also receive:

- A cheque for £300 from the Radiocommunications Agency and an invitation to tour the DTI Monitoring Station at Baldock.
- A general coverage receiver from the RSGB presented by RSGB President Clive Trotman, GW4YKL.
- Siskin Electronics have kindly donated a Mini Pak packet radio modem.

And, the runner up will receive:

- A hand portable transceiver donated by ICOM (UK).
- A cheque for £50 from the Radiocommunications Agency.
- A £25 book token from the Mobile Radio Users Association
- A 5315B multimeter donated by Cirkit Distribution.

PLUS: All entrants will receive a copy of the RSGB Log Book.

QSL

JOHN HALL, G3KVA
Corfe Lodge, Ipswich Road, Long Stratton, Norfolk NR15 2TA.

THERE IS A NEW QSL Sub-Manager for the G1 series: Mr M Marriott, G0OPC, Greenfield View, March Road, Friday Bridge, Nr Wisbech, Cambs PE14 0HA, who takes over from R A Kingstone, G4HHB.

Nigel Roberts, G4KZZ, who is the QSL Sub Manager for the G0G series has moved house. His new address is 13 Rosemoor Close, Hunmanby, North Yorkshire YO14 0NB.

Remember that basic UK inland postage allows for up to 60 grams which is about 12 to 15 cards. The reason I point that out is because we have, of late, had several packages of cards from punters that bore insufficient postage and that's not playing the game.

Reg Allenet, GJ3XZE, the GJ QSL Sub Manager, tells me that he gets lots of SAEs sent to him bearing English stamps which are *not* accepted by the Jersey Postal Service. I must confess I didn't know that myself but I do now!

ENVELOPES

DAVE HOBRO, G4IDF, sent me the interesting GB2CF card, which is made from a display photograph. The reverse was done on a BBC computer using BASIC and a dot matrix printer. Dave also tells me he has a supply of fairly stout manila envelopes of the right size for QSL cards. He can supply them at £1 for 12 plus postage. Dave is QTHR.

Don Mirams, G4SFU, writes about the difficulties in obtaining suitable, gummed flap QSL envelopes. Don says he gets his supply from a local sub Post Office that doubles as a stationers. Don sent me a sample and they seem eminently suitable. They are made of stout manila and measure about 7.5" X 5". He also sent me the descriptive wrapper from the packet which states they are 'Giant Manila' envelopes made in Great Britain by DRG Stationery.

W G Reeve, G0NSU, tells me I got my metrics in a mess in the October 1994 column when referring to recommended sizes for QSL envelopes. Sorry about that, but I never did agree with the metric thing anyway and still mentally convert prices into what is now 'old money'! I bet I'm not the only one who does that either. Anyway to get the envelope thing straight, the recommended size is only a guide to stop people sending in envelopes the size of down quilts. Any stout manila envelope between 6½" x 4" and 8" x 5" is perfectly satisfactory but not bigger than the latter - please.

WRITE CLEARLY

CAN I MAKE a further plea for *clear* printing on QSL cards. All too often cards go round and round the system accumulating words like 'try G****' and 'can't read it' until we are all sick to death of seeing them. If you print the destination call clearly not only will we deliver them safely but you will have a better than average chance of getting an acknowledgement!

RSGB HQ QSL Bureau, P O Box1773, Potters Bar, Herts EN6 3EP, England.

GB2CF card sent by Dave, G4IDF (see text).

The Russian QSL bureau at PO Box 59, Moscow.

OVERSEAS BUREAUX

ALEX, RK3DT, has written and sent a photograph of the staff of P O Box 59, Moscow, in case we thought it didn't exist! From left to right are RA3AUM; Alex, RK3DT; Nick, RU3FM (bureau manager and well-known DXer); and UA3AFS. Alex says it is still pretty difficult out there and things are improving only very slowly. He says they have great problems getting cards to the [former Soviet - *Ed*] Asiatic Republics and he thinks that some of the bureaus out there are not operating fully.

Gerald Ashcroft, V85GA, tells me that there are problems with the BDARA QSL Bureau in Brunei Darusalam - so much so that there isn't one at the moment! Gerald says that if you want a card from V85-land QSL direct and enclose postage, otherwise you will not get a reply. We shall not be sending cards from the bureau until the situation is rectified, so be warned!

Petar Filipovic, YT1WW, who is the YU QSL Bureau Manager wrote to us to say that we could send a trial parcel of cards to him at his home address. He says perhaps the Royal Mail will accept parcels for private individuals and not addressed to companies or organisations. Apparently, the UN sanctions do not apply to QSL cards but it's our Royal Mail people that are being difficult in not accepting them. Does anyone know why?

IRISH QSL BUREAU

THE INCOMING QSL Bureau sub-managers coordinator for the Republic of Ireland - Robert McGrogan, EI4HE, has given me full details of how the Irish national QSL bureau works, for which I am grateful.

The outgoing service is looked after by two volunteers who collect the cards sent in by members of the national society. They are despatched overseas monthly to the popular bureaux whilst the lesser-used bureaux get a mailing at least four times a year.

Incoming cards go to PO Box 462 in Dublin and are sorted by prefix by volunteers and passed on to sub-managers monthly. They then sort them into members and non-members (who have to pay £20 if they wish to use the bureau, otherwise the cards are returned to the bureau of origin).

The whole system is run by twelve volunteers: one PO Box Manager, two members looking after the outgoing service and nine sub-managers.

Robert reckons the Irish national bureau is despatching about 5000 cards overseas every month.

EAVESDROPPINGS

STAN CASPERD, G3XON, tells me he heard the following conversation on an HF band: "I will send you my QSL card as soon as I receive yours" Reply: "Thank you Joe, I will send you my QSL card as soon as I receive yours" I wonder if they are both still waiting? No wonder the bureau throughput has dropped off of late! ♦

CORRECTION

In last month's *QSL*, we showed an award belonging to John Key, G3AAE.

Unfortunately, we gave his name as John Hey, who is someone quite different.

Apologies to both - *Ed.*

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I WAS RATHER SORRY to have missed the VHF Convention this year where, I understand, there was a very productive contest forum. While the convention was running at Sandown Park, I was lucky enough to be attending the Finnish Amateur Radio League Winter Convention at Lahti, near Helsinki which proved to be an excellent event.

It was interesting to note that, compared to our own events, there were many more young people present, and also many more women who were fully involved with the contesting and DXing scene. I also noticed that there was very little tension between the various contest groups, with a lot of healthy exchange of ideas rather than the great secrecy and back-biting which we sometimes witness in this country. I suspect that these are the features which enable the Finns to put such big successful stations together, and help keep the competitive side of amateur radio very much alive and well in Finland.

Part of the discussion at the VHF Convention forum was on rule changes for 1996 as part of the overhaul of the VHF rules which the VHFCC is planning. Don't forget to provide your contribution to this debate with comments to David Johnson, G4DHF, QTHR. The next VHFCC meeting is towards the end of April so hurry with your comments.

One of the questions which comes up on a regular basis is:'Why does it take so long for the results of a contest to come out?' To answer this, you need to understand the complete process involved when contests are adjudicated. The method outlined here is that used by the VHF Contest Committee, but the HFCC's system is similar. After the contest, there is a period of about two weeks allowed for the preparation and posting of the logs, and it can take anything up to another week for all the envelopes to have arrived with the adjudicator. What usually happens then is that the adjudicator attempts to get everything wrapped up in time for the next committee meeting if possible (meetings are normally held at about two monthly intervals). Whether this is reasonable or not depends on various factors such as the size of the contest, the amount of time before the next meeting, how much spare time the adjudicator has and whether there is anything contentious in the entries which needs close scrutiny.

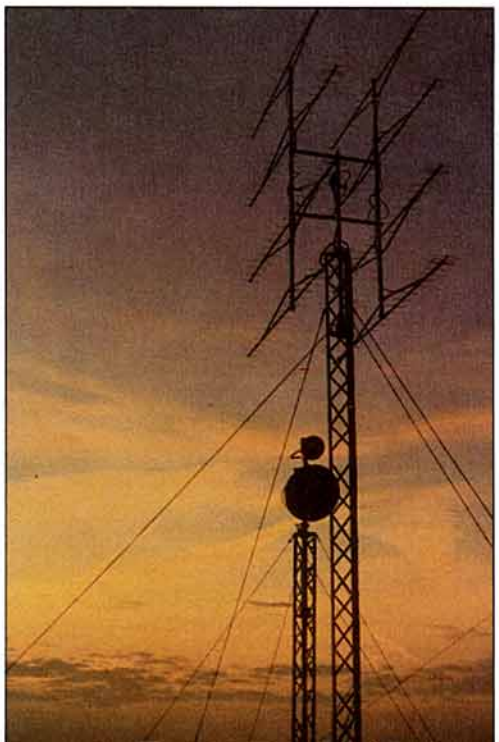
At the meeting, the committee will hopefully approve the results and they are then ready to be sent into *RadCom* and out onto packet. I mail all the results on packet to VHF @ GBR, normally within a week or so of getting them, subject to spending enough time at home to get a chance to do it. Unfortunately, for the last few months I have not been able to do this since my local BBS has been cut off from the rest of the Universe, but this should be sorted again by the time you read this. This could also explain why anyone who has been trying to send me packet mail recently may not have received any replies. The lead time for *RadCom* is at least one month (time from receipt of copy to when it drops through your letterbox into your dog's jaws) but, due to the fixed amount of space available for contest results each month, results can sometimes be held over for several months until a suitable sized block of space is available. This is particularly a problem with the bigger files. I mail the files to *RadCom* once a month, normally towards the end of the month.

I hope this explains why there is a minimum length of time before a set of results are released. If you want to keep up to date with results more quickly you could follow the VHF Newsgroup on packet. However, I find the network is a little less than perfect with some parts of the country seeming like black holes where contest results are concerned. Unfortunately, it does sometimes happen that results get held over in *RadCom* for longer than we would like, and the committee works closely with *RadCom* to try and rescue these situations as soon as they become critical. We really do understand your frustrations at putting all the efforts into a contest and sometimes having to wait a very long time for the results.

The first weekend in October marks the IARU Region 1 UHF/SHF contest which covers all bands from DC (well 432MHz anyhow) to light (245GHz, though currently the RSGB event stops at 24GHz). This contest has been dominated in the UK for some years by the Hadrabs & Windbreakers group operating from Walton-on-the-Naze on the Essex coast. They have also come top in Region 1 on a number of occasions - something for which they should be heartily congratulated. However, during the 1994 event, they got more visitors at their site than they bargained for. It seems that an RSPB contest was more popular than the RSGB one - the first red-throated thrush from Siberia ever sighted in the UK took residence near G4JAR/P's site and the cliffs were littered with tripods which, unfortunately, were carrying cameras rather than microwave dishes! The group did get an opportunity to exact revenge on the invading hoards when a bird watcher, who had barged into the operating tent to ask what they were doing, was told that the bird was carrying a radio tag and they were the official tracking station!

WRTC

OVER THE PAST FEW months I have referred quite a few times to the World Radiosport Team Championship to be held in Washington DC in June. We now have a full set of rules for this event and entry to the event is to be based on your published performance (including multi-operator entries) in up to 15 international contests (*CQ* WW, *CQ* WPX, IARU, ARRL DX, WAE, All Asia, *CQ* 160m, ARRL 160m & ARRL 10m) over the past five years with some specific rules controlling how many of each contest can count to your 15 events. Scores generated as part of a multi-operator entry do count, though the detail is rather complex. The teams consist of two people of whom only one is selected through this ranking process. That person can then select anyone else to form the other member of the team. About 50 teams are expected to take part from around the globe, of which 33% will be from Europe. The closing date for entries is 15 April although you have to request an application by **31 March**. If you are interested in participating in this event both Dave Lawley, G4BUO, and myself have copies of the rules, but you will need to move quickly. The WRTC administration can also be contacted by fax on 00 1 301 470 1580.

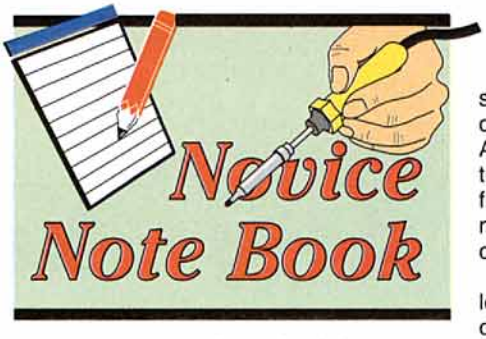


G4JAR/P's 'red-throated thrush' tracking station using 8 x 21el on 432MHz, 4 x 55el on 1296MHz, 66 el Quad Loop on 2320MHz, a 1.4m dish for 3.4 & 5.7 GHz and a 30cm dish for 10GHz.

APRIL CONTESTS

JUST A QUICK reminder about the new 2m SSB Cumulatives held during April. These short two hour events on weekday evenings are intended to attract fixed stations onto the band for a little fun and there are low power and high power sections. You'll find full rules on page 86 of February's *RadCom*. On HF, April brings some good opportunities to practice your CW contesting, whether you are a beginner to CW contesting or not. The Rotating Post Code contest (ROPOCO) has been going for many years now, but remains a real test of accuracy. You start by sending your own post code and continue by sending the code which you received from the last station you worked - it's always amusing to receive your own one back, but garbled! Also, there are the QRS Cumulatives with a maximum speed of 12WPM. These events are really aimed at Novices and newcomers to CW contesting as a good way of getting your feet wet - do give them a try. Both the latter events are on 80m. ♦

TURN TO PAGE 79 FOR CONTEST CLASSIFIED



IAN KEYSER, G3ROO
Rosemount, Church Whitfield, Dover, Kent CT16 3HZ

ROOTING OUT FAULTS

WOULDN'T IT BE GREAT if we could all service our own radios! This may appear to be a far fetched notion but there is no reason why we should not make sensible efforts and have a go.

The first and most important stage of fault finding is carried out without removing a screw. We apply power to the equipment and observe what is happening. For instance, does the fuse blow? Do panel lights light up or is there a hiss from the speaker? Having observed as many effects as possible we can then work out which parts of the circuit are functioning. It is important during fault finding to be methodical and observant.

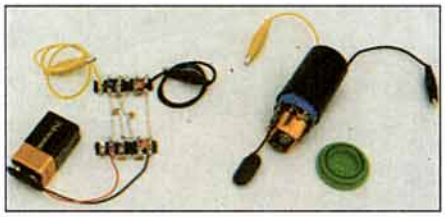
The next step is to check using test gear. A multi-meter is the prime requirement. The second most important piece of equipment is a signal generator. The problem here is the expense involved, something that might discourage the average constructor.

SIGNAL INJECTOR

FOR FAULT LOCATION in a radio we need a signal generator. We commence by connecting an **audio frequency** (AF) signal generator to the audio section; if the audio section works then we will hear a tone in the loudspeaker.

If the audio section works but the radio does not receive signals then the fault must be in the **radio frequency** (RF) sections of the radio. A signal generator can then be used to check these RF sections but we would need an RF frequency generator to do this.

There is, however, a little circuit that we can use for both AF and RF functions. A square wave generator output is rich in harmonics; a harmonic is a multiple of the fundamental output of the generator. A square wave generator with a fundamental output frequency of 2kHz will have a second harmonic on 4kHz, a one hundredth harmonic on 200kHz and a three thousandth harmonic on 6MHz and all the others in between!



Example of signal injector construction.

CONSTRUCTION

THE SQUARE WAVE generator that we use is called a multivibrator. It is constructed on two short lengths of 'herring bone' tag strip as shown in **Fig 1** and **photo 1**. Each tag strip contains the components for each transistor. An output is taken from one or other of the transistor collectors via a 100n capacitor to a fly lead. A second fly lead is connected to the negative battery supply and an earth on the circuit under test.

Test the oscillator by connecting the fly leads to a pair of headphones, tone should be clearly audible. If there is no tone check the voltages on the transistors, which should be; emitter 2V, base 2.6V and collector 5.5V when connected to a 9V battery.

The circuit can be installed in a plastic container as shown in the photograph. I used a film container, with the circuit wrapped around the battery. If you use this method of packaging the circuit must be assembled with care.

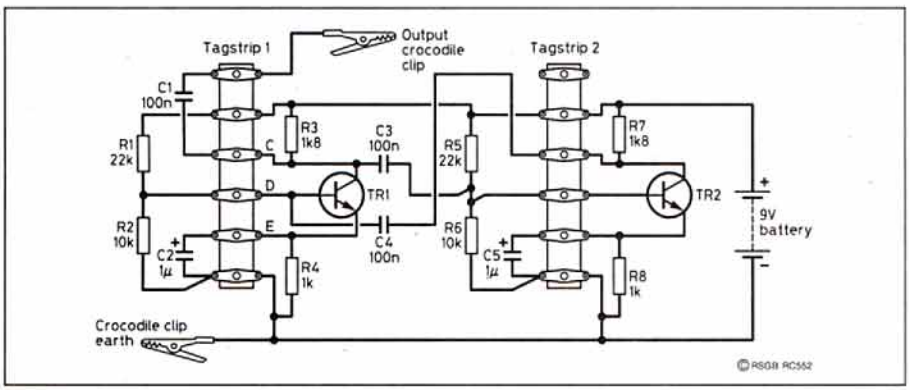


Fig 1: Signal injector, component layout.

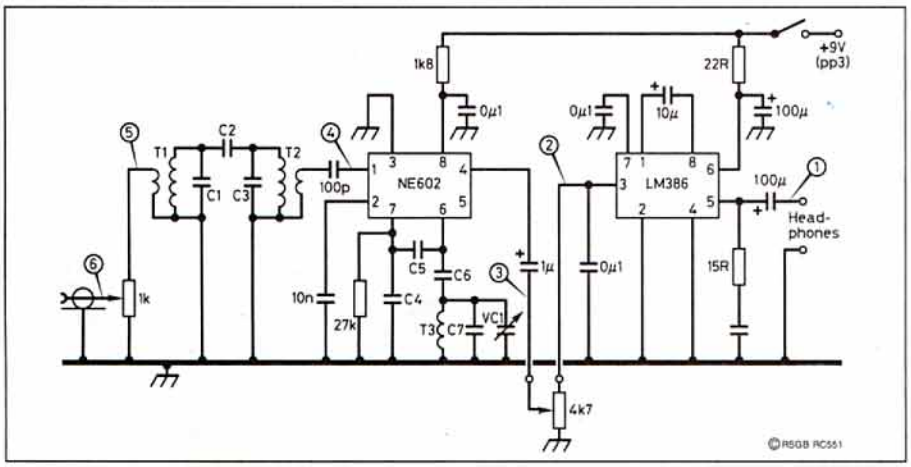


Fig 2: Receiver test points.

TESTING

A TEST PROCEDURE for testing a receiver is given below. A simple receiver, see **Fig 2** (G3RJV's Sudden receiver) is used as an example.

Connect the output probe of the injector to the speaker terminal (1). You should hear a weak tone.

Move the probe to the volume control terminal(2); the sound should be much louder. Move the probe to the slider of the volume control (3); varying the volume control should cause the volume of the sound to vary.

If the audio signal tests were successful but the radio still does not receive signals then the signal injector can be used to check the RF stages.

Move the probe to the input of the NE602 (4).

If this stage is working the tone will sound very different to those produced in the audio tests. When the tuning capacitor VC1 is tuned, a multitude of whistles of changing frequency, will be heard; caused by tuning through the harmonics of the signal from the injector.

Move the injector probe to the input of the antenna filter (5). The signal will sound a little weaker than position (4), and by shifting the injector to the antenna input(6), varying the input attenuator will cause the volume of the received signal to change.

All of the tests described assume that the radio is working. If the test fails at any point then the stage that failed should be checked.

Although this is not a comprehensive fault finding aid, I can assure you that, for all the expensive test gear I have in my workshop, I still frequently use my signal injector for locating many faults in radio equipment. ♦

COMPONENTS LIST

Resistors

R1, R5	22k
R2, R6	10k
R3, R7	1k8
R4, R8	1k

Capacitors

C1, C3, C4	100n
C2, C5	1µF

Semiconductors

TR1, TR2	BC237, BC238, BC548 or similar NPN transistor

Additional Items

9V battery, tag strip, two crocodile clips

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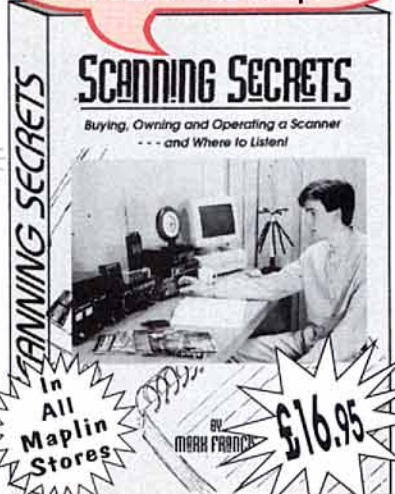

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RADCOM TECHNICAL FEATURE

The User Friendly Smith Chart

By *RadCom* Technical Editor Peter Dodd, G3LDO*

NEARLY EVERY MAJOR book on antennas has a description of a complicated circular graph known as a Smith chart, with instructions on how to use it. The Smith chart is very useful and is used by the professionals to design antennas and impedance matching networks. In spite of this I have never, in 37 years of amateur radio, met anyone who uses the Smith chart to solve a practical antenna problem. So why should this be? And what's wrong with the good old SWR meter for solving antenna matching problems?

THE SWR METER

THERE DOES NOT SEEM to be any problem with a general understanding of standing wave ratio (SWR). Even the most non-technical radio amateur is aware that the coaxial transmission line connecting the rig to the antenna has a characteristic impedance, which is around 50Ω; and that an SWR meter can be used to measure any 'standing waves' on the coaxial line caused by the antenna impedance having a different value to that of the coaxial line. In nearly every ham shack there is usually a SWR meter connected permanently into the coaxial between the transmitter and the antenna or antenna system.

The method of antenna adjustment using an SWR meter is well known. You connect up your antenna system then make a number of adjustments to the antenna and then see which one improves the SWR. This approach is fine with simple antennas such as dipoles. However, things don't always go smoothly. It is not unusual to hear: "I've tried everything but I can't get the SWR down". The setting up and adjustment of a gamma match on a beam, or matching network on a compact antenna can be quite frustrating if the only indication that you have is an SWR meter.

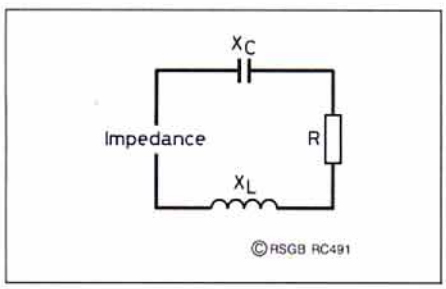


Fig 1: Equivalent antenna circuit

*37 The Ridings, East Preston, West Sussex BN16 2TW.

WHAT IS IMPEDANCE?

THE BEST WAY TO TELL what is happening at the feedpoint of an antenna is to measure its impedance directly.

Impedance (whose symbol is Z) is a general term, which can be applied to any electrical circuit that impedes the flow of AC current. An antenna is a tuned circuit having inductance, capacitance and resistance and an equivalent circuit is shown in **Fig 1.**

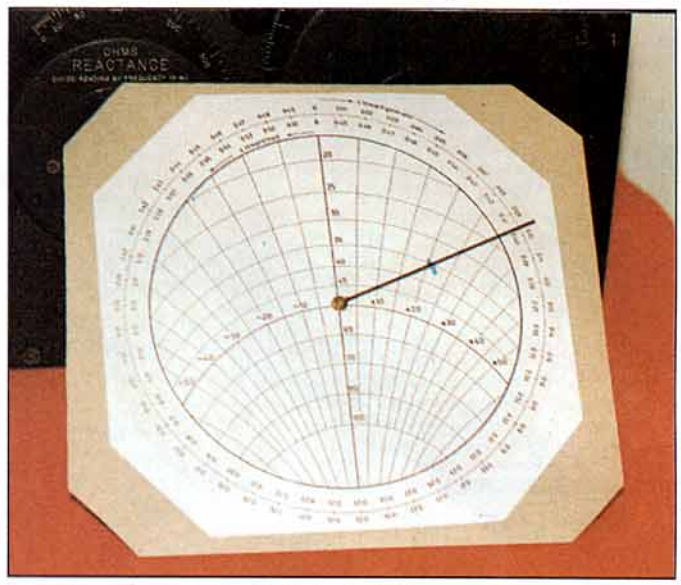
When transmitter power is fed to the antenna the current in the resistive part is in phase with the applied voltage; while the current in the inductive or capacitive part (reactance) is 90 degrees out of phase with the applied voltage. Thus the phase relationship between current and voltage in a tuned circuit or antenna element can be anything between zero and plus or minus 90 degrees, depending on the ratio of resistance and reactance.

Because of this, impedance is always expressed in two parts; resistive and reactive. An impedance having an resistance of 75Ω and a inductive reactance 50Ω is conventionally written as:

75 +j50

The j symbol bothers a lot of people. This is probably due to the way it is described in literature as "the square root of minus one" or "imaginary". Furthermore, impedance is described as "complex". All these terms are derived from the mathematics used in impedance calculations. For our consideration of impedance, j can simply be regarded as a convention for reactance. The '+j' indicates inductive reactance and a '-j' indicates capacitive reactance. When the antenna is at its resonant frequency the +j and -j parts are equal and opposite so only the resistive part remains.

An impedance value can be plotted as co-ordinates on a rectangular chart or map in just the same way that a QTH longitude and latitude is plotted on a map. A position of, say, 52°N 3°E would be plotted on a map as shown in **Fig 2.** Our impedance value of 75 +j50 would be plotted on an impedance map or chart as shown in **Fig 3.** On the impedance chart we use + or -j instead of E or W longitude.



General construction of the Smith chart calculator.

IMPEDANCE MEASUREMENT

BEFORE WE CAN MAKE full use an impedance chart we need an instrument for determining a position on the chart. A simple instrument for measuring impedance was described by Ed Chicken G3BIK [1]. A even simpler and more accurate impedance measuring technique, known as the 3-Meter

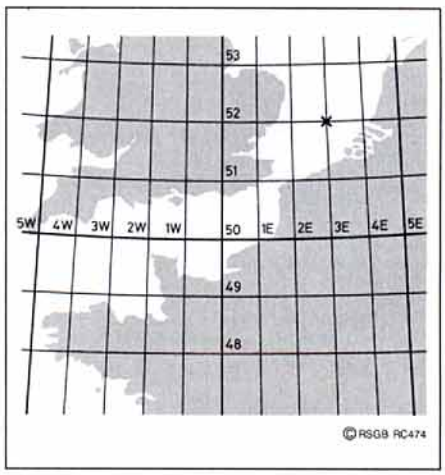
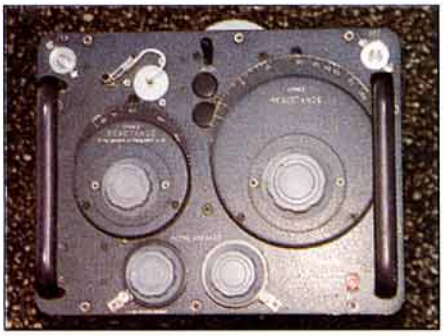


Fig 2: Map showing co-ordinates of latitude and longitude.



General Radio 1606 impedance bridge, showing the resistance and reactance scales.

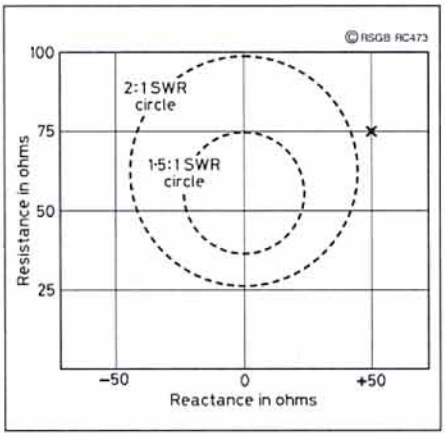


Fig 3: Impedance map showing co-ordinates of resistance and reactance.

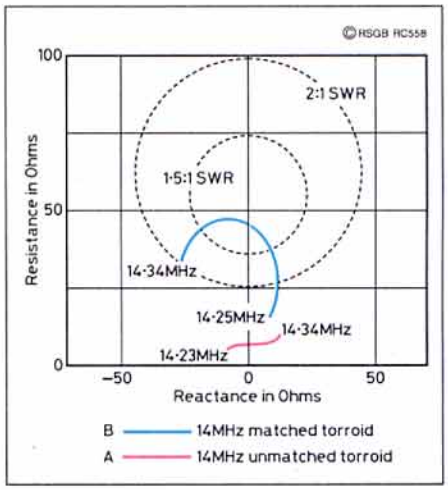


Fig 4: Impedance 'signatures' of a double toroid antenna.

method, is described in *The Antenna Experimenters Guide*, available from the RSGB, see page 90.

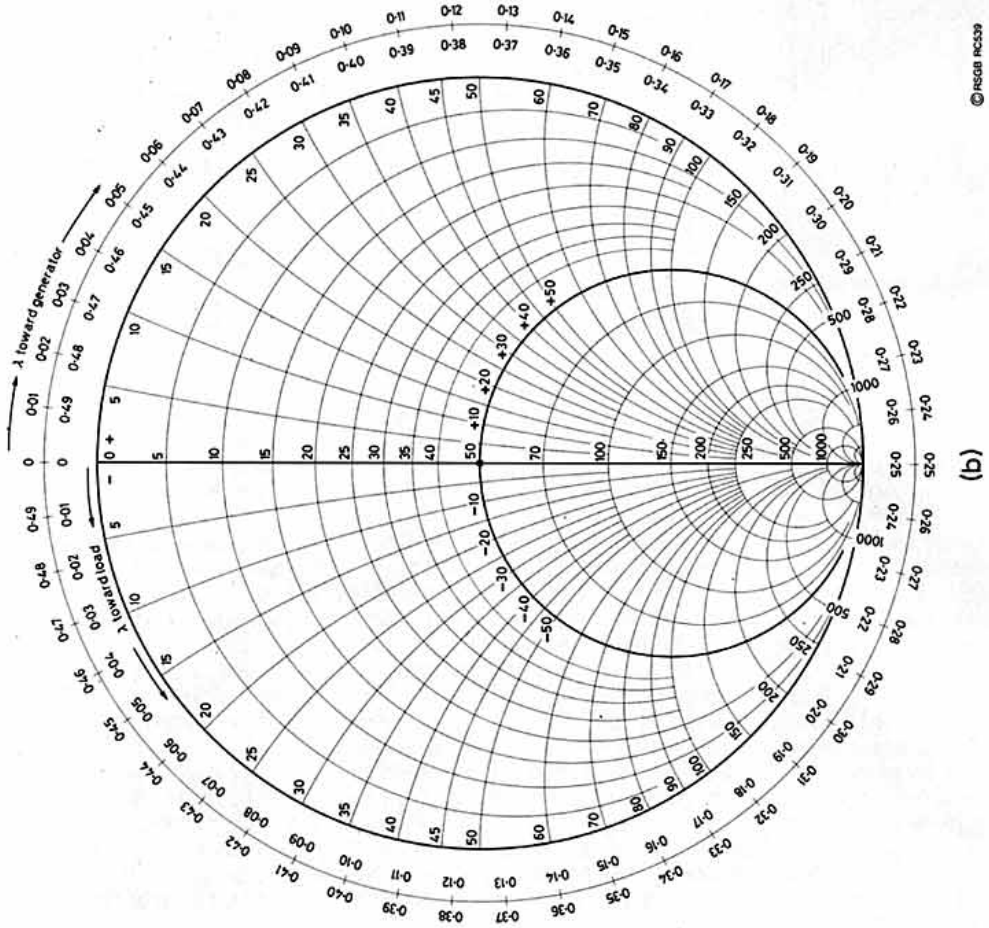
A professional impedance bridge is shown in the above photo. As you can see there are two calibrated controls, one for R and the other for j. Information from the calibrated dials on the instrument can be used to establish the impedance position on the chart.

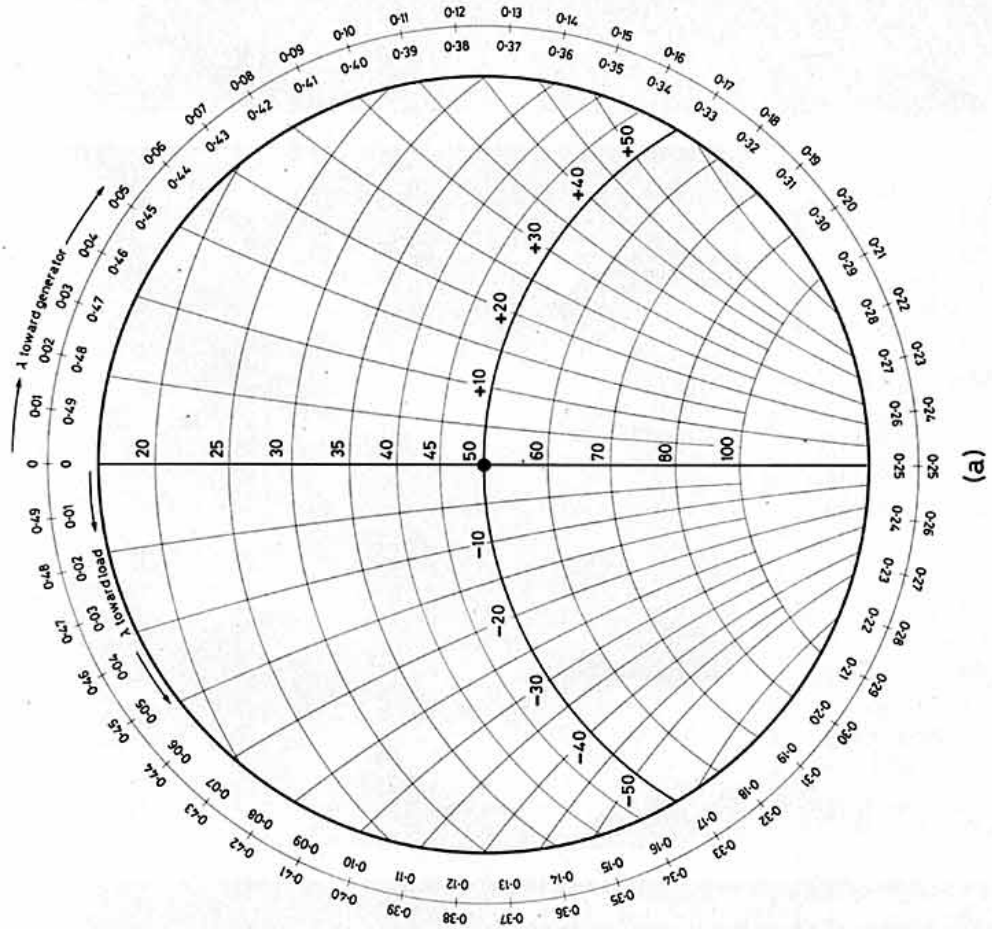
The chart in **Fig 3** also illustrates the limitations of SWR as a means of determining the characteristics of the feedpoint of an antenna. The two circles shown in Fig 3 are circles of constant SWR, one for 2:1 and the other for 1.5:1. Using our map analogy they can be regarded as SWR contours. When you measure SWR to try to find out what is going on at the antenna you are measuring the effect of the antenna not having the same value of impedance as the antenna. However, an impedance of 100 +j0 would give the same SWR as an impedance of 25 +j0. You will see that there is a large number of impedance values that can give an SWR of 2:1. If you measure an SWR value of 2:1 then all you know is that you are somewhere on the 2:1 circle. This explains why an SWR meter is not necessarily the best instrument for adjusting an antenna with a matching network such as a Gamma match.

If you make several impedance measurements of an antenna over a range of frequencies they can be used to produce an impedance 'signature' of the antenna. **Fig 4** shows two of these signatures, which were obtained when evaluating the G2AJV double toroid antenna [2]. Plot A shows that the resistance is around 8Ω at resonance, and explains why no amount of antenna pruning would bring the SWR value to usable proportions. With a suitable matching circuit, the impedance is very close to 50Ω at resonance as shown in plot B.

(Resonance is where the inductive and capacitive reactances in a tuned circuit or antenna element are equal and opposite, and this condition exists only on the 0 reactance vertical line of Figs 3 and 4)

To obtain the results shown in Fig 4 it is necessary to measure the antenna feedpoint impedance at the point where the coaxial is connected to it. There are many practical difficulties in doing this and it is much more





Smith charts for constructing the calculator.

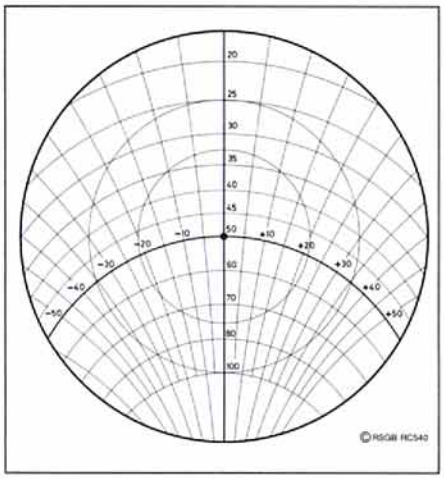


Fig 5: Basic simplified Smith chart.

convenient if impedances could be measured via a length of coaxial cable. Now while SWR is the same anywhere along a transmission line (neglecting any losses) the measured impedance at one end depends on the transmission line electrical length. This is where the Smith chart comes in.

The Smith chart, shown in **Fig 5** is an impedance map similar to the ones shown in Figs 3 and 4. It can be considered as just a different projection, just as maps have different projections, such as the Mercator Projection or the Great Circle projection. The most obvious difference with the Smith chart is that all the co-ordinate lines are sections of a circle instead of being straight.

The Smith chart, by convention, has the resistance scale decreasing towards the top. With this projection the SWR circles are concentric, centred on the 50Ω point, which is known as the prime centre.

If you are familiar with a normal Smith chart you will recognise that the one shown in Fig 5 is simplified. The differences and the reasons for simplification are described later.

One advantage of the Smith projection is that it can be used for calculating impedance transforms over a length of coaxial feeder. Because the reflected impedance varies along the feeder it follows that you need to know the electrical length of your coaxial feeder to the antenna. You can then calculate the transform of impedance measured at the shack end of the feeder using the noise bridge.

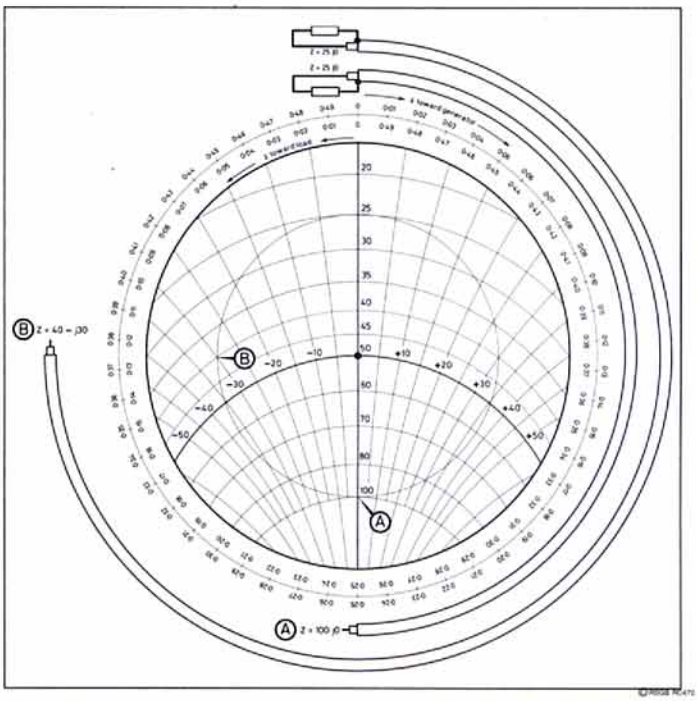


Fig 6: Smith chart, with transmission line electrical length scale, superimposed on two lengths of coaxial cable.

The impedance transformation Smith chart is illustrated in **Fig 6**. An additional scale is added around the circumference, calibrated in electrical wavelength. Halfway round the chart equals 0.25 or quarter wavelength, while a full rotation equals 0.5 or half wavelength.

Two lengths of 50Ω coaxial feeder are shown superimposed around the circumfer-

ence of a Smith chart in Fig 6; one length quarter wave long and the other 3/8 wavelength). Both lengths are connected to a load having an impedance of 25 +j0. The quarter wave length of line (0.25) gives a measured impedance of 100 +j0 at the other end while the 3/8 section (0.375) gives an impedance of 40 +j30. It can also be seen from Fig 6 that a halfwave length of coaxial cable would transform the impedance back to 25 +j0.

A PRACTICAL SMITH CHART CALCULATOR

YOU CAN USE EITHER of the charts on Page 42 to construct a Smith chart calculator.

Chart (a) has a restricted impedance range but is easier to use. It is used where the impedance excursions are limited and do not cause an SWR much greater than 2.5:1.

Chart (b) is the standard chart which covers impedances from (theoretically) zero to infinity.

For this exercise we will make an impedance calculator using the restricted range chart, which is easier read and use, see the photograph on page 40.

Make a photocopy of the chart enlarging it to bring it to a usable size. I suggest an enlargement from A4 to A3; a single chart will then fit on a single piece of A4 paper. The chart is then glued to a circular sheet of stiff cardboard or thin aluminium. A small hole is drilled in the chart and backing material at the 50 +j0 point.

From a piece of very thin perspex or transparent plastic or celluloid cut a circle the same size as the chart to make an overlay. A hole is then drilled exactly at the overlay centre. Identifying the centre point should be no problem if a pair of compasses is used to mark the overlay before cutting.

Make a cursor by drawing a line along the radius of the overlay, using a fine tipped marker pen. Cover the line with a strip of cellotape to prevent the line rubbing out. Trim off the excess tape.

Fix the transparent overlay to the chart with a nut and bolt with the tape covered line against the chart. Adjust the nut and bolt so that the overlay can be easily rotated, as shown in the photograph.

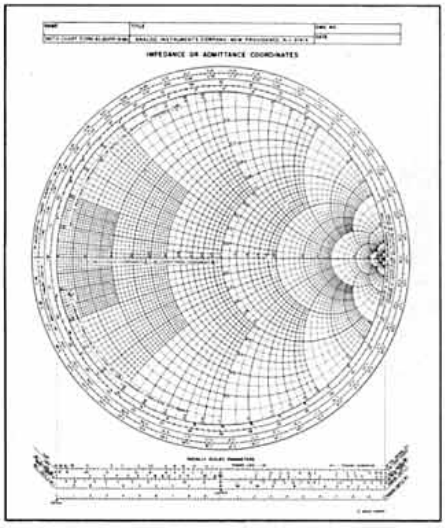


Fig 7: View of a normalized standard Smith chart.

USING THE CALCULATOR

THE USES TO WHICH this calculator can be put are too numerous to be included in this article. But here are three examples.

MEASURING COAXIAL CABLE ELECTRICAL LENGTH

YOU CAN FIND THE electrical length of coaxial cable by physically measuring its length and multiplying it by the cable velocity factor.

A more accurate method is to measure the electrical length directly using an RF impedance measuring instrument (eg a noise bridge). It also assumes there are no cable losses; in practice this means that the procedure will only work with relatively short lengths of fairly good quality coaxial cable. You should be using reasonable grade coaxial anyway to measure antenna characteristics - even SWR.

1 Terminate the load (antenna) end of the cable with a 22Ω resistor.
2 Measure the impedance at the other end of the feeder.
3 Move the cursor so that it intersects the measured impedance point. The cursor will now point to the electrical wavelength of the feeder marked on the outer scale marked 'wavelengths towards generator'.

The cable may be several half wavelengths and part of a half wavelength long. The Smith chart will only register the 'part of a half wavelength', which is all we are interested in regarding the impedance transform effect.

CALCULATING ANTENNA IMPEDANCE

THIS IS A METHOD of calculating antenna impedance from a measured impedance value, using coaxial cable whose electrical length has already been determined.

1 Connect the cable to the antenna.
2 Measure the impedance at the other end of the coaxial.
3 Move the cursor over the measured impedance point and mark the point on the overlay with a wax pencil.
5 Follow the cursor radially outwards to the scale marked 'wavelengths towards load'. Write this number down.
6 Add the length of cable in wavelengths to this number.
7 If the number is larger than 0.5, subtract 0.5.
8 Rotate the overlay until the cursor points to this number on the 'wavelengths towards load' scale.
9 The antenna impedance will be found on the cursor directly under the wax pencil mark.

EXAMPLE

The measured impedance is 35 +j20Ω and the cursor points to 0.407 on the 'wavelengths towards load' scale.

The cable electrical length was measured as 0.13 wavelengths.

Then 0.407 + 0.13 = 0.537 wavelengths. Off scale - too big! So subtract 0.5 wavelengths = 0.037 wavelengths.

Rotate the overlay until the cursor points to 0.037 on the 'wavelengths towards load' scale.

The antenna impedance is shown as 28 -j8Ω under the cursor at the same radius as the measured impedance.

MEASUREMENT OF SWR

CALCULATION OF SWR is very simple using the Smith chart. The result is useful for correlating impedance measurements with SWR measurements. To measure SWR:

1 Move the cursor over the measured impedance point.
2 Mark the point on the overlay with a wax pencil.
3 Move the cursor to the 0 point on the outside scales.
4 The SWR can be read off as 50 divided by the mark on the cursor. The impedance measured above gives a reading of 27 +j0. 50 divided by 27 equals 1.85; the SWR in this case is 1.85:1.

You can, of course, calibrate the cursor in SWR. Just place the cursor in the vertical zero position and place marks on the cursor at the 33.3, 25 and 20 resistance points to give SWR marks at 1.5:1, 2:1 and 2.5:1 respectively.

CONCLUSION

USING THE SMITH CHART, as described above, doesn't seem so complicated, so why is it not more widely used?

It is probably because the Smith chart is designed for professional use and is required to have high resolution to give accuracy to the results. Like any graphic aid, the higher the line density the greater is its resolution but the harder it is to read as you can see in **Fig 7**.

In addition most Smith charts are 'normalized' so that they can be used at any impedance and not restricted to 50Ω, as are the ones described in this article. This is achieved by assigning 1 to the prime centre; other values, for example, are 0.5 for 25Ω and 2 for 100Ω in a 50Ω system.

NOTE

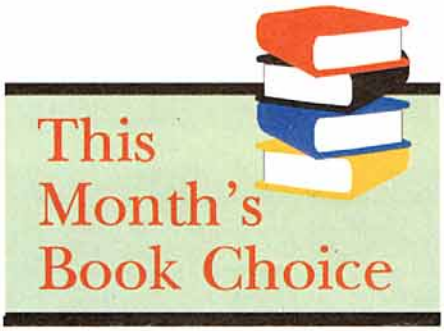
YOU COULD OBVIOUSLY measure the impedance of the antenna using a halfwave, or a multiple of a half wavelength, of coaxial cable and dispense with the Smith chart altogether. In fact this is often done but there are a couple of disadvantages. Because the cable is resonant it can result in antenna currents on the cable, which can give inconsistent impedance measurement results. Also if you make several impedance measurements over a range of frequencies remember that the cable is a half wavelength long on one frequency only.

ACKNOWLEDGEMENT

TO PETER SWALLOW, G8EZE, for checking the manuscript and help on a procedure for using the Smith chart.

REFERENCES

[1] 'Tone Modulated HF Impedance Bridge', E Chicken, G3BIK, *Radio Communication*, June/July 1994.
[2] 'Evaluation of the G2AJV Toroidal Antenna', Peter Dodd, G3LDO, *Radio Communication*, August 1994. ♦



Described by HQ Staff

SKYCALL UK AMATEUR RADIO CALLBOOK WITH BBS AND REPEATER LISTINGS

Software produced for the RSGB by Skyview Systems Ltd. Available from RSGB Sales at £19.80 plus P&P.

ALTHOUGH SKYCALL IS a Call Book, it isn't a book at all - it comes on four 3.5in, 1.2Mb diskettes in compressed form, and runs on a computer under Windows. The packaging, too, is deceptive; the disks are contained in a smart book-shaped cardboard folder which also contains the documentation. SkyCall is the RSGB's first attempt at marketing its own amateur radio software and is designed to be a quality product.

Minimum computer requirements are: an IBM compatible 80386 with Windows 3.1 or 3.11, equipped with either an EGA or VGA monitor, and having 4Mb of RAM and a spare 8Mb of hard disk space.

Getting Started

THE DOCUMENTATION includes full installation instructions and once the installation program is running, you are prompted at each stage. Once in place, SkyCall places its own icon - an open book - into your Windows Program Group, or makes its own Group if that is what you specified on set-up.

Double-clicking on the icon starts the program and brings up the main call book screen (**Screen 1**). This screen, which performs all of the callsign directory functions, can be maximised to full screen size or minimized to an icon - which can be configured to open and close every few seconds to remind you that it is active - but is most useful set at its quarter-screen size. This small display can be moved around so that it can be run simultaneously with, say, a packet radio program or a computer log, the usefulness of which is shown below.

An optional 'Button Hints' facility provides a brief description of what a button does as you place the cursor over it.

The Callbook

THE MAIN DISPLAY (Screen 1) shows the 'cardfile' menu which allows switching between the four sections of the 'book' with a single click of the mouse.

The cursor defaults to the Callsign box and typing in any callsign (in upper or lower case) causes that station's initials, surname, address and postcode to be displayed rapidly in the other boxes. The complete list of over 55,000 UK calls is available.

Video-recorder style arrows allow you to step through the list one entry at a time, or to jump several entries; both work backwards as well as forwards and can also be operated by key strokes.

The indexing can be changed by clicking on the 'Index by' buttons so that the arrows can be used to browse through the Callbook in Surname or Postcode order. Typing in the Callsign, Surname or Postcode boxes automatically switches the program to the appropriate index.

Clicking on the pages symbol (Copy button) at the bottom right of the display copies the Callbook entry to the Clipboard in a multi-line format. This is ideal for making labels for your QSLs or setting up a club mailing list.

A novel, but most useful, facility is activated by holding the cursor over the callsign box and pressing the right mouse key. This shows the displayed station's AX25 packet radio address (Home BBS) if known.

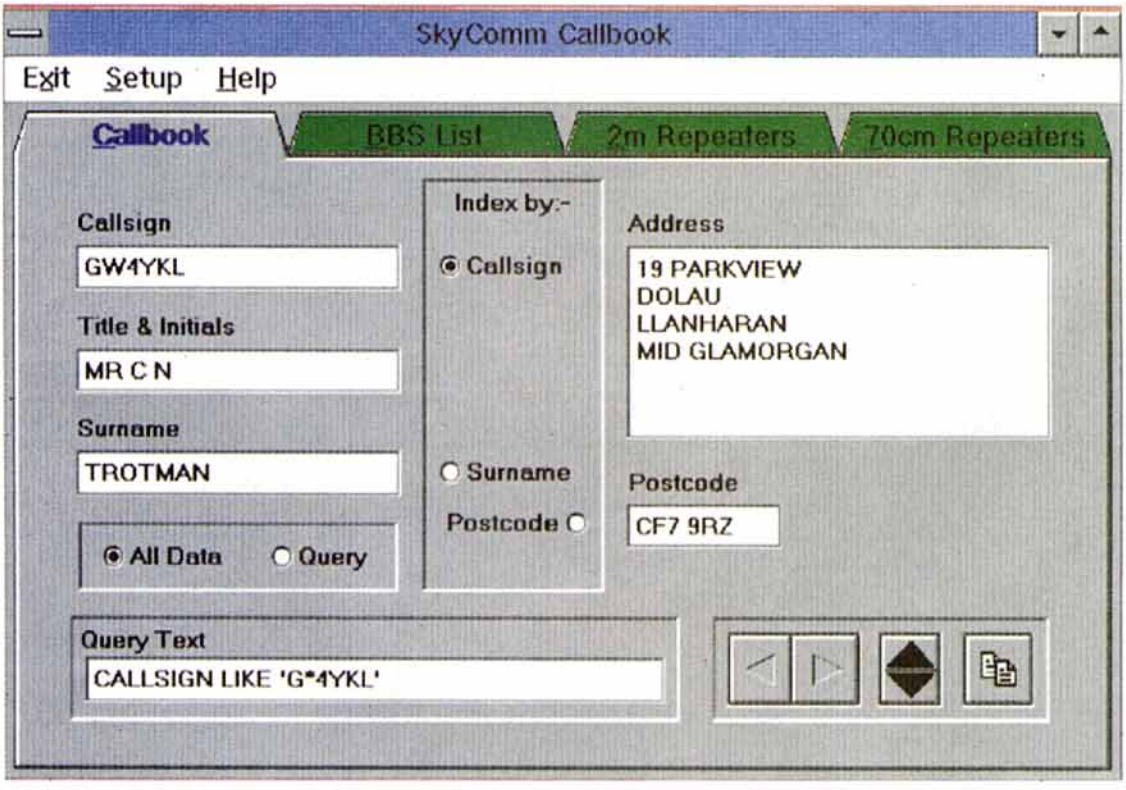
Where a software call book differs from the conventional paper one is in its search and sort options. For a start, in the Callsign, Surname and Postcode boxes you can use an asterisk as a 'wildcard', so that typing G3*DV will produce all valid calls starting with G3 and ending with DV. Similarly, a list of all those in, for instance, the St Albans postcode area can be obtained by typing, for instance, AL*.

More powerful options are available from the Query Text box. This uses the standard database language SQL (Structured Query Language) which permits, not only similar searches to the above, but also complex searches such as:

(SURNAME = 'SMITH' OR SURNAME = 'SMYTHE') AND (POSTCODE LIKE PE* OR POSTCODE LIKE WV*)

which will find all valid calls with surname Smith or Smythe in the Peterborough or Wolverhampton areas (not an easy task using a conventional call book!). Although initially daunting, this part of the program is made to be as simple to use as possible; the commands may be typed in upper or lower case and double quotes are automatically converted to single quotes.

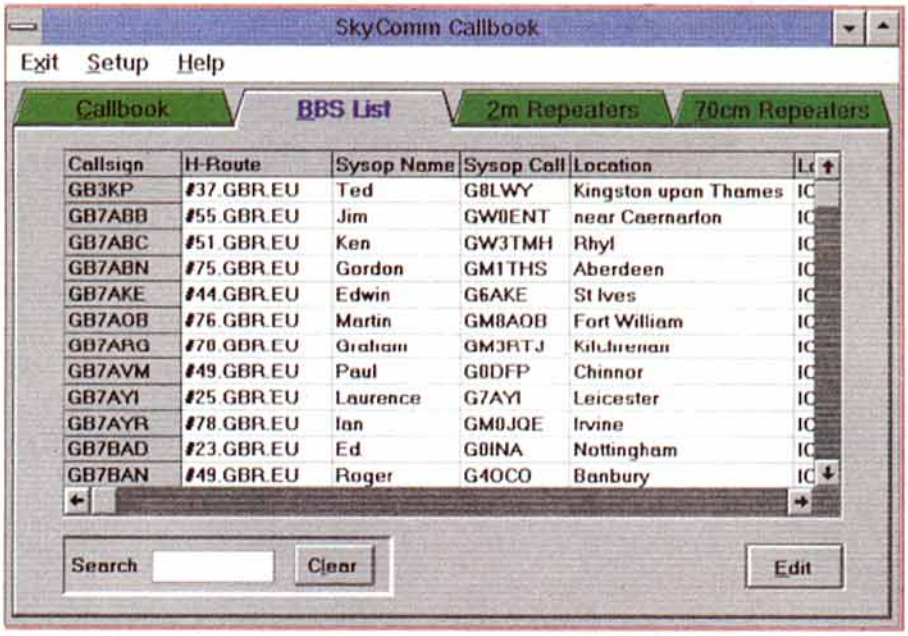
The program will also present the result in callsign, name or postcode order, though the handbook warns that the use of the ORDER function will delay the result significantly. An optional Records box (not shown here) allows a total to be displayed of the number of records corresponding to the search criteria.



Screen 1: The main Callbook display. The area to the right of the postcode is where a total of selected records can optionally be shown.

Repeaters and Packet

ALTHOUGH A program on floppy disk cannot hope to compete with the vast amount of information available in the *Information Directory* part of the *RSGB Call Book*, SkyCall offers three useful and versatile lists: BBSs (packet radio mailboxes), Two metre Repeaters and



Screen 2: The BBS List display. This is similar to the repeater displays.

Screen 3: The result of clicking on the EDIT button which appears on the BBS and repeater displays.

Seventy centimetre Repeaters.

These lists work differently from the Callbook in that a listing is visible on screen at all times (**Screen 2**). Basic searching is available only on Callsign (but see below for a way to expand on this). The record you have selected appears at the head of the list.

Displayed on the BBS List are the callsign, H-route, name and callsign of the System Operator (SysOp), town and county. The list is in callsign order. Scroll bars are provided which allow vertical and horizontal scrolling through the display.

The repeater lists are displayed in channel order (this is the most useful order when trying to identify a repeater as you will know what channel you have tuned to). In addition to channel and callsign, the Locator and location are shown.

Although these are handy features, it is possible to extend them by clicking on the Edit button. This opens Windows Notepad (**Screen 3**) and permits updating of the BBS and repeater lists; another facility not available in a paper call book. Some very useful additional features become available by courtesy of Notepad, such as printing, searching for any word or phrase, and cut and paste. It is possible, for instance, to produce your own printout of the BBSs or repeaters in a particular area.

Instructions

THE MANUAL SUPPLIED with SkyCall provides all you need to set up the call book and use any of its facilities, including SQL which is described briefly.

In addition to the manual, there is a comprehensive on-screen HELP facility with 21 sections (**Screen 4**).

Summary

IF YOU HAVE a modern computer capable of running Windows at a reasonable speed, SkyCall is certain to be of use to you, particularly in conjunction with logging or packet programs. The display is simple yet attractive, and the Callbook can run at the same time as other Windows applications, either on-screen or as an icon. The search facilities are powerful and there is potential for experimentation with the editing commands in the BBS/repeater lists.

The RSGB version of SkyCall was launched at the London Amateur Radio and Computer Show. It costs £19.80 (+P&P) to Members from RSGB Sales. Annual updates will be available *to registered users* at a discount. ♦

Screen 4: The HELP index covers 21 topics.

UK Amateur Radio Band Plans

1.8 MHz (160 m)

LICENCE NOTES:

Amateur Service: 1.810 - 1.850 MHz, Primary. Remainder secondary. *Available on the basis of non-interference to other services (inside or outside the UK)*

Satellite Service: No allocation

Power limit: 1.810 - 1.850 MHz: 26 dBW PEP. Remainder 15 dBW

Permitted modes: Morse, telephony, RTTY, data, fax, SSTV

IARU	Novice	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage
1.810					
CW only					
1.838					
Digimodes (and CW but excluding packet radio)					*RTTY (baudot) is the preferred digital mode on this band* *Phone may be used above 1.840*
1.842					
Phone and (CW)	✓		✓		*[1.950 - 2.000 Novice]* *1.960* DF contest beacons (14 dBW) 12.5 kHz b/w max *1.970* Provisional Novice calling freq.
2.000					**Note: packet radio should not be used on the 1.8 MHz band.**

3.5 MHz (80 m)

LICENCE NOTES:

Amateur Service: Primary, *Shared with other services*

Satellite Service: No allocation

Power limit: 26 dBW PEP

Permitted modes: Morse, telephony, RTTY, data, fax, SSTV

Unattended beacons: Only for DF contests Sat & Sun only. 14 dBW ERP PEP max

IARU	Novice	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage
3.500					
CW only					*3.500 - 3.510* Priority for CW inter-continental working *3.500 - 3.560* CW contest preferred segment *[3.560 - 3.585 Novice]*
3.580	✓				*[3.585]*
Digimodes (and CW)				✓	*3.590 - 3.600* Preferred packet radio frequencies *(Phone may be used and has priority above 3.600 MHz)*
3.620					*3.600 - 3.650* Phone contest preferred segment *3.635 - 3.650* Used by CIS stations for intercontinental working *3.700 - 3.800* Phone contest preferred segment *3.730 - 3.740* SSTV/fax recommended *3.775 - 3.800* Reserved for intercontinental phone working
Phone (and CW)					
3.800					

Novice Licence: powers and modes

The power levels shown in these band plans are for the full UK licences. Novice licencees are limited to 5 W DC input or 3 W RF output. Furthermore, the novice licence schedule makes some restrictions on the modes which are permitted *within* the bands shown in these pages as being available to novices. Please refer to the Amateur Radio Novice Licence and its schedule for full details.

7 MHz (40 m)

LICENCE NOTES:

Amateur Service: Primary

Satellite Service: Primary

Power limit: 26 dBW PEP

Permitted modes: Morse, telephony, RTTY, data, fax, SSTV

IARU	Novice	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage
7.000					
CW only					
7.035					
Digimodes (and CW, SSTV, Fax)					*(Phone may be used above 7.040)*
7.045					
Phone (and CW)					
7.100					

10 MHz (30 m)

LICENCE NOTES:

Amateur Service: Secondary

Satellite Service: No allocation

Power limit: 26 dBW PEP

Permitted modes: Morse, telephony, RTTY, data, fax, SSTV

IARU	Novice	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage
10.100					
CW only	✓				*10.130*
10.140					*10.140*
Digimodes					*(Unattended digimode stations should avoid the use of the 10 MHz band.)*
10.150					

10 MHz Band Plan notes:

Note: The 10 MHz band is allocated to the amateur service only on a secondary basis. Therefore IARU have agreed on a worldwide basis that only CW and digimodes being narrow bandwidth modes, are to be used on this band. Likewise this band is not to be used for contests or news bulletins.

14 MHz (20 m)

LICENCE NOTES:

Amateur Service : Primary
Satellite Service : 14.000 - 14.250 MHz: Primary
Power limit: 26 dBW PEP
Permitted modes: Morse, telephony, RTTY, data, fax, SSTV

IARU	Novice	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage	
14.000						
CW only					*14.000 - 14.060*	*CW only contest preferred segment*
14.070						
Digimodes *(and CW)*					*14.089 - 14.099*	*Packet radio preferred frequencies*
14.099						
Beacons only					*14.099 - 14.101*	*Reserved exclusively for beacons*
14.101						
Digimodes *(+ phone and CW)*					*14.101 - 14.112*	*Packet radio preferred frequencies*
14.112						
Phone *(and CW)*					*14.125 - 14.300*	*SSB only contest preferred segment*
					14.225 - 14.235	*Used for SSTV/fax*
14.350						

21 MHz (15 m)

LICENCE NOTES:

Amateur Service: Primary
Satellite Service : Primary
Power limit: 26 dBW PEP
Permitted modes: Morse, telephony, RTTY, data, fax, SSTV

IARU	Novice	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage	
21.000						
CW only						
21.080						
Digimodes *(and CW)*					*21.100 - 21.120*	*Packet radio preferred*
					[21.100 - 21.149 Novice]	
21.120	✓					
CW only						
21.149						
Beacons only					*21.149 - 21.151*	*Beacons exclusive*
21.151						
Phone *(and CW)*					*21.335 - 21.345*	*Used for SSTV / fax*
21.450						

18 MHz (17 m)

LICENCE NOTES:

Amateur Service: Primary
Satellite Service: Primary
Power limit: 26 dBW PEP
Permitted modes: Morse, telephony, RTTY, data, fax, SSTV

IARU	Novice	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage	
18.068						
CW only						
18.101						
Digimodes *(and CW)*						
18.109						
Beacons only					*18.109 - 18.111*	*Exclusively beacons*
18.111						
Phone *(and CW)*						
18.168						

24 MHz (12 m)

LICENCE NOTES:

Amateur Service: Primary
Satellite Service: Primary
Power limit: 26 dBW PEP
Permitted modes: Morse, telephony, RTTY, data, fax, SSTV

IARU	Novice	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage	
24.890						
CW only						
24.920						
Digimodes *(and CW)*						
24.929						
Beacons only					*24.929 - 24.931*	*Beacons exclusive*
24.931						
Phone *(and CW)*						
24.990						

28 MHz (10 m)

LICENCE NOTES:

Amateur Service: Primary
Satellite Service: Primary
Power limit: 26 dBW PEP
Permitted modes: Morse, telephony, RTTY, data, fax, SSTV
Unattended beacons: Only for DF contests (14 dBW PEP max)

IARU	Novice	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage
28.000					
CW only					
28.050					
Digimodes (and CW)	✓				[28.060 - 28.190 Novice] 28.120 - 28.150 Packet radio preferred
28.150					[28.190]
CW only					28.190 - 28.199 Beacons operational
28.199					
Beacons only					28.199 - 28.201 Beacons exclusive
28.201					
Phone (and CW)	✓			✓	[28.225 - 28.500 Novice] 28.201 - 28.255 Beacons operational [28.500] 28.675 - 28.685 used for SSTV / fax
29.200					
Digimodes (+ phone and CW)					29.200 - 29.300 Preferred for packet radio (FM 2.5 kHz)
29.300					
Satellite downlinks					29.300 - 29.500 Reserved exclusively for satellite downlinks
29.550					
Phone (and CW)					Some experimental FM repeaters may be established in IARU Region 1
29.700					

50 MHz (6 m)

LICENCE NOTES:

Amateur Service: 50.0 - 51.0 MHz, Primary; 51.0 - 52.0 MHz, Secondary *Available on the basis of non-interference to other services (inside or outside the UK).*
Satellite Service : No allocation
Power limit: 50.0 - 51.0 MHz, 26 dBW PEP; 51.0 - 52.0 MHz, 20 dBW PEP
Permitted modes: Morse, telephony, RTTY, data, fax, SSTV

IARU	Novice	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage
50.000					
CW only					50.020 - 50.080 Beacons 50.090 CW calling frequency
50.100					
SSB and CW only			✓		50.100 - 50.130 DX window - note 1 50.110 Intercontinental calling - note 2 50.185 Cross-band activity centre 50.200 SSB calling frequency 50.300 CW MS calling frequency 50.350 SSB MS calling frequency
50.500					
All modes					50.510 SSTV 50.550 Fax 50.600 RTTY (afsk) 50.630 - 50.750 Packet radio - note 3
51.000	✓				
SSB and CW only					
51.125					
All modes					51.210 Emergency comms. priority
51.410					
FM simplex channels Note 4					51.210 - 51.390 Repeater inputs 51.410 - 51.590 FM telephony 51.510 FM calling 51.530 Note 5
51.830					
All modes					51.810 - 51.990 Repeater outputs 51.940 - 52.000 Emergency comms priority
52.000					

50 MHz Band Plan notes:

1. Only to be used for QSOs between stations in different continents.
2. No QSOs on this frequency. Always QSY when working intercontinental DX.
3. 20 kHz channel spacing. Channel centre frequencies start at 50.630 MHz.
4. 20 kHz channel spacing. Channel centre frequencies start at 51.410 MHz.
5. Used by GB2RS news and for slow morse transmissions.

Notes to the HF Band Plans

1. The expression "phone" includes all permitted forms of telephony.
2. If transmitting very close to a band edge, take care not to radiate outside of the band.
3. Before transmitting, all operators should check that the frequency is not already occupied. The normal advice is to use the phrase "Is this frequency in use?" on SSB or "QRL?" on CW.
4. Digimodes are defined as including: AMTOR, PACTOR, CLOVER, ASCII, RTTY (Baudot) and packet.
5. LSB is recommended on bands below 10 MHz, and USB recommended on bands above 10 MHz.
6. The Region 1 IARU HF band plans are designed to enable the best utilisation of the HF spectrum space available. They achieve this objective because the vast majority of licensed amateurs observe the voluntary recommendations. In some countries (e.g. the USA) licence regulations require that specific modes be confined to specific sections of each band.

Notes on the VHF Band Plans

1. The beacon and satellite services must be kept free of normal communication transmissions to prevent interference with these services.
2. The use of the FM mode within the SSB / CW section and CW and SSB in the FM-only sector is not recommended.
3. Repeater stations are primarily intended as an aid for mobile working and they are not intended to be used for DX communication. FM stations wishing to work DX should use the all-modes section, taking care to avoid frequencies allocated for specific purposes.

70 MHz (4 m)

LICENCE NOTES:

Amateur Service: Secondary. Available on the basis of non-interference to other services (inside or outside the UK).
Satellite Service: No allocation
Power limit: 22 dBW PEP
Permitted modes: Morse, telephony, RTTY, data, fax, SSTV

IARU	Novice	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage	
70.000						
Beacons					*70.030*	*Personal beacons*
70.030						
SSB and CW only					*70.150*	*Meteor scatter calling*
					70.185	*Cross-band activity centre*
					70.200	*SSB / CW calling*
70.250						
All modes					*70.260*	*AM / FM calling*
70.300						
Channelised operation using 12.5 kHz channels					*70.3000*	*RTTY / fax*
					70.3125	*Packet radio*
		✓	✓	✓	*70.3250*	*Packet radio*
					70.3375	*Packet radio*
					70.3500	*Emergency comms priority*
					70.3625	
					70.3750	*Emergency comms priority*
					70.3875	
					70.4000	*Emergency comms priority*
					70.4125	
					70.4250	
					70.4375	
					70.4500	*FM calling*
					70.4625	
					70.4750	
			✓		*70.4875*	*Packet radio*
70.500						

144 MHz (2 m)

LICENCE NOTES:

Amateur Service: Primary
Satellite Service: Primary
Power limit: 26 dBW PEP
Permitted modes: Morse, telephony, RTTY, data, fax, SSTV
Unattended beacons: Only for DF Contests

144 MHz Band Plan notes:

1. CW meteor scatter operation can take place up to 26 kHz higher than the reference frequency.
2. Used by emergency communications subject to 14 dBW PEP limitation. This note will eventually be deleted from the band plans.
3. Frequencies in the range 144.5125 MHz to 144.6875 MHz may be used for data communications subject to the requirement that sidebands do not spread outside this range of frequencies. The use of frequencies beneath 144.600 MHz for data communications is a temporary measure pending a complete review of the band plan for 144.0 - 145.0 MHz scheduled to be completed in time for the 1996 IARU Region 1 Conference. Before any use is made of frequencies beneath 144.600 MHz for data communications, operators must make every effort to consult with existing operators using that part of the band.

IARU	Novice	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage	
144.000						
CW only					*144.000 - 144.035*	*Moonbounce*
					144.050	*CW calling frequency*
					144.100	*MS CW ref frequency - note 1*
					144.140 - 144.150	*CW FAI working*
144.150						
SSB and CW only					*144.150 - 144.160*	*SSB FAI working*
					144.175	*Microwave talk-back calling frequency (UK)*
					144.195 - 144.205	*SSB random MS*
					144.250	*GB2RS and slow morse transmissions*
					144.260	*Emerg. comms priority*
					144.300	*SSB calling frequency*
					144.395 - 144.405	*SSB random MS*
144.500						
All modes non-channelised					*144.500*	*SSTV calling frequency*
					144.5125 - 144.6875	*Note 3*
					144.600	*RTTY calling frequency*
					144.600 ±	*RTTY working (fsk)*
					144.625	*Packet radio (TCP/IP)*
					144.650	*Packet radio mailboxes*
					144.675	*Packet radio*
					144.700	*Fax calling frequency*
					144.750	*FSTV calling+talk-back*
					144.775 - 144.825	*Emergency comms priority*
144.845						
Beacons					*144.845 - 144.990*	*Beacons*
					144.850	*Note 2*
145.000			✓	✓		
FM Repeater Inputs					*145.000*	*R0*
					145.025	*R1*
					145.050	*R2*
					145.075	*R3*
					145.100	*R4*
					145.125	*R5*
					145.150	*R6*
					145.175	*R7*
145.200						
FM Simplex Channels					*145.200*	*S8*
					145.225	*S9*
					145.250	*S10*
					145.275	*S11*
					145.300	*S12*
					145.325	*S13*
					145.350	*S14*
					145.375	*S15*
					145.400	*S16*
					145.425	*S17*
					145.450	*S18*
					145.475	*S19*
					145.500	*S20*
					145.525	*S21*
					145.550	*S22*
					145.575	*S23*
145.600						
FM Repeater Outputs					*145.600*	*R0*
					145.625	*R1*
					145.650	*R2*
					145.675	*R3*
					145.700	*R4*
					145.725	*R5*
					145.750	*R6*
					145.775	*R7*
145.800						
Satellites						
146.000						

FM calling channel
Used for GB2RS
Recommended channel for rally & exhibition talk-in
FM calling channel

Band Plans – *Simply being a good neighbour to your fellow amateur!*

430 MHz (70 cm)

LICENCE NOTES:

Amateur Service:	Secondary
Satellite Service:	435-438 MHz, Secondary
Exclusion:	431 - 432 not available for use within 100 km radius of Charing Cross, London. (51° 30' 30"N, 00° 7' 24"W)
Power limit:	430 - 432 MHz: 16 dBW ERP PEP, 432 - 440 MHz: 26 dBW
Permitted modes:	Morse, telephony, RTTY, data, fax, SSTV, FSTV

IARU	Novice	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage
430.000					
All modes Note 1					*430.400 - 430.600 Packet radio* *430.600 - 430.800 Note 5* *430.625 - 430.775 Packet radio (25 kHz channels)*
430.800					
Low power repeater I/p Note 1					*430.825 R61* *430.850 R62* *430.875 R63* *430.900 R64* *430.925 R65* *430.950 R66* *430.975 R67*
431.000					
All modes Note 1					*Licence note exclusion*
432.000					
CW only					*432.000 - 432.025 Moonbounce* *432.050 CW centre of activity*
432.150					
SSB and CW only					*432.200 SSB centre of activity* *432.350 Microwave talk-back calling frequency (Europe)*
432.500					
All modes non-chanelised	✓	✓	✓		*432.500 - 432.600 IARU Region 1 linear transponder outputs* *432.600 - 432.800 IARU Region 1 linear transponder inputs* *432.500 SSTV activity centre* *432.600 RTTY (fsk) activity centre* *432.625 Packet radio* *432.650 Packet radio* *432.675 Packet radio* *432.700 Fax activity centre*
432.800					
Beacons					*432.800 - 432.990 Beacons*
433.000					
FM repeater outputs in UK only Note 1					*433.000 RB0* *433.025 RB1* *433.050 RB2* *433.075 RB3* *433.100 RB4* *433.125 RB5* *433.150 RB6* *433.175 RB7* *433.200 RB8* *433.225 RB9* *433.250 RB10* *433.275 RB11* *433.300 RB12* *433.325 RB13* *433.350 RB14* *433.375 RB15*
433.400					

Continued on next column

IARU	Novice	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage
433.400					
FM simplex channels			✓		*433.400 SU16* *433.425 SU17* *433.450 SU18* *433.475 SU19* *433.500 SU20 FM calling channel* *433.525 SU21* *433.550 SU22 Recommended channel for rally and exhibition talk-in* *433.575 SU23* *433.600 SU24 RTTY afsk* *433.625 Packet radio* *433.650 Packet radio* *433.675 Packet radio* *433.700 Notes 2, 3 and 5* *433.725 Notes 2 and 5* *433.750 Notes 2 and 5* *433.775 Notes 2 and 5*
434.600					
FM repeater inputs (in UK only) - note 1; and fast scan television - note 4					*434.600 RB0* *434.625 RB1* *434.650 RB2* *434.675 RB3* *434.700 RB4* *434.725 RB5* *434.750 RB6* *434.775 RB7* *434.800 RB8* *434.825 RB9* *434.850 RB10* *434.875 RB11* *434.900 RB12* *434.925 RB13* *434.950 RB14* *434.975 RB15*
435.000	✓				
Satellites and fast scan TV - note 4					
438.000					
Fast scan TV					*438.025 - 438.175 Note 5* *438.200 - 439.425 Note 1*
438.425					
Low power repeater o/p + fast scan TV					*438.425 R61* *438.450 R62* *438.475 R63* *438.500 R64* *438.525 R65* *438.550 R66* *438.575 R67*
438.575					
Fast Scan TV					*438.200 - 439.425 Note 1*
439.750					
Packet radio					*439.775 - 439.975 Packet radio (25 kHz channels)*
440.000					

430 MHzBand Plan notes:

1. In Switzerland, Germany and Austria, repeater inputs are 430.600 - 431.825 MHz with 25 kHz spacing, and outputs are 438.200 - 439.425 MHz. In France and the Netherlands repeater inputs are 430.025 - 430.375 MHz with 25 kHz spacing and outputs at 431.625 - 431.975 MHz. In other European countries repeater inputs are 433.000 - 433.375 MHz with 25 kHz spacing and outputs at 434.600 - 434.975 MHz ie the reverse of the UK allocation.
2. Emergency communications priority.
3. IARU Region 1 fax / afsk.
4. Fast Scan Television carrier frequencies shall be chosen so as to avoid interference to other users, in particular the satellite service and repeater inputs. IARU Region 1 recommends that video carriers should be in the range 434.000 - 434.500 MHz or 438.500 - 440.000 MHz.
5. IARU Region 1 packet radio.

1.3 GHz (23 cm)

LICENCE NOTES:

Amateur Service: Secondary

Satellite Service: 1260 - 1270, Secondary *Earth to space only*
1296 - 1297, Secondary *Earth to space only*

Power limit: 26 dBW PEP

Permitted modes: Morse, telephony, RTTY, data, fax, SSTV, FSTV

Unattended operation: Not permitted in Northern Ireland

IARU	Novice	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage	
1,240.000						
All modes					*1240.150*	*Packet radio (150 kHz b/w)*
					1240.300	*Packet radio (150 kHz b/w)*
					1240.450	*Packet radio (150 kHz b/w)*
					1240.600	*Packet radio (150 kHz b/w)*
					1240.750	*Packet radio (150 kHz b/w)*
1,243.250						
ATV					*1248.000*	*RT1-3 FM TV input*
					1249.000	*RT1-2 FM TV input*
1,260.000						
Satellites						
1,270.000						
All modes						
1,272.000						
ATV					*1276.500*	*RT1-1 AM TV input*
1,291.000	✓					
Repeater inputs					*1291.000*	*RM0 (UK) 25 kHz spacing*
					1291.375	*RM15*
1,291.500						
All modes						
1,296.000						
CW only					*1296.000 - 1296.025*	*Moonbounce*
1,296.150						
SSB and CW					*1296.200*	*Narrow band centre of activity*
					1296.400 - 1296.600	*Linear transponder input*
					1296.500	*SSTV*
					1296.600	*RTTY*
					1296.700	*Fax*
					1296.600 - 1296.800	*Linear transponder output*
1,296.800						
Beacons exclusive					*1296.800 - 1296.990*	*Beacons*
1,297.000						
Repeater outputs - note 1					*1297.000*	*RM0 (UK) 25 kHz spacing*
					1297.375	*RM15*
1,297.500						
FM simplex - note 1					*1297.500*	*SM20*
					1297.750	*SM30*
1,298.000						
All modes		✓		✓		*Digital communications*
1,298.500						

IARU	Novice	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage	
1,298.500	✓	✓		✓	*1299.000*	*Remote control*
					1299.000	*Packet radio (25 kHz b/w)*
					1299.425	*Packet radio (150 kHz b/w)*
			✓		*1299.575*	*Packet radio (150 kHz b/w)*
					1299.725	*Packet radio (150 kHz b/w)*
1,300.000						
TV repeater oututs					*1308.000*	*RT1-3 FM TV output*
					1311.500	*RT1-1 AM TV output*
					1316.000	*RT1-2 FM TV output*
1,325.000						

1.3 GHz Band Plan notes:

1. Local traffic using narrow-band modes should operate between 1296.500 - 1296.800 MHz during contests and band openings.
2. Stations in countries which do not have access to 1298 - 1300 MHz (eg Italy) may also use the FM simplex segment for digital communications.

2.3 GHz (13 cm)

LICENCE NOTES:

Amateur Service: Secondary. *Users must accept interference from ISM users*

Satellite Service: 2400 - 2450, Secondary. *Users must accept interference from ISM users.*

Power limit: 26 dBW PEP

Permitted modes: Morse, telephony, RTTY, data, fax, SSTV, FSTV

ISM = Industrial Scientific and Medical

IARU	Novice	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage	
2,310.000						
Sub-regional (national band plans)					*2310.000 - 2310.500*	*Repeater links*
					2310.100	*Packet radio (200 kHz b/w)*
					2310.300	*Packet radio (200 kHz b/w)*
					2310.000 - 2310.500	*Remote control*
2,320.000						
CW exclusive					*2320.000 - 2320.025*	*Moonbounce*
2,320.150						
CW and SSB					*2320.200*	*SSB centre of activity*
2,320.800		✓	✓	✓		
Beacons exclusive					*2320.800 - 2320.990*	*Beacons*
2,321.000						
Simplex & repeaters (FM) - note 1						
2,322.000					*2322.000 - 2355.000*	*ATV*
All modes					*2355.100 - 2364.000*	*Repeater links*
					2355.100	*Packet radio (200 kHz b/w)*
					2355.300	*Packet radio (200 kHz b/w)*
					2364.000	*Packet radio (1 MHz b/w)*
					2365.000 - 2370.000	*Repeaters*
					2370.000 - 2390.000	*ATV*
					2390.000 - 2392.000	*Moonbounce*
2,400.000						
Satellites						
2,450.000						

Notes continued on next column

2.3 GHz Band Plan notes:

1. Stations in countries which do not have access to the All Modes section (2,322 - 2,390 MHz), use the simplex and repeater segment 2,321 - 2,322 MHz for data transmission
2. Stations in countries which do not have access to the narrow band segment 2,320 - 2,322 MHz, use alternative narrow band segments: 2,304 - 2,306 MHz and 2,308 - 2,310 MHz.

3.4 GHz (9 cm)

LICENCE NOTES:

Amateur Service: Secondary
Satellite Service: No allocation
Power limit: 26 dBW PEP
Permitted modes: Morse, telephony, RTTY, data, fax, SSTV, FSTV

IARU	Novice	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage
3,400.000					
Narrow band CW/EME/SSB					*3400.100 Centre of activity*
3,402.000					
All modes		✓	✓	✓	
3,456.000					
Narrow band CW/EME/SSB					*3456.200 Centre of activity* *3456.800 - 3457.000 Beacons* *3457.000 - 3458.000 Remote control*
3,458.000					
All modes					
3,475.000					

Unattended (U/A) Operation

Frequencies on which unattended (U/A) operation is permitted by full licensees are shown in these band plans. Novice licensees can also operate their stations unattended but the frequencies and powers are different – please see the Novice licence for the details. Remember that unattended operation requires the prior consent of the local Radio Investigation Service before operation can begin, to enable close down arrangements to be made.

Unattended beacons are limited to 14dBW ERP max. Do not confuse this type of unattended beacon operation with the normal beacon sections of the bands (these are fully site cleared, have special licences and are co-ordinated on an international basis.

Unattended low power remote control is limited to -20 dBW ERP and should not radiate outside the boundary of the premises from which you are operating.

Unattended digital operation is limited to 10 dBW on the 50 MHz band and 14 dBW on the other bands where it is permitted.

5.7 GHz (6 cm)

LICENCE NOTES:

Amateur Service : 5,650 - 5,680, Secondary; 5,755 - 5,765 + 5820 - 5850: Secondary. Users must accept *interference from ISM users*
Satellite Service: 5,650 - 5,670 Secondary *Earth to Space only;* 5,830 - 5,850 Secondary *Users must accept interference from ISM users Space to Earth only*
Power limit: 26 dBW PEP
Permitted modes: Morse, telephony, RTTY, data, fax, SSTV, FSTV

ISM = Industrial, Scientific & Medical

IARU	Novice	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage
5,650.000					
Satellite uplinks					
5,668.000					
Narrow band and satellite		✓	✓	✓	*5668.200 Centre of activity* *5668.800 - 5669.000 Beacons*
5,670.000					
All modes					
5,680.000					
5,755.000					
All modes					
5,760.000					
UK Alternate narrow band CW/EME/SSB		✓	✓	✓	*5760.200 Centre of activity (UK)* *5760.800 - 5761.000 Beacons*
5,762.000					
All modes					
5,765.000					
5,820.000					
All modes					
5,830.000		✓	✓	✓	
Satellite downlinks					
5,850.000					

IARU – International Amateur Radio Union

As the RSGB represents the interests of radio amateurs within the UK, so the International Amateur Radio Union (IARU) represents amateur radio on an international scale. Its membership is made up of national societies rather than individuals and it has more than 125 member societies. The RSGB is the UK's IARU member society. The IARU was founded in 1925 and has its headquarters in the USA. It is split into three sections as is the International Telecommunications Union (ITU). Region 1 comprises the UK, Europe, Africa, the CIS and the Middle East.

The aim of the IARU is to promote, preserve and protect worldwide growth in amateur radio and where necessary represent the movement's interests at the ITU. It also regulates and co-ordinates band plans, and makes recommendations for the operation of specialised activities such as meteor scatter.

Another service provided is the Monitoring System (IARUMS) which monitors unauthorised transmissions by other services within the amateur bands. Reports from the IARUMS are sent to both the ITU and national telecommunication administrations.

10 GHz (3 cm)

LICENCE NOTES:

Amateur Service: Secondary
Satellite Service: 10,450 - 10,500: Secondary
Power limit: 26 dBW PEP
Permitted modes: Morse, telephony, RTTY, data, fax, SSTV, FSTV

IARU	Novice	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage	
10,000.000						
All modes (ATV, data FM simplex, duplex and repeaters		✓	✓	✓	10,006 - 10,026	Packet radio and repeater links / control
					10,040	RT10-1 FM TV output
					10,065	RT10-2 FM TV output
					10,090 - 10,110	Wideband beacons
					10,150	RT10-3 FM TV output
					10,200	RT10-1 FM TV input
					10,225	RT10-2 FM TV input
		✓	✓	✓	[10,270 - 10,300 unattended operation]	
					10,278	RT10-3 FM TV input
10,368.000						
Preferred narrow band CW/EME/SSB Beacons					10,368.1	Centre of activity (UK)
					10,368.2	SSB centre of activity
					10,368.8 - 10,369.0	Narrow band beacons
10,370.000	✓					
All modes					10,390 - 10,410	Wide band beacons
					[10,400 - 10,500 unattended operation]	
10,450.000		✓	✓	✓		
All modes + satellites					10,450 - 10,452	Alternative narrow band CW/EME/SSB - note 1
10,500.000						

10 GHz Band Plan notes:

1. Stations in countries who do not have access to the narrow-band segment 10.368 - 10.370 GHz, may use 10.450 - 10.452 GHz instead.

24 GHz (12 mm)

LICENCE NOTES:

Amateur Service: 24,000 - 24,050 Primary. *Users must accept interference from ISM users*; 24,050 - 24,150 Secondary, *May only be used with the written consent of the Secretary of State. Users must accept intereference from ISM users*; 24,150 - 24,250 Secondary. *Users must accept interference from ISM users.*
Satellite Service: 24,000 - 24,050 Primary. *Users must accept interference from ISM users*
Power limit: 26 dBW PEP
Permitted modes: Morse, telephony, RTTY, data, fax, SSTV, FSTV

ISM = Industrial, Scientific & Medical

IARU	Novice	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage	
24,000.000						
Satellites		✓	✓	✓	24,025	Preferred operating frequency wide band equipment
					24,048 - 24,050	Preferred narrow band operating
24,050.000						
All modes					24,192 - 24,194	Narrow band op (UK)
24,250.000						

47 GHz (6 mm)

LICENCE NOTES:

Amateur Service: Primary
Satellite Service: Primary
Power limit: 26 dBW PEP
Permitted modes: Morse, telephony, RTTY, data, fax, SSTV, FSTV

IARU	Novice	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage	
47,000.000		✓	✓	✓	47,088	Centre of narrow band activity
47,200.000						

Other amateur bands allocated in the UK are: 75.5 - 76.0, 142.0 - 144.0, 248.0 - 250.0 GHz.

RADCOM EQUIPMENT REVIEW

Alinco DR-M06 6 Metre FM Mobile

Reviewed by Dave McQue, G4NJU*, and RSGB HQ Staff

THIS LITTLE GEM is probably the smallest mobile rig yet. Measuring 140mm (W) x 40mm (H) x 115mm (D), there should be no difficulty in finding a place for it even in a modern car! Short of an aerial and 13.8V power source, the DR-M06 SX comes with all the bits and pieces you will need for either mobile or base station installation. It is one of the first dedicated 6m rigs from Japan and includes all of the 'bells and whistles' we have come to expect.

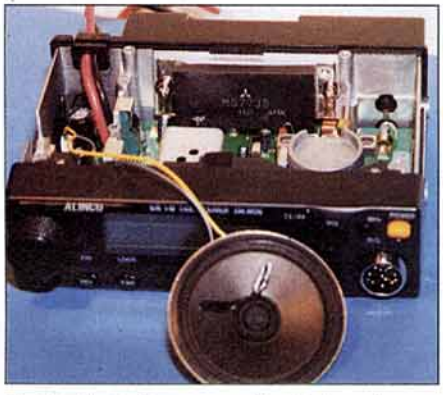
Due to surface mount circuit construction, the weight is only 860g, most of which is concentrated in the large rear-panel heat sink. Inside, the Alinco DR-M06 is deceptively empty, the most noticeable features being the power amplifier chip on the rear heatsink and display / scanning facilities etc located on a board behind the front panel.

The plain but comprehensive instruction manual is very clear and easy to follow and should be studied in detail before attempting to use the rig. It includes a copy of the UK / IARU band plan which has been reprinted from the RSGB *Call Book*. A wiring diagram of the microphone socket is shown for connection to a TNC, though it would have been nice to have had a separate socket. No other circuits are included.

FEATURES

AS SUPPLIED, THE Alinco DR-M06 SX covers 50 - 54MHz, FM only. It comes set up for 10kHz channel spacing, but is easily changed to a number of other options, including the UK standard of 20kHz channel spacing.

It can operate in either VFO mode, in which case the frequency is displayed on the front panel, or in Memory mode, in which case an 'M' and the channel number appears beside the frequency. There are 100 memory channels, more than enough to cover the whole of the top half of the UK band plus several extras for packet radio, etc. Each memory will store frequency, repeater shift (if any), and CTCSS tone.



The PA chip on the rear panel heatsink can be seen clearly.

Scanning can be accomplished in both VFO and Memory modes. In VFO mode it scans over the entire frequency range. Incidentally, the receiver (but not transmitter) coverage can be extended to 40 - 60MHz, which also increases the scan range to these limits.

A 'Priority' feature enables you to monitor two frequencies for activity more or less simultaneously by automatically switching between a selected channel or frequency and the primary channel. Reverse repeater mode can be selected simply by pushing a front panel button.

CTCSS encode is standard. With the optional tone squelch decoder, CTCSS tones can be decoded for selective receiving, too. A time-out timer can be set by the user for any period between 30 and 450 seconds. This should avoid the 'stuck mic' effect on repeaters? It can also serve as a most welcome anti-waffle feature.

The power cable supplied for connecting to the battery or power supply unit is fused in both the positive and negative leads with 15A fuses to protect the wiring, and a 5A fuse in the positive lead local to the rig. This method ensures that if the main earth strap fails the starter current will blow a fuse rather than set fire to the rig's negative lead!

*6 Labumum Gr, Bletchley, Milton Keynes, Bucks MK2 2JW.

CONTROLS

BECAUSE OF the tiny front panel, much thought has been given to the ergonomics. There are only three knobs: a small one for frequency or memory channel selection and two even smaller ones for volume and squelch. Eight buttons complete the operating controls, all serving a dual function. The primary functions are those most frequently required, such as VFO / MEMORY select which has the secondary function of Memory Write when used with the Function button. Even the Function button has a secondary function, as squelch defeat occurs when it is held down for more than half a second. Button presses are confirmed by a Beep which can be switched off if desired.

The microphone supplied with the rig has UP / DOWN buttons to control the VFO, Memory channels and shift, as well as the scanner start /stop and direction. These are disabled by a LOCK button.

IN USE

THE MICROPHONE IS strangely flat in shape but nevertheless comfortable to hold. The transmitted audio quality was reported to be clear and 'punchy'. Receive audio from the internal speaker was loud and clear, probably due it being mounted on the top of the case unlike many modern rigs.

The controls proved easy to use and the only real snag came when attempting to switch the repeater shift on and off (not important now but repeaters are proposed for this band). The process up to six key presses,

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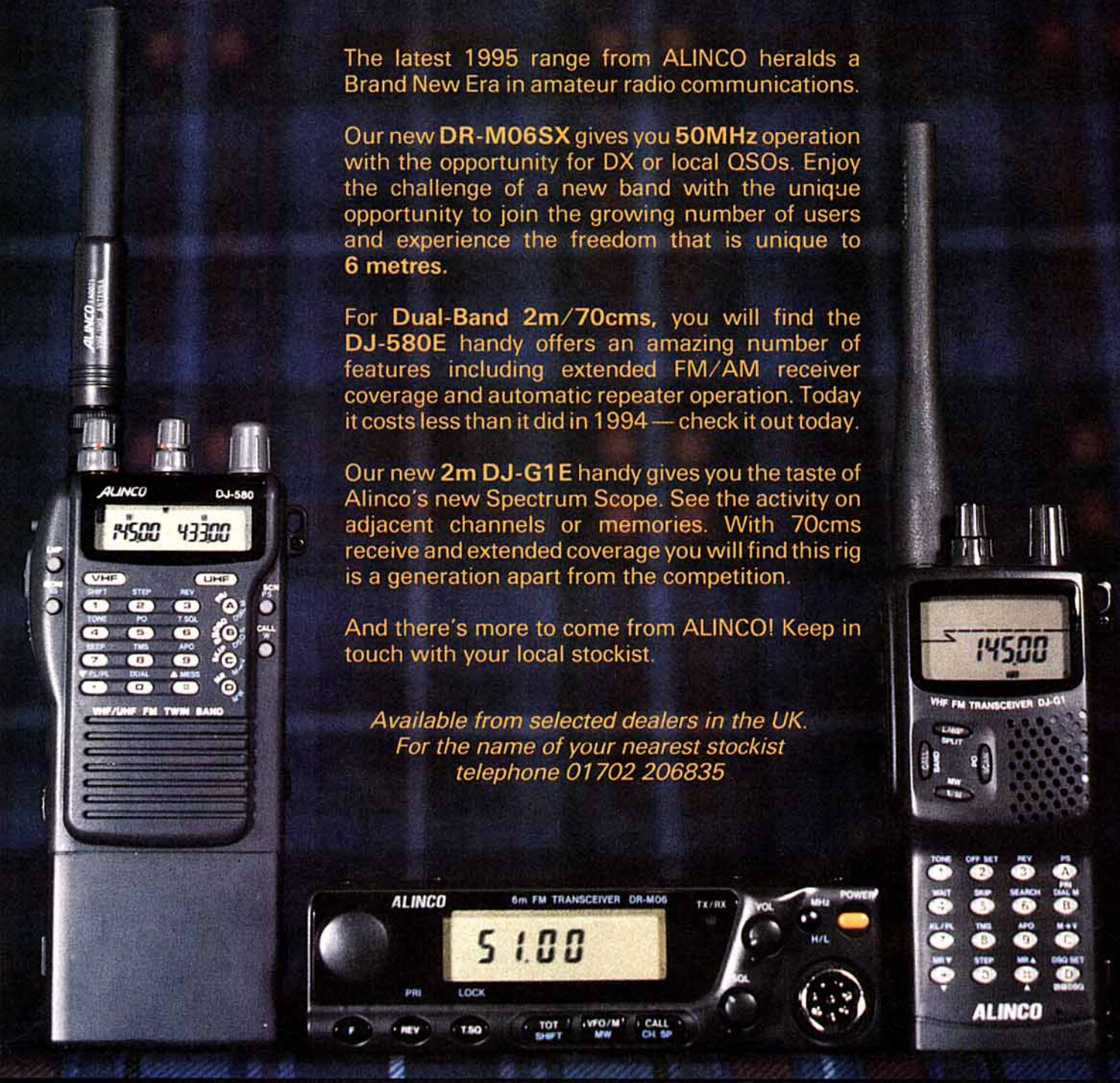


ALINCO is distributed in the UK by:

Tel 01702 206835

WATERS & STANTON ELECTRONICS

SPECIFICATIONS

GENERAL	
Frequency Coverage	50.00 - 54.00MHz TX. 40.00 - 60.00MHz RX
Frequency Steps	5, 10, 12.5, 15, 20 and 25kHz
Antenna Impedance	50ohms Unbalanced
Power Supply Requirements	13.8 + / - 10%V DC
Current Drain at 13.8V	RX: Squelched less than 700mA. TX: High / 3.0A
Dimensions	140mm (W) x 40mm (H) x 115mm (D)
Weight	0.86kg
Memory channels	100
Frequency Offset	0 to + / - 15.995MHz freely programmable any CH
CTCSS	50 tone encoder installed (decoder option)
Time-Out-Timer	30-450 Seconds
TRANSMITTER	
Output Power	High 10W / Low 1W
Emission Mode	F3E (FM)
Modulation System	Variable Reactance Frequency Modulation
Max Frequency Deviation	+ / - 5kHz
Spurious Emission	-60dB or under below carrier
Microphone	Electret Condenser Microphone
Operation Mode	Simplex / Semi-Duplex
RECEIVER	
Receiving System	Superheterodyne Dual Conversion
Intermediate Frequency	1st - 10.7MHz and 2nd - 455kHz
Sensitivity	12dB SINAD - 16dBu
Selectivity	+/- 6kHz or less - 6dB. +/- 15kHz or less - 60dB
Audio Power Output	More than 2.5W at 10% Dist.
Speaker Impedance	8Ω

Note: Specifications are guaranteed on the amateur radio band only.

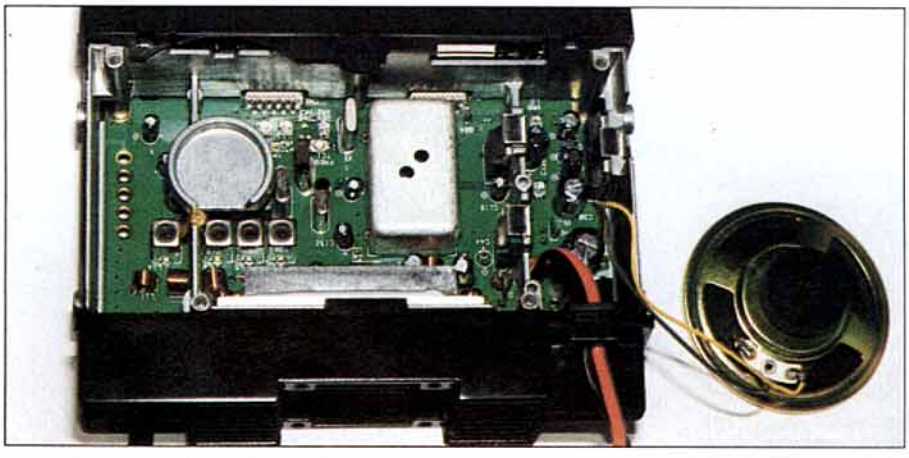
which would be virtually impossible to carry out while mobile. However, there is no problem if repeater channels are pre-programmed into the rig's memories; the DR-M06 is plainly designed to be used in Memory mode when mobile.

A similar niggle arose when setting the scanner as it is not possible to programme the scan limits when in VFO mode - it scans from 50 to 54MHz only (though the rig will scan between 40 and 60MHz if the extended receiver coverage has been selected). But since all useful FM channels can be stored in the 100 memories, and since 'programmed memory scan' mode allows empty or unprogrammed memory channels to be ignored, the problem is solved by making extensive use of the memories rather than the VFO.

The unit supplied performed to spec (see Specification box) as regards receiver sensitivity and selectivity. The transmitter uses a power amplifier 'brick' mounted on the rear panel heatsink. Setting the time-out to the maximum 450 seconds and running the full 10W, into a dummy load, the total power input from the 13.8V supply was 31W. The heatsink temperature had risen by only 16°C at the time-out.

If and when we get 50MHz repeaters this unit will prove a popular choice. It may well increase activity on a band which has plenty to offer during the sunspot minimum (and even more at maximum). The RSGB HQ beacon, GB3NHQ on 50.05MHz proved a useful guide to conditions; and it was possible to hear G0RDI/P, the new Amersham NBFM beacon running 1W on 50.83MHz, as well as the *GB2RS* news broadcast from G3MEH. Many packet bursts were heard on 50.65MHz, and 6m is plainly a useful band to obtain QRM-free access to the packet network. Though more expensive than the AKD 6001, the DR-MO6 SX should prove attractive to anyone wanting the higher power and additional facilities such as scanning, CTCSS etc.

The Alinco DR-MO6 SX retails at £299 and is obtainable from Waters & Stanton who are thanked for the loan of the review model. ♦



Inside view of the Alinco DR-M06 SX.

RADCOM HELPLINES Helplines FOR MEMBERS

● Kenneth Graham, GM0AVB, requires information on how to modify the frequency coverage of the **FDK Multi-700E** 2m FM transceiver, in order to be able to use it on packet. If you can help, please write to Kenneth QTHR.

● Ambassador Leif Leifland, a Swedish diplomat historian, is writing a paper on a special mission by a team from the air ministry in **1945.** The team was sent to the **British Consulate in Malmö**, Sweden, in April 1945 to install navigational aids (GH station) to help to direct RAF bombing missions to Berlin and other German cities. The Swedish government issued visas to the following members of the team: Mr B Ewing, Mr G A Alderson, Miss R Barff, Miss J R Griffiths and Mr C Lee. Ambassador Leifland would like to get in touch with the members of the team or their families and friends who may have diaries, letters, photographs or reminiscences of the mission. Please write to Ambassador Leif Leifland, Nybrogatan 77, S-114 40 Stockholm, Sweden. [A similar request published in the August 1994 *Helplines* brought a couple of useful responses, for which Ambassador Leifland was most grateful - *Ed*]

● Ken Smith, G3JIX, requires any information such as a manual, circuit or setting-up instructions for a **Bridge Universal CT 375**, which is an RAF version of the **Wayne-Kerr Component Bridge B 521.** Contact Ken by writing QTHR or tel: 01304 812 723.

● Dick Biddulph, G8DPS, would like any information on a **Shimadzu [or Shimizu? - *Ed*] C-R3A chromatopac** (data logger?) or **Philips sampling 'scope PM3400.** If you have any data on either, please contact G8DPS QTHR, or tel: 0181 399 8787.

● Malcolm Perry, G8AKX, requires circuits, service and any other information on the main frame of an **Advance OS2200A storage 'scope.** Also the circuit for **'B' timebase of OS2005X (fig 4).** If you can help, please contact G8AKX QTHR.

● Douglas Byrne, G3KPO, is searching for a flat neon tube specially made for the **30-line Baird television receiver.** He is also looking for wartime and pre-war copies of ***Radio Times***, ***World Radio*** and other old wireless magazines and books. Contact Douglas on tel: 01983 567665 or write QTHR.

● Chris Doran, G3VZH, requires further information on a **Sytek radio modem** which was apparently originally used by the North Sea oil industry. The unit is marked **'LocalNet 20/100'.** If you can help, please write to G3VZH QTHR.

● Klaus Werner, G7RTI, requires a manual for a **Data Technology Corporation digital multimeter, model 30A.** All costs reimbursed. Tel: 01628 893403 (daytime) or 01494 438978 (evenings) or write to G7RTI QTHR. ♦

PRODUCT NEWS

Note: Product news is compiled from press releases sent in by the manufacturers and distributors concerned. Details are published in good faith but *Radio Communication* cannot be held responsible for false or exaggerated claims made in the source material.

THE NEW **ALINCO DR-150E** is a high-power 2m FM mobile transceiver with innovative features at a highly competitive price. The transceiver features 'Channel Scope': a panoramic display on the front panel of the activity on seven channels, and wide-band receive, including the 70cm band.

The power output is switchable in three levels: 10W, 25W up to a hefty 50W for when you need reliable simplex operation. If you wish to operate both on FM and Packet, you will be pleased to hear that the DR-150E has a separate 1200 / 9600bps connection for Packet. UK repeaters are now becoming equipped with CTCSS and the Alinco DR-150E has a CTCSS tone encoder fitted as standard, allowing you easy access even when signals are weak.

On receive, the DR-150E covers not just the 2m band, but also AM and FM between 135 - 174, 400 - 480 and 800 - 950 MHz.

The DR-150E has 100 memory channels and multiple scan modes. Any frequency from any of the three receive bands can be programmed into the memory channels and the 'Channel Scope' display will show you activity on seven of those channels at a time. In this way you can monitor for activity on S20, S22, SU21, your local 2m and 70cm repeaters, your club 2m net frequency and your favourite 2m simplex channel all at the same time. When in VFO mode, the display simply shows activity on the channel selected and on the three channels above and below it.

The DR-150E costs £349.95.

Waters and Stanton Electronics, 22 Main Road, Hockley, Essex SS5 4QS. Tel: 01702 206835; Fax: 01702 205843.

BOTH HF AND VHF contesters will be interested in the new **MFJ-432 Digital Voice Keyer.** This unit will store up to 20 seconds of digital audio in up to four messages. Message 1 can be up to eight seconds long and the other messages four seconds each. Unlike most other digital voice keyers, the MFJ-452 has a built-in microphone. Alternatively, there is an 8-pin mic connector so you can connect your normal station microphone via the unit. There is also a built-in speaker so that you can monitor the messages you have recorded without transmitting. The monitor level is adjustable with the front-panel volume control while the audio level being sent to the radio can be adjusted by a small trimmer pot on the rear panel. The MFJ-432 has a message repeat function whereby the contents of message 1 can be repeated a number of times. Great for calling 'CQ contest' on 1.3GHz in the middle of the night!

The MFJ-432 Digital Voice Keyer is available for £119 from:
Waters and Stanton Electronics, 22 Main Road, Hockley, Essex SS5 4QS. Tel: 01702 206835; Fax: 01702 205843.

THE MFJ-452 is a **CW keyboard and keyer** with a two-line LCD display. It features eight 250-character non-volatile message memories, an iambic keyer and a 150 character type-ahead buffer.

The LCD display simultaneously shows you what you are typing on one line and what is being sent out on the other. Any typing errors can be corrected quickly by backspacing. The keyboard has excellent RFI suppression: MFJ say it won't lock up or send unwanted characters because of RF, nor will you hear hash in the receiver.

You can also plug a paddle into the MFJ-452 and alternate between messages from the keyer, keyboard sent Morse and Morse from the paddle.

The MFJ-452 is also a useful Morse tutor, suitable for practising or teaching the code using either the Farnsworth technique or normal Morse. Any combination of letters, numbers, punctuation symbols and prosigns can be selected in either random one to eight character groups or the standard five-character sets.

The MFJ-452 comes complete with speaker, side-tone, volume control, jack for external speaker or headphones and is available at £149 from:

Waters and Stanton Electronics, 22 Main Road, Hockley, Essex SS5 4QS. Tel: 01702 206835; Fax: 01702 205843.

MidNet is a service which gives access to Internet E-mail and UseNet groups for a very competitive fixed subscription fee: there is no connect time charge or account set-up fee. MidNet systems, run by G8FRA, is keen to form an amateur radio community on the system and is therefore offering RSGB members a 10% discount on the normal subscription rate. The discount rate is £37 for six months or £63.45 for 12 months. This includes a user ID and Internet mail name such as G8FRA@midnet.com.

MidNet Systems, 9 Ilfracombe Grove, Green Lane, Coventry CV3 6DX. Tel / Fax: 01203 415815; E-mail: G8FRA@midnet.com.

USERS OF G3PMR's popular SHACKLOG logging program and IOTA database will be interested to hear about the new Shacklog Awards Manager for IOTA - **'SAM-I'**.

Operating in conjunction with SHACKLOG's QSO database and the SHACKLOG IOTA database, SAM-I produces its own separate island status database and allows you to track your progress towards *all* the RSGB IOTA awards, including the continental and regional awards. It will allow you to keep track of islands worked but not yet confirmed, and islands not yet worked. It will also produce bar charts to plot your progress and, when sufficient confirmations have been received, it will automatically generate the claim with all the necessary information.

SAM-I represents exceptional value at only £5. The complete package of SHACKLOG, the IOTA database and SAM-I is £37.50. They may be obtained direct from:

Alan Jubb, G3PMR, 30 West Street, Great Gransden, Sandy SG19 3AU. Tel: 01767 677913.

THE 13TH EDITION of Joerg Klingenfuss' ***1995 Guide to Utility Radio Stations*** has recently been published. It has become the standard reference book for information about utility stations transmitting between 3 and 30MHz. In addition to the comprehensive frequency listings, there is much information on a wide variety of data modes such as ARQ-E, FEC-A, SITOR and many others.

The 13th edition of the *Radioteletype Code Manual*, which gives detailed descriptions of telegraphy transmissions including new systems such as Clover, PACTOR and others, recently has also been published. Comprehensive information on the Arabic, Cyrillic, Greek, Hebrew and Japanese Morse alphabets is also included

Klingenfuss Publications, Hagenloher Str.14, D-72070 Tuebingen, Germany. Tel: 00 49 7071 62830; Fax: 00 49 7071 600849.

NEW EQUIPMENT PURCHASED from Martin Lynch is now offered with a **five-year warranty** covering parts, labour and collection / delivery on the UK mainland. This service is also transferable to a new owner in the event that you sell your equipment before the five year period has expired. If you have purchased equipment in the last six months, the extended warranty could still be available. To find out more details call the shop and ask Jennifer about the 'five-year plan'.

Martin Lynch, 140 - 142 Northfield Avenue, Ealing, London W13 9SB. Tel: 0181 566 1120; Fax: 0181 566 1207.

Pat Hawker's Technical Topics

PAT HAWKER, G3VA
London 37/SE22 8SS

MORE ON SEALING COAX

IN THE MARCH 93 *TT*, I included comments that the *QST* 'Hints & Kinks' editor WJ1Z, had added to the W0KKG item, in which he stressed the need to seal the SO-239 and PL-259 socket and plug to make them weatherproof. However he warned against using, in closed compartments, caulking compounds that liberate acetic acid vapour as they cure, since this can severely corrode susceptible metals such as steel wool. Gerald Stancey, G3MCK, heartily agrees with WJ1Z's warning on the need to seal coaxial cables against water ingress, but has reservations about avoiding sealants which liberate acetic acid – at least for conventional use not involving steel wool in a closed compartment. He writes:

"I have rcently completed a six-month weathering test on a piece of coaxial cable which has been sealed with a silicone sealer called Hermetite. The seal reeked of acetic acid (vinegar) while curing. After the test the cable was cut open and showed no sign of corrosion or water ingress. Perhaps I was lucky with my choice of sealer but perhaps the problem occurred in the past but no longer occurs with modern silicone sealers." The March 1993 *TT* also included some comments by G2HCG and GW3TMP that have not passed entirely unchallenged. J K Todd, G2KV, notes that: "G2HCG doesn't like the impedance discontinuity of the PL259 plug. But I suggest that it is adequately satisfactory on HF and not too bad on VHF. It is about 2cm long and therefore only 0.02-wavelength long at 300MHz. Put this on a Smith Chart and the resultant effect of the discontinuity is surely negligible."

GW3TMP in advocating the use of his Ferromagnetics choke balun for G5RV-type multiband dipoles may have given the impression that such a device is always advisable. A number of writers, apart from G0GSF, have shown that provided the element and feeder are erected symmetrically there will normally be very little outer-braid RF current flowing on the coaxial cable, in spite of the junction of unbalanced coax to the balanced 300ohm line. This of course is usually also the case with any symmetrical dipole. Baluns are likely to be necessary only where the element is not symmetrical and at 90° to the first downward part of the transmission line. The answer would seem to be to check for outer-braid current before fitting a balun.

COAXIAL CABLES AND CONNECTORS AT VHF/UHF.

IVO CHLADEK, ZS6AXT, in Part 3 of his 'VHF/UHF/Microwave Primer' (*Radio-ZS*, June 1994, pp4-5) has some pertinent comments on the selection of coaxial cables and connectors for use above 50MHz. He writes:

- For the frequencies above 50MHz and cable runs longer than 10m, one should not consider thin coaxial cables such as RG58 or similar, since their losses are too high. Some makes of thicker coaxial cables such as RG213 have very poor outer braiding and these must also be avoided. The most suitable is 0.50inch Heliax-type cable for long runs, but this cable and connectors for it are rather expensive.
- Buying secondhand RG213 or similar cables is rather dangerous - even a minute amount of humidity in the cable will permanently damage it and increase its losses. Heliax-type cable with a foam dielectric is effectively sealed and humidity cannot penetrate it. 30m of good RG213 cable has a loss of over 2dB at 144MHz but losses can be much greater for cable in poor condition.
- Another problem is ageing of the cable when exposed to UV (ultra-violet, sunlight) radiation. Cables used outside for a few years will tend to become yellowish in colour and such cables will have high losses.

ZS6AXT notes that there is a large selection of coaxial connectors on the market: "The UHF or PL259 series is suitable for the 50 and 144MHz bands but with reservations. First, it is quite difficult to fit this type of connector and unless done correctly may result in excessive losses. Second, these connectors are not watertight and must be well sealed when used outside. Thirdly many of these connectors use inferior insulating materials and that increases losses.

"The BNC-type of connector is suitable only for the thinner cables such as RG58 and for use inside the shack. They tend to be noisy due to rather poor insulation, avoid them in the front end of a receiver.

"For the thinner cables and interconnections between equipment modules, the best choice is the SMA-type of connectors or the cheaper SMB-type. Both are quite expensive but for frequencies above 432MHz they are virtually the only choice. They are suitable only for the thinner cables.

"Probably the best choice is the N-type which is suitable for use up to the GHz region. They are fairly easy to work with and they are

A SIMPLE 'HF STARTER RADIO'

ALTHOUGH VERY SIMPLE 'straight' receivers cannot be recommended for serious amateur use, they can provide a low-cost and eminently satisfying project for anyone, young or old, who has never experienced the fun of listening to HF broadcast stations and amateur SSB/CW transmissions on a home-built receiver.

Bill Orr, W6SAI, in his column in *CQ* (December 1994, pp102-103) provides the circuit diagram of a "Nifty shortwave receiver for the beginner" originally designed by Charles Kitchen of Analog Devices in the 'Design Ideas' of *Electronic Design News* (EDN) with a component cost of less than about £20: see **Fig 1.**

With the coil shown, the tuning range is about 5 to 10MHz, covering several broadcast bands and the 7 and 10.1MHz amateur bands, but adding or subtracting turns from L1 will change the tuning range as required. TR1 can be regarded as either a regenerative RF amplifier or more correctly as a signal-frequency Q-Multiplier, with D1 acting as the signal detector. Regeneration is controlled by RV1. With TR1 carefully adjusted to the 'just-oscillating' condition, CW and SSB signals can be received. It is claimed that the low power of TR1, with the complete receiver drawing less than about 10mA from a 9V battery, means that although the oscillator is coupled directly to the antenna (through C1) it is most unlikely to interfere with other local receivers. C1 removes 'dead spots' which could be caused by directly coupling a resonant antenna to the resonant circuit but with a very short whip antenna C1 can be omitted. If required, a volume control can be added by making R3 (2K) a potentiometer and then connecting C3 to the variable arm. R4/C4 form a low-pass filter to improve sound quality and prevent circuit instability. D2, D3, D4 provide voltage regulation for TR1 and minimise drift. L1 can be wound on a plastic film can or a pill bottle of one-inch diameter.

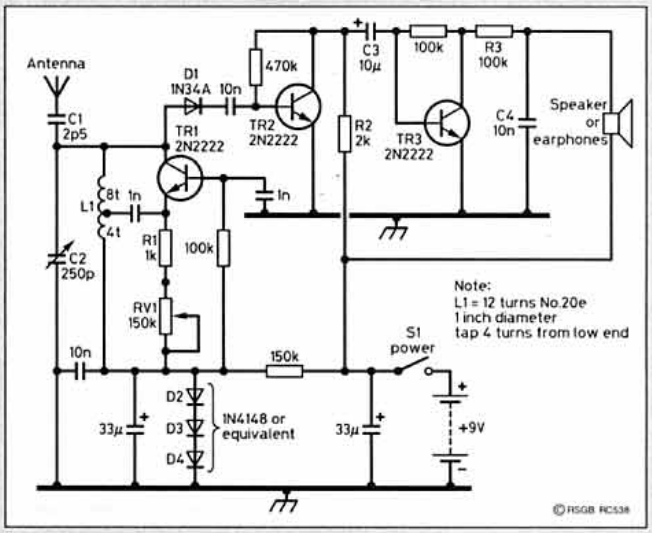


Fig 1: Inexpensive shortwave receiver for 'first steps' on HF and home construction.

watertight. A few makers use inferior insulating material. This should be PTFE (Teflon) which is quite easy to recognise. They are expensive but good value for money. The normal type of N connector can be used for 0.50inch Heliax-type cables with a small modification. It is a good idea to lubricate the thread on those connectors which are often plugged in and out with a small drop of oil. This will greatly prolong the life of the connector.

FRINEAR 400W GROUNDED-GRID LINEAR

IN RECENT YEARS, Frits Geerligs, PA0FRI, has presented through *Technical Topics* a series of passive-grid linear amplifiers based on a still-available colour-TV line output (sweep) valve, type PL519. Among the ones featured were a 400W linear using four PL519 valves (*TT*, August 1992, p39 and reprinted in the new 6th edition of the *Radio Communication Handbook*, (p5.32-3) and an earlier, rather more complex three PL519 version (*TT*, February 1990, p30).

PA0FRI has now sent along details of a new grounded-grid amplifier which is based on four fan-cooled PL519 valves used in association with a novel power supply unit which provides switchable output voltages. He writes: "After experimenting over the years with transmitting valves in various modes, I have finally come up with the basic (KISS) arrangement shown in **Fig 2** and developed for use with the current 'standard' range of 100W solid-state transceivers. When properly assembled and installed it will provide a comfortable 350W at 28MHz, rising to 450W at 3.5MHz, including the WARC bands. Signal reports confirm a clean signal with excellent audio quality; in fact, equal to that of the transceiver driving it, in my case a Kenwood TS-50."

The main points of difference from the arrangements used in the earlier Frinlear amplifiers are the input circuit and the voltage-quadrupler PSU.

Input circuit: The broadband input circuit is through a bifiliar transformer connected to give a 4:1 impedance step-down from the 50Ω line from the driver. The cathode input impedance is approximately 25Ω and this is thus transformed to 100Ω. A 100Ω, 50W resistor in parallel with the transformer on the input side thus provides a reasonably close match to the transceiver. This non-resonant (dummy-load) input circuit makes the linear much easier to drive from a 100W transceiver and prevents overdriving. The measured input-VSWR from 3.5 to 30MHz is less than or equal to 1.5, with an average SWR of 1.2:1.

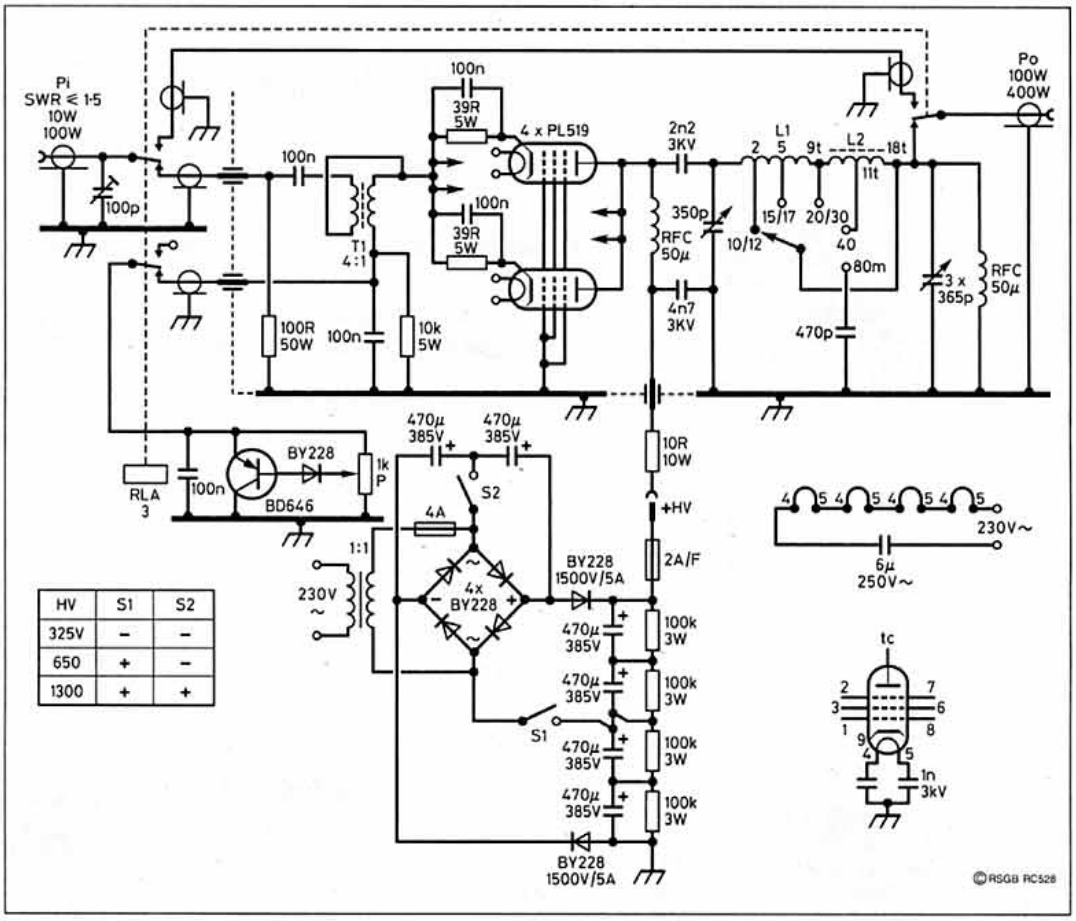


Fig 2: Annotated circuit diagram of PA0FRI's grounded-grid 400W 'Finear' linear amplifier based on four PL519 valves including quadrupler-type PSU. The four heaters of the PL519 valves are series-connected with a 'wattless' voltage-dropping capacitor. Note that the high voltages involved are potentially lethal. L1 – 9t 2.5cmm dia, 3mm wire, 6cm long; L2 – 11t+7t 2mm dia wire, T200-2 toroid; T1 - 9t bifiliar, 1mm dia wire on 5cm ferrite rod, 1cm dia; TC – set for minimum SWR on 29MHz; P – set for quiescent current 80-100mA; 100R – 2x 50Ω/25W non inductive, TO220 type; BD646 – power PNP darlington.

The 100Ω, 50W swamping load is formed by two 50Ω, 25W, non-inductive T0-220-type resistors in series. These are bolted to a small heatsink which in turn is placed close to the computer-fan used for cooling the PL519 valves. The 100pF trimmer across the input socket provides low VSWR at 29MHz.

Voltage quadrupler PSU: The special feature of this arrangement (as can be seen more clearly from **Fig 3**) is that by means of two manually-operated switches, the unit provides rectification, doubling and quadrupling of the AC-voltage delivered from a 1:1 mains isolating transformer (note this must be of suitable rating to handle the wattage and heavy current involved in a voltage quadrupling circuit - G3VA). PA0FRI has not seen this particular arrangement published previously and believes that he may be the originator of this type of flexible PSU.

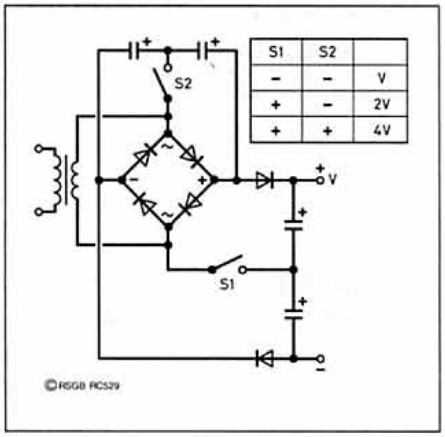


Fig 3: The flexible power supply configuration used by PA0FRI could have general application at high and also low voltages, provided suitably high-value capacitances are used to ensure reasonable voltage regulation.

'THIRD WORLD' DIRECT-CONVERSION RECEIVER

JAN-MARTIN NOEDING, LA8AK has felt rather frustrated at seeing a number of simple receiver and transceiver designs using ICs and other components not readily available in many countries, particularly in Third World countries where direct-conversion receivers and simple equipment can do much to stimulate interest in amateur radio.

He therefore set out to design a receiver using readily available and inexpensive transistors and components often found in surplus PCBs and other local sources, rather than aiming at a minimum component count.

He writes: "It was not my intention to use few components. For example, more than the usual number of bypass capacitors do not necessarily increase the cost to any great degree but can improve performance and stability. Most direct-conversion receivers have the problem that it is very difficult, but

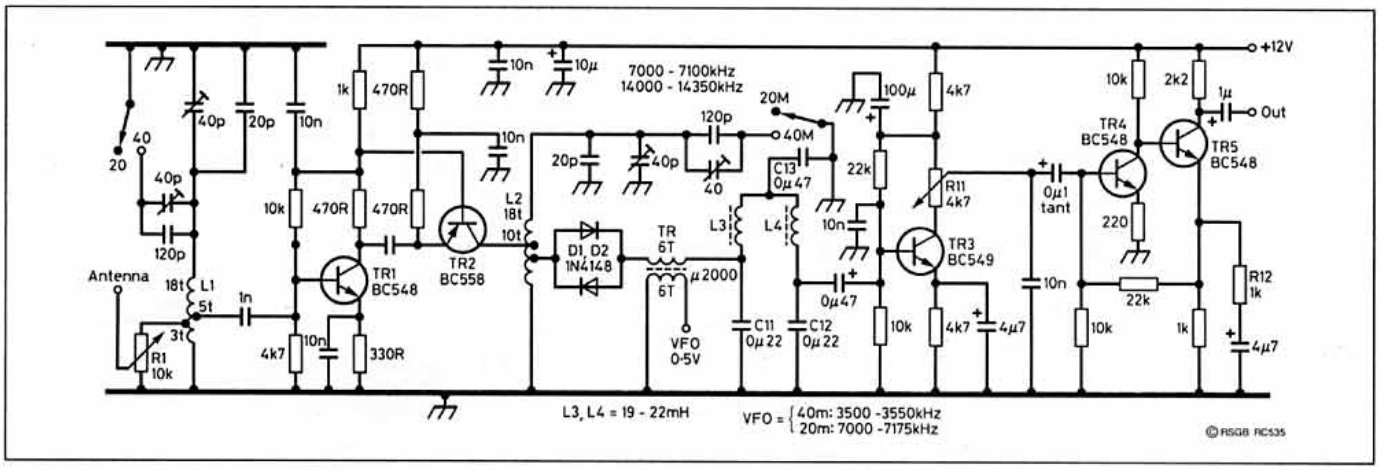


Fig 4: LA8AK's 'Third-World' direct-conversion receiver strip using RA3AAE-type harmonic mixer.

important, to prevent the VFO from radiating a signal through the mains supply. As a result a hum-modulated signal comes back via the antenna, causing a steady 100Hz hum in the receiver output. This problem can be largely avoided by using a subharmonic mixer (in which the oscillator outputs at half the signal frequency) such as the RA3AAE bilateral anti-parallel diode mixer (ART7, pp131-132 or *Technical Topics Scrapbook 1985-89*, pp46-47).

"I therefore designed a 14MHz receiver using the RA3AEE mixer. The first version had no RF amplifier but sensitivity was none too promising with too much gain needed in the audio section and with noise problems arising from the first audio stage needed to amplify signals of less than 1μV. This version used a low-noise audio pre-amplifier and this remains for the later version together with an added RF amplifier.

"14MHz is an interesting band but not too well suited for experimenters late in the evening when the 7 and 3.5MHz bands are much better and provide many strong signals. After testing the 14MHz receiver with signal generator and some on-air tests, I changed to 7MHz which presents totally different problems.

"On 14MHz post-mixer selectivity is not too critical and an active AF filter may be sufficient for providing the main selectivity. But on 7MHz some neighbouring broadcast stations can provide signals strong enough to intermodulate in the AF stages. It is thus virtually essential to use an LC filter cutting off at about 4kHz or so ahead of any AF amplifiers; standard 88mH toroid coils (or 77mH European pupin coil cores) are very suitable, using only the single winding and leaving about 20mH to be used. Experience shows that single-coil filters do not have sufficient harmonic attenuation in the range 10-100kHz; a two-coil filter improves performance (C11 = C12 = 220pF) but you really need some instruments to measure such a filter when it is to be used for high or low audio frequencies.

"This presents a problem when the main intention is to use only readily available components. However lower-inductance coils will have some effect; the use of 2.2mH RF chokes may increase the cut-off frequency to about 12kHz and such a filter is still quite useful in reducing some audio intermodulation.

"The first receiver used only audio gain control but it was later found that RF gain control was much more important on 7MHz and AF gain control was then not really necessary. The AF gain is rather high and R12 is used to reduce it. As my high-impedance headphones were missing, I cheated by using an available audio amplifier.

"Oscillator drive for the mixer is fairly critical and should be roughly 0.5V RMS. Too high or too low a drive level will dramatically reduce the sensitivity but fortunately the target level has a range of about 10dB.

"It proved possible to hear extremely weak 0.1μV CW signals on both 14 and 7MHz when sensitivity was checked with a signal generator. The need to prevent RF from getting into the AF amplifier must be strongly emphasised; otherwise some strange cross-over effects may be caused."

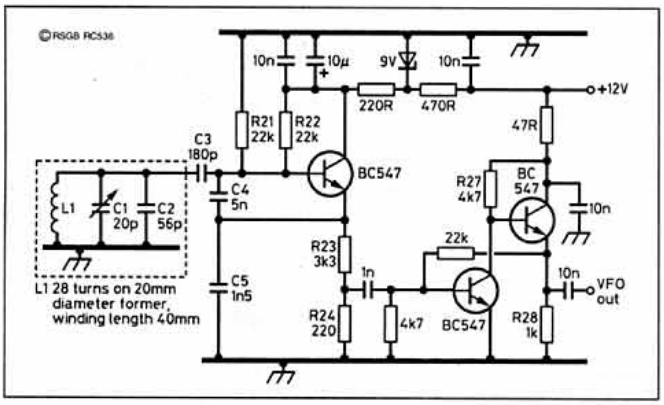


Fig 5: 'Synthetic rock' oscillator/doubler as used by LA8AK for the 'Third World' direct-conversion receiver.

The basic receiver strip is shown in **Fig 4**, and is suitable for use on 7MHz with a VFO output on 3.5MHz or on 14MHz with a VFO output on 7MHz. For the VFO of **Fig 5** LA8AK used a low-cost version of the long-established 'W3JHR synthetic-rock' design (see *TT*, November 1994, Fig 6) but using three BC547 bipolar transistors with the oscillator on 3.5MHz, with a different buffer and with a 3.5/7MHz frequency-multiplier-driver (2 x BC238 = BC547). However, he feels that, for European/American constructors, with access to a wider range of components, it would be a better idea to use as the basic oscillator stage a ceramic-resonator VXO (**Fig 6**) with a 3.579MHz ceramic resonator (see *TT*, May 1994, pp54-55).

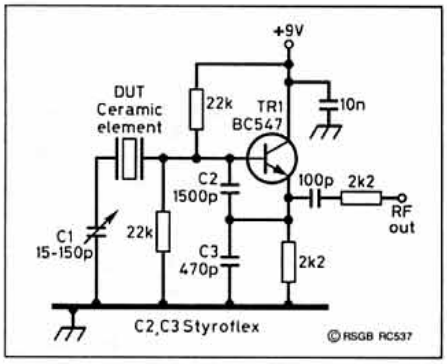


Fig 6: Alternative ceramic-resonator VXO could be used as substitute for oscillator stage of the VFO/doubler.

Component notes on the VFO of **Fig 5**: LA8AK used silvered mica capacitors and 20mm diameter 40mm on plexiglass coil former with 28 turns and a winding length of 25mm. Frequency stability was within 250Hz during the first hour of operation on 3.5MHz.

Component notes for receiver strip of **Fig 4**: The coils are made on 15mm plexiglass formers, 18 turns of 0.2mm enam. copper, 15mm long, tapped as shown. Coils are dipped with a 47 to 50pF capacitor in parallel at 14MHz. Adjustment is by spreading or closing up the turns (it might be easier to use coils with adjustable cores but this is not really necessary). The ferrite bead (u = 1000 to 2000) used for VFO injection was of the type found on heaters in VHF equipment but is not critical); two by six turns (0.2mm enam copper wire) is about the maximum possible with the small hole in these beads. L3 and L4 are 19 to 22mH RF chokes. C11 and C12 are 22OnF, C11 is 470nF.

RUSSIAN POWER VALVES

IT HAS FOR LONG been evident that manufacture of those 'old-fashioned' (but still relevant for high power amplifiers) RF power valves is increasingly being phased out in many countries but continues in some east-

ern European countries and in China etc. Some time ago, attention was drawn in *TT* to the rather wide range of manufacturing skills found in RF power valves stemming from China as observed by Bill Orr, W6SAI. Some factories were turning out good quality, close tolerance valves but others less so.

A 'New Products' item in *QST* (November 1994, p104) draws attention to a range of Svetlana Electron Devices power valves including a new, relatively low-cost, 4CX800A ceramic/metal transmitting tetrode which used as a linear amplifier is rated at up to 750W PEP output (a pair giving 1500W PEP) and which is being manufactured at a Svetlana valve factory in St Petersburg, Russia.

The air-cooled 4CX800A is a high-performance valve intended for grounded-grid or grounded-cathode service with a passive (untuned) 50Ω input circuit and capable of good linearity at relatively low anode voltages. The SK1A socket, with built-in screen bypass capacitor, increases the maximum frequency rating to 250MHz.

Interestingly enough, *QST* gives the address for data enquiries etc as George Badger, W6TC, Svetlana Electron Devices Inc, 3000 Alpine road, Portola Valley, CA 94028, USA (tel 415-233-0429). W6TC is well-known in the UK not only for his detailed work on coaxial-cable baluns but also for his many visits to Europe on behalf of Varian-Eimac.

THE T-NETWORK ANTENNA TUNER

THE CLASSIC PI-NETWORK or LC/CL two-component matching networks can be used as the basis of an antenna tuning unit (ATU). These are theoretically capable of matching any transmitter to any antenna impedance (resistive or reactive). However, in practice the matching range is dependent on the component values. For the widest step-up and step-down transformations, the high-voltage variable capacitors need to have low minimum and very large maximum capacitance values - a significant disadvantage these days. The pi-network and the standard LC configurations do however possess the advantage that they not only transform impedance but also form a low-pass filter and so provide additional harmonic and higher-frequency spuriae attenuation: see **Fig 7.**

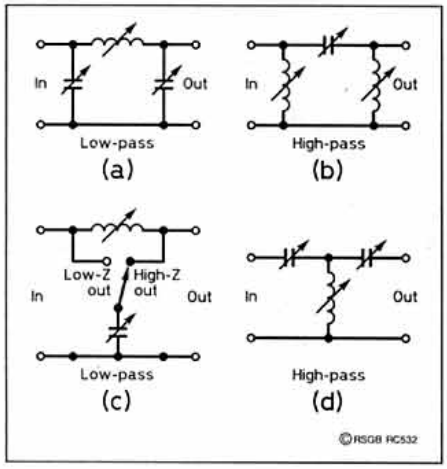


Fig 7: Some basic ATU configurations. (a) Pi-network in conventional 'low-pass' form. (b) Inverse pi-network with components interchanged but providing high-pass filter. (c) Switched LC network providing either step-up or step-down of the impedance with a degree of low-pass filtering. (d) T-network (high-pass).

But modern solid-state transceivers include built-in low-pass filtering tailored to the individual bands, with the result that there is far less requirement for the harmonic attenuation previously provided by the ATU. This has opened the way to much greater use of the T-network which can provide an acceptably wide range of impedance transformations without a requirement for large-value variable capacitors. The disadvantage that they form a high-pass rather than a low-pass filter is no longer regarded as a real disadvantage. Many of the current ATUs on the amateur market now utilise the T-network: see **Fig 7(d).**

Andrew S Griffith, W4ULD, provides a useful article on 'Getting the most out of your T-network antenna tuner' (*QST*, January 1995, pp44-47). He describes "how to adjust this popular tuning circuit so that it transfers maximum power to your antenna without going snap, crackle and pop."

He shows that the T-network of **Fig 8**with variable capacitors with a range of 20-240pF and a roller-coaster inductance variable from 0.1 to 35μH when used with a transmitter designed to feed 50Ω line can match purely resistive loads of about 10Ω to 3000Ω from 1.8 to 21MHz. On 24 and 28MHz the range narrows to about 10 to 1500+ since C_{in} and C_{out} cannot be adjusted to less than 20pF. With reactive loads, the matching range narrows. However, W4ULD points out: "Even with reactance present, very few cases should occur in which the antenna cannot be matched with the proper tuning technique."

He provides detailed tuning procedures for both roller-coaster tuners and tapped-inductor tuners but warns that while power loss in a T-network is often less than 0.3dB "it may be considerably higher. For a given impedance transformation, minimum loss occurs when C_{out} is as high as possible when a match has been achieved. The loss in a T-network with the component values shown in Fig 8 can approach 2dB when matching load impedances lower than 20Ω at 1.8, 3.5 and 7MHz. Under these conditions, component heating and/or arcing may occur, and the tuner's power-handling capability may have to be derated. With the proper tuning techniques, however, an acceptable impedance transformation - as indicated by a 1:1 SWR - should be obtainable under most circumstances. Tips include:

- To achieve the highest possible efficiency at a given impedance transformation, tune the network with the highest output capacitance that allows a match.
- When matching loads of less than 25Ω on 3.5 and 1.8MHz, you may have to reduce output power to reduce tuner heating or to keep it from arcing.

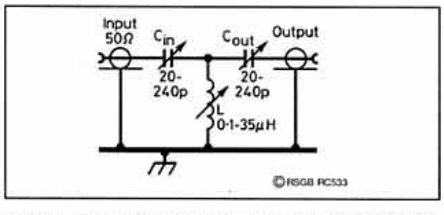


Fig 8: The T-network ATU as described by W4UMD.

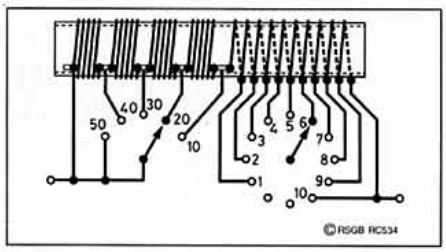


Fig 9: A variable-inductance ATU coil described by Hector Cole, G3OHK in *TT* (May 1989) using two switches and just 14 taps to permit selection of from one to 50 turns of a 50-turn coil and which can be quickly reset to any number of turns previously found suitable without the turns counters required for roller coaster coils.

- When operating high power, do not feed short (less than 0.3λ) loaded dipoles with a feed-line that is a multiple of 0.50λ (electrical) long. Such antennas may have feedpoint impedances of 5 to 9Ω, and the tuner will see this very low load impedance.
- When operating high power, do not operate a 1.8MHz dipole on 3.5MHz or a 3.5MHz dipole on 7MHz with a coax feed-line that is an odd multiple of 0.25λ (electrical) long. The antenna's high feedpoint impedance will be transformed to 1.5 to 2Ω at the tuner. To add insult to injury, the feed-line loss will be excessive - over 6dB and so wasting 75% of the transmitter's output power as heat.

The tuning procedure recommended by W4ULD for roller-inductor tuners is given below, but it is advisable to practice with low power into a dummy load fed via a length of coaxial cable, preferably with a variable capacitor of about 100pF in series with the centre conductor of the coax at the dummy antenna and to provide practice at matching reactive loads.

1. Set C_{out} at maximum capacitance and leave it there.
2. Set C_{in} to about half scale.
3. Adjust roller inductor for an SWR dip (this may be barely noticeable).
4. Slightly increase or decrease C_n and readjust the inductor for a dip.

5a. If the SWR is lower than it was in (3), slightly vary C_{in} in the same direction as in (4).

5b. If the SWR is higher than before, adjust C_{in} in the opposite direction to (4). Alternatively, inch C_{in} in the step (4) direction and redip the SWR with the inductor until an SWR of 1:1 is obtained.

6. When you have almost reached the match point, the SWR may start to go up as C_{in} is adjusted, but make the change anyway and redip with the inductance.
7. Continue to adjust C_{in} in the same direction until adjusting the inductor produces a higher SWR than before. Inch the capacitor back to the previous setting.
8. If you cannot obtain a 1:1 SWR reduce C_{out} and repeat the process, beginning at step (2). If you cannot acceptably minimise the SWR at some setting of C_{out}, the antenna impedance is out of range of the tuner.

Clearly, in operational circumstances and when the correct settings of the ATU have not previously been determined, it will be helpful to fellow operators to use a 'quiet tuning'

QUIET-TUNING FOR 100W TRANSCEIVERS

FRITS GEERLIGS, PA0FRI, uses the arrangement shown in **Fig 10** to permit the adjustment of an ATU without radiating more than a tiny fraction of the transceiver output. This does not give a direct SWR reading but makes it easy for zero tune-up of the ATU without radiating more than about 50mW. With the silicon diode in parallel with the meter, the usual sensitivity-control potentiometer can be omitted. The only critical component is the 50Ω non-inductive (dummy load) resistor formed from two 100Ω, 25W resistors in parallel. For further information on quiet tuning see 'Simple quiet tuning and matching of antennas' by Professor Mike Underhill, G3LHZ, *RadCom*, May 1981, pp420-422.

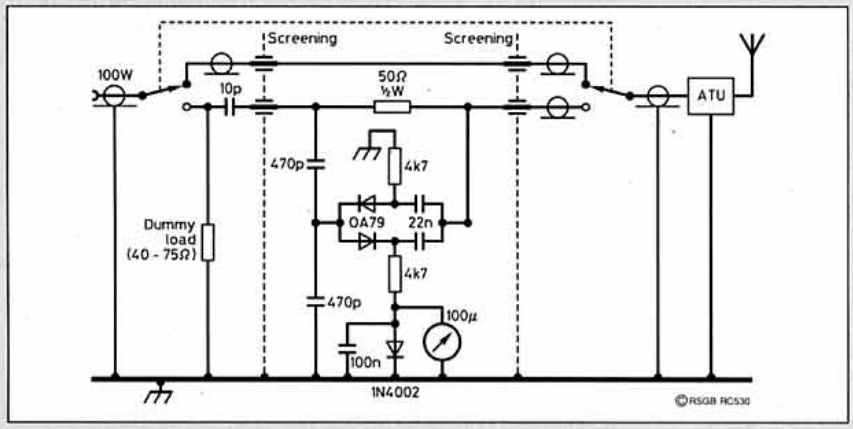


Fig 10: PA0FRI's quiet-tuning unit for use with 100W transceivers. Note that the OA79 diode is a germanium type (the germanium-type 1N34 is suitable.

device such as that described by PA0FRI or the article by G3LHZ in *RadCom*, May 1981, pp420-422. **Fig 9** shows a useful substitute for a high-cost roller-coaster.

A point emerging from W4ULD's article is the significant power loss (even with a 1:1 SWR) that can be incurred with ATUs when the component values are restricted, often detected by heating of the coil. It has been noted before in *TT* that, particularly on the lower frequency bands where very low feedline impedances may be presented to the ATU, more than half the transmitter output power (3dB) may easily be lost in an otherwise efficient ATU, usually the result of insufficient maximum capacitances.

CHEQUERBOARD CONSTRUCTION JIG

COLIN WALKER, G3VTS, reiterates the view often expressed in *TT* that for one-off construction of prototypes or operational circuits the home-etched PCB offers few advantages and several disadvantages.

He writes: "Many amateurs often have the need to construct simple items quickly for use in the shack but cannot be bothered to design and etch a PCB particularly if the components to be used come from the junk box.

"Perforated (Veroboard) board or 'dead bug' techniques are suitable but if you have odd pieces of single or double-sided board available it is much easier to cut the surface in chequerboard fashion to a size that suits the project.

"In this connection, a simple jig to cut through the copper or piece of PCB quickly and accurately is a useful tool. Such a jig is shown in **Fig 11(a).** No dimensions are given for the jig as it can be made to suit particular requirements and the material available. I used chipboard and aluminium for the saw guides.

"When complete, the jig is held in a vice and after marking the board with a pencil to show where to cut, it becomes a simple operation to cut through the copper with a fine tooth hacksaw and then clean up with 'Scotchbrite' to remove any burrs and clean the board ready for soldering: see **Fig 11(b).** The board can be easily held by hand and the guides at each side hold the hacksaw-blade square. With care it is possible to cut close enough to solder the pins of an IC onto adjacent lands but I find it easier to cut larger lands and only solder the four corner pins down, then use short wires or components for the remaining pins. With double-sided board, small holes can be drilled through to ground pads as necessary."

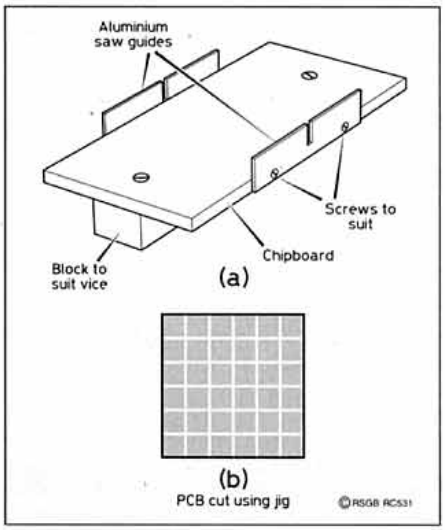


Fig 11(a): G3VTS's home-made jig used for cutting chequerboard slots in the copper covering of PCB material. (b) Typical appearance of the board after cutting, providing square or rectangular lands to which component leads can be soldered.

RF SWITCHING & TUNING DIODES

TT FEBRUARY 1993 REPORTED briefly an important article by Dr Ulrich Rohde, KA2WEU/DJ2LR, which was published simultaneously in English and German (*QST* and *CQ-DL*, November 1992) on "Recent advances in shortwave receiver design". He subsequently published a series of three articles (*QST* May, June and July 1994) on "Key components of modern receiver design" and a recent follow-up "Key components of modern receiver design: a second look" (*QST*, December 1994). In these articles he stressed that for receivers intended to have a very wide dynamic range, the intermodulation distortion that arises from the use of unsuitable RF switching and tuning diodes imposes an important limitation. He has recommended the use (or substitution) of such special-purpose RF diodes as the Hewlett-Packard HP5082-3081 PIN diodes.

Dr Rohde's articles encouraged Tom Thomson, W0IVJ, to investigate how bad in practice are the more distortion-prone switching diodes and how good are those designed for low distortion ('Exploring intermodulation distortion in RF switching and tuning diodes', *QST*, December 1994). He carried out laboratory tests on four types of diodes: The IN4153 generic PN switching diode; the Motorola MPN 3700 PIN diode intended for RF switching; the BAT-17 Siemens PIN switching diode; and the low-cost 1N4007 which is a generic 1kV-PIV rectifier diode with a PIN structure but not intended for RF switching.

He has tabulated results in terms of diode switch insertion loss (dB) at 10MHz with 0, 5, 10 and 20mA bias currents; and similarly the second- and third-order intercept points (IP2, IP3 and dBm). He draws the following conclusions: "RF-specified PIN diodes are the devices of choice for low-distortion switching at HF and above, for bandpass filter selection and IC switching in a narrow-band pre-selector. Although the presence of a PIN structure in the 1N4007 makes it seem attractive as a low-cost alternative to RF-specified PIN diodes, its insertion-loss performance when unbiased and reverse-biased - and its IMD performance when unbiased - is demonstratively inferior to RF-specified PIN diodes.

He adds: "The manually switched and tuned front-end filters of the 1960s and 1970s had much to offer in terms of second-order IMD, but we need not retrogress to those techniques to achieve improved IP2 and IP3 performance today. More attention paid to front-end filtering in general can produce the improvement we need."

Dr Rohde in commenting on W0IVJ's finding, notes that many amateurs had reported difficulty in obtaining HP5082-3081 diodes. He recognises that even with the Motorola MPN3700 with a US price of less than £1, replacing all 20-plus filter-switching diodes can be expensive. Nevertheless he recommends changing all the diodes between the antenna and the first mixer, which includes the diodes on both sides of the bandpass filters of a transceiver but not the transmit/receive switching diodes which typically are already high-quality PIN types. He also adds some notes on Japanese switching diodes which might be used "to replace the 'bad' diodes seen in the past". ♦

RADCOM TECHNICAL FEATURE

HF/VHF Vee Beam Design & Performance

The second of two parts by Richard A Formato, PhD, K1POO*

SEVERAL EXAMPLES OF Sloping Vee performance are discussed in this section, mostly in terms of radiation patterns. Before examining the radiation patterns, however, it's useful to review the geometry and concepts presented in **Fig 8.** Antenna characteristics are described in spherical polar co-ordinates defined with respect to a right-handed Cartesian (XYZ) co-ordinate system. The antenna is located at the origin, and the X-Y plane is earth's surface. The zenith is overhead in the direction of the +Z axis.

Directions in space are specified by two angles, azimuth and polar angle. The azimuth is measured counter-clockwise from the +X axis in the Z-Y plane (viewed from above). The polar angle is measured from the +Z axis as shown. A polar angle of zero corresponds to directly overhead, while 90° is at the horizon. The take-off angle is the complement of the polar angle. Zero take-off is in the direction of the horizon, while 90° take-off is overhead.

Because of the mixed polarisation from a Sloping Vee antenna, its electric field contains a horizontal component and a vertical component. These far field vectors are perpendicular to each other and to the wave vector, which points radially outward in the direction of propagation. The total radiated electric field is the vector sum of the horizontal and vertical fields; it's inclined at an angle determined by their relative magnitudes. Note that the vertical field is 'vertical' (in the sense of perpendicular to the X-Y plane) only when the take-off angle is zero. Directly above the antenna, the vertical field is actually horizontal!

The power flux radiated by an antenna in a specific direction (watts/square metre) is proportional to the square of the electric field strength divided by the impedance of free space (377Ω). Power gain is computed as the ratio of the flux actually produced by the antenna to the flux that would be produced by an ideal isotropic radiator with the same input power. The isotropic source is a fictitious antenna that radiates equally well in all directions.

For example, if a particular Vee produces a flux of 20 watts/sq m at a take-off angle of 10° and an azimuth of 5°, and if the isotropic flux for the same input power were 1 watt/sq m, then the Vee's power gain at 10° take-off, 5° azimuth, is 20. What this means is that the Vee produces 20 times more power per unit area in that direction than an isotropic source with the same input power. The power gain in dBi is given by the familiar expression 10og(20) = 13dBi.

* 116 Stiles Road, Boylston, Mass, 01505-1506 USA.

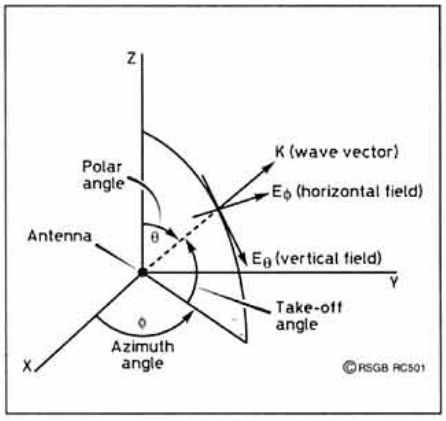


Fig 8: Electric fields radiated by the antenna.

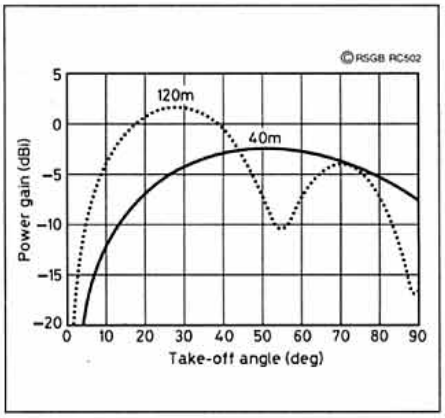


Fig 9(a): Sloping Vee pattern at 5 MHz.

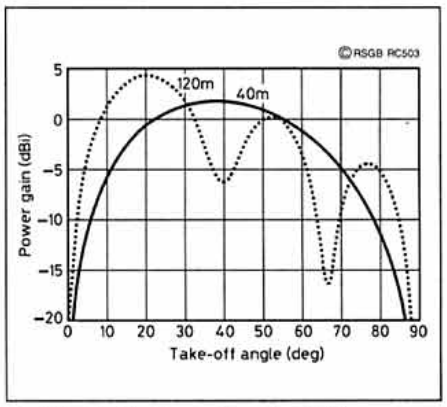


Fig 9(b): Sloping Vee pattern at 7.5 MHz.

5-30MHz HF Vee

The first antenna considered in detail is an HF design with the following parameters:

Apex Angle = 60°
Radiating Element Diameter = 0.32cm
Feed Point Height = 12 metres
Termination Height = 4 metres

This antenna's radiation patterns were computed for average ground (conductivity = 0.005 Siemens/m, dielectric constant = 8) at frequencies of 5, 7.5, 15, 22.5 and 30MHz for two radiating element lengths (40, 120m). All patterns are in the vertical plane at zero° azimuth (that is, the plane perpendicular to the earth's surface that bisects the angle formed by the radiating elements). The take-off angles run from zero (horizon) to 90° (Zenith). Plotted patterns appear in **Figs 9(a) - 9(e)**. Following standard practice, linear scales are used because they provide better resolution of fine detail than do polar plots.

Pattern features of particular interest include the main lobe gain and take-off angle, and first sidelobe level and angle, which are summarised in **Table 2**. In the table, L is the radiating element length, G_{max} is the main lobe maximum gain, and 1st SL (dBi) is the first sidelobe level. Angle is the take-off angle at which the corresponding gain is achieved.

The results show that this design (which has not been optimised) provides moderate gain over most of the HF band. With the long radiating element (120m), the Vee's gain increases from 1.8dBi at 5MHz to 10.6dBi at 22.5MHz, followed by a decrease to 8.6dBi at 30MHz. The corresponding values for the

L (m)	Gmax (dBi)	Angle (deg)	1st SL (dBi)	Angle (deg)
Frequency = 5.0MHz				
40	-2.5	51	-	-
120	1.8	28	-4.0	70
Frequency = 7.5MHz				
40	1.9	38	-	-
120	4.4	21	0.3	52
Frequency = 15.0MHz				
40	8.1	22	-3.8	57
120	7.0	28	-0.4	45
Frequency = 22.5MHz				
40	10.3	15	3.3	40
120	10.6	15	2.5	31
Frequency = 30.0MHz				
40	10.1	11	6.7	30
120	8.6	8	6.2	21

Table 2: Pattern features of interest; 5-30MHz Vee.

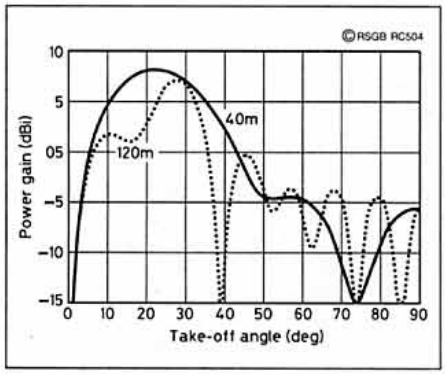


Fig 9(c): Sloping Vee pattern at 15 MHz.

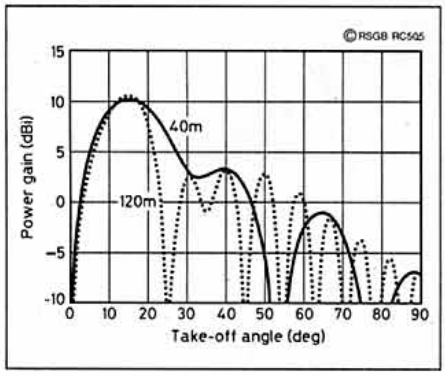


Fig 9(d): Sloping Vee pattern at 22.5 MHz.

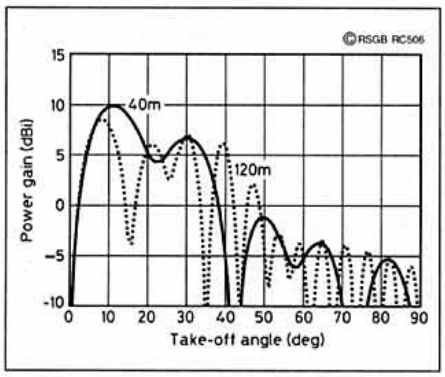


Fig 9(e): Sloping Vee pattern at 30 MHz.

short (40m element are -2.5, 10.3 and 10.1dBi. The short element design could be used in a space-limited installation, but the larger one provides better low band performance.

With the long radiating element, the range of take-off angles for maximum gain is 28° at 5MHz to 8° at 30MHz. For the short element, the range is 51° to 11°. At the low end of the band, the short element isn't long enough to break up the pattern (40m compared to 60m wavelength at 5MHz). Radiation is distributed in a single, smooth main lobe extending essentially from horizon to zenith. The long element, by contrast, shows the scalloped pattern characteristic of radiators that are longer than the wavelength.

48-56MHz VHF Vee

The HF Vee described above covers at least a 6:1 frequency range. If a smaller range is acceptable, especially for single band or closely spaced multi-band operation, then the antenna can be designed for higher gain. The Vee described in this section covers the US 6-metre amateur radio band (50-54MHz) with high gain. Its design parameters are as follows:

Apex Angle = 15°

Radiating Element Diameter = 0.32cm

Feed Point Height = 6 metres

Termination Height = 8 metres

This antenna, unlike the HF Vee, has the terminations higher than the feed point. As a general rule, this arrangement provides better performance. For practical reasons, however, many Vees are built with the terminations lower than the feed, frequently right on the ground.

The 6-metre Vee's input resistance is 455, 446, and 437Ω, respectively, at 48, 52 and 56MHz. Using an average value of 446Ω, each radiating element should be terminated by a 223Ω non-inductive resistor (in practice, 200 or 250Ω is close enough). Since the computed input resistance varies only 4% between 48 and 56MHz, this design should provide essentially flat VSWR from 50-54MHz.

Radiation patterns were computed at 48, 52 and 56MHz for three radiating element lengths (20, 40 and 60 metres); they are plotted in **Fig 10(a) - (c)**. Like the HF patterns, these radiation patterns are in the vertical plane bisecting the elements (zero azimuth angle). **Table 3** summarises some of the important performance parameters. 3dB BW is the approximate main lobe beamwidth between -3dB points (3dB down from the maximum gain). 1st SL (dB//Gmax) is the first sidelobe level relative to the maximum gain ('dB down' from the main lobe).

It is apparent that this simple antenna provides exceptionally good gain performance throughout the 6-metre band. The gain increases from 16.3 to 18dBi between 48 and 56MHz using the longest (60m) radiating element. Even the shortest element (20m) provides moderate gain (7.7-9.3dBi). For all element lengths, maximum gain occurs at take-off angles between 9 and 12°, which are suitable for long range links. As this example shows, the physical size of a high gain Vee can be large. But the dimensions become less imposing when they're compared to the size of a yagi providing the same gain. Of course, at higher frequencies, especially high VHF and UHF, the shorter wavelengths result in much smaller designs.

10-60MHz HF/VHF Vee

As a final example of Vee performance, the measured VSWR data for an upper HF/lower VHF Vee on average ground are presented. The antenna was designed to provide moderate gain (4-8dBi) from 20 to 60MHz with a small footprint. It turned out that the antenna was actually usable down to below 7MHz. Its design parameters are as follows:

Apex Angle = 70°

Radiating Element Length = 20m

Radiating Element Diameter = 0.32cm

Feed Point Height = 6m

Termination Height = 0m

The radiating elements were terminated with off-the-shelf 100 watt, 300Ω non-inductive power film resistors (even though the input resistance was closer to 700Ω than to 600). The antenna was used continuously at

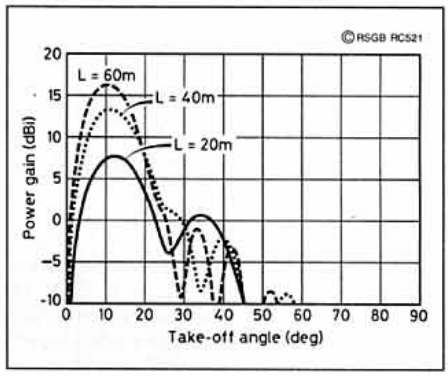


Fig 10(a): Sloping Vee pattern at 48MHz.

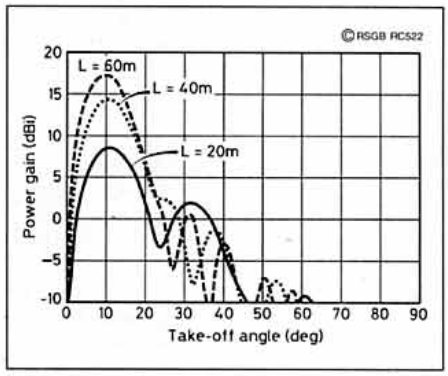


Fig 10(b): Sloping Vee pattern at 52MHz.

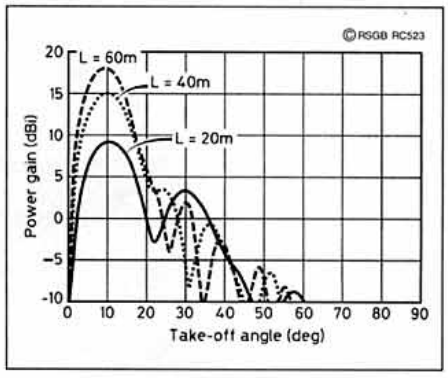


Fig 10(c): Sloping Vee pattern at 56MHz.

800W input power without problems. However, as a rule of thumb, the resistors should be rated to handle 25% of the RF input power. Under some circumstances, up to 50% of the input power may be dissipated in the resistors.

The antenna's VSWR is plotted in **Fig 11**.

L (m)	Gmax (dBi)	Angle (deg)	3dB BW (deg)	1st SL (dBi)	1st SL (dB//Gmax)
			Frequency = 48MHz		
20	7.7	12	12.6	0.5	7.2
40	13.3	11	12.0	-2.3	15.6
60	16.3	11	10.6	-1.1	17.4
			Frequency = 52MHz		
20	8.5	11	11.9	1.9	6.6
40	14.2	10	11.0	-1.5	15.7
60	17.2	10	9.9	0.3	16.9
			Frequency = 56MHz		
20	9.3	10	11.0	3.3	6.0
40	15.0	10	10.4	-0.9	15.9
60	18.0	9	9.5	1.8	16.2

Table 3: Pattern features of interest; 48-56MHz Vee.

It was measured at the input to 150ft of low-loss 50Ω coaxial feeding the antenna and at the balun. At the cable input, the VSWR is below 1.5:1 at most frequencies from 10 and 60MHz. The average VSWR at the coax input was 1.41:1 and 1.73:1 at the balun. This antenna illustrates how good a Vee's VSWR performance can be over a wide frequency range.

It's common practice to define an antenna's impedance bandwidth relative to a VSWR threshold of 2.5:1 (see Box 1 in Part 1). Although the threshold should be set by the characteristics of the specific Tx being used, a value of 2.5:1 is representative for modern equipment. The VSWR for the HF/VHF Vee is well below 2.5:1, and it's low enough that no antenna tuner or matching network is required. This Vee can be loaded directly at any frequency between 10 and 60MHz (and, in fact, beyond).

SOURCES OF MATERIALS

IF YOU WANT to experiment with Sloping Vees, you may wish to contact the following US companies for information. A Sloping Vee computer modelling program is essential to designing a good antenna. It's the only way to investigate performance trade-offs as various antenna or ground parameters are changed.

The radiation patterns, apex angle plots and input resistance plots were computed using PC (IBM-compatible) software supplied by Phadean Engineering Co Inc, PO Box 611, Shrewsbury, MA 01545-8611.

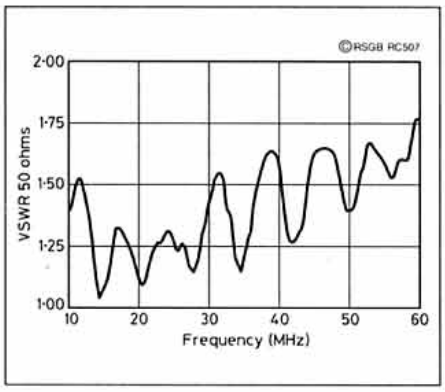


Fig 11: Sloping Vee, measured VSWR.

Phadean provides inexpensive ($10-$30) antenna design software.

Non-inductive film power resistors for terminating your Vee are available from Power Film Systems Inc, Yellville, AR 72687. PFS's standard values should cover most applications, but custom devices are available at extra cost if required. Toroidal and cylindrical ferrite cores for winding baluns are available from Radio Kit Inc, PO Box 973, Pelham, NH 03076 (be sure to run back-to-back tests!)

7 x 9 stranded phosphor-bronze cable is an excellent wire for the radiating elements. It's especially useful if the Vee will be installed and removed frequently (doesn't kink or tangle). It's available from Astro Industries Inc, Dayton, OH 43432. If a non-metallic mast is desired or required, a very strong, non-bending, thick-wall fibreglass tubing called EXTREN 500 is distributed by J T Ryerson Co, PO Box 1111, Boston, MA 02103. Since the phosphor-bronze wire and EXTREN are quite expensive (about $2 and $4 per foot, respectively), most experimenters won't want to spend that much. This information is being provided for completeness. The Vee's electrical performance is the same whether an exotic stranded cable or a plain single-conductor wire is used. The main difference is convenience. As far as masts go, 'masts of opportunity' (trees) provide the same results as fancy dielectric ones, with somewhat less convenience perhaps, but almost certainly more fun!

CONCLUSION

THIS ARTICLE HAS discussed Sloping Vee design and performance. The Vee is inexpensive, mechanically and electrically simple, easily transported and installed, and, most importantly, it provides excellent gain-bandwidth performance. The Vee also provides the added bonus of inherent polarisation diversity because the radiating elements are inclined wires.

Sloping Vee performance has been illustrated by several design examples. Just about any performance characteristic can be changed by suitably modifying the antenna design. The Vee can provide a balance between gain, take-off angle, and bandwidth, or it can be designed to optimise a single performance parameter. The examples have illustrated various design approaches that achieve different balances. ♦

RADCOM TECHNICAL FEATURE

80 - 30m Switchmode PA CW Transmitter

The second of a two part article by Chas Fletcher, G3DXZ*

THE PROTOTYPE including the 7V regulator (**Fig 11**), was built into an aluminium case 7 x 7 x 4 in. overall (approx. 178x 178x 102 mm) without overcrowding. All components were mounted on the surface of copper clad board affixed to the internal horizontal shelf or the alloy side/rear panels.

I am now a devotee of soldering components onto an earthed copper surface by their grounded pins, the wiring above them supported by the components. Unearthed components can be fixed by sticky pads. With good component layout and soldering, the result is stable and totally reliable. Mistakes are simply rectified as no tracks or holes need be corrected; simply clean off and start again! As a guide, the layout of the major components in the prototype is shown as **Fig 12**. Wiring, with the exception of the low impedance RF circuits, is best done in coloured plastic covered single conductor (hook up) wire. Using consistent colours, eg red is always +12 volt rail, really helps in tracing runs. The standard single cable on sale seems to be 0.6 mm diameter. This is ideally a little too thick for easy wrapping around IC pins. A scrounge around the surplus dealers can be beneficial - I now have a selection of 0.2 mm wires which are perfect!

The VFO is built on copper clad board 2.25 x 3.25 in. (57 x 73mm). The coil L1 is wound on a T50-2 powdered iron core which is fixed to the board with a sticky pad. The wires between the coil, S1a, C3, C5 and C6 were 18SWG bare copper for rigidity. A good source of this wire is twin and earth, 1.5 sq mm, house lighting cable which strips very easily. The fine tuning capacitor C4 was mounted on the opposite side of the front panel to the rest of the components (in order to separate the two tuning controls) and connected to C3 with miniature coaxial cable. This method controls stray fields well and is very stable. The only delicate operation is winding the mixer filter coils, L2. These, in my case, were old TOKO 10.7 MHz IF transformers but the coil specified is just the same. These transformers can be pulled from their screening cans by the pins. The existing windings must be carefully removed and the pins cleaned up. The plastic used in the TOKO coils resists heat well. Using 36SWG wire, wind on the turns as specified in Fig 7 (see Part One). It's worthwhile checking resonance before putting on the brass screening cans as some are a tight fit. The cans are fixed upside down on the copper board with solder and the tuning capacitors wired across the pins.

The converter, driver and output filters fit on to a 4.5 x 2.25 in. (114 x 57mm) board. The wires that connect the output of the driver, IC3, to the gates of the PA devices should be short and something like 20SWG. I used multi-strand flexible wire. Similarly, the low impedance feeds from T2, C22 and C23 need plenty of copper. The relays RL1, 2 and 3 are stuck down on their sides with their common connections bonded with 18SWG copper. The filter inductors L3 and 4 are mounted between the relays and the compression trimmers, C24, their wires being strong enough to support them in space. TR5, the shaper circuit power transistor, is also supported above the board by the bypass capacitors C29 and C30. It does not need a heatsink.

The control circuits are mounted on a 1.25 x 3.25 in. (32 x 83mm) board. Most of the 0.33 watt resistors are fitted between the pins of the IC's using short connections. Neatness is needed here. A good pair of fine nosed pliers is essential when forming tiny loops on the ends of wires to slot over the IC pins. Try to crimp component wires together before soldering as it makes assembly much easier

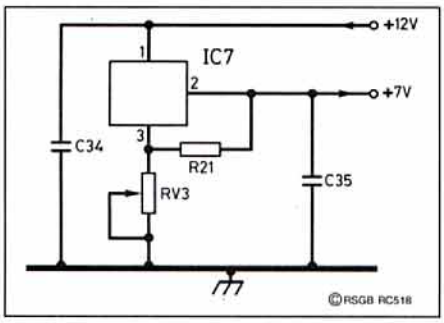
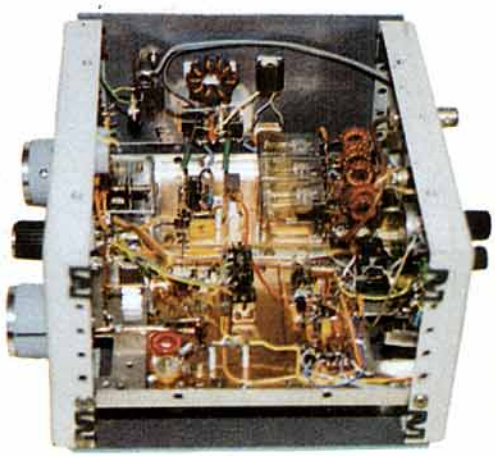


Fig 11: 7 volt supply regulator.



* 12 Park Cresent, Retford, Notts DN22 6UF.

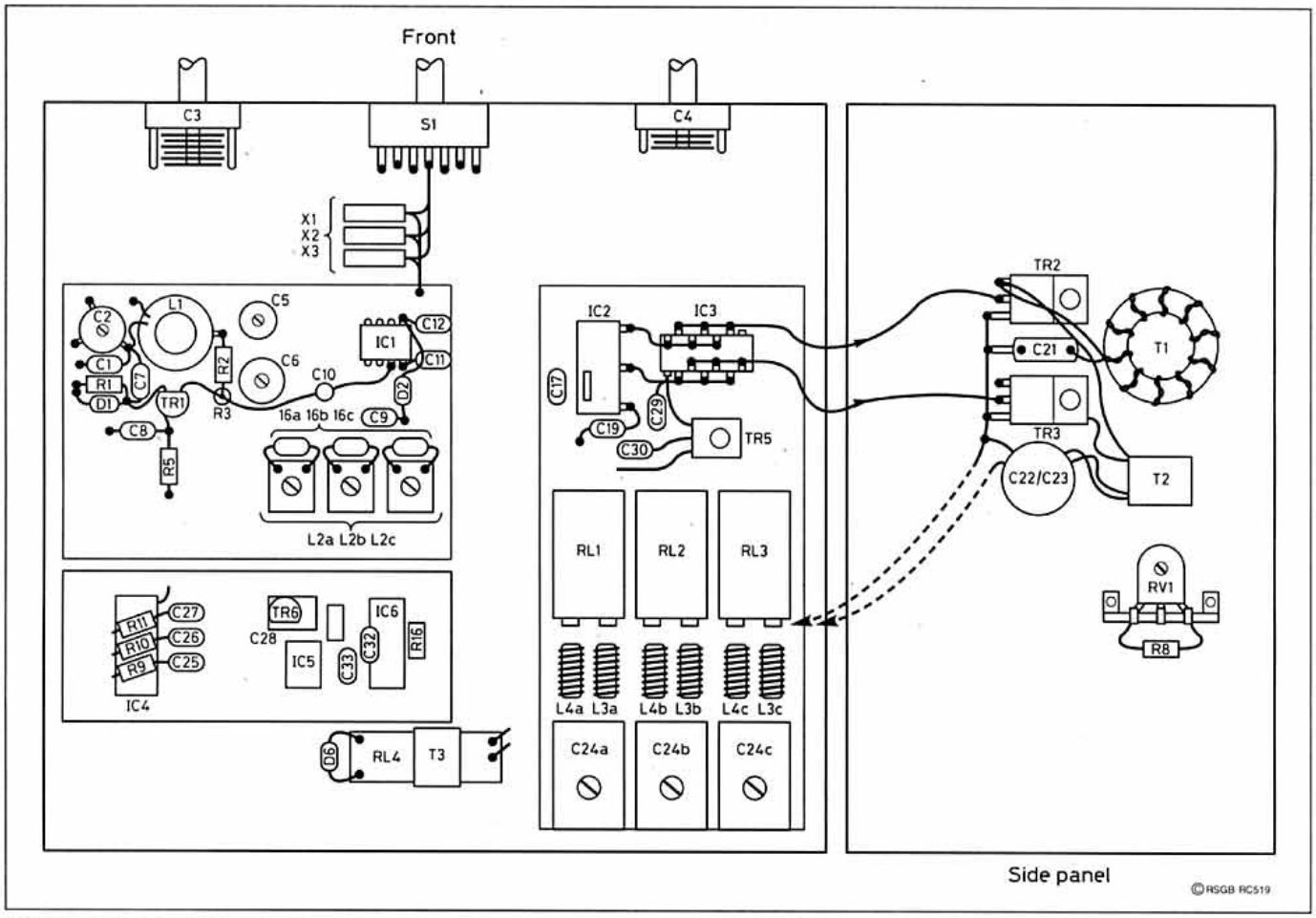


Fig 12: Prototype component layout.

when several wires arrive at the same pin. I find that about 3/16 inch (5mm) of wire between component and loop makes a very neat job and leaves enough wire to hold with pliers if you wish to keep the component cool.

The PA Mosfets, together with all the components working at full PA positive supply volts, are mounted close together on the aluminium side panel. The Mosfets are thermally mounted on the panel to conduct away the small amount of heat that is generated. This is a power switching stage working at low impedance levels and appropriate wiring should be used. T1 uses 20SWG copper, two strands twisted together before being wound on the ferrite ring to form a bifilar winding. T2 is a twin hole bead wound with low voltage insulated multi-strand wire, which I found easier to work with than single strand wire. C22 and C23 are disc ceramics conveniently stuck on their sides to the panel. This method forms a strong mounting point for the heavier wire.

The use of a PA current ammeter is recommended; 4 amps FSD. It is quite easy to find small meters, usually scaled in VU or something. It is not difficult to rescale these instruments, a quick respray and 'Letraset' does the trick. They mostly work to around 400 microamp or 200 millivolt full scale. The shunt R8 is intended to produce around 200 mV at 4A, VR1 allows for variation in the instrument used.

Reed relay RL4 has the matching transformer T3 stuck to it and is mounted close to the filter relays in an attempt to keep the low impedance unscreened wires carrying RF power as short as possible. The 50Ω side can be wired in miniature coax.

POWER SUPPLIES

ALTHOUGH THIS TRANSMITTER will work from a single 12 volt supply it is better to separate the 12V exciter supply from the power to the PA Mosfets. With switchmode amplifiers, which always work in an overdriven state, you cannot control the output by turning down the drive. Output power is controlled by reducing the PA drain voltage.

Having matched the PA to the ATU at 50Ω, the power out is then simply a function of the volts supplied to the PA. The best arrangement is a variable power unit, say 5 to 15 volts at 3 amps maximum for the PA with a fixed +12 volt at one amp (using a 7812 regulator) for the exciter.

Initial PA testing can be done with the voltage turned down; in this condition it is very difficult to damage the Mosfets. Separating the +12 volt exciter supply also makes for better stability when keying. **Fig 13** shows an arrangement using cheap LM317T regulators. This IC has a nominal max. output of 2 amps but two can be paralleled to provide 4 amps. These regulators are very robust and will withstand short circuit conditions for short periods. A similar IC is used for the fixed 12 volt supply.

The 7 volt power regulator (Fig 11), is fixed to the rear panel of the transmitter case, along with the sidetone volume control and all plugs and sockets. (Layout not shown on Fig 12.)

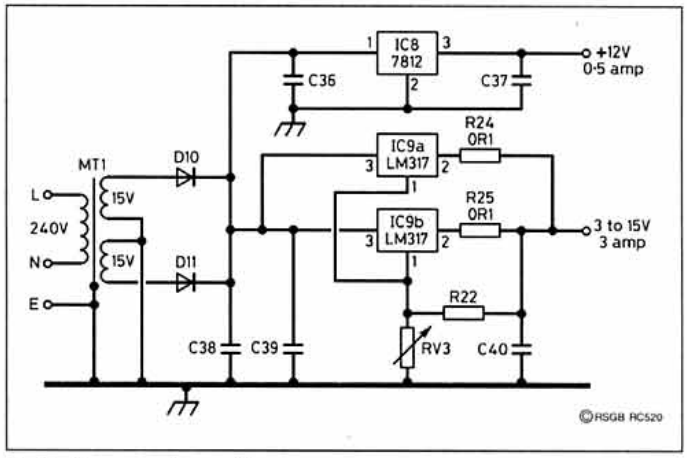


Fig 13: Power supply regulators.

TESTING

ADJUST VR2 FOR +7V and reduce the PA volts to zero. Connect the VFO and driver circuits and activate the VFO by closing the NET switch.

Assuming the use of the surplus crystals listed, select the

7MHz band and adjust the VFO to 5MHz (mixer output 7MHz), using C2; C3 with C4 at minimum capacity. The signal across R4 should be between 100 and 200mV peak to peak (p/p). If it exceeds these limits by a wide margin adjust R2; it is wise not to overdrive the NE602 mixer.

Next, connect the scope probe to C15 and adjust the core of the selected L2 for maximum. A clean sinewave around 1 volt p/p should be available. Anything over 0.5 volts is acceptable. Beware, the scope probe capacitance will cause some detuning of the L2 - C16 resonant circuit. The probe has little effect on 3.5MHz but detuning becomes serious on 10.1MHz. A way around this problem is to buffer the probe with a 4k7Ω resistor between probe and resonant circuit during final adjustment. The resistor introduces an amplitude measurement error and reduces the size of the signal on the scope, but, it removes the detuning shunt capacitance effect and permits accurate tuning.

Now check the control voltage generator, IC4. Connect a key and check that the voltages DK, M and T change as indicated on Fig 8 (see Part One). To check that the delays are correct, trigger the scope directly from the key (K - voltage). Observe the output of IC4 while sending continuous dots; a dot length of around 40ms gives a good picture. Similarly the shaper output, SK+, can be observed.

With correct control voltages the squarewave converter should be active. Again, sending a string of dots should produce outputs at A and B (see Fig 4), with a 6 to 7ms rise and fall time. The length of the output burst at half height should be the same as the keying voltage K-. If a double beam scope is to hand, the phasing of the two outputs can be checked with the key held down. A full 7V p/p square signal should be seen. Proceed next to the driver, IC3. Its output, seen at the gates of TR2 and TR3, should look almost identical to A and B.

Finally the PA. I always feel nervous about applying power to a newly-built solid state PA for the first time. With the other circuits 7 V is the maximum encountered, and currents are measured in milliamps. Once the PA fires, things are different. Peak voltages of 60V or more and currents of up to 3A have much more destructive power and need a little caution in their handling. My preferred method is to pre-tune the filters and try to ensure a proper PA load from the word go. The 'T' filters used, like almost all others, only tune correctly when terminated in their correct resistances.

So using a signal generator and a scope proceed as follows: Apply the exciter supply, needed to operate the filter selection relays, but not the PA supply.

Connect a 15Ω carbon resistor between point C (Fig 5) and the 0 volt rail. This is the correct terminating resistance for the output filter on the PA side.

Connect a signal generator (50Ω source resistance) to the antenna socket.

Select the 3.5 MHz band.

Observe the voltage across C24 (Fig7) as the generator output is tuned across the bandpass. Peak it at 3.5 MHz using C24. This peak is well defined; on the prototype, 300mV p/p from the sig gen produced 600mV p/p across C24. Complete this tuning on all bands before proceeding further.

Remove the 15Ω resistor.

This straightforward test sequence ensures that the load presented by the filters to the Mosfet amplifiers is near enough correct but will require only final fine tuning on load.

Having prepared the ground, connect a 50Ω dummy load and now apply PA volts - ideally reduced. Once the PA devices draw current, most of the driver waveforms will look distorted due to the influence of the fast switching edges in the PA. Do not worry.

Observe the voltage across C24, this should be a good sinewave. Checking the drain voltages of TR2 and TR3 should reveal around 1 volt when ON and a large overswing on the rising edge of the square wave when going OFF. The low ON state voltage is essential for efficient operation and if not achieved check that the drive is adequate (7 volts p/p) or the load impedance is not too low. The high voltage overswing on going OFF is due to the filter rejecting the third and fifth harmonics generated by the PA. Using a 15V supply, the peak is likely to be around 60V which is normal. Had the PA been terminated in resistance only - no reactive filter - the drain voltage would have been a good squarewave.

CONCLUSION

MOST OF THE COMPONENTS specified are available from a number of suppliers. The following have either good prices or good availability.

Tuning capacitors - J. Birkett, Lincoln. Tel 01522 520767

Mosfets - Electromail, Corby. Tel 01536 204555

Crystals - Keytronics, Bishops Stortford. Tel 01279 505543

Iron Dust Cores - Ferromagnetics, Mold, Clwyd CH7 1AH

General bits - Maplin, Rayleigh. 07102 554161

The switchmode PA stage is ideal for the CW transmitter. The IRF510 devices chosen for the PA are limited to around 10MHz in this mode but on lower power levels, eg 7 Watt output, a pair of VN66 will run to 24MHZ.

On the other hand, this design works very well on 1.8MHz where its efficiency is amazing.

Although the tuned, 'T' type, output filter reduces the harmonic output of the transmitter to a respectable level, I always back it up with a tuned, low-pass ATU to feed the antenna. Such additional filtering further reduces harmonic radiation and is to be highly recommended for an RFI- free co-existence with one's neighbours.

On the air, much fun has been had in asking stations what transmitter was being used. Invariably only the best CW rigs have been suggested, and that is a rich reward for a constructor. ♦

COMPONENT LIST

Resistors -	**All resistors 1/3W carbon film except where noted**
R1	100k,log
R2	1k
R3	2k7
R4	330
R5	220
R6	220k
R7	470
R8	0R12 3 Watt
R9	1M
R10, 11	1M
R12,14	10k
R15	82k
R16, 17, 18, 19, 20,	4k7
R21	470
R22	220
R23	82k
R24, R25	0R1 3 Watt
VR2	470 preset
VR3	5k lin
Capacitors	
C2	65pF Film dielect. trimmer
C3	50pF Air spaced variable
C4	5p Air spaced variable
C5 a, b, c	22pF Film dielect
C6	65pF Film dielect
C7, 8, 9	100nF 63V Polyester
C10, 11	2n2F 63V Ceramic plate
C12	100nF 63V Polyester
C13	33pF 63V Polystyrene
C1, 14	100pF 63V Polystyrene
C15	12pF 63V Ceramic plate
C16	63V Polystyrene, see Table 1.
C18	15pF 63V Polystyrene
C21	200nF - 2 x 100nF 50v Ceramic disc
C22, 23	100nF 50V Ceramic disc
C24	1250pF Ceramic compression
C25	15nF 63V Polyester
C26	2n2F 63V Polyester
C27	22nF 63V Polyester
C28	47nF 63V Polyester
C31, 32	10nF 63V Polyester
C19, 20, 29, 30, 33, 34, 35, 36, 37, 40	100nF 63V Polyester
C38	22000uF 25V Electrolytic
C39	100nF 63V Polyester
Inductors	
T1	FT82-61 ferrite ring core. 9+9 turns bifilar.
T2	BLN-73-202 twin hole bead. 3 turns twin twisted.
T3	BLN-73-202 twin hole bead. 3+3 turns bifilar.
L1	37 turns 26SWG tap at 13 turns onT50-2 Amidon dust iron core
L3, L4	T50-2 cores. See **Fig7** for details.
L2	TOKO KANK3335R (see text)
Semiconductors	
D1 to D9	1N914
D10, D11	1N5401
TR1	2N3819
TR2, TR3	IRF510
TR4	VN10K
TR5	BD135
TR6	BC558
TR7	BC548
IC1	NE602
IC2	74HC00
IC3	74HC04
IC4	4049B
IC5	CA3140
IC6	4001B
IC7	7805
IC8	7812
IC9a, IC9b	LM317T
Additional Items	
RL1, RL2, RL3	12V DPDT relays
RL4	6V reed relay.

Crystals	**Exact**	**Surplus**
3.5MHz band	8.5MHz	8.488MHz
7.0MHz band	12.0MHz	12.0MHz
10.1MHz band	15.1MHz	15.0MHz

IMPEDANCE OF COAX CONNECTORS

HOW DO I DETERMINE the impedance of BNC or N connectors on sale at a rally?

THE CHALLENGE IS TO do this with nothing more than you can carry in a pocket – or in your head. BNC sockets are the easiest to tell apart. A 50Ω socket has PTFE insulation all the way up the centre connector, while a 75Ω socket has a shorter PTFE sleeve with part of the centre connector standing out (**Fig 1**). The easiest BNC plugs to tell apart are the silver-plated ones from RS Components, which have the impedance stamped on the side.

Many 'RS' branded connectors are actually made by Greenpar Electronics, whose own-brand connectors have type numbers beginning 'GE' followed by some digits. The second digit on a Greenpar 50Ω plug is always '5', while on a 75 Ω plug it is always '7'. Thus a BNC plug marked 'GE-35148' is a 50Ω part.

With other manufacturers' BNC plugs you either have to remember some numbers or develop a keen eye. For further details of the numbers, see G4PMK's article in *RadCom* for May 1988 [1], reprinted in the *HF Antenna Collection* [see RSGB Book Case on page 90]. The alternative 'eyeball' method involves careful inspection of the centre pin and the cable clamping nut.

Although the pin is tapered in both cases, the taper on a 75Ω pin is much more pronounced than on a 50Ω pin, which looks almost parallel-sided except at the tip. The hole in the cable clamping nut is sized to suit the intended cable: the URM76 or RG58 cable for a 50 ohm BNC plug is 5mm diameter while the equivalent 75Ω cables are thicker (5.8mm for URM70 or 6.15mm for RG59).

I wouldn't expect you to be able to tell these differences by eye without a magnifying glass and some experience, but fortunately you can often compare against a marked connector on the same stall. You won't lose much by making a few mistakes, because BNC 50Ω and 75Ω connectors will mate together with no significant impedance problems below 1GHz.

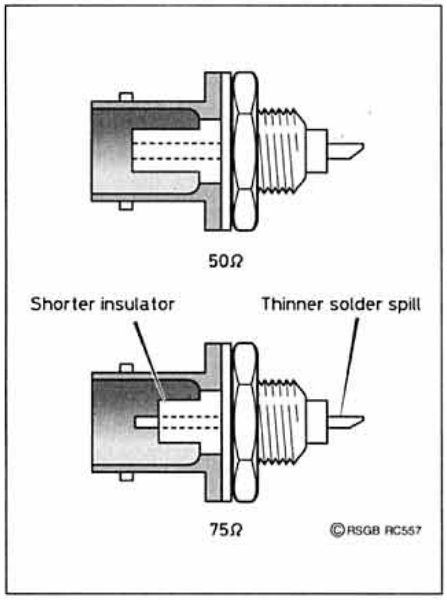


Fig 1: BNC centre connector is insulated over the full length in a 50Ω socket, but not in a 75Ω socket which also has a thinner solder spill.

IAN WHITE, G3SEK
52 Abingdon Road, Drayton, Abingdon, Oxon OX14 4HP
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It's much more unusual to find 75Ω N connectors, and they will not mate with the common 50Ω parts. If you need any further help, the Greenpar/RS connectors follow the same part numbering rules as the BNC products.

In both BNC and N plugs, I tend to avoid the 'original' designs that have a loose centre pin, because the cable end must be prepared quite accurately if the connector is to fit properly. I strongly prefer the later Greenpar/RS types which have a captive, self-locating centre pin and much better 'pressure sleeve' cable clamping. Again, see G4PMK's article for full details [1]. These connectors are always silver-plated, whereas nickel-plated connectors are almost certain to be one of the older designs. By the way, avoid those cheap-and-nasty coaxial connectors with a super-shiny mirror finish. Second-hand plated connectors that have only been used a few times are probably cheaper, and may well prove more reliable.

COAX CONNECTORS AND SEALING

Here are two useful tips from GM3IBU, and another from G4DCV.

- TO PREVENT THE cable nut from sliding away down a long length of coax, trap it in a loose knot, a little way down from the end you're working on. For thicker cable, use one or two clothespegs instead.
- TO HOLD THE CENTRE pins on BNC or N Plugs while soldering them to the centre conductor, stick them into a block of wood. GM3IBU has a block specially drilled to hold the pins of BNC, N and 'banana' plugs, with a larger hole that will hold the complete inner part of any DIN plug.

For sealing the open end of coaxial cable, G4DCV recommends a hot-melt glue gun: "Like lots of things, you'll wonder how you managed without it. Hot-melt glue is also very useful for anchoring components, for example in 'ugly' construction. As for the dielectric properties, I did test a glue stick by putting it in my microwave oven at full power [put a small glass of water in the oven as well, to provide a 'dummy load' – G3SEK]. After several minutes there was no significant heating so I guess it's OK. I have used hot-melt glue to seal the coax feed to HF antennas at the 100W power level. It works fine and makes a waterproof seal. Obviously you lose a couple of inches from the feeder if you replace the antenna but that's a small price for such convenience."

CIRCULAR MILS

LOOKING IN SOME American wire tables, I saw cross-sections given in 'circular mils'. What's a circular mil?

YOU'RE GOING TO wish you hadn't asked. The easy part is that a 'mil' is US engineering parlance for one thousandth of an inch – in other words a 'thou', not a millimetre. But a circular mil is a unit of area, invented to eliminate that huge intellectual obstacle called π. The cross-sectional area of a round wire in circular mils is simply the diameter squared. Thus a wire with a diameter of 100 mils has an area of 100 x 100 = 10,000 circular mils. The rest of the world measures areas in square units, and of course there are (4/π) circular units in every square one.

Honestly, this is not an April Fool joke – in the days before calculators with a π button, they really meant it.

ONLY SKIN DEEP

HERE ARE THREE questions related to the 'skin effect' which makes RF current flow only on the outside of a conductor.

WHY IS STEEL WIRE so lossy when used as an antenna, and why is copper-plated steel acceptable?

FIRST, MORE ABOUT the skin effect itself. G4AEE described it in his January article on VLF cave radio [2] and I've often mentioned it in this column. The shaded section of the wire, shown in **Fig 2** shows the relative RF current levels inside a piece of wire (the darker the shading, the greater the current). Almost all of the current is concentrated close to the surface of the wire, and

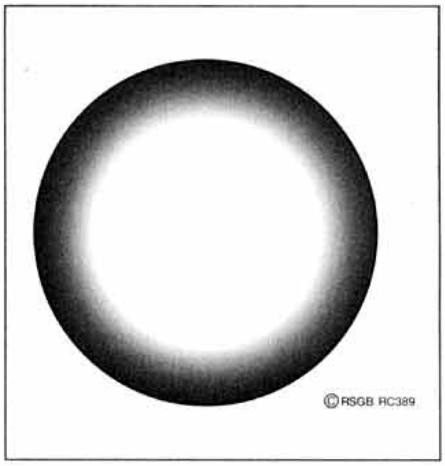

Fig 2: Skin effect forces RF currents towards the outer surface of a wire. Darker shading indicates higher current density. At HF and above, the penetration is much less deep than can be illustrated here.

the current density falls away rapidly inside the solid material.

The reason for the 'skin effect' is that the alternating electric and magnetic fields created by a wire carrying RF current are almost cancelled inside the wire itself. Cancellation is not quite complete because the resistivity of the conductor does allow a small electric field to penetrate inside the wire, which in turn creates an alternating magnetic field and allows some RF current to flow beneath the surface. The depth of penetration of current is therefore less in materials with lower resistivities. In the limit, a superconducting wire allows no alternating electric or magnetic field inside of itself - the RF current flows literally on the surface and nowhere else.

The normal formula for 'skin depth' is:

$$\delta = \sqrt{\frac{1}{\pi f \sigma \mu}}$$

In this formula, δ is the skin depth, f the frequency, σ the conductivity of the medium and μ its magnetic permeability. The formula gives the depth at which the current density falls to 37% of its surface value. However, it may be more helpful to quote the depth at which it falls to 1% of its surface value, so that negligible current is flowing at deeper levels. This '99% skin depth' is 4.6 times the conventional skin depth given by the formula. Let's explore some of the implications.

Skin depth decreases with increasing conductivity (lower resistivity) and it decreases at higher frequencies. In copper, the '99% skin depth' is 43mm at 50Hz, 3mm at 10kHz, 0.23mm at 1.8MHz, 55(m at 30MHz and only 9.6(m at 1GHz. This implies that skin depth is not an issue for mains power transmission (except for very large conductors) but starts to become significant at audio frequencies and VLF. By the time we reach the amateur bands, RF currents flow only within the thickness of any surface layer or plating.

At microwave frequencies the skin depth is so small that it becomes economic to apply a very thin surface 'flash' of high-conductivity precious metals such as gold to parts that are otherwise made of poor-conductivity base metals.

The reason why steel wire has such high RF losses is not only its poor conductivity. The skin depth also decreases with magnetic permeability, so that in a magnetizable material such as steel the RF current is forced even more strongly towards the outside of the wire. Since losses are proportional to the square of the current density (I^2R, remember) steel wire is almost useless for RF applications. However, the situation changes with copper-plating, because the RF current is now forced completely out into the copper. That is why even thinly copper-plated steel is an acceptable antenna material . . . for as long as the copper plating lasts, anyway.

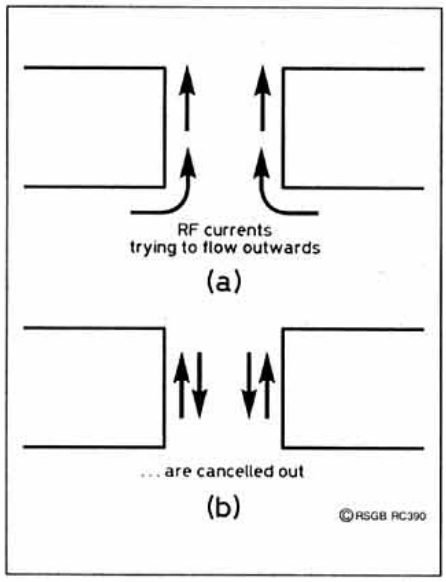

Fig 3: Parallel RF currents attempting to flow outwards direction through a small hole (a) are cancelled out by induced currents from the opposite side (b). The net current is zero.

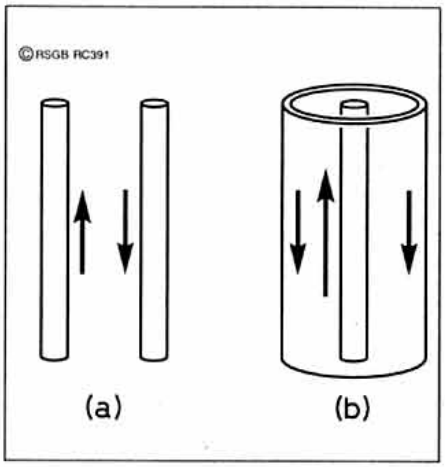

Fig 4: Currents flow in opposite directions in (a) two-wire and (b) coaxial transmission lines.

WHY DOESN'T RF ESCAPE through the holes in perforated metal shielding?

OBVIOUSLY, THE SKIN EFFECT prevents RF currents from escaping directly through the thickness of the material. Any current paths to the outside world must be along the surface only. So why doesn't the RF leak out through the holes?

When RF flows out through a hole which is very small in relation to the wavelength, equal currents will be flowing in the same direction on opposite sides of the hole (**Fig3**). Now this is a situation which Nature abhors - in other words there's a physical law against it. In this case it is Lenz's Law, which says that an induced current will flow in the opposite direction to the current that induces it. For example, **Fig 4(a)** shows a two-wire transmission line: current flowing upwards in the left-hand wire induces an equal current flowing downwards in the right-hand wire. In the equivalent coaxial cable in **Fig 4(b)**, current flowing upwards on the inner conductor induces an equal current flowing downwards on the inside of the outer conductor. Returning to the hole shown in Fig3, if you regard the metal surface at opposite sides of the hole as two separate conductors, the current flowing up the left-hand side will induce an equal current in the right-hand side, but flowing downwards. The same applies all around the periphery of the hole, and the net effect (Fig 50b) is that no current flows through it.

Cancellation of currents is almost complete if the holes are small enough. As the size of the holes becomes a significant fraction of a wavelength, allowing phase and amplitude differences to appear between the currents flowing on opposite sides, cancellation becomes less effective and the hole starts to 'leak' RF energy. In the extreme, where the hole is a half-wavelength across, the phase difference between opposite sides of the hole has risen to 180° and you have quite an effective radiating antenna.

To give you some idea how large a hole can be while still being leaktight to RF, probing with a professional RF power density meter around a pair of 1cm holes in the anode compartment of a 144MHz PA showed no detectable leakage when the PA was running at 400W output.

Similarly, 'one-inch' chicken mesh is a quite adequate surfacing material for a dish antenna for 432MHz, and very little RF leaks through to the back of the dish.

WHY DOES RF CURRENT flow only on the inside of the braid of coaxial cable, instead of following each individual wire through to the outside?

WE ALREADY HAVE the answer, don't we? The reasons are exactly the same as for holes in a sheet. The RF current in braided coax picks its way from wire to wire, always keeping to the inside of the braid because that is literally the path of least resistance. Bearing in mind what was said about the size of the holes in relation to the wavelength, it's clear that very thinly-braided coax used for domestic UHF TV downlead is going to be more 'leaky' than heavily-braided coax such as RG213, or the double-braided RG214 which is almost as good as 'hardline' with a solid outer conductor. This leakage contributes directly to the losses of the cable, as discussed in detail in the January 1994 column.

IF YOU HAVE NEW QUESTIONS, or any comments to add to this month's column, I'd be very pleased to hear from you by mail, packet or E-mail (see head of column). But please remember that I can **only** answer questions through this column, so they need to be on topics of **general** interest.

REFERENCES

[1] 'Fitting Coaxial Connectors', Roger Blackwell, G4PMK, *Radio Communication*, May 1988.

[2] 'Venturing Underground with VLF Radio' by Mike Bedford, G4AEE, *Radio Communication*, January 1995, page 16. ♦

RADCOM TECHNICAL FEATURE

Simple BIK-Pen Test Probes

The first of two parts by E Chicken, MBE, G3BIK*

THIS ARTICLE BRINGS together an assortment of useful test-probes that can be constructed very easily and at low cost, by using readily available components and discarded ball-point pens.

No originality is claimed for the technical basis of these test-probes, which has been well proven since its use in the crystal-set radio of yesteryear. With the exception of the continuity-tester (in Part Two), all of the probes described here use a modern point-contact diode to convert radio-frequency signals into either an AF signal that can be heard, or a DC voltage that can be used to quantify the voltage or power of the RF signal. The RF sniffer and RMS-voltage probes can be used over the frequency range from AF to HF, and are usable into the lower VHF region thanks to the low internal capacitance of the point-contact diodes.

CONSTRUCTIONAL NOTES

A CLEAR-PLASTIC ball-point pen of the refillable type with a removable end-cap and ink-tube, is used to accommodate the probe-circuit. Such a pen typically has an internal diameter of about 6mm, which comfortably accepts the specified components.

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The components are soldered together to be self-supporting, and the finished circuit complete with probe-wire is entered into the empty pen from the cap end. A hole is drilled through the end-cap to allow exit of the flexible screened cable.

The use of fine-nosed pliers is advisable when bending and soldering the wire-ended components, and care should be taken to avoid unwanted contact between adjacent uninsulated wires.

The probe-needle is a short length of stiff copper wire, tinned or untinned, with its tip cut at an angle to produce a sharp point. Wire of 16 - 18SWG is suitable, such as the solid copper conductor and its PVC sleeving from UK 1.0mm² or 1.5mm² electrical mains cable. After being soldered to the appropriate component, the wire is inserted into the pen-body at the open end until it protrudes from the ball-point end, then held in position by a piece of tight-fitting PVC sleeve over the exposed pointed tip. A tip length of 10mm is adequate. Another piece of sleeving may be slipped over the wire before it is fed into the pen, to give additional security, if needed.

Low cost screened-single audio-cable is suitable for connection to the voltmeter if its length does not exceed say 0.5m, otherwise the cable's self-capacitance might restrict the upper frequency of use. The 4mm plugs at the ends of the screened cable for connection to the multimeter, should be red colour for the positive and black for the negative.

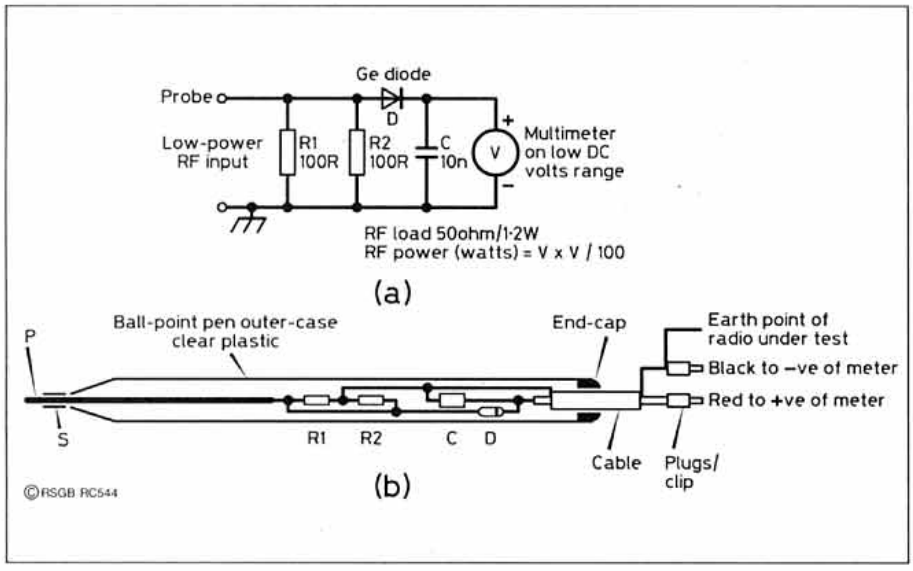


Fig 1: RF power-measuring probe, low power, 1.2W/50Ω: P = probe = wire 75mm of 16-18SWG, or from 1.5mm² mains cable; S = sleeve, PVC, tight-fitting, (from above cable); R1, R2 = resistor, 100R, 0.6W, metal-film, 6.5mm x 2.5mm; C = capacitor 10nF, 100V, monolithic resin-dipped ceramic; D = diode, germanium, OA91 or OA95; Cable = screened single, 7/0.1mm or 7/0.2mm, 0.5m long; Plug = 4mm, or to suit multimeter, red and black.

RF POWER-MEASURING PROBE, QRP 1WATT/50Ω

FOR QRP AND NOVICE operation there a need to measure transmitter RF power. The diagram of the probe is shown in **Fig 1**.

Many transmitters are designed to feed into a 50Ω load-impedance. When connected to the output of a low-power transmitter or to the intermediate stages of a high-power transmitter, this probe presents a 50Ω dummy-load rated at 1.2W. The load consists of two 100Ω 0.6W resistors connected in parallel. Carbon composition resistors are often recommended for RF service because of their non-inductive characteristics. However, metal-film resistors are more stable and can be manufactured to tighter tolerances, and work well at RF frequencies.

The RF power developed in the load resistor of the probe is determined by measuring the voltage developed across the load and applying Ohm's Law. In order to measure that voltage conveniently, the RF signal applied to the 50Ω load is half-wave rectified by the diode, causing capacitor C to charge up to the peak voltage (V_{peak}) of the RF signal. A DC voltmeter is then used to measure that peak voltage across the capacitor, from which the RF power in the load can be calculated.

For accuracy of measurement a meter with a high input resistance is required. A digital multimeter is preferred because its input resistance on the DC voltage ranges is typically 10MΩ, as compared with the few kilohms presented by an analogue DC voltmeter. If an analogue voltmeter is used, its kilohm-per-volt rating should be as high as possible, eg 20k/V.

Power is given by:

$$P(\text{Watts}) = \frac{(V_{RMS})^2}{R_L}$$

but $V_{RMS} = \frac{V_{peak}}{\sqrt{2}}$, and R_L in this probe is 50Ω, so:

$$P(\text{Watts}) = \frac{(V_{peak})^2}{2R_L} = \frac{V_{peak} \times V_{peak}}{100}$$

where V_{peak} is the voltage shown on the meter = V_{meter}.

$$\text{Hence, Power Watts} = \frac{V_{meter} \times V_{meter}}{100}$$

For simplicity this formula ignores the fact

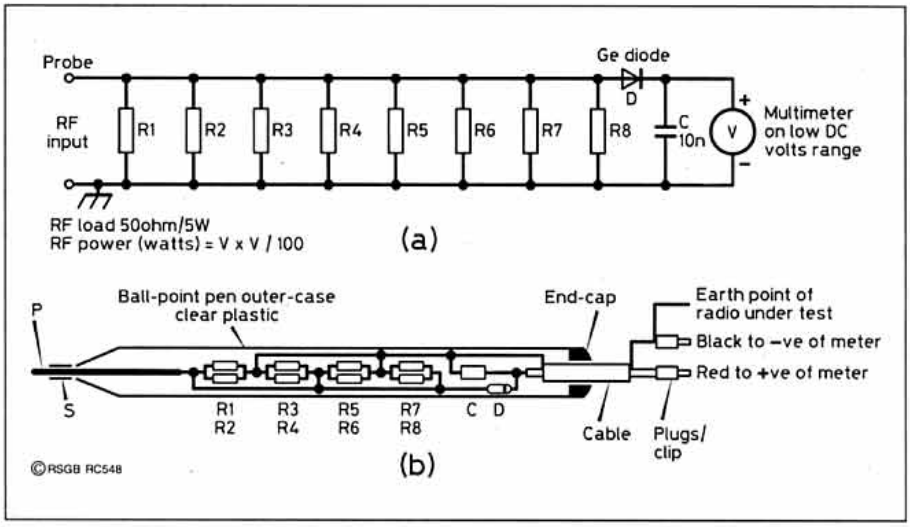


Fig 2: RF power-measuring probe, low power, 5W/50Ω: P = probe-wire 75mm of 16-18SWG, or ex 1.5mm² mains cable; S = sleeve, PVC, tight-fitting, (from above cable); R1, R2 = 240R, 0.6W, metal-film 6.5mm x 2.5mm; R3-8 = 510R, 0.6W, metal-film 6.5mm x 2.5mm; D = diode, germanium, OA91 or OA95; C = capacitor 10nF, 100V, monolithic resin-dipped ceramic; Cable = screened single, 7/0.1mm or 7/0.2mm, 0.5m long; Plug = 4mm, or to suit multimeter, red and black.

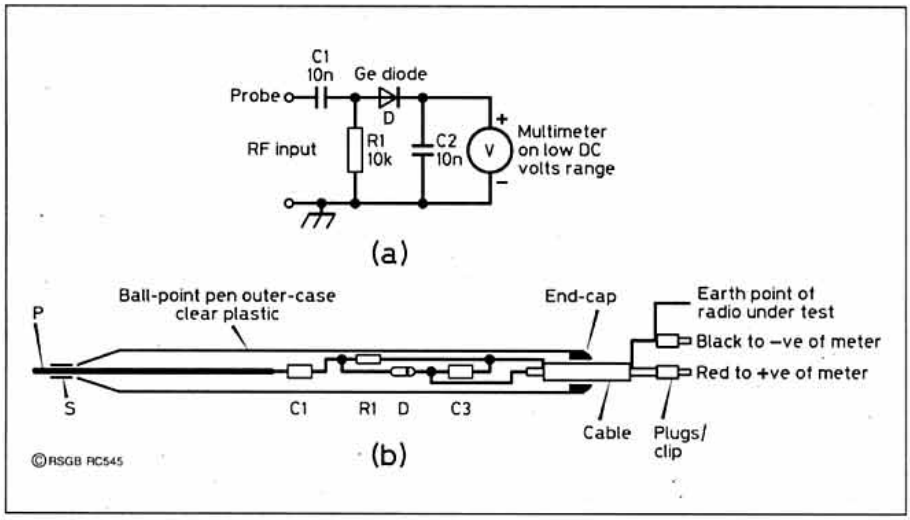


Fig 3: RF sniffer probe: P = probe-wire, 75mm of 16-18SWG, or from 1.5mm² mains cable; S = sleeve, PVC, tight-fitting (from above cable); R1 = resistor, 10k, 0.6W, metal-film, 6.5mm x 2.5mm; D = diode, germanium, OA91 or OA95; C1,C2 = capacitor 10nF, 100V, monolithic resin-dipped ceramic; Cable = screened single, 7/0.1mm or 7/0.2mm, 0.5m long; Plug = 4mm, or to suit multimeter, red and black.

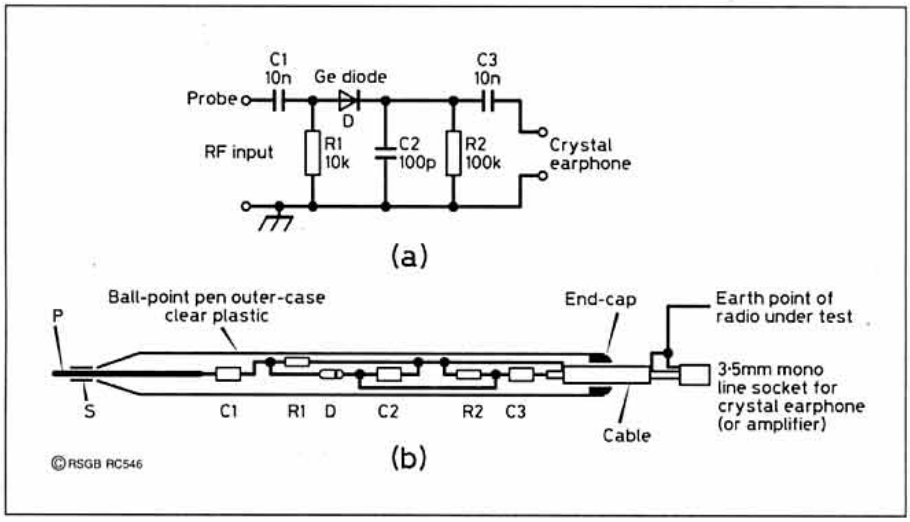


Fig 4: AF detector probe (AM, SSB, FM): P = probe-wire, 75mm of 16-18SWG, or from 1.5mm² of the current density (I^2R, remember) steel wire is almost useless for RF applications. However, the situation changes with copper-plating, because the RF current is now forced completely out into the copper. That is why even thinly copper-plated steel is an acceptable antenna material... for as long as the copper plating lasts, anyway.

that about 0.2V DC is developed across the germanium diode, because the calculated power is still correct to within a few percent.

RF POWER-MEASURING PROBE, QRP 5W/50Ω

A 5 WATT VERSION of the RF power-measuring probe, previously described, is shown in **Fig 2**. The RF load is still 50Ω, but this value is now made up from 8 resistors in parallel each with a power rating of 0.6W to give a total power-handling capacity of about 5W. The ohmic value is derived from 6 x 510Ω in parallel = 85Ω, and 2 x 24Ω in parallel = 120Ω. Hence 120Ω in parallel with 85Ω = 50Ω to a near approximation.

$$\text{RF Power Watts} = \frac{V_{meter} \times V_{meter}}{100}$$

RF SNIFFER-PROBE

THIS PROBE, SHOWN in **Fig 3**, is not intended to give a measured value of RF voltage or power. Its 10k load-resistor makes it suitable for giving an indication of the presence and/or relative level of an RF signal, eg when aligning or re-tuning the frequency-multiplying stages of a transmitter or of the local-oscillator in a receiver. Capacitor C1 isolates the probe from any DC in the external circuit. As with the RF power-measuring probe, capacitor C2 charges up to peak voltage of the RF signal, after rectification by the diode, to be indicated on an external low-voltage DC meter.

This can be particularly useful for example when converting an ex public-service (PMR) radio transceiver, in that it provides a visual representation of the effect whilst adjusting the tuning-cores for maximum or minimum response. In that sort of application, an analogue voltmeter is better than most digital meters because the meter pointer can be seen to rise and fall in sympathy with the adjustments. Alternatively, the variable DC output signal from the probe could be fed to the DC-input terminal of an oscilloscope for a different form of visual presentation.

AF DETECTOR-PROBE FOR AM, SSB AND FM

THE DESIGN, SHOWN in **Fig 4**, is similar in concept to the RF-sniffer probe, except that it converts a modulated RF signal into AF, which can then be heard either in a crystal earphone, or by being fed into an AF monitor-amplifier. That is very useful when fault-tracing in the circuit of a defective radio or TV receiver. It can detect AM and to a certain extent FM before and up to the detector stage of a receiver, and SSB after the product-detector stage. It can also be used to detect colour or synch-signals in the video section of a TV receiver.

The high impedance of a crystal earphone does not adversely load the detector circuit as would the low impedance of a magnetic earphone. ♦

NEXT MONTH

Two more probes from Ed Chicken: An RMS Voltage measuring Probe and a Continuity Test Sounder

IDEAS FROM ABROAD

TRANSLATED AND EDITED BY ERWIN DAVID, G4LQI

The RS232 link between a packet TNC and a computer features in *Radio-REF* 10/94. **Michel Pelhate, F3ZZ** explains how the link works and **Hervé Epp, F5FYU** describes home-brew RS232 data switches with DB9 or DB25 connectors. Additional comments by Data Stream editor **G4BLT**.

WHEN DATA ARE BEING transmitted to a computer, they may arrive faster than they can be processed; loss of data would result. A buffer would help, but it would soon fill up and become ineffective. To prevent this buffer overflow, the computer must be able to tell the data source to stop sending when the buffer is full, and to resume transmission when the buffer contents have been processed.

THE RS-232C STANDARD

DATA LINKS MAY BE OF TWO different kinds: parallel or serial. In the first, the eight signals making up an 8-bit character (octet) are sent simultaneously on eight separate active wires (plus a return) of only a few metres length, as is common between a computer and a printer.

In series links, these eight bits are sent, one after another, over a single wire pair. This method is suitable for connection between a computer and a modem, including a TNC, as the latter uses a serial format of communication via a telephone line or radio channel.

Standardisation of the serial links was necessary to permit black boxes of different manufacturers to be used in one system. The standard was to include the nature, electrical specification and nomenclature of each signal as well as the connectors and pin assignment at each end.

The resulting RS232C standard is good for data rates up to 20,000 bits per second over distances up to 15m [higher over shorter distances - *G4BLT*]. To make the system more immune to interference in noisy surroundings, bipolar voltages higher than TTL levels are specified: logic-zero is represented by +3 to +15V, logic-one by -3 to -15V. Typically, +12V for logic-zero and -12V for logic-one are used [though the BBC-B computer works with ±5V levels - *G4BLT*].

THE HARDWARE

THE STANDARD CALLS for 25-pin D-connectors, of which only nine pins are normally used. Manufacturers have made cost and space savings by the use of 9-pin D-connectors instead, see **Table 1**. Terminals (computers) have male D-connectors. Peripherals, including TNCs, have female D-connectors [There are exceptions; the Tiny-2 TNC has a male DB9 - *G4LQI*]

Computer supply houses sell cables to mate with the D-connectors on any two black boxes and in several lengths; they are not inexpensive, especially if they must be shielded, as is recommended near HF receivers or transceivers. Only four wires, TXD, RXD, RTS and CTS, with the braid serving as SG/FG, need to be used for computer-to-TNC communication. This makes cable assembly easy and inexpensive. On BBC computers, these lines are available on a 'domino-5' pin DIN socket - *G4LQI*] [In some of the more sophisticated systems, the DCD or DSR lines are required, but these are not available on DB9 connectors - *G4BLT*].

DATA SWITCHING

IF TWO TNCs, OR A TNC and a phone modem, must be connected to a single computer serial port, a 'data or T-switch' can be used. There are automatic data switches, which select between two or more peripherals in response to software commands, and manual ones; some commercial manual models, with one DB25 input and two or four switch-selectable DB25 outputs (or vice-versa), are reasonably priced, but if one adds ready-made cables, the cost mounts. No switches with DB9 connectors were found in a selection of UK catalogues.

COMP DB25		TNC DB25	
1	———	1	FG: frame ground - shield
2	→→→	2	TXD: data sent to TNC
3	←←←	3	RXD: data received from TNC
4	→→→	4	RTS: request to send to TNC*
5	←←←	5	CTS: clear to send to TNC
6	←←←	6	DSR: TNC ready to respond
7	———	7	SG: signal ground - common
8	←←←	8	DCD: connect detected
20	→→→	20	DTR: terminal ready*

* Some TNCs, incl. the BSX2, require that pins 4 and 20 be strapped together, either in the TNC or in the DB25 cable connector.

DB9		DB25	
3	→→→	2	TXD: data sent to TNC
2	←←←	3	RXD: data received from TNC
7	→→→	4	RTS: request to send to TNC
8	←←←	5	CTS: clear to send to TNC
5	———	7	SG: signal ground - common

Table 1: Pin assignments on D-connectors for cables between computers and Terminal Node Controllers. On TNCs with DB25 connectors, only pins 1-8 and 20 should be connected.

F5FYU suggests home construction of a data switch and gives diagrams for one with three DB9 (**Fig 1**) and one with three DB25 connectors. To permit all-purpose usage, all lines but SG (ground) are switched on the DB9 model, as are the corresponding eight lines on the DB25 model. There also are LEDs on seven signal lines, which light when that line is 'high' and two LEDs which indicate the switch position.

CUSTOMIZE AND SAVE

G4LQI COMMENTS: IF YOU don't build a general-purpose RS232 switch box but, instead, a junction box for your system with only the facilities that are going to be used, the cost will come down dramatically. By terminating input and output cables on the switch proper, you save not only the cost of six D-connectors, but also the drilling and nibbling of three odd-shaped holes in the case and the soldering of a multitude of wires. Cable lengths can be matched to your station lay-out.

The cost of the switch itself depends on how many lines need switching. With switches available from the current Maplin catalogue, the aforementioned minimum four lines can be switched three ways, with a 4-pole slide switch, FH38R at 79p; Switching six lines two ways requires a rotary *maka-switch*, FH46A+FH51F at £4.38; The full eight lines need a *maka-switch* with two wafers, FH46A+2xFH50E at £6.27. [A pair of the 4-pole slide switches, flipped together, can also switch up to eight lines! - *G4BLT*]. ♦

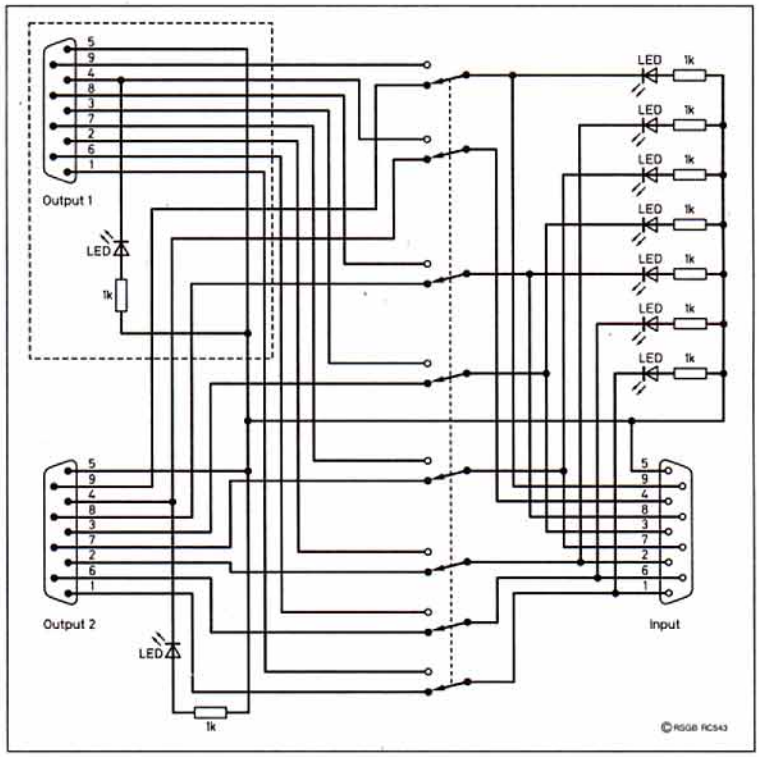
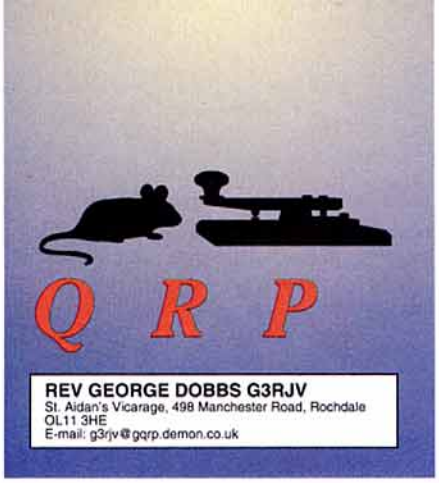


Fig 1: F5FYU's RS232C switch box with DB9 input and output connectors.



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MEMBERS OF THE G QRP Club have founded a mailing list aimed at QRP enthusiasts who have access to the Internet in the UK and further afield. Its formation is mainly due to the skills and loaned resources of Peter Bowyer, G4MJS. The list exists for the discussion of technical matters, QRP operating and events plus other QRP related topics. It is intended to be UK oriented and is not designed to replace the over-subscribed USA-based QRP List at netcom.com.

To join the list send mail to majordomo @insite.parasoft.co.uk with the following command in the body of the E-mail message 'subscribe gqrp-l' (The last figure is L). Send mail to gqrp-l@insite.parasoft.co.uk and the mail will then be sent to everyone on the list. The list has a few basic rules - messages should be of direct interest to QRP enthusiasts. Also, users are asked to not over-quote in replies and, whenever possible, reply direct to the sender rather than the list. It is hoped that the mail will add to the sum total of information on QRP related amateur radio rather than being used for personal remarks and messages. Anyone subscribing to the list will receive guidance on its use and how to unsubscribe.

GW CLUB PROMOTES QRP

THE GW QRP Club strives ever onwards in its bid to develop a QRP grouping in Wales to encourage low power operating amongst Welsh radio amateurs. The club, founded in June 1994 by Leighton Smart, GW0LBI, and Dave Griffiths, GW0JUJ, maintains an informal approach with neither subscriptions nor structures etc. The club represents a grouping of QRP enthusiasts brought together by common interest. The only costs are for postage and members are asked to send a minimum of six 2nd-class stamps to cover the cost of the quarterly newsletter. The club also issues free awards. For further details send a SASE to Leighton Smart, GW0LBI, 33 Nant Gwyn, Trelewis, Mid Glamorgan, Wales.

I QRP CLUB 100 STRONG

THE NEW I QRP Club is very much on the ascent. Indeed, I have just been enrolled as member number 100! Details are available from Franz Falanga, I7FFE, P O Box 243, 70059 Trani (BA), Italy. Club members also have a packet radio Server on IQRP@IK7NXQ.

OPERATE QRP IN ROMANIA

VASILE CIOBANITA, YO3APG, has issued a general invitation for a team of three or four British radio amateurs to take part in the 'YO QRP Contest'. This event takes place near the Black Sea resort of Constanta during the first weekend in June each year. Basic accommodation and food are provide for three days and two nights and up to 30 teams take part. The contest takes place on Saturday for two to four hours (depending on entrants). Stations are randomly assigned operating positions within a 5km radius and are given special event (YO0**) callsigns.

Stations work each other only with duplicates allowed within one hour spacing. Stations must be *home built*, powered independently from mains supplies, and operate within the band 3510 - 3575kHz with a maximum power of 5W. Certificates are presented on Sunday for the best performance and the best home-brewed equipment. If someone would like to act as a team leader please contact Vasile Ciobanita, YO3APG, Box 22-50, R-71100, Bucuresti, Romania. Further information is available from Paul Howett, G4MD, 12 Arne Road, Walsgrave, Coventry CV2 2BY tel: 01203 613213. Paul is a member of Radio Amateur Relief Expeditions.

SLOVAKIA HOSTS BIG EVENT

SET IN IDYLLIC SURROUNDINGS, the Slovak QRP and Construction Competition takes place on 27/28 May 1995 at Zeleznicne uciliste Priekopa, in Vrutky, Slovakia. The venue is easy to reach by rail or coach from London, or by air. Accommodation is included at £4 per person per night with a convention entry fee of £2. The closing date for booking to G4FDC is 1 May 1995.

This convention could be combined with a holiday in Slovakia and extended accommodation is available. There are good local attractions, including mountain walking. Alternatively, you could stay even longer and operate the special event station OM9QRP from a mountain top during HF Field Day on 2/3 June!

Every QRP and home construction enthusiast is invited to submit a paper or lecture in person (Slovak, Czech or English). Send your paper to G4FDC and, if time permits, it will be read in your name. The maximum duration for talks is 20 minutes. Submitted papers are to be typed on one side of A4 paper. The event also includes a bring and buy stall and an exhibition of home built equipment with a prize for the best entry. Don't forget to bring home built equipment and your amateur radio licence. For more details contact Alex Korda, G4FDC, 5 Windmill Court, North Street, Royal Tunbridge Wells, Kent TN2 4SU tel: 01892-541733.

FUN-RUN AT YEOVIL

A FUN-RUN CONTEST is being staged in conjunction with the Yeovil QRP and Construction Convention. This year's convention is on Sunday 21 May at the Preston School, Monks Dale, Yeovil, Somerset.

FUN-RUN BONUS STATIONS:

GBLOW at QTH of G3GC.
G0LKX located in Fareham, Hants.
G3DYY located in Huntingdon,Cambs.

RULES

When: Tuesday 9 May to Friday 12 May. 8.00pm to 10.00pm UK Clock Time each evening.

Frequencies: 3560kHz and 7030kHz, both +/- 10kHz.

Contacts: CW Contacts must be between QRP stations (maximum 5W output). Stations may be worked once only on each band during the Fun-run but Fun-run stations (all operating each evening randomly for one hour on each band) may be worked once each evening on each band.

Call: 'CQFR'.

Scoring: Each QSO with another QRP station scores 10 points. Each QSO with Fun-run Bonus Stations G0LKX and G3DYY scores 25 points. Each QSO with the Yeovil Club Fun-run Station, GB2LOW scores 50. All duplicates must be marked and no points claimed. Points will be deducted for unmarked duplicates at twice the QSO value.

Exchange: RST, Serial Number (see below), Output Power, Name.

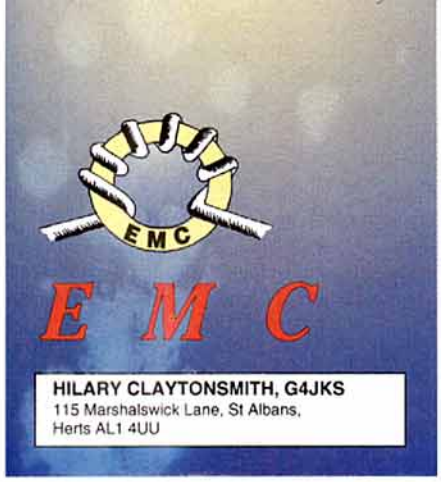
Serial Number: The three figure serial number should start at a random number of your choice not less than 100 and must then be increased by one for each QSO. However, the three club Fun-run stations listed above will all commence at 001 in the usual way.

Entry Sheets: Separate log sheets for each band, with sub-totals for each evening, preferably in RSGB format. Also, a separate signed RSGB-style cover sheet stating output power, rig and aerial used. Send your entries to G3CQR, 9, Quarr Drive, Sherborne, Dorset DT9 4HZ to arrive not later than Thursday 18 May 1995.

Certificates for the highest score on each band, the highest total overall score and to the station consistently using the lowest power will be presented at the convention on 21 May.

Note: Apart from the Club's GB2LOW Fun-run Bonus Station, this year's other two Fun-run Bonus Stations were selected from last year's winners. It is our intention that in future this status will be offered to the previous year's leading stations. ♦

Few things can beat a peaceful evening's construction at the G3RJV workbench.



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

THIS MONTH'S column includes items on dimmer switches/touch lights and computers radiating interference in the amateur bands. We are also keeping a watch on emissions from TVs, some video recorders, low energy lighting, intruder alarms, RF induction lighting, cable TV systems, NICAM TV, widescreen TV sets, video on demand and the Manchester Metrolink tram system!

COUNTDOWN TO 1996

THE UK ELECTROMAGNETIC Compatibility Regulations (SI 2372/1992) come into force on 1 Jan 1996 but it appears that some manufacturers are only just starting to think about making their products comply and others, particularly in the Far East, may not know how to make them comply. EMC test laboratories are reporting a rush of work but some manufacturers may have left EMC compliance too late. Although 90% of industry is now aware of the EMC Directive, one in three companies has not yet made any significant effort to ensure compliance.

From 1996, local authority trading standards officers will have the power to remove products from the market if they do not comply with the EMC Regulations. If there is reason to suspect that a CE mark has been falsely affixed, the product in question will need to be tested by an EMC test laboratory. It remains to be seen whether trading standards officers will have enough resources to do this. One trading standards officer in a London borough told the EMC Committee that his department has a testing budget to cover all types of testing including safety testing. EMC testing of only three products each year would use up the whole of this testing budget.

RF EMISSION STANDARDS

AT THE LAUNCH OF the DTI's Electromagnetic Compatibility Awareness Campaign on 12 January 1993, Mr Edward Leigh, MP, Parliamentary Under Secretary of State for Technology gave a keynote speech. On the subject of emissions, he said: "It may surprise some of you to learn that EMC is an environmental issue. The airwaves are rapidly becoming polluted with the spurious electromagnetic output proliferating from various electrical and electronic devices. In the last few years there has been a considerable expansion in the use of personal communications, in microprocessor controlled consumer goods, automotive electronics and audio systems.

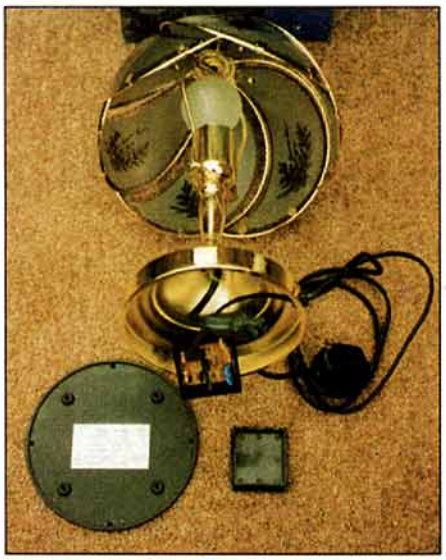
"As the use of electronics becomes more commonplace, the electromagnetic environment inevitably becomes more polluted. Therefore, in addition to removing the technical barriers to trade, the EMC Directive also attempts to combat this pollution spiral. The aim of the Directive is to reduce this electromagnetic smog to a level which is acceptable so that various communications, broadcast and electronic control systems can coexist and thereby not interfere with each other's legitimate operation."

We couldn't agree more, although the level of "electronic smog" which is acceptable to radio amateurs may be well below that which the standards permit. For some products, RF emission standards will not be compulsory in the UK until 1996. These include computers (BS 6527/EN 55022) and TV sets (BS 905 Pt 1/EN 55013).

There are, however, other products for which RFI standards have been compulsory for many years, thanks to European Directives in 1977. The standard for fluorescent lighting, including compact fluorescent lamps, is BS 5394/EN 55015 and the standard for portable tools and household appliances including dimmer switches is BS800/EN 55014. The WT (Control of Interference from Household Appliances, Portable Tools, etc) Regulations 1978 were issued as UK Statutory Instrument (SI) 1978 No. 1267 and made compliance with BS 800 compulsory for relevant apparatus. There was also SI 1978/1268 which applied to fluorescent lighting apparatus. New SIs were issued in 1985 and again in 1989, superseding the previous ones. The current European Harmonised Standard, EN 55014 effectively replaces BS 800.

DIMMER SWITCHES

LAMP DIMMERS USE 'phase control' of the AC mains which results in a waveform with fast rising edges and requires a suppression choke and capacitor in order to comply with EN 55014. In many countries outside Europe, such suppression is not yet compulsory. In the UK, it is the responsibility of the manufacturer or importer to ensure that products such as lamp dimmers comply with EN 55014. There is not yet any formal procedure for declaring compliance and enforcement is said to be 'complaint driven'. When we came across products which generated excessive RFI, we made a complaint to the Radiocommunications Agency who took enforcement action.



The B&Q Touch Lamp dismantled.

TOUCH LIGHTS FAILED EN 55014

Touch lights are brass table lamps containing a touch sensitive switch which turns the lamp on and steps through several levels of brightness. In the USA, where RFI emission standards for such products are not compulsory, they have been causing EMC problems for radio amateurs for the past 10 years.

After GW4BYA had alerted us that touch lights were on sale in the UK and that they generated RFI, we decided to investigate them (See *RadCom* EMC Column, April and October 1994). We had reason to believe that they did not comply with EN 55014 so we brought the matter to the attention of the Radiocommunications Agency. The RA tested samples of touch lights which were provided by the EMC Committee and advised us that both types failed to comply with EN 55014.

The first touch lamp (see photograph) was a model L-1423 imported from China by Readers (IOW) Ltd and was sold by the B&Q DIY chain, priced £29.95. It uses an oscillator at about 192kHz which drives a sawtooth waveform onto the body of the lamp. The touch sensor detects the change in loading caused by a hand touching the lamp. The second, third, fourth, fifth and sixth harmonics of the oscillator all exceeded the EN 55014 conducted emission limits when the lamp was plugged in but not switched on. The lamp dimmer had no RFI suppression and when switched on at the half brightness setting, it produced broad band RFI which exceeded the EN 55014 limit from 150kHz to 8MHz. At around 400-500kHz, it was 43dB over the limit. This is an interference signal which is 140 times the permitted voltage level and 20,000 times the permitted power level! The levels were about 20dB over the limit in the 1.8MHz amateur band and 14dB over in the 3.5MHz band.

Readers (IOW) Ltd have been told that they must modify the design of these touch lamps so that they comply with EN 55014. In the meantime, B&Q has stopped selling them.

The second touch light, which was imported by Carramar Lighting Ltd, had been sold by a branch of the Sainsbury's Homebase DIY chain at £36.95. It uses a similar principle to the one described above but it does incorporate some RFI suppression. It passes the EN 55014 test when switched off or when on full brightness but it fails on the intermediate brightness settings. The failure is between 150kHz and 400kHz where it is between 6 and 10dB over the limit. This suggests that it was designed to meet an RFI standard in a part of the World where Long Wave radio broadcasting does not exist. Although it is within the EN 55014 limits in all amateur bands, the tenth harmonic of the oscillator produces a broad signal which extends from 1810kHz to 1880kHz on the sample tested. This oscillator runs whenever the lamp is plugged in and is modulated with a 50Hz buzz.

The manufacturer, Carramar Lighting Pty in Australia, has given assurances to the RA that they will modify the switch to ensure that the lamp complies with EN 55014. It probably only needs some more turns on the choke.

Although both lights can be made to comply with the EN 55014 conducted limits by using suitable mains filtering components, this does not prevent the lamp body from

radiating significant levels of oscillator harmonics in the lower amateur bands 24 hours a day. These harmonics are quite unnecessary and could be cleaned up using a few pence worth of components. It would also be a good idea to move the fundamental frequency below 150kHz to keep it out of the Long Wave broadcast band.

RECEIVED INTERFERENCE

THE AMATEUR SERVICE is not protected and therefore cases of received interference, which are on the increase, can be difficult for us to resolve. They can also manifest themselves in strange ways.

A MICROPHONIC COMPUTER

In Spring 1994, Peter Howard, G0AFN, of Chichester, West Sussex reported a problem which is all too common nowadays. He received strong signals on various frequencies between 145.000MHz and 145.375MHz which were modulated with the characteristic buzzes and bleeps of a computer being used nearby. There were also signals on various HF frequencies including 28.130MHz and general 'hash' raising the background noise level on the HF amateur bands. The computer which was the source of this QRM had an undocumented feature which revealed its location without the need for radio direction finding! When it was in standby mode, there was still a carrier at 145.000MHz which appeared to be unmodulated until Peter heard a voice which he recognised as that of his neighbour who lives 50m away!

Sure enough, the neighbour was using a new portable computer, a Maruda 486SX25 mono notebook. Peter and his neighbour did some tests and found that using the computer portable on its batteries did not reduce the level of VHF emissions which could be heard up to 100m away on a 2m hand-held. The oscillator which produced the signal at 145.000MHz continued to run when the computer was in standby mode and was also microphonic. Tapping the computer or talking to it, frequency modulated the oscillator sufficiently to be audible on a narrow band FM receiver at 145MHz.

The UK importers, Fands Computer Consultancy Ltd of Hadleigh, Essex informed us that this model is sold to companies and organisations for their own use. It is not sold via dealers and we have not seen it advertised in any computer magazine. We are informed that it meets US FCC Part 15 Class 'B' limits and that there is a model which is sold in Germany where it would need to meet EN 55022 Class 'B' limits. As computers are not yet required to meet EN 55022 in the UK and amateur radio is not a protected service, Fands were not obliged to take any action. To their credit, they took back the machine at no cost to the user and Peter hasn't heard any computer RFI since then.

We tried to find out the exact frequencies of all oscillators used in this computer but without success. The importers told us that it had ceased production by the end of May 94. They offered us a meeting with the development director from the manufacturers in Taiwan who would be visiting the UK in Autumn 94 but this did not materialise.

As the signal at 145MHz drifts +/- 8kHz, this suggests that it is derived from a ceramic resonator rather than from a crystal. It could be the 59th harmonic of a baud rate generator oscillator at 2.4576MHz. If vibration due to sound waves produces a few tens of hertz of FM at the fundamental frequency, this would give 59 times as much deviation at the 59th harmonic. It may only need a blob of glue in a suitable place to cure this effect. We would be interested to hear from anyone who has any further information on microphonic computers as we understand that there may be other models which exhibit this effect.

OPERATING REASONABLY

"I AM HAVING PROBLEMS. Apparently, I'm knocking out all the neighbours' TV sets. What can I do?" This is quite a common cry for help to EMC Co-ordinators and Committee members. On careful questioning, it turns out that our member lives in a terraced house in London and has just put up a four element HF Yagi on a pole strapped to the back of the house with the elements overhanging both neighbouring properties. When asked about the power being used, he replied: "I'm licensed to run 400 watts and that's what I'm going to run." Even with TV sets having good immunity and additional filters fitted, there is a limit to the field strength which they can withstand. This is a prime example of what can be considered unreasonable and is contrary to the traditional concept of a radio amateur who is technically knowledgeable and reasonable.

The dictionary defines "reasonable" as "having sound judgement, not expecting too much, ready to listen to reason".

HAVING SOUND JUDGEMENT

Amateurs should consider whether operating conditions are sensible in view of the type of property and surrounding environment. It is a matter of deciding what type of antenna is most appropriate and what power level is suitable.

Obviously, if your nearest neighbours are hundreds of yards away, the considerations are different to those of an amateur in a terraced house in an inner city area. In the latter case, the constraints are greater and more care is needed when it comes to good radio house keeping. Antennas should be as far away from surrounding properties as possible and as high up as permissible. To minimise breakthrough, HF antennas should be horizontally polarized, balanced, compact and with the feeder dropping vertically down to ground level.

Antennas should be kept clear of wiring of any sort, including telephone wires. VHF antennas should be chosen carefully. Although most amateurs might like high gain beams stacked and phased, these can produce very high field strengths nearby. With careful siting and possibly a slight upward tilt, most of the power can be made to miss neighbouring properties.

How much power is necessary to have a contact on your favourite band? Power levels can be turned down as well as up! "How low can you go for a QSO?" would be my motto if I lived in a densely populated area. Operating in *CQ* World-wide at 01.00 hours demands a different power level to that needed to talk to Joe down the road on 80m at peak television viewing time.

Which mode is most EMC friendly? Most people use SSB but unfortunately, this is the least EMC friendly of all. CW of course has two advantages; it can be very effective even with low power and the rectified carrier is not such a problem with audio equipment as with SSB. Data modes should be reasonably EMC friendly but the mode which comes out best is FM. However, apart from 10m, it is not really practical for HF working.

NOT EXPECTING TOO MUCH

Although amateurs understand the principle of radio and the function of antennas, it is worth bearing in mind that the average person does not have this knowledge. It is good to try to involve your neighbours in your amateur radio activities. Ask them into the shack and let them listen to or watch what is going on. Discuss any changes which you plan to make to masts or antennas and you might even be lucky enough to get an extra pair of helping hands. Talk about immunity of equipment or the lack of it, the use of filters and the EMC Directive. Demonstrating that your own TV, hi-fi, etc is not affected by your transmissions should convince almost anyone. Mention that you had to pass an exam to obtain a licence from the Radiocommunications Agency (RA). You may be able to offer your neighbour useful technical advice in other areas and this can help to build up a friendly relationship.

Technical problems of EMC can normally be solved but social problems can be more difficult. If relations are already strained, amateur radio activities could be the trigger which brings an already simmering situation to the boil.

READY TO LISTEN TO REASON

When the knock comes at the door, try to see the situation from the neighbour's point of view although this is not always easy. Assume that your neighbour is reasonable even though he or she may be angry and rude. Try a diplomatic and reasoned approach and at all times, keep your temper and offer to do tests. After all, the problem could be coming from somewhere else such as a taxi operator, emergency services or a CBer nearby.

Always keep an EMC first aid kit handy containing filters and ferrite rings which you can provide on loan for your neighbours to fit. If these do not cure the problem, you can telephone your nearest EMC Co-ordinator for additional advice. If the neighbour does not co-operate or wants advice from elsewhere, they can contact the local office of the RA (see also 'Calling out the RIS', *RadCom*, August 1994, p75). This should be done using form RA 179 which is available from the RA Document Distribution Centre on 0171 215 2072. It is not available from Post Offices. ♦

CONTEST CLASSIFIED

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

HF RULES

NATIONAL FIELD DAY 1995

1 The General Rules as published in the January 1995 edition of *Radio Communication* apply. NFD is a Portable Contest as defined in the General Rules. Please note the change to rule 4.

2 Notification: Each group intending to compete must send details of the site to be used to: **D L Hill, G4IQM, 14 The Garrones, Worth, Crawley, West Sussex RH10 7YT,** to arrive no later than 6 May 1995. Details must include the name and address of the person responsible for the entry; section to be entered; name of group; callsign(s) to be used; national grid reference and sufficient access information for an inspector to locate the site. Contest stationery will be sent on request.

3 Date and Time: From 1500UTC 3 June to 1500UTC 4 June 1995.

4 Sections: All sections are multi-operator. **(a) Open.** One transmitter and one receiver (or one transceiver) *plus an additional receiver.* There is no restriction on the number or type of antennas, but the maximum height must not exceed 20m. Power is limited to 100W output from the final stage.

(b) Restricted. One transmitter and one receiver (or one transceiver) *plus an additional receiver.* One antenna only which must be a single element such as a dipole, vertical, end-fed wire etc, having not more than two elevated supports and not exceeding 11m above ground at its highest point. Power is restricted to 100W output from the final stage. **(c) Low Power.** Same equipment and aerial limitations as the restricted section. Power is further restricted to 10W DC input to, or 5W output from the final stage.

Notes:

(i) A transceiver with a second receiver eg FT1000 counts as two receivers.

(i) Stand-by equipment is allowed on site, but may not be connected to a power source when the main equipment is in use.

(ii) All stations are subject to inspection by representatives of the HF Contests Committee. The inspector's brief will be to ensure that the rules and spirit of the contest are being observed. Should the inspector be unable to locate the site to due inadequate or incorrect information, the entry may be disallowed. In the event of a late change of site, it is the responsibility of the members of the group to make suitable arrangements for the inspector to find the new site. The inspector must be given immediate access to all parts of the site with the right to stay as long as desired, and the ability to return at any time during the contest. The inspector may also visit in the 24 hours before the start of the contest. The presence on site of any amplifier or modified commercial equipment capable of excess power may result in the entry being disallowed, and in the event of such an infringement being proven, all operators listed as being associated with the group in operating the station may be disbarred by the HF Contests Committee from entering any RSGB contest for five years.

5 Frequencies and mode: CW (A1A) only in the 1.8, 3.5, 7, 14, 21 and 28MHz bands. Contest preferred segments, as recommended by the IARU, should be used ie 3510 - 3560 and 14010 - 14070kHz.

6 Exchange: RST and serial number starting from 001.

7 Scoring: Each station may be worked once per band, but points must not be claimed for contacts made by a competing station with members of its own group. Points will be scored for contacts with:-

Fixed stations in Europe (including UK) 2 pts.

Fixed stations outside Europe 3 pts.

Portable and Mobile stations in Europe (inc UK) 4 pts.

Portable and Mobile stations outside Europe 6 pts.

Contacts on 1.8MHz and 28MHz should be scored as above and the totals multiplied by two to obtain the band score for the RSGB listing.

8 Address for entries: As in 'Notification' above and postmarked no later than Monday 26 June 1995. Entries on disk are encouraged, see General Rule 28.

9 Awards: (a) The National Field Day Trophy to the station having the highest overall checked score, regardless of section. **(b)** The Bristol Trophy to the station having the highest overall checked score in the other section. **(c)** The Scottish Trophy to the Scottish station having the highest overall checked score. **(d)** The Gravesend Trophy to the runner-up in the section having the highest number of entries. **(e)** The G6ZR Memorial Trophy to the runner-up in the other section. **(f)** Certificates of merit to the stations having the three highest overall checked scores in each section. **(g)** The Frank Hoosen G3YF Trophy to the station having the highest checked score on the 14MHz band. **(h)** Certificates of merit to the groups in each section with the highest checked scores on each band.

10 Check logs: While overseas stations are not eligible to enter NFD, checklogs are very welcome. A certificate will be awarded to the overseas station in each continent whose checklog shows the most points contributed to competitors.

LOW POWER FIXED CONTEST 1995

1 The General Rules for RSGB HF contests apply.

2 Date and Time: 0700 - 1100UTC Sunday 23 April 1995.

3 Frequencies, mode and power: 3510 - 3560kHz and 7010 - 7040kHz, CW only. Maximum power 5W RF output.

4 Exchange: RST + serial number commencing at 001 + output power, eg 559001 3W.

5 Scoring: Each QSO with a QRP station 15 points; all other QSOs 5 pts. The same station may be worked for points on both bands.

6 Equipment: The transmitter or final power amplifier stage shall not be capable of RF output power in excess of 15 Watts. A description of any method of power reduction to comply with the contest rules and details of the equipment used to measure power *must* accompany each entry.

7 Awards: The 1930 Committee Cup to the winner. Certificates of merit to the second and third placed stations and to the highest placed entrant using completely home-made equipment. A further certificate to the highest-placed entrant using 1W or less RF output power.

ROPOCO CONTESTS 1995

1 The General Rules for RSGB HF Contests apply.

2 Dates & Times: ROPOCO-1 0700 - 0900UTC Sunday 2 April 1995. ROPOCO-2 0700 - 0900UTC Sunday 6 August 1995.

3 Band & Mode: 3520 - 3570kHz, CW only.

4 Exchange: RST only, plus (a) for the first QSO, the entrant's own postcode and (b) for each subsequent QSO, the postcode received from the previous contact.

5 Scoring: Ten points per QSO. Contacts with UK stations only.

6 Awards: Certificates to the leading three entrants in both contests. Trophies to the highest-scoring entrant with a perfect or the most accurate log; in ROPOCO-1 the Verulam Silver Jubilee Trophy and in ROPOCO-2 the G3XTJ Memorial Trophy. The G5MY Trophy to the entrant with the highest aggregate score from both events.

VHF RULES

10GHZ TROPHY

6 May, 1400 - 2200UTC

This is a new event devised by the VHFCC and the Microwave Committee to coincide with the May 432MHz - 24GHz IARU contest.

Rules: 12. One-way / Cross-band QSOs count for half points.

13. Log entries for one-way QSOs must be clearly marked.

14a. County / Country multipliers.

18b. Attention is drawn to this rule which permits 144 / 432MHz talkback.

Sections: O Open only.

Awards: The 10GHz Trophy to the leading station.

Adjudicator: L Kellett, G8KMH, 79a Lower Icknield Way, Chinnor, Oxon. OX9 4EA.

Please note that due to changes in the VHFCC, these rules supersede those published in March RadCom:

50MHZ IARU

3 / 4 June, 1400 - 1400UTC

Scoring: 1pt per km. No multipliers. Full Locator exchange - if a station only gives the first four characters, score to the nearest corner of the square.

Sections: M - Multi-Operator, Fixed or Portable; S - Single-Operator, Fixed or Portable.

50MHZ RSGB TROPHY

3 June, 1400 - 2200UTC

Rule: 14a. Radial Ring scoring.

Sections: M - Multi-Operator, Fixed or Portable; S - Single-Operator, Fixed or Portable.

Awards: The Telford Trophy will be awarded to the highest-scoring entry in the Multi-Operator section. The SMC 6M Cup will be awarded to the highest-placed Single Operator.

Adjudicator: I W N Pawson, G0FCT, 3 Orion, Bracknell, Berkshire RG12 7YX.

These are two separate contests, so separate logs and Cover Sheets for each event, please.

1ST 50MHZ BACKPACKERS

3 June, 1300 - 1700UTC.

See separate rules.

2ND BACKPACKERS 144MHZ

18 June, 1100 - 1500UTC

See separate rules, adjudicator G4DHF.

432 MHZ FM FIXED AND OPEN

25 June, 1800 - 2200UTC

General rules apply, and Rule 14a.

Sections: F single operator fixed, O all others, L listeners.

Adjudicator: M J Platt, 451 Newcastle Rd, Shavington, Cheshire CW2 5JU.

VHF FIELD DAY

1 / 2 July, 1400 - 1400UTC

Rules will be published later.

HF RESULTS

QRS CUMULATIVES 1994

Once again, the QRS Cumulatives were well supported by newcomers and veteran contesters alike. Although we only received entries from two novices, nine of them appeared in the logs along with some 80 G0s. Quite a few operators misunderstood or disregarded the requirement to send their first names in full, so the HFCC has decided to modify the rule for 1995 (send your name as you do normally). Congratulations to Tom, 2E0ACY, for winning the contest outright (the first occasion I can recall when a novice has won an HF contest) and to all the other entrants who took the plunge.

Soapbox: "It looks as if a number of people have not read the rules properly again this year with regard to first name in full" (G0LKX, G0ROT, G4DDX and others), "Hard going working G with my vertical through the European QRM" (G3KEF), "Nice friendly contest, nice to meet some new ops. Hope this encourages some of them to have a go in other contests" (G4CZB, G4XPE, G0TIB and many others), "An excellent contest but hard work" (G3ZGC), "Not so much a contest, more a gentleman's activity event" (G3RSP), "It was fun to use the old gear and antique straight key for a change" (G4EDG), "Band very noisy with a number of strong continentals" (G0SJC), "I was surprised to find how well 10W works on 80m" (GU0SUP), "My licence was not issued in time for the first session so I have only sent in four logs - this was my first attempt at entering a contest!" (G0UPU - good effort Roger), "Going into contests is my main interest in the hobby now and I enjoy it a lot. I am looking forward to passing the RAE one day and using all the bands" (2E0ACY - congratulations Tom). The final comment comes from G0ILN: "I learnt more about operating in five one-and-a-half hour sessions than all of my time as an amateur. I will have greater appreciation of contesters in the future and am looking forward to the next slow CW cumulative or who knows I might just try another contest later in the year."

G4IFB

Pos	Call	Total score	5/4/94	Individual session scores 13/4/94	21/4/94	29/4/94	9/5/94
1 *	2E0ACY	900	180	340	ck	ck	380
2 *	G3MCK	545	ck	195	200	150	ck
3 *	G2HLU	500	ck	150	185	165	ck
4	G3RSP	420	-	145	145	130	-
5	G4BLI	393	-	140	128	-	125
6	G4XPE	365	ck	125	-	125	115
7= *#	GU0SUP	350	ck	85	ck	135	130
7=	G3VNG	350	ck	110	125	115	-
9	G4DOX	342	-	135	110	97	ck
10 #	G0ILN	335	ck	85	120	130	ck
11	G3RSF	330	-	90	110	130	ck
12	GD0LQE	295	ck	90	65	140	-
13	G4EDG	290	-	160	130	-	-
14	G4KDL	280	-	119	ck	74	87
15=	2E0ADL	270	95	95	-	80	ck
15=	G0ROT	270	ck	90	-	90	90
17	G3ZGC	225	95	-	45	85	ck
18 #	G0TEB	220	-	70	-	80	70
19	G0TIB	215	ck	65	80	-	70
20 #	G0UPU	155	-	ck	40	55	60
21	G0SJC	145	40	-	55	-	50
22	G4CZB	95	-	-	-	95	-
23	G3XYF	60	-	20	20	-	20

Key: * = Certificate winner. # = First-time entrant. - = No log. ck = Checklog.
Checklogs: G0GAZ, G3KEF, G3HEL, G0LKX. Not accepted: G3JSR (not QRP).

VHF RESULTS

4TH 144MHZ BACKPACKERS 1994

Conditions varied quite markedly across the country and upon location. This was highlighted by the extreme range of comments, "Very windy, driving rain and sleet. Stations commented that they could hear the wind howling through the rigging! Contest and summit abandoned before the end because of the conditions" (G0LBO/P on Conniston Old Man Summit). "WX unpredictable thereby not allowing us to reach our usual site" (G0HAC/P). "Fine and sunny, heavy QSB towards end of contest" (G4FUH/P). Even so, it was gratifying to note so many excellent contacts in almost all logs and it would appear that there has been widespread support for the general format of these contests: "A most enjoyable series of contests" (G8JAY/P). "Good idea, here's to next year!" (G6TTL/P). Congratulations to all section and certificate winners(*).

Next year the format for these events will be the same but with the following amendment - contests 3 and 4 will follow the same contest exchange as the major 2m event, ie a County Multiplier will not be used. *G4DHF*

10W SINGLE OPERATOR

Pos	Call	Pts	QSO	Mult	Loc	Ant	Best DX	Km
1*	G0RMG/P	60192	115	76	IO82XJ	12ZL	F5OAU/P	748
2*	G8JAY/P	47058	84	69	IO91AW	17el	F8KLW/P	618
3	GW8ZRE/P	46464	103	66	IO83JA	HB9CV	PA3BZZ/P	589
4	G0CLP/P	41160	113	49	IO93AF	10el	F8KLW/P	733
5	G0SOO/P	34706	70	67	IO91SE	9el	GM0CLN/P	537
6	G7LQD/P	19398	42	53	IO84KP	9el	F6KBF/P	597
7	G0GCI/P	19278	62	51	JO01ED	13el	GD4IOM	474
8	G7KOL/P	14535	42	51	IO92LO	4el	OT4E	409
9	G3FDW/P	2669	21	17	IO84ME	10LPY	G1HWY	408

10W MULTI-OPERATOR

1*	GW3TAD/P	51612	99	66	IO81KW	17el	DF0RI	840
2*	G8PNN/P	23400	62	52	IO95CK	4x9el	F6KVF/P	674

3W SINGLE OPERATOR

1*	G0HIK/P	26950	68	55	IO84KF	13el	F6KBF/P	556
2*	G4WGE/P	19649	65	49	IO91VH	17el	PI4GN	535
3	G0LBO/P	17526	41	46	IO84KI	9el	F6HPP/P	716
4	G4IDF/P	17331	55	53	IO82TC	8el	F1CUA	452
5	G4FUH/P	11790	40	45	IO93OO	9el	GU0EMG/P	442
6	G0HAX/P	9758	42	41	JO01ED	17el	DK0BN/P	539
7	G0HAC/P	6864	41	39	IO83WK	9el	GM4AFF/P	403

3W MULTI-OPERATOR

1*	G6TTL/P	11193	40	41	JO01LE	14el	GD4IOM	449
2*	GW0SYG/P	3174	10	23	IO71JR	9el	GM0CLN/P	490

Check log received from G7OZE/P.

VHF RESULTS CONTINUED

MAY 432MHZ - 24GHZ CONTEST 1994

The number of entries received was very similar to those last year and this was also reflected in terms of diminishing band entries above 432MHz. Conditions were described as being "average" to "fairly reasonable" and there were certainly some good distances worked.

The VHFCC is presently working in co-operation with the Microwave Committee in order to stimulate more activity on the higher bands and intend to introduce a 10GHz Trophy into next year's event.

There is clearly a need to promote an awareness of the range and nature of equipment and designs which are currently available if individuals and contest groups are to work towards being active. Keep an eye on *Microwave News*, *Contest Classified* and *Contest Exchange* for information as it becomes available. In the meantime, congratulations to all section winners and certificate winners (*).

G4DHF

432MHZ SINGLE OPERATOR FIXED SECTION

Pos	Call	Pts	QSO	Loc	Pwr	Ant	Best DX	km
1*	G4BRK	101	19	IO91DP	100W	19Y	PA3BPC/P	403
2*	G4LRT	63	15	IO92LJ	400W	2x18PB	G7AZP	191
3	2E1CBI	35	9	JO01BI	1W	7eleZL	G3CKR/P	244
4	G4PMK	29	5	IO93GT	60W	19Y	G6BRA/P	270

432MHZ SINGLE OPERATOR PORTABLE

1*	G8FBG/P	1671	137	JO02QD	400W	4x28Y	DL3ARM/P	755
2*	GW4BVY/P	1151	125	IO81NV	400W	4x21Y	DL1ECB	661

432MHZ ALL OTHER SECTION

1*	G4PUB/P	3437	253	JO01PU	400W	4x21Y	DL8UDD/P	837
2*	G3CKR/P	3230	248	IO93AD	400W	12x21Y	DB9NBT	923
3	G6BRA/P	853	123	IO91PK	400W	4x21Y	DL0FH	703
4	G8MNY/P	811	124	IO91XG	400W	27QLY	F5KCR/P	588
5	G4CRA/P	638	66	JO01FT	100W	21Y	DG9NBT	683

1296MHZ SINGLE OPERATOR FIXED SECTION

1*	G4PMK	21	9	IO93GT	60W	23Y	G6PHJ/P	81
2*	G4LRT	19	7	IO92LJ	70W	27QLY	G4PUB/P	170

1296MHZ SINGLE OPERATOR PORTABLE

1*	G8FBG/P	87	11	JO01QD	10W	55Y	DK2MN/P	405

1296MHZ ALL OTHER SECTION

1*	G4PUB/P	1088	102	JO01PU	300W	4x55Y	DF4ZR/P	563
2*	G6PHJ/P	298	38	IO93AD	250W	4x55Y	DF0HS/P	595
3	G6SPS/P	77	19	JO01IT	15W	2x23Y	PA3FPQ	349

2320MHZ SINGLE OPERATOR FIXED SECTION

1*	G4LRT	294	3	IO92LJ	10W	46QLY	G4PUB/P	170
2*	G4PMK	108	2	IO93GT	5W	0.6m dish	G8XVJ/P	81

2320MHZ ALL OTHER SECTION

1*	G4PUB/P	5535	22	JO01PU	50W	66QLY	DK2MN/P	412
2*	G8XVJ/P	1440	10	IO93AD	50W	0.9m dish	G4PUB/P	262
3	G6SPS/P	385	4	JO01IT	0.8W	25Y	PE0MAR/P	235

56MHZ SINGLE OPERATOR FIXED SECTION

1*	G4LRT	132	2	IO92LJ	1W	1.2m dish	G8XVJ/P	103
2*	G4PMK	108	2	IO93AD	0.6W	0.9m dish	G8XVJ/P	81

3456MHZ ALL OTHER SECTION

1*	G4PUB/P	2200	9	JO01PU	7W	1.2m dish	DF1EQ	412
2*	G8XVJ/P	446	3	IO93AD	1W	0.9m dish	G4PUB/P	262

5760MHZ SINGLE OPERATOR FIXED SECTION

1*	G4PMK	108	2	IO93GT	0.1W	0.6m dish	G8XVJ/P	81

5760MHZ ALL OTHER SECTION

1*	G4PUB/P	1549	7	JO01PU	20W	1.2m dish	PA3FPQ	309
2*	G8XVJ/P	81	1	IO93AD	0.05W	0.9m dish	G4PMK	81

10GHZ SINGLE OPERATOR FIXED SECTION

1*	G4BRK	1511	6	IO91DP	10W	0.6m dish	PA0EZ	478

10GHZ ALL OTHER SECTION

1*	G4PUB/P	4486	23	JO01PU	100W	0.8m dish	DF1EQ	412

24GHZ ALL OTHER SECTION

1*	G4PUB/P	7	1	JO01PU	7mw	0.50m dish	G0TJN/P	7

OVERALL POSITIONS SINGLE OP FIXED

Pos	Call	432	1296	2320	3456	5760	10GHz	24GHz	Norm	Tot
1*	G4LRT	2	2	1	1				3529	
2*	G4PMK	4	1	2	2	1			3472	
3	G4BRK	1					1		2000	
4	2E1CBI	3							346	

OVERALL POSITIONS SINGLE OP PORTABLE

1*	G8FBG/P	1	1				2000	
2*	GW4BVY/P	2						875

ALL OTHER SECTION

Pos	Group	432	1296	2320	3456	5760	10GHz	24GHz	Norm	Tot
1*	Windbreakers CG	1	1	1	1	1	1	1	7000	
2*	Warrington CG	2	2	2	2	2				1729
3	Colchester RA	5	3	3						326
4	Bracknell ARC	3								248
5	11th Hour CG	4								236

BACKPACKERS TROPHY 1994

The following table lists those stations who have entered a minimum of three out of the four Backpackers events. All scores have been normalised according to the section entered. Only the best three scores have been accumulated to arrive at a total. Congratulations to G0HIK/P who is the first winner of the Backpackers Trophy.

G4DHF

10W SINGLE OPERATOR

Session	1	2	3	4	Total
G0RMG/P	388	1000	922	1000	2922
G8JAY/P	889	559	982	782	2653
G0CLP/P	1000	-	636	684	2320
G(W)8ZRE/P	-	265	827	772	1864
G0SOO/P	549	368	355	576	1493
G7LQD/P	557	521	347	322	1425
G0GCI/P	396	193	578	320	1294
G3FDW/P	220	-	759	44	1023
G7KOL/P	86	-	173	241	500

10W MULTI-OPERATOR

GW3TAD/P	138	767	481	1000	2248
G8PNN/P	309	1000	638	453	2091

3W SINGLE OPERATOR

G0HIK/P*	760	1000	1000	1000	3000
G0LBO/P	1000	781	692	650	2473
G7OZE/P	882	405	870	-	2157
G4FUH/P	290	393	211	437	1120
G0HAX/P	128	159	385	362	906
G0LJD/P	125	107	464	-	696

3W MULTI-OPERATOR

NIL

Note: In the event of any future tie-breaks, the forth entry will be taken into consideration in deciding the Trophy Winner.

2ND 1.3 / 2.3GHZ FIXED OCT 1994

Conditions were "poor", "lousy", "terrible" etc. This resulted in low activity and correspondingly few entries. G8NEY and G0BPU had 13cm equipment on but couldn't make any contacts. There were two comments about the timing: G8NEY suggested later in the evening, G6XDI suggested 0900 - 1300. Please let us have your views.

Congratulations and certificates to G8ZQB, G3MEH and G6XDI who gets the low power/single aerial award.

GW8GSQ

1.3GHZ SINGLE OPERATOR

Pos	Call	Score	QSO	Loc	Pwr	Ae	DX	km
1	G8ZQB	128	17	IO92	150	40	F6IFR	363
2	G3MEH	89	19	IO91	100	2x50	ON4ALF/P	317
3	G4ZTR	54	10	JO01	80	55	G3KTU	229
4	G8NEY	45	7	IO81	250	55	G0BPU	245
5	G6XDI	23	7	IO91	20	28	G8OHM	141
6	G6SPS	15	3	JO01	18	2x23	F6IFR	227

2.3GHZ SINGLE OPERATOR

Pos	Call	Score	QSO	Loc	Pwr	Ae	DX	km
1	G8ZQB	3	3	IO92	8	1.6m	G4LRT	21

VHF CONTESTS CALENDAR

9 Apr	1st 23cm & 13cm Fixed / SWL (Feb 95)
12 Apr	144MHz SSB Cumulatives (Feb 95)
20 Apr	144MHz SSB Cumulatives
6 May	10GHz Trophy (April 95)
6/7 May	432MHz to 24 GHz and 70cm Trophy (Mar 95)
20/21 May	144MHz and SWL, Single / All Others (Mar 95)
21 May	1st Back Packers 144MHz (April 95)
3 Jun	50MHz Trophy (April 95)
3/4 Jun	IARU 50MHz (April 95)
3 Jun	1st 50MHz Backpackers (April 95)
18 Jun	70MHz CW (Mar 95)
18 Jun	2nd 144MHz Backpackers (April 95)
25 Jun	432MHz FM Fixed/Open (April 95)
1/2 July	VHF Field Day
2 July	3rd 144MHz Backpackers

HF CONTESTS CALENDAR

1/2 Apr	*EA RTTY* (Mar 95, p21)
1/2 Apr	*SP-DX* (Mar 95, p21)
2 Apr	ROPOCO-1 (Apr 95)
4 Apr	QRS Cumulative (Feb 95)
12 Apr	QRS Cumulative
15/16 Apr	*Holyland* (Feb 95, p21)
20 Apr	QRS Cumulative
23 Apr	Low Power Fixed (Apr 95)
22/23 Apr	*Helvetia* (Mixed Mode)
28 Apr	QRS Cumulative
1 May	QRS Cumulative
6/7 May	*ARI DX (Mixed Mode)*
13/14 May	*CQ-M (RSF[Russia] Mixed Mode)*
26/27 May	*CQ-WPX (CW)*
3/4 Jun	National Field Day (Apr 95)
17/18 Jun	*All Asia (CW)*
24/25 Jun	Summer 1.8MHz CW

AMATEUR RADIO DIRECTION FINDING

TOP BAND ARDF CALENDAR 1995

7 April	Collier Cup - round 1	Mid Thames
9 April	National Final Qualifier - round 1	Banbury
19 April	Gage-Tyler Cup - round 2	Mid Thames
21 April	Chelmsford Club - round 1	Chelmsford
30 April	National Final Qualifier - round 2	Mid Thames
5 May	Collier Cup - round 2	Mid Thames
12 May	Colchester Club - round 2	Colchester
17 May	Gage-Tyler Cup - round 3	Mid Thames
21 May	National Final Qualifier - round 3	Salisbury
26 May	Chelmsford Club - round 2	Chelmsford
2 June	Collier Cup - round 3	Mid Thames
2 June	Colchester Club - round 3	Colchester
11 June	National Final Qualifier - round 4	South Manchester
21 June	Gage-tyler Cup - round 4	Mid Thames
23 June	Chelmsford Club - round 3	Chelmsford
2 July	National Final Qualifier - round 5	Stratford upon Avon
7 July	Collier Cup - round 4	Mid Thames
14 July	Colchester Club - round 4	Colchester
19 July	Gage-Tyler Cup - round 5	Mid Thames
23 July	National Final Qualifier - round 6	Chelmsford/Colchester
28 July	Colchester Club - round 4	Colchester
4 August	Collier Cup - round 5	Mid Thames
13 August	National Final Qualifier - round 7	Coventry
16 August	Gage-Tyler Cup - round 6	Mid Thames
18 August	Chelmsford Club - round 4	Chelmsford
1 September	Collier Cup - round 6	Mid Thames
3 September	National Final Qualifier - round 8	Ripon
20 September	Gage-Tyler Cup - round 7	Mid Thames
8 September	Colchester Club - round 5	Colchester
15 September	Chelmsford Club - round 5	Chelmsford
24 September	National Final	Torbay
6 October	Collier Cup - round 7	Mid Thames
14 October	Slade Double Night	Slade
28 October	Eric Mollart Memorial	Mid Thames
10 November	Colchester Club Night Event	Colchester

All Friday evening events start at 7.30pm

Colchester events start at Fordham Heath: Map 168 (Colchester and Blackwater) NGR 945 264, opposite public house. Further details from Phil Cunningham, G0NXH, 2 The Park, Medley, Manningtree, Essex, tel: 01206 393737.

Chelmsford events start at Tiptree Heath: Map 168 (Colchester and Blackwater) NGR 884 148, 1 mile SW of Tiptree on B1022. Further details from Dick Brocks, G3WHR, 12 Blacksmiths Lane, Wickhams Bishops, Essex, tel: 01621 891868 (home), 01245 353221 ext 3954 (work).

Gage-Tyler Cup events start at Maidenhead Thicket: Map 175 (Reading and Windsor) NGR 855 816, also use maps 165 (Aylesbury and Leighton Buzzard) and 176 (West London).

Collier Cup events start at the lay-by on A418: Maps 164 (Oxford) and 165 (Aylesbury) NGR 640 049. Further details from Mn Standen, G0JMS, 11 Hazel Gardens, Sonning Common, Reading RG4 9TF, tel 01734 723504.

BANBURY QUALIFYING EVENT (TOP BAND)

Date: 9 April, Time: Assemble at 1300 for 1320 start

Map: 164 (Oxford)

Location: The bus and coach park at Chipping Norton School, NGR 315265.

Competitors requiring tea should notify Graham Nicholls, 64 Mascord Road, Banbury, Oxon OX16 0NB, tel: 01295 265492, no later than 2 April.

MID-THAMES QUALIFYING EVENT (TOP BAND)

Date: 30 April, Time: Assemble at 1300 for 1320 start

Map: 186 (Aldershot and Guildford)

Location: Yately Common off A30, NGR 838596.

Competitors requiring tea should inform Min Standen, 11 Hazel Gardens, Sonning Common, Reading RG4 9TF, tel: 01734 723504, no later than 23 April.

RADCOM OPERATING FEATURE

The 1994 Backpackers VHF Contests

by David Johnson, G4DHF*, VHFCC Chairman

WHEN WAS THE last time you entered a contest? Perhaps you are one of those who are new to contesting and would rather like the idea of participating but feel somewhat at a loss to come to terms with the amount of work involved before, during and after the event. Perhaps you have previous experience but for one reason or another can no longer find the time for full-blown events. Well, the Backpackers series of 2m contests introduced in 1994 was designed with just you in mind. The VHF Contest Committee has realised for that there are many potential contesters who feel somewhat daunted by the prospect of launching themselves into the challenging and frequently hectic nature of contesting. As a result, these four events were designed to enable both the newcomer and the lapsed contester to participate alongside major events with the minimum amount of equipment and over a four-hour period. Contesting is great fun and judging by the comments on the entries for this year's events, that's precisely what the majority had!

Above: G8ZRE shows all the equipment required for a successful Backpackers operation.
Bottom Left: G0SOO/P takes a break between QSOs.
Bottom Right: Backpackers trophy runner-up Julian Ross, G0LBO/P.

Gear Required

THERE ARE TWO power level sections of 3W and 10W, which match the wide range of commercial equipment which is currently available and each have single and multi-operator portable sections. All equipment must be battery powered and there are limitations on the height and diameter of the mast to exclude mobile towers and other 'significant structures'. This has helped to even out the field and has given full range to a host of experimentation with single and group antennas, power supplies (including solar energy), locations and operating practices. The multi-operator group at G8PNN/P managed to erect 4 x 9-element yagis in all events, single operator G3FDW/P used the log periodics he has been designing while G(W)8ZRE/P has made a large number of contacts over staggering distances using only a simple (but effective) HB9CV. Many contestants have, quite literally, picked up their equipment and walked, frequently to the tops of mountains, hills and local high spots. At the same time, those who may have been less energetic have operated from the comfort(?) of their cars with the engine switched off. Both modes of operating are equally valid, the emphasis has been to encourage more portable activity rather than to exclude those who for any reason are not able to reach the advantage of the really high spots. At all times safety for yourself and others should be of prime concern.

* 65 West Street, Bourne, Lincs PE10 9PA.

Type of Events

THREE OUT OF THE FOUR events are designed to coincide with existing 24-hour 144MHz SSB/CW contests to ensure that there is plenty of activity. This also provides an opportunity to contact the well-equipped, more distant stations. The timing is such that three out of the four hours are scheduled to co-ordinate with the final hours of the main levels of activity with the last hour enabling the Backpackers to make further contacts, particularly among themselves when the portable 'big guns' have gone QRT leaving the band less congested. The second event is a 'stand alone' Backpackers contest. All events are scored using 50km radial rings [1].

Scoring

ALMOST EVERY ENTRANT commented on how much they enjoyed the variety of multipliers which made chasing for contacts so much fun. This consists of multiplying your final score by the number of different Counties, Countries and Locators you have worked. The VHFCC are always willing to listen to comments from all participants and so, following feedback from last year's events, it has been decided that the 1995 series will not require a County Multiplier in the third and fourth events. All other multipliers are unaffected and, of course, this does not apply to the first two events. This will ease the flow of information required between the two types of contests. Remember, each of the four events are treated as individual contests and so require a separate entry at the end of each event. The 'Backpackers Trophy' will be awarded to the station whose best three entries gains the highest placement, regardless of section. This is determined by a process

called normalisation applied by the adjudicator and allows stations in the various sections to be fairly compared [1].

1994 Results

THE RESULTS OF the 4th 144MHz Backpackers contest and the Backpackers Trophy are published in *Contest Classified* this month and so the VHFCC are pleased to confirm that G0HIK/P operating from Cumbria and running only 3W into a single antenna, is the proud winner of the 1994 series. This year the Backpackers has also been extended to cover two events on 50MHz. If there is sufficient interest these will be increased next year into a full-blown Trophy contest.

G3IZD receiving the backpackers trophy on behalf of G0HIK/P.

Preparing for This Year

ARE YOU BECOMING interested? If so, then to participate in this year's events you need to make some simple preparations. Check that your local high spot is not being used by a major contest group and if it is, don't set up your station in the next field if you expect to hear anything, even if the other station is also only running low power. Always follow the Country Code and ask permission before venturing on to private land. Take some provisions with you and wrap up well: even in summer our rather fickle weather is notoriously changeable. Anyhow, you don't have to be on top of a mountain to be affected by wind-chill, particularly if you remain static while operating your radio in open country over a three or four hour period. It's not much fun operating from your car in wet clothes either, particularly when you have been drenched while erecting the antenna. Important: tell someone where you are going and what time you are expected back, it's good common sense.

After selecting and negotiating your site, work out your full Locator using the appropriate OS map. It may be worthwhile having a nearby alternative site in mind in case of any problems on the day. You will also need a list of the three-letter County Codes [1] ready to send your particular information. The more adventurous among you may wish to log in 'real time' with a computer, but it is more likely that pencil and paper will be used. Anyhow, there's less battery drain and you can at least write on wet paper! When you make contact with a station, confirm the callsign and send the report, your contest serial number (starting from 001), your full Locator and County Code. Ensure that both parties have confirmed the appropriate information and politely sign off. If you have called another station, you should QSY and vice-versa. Be gentlemanly and polite on all occasions, people will actually want to work you and will usually call back again later if they did not work you in the pile-up the first time round. Incidentally, although fixed stations cannot submit a contest entry, they can greatly assist by sending serial numbers when they work stations. This helps to make contest logging and later adjudication more straight-forward. Their presence on the band is of particular benefit during multiplier contests, so keep on calling-in and giving points away!

When, in the comfort of your own home, you come to transfer the information on to the appropriate log sheets, take care to do so neatly and correctly - ensure that /P accompanies the appropriate callsigns and that the Locators are correctly transcribed before scoring, ie JO03CE, IO92TR etc, and not IO03/JO92! Make sure that all duplicate contacts are scored once only and that the remaining ones are marked accordingly. Having scored your contacts, apply the multipliers you have worked and fill in the Cover Sheet which gives all the information about your station that we require and send your entry to the adjudicator's address (myself for the '95 events). Don't be put off from submitting your entry by the large scores you hear on the band. Most of these will be in connection with the 24-hour event and anyhow, the multipliers for the Backpackers event have a significant effect on placings. As you gain in experience you will have the satisfaction of seeing your placings steadily improve. Who knows, you may, with the help of friends or club, decide to participate in a future 24 hour event.

The VHFCC has acquired a mailing address: P O Box 29, Bridgend CF35 5YA. By 1996, all VHF contest entries will be directed to this one address. In the meantime we will accept entries delivered to both this and the published adjudicator's address.

These events are an ideal way of participating in contests with the minimum amount of equipment and allow you to operate in a group or individually to experience the thrill and challenge of contesting for yourself. At the same time they are flexible enough to promote innovation and to develop new ideas and personal qualities. Don't just take my word for it, comments in 1994 included: "Couldn't believe the first contact until further stations worked in the same region - outstanding performance on 2.5W!" (G0LJD/P), "Another pleasant day to spend in the open air" (G0HAX/P), "Enjoyed the four legs very much" (G0RMG/P), "Good idea, here's to next year!" (G6TTL/P), G8PNN/P and the greater majority of entrants.

Reference

[1] 'General rules for VHF/UHF Contests', *Radio Communication* January 1995. ♦

Inquisitive visitors at G0LBO/P on Conniston Old Man summit.

THE BACKPACKERS SERIES OF CONTESTS

Aims:
a. To promote the fun of contesting and to develop skills in contesting and operating.
b. To increase access to major contesting events.
c. To encourage low-power portable operation with operators working fellow low-power enthusiasts from a variety of hill-top sites within the UK.
d. To introduce the art of contesting to those who, for various reasons, are unable / unwilling to form / join contest groups, or those who simply do not have the time for 'full-blown' contests.
e. To promote innovation, home construction and an awareness of how equipment actually works, particularly in the development of receivers, transmitters, antennas, pre-amplifiers and feeder systems.
It is in the spirit of the contests that the equipment should be capable of being carried to the operating site by the operator(s) or being transported / erected outside a car.

Times: 'Socially-acceptable' four-hour periods. Timing of the contests should allow participants time to (walk) reach their destination, set-up, operate, clear away and return home with a good margin of daylight. Times will be staggered to co-ordinate with existing contests.

Modes: SSB or CW.

Sections: a. 10W Single Operator Portable. b. 10W Multi-Operator Portable. c. 3W Single Operator Portable. d. 3W Multi-Operator Portable. The listed power is output from the transmitter. Participants will be expected to demonstrate how their power level was determined, particularly where the basic commercial equipment is rated at higher output power.

Restrictions:
1. All operators must be RSGB members.
2. The contest is open to all stations, but only portable stations may submit a contest entry.
3. Although any number of antennas or groups are permitted, no fixed or mobile towers, cranes or any other 'significant structure' (in excess of 2in outside diameter) is to be used as support. The highest feed-point of the antenna(s) driven element will be limited to 30ft (9m) above ground level.
4. **All equipment must be battery powered.** If a mains rotator is envisaged, this must also be powered from a single-source battery (with suitable converter circuitry) supply not exceeding 28V.
5. Petrol / Gas / Diesel generators for charging are not permitted. This includes a motor vehicle engine. **If operating from a vehicle supply, the engine must be switched off for the duration of the contest.** Wind and solar power generation and charging is permitted.
6. 1995 General Rules apply. In addition:
144MHz Backpacker events 1 and 2, Dates 21 May and 18 June, Time 1100 - 1500UTC, Rule 14c (Country / County / QTH Locator Multipliers).
144MHz Backpacker events 3 and 4, Dates 2 July and 3 September, Time 1100 - 1500UTC, New Rule 14e (Country / QTH Locator Multipliers).
50MHz Backpacker event 1, Date 3 June, Time 1300 - 1700UTC Rule 14c.
50MHz Backpacker event 2, Date 9 July, Time 1100 - 1500UTC Rule 14c.
Radial Ring scoring system.

Award: Each event should be treated as a separate contest with an entry made after each contest. Session winners and runners-up certificates will be awarded. In addition, a certificate will be awarded to the leading station running 1W or less into a single antenna for each event.
Rule 10 Normalisation will apply.
On 144MHz, the Backpackers Trophy will be awarded to the leading stations in either category, the best three placings out of a maximum of four sessions. In the event of a tie, if appropriate, the remaining session will be taken into consideration. The 50MHz Trophy will be determined by both sessions.

Adjudicator: D Johnson, G4DHF, 65 West Street, Bourne, Lincolnshire PE10 9PA, or alternatively P O Box 29, Bridgend CF35 5YA.

Recommendation: Stations intending to enter any of these Backpackers contests are requested not to make any contacts from their home stations in the major events before the Backpackers contests start, as they may, in effect, appear to be working the same station twice. In fact this is not the case, as the Backpackers series should be seen as separate, independent events. However, the reality of the situation is such that stations operating in the major events will register the second, portable, contact as a 'dupe', thereby causing some confusion and delay. Should this happen, the second contact should be corrected and scored at a later time. This anomaly has arisen as a result of attempting to create more activity by co-ordinating two quite different contests simultaneously. Backpackers participants, in particular, are requested to bear this in mind in order to help both contests run as smoothly as possible.

David Johnson, G4DHF
VHFCC Chairman.

RadioSport-RSGB Events, 1995

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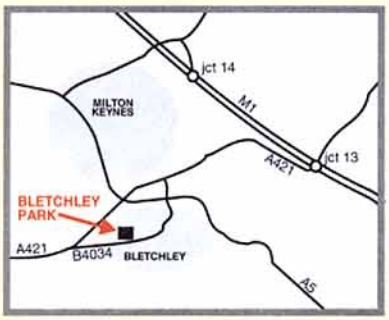

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FOR SALE

20m BEAM - Hygain 203 BA, 3-ele beam, never used but stored inside for 20 years: £150. 12MHz 286 PC with co-processor, 1MB ram, 3.5" FDD, 40MB IDE hard disk, 1 parallel, 2 serial & games ports, serial mouse and VGA monochrome monitor & keybd: £250. Oscilloscope - Telequipment D61, dble beam, solid state (except CRT) 10MHz bandwidth. Has had very little use and is in good condx: £80. Hazeltine dumb terminal (VDU). A cheap way to make a start on packet: £25. Prefer buyer view & collect, otherwise carr at cost & buyer's risk. Alan, G3WXI (York) 01759 388172.

BRAND NEW valves: £1 ea: EB91, EBC81, ECC82/84, ECL84/85; EF80/89, EF91/92, EF183/184, EH90, EL36/81, EL85/86, EL91, EL360, EL821, EZ35, PD500, PL33/36, PL504, PCL85/805, PY500A, PZ30, R19, 6C4, 6H6, 6X4, 6X5. Also, at £3 ea: 12BH7, 6F33, 5763, OC3, VR150/30, EF50/55, PEN45/46, UU8, DW4/500, FW4/500, AC/P1, KT33C. Please add £2 postage. Cheques to K Bailey, 40 Seymour Close, Selly Park, Birmingham B29 7JD 0121 472 3688.

INSECT audio filter bandwidth 10-110Hz, instructions etc, perfect: £30. Valve 3-500Z, used but OK: £30. G3BDQ QTHR (Hastings) 01424 812262.

KENWOOD TR851E 70cm m/mode, little used, in exInt condx: £495ono. John, G0NAJ QTHR (Dukinfield) 0161 3049327.

KENWOOD TS150, mint: £675. Yaesu 902DM Tx/Rx with memory module, mint: £460, Kenwood TM241E 2m Tx/Rx, mint: £250. Welz 400W dummy load: £40. All with mics, manuals, boxes etc. Prefer buyer inspects/collects. Carr extra. (Cardiff) 01446 747223.

TEST Equipment. Hewlett Packard sweep oscillator 8690B. Modules covering 100kHz to 8GHz: £200. Marconi frequency meters TF1026/1 (250-500MHz) and TF1026/2 (500-1000MHz): £20 ea. Manual for Philips PM3252 scope: £10. Box of assorted valves, some new, incl KT88, Z759, 3CX100A5: £10. Buyer collects. G7KOU (Camberley) 01276 29692 (eves).

TRIO TS520S complete with DG5 digital display, Shure 444 mic, one owner from new, all manuals and packing: £350. Vintage Eddystone EC10 Mk 1: £40. Over 100 valves: £20. Mostly post-war types. (Luton) 01582 25519.

WORKSHOP clearout. 1000's items ideal for selling at rallies etc. Chassis, power supplies, plugs, sockets, hardware, 0.25" audio tape, co-ax, test gear, PCBs etc etc. Also 5 multidrawer cabinets crammed full of semiconductors, ICs, transistors. Retail value several £1000s. Enough to fill a transit van. Absolute bargain. Accept first £395 cash the lot for quick sale. (Buyer must collect please). (Birmingham) 0121 472 3688.

YAESU 747GX, FM board, all filters, mobile mount: £500. Matching 20A PSU: £90. Both immac. GM3WYL QTHR (Glasgow) 0141 776 6098.

1.5-2.0MHz, RF Amplifier modulator unit, mains powered, 25W output, make top band Tx: £20. 40W RF valve amplifier 3-20MHz mains PSU: £20. 4W 1.5-20MHz RF amplifier wide band unit, all transistor 31V-DC supply possible QRP rig: £10. All with data, carr extra. Honda 2.5kW generator, mint: £300. Please SAE for lists of shack clearance items. 153 Welland Road, Dogsthorpe, Peterborough, 01733 53998.

1155A Rx, PSU and output stage: £80. Mechanical filter type MF-455-10XK Kokusai Electric Co Japan: £12. SSB tcvr home-brew: £50. (Deal) 01304 364197.

286PC Goldstar VGA col monitor, 6 mnths use, ideal for Packet, bxd DOS 6.2, amateur software loaded: £180. Maxtor 120MB h/drive loaded DOS 6.2 Windows 3.1 radio software, 12 mnths use, perfect order: £70. Or make offer for both items. Peter (Lutterworth) 01455 557263.

40A LATTICE tower, gd condx, telescopic tilt-over head unit winches frame base new unused ground post Hamll rotator TA33Jun Triband antenna 50m coax control cable in GWO, h/books. Would split: £550. (Scarborough) 01723 362537.

60FT Galvanised steel triangular tower mounted on trailer, complete with guy ropes, stakes, box for tools, top head unit. Will deliver anywhere on UK mainland: £700 ono. Computer IBM compatible, 640k RAM 3.5 floppy 20HD VGA B&W monitor, keyboard, mouse scanner plus Epson LC10 colour printer. (Hemel Hempstead) 01923 267405.

ALINCO DJ580 dual band h/held tcvr, extended receive, CTCSS fitted, empty bttry case, soft case, bxd: £295. Trio 7730 2m mobile tcvr, 25W output: £125. (Durham) 0191 3847306.

ALINCO DR-590E d/band mobile 2m/70cm 45W/35W: £350. TS-130S HF tcvr 100W SSB/CW: £350. 30A PSU: £80. G0SQQ (Sth London) 0181 398 5756.

AMIGA Mirage piano tutor and Nintendo ES Amiga program disks, as new: £100. G3BPE QTHR (Westbury) 01373 826939.

AMSTRAD 3086 PC (IBM compatible) 2xFDD, 42Mb HDD, 14" colour monitor. S/W incl DOS5, WP5.1, ham radio, utilities and other programs. Ramsey TNC with Baycom s/w: £165. (Nr Swindon) 01793 782 604.

ANTENNA Tower 30ft in three sections with sockets for top pole. All steel, galvanised, triangular lattice construction with integral ladder: £185 (dismantled). Buyer collects. Storno 5000 2m conversion 12 chans, 600Hz offset, tone-burst, full instructions for programming, 25W out: £85. 6146A's matched pair (GE) brand new: £25. Solartron CD1016 osc'scope, faulty: £35. Buyer collects/carr extra. Dave, G0RDT (Northampton) 01604 757368.

AOR 2002 Rx: £150. Create log periodic aerial: £70. Global ATU 1000: £50. 70cm collinear, new: £30. 10 amp h/brew metered PSU: £15. Alinco DJ580 with spkr mic, h/set, car adpt: £275. Mutek SLN144 preamp, new: £45. (Forest of Dean) 01594 544689 (eves) 01452 528431 Ext 265 (daytime).

AOR3000A Scanner, hardly used: £600ono. Realistic scanner PRO-34 200 chan, mint condx: £110ono. Realistic scanner PRO-2003, 60 chan, bxd: £70ono. Acorn Archimedes A3010, 4M RAM, 84M H/D, monitor, as used by schools: £500. Buyer collects. William, G7BWH (Bedford) 01234 855217 (after 6pm).

BBC COMPUTER mono monitor, disk drive, ATPL board, Prestel adaptor printer cable RTTY ROM: £95. Grant, G4ILI QTHR (Cheltenham) 01462 855339.

BC348Q Rx, works but needs lot of attention, cct diag, few valves: Offers. Mike (Devizes) 01380 812779 (eves).

BLACK Jaguar 200 Mk III scanner AM/FM frequency 26-29.995, 60-88, 115-178, 210-260, 410-520MHz, with chrgr, VGC: £80. Plus postage. GM7TMT QTHR (Orkney Isles) 01856 873920.

BNOS 2m linear amplifier 10x50W with receive preamp: £90. John, GW7DWR (Sth Glamorgan) 01446 792091 OS (eves only).

BUTTERNUT Butterfly HF beam: £90. Yaesu 400RC rotator: £90. Buyer removes. (Nuneaton) 01203 349156.

C7800 70cm 1W 10W, manual, bxd; £120. AT286 2.40m HD Amtor Pactor RTTY etc, programs DOS 6.2 Windows 3.1 XTGOLD BMK Pactor Module: £250. (Bletchley) 01908 642398.

CAPCO 1kW ATU SPC300: £175 + £10 carr. PW Meon 6m transvert board, complete, not tested: £10. Altron AQ620 loading coils + spokes for 3el, needs cleaning: £30. Philips 12" green screen monitor: £25 incl del. Epson P40 mini thermal serial printer: £10. Datong AD270 antenna: £20.

CAPCO Magnetic Loop 10-20m, used indoors only, as new: £100. (Sunderland) 01915 200051 (after 6pm).

CAPCO Magnetic Loop antennas pair 80m-10m plus WARC bands inc control box, cables. Buyer collects: £190 pair. (Norwich) 01508 538752.

CASIO FX-7700GB graphic calculator, bxd, as new: £50. G4FAS QTHR (Stockport) 0161 437 7784.

COLLINS KWM2A with 516F2 PSU, VGC, R/E: £500 or Xchange for 30L1 in VGC. G3GBB (Suffolk) 01379 783657 (home) 01284 753049 (work).

COMMODORE 64 disk drive: £35. Commodore 64 computer: £20. Also books and software. Offers? (Gloucester) 01452 385911.

COSSOR double beam oscillograph Planet 808 SPE processor Philips valve 19" rack system, heavy bench power supply, Ekco CR152/F valve car radio, 500V bridge megger: £10. LM13 freq meter: £20. Other items low prices to clear. (Loughborough) 01509 231251.

CUSHCRAFT R5 antenna, as new: £200. (London NW) 0181 423 6159.

DATONG FL2 audio filter, SEM noise eliminator Mk 1, Sangean 803A Rx, all brand new. Offers. G3PKR QTHR (Middlesex) 0181 897 7196 (eves).

DETACHED 2-bed bungalow, GCH, garage, very good order, village location, near Holywell, North Wales. Easy access to coastal resorts, mountains, Chester and Manchester. 750ft ASL, exInt take-off across NE Wales, N England, N Midlands. Antennas for 70cm, 2m, 6m and HF, negotiable. Ample garden space. Photos available. Reasonable offers considered. Derek, GW0UDJ (Holywell) 01352 781311.

DIAMOND X-50 dual band vertical, mint: £45. Deecom 6m Halo, unused: £10. Bush DAC41 valve wireless, partially restored, GWO, with diag: £20. Buyer collects or local delivery. Kanga 'LCK' 40m tcvr, complete kit (unbuilt) incl case and all extra components, 3W output, superhet Rx, nice Vernier dial: £45 incl post. G0OIW QTHR (Reading) 01734 483593.

EDDYSTONE 750 sell exchange for Rx or tcvr, prefer solid state. PS - Gordon? Sevenoaks left wrong telephone number. (Tamworth) 01827 58605.

EMOTATOR 747SR heavy duty rotator, VGC: £180. Tokyo HT106 6m SSB/CW tcvr 10W, VGC, bxd, hardly used: £160. Clark Scam 40ft pump-up mast: only £30. (Buyer collects). GW7LCB (Llantrisant) 01443 227971.

FR101 Digital with 2m cnvrtr, excl condx: £250. Les, G8LOK (Welwyn Garden City) (01707 326058.

FRG-8800 Rx 150kHz-30MHz, operating and service manuals, Global AT-1000 (new) 2m mag aerial (new) 1994 WRTH handbook, SWL Frequency Guide: £375. (Alsager) (01270 761120 (day) 01270 582748 (eves).

FT-101ZD WARC FM/AM FC902 ATU and Power/SWR unit, recently professionally serviced. Exlnt condx, 120W output, service manuals: £450. Lee, G0MTN (Solihull) 0121 733 8098.

FT101ZD, FM, CW filter, WARC, Shure mic, manuals, gd condx: £300. G3TTZ (Bristol) 0272 710402. (Has this number changed?)

FT102 tcvr, mint condx, extra filters, bxd: £450. G3XYC QTHR (Loughborough) 01509 881332.

FT290 Mk 2 multimode, C/W nicad pack, chrgr, mic and matching linear: £375. Also 6 months old FT2200: £260. (Cleckheaton) 01274 871267.

FT736R 2m/70cm with Mutek front end, bxd, as new: £1000. IC726 HF/6m, gd condx, bxd: £650. IC211E 2m m/mode base station with Mutek: £325. FT290 Mk 1 with mobile mount, nicads and Heatherlite mic: £210. G400 rotator: £100. Cushcraft 15-ele 2m beam: £40. BNOS LPM100 amp: £100. Dressler 2m masthead preamp: £50. Jaybeam D8 8-over-8 yagi: £25. (Solihull) 0121 7458222.

FT747 with FM, mint: £525. Icom IC24ET 144/430 Handie: £250. FT480R: £200. SEM Tranzmatch: £65. Icom 23cm Gaasfet preamp: £70. Daiwa 23cm SWR/PWR meter: £65. B&W AP10 portable HF antenna: £50. All ono but plus carriage. Steve, GM6LZO (Hamilton) 01698 420662.

FT902DM, gd condx, SSB filter, Curtis keyer, mains DC leads, mic, h/book: £450. Prefer buyer inspect collect. (Tyneside) 0191 2572852.

GLOBAL AT-1000 ATU, as new, complete with instructions: £48 includes postage. (Greatstone on Sea) 01797 62775.

GRUNDIG multi-band Rx FM/AM/AMW with SSB Unit, service man: £165. Trio TS520 HF tcvr 12 or 240 volt, with service man: £350. 2m Cushcraft ringo-ranger collinear: £28. 70cm collinear: £28. 2x17ele Met 70cm Yagis manufactured to NBS standard, excl DX antennas: £38 ea. 70cm power splitter N-types: £20. Glass-fibre 6ft poles, ideal mounting stacks for better VSWR etc!: £20. RCA valve-volt meter with service man: £35. Icom IC735 HF tcvr: £625. Icom automatic antenna tuners IC-AT-500: £325. IC-AH2: £375. Kenwood MA-5 band HF mobile antenna with heavy-duty VP-1 bumper mount (new £190): £125. Small spkr/mic: £10. Mobile spkr: £15. Alinco DR599 twin-bander 2m-45W 70cm-35W extended receive AM-band, detachable front panel kit: £475. Alinco ALR-72 70cm 25W: £195. Heathkit HF linear: £375. (Norfolk) 01328 710641.

HEATHKIT 30ft tower CW thrust bearing. Buyer collects: Offers. G3WAD (Fareham) 01329 665757.

HRO RX (no PSU) 12 coil packs. Offers. GEC RC411R 15kHz-30kHz Rx: £95. Trio TR10JR (valved) 80-10m: £55. Buyer inspects collects. (Romford) 01708 42176.

IBM Compatible XT computer, 20MHz hard disk, colour EGA monitor, 5.25" floppy drive. Ideal for packet radio, with s/ware for packet incl BPQ and Paket 6.1: £100. Paul (Penge, London) 0181 659 4102.

IBM PSNOTE-182 Notebook computer 386SL25 4MB RAM, 84MB HDD (170MB stacked) 1.44 FDD, spare bttry, PS/chrgr, mouse, c/case etc, hardly used and as new: £450. Also 386SX25 computer HM-Systems Minstrel small footprint desktop, 4MB RAM 105(210) HDD, 1.44 FDD, 14" VGA c/monitor, mouse etc, occasional domestic use only: £395. Ken (Dunstable) 01582 605693.

ICOM 740, mint condx, Cushcraft R5 Diamond Double 5/8 2m Tokyo HC400L ATU 80m G whip: £600 the lot. (London) 0181 575 7984.

ICOM 760 Japanese version of IC765 built-in ATU PSU gen coverage and all Ham HF bands, just overhauled by Icom (UK): £1450. Silent Key sale. (Runcorn) 01928 715604.

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ICOM IC-761, exInt, with Icom HM-12 mic, fitted up/down buttons, instruction and service mans: £1100. G3RDG QTHR (London) 0181 455 8831.

ICOM IC-R7000 communications Rx, 25-2000MHz, mint condx, bxd with handbook and service man: £600. G4DTC QTHR (Caterham) 01883 343838.

ICOM IC290E 2m multi mode, VGC, 10W o/p: £240 (Doncaster) 01302 537686.

ICOM IC2E h/held, bxd, gd condx, with BP6 high capacity nicads, BP3 DC1 regulator, two BP4 bttry cases, wall chrgr, desk chrgr, with genuine Auralite headset and Cairo adaptor. Ideal Raynet. Leather cases. Offers based on £150. G4SPZ QTHR (Bewdley, Worcs) 01299 403025.

INTERNET books half price. Internet Companion: £6. The Whole Internet: £8.50. Navigating the Internet: £12. Internet Guide for New Users: £13. Internet Mailing Lists: £10. Up Running with Compuserve: £5. Understanding

Procomm Plus 2: £12. All plus £1.50 ea towards postage. 12 BATC back issues free, £2.50 post for lot. G0KTN QTHR (Melksham) 01225 703726.

JAYBEAM TB3, brand new, still in its box and unused: £250ono. Buyer to collect. (Southend) 01702 712775 (eves).

KENPRO dual control rotor: £210ono. (Barnaldswick) 01282 812288.

KENWOOD TH79E 2m/70cm dual-band h/held tcvr with BT-9 batt-case softcase, virtually unused, bxd: £325. Ken (Dunstable) 01582 605693.

KENWOOD TL-922 linear amplifier with manuals and cables, in gd condx: £1100ono. (Camberley) 01276 65951.

KENWOOD TL922 linear amp: £900ono. Little used, mint condx. G0HBS. (Horwich, Lancs) 01204 668475 (after 6pm or w/ends).

KENWOOD TR751E 2m m/mode tcvr, bxd, with manual, exInt condx, never used mobile: £450. G0KDR QT (Saxmundham) 01728 663476.

KENWOOD TS-711E 144 all mode tcvr: £600. HS-WX2 144/430MHz base collinear: £60. All items new and unused. G4OQM QTHR (Rotherham) 01709 850517.

KENWOOD TS140S HF tcvr, VGC, comes with Diamond CP5 antenna: £680. Les Cartwright, G0UVL (Wigan) 01942 700762.

KENWOOD TS430S with FM PS430 AT230 MC60: £600. RCA Vidiplex system: £100. G3KKN QTHR (1995). (Coleford, Glos).

KENWOOD TS430S, fitted FM, gd condx: £525ono. Yaesu FT480R, gd condx: £225. HQ1 minibeam, new fittings: £80. Houskin 80-10m vertical, weathered but working condx: £50. Yaesu FC757 auto ATU, gd condx: £225. Kenwood TM251E 50W mobile, 10 months old, excellent: £250. (Whitchurch) 0275 541731.

KENWOOD TS50 mobile/base 100W HF tcvr and AT50 matching auto ATU with fist and mobile mics, orig packaging and in new condx: £875. No offers. Buyer collects or pays postage. GM0FSW QTHR (Dundee) 01382 815173.

KENWOOD TS530S WARC filters, 1.9MHz 250CPS, manual, bxd, spare valves, Shure 444 desk mic: £380. Don, G3XID QTHR (Sunderland) 0191 5147679.

KENWOOD TS850S: £1000. Yaesu 570 dual band h/held: £250. Icom 240: £60. M/Modules 100W linear 2m: £90. MFJ1278B m/mode data controlled incl all cables, s/ware: £250. CAPCO loops 3.5-30MHz, new condx, all cables controllers incl, PRO2004 300 channels: £90. For more info call 0191 4153654 (Washington).

KW1000 linear amplifier, very clean condx, with two spare 572B's: £350. 2m trnsvrtr: £25. G3POX QTHR (Huntingdon) 01480 811549.

KW109 ATU, bxd: £150. KW108 monitorscope, bxd: £100. KW103 SWR meter: £15. Heathkit ID29 analyser: £20. 8 track tapes Qty 21: £5. (Seaford) 01323 897145.

LOWE communication Rx, vgc, with software disk and interface lead: £275. Call evenings 6pm. Paul Harrison, G4VAM (Peterborough) 01733 341817.

MAGNETIC Loop AMA-4 160-80m and AMA6 40-12m, will split, mint condx: £400. FC102, bxd, as new: £120. G4XVR QTHR (Chester) 01948 820580.

MICROWAVE MODULES frequency meter dual range to 500MHz: £40. 286-12 laptop 20MB HDD Imbram; printer; carrying case; s/ware etc: £450ovno. 4167-33 Weitek coprocessor tested but unused: £175ono. Summasketch plus A4 tablet with mouse s/ware etc: £160. Graham, G4FUJ (Cheltenham) 01242 518776.

MIRAGE MP1/2 power meter C/W Heds for HF/VHF: £120. Bird 43 power meter: £120. Bird element case: £15. Bird elements 3-30 500W, 50-125 10W, 60-80 1W, 150-180 250MW, 200-300 1W: £30 each. HK804 solid brass key: £55. Fluke 8026B h/held multimeter TRMS: £85. HP 1630A logic analyser: £350. FT1 extender card kit: £25. Yaesu FTV 70cm module: £135. 6m module: £100. Yaesu FT2700 2m/70cm: £250. Yaesu FT270 2m: £160. Dressler 2m and 70cm preamps and PSU interface: £75 each. Gould PG85A pulse generator: £65. Yaesu FT980: £725. MM 70cm/50W amplifier: £65. G4CCZ QTHR (Woodham, Surrey) 01932 342927.

MIZUHO 40m h/held, matching 10W amplifier, leather case, telescopic antenna, Heatherlite boom mic, bttries included; also manuals. No splits: £185. Buyer collects. (Huddersfield) 01484 423282.

PACKET TNC PC-320: £85. G3NOH QTHR (London) 0181 473 4905.

PC II TEN XT 32m HD 5-25 & 3-5FDD IBM col monitor, s/ware for RTTY, Packet, SSTV etc: £115ono. Apple 11 Europlus PC with FDD, monitor, printer, RS232 cards & S/ware for RTTY, SSTV etc: £30ono. 23/24cm 60W 2C39, PA + PSU: £45ono. Gen Micro 475A 18GHz PWR meter, manual, requires attn: £50ono. Prefer inspect and collect. (Stourbridge) 01562 730983.

POCKET frequency counter 200MHz RS610-972: £50. 1000MHz prescaler RS611-802: £35. Dip meter DM-4061: £15. Nemco DC-1500 power meter: £60. FR-SOB Rx: £35. BLY33 transistors: £4 ea. LCR-740 bridge: £150. All VGC. Buyers collect except transistors. G3ZYL (Launceston) 01566 862463.

QRT sale: FT757GX: £500. AT230 ATU: £100. Revex W520 SWR/PWR meter: £25. Revex P300 30A 13.8V power supply: £75. Paddle Key: £10. Brass straight key: £15. Many other items. Buyer collects or postage extra. Cliff, GW3CGT (Anglesey) 01248 430759.

R-2000 Kenwood Rx, VHF unit, exInt clean condx, regret no manual. £450 incl carr. GM4AXS (Oban) 01631 71442.

RACAL 17. This particular Rx is in exInt working order and is much more sensitive than the usual L model, good cosmetic condx, could demonstrate or deliver: £120. John, G0LXY (Oxford) 01295 721511.

RACAL RA17 Rx, working complete with cct: £55. No offers. Pye 70cm sig generator, incl internal nicads, portable piece of FM test gear: £50. No Offers. Roger, GW3XJC (Maesteg, Mid Glam) 01656 733729.

RACAL RA17, excellent condx in steel cabinet: £175. Includes full set of spare valves and manual. Francis (Southampton) 01703 845295.

RECEIVER modules 12V 25mA 0.5uV for 10dB s+n:n 2xBF981, MC3359 IC 10.7MHz xtal filter, 455KHz mechanical filter. Complete but failed manufacturers testing. With data and cct diags. 173MHz convertible to 2m. Several available £5 each + 50 p&p. G8ZGK QTHR (High Wycombe) 01494 448030.

REDIFON 551N solid state HF Rx, overhauled and working well with its legendary stability: £195. Could deliver. John, G0LXY (Oxford) 01295 721511.

SHACK Clearout. Sommerkamp FRDX500, ham bands plus 2m all mode. Standard C58 2m multimode. Heatherlite mobile mic. Microwave Modules MML 144/25. Heathkit 2m 10W amp AVO M2005, hard case + leads. High intensity bench lamp. Spectrum ZX computer with basic games. Everything must go. No reasonable offer refused. P&P extra. Bill, G4WUS (Guisborough) 01287 642596 (after 6pm).

SILENT Key sale - G3VIL. Kenwood TS120S 100W SSB/CW tcvr, PSU, mic, key, mint condx, manual: £450ono. Rob, G2BKZ (Stevenage) 01438 721418.

SILENT Key sale. Icom IC725 HF tcvr: £420. Icom R7000 Rx (SSB/FM/FM-N/AM) incl TV-FM Adpt: £500. Icom IC R71 Communication Rx plus IC EX257 FM unit fitted: £500. All items bxd, C/W instructions, VGC. Buyers collect or P&P extra. G4UYI QTHR (Workington) 01900 67226.

SILENT Key sale. Kenwood FM241E 144MHz tcvr, 50W: £225. Yaesu FP700 12V PSU: £110. Both 12 months old. Yaesu FT102, FM board: £450. SP102 spkr: £60. ERA microreader: £125. All with handbks, all ono. SAE for list. Arthur, G3KKC QTHR (Littleport, Cambs) 01353 860214.

SILENT Key sale. Yaesu FT901DM, spare PAs, Adonis desk mic and Morse key. All for £375ono. AOR1000 VHF/UHF h/held scanner: £175ono. KAM all mode: £175ono. Buyer inspects and collects or pays carr. (Chippenham) 01249 651471 (early eve please).

SSTV Robot 400 homebrew: £135. SSTV colour Rx G3WCY: £85. Hygain TH3 Mk 3, 3-ele beam: £140. Printer Mannesman Tally 85 :£60. (Ruislip) 01895 677017.

STANDARD C528 VHF/UHF tcvr, leather case, mic, two nicad battery pack, owners manual, VGC but no chrgr: £240 with CTCSS. (London) 0171 586 1337.

STRUMECH 40ft versatower tiltover, needs ropes, pulleys, hence £275. Tokyo Hi-Power antenna coupler HC400L: £100. John, G0HIC QTHR (Nr Bath) 01373 812024.

STRUMECH E45 versatower de-telescoped, height 22ft, large winch less ground post: £275. Hygain TH3JRS Thunderbird Junior with BN86 balun: £135. Buyer must view and collect. (Ipswich) 01473 735736.

TAIT 70cm 100ch mobile ex-PMR 25W: £60. Baycom USCC 4-port DRSI card 2xVHF/1200 1x9600 1xRS232: £160. Fairmate HP-200E 1000ch scanner 0.5-1300MHz h/held, bxd, with all orig accessories: £200. Atari Portfolio h/held PC 8088: £60. (Gateshead) 0191 4691906.

TEKTRONIX dual beam oscilloscope 2215, 60MHz bandwidth, recently overhauled and recalibrated and in exInt condx. Incl unused probes X1X10. Ideal gen purpose scope from audio to HF, with outstanding synchronisation. Any examination or test welcomed: £295ono. G0OWO (Harrow) 0181 904 6171.

TELEQUIPMENT dual beam oscilloscopes D43 D52 D53: £20 ea. Philips video recorders N1700/15 plus box of tapes: £15. Buyer collects. Offers Eddystone 898 Dial Hartley Scope for spares or repair. Duncan (Worcester) 01905 821545.

TEST equipment sale. Clearance includes TF2372 110MHz spectrum analyser, HP 141T 1200MHz analyser. Racal, HiP and Marconi signal gens, radiometer modulation meters, Tektronix, advance scopes, counters etc. Racal RA17 Marconi VLF Rx, many more. List available (Berks) 01344 27869.

TH25E 5W 2m FM h/held + accessories: £220. PACCOMM PC-320 HF/VHF TNC (PC card): £100. DRSI type 2 PC TNC (2x1200): £100. PACCOMM Tiny-2 with RTC (no manual): £90. THAN DAR TG101 function generator: £60. Kenwood HC-10 world clock: £20. BC221 original charts, mains: £25. Z88, Atari Portfolio portables/accessories. Please enquire Al, G4CVZ (Merseyside) 0151 482 0335.

TIMEWAVE DSP-9, 3 months old, bxd, with diags and instructions. Bargain: £115. G3XKF (Aylesbury) 01296 614128.

TINY-2 TNC, excl for VHF packet. Selling to up-grade to an HF/VHF TNC from same manufacturer: £100 with software. Malcolm, G4TJK (Hook, Hants).

TOWER/Mast, three section, 40ft plus 20ft top section (bent), cut ground post: £150ono. G6GSF not QTHR (Horley) 01293 775278.

TR751E 2m m/mode, bxd, mint: £475. TS530SP, bxd, recent Lowe service: £475. Kenwood ART230 ATU, bxd, mint: £150. S/master: £45. Star LC10 printer with i/face: £70. Commodore 1541 disk drive + mouse: £70. 3 of Commodore 64C with data cassettes: £40 each, all ovno. (Darlington) 01325 480280.

TRIO 9130 plus BO-9A base and Vogad mic :£350. SWR bridges 427H: £25. T3-170: £15. Datong filter PL2: £25. FET/DIP oscillator: £25. Moving QTH (Sutton-in-Ashfield) 01623 552319.

TRIO/KENWOOD TS520S HF tcvr, CW filter fitted plus TS520 VFO and mic, gd condx, collect or carr extra: £300. (Clacton-on-Sea) 01255 431221.

TS130V, complete station with TL120 linear, Manson EP925 PU. Securicor carr UK: £550 (Letters only). TS130V. Both filters and new bands 10,18,24. Exlnt condx. Work VK, regular contact. First cheque secures. J Gray, Norland, Stromness, Orkney KW16 3DJ.

TS430S AT230 PS30 plus many extras in first class condx: £700 lot. Inspect collect. G4POE QTHR (Leek) 01538 381308.

TS430S, best offer above £330 wins. One unimportant G/C Rx fault. VGWO amateur bands. Buyer collects. G3JKX QTHR (Telford) 01952 299677.

TS530S filters MC50: £400. FT290R: £200. IC2E h/held: £100. Sony Rx ICF2001: £80. 10m FM conversion PSU ATU. All good condx. G4RNN (Marlow) 01628 486497.

TS830S Remote VFO240, hand mic, service manual and spare PA valves, exInt condx: £525. GM3XOQ (Shetland) 01950 422354.

TS850S Fitted 500Hz filter, little used: £1100ono. TenTec Omni V, fully filtered, mint condx: £1250. TenTec matching PSU: £120. TL922 linear amp, also little used, recently serviced: £925ono. First instance G0JSM (Preston) tel/fax 01772 622009.

WEATHER Satellite Receiver Timester proscan incl antenna, s/ware, card. Live display, false colour. Cost £317 new. Offers. Mike, G3HKH QTHR (Weybridge) 01932 847112.

YAESU FT-101E, narrow CW filter, WARC bands, remote VFO, spkr: £280ovno. FRG-1 GC Rx, with FM and other mods: £90ovno. FT-230 2m Tx/Rx, dual VFO, 5/25W, superb audio, with fist mic. Ideal first 2m rig: £130ovno. All with h/books. G0OPL (Telford) 01952 494251.

YAESU FT-840 plus matching auto-ATU (FC-10): £750. Separate trcvr: £650. Martelec JVFAX interface: £55. Malcolm, G4TJK (Hook, Hants) 01256 766558.

YAESU FT101E with mic and handbk, VGC: £275. RS 555-279 UV exposure unit with dishes, boards, drawing film, developer, ferric chloride etc. All brand new: £75. G4GXK (Saltash) 01752 847705.

YAESU FT102 AM/FM fitted narrow CW filter, Daiwa auto ATU CNA 2002, Datong UC-1UP cnvrtr: £600 the lot. (Loanhead) 0131 440 0785 (eves).

YAESU FT102 FC102 FV102DM SP102: £800. FT726R 2m 70cm 6m Sat bd: £650. P30 tower: £300. Triband beam 2kW rotator: £125. 2m Yaesu h/held: £80. QRT sale. The lot for £1800. G4URG QTHR (Oldham) 0161 6651377 (eves).

YAESU FT102, FM/AM unit, CW filter, mainly Rx use, bxd, service h/book, diags, v good condx. Now QRP, only: £385. JVC camera/VCR video colour corrector, noise filter, detail enhancer, stereo mixer with mic input, as new condx: £110 inc P&P. (Kenilworth) 01926 56384.

YAESU FT225RD 2m m/mode tcvr, VGC, bxd: £450ovno. Buyer collects. G7PZR QTHR (Felixstowe) 01394 282768.

YAESU FT707, exInt condx: £350. Icom IC290D 144MHz 25W m/mode: £225. DRAE 24Amp PSU: £75. TC 220 HF/VHF TNC: £75. Jaybeam TB2 2ele Triband Yagi, gd condx: £150. 3ele triband yagi, scruffy but OK: £50. Sommerkamp FL1000 HF amplifier, OK but needs new valves: £150. 2m homebrew valve amp 100W with preamp: £100. 2m collinear: £50. LCD multimeter: £15. No offers. Bob, G4UJS (Shropshire) 01948 880392.

YAESU Separates FR101 FL101, seen very little use, spare PA valves: £250. Tona communication terminal: £275. Offers. (Welwyn Garden City) 01707 325257.

WANTED

ALL EARLY wireless and television items, xtal sets, Rx, Tx, Horn spkrs, pre-1925 valves, early Hi-fi, pre-war TV, Spy Sets, any clandestine eqpt. Early radio, television books. Pay cash and collect. G4ERU, 5 Luther Road, Winton, Bournemouth, Dorset BH9 1LH. 01202 510400

ANY EARLY 1950's ARRL International Call Books, for a collation of obsolete callsigns. Top prices paid by researcher. RS95170, 23 Gladeside Court, Succombs Hill, Warlingham, Surrey CR6 9JG. 01883 625298.

AP1086 Issue 1 (RAF Radio Stores Ref Nos). Also air publications relating to radio, radar equipment and AP1186A, AP1186B, AP1186D, AP1186E. Excellent price offered. Would purchase post-war to current magnetrons, klystrons, T/R cells, photo-multipliers, thyratrons, ignitrons, planar-ceramic, microwave and special CV types. Required RX Type R1355 10D/13032 unmodified. Also R3002-3, R3120, ABK-ABK1 IFF units and control unit Type 17/18. (London) 0171 511 4786. Phone or fax anytime.

DAIWA Rotator MR750, complete or four separate motors. Your price within reason paid. Phone or write G3DYY QTHR (Nr Huntingdon) 01487 841558.

QUAD, Leak, Radford etc Valve Hi-Fi equipment, working or not. Will pay cash and collect. (Chelmsford) 01245 381961.

QUAD, Leak, Radford, etc Valve Hi-fi equipment, working or not. Will pay cash and collect. (Chelmsford) 01245 381961.

VHF Full-Duplex PMR units with duplexers, anything considered in dead or alive condx. Philip, G4ZOW (Potters Bar) tel / fax: 01707 660760.

YAESU FT5100/Icom IC3220H or similar dual band mobile tcvr in dead or alive condx. Philip, G4ZOW (Potters Bar) Tel/fax 01707 660760.

23CM YAGI. 23cm ATV Rx. D2MAC decoder. Multimode TNC. (Norfolk) 01328 710641.

AMSTRAD DNP4000 dot matrix printer operating manual. (Tiverton) 01884 252259.

ANODE Current meter for KW600 linear, prefer working but repairable accepted. G3IZM QTHR (Bristol) 0272 572176.

CIRCUIT Diagram and technical information for Octal Valve type National HRO (ex-WD HF reception set R106 Mk2). G7RGI QTHR (Crewkerne) 01308 868598.

COLLINS 180S-1 antenna tuner, Heath grid dip meter GD1 with coils. (Nr Brighton) 01273 887821.

COLLINS Linear 30L1, must be in VGC. Collins 55GI tuner for 51S1 Rx. G3GBB (Suffolk) 01379 783657 (home) 01284 753049 (work).

CRYSTALS - 1.4MHz for xtal filter. Butternut vertical 6 or 9 band with/without top band coil. G4EHT QTHR (Lichfield) 01543 251133.

DATONG cnvrtr UC1, any information on Timestep Frequency Meter (digital dial) DFC41 and Zetagi Frequency Counter C50. (Worcester) 01905 641759.

DATONG FL3 audio filter. G3RZF QTHR (Slough) 0171 320 1764 or 01753 537673.

DENCO IF trnsfrmrs IFT 11-465. Neosid or Aladdin formers/cans. Abandoned, failed or just old valve projects, especially G2DAF. Complete or otherwise, or individual components. 1.5" cord drive pulleys. Write or phone G3WCE QTHR (Norwich) 01603 250910.

MEMBERS' ADS

DRAKE MN-4C ATU in gd condx. G3XYD QTHR (Poole) 01202 671562.

EDDYSTONE 830/7 Rx sought, must be really good. Also McCoy Golden Guardian SSB filter. Q mult. for KW201. Please advise G3CUN (Birmingham) 0121 474 4856.

EDDYSTONE EC10, 960, EB35, EB37, 888A, diecast spkrs, Clarke and Smith, war-time civilian, for cash. Collection possible. Lepino (Leatherhead) 01374 128170.

FOR SCHOOL club station educational project. Multimode or separates FT726/IC211 IC245 IC251A IC271A TS700 series or similar. Any condx. Fair price. Also req'd S/H books, magazines. (Essex) 0181 505 7207.

FP757GX switch mode power supply for FT757GXII, no mods please. Ted, G4TLY QTHR (Malmesbury) 01666 822935.

FT101ZD with FM. Pref London area. QTHR Nr Heathrow G3IUL (Bedfont, Middx) 0181 890 7091.

FT70G in gd working order. Bob, G3WWF, QTHR (Leeds) 0113 2825519.

HEWLETT Packard distortion measurement set 339A in clean condx with all controls unbroken. John Akam, G8BIH (Gloucester) 01452 830018. (any time).

ICOM BP2 battery packs and base chrgr. Cases must be good but electronics irrelevant. G4BJN (Hemel Hempstead) 01442 241281.

ICOM IC-202 2m SSB tcvr or similar. GM7TMT (Kirkwall, Orkney) 01856 873920 (after 6pm).

ICOM IC1271E 23cm tcvr (multimode). (Devizes) 01380 725075.

KENWOOD S520 spkr DG5 d/display. Pete, G0THA QTHR (Rye) 01797 223262.

KENWOOD TR7800 2m FM tcvr 5/25W with mobile bracket and mic. Cash waiting. Suzanne, GW7SWI (Cardiff) 01222 598084.

MANUAL Cct R551N, buy or borrow. G3ICB QTHR (Thatcham) 010635 873133 010635 864345 Fax 010635 872762.

ORIGINAL loudspkr for RCA 88D Rx. 21 Mechanics Lane, Pentre, Deeside, Clwyd CH5 2AB. 01244 810547.

PAIR of EIMAC SK620 valve bases for K2RIW amplifier. Club project for De Montfort University ARS. Your abandoned project considered. (Leicester) 0145 555 2648.

QUAD aerial for 144MHz. Also help re G8GIW synth FM Tx/Rx (WW design 1977). Nigel, G4OPB (Ipswich) 01473 626415.

RACAL MA350B synthesizer in GWO. Racal MA79H drive unit in GWO. Racal RA137/237 LF adaptor in GWO. Racal MA89, 90, 91 and 92 test jigs. Rob (Scarborough) 01723 581472.

RACAL RA37, 137 or 237 LF adaptors. RA63 or RA218 SSB adaptors. MA197 B/C preselector. Rob, G0HJR (Scarborough) 01723 581472.

SONY PRO80 wanted FRQ-80 frequency cnvrtr for VHF coverage, also any accessories. Wanted a good home for an Ampex model 1100 reel-to-reel audio tape recorder. Call Peter (North London) 0181 802 2140 anytime.

TAIT T375 VHF base Rx module, tower sections to make 100ft tower. Can collect. Laptop PC IBM compatible. (March, Cambs) 01354 741168.

TS VFO230 external VFO for TS830S. G0UFI QTHR (Thirsk) 0176 564229.

TS50, also FT726 and SM220 monitor station. All must be ex condx. (Dudley) 01384 236611.

VALVES: DA-30, DA-60, DA-100, STC4300A/B, 4212E, 4242A, 4274A, PX-4, PX-25, DO-26, P27-500, PP4-250, PP4-500, EL-34, KT-66. H Jakobi, Cambridge House, Cherry Lane, Bolney, W Sussex RH17-5PR, 01444-881184 (before 7pm).

WANTED Alive or Dead - prefer alive Icom IC240 2m tcvr. G3LRM QTHR (Cheltenham) 01242 674027.

WAVECOM W-4010 data decoder. Morris (Bolton) 01204 840629.

YAESU 726R with Sat Board. Would prefer fully banded. Also Microwave Modules MML144/100S 2m linear preamp. Cash waiting. Terry (Wirral) 0151 608 0794.

EXCHANGE

HAVE MK119 Tx Unit in diecast case, also B2 Tx with coils. Looking for Mk 123 set or WHY. G3JQL QTHR (Durham) 0191 3861116.

YAESU FT980, gd condx, for Yaesu FT726/736, cash adjustment +/- or quality photo gear 6x6cm Hassleblad etc. John, G4MXU (High Wycombe) 01494 520639.

Kent keyer built PCB + instructions, needs box: £20. Minimitter 10-80 converter 4-6IF: £30. Novice Antenna Notebook W1FB: £3. G0KTN QTHR (Melksham) 01225 703726.

EVENTS DIARY

CLUB NEWS

DEADLINE - Items for inclusion in the June 1995 issue must be sent to HQ marked "Club News - DIARY", to be received by 28 April 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 - ***NEW SECRETARY***. David Treasure, G4ZBT, QTHR, tel: 01272 654886. Club meets every Thursday.

SOUTH BRISTOL ARC - 5, The 'Matthew' J Cabot 500th anniversary exhibition; 12, Club quiz night; 19, Lundy Group report; 26, Talk 'History of WD and HO Wills' by Fred, G7LPP. Details 01275 834282. (24hr Answerphone).

BEDFORDSHIRE

SHEFFORD & DARS - 6, Spring junk sale; 20, Tour of Shefford Fire Station; May 4, Talk 'Four Metres Portable' by Bryan, G8EIK. Details 01462 700618.

BERKSHIRE

BRACKNELL ARC - 12, Amateur Radio software. Details 01344 420577.

NEWBURY & DARS - 26, Annual General Meeting; 30, Special events station. Scouts at Northcroft. Details 01635 863310.

BUCKINGHAMSHIRE

AYLESBURY VALE RS - 5, Used equipment sale. Details 01296 437720.

MAIDENHEAD & DARC - 6, Talk 'HF prediction' by Ray, G3LTP; 18, Talk, 'Proposal for 6m repeater' by Jim, G6JIM; May 4, ARDF RX construction. Details 01628 486554.

CENTRAL

CENTRAL SCOTLAND FM GROUP - 23, Annual General Meeting. Details 01560 482720.

CHESHIRE

CHESTER & DARS - 11, Talk 'Continuation of 73 Years of Radio' by Dave, G2FVA; 18, Talk 'Support Structures' by Dave, G6IFA; 25, Talk 'Law and the Radio Amateur' by Jonathon Malitt, G0KCT; May 9, 'FAX' by Mike Tyrrell, G6GAK. Details 051 608 3229.

MID-CHESHIRE ARS - 3, Committee meeting; 5, Construction night; 12, Talk 'The Mary Rose part II' by Ken, G0VFL. Details 01606 592207.

DERBYSHIRE

BUXTON RA -11, Focus discussion with Brendan, G1OHD. Details 01298 25506.

DERBY & DARC - 5, Junk sale. Details 01773 856904.

DEVON

SOUTH DEVON RC - 4, 144MHz SSB contest; 12, 144MHz SSB contest; 19, Contest planning; 20, 144MHz SSB contest; 26, Club rigs on air & avionics by Bill, G62RM. Details 01803 522995.

TORBAY ARS - 21, Talk 'Trains etc' by Peter, G4VFG. Details 0803 526762.

DORSET

AXE VALE ARC - 7, Talk 'Antennas' by G3GC. Details 01297 445518.

FLIGHT REFUELLING ARS - 2, Talk 'The Trans-Siberian Railway' by G4VCQ; 9, Safety in the shack; 16, Members' discussion night; 23, Marconi lecture by G4POF; 30, Construction contest. Details 01425 653404.

EAST SUSSEX

HASTINGS E & RC - 19, Spring auction of equipment. Details 01424 830454.

SOUTHDOWN ARS - 3, 'Bring your own thing' (members' contributions). Details 01825 763022.

ESSEX

BRAINTREE & DARS - 3, Construction contest. Details 01376 327431.

CHELMSFORD ARS - 4, Talk 'A Gallimaufry of Amateur Radio Devices and Experiences' by Geoff, G3EDM. Details 01245 256654.

COLCHESTER RA - 6, Talk 'Harnessing Solar Energy' by Mike, G4GGC. Details 01206 383510.

DENGIE HUNDRED ARS - 3, RNLI. Details 01621 776237.

VANGE ARS - 6, Junk sale; 13, Easter buffet; 27, Wartime radio equipment. Details 0268 552606.

GLOUCESTERSHIRE

GLOUCESTER ARS - 5, Talk 'British Steel Round the World Yacht Race' by Nuclear Electric; 30, Club lunch; May 3, QRP by G4CIB. Details 01452 421510.

GREATER LONDON

ACTON, BRENTFORD & CHISWICK RC - ***NEW SECRETARY***. W G Dwyer, G3GEH; 18, 'Design & Construction' by G8CYE. Details 0181 992 3778.

BROMLEY & DARS - 18, Talk 'First Aid' by David Milne, G6VMI. Details 0181 777 0420.

COULSDON ATS - 10, Talk 'Portable Military Radio from 1930 to 1950' by Brian Cannon, G8DI. Details 0181 684 0610.

CRAY VALLEY RADIO SOCIETY - 6, Talk 'Local Area Networks' by Tony G4WIF; 20, Annual General Meeting; May 4, talk 'EMC' by Robin Page Jones, G3JWI. Details 0171 739 5057.

CRYSTAL PALACE & DRC - 15, Talk 'Backyard Antennas' by George, G3DWW. Details 0181 699 5732 or 01737 552170.

DARENTH VALLEY - 12, Printed circuit board preparation; 26, Junk sale. Details 01689 826846.

ECHELFORD ARS - 13, Annual General Meeting. Details 01784 456486.

GRAFTON RS - 12, On air with 2m and CW Instruction; 26, Talk 'The Secret War' by George, G0OXH. Details 0171 272 2328.

SOUTHGATE ARC - 13, Grand surplus equipment sale; May 11, Talk 'Meanwhile, What Were the Germans Doing?' by Marconi historian Stan Woods. Details 0181 360 2453.

SURREY RCC - 3, Annual General meeting; May 1, Construction contest. Details 0181 660 7517.

WHITTON AMATEUR RADIO GROUP - 14, Annual General Meeting. Details 0181 995 6553.

WIMBLEDON & DARS - 28, Talk 'Come Fly With Me' by G0AWQ. Details 0737 351313.

GREATER MANCHESTER

ECCLES & DARS - 4, Discussion 'HF NFD contest'; May 2, Talk 'When and how to use valves' by G8VF. Details 0161 773 7899.

OLDHAM ARC - Meets 8pm on Thursdays. Details Nick, G0ULA, 0161 627 1639.

SOUTH MANCHESTER RC - 7, Talk 'Around the World' by G3SHW; 14, Club closed; 21, Digital sound for TV; 28, Indoor DF. Details 061 969 1964.

GWYNEDD

DRAGON ARC - 3, Surplus equipment sale; 22, International Marconi Day. Details 01248 600963.

HAMPSHIRE

BASINGSTOKE ARC - 3, Constructors competition; May 1, Training and practice for the 1995 VHF Field Day. Details 01256 25517.

HORNDEAN & DARC - 25, Brains Trust meeting. Details 01705 472846.

ITCHEN VALLEY ARC - 28, Talk by a member of the Institute of Advanced Motorists (IAM). Details 01703 732997.

WATERSIDE ARS - 25, Annual General Meeting. Details 01703 783170.

HEREFORD AND WORCESTER

BROMSGROVE ARS - 25, Antennas/Baluns/Chokes; May 9, AGM. Details 01527 542266.

DROITWICH ARC - 4, Talk 'Aerials, baluns and SWR' by Dave Yates; May 2, Surplus sale

MALVERN HILLS RAC - 11, Club quiz. Details 01684 560490.

VALE OF EVESHAM RAC - 6, Demonstration 'Make Your Own PCBS'; May 4, Meeting at MEB Training Centre. Details 01386 41508.

HERTFORDSHIRE

CHESHUNT & DARC - 5, Talk by the chairman, G3TIK; 19, DX cluster with David Evans, G3OUF. Details 01992 464795.

DACORUM ARTS - 4, Annual General Meeting. Details 0582 766973 (eves) 0956 344574 (daytime).

HARPENDEN ARC - 6, Packet radio evening with Ken, G3MSW; May 4, Abbey Tower with Peter, 2E1BDB. Details 01707 372044.

HODDESDON RC - 13, Meet RSGB President Clive Trotman, GW4YKL; 27, Talk 'Orchids of the World' by Frank, G0KUO. Details 081 245 8119.

STEVENAGE & DARS - 11, Talk 'Computers and Amateur Radio - the Applications' by Tony, G7JAW. Details 0438 724509.

VERULAM ARC - 25, Talk 'Radio Publications' by Dick Ganderton, G8VFH. Details 01923 262180.

HUMBERSIDE

GOOLE R & ES - 7, Discussion on contest antennas; 14, Talk, 'Topical Tv' by Steve, G8VHL; May 12, Talk 'Six Metres' by Colin, G0SWL.

GRIMSBY ARS - 6, Packet radio club AGM; 13, Table top sale and raffle evening; 27, Talk on 'Satellites' by Dave, G0IIQ; May 11, Talk 'DF techniques' by Adrian, G1BRB. Details 01472 825899.

HORNSEA ARC - 5, Talk 'Truck driving abroad' by G1IKT; 12, Talk 'Ramblings of a G3' by G3TLI; 19, Talk 'Colour processing' by G0VNH; May 3, QRP G0DEB; 'Desert island disks?' with G4IGY and G4YTV. Details 01964 562258.

KENT

MAIDSTONE YMCA ARS - 7, RAE Morse tuition; 14, Antenna maintenance etc with GX3YSC; 21, RAE Morse tuition; 28, Rally meeting; May 5, RAE Morse tuition. Details 01622 832259.

SEVENOAKS & DARS - 24, Talk 'Packet Radio' by Peter Burton. Details 0181 304 3950.

LANCASHIRE

THORNTON CLEVELEYS ARS - 3, Talk 'Antennas With Drawing Pins' by Roy, G0TAK; 10, Talk 'Aerodrome Traffic Information Service' by Mick, G4EZM; 24, A short talk by Fred, G4HWK.

LEICESTERSHIRE

LOUGHBOROUGH & DARC - 11, First DF of 95, 2m; 18 Talk by G0LCU; 25, Visit to Wymswold. Details 01509 231289.

LINCOLNSHIRE

LINCOLN SHORT WAVE CLUB - 12, Junk sale; May 10, AGM. Details 01427 788356.

LOTHIAN

LOTHIANS RS - 12, 'TVI and how to cure it' with the Radio Communication Agency; 26, Talk 'The Stockton Power Meter' with David Stockton; May 10, DF hunt receiver tune-up. Details 031 337 7311 (eves) or 031 343 5423 (daytime).

MERSEYSIDE

LIVERPOOL & DARS - 4, Quiz; 25, Surplus sale. Details 0151 722 1178.

WIRRAL ARS - 5, Talk 'Introduction to ATV' by G4ZQP; 19, DF Demonstration. Details 0151 644 6094.

WIRRAL & DARS - 5, Ten-pin bowling (names to Ron, G3HFA); 12, The great egg race; May 10, demonstration of Massage and reflexology. Details 0151 606 8989.

MID-GLAMORGAN

MID-GLAMORGAN ARG - 6, Talk 'Amateur Television'. Details 01656 733729 or 0656 736954.

NORFOLK

NORFOLK ARC - 5, Annual General Meeting; 19 Talk 'Commercial Broadcast TV Cameras' with Ian, G4FOS; 23, Surplus equipment sale; May 3, GB3NB Repeater Group AGM. Details 01603 789792.

YARMOUTH RADIO CLUB - 13, Used equipment sale; May 4, Mechanical TV G3OEP. Details 0493 721173.

NOTTINGHAMSHIRE

ARC of NOTTINGHAM - 6, Annual General Meeting; 20, Fox hunt; 27, Construction night; May 11, ARCON junk sale. Details 0115 950 1733.

SOUTH NOTTINGHAM ARC - 7, Junk auction with Julian, G0LXX; 14, Talk 'The SNARC Organisation for Peak 95' by Julie, G0SOU; 28, Construction at Fairham College. Details 01509 672734.

OXFORDSHIRE

VALE OF WHITE HORSE ARS - 4, The club meets the first Tuesday of every month at The Fox, Steventon. Details 01235 531559.

SHROPSHIRE

SALOP ARS - 6, Construction competition; 20, Fox Hunt with Tony, G0RVE as fox; 27, RAE tuition; May 4, Junk sale; 11, Telford Rally Group night. Details G7SBD QTHR or @ GB7PMB.

TELFORD & DARS - 12, Talk by Brian, G6UDX; 19, G3JKX Operating from V85 Land; 26, 'The ISWL' by Jim, G0IZI and Evelyn, G1GWG; May 3, Equipment night & G3ZME. Details 01952 588878.

SOMERSET

TAUNTON & DARC - 7, Talk 'Electrical Safety' by Mike Cockram, SWEB; 21, Practical ham workshop with Graham, G0GTR. Details 0823 680778.

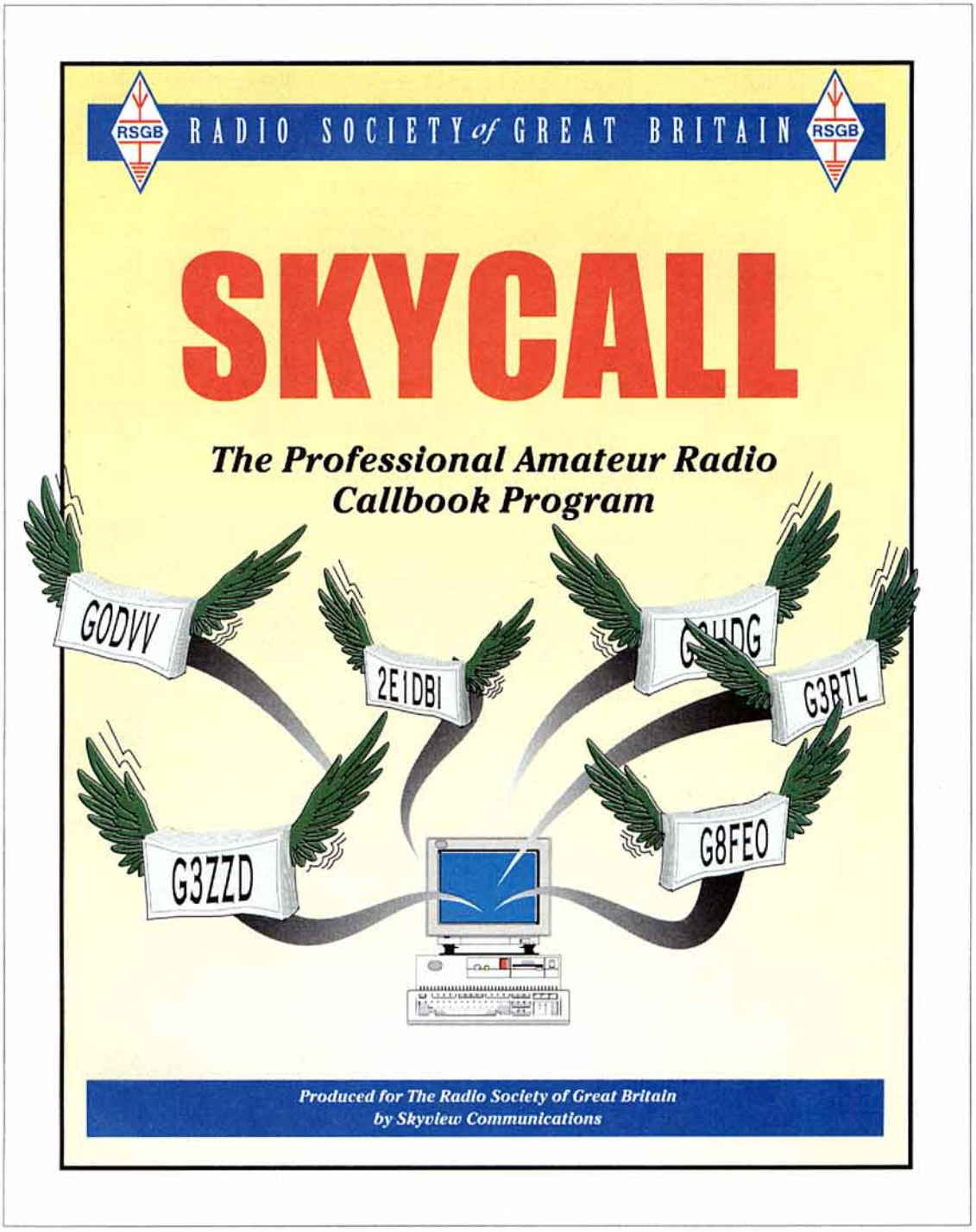
CONGRATULATIONS

To the following who our records show as having reached fifty years continuous RSGB membership this month:

Mr G F Weller, G3DNJ
Mr R T Laing, G3TXT

RSGB CALLBOOK ON DISK

NEW!



Members' Price: £19.80

(See page 45 for full description)

Minimum system requirements: IBM compatible 386, 4Mb RAM, 8Mb spare hard disk space.
Skycall runs under Microsoft Windows 3.1 (not supplied).

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Quad Antenna Handbook	(ARRL)	£11.99	£10.19
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K1BV DX Awards Directory	(K1BV)	£17.06	£14.50
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NEW!

THE RSGB PREFIX GUIDE

FOR MANY YEARS until his death last year, Geoff Watts produced his *Prefix - Country - Zone List* which was the definitive guide to identifying those tricky callsigns so often used by special event and contest stations, not to mention the new countries that pop up from time to time.

Now the RSGB has taken on this task and has produced the *RSGB Prefix Guide*, which will be regularly reprinted to ensure that it contains the very latest information.

25/26 MARCH
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EVENTS DIARY

SOUTH GLAMORGAN

CARDIFF RSGB GROUP - 10, 'Quartz Crystals' by Jim, GW3ISJ. Details 01222 810368.

SOUTH YORKSHIRE

SHEFFIELD ARC - 3, Visit to new Hallam FM studios (maximum of 10 people); 10, Quiz in preparation for the interclub competition; 17, Club closed; 24, Lessons for N & RAE students. Details 0114 244 6282 or G0JJR @ GB7CWS.

SUFFOLK

SUDBURY & DRA - 4, Talk and demonstration on antennas by Frank, G3FIJ; May 2, Talk 'Starting in contesting' by Alan, G0EGX. Details 01787 313212 (before 10pm).

SURREY

ECHELFORD ARS - 13, Annual General Meeting. Details 01344 843472.

TAYSIDE

DUNDEE ARC Club - 4,11, College closed; 18, Local commercial radio; 25, Construction evening. Details Allan, GM7ONJ, QTHR.

TYNE & WEAR

TYNEMOUTH ARC - meets every Friday at Linskill Centre (former High School), Linskill Terrace, North Shields from 7.00 to 9.00pm. Talks, activities, Morse etc. Warm welcome to new members. 7, Talk 'Impedance Matching' by G0TAP. Details Derek, G0TAP 0191 2577819.

WARWICKSHIRE

COVENTRY ARS - 7, Proposed visit to PO Sorting Office; 14, Night on the Air - theme; Packet; 21, Amateur radio video evening; 28, Night on the Air - theme: VHF/UHF/TV.

MID WARWICKSHIRE ARS - 11, Talk 'EMC' by Dr A J Pratt. Details 01926 424465.

STRATFORD Upon AVON & DARS - 10, Annual General Meeting; 24, Visit to BBC Sutton Coldfield; May 8, Digital broadcasting. Details 01789 740073.

WEST GLAMORGAN

SWANSEA ARS - 20, Final details for Swansea Rally. Details 01792 403527.

WEST MIDLANDS

STOURBRIDGE & DARS - 24, 'ATV' by Andrew, G8MKK. Details G7HEZ @ GB7PZT or 01384 374354.

WEST SUSSEX

CHICHESTER & DARC - 4, Annual General Meeting. Details 01243 573541.

HORSHAM ARC - 6, Talk 'World War II Sites in Sussex' by Peter Longstaff Tyrell. Details 081 686 5701 (daytime) or 0403 275525 (eves).

WORTHING & DARC - 5, Portsmouth Dockyard; 12, Club dinner; 19, Spanish QSOs; 26, Transistor radio history; May 3, Discussion evening; 10, G8DHE amateur television.

WEST YORKSHIRE

DENBY DALE & DARS - 5, Talk 'Diving' by Barry, G4TML and Frank, G1FBC; 19, Talk 'Parachute mobile' by Roy, G4CMT; May 3, Talk 'Simple ATV 10 GHz' by John, G6GSV; 14, Drayton Manor rally coach trip. Details 01484 547553.

HALIFAX & DARS - Talk 'Low Power Morse Communications' by John, G0BXO. Details 01422 202306.

KEIGHLEY ARS - 13, Visit to Gooseye Brewery; 27, Junk sale; May 11, Fox hunt. Details 01274 496222.

PONTEFRACT & DARS - 6, Rally wind up; 13, Discussion on special event stations and contests; May 4, Mystery talk by Bill, G4ZVB. Details 01977 677006.

WILTSHIRE

TROWBRIDGE & DARC - 5, Talk and demonstration provided by Severnside TV Group. Details 01225 864698 (evenings).

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'.

2 APRIL

FELTHAM AND HOUNSLOW SEA CADETS Computer and Radio Rally - Feltham & Hounslow Sea Cadet Corps, 2 Poplar Way, Feltham, Middx TW13 7AB. Doors open 10am. Entrance fee £1, children under 14 years accompanied by an adult free. Stall bookings and enquires talk-in on S22 and 1933MHs Allan, G49JU. Tel 01794 456486.<

9 APRIL

LAUNCESTON 9th Amateur Radio Rally - Launceston College. Doors open 10.30am. Event features trade stands, RSGB bookstall and a bring and buy stand. RSGB Morse tests available on demand, remember to bring two passport size photos and the relevant fee. Hot snacks from 7am. Talk-in on S22. Ample parking. Details Roy, G0IKC on 01409 221624 or Rodney, G8HDW on 01566 775167.

WHITE ROSE Rally - ***NEW VENUE*** Leeds University. Morse test available on demand, subject to two passport size photos and the necessary fee. Details Allen, G7ELS PO Box 73, Leeds LS1 5AR or tel 0973 189276.

14-17 APRIL

AMATEUR RADIO CARAVAN & CAMPING CLUB Rally - Amerton, Staffs. Details G4LWA QTHR, tel: 01494 531755.

15 APRIL

THE ALL MICRO SHOW Radio Rally & Electronics Fair - Bingley Hall, Staffordshire County Showground, Weston Road, Stafford, Signposted Junction 14 on M6. Open 10am until 4pm. Admission £2.50 adult, 50p children under 14, concessions OAPs, RSGB members, student card and UB40. Details 01473 272002.

16 APRIL

CAMBRIDGESHIRE Repeater Group Amateur Radio Rally - Philips Telecom - Catering Centre, St Andrews Road, Chesterton, Cambridge. Doors open 10.30am. Event features trade stalls and a bring and buy. Ample parking space. Details Darren, G1ERM on 01223 60601 evenings.

22 APRIL

INTERNATIONAL MARCONI DAY Special Exhibition Station at the Wireless Museum, Puckpool Park, Seaview, Isle of Wight. Details Douglas, G3KPO 01983 567665.

INTERNATIONAL MARCONI DAY H/Q - Details Norman, G4USB 01209 212314.

RSGB HQ OPEN DAY - See this month's News & Reports page.

23 APRIL

BURY RS Annual Rally - the Castle Leisure Centre, Bolton Street, Bury. Doors open 11am, 10.30 for disabled visitors. Bring and buy. Bar and refreshments available. Talk-in on S22. Details G4KLT, 0161 762 9308.

LOUGH ERNE ARC 14th Mobile Rally - Starts at noon at the Killyhevlin Hotel, Enniskillen. All radio amateurs and those interested in electronics and computers welcome. The usual traders will be present and will the commission-free bring and buy. Details Fred, GI4PCY, 0365 324993 or Herbie, GIPJO, 0365 87761.

SWANSEA ARS Amateur Radio and Computer Show - Swansea Leisure Centre, on the A4067 Swansea to Mumbles road. Doors open from 10.30am to 5pm. Event features trade stands, a bring and buy stall and special interest groups. Operational HF and VHF Station. Talk-in on S22. Details Roger, GW4HSH 01792 404422.

29/30 APRIL

AMATEUR RADIO AND COMPUTER RALLY - Adam Bede Trade & Exhibition Centre, Derby Road, Wirksworth, Nr Matlock, Derbyshire. Doors open 10am. Refreshments available, free car parking. Admission £1. A few stands are still available. Details John McLaughlin 01629 825607/8, fax: 01629 825606.

30 APRIL

BRITISH ATV CLUB (BATC) Rally - The Sports Connexion, Coventry. Doors open 10am, 9.30 for disabled visitors. Rally features many radio trade stands, special interest groups and a bring and buy. Refreshments available all day. Entrance £1, 50p under 14 and OAP. Talk-in on S22 and GB3CV. Details & trade enquiries Mike, G6IQM 01788 890365 or fax: 01788 891883.

EAST CLEVELAND ARC Annual Rally - the Leisure Centre, Marske by the Sea. Doors open 11am. Event features the usual trader stands and a bring and buy stall. Refreshments available. Details Malcolm, G4YMB 01287 638119.

12th ANGLO-SCOTTISH Rally - Tait Hall, Kelso. Doors open 11am. Features the usual traders and a bring and buy. Refreshments available. Talk-in on S22 via GM4KHS. Entrance still £1. Details Colin, GM4UFP 01750 20006 after 6pm.

5-8 MAY

AMATEUR RADIO CARAVAN & CAMPING CLUB Rally - Weston, Northants. Details G4LWA QTHR, tel: 01494 531755.

6 MAY

DARTMOOR Radio Rally - Yelverton Memorial Village Hall, Meavy Lane, Yelverton, Devon. Parking for 600 cars. Access for disabled. Playground for children. Trades stands, bring & buy etc. Refreshments. Doors open at 10.30am. Talk-in on S22, Details Ron on 01822 852586.

8 MAY

EXHIBITION OF WARTIME equipment from all three services and Special Event Station at Puckpool Park Wireless Museum, Seaview, Ryde, IOW. Details Douglas, G3KPO 01983 567665.

MID CHESHIRE ARS Rally - Please note this event has been cancelled.

14 MAY

DUNSTABLE DOWNS Radio Club 12th Annual National Amateur Radio Car Boot Sale - Stockwood Country Park, Luton, Nr junction 10 M1. 10am until 5pm. Talk-in on 2m. Attractions include open day, environmental exhibits, side stalls, free entry to the Mossman Collection of Horse Drawn Vehicles, craft museum, train and carriage rides. Plot details on 01582 451057. Pre-booking for plots until 11 May. Plots can be purchased on the day.

MARS/DRAYTON MANOR Radio and Computer Rally - Drayton Manor Park Nr Tamworth, Staffs - on A4091. Doors open 10.30am. Usual traders, bring and buy. Main traders in four marquees with an outdoor flea market. Local clubs and special interest stands. Details Norman, G8BHE 0121 422 9787 (evenings).

MARTLESHAM RS VHF Roundtable 1995 - BT Laboratories, Martelsham Heath, Ipswich, Suffolk. Doors open 10am. The event will include round table sessions, test facilities and bring and buy facilities. For BT Labs security requirements, all access is by advance booking only. Please give the names and details of all persons attending in a group. For tickets send an SASE to Roy Smith, G0RRC, Lykkeboo, The Street, Burstall, Ipswich, Suffolk, IP8 3DN.

21 MAY

11th YEOVIL QRP & Construction Convention - Preston School/Centre, off Preston Rd, Yeovil. Details G3CQR, 01935 813054.

26-29 MAY

AMATEUR RADIO CARAVAN & CAMPING CLUB Rally - North Scarle, Lincs. Details G4LWA QTHR, tel: 01494 531755.

28 MAY

EAST SUFFOLK Wireless Revival - Ipswich Rally - Maidenhall Sports Centre, Stoke Park High School, Maidenhall Approach, Ipswich. Open 10am-4pm. Admission £1.50 (open to car boots from 8.30am). Attractions include trade stands, car boot sale, bring and buy, drive in antenna test facility, radio check facility, RNARS RAFARS RAOTA ISWL, local club stands, novice licence City & Guilds entry, vintage wireless show, non-radio traders, large traders hall, improved disabled access, refreshments and bar available, free parking, talk-in on S22 GB4SWR. Details Bob, G7HZV on 01394 271257 or 01473 645885.

MAIDSTONE YMCA Mobile Rally - Off Cripple St, Loose (South of Maidstone), 300 yds South of Maidstone Fire Stn. Opens at 10.30am (Free entry at 10am for severely disabled). Admission £1.50 per adult. Features include amateur radio, CB and computing stands plus snack bar, all day video, and free brunch and afternoon tea for traders. Telephone YMCA desk 01622 743317 for free pre-rally camping and caravan facilities. Trade bookings (£2 per foot of table) Ian, 01622 630000 before 9.30pm.

PLYMOUTH Radio Club Annual Radio Electronics Fair - Plymstock Secondary School, Church road, Plymstock, Plymouth. Doors open at 10.30am. More than 25 stalls with electronic, computer and radio components. Also features bring and buy stall, bookstall, grand raffle and refreshments plus talk-in on S22. Details Frank, G7LUL on 01752 563222.

TRAFFORD Rally (The Great Northern Rally) at G-Mex - Greater Manchester Exhibition and Events Centre, City Centre, Manchester. All usual traders and attractions including RSGB stand, bring and buy, new traders, free cash draw, licensed bar, refreshments, hot and cold food and car parking (both free and paid for). Doors open at 10.30am (with disabled persons priority queue) and close at 5pm. Admission £1.50. Talk-in on S22 - Mtrs via GB1GMX. Trade and further enquiries Graham, G1IJK on 0161 748 9804.

4 JUNE

SPALDING Amateur Radio and Computer Rally - Springfield Gardens, Spalding. Details G4TWR, 01775 722940.

9-11 JUNE

AMATEUR RADIO CARAVAN & CAMPING CLUB Rally - Elvaston, Derbyshire. (Full Members only). Information and booking details from G4LWA QTHR, tel: 01494 531755.

11 JUNE

THE 26th ELVASTON CASTLE National Radio Rally - Elvaston Castle Country Park near Derby. Parking, including entrance to the rally site, is £2 - £10 for coaches. More than 150 radio, computer and electronic stands will be on display. Other attractions include a flea market (for private vendors only), a crafts marquee and children's entertainment. Full on-site catering. Details from Ken, G3OCA, 01332 662818. Trade enquiries, Keith, G1ZLQ 01332 662896 after 7pm, please.

THE 6th ANNUAL BELFAST RALLY - The Chimney Corner Hotel, Antrim Road, Glengormley, Belfast. Doors open at 12pm. For details, including information about booking a free stand, contact David Caldwell 01232 471370.

ROYAL NAVAL Amateur Radio Society (RNARS) Annual Mobile Rally - Sports Field,. Event will take place between 10am and 5pm on the sports field, HMS Collingwood, Fareham, Hants Details Clive, G3YTQ on 01329 234143.

17/18 JUNE

BLETCHLEY PARK Amateur Radio and Computer Rally - Bletchley Park, Bletchley, Milton Keynes, Bucks. 10am to 5pm both days. Large trade presence with special interest groups, Morse tests, displays, a working Y station, talk-in and bring and buy. One price admission to rally and museum. Details 0923 893929.

18 JUNE

NEWBURY Boot Sale - Acland Hall, Cold Ash, Nr Thatcham, Nr Newbury. 9am to 3pm (set up after 8am). Plots £8. No advance bookings. Free admission and parking. Talk-in GB4NBS S22. Details George 01488 682814.

THE GORDON Rally (North of Scotland AR Convention) - Huntly, Aberdeenshire. New event not to be confused with SARCON. Details GM6TAN 01466 780739.

23-25 JUNE

AMATEUR RADIO CARAVAN & CAMPING CLUB Rally - Tuttbury, Staff. Information and booking details from G4LWA QTHR, tel: 01494 531755.

25 JUNE

38th LONGLEAT Amateur Radio Rally - Details Gordon, G0KGL 0117 940 2950.

2 JULY

The 6th YORK Radio Rally - Details Dave, G7FGA 01904 790079.

7-9 JULY

AMATEUR RADIO CARAVAN & CAMPING

SILENT KEYS

WE REGRET to record the passing of the following radio amateurs:

G0IEM	Mr E F K Wilce	10.01.95
G0LZZ	Mr H Pawson	
G0MIO	Mr J Hobbs	Dec 94
G0VAN	Mr C Campbell	04.01.95
G2ALA	Mr W P Smith	Nov 94
G2CG	Mr C W Howes	14.01.95
G2RX	Mr R Reed	22.01.95
G3AQQ	Mr J Kelsall	29.01.95
G3CZS	Mr A L Whatley	06.12.94
G3DTU	Mr E Clowes	24.01.95
G3EKM	Mr A Tonkyn	
G3ESH	Mr T Mansfield	26.01.95
G3GYX	Mr J J Wilson	04.01.95
G3IDX	Mr C A Nightingale	15.01.95
G3LPF	Mr C H Emeny	
G3NNC	Mr B L Cayless	24.01.95
G3OGD	Mr A Frost	Aug 94
G3RQ	Mr D F Davies	02.02.95
G3ZKV	Mr A A Leonard	05.02.95
G4BS	Mr C W M Frampton	05.02.95
G4CUT	Mr L Turner	06.02.95
G4GX	Mr F W Cole	03.02.95
G4KRE	Mr W Ling	24.12.94
G4MSX	Mr M A Maby	05.01.95
G4OOM	Mr E Tittensor	03.02.95
G4OQA	Dr J H Holland	13.12.94
G4PVW	Mr J J Booth	17.01.95
G6HFP	Mr C F Hoptroff	19.01.95
G7PWC	Mr H D Neil	June 94
G8DLQ	Mr R Berkolds	27.12.94
G8UJR	Mr A W Nicholls	
GI4IBD	Mr K A Fillmore	16.01.95
GJ0ORQ	Mr W S Clarke	19.06.94
GM0CNY	Mr T G M Clark	
GM3DWX	Mr W G Beaton	16.01.95
GM3GIJ	Mr F D Bell	
PA0TO	Mr A J Dijkshoorn	05.01.95
RS20307	Mr E A A Warwick	06.02.95
RS24456	Mr B R L Mawdsley	29.01.95
RS40902	Mr H F Richards	
RS626	Mr D G G Brace	15.01.95
RS94834	Mr S J Bulled	Oct 94
W8CUP	Mr L C Consterdine	21.09.94

CLUB Rally - Brooksby Agricultural College, Leics. Details G4LWA QTHR, tel: 01494 531755.

8 JULY

CORNISH Radio Rally and Computer Fair - Information & booking Ken, G0FIC 01209 821073.

9 JULY

SUSSEX Amateur Radio & Computer Fair - Information and booking Ron, G8VEH 01903 763978 or 0273 417756 office hours.

16 JULY

RAIBC Romsey Picnic - Details John, G4COM, 01703 693017.

12TH McMICHAEL RALLY - Details Chris, G0MZN 01734 874870 or Ed, G7PRS 01734 411117.

22 JULY

AIR FORMATION Open Day - Colerne Airfield. (RSARS) Stall applications etc to RSm G Baldry on 01225 743240 x5256.

23 JULY

COLCHESTER Radio & Computer Rally - Details Richard, G7BIV, 01376 571239.

2nd HUMBER BRIDGE Amateur Radio Rally - Details or bookings Roly, G0UKS 01482 837042.

THE OUTDOOR BOAT AND LEISURE SHOW - Details 01626 890243.

28 JULY - 5 AUG

AMATEUR RADIO CARAVAN & CAMPING CLUB Rally - Lytchett Matravers, Dorset. Details G4LWA QTHR, tel: 01494 531755.

30 JULY

SCARBOROUGH ARS Radio Electronics and Computer Fair - Details Ross, G4ZNZ 01723 514767

6 AUGUST

RSGB WOBURN Rally - Woburn Abbey, Bedfordshire. Details from Norman Miller, G3MVV, 01277 225563.

13 AUGUST

38th ANNUAL DERBY Mobile Rally - Details 0332 556875.

FLIGHT REFUELLING ARS Hamfest'95 - Dorset. Overnight camping facilities available for Saturday 12th. Details Richard Hogan, G4VCQ 01202 691021.

18 AUGUST

COCKENZIE & PORT SETON ARC Radio Junk Night - Details Bob, GM4UYZ on 01875 811723 or via GB7EDN.

19-20 AUGUST

STAFFORD Amateur Radio and Computer Show (incorporating RSGB National Convention - Details 0923 893929.

20 AUGUST

6th GREAT EASTERN Rally - Details Ian, G0BMS 01553 765614 or at GB7OPC.

WEST MANCHESTER Radio Clubs 'RED ROSE' Rally - Details Dave, G1IOO 01204 24104 evenings only.

25-28 AUGUST

AMATEUR RADIO CARAVAN & CAMPING CLUB Rally - Stratford upon Avon, Warwickshire. Details G4LWA QTHR, tel: 01494 531755.

27 AUGUST

TORBAY ARS ANNUAL Mobile Rally - Details John, G3YCH, QTHR; 01803 842178.

EAST COAST Amateur Radio & Computer Rally - Details 01473 272002.

28 AUGUST

HUNTINGDONSHIRE AMATEUR RADIO SOCIETY Seventh Annual Bank Holiday Monday Rally - Details David, G7DIU 01480 431333.

2 SEPTEMBER

ANNUAL WIGHT WIRELESS Rally - National Wireless Museum, Arreton Manor, Newport, IOW. Details Douglas, G3KPO 01983 567665.

3 SEPTEMBER

BRISTOL RADIO RALLY - Details Muriel, G4YZR 01275 834282 (24 hour answerphone.)

18th TELFORD Rally - Details 01952 588878 or 01743 249943. Traders only contact Jim on 01952 684173.

VANGE ARS Rally - Details Stuart, G1VWB 01375 859632.

8-10 SEPTEMBER

AMATEUR RADIO CARAVAN & CAMPING CLUB Rally - Lincoln Hamfest. Details G4LWA QTHR, tel: 01494 531755.

10 SEPTEMBER

BARTG Rally - Details Peter Nichol, 38 Mitten Ave., Rubery, Rednal, Birmingham, B45 0JB tel: 0121 680 5963.

SOUTHEND & DRS 75th Anniversary Radio & Computer Rally - ***NEW VENUE***Cliffs Pavilion, Southend-on-Sea. Details Ron, G0UAW on 01702 353676 or Fax Martin, G0OQR on 01702 602271.

24 SEPTEMBER

HARLOW AR AND COMPUTER SHOW - Details Mike, G7BNF tel: 01850 487863.

NORTH WAKEFIELD Radio Club Rally - Details John, G4RCG on 01924 362144 or John, G0EVT 01924 825443.

THE THREE COUNTIES Radio Rally - Details & bookings Eddie, G4PQZ on 01905 773181.

29 SEPTEMBER-1 OCTOBER

WACRAL 1995 CONFERENCE - Details G4EZU, 124 Damley Road, Gravesend, DA11 0SN.

AMATEUR RADIO CARAVAN & CAMPING CLUB Rally - Thurlaston, Leics. (AGM). Details G4LWA QTHR, tel: 01494 531755.

1 OCTOBER

THE GREAT LUMLEY Amateur Radio Rally - Details G1JQT on 0207 237927.

8 OCTOBER

KIDDERMINSTER & DARS Rally - Details G8JTL on 01384 894019.

13-15 OCTOBER

AR CARAVAN & CAMPING CLUB Rally - Elkington, Nr Welford, Northants. Details G4LWA QTHR, tel: 01494 531755.

20/21 OCTOBER

LEICESTER AR Exhibition - Details Frank, G4PDZ on 0116 287 1086.

29 OCTOBER

HORNSEA ARC Rally - Details Duncan, G3TLI on 01964 532588.

12 NOVEMBER

MARS-STOCKLAND Radio/Computer Rally - Details Norman, G8BHE on 0121 422 9787.

19 NOVEMBER

BISHOP AUCKLAND RAC rally - Details Mike Shield 01388 766264.

26 NOVEMBER

BRIDGEND & DARC Radio Rally - Details Mike, GW7NIS on 01656 722199.

WEST MANCHESTER Radio Clubs 'WINTER' Rally - Details Dave, G1IOO on 01204 24104 evenings only.

3 DECEMBER

VERULAM ARC Rally - Details Ian, G0PAU on 01923 222284.

GB CALLS

The list below shows special event stations licensed for operation during this month and up to 30 April. It was taken from the HQ computer on 7 March. These callsigns are valid for use from the date given but the period of operation may vary from 1-28 days.

APRIL

1	GB0FUA	First Unitary Authority
	GB0SRC	Stelar Radio
	GB0WWW	Wet Windy Weather
	GB2FUA	First Unitary Authority
	GB2SR	Stelar Radio
2	GB0IMD	International Marconi Days
	GB0IMD	International Marconi Day
7	GB4IRC	International Rescue Corps
12	GB4CRO	Cave Rescue Organisation
13	GB2RCC	Radio & Caravan Club
14	GB2CRO	Cave Rescue Organisation
	GB4JAM	Jameson
15	GB5SR	Stelar Radio Net
16	GB4MD	Marconi Day
20	GB0CDY	Coastal Defence 'Y'
21	GB13FRI	Friday The Thirteenth
	GB4IMD	International Marconi Day
	GB4IMD	International Marconi Day
	GB4IMD	International Marconi Day
	GB4IMD	International Marconi Day
	GB4IMD	International Marconi Day
	GB4IMD	International Marconi Day
	GB4IMD	International Marconi Day
22	GB0MAR	Marconi
	GB0MWT	Marconi's Wireless Telegraph
	GB2MID	Marconi International Day
	GB100IMD	International Marconi Day
23	GB4SG	Saint George
25	GB4MDI	Marconi Day International
27	GB0SOM	Scouts On The Meridian
28	GB0KWH	Kentwell Hall
	GB0SBB	Scottish Boys Brigade
	GB2BSC	Bedfordshire Scout Camp
	GB2USA	Great Britain to USA
	GB50LIB	50 Years of Liberation
29	GB2SR	Stelar Radio
	GB25RR	25 Years of Range Rover

The LAST WORD

SLOW ADS?

If I phone one of the newspapers to insert an advert on Friday it will appear in the paper on Sunday, so why does it take two months for adverts to be published in *RadCom*, which usually means that when the advert appears the articles are sold! I know *RadCom* is a monthly, but surely a system could be found to get the advert in within one month?

Jack Butcher, G0RWX

[The deadline for Members Ads *is between five and six weeks before the publication date. This includes one week when the magazine is at the printers, and another week when it is in your hands (we usually post well before the first of the month). A daily or weekly produces the whole magazine in a day or a week* - RadCom, *being a monthly, is planned in detail more than a month ahead and pages are being completed every day of the month. Given a fixed number of pages we just cannot have one section whose size is unknown until the last minute.* RadCom's *ad section is extremely popular and if it were as ineffective as you believe I am sure that far fewer members would use it* - Ed*]*

RLO FOR "THE WILD NORTH"

I was delighted to read (*RadCom*, Dec 94) of the appointment of Keith Ritson [G0PKR - *Ed*] as RLO for Tyne and Wear, as both he and his wife have been past students on my RAE course.

On a dark, cold Wednesday night in January I turned up for the course to find most of the class waiting as usual and an extra face present in the crowd. It was Keith: he'd turned up to introduce himself as RLO and give a talk about the benefits of being in the RSGB to my class. This went down very well and he concluded his bit with a few 'handouts' and his address for all to contact.

We sometimes feel a little forgotten up in the wild North - this was the first time an official approach has been made to us and I would like to express my public thanks to Keith for his efforts on your behalf. I wouldn't mind betting you're going to hear more from this area as a result.

Stuart Wisher, G8CYW

TRY, TRY AGAIN

I have gone through a similar experience to that of Joe Johnson, G0VIJ (*The Last Word*, Feb 95). For two years I struggled to master the Morse code and many times thought of giving up. I took the test last September and failed, but a local amateur and friend, Michael, G0SMG, undertook the task of making me proficient so I could eventually pass the test. In February this year I once again had an attempt at the CW test and to my delight and relief passed. I am 77, on the deaf side despite having a hearing aid, and my memory is terrible, so I think G0SMG deserves all credit for assisting me.

I started out as an SWL back in the sixties, and at long last have reached the goal I never thought I would. But I've had much support from various amateurs over the years to help me along. It's a great hobby and I hope to enjoy a few more years yet.

Maurice Williams, G1NVB

CALLING LONDON RADIO COLLEGE STUDENTS

Are there any ex-students of the London Radio College, 43 Grove Park Road, Chiswick, London W4 who were sitting their radio tickets as Merchant Navy Radio Officers with me between May and November 1942? I would be most interested to hear from anyone who was there at that time. I suspect that some of my ex-colleague students were lost in the Battle of the Atlantic. If there are any survivors, please contact me.

NB - the college no longer exists, it is now the HQ of the RAF Association.

Peter C Bond, G3BEG

AN INSPIRATION

May I just say that since getting my 'A' Licence in October 1994 I have been made welcome by many old-timers on the HF bands. I have been welcomed on the pre-news net by G4ARZ and company and I really appreciate this. Please can my letter be included in *The Last Word* as an inspiration to any Class 'B' licensees thinking of going for their Morse and an 'A' Licence.

Mike Rutland, G0VIX, ex-G7PGR

POSITIVE HELP

I would like to thank G8NAV for his letter (*The Last Word* Feb 95). With reference to the point made by G6** and G4** about me possibly having used too much power, I treat these comments with the disdain they deserve. However, their comment that I was helped is perfectly true.

Firstly, my father helped me with the design and construction of a 3-element 10m beam (made mainly from scrap aluminium and costing about £10). Secondly, I got a lot of help from the fact that I was fortunate enough to be one of the first 2E0 calls on 10m and the centre of many pile-ups (usually before school each morning, since in 1992 the band was in great shape early in the morning). Thirdly, I have noticed that it helps a lot to be a girl in amateur radio! Whether this is due to a higher-pitched voice penetrating the pile-ups, or to the fact that the *majority* of operators are gentlemen and they listened particularly carefully for my weak 3W signal, I don't know.

I am sure that with the practical training of the Novice course, and the enthusiasm inspired by it, there will soon be other Novices applying for their DXCC.

Emma Wills, 2E0AAX

CALLING ALL INTERCEPTORS

During WW2 more than 1000 amateurs worked as voluntary interceptors and several hundred were taken on as full-time operators. The Imperial War Museum is staging an exhibition in July which will include radio intelligence and perhaps the best way to secure a record for future generations is to allow documents and first-hand accounts to be lodged with the museum for the exhibition and their permanent records. I have been asked to help in this work as I have some documents from my own work as a VI and later at Arkley (Box 25, Barnet). If any kind ex-operators can let me have logs returned (stamped), copies of 'General Search', 'The Hunt' or any other documents please do send them to me QTHR or contact me at G3ASE@GB7MHD. Your help will be greatly appreciated and anything not used will be returned to you.

H S King, G3ASE

JACK HUM, G5UM

Please would you thank all radio amateurs for their kind help to me since the death of my husband Jack Hum, G5UM. Also for the many letters, cards and flowers and generous contributions to the British Heart Foundation in his memory.

It is a great help to me to know that so many of his radio friends are thinking of me. I know he will be missed by many. Life is very difficult to face without him, but Jack would not wish me to be unhappy so I must face the future bravely.

Thanking you again.

Grace Hum (Mrs)

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.

LOTS OF LIDS

David Thomas, G4OGW, asks (*The Last Word*, Feb 95) about the derivation of the term 'lid'.

It is, of course, an acronym meaning "Legitimacy in Doubt". This relates to whether the accused is in possession of a valid amateur radio licence and it would be quite wrong to suggest that it can have anything to do with his parentage.

It came to be used in its present sense when a very well known DXer, frustrated in his attempts to work his 340th DXCC country by a persistent tuner on frequency, was overheard by a visitor in his shack to say "Oh dear, that operator has put the lid on things and has thereby upset my earnest endeavours!" The visitor responded by saying "Yes, I suppose it could be said that the tuner could be looked upon as the lid!"

Someone else picked up the story and ever since then all amateur radio operators who step out of line by tuning-up, asking silly questions during DX pile-ups and generally displaying loutish behaviour on the bands have been known as 'lids'.

R Johnson (Dick), G2FFO

...Some 65 years ago I recall my father saying "That's put the tin lid on it!" The meaning was that someone had made a complete hash of things. Later the term was shortened to "Putting the lid on it". Possibly 'lid' was derived from the shortened version of the above.

I recall a service equivalent which meant "Please put on a competent operator, are you sending with your left leg?"

D H McGredy, G3PKX

...This authoritative reference is from a list of abbreviations for CW work on page 550 of the 16th Edition of the *ARRL Handbook* (1949): "LID - A poor operator".

T J Wynn, RS43579

...I've always understood this was "Lacks Intelligence Definitely".

B J Clark, G3BEC

...It goes back to the days of landline telegraphy. The telegraph sounders emitted only a clicking sound and new ops had much difficulty distinguishing a dot from a dash. Placing a tin can (or 'lid') over the sounder sustained the ring of the sounder's arm enabling the novice to distinguish the elements of a character.

Sardine lids were popular covers and some say the new ops who used these types of lids were called a 'sardine' or 'fish'. But the term 'lid' seems to be the only one to have survived.

Jeff, NH6IL on Internet
via Steve Harwood, G4OWT

[So now we know - Ed]

SEE AND BE SEEN

It is with delight that I received information that the RSGB intends to enforce legislation at their rallies which requires traders at rallies (markets) to display their names in letters of not less than two inches tall. Many traders at rallies are only too happy to get their names as big and as high as they can but there is a small number that refuse to comply with this.

It must beg the question "what are they trying to hide?" Those of us who display our names (and addresses with telephone numbers) are often asked "who was next to you at XYZ rally last month, as the gear I bought doesn't work."

It is very obvious that not all of these traders are dubious but if *all* traders are forced by rally organisers to comply with these rules the innocent rally-goers will be much better off when equipment is found to be faulty.

R A Pascoe, G0BPS

THE OTHER SIDE OF THE COIN

I read the article 'Will you talk to our Club?' by Peter Chadwick, G3RZP (*RadCom*, Jan 95 page 92). I have written to many amateurs who have given talks at other clubs, asking them if they will repeat the talk at our club and informing them that a white board with coloured pens and automatic slide projector and screen could be provided, and that any expenses would be reimbursed. I have always enclosed an SAE for their reply.

My success rate is about 50%, the other 50% made no use of the SAE at all. It does not take long to write on a scrap of paper "Dear OM, No can do" and then scrawl a signature, put it in the envelope and post it, but no reply, not even a telephone call. When you get a reply to a request it is very satisfying and some thank you for asking them, they are rather let down by the other 50%.

I wonder what happens to the envelope with my stamp?

H T Lunson, G3WR

RSGB – at Your Service

SOME OF THE RSGB'S TEAM OF VOLUNTEER EXPERTS — AVAILABLE TO HELP YOU

Zonal Council members

Zone A (North of England): Peter Sheppard, G4EJP, 89 St Catherines Drive, Leconfield, Beverley, North Humberside HU17 7NY. Tel: 01964 550397.

Zone B (Midlands): TBA.

Zone C (SE England and East Anglia): Neil Lasher, G6HIU, 8 Highwood Grove, Mill Hill, London NW7 3LY. Tel: 0181 201 1578.

Zone D (SW England): Julian Gannaway, G3YGF, Dean Hill Barn, East Dean, Salisbury, Wiltshire SP5 1HJ. Tel: 01794 40008.

Zone E (Wales): E Paul Essery, GW3KFE, 287 Heol-y-Coleg, Vaynor, Newtown, Powys SY16 1AR. Tel: 01686 628958.

Zone F (Northern Ireland): Ian Kyle, GI8AYZ, 1 Portulla Drive, Pond Park Road, Lisburn, Co Antrim BT28 3JS. Tel: 01846 665034.

Zone G (Scotland): Frank Hall, GM8BZX, 45 Priory Cottages, Lunanhead, Forfar, Angus DD8 3NR. Tel: 01307 467565.

For general advice and details on local clubs, or if you don't know who to contact:

Your **RSGB Liaison Officer** see this page and January *RadCom*, page 93.

Specialists

Antenna Planning: Booklet free to members from RSGB HQ. Planning application refused – RSGB Planning Panel, via RSGB HQ. Planning Advisory Committee Chairman – Geoff Bond, G4GJB, QTHR.

Audio Visual Library: Coordinator – David Simmonds, G3JKB, QTHR.

Awards: For contest awards, refer to the appropriate contest committee. For other awards, enquiries and applications go to the: HF Awards Manager – Fred Handscombe, G4BWP; IOTA (Islands on the Air) Awards Manager – Roger Ballister, G3KMA or VHF (and Microwave) Awards Manager – Ian L Cornes, G4OUT. Trophies Manager – David Simmonds, G3JKB.

Band Plans and operating practices: See the *RSGB Call Book* or April 95 *RadCom* for latest bandplans. For policy, contact the appropriate spectrum manager or committee chairman: HF Committee Chairman – David Evans, G3OUF, QTHR; VHF Committee Chairman – Peter Burden, G3UBX, QTHR; Microwave Committee Chairman – Steve Davies, G4KNZ, QTHR; HF Manager – Post vacant; VHF Manager – Dave Butler, G4ASR; Microwave Manager – Mike Dixon, G3PFR.

Beacons: HF Beacon Coordinator – Prof Martin Harrison, G3USF, QTHR. VHF Beacon Coordinator – John Wilson, G3UUT, QTHR. Microwave Beacon Coordinator – Graham Murchie, G4FSG, QTHR.

RSGB Contests: First contact the appropriate contest adjudicator (see the contest rules). For policy, contact the respective Committee Chairman: HF Contest Committee – Chris Burbanks, G3SJJ, QTHR; VHF Contest Committee – David Johnson, G4DHF, QTHR; ARDF (direction finding) Committee – Post vacant.

EMC: Advice on solving breakthrough and other electromagnetic compatibility matters: First contact your local EMC Co-ordinators - see this page. Committee Chairman – Robin Page-Jones, G3JWI, QTHR.

Emergency: Emergency Communications Officer – Greg Reilly-Cooper, G0MAM, PO Box 98, Northwich, Cheshire, CW9 5SZ.

Exhibition & Rally Committee: Chairman – Norman Miller, G3MVV, QTHR.

History: Society Historian – George Jessop, G6JP, 32 North View, Eastcote, Pinner, Middx, HA5 1PE.

IEE: Liaison Officer – Peter Saul, G8EUX, QTHR.

Licensing: LAC Vice-Chairman – Julian Gannaway, G3YGF, QTHR.

Membership Liaison: MLC Chairman – Peter Sheppard, G4EJP, see Zone A (left).

Morse: Morse Practice Transmissions Coordinator – David Pratt, G4DMP, 11 Moorleigh Close, Kippax, Leeds L525 7PB. Chief Morse Test Examiner – Roy Clayton, G4SSH, QTHR.

Packet Radio: Datacomms Committee Chairman – Tom Lilley, G1YAA, QTHR.

President: Clive Trotman, GW4YKL, QTHR.

Propagation: Propagation Studies Committee Chairman – Charlie Newton, G2FKZ, QTHR.

QSL Bureau: Outgoing cards – PO Box 1773, Potters Bar, Herts, EN6 3EP. Incoming cards – your QSL submanager (see *RSGB Call Book* or November *RadCom*, p91 for a list). QSL Bureau Liaison Officer – John Hall, G3KVA.

Repeaters: Repeater Management Group Chairman – Geoff Dover, G4AFJ, QTHR.

Spectrum Abuse: Packet – Via Datacomms Committee. Repeaters – Via the Repeater Management group. Other – Via Licensing Advisory Committee. Intruder Watch Coordinator – Chris Cummings, G4BOH.

Technical & Publications: Committee Chairman – Dick Biddulph, G8DPS, QTHR.

Training and Education: Committee Chairman – John Case, GW4HWR, QTHR. Radio Amateur's Examination – George Benbow, G3HB, QTHR. Novice RAE – Hilary Claytonsmith, G4JKS, QTHR. Project YEAR Coordinator – Phil Mayer, G0KKL, QTHR.

The Society has a large number of volunteer experts available to help and advise members on a wide variety of subjects. Each month we will be focusing on a different section of the volunteer workforce, whilst still giving brief details of the main office-holders. See also the Information Directory section of the *RSGB Call Book*.

EMC Co-ordinators

WHEN A MEMBER has an EMC problem which they cannot deal with themselves, the first point of contact should be their nearest co-ordinator. In many cases the co-ordinator will be able to give the necessary advice, but where this is not possible, the problem will be passed to a committee member who specialises in that particular type of problem.

What to do for advice

If you are an RSGB member and are experiencing difficulties in solving an interference problem, please look up the EMC co-ordinator for your zone from the list below and give him or her a ring.

Before you do so:

1. Make sure that you have done everything possible to solve the problem yourself.
2. Arm yourself with as much information as possible which will be useful to the co-ordinator.
3. Remember that the co-ordinator is a volunteer, so please ring at sociable times.
4. Remember also that the scheme only offers telephone advice at present - no visits will be made.

Zone A The North of England

Mr A Armstrong, G0FBW - County Durham, tel:0191 5864500

Mr N Carr, G0JHC - Lancashire - tel: 01772 742710

Mr S Dimmock, GD8COH - Isle of Man, tel: 01624 862802

Mr S Ellis, GD3LSF - Isle of Man, tel: 01624 673303

Mr R Gilchrist, G0TUE - Cumbria, tel: 01229 718657

Mr D Hopkins, G0MXI - Hull, tel: 01482 210763

Mr FG Sawyer, G3SLN - Manchester, tel: 0161 643 9014

Mr RP Smith, G3SVW - Cheshire, tel: 0161 969 3999

Mr D Smith, G3LIS - Lancashire, tel: 01695 577960

Mr GA Valleley, G4YRS - North Yorkshire, tel: 01748 850430

Zone B Midlands

Mr RM Allsopp, G1YFT - Leicester, tel: 0116 2833714

Mr B Harrison, G4UJS - Shropshire, tel: 01948 880392

Mrs S Morley, G0MCV - Loughborough, tel: 01533 374999

Mr S Wood, G4OWI - Nottinghamshire, tel:01636 72625

Zone C SE England

Mr P Daly, G0GTE - Hertfordshire, tel:01438 724991

Mr GL Halse, G3GRV - Hertfordshire, tel: 01442 214972

Mr K Hendry, G0BBN - Essex, tel: 01268 755350

Zone C SE England

Mr AD Maish, G4ADM - Surrey, tel: 0181 335 3434

Mr R Sykes, G3NFV - Surrey, tel: 01372 372587

Zone D SW England

Mr LK Ayre, G3DPR - Hampshire, tel: 01425 615676

Mr P Bertram, GJ8PVL - Jersey, tel: 01534 855568

Mr G Brown, GJ4ICD - Jersey, tel: 01534 77067

Mr M Goodfellow, G4KUQ - Bristol, tel: 0117 971 6093

Mr S O'Sullivan, G8VPG - Bristol, tel: 0117 987 3098

Mr LJ Parry, G8AMK - Berkshire, tel: 01344 423704

Mr K Watkins, G3AIK - Somerset, tel: 01935 825266

Zone E Wales

Dr C Barnes, GW4BZD - Gwynedd, tel: 01248 353940

Mr J Lawrence, GW3JGA - Clwyd, tel: 01745 853255

Mr S Lloyd Hughes, GW0NVN - S Glamorgan, tel: 01446 743370

Zone G Scotland

Mr R Adam, GM4ILS - Morayshire, tel; 01343 545842

Rev S Bennie, GM4PTQ - Isle of Lewis, tel: 01851 703609

Mr G Brooks, GM4NHX - Caithness, tel: 018478 3570

Mr D Morris, GM3YEW - Perth, tel: 017388 5533

CLASSIFIED ADVERTISEMENTS

Classified advertisements 55p per word (VAT incl) minimum 14 words (£7.70). Please write clearly. No responsibility accepted for errors. Latest date for acceptance — 5 weeks before 1st of issue month.

All classified advertisements MUST be prepaid.

NB: CHEQUES SHOULD BE MADE PAYABLE TO RSGB.

Copy and remittance to: **Victor Brand Associates, 'West Barn', Low Common, Bunwell, Norwich, Norfolk, NR16 1SY.**

NB. Members' Ads must be sent to "Members' Ads," RSGB Hq.

FOR SALE

YAESU SPARES. Main transformers FT102 £169, FT101ZD £179 + £7 p&p — S.H. FM boards FT101ZD Mk3 £45 pp — P.A. anode chokes FT401/200/101 etc £18 pp. Fans FT101 (state which) £30pp (slightly used) — DC leads FT757 £14.50 pp — C.W. Filters FT101E, 101ZD, 102, 707 etc (state which) £67 pp — P.A. Valves special offer see last months ad. G3LLL — see below...

S.H. YAESU & ICOM. FT200, 107,757, 101ZD, 902, IC735, IC728. Phone G3LLL — see below ...

NEW YAESU & ICOM. We give 'biased advice' we'll tell you what not to buy! G3LLL — Holdings Amateur Electronics, 45 Johnstone St., Blackburn BB2 1EF. Normally open Tues, Wed, Fri & Sat. Lunch 12-1.30 but phone & check (closed Easter) (01254) 59595.

G4TJB QSL Cards printed to your specification, send large SAE for samples and full product list. Unit 6, Worle Industrial Centre, Coker Road, Worle, Weston-super-Mare, BS22 0BX. Tel/Fax: (01934) 512757.

"RAYNET" YELLOW REFLECTIVE TABARDS with "RAYNET". Medium £10.50, Large £11.00, XLarge £11.50. "RAYNET CONTROLLER" 50p extra.- EPSON PX4+ lap top computer, built-in printer, charger Eprom for packet £46.50 inc pp. Nonreversible battery connectors line/panel mounting (10 pairs/pack) £6.50. Mike Watson G8CPH, Ipswich (01473) 831448.

MOSLEY ANTENNAE — All the famous British Manufactured Antennae, direct from us including spares/replacements. Mustang, Elan, TA-33Jnr etc. Full details shown in our Handbook, price £1.25 refunded upon purchase of Antennae, Mosley Electronics, 196 Norwich Road, New Costessey, Norwich NR5 0EX (Administrative address only).

ANTI-T.V.I. CUSTOM BUILT HF/VHF AERIALS, Trap-dipoles, multibanders, traps, baluns, parts. Reconditioned TX/RX's, Linears ATU's. Data 38p SAE, Aerial Guide £1.50. G2DYM, Uplowman, Devon EX16 7PH. Tel: 013986-215 any time.

THE RIG REVIEW contains details of over 400 rigs (see Product News September). Unravel those small ads, and tell an IC2SRE from and IC2SE, covering 25 years of manufacture and describing each rig's main features and original price. Price £5.00 post free, or on disk at £4.00 from Twrog Press, see below ...

QSL CARDS. Gloss or tinted cards. SAE for samples to Twrog Press, Penybont, Gellilydan, Blaenau Ffestiniog, Gwynedd LL41 4EP.

ALUMINIUM TUBE. Heavy-duty (scaffold) tube approx. dimensions 20' long, 2" dia, 11/64" (4.5mm) wall thickness. 20' and 10' lengths available @ £1.80 + VAT per ft. C.W.O. Rusper Hire (Crawley) 01293 87 1621 office hours only.

SOLAR/WIND POWER. All sizes and types available. For new catalogue, info, prices send £1 or 4 x 1st class stamps to Keysolar Systems (GW4IED), 4 Glanmor Cres, Newport, Gwent, NP9 8AX.

QSL CARDS — low cost, quick delivery, superior designs, quality guaranteed, personal designs our speciality. L.S.A.E. for samples: The Standfast Press, 5 South Drive, Inskip, Preston PR4 0UT.

AMIDON TOROIDS send £1.00 for catalogue, refundable on purchase. "Choke Baluns" Models for G5RV £28.25, Dipole £36.54, Yagi to fit 1.5" or 2" booms £37.15 inc, or send SAE for full details. Ferromagnetics, P.O. Box 577, Mold, Clwyd, N. Wales CH7-1AH.

QSL, SWL's ECONOMY CARDS. Very low prices, quick delivery, specials a speciality. Sample enquiry to G3ETU, 34 Park Lane Court, Salford, Manchester M7 0LF. Tel: 0161-792 9144.

DIY Z MATCH ATU BFO. Loops. PRE Amps. Field strength meter. SAE G2VF, 39 Parkside Avenue, Southampton SO16 9AF.

LANDWEHR VHF/UHF MASTHEAD PREAMPLIFIERS 2 metre 145mas £147 and 70cm 435ma £152. Post & packing £4. Write or phone for leaflet. Qualitas Radio, 23 Dark Lane, Hollywood, Birmingham B47 5BS, Tel: 0121-430 7267.

ESSEX AMATEUR RADIO SERVICES. New and used amateur equipment bought & sold. PX welcome. All warranted & serviced. 8am till 9pm. Ring Alan — 01268 752522, 4 Northern Avenue, Benfleet, Essex SS7 5SN.

FT747GX + FC757AT mint. £600.00. Racal RA1218 Rx. £350.00. Eddystone 1650 Rx 10KHz-30MHz £650.00, RA121 SSB adaptor £99.00. HP 180 50MHz scope £150.00. Ring Tony after 6pm 01788 571066.

QSL!! AMATEUR/SWL CARDS SASE for samples/prices. Example 100 economy coloured cards £6.00. J&I Print, 33 Recreation Road, Haverhill, Suffolk CB9 8BY.

RSGB AMATEUR RADIO INSURANCE SCHEME

"ALL RISKS" INSURANCE for portable/mobile/base station amateur radio and ancillary equipment. A service for RSGB members only. Also public liability and equipment insurance for affiliated clubs and societies. Details and leaflets from Jim Stroud, Amateur Radio Insurance Services Ltd, Shepheards Hurst Green Lane, Outwood, Surrey RH1 5QS. Tel: 0134-284-4000. Fax: 0134-284-4554.

COMPUTER SOFTWARE HARDWARE

G4UXD's MORSE TUTOR/PRACTISE DOES EVERYTHING! See Feb 95 Novice News. IBM-PC's, Archimedes, BBC's. 100% new "QSO" format. Guaranteed: delight or refund! £9.99. SAE details. P. Brandon, 1 Woodlands Rd., Chester, CH4-8LB, 01244 683563.

SUPER-DUPER, the PC CONTEST LOGGER. "Highly recommended" — RadCom, September 1993. With printed manual and upgrades for 12 months. HF £25.00, VHF £25.00, both £39.00. Paul O'Kane E15DI, 36 Coolkill, Sandyford, Dublin 18. (00 353 1295 3668).

G4BMK PACTOR — See display advert this issue. Grosvenor Software, 2 Beacon Close, Seaford, Sussex.

SHACKLOG4 *the* PC logging system. Real time and post event QSO logging. QSL labels. Database analysis, reports, import, packet terminal etc. Optional IOTA database (G3KMA). Plus lots more!! Still only £27.50!! SASE (+disk for demo copy) for full details. G3PMR, 30 West Street, Gt Gransden, Sandy SG19 3AU. 01767 677913.

JVfax/SSTV, HamComm, PktMon. 9FD or 25FD PC Transceive Interface, Programs, Manuals, Pictures. £28.50. G8SLB (QTHR). 0181-595 0823.

INTERNET ACCESS to email and Newsgroups. Subscriptions are £35/6 or £60/12 months. NO joining fee. NO connect charges. MidNet, 9 Ilfracombe Grove, Green Lane, Coventry CV3 6DX. (Tel: 01203 415815) (BBS: 01203416985) G8FRA@midnet.com.

SWISSLOG PC Station/Contest log. Supports Packet, Rotator & Rig Control, DXCC, WAB Quick Screen Reports. Probably the best logger in the world! £50 inc. P&P. Tony Pritchard, 29 Brockley Road, Leonard Stanley, Stonehouse, Glos. GL10 3NB.

'The Why? and How? of TCP/IP' booklet has been specially written for this mode's newcomers. Steps through creating a TCP/IP station and command usage of the popular JNOS program with a PC. Includes a Quick Reference section for immediate answers. To 'TCP-it' easily this is the one! Send £5.95 to D. Norris G4TUP, 148 Sefton Street, Southport PR8 5DA.

HOLIDAY ACCOMMODATION

FLYING FROM GATWICK? Stay at Mill Lodge Guest House. 4 minutes from airport. Transport available. Telephone (0293) 771170.

NORTH WALES. Elevated site, B&B, caravan, bunkhouse, camping, open all year, use of shack. "Tynrhos", Mynytho, Pwllheli, LL53 7PS, (0758) 740712.

JAVEA, SPAIN. Unsurpassed views, tranquil spacious guest's apartment in villa, with pool. G8JTW. 01754610331.

PROPERTY FOR SALE

LINCOLNSHIRE (Nr. Louth). Village Sub Post Office/Stores, good business, 5½ day week, retirement sale, trunk road, luxury detached 4 bed family house with radio workshop (plus 2 other workshops) garden, garage, freehold, £75,950. Ref 254 East of England Business Transfer Co. Tel: (01780) 56066.

MISCELLANEOUS

COURSE FOR CITY & GUILDS, Radio Amateurs Examination. Pass this important examination and obtain your licence, with an RRC Home Study Course. For details of this and other courses (GCSE, career and professional examinations, etc) write or phone — THE RAPID RESULTS COLLEGE, Dept JT108, Tuition House, London SW19 4DS. Tel: 081-947 7272 (9am-5pm) or use our 24hr answerphone service 081-946 1102 quoting JT108

VIDEO TAPE CONVERSIONS to and from all modes N.T.S.C.; S.E.C.A.M.; P.A.L.N.; P.A.L.M. Digital processing. Fast and economical service. Also 'cine' conversions. Phone G4WMP 0932 846139.

HEATHKIT EDUCATIONAL PRODUCTS U.K. Distributor/Spares and Service Centre. Cedar Electronics, 12 Isbourne Way, Broadway Road, Winchcombe, Cheltenham, GL54 5NS. Tel: (01242) 602402.

ADVERTISERS INDEX

NEXT COPY DATE

The display advertisement copy date for our June 1995 issue will be

12th April 1995

IC-Z1

Special Agent in the field

ICOM are constantly expanding the frontiers of radio communication, the very latest IC-Z1 is no exception to this tradition

ICOM introduce a unique new dual-band handheld transceiver with a difference... namely an optional, detachable front panel that can be used as a remote control microphone. The radio's keypad is removed instantly allowing the installation of the dummy panel and extension lead creating a remote speaker/mic that can be hand held or clipped to your lapel for hands-free operation, (see picture below).

To help you to store station names etc., alphanumeric notes can be programmed into each memory channel and displayed together with the operation frequency.

A total of up to six messages can be transmitted using DTMF codes, ideal for transmitting 'secret' codes etc.

Other features include:

- Twin tuning dials for both main and sub-band control.
- Electric volume control via detached panel.
- Wide 4.5 -16 Volt operating via external DC jack.
- V/V and U/U for simultaneous 2 signal receive capability in the same band.
- Large memory capacity of 100 channels (50 channels for each band).

We anticipate that this truly innovative dual-band transceiver will catch on in a big way, just imagine being able to walk around and communicate hands-free, very 'Special Agent', in fact... VERY SPECIAL!

ICOM

ICOM manufacture a full range of base-stations, mobiles and handheld transceivers and receivers to cover all popular Ham frequencies... and beyond.
No matter what your requirements, ICOM have the radio for you.
For the full picture and details of your local authorised Icom dealer contact:
Icom (UK) Ltd. Sea Street Herne Bay Kent CT6 8LD.
General Operator: 01227 743000. Sales & Service: 01227 741741. Fax: 01227 741742.

NEW
Dual Band HT

Dual Band Handheld FT-51R

Only one Dial/Volume knob required for easier use.

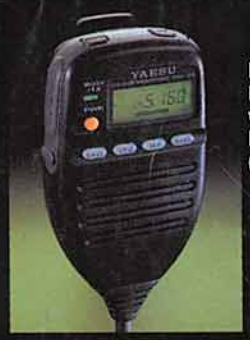
The First Dual Band HT with WINDOWS!

Three dual receive configurations VHF/VHF, UHF/UHF, or VHF/UHF with main band frequency on right or left side. Flexible programming allows transmit on main or sub band.

An 8 character alpha-numeric user help menu scrolls operation instructions in the bottom of the large, backlit display.

Digital battery voltage readout displays condition of battery in use. Scan skip function allows individual memory channel lock-out during scanning mode.

Spectrascope™ displays active adjacent frequencies in real time with relative signal strength.



MH-29A2B
LCD Display Mic with Remote Functions. (Optional)

FT-51R
2¼"W x 4¾"H x 1⅛"D
(2 Watt version shown.)

The new FT-51R Dual Band HT is state-of-the-art, and easy to use! So easy, you won't need an operating manual. Its exclusive, scrolling instruction menu located in the large, backlit display "window", guides you through total operation while simultaneously viewing the main display window.

You'll like some of the other new, exclusive features, too. Like Spectrascope.™ This unique feature displays real time, continuous scanning of activity on adjacent frequencies in VFO mode or 8 of your favourite memories. A cloning feature duplicates favourite channels to another FT-51R.

A digital battery voltage display, five power output levels, the largest backlit dual band HT keypad made, Smart Mute,™ two VFOs on both VHF and UHF, as well as available 2 Watt and 5 Watt versions, round out the exciting FT-51R. Plus, the optional MH-29A2B Display Microphone allows you to control volume and also access Memory, VFO, Call Channel, Band Selection and scanning functions. All of this in world's smallest dual band HT radio!

See the FT-51R with "windows" at your Yaesu dealer today!

"I can see two frequencies and alpha-numeric all at the same time."

"Scrolling instructions tell me what to do next!"

"I use the Spectrascope to find new contacts faster."

"Yaesu did it again!"

Specifications

- Frequency Coverage
  VHF RX: 110-180 MHz
  TX: 144-146 MHz
  UHF RX: 420-470 MHz
  TX: 430-440 MHz
- Spectrascope™ Display
- Scrolling User Help Menu
- Alpha-Numeric 8 Character Display
- Up/Down Volume/Squelch Controls & Display
- Selectable Sub-Band TX Mute
- Automatic Tone Search (ATS)
- Digital Battery Voltage Display
- AM Aircraft Receive
- Scanning Light System (SLS)
- 120 Memory Channels (80 w/Alpha-Numeric)
- Large Backlit Keypad & Display
- Automatic Repeater Shift (ARS)
- Multiple Scanning Modes
- 3 Selectable Scan Stop Modes with Scan Skip
- User selectable lock function w/15 combinations
- Automatic Power Off (APO)
- TX/RX Battery Savers Built-in
- Handy Cloning Feature
- 5 Selectable Power Output Levels
- Message system with CW ID
- Selectable RX Smart Mute™
- Cross-Band & One-Way Repeat Functions
- DTMF Paging/Coded Squelch Built-in

Accessories
Consult your local dealer.

YAESU
Performance without compromise.℠

YAESU UK LTD. Unit 2, Maple Grove Business Centre, Lawrence Rd., Hounslow, Middlesex, TW4 6DR

Specifications subject to change without notice. Specifications guaranteed only within amateur bands.
Some accessories and/or options are standard in certain areas. Check with your local Yaesu dealer for specific details.