Radio Communication

The Journal of the Radio Society of Great Britain

April 1994

Volume 70 No 4

THE VOICE OF AMATEUR RADIO FOR 81 YEARS

QSL Mountain: ZD9SXW DXpedition – page 16

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Production Editor
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Technical Illustrators
Derek Cole
Bob Ryan

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John Davies, G3KZE

Production Assistant
Jennifer Preston

Editorial Secretary
Erica Fry

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

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

Tel: 0707 659015
Fax: (Editorial *only*) 0707 649503
E-mail (Telecom Gold) 87:CQQ083

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Radio Communication

COVER PICTURE:
Western Mail: Roger Western, G3SXW returned from a three-week expedition to Tristan da Cunha to find 4,000 direct QSLs waiting for him. His postman is still in shock! Turn to page 16 for the first of our two-part colour feature on ZD9SXW.
PHOTOGRAPH: G3SXW

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RADIO SOCIETY OF GREAT BRITAIN

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

PATRON: HRH PRINCE PHILIP, DUKE OF EDINBURGH, KG

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Headquarters and registered office:
Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE
Telephone: 0707 659015 - Members Hotline and book orders
Fax: 0707 645105. Telex 9312 130923 (RSGB)
Electronic Mail Via Dialcom/Telecom Gold: 87 CQQ083

General Manager: Peter Kirby, MIMgt, MISM, G0TWW
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UK associate member under 18: £16.00. Family member: £14.00
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:
0707-659015

The RadCom Leader

Caring for Members

LAST MONTH SAW THE LAUNCH of a major initiative to encourage new members to the Society. For the first time, anyone with an interest in amateur radio can join the Society on a three month free trial membership.

This is the first stage of an extensive 'Members' Care' programme that will be developed throughout the year. The care programme is to be designed to encourage existing members to maintain their membership of their National Society by way of incentive measures.

A Presidential Working Group is currently engaged in discussions designed to simplify our current membership categories. The aim is to provide membership categories to suit the modern amateur radio environment.

Never before has there been the pressures on the amateur radio service that exist today. These come from many directions and the RSGB is determined to meet these pressures head-on. Only a strong National Society with the full support of the majority of the amateur radio community will succeed.

I am confident that we will have your support and cooperation in the battles that lie ahead in maintaining and encouraging the growth of amateur radio within the UK and throughout the world.

Peter Kirby, G0TWW
General Manager

NOTICE BOARD

Tell Your Friends!

*FREE RSGB TRIAL MEMBERSHIP**

For a limited period only, we are offering a trial membership to the RSGB for three months – ***FREE***.

During the three months trial members will receive ***FREE***:

- **New Member's pack**
- **Radio Communication magazine**
- **Member's discounts on books**
- **ALL membership services**

The three months free trial is subject to the satisfactory completion of a Trial Membership Application and Direct Debit mandate form.

Send off today for one of our special Gold membership application forms and pass it to a friend.

* This offer is for a limited period only. Note that a new member is a person who has not been a member during the last twelve months. The Direct Debit mandate may be cancelled at any time during the first three months.

NEWS & REPORTS

● Eddystone User Group has become so successful that the work has outstripped the spare time which administrator Kathy Moore has available. Thanks to the kindness of Eddystone Radio's Managing Director Chris Pettitt EUG work will be carried out by volunteers at the Eddystone works. From the start of April, all subs and queries should be addressed to: EUG c/o Eddystone Radio Ltd, Alvechurch Road, West Heath, Birmingham B31 3PP. Please do not telephone. Subscriptions remain at £10 for the year 1994/95.

● THE SCHOOL OF PHYSICAL Sciences at Kings College, London is participating in National Science and Technology Week and has planned an exciting and stimulating programme of events suitable for audiences of all ages. They are planning two Radio Days on 25/26 March when there will be displays, demonstrations and talks. GX0KCL will be operational. Contact Dr Michael Holwill on 071 873 2715 for further details.

● MEMBERS OF THE VK4 Gold Coast Amateur Radio Society (Inc) will be using the special call VI2CQ from Camp Quality (Kids with Cancer) in the Tweed Heads area of north-eastern New South Wales. From 3 - 9 April, the station will operate on 7.050, 14.150, 21.150 and 29.550MHz, and probable times are 2300 - 0000UTC and 0300 - 0500UTC.

● THE ARFON REPEATER Group reports teething problems with the refurbished GB3AN (Anglesey, RB8). All is now working fine. Details of how users can link from GB3AN to 2m repeater GB3AR can be obtained by sending an SASE to GW0AQR (QTHR).

● RAF FINNINGLEY ARC will use GB2AMN on 25 April to mark Newark Air Museum's 20th year. Operation will be from inside a Varsity and a Shackleton aircraft on the ground at the museum.

● 24CM ATV REPEATER GB3WV has been approved by the RA and was due to go into service in March. Reports to John, G4NTS, of the Dorset Video Repeater Group on 0305 778575.

● THE LATEST CALLSIGNS issued by SSL at 9 March were in the G*0UP*, G*7SE* 2*0AH* and 2*1CT* series.

● THE *NEWSLETTER OF THE ITU* (No:1/94) features an interview with RSGB member Prof Les Barclay OBE, G3HTF.

Kenwood and Waters & Stanton Invest in the Future of Amateur Radio

Business Supports Youth Initiatives

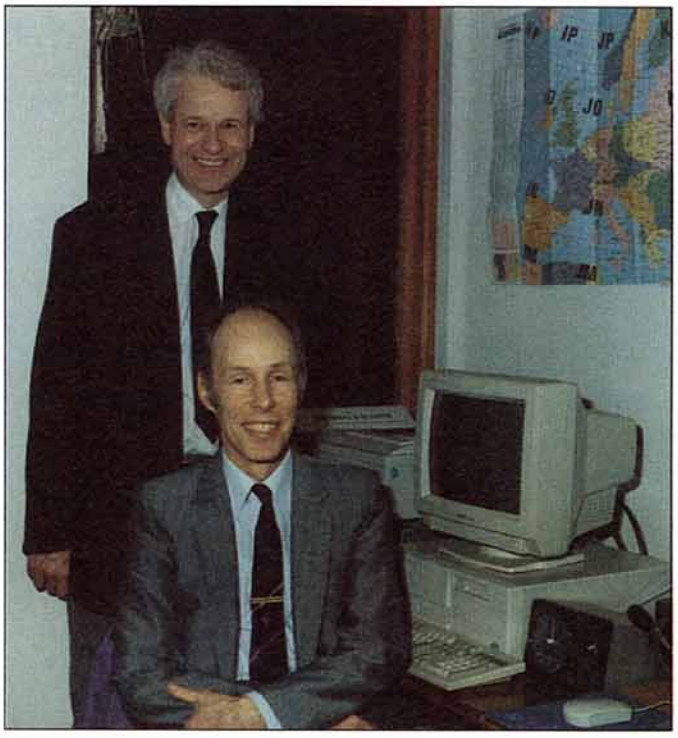
ON THE evening of 1 February, Jeff Stanton, G8XYU, of Waters and Stanton Electronics carried out the official opening of the new amateur radio station and packet radio node at the South-East Essex Sixth Form College in Thundersley.

The opening was attended by the college Principal, Mervyn Francis, several representatives of the Board of Governers, science masters from surrounding schools, representatives of the Kent and Essex Packet Radio Group and several supporting staff from Waters and Stanton.

A disappointment was the failure to repeat a previously successful packet contact by undersea cable to Intermediate School 192 in Bronx County, New York. However, Boswells School in Chelmsford came to the rescue, and the demonstration proved the worth of packet for inter-school communication.

The station comprises a Kenwood TS-790 VHF/UHF transceiver with SM 230 oscilloscope, a PacCom Tiny 2 packet controller and a Yaesu rotator.

The hope was expressed during the evening that students would take up an interest in radio which could eventually lead to careers in electronics or radio communications.



Jeff Stanton, G6XYU (left), of Waters and Stanton Electronics with Dr George Brown, G1VCY, at the official opening of the amateur radio station and packet radio node at South-East Essex Sixth Form College

Kenwood UK Teaches the Teachers

THE NEWLY formed group of educationalists, Science and Technology through Educational Links with Amateur Radio (STELAR) has secured the support of one of the world's leading equipment suppliers.

Trio-Kenwood UK Ltd have demonstrated their commitment to education by underwriting STELAR's first four-day residential course for twenty teachers from schools with no current amateur radio programme.

The course will involve training for the Radio Amateurs' Examination by experienced instructors at Kenwood's headquarters at Watford, and practical demonstrations of amateur radio from Kenwood's permanent station GB2SR. The station will be operating during the evenings of 5/6 April.

Kenwood's support has enabled STELAR to increase the number of teachers using amateur radio and hence to stimulate a future generation of young people to consider the benefits to be gained from it.

New RLOs

THE RSGB Liaison Officer for the **West Midlands** is Tony Faulkner, G0SKG, 105 Corbyn Road, Russells Hall Est, Dudley, W Midlands DY1 2JZ; tel 0384 455502.

The new RLO for **Somerset** is Dick Atterbury, G4NQI, 14 Holloway Road, Taunton, Somerset, TA1 2EY, telephone 0823 333009.

For the County of **Lothian** the RLO is Tom Menzies, GM1GEQ, 31 Pentland Terrace, Edinburgh, EH10 6HD; tel 031 447 3219.

And the new **Isle of Man** RLO is Colyn Baillie-Searle, GD4EIP, of 2 Marguerite Place, Foxdale, Isle of Man, IM4 3HE; tel 0624 801353.

YAOTY

Turn to page 67 for details of how to nominate someone as the 1994 Young Amateur of the Year.

International Marconi Day

SATURDAY 23 APRIL is this year's International Marconi Day (IMD), the date being the nearest Saturday to Marconi's birth date. Coordinated by the Cornish Radio Amateur Club (CRAC), this event has involved a large number of special event stations around the world. It is now in its seventh year and over 500 Marconi Award certificates have been issued to date.

In addition to the stations operating on the VHF and UHF bands (see the list on this page) Marconi Radar Systems HQ in Lancaster will use GB1IMD on a number of amateur satellites, principally OSCAR-13, Mode B (downlink 145.930MHz USB, uplink on the 435MHz band). Other operation may be on O-13 Mode S (downlink 2.4GHz) and RS10 (downlink 28.385MHz). DA0IMD and KK6H/IMD may also use satellites during the event.

History of the Event

THE IDEA FOR IMD came to Norman Pascoe, G4USB, whilst Monty Curtis, G4ZKH was visiting his shack in 1987. Leafing through the archives of the CRAC, Norman came across a report of a special event station run by the club in 1978 at Marconi's transmitting site at Poldhu. They thought it would be a good idea to run another event on the tenth anniversary of that first club operation.

Having secured the support of other clubs in many parts of the world having connections with Marconi, the event was announced and the Cornish Radio Amateur Club agreed to endorse the project.

From this relatively modest start, International Marconi Day has grown so much that the club is having to restrict the number of participating special event stations to thirty to keep things manageable.

Curator Doug Byrne, G3KPO, at the Puckpool (IoW) Wireless Museum where GB0IMD will operate on International Marconi Day, 23 April.

International Marconi Day Stations

Callsign	Location
CT1TGM	Tertula Radio Club, Coimbra Portugal
DA0IMD	Former Marconi Site, off Borkum Island
EI2IMD	Former Marconi operating site, Crookhaven, Eire
EI4IMD	Former Marconi operating site, Galway, Eire
GB0IMD	Puckpool Park Marconi Wireless Museum, Isle of Wight
GB1IMD	Marconi Radar Systems Building, Leicester
GB2GM	Mullion, nr Helston
GB2IMD	The Rathlin Island Marconi Site, N Ireland
GB2MDI	just South of the Figsbury Rings, Salisbury Plain
GB2MID	Marconi Field HQ, Haven Hotel, Sandbanks, Poole
GB2SFL	South Foreland Lighthouse Marconi Centre, Kent
GB4GM	Waunfawr, North Wales.
GB4IMD	Penair School, Truro, Cornwall
GB4MD	The Old Caernarfon Station at Waunfawr
I?????	Marconi's School at Caselecchio di Reno, Bolognia
IY0GA	Cape Figari, Golfo Aranci, Sardinia Island
IY0ORP	500MHz experimental site at the Observatory Rocca di Pappa, Rome
IY0TCI	Instituto Tecnico Industriale GM Civitavecchia
IY1TTM	Tigullio Tower, Sestri, Levante, Nr Genova
IY4FGM	Villa Grifone, Pontecchio
K1VV/IMD	The Cape Cod Marconi Site, Massachusetts
KK6H/IMD	Marconi Park, Marshall, California
OE?????	Radio Osterreich International, Wien
PY?????	Rio de Janeiro, Brazil
VE1IMD	Glace Bay, Nova Scotia
VK2IMD	Wahroonga, Sydney, Australia
VO1IMD	St Johns, Newfoundland
ZS6IMD	Johannesburg, South Africa

For further information, including a picture of the Marconi Award, see this month's *HF News*, *QSL*, *SWL News* and *Novice News* columns.

Norman, G4USB, can supply more details; he is QTHR or can be reached via packet @GB7AKE.#44.GBR.EU.

News Readers Wanted

MAIN AND reserve *GB2RS* news readers are required to provide a 2m FM broadcast for the Glasgow North area. This is to serve listeners not covered by the 10.00am Ayrshire transmission.

RSGB Regional Meeting

ALL RSGB members are invited to a Regional RSGB Meeting to be held on 27 March. The venue is the Elephant and Castle Hotel, Newtown, Powys. Doors open at 1130, for a 12 noon start. This is the first Regional Meeting to take place for many years in this area so come along and meet RSGB officials, including Council Members and the General Manager. Non-members are also welcome to attend.

Milliwatt QSO Success

20 FEBRUARY was the 40th anniversary of the first sky-wave amateur radio contact to be made using a transistor transmitter. To commemorate this, members of the Yeovil ARC attempted to repeat their original achievement.

Using a replica transmitter running only 12mW and a dipole 15ft high, GX3CMH/P had 23 contacts, the best being with GI4LSH some 260 miles distant. There were also several QSOs with G3MY in Sheffield and one with G3TUX in Haslemere, the remote end of the 1954 contact. Derek Alexander, G4GVM, used a similar QRPP transmitter for his contact with GX3CMH/P from near Hereford.

Reward Offered

A NUMBER of boxed FT-840 Transceivers and FT-5200 Dual Band Mobiles were stolen from Yaesu's warehouse on 8 March. A reward is offered for any person supplying information leading to the recovery of the property or arrest and conviction of those responsible. Any information, please, to DC Goodwin of Hounslow CID on 081 557 4015.

1995 Events?

THE SOCIETY is keen to publicise as early as possible rallies and similar events taking place next year, 1995. If you are organising a rally and the date is fixed, please let us know as soon as possible. Many thanks to all of those who have already responded to this appeal when broadcast on *GB2RS*. Please write to: Justine Hodges at RSGB HQ.

Novice on TV

NOVICE EMMA Constantine, 2E1BVJ, has been filmed by the BBC for a programme scheduled for broadcast in early April. The programme *Why Don't You* . . . . (short for 'Why don't you switch off the TV and do something useful instead' - or thereabouts) features hobbies and interests for young people.

West Midlands Snr Instructor

THE NEW SENIOR NOVICE Instructor for the West Midlands is Warwick Hall, G4WMH. He is QTHR and his telephone number is 021 705 0488.

About to unveil the latest Icom goodies at a product launch in Warley, W Midlands, are (l to r) Paul Nicholson, G3VJF (Company Chairman); Dennis Goodwin, G4SOT(Manager, Ham Sales); Chris Gibbs, G8GHH (Service Manager) and Gordon Adams, G3LEQ (Birmingham Shop Manager). What was revealed? See *Product News* this month and last.

RSGB VHF/UHF Award News

SINCE THE previous Awards News, nine applications have been received from overseas. This included two 144MHz applications from Bernd Westphal, DL8AAV, for a Standard transmitting award and 125 squares/20 countries confirmed. Seven were for the 50MHz band: YS1AG with 10 countries, 9H1FP 30 countries and 25 squares, OH9NYW 10 countries, VK4IT 20 countries, LA1KHA 10 countries and Netherlands listener NL213 with 275 squares.

On 50MHz UK short-wave listeners were represented by David Whitaker, BRS25429, with 80 countries and 250 squares and Bob Treacher, BRS32525, with 100 countries.

Jerry Russell, G4SEU, was awarded a six metre Senior transmitting award to add to his collection; Jerry already holds a Supreme Award for his senior achievements on 70MHz, 144MHz and 432MHz.

Beginning her ascent of the awards ladder was Pat Williams, 2E1AFN, who became the first holder of a UK Novice licence to be awarded a 50MHz 10 countries certificate.

Two other notable firsts were those of David Dibley, G4RGK, with 160 squares and 20 countries on 432MHz and Geoff Brown, GJ4ICD, with 500 squares and 140 countries confirmed on 50MHz.

John Hoban, G0EVT, was issued with a Senior transmitting award on 144MHz and a Standard transmitting award on 432MHz. John Arnold, G4NPH, and Roger Piper, G3MEH, were each awarded a 144MHz Senior transmitting certificate.

G4YTL continues his support for VHF/UHF awards by receiving certificates for 40 squares / 8 countries on 70MHz, 30sq / 6c on 432MHz and 275sq / 35c on 144MHz.

A large bundle of QSL cards submitted by John Rogers, G0LAK, for operation on 144MHz resulted in him collecting two Senior transmitting awards and two certificates for 60 sq / 15c confirmed for fixed station and portable operation respectively.

As well as updating her confirmed totals to 100 countries (two-way), 350 squares and DX 100 countries on 50MHz Ela Martyr, G6HKM, gained a certificate with the unusual endorsement 'All Auroral SSB' for 80 squares and 18 countries confirmed on 144MHz. All the contacts to achieve this award were made from Ela's home in Essex using auroral propagation.

Congratulations to all award recipients who include:

50MHz: 10 countries: G0CZD, G0SLR, G1LMZ, G1WSH, G7DEC, G7EWL, G7GGM, G7LJF, GW1SXT, GW6PBW/P. 20c: G0REE, G1HXH, G6XFC, G7EWG, G7JBG, GW8CMU. 30c: G0NFH, G4BAL, G7GMD. 40c: G1EHJ, G1UGH. 50c: G0HVQ, G3KPT, G4SEU, GD0TEP, GU7DHI. 60c: G1SDO. 70c: G0LCS, G8BQX. 80c: GW6VZW. 100c: G3VYF. 130c: G3WOS. 25 squares: G0REE, G7EWG, G7GYS, GW8CMU. 50sq: G0PEU, G4BAL. 75sq: G7GMD. 100sq: G0NFH, GM4ILS. 125sq: G3KPT. 150sq: G1UGH, G4SEU. 175sq: G1SDO. 200sq: GD0TEP. 250sq: G8BQX. DX Award 25 countries: G0NFH, G3DNR, G7HCC, GW8CMU. DX Award 50c: G0HVQ, G3KPT, G4SEU, GD0TEP, GU7DHI.

144MHz: 40 squares / 10 countries: G0GRI/P, G4NPH, G7EWL, G7GYS, GJ6WDK/P. 60sq/15c: G7GMD. 80sq/18c: G8RXH. 175 sq/20c: G0FIG, G8BQX.

432MHz: 60 squares / 15 countries: G4DHI, G8NEY.

1.3GHz: 600km: GM8LWR. 25 squares: G8NEY. 50sq: G4FRE.

10GHz: 300+km: G8LSD, G3JMB. 15sq: G8LSD. Standard transmitting: (20 counties / 3 countries) G8LSD, G3JMB.

Details of the RSGB VHF/UHF awards are contained in the 1994 UK *RSGB Call Book* or may be obtained from the VHF Awards Manager, Ian L Cornes, G4OUT, 6 Haywood Heights, Little Haywood, Stafford, ST18 0UR.

Proton Event in the Press

THANKS TO Laurence Howell, GM4DMA, readers of the *Guardian* were able to share with radio amateurs and other HF operators the knowledge that a major proton event occurred during February. The huge solar flare caused massive disruption of the HF bands for more than a week, and an aurora or two.

Laurence had the opportunity to bring this event to a wider audience when he was commissioned to write part of a weekly feature in the *Guardian Education* supplement which has been following the Transpolar Driftstream Expedition. A number of schools and colleges are using news of the expedition in a variety of lessons.

Describing the affect of the proton event on polar radio communication, Laurence wrote: "Unfortunately the polar regions are very susceptible to these events, and we can expect more, many more, 'no voice communication' days. People in the Arctic have been known to dismantle radio receivers, thinking they are faulty, not hearing a soul for days - let's hope they left their screwdrivers at home."

As communications officer for the Transpolar Driftstream Expedition, Laurence Howell is employing both satellite and HF (using commercial frequencies and a rhombic) to keep in touch with the expedition. Progress reports and details of hazards encountered can be condensed into short numerical codes.

The three man team set off in mid-February to walk 2,215km unsupported across the North Pole, taking advantage of a huge area of ice which is constantly drifting a few kilometres a day from Siberia to Greenland. The expedition hopes to raise £1M for Save the Children.

Digital Broadcasting

THE DTI has said that 217.5 - 230MHz will be used for Terrestrial Digital Audio Broadcasting (T-DAB) in the UK. The time scale for implementation is about two years and most of the country will have access to about a dozen near-CD-quality stereo audio channels for national radio plus up to six local channels in any one location. The second harmonic of part of this allocation falls within the 430MHz amateur band.

144.000 - 145.000MHz Sub-band Proposals

AT THE IARU Region 1 Conference (De Haan, September 1993. See report in *RadCom*, November, p28). it was agreed that RSGB VHF Manager Dave Butler, G4ASR, would convene a sub-committee to discuss and formulate a plan, and later a proposal, for the use of the 2m band below 145MHz.

The following societies, DARC, EDR, REF, RSGB, SRAL and UBA would participate and a report would be presented to the next Region 1 VHF Managers' meeting to be held in 1995.

Band plans are evolutionary: Modes of operation and technologies change; activity levels alter and new techniques are adopted. For these reasons a review of the sub-band 144.000-145.000MHz is now necessary.

Currently the Region 1 Band Plan below 145MHz has assigned the following: CW 150kHz, SSB 350kHz, All Modes 345kHz, Beacons 145kHz.

Do you think the proportions are correct? What changes would you make? Are there any new communication modes that should be provided for?

The 'All Modes' section is used for SSTV, RTTY, FAX, FM telephony and digital communications; how should this area be apportioned?

Before altering the band plan below 145MHz the following points need to be considered:

(i) Many of the transmission modes and techniques currently in use may not be compatible with each other. Therefore it is important to assign frequencies in such a way that all current users can practise the various modes with a minimum of mutual interference.

(ii) Although the All-Mode section is designated as being non-channelised, the current usage is inherently based on 25kHz channels. Any changes to this, possibly by moving to 12.5kHz channels, will have an impact on the usage above 145MHz.

(iii) This is a European-wide initiative. The band plan will only be adopted if it is suitable for all Societies within IARU Region 1.

(iv) Try not to be too revolutionary in modifying the band plan. Changes will need to be implemented by all band users!

(v) Keep your suggestions simple. The aim is to produce a basic sub-band framework of allocations below 145MHz. It is not necessary to allocate the usage of these sub-sections. Packet radio for example can simply be designated as digital communications without the need to specify the actual usage of various frequencies.

The RSGB VHF Committee (via G4ASR) welcomes your suggestions. They should be addressed to David Butler, G4ASR, RSGB VHF Manager, Yew Tree Cottage, Lower Maescoed, Herefordshire HR2 0HP. Communications via packet radio are also acceptable (receipt will be acknowledged) @ GB7MAD.

Scouting Success

LAST AUGUST, Geoff McConnell, GW0DIB, and Mike Rowles, GW4WWN, tried running a scout jamboree station for the first time. They found it "pretty demanding" but " a very rewarding experience". The event was Jamboree Cymru 1993, a ten day camp at Glanusk Park, Crickhowell, Powys.

Operation was on the HF bands, especially 20 and 80m. When they were called by GB0PCP, operator 2E1BZK, it seemed a good opportunity to put Lewis, 2W1BIY, on the microphone for his first 'live' QSO. Amateur radio was just one of the activities available in the marquee, which included bee keeping, photography, electronics and badge-making. Inspired by their success in interesting youngsters in radio, Geoff and Mike are already planning for the next Jamboree Cymru in 1997.

Scouts take a look at GB4JGU during Jamboree Cymru 1993 at Glanusk Park, Crickhowell, Powys.

Practice Your Morse in April & May

DURING APRIL and May there will be an opportunity for Novices, Full Licensees and SWLs to practice their Morse at slow speeds in a popular contest organised by the RSGB's HF Contests Committee (HFCC). The Slow Morse (QRS) Cumulatives take place between 1900 and 2030UTC on the following dates: Tue 5 April, Wed 13 April, Thu 21 April, Fri 29 April and Mon 9 May.

Entrants should send at no more than 12WPM and never faster than the other station is sending. The sessions take place between 3.540 and 3.580MHz with a power limit of 10W. This is an ideal opportunity for members to practice sending good (as opposed to fast) Morse. The HFCC looks forward to hearing as many stations as possible in this event. The full rules can be found on page 83 of January's *RadCom*.

More EMC Advice

WE HAVE had a very good response to last month's offer of copies of the obsolete (but still useful) RA booklet *How to Improve Radio and TV Reception* (see *RadCom*, Feb, p6). The up to date publication from the RA is RA179 *Advice on Television and Radio Reception* and this contains all of the latest information on RIS visit charges as well as the necessary forms. Although not so comprehensive as the old 'glossy' this leaflet is essential if you need to involve the RIS, or you want to advise your neighbour of his/her rights. It is available free of charge from the RA by telephoning 071 215 2072.

Early QE2 Operation

IT IS DANGEROUS for any magazine to claim that anything is a record or a first. It came as no surprise, therefore, to hear from Henry Balen, G4MHB, who sent in a QSL card for a 40m contact with Phil Williams, G3YPQ, who operated from the QE2 whilst employed as a Technical Radio Operator in December 1982. This pre-dates the G3UXO operation (*News and reports*, January) by 11 years.

In addition to operating on HF and 2m from 1982 to 1987, Phil acted as a staging post for an abortive attempt by the West Kent ARS to establish 2m contact with the USA. This attempt to reach the parts others could not reach was, unsurprisingly, sponsored by Heineken.

Henry is emphatic in not wishing these facts to deflate the interest in G3UXO's operation from the liner which will, in any case, be the first in the lifetime of many members' licences.

QSL card used by Phil Williams, G3YPQ, on the QE2 in 1982.

GM Weekend

SCOTTISH ACTIVITY Weekend is the 48 hours of 16/17 April and as many Scottish stations as possible are urged to get on the bands to air their GM, 2M or GS calls. Run by the Scottish Tourist Board (Radio Amateur) Expedition Group, the event aims to encourage activity by Scottish radio amateurs and create a worldwide interest in contacts with Scottish stations. The Scottish Century Award will be available. Further details from Robbie Aitkenhead, GM4UQG, QTHR.

● STOLEN from the Cambridge area in January: Standard C528 dual band radio S/N E300736. Any information, please, to M L Ansell, G1WUA (QTHR).

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The TM255E and TM455E are set to carry on Kenwood's great tradition of superb 2m and 70cm multimodes. Facilities like AIP, IF shift, DDS, dual tuning knobs and a new menu control system will aid operation. They also have a detachable front panel for mobile installation and a dedicated 1200 / 9600 baud data port for packet operation.

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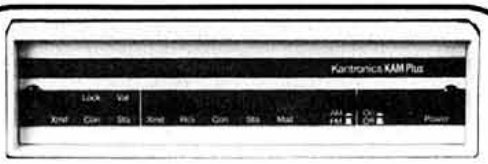

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AND THERE'S MORE OVER THE PAGE...!

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THIS MONTH'S LEADING PROJECT

G2AJV Toroidal Antenna

The first of a two part article by Roger C Jennison, G2AJV*

TOROIDAL COILS ARE used as chokes, transformers and in all sorts of circumstances where the magnetic flux is required to be contained entirely within the system. Most of us assume that this implies that the toroidal coil is completely isolated from all nearby objects and certainly from equipment thousands of miles away. As we shall see, this total isolation is a myth.

I originally constructed the apparatus in **Fig 1** because I had reasoned that it should form the basis of an antenna and I needed to demonstrate to my students, and to myself, that this was really the case. I also reasoned that the more efficient the toroidal coil would be in trapping the magnetic field, the greater would be the electric field produced.

Fig 1 shows a prototype model. It comprises an air-cored toroidal coil of about 20 turns. It is resonated with a small capacitance and fed at 14MHz via a two-turn primary. The coil matches straight into the cable but doesn't get hot if it is supplied with radio frequency power, so where is the energy going? A little of it is dissipated in the surroundings from the electric induction field but we have taken care to contain the most intense electric field between the two well insulated metal plates [see warning 1], above and below the coil, so that the stray field is minimal.

> The antennas described in this article are radically different from any previously published designs. Provisional tests, by the *Radcom* team, of a 20 metre mobile model indicate that it has a wide bandwidth and is every bit as good as a traditional centre-loaded low loss mobile antenna. We feel that it is not a beginners' antenna and the warnings at the end of the article *must* be heeded.

THEORY OF OPERATION

SO HOW CAN A STRUCTURE like this work as an antenna? The answer lies with our old friend James Clerk Maxwell who, in 1873, postulated that light was electromagnetic in nature and that electromagnetic radiation at other wavelengths should be possible.

In order to make his arguments consistent, Maxwell had to predict a new sort of current, the displacement current, which did not require the presence of conducting wires. It could not only pass through the dielectric in a capacitor but could also propagate over great distances through the vacuum of space. Indeed, he showed that empty space has its own dielectric constant, or permittivity.

Maxwell's equations permeate the whole of our hobby, but most of us can get by without having any real idea of what they are or what to do with them. Nevertheless, after a hundred and thirty years, we can still discover that they have some surprises

What concerns us here is an equation which connects the displacement current with one aspect of an alternating magnetic field. When an RF current is applied to a toroidal coil it causes a magnetic field to alternate to and fro along a circular path within the coil. Because the two ends of the coil are in close proximity, very little of the magnetic field escapes, it just curls around within the space inside the torus.

Now the relevant Maxwell equation states that if the magnetic field curls it will produce a displacement current at a right angle to the magnetic field, and therefore near the axis through the middle of the torus. The strength of the displacement current is dependent upon the intensity of the magnetic field and the frequency with which it alternates. If we thread a wire through the middle of the torus, the displacement current will run along the wire. If the two ends of the wire are then connected to a load we will get a conduction current (we will have made a transformer) and all the power will be converted to heat in the load.

This is one way of tapping the displacement current from a toroidal coil, but what happens if we remove the secondary wire? The displacement current can collapse back whence it came, or it can radiate into space as Maxwell predicted. If it goes off into space then the coil will continue to accept power

Parallel tuned 18MHz toroidal coil swung into the vertically polarised position. Regular contacts between Kent and the north of Scotland have been made with this antenna at ground level. The vacuum tuning capacitor can be seen inside the clear plastic jar with a red lid at the bottom left of the coil.

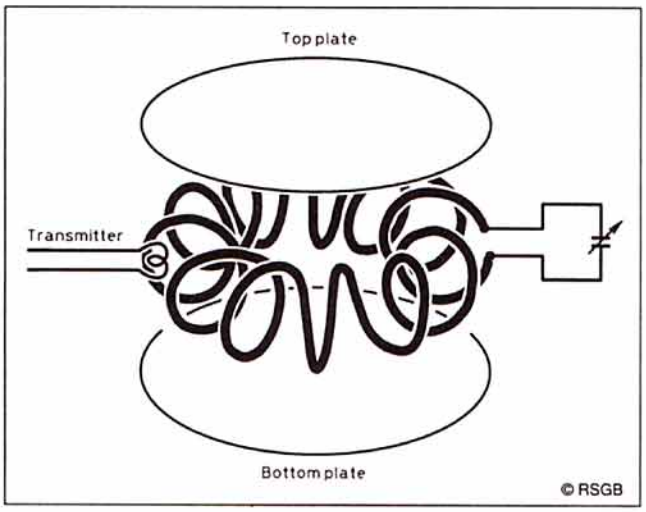


Fig 1: The prototype single toroidal antenna.

from the oscillator without getting hot and yet it should present a finite resistive impedance at resonance. That is precisely what does happen.

Over the past ten years I have made a whole variety of antennas using this principle. They are essentially very short dipoles, so one should not expect high gain from them. A simple wire dipole, very much smaller than the wavelength, behaves as though it has a tiny capacitance in series with its radiation resistance. This has to be tuned out with a relatively large inductance in order to match the transmitter to the radiation resistance and this inductance always has ohmic losses. The toroidal coil exhibits a similar property but, because of the geometry of the system, the losses are far less. Additionally, these antennas are easy to match so that one does not have the problem of a lossy matching network.

It is appropriate at this point to consider why some systems radiate well while others show little incentive to do so. The key to this really lies in the little demonstration of the flow of the displacement current guided by a secondary wire passed through the centre of a toroidal coil, which I mentioned earlier. Any changing current in a wire moves along that wire millions of times faster than the speed of the electrons. The flow of energy and information is in the field system of the wave which surrounds the wire and penetrates its surface in the microscopically enormous gaps between the conduction electrons in the lattice of the conductor. The electrons simply guide the current but move only very slightly in the process.

When a current flows in a cable it is accompanied by a magnetic field which can be looked upon as being generated by the changing electric field. As the greatest rate of change of the electric field occurs in the steepest part of its waveform where the electric field goes through a minimum, the magnetic field is a maximum at these epochs. This is illustrated in **Fig 2** which shows, in skeletal form, the field distribution travelling down a transmission line. The dotted circle is not observed but it is the key to the phenomenon. It represents a complete loop of displacement current as it would appear if the conducting boundaries were not present.

Because the boundaries have been introduced, the displacement current is forced into a geometry where it travels straight across between the wires and flows as a conduction current along them. One can look upon the displacement current as the driving force behind the whole phenomenon of a travelling wave and it takes us to the next step, how a wave may travel through completely empty space, and how to launch it so to do.

If we excite a resonant dipole with radio frequency energy it pours out a succession of similar closed loops of displacement current in a broadside direction. This is because the displacement current has to complete the circuit by curving through empty space between the two conducting halves of the dipole in which it appeared as a conduction current. When the current in the dipole changes, a loop is shed off and another starts to form to take its place. One such loop, with subsidiary contour loops to show the gradient, is depicted in **Fig 3**.

This loop will move away from the antenna at the speed of light and another loop will take its place so that, ultimately, we have a continuous stream of loops diverging into space. When they are very far from the transmitter they will be separated by half a wavelength but they will be extremely elongated parallel to the direction of the original dipole and we may then look upon the system as a plane wave.

Now we turn to the radiation from a toroidal coil. This is, in many ways, the easiest to visualise. We have already seen that displacement pours out from a toroid. This displacement current has to form complete circuits and the configuration generates the loops *directly* into space, as illustrated in **Fig 4** in which the torus is shown, greatly enlarged, as the black silhouette at the centre. The geometry of the system is ideally suited for this purpose and, as we have seen, the displacement current is extremely intense.

RadCom's Peter Dodd, G3LDO, shows a flourescent tube being illuminated by RF from a mobile antenna built to G2AJV's design.

TYPES OF TOROID ANTENNA

I HAVE DEVELOPED DIFFERENT types of this antenna in addition to the parallel tuned model shown in Fig 1. Essentially, these are the twin toroidal single ended antenna and the twin toroidal dipole antenna.

The single ended twin toroidal antenna is shown in **Fig 5**. I have made them for 2, 20 and 80 metres and their characteristics are all similar. A useful feature of these twin toroidal antennas is that they have a wide operational bandwidth. Although they exhibit a sharp resonance, the resonant frequency does not correspond to the maximum radiation efficiency. They simply require the maximum change of flux in the coupled toroidal systems which effectively form a band-pass circuit.

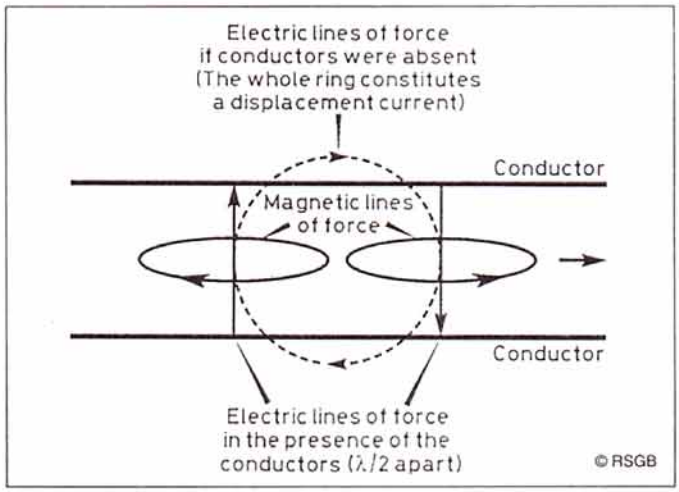


Fig 2: Field distribution on a transmission line.

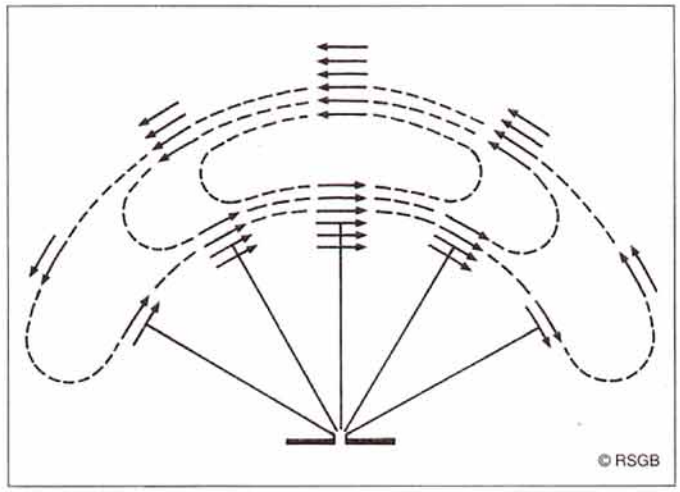


Fig 3: Displacement current on a dipole.

With all these antennas the E field lies near the axis of the toroid so in this case the antenna is vertically polarized.

TWO METRE MODEL

YOU MAY LIKE TO TRY and experiment with the double toroid antenna by building a 2m model. The antenna is fed, single ended, straight into the lower toroid, so that one can mount it directly into the same socket as the usual whip antenna. It matches directly and has a bandwidth covering the whole band.

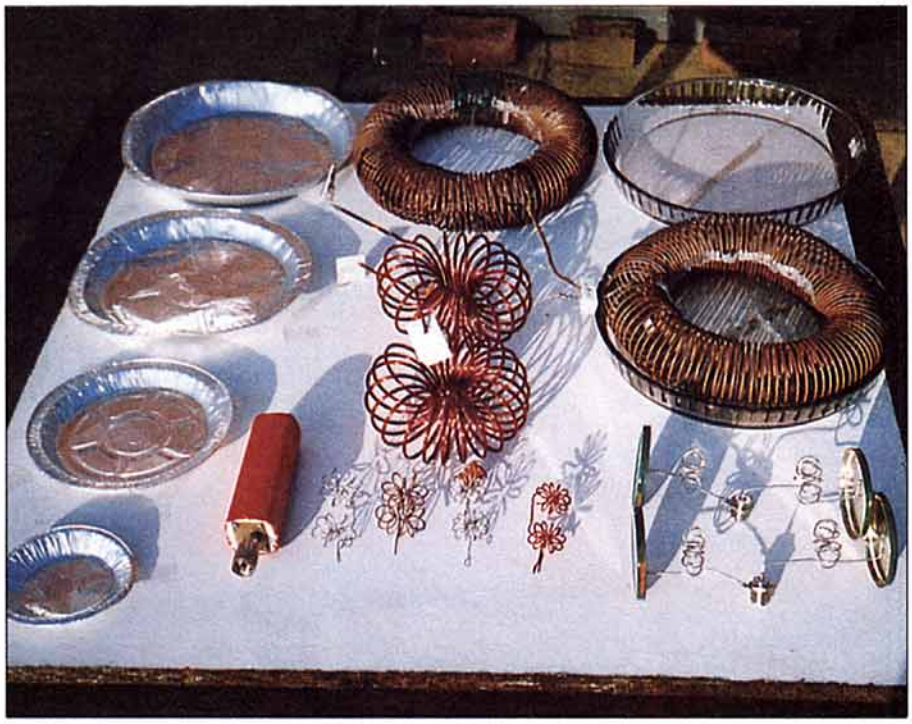
To make one of these you just take about 90cm of 18SWG copper wire. One inch from one end you wind it round a temporary mandrel 0.39 inches in diameter (such as the shaft of a 25/64 inch drill). Wind twelve turns, then a straight section of about two and three quarter inches and finally another twelve turns. Remove from the mandrel.

Curve each of the twelve-turn sections round to form a torus with a minimal gap between the end turns of each so that the magnetic field is nicely contained. You may have to trim this antenna slightly but there is a good chance that it will work straight away and it is easy to make another one if you slip up. By the way, the two coils should be wound and fed in the same sense, eg clockwise in each case, and the wire between the two sections should be on the outside of the windings, ie remote from the central axis.

If you haven't got anything 0.39 inches in diameter to use as a mandrel, all is not lost. You will still require about the same total length of wire but the number of turns will be different. With the shaft of a half inch drill you will require eight turns in each section and it is better to use 16SWG wire. In all cases make sure that the turns do not touch at the inner circumference of the torus.

After you have tested the skeletal system you can slip the whole assembly snugly inside a stubby length of thin plastic tubing, such as the sawn-off case of a discarded torch, and mount it on a standard coaxial plug to preserve it from the elements and vandals. The lower torus should be about three quarters of an inch above the top of the plug, this affects the efficiency but check it for yourself. The tube introduces a small loss in output. It should be possible to pot the assembly in a light plastic foam but I have not tried this.

Recently I showed this two metre antenna to my old friend Ivan Cline, G3EMU. He was suitably impressed but he then recalled that many years ago, in the days of two metre AM, he used to receive quite strong signals from another amateur many miles away with a prominent hill en route. The other operator was using an artificial aerial but he loaded it with a coiled-coil filament lamp. Neither of them had thought about Maxwell!



A selection of toroidal antenna components: the cheap aluminium foil picnic plates are very useful for end capacitors. In the centre, coils for 18 and 21MHz can be seen – each must be combined with a twin coil to form a dipole. Rear centre is an 80m coil and to its right a Pyrex dish (more about this next month). The spidery objects are VHF antennas.

Fig 4: Displacement current on a toroid.

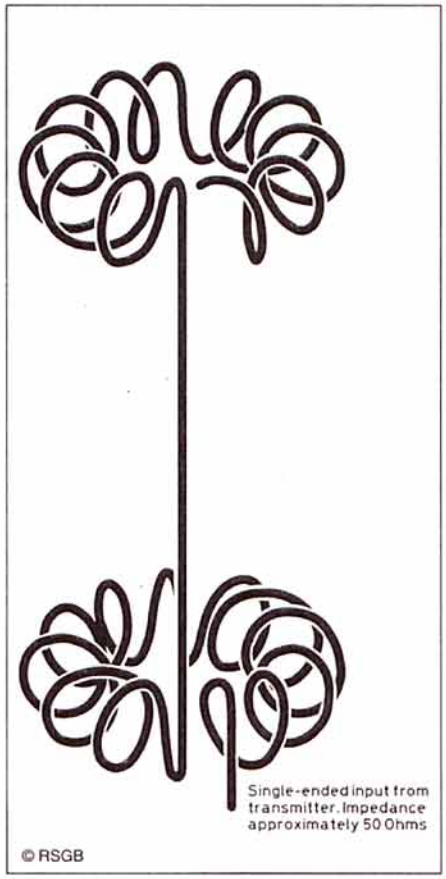


Fig 5: Twin toroidal antenna.

. . . to be continued

* **NOTE:** These antenna designs are copyright: Emeritus Professor Roger C Jennison, BSc, PhD, CEng, FIEE, CPhys, FInstP, FRAS, PPIE, FRSA, Nackington, Canterbury, CT4 7AY. (This does not apply to non-commercial do-it-yourself construction).

WARNINGS

[1] Do not to touch these plates when the antenna is energised or you will get a very nasty radio frequency burn, for the potential between them may sometimes reach 20kV.

[2] Very high displacement currents exist at the centre of these toroid coils. If the coils are supported at the centre using lossy plastic or wood, not only are the losses high but there is a danger of overheating and fire. This warning is particularly relevant if the antenna is mounted in a loft. Toroid wound coils must be supported on the outside and the method of construction will appear in part two.

NEXT MONTH

IN PART TWO, Prof Jennison goes further into practical experimental HF toroidal antennas.

RADCOM NEWS FEATURE

ZD9SXW on CW from Tristan Da Cunha

The first of a two-part feature by Roger Western, G3SXW

TRISTAN DA CUNHA (British; population 300; 37°S, 12°W in the South Atlantic; six days sailing from Cape Town; nearest inhabited land St Helena 1,300 miles North) is known as "The Loneliest Island in the World". The island is 10km across and 2,000 metres ASL at the peak and is best known because the whole community was evacuated in 1960 when the volcano erupted. In October 1993, ZD9SXW made 23,300 CW QSOs on a one-man expedition.

A Dream

I HAD A rare opportunity to take six weeks off work so the priority was to choose a DXpedition location that was rare (especially on CW) but which could not normally be achieved due to travelling time. The necessary long sea voyages to many DX locations can make them impractical for anyone in employment.

I had always dreamed of visiting Tristan da Cunha; its extreme isolation makes it fascinating. So I contacted Andy, ZD9BV, one evening early in 1993 to ask about visiting the island. His response was immediate: "Come and stay with me". Amateur radio is really wonderful when a complete stranger is welcomed so warmly. But how to get there? There is no air transport and the only scheduled vessel visits once a year for 48 hours, but the other regular ship, the *S A Agulhas*, re-supplies the island each October and can return you to Cape Town after a three week stay on the island, very suitable for an expedition.

The next six months involved vital weekly 21MHz SSB skeds with ZD9BV and XYL Lorraine, ZD9CO as communication by mail or even telephone is not easy. Phone calls and FAXes to Cape Town and the island resulted in permission for the visit and the voyage. I sent my UK licence and I applied for the call ZD9SXW.

Roger Western, G3SXW, working the CW pile-ups from ZD9SXW. The three-week operation logged 23,300 QSOs.

Preparations

I WOULD bring my TS930S and linear but what about antennas? Andy had a 3-element beam for 20/15/10 metres. I would supply antennas for the rest of the bands. The Cushcraft A3WS 3-ele beam was a natural choice for 18/24MHz and I decided to take the GAP Voyager DX-IV vertical for 160/80/40m. These were shipped to S Africa.

An antenna for the 30m band would be made from the tubes of a Butternut vertical and a 160 metre dipole was prepared as a back-up; it could be cut down for any band.

Keyer, connecting cables, wattmeter, torch, soldering gear, computer and paper-logs, slide and print film, spare batteries, connectors of all types, fuses, compass, waterproofs, medicines, passport . . . . the list grew and grew with essential items. It all took a long time to pack.

The day finally arrived and the feeling of anticipation was unbearable. Travelling to places like Swaziland, the Solomon Islands, The Gambia, Morocco had been major experiences in my life but the prospect of visiting so remote an island suddenly caused an enormous wave of excitement.

Cape Town

I ARRIVED in Cape Town on 20 September, two days before the ship's departure. The TS930 was rapidly installed in the hotel bedroom, without which it looked strangely unfurnished. A local phone call confirmed that the two beams had already been loaded on the ship. Excitement mounted as I took a taxi for my first view of the *S A Agulhas* - 3,600 tons, 100 metres long and 42 crew.

We sailed directly to Tristan da Cunha. I slept well that night, after a day of excitement and carrying luggage. The passengers consisted of several returning islanders, the helicopter crew from the S A Air Force, the replacement team for Gough Island, plus several specialists journeying to Tristan: dentists, asthma researchers, an educationalist, a conservationist to inspect Gough, an optometrist, two scientists from Cape Town museum to collect the skeleton of an unusual species of whale, and an ornithologist.

Band	Any	Europe	UK	Americas	Japan
160	PY1BVY	GW3YDX	GW3YDX	PY1BVY	None
80	PY1BVY	LZ1GC	G3COJ	PY1BVY	JA8CDT
40	DK2FG	DK2FG	G3TXF	W3UM	JR1FYS
30	JA3EGE	DL3SDP	G3RTE	K9AJ	JA3EGE
20	W8HFY	F2NB	G2HPF	W8HFY	JA8CEA
17	OH2BDP	OH2BDP	G4BWP	W4AI	JA2MGE
15	SM5AQB	SM5AQB	GW3CBA	W1MLG	JR1BVU
12	ON5TW	ON5TW	G3RTE	W4AI	JA7HMZ
10	F6AQF	F6AQF	G3TBK	K9CW	None

Table 1: The first stations worked.

G3SXW/MM

THE SHIP'S Captain agreed to my operating from on board. He stipulated that I must obey the ship's radio officer who suggested I operate in the Meteorological Office. A major objective of the voyage was weather observations so there were three South Africans with a large laboratory, computers and equipment, twice-daily helium balloons etc - all very fascinating. The eighteen weather buoys to be laid at precise co-ordinates around the Atlantic would transmit data every 90s to satellites and would float with the currents.

My rig was bolted to the bench (an ominous sign). In an isolated corner I found a plank and rapidly attached a 20m dipole, tied to railings. Early evenings saw excellent openings to Europe/USA and many rag-chews with friends. The very first QSO was with 8J1RL, the Japanese Antarctic base which fascinated my meteorological friends. The reports from Europe and USA were still 579-589 even when I reduced power to 20W! It's amazing what an excellent take-off salt water provides.

It was fun to do /MM for the first time and I enjoyed those 150 contacts. It also helped to keep the DX world informed of progress. On the last night at sea ZD9BV reported severe storms on the island including structural damage. Would we be able to land?

Roaring Forties

40° SOUTH is famous for its roaring winds and currents from the Antarctic, and the ship's stabilising system was not working. On the fourth day we met a weather front, winds reached 40 knots and the sea boiled. The ship rolled 25° all day and at last I had a real excuse for CW errors as my chair kept sliding around the room! I was on the helicopter-deck when the ship went into a 45° roll and I saw a guy running towards the low railing, unable to stand still on the empty sloping deck. If he had not fallen flat on his back he would have surely gone overboard. Cabins were flooded, furniture was damaged, and it was amazing no-one was injured. The Captain later said "We like to make each voyage memorable"!

Tristan - at Last

WE DROPPED anchor at dawn 500 yards off Tristan and waited for weather conditions to permit landing. Winds were so bad that even the helicopter was grounded. Eventually the swell eased and at 11am a small motor-boat came out of the harbour and several Tristanians climbed the rope ladder onto the *Agulhas*. One family reunion was especially emotional, a daughter who had stayed in England in 1962 hugging her father for the first time in 30 years.

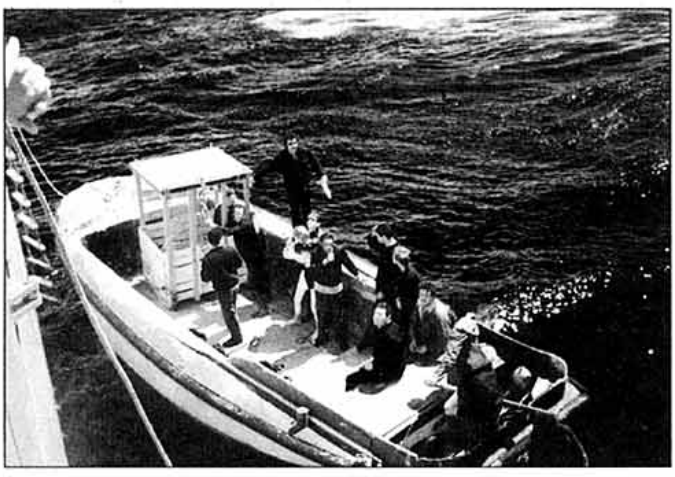
With everyone and their luggage packed into this tiny boat we made our way to the harbour in seas that were far rougher than appeared from the decks of a large ship. After a few minutes the right wave was chosen and we rushed into the harbour, followed by big waves. On the quay was a large group of islanders and someone pointed out Andy and Lorraine. Can you imagine that moment of greeting? The sun was shining brightly, it was noon and I had landed safely on the most remote island in the world, and was embarking on three weeks of pure joy. The thrill cannot be described.

Settling in

I WAS PRESENTED with my ZD9SXW licence at the Administrator's office then took a five minute walk through the village to my new home for the next three weeks. It was a single-storey building with plenty of room inside. My bedroom was just by the large shack. After a welcoming lunch - Tristan crayfish. it was party time sitting in the sunshine and drinking beer. Everyone was enjoying the occasion and laughing at every opportunity. Throughout the stay I found all Tristanians so warm and welcoming, and it reminded me of a small English country village.

Mid-afternoon on 29 September my cabin luggage arrived so I set up the TS930 and checked the SWR on Andy's tribander. Equipment in the *Agulhas* lock-up, including the linear and antennas, were to be delivered the next morning.

The bands sounded good. HF signals were loud from Europe and the Americas but I quickly realised that the S1 hiss was the receiver noise floor. That's never audible at home and I'd forgotten what it sounds like! Those 'loud' signals weren't moving the S-meter at all. I sent my call-sign once on 21,023, the published frequency for that band, and SM5AQB instantly sent his call once and fast. It needed only one diddle-diddle-dit dah-dit dah-dit from me and the frequency exploded. The pile-up remained large throughout the three-week stay. That first three-hour session on 15 metres provided 450 contacts, running barefoot. I fell



Disembarkation from the *Agulhas* is by a box lifted into the motor-boat by the ship's crane, four people at a time.

The village where all 300 people live on the only flat land on the island.

exhausted into bed at midnight when the electricity went off and ready to wake at 7 a.m. before it came back on again, a routine that became regular on most nights over the next three weeks.

Twenty metres was excellent the next morning and 320 QSOs were logged in that session. During the morning the rest of the luggage arrived and I was able to get the linear going, but still with just the one antenna. Each day I would have lunch with Andy and Lorraine but the rest of the day I was left alone, exactly what a pile-up operator likes.

Antennas

THE TRIBANDER was fine, although fixed on Europe. It was a TH3 on a 40ft triangular tower and the traps were big enough for high power. Andy had prepared a ground mounting and 20ft steel pole for the A3WS 18/24MHz beam which I built the next morning. The SWR was very good, even though the beam was at 45° and the reflector almost on the ground. At 1600UTC on 1 October I sent my callsign on 24,893kHz, ON5TW called and there ensued 150 contacts in the next hour. It felt very good to make the WARC bands available for the first time from ZD9.

Permission to install the GAP vertical temporarily on public land would take a day or so but I wanted to get on 40m that evening after HF died out. An inverted-Vee was quickly attached to the tower. That evening saw 300 contacts go into the log on 40 metres, with DK2FG being first.

The following morning it was time to build the 30 metre vertical. Meantime, 17 metres provided 330 contacts, still with the beam on the ground! OH2BDP was the first ever to work ZD9 on that band. The delays in getting all antennas working would of course have been a major problem if this had been a one-week expedition but with three weeks on the island there was time to let things develop.

By 8 October the GAP was up and working though not on 40m for some reason. Not to worry though because that simple Vee was performing very well on forty. Finally, the full nine bands were available. After using the GAP for a week, with very good performance on 80 but less impressive top-band results, there was a big storm on the night of 13/14 October.

Wind speeds picked up to 60kph, with stronger gusts, roaring down the sheer 700m cliff straight onto the antennas. At dawn the disaster became apparent: the middle section of the vertical had simply buckled out mid-way between the guys, which had themselves withstood the test. There was nothing for it but to take the thing apart. At least there were several hundred 160/80 metre contacts in the log by then.

Before leaving I extended the 40m Vee into an 80 metre dipole but of course from only 40 feet it performed more as a low dipole than a Vee.

. . . to be continued

THREE WEEKS on the air from ZD9SXW.

HF NEWS

JOHN ALLAWAY G3FKM
10 Knightlow Road, Birmingham B17 8QB

MORE ABOUT the International HF Convention 7-9 October: As mentioned last month this year's programme will be a broad one and should appeal to all interested in HF. Part of the programme will be directed at the new DXer and should appeal to those starting out to work their first 100 countries. Come and learn some of the tricks of the trade from newly licensed amateurs who have already established themselves in the DX field.

Another topic will be 'Computers in the Shack'. Hear about hardware and software selection, the many applications now in use in the amateur field as well as possible future trends.

Full details next month but in the meantime contact Neville, G3NUG, (QTHR) to put your name on the mailing list for the programme and application form.

Congratulations to Alex, G3KKJ, who led the 1993 WARC Bands Table. He produced a hat trick of scores, coming top on all three bands. A new – 1994 – table starts this month, but do readers think that the 1993 table should be used to form the basis of an '*All Time*' WARC Bands Table?

DX NEWS

A RECENT *DXCC News Release* from ARRL says that documentation has now been received and approved for the following operations: C53GK (19.5.92), D2SA (15.9.93), J5TUBA (27.4.93), JT1/KB9IBZ (10.11.92), T5/TU4EC (10.12.92), TR8YA (8.4.92), TU4EC (30.4.92), TU4EF (7.7.92), TU5AX (25.11.92), TU5BA (11.12.92), TU5BD (11.12.92), V26A (28.10.93), VP9/K8PYD (22.11.93), VP9/WB8YJF (22.11.93), XU5DX (1.1.93), XU5SE (1.1.93), YI1RJ (22.10.91) and 5R8DK (17.3.93). It also notes that the use of all bands 1.8 to 28MHz (including WARC) is now permitted in Angola.

Two further releases said that the number of unprocessed applications at the end of January was 449 (40,710 QSLs). The DXCC Desk had received 909 applications (66,054 QSLs) for endorsements and new awards during January. At this time the turn-round time was two weeks. Tom Hogerty, KC1J, has been transferred to a new position of Special Projects Manager, and his place as DXCC Manager has been filled by Bill Kennamer, K5FUV, who writes *How's DX* in *QST*.

I have heard from Alex, RA1NL, who tells me that his friend Fyodor Kondratiev was due to start operating from his ship *Baltiysky-42* during February. His callsign will be RN1NW/MM and he will be using an FT-102. JW5EBA is on Hopen Is, **Svalbard,** and using CW and SSB on most bands. He should be there until July. *RSGB DX News Sheet* says that **Moldova** has now been divided into five areas (ER1 – ER5). ER6 – ER9 are for special purposes and ER0 is reserved for foreign amateurs visiting the country. JA3MNP might be returning to **Mount Athos** in May – there have been problems with the RTTY equipment which has been repaired and will be returned at that time.

There is reputed to be a new station on the air from **Niger.** The operator is Japanese and his callsign is 5U7Y. A22MN, in **Botswana**, is now said to be active daily between 24.945 and 24.950 MHz from 1600. According to the *Long Island DX Bulletin* D2EGH, in **Angola,** is often near 14.201, or 14,225MHz between 2000 and 2300 and is in the habit of announcing his schedules for the following day. ET3RA, in **Ethiopia**, is frequently near 21.250MHz from about 1600. The *Lynx Dx Bulletin* says that J28RP, in **Djibouti**, has been found on 7.043 and 7.055MHz around 2030. Pierre, FT5XJ is located on **Kerguelen Is** and is expected to be there until July. He has been heard in the UK on 14.187MHz at around 1600. *RSGB DX News Sheet* says that he has 100W to a dipole but was hoping to acquire a beam. In 1995 he may move to FT5Z – **Amsterdam Is.**

SM5BQB has returned to **Fiji** and he is on the air as 3D2QB. He is expected to be there for about a year. JA1CMD was due to be on the air from **Saipan** between 27 March and 1 April using the callsign KH0/JA1CMD but operation may be confined to CW on 3.5 and 7MHz only. SM6CAS and SM7PKK are expected to be visiting **Banaba Is** between 27 March and 5 April. SM6CAS has the callsign T33CS which he will use on SSB, and SM7PKK has T33KK which will be used on CW. Activity will be mostly on 14, 21, and 28MHz but SM7PKK will try to use 1.8, 3.5, and 7MHz CW as well.

According to *DXPRESS* Brian, VP8CFM, has been assigned as Base Commander at the British Antarctic Survey Base in **Antarctica.** He should be there for one year and will be using either the base callsign VP8HAL or his own which is VP8VFM. Another new station in the same area is 3Y9YBA who is LA9YBA and located at Bluefield Camp in the Tierro Mountains. He has been found near 10.102MHz at about 0100. AT3D is located at the Dakshin Gangotri base which is under Indian administration and has been reported on 14MHz SSB. According to *RSGB DX News Sheet* the following other stations in Antarctica have been active recently – IA0PS (Terra Nova Bay), LU1ZA (Orcadas Base), CX0CMK (Cheriffe Base), ZX0ECF (Ferraz Base), and OA0MP (Macchu Picchu Antarctic Base, S Shetlands).

The 'Camel Train' will be on the move again beginning on 15 April. Range Rover *Discovery* vehicles will be used and the route followed will begin in Iguazu and go through Paraguay to Antofagasta on the Pacific coast of Chile. All bands from 1.8 to 28MHz may be used and callsigns to be used include LU/G4SMC and CE/G4SMC. G3KOX, G3PSM, G3SED, and G4CVI may also be heard.

S21AM, in **Bangladesh**, is often near 14.185MHz after 1200. *RSGB DX News Sheet* quotes rumours coming from 9M6DZ which say that there may be an

BAND REPORTS

Many thanks to the following for sending information from which this part of the column has been produced: G2HKU, G3s EUE, GVV, YRM, GJ4GG, GW4KGR, G4OBK, G0MHC, and the UK DX Cluster via G4PDQ. Callsigns listed in italics are of stations using cw:

1.8MHz
0000 *A71CW, HZ1AB, P40O, VP2EC, VQ9RM, XE1CCB, ZS6NW, 5N0MVE, 9M2AX.*
0300 *P40GG, PY0FF.*
0700 *FM5BG, HH7PV, N7CL(AZ), PJ9JT, PY2DP, TI4CF, VP9AD, YS1RRD, XE2/N6XQ.*
1700 *ZL2JR.*
2000 *VK3IO, VR2BH, 4K2MAL.*
2100 *D2EYE, HV3SJ, JA, VK6HD, VS6WV.*
2200 *JR6PGB, V85AA, ZA/OK2PSZ, Z21HS, ZD8Z, 6W6JX.*

10MHz
0000 *A22DX, VP8BZL, ZD8M, 3Y0PI.*
0800 *4K2MAL.*
0900 *KL7XD, ZL4SEA.*
1300 *T30RT, ZA1E.*
1700 *DU3/W4NXE, JT1CD, V85KX, VQ9QM, VR2HB, 5B9FR.*
2000 *HZ1HZ, PJ8AD, TL8NG, 8Q7AB.*

14MHz
0700 A35MR, ET3SID, T30EB, 3Y0PI.
0800 A35KB, AH8C, FK8GT, KH0AC, P29DX, S92SS, SV2ASP/P, *TR8LT, YI9CW.*
0900 BZ5HAN, *JH1KSB/JD1*, PY0FF, V85PB, 9M2/G3NUG, 9M8DB.
1100 HS0ZAR (LP), LU8VCC (LP), VR2BH.
1500 AP2JZD, HS0/G4UAV, S21B, YK1AO, 7Z1IS, 9V1ZJ.
1700 D2SA, KL7XD, S79MD, T32BB, VR6CB, XX9AS, ZS8MI, 5R8DG, *7Q7TA, 9X5HG.*
1800 *A35MR/P*, AT3D, *FH/F5NCU, KH6CD*, ZS8MI.
2000 C91AI, I2RAO/HK0, KC4AAA, ZD8KZR, ZL3AAA, ZS9A, *3Y0PI, 8J1RL.*

18MHz
0900 *A71CW, D2EV, FK8GJ*, P29WJ, ZD9BV, ZL4DJ.
1000 A35KB/P, KL7XD, VP8BZL, XV7VK.
1100 KH0AC, *P49I, VU2OXX, 3Y0PI.*
1300 PJ2MI, TL8NG, ZA1MH.
1600 C93BM, I2RAO/HK0, 9G1UW, 9Q5KM.

21MHz
0800 A71A/QS, BY4RSA, 3Y0PI.
0900 A71BY, *BV7FC*, BY4BX, *TR8XX*, VS6CT, 3X/EL2BS, 4S7IP.
1000 A61AF, D2SA, ET3SID, S21YC, ZD8Z.
1100 *BV7FC*, C53NG, ET3RA, *HS0ZAR*, P29DX, ST0K, XV7VK, ZL, *8Q7AB.*
1200 A71BA, *FJ/N0IMH, FR5BT*, FR/JE8XRF, S21AM, ZD7GWM, 3Y0PI.
1600 ET3SID, FH5CB, I2RAO/HK0, *VQ9CM*, ZS8MI.
1800 SO1MZ.

28MHz
1000 A22EX, A45XI, *FH/F5NCU.*
1200 *ZS6PW* (beacon), ZY0SQ, 3Y0PI.
1400 *CU2BJ*, HC2RG, J28RP, J37ZA, 3B8FQ, 9G1SD.
1500 D2SA, FH5CB, KB6NUY, V2/VE3BW, V51BG, W7KMZ.
1700 HC6LR, 3Y0PI.

1994 WARC BANDS TABLE

	10MHz	18MHz	24MHz	Total
G4OBK	13	47	36	96
G0MHC	20	28	11	59
GJ4GG	10	20	7	43
G3IAR	26	11	1	38

expedition by some Malaysian amateurs to the **Spratley Is** "sometime around Easter". If you contacted A71A/QS it was a special call used by the Qatar Scouts. A92FV is ex-ZC4DG and will be in **Bahrain** for a little longer.

RSGB DX News Sheet repeats a message received from NT2X on behalf of the Armenian Radiosport Federation. This says that a pirate using the callsign EK7M has been very active – mostly on 3.5 and 7MHz. He is not located in **Armenia** which does not issue calls with one letter suffixes.

Terry Langdon, W6/G3MHV, now has a Japanese callsign – 7J6ABN. Citizens of any country can now be issued with a Japanese call if they have a full licence (not reciprocal) from the USA, Germany, Canada, Australia, France, Korea, Finland, or Ireland.

IOTA DIRECTORY

A REMINDER that IOTA (Islands On The Air Award) is now one of the top international award programmes. Seven foreign language versions of the *Directory* are now available (the latest being Russian) The current *Directory* consists of 60 pages. and is available from: RSGB IOTA Director, Roger Ballister, G3KMA, La Quinta, Mimbridge, Chobham, Woking, Surrey GU24 8AR (to whom cheques should be made payable) and the cost is £6, US$ 10, or 15 IRCs (for European applicants), or £7, US$12 or 18 IRCs to others. The price includes postage. There will be an IOTA Contest run by RSGB on 30 and 31 July.

INTERNATIONAL MARCONI DAY

THIS WILL BE celebrated on 23 April – the Saturday nearest to Marconi's birth date. There will be up to thirty special stations active during the 24 hour period including GB1IMD located at the Marconi Radar Systems building at Leicester, a station from the location of Marconi's school near Bologna, GB4MD from the old Caernarfon station at Waunfawr, and many others from sites of significance connected with Marconi.

The isolated location on Atafu Atoll, where ON4QM operated as ZK3DM.

As usual there will be a special award issued and the requirement for this year's award is to work/hear 12 different participating stations. The award for transmitting amateurs costs US$10, £3.50, or 12 IRCs, for listeners US$5, £3, or eight IRCs. Claims which must include full log extracts of stations worked/heard must be sent to CARC, IMD Awards Manager, PO Box 100, Truro, Cornwall, TR1 1RX [see this month's *QSL* for details of the certificate – *Ed*].

Norman Pascoe, G4USB, Chairman of the Cornish Radio Amateur Club (which is organising the event) can be contacted on packet via G4USB @ GB7AKE.#44.GBR.EU or at Westwynds, Loscombe Lane, Pencoys, Four Lanes, Redruth, Cornwall TR16 6LP.

ANDORRA

A LETTER from J Manuel Sauri, C31US, President of the Unio Radioaficionats Andorrans, contains up-to-date information concerning the amateur services in Andorra.

He says that until recently amateur licensing was administered by France together with the Episcopal See of Urgell (Spain). This was because of the former historical and unique ties between Andorra, the Head of State of France and the Bishop of Urgell. Andorra now has its own Constitution and has become the 184th member of the United Nations and also member of the ITU. The last C30 guest licenses in Andorra were issued three years ago and the country does not accept the CEPT TR/61-01 arrangements for visitors yet. A list of illegal stations includes C31/OZ3JK/M (SSB), C31LX (CW), C31NP (CW/SSB/RTTY), C30EJA (SSB), and C31AZ (SSB). If you worked any of these please don't send QSLs! The prefix system currently in use is : C31xxx = residents with all privileges for all bands. C32xxx = residents with limited licence privileges. C33xxx = limited licence issued during the process of qualifying for the full licence.

The QSL which went to the 3,260 stations that ON4QM worked as ZK3DM.

AWARDS

AC-15-Z AWARD

Issued for contacts since 1.1.1955 with at least 23 countries or call areas located in *CQ Magazine* zone 15. These are: 9A, 9H, ES, HA, HV, I, IS, LY, OE (two call areas), OH0, OH (three call areas), OJ0, OK, OM, S5, SP (four call areas), T7, T9, TK, UA2, YL, YU, and ZA. Contacts with the four call areas of Poland are obligatory.

W-21-M AWARD

This is issued for contacts since 1.1.55 with at least 15 countries located on the 21° East longitude. These are: 5A, 9Q, A2, D2, HA, JW, LA, LY, OH, OH0, OM, SM, SP5, SV, TL, TT, UA2, YL, YO, YU, V5, ZS2, ZS3, ZS4, ZS5, ZS6. A contact with Poland is obligatory. Both the AC-15-Z and W-21-M awards are available to licensed amateurs and listeners and there are no mode limitations. QSLs may not be sent but a list certified by the awards manager of your national society, your radio club, or by two licensed amateurs. The fee is 10 IRCs each award. Send applications to Awards Manager PZK, Monika Szklarska, SP5NOW, PO Box 320, 00-950 Warsaw, Poland.

HELVETIA 26 AWARD.

An extremely attractive award which requires proof of contact with all Swiss cantons and 'half cantons' a total of 26 in all – AG, AI, AR, BE, BL, BS, FR, GE, GL, GR, JU, LU, NE, NW, OW, SG, SH, SO, SZ, TG, TI, UR, VD, VS, ZG and ZH. Available to licensed amateurs and listeners for confirmed contacts/reports since 1.1.79 on CW, SSB, mixed modes, RTTY, or SSTV. The canton or its abbreviation must be shown on all QSLs. The award is free but return postage for the cards and the award would be appreciated. Applications to USKA Awards Manager, Kurt Bindschedler, HB9MX, Strahleggweg 28, CH-8400 Winterthur, Switzerland.

PROPAGATION

THE G8KG REPORT reads as follows: "The period from mid-January to mid-February was mostly rather disappointing from an HF point of view. The surge of solar activity at the turn of the year was not sustained and by the end of the period daily solar flux values were back in the 90-100 range with the 27-day mean down from 120 sfu to a rather flat 105. There were a few good days early in February but the most striking feature was a sharp, rise in geomagnetic activity, the mean Boulder A index for the 27 days to the middle of February reaching 18 (daily value of 50 on 7 February) which is twice the average of the previous 27-day period. It will be interesting to see whether this rise continues, bearing in mind that in Cycle 18 the peak geomagnetic activity occurred in the eighth year and in Cycle 20 toward the end of the tenth."

CONTESTS

RESULTS OF the **European DX Contest, 1993,** have now been published. In the single-operator section **G5LP** scored 153,966 points, G3ESF 79,212, **GM4SID** 55,296, GM3CFS 52,490, and G5MY 13,689.

HELVETIA CONTEST

1300 23 April – 1300 24 April

CW on 1.8MHz and CW and SSB on 3.5 to 28MHz (no WARC bands). Mixed mode only single and multi-operator and listener sections. Operation must be confined to the band segments 1.81-1.84, 3.5-3.56, 3.6-3.65, 3.7-3.8, 7.0-7.03, 7.05-7.1, 14.0-14.06, 14.125-14.3, 21.0-21.125, 21.2-21.350, 28.0-28.15, and 28.3-

QTH CORNER

A35MR	Jim Smith, VK9NS, PO Box 90, Norfolk Is, Australia 2899.
FT5XJ	F5NLL, Pierre Clauzel, le Capitaine Plaigne, F-11420 Belpech, France.
I2RAO/HK0	Box 146, I-27100 Pravia, Italy.
P29DX	via G3LQP, 32 Albert Rd, Sutton, Surrey SM1 4RX.
T33CS	via G4WFZ, 28 Orcheston Rd, Charminster, Bournemouth, Dorset BH8 8SR.
T33KK	via SM7PKK, Mats Persson, Betesv 22, S-24010 Dalby, Sweden.
5R8DS	(see 5R8DY)
5R8DY	Box 404, Antananarivo, Madagascar.
5U7Y	via JG3UPM.
7J6ABN	via JARL Bureau.

29.00MHz. Exchange report and serial QSO number (from 001). Swiss stations will send two letters indicating their canton. Each QSO counts three points and a station may only be worked *once per band* – either on SSB or CW. The multiplier is one for each canton worked on each band and the cantons are: AG, AI, AR, BE, BL, BS, 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 include the usual signed declaration and summary sheet with your category and name and address. Logs to Walter Schmutz, HB9AGA, Gantrishweg 1, CH-3114 Oberwichtrach, Switzerland, to arrive no later than 1 June 1994. (Again no rules received this time but the previous ones – as given here – probably still apply.) (See also *Awards*.)

ARI INTERNATIONAL DX CONTEST

2000 7 May – 2000 8 May

1.8 to 28MHz (no WARC Bands) following IARU band plans. Band and mode may only be changed after ten minutes on a band. Single-operator CW, SSB, RTTY, and Mixed categories, multi-operator single transmitter mixed, and listener categories. Italian stations will send RS/T plus two letters to indicate their province. Others send RS/T plus QSO number from 001. QSOs with own country count for multiplier credit only, with different country on same continent two points, outside own continent three points, and contacts with Italian stations (I and IS0) count ten points. Same station may be contacted on the same band on different modes but only the first can be claimed for multiplier credit. Multipliers are the 102 provinces and each DXCC country (not I and IS0). Listeners follow the same rules and a station cannot appear on any band more than three times. I have copies of the rules (SASE please). IBM compatible software for the 1994 contest is available free – please send US$5 or ten IRCs to cover the cost of the disk and postage – to ARI Contest Manager I2UIY, PO Box 14, 27043 Broni (PV), Italy. A pocket floppy calculator will be sent to all Europeans who work more than 250 Italian stations (100 if outside Europe). In the 1993 competition G4IQM came 10th in the single-operator mixed category with 859,460 points. Also in the mixed class was GM0/WN1G with 46,128. On SSB GI0SAP scored 480,224 points and on CW G3ESF 319,264 and G5LP 220,626.

February *CQ-DL* contained the results of the **WAEDC CW Contest 1993.** UK scores included **G5LP** (153,966 points), G3ESF (79,212), **GM4SID** (55,296), GM3CFS (52,490), and G5MY (13,689). The results of the **ON Contest 1993 – 3.5MHz CW** show that G4IQM came third with 5,208 points followed in fourth place by G4OGB with 4,929. G4IQM also came third in the 3.5MHz SSB section.

SP DX CONTEST

Results of the **1993 SP DX Contest** list **GI0BEY** (13,098) and **G3URA** (8,811) as sixth and tenth respectively in the 14MHz listing. On the 7MHz band **GW4HBK** was sixth with 9,690 points. Other scores (Multiband) **G3ESF** – 21,672, (14MHz) G4IQM – 8,613.

THANKS

TO EVERYONE WHO contributed and to the authors of the *RSGB DX News Sheet* (G4DYO), *DXPRESS* (PA3FQA), the *Lynx DX Bulletin* (EA2KL), and the *Long Island DX Bulletin* (W2IYX). For the **June** issue I need to receive your input no later than **21 April** please.

OOPS . . !

UNFORTUNATELY, some rather old copy was patched into the *HF News* column last month re the DXCC Honour Roll. Apologies for any embarrassment caused – *Ed.*

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

THIS MONTH'S menu includes a report on the VHF Convention, 144MHz band plan notes, expedition news plus the regular items. The main DX activity in January and February was provided by several auroras, but there was some welcome tropospheric propagation to Spain.

VHF CONVENTION

IN SPITE of dire predictions of snowfall in the Midlands, broadcast on the Saturday evening, the weather in the London area and home counties remained fair, with no sign of the white stuff. By opening time at 1015 on Sunday, 20 February there was the usual long queue of visitors stretching back to the main gate of Sandown Park Racecourse.

THE EXHIBITION

The exhibition and trade show were well supported. Whether you wanted a few components for a weekend project or had hundreds to spend on a new multimode transceiver or EME antenna system, it was all on offer. There were some terrific bargains; eg a 486 Motherboard for your homebrew computer for £10.

There was a steady stream of visitors to the VHF Committee stand and I enjoyed meeting many of the regular contributors to *VHF/UHF News*. The proposed re-planning of the 144.0 - 145.0MHz sub-band and the packet radio situation on 2m created some lively discussion. The move to eventual 12.5kHz channel spacing for FM and repeater channels was also commented upon.

A very pleasant surprise for me was to meet Joe Kasser, G3ZCZ, and to catch up on the last thirty years. He has lived in Maryland for ages as W3/G3ZCZ and publishes amateur radio software through his company, Software for Amateur Radio. Among other titles, he is the author of *lanlink* and *elmer*, which are available from the Public Domain and Shareware Library.

Joe kindly gave me a copy of his book, *Basic Packet Radio*, an extremely readable publication which I recommend to those contemplating joining the faith. The ten sections range from what packet radio is, through How to send and receive Messages and Bulletins, to ELMER, The Ham's Expert System.

THE CONVENTION

The Convention was formally opened at 1330 by RSGB President Ian Suart, GM4AUP. In his address, he referred to the Society's participation in international conferences, most recently the IARU Region 1 event in De Haan last September. He highlighted the pre-conference publicity and the speedy publication of the results in *RadCom*.

The President spoke about the current packet radio problems in the 2m band and of the VHF Committee's short term step to improve the situation. He reminded the audience that it was decided at De Haan that a re-appraisal of the 144-145MHz sub-band be undertaken in view of the; ". . . . hodge-podge of special purpose frequencies that have been written in over the years."

He commented on the continuing debate about 12.5kHz channel spacing in view of: "Our inefficient use of 25kHz channels . . . . which must seem remarkable to commercial users who are already moving from 12.5 to 6.25kHz channels." He reminded members of the 'European dimension' of the commercial pressure on the amateur VHF bands and that the VHF Committee now liaises with the European Radiocommunications Office (ERO) in Copenhagen. Regarding activity, he remarked that contests seemed to be coming back into favour, adding: "I hope you'll enjoy the back packers events."

On the future, the President mentioned 50MHz repeaters, novice access to 2m, higher power levels, more lenient planning regimes for towers, 19.2kbaud packet radio and VAT-exempt amateur radio equipment. He concluded: "Well, you can always dream, but what is certain is that none of these things will ever happen without a strong and respected national society."

There followed the presentation of trophies after which visitors joined the two lecture streams, which were very well supported. The overall attendance was in excess of 2,000 which, considering the rather early date, was very satisfactory. The talk-in was run by members of the Echelford Radio Club in their customary efficient manner.

VALE G3VVB

READERS WILL be saddened to learn that Cyril James, G3VVB, died on 22 January after a short illness. He was a 2m enthusiast, and a member of the Echelford ARS until moving to Cornwall. His professionally machined cavities and filters for the microwave bands, which many operators have, will be a permanent reminder of his dedication to the hobby. Our condolences to his wife Ruby and daughter Sandra.

DXPEDITION NEWS

THE DATES of the Jordan operation by members of the UK Six Metre Group have been confirmed as 29 May to 26 June. The allocated callsign is JY7SIX and the locator KM71WX. Neil Carr, G0JHC, and Geoff Brown, GJ4ICD, will be the first to arrive to install the equipment on the top floor of the Amman Marriott Hotel which is situated on the Jebel hill overlooking the city. The station will comprise an FT-650 and 6-ele long-boom Yagi at 150ft AGL. G3KOX, DL7AV, G3WOS, G4CCZ and G3SED will join the party later.

In the March *VHF/UHF News* it was mentioned that the UKSMG had started a fund to purchase a 6m transceiver and antenna to leave in Jordan. Secretary Chris Gare, G3WOS, has since learned that the Royal Jordanian Amateur Radio Society already had plans well in place to purchase such equipment, so it has turned down this offer.

Accordingly the UKSMG is dropping its plans to collect equipment donations and will, with the permission of all those who have already generously donated monies, use the fund to defray the high costs of excess baggage on the flights to and from Jordan.

The Group would like to thank HM King Hussein for his generous permission to allow this first 6m DXpedition to go ahead. It would also like to thank Colonel Ali Shukri, JY3AK, and Mohammad Balbisi, JY4MB, for all their help with licences.

BAND PLAN

ON PAGE 8 you will find a statement from David Butler, G4ASR, the Society's VHF Manager, concerning the reorganization of the 144.0-145.0MHz sub-band. Please read it carefully and remember that *nothing has yet been decided.* I mention this as I've already received comments that: "This will be the end of 2m weak-signal working as we know it."

No proposals will be formally discussed until the next meeting of IARU Region 1 VHF Managers some time next year, so there is ample time for everyone to have their say. If you want to air your views in this column, then feel free to write, fax or E-mail them to the usual addresses. All comments will be passed to the VHF Committee so that members can very carefully consider the RSGB's plan.

REPEATERS

THE JANUARY issue of *Lens*, the periodical of the Leicestershire Repeater Group, includes a list of the 84 members at 27 October 1993. Engineering Manager Don Winters, G3IPL, reports failures of VHF repeater GB3CF on R0, and 13cm beacon GB3LES on 4 January. This was due to flooding caused by a failed water pump. Equipment overhaul was in progress when this issue was edited.

The LRG also runs UHF voice relay GB3LE on RB4; 23cm colour TV repeater GB3GV on RT2 and the 3cm beacon GB3LEX. The editor of *Lens* is Wayne Taylor, G6NGV. If you would like more information about the LRG, contact them at P O Box 180, Leicester.

FIRSTS

PAT ALLELY, GW3KJW (GDD), has revised his list of firsts based upon recent claims. I will deal with these later but here is the Scottish 144MHz list as received on 25 February: GM3WCS-4U1ITU 2/7/84; GM4AFF-C53GS ?/?/92 (EME); GM4IHJ-CT4IB 1636 10/7/81 (Es); GM4AFF-CX9BT ?/?/92 (EME); GM2FHH-DL9ARA 31/3/60 (A); GM3BDA-DM2ADJ 1/4/60 (A); GM3VTB-EA5AVN 10/7/81 (Es); GM4IHJ-EA6AU 10/7/81 (Es); GM0BWU-EA8BML 1401 9/9/88; GM3BDA-EI2W 2324 12/6/51.

GM3EGW-F5VN 6/64; GM3OL-G3BW 13/2/49; GM3DAP-GD3DA/P 29/7/51; GM3BDA-GI2FHN 1/7/49; GM6LS-GM5VG 26/4/49; GM3HLH/P-HB1RG/P 4/8/57; GM4IPK-I0SNY/EA9 30/6/84; GM3GUI-I1ACD 1116 4/7/65 (Es); GM4COK-IV3HWT 1/80; GM2FHH-LA7AE 6/7/58; GM8NCM-LX1FX 29/9/78; GM5CJF-OE3UP 4/6/78; GM4BYT-OH0JD 1/79; GM2FHH-OK2VCG 2100 12/12/60 (MS).

GM3EOJ-OY2BS 12/6/70; GM5KW-OZ2IZ 24/7/54; GM8BJF-SK6AB 17/8/76; GM3EGW-SP3GZ 6/10/60 (A); GM4IPK-UB5BAE 8/6/84 (Es); GM4COK-UO5OX 8/6/84 (Es); GM4CXP-UP2BBC 6/4/77; GM4CXP-UQ2IV 6/4/77; GM3EOJ-UR2CQ 2345 14/4/71 (A); GM8YJU-UT5DL 7/6/81 (Es); GM4IHJ-YO6AFP 1851 7/6/81 (Es); GM5CJF-YU3TCD 6/78 (MS); GM8YJU-ZB2BL 1950 15/7/81 (Es). Next month, the GW firsts.

SOFTWARE

MY LIBRARY of CP/M amateur radio software is for the Amstrad PCW computers type 8256, 8512 and 9512 which use *three inch* disks. Amstrad now has a range of PCW machines which use 3.5in disks still running under CP/M. As I do not have a 3.5in drive, I cannot copy programs onto these, but I now know a man who can.

So I am very grateful to Tom Hyde, G7DQD, who has kindly offered to copy files from the Proglist to your ready-formatted 3.5in disks. Send him an SASE for the current Proglist, from which you can select the files you want and send him the necessary disks. His QTH is: 9 Celandine Drive, St Leonards-on-Sea, E Sussex TN38 0XT.

The Six News editorial team receive the Harold Rose Trophy for contributions to the 50MHz band.

CONTESTS

THE BARTG Spring VHF/UHF RTTY Contest is on 10 April from 1000 to 1500GMT and the bands are 144, 430 and 1296MHz. The exchange message is time (GMT), RST report, Maidenhead locator or nearest town. Radial ring scoring on 144/430MHz and one point per kilometre on 1296MHz. The sections are: Single-op, Multi-op and SWL. For full rules send an A4-size SASE to John Barber (G4SKA), BARTG Contest Manager, P O Box 8, Tiverton, Devon, EX16 5YU. Also on 10 April is the last leg of the UKSMG's Winter Contest, 1000-1300GMT - see p21 in the March *RadCom* for further details.

The Danish SSTV Group is running a 48 hours event over the 7/8 May weekend. The VHF bands are 50 and 144MHz using the IARU Region 1 recommended SSTV frequencies. Scoring is two points for the first contact with a DXCC country and one point for additional contacts. Each Danish QSO will gain one bonus point. The same station may be contacted on both bands. Mail logs, postmarked before 7 June, to Carl Emkjer, Soborghus Park 8, DK-2860 Soborg, Denmark.

METEOR SCATTER

THE MAIN event this month is the Lyrids shower. The original KR1P program suggests the peak around 1100GMT on the 22nd. The Zenithal Hourly Rate (ZHR) was about 90 in 1982 but has been much less since. The radiant is below a mid-UK horizon from 1430-1830. The periods when the reflection efficiency exceeds 50% 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.

Colin Morris, G0CUZ (WMD), reports that the Quadrantids shower peaked between 2300 on 3 January and 0230 on the 4th. Various stations were worked but the best QSO was with US5WU (KO20DI), who is ex-RB5WU; it took over an hour to complete for a new country and square, even though reflections were good.

MOONBOUNCE

144MHZ

G0CUZ, using a single 9-ele Yagi, completed with SM5MIX within 15min in a moonrise sked on 28 January. In last year's EME tests, Peter Burt, G3NBQ (IO83), completed with K5GW, W5UN, WA6MGZ, WB5LBT, N1BUG,

VE7BQH, DL8DAT, IK3MAC and S51WV; he also used a single 9-ele Yagi driven by an FT-290 with amplifier. During the 29/30 January weekend John Hunter, G3IMV (IO91), completed with VP2MGW for a new country and square in an 0330 sked; it was a three-day expedition to Monserrat by K5GW.

432MHZ

Allen Katz, K2UYH, published two issues of his *432 and Above EME News* in February. He reports that PY5ZBU is now QRV with 180W and four 32-ele Yagis, and has completed with DL9KR; his telephone number is 010 55 413354833. Others on include 9M2BV and HL9UH. CX9BT is working on his 6.7m dish and AZ/EL mount for 70cm and 23cm operation; Manuel's packet address is CX9BT@CX3ACB.#PQE.NV.URY.SA and his fax number is 010 598 3 392737. 9A2SB (JN95GM) is a new station from Croatia; Zlatko runs 200W to four 23-element DL6WU Yagis with manual elevation. The second leg of the REF Contest is on the 16 / 17 April and is for 432MHz and 2.3GHz and above. Average data are +20°, 1.4dB signal degradation, +60° Sun offset and 44°K sky temperature on 70cm.

50MHZ

THE HALCYON days of Pacific DX may be but dim memories, but there is still some DX to be worked. Ted Collins, G4UPS (DVN), wrote: "Do please help spread the word that thirteen countries were worked in January, plus two heard . . . ." He reckons that twenty could have been contacted.

From G4UPS's notes, 9K2WR's QSL manager is his wife, N6UXB, who now has Don's log on computer. Her QTH is: Mrs Amy Nutt, 5005 Willow Rock Way, Sacramento, CA 95841-4912, U S A. Peter Taylor, G8BCG, used to operate from the Solomon Islands as H44PT. He still has his logs and can be reached at: 10910 Kester Drive, Cupertino, CA 95014, U S A. Mike Wadsworth, ZD8M, was due to leave Ascension Island on 16 March; his home call is G3UOF (QTHR).

As to activity, on 30 January from 1610, G4UPS noted strong in-band Euro-TV. From 1615 QSOs were made with S5, 9A, YU1, DL, OE6, IK2 and IN3 stations; the opening faded by 1740. The other significant event was an aurora on the afternoon of 6 February which faded out by 2040. Apart from PA0OOS (JO33), all Ted's QSOs were with British stations.

Paul Baker, GW6VZW (GWT), operated in the January Quadrantids. In one 30s burst he completed on SSB with PE1OOY, PB0ALN and ON7YD. Other countries worked were OZ, SM, DL and S5. In the 6 February aurora, he only worked 'locals' the sole continental heard being ON4PS on CW. The beam heading (QTE) was 310° and the event lasted from 1545 to 1845.

144MHZ

G0CUZ MENTIONS the tropo lift to Spain in the 29-31 January period; Colin worked several EAs, ". . . . but nothing out of the ordinary." The 6 February aurora started in the Midlands about 1430. Around 1700 he worked SM0FMT (JO89) and LA2AB (JO59). He notes that when these big auroras appear to have faded, it is worth beaming to the north-west. He did this on 6 February and, after 30min of calling CQ at 300°, worked OZ1KLU (JO46). During this period, beacon GB3LER had disappeared and the only sign of an aurora was the Irish TV station on 53.757MHz. He finds that when the main reflections are from about 60°, this 270-300° backscatter path always seems to work.

On 29 January, Andy Wyspianski, G1AWF (LDN), worked EAs in IN63 and IN73 on tropo. In the 6 February aurora at 1514 and some signals peaked to S9+20dB. He worked Scottish stations in CTR, FFE, HLD, SCD and TYS regions, plus GI4GVS (ATM). QTEs were mostly 25° with only weak reflections from 60-70°. The event went on till after 1900. At 1447 next day he worked GM6VIU (LTH) at 30°.

G3NBQ pays tribute to Andy Steven, GM4IPK, for keeping beacon GB3LER on air. Peter copied it from NW Lancashire on 11 January, 5 – 13, 15 and 21 February. He hears GB3ANG, PI7CIS, GB3VHF, EI2WRB and GB3MCB in any conditions. In an aurora on 11 January he contacted LA; on 5 February GM, LA and SM; next day DL, G, LA, ON, OZ, PA and SM; on the 8th GI, GM and LA; on the 10th SM; on the 13th DL, GM, LA and SM and on the 21st DL. He uses 100W and a 9-ele Tonna Yagi.

Welcome to Eddie Lingard, G3WNQ (LCN), who had some queries about Scottish regions. He runs 10W of CW and SSB to a 5-ele Yagi 21ft AGL and since 1992 has worked 13 countries in 51 squares. Keith Sharples, G7LPW (LNH), uses an FT-221R, 100W BNOS amplifier and 13-ele Cushcraft Yagi at 35ft AGL. January was uneventful until the 30th when Keith worked GM0HBK (IO77) on Skye at 1506, a distance of 438km.

Ron Adam, GM4ILS (GRN), submitted a huge list of stations worked via aurora, starting with SM0FMT (JO89) at 1845 on 15 January. Between 2338 on 5 February and 0053 on the 6th he had five QSOs with DL and SM . The big event started at 1414 and in the next five hours he made 114 contacts. Most numerous were the DLs, 82 of them. The rest were ten PAs, eight Gs, three each Fs, ONs and SMs, two OZs LA5XGA (JO59), OH2BNH (KP20) and SP2OFW. QTE throughout was 60°.

The next event was on the 9th which brought LA2RZ (JP20) at 1957, SM5BSZ (JO89) at 2006 and SM4RNA (JP70) at 2346, all at QTF 20°. Next evening produced two SMs in JP70 and JO89 and the last aurora was on the 13th from 1723, for an hour. It provided eight contacts with DL, EI, F, G, LA, OZ and SM stations at QTEs 310-020°.

Edward Allely, GW0PZT (GDD), operated in the 6 February aurora after finding GB3ANG just auroral at 1400. First QSO was with GM4CXM at 1419, followed by more GMs. The first continental contact was DL1KDA (JO30) at 1509 with more DLs worked in the next two hours, but none further than JO44. At about 1730 it spread further east to SM7 and OZ before fading at 1930. Minor events were noted on 10, 11 and 13 February to GI and GM, and on the 21st a few GMs were worked.

LOCATOR SQUARES TABLE
STARTING DATE: 1–1–1979

Callsign	50MHz	70MHz	144MHz	430MHz	1.3GHz	Total
G3XDY	–	–	224	153	100	477
GJ4ICD	611	1	264	121	68	1065
G4DEZ	201	–	255	71	62	589
G6HKM	456	–	242	118	61	877
G4RGK	167	–	319	182	58	726
G3IMV	434	15	512	125	52	1138
GW4LXO	475	34	261	109	48	927
G1GEY	–	–	179	125	35	339
G4MUT	200	26	159	97	34	516
G8LHT	225	20	210	95	20	570
G1SWH	245	33	179	63	9	529
G3FIJ	32	24	82	27	3	168
G0EVT	251	12	261	65	1	590
G4IGO	565	–	250	–	–	815
G6HCV	468	–	250	–	–	718
G4TIF	339	28	209	112	–	688
G0CUZ	139	–	389	80	–	608
G4SSO	191	–	279	100	–	570
G0JHC	512	–	48	–	–	560
GW6VZW	377	–	143	6	–	526
GU7DHI	363	–	111	5	–	479
G0FIG	200	–	192	53	–	445
G0GMB	106	–	225	108	–	439
G4SWX	–	–	404	–	–	404
G0HVQ	310	–	71	–	–	381
G1UGH	234	–	122	–	–	356
GW8JLY	–	–	277	36	–	313
G0EHV	–	35	191	82	–	308
G8XTJ	182	–	126	–	–	308
G4YTL	–	43	182	38	–	263
G3FPK	–	–	246	–	–	246
GW4FRX	–	–	236	–	–	236
G0ISW	147	–	64	20	–	231
G4DOL	–	–	226	–	–	226
G1AWF	46	–	160	–	–	206
GM1XOG	181	–	–	–	–	181
GI1CET	97	–	67	6	–	170
GW0PZT	–	–	168	–	–	168
G7LIJ	–	–	153	–	–	153
G7EWL	54	2	79	6	–	141
G7CLY	70	–	60	2	–	132
G1JDU	93	–	39	–	–	132
G6ODT	–	3	62	66	–	131
GM0GDL	–	–	122	–	–	122
G4OUT	–	21	100	–	–	121
GU4HUY	–	–	84	–	–	84
GM0NXP	–	–	69	–	–	69
G4OBK	21	1	45	–	–	67
G3UOL	–	–	43	–	–	43

No satellite, repeater or packet radio QSOs. If no updates received for a year entries will be deleted. Next deadline is **28 April**. Band of the month 1.3GHz.

SIGN OFF

THERE WAS no 4m or 70cm input this time. Some reports on the 4m Cumulatives, the 4m Fixed and the 2m/70cm events would be welcome for May. The deadline for **May** is **31 March** and for **June**, **28 April**. My E-mail routes are via CompuServe to 70630,603; via Internet to 70630.603@compuserve.com; via BT Gold to 76:MSX021. The fax machine is on 081 763 9457.

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G4PIQ @ GB7MXM.#36.GBR.EU

I'M PLEASED to report from both the HF and the VHF Contests Committees that the number of entries which they are receiving to many of their contests is on the up – it seems there is a growing enthusiasm for contesting out there. This is particularly true in the recent 80m and 2m AFS contests which have all seen quite a large increase in entries over last year.

I was very pleased to be able to make it on air for both 80m AFS contests for a change this year, and as usual learnt one or two things in the process. Top of the list I think was that using baler twine (a strong plastic string) as the only end insulator on an HF dipole is not a good plan. We had quite a lot of rain around the time of this year's CW leg, and so the string was not the perfect insulator which it might have been. Unfortunately, at 400W, there was sufficient voltage at the ends of the dipole to burn through the insulation on the wire and then through the baler twine to cause one leg of the dipole to come crashing to the ground half an hour into the CW event! The second thing I learnt from this experience was that a high quarter-wave sloper to the south is not the ideal antenna for working the UK on 80m – I used some better insulators for the SSB leg!

APRIL'S CONTEST CALENDAR

APRIL IS not the busiest of months for contests, however there is always something to keep you occupied. On HF the main events are all CW based. If you don't feel your CW is up to the standard 30WPM HF contest type rates then the QRS CW Cumulatives are ideal occasions to build up some practice. These are short events which take place on 80m during weekday evenings, and where the speed is limited to 12WPM and the power to 3 or 10W for Novices and full licensees respectively. Particularly if you are a Novice or new to CW contesting, get on and have a go – it is an excellent opportunity to get your feet wet in a controlled environment, and there is a certificate for the highest placed newcomer to RSGB HF CW Contests. Even if you are an old-hand, go on and have a play, but just remember that you have to slow down! Full details are on page 83 of January *RadCom*.

Another popular event on HF is ROPOCO (rotating Post Codes – rules p 93 March '94 *RadCom*) where the contest exchange is the post code sent by the previous station you worked! Although a somewhat off-the-wall idea, it is a very well supported event, and, being held at a time when pretty much all the UK can hear each other, getting heard is less of a problem than in many other contests. Accuracy on the other hand is the key to success, and there is a trophy for the most accurate log. It's always amusing to see how some postcodes become garbled as they pass from one person to another, and the highlight must be receiving a garbled version of your own back again! At VHF, the only contest in April is the 23/13cm Fixed contest (p 83, Feb 94 *RadCom* for rules). Many more people are becoming equipped for these bands and activity is often very sparse outside of contests and openings, so this is a great opportunity to get on and make a few contacts on the high bands.

MICROWAVE CONTESTS

YOU MAY think that organising contests is the sole prerogative of the HF & VHF Contests Committees. However, as we move up into the microwave bands, there are two sets of cumulatives organised by the RSGB Microwave Committee, known as the Summer and Winter Cumulatives (rules p 93, Mar 94 *RadCom*). Lehane Kellett, G8KMH, has supplied me with some information about these since, even if you don't have gear for these bands, it is interesting to see a completely different aspect of the contest scene. The technology has moved on a long way in the last few years, and it is no longer line-of-sight, mountain-top to mountain-top only contacts which are made on 10GHz, but paths of several hundred kilometres are covered on a daily basis now.

For the Summer Cumulatives, two separate days are organised each month between April and October – one day for 10GHz, and one for 24GHz. The Winter Cumulatives are organised slightly differently, in that operation on any band from 2.3GHz upwards counts, and there is just one event per month, usually the last Sunday. The events are organised both as contests, and as a way of increasing activity, there's nothing like the competitive element to make you build or improve upon your equipment! Operation tends to be from a mix of portable and home locations – some hardy souls even brave the weather at all times of the year to activate a hill top.

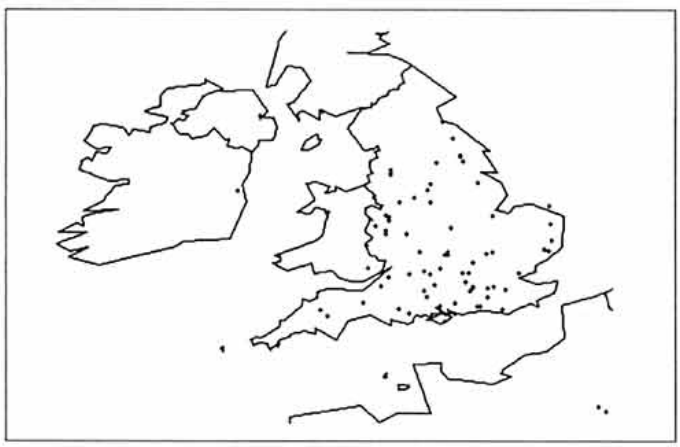
The 10GHz summer events are the most popular, with seventy or more UK stations taking part, as well as a handful of continentals. The best DX in 1993 would do credit to the lower frequency bands, with G3FYX/P working HB9MIN/P on 10GHz during the October event, a distance of 780km. Operation on 10GHz during the cumulatives is now virtually all narrowband SSB/CW. 24GHz is much less well developed, and is used more to try new equipment and paths, and to investigate the vagaries of propagation. Up to now, operation on this band has largely been with simple wideband equipment, but an increasing number of people are now getting going with narrowband equipment, and so both types of gear are in use. Here is how a typical contact takes place:

- A CQ call is made on the microwave talk-back calling channel (144.175 or, occasionally, 432.350MHz) and, when contact is established, the two stations QSY to a working frequency on the 2m or 70cm bands.
- Location details are exchanged, either as IARU locator, NGR or Lat/Long, and the dish headings either computed or looked up from a pre-computed table of sites. With antenna beamwidths often as small as 2° or 3°, accurate headings are vital and the variance between true North and magnetic North has to be taken into account. Both stations set their dishes accordingly, subject of course to being able to keep the dish aligned on a windy moor!
- One station, normally the one with the greater transmit power, will send a carrier or CW beacon and the other will take a listen and tweak the dish in both azimuth and elevation for best signal. The reverse then takes place.
- Finally, the contest details exchanged.

Everything doesn't always go to plan and one-way contacts often take place (which score half points). Sometimes the exchange may take an hour or more, perhaps needing very weak CW to be copied. It is also becoming frequent for the contact to be directly established on 10GHz by 'tail-ending' another QSO.

On 10GHz, the equipment used varies widely. The simplest station may be using the G3WDG transverter modules plus a G4DDK local oscillator source, with 50 to 300mW output, to a 45cm dish and a small prime mover, such as the FT290 or IC202 which is ideal to backpack up the top of a hill. Some of the more ambitious portables and many home stations may have several watts to a 1.2m dish. All have a lot of fun and the choice of site can be more important than the depth of your wallet.

Equipment for 10GHz is much easier to build than it was some years ago, particularly with the efforts of G3WDG and G4DDK in generating easily reproducible designs – there is even at least one commercial transverter on the market. If the ability to break new frontiers inspires you, why not build some gear up, or even buy some, and try something completely different. Alternatively, take a listen around 144.175MHz during the contests and hear what is going on.



Known sites of activity during the 1993 Summer 10GHz Cumulatives.

QSL

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

I AM ASSURED by Gerry Metcalfe, G3JDC, that the Royal Air Force slang expression 'Gone for a Burton' is derived from the war-time practice of conducting Morse tests for RAF wireless operators in tailors' shops bearing that name. To fail the test brought about the expression. Anybody out there got any better ideas?

Ted Binns, G0PAJ, has dropped me a line enclosing a letter he received from Valery Metaxa, ER1DA, who is a Moldovian ham. Valery says that Box 88 is not reliable and cards for Moldova should be sent to PO Box 6637, 277050, Kishinev, Moldova. Valery goes on to say that WEF 1 January 1994 'ER' is the new Moldova prefix and the country has been divided into five amateur radio regions using ER1 to ER5 as callsigns. Prefixes ER6 to ER9 will be utilised for special events. ER0 will be allocated to foreign amateurs operating from within Moldova.

I reproduce on this page the QSL card from one of the giants of amateur radio Charles Young, G2AK, who sadly died in December. Charles obtained his first licence in 1924 and joined the Society four years before I was born! He helped so many young people obtain their licences and whilst he preferred phone operation he was no stranger to CW. Amateur radio will miss him.

I have received a letter from Francisco Shubeius, ZP5FGS, saying that an incorrect QSL route to him is being published in various places. To put matters straight he assures me that the *only* routes are as follows: (a) via the Bureau or, (b) direct to him at PO Box 1059, Ascuncion, Paraguay.

Jack Tootill, G4IFF, of Ipswich Radio Club wrote to me about club mailing addresses. Sadly Jack died since writing. However what he wrote is still as relevant and so I reproduce with some slight alterations. He said that previously the licence holder's mailing address had always been shown in the *RSGB Call Book* but that the system had now changed in that the station address is shown which can, on occasions, cause problems. He said it is *always* preferable to QSL via the Bureau which has the up-to-date addresses. However Jack went on to say that those wishing to communicate with G4IRC, GB2IRC or G1IRC can do so via the Secretary of the club as shown in the affiliated societies' section of the RSGB *Call Book*.

We have had parcels of cards returned from both Senegal and Uzbekistan of late. This is the first time that has happened and no reason was given. We shall try again but we hope it's not the start of a trend.

There is still great confusion about new prefixes for some CIS countries because some 'new' ones are identical to those used by other countries in the past. For example, UI which was previously Uzbekistan is now allocated to European Russia whilst UR, once used by Estonia, has now been allocated to the Ukraine. It's all a little muddled so the best thing to do when QSLing via the bureau is to write the country of destination on the QSL card and the girls can then at least have a chance of pointing it in the right direction. Whether it actually arrives is another matter which I will not go into now!

We now have only a very small backlog of cards awaiting sorting at the central bureau. In fact, once your outgoing cards arrive at Potters Bar they are sorted immediately into the outgoing pigeon holes for despatch.

W4 BUREAU

I AM GRATEFUL to Joe Carcia, NJ1Q, for explaining why the USA fourth call area necessitates two bureaux. The fact is that the 'fourth' has the highest number of amateurs of all the call areas – some 102,000 at the last count. The resultant workload justifies the extra bureau. The incoming bureau at Charlotte, North Carolina (Mecklenburg ARC) handles all the 'single letter' prefixes, eg W4, whilst the incoming bureau at Sterling Park, Virginia (Sterling Park ARC) deals with the 'two letter' prefixes, eg WA4.

Joe tells me that one of their biggest problems is finding 'homes' for cards destined for countries with no QSL bureau. They use two US publications to try and help them. The first is *QRZ DX* (similar to our own *DX News Sheet*) and the other is the *W6GO/K6HHD QSL Manager List*. The latter is a monthly publication which lists over 5000 foreign stations and their QSL managers. Further information can be obtained from The W6GO/K6HHD List, PO Box 700, Rio Linda, CA 95673 – 0700 USA.

G2AK, one of the giants of amateur radio, died in December.

RECIPROCAL QSLs

PAUL PASQUET, G4RRA, is an RSGB Sub-Manager with a responsibility for G5 and 'reciprocal' calls. That latter category stems from the days when G5 plus three letter calls were issued as a routine to overseas amateurs on extended visits over here. He has raised an interesting problem which I am having some difficulty in answering, although I am sure there is someone out there with the definitive solution. My understanding is that if I go abroad to, say, The Gambia for a holiday I will work as C56/G3KVA and the resulting QSL cards should be sent to the G3I-K Sub Bureau Manager for transmission to me in due course. To send them to The Gambia National Bureau would be pointless unless I had made special arrangements for their collection.

It follows then that if my substantive call was C56KVA and I came to England for a short holiday then my cards would go to The Gambia Bureau. However there are many overseas amateurs who are here for longer periods as students or working. They send envelopes to the 'reciprocal' QSL sub manager for their cards. What I am not sure of is how do the sorters distinguish between someone who is here semi-permanently and one who is merely on holiday? Ted Allen tells me that the position has never really been satisfactorily resolved and whilst every other aspect of the Bureau system worked well for him the 'reciprocal' call was always a problem area.

This attractive certificate is issued to those hearing/working 12 of the 30 special stations active on International Marconi Day, 23 April.

QSL PLEASE

IF THERE IS any particular QSL topic or point you would like discussed or aired in this column please let us know and we will do our level best to research it and print the result. We feel that now space has been made available in *RadCom* for the second most popular service provided by the Society the column should be dynamic. Please let us know what you want. In addition any constructive criticism will be welcome.

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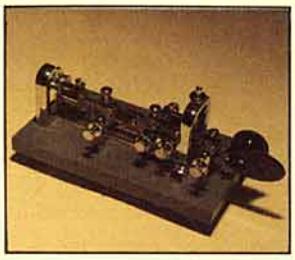
ORIGINAL



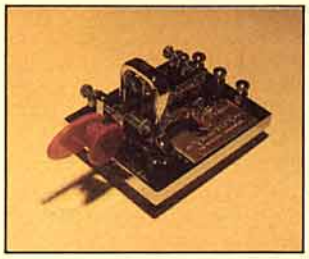
The **Vibroplex "Original"** design, with little modification, is made today using the same tools and dies as the early models. Modern day operators can put their fist to the same equipment as the Western Union and railroad operators of old. The feeling of quality and pride from owning a piece of history can't be achieved with any other later day piece of equipment. Still popular today, the distinctive sound of the "Bug" can still be heard; - the signature of a true C.W. expert.

Original Presentation - 24K gold plated brass plate on a highly polished chrome base with bright chrome top parts.
Its silky smooth jewelled movements are the same as those used in fine Swiss watches.

Original Deluxe - As the Presentation but without the gold plated brass plate.

Original Standard - A neat, crisp textured finish grey base with bright chrome top parts.

VIBROKEYER



The **Vibroplex Vibrokeyer** is designed for "Bug" operators who want to move to electronic keyers without relearning keying. The single lever paddle initiates the automatic dots and dashes of the electronic keyer with the same motion used to operate the "Bug".

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Vibrokeyer Standard - A neat, crisp textured finish grey base with bright chrome parts.

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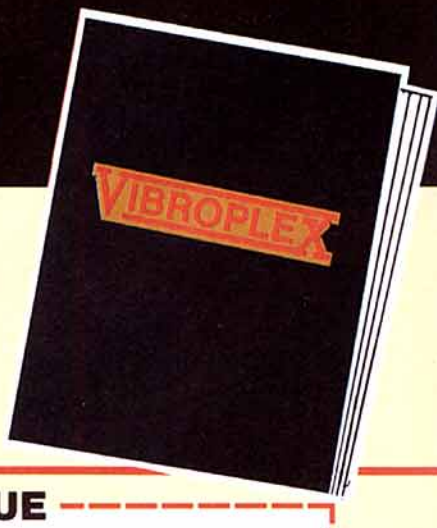

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Iambic Standard – A neat, crisp textured finish grey base with bright chrome top parts.

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Address .....

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.....

HF F-LAYER PROPAGATION PREDICTIONS FOR APRIL 1994

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

Time / / GMT	28MHz 000001111122 024680246802	24MHz 000001111122 024680246802	21MHz 000001111122 024680246802	18MHz 000001111122 024680246802	14MHz 000001111122 024680246802	10MHZ 000001111122 024680246802	7MHz 000001111122 024680246802	3.5MHz 000001111122 024680246802
** EUROPE								
MOSCOW	000000000000	000001111000	000023333300	002456666620	016666777872	545544445797	864221123578	+4000000025+
MALTA	000000000000	000001111100	000033444410	002566677740	101777778983	766755556899	997422223589	++4000002++
GIBRALTAR	000000000000	000000000000	000011112310	000034444630	002777778882	543765556798	998643223589	+++3000002++
ICELAND	000000000000	000000000000	000000000000	000001112210	000024556761	200355556787	765543233567	++5200000235
** ASIA								
OSAKA	000000000000	000000100000	000012210000	000134421000	000253333230	000021012562	000000000251	000000000020
HONGKONG	000000000000	000011111000	000134443100	000245555410	000133335751	100011013584	000000000363	000000000030
BANGKOK	000001111000	000122222100	000245555300	000345556620	001123336762	300001013587	100000000366	000000000033
SINGAPORE	000011111000	000123333100	000345556400	001346567620	101123336772	300001013587	100000000366	000000000033
NEW DELHI	000011111000	000123332000	000345555100	001345566310	112123336663	520000013588	510000000368	200000000035
TEHERAN	000012222000	000234444200	000455666510	002545567730	214322336885	853000013688	841000000368	500000000035
COLOMBO	000012222000	000234444200	000346666510	001345567730	211112336885	720000013688	510000000368	200000000035
BAHRAIN	000123222000	000234444200	000455667520	002544567741	424322336886	863000013689	841000000368	+0000000035
CYPRUS	000122323200	000245555400	000567777730	102777778962	536655667897	986432334789	873100011478	+4000000004+
ADEN	000123443200	000245666410	000555678731	202544567863	744311235898	973000013589	851000000368	+2000000035
** OCEANIA								
SUVA/S	000000000000	000000000000	000000110100	000012222210	000133234630	001431012520	000200000200	000000000000
SUVA/L	000000000020	000000000040	110210000072	220431100173	123752211562	002521002530	000200000200	000000000000
WELLINGTON/S	000000000000	000000000000	000001110000	000023331100	000343334430	002421013541	000200000210	000000000000
WELLINGTON/L	000000000000	000000000000	000000000022	220210000044	343641000164	123531000342	001200000210	000000000000
SYDNEY/S	000000000000	000012000000	000234211000	000455333210	001553335641	000321013572	000000000341	000000000020
SYDNEY/L	000000000000	000000000000	000020000012	100040000034	211252100065	101331001263	000100000241	000000000000
PERTH	000012100000	000234300000	000466510000	001576521100	212353333441	310021013585	100000000365	000000000032
HONOLULU	000000000000	000000000000	000000001100	000001002310	000023114520	001321012200	001200000000	000000000000
** AFRICA								
SEYCHELLES	000123444200	000245666410	000456778731	201445678763	744211335898	973000013589	840000000368	+2000000035
MAURITIUS	000124544300	000246666510	000556778841	201545668874	744322335898	973000003589	851000000368	+2000000035
NAIROBI	000124555400	000245777610	000556678852	311644466975	865411135899	995100002589	872000000368	+5000000035
HARARE	000024666510	000245788720	000466678962	421654567985	875522235799	996200002589	884000000268	++0000000035
CAPETOWN	000023677500	000155788720	000376778952	200665567985	740742235799	984410002589	886200000268	++3000000035
LAGOS	000023677620	000045778840	000276668972	430564457995	884742125799	997510002589	786200000268	5+3000000035
ASCENSION Is	000022346620	000044457850	000076567982	331075446895	885353113799	998530000489	886200000168	5+3000000035
DAKAR	000012455620	000034677850	000066667882	221275445895	775563212698	998530000379	886200000157	5+3000000025
LAS PALMAS	000011222310	000023444630	000056777871	100277778983	553676666898	998753333589	997421111368	++4000000003+
** S. AMERICA								
Sth SHETLAND	000000455530	000000677750	000002778882	200035678884	622123335778	886421002 45	786200000125	4+3000000002
FALKLAND Is	000000355630	000001567750	000003678882	221115567784	775533334578	998531001247	886200000025	++3000000002
R DE JANEIRO	000002333530	000004555750	000006666882	220116544785	664543322478	998531000159	886200000027	++3000000004
BUENOS AIRES	000012445220	000034566502	000005666772	110106555684	664424333268	998531000137	886200000015	++3000000002
LIMA	000001112220	000000233440	000000455562	100021554464	532242331136	887531000004	686300000001	3+3000000000
BOGOTA	000000011110	000000222330	000001444552	100012544454	521133321136	886431000004	686310000001	3+3000000000
** N. AMERICA								
BARBADOS	000001111220	000002233440	000004444562	100016544475	532244321257	987531000026	886300000003	5+3000000000
JAMAICA	000000000110	000000111220	000000333442	100001444454	421113322126	775421000003	586310000001	2+3000000000
BERMUDA	000000000110	000000111220	000002333452	000003444464	410014322257	875431000025	686310000002	3+3000000000
NEW YORK	000000000000	000000001110	000000223341	000001344453	410003332246	764321000014	586310000001	2530000000
MEXICO	000000000000	000000011110	000000122331	000000243332	310010232113	454321000001	266210000000	0330000000
MONTREAL	000000000000	000000000110	000000122241	000001333453	310003232356	663221000024	586210000001	2530000000
DENVER	000000000000	000000000010	000000011221	000000123223	200000132233	342210001001	155210000000	0230000000
LOS ANGELES	000000000000	000000000110	000000012221	000000024222	100000024222	232210002000	035200000000	0300000000
VANCOUVER	000000000000	000000000000	000000000011	000000012222	100000012222	222210002101	025200000000	0200000000
FAIRBANKS	000000000000	000000000000	000000000000	000000000000	000021112211	112321012211	012200000000	0000000000

The provisional mean sunspot number for February 1994 issued by the Sunspot Data Centre, Brussels was 35.9. The maximum daily sunspot number was 46 on 7, 13, 28 February and the minimum was 19 on 21 February. The predicted smoothed sunspot numbers for April, May and June, are respectively: (classical method) 36, 34, 32 (±8); (SIDC adjusted values) 21, 18, 16 (±4).

IARU

JOHN ALLAWAY, G3FKM
and
TIM HUGHES, G3GVV

DICK BALDWIN, W1RU, President of IARU, has set up an Ad-Hoc Beacon Project Committee to study ways in which our HF beacons can be more fully utilised. For example – is there any way that the HF beacons can be made more useful to the DX fraternity? There may also be an as yet unidentified opportunity for us to make a valuable contribution to an ITU study group dealing with propagation. This committee will be chaired by David Rankin, 9V1RH (who is Chairman of IARU Region 3) and the other members include Richard Kirby, W0LCT (Director of the ITU Radiocommunication Bureau, Geneva), Dr Kevin Hughes, G3WOZ, (Counsellor, Radiocommunication Bureau, Geneva), Jack Troster, W6ISQ (International IARU Coordinator for the HF Beacon Project), and Martti Laine, OH2BH/VR2BH. Both Jack and Martti have been associated with the N California DX Association Beacon System for a number of years and have a great deal of practical experience. Five ad-hoc committees had been formed previously and are already working on their respective tasks. These cover: (1) Morse code: the issues and a proposed position; (2) The Voluntary Group of Experts *(of the ITU)*: Radio Regulations, desirable changes and threats; (3) Satellites: (a) IARU role, and (b) requirements of the Amateur-satellite Service; (4) The evolution of the IARU, and (5) 7MHz issues.

HIGH SPEED TELEGRAPHY

During the course of the 1993 Region 1 Conference a new High Speed Telegraphy coordinator was elected. She is Klara Lendvai, HA5BA. Her predecessor lived in Russia and was not in a good position to communicate rapidly and reliably. However, it seems that Klara is getting to grips with the backlog and she is hoping that the next Championships can be arranged to take place in Hungary during 1994.

DIRECTION FINDING

Another activity encouraged by IARU is Amateur Radio Direction Finding (ARDF). Originally this was largely only very popular in some of the eastern European countries but it is now gaining support in many others and it seems set to 'take off' in the Far East. This year the 7th World ARDF Championships will be organised by SSA – the Swedish national society – and held in Loka Brunn, 300km west of Stockholm, between 12 and 17 September.

NEW MEMBERS

IARU was very pleased to welcome several new Member Societies recently. These included SRABiH (Savez Radioamatera Bosne i Hercegovine) and QARS (Qatar Amateur Radio Society). At the time of writing Region 1 consisted of 71 Member Societies and was awaiting the outcome of the voting on the admission of the Ukraine Amateur Radio League, Belarus Amateur Radio Union (BARU), and the Iraqi Amateur Radio Club (IARC). An application from the new Russian society, SRR, was being considered by the Executive Committee at its meeting last month. Interest in IARU membership is also being shown by societies in Sudan, Armenia, Latvia and Moldova. In all a rather encouraging state of affairs – even if it does mean more work for the secretary!

FRANCE

The French national society, REF, now has a new name – REF Union. This follows changes which mean that now the society represents most of the smaller organisations in France as well as the members of the former REF.

CTARL

Mr Tim Chen, BV2A, the former President of the Chinese Taipei Amateur Radio League (CTARL), has now retired and has been honoured as a Founding President of the society. Mr Bolon Lin, BV5AF, is the new President. Mr Ralph Yang, BV2FB, becomes Vice President and Liaison Officer for IARU, whilst Mr James Huang, BV2BO, the founding Secretary General is the Board Director. CTARL was recently admitted to IARU as a member society.

LESOTHO ARS

Meg Edkins-Gibson, 7P8CO, tells us that solar power has been installed in her home in Lesotho. She goes on to say: "As amateur radio operators are amongst the leaders in experimental and electronic fields, their expertise could assist in research and development. The world's energy requirements are increasing, and if more consumers could use a percentage of renewable energy technologies, this would reduce demand on grid electricity and would assist our planet. In the event of possible emergencies, one's own independent power would be an advantage. We would be interested to know if any of your members are using solar or another alternate energy source for powering their stations, repeaters, or any other loads." If you have information, please tell G3FKM or G3GVV.

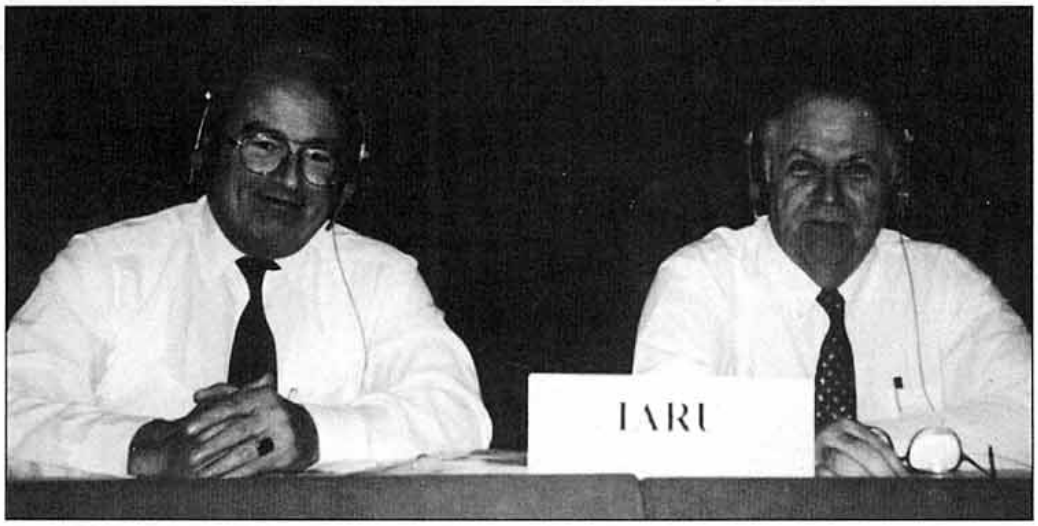
David Rankin, 9V1RH, IARU Region 3 Chairman, will chair an ITU propagation study group.

IARU REGION 3 CONFERENCE 1994

The triennial Region 3 Conference will be held in Singapore next September, with the Singapore Amateur Radio Transmitting Society (SARTS) as Host Society. Region 3 comprises Asia and Australasia. The RSGB will be showing its usual support for the Conference; a number of Papers have already been written and will be circulated within our society before receiving approval from Council, and will then be forwarded to JM1UXU, Secretary of Region 3.

TELECOM 95

The IARU will have an exhibit at this prestigious event in Geneva from 3 to 11 October 1995. Stand space has already been allocated by the International Telecommunication Union and accommodation provisionally booked for those who will attend to man the stand. This is an event which attracts visitors from all over the world and included amongst these are many Ministers of telecommunications and influential officials from many of the smaller countries where amateur radio is not well developed.



Louis van de Nadort, PA0LOU (left), and Dr Larry Price, W4RA, representing IARU at WRC 93.

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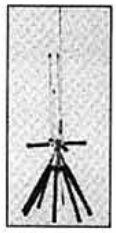

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SWL NEWS

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

EARLY FEBRUARY saw perhaps the best ever DXpedition; 3Y0PI from Peter 1st Island in bleakest Antarctica put in a truly magnificent effort to give many SWLs a new one. The only previous expedition to the Island took place in late January/early February 1987. Then, two Norwegians - LA1EE and LA2GV made over 17,000 QSOs, but most UK SWLs only managed to hear their signals on 14MHz (some were also lucky on 3.8MHz). This time, led by K0IR, the team of seven amateurs had amassed a staggering total of over 45,000 QSOs in the first nine days of the expedition. At the time of writing, listeners had reported their signals on 28, 24, 21, 18, 14, 7 and 3.5MHz. Some reported hearing them on six or seven bands.

The daily '3Y information net' run by ON4UN and ON4WW was most valuable in planning the next day's listening. Indeed, as a direct result of listening to the net I heard 3Y on 28 - 14MHz SSB in one day. The whole operation was a truly marvellous effort by all concerned.

INTERNATIONAL MARCONI DAY

G4USB WROTE with details of this year's event. It appears that the idea came to him and G4ZKH back in 1988 when they decided that it would be a good idea to run a Marconi related special event ten years on from the week-long 1978 event sponsored by the Cornish Radio Amateur Club at Poldhu.

This year's event takes place from 0001 - 2359UTC on Saturday 23 April. As ever there are some new stations participating and the Cornish RAC are considering restricting the number of special stations to a maximum of 30 to try to keep a measure of control. This year, GB1IMD will operate from the Marconi Radar Systems building in Leicester. The station will be DXing on satellite only. There will also be stations operating from Marconi's school near Bologna, Italy, while GB4MD will be operating from the old Caernarfon station at Waunfawr [see last month's News & Reports – *Ed*]. There are a good many more special stations active on Marconi Day including CT1TGM, DA0IMD, EI2IMD, EI4IMD, GB2GM, GB2IMD, GB2MDI, GB2MID, GB2SFL, GB4IMD, IY0GA, IT0ORP, IY0TCI, IY4TTM, IY4FGM, K1VV/IMD, KK6H/IMD, VE1IMD, VO1IMD and ZS6IMD.

Once again there will be a special Award for hearing IMD stations. Information about the award can be obtained by writing (with an SASE) to N Pascoe, G4USB at Westwynds, Loscombe Lane, Pencoys, Four Lanes, Redruth, Cornwall TR16 6LP. [The award is featured in *QSL* this month – *Ed*].

BAND REPORTS

1993 BEGAN with much activity from OK and OM, and listeners trying to catch S5, 9A, T9 etc on each of the bands. Nothing so exciting has presented itself so far this year, but it is worth commenting on the confusion which the CIS have caused by introducing their new prefix allocations. The situation now exists that stations using the UR prefix are located in the Ukraine, while amateurs using the UI prefix are now in European Russia. Some stations have still not switched to their new prefixes, but at least UH8EA in Turkoman has been heard using his new EZ5AA callsign. Very confusing!

Conditions on 7 and 3.5MHz are quite good up to the time of writing. David Whitaker noted that over 160 countries have been reported as active on each band. Even 1.8MHz boasted over 100 countries this year. Much of the DX has been on CW, and many listeners miss out due to their inability to read Morse. Some DX traffic has been noted on SSB on the band, particularly D2EYE who was very strong on several evenings at 2345. Other DX on 1.8MHz has included TF3GB, CN8GI, YS1JRG, PZ1EL, 5N0MVE and 4L0G.

On 3.5MHz the best DX was 9N1WU, 9M2DM, 9M8DB, DK6DR/DU6, TL8NG, BZ4WM, D2SA, V85PB, K1RX/BV and VP5JM.

After a poor January, 7MHz began to produce some good DX. Indeed, in one 15-minute period stations from ZA, TJ, TR8, 9X5 and D2 were copied. In the mornings, VK and ZL stations was audible up to 0800 and on one morning P29DX was a welcome addition. However, Steve was far better copy at his sunrise at 2015 on several evenings. ZY0SK was also heard from St Peter and Paul Rocks one evening. He was an extremely good signal for over two hours. There was much other DX reported on both bands, but these caught the eye.

On HF, 28MHz opened to various parts on odd days. It certainly pays to keep an eye on the band.

NET LIST

FOLLOWING THE Net List which I offered last year, these details will be of interest to any SWL keen on monitoring /MM stations. The main net to monitor appears to be the UK Maritime Net, which meets on 14.303MHz at 0800 and 1800 daily. The target area is the North Atlantic and the Mediterranean. Another to look for is the Intermar Net. This operates continuously from 0600 to 1100 daily on 14.313MHz. On weekdays from 0900 to 1000, control passes to the Cyprus Net. It appears that 14.313MHz is a frequency used by a chain of maritime nets around the World. A third is regularly audible in Britain. That is the Trans-Atlantic Net which meets at 1300 on 21.400MHz The net controller is often 8P6QH. The net operates mainly during the north Atlantic crossing season.

There are others, too, but they are not targeted for Europe. For information, they are shown in **Table 1**. I am unaware of how many SWLs monitor /MM (Maritime Mobile) stations, but I am always pleased to publish any unusual aspect of listening.

VK, ZL and Africa MM Net	0500	21.200MHz
Pitcairn MM Net	0630	14.180MHz (Mondays only)
Travellers Net	0400	14.116MHz
South African MM Net	0630	14.320MHz and
	1130	14.316MHz
Bay of Islands MM Net	1900	14.329MHz

Table 1: Some useful nets.

SATELLITES

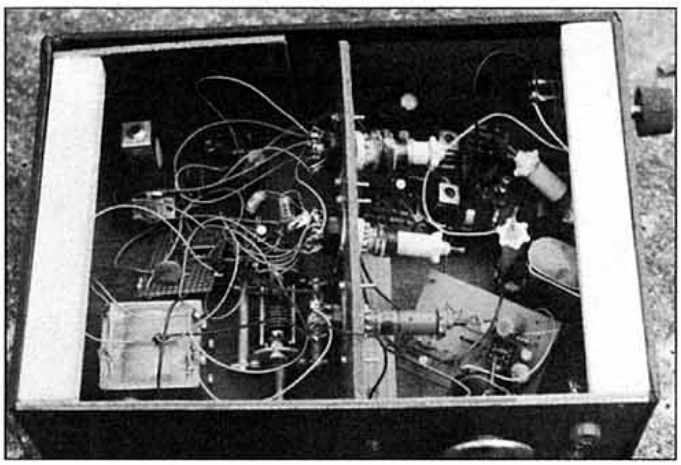
DAVID WHITAKER, BRS25429 rediscovered the Satellite segment of 144MHz above 145.800. He had listened to the satellites on 28MHz at the last sunspot minimum. Now he has heard some exotic callsigns courtesy of OSCAR-10 and OSCAR-13. He logged 29 countries in one week in early February in all continents, including VK6YBQ, JJ1BMB, YB0UNC, FR1GV (Novice station in Reunion Island), Z21HJ, NL7RY, CE6BFZ, TI5RLI, 9K2WA and 8P6SM. His listening habits had been rather haphazard, but David is thinking of getting a PC, and getting the programme which will tell him when are the best times to listen.

50MHZ

AS DAVID WHITAKER was writing his letter, he caught an auroral event on 50MHz. He heard nine countries - G, GM, GI, PA, SM, LA, OH, OZ and EI.

FINALE

APART FROM the usual reminder that the text copy date is 13 April, Bill McConachie, BRS22941 mentioned a most unusual logging. On 7MHz one morning he heard G0EHQ/M - nothing unusual in that, but he was driving a cement mixer on a motorway bound for Bristol.



Peter McBeath, RS44030, provides this month's photo. Eagle-eyed readers will observe that the majority of the components which make up the receiver are obsolete. It is a dual conversion receiver with 1.6MHz and 455kHz IFs covering 0.175 to 31.5MHz.

Novice Note Book

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

EVERY THURSDAY NIGHT in our workshop I get some comment to the effect that I have, yet again, cornered the soldering station. But thanks to my wife Margaret all this has changed! On a visit to G4SDI she noticed Lewis's workstation and commented that it looked very useful. I realised just how useful a workstation is for constructors who do not have workshop facilities.

A workstation is a portable unit where equipment can be built, tested and set up. It contains all that the soldering station contained plus basic test equipment: A variable voltage power supply, an audio amplifier to be used as a signal tracer or as a replacement for headphones, and a simple multimeter.

The workstation also has a light box. This item is particularly useful for 'looking through' single sided boards revealing the route of tracks connecting components. It can also be used when making drawings and tracings as the increased contrast eases eye strain. Finally a tray in the front of the box is ideal for keeping tools safely stored while not in use. For those with a lack of space and who construct 'on the kitchen table' this is especially ideal because at the end of the session it can be stored vertically in the back of a wardrobe or large cupboard.

The design of the base unit can be varied to suit the individual requirement of the builder. As a guide I have given the dimensions of the unit that I constructed, as shown in **Fig 1**, as it has proved to be just about right for the job.

CONSTRUCTION

I FIRST CUT THE TWO SIDE PANELS, and the front and back panels. Then, having ensured that the oversized base panel was square on one corner I glued and tacked the sides onto the base, starting from that corner. When this had set I carefully cut off the excess base material and cleaned the job up with sandpaper. I did it that way because I doubted my ability to cut the base correctly! I then cut two pieces of ply to divide the base unit into three sections. The tool tray at the front, the light box in the centre and the test gear compartment at the rear. The front panel of the test gear compartment was bent from a piece of 22SWG aluminium to fit the base. Due to the bends reinforcing the panel, 22SWG is adequate and is relatively easy to work. I then hinged the test gear front panel onto the base. This makes the whole unit a little easier to work.

The first module I included was the light box. This enabled the front of the box to be completed and used for tool storage while the rest of the unit is being constructed. A complete fluorescent strip light could have been purchased and built into the box but my junk box contained many bits of old units which I used. I shaped a piece of aluminium to act as a reflector. The choke, starter and tube clips were then fitted to this reflector and the whole lighting assembly was then fitted into the light box area. I also mounted a switch on the metal front panel to enable the light to be turned on and off.

A sheet of white perspex covered with a thin sheet of clear perspex was then fitted over the light box area and screwed into the side panels. I used this method for two reasons: firstly it is easier and cheaper to replace the clear than the white perspex; secondly, useful data can be included around the light box between the sheets as shown in the photo.

I also added a 24V transformer for my soldering iron. The circuit for all of the electrics used in the workstation is shown in **Fig 2**. A socket was added to the side of the box to take a Bulgin plug used by Weller soldering irons and a soldering iron stand was mounted to the workstation work-top. The 'spring' for the solder stand was made using the wire from an old wire coat hanger, shaped by winding it around a broom handle. The ends were then neatly finished and one end bent to take a nut and bolt to fasten to the base.

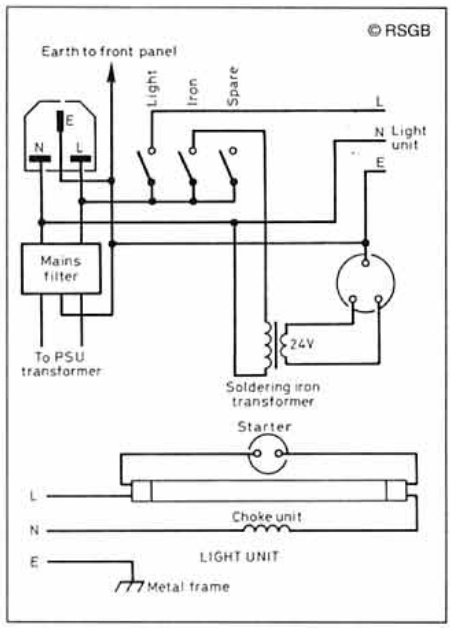


Fig 2: Workstation circuit diagram.

Mains input to the panel was made via a filter unit. My filter unit was rated at 1A so the light was connected directly to the input socket leaving the filter for the PSU.

For safety reasons it is imperative that all metalwork is connected to the earth pin on the input socket using the same gauge wire as used on the input lead. I have not included fuses within my unit as I consider that too many fuses increase the chance of an incorrect fuse being fitted. However, it cannot be stressed too much, a maximum of a 3 amp fuse *must* be fitted to the mains plug.

There are many other units that could be fitted to the basic workstation. For those interested in digital work a square wave generator with TTL/CMOS output levels would be useful. For RF work a frequency counter would be a very useful addition.

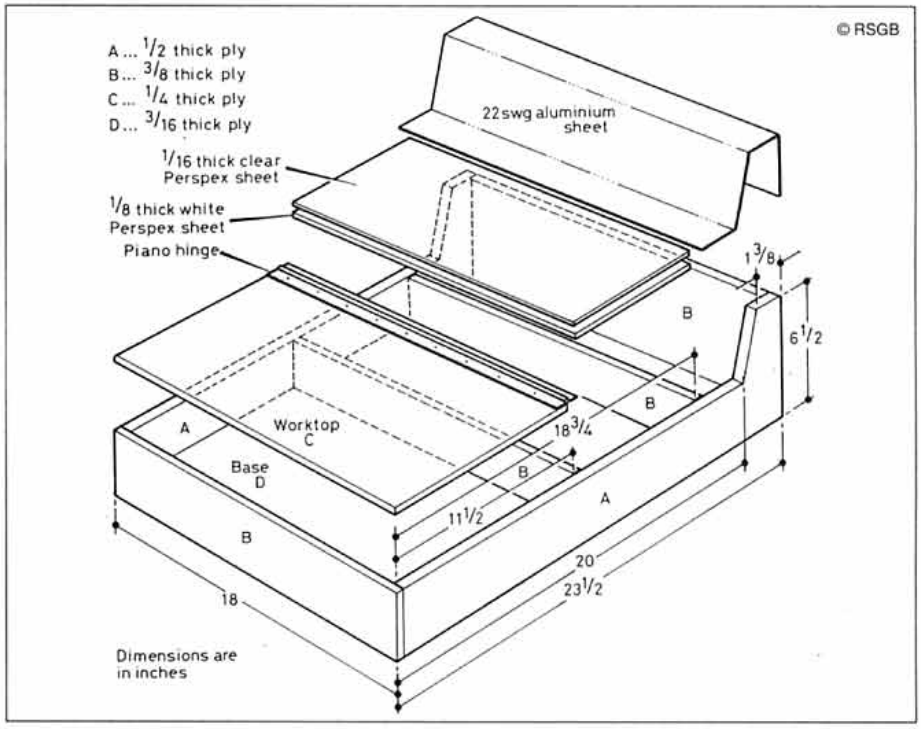
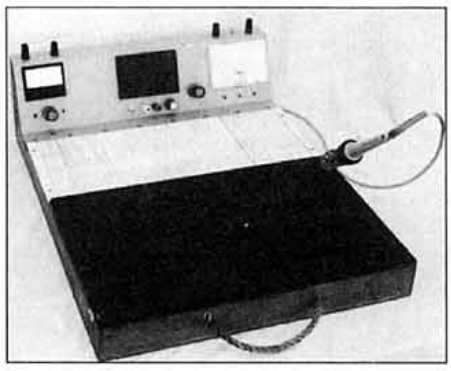


Fig 1: Workstation construction.



General view of workstation.

NOVICE NEWS

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

AS PROMISED last month, here is a little more information on International Marconi Day which takes place later this month.

The latest list of official stations has arrived with almost thirty listed locations – nine of which are in the UK with two more in Southern Ireland. Nearly all of these are associated in some way with events or stations set up during the early experiments which Marconi carried out. As many of the stations overseas will be located in national radio network premises, signals should be strong and clear and, with about half of them using the letter combination 'IMD', they should be easy to identify.

To gain the award you need to *work* twelve of the stations. With a 24 hour period and so many participating stations, this should prove challenging but not impossible. You need to send a copy of your log entries plus £3.50 for a certificate, or as a listener, you need to *hear* twelve stations. In this case a list of stations, times and the station being worked plus £3 is all that is needed. All information should be sent to Marconi Award, P O Box 100, Truro, Cornwall TR1 1RX [see page 25 for a picture – *Ed*].

Members of the Cornish Radio Amateur Club will be manning GB2GM at Poldhu, the site of the first transmission across the Atlantic and the station GB2IMD at Penair School in Truro. If you are in that area on 23 April call in at one of the stations and meet the operators.

A RADIO ACTIVE PAIR

RICHARD AND his son Christopher enrolled on a Novice training course last year when Richard was thirteen. They sat the NRAE in June and were successful.

While waiting for the results, Richard was not idle. A keen Scout, he qualified for proficiency badges in Communicator, Electronics and Radio Technician before adding 2W1CCP to his achievements. After this, he attended a training weekend at Gilwell Park and qualified as a Communicator Instructor.

Still under fourteen, Richard sat the RAE exam in December and was again successful. The information – and his photograph – reached me before his new callsign was known and I am very pleased to give credit to a hard working young man. I am pretty sure that I know his next venture!

Con, GW0FJH, sent me the information and added that Novice training still continues in Pontypool. By the time you read this, there should be a family of Novices in the offing (*a Novice family* gives the wrong impression entirely!) Mum, two daughters and a son sat the March exam and will be waiting for the postman's knock telling them of their success. Four more students are taking the course at present – one of them being Christopher's friend. This course will be followed by a well-earned rest for Con and his fellow Instructors until September. There is already one name on the list of prospective students for the next Winter programme.

AN ON-GOING TALE

THROUGHOUT THE country Novices are increasingly active, not only on the bands but in many useful ways. Many help their clubs at special events and field days and a number hold office helping to organise and run their club affairs. This brings a fresh approach and often more youthful ideas – although not all Novices are youngsters of course. Here is news of one youngster who is certainly working hard to further the amateur radio cause and is unstinting in his efforts.

Simon was one of the very first successful Novices and was given the callsign 2E1AAB. This was the first rung of the ladder and now, although he still holds that callsign he has added another – G0STU. School work takes up a lot of his time of course but Simon makes good use of his leisure time too. Having introduced an amateur radio activity at his school last September he found that there was enough interest to take things further. In the near future there could be a Novice course run at the school as Simon is now a registered Instructor. A school station could be the next development.

Simon is also active in the affairs of Bury Radio Society where he is a committee member and Editor of *Feedback* the Society's Journal – a copy of which has been sent to me – the first of many, I hope.

Simon's younger brother, Daniel, also holds a Novice licence. He is 2E1AAH and is interested in 70 centimetre contacts. He started a 70cm Net but gradually it dwindled and sadly no longer exists. If you live in the Manchester area, perhaps you would like to see it revived. This led Simon to wonder if anyone was interested in starting an HF Novice net. He is still technically a Class B Novice also and is very keen on the Novice concept – as his acceptance as an Instructor shows. If you have Packet capabilities, you can send information to him at GB7BEV.

FISTS

AN ARTICLE IN *Morsum Magnificat* about FISTS prompted me to write for more details. This could be of wider interest to *all* amateurs who have let their key remain unused and unloved because they lacked the confidence to make that first CQ call - and the longer it is left, the harder it becomes. I speak from experience!

FISTS founder, Geo, G3ZQS, has sent me a potted history and a copy of their newsletter *Keynote*, to tell me why FISTS is different. The only qualification required to join is a love of Morse as a means of communication. There is no minimum speed requirement.

Membership throughout the world is around 1000 and growing with members committed to encouraging the less proficient. A 'phone-a-sked' service exists for the nervous beginner where you can pre-arrange a QSO by phone and know that when your call goes out, a sympathetic listener will be ready to guide you through *at your speed*.

Other advantages on offer include: club QSL cards at an attractive price, a monthly newsletter (a talking newsletter for the visually handicapped), special discounts from carefully chosen dealers, and very many firm and lasting friendships.

There is some sound common sense in the newsletter which reached me this morning, one of which is "Do not waste time correcting small errors that are obvious. Credit the other chap/chappess with enough sense to know what you mean".

For more information, write to the Secretary: E (Geo) Longden, G3ZQS, 119 Cemetery Road, Darwin, Lancs BB3 2LZ, enclosing a self-addressed stamped envelope (SASE) please.

SLOW MORSE

IT IS OFTEN difficult to find good hand-generated Morse at a reasonable reading speed in the early stages of learning. Computer programs, tapes, help from friends and group learning sessions all play a part but there is nothing to beat listening to the experts.

The Royal Naval Amateur Radio Society runs a QRS Net on Monday at 1400 as close as possible to 3.525MHz. Maximum speed allowed is 12WPM and it is possible that it could be slower. The Net Controller is Chris, G3AWR, with Norrie, G3UEC, the Deputy Controller (who gave me this information). If you can listen in and need some practice in receiving, this seems a good opportunity to hear different operators holding a real QSO under real conditions.

● UNDER THE HEADING 'St Andrew's Eastbourne' in Novice News (Feb *RadCom*) the callsign given for the instructor was G3SER. This should, of course, have been John, G3SGR.

Thanks to Con, GW0FJH, for this photograph which shows Richard, 2W1CCK, and Christopher, 2E1CCP.

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THE PETER HART REVIEW

ICOM IC-707 HF Transceiver

THE IC-707 IS THE LATEST addition to Icom's extensive range of HF transceivers. It is their entry level budget priced radio, and indeed is one of the lowest cost full coverage 100W radios on the market today. It is a 12V operated multimode and ideally suited for home use, mobile or portable operation.

PRINCIPAL FEATURES

THE IC-707 COVERS USB, LSB, CW and AM modes as standard and FM when fitted with the extra FM unit. The receiver covers the frequency range 500kHz to 30MHz according to the manual, but in fact the receiver coverage extends down to 30kHz with reduced performance. The transmitter covers the amateur allocations with a little bit extra in most cases.

The main tuning drive is 45mm in diameter and smooth in operation. The tuning is in 10Hz steps at 2kHz per revolution or in 1kHz steps at 100kHz per revolution on any mode. Auto speed-up is engaged in the 10Hz step mode when the tuning knob is rotated fast to improve the speed of tuning from one end of the band to the other. 1kHz steps are selected by default on AM and FM (when fitted) and, of course, 10Hz steps are normally used for tuning CW and SSB.

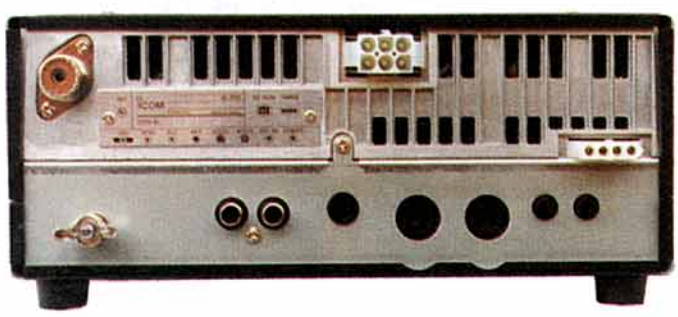
No distinction is made between amateur band operation and general coverage operation and there is no dedicated band switch as such. The tuning drive can be set to step in 1MHz increments or alternatively between amateur bands. In this case, as each band is selected, the last used frequency and mode (including narrow CW filter when fitted) is returned. A step button scrolls between the various tuning step sizes.

Twin VFOs, A and B, are provided and a total of 32 memories. Facilities are provided to operate split frequency, equalise A and B VFOs and transfer VFO contents to and from the memories. There is no memory preview facility or indeed anything other than the basic functions. The memories store frequency and mode and direct tuning from any memory is allowed. Four of the memories can store split operating frequencies and two memory locations are intended primarily for storing scan limits. Scanning is provided, either between two set frequency limits or across the memories. The scan will pause or stop when a signal is found or may be cancelled using the UP/DOWN keys on the microphone. The microphone UP/DOWN keys may also be used to tune the radio.

> **'. . . one of the lowest cost full coverage 100W radios on the market today.'**

A receiver RIT function is included but no XIT transmit capability. The RIT operates over a range of ±1.2kHz but the offset is not included in the main frequency display. There is no provision for selectable IF bandwidths on the different modes, but a narrow CW filter is an option for 250Hz or 500Hz bandwidth, selected by narrow CW mode.

Other receiver functions include switchable front-end preamp and switchable attenuator to suit input signal levels, noise blanker and all-mode squelch.



There is no RF gain control and the AGC speed is fixed with fast decay on CW and slow decay on SSB.

On transmit, the power output is variable from a few watts to nominally 100W. Transmit is engaged by PTT on the microphone or operating the key. There is no other transmit switch other than one pin of the multiway accessory connector on the rear panel. CW uses semi break-in only and the delay time is accessible only via an internal adjustment. Both this and the sidetone amplitude needed adjustment before the review radio was really usable on this mode. A substantial internal fan is fitted, which can be seen in the photograph, and this is quite quiet in operation. There is no speech processor but this feature would not be expected in a radio in this price bracket.

The display uses a large backlit LCD panel to indicate frequency to 100Hz resolution, memory number, mode and various status indicators, and a bargraph type S meter. The bargraph meter indicates power on transmit. The frequency is shown using 16-segment digits, which is not quite as clear as normal 7-segment numeric digits. The 16-segment displays are capable of displaying full alphanumeric characters and it seems strange to use this type of display for pure numeric data.

The rear panel carries connectors to interface to the usual accessories. Three multipin accessory sockets are provided for connection to data terminals, external Icom auto-ATUs, Icom linear etc. Relay controlled T/R switching and ALC is also provided for general linear use and these interface connections are common to all transceivers in the Icom HF range. Hence accessories and external connections to other units are all directly interchangeable. Although there is no specific provision to cover data modes such as RTTY, AMTOR and packet, the interface 'hooks' are provided and it is just necessary to select SSB or FM as appropriate. The external auto-ATU is controlled from the front panel.

The Icom CIV serial computer interface is

fitted, with selectable baud rate, address and data length. The CT-17 level converter should be used to connect to a personal computer. The radio is compatible with, and can be used in conjunction with other Icom radios for overall computer control.

The radio is provided with a 44 page instruction manual and circuit diagrams.

DESCRIPTION

THE IC-707 IS UNUSUAL in having a forward facing speaker dominating the front panel. This really is the ideal place to put the speaker acoustically but there is usually not enough room. However, the IC-707 has a relatively limited number of controls and room has been found for a reasonable sized speaker. Accessory units can be placed on top without muffling the audio.

The IC-707 is similar in size to other budget priced radios, measuring 240mm (W) by 95mm (H) by 239mm (D) and weighing 4.1kg. It is very ruggedly constructed, this is certainly not an area of cost cutting. The upper section comprises a die-cast moulding housing the PA, filters and PLL boards, all fully shielded. This die-cast assembly also provides the PA heatsink. The lower section contains the main PCB and the control board is located behind the front panel. The memory back-up battery is located on the control board.

The receiver is double conversion with IFs of 64.455MHz and 455kHz with the main IF selectivity being achieved at 455kHz. The transmit signal is generated at 455kHz and mixed via 64.455MHz to final frequency. The frequency synthesizer uses a combination of DDS and PLL techniques.

MEASUREMENTS

MEASUREMENTS WERE MADE with the IC-707 powered from a 13.6V PSU and are detailed in the table. Additional comments are as follows.

RECEIVER MEASUREMENTS

Sensitivity

Sensitivity is entirely adequate. The preamp gain measured about 11dB and front end attenuator about 20dB.

S-Meter Calibration

This is typical of most transceivers with the preamp switched out and fairly generous with the preamp switched in. The range on FM is reduced but is better than many radios.

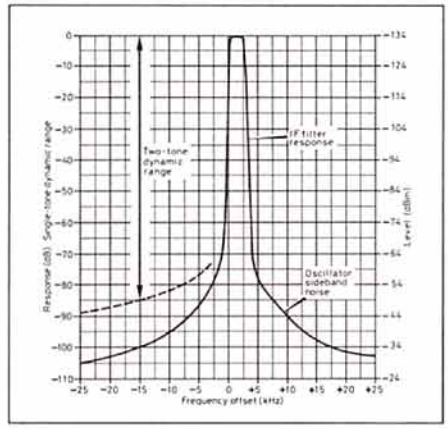


Fig 1: IC-707 effective selectivity curve on USB.

Spurious rejection

Rejection of the first mixer image and IFs was in excess of 90dB. Second mixer image which appears as a spurious response 910kHz above the on tune frequency was 80dB down and there were virtually no other responses even close-in. This is a very good result.

AGC

The AGC performance on SSB seemed reasonable but on CW there were problems. The decay time of 60ms or so is too short but the main problem was a massive overshoot on the attack characteristic lasting up to 50ms. See comments later.

Selectivity

A ceramic filter is used for the SSB bandwidth and gives acceptable results. The narrow CW filter option uses a high grade 8 pole crystal filter and, as the results show, this does not give the narrow skirt selectivity expected from such a quality filter. There seemed to be some indication of leakage around this filter and at the –60dB level, reciprocal mixing was a limiting factor.

Strong Signal Performance

The dynamic range and reciprocal mixing performance is reasonable for the price but is bettered in most aspects by more up-market radios. Wideband second order responses measured at 21.1MHz (test signals 11.6 and 9.5MHz) and 14.3MHz (test signals 7.2 and 7.1MHz) showed a response some 8dB worse than the normal 3rd order 50kHz spacing test. The overall effect of IF filter selectivity and reciprocal mixing is shown in **Fig 1**.

Frequency Calibration

The receive and transmit frequencies were accurate to within the display resolution of 100Hz. The CW frequency reads correctly for a beat note of 800Hz.

TRANSMITTER MEASUREMENTS

Power Output

The power output was variable down to about 5W. The power reduces quite substantially into mismatched loads, and this may be a problem for mobile operation. Where the antenna match is poor, an ATU would benefit.

CW Keying Performance

Fig 2 shows the CW keying waveform at 40WPM and **Fig 3** shows the equivalent keying spectrum. This is acceptable with minimal distortion.

Transmit-Receive Switching Speed

The measured figures should permit fully satisfactory operation on all data modes.

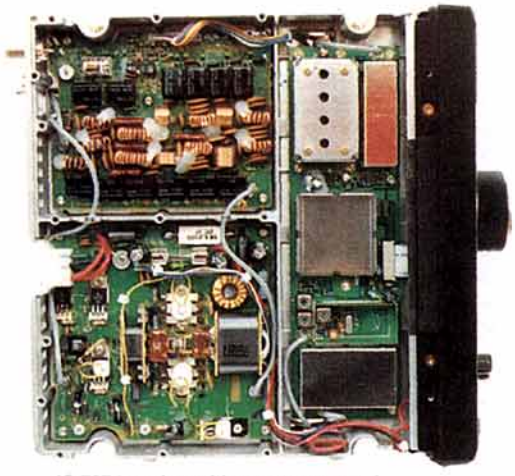
ON-THE-AIR PERFORMANCE

I USED THE IC-707 in place of my IC-726 and was operational immediately, having identical linear and keying interfaces. The receiver audio was good quality on SSB and on AM broadcast stations, aided no doubt by the forward facing speaker. The receiver performed very well both on the higher bands and on the noisier lower frequency bands and I used the receiver to monitor the various frequencies used in the recent 3Y0PI expedition. Although signals were frequently very marginal, I could always copy signals on the IC-707 that I could hear on more up-market radios. Generally the preamp was not needed except on 24 and 28MHz and if used on the lower bands some intermodulation problems were observed at times.

Although the AGC was fine on SSB, I did not like the AGC characteristic on CW. The recovery was too short, bringing up the noise between individual characters although this can be reduced by selecting the narrow CW filter (when fitted). There was also a tendency to 'pump' on noise and interference due to the problem with the attack characteristic reported in the measurements.

The narrow CW filter did seem to leak a little around the skirts. Very strong CW signals could be heard outside the filter passband at times. I also noticed a slight hiss in the audio with the AF gain control reduced to minimum. Transmit reports were good with natural sounding audio and no clicks or other problems on CW.

The transceiver is easy to use and there really are very few controls. Although I do not particularly like auto speed-up tuning, it seemed fairly effective in this case. I must admit that I found changing modes rather cumbersome. The mode select button is pushed to scroll between LSB/USB/CW/CW-N/AM/FM/FM-T and then back to LSB again. Changing from USB to CW is one press, from CW to USB is six presses (or 13 if you



IC-707 top view with covers removed

IC-707 bottom view with covers removed

ICOM IC-707 MEASURED PERFORMANCE

RECEIVER MEASUREMENTS

FREQUENCY	SENSITIVITY SSB 10dBs+n:n PREAMP IN	PREAMP OUT	INPUT FOR S9 PREAMP IN	PREAMP OUT
1.8MHz	0.16µV (–123dBm)	0.45uV (–114dBm)	9µV	32µV
3.5MHz	0.16µV (–123dBm)	0.45uV (–114dBm)	8µV	32µV
7MHz	0.16µV (–123dBm)	0.40uV (–115dBm)	8µV	28µV
10MHz	0.16µV (–123dBm)	0.35uV (–116dBm)	9µV	25µV
14MHz	0.16µV (–123dBm)	0.35uV (–116dBm)	9µV	25µV
18MHz	0.16µV (–123dBm)	0.35uV (–116dBm)	9µV	25µV
21MHz	0.14µV (–124dBm)	0.35uV (–116dBm)	9µV	28µV
24MHz	0.14µV (–124dBm)	0.35uV (–116dBm)	8µV	28µV
28MHz	0.14µV (–124dBm)	0.40uV (–115dBm)	9µV	32µV

S-READING (14MHz)	INPUT LEVEL SSB	FM
S1	1.4µV	0.5µV
S3	1.8µV	0.6µV
S5	2.2µV	1.1µV
S7	3.5µV	1.8µV
S9	9.0µV	3.5µV
S9+20	140µV	20µV
S9+40	1.1mV	63µV
S9+60	9.0mV	320µV

AM sensitivity (28MHz): 0.8µV for 10dBs+n:n at 30% mod depth

FM sensitivity (28MHz): 0.25µV for 12dB SINAD 3kHz pk deviation

AGC threshold: 1.0µV

100dB above AGC threshold for +2dB audio output

AGC attack time: 2ms

AGC decay time: 0.6–1.2s (SSB), 60–100ms (CW)

Max audio before clipping: 2.1W into 8Ω at 2% distortion

Inband intermodulation products: –30dB

MODE	IF BANDWIDTH –6dB	–60dB
SSB,CW	2650Hz	4500Hz
CW(N)	530Hz	1740Hz
AM	7920Hz	14.1kHz
FM	15.5kHz	25.1kHz

Frequency	INTERMODULATION (50kHz Tone Spacing) PREAMP IN 3rd order intercept	2 tone dynamic range	PREAMP OUT 3rd order intercept	2 tone dynamic range
1.8MHz	–1dBm	88dB	+14dBm	92dB
3.5MHz	+1dBm	89dB	+14dBm	92dB
7MHz	+1dBm	89dB	+11dBm	91dB
14MHz	+1dBm	89dB	+10dBm	91dB
21MHz	+2dBm	91dB	+11dBm	91dB
28MHz	+1dBm	90dB	+12dBm	91dB

TONE SPACING (7MHz BAND)	3rd ORDER INTERCEPT	2 TONE DYNAMIC RANGE
3kHz	–24dBm	73dB
5kHz	–18dBm	77dB
10kHz	–8dBm	83dB
15kHz	–7dBm	84dB
20kHz	–3dBm	87dB
30kHz	+1dBm	89dB

FREQUENCY OFFSET	RECIPROCAL MIXING FOR 3dB NOISE	BLOCKING	TX NOISE IN 2.5kHz BANDWIDTH
3kHz	79dB	–23dBm	–72dBC
5kHz	82dB	–23dBm	–79dBC
10kHz	93dB	–16dBm	–89dBC
15kHz	99dB	–2dBm	–93dBC
20kHz	102dB	0dBm	–94dBC
30kHz	108dB	0dBm	–95dBC
50kHz	114dB	0dBm	–96dBC
100kHz	119dB	0dBm	–97dBC
200kHz	125dB	0dBm	–98dBC

TRANSMITTER MEASUREMENTS

FREQUENCY	CW POWER OUTPUT	SSB(PEP) POWER OUTPUT	HARMONICS	INTERMODULATION PRODUCTS 3rd order	5th order
1.8MHz	96W	100W	–55dB	–30dB	–40dB
3.5MHz	96W	100W	–65dB	–36dB	–44dB
7MHz	96W	100W	–65dB	–27dB	–38dB
10MHz	95W	98W	–70dB	–25dB	–35dB
14MHz	95W	98W	–60dB	–23dB	–35dB
18MHz	95W	100W	–62dB	–30dB	–32dB
21MHz	97W	100W	–70dB	–22dB	–31dB
24MHz	99W	100W	–75dB	–14dB	–26dB
28MHz	99W	101W	–75dB	–21dB	–30dB

Carrier suppression: 50dB. Sideband suppression: 70dB @ 1kHz. Transmitter noise: see table above. Transmitter AF response at –6dB: 305–2600Hz (USB), 180–2470 (LSB). Transmitter AF distortion: <1% up to 20mV. Microphone input sensitivity: 2.5mV for full output. T/R switching speed (SSB): mute–TX 8ms, TX–mute <1ms, mute–RX 20ms, RX–mute <1ms. Power into load mismatch: 2:1 VSWR 50–70W, 3:1 VSWR 20–23W

NOTE: All signal input voltages given as PD across antenna terminal. Unless stated otherwise, all measurements made on SSB with the receiver preamp switched in and operating from a 13.6V PSU. All two-tone transmitter intermodulation products quoted with respect to either originating tone.

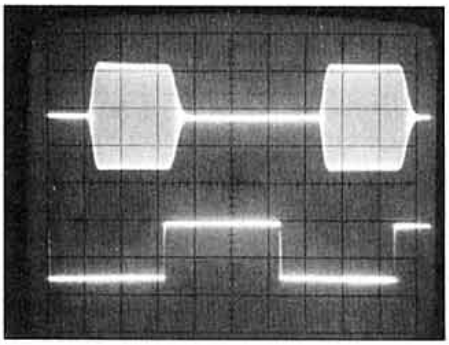


Fig 2: CW keying waveform at 40WPM. Horiz scale 10ms/div.

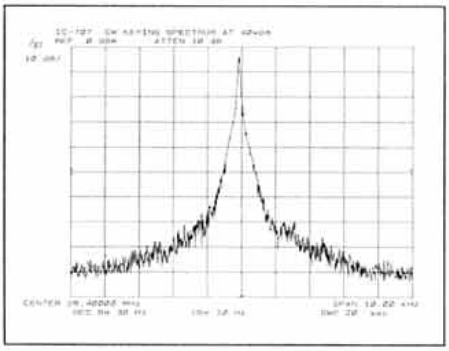


Fig 3: CW keying spectrum at 40WPM. Horiz scale 1kHz/div; Vert scale 10dB/div.

overshoot as I seemed to do quite often in my haste). Note that FM-T is FM with tone burst and CW-N is CW with narrow filter. Without the narrow CW filter and FM, these are not included in the scrolling process and mode selection becomes much easier. Similar comments apply to band changing/tuning to a certain extent where the tuning speed button scrolls between 10Hz/1kHz/1MHz/band steps and back to 10Hz again. This slight 'unfriendliness' to the ergonomics is a consequence of trying to keep the number of controls to an absolute minimum. Similarly, operations involving switching between memories, VFOs and transfers between these often involve pressing several keys.

CONCLUSIONS

THE IC-707 IS AN EFFECTIVE HF transceiver, providing full multiband 100W operation on SSB, CW and AM modes at a minimum of cost. The performance is good for a low cost transceiver, it is easy to use and ruggedly constructed. Naturally the performance and features must be viewed in relation with other budget priced rigs and in this comparison, it comes out very well. I have a few niggles over some of the ergonomics but overall it is to be recommended and would make an ideal beginners radio.

The current list price is £895 inc VAT with the FM board an extra £55 and the narrow CW filters for 250 or 500Hz bandwidth cost £129. The filter cost is a consequence of adopting a single IF at 455kHz. These lower frequency filters use large chunks of quartz and are expensive items.

ACKNOWLEDGEMENTS

I WOULD LIKE TO THANK Icom (UK) of Herne Bay, Kent for the loan of the equipment.

Peter Hart, G3SJX

NEVADA

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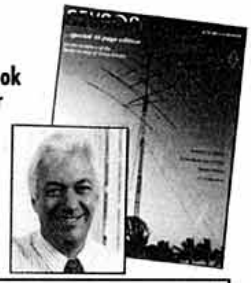
..... This month I've listed a selection of our most popular items - take another look at our special RSGB catalogue for further details. *Can you spot the bargains?*



73 - Mike Devereux G3SED

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WARC BAND T/DIPOLE - 200W	£79.95
G5RV HiQ 1/2 Size - Power - 1KW	£34.95
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RADCOM TECHNICAL FEATURE

MSF Locked Frequency Reference

The first of a two part feature by Andy Talbot, G4JNT

WHEN OPERATING narrow-band on the microwave bands, frequency setting can become a problem. Typically, crystal oscillators used in transverters can, with a certain amount of care, achieve 0.5 parts per million (ppm) accuracy when temperature compensation is used. However, at 10GHz this still corresponds to 5kHz uncertainty, nearly two SSB bandwidths! Frequency counters are available that can give accuracies of 1 part in 10^8 but these are expensive and not usually available when wanted.

Some years ago a frequency source based on the 200kHz long wave transmission from Droitwich was published. This suffered from residual phase modulation on the carrier and a good 'note' was difficult to obtain when multiplied to 10GHz. Since then, the Droitwich transmission has moved to 198kHz and the carrier is phase shift keyed at 25Hz during some times of the day, making a reliable and clean frequency standard much more difficult to achieve.

It was decided to adopt a different approach. The MSF Standard Frequency Transmission from Rugby on 60kHz is well known for transmitting time and date information which is easily decoded. The carrier frequency is related to International Standards, and is accurate to better than 1 in 10^{10}. This corresponds to an error at 10GHz of just 1Hz! In fact accuracy can be degraded by the transmission path at dusk and dawn, due to Doppler shift caused by the height of the Ionosphere changing, but this is unlikely to be noticeable.

It was decided to produce a general purpose frequency standard that had sufficiently good short term stability to be multiplied to microwave frequencies. In addition, lower frequencies would be provided that could be used as the timebase for frequency counters and oscilloscopes if required.

Direct multiplication of the 60kHz signal would not serve any useful purpose. No useful frequency could be produced for timebases, and the concept of directly multiplying by 172800 to 10GHz is mind boggling! In any case, the carrier is pulsed at 1Hz and an intermittent output would result.

The solution was to employ a 12MHz voltage controlled crystal oscillator which is divided down to 60kHz and phase locked to the MSF transmission. 12MHz was chosen for several reasons. Firstly, a simple to achieve division ratio of 200 gives the 60kHz VCXO signal. Secondly, all frequencies in the narrow-band segments of the microwave bands are (currently) multiples of 12MHz, making calibration simple. Since the prime purpose of the frequency standard was for calibrating my 10GHz equipment, a times-9 multiplier section was added to give a 108MHz output which could be used to generate a comb of harmonics detectable up to 10GHz.

The frequency reference is built in four modules, each one of which could be used for other purposes. A block diagram of the Reference is shown in **Fig 1**. The MSF signal is received off air by a ferrite rod antenna and head amplifier, mounted remotely. Any attempt to place the antenna near to the divider circuits will lead to pick up of the VCXO signal and the loop locking to itself rather than MSF. An NE567 tone decoder provides a gating signal corresponding to the carrier on/off keying. The received signal is squared up in an LM393 comparator, and applied to an Exclusive OR gate used as the phase detector for the PLL.

A 12MHz crystal oscillator is voltage tuned over a limited range of approximately 5ppm by the varicap across the crystal. The 12MHz output is applied to two bipolar tripler stages to give the 108MHz signal, and a portion is squared up and divided by 200 in a TTL divider chain. The resulting 60kHz output is applied to the other input of the phase comparator.

The output of the phase comparator has a mean level corresponding to the phase difference between the two signals when the carrier is on but settles to half output when the carrier is keyed off every second. The gating output of the tone decoder is used to control a sample-and-hold circuit consisting of a 4066 analogue switch and capacitor.

The voltage at this point is an accurate measure of the phase relationship between the two signals, and is displayed on a front panel meter to show the loop lock state. A loop filter integrates this output and uses it to control the VCXO frequency. Since a second order loop is used, the mean phase relationship is exactly 90° and the meter clearly shows when the loop is in lock by sitting firmly at mid scale.

An analogous system to this reference is used in colour television receivers to regenerate the colour subcarrier, at 4.43MHz, from a burst reference transmitted just after the line synchronising pulse. In this case the gating signal is generated by delaying the line

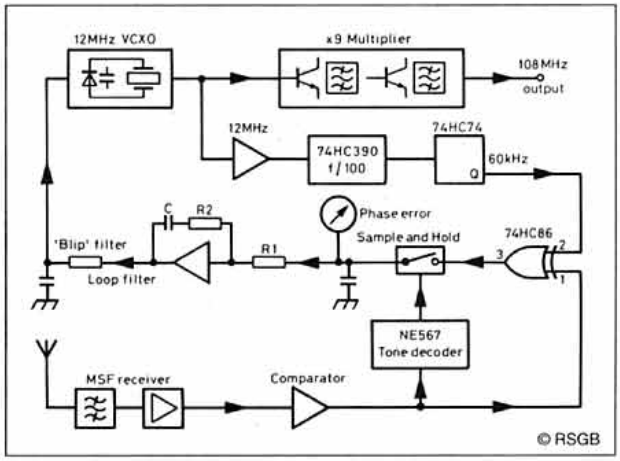

Fig 1: MSF Reference, block diagram.

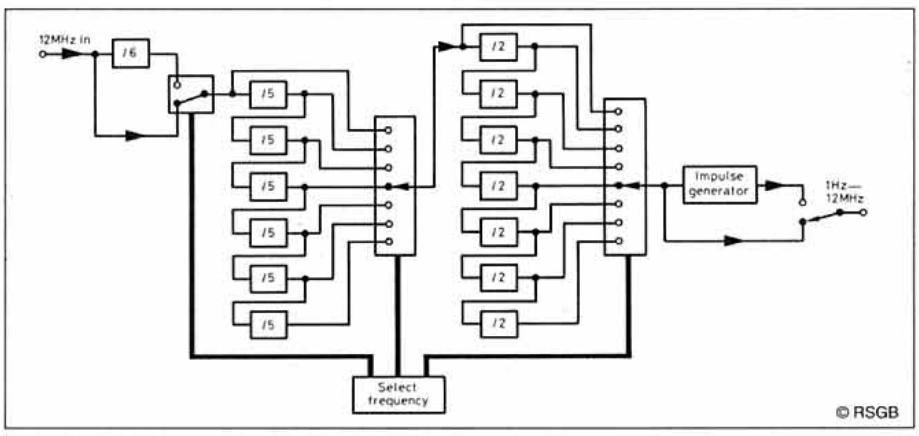

Fig 2: Programmable Frequency Divider, block diagram.

timebase flyback pulse.

To provide a range of other useful frequencies, a switchable, or programmable, divider is also included. The block diagram of this is shown in **Fig 2.** By selecting thumb-wheel switches, the 12MHz signal can be passed through between 0 to 7 divide-by-2 blocks, 0 to 6 divide-by-5 blocks and a possible divide-by-6. By this means 112 different frequencies down to 1Hz can be produced, by setting total division ratios from 1 to 12,000,000. All the 'useful' ones such as 1MHz, 25kHz etc can be obtained, as well as such frequencies as 93.75kHz and 375kHz. Who knows, they may be useful one day!

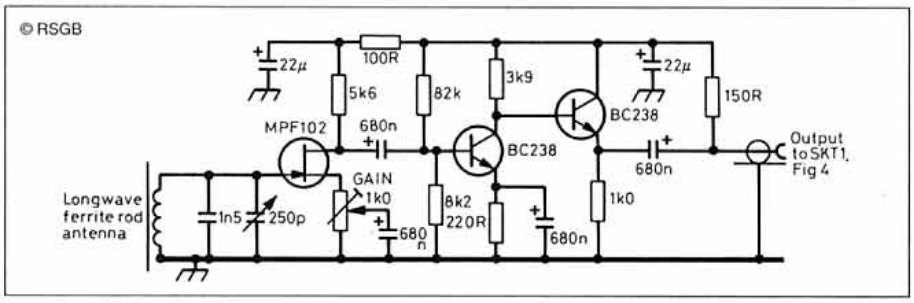

Fig 3: 60kHz Head Amplifier.

CONSTRUCTION

NO DETAILED CONSTRUCTION details are given as constructors will probably want to tailor the design to their own requirements. Separate units such as the times-9 multiplier and the programmable divider could be used on their own if desired.

The complete circuit diagram is given in **Figs 3, 4, 5 and 6**. The MSF head amplifier is built in a remote box and supplied with power via the coaxial cable. In spite of being at nearly audio frequencies, RF techniques need to be used here because of the low signal levels in this area. Input and output signals should be kept separate as the high gain in this block can easily cause oscillation. The ferrite rod antenna is a long wave unit, with extra capacitance added, and provides the only filtering needed. Bandwidth is around 1kHz, but depends to a large extent on the size of rod employed. The bigger the ferrite rod the larger the signal received.

The reference generator is made in three blocks. The VCXO and times-9 multiplier are on one board, which contains all the real RF circuitry. Layout should be suitable for the frequencies involved, and ideally a printed circuit board should be used. However, any other method of RF construction, such as the 'ugly' technique could be employed.

A second board contains all the sections needed for the PLL and the divide-by-200 circuitry, together with the MSF input comparator and tone decoder. Any 'logic' type construction such as point-to-point wiring is suitable. Care should be taken to keep the two 60kHz signals separate, as otherwise the loop will lock onto its own internally generated signal, and ignore MSF completely. Each integrated circuit should be by-passed with a 0.1µF capacitor at its pins, and ground connections should be as thick and direct as possible. If the 108MHz output is not required, the VCXO could also be incorporated on this board.

The same comments on decoupling and layout apply to the programmable divider; this should be kept away from the RF board as the low frequency signals could modulate the crystal oscillator in the event of any leakthrough.

ADJUSTMENTS

THERE ARE A NUMBER of adjustments to be set up and constructors are advised to follow the procedure given.

Firstly the VCXO is built and the 108MHz multiplier aligned. Monitor the voltage on the emitter of TR2 and peak L1 - L3 for a figure of 0.7V or higher. Then monitoring the emitter of TR3, peak L4 and L5. Finally, using a diode detector, peak L6 for maximum output. An output level of around 10dBm should be easily achieved, enough to drive a 1N23 type diode in a comb generator to 10mA.

The next stage is to bring the ferrite rod onto 60kHz. The use of an oscilloscope makes this a relatively straightforward job. With the head amplifier unpowered, connect the oscilloscope across the tuned circuit and, making sure the ferrite rod is at right angles to the direction of Rugby, adjust the preset capacitor until a 60kHz signal is seen which is pulsing on and off. Depending on the particular ferrite rod employed, it will probably be necessary to slide the coils along the rod to obtain resonance.

On the South Coast I am able to obtain a signal of 5 to 10mV peak-to-peak (p-p). If the head amplifier is now powered, a signal of more than 0.5V p-p sinewave should be present on the feeder. If a distorted signal much greater than this is present, the gain of the head amplifier should be reduced by adjusting the preset.

With the MSF signal applied to the Phase Locked Loop board, ensure that a 60kHz square-wave output from the LM393 comparator is present on pin 2 of the NE567. During breaks in carrier, noise should cause a random output at this point. Adjust the 10k preset until the LED flashes on and off with the received carrier. This completes the tone decoder setting up.

Set the lock / free switch so that the VCXO

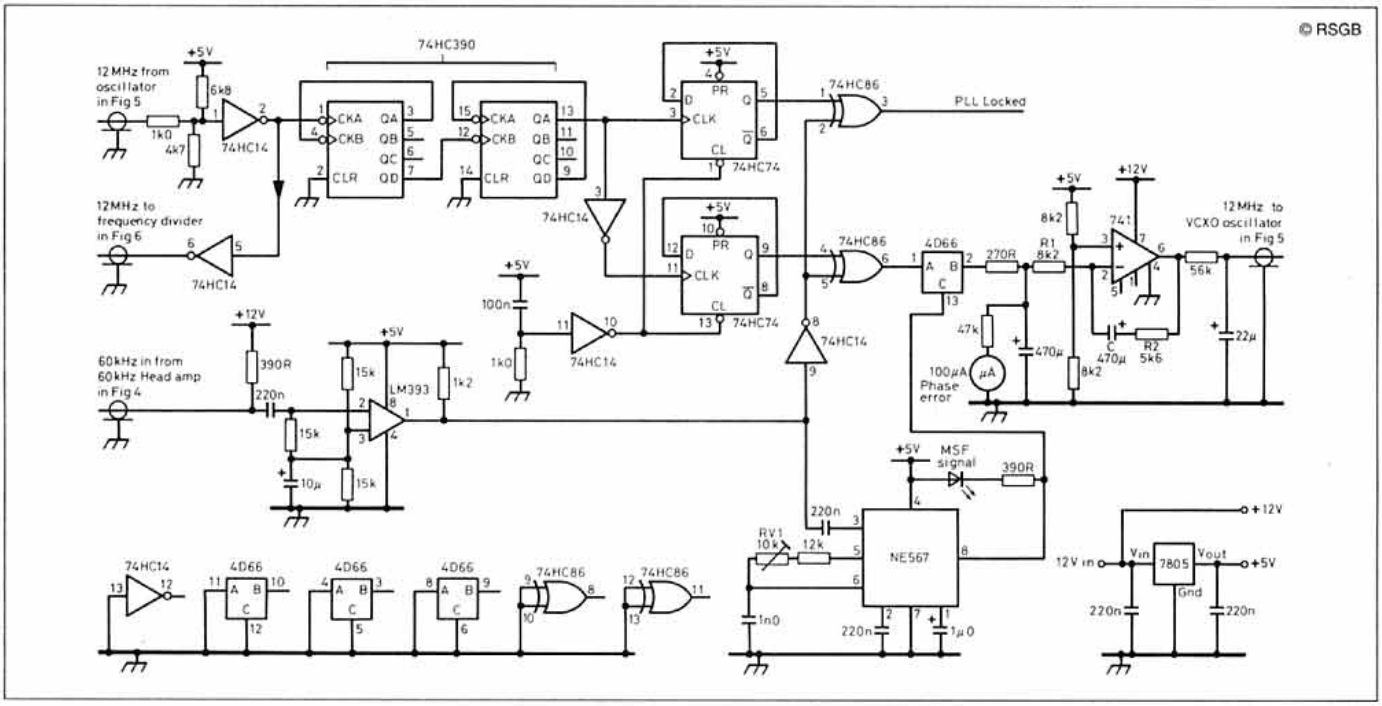

Fig 4: Comparator and part of Phase Locked Loop.

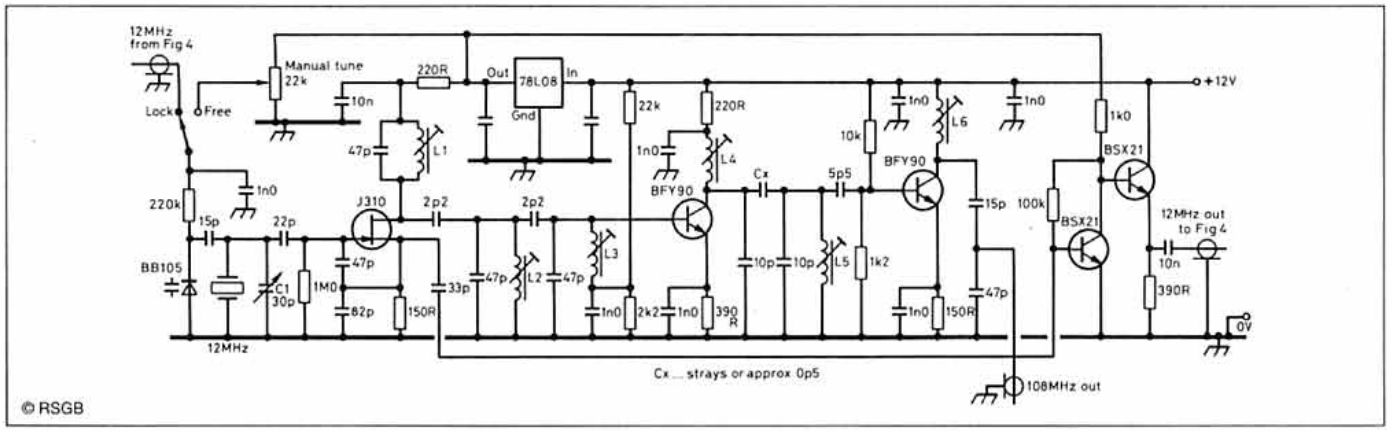

Fig 5: 12 MHz VCXO and Multiplier.

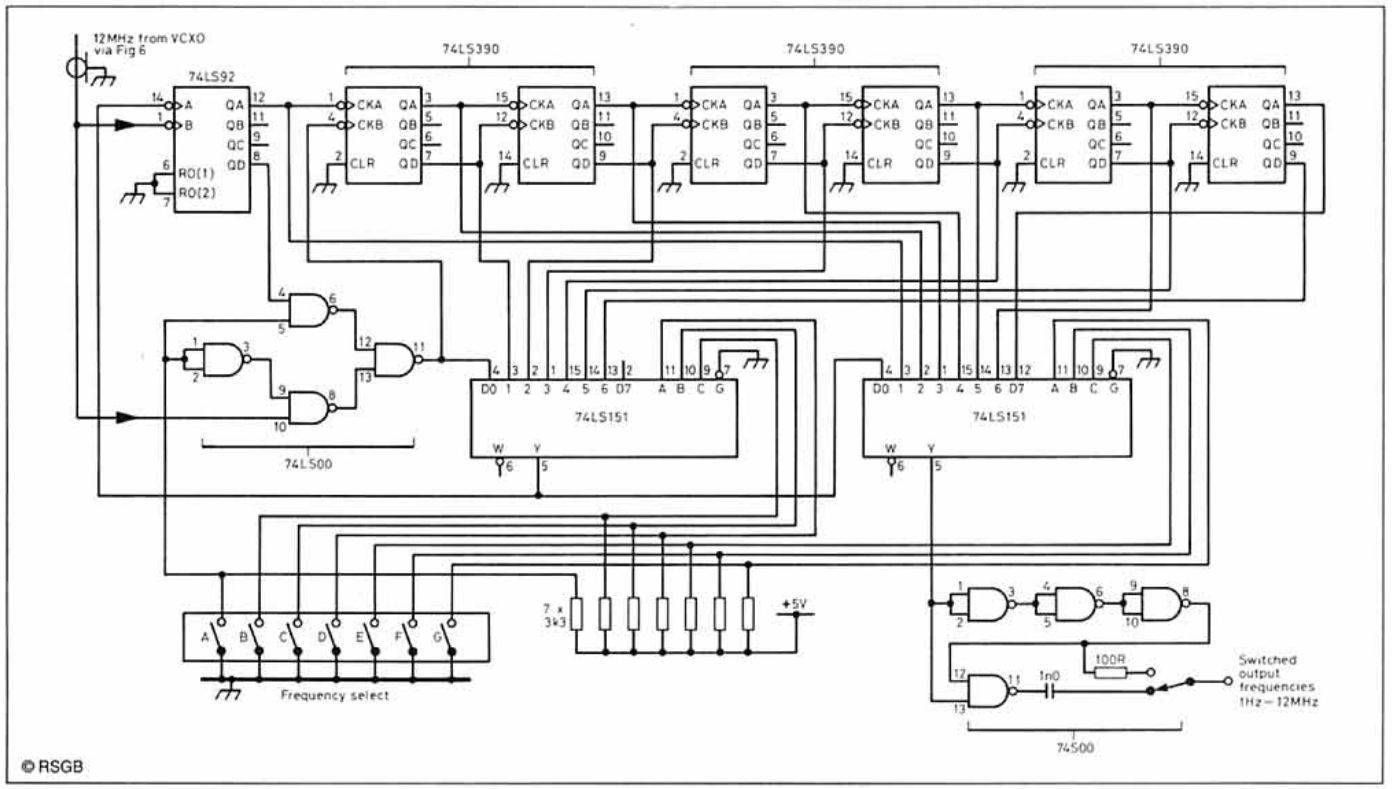

Fig 6: Switched Frequency Divider

free-runs and adjust VR1 for a VCXO tuning voltage of 3V. If the divide-by-200 circuitry is working correctly, the phase meter should now be swinging between 0 and FSD. If not, it is possible that the beat frequency between the VCXO and the received signal is too high for the meter to indicate.

Adjust the VCXO preset, C1, to bring this beat frequency as near as possible to zero. The error should be less than 0.1Hz, ie a complete cycle from zero to full scale and back to zero should take longer than ten seconds. Set the switch to Lock, discharge the 470µF capacitor, C1, by momentarily shorting it, and watch the meter. After three to four swings, the amplitude of the oscillation should have died away and the meter needle will be resting at mid scale, this is the 90° phase point and the loop is now locked.

If a digital voltmeter is available, monitor the tuning voltage over a period of one hour, it will drift due to the VCXO warming up, and if the voltage exceeds 3.5 Volts, C1 should be adjusted to achieve this value when locked. Harmonics of the VCXO can now be listened for on any band of choice and the calibration of receivers etc checked.

If at any point in the setting up, the MSF LED stays on, the receiver is picking up the internally generated 60kHz signal and the head unit should be moved further from the main unit. If all leads are sufficiently decoupled, a distance of 1 to 2 metres should be sufficient.

There is no setting up of the programmable divider, except by ensuring an output of the correct frequency is available for different settings of the programming switches.

. . . to be continued

NEXT MONTH

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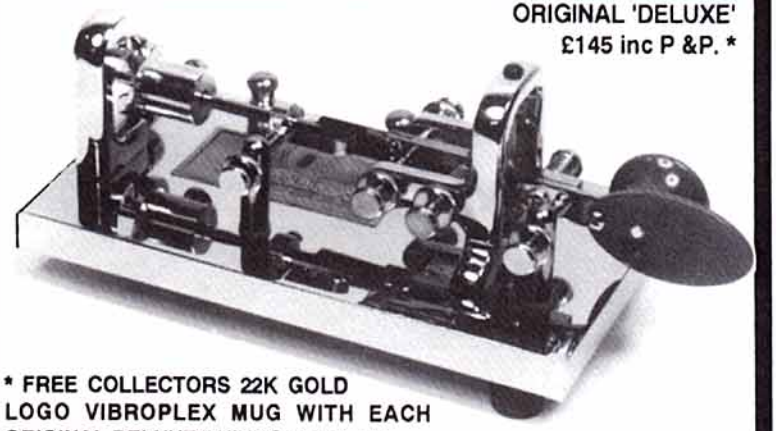

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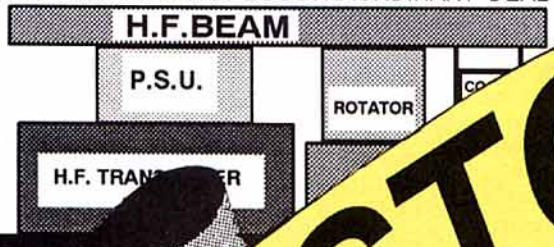

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This is not only an attractive and useful addition to any 'shack', but also a valuable aid to an HF operator using a rotary beam antenna system.

A single "AA" battery provides over one years operation.

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Pat Hawker's Technical Topics

EASY TUNING ON VINTAGE RECEIVERS

MANY YEARS AGO, listening to the Presidential Address given by the late 'Dud' Charman, G6CJ, I was impressed by his recommendation that the CW operator needed to be able to tune his receiver carefully across the response curve of narrow-band morse signals and that this could be done only with a very slow tuning rate, much slower than usually provided on communication receivers of the pre-SSB era, even those fitted with good electrical or mechanical bandspread.

Ever since, I have tended to add an extra external slow-motion drive to both home-built and factory-built HF receivers. Currently I use this approach with a KW2000A receiver and for the VFO of the old Labgear LG300 transmitter, with resulting tuning rates of the order of 5-10kHz per knob revolution. I have always found it possible to fit outboard drives without drilling panels etc (not always a neat result but serviceable).

I was therefore interested to receive a letter from Frank Penton, G0RZK who was most complimentary about the new *Technical Topics Scrapbook*, 1985-89. He is much enjoying rediscovering items that he had previously read – and forgotten – and reading others for the first time.

But his prime purpose in writing was to report a simple modification recently made to his Racal RA17L which has greatly improved the tuning of this excellent receiver. Incidentally an excellent and very detailed, two-part article *Racal and the RA17 HF Communication Receiver* (including full circuit diagram of the RK17L Mk II) by Keith Thrower (Research Director of the Racal Radio Group Ltd) has been published in *Radio Bygones*, (Part 1, October/November 1993, issue No 25 pp4-9; Part 2, Christmas 1993 issue No 26 pp17-26).

G0RZK writes: "I acquired my RA17L at a rally and found it to be extremely deaf. I bought a manual, replaced a few valves and carefully realigned it. I was very impressed with its performance and in particular its ability to resolve SSB even in a totally unmodified state.

Generally speaking, anything I could copy on my FT990 I could copy on the RA17L, and on 7 and 3.5MHz at night, the RA17L was often better thanks to the high Q input circuits and lack of diode signal-path switching.

"The one real inadequacy lay in the high tuning rate which was too fast for easy SSB tuning or the use of the narrow bandwidths on CW. I considered adding electrical bandspread on the third IF oscillator using a small varicap diode but decided that the additional front panel control would not 'fit' conveniently and so turned to mechanical bandspread.

"I eventually hit on the solution illustrated in the sectional sketch shown in **Fig 1**. It requires the minimum of modification to the receiver and it can be restored to original appearance if required. A standard J-B ball drive mounted on the 'kilocycle' tuning shaft is secured to the front panel with a pair of internally-threaded pillars 24mm long.

"The front panel was drilled and tapped 6BA to take short lengths of 6BA studding to fasten the pillars to the panel. A plastic coffee jar lid was then prepared to serve as a tuning knob to preserve the original tuning rate for rapid frequency changes. The cardboard insert from the lid formed a convenient template to mark out an aluminium disc that was cut from a scrap of aluminium sheet. This disc was then carefully marked out and drilled to match the dial mounting holes on the ball drive and to clear the central boss. The internal threads in the lid were removed with a pocket knife and the aluminium disc fitted inside the lid and fastened with small pop rivets (small pan-headed screws and nuts could serve as well).

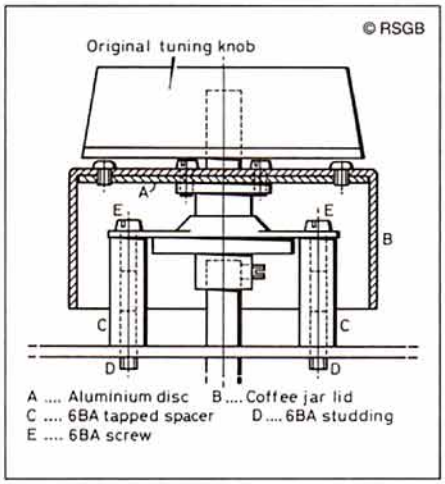
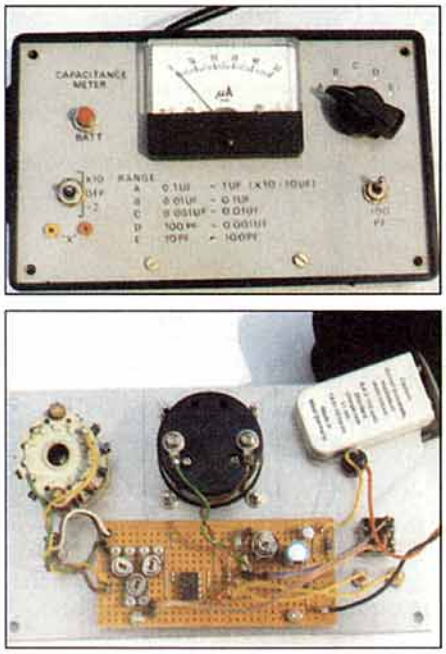


Fig 1: Constructional details of a two-speed tuning arrangement used by G0RZK but applicable to other receivers having good drives free of backlash but with too high a tuning rate.



External and internal views of G3CW's direct reading capacitance meter.

"The lid was then drilled using the disc as a template and fastened to the ball drive using suitable short screws. The original tuning knob was then mounted on the ball drive shaft.

"The final result was a concentric-knob, two-speed drive with the bottom knob preserving the original tuning rate of approximately 108kHz per turn and the top knob approximately 15kHz per turn. The improvement in ease of tuning can be imagined. The same principle could probably be applied to other receivers having good drives free of backlash but too high a tuning rate for the easy resolution of SSB signals."

CONSTRUCTING THE CAPACITANCE METER

H F ('BERT') KNOTT, G3CU, was interested to see the recent notes on the direct-reading capacitance meter (*TT*, April and June 1993) originally described by Alan Willcox in *Television* (May 1976) and then briefly noted in *TT*, (January 1977 and January 1989). He had been preparing to write an article describing his construction of this simple but accurate bridge, but, in view of the recent *TT* items, he considers this would be largely redundant. However he has sent along photographs and layout drawings of his implementation of this device (using the original circuit diagram as Fig 2, April *TT*, p51). He writes:

"Following the publication of your notes some years ago and after making a careful study of the original circuit, I realised that the theoretical circuit lent itself to a simple physical layout and that the use of Vero PC Stripboard – 0.1in spacing – (33 holes x 14 holes) was feasible. With a little thought, the modifications suggested in the recent *TT* notes could, if needed, be easily included.

"**Fig 2** shows my layout of the original circuit, and the photographs show my approach to the finalised unit. With the information in *TT*, I had no trouble in constructing this useful piece of test gear.

"I retained the divide-by-two and the x10 functions, but instead of separate switches, I used a DPDT switch with a centre-OFF position.

"I have found the unit quite stable and it gives repeatable results, with no difficulty in measuring capacitance down to a few pF. I use a rechargeable PP3-size 9V battery and a push button switch for 'on' and 'off', ensuring that current is drawn only during test periods. The illustration shows that I have calibrated the unit for highest readings with the 'range' switch in an anti-clockwise position in order to help prevent overload damage to the meter. The whole unit is installed in a Maplin Desk Console style 1 (type M1005) plastics box 161 x 96 x 61/39mm – Catalogue No LH63T – which has an aluminium panel."

GRAY LINE DXING

AS MENTIONED A FEW months ago in *TT*, a number of additional comments have come in on the topic of gray (or grey) line propagation. But there has also been a good introduction to the subject by Tom Russell, N4KG (*QST*, November 1992) pp80-82). N4KG (formerly W8FAW and WA0SDC) has worked over 300 countries on 3.5MHz using dipole

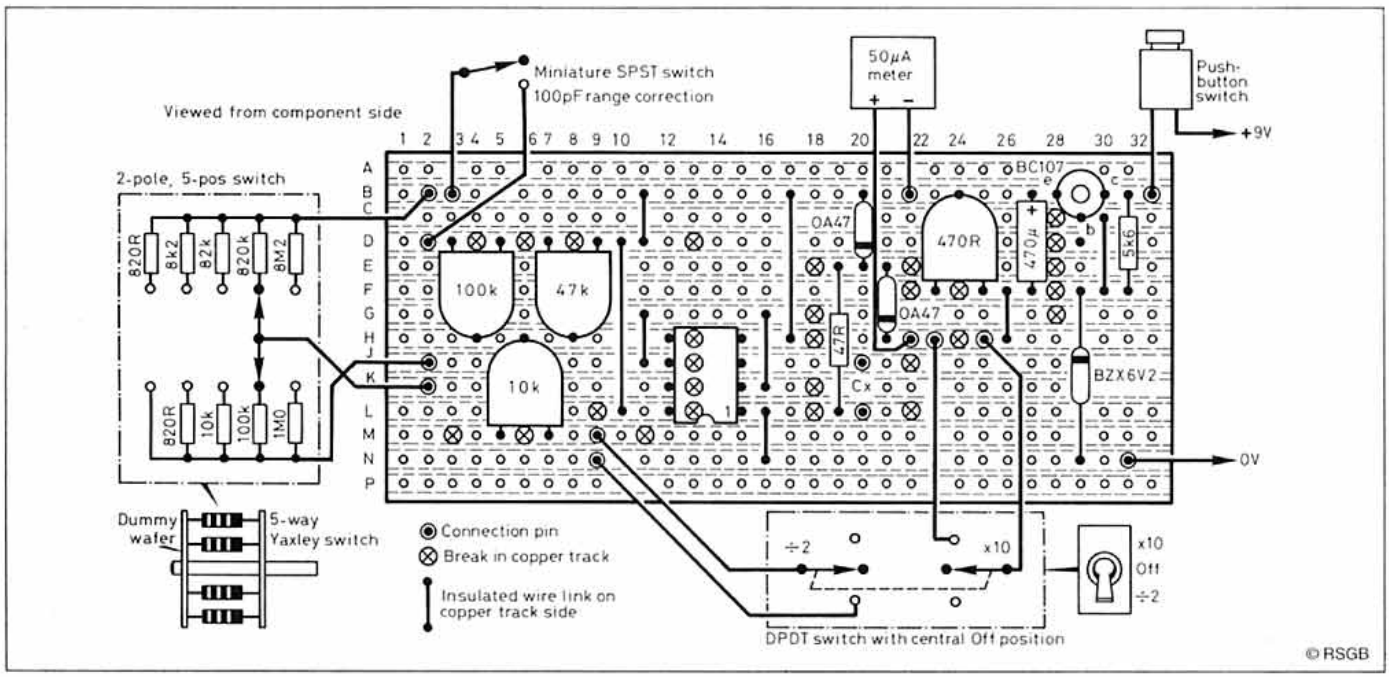


Fig 2: How G3CU lays-out his direct reading capacitance meter using the circuit shown in *TT*, February 1993, Fig 1, p51.

and vertical antennas and has clearly been aided by gray-line propagation.

So first some extracts from his introductory notes: "The transitions from darkness to daylight and daylight to darkness cause drastic changes in the ionosphere affecting all HF propagation. All-band DXers need to understand these changes to improve their chances of long-distance communication, especially over long or difficult paths.

"Several factors affect HF propagation: path, frequency, solar activity and time . . . . frequency and time are the only ones over which we have much control. Understanding the sun's effects helps to select the best frequency for a given time, or perhaps more importantly the best time for a given frequency, for each selected path and level of sunspot activity.

"Time is a complex factor in propagation, encompassing time in the 11-year sunspot cycle; time of year (season and tilt of the Earth); and time of day (daylight, darkness or twilight). From October through March, the North Pole is in partial to total darkness, permitting over-the-pole, northern hemisphere, low- and high-frequency propagation between opposite sides of the earth. This is also true for the south pole and the southern hemisphere from March through October. Summertime propagation is totally different from the rest of the year, with HF openings and closings occurring much later in the day. The polar paths are primarily restricted to 7 through 21MHz in the summer, while transequatorial paths predominate on the low bands and on 28MHz . . . . the ionosphere's behaviour at sunrise and sunset is highly dependent on frequency . . . .

"The sunrise/sunset line, also known as the terminator, gray line or twilight zone, is a circle about the Earth whose position depends on the time of year (season) and time of day. Maximum usable frequencies (MUFs) are highest on the illuminated face of the Earth. so is the absorption caused by the effects of the energized D region of the ionosphere. Propagation losses are lowest near the MUF. the MUFs drop on the dark side of the earth, to a minimum value of approximately one third the day time MUF, just before sunrise. Absorption also quickly subsides as the D region is no longer illuminated by the sun.

"Propagation along the gray line is especially interesting. MUFs are rising rapidly on the sunrise side and are still high on the sunset side of the Earth. The D region has not yet been energized on the sunrise side, and is rapidly dissipating on the sunset side, resulting in low absorption. The net result is that for a period ranging from a few minutes at low and high frequencies (1.8MHz and 28MHz), to one or two hours at intermediate frequencies (14MHz), with suitable ionospheric conditions, stations in the twilight zone can communicate with stations at any other location within the twilight zone on any HF band!"

N4KG's article continues by examining these effects in greater detail but the important point to note is the period during which gray line contacts are possible varies greatly on the different bands. Since long-distance contacts are possible on 7MHz and above by other modes of propagation, amateur interest is centred primarily on 1.8MHz where the openings may last only a few minutes, 3.5MHz slightly longer, and to some extent on 7MHz where gray-line propagation opens paths that are very difficult at other times.

Nevertheless on 14MHz, 21MHz and the WARC bands it has long been recognized that dawn and dusk are the optimum times for long-distance contacts using 'chordal hop' paths without intermediate Earth reflection as utilised in the gray-line modes, and dependent largely on the ionospheric tilts as the F2 layer and the F1 layer merge or separate.

A point of considerable practical importance (as discussed in *TT* on several occasions during 1992) is that gray-line and chordal hop modes do not necessarily depend on low-elevation radiation antennas but on the position of the tilts in relation to the two locations. With the tilts nearly overhead, antennas such as relatively low dipoles can be as effective as the best verticals, etc.

It should be emphasised, as N4KG does in his concluding remarks, that "Several problems combine to make low-band, long-path contacts difficult to rare. Low activity, brief openings, atmospheric noise, E-region MUF, absorption and station capabilities are other reasons. Yet with the right timing, persistence can be rewarded with rare and exotic DX! Although these openings do not always occur on a daily basis, they do always occur in the time periods indicated."

David Reynolds, G3ZPF, is one of those who has taken considerable interest in gray-line paths. His useful articles "Calculating grey line paths" appeared in the now-defunct British *Amateur Radio* magazine in March 1986 (pp34-38) and his earlier "Calculation of sunrise and sunset times using the Apple-2 microcomputer" in *Short Wave Magazine*, October 1982. In *Amateur Radio* he made the point that although the transition from day to night (and vice versa) varies in duration across the world, the width of the twilight zone is nearly constant. For a station at the equator to pass through the twilight zone requires a far smaller rotation of the earth than for one at a more northerly (or southerly) latitude. This is why it gets dark very quickly in the tropics.

G3ZPF adds some caveats: "First (and especially for the G/ZL path) find out how accurate the computer program (used to determine sunrise/sunset times) is. There is little point in using software which has ±15min accuracy to predict openings of just a minute or so. Do not be fooled by its accuracy at the home QTH. Errors in the software will vary with latitude.

"Secondly, I found that signals do not necessarily peak during the twilight zone. In sunspot minima years I found that signals could peak up to an hour after full sun-up, possibly, it seemed to me, because the less active sun was taking rather longer to 'cook' the ionospheric layers than in sunspot maxima years."

I presume that most of G3ZPF's gray-line operation was on 3.5MHz and he does not

make N4KG's pertinent observation that the period over which gray-line propagation occurs depends on the band in use, with 1.8MHz being the most short-lived.

Old-timer Ted Cook, ZS6BT, follows up the earlier comments (*TT*, June 1992) on signal enhancement along antipodal paths: "It is not quite so simple as suggested. If we take the Poles as the two locations – and especially at an equinox – I would agree. But, taking the practical example I gave of Johannesburg and Hawaii with signals receivable simultaneously on different HF bands, at no time is there either common darkness or common daylight. It is however sunrise at one location and sunset at the other – the Great Circle twilight zone or gray-line path.

"Professional and most amateur HF communicators have traditionally thought of 'day' and 'night' frequencies with little mention of optimum 'median' frequencies for gray-line propagation over a reasonably extended period: I would suggest these as roughly 13 to 17MHz.

"Only the higher latitudes have twilight so it is misleading to talk of a twilight zone or belt. Rather there is a gray zone, about ±2 hours along with the sunrise-sunset great circle. Median frequencies prefer this zone and hence there is enhancement of (say) 14MHz signals in the gray zone between antipodal points. However, the higher and lower frequencies manage to sneak through the gray zone for a short time only.

"Secondly, signals on 'day' frequencies do not reach far across the gray zone into darkness and similarly signals on 'night' frequencies do not proceed very far into daylight areas. 'Median' frequency signals find it difficult to cross the gray zone at right angles but are happy to cross it at a more acute angle. this results in the 'go' and 'no-go' seasons for short path and long path contacts!"

Ted Cook emphasises that to take advantage of the gray zone on median frequency bands there is no need for accurate computer predictions of sunrise and sunset times but merely a rough idea of how the zone varies with the seasons which can be depicted on maps based on Mercator projection together with a great circle map on which to interpret the rule: "If a short path crosses a point, the long path will cross the antipodes of that point. We can now plot any great-circle path on the Mercator map usually in the form of a fancy curve."

Many years ago in *TT* and subsequently in *ART*, I attempted to provide a series of thumbnail sketches showing the sunset/sunrise boundaries at various seasons. The intention was to provide at least sufficient accuracy to show whether DX paths are likely to be 'go' or 'no-go' on, say, 14MHz. These were reproduced in *TT*, June 1992, as Fig 3, page 37. It has long been recognized that the G/VK and G/ZL paths (very roughly antipodal) are particularly reliable in the early mornings on 14MHz – a practical illustration of the importance of understanding the basics of propagation not only in terms of sunspot cycle, MUF, or 'conditions' but also, as ZS6BT puts it, in terms of seasonal illumination! Several writers have also emphasised that even on the lower-frequency bands, 'long-path' openings can be as important as 'short path' openings.

PSU LORE AND THE SWITCHING REGULATOR

EARL HORNBOSTEL, DU1AE, recalls that, some time ago, some comments of his concerning the use of SCRs (thyristors) as overvoltage protection in power supplies were published in *TT*. These emphasised that it is essential that the SCR (thyristor) itself should be protected against excessively high currents. Otherwise when turned on by an overvoltage it is likely to blow out virtually instantaneously, before the associated fuse has any chance of acting.

DU1AE notes, however, that this problem continues to be ignored in many published designs, including, for example, the lead technical article by Ben Spencer, G4YNM in *QST*, (November 1993, pp27-29) which is presented with the editorial comment: "This power supply's features, keep itself – and the equipment attached to it – safe!"

Earl writes: "You will note that the 25A SCR in G4YNM's article is placed before the regulator, after a 10A fuse which immediately follows the main 10,000µF reservoir capacitor. If the SCR is switched on, it will almost certainly burn out before the fuse, leaving the supply unprotected. What is needed is a suitable resistor in series with the anode of the SCR to limit the current to about 15A, enough to blow the fuse but not enough to harm the SCR. Yet this basic design fault continues to appear, time after time, in PSUs designed for or by amateurs."

DU1AE also draws attention to the new family of switching-type IC regulators which have become available during the past few years. He writes: "These can be used with very simple circuits with standard components and are available in several versions, both in current capability and fixed or adjustable voltage outputs. They have very low dropout voltages and since this form of power supply occupies a very small physical space, they can be mounted in the smallest battery-operated equipment.

"Their advantage, when used for battery equipment, is that they provide a regulated output at high efficiency and the equipment will have uniform performance over the life of the battery; in other words the output voltage can be kept constant while the input voltage to the switching regulator falls. A standard Leclanche cell will have a voltage drop from about 1.5V to about 1V as about 90% of its energy is used up.

"Using a switching regulator with a 9V battery, a constant 6-volt output over nearly the whole life of the battery is possible without wasting any appreciable energy. With this form of switching-mode regulator the higher voltage at the battery terminal is mostly converted to higher current at the output terminal. In converting from 9V to 6V the current into the regulator would be about 20% less than the output current; in other words voltage is converted into current resulting in high efficiency.

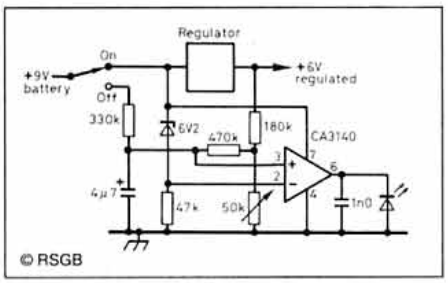


Fig 3: The blinking LED circuit which briefly shows when equipment is turned 'on' and which also blinks when the 9V battery is near its end-point voltage (6V). Used in conjunction with a switching-mode regulator as described by DU1AE.

"I recently designed a small 50mW FM transmitter using 6V from 9V batteries; to give a proper usage indication, I arranged for the operator to know when the transmitter is turned on; also, when the battery voltage drops to an unacceptable level. **Fig 3** shows the circuit. It uses a 5-to-6V blinker type 5mm LED and a CA3140 high input impedance op-amp.

When the transmitter is switched on, the blinker will operate for a few seconds and then go off. On the other hand, the blinker will start operating when the battery voltage is down to 6V. The device takes up an extremely small space. The reason for having the LED operate for only a short time after turn on is to avoid wastage of battery, yet to show the operator to know it had been turned on. When on, but not blinking, the drain is only 1.66mA at 9V."

DU1AE enclosed information on the Micrel LM1576 and 2576HV "3A buck voltage regulator" one of a large family of switching regulators which uses 52kHz (±10%) switching in conjunction with an external standard 100µH inductance [perhaps one should note that with switching-mode devices there could conceivably be RFI problems in some circumstances – *G3VA*].

The device is described as follows: "The LM1576 series of monolithic integrated circuits (**Fig 4**) provide the active functions for a step-down (buck) switching regulator with a minimum of external components. Fixed versions are available with a 3.3V, 5V, 12V or 15V fixed output. Adjustable versions have a range from 1.23V to 37V (57V for the high voltage version).

Both versions are capable of driving a 3A load with excellent line and load regulation." It is pointed out that the fixed voltage version has an efficiency of 80% (better than 80% with the adjustable version) with thermal shutdown and current limit protection. This form of regulator substantially reduces the size of the heat sink used with conventional regulators and in many cases no heat sink is required: **Fig 5** shows typical applications of the LM2576.

AIR CELLS – LECLANCHÉ AND ZINC-AIR

MANY YEARS AGO (*TT*, December 1977 with a follow-up in May 1978) attention was drawn to the use at remote repeater sites in South Africa of large-capacity Leclanche air-cells. These were used in conjunction with 'reservoir' nicad cells which coped with occasional heavier (transmit) demands and were kept charged from the air-cells.

It was claimed by the South African writer, R T Hubbard, that the adoption of this system, rather than using thermo-generators, had reduced costs of providing power at remote sites by 80%, with the cost per station (in the 1970s) of a set of batteries about £80. Sev-

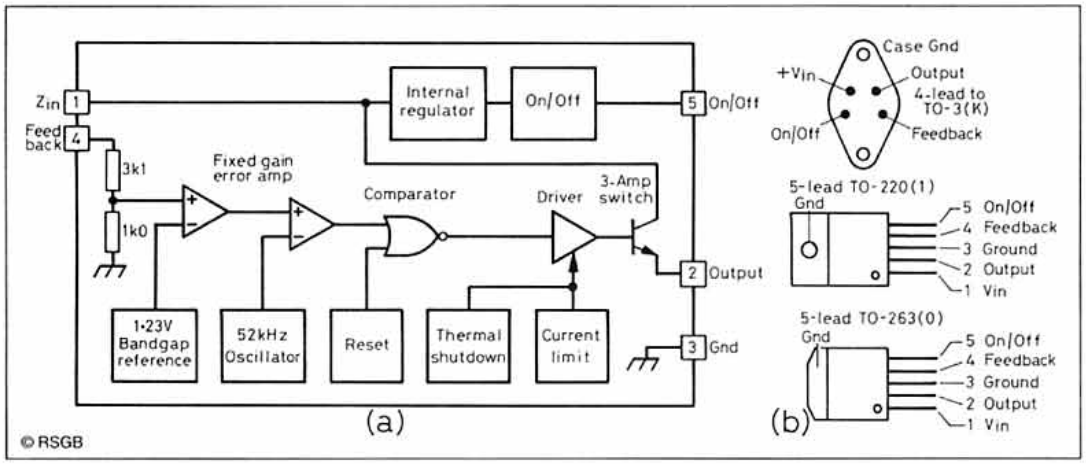


Fig 4: Switching regulator IC. (a) Internal arrangement of a fixed-voltage regulator. The variable regulator is similar except that the feedback (pin 4) goes directly to the error amplifier without the two resistors forming a potential divider. (b) Pin connections of the series for the TO-3, TO-220 and TO-263 packages.

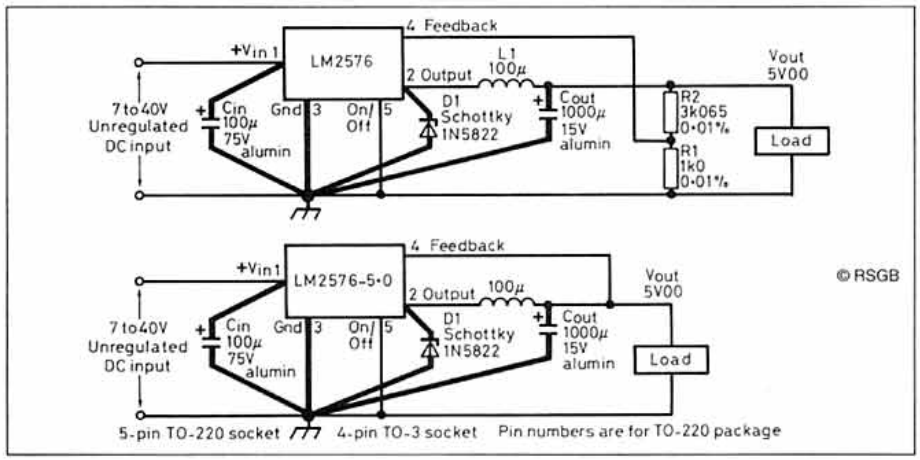


Fig 5: Test circuits for LM2576 and 2576-5.0 regulators. Note that as in any switching regulator, layout is very important. Rapidly switching currents associated with wiring inductance generate voltage transients which can cause problems. For minimal stray inductance and ground loops, the length of the leads indicated by heavy lines should be as short as possible. Single-point grounding (as indicated) or ground-plane construction should be used for optimum results.

eral readers subsequently pointed out that British-made air-cells of this type were used by British Rail.

To quote the 1977 *TT* item: "In effect, primary power is provided by a bank of 12 air-depolarized cells having an electrolyte of caustic soda and a capacity of 2000Ah. These cells (which are not a new invention) are air-depolarized, rather than using manganese as in the conventional Leclanché cell.

"The carbon element consists of a porous block of special construction which allows it to remain dry even when partially immersed in an electrolyte, yet permits gases generated by the action of the cell to mix freely within the pores and so cause hydrogen to combine with oxygen in the air, through the catalytic properties of the carbon.

"The cells have much greater capacity and far less weight for a given output compared with cells using chemical depolarizers, and have exceptional shelf-life [when not activated].

"The cell is in a black moulded case and is taken to the site before filling with water. Once the cell is connected and water added it is ready for immediate service . . . . They can supply a maximum of 1A in conditions of continuous discharge, enough for about 5W of transmitter power.

"To allow higher powers to be used, a nicad battery is trickle charged via a current-dependent resistor from the air cells. With a 3A load on transmit the repeaters can operate for about three years from the bank of air cells which are then discarded and replaced." It should be noted that once water is added such air-cells are intended for continuous limited discharge.

It was stressed in the 1977 *TT* that such air-cell batteries are large and heavy and not suitable for portable operation but seemed a useful and reliable source of primary power at remote sites where mains supplies are not available.

Today, in sunny climates, the choice would more likely fall on solar generators in conjunction with large lead-acid rechargeable batteries although one suspects that the air-cell might still prove initially more economic, particularly in the less sunny climate of the UK.

While the Leclanché air-cell is an ancient, if useful, means of powering a relatively small load, an alternative form of air cell – the zinc-air cell – has been making strides recently. A news item in *New Scientist* (22 January 1944) reports: "Zinc and air will soon be replacing petrol and diesel as the driving force behind Germany's postal service. From next year, 40 electric postal vans will take to the streets, complete with novel zinc-air batteries that can store large amounts of energy, and be recharged simply by replacing their electrodes . . . ."

These large-capacity vehicle batteries have been developed by the Jerusalem-based company, Electric Fuel Limited, and have an energy density of 207 watt-hours per kilogram, which is about four times better than a nicad battery and ten times better than a lead-acid battery. It is claimed that the EFL zinc-air battery can work at temperatures of –20°C, does not discharge itself, and cannot burn or explode. Zinc-air batteries work like a conventional alkaline dry cell; the oxidation that generates the electricity is achieved as the oxygen in the air turns the zinc electrodes to zinc oxide.

In tests by the German parcel post service, a 3.5-tonne electric Mercedes vehicle laden with a tonne of goods, fitted with a 350kg EFL zinc-air battery, gave a range of 350km and could be recharged in three minutes by changing the electrodes. Cost is put at DM1.40/km compared with 40 pfennigs/km for a diesel-fuelled van. Clearly the replacement electrodes do not come cheaply – but one could imagine such a power source having applications for Field Day and other events.

Small zinc-air batteries for portable and miniature equipment have been available for some years in the USA (and possibly in the UK). A survey *Choosing the best battery for portable equipment* in IEEE Spectrum (March 1988) listed zinc-air primary cells as providing highest energy density on continuous discharge; excellent shelf life (unactivated); limited rate capability and shelf life when activated; flat discharge characteristic with button cells available to 1150mAH; larger cells to 8.5AH. The nominal cell voltage is 1.4V.

This survey noted: "A zinc-air battery is unlike any other in that oxygen from the air is the active cathode material. Because the air cathode occupies only a tenth of a cell's internal volume and the anode can be correspondingly larger, a zinc-air battery can incorporate more anode material than any other primary battery of the same size.

In fact, zinc-air batteries have the highest energy density per volume or weight of any primary battery: **Fig 6**, from the 1988 IEEE Spectrum survey, shows the advantage of zinc-air cells in terms of energy-density per unit volume. To electronics designers, that means either a smaller battery compartment for the same operating life, or more capacity in a given space.

"The anode is an amalgam of powdered zinc mix with a gelling agent to keep it uniform during discharge. The electrolyte is a water-based solution containing potassium hydroxide and a small amount of zinc oxide. The air cathode assembly is a mixture of carbon, Teflon, and manganese dioxide impressed onto a nickel-plated screen.

Separating the electrodes is a semi-permeable membrane of Teflon, which prevents moisture from entering or leaving the battery and ensures the proper distribution of the air.

The air holes are sealed until use .... once activated the battery should be discharged within a few months for devices that are used frequently at low to medium drains, such as hearing aids, fetal-heart monitors, hand-held paging devices, and [small hand-held] transceivers."

It would appear that the Jerusalem-based EFL firm must have made significant developments in advancing the zinc-air battery from button cells for small portable equipments into a large capacity system, with rapid electrode replacement, for electric vehicles. Replacing the electrodes seems to be an easy and quick process but clearly for a large vehicle battery is a lot more costly than the conventional recharging of a large lead-acid battery. Nevertheless, these developments seem worth watching.

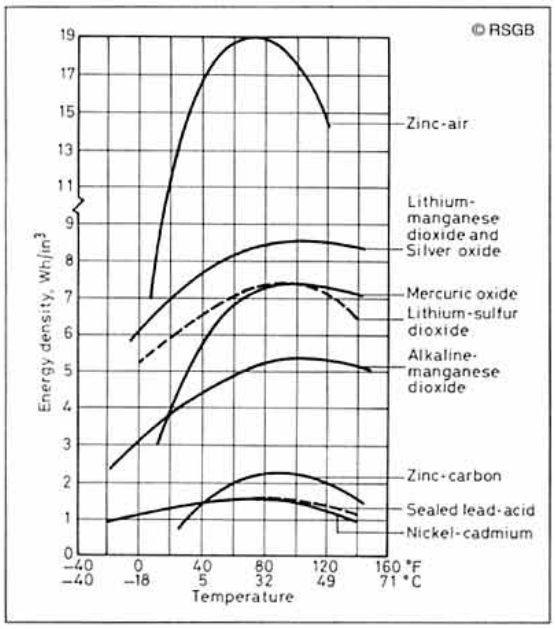


Fig 6: Energy density per unit volume of various primary and secondary cells. But note that energy density is sensitive to temperature and for all batteries is highest at room temperature. (Source IEEE Spectrum, 1988).

HERE & THERE

SYD FENWICK, G3AIO, noted my reference in the February *TT* to the failure of the 50-watt (5A at 10V) filament of the 813 in my ancient LG300 transmitter. He writes: "I acquired an LG300 in 1980 from the late G8ML and have used it almost daily since then. It came with the original 813 and imagine my chagrin when the filament went open-circuit a couple of years ago. Like you I had thought it would go on for ever! Fortunately G8ML had provided me with a spare 813. In my view the LG300 is still a good CW transmitter and in conjunction with an Eddystone EA12 (valve) receiver I can work plenty of DX. One drawback was VFO drift especially on the higher bands.

Perhaps it was good enough in the 1950s but not under present conditions – so I use an outboard VFO currently based on a BC221 mixer oscillator. All rather Heath Robinson but I no longer get reports of VFO drift." Like G3AIO, I used to get drift reports on 21 and 28MHz until I found that an easy answer is always to switch on the VFO for at least 15-20 minutes before operating – the drift could probably be cured by better thermal compensation of the oscillator but I have a suspicion that part of the drift arises from the influence of the buffer amplifier on the load on the oscillator. An external VFO or a 20-minute wait overcomes the problem on what remains an excellent 1950s CW transmitter.

Ray Loveland, G2ARU provides a practical tip: "The body of the pump-type toothpaste dispensers now on sale provides an excellent and robust coil former for larger coils such as those for ATUs. Made in tough polystyrene 400mm diameter and up to 120mm long. The small flange at one end is just about wide enough for mounting."

Hacker Radio by Geoffrey Dixon-Nuttall & Gordon Bussey (GDN Publications, Longmeadow, Miles Lane, Cobham, Surrey KT11 2EA, 1993, 28pp with 25 illustrations, £2.75 + 45p post & packing) traces the history of the Hacker brothers from 1927 to 1977 and the much misunderstood relationship between Dynatron, Hacker and Roberts Radio broadcast receivers.

During the 1939-45 war, the brothers offered Dynatron for service on a non-profit-making basis and were responsible for pre-production models of Gee, Rebecca and Oboe. At the aborted 1939 Radiolympia, Keates-Hacker showed a 25-valve "Ether Emperor" receiver which provided choice between superhet or TRF reception and became a double superhet on short waves. It was priced at no less than 165 pre-war guineas, but presumably the outbreak of war meant that it never went into production. A well-produced and attractive booklet for those interested in the rise and fall of the British 'wireless' industry. It includes a list of Dynatron models introduced between 1927 and 1939, and Hacker Radio models between 1960 and 1976.

I wonder how many of those using 'Zener diodes' have realised that they are named after Clarence M Zener, who died in his home in Pittsburgh last July aged 87 years, and had their origin in a paper he wrote as long ago as 1934. A distinguished physicist, he was Director of Research at Westinghouse for 15 years from 1951 and in later years researched into the possibility of using differences of temperature at varying ocean depth to produce power at low cost without pollution – a possibility that some believe may come to fruition in the next few years.

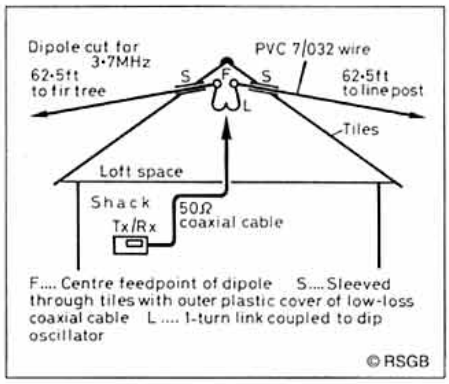


Fig 7: GWOGHF recommends using a GDO directly coupled to the feed-point of a dipole antenna rather than attempting to find resonance with a GDO at the transceiver end of a coax feeder.

The March 1993 blizzard along the eastern seaboard of the USA produced 59,000 cloud-to-ground lightning strikes, with a peak of 5,100 flashes an hour and a maximum density of strikes of 0.16 per square kilometre just south of Tampa, Florida. The blizzard also set new records for snowfall and low pressure. No information yet on how many solid-state equipments were put out of action!

In a letter to *Nature* (14 October, 1993, pp628-630) a team of scientists (N C Greenham et al) at the Cavendish and University Chemical Laboratories of the University of Cambridge report the development of more efficient light-emitting diodes based on polymers with high electron affinities. the first polymer LEDs (1990) were based on poly (p-phenylene vinylene – PPV) but they now report the fabrication of devices using a new family of processible poly(cyanoterephthaly-lidene)s. For hole injection indium tin oxide coated with a PPV layer is used and it has been shown that it is possible to achieve high internal efficiencies (photons emitted per electrons injected) of up to 4%. They write: "The demonstration of high efficiencies in polymer LEDs using metal electrodes which are not prone to oxidation represents an important step in the development of these devices. Long-term stability, both under storage and under drive, must be demonstrated before these devices can find applications, and there is much to be learned yet about the nature of the polymer-electrode interfaces. However, promising lifetime studies of the A1-PPV interface indicate the formation of a stable covalently bonded structure."

Brian Williams, GW0GHF, points out that the technique sometimes advocated for checking (with a GDO) the resonant frequency of coax fed antenna by terminating the end of the feeder in a one-turn loop produces misleading results. He finds that the method usually results in finding dips at many frequencies but none at or near the resonant frequency of the element [presumably because there will seldom be a perfect match between unbalanced co-ax and the element – *G3VA*]. His method is to disconnect the feeder from the antenna element and (in the case of HF dipoles) to insert a one-turn loop across the feed point; then couple the GDO to the loop. Unfortunately this may not be possible with the element at its full height although in his case the feedpoint of his 3.5MHz dipole is at the apex of his roof-space: **Fig 7**.

CORRECTIONS

JOHN BROWN, G3DVV, points out that the 1296MHz preamplifier, reproduced in the February *TT* (Fig 2) from *Radio-Rivista* but originally by YT3MV in *VHF Communications*, Summer (not February) 1992, should not have a 470pF capacitor across the input (not shown in layout diagram).

Another correspondent, C M Lindars suggests that the simple 3.5MHz direct conversion receiver (*TT*, July 1993, p52), reprinted from *Electronics Australia*, should have the 2.2µF capacitor in the lead from pin 5 of the NE602 to pin 2 of the 741 (via a 2k2 resistor) instead of between pin 4 of the NE602 to pin 3 of the 741. ***G3VA***

RADCOM USER REVIEW

Rexon RL-102 2m Transceiver

by Paul Lovell, G3YMP

FIVE YEARS AGO, nearly all imported amateur transceivers were marked with the familiar legend 'Made in Japan'. However the increase in the value of the Yen has made that country's exports relatively expensive, and as many readers will have noticed, rigs from other parts of the world are becoming more commonplace.

The Rexon RL-102 featured here is an interesting example of this trend. It is made in Taiwan, but appears to lack none of the features of its Japanese counterparts. Indeed, from the user's point of view, operation is remarkably similar to several other handhelds already on the market.

ACTION PACKED

ALONG THE TOP REAR of the transceiver are sockets for the antenna (BNC), external speaker or headphones and external microphone. In front of these are the usual variable controls for squelch and on/off-volume. On the right is a rotary switch for channel selection. On the left of the case are two buttons – the upper one is a function control used in conjunction with the front panel switches, and the lower is a push-to-talk (PTT).

Next turn to the front panel, and the three small push buttons on the left control the 1750Hz toneburst, and the back lighting of the LCD display and keypad. This light goes out after five seconds to conserve battery power. The middle of the three is a monitor button which opens the squelch, and this proved useful on occasions for receiving 'fluttery' mobile signals.

The LCD display is comprehensive but rather small, and although readout of the channel frequency is quite clear, it proved rather difficult to see the indications of programmed functions. The Rexon was no worse than a number of other rigs in this respect, however. Below the frequency readout is a 14-segment bargraph S-meter, which gave a useful signal strength indication.

Each key on the main front keypad has three functions, and the couple of hours spent experimenting and studying the manual were found to be most rewarding! Direct entry of operating frequency is possible with the keypad, and all programmable features are retained while the RL-102 is switched off by means of an internal lithium battery.

TUNING AROUND

OPERATION OF THE REXON is very straightforward, once a few of the default settings have been changed to suit the UK bandplan (see *RadCom*, January). These include channel spacing which is originally set to 10kHz, but can be set to any one of six spacings between 5 and 50kHz. Also the call frequency of 145MHz is probably best changed to 145.500MHz (S20).

The RL-102 has a number of very useful scan modes which facilitate coverage between either preset limits (eg 145.3MHz to 145.775MHz), or complete 1MHz sectors. The twenty memory positions can also be scanned, although it should be noted that two of these memories are the upper and lower frequency limits of the preset scan range just mentioned.

Repeater shift on transmit is programmable, and this function can be entered into the various memory channels as required. Fortunately, it is not possible inadvertently to program out-of-band channels as coverage is restricted to 144-146MHz on both transmit and receive. This is in contrast to most other 2m handhelds on the market, which often have an extended frequency coverage on receive.

SENSITIVE

IN USE, THE RECEIVER WAS sensitive and modulation reports were good. No evidence of spurious responses was found, and all the controls worked smoothly. The maximum power output of 5 watts (with an external 13.8V power unit) is good for a rig of this class. Lower power output of either 2.5W or 350mW is also possible by setting the appropriate front panel controls.

I found that the 'Busy Scan' mode of the memory channels was the most useful, but it would have been nice to have been able to resume scanning by turning the rotary channel selector, rather than having to press a button – it's rather easy to press the wrong one accidentally! Perhaps an audio detector would be useful on rigs of this type, so that the scan facility was not interrupted by unmodulated carriers.

Yet another mode is known as 'Dual Watch' and, as its name implies, this allows listening on two frequencies. In fact it is possible (and sometimes quite useful) to incorporate this facility with the memory scan, with the result that the Rexon scans all its memories plus the indicated dial frequency.

When using the radio for long periods there are two ways to conserve power. The first is to use the 350mW transmit output setting and the second is by activating the battery save function when monitoring a vacant channel for long periods.

Also, the radio' auto-power off (APO) feature can be enabled so that the RL-102 will power off automatically when a signal has not been received, and no button has been pressed for a period of about 30 minutes.

GOING BY THE BOOK

A COMPREHENSIVE 55-PAGE operating manual, with a reasonable translation gives all that most owners would wish to know. All the functions are well illustrated, with step-by-step diagrams showing which buttons to press. Unfortunately, a circuit diagram is not in-

continued on page 53 ▶

FOR THE BEST CHOICE,

Almost 16000 customers tell me we're getting it right. Not only offering a "super deal", but after-care in the unlikely event of something going wrong. The continuing silly prices offered by various so called competitors may attract your eye - we all like a bargain, but can you really afford to buy that new rig from anyone who just cannot afford to plough profit back into long-term customer care and a highly developed personal service! If you think you can take that risk, then do so, in the mean time we will carry on offering the "BEST PACKAGE DEAL" and our renowned "price promise". Speak to any of my sales team, (including me), and ask our advice on what we would recommend for your individual requirements. You'll be surprised at the response, you won't be sold anything until we're confident you've made the right choice and will be happy with your purchase, (if you're not, we will gladly change it). Then...we'll quote you the best price!

73 Martin G4HKS

Mr Jan Hasegawa, the Yaesu President, on a recent visit to my new super store in London.

Yaesu Musen

FT1000

Awarded the best of everything, the Yaesu FT1000 is their flagship, why not make it yours too? I know it retails at three & a half grand, but I can do wonders to the price and give you options on paying the balance. If you want to make a serious investment on the very best transceiver in the world, then come and see me!

FT990

If you don't feel the necessity on having the FT1000, then why not choose the FT990? It's built along side it's big brother and still offers most of the main features - including "digital" filtering that no other radio has! The price has already been slashed by Yaesu U.K. and I'm offering even better tempters to relieve you of your cash!

FT890

"The worlds smallest 100w H.F. transceiver with auto-atu", is true, (the TS-50S has a tuner the same size as the radio), but if you want a compact H.F. station with features only found on bigger machines, then take a closer look at the FT890. The auto-atu actually fits inside the radio, making it a truly portable H.F. system.

FT840

Launched at the Leicester show last year, this NEW H.F. transceiver costs less than many receivers available on the market and offers stunning performance. The RadCom team loved it and so do I - you can have one from only £13.50 a week!

FRG100

Now the price is back to what it was twelve months ago, this excellent 50KHz-30MHz receiver is an absolute winner. Yaesu have improved the AM filtering and for the price of a dual-band handie you can have one today!

FT736R

The only VHF/UHF base station to offer EVERYTHING in one box, the FT736R has proved to be the DX'ers choice for 2/6/70 or 23cm. Yaesu tell me they have a permanent waiting list for this one, despite it being several years old. For complete flexibility on all the upper bands, including a built in PSU, full satellite operation and much more, if you want one today, give me a call!

FT290R mk11

Once again, Yaesu have the market to themselves, the FT290/690/790R series are the only multimodes operating on 2, 6 or 70cm offering full portability if required. Clip on the optional linear amplifier and you turn it into a full blown base/mobile installation!

FT5200

The only DualBand mobile 2/70 FM tran-sceiver with a "quick release" front panel, the new LOWER price for this model makes it a must! Full duplex, optional CTCSS and remote cable kit make this the most versatile of all the "funny mode" talk boxes!

FT2200/7200

The latest in a long line of FM transceivers, these two are the most compact and easy to use yet. A full 35 watts on seventy, or 50 watts on two, these two new "super models" are the ones to go for.

FT530R

Think you've seen a good deal elsewhere? Think again! When Yaesu introduced their new DualBand handie to replace the FT470R, customers couldn't believe the build quality and features contained in such a neat package. No, it's not the smallest, but then unless you're a ballerina with dainty little fingers, who cares? Unlike all the competitors, the FT530R has CTCSS fitted and comes supplied with NiCads & Charger. The price? You won't believe it!

FT11R/41R

I know you probably think the Japanese have gone bonkers building VHF portables, but you've just got to see what Yaesu have done with these two. No larger than a packet of cigarettes, the NEW FT11/41R handies are full-feature machines with all the "trick" facilities built in. The volume & squelch are controlled by up & down buttons, leaving the top panels with only one knob - the channel change knob. See one today!

Trio-Kenwood

TS950SDX

The only H.F. base station to feature proper digital signal processing, 150 watts, all mode, general coverage, dual receive and lots more. If you listen to 14.295 and hear Eddy, G0BBD, he'll tell you how good it is. You will be able to HEAR how good it is on transmit yourself!

TS850S

Recently reviewed in PW, the TS850 set the standard for sub £2K radio's and judging by how many we get through every month, you obviously appreciate the machine as well! Rather like a popular car, you either know someone with one, had one and wish you never sold it, or haven't yet got round to investing in the best HF base station since Trio launched their TS530 all those years ago. I'm here and I'm ready to take your money!!

TS450/690S

For those of you that like things a little more compact in H.F. operation but don't want to lose the bigger radio features, try the TS450 or TS690 for size. You can specify auto ATU with either, (Yes the TS690 will give you 100w on H.F. 50w on 6 metres & contain an auto atu!) and the price won't bust the bank.

TS50S

Apparently there are people out there that still think the ever so small TS50S is an April Fools ploy from last year! To put the record straight, the radio really is the size of a 2m multimode, does produce a clean 100w output, does possess a multimode receiver with general coverage and is just about the most amazing piece of kit I've ever seen out of Japan. Don't continue being a mushroom sitting in the dark, ask about one today.

R5000

Still the favourite shortwave receiver and built to Kenwood's high quality of construction. You can add an internal VHF option to cover 108-174 MHz for a minimal cost and additional filters throughout the modes.

TR751E/851E

Take it from me, these two 25 watt multimodes for 2 & 70 are still unmatched by any other manufacture. No frills no gimmicks, just good RF performance, (they must be, "muTek" hasn't touched them since they were introduced!). These two winners continue to sell despite any recession.

TS790E

For those of you that like TS850 style looks but want it on VHF, then take a look at the new TS790E. Comes fitted with 45 watts on 2 & 70, you can add a 10w 23cm module and have a triple band base all in one box! I used one at home for a while, until Chris, G1FMH sold my own machine to a customer.

TM241E/441E

Simple to use high power 2 or 70 FM mobiles. No more to say. We love 'em. Get your money out and lets haggle.

TH78E

The TH78E still has the most features per pound offered on a dual bander. It's the smallest shape with the most buttons on it. I haven't counted them all, but the first person who does and tells me face to face, gets a free case for it worth £16!

TH22/42E

The latest in slim-line single band FM handies. If you're fed up with the bits you'll never use, but just want a good 2 or 70 radio then look no further. They are sensibly priced too!

STOP PRESS... Kenwood announce new range of Amateur Radio Products!

TR-255E/455E

The latest all-mode 2m or 70cm transceiver, with remote head! 35W output, separate packet input. At last, you cannow run SSB mobile!

TR-215E/415E

The new pair of high power 35W/50W mobiles with separate 9600Baud packet inputs. Featuring "listen on opposite band" i.e., the 2m version allows reception on 70cm, plus extended coverage, with air-band.

TS-60S

Identical to the TS-50S HF version, this new baby offers 100W all-mode on 6m. Ideal for the shack or car.

Call 081 566 1120 NOW for full details or colour brochure.

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ICOM

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100 watts on HF + 100 watts on SIX!

The IC-736 is a worlds first all mode all band 100w transceiver including the brilliant SIX METRE BAND. No other manufacturer has given you so much in one package. Based on the already best selling IC-737 introduced last year, just look at the additional features:

★ 100 watts from 160m - 6m inclusive YES! 100 watts on Six!
★ Built in Mains PSU
★ Dual Antenna ports
★ Now with R.F Gain control
★ Dual display
★ See & check second VFO instantly
★ Mid-size package

No other radio offers you so much - for so less. Have Icom got it right? I should say so! Call now for the best advice and price!

Icom IC737
If you're not enthused about the NEW IC736, or simply don't want 6M or possibly a power supply, then take a special look at the IC737. It's been a favourite of mine since it's introduction last year. Voted one of Peter Hart's favourite rigs, his comment "amongst the best receivers I've ever tested" is absolutely true. They're in stock at a special price to suit you.

Icom IC728/9
Sub £1K will bring you a neat 100w HF station called an IC728. If you want 6m then add £300 or so pounds and buy the fabulous IC729. Both have digital synthesisers giving unparalleled "smoothness" and real VFO like tuning.

IC275H/475H
Still the trend setters amongst the "BIG BOYS" on VHF, 100w on either 2m or 70cm is the way to go. When I first took the pair home I thought there was something wrong with the receivers - they're that quiet! Throw out your old FT225RD, even with muTek, believe me, it doesn't compare.

ICW21E/ET
The alternative Icom Dual Bander is available with or without keypad. They are great value and still offer all the extended receive features that is so important today. Why I don't know, but there it is. What ever happened to AM on 2 and tuning "low to high?"

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TSM-1310	2m/70cms	2.1/5.0dbi	0.80m long	£29.95
TSM-1326	2m/70cms	2.1/5.0dbi	0.77m long	£29.95
TSM-1332	2m/70cms	4.5/7.2dbi	1.50m long	£44.95
TSM-1607	2m/70cm/23cms	2.8/6.0/8.4dbi	0.78m long	£49.95

BASE RANGE

TSB-3002	2m (2 section)	6.5dbi	2.87m long	£44.95
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TSB-3303	2m/70cms	3.0/6.0dbi	1.15m long	£49.95
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Here are just a few examples of their unbeatable range:

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MFJ-948 Antenna Tuner	**£149.00**
MFJ-1278BX All mode Packet Controller	**£339.95**

Alinco

Alinco DJ580
Now the "classic" amongst the Dual Banders, there are probably more of these sold in the U.K. than any other Handie. Try one for size.

Alinco DJ180/480
Probably the strongest and most versatile 2 or 70 handie available. One of the few to come with a proper "stand-in" charger at the all in price.

Yupiteru

MVT7100
An all mode all band, (150KHz-1.3GHz) receiver, that you can hold in your hand? If you turned up with one of these 10 years ago, you would have probably been classed an Alien. There's a joke there somewhere but my brain is running a bit slow. Something to do with my mates in the Midlands perhaps? If you haven't played with an MVT7100 by now, then you're probably still watching a black & white T.V., whilst operating the 80m net on Wednesday afternoons.

AOR

NEW AR3030

The AR3030, is the very first in a range of ShortWave receivers from AOR. Using the famous "Collins" filters, the performance over the entire range (50KHz-30MHz) in uncompromised. We should have stocks by March, so get your order in now!

AR1500EX
We have literally sold hundreds of these little pocket scanners. All mode and general coverage right up to 1300MHz, the little AR1500EX is a delight to use.

AR3000A
For those of you that take listening seriously, you cannot overlook the amazing AR3000A. Covering 150KHz to 2GHz, the ultimate in affordable wide band receivers has never been so desirable. For computer buffs, there is an RS232 port fitted as standard and there is "off the shelf" software to get you on your way.

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Whether you're using a FT747 or a top flight FT1000, if the space is limited, try the new range of CAPCO LOOPS for yourself.

Magnetic Loops

AMA-3 200W 13.9 - 30 Mhz	£249.95
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AMA-6 150W 6.9 - 24Mhz	£279.95

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SPC-300D Roller Coaster, 300W RMS, 1kW pep	£299.95
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And don't forget the high power range of baluns, all ratio's.

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Recently appointed the only London retailer for theis excellent range of Swedish antennas, the full Vargarda range is now available from stock.
In addition to the antenna range, the range of stacking kits can be obtained. Call for free catalogue.

3	ele	6m beam	**£85.55**
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Moving to a larger premises has also enabled us to show off our massive range of new & used datacomms equipment. Here is just some of the range stocked:

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KPC-3	**£139.00**
MFJ 1278	**£339.95**
Universal M400	**£399.95**
M900	**£529.00**
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M8000	**£1279.00**
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And Here's The Proof

"Advice given was excellent - the delivery as promised. All this in Christmas week! - Wonderful!"

"The best advice was pushing me on to the FT990 - it's a cracker - many thanks and it works like a dream come true."

"The standard of service on the repairs was excellent and I will use your company again."

"Helpful, polite and efficient, I am very satisfied with your service."

"Very pleasant and happy atmosphere + helpful. Not found very often nowadays."

"Good attentive service and quick despatch, was received 10.30 next morning."

"I've been SWLing for 39 years and never have I had better service from Chris Taylor in all those years, I will be back."

"Of my many world wide QSOs - the name "Martin Lynch" crops up many times, with nothing but highest praise."

"All equipment supplied is of excellent quality and value. I look forward to continued good relationship."

This is just a small selection of authentic comments from my satisfied and loyal customers.

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RADCOM TECHNICAL FEATURE

Home Construction Is Dead...?

by John Morris, GM4ANB

IN *RADCOM*, MAY 1991 (page 29), Pat Hawker reprinted some comments from Robert W Lucky, originally published in *IEEE Spectrum*. In essence it was a long moan about the death of electronics as a hobby, with the blame being firmly placed on manufacturers who make better and cheaper products than can come off the most expert kitchen table.

What a load of baloney! The whole tirade reminded me of a medieval monk complaining about ye cursed Caxton fellow who can produce books by the library in the time it takes to illustrate the first page of a manuscript by the traditional methods.

Reading the reprint again, it was clear that the real grouse was about money and pride: "See my great hi-fi system? Built it myself, saved a bundle . . ."; "I was more proud of my home designed computer . . ."; "It costs more to package a kit than to build the finished product"; "Ever try to buy the parts? Forget it, they cost a lot more than the finished and tested board"; "Any computer program I could think of had already been packaged and worked far better than anything I could write".

"The real grouse was about money and pride."

Depressing stuff. But it all completely misses the point. So you can buy hI-fis, televisions, radios, transceivers, computers, software and the rest off the shelf. So what? Just because there is a black box on the store's shelf does not make it illegal to do something for yourself!

WHY SHOULD WE BUILD?

ISN'T IT TIME WE took a look at our motives for building things? There's no point doing it to save money, true. These days it is also true that you don't get a better product for your money (with some exceptions). But there remains one thing. It is still *fun*!

Forget what you can buy off the shelf. Do it because you enjoy it. Professional electronics and radio have moved way beyond what you can do at home, but who cares? I can still design and build things and enjoy myself doing it.

"I like cooking . . . . I certainly have no qualifications (apart from a lifetime's over-indulgence in the results)."

Let me give you an analogy. I like cooking, though I am not particularly good at it. I certainly have no qualifications (apart from a lifetime's over-indulgence in the results). Occasionally I will spend an afternoon preparing the best meal I know how; sometimes for a small party, but usually for just my wife and myself. I read the recipe books. I use basic ingredients and stay away from instant powders and pre-cooked sauces. I go all out for perfection; or as near to it as I can get.

Usually the food goes down well, and I get congratulations – maybe just out of politeness. But that's not the point. The point is that I've had a good time creating something, in this case a meal. If I had applied common sense then I'd have been far better off packing us into the car, driving to a restaurant and waving the plastic card. It would have been quicker and probably cheaper in the long run – especially if you factor my time into the equation. But it would have been much less fun! The fact that a meal came out at the end was almost incidental. It was a nice by-product, but not the essence of the exercise. The joy was in the making, not in the eating.

Electronics is the same. If you want to build something to save money or to impress your friends, forget it. Don't do it for them. Don't do it for your bank account. Do it for yourself. The neighbour with the satellite dish on the roof watching full colour high definition pictures live from a sporting event in Australia will take one look at your home-brew automatic electronic cat flap opener and yawn, and possibly start to doubt your sanity. And that neighbour would be right to yawn.

But electronics is moving. It has been moving for 170 years (Faraday made the first electric motor in 1821) and will carry on moving. The movement seems to have left Robert W Lucky behind in its trail. I beg to differ. For me each movement just unfolds new opportunities, new wonders to behold, new territories to explore: and I don't care if somebody has been there before. Did expeditions to Everest stop just because Hillary and Tensing had been there?

For example, PAL (Programmable Array Logic) devices have been around for a while. Some time ago I decided to read up on them, just out of interest. It took a little while for the new ideas to penetrate my brain, but eventually they did. So I built a circuit using them. I designed the PAL equations myself, after a few false starts. Eventually I got it working. Now it doesn't matter what that circuit was, because I know that it will never be used again. So what was the point? Easy – I had a lot of fun, and I learned a lot. As Kipling put it, I fed the elephant's child.

IS ELECTRONICS DEAD?

NO, HOBBY ELECTRONICS – and I include both amateur radio and home computing as parts of that – is not dead, any more than it was when coils started to be manufactured, so that you could buy them instead of having to wind your own. I have a copy of the RSGB *Radio Handbook Supplement*, published shortly after the second world war. (Price 2s 6d). On page 120 it tells you how to repair a broken resistor. Wasn't it terrible when resistors got so cheap that instead of repairing them you just threw the broken one away and replaced it with a new resistor?

"Your home-brew automatic electronic cat flap opener . . . ."

Electronics is growing all the time; getting bigger and bigger. In early Victorian times it was possible for a single person to understand and remember practically all of the scientific knowledge of the day. Today we have chemists, botanists, geologists, surgeons, metallurgists and mathematicians. There is so much knowledge that you have to specialise. Electronics is getting to the stage where a single person cannot keep up with all of it. Computer programmers who can't change a fuse. It is not important. You don't have to know *everything*.

I remember the first time I made a QSO with Spain on two metres. Boy, what a thrill! I can still remember the excitement. A few years ago I visited Spain. While I was there I phoned home. In both cases I had managed to establish communication between G and EA. The only difference was that the phone was cheaper, clearer and much more convenient. So why was doing it on the air so exciting? Because I had put a bit of myself into it. I had set up the station, rigged the antenna, operated the station. So what if I didn't build the rig. I didn't smelt the iron used for the antenna mast either.

SMALL BEGINNINGS

SO TO ALL OF you moaners about the death of home construction, snap out of it! If you don't build things that is your problem. Don't try and blame anybody else. You can't keep up with the commercial companies where dozens of engineers spend months surrounded by thousands or millions of pounds worth of design and test equipment, so don't try. Just create something for your own satisfaction. Nobody else's, just yours. Build a direct conversion receiver. Write a computer program to send Morse code. String random wires all over the garden to see which works best on top band. It's been done before, but not by you.

"Write a computer program to send Morse code."

Maybe all you'll get out of it is junk. Maybe it will work, but then you'll decide to replace it with something bought. Maybe you'll become a world expert and take it up for a living. That doesn't matter. What does matter is that you'll have fun. (If you don't have fun don't waste my time moaning and groaning. I'm too busy learning about data compression techniques to listen to your grouches). I'll give you a cast iron, money-back guarantee that whatever you try, however well or badly it comes out, you will learn something new. Not new to the world perhaps, but new to you. Remember the bit about 'self training' in the licence? . . . . Long live home construction!

Rexon RL-102 2m Transceiver

continued from page 49

cluded but there is a handy troubleshooting chart, to help if you find a problem.

The Rexon RL-102 is supplied with a small battery pack which takes six rechargeable AA NiCad cells. A 12cm 'rubber duck' antenna, hand strap and belt clip are also included with the set. A CTCSS unit is available as an optional extra, and there is also a 12V 600mAH rechargeable battery pack, which is attached to the rig in place of the smaller one shown in the photograph.

WELL UP WITH THE COMPETITION

PERFORMANCE OF THE REXON was well up with the competition, and the facilities included should be more than adequate for most amateurs. In this sector of the market, the RL-102 faces some tough competition.

The final decision may well be made on value-for-money grounds, and here the Rexon should certainly score. The RL-102 is priced at £199 inc VAT plus £7.50 P&P, and the optional RNB112 12V 600mA battery pack is £39.95 extra.

Our thanks to South Midlands Communications Ltd for the loan of the review model. Their telephone number is 0703 254247 for any further queries you may have.

MANUFACTURER'S SPECIFICATIONS

GENERAL	
Frequency range	144-146MHz
Modulation type	F3
Channel steps	5, 10, 12.5, 20, 25, 50kHz
Antenna impedance	50Ω unbalanced
Input voltage range	5.0 to 12VDC
Nominal voltage	7.2V
Approx Current drain:	
Transmit 13.8V:	
5W	950mA
2.5W	650mA
0.35W	500mA
Transmit 7.2V:	
2W	900mA
0.35W	450mA
Standby	35mA
Battery save	15mA
Auto power off	7mA
Dimensions	152 x 65 x 35mm
Net weight	300g (with battery and antenna)
RECEIVER	
Sensitivity	Better than 0.16µV (12dB SINAD)
20dB quieting	Better than 0.25uV
Squelch sensitivity	0.16µV max.
Audio output power	250mW at 10% distortion (8Ω)
TRANSMITTER	
RF output power	5W (13.8V), 2W (7.2W)
Max deviation	±5kHz
Frequency stability	±10ppm from –20 to +60°C
Distortion	Less than 5%
Spurious and harmonic emission	Less than –60dB

RADCOM TECHNICAL FEATURE

The Transmission Line Explained

by Clive Smith, G4FZH

IN MOST AMATEUR radio publications very little is mentioned of the mathematical equations which describe the transmission line. This, in most instances, is a valid situation as the mathematics can become fearsome and mean nothing to many people. However, with the advent of cheap and easily accessible computing power it is worth a reappraisal of the situation.

This article attempts to provide a mathematical basis for calculations along with relevant computer programs that the reader can modify and/or combine for their own use. The programs have been tested on a BBC B computer and an IBM-compatible PC (using GWBASIC).

The transmission line is treated throughout as an impedance, the analysis being valid for both balanced and unbalanced lines. Although various concepts are examined they are not all fully investigated, but it is hoped that the article will whet the appetite of experimenters. For further discussion the reader is referred to [1].

For those members who do not like the mathematics please persevere with the concepts introduced as the computer programs shown on page 56 will do most of the hard work for you.

THE MATHEMATICS NEEDED

THOSE FAMILIAR with maths may skip this section unless the revision will help. The number π (PI, or 3.141592654 . . . .) is well known to many, the number 'e' is probably less well known and is equivalent to 2.718281828 . . . . etc. It must follow all of the basic rules of arithmetic and so numbers like e^2 have a meaning. It is also a number which occurs naturally in higher mathematics and manifests itself on scientific calculators in various forms.

Sin, cos and tan are trigonometric functions that many have come across. What are very much less familiar are the hyperbolic functions sinh (shine), cosh and tanh (than). These are in fact shorthand ways of writing functions which involve e. They are found on many scientific calculators and are defined as:

$$\sinh x = \frac{1}{2}(e^{x}-e^{-x}),\ \cosh x = \frac{1}{2}(e^{x}+e^{-x}),$$

$$\tanh x = \frac{\sinh x}{\cosh x}$$

where x is a number that can be real, imaginary or complex and e^{-x} is the same as $1/e^{x}$.

In addition to this, the concepts introduced in two previous articles [2] and [3] are required.

A CIRCUIT COMPONENT

WHEN A MATHEMATICAL analysis of a transmission line is undertaken it is assumed to consist of infinitesimally small lengths of cable composed of components as shown in **Fig 1**. The values R, L, G and C are values per unit length (normally per metre). Using mathematical analysis known as calculus (which you may be familiar with), the following relationships for the voltage and current at any point on the transmission line can be established:

$$E = E_T \cosh \gamma x + I_T Z_0 \sinh \gamma x$$

$$I = I_T \cosh \gamma x + \frac{E_T}{Z_0} \sinh \gamma x$$

where x is the distance along the line from the termination (see **Fig 2**). E_T, I_T are the termination voltage and current

$$\gamma = \alpha + j\beta = \sqrt{(R + jX)(G + jB)}$$

$$X = 2\pi fL,\ B = 2\pi fC$$

γ is known as the propagation constant, α is known as the attenuation constant and β is known as the phase constant.

$$Z_0 = \sqrt{\frac{(R + jX)}{(G + jB)}}$$

If the line is terminated by an impedance Z_T which is given by E_T/I_T, the sending end impedance Z_S is given by:

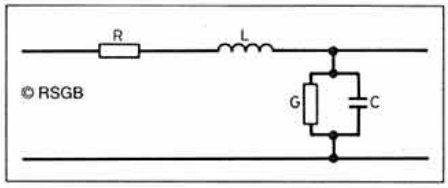

Fig 1: R, L, G and C values per unit length.

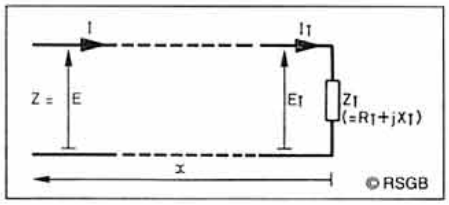

Fig 2: Definitions of X, E_T and I_T.

$$Z_S = \frac{E}{I} = \frac{Z_T \cosh \gamma x + Z_0 \sinh \gamma x}{\cosh \gamma x + (Z_T/Z_0) \sinh \gamma x}$$

Do not forget, γ, Z_T and Z_0 are each possibly complex numbers, only x (the line length) is always real. The problem is how to evaluate this equation. **Listing 1** provides a program that will solve this equation. Line 30 contains some typical values for resistance, inductance, capacitance and conductance of a transmission line. The program requires the line length and line termination to be input.

Before pressing on too far, it is worth considering two special cases. If the line has a short circuit termination, ie $Z_T = 0$, then the equation simplifies to:

$$Z_S = Z_{SC} = Z_0 \tan \gamma x \text{ where}$$

$$\tanh \gamma x = \frac{\sinh \gamma x}{\cosh \gamma x}$$

If the end of the line is open-circuited, ie $Z_T = \infty$, then the sending end impedance is given by:

$$Z_S = Z_{OC} = \frac{Z_0}{\tanh \gamma x}$$

Combining these gives:-

$$Z_0^2 = Z_{OC} \cdot Z_{SC}$$

Thus, if open and short tests are carried out on a section of transmission line, it is possible to determine the characteristic impedance of the line Z_0.

In most circumstances, manufacturers do not provide the values of R, L, G and C. Also, in many practical cases the transmission line can be considered as low loss. The condition of low loss can be expressed by:

$$R << 2\pi fL \text{ and } G << 2\pi fC$$

This gives rise to the following simplifications:-

$$\alpha \approx 0.5\left(\frac{R}{Z_0} + GZ_0\right) \text{ Nepers/m}$$

$$\beta \approx 2\pi f\sqrt{LC} \text{ and } Z_0 \approx \sqrt{\frac{L}{C}}$$

Note: The value of Z_0 is now purely resistive. Also 1 Neper = 8.686dB.

When looking at manufacturer's literature, values for attenuation, characteristic impedance and capacitance per metre are normally quoted. If Z_0 and C are known, then L can be

calculated. The values for R and G are not given, only the overall value for attenuation in dB/m. The attenuation varies with frequency and this is normally specified in the manufacturer's data at various frequencies. R increases with the skin effect and proximity losses whilst G is a measure of the dielectric losses. The computer program in Listing 1 can be modified to cater for low loss cable and the parameters normally given by manufacturer's. The resulting program is given in **Listing 2**.

If the transmission line is assumed to have no losses (eg a short cable), it is possible to make some fairly drastic simplifications. No losses assumes R = G = 0, hence $\alpha = 0$. The input impedance is now given by:

$$Z_S = \frac{Z_0 \text{Cos } \beta x + j \text{Sin } \beta x}{\text{Cos } \beta x + j(Z_T/Z_0) \text{ Sin } \beta x}$$

Still in similar form to the previous equation but sinh and cosh have been replaced by sin and cos – indicating a relationship between the two sets of functions – not to be explored further. The equation is still tedious to work out and is used in **Listing 6**.

THE TRANSMISSION LINE AS A CIRCUIT ELEMENT

THERE ARE SOME important cases of line conditions which are useful, mainly at VHF and UHF. Two of these have already been partially examined – the short circuited and open circuited line.

The Short-Circuited Line

Assuming the line is loss free (a valid assumption for short lines), ie $\alpha = 0$, the original form of $Z_S = Z_0 \tanh x$ reduces to the form

$$Z_S = Z_0 \tan \beta x$$

As Z_0 is purely resistive, the value of Z_S is a pure reactance whose sign depends on the value of tanβx.

The velocity of propagation on the line is given by:

$$vp = \frac{1}{\sqrt{LC}}$$

Substituting this in the equation for β, gives

$$\beta \approx \frac{2\pi}{\lambda}$$

and the equation for the input impedance becomes:

$$Z_S = jZ_0 \tan \frac{2\pi x}{\lambda}$$

If $x < \lambda/4$, then the tangent is positive and Z_S is a positive reactance – ie inductive. If $\lambda/4 < x < \lambda/2$ then Z_S is a negative reactance, ie capacitive – see **Fig 3**.

A special condition applies when the line is an exact multiple of a quarter wavelength – If it is an odd number of quarter wavelengths it looks like a parallel resonant circuit. If it is an even number of quarter wavelengths it looks like a series resonant circuit.

Hence short lengths of short circuited transmission line can be used as circuit elements and **Fig 4** shows the overall effects. **Listing 3** will calculate the circuit elements for the shorted line.

The Open-circuited Line

A similar equation can be developed for a loss-free open-circuited line, in this case the sending end impedance is given by:

$$Z_S = \frac{Z_0}{\tan \beta x} \text{ or } Z_S = Z_0 \text{ Cot } \beta x$$

NOTE: $\cot = \frac{1}{\tan}$

In this case, if $x < \lambda/4$ then Z_S is a negative reactance (ie capacitive) and for $\lambda/4 < x < \lambda/2$ then Z_S is positive, ie inductive – see **Fig 5**.

Again, a special condition applies when multiples of a quarter wave is involved. In this case odd multiples give a series circuit and even multiples a parallel circuit.

Hence short lengths of open-circuited transmission line can be used as circuit elements and **Fig 6** shows the overall effects – opposite to the short-circuit case. **Listing 4** will calculate the circuit elements for the open line.

THE TRANSMISSION LINE AS A TRANSFORMER

THE PROPERTIES OF a loaded transmission line and its impedance transformation properties are now examined. Consider the input impedance of a loss free transmission line terminated by a resistance. This is given by:

$$Z_S = \frac{R_T \text{Cos } \beta x + jZ_0 \text{Sin } \beta x}{\text{Cos } \beta x + j(R_T/Z_0) \text{ Sin } \beta x}$$

For a quarter wavelength, $\beta x = 2\pi/\lambda \times \lambda/4 = \pi/2$. Thus Cos$\beta$x = 0 and Sin$\beta$x = 1, hence:

$$Z_S = \frac{Z_0^2}{R_T}$$

As Z_0 is a pure resistance, then the input impedance is also a pure resistance.

Consider **Fig 7(a)**, if a line of characteristic impedance 50Ω is terminated by a 34Ω resistive load, then the input impedance is purely resistive and of value 73.5Ω – almost a match to a 75Ω source. An extension of this concept is that the termination RT could itself be a terminated quarter wavelength line, **Fig 7(b)** then applies, the feeder being of any length but matched to the input resistance of the terminated quarter wavelength line. Taking this example, if an antenna has an input of 34Ω resistive, it can be matched to a 75Ω transmission line by a quarter wavelength of transmission line with a characteristic impedance of 50Ω.

This concept can now be taken one more step – for terminations with both resistive and

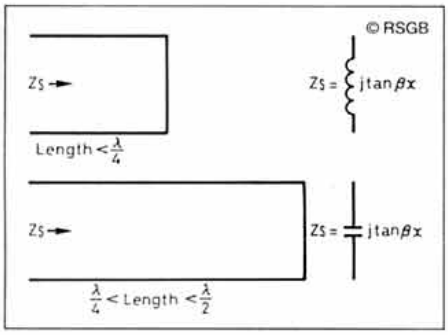

Fig 3: Shorted line reactances.

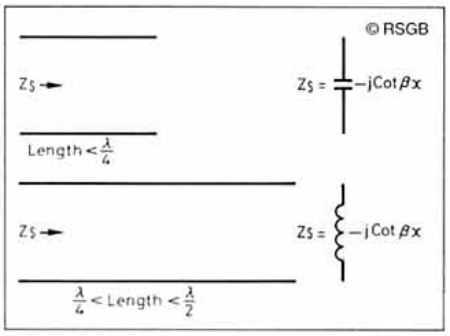

Fig 5: Open line reactances.

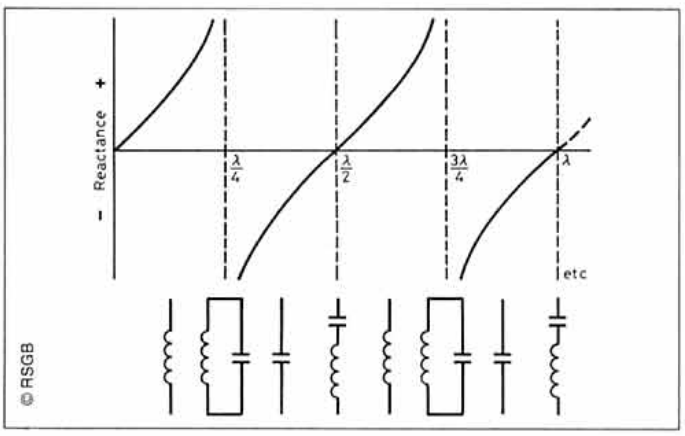

Fig 4: Reactances over length of shorted line.

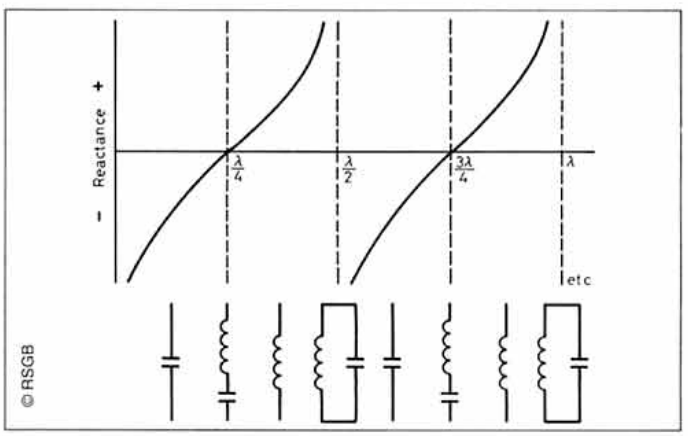

Fig 6: Reactances over length of open line.

PROGRAM LISTINGS

Listing 1

```
 10 REM transmission line impedance
 20 CLS
 25 REM choose own input parameters for line 30
 30 C=1E-10:G=1E=14:R=.001:IND=2.5E-07
 40 INPUT "Working frequency in MHz ",F:F=1000*F*1000
 50 B=2*3.14159*F*C:X=2*3.14159*F*IND
 60 INPUT "Line length in metres ",L
 70 PRINT "Line Termination"
 80 INPUT "            Real part ",RT
 90 INPUT "            Reactive part ",XT
100 Z=SQR(R^2+X^2):Y=SQR(G^2+B^2):THETA=.5*(ATN(X/
    R)+ATN(B/G))
110 ZY=SQR(Z*Y)
120 ALPHA=ZY*COS(THETA):BETA=ZY*SIN(THETA)
130 AL=ALPHA*L:BL=BETA*L
140 RCHGL=.5*COS(BL)*(EXP(AL)+EXP(-
    AL)):ICHGL=.5*SIN(BL)*(EXP(AL)-EXP(-AL))
150 RSHGL=.5*COS(BL)*(EXP(AL)-EXP(-
    AL)):ISHGL=.5*SIN(BL)*(EXP(AL)+EXP(-AL))
160 YZ=SQR(Z/Y):PHI=.5*(ATN(X/R)-ATN(B/G))
170 RO=YZ*COS(PHI):XO=YZ*SIN(PHI)
180 RA=RT*RCHGL-
    XT*ICHGL:IA=XT*RCHGL+RT*ICHGL:RB=RO*RSHGL-
    XO*ISHGL:IB=XO*RSHGL+RO*ISHGL
190 RTOP=RA+RB:ITOP=IA+IB
200 DR=(RT*RO+XT*XO)/YZ^2:DI=(XT*RO-RT*XO)/YZ^2
210 RD=DR*RSHGL-DI*ISHGL:ID=DI*RSHGL+DR*ISHGL
220 RBOT=RCHGL+RD:IBOT=ICHGL+ID
230 ZBOT=RBOT^2+IBOT^2:RS=(RTOP*RBOT+ITOP*IBOT)/
    ZBOT:XS=(ITOP*RBOT-RTOP*IBOT)/ZBOT
240 IF XS<0 THEN S$=" - j " ELSE S$=" + j "
250 PRINT "Input impedance is ";SQR(RS^2+XS^2);" at an
    angle of ";180/3.14159*ATN(XS/RS)
260 PRINT "       or"
270 PRINT RS;S$;ABS(XS)
280 PRINT:PRINT
290 END
```

Listing 2

```
 10 REM transmission line impedance
 20 CLS
 30 INPUT "Charactersitic Impedance ",RO
 40 INPUT "Line attenuation in dB/m ",ALPHA:ALPHA=ALPHA/
    8.686
 50 INPUT "Line capacitance in pF/m ",C:C=C*1E-12
 60 INPUT "Line length in metres ", L
 70 INPUT "Frequency in MHz ",F:F=1000*F*1000
 80 PRINT "Line Termination"
 90 INPUT "            Real part ",RT
100 INPUT "            Reactive part ",XT
110 PRINT
120 IND=RO^2*C:BETA=2*3.14159*F*SQR(IND*C):AL=ALPHA*L:
    BL=BETA*L
130 RCHGL=.5*COS(BL)*(EXP(AL)+EXP(-
    AL)):ICHGL=.5*SIN(BL)*(EXP(AL)-EXP(-AL))
140 RSHGL=.5*COS(BL)*(EXP(AL)-EXP(-
    AL)):ISHGL=.5*SIN(BL)*(EXP(AL)+EXP(-AL))
150 RA=RT*RCHGL-
    XT*ICHGL:IA=XT*RCHGL+RT*ICHGL:RB=RO*RSHGL:IB=RO*ISHGL
160 RTOP=RA+RB:ITOP=IA+IB
170 RD=1/RO*(RT*RSHGL-XT*ISHGL):ID=1/
    RO*(XT*RSHGL+RT*ISHGL)
180 RBOT=RCHGL+RD:IBOT=ICHGL+ID
190 ZB=RBOT^2+IBOT^2:RS=(RBOT*RTOP+ITOP*IBOT)/
    ZB:XS=(RBOT*ITOP-RTOP*IBOT)/ZB
200 ZSTHETA=ATN(XS/RS):ZS=SQR(RS^2+XS^2)
210 IF ZSTHETA<0 THEN S$=" - j " ELSE S$=" + j "
220 PRINT "Input impedance is ";ZS;" at an angle of
    ";180/3.14159*ZSTHETA
230 PRINT "       or"
240 PRINT RS;S$;ABS(XS)
250 PRINT:PRINT
260 END
```

Listing 3

```
 10 CLS
 20 PRINT "Circuit Elements from Shorted Lines"
 30 PRINT
 40 INPUT "Working frequency in MHz ",F:F=1000*F*1000
 50 INPUT "Characteristic Impedance of Line ",ZO
 60 INPUT "Capacitance of line in pF/m ",C:C=C*1E-12
 70 INPUT "Reactance of Circuit Element Required (with
    sign) ",X
 80 L=ZO^2*C
 90 LAMDA=1/(SQR(L*C)*F)
100 LENGTH=LAMDA/2/3.14159*ATN(X/ZO)
110 PRINT
120 IF X<0 THEN LENGTH=LENGTH+LAMDA/2
130 PRINT "Length of line is (m) ",LENGTH
140 PRINT "Fraction of wavelength on line is ",LENGTH/
    LAMDA
150 PRINT:PRINT
160 END
```

Listing 4

```
 10 CLS
 20 PRINT "Circuit Elements from Open Circuit Lines"
 30 PRINT
 40 INPUT "Working frequency in MHz ",F:F=1000*F*1000
 50 INPUT "Characteristic Impedance of Line ",ZO
 60 INPUT "Capacitance of line in pF/m ",C:C=C*1E-12
 70 INPUT "Reactance of Circuit Element Required (with
    sign) ",X
 80 L=ZO^2*C
 90 LAMDA=1/(SQR(L*C)*F)
100 LENGTH=LAMDA/2/3.14159*ATN(-ZO/X)
110 PRINT
120 IF X>0 THEN LENGTH=LENGTH+LAMDA/2
130 PRINT "Length of line is (m) ",LENGTH
140 PRINT "Fraction of wavelength on line is ",LENGTH/
    LAMDA
150 PRINT:PRINT
160 END
```

Listing 5

```
 10 CLS
 20 PRINT "Matching using shorted stub"
 30 PRINT
 40 INPUT "Working frequency in MHz ",F:F=1000*F*1000
 50 INPUT "Characteristic impedance of lines ", ZO
 60 INPUT "Capacitance of line in pF/m ",C:C=C*1E-12
 70 INPUT "Resistance of load ", RT
 80 L=ZO^2*C
 90 BETA=2*3.14159*F*SQR(L*C)
100 LENGTH=1/BETA*ATN(SQR(RT/ZO))
110 PRINT "Stub distance from load is (m) ";LENGTH
120 B=(RT/ZO-1)/SQR(RT*ZO)
130 PRINT "Susceptance at this point is ";B
140 S=1/BETA*ATN(SQR(RT/ZO)/(RT/ZO-1)
150 LAMDA=1/(SQR(L*C)*F)
160 PRINT
170 IF B<0 THEN S=S+LAMDA/2
180 PRINT "Length of stub is (m) ",S
190 PRINT "Fraction of wavelength on stub is ",S/LAMDA
200 PRINT:PRINT
210 END
```

Listing 6

```
 10 REM iterative method to find a given value of Rin
    with a complex termination
 20 CLS
 30 INPUT "Working frequency in MHz ",F:F=1000*F*1000
 40 INPUT "Characteristic impedance of line ",ZO
 50 INPUT "Capacitance of line in pF/m ",C:C=C*1E-12
 60 PRINT "Load impedance"
 70 INPUT "       Resistive part ",RT
 80 INPUT "       Reactive part (with sign) ",XT
 90 L=ZO^2*C
100 LAMDA=1/(SQR(L*C)*F)
110 BETA=2*3.14159*F*SQR(L*C)
120 PRINT "Length","RS","XS":PRINT
130 FOR LL=0 TO LAMDA/4 STEP .025*LAMDA
140 GOSUB 240
150 NEXT
160 PRINT
170 INPUT "Start length ",LLS
180 INPUT "Finish length ",LLE
190 PRINT "Length","RS","XS":PRINT
200 FOR LL=LLS TO LLE STEP .1*(LLE-LLS)
210 GOSUB 240
220 NEXT
230 END
240 REM subroutine for RS and XS calculation
250 RTOP=RT*COS(BETA*LL):ITOP=XT*COS(BETA*LL)+ZO*SIN
    (BETA*LL)
260 RBOT=COS(BETA*LL)-XT/ZO*SIN(BETA*LL):IBOT=RT/
    ZO*SIN(BETA*LL)
270 ZZ=RBOT^2+IBOT^2
280 RS=(RTOP*RBOT+ITOP*IBOT)/ZZ:XS=(ITOP*RBOT-
    RTOP*IBOT)/ZZ
290 PRINT LL,RS,XS
300 RETURN
```

reactive parts. Again, assuming a loss free quarter wavelength transmission line, the input impedance is given by:

$$Z_S = \frac{Z_0^2}{Z_T}$$

Replacing Z_T by the series impedance $R_T + jX_T$, the above equation can be rewritten as:

$$Z_S = \frac{Z_0^2}{R_T + jX_T}$$

This equation can be manipulated to give an input impedance for the transmission line in both a series and a parallel form, these are depicted on **Fig 8** with the corresponding equations. In both cases, the opposite reactance is produced – a fact that may be useful when trying to eliminate the reactance. One could also assume a load impedance Z_T with parallel components.

MATCHING LOADS TO A TRANSMISSION LINE

THIS SECTION IS REALLY the culmination of the foregoing section and previous articles [2, 3], it requiring the knowledge already gained. Consider a transmission line terminated by some complex impedance (eg an antenna system) and it is desired to match this to a transmitter with minimum VSWR. As is known, both from theory and practice, for maximum power transfer and minimum VSWR, the load as seen by the transmitter (eg the terminated transmission line) must equal the complex conjugate of the transmitter output impedance. In most cases the transmitter output impedance is resistive and hence the transmission line input impedance should ideally be resistive.

For ease, this is often accomplished by an antenna matching unit and ignoring what happens on the transmission line. The alternative approach, ideally for single band working, is to transform the antenna impedance into a resistive element which matches the desired characteristic impedance of the transmission line to be used (ie 50Ω or 75Ω).

From an examination of the transmission line impedance equation for a loss free line with a resistive load, it can be deduced that, for a transmission line length between zero and a quarter wavelength, a condition will occur when the resistive portion will equal the desired value to match the characteristic impedance.

There will, generally however, be a reactive element which, for minimum reflected waves and optimum power matching, should be cancelled out by an opposite reactance. This cancellation could be achieved by a physical variable component with adequate voltage rating OR it could be cancelled using a shorted or open circuit section of transmission line (see earlier section The Transmission Line as a Circuit Element). This is depicted in **Fig 9**, all that is needed is the necessary mathematics.

To begin, it is best to convert the section XC to a parallel combination as the stub XD is in parallel at X. Matching the input resistance of XC to the feeder of characteristic Z_O, this occurs when:

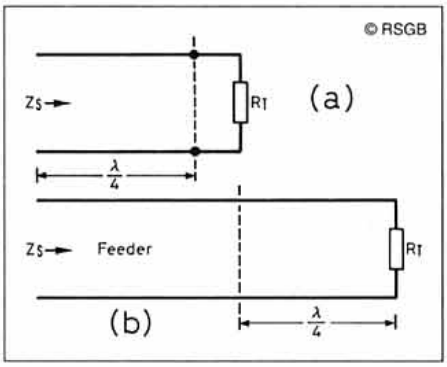

Fig 7: Impedance matching using ¼λ line.

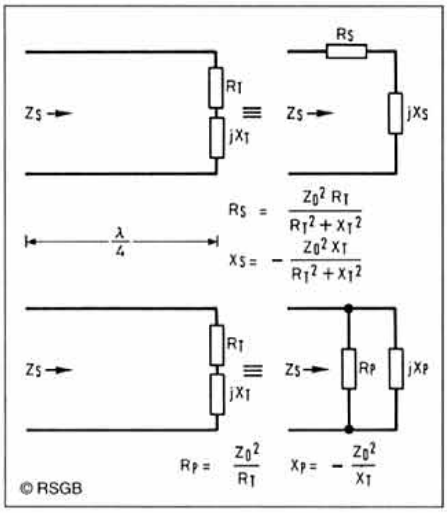

Fig 8: Reactance elimination using ¼λ stub.

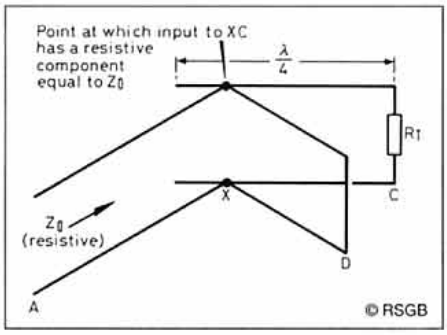

Fig 9: Shorted ¼λ stub matching.

$$\text{Tan } \beta x = \sqrt{\frac{R_T}{Z_0}} \quad \text{or} \quad x = \frac{1}{\beta} \tan^{-1}\left(\sqrt{\frac{R_T}{Z_0}}\right)$$

Where x is the required length of XC.

Note: $\tan^{-1}x$ = the angle whose tangent is x, ie $\tan^{-1}0.5774 = 30°$).

This can be accomplished on most scientific calculators.

The associated susceptance (B) is given by:

$$B = j\frac{(R_T/Z_0) - 1}{\sqrt{R_T Z_0}}$$

This reactance must be cancelled by that of the stub, XD. For a shorted stub then:

$jZ_0 \tan \beta s = -B$, where s is the stub length

Combining these two equations produces an equation for the stub length s given by:

$$s = -\tan^{-1}\left(\frac{(R_T/Z_0)}{(R_T/Z_0) - 1}\right)$$

The feeder AX will then see a match at its remote end (X).

The program in **Listing 5** will perform these calculations. In reality the line AXC may be the same transmission line and the stub XD having to be placed across it somewhere.

When the termination Z_T is a complex impedance, the mathematics is somewhat more complicated. There are two approaches possible to this problem.

Approach 1

Find the point closest to the termination end of the line where the impedance is resistive only (using Listing 2). Then use the matching stub approach as just described, using the resistive point as the new starting point (Listing 5)

Approach 2

Run the program in Listing 6 for the feed transmission line and find where the resistive part of the line impedance is that of the characteristic impedance closest to the load end. Then use a stub (Listings 3 and 4) to cancel out the reactance at this point.

USEFUL PROGRAMS

THE PROGRAMS ARE ELEMENTARY in operation and it is up to the user to combine various options to make a more sophisticated solution. There is no error checking for invalid user inputs! Remember, rubbish in equals rubbish out.

Listing 1

This program calculates the sending end impedance of a terminated transmission line given the parameters R, L, C and G of the transmission line. Line 30 should contain the typical values for the cable being examined, this line can be converted to INPUT statements if the user wishes. This program contains the full implementation of the transmission line equations.

Listing 2

This is an adaptation of Listing 1 to cope with low loss cable and the typical manufacturer's data as found in many catalogues, ie characteristic impedance, attenuation and capacitance per metre.

Line 40, the attenuation per metre: Alpha is divided by 8.686 to convert from dB/m to Nepers/m. Capacitance (line 50) is converted from pF to farads, frequency is converted from MHz to Hz (line 70). Line 120 converts from input parameters to parameters needed for calculations.

Listing 3

This program calculates the length of a short-circuited transmission line to provide a given circuit reactance. It provides values between zero and half a wavelength. The output is the actual length of the line taking into account the velocity of propagation on the line and the

continued on page 61 ▶

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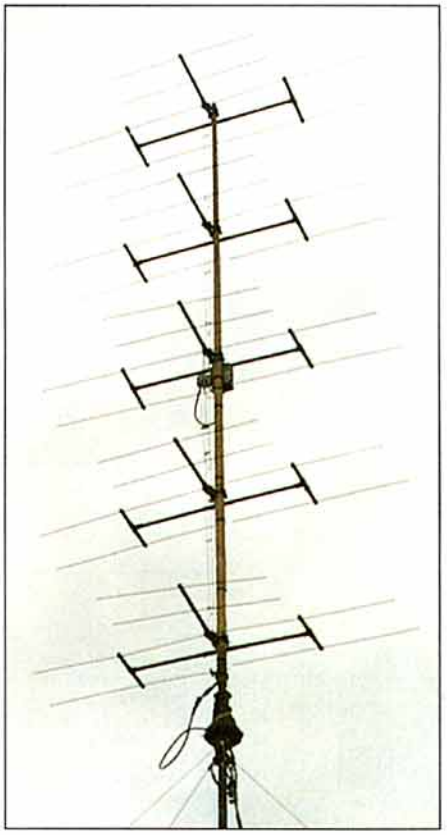
RADCOM TECHNICAL FEATURE

Portable 30-Element 2m Antenna

Concluding a two-part project by Jean-Pierre Morizet, F5OAU

This article, translated from *Radio-REF (F)* 6/93 by Erwin David, G4LQI, describes an interesting variation of the proven stacked collinear antenna [see also *ARRL Handbook* 1959 onwards and *RSGB VHF-UHF Manual* on VHF collinear and stacked dipole array antennas *Ed*]. Practical construction and easy field assembly are described in detail by F5OAU.



For heights greater than 4m, the gas pipe telescopes in the lattice mast and a rotator is used.

AN ADJUSTABLE QUARTER-WAVE stub is connected to the feedpoint of the centre bay. It is 60cm long and is constructed like the phasing lines. The adjustable shorting bar can be made in a similar way to the radiator clamps (**Fig 8**).

The half-wave balun, for a centre frequency of 144.15MHz, consists of 650mm of RG213 coax with the braid stripped back 10mm at each end. The balun is terminated in an electrician's waterproof PVC junction box which also carries the N-socket for the feeder; the whole box can slide up and down on the stub (**Fig 9**).

JOINING FIBREGLASS TO STEEL

TO PERMIT FIELD ASSEMBLY and removal of a tapered fibreglass mast on top of a steel pipe of smaller and uniform diameter, the former must have a lining with an inside diameter (ID) to match the outside diameter (OD) of the steel pipe. This lining must be fixed in the fibreglass so that the bending moment is spread over a length of, say, 20cm or more. **Fig 10** shows how this was done. The lining, aluminum tubing of 40mm ID, is built up on both ends with as much adhesive tape as is required to seat the lining co-axially in the bottom of the fibreglass mast. Before the lining is inserted to stay, the space between the tapes is wrapped with glass-fibre wadding from a car-body repair kit.

To keep the assembled antenna from rotating on the steel mast, a collar is formed and welded of flat steel bar and an M8 nut; it fits around the fibreglass just above the lower tape winding.

Where the locking bolt is to go through, a 10mm hole is drilled through the fibreglass mast; the epoxy from the car-body repair kit is then poured through this hole to saturate the wadding and fill the space between the mast and the aluminium tubing. After the epoxy has cured, an 8mm hole is drilled through the fill hole, the epoxy and the aluminium lining to permit the locking bolt to bite into the steel mast.

TUNING FOR BEST SWR

ASSEMBLE THE ANTENNA on its mast. Support the mast horizontally with the antenna beaming skyward and the stub just accessible from the ground. Apply a few watts of RF through an SWR indicator. Start with the shorting bar 50cm and the balun 10cm below the top of the stub.

Systematically slide the balun down the stub, 2cm at a time, till the point of lowest SWR is found. Then adjust the shorting bar to reduce the SWR further.

Repeat with the balun and

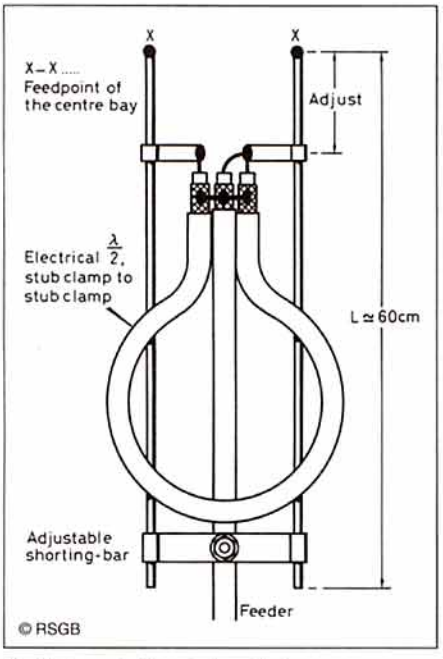


Fig 8: The matching stub and balun.

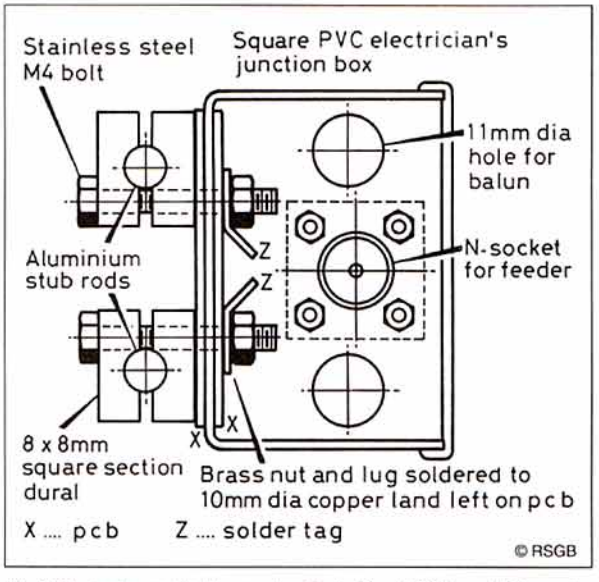


Fig 9: The feeder and balun are terminated in a PVC box which can be moved along the stub for best SWR.

The balun and the feeder cable are shown terminated in the weatherproof plastic box which can be slid up and down on the matching stub. The bigger box contains the receive pre-amp.

again with the shorting bar. An SWR of no more than 1.05:1 is readily attainable, but the final adjustment may have to be done with the antenna at operating height. Tighten the balun box and the shorting bar to the stub.

RAISING THE ANTENNA SINGLE-HANDEDLY

I CAN INSTALL the whole station, antenna, mast amp, power generator etc in 25 minutes, provided the antenna needs to be raised no higher than 4m above the ground.

For this, I use a galvanised steel gas pipe 4m long and 40mm dia. which I guy at 120° with three widely-spread stays of 8mm plastic rope (**Fig 11**). Hammer a peg into the ground at the base of the mast and tie the mast to that peg with a 30cm length of cable or chain. Unhook one stay and lower the pipe to the ground. Assemble the antenna, mast amp, amplifier supply cable and feeder on the fibreglass mast and lock the latter on top of the gaspipe mast. Walk the mast up to the vertical position against the two guys already in place. Catch the third guy and attach it to its peg. For heights over 4m, unless you have a telescopic fold-over mast, things are more complicated. A 4m lattice mast section in which the gas pipe can slide up and down is shown, but that takes considerable muscle, especially as a rotator is then required. Another method is the use of a gin pole and four-way guying[3].

PERFORMANCE

USING A CALIBRATED attenuator, this antenna seems to have 3dB more gain than F6HVK's three-bay model but 3dB less than an array of four 17-element Yagis; my antenna sometimes outperforms the 4x17 array when the other station is in mountainous terrain. A computer simulation by F6DRO shows a free-space gain of only 13.3dB for my 5-bay model but the radiation patterns (**Fig 12**), suit my application, ie tropo QSOs and contesting; the –3dB azimuth opening angle is approx. 2x20° and the –10dB minor lobes in the elevation pattern seem to do no harm.

REFERENCES:

[3] 'Raising a 60-foot Mast for Portable Operation' by Dick Pascoe, G0BPS. *RadCom* Jan 87 or *HF Antenna Collection*, RSGB, p175.

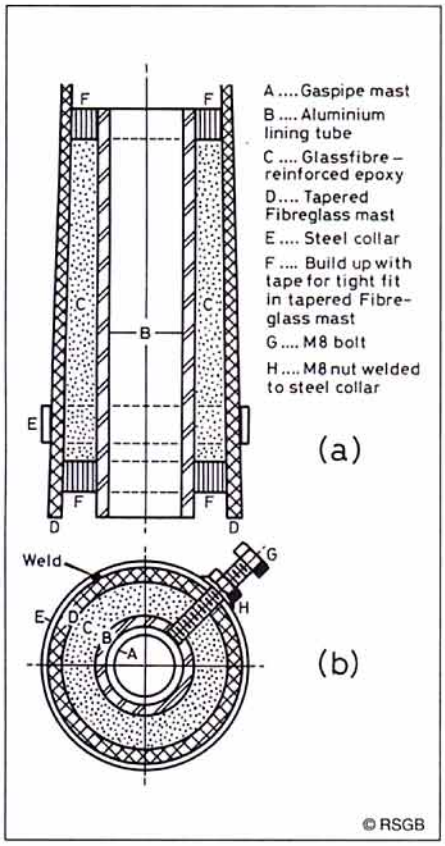


Fig 10: (a) To allow the fibreglass windsurfer mast to be field-spliced onto a 40mm OD gas pipe, a 40mm ID aluminium tube is coaxially moulded into the low end of the fibreglass mast. (b) A steel collar with set screw serves to lock the masts together.

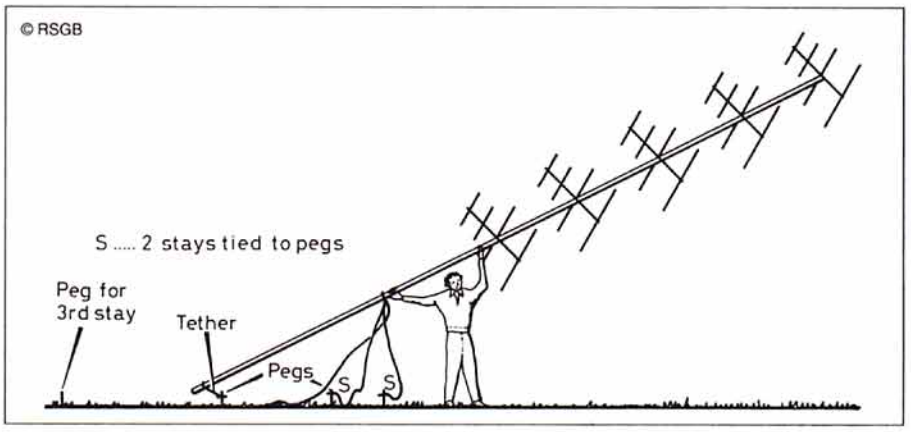


Fig 11: Erecting the antenna single-handedly.

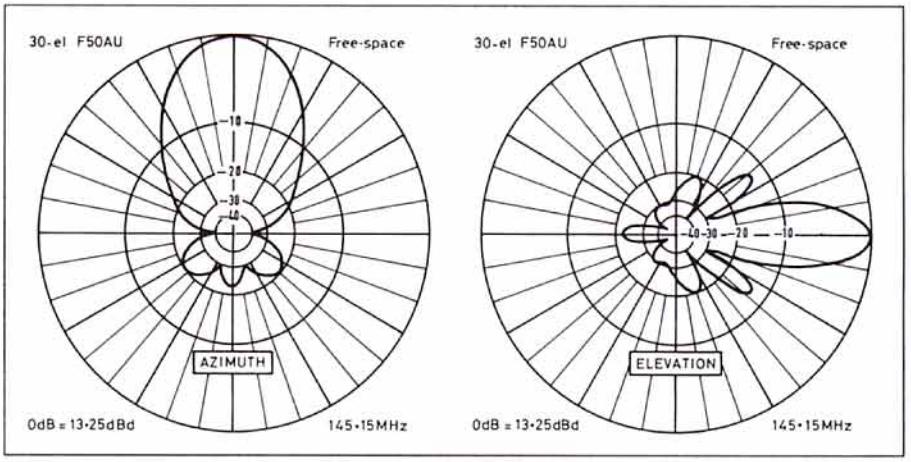


Fig 12: Free-space radiation patterns computed by F6DRO.

The Transmission Line Explained

continued from page 57

fraction of a wavelength the line length represents.

Listing 4

This program calculates the length of an open-circuited transmission line to provide a given circuit reactance. It provides values between zero and half a wavelength. The output is the actual length of the line taking into account the velocity of propagation on the line and the fraction of a wavelength the line length represents.

Listing 5

This program is for calculating the position of the stub relative to the load and the length of a shorted stub. In all cases it is assumed that the same transmission line is used throughout.

Listing 6

This program requires interaction from the user. It is for finding the value of Rin with a complex termination.

CONCLUSIONS

THIS ARTICLE HAS GIVEN some of the concepts and deeper mathematics involved in transmission line work and matching. The transmission line has been treated as an impedance and methods are shown how to achieve matching to the characteristic impedance of feeders. It is hoped that this article will be of use to those who want to see what is going on and how the mathematics is used. I hope it will help readers with further experimentation and that the computer programs provided are useful. Best of luck with your endeavours.

REFERENCES

[1] *The Services Textbook of Radio, Vol.5, Transmission and Propagation*, Glazier and Lamont, HMSO.

[2] 'Complex Numbers', Clive Smith, G4FZH, *Radio Communication*, May 93

[3] 'Circuit Concepts', Clive Smith, G4FZH, *Radio Communication*, November 1993

REPRINTS OF Clive Smith's previous articles, a total of four pages, are available from the RadCom Office at RSGB HQ for £2 – *Ed.*

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News items should be sent to RSGB, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE, marking the envelope "Urgent news for GB2RS". The deadline is noon on the Tuesday preceding the Sunday broadcast.

See page 53 for details of where to listen for the news bulletin.

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RESONANCE AND ANTENNA LENGTH

HOW DOES THE LENGTH of a 'half-wave' dipole relate to impedance, resonance and VSWR? What am I doing when I adjust the length to give minimum VSWR?

A RESONANT HALF-WAVE dipole is not a true half-wavelength long – it's always a few percent shorter than that. When you open up the midpoint of a nearly half-wave dipole, the feedpoint impedance behaves very much like a series-tuned R-L-C circuit (**Fig 1**), and we can talk about 'resonance' in the same way. The circuit in Fig 1 is resonant when the positive inductive reactance X_L is exactly cancelled by the negative capacitive reactance X_C, leaving only the resistive component R. The antenna behaves very similarly, as shown in **Fig 2**.

Fig 2 plots the resistive component R and the reactive component X of a 7.05MHz dipole in free space, against the length of wire. Unlike a true tuned circuit, the resistive part R is also varying with length, but much more slowly than the reactance X which has a much steeper gradient. Resonance occurs at the length where X=0, which is quite a bit shorter than the true half-wavelength (marked 'λ/2'). At resonance, R has the textbook value of about 72Ω, depending slightly on the diameter of the wire (1.6mm for Fig 2).

A thinner wire would have a slightly longer resonant length and a slightly higher feedpoint resistance, while a thicker wire would need to be made shorter. In the extreme case of a VHF/UHF dipole made out of tubing which has quite a large diameter in relation to the wavelength, large corrections are required [1].

The VSWR depends on three variables: the resistance R, the reactance X and the reference impedance Z_0 which is conventionally 50ohm. The further R is away from Z_0, and the further X is away from zero, the higher the VSWR will be. This is clearly shown in the upper part of Fig 2 which plots VSWR against antenna length. As you see, the VSWR dips to a minimum at the resonant length, because that is where the rapidly-varying X component passes through zero.

Note that R at resonance is nowhere near 50Ω – if all you're adjusting is the length of the dipole, you have to take whatever feedpoint resistance you get. Even cutting an antenna exactly to resonance will only create what G6XN so aptly calls "a tendency to match" [2], and if that isn't good enough for your transmitter you'll have to use an ATU.

To hammer the point home, saying that an antenna is 'resonant' does not mean it is also matched to your system impedance of 50 or 75Ω. Nor does a matched antenna have to be resonant. With the aid of an ATU you can match (or 'load up') almost any metal structure, regardless of whether it's resonant or not.

In practice the VSWR of your HF dipole may be better than indicated in Fig 2, because real HF antennas are always relatively close to ground and this lowers the feedpoint resistance of a horizontal dipole. The value at resonance depends on the height above ground, the wavelength in use and the nature of the ground itself. Many 3.5MHz dipoles are around the height that gives a good 50Ω VSWR at resonance, and most 1.8MHz dipoles have a significantly lower feedpoint resistance. I won't even hint at the 'magic heights' for each band, because you should always be striving for maximum height, not the lowest VSWR!

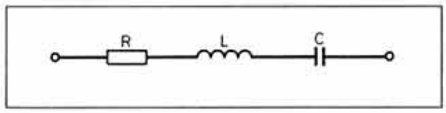

Fig 1: Near resonance, the feedpoint impedance of a 'half-wave' dipole behaves much like a series-tuned R-L-C circuit. The reactance is zero at the resonant frequency, leaving only the resistive component.

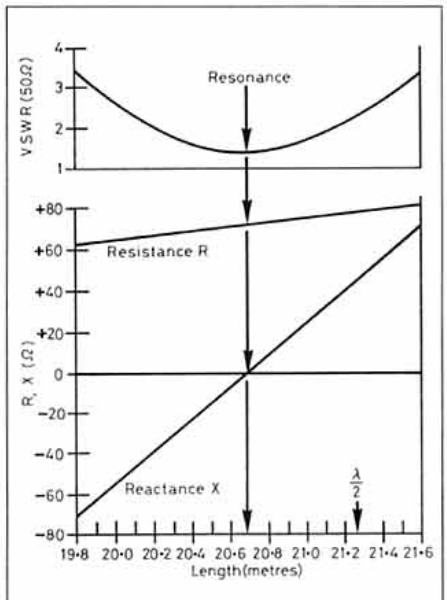

Fig 2: Feedpoint reactance, resistance and VSWR of a nearly half-wave dipole in free space. Resonance and minimum VSWR occur together, but at a significantly shorter length than λ/2.

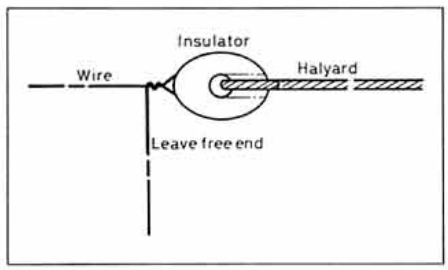

Fig 3: After you have calculated the length of wire required, leave the end part dangling for easier adjustment.

WHAT'S THE FORMULA for calculating the resonant length of a dipole?

IT DEPENDS ON many factors, notably the diameter of the wire, the height above ground and of course the frequency in use. The classic ARRL formula is:

$$L(ft) = 468 / f(MHz)$$
$$L(m) = 142.6 / f(MHz)$$

This formula works quite well for HF wire dipoles at relatively low heights, which is not surprising because it was determined by cut-and-try in the alleyway behind the old ARRL headquarters. However, the height above ground does have quite a significant effect, lower heights requiring shorter lengths. In practice it's best to leave the end sections dangling below the insulators for ease of adjustment (**Fig 3**) – say 10cm for a 14MHz dipole and proportionately longer or shorter for the other bands. This avoids having to mess with the insulators every time, and guarantees that you won't need to splice an extra length into the main span. If you need to add extra lengths, use terminal blocks until you're sure how much you need. Then tidy-up with the soldering iron and waterproof your joints.

To test the antenna, you'll have to make a 'VSWR run' across the band and plot a graph like the upper part of Fig 2. Do this with the minimum possible power and preferably on a 'dead' band. You don't have to tune to exact 100kHz multiples or whatever; be sensible – choose the nearest clear frequency and **ask first**. If the VSWR minimum is not exactly where you want it, work out the percentage difference in terms of frequency and add or subtract the same percentage from the length of the antenna. Two or three sets of simple adjustments should finish the job.

DOES INSULATED WIRE make any difference?

YES – AN ANTENNA made from the inexpensive and readily-available insulated stranded wire needs to be very roughly 5% shorter than if you used bare or thinly enamelled wire. The exact value will depend on the type of wire and your particular situation, so you'll need to factor the 5% shortening into your calculation and maybe provide extra lengths for adjustment. The same applies to quad loops, except that the difference may be even greater. W6SAI wisely recommends resonating a test loop to find your own correction factor [3].

MEASURING HIGH VOLTAGES

HOW CAN I MEASURE high voltages? I have a good digital voltmeter but it's limited to 1000V maximum.

A HIGH-VOLTAGE PROBE is not difficult to construct and calibrate. Basically a HV probe is a voltage divider which scales-down the

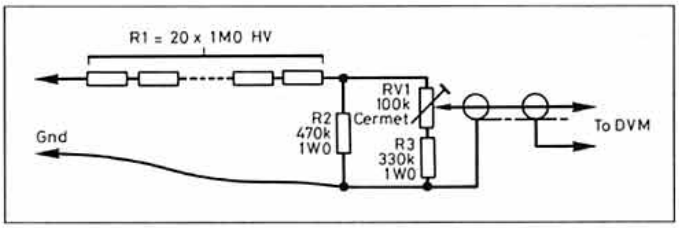

Fig 4: Circuit of a 100:1 high-voltage probe

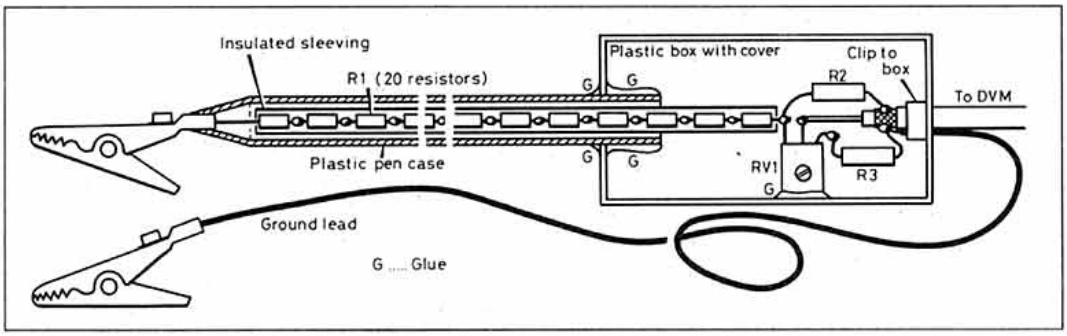

Fig 5: Construction of the high-voltage probe

measurement point to ground using a screwdriver with an insulated handle. When you switch the power on again, do not touch either the probe or the DVM. After you make the measurement, disconnect the mains and short the probe clip to ground before you touch it. Do this every time, even though you may firmly believe that it's safe to touch – because if ever you're wrong, you're dead!

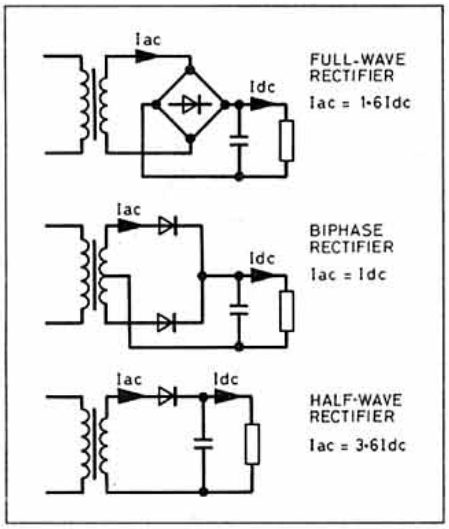

Fig 6: The VA rating of a transformer is the AC voltage multiplied by the AC current. For some capacitor-input rectifier circuits, the AC current rating needs to be much more than the DC current delivered to the load

high voltage to something your meter can comfortably read.

The HV probe I'm going to describe is mainly intended for use with power supplies for big RF amplifiers, which range up to 3 or 4kV at most. This probe is rated up to about 10kV, and for significantly higher voltages you'd need to use special HV components and techniques. Although division by 100 is not necessarily the best way to use the available precision of a conventional digital voltmeter (DVM) which reads from zero to 1.999, it does avoid having to carry out arithmetic on every meter reading.

The circuit is a simple voltage divider (**Fig 4**) with additional features because of the high voltages involved. A reasonable input resistance for the HV probe would be about 20MΩ, but this design does not use any special resistor values. Instead it uses any suitable resistors and has a calibration adjustment which need only be set once.

Although some component catalogues do feature 20MΩ resistors, there are three reasons why you can't just buy one resistor and solder it in. First, the power dissipation across 20MΩ at 10kV is 5W (V^2/R). Second, the allowable voltage drop across any normal resistor is only a few hundred volts, so R1 will have to consist of several lower-value resistors in series. Third, if these resistors run too close to their maximum rated power dissipation they will change in value and affect the meter reading, so the whole resistor chain must be substantially over-rated. Maplin Electronics offer a range of 0.5W high-voltage resistors at 20p a go, so a chain of 20 at 1MΩ each will be more than ample in terms of both voltage and power ratings.

To make a 100:1 voltage divider with R1=20MΩ, the resistance at the bottom of the divider must be about 200kΩ. An adjustable tap will also be required for the output, to set the division ratio to exactly 100:1 while taking up any component tolerances and compensating for the input resistance of your particular DVM. For safety reasons I'd recommend two resistors in parallel at the bottom of the divider chain, to make sure that the output voltage remains low if either resistor should fail open-circuit. Actually three resistors are required: the 470kΩ safety resistor R2 is a 1W component, RV1 is a 100kΩ ten-turn cermet trimpot and R3 is 330kΩ 1W.

Construction of a HV probe requires multiple insulation (**Fig 5**). The resistors comprising R1 are soldered into a chain with very short leads and slipped into a length of plastic sleeving. This in turn is inserted into the thick plastic barrel of a pen, with a suitable probe clip attached to the far end. Glue the pen barrel into a plastic box as shown (I made mine from PVC electrical conduit) and you can also glue RV1 in place. Provide a long ground lead with a croc-clip, and a two-core or screened lead with plugs to suit your DVM. Attach all leads firmly to the plastic box with clips or cable-ties. The other components can then be soldered on to the available anchor points.

To set the division ratio, organise yourself a DC supply of a little less than 200V, which can often be 'borrowed' from equipment using valves. If the available supply is more than 199.9V, as measured using the 200V DC range on your DVM, change tappings on the mains transformer or divide the voltage down using suitable resistors. Make a careful note of the reading and then insert the HV probe between the 200V supply and your DVM. Switch the DVM to its 2V range and adjust RV1 to obtain exactly the same digits as before. This sets the division ratio to 100:1, so you can measure up to 2kV on the 20V range and higher voltages on the 200V range.

DANGER – high voltages are lethal! Before you attach the HV probe and its ground lead, disconnect the HV power supply from the mains and physically short-circuit the

VA RATINGS

I KNOW ABOUT VOLTS, amps and watts, but what do transformer ratings in 'VA' mean?

'VA' IS SHORT FOR 'volt-amps' and it often appears in the ratings of transformers or petrol/diesel generators. These devices often have to work into loads involving inductance or capacitance as well as resistance, so the voltage and current output waveforms are usually not in phase. You can measure the AC voltage and current separately, but when you multiply them together the result is not true power but only volt-amps. To calculate the power you also need to know the power factor, which is related to the phase difference between the voltage and current waveforms. The power factor in an AC circuit is less than 1 if inductance or capacitance are involved.

Power = volts x amps x (power factor)
= VA x (power factor)

In applications such as power supplies with the almost universal capacitor filter, the power factor is quite low and the volt-amps being handled by the transformer can considerably exceed the true power. **Fig 6** shows the relationships between AC current (on which the transformer needs to be rated) and the DC current delivered to the load [4]. For bridge rectifiers the AC current rating of the transformer needs to be about 1.6 times higher than the DC current to be drawn, and for a half-wave rectifier the 'mark-up' is 3.6 times. These figures assume an adequate value of smoothing capacitor, but as noted in the December 1993 column some power supply manufacturers use very low values; this allows them to get away with a lower-rated transformer, but it does absolutely nothing for the quality of the so-called 'DC' output!

REFERENCES

[1] The VHF/UHF DX Book, *Chapter 7 (available from RSGB).*

[2] *L A Moxon, G6XN,* HF Antennas for All Locations *(RSGB).*

[3] *W Orr, W6SAI and Stuart Cowan, W2LX,* All About Cubical Quad Antennas *(available from RSGB).*

[4] RS Components / Electromail catalogue.

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 or by packet (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.

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BIRMINGHAM: (JUST OFF M5 MOTORWAY JUNCTION 2) - *GORDON & JOHN* International House, 963 Wolverhampton Road. Oldbury, West Midlands B69 4RJ. Tel: 021 552 0073 Fax: 021 552 0051. **LONDON**: - *PAUL* - 11 Watford Way, Hendon, London NW4 3JL. Tel: 081 202 0073 Fax: 081 202 8873. **HERNE BAY**: - *CHRIS* - Unit 8, Herne Bay West Industrial Estate, Sea Street, Herne Bay, Kent CT6 8LD. Tel: 0227 741555 Fax: 0227 741742.

OPENING TIMES: Tuesday to Friday: 09:00-17:00 & Saturday: 09:00-16:00. Herne Bay closed for lunch 1-2pm.

PRODUCT NEWS

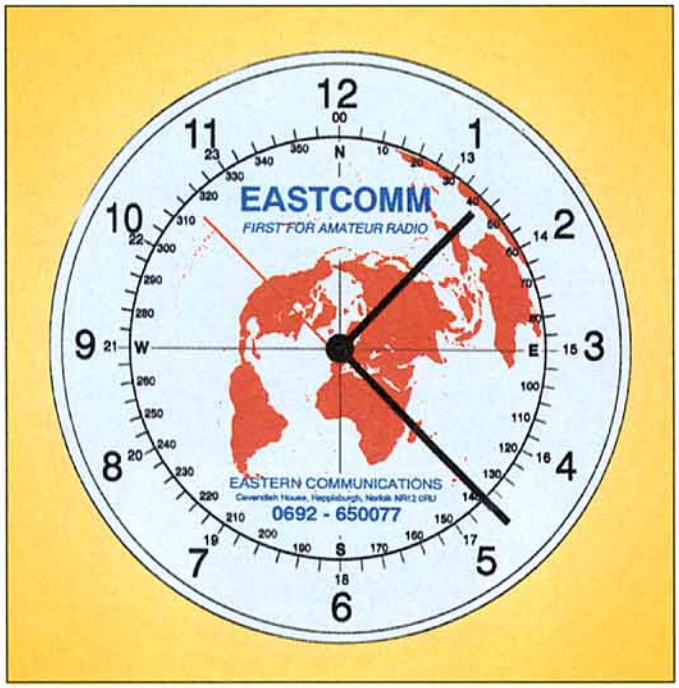
Note: Product news is compiled from press releases sent in by the manufacturers and distributors concerned. Details are published in good faith but *Radio Communication* cannot be held responsible for false or exaggerated claims made in the source material.

ANYONE INTERESTED IN KITS will know of C M Howes Communications. Their latest **Kits Catalogue**, just published, contains full details of more HF kits and metalwork packages than ever before. The 12-page brochure is extensively illustrated with photographs of the kits and completed projects showing just how smart home built equipment can be. New products include a 100W ATU kit.

To get your copy, just send Howes an A5 or A4 self-addressed envelope with a 25p stamp (or two IRCs for overseas postage).

Send to: C M Howes Communications, Eydon, Daventry, Northants NN11 3PT.

● **GREENWELD Electronic Components** are now open from 8am to 5.30pm six days a week. Call them on 0703 236363.

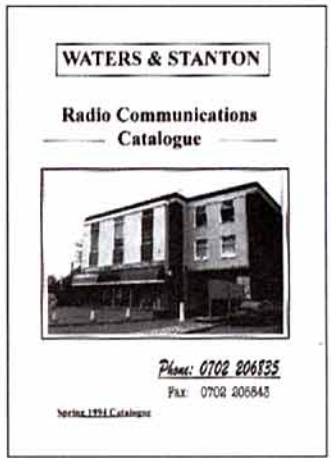


FROM EASTCOMM COMES an **amateur radio wall clock** with a 9in diameter face which gives excellent visibility across a room. Both 12 and 24-hour format is displayed as well as a great circle map with bearings in degrees from London. A single AA battery will provide over a year of operation. The price, including UK post, packing and VAT, is £24.95.

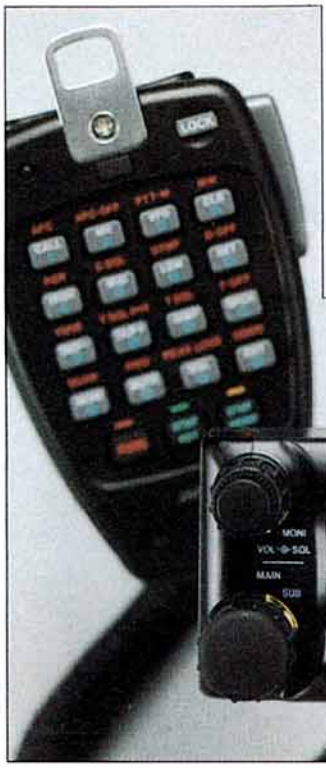
Write to: Eastern Communications, Cavendish House, Happisburgh, Norfolk NR12 0RU; tel 0692 650925.

AT 64 PAGES, the second edition of Waters and Stanton's Radio Communications **Catalogue** is twice the size of its predecessor. The complete range of transceivers, antennas, test gear, kits, books etc are listed, illustrated and described in detail. Vouchers for up to £18 discount are included with the catalogue which comes free to anyone writing in with two first class stamps (overseas £2) to cover postage.

Write to: Waters and Stanton Electronics, 22 Main Road, Hockley, Essex SS5 4QS; tel 0702 206835.

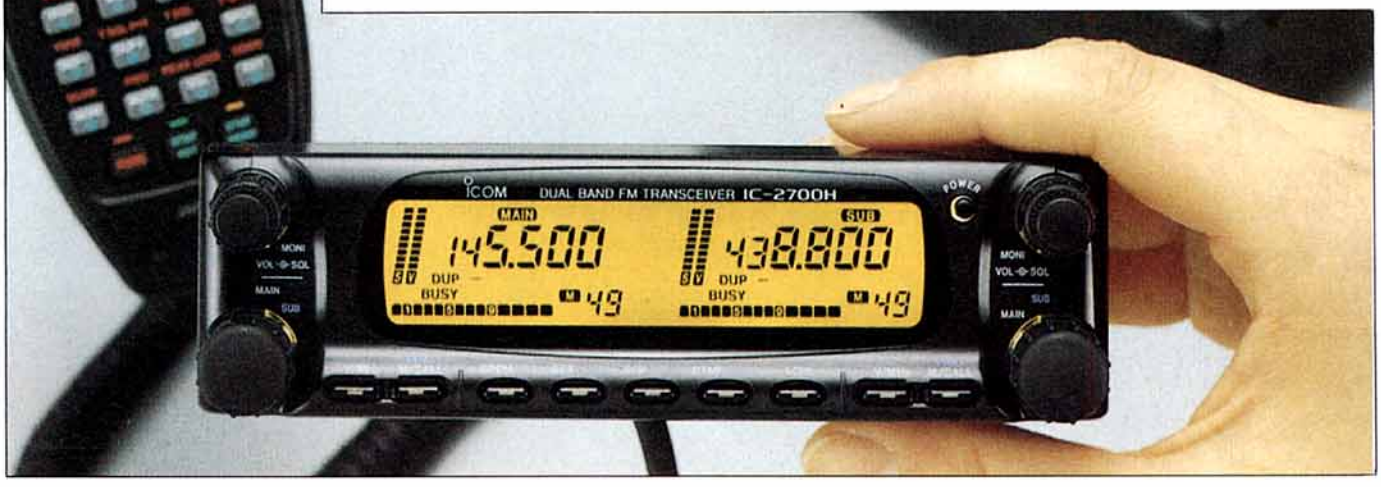


● IN FEBRUARY'S *Product News* we published a couple of fax numbers instead of phone numbers. **LMW Electronics Ltd** can be phoned on 0538 231141 and the **Public Domain and Shareware Library** are on 0892 663298. Apologies to both.



IF YOU HAVEN'T much room in your car (and who has these days?) you'll be interested in the latest radio from Icom which has an optional detachable front-panel. The **IC-2700E dual-bander** runs 25W on the 144 and 430MHz bands (a 50/35W version is also available) and, despite the small size of the front-panel, has separate controls for each band. The wide range of 'bells and whistles' includes full access to all of the transceiver's functions from the microphone, DTMF tones, six scratch pad memories, simultaneous receive on two bands or even two signals on the one band, four levels of LCD backlighting, code-squelch and a time-out timer. The really interesting things are two of the optional extras: A detachable front panel, which allows the rig to be stored out of the way but the front-panel to be located in an easy-to-see position, and the infra-red wireless microphone which gives full control of the radio, even from the back seat!

Further info from: Icom (UK) Ltd, Sea Street, Herne Bay, Kent CT6 8LD; tel 0227 741741.



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PX IC725	Icom	HF Transceiver	£625.00
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PX FT747	Yaesu	HF Transceiver	£625.00
PX FT101Z	Yaesu	HF Transceiver, Valve PA	£375.00
PX FT101Z	Yaesu	HF Transceiver, Valve PA	£395.00
PX FTONE	Yaesu	HF Transceiver	£795.00
PX TS440SAT	Kenwood	HF Transceiver	£795.00
PX KWM380	Collins	HF Transceiver	£1495.00
PX FT767GX	Yaesu	HF Transceiver + 2m	£1375.00
AX ARGOSY	Tentec	HF Transceiver	£475.00
AX FT747GX (X2)	Yaesu	HF Transceiver	£725.00
AX IC725	Icom	HF Transceiver	£650.00
AX IC751A	Icom	HF Transceiver	£975.00
AX IC761	Icom	HF Transceiver	£1200.00
AX TS430S	Kenwood	HF Transceiver	£595.00
AX TS50S	Kenwood	HF Transceiver	£725.00
AX TS690S	Kenwood	HF/6M Transceiver	£1199.00
AX TS700	Kenwood	HF Transceiver	£299.99
AX TS430S	Kenwood	HF Transceiver	£650.00
AX FT101ZD	Yaesu	HF Transceiver	£449.00
CX FT757GX	Yaesu	HF Transceiver	£705.00
LX TS140	Kenwood	HF Transceiver	£699.00
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RX FT747GX	Yaesu	HF Transceiver	£625.00
RX FT767GX	Yaesu	HF Transceiver with 2m & 6m	£1650.00
RX FT767GX	Yaesu	HF Transceiver	£1295.00
RX FTONE	Yaesu	HF Transceiver	£995 .00

VHF EQUIPMENT

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PX FT690R2/A	Yaesu	FT690R A Version	£350.00
PX FT76	Yaesu	70CM Handheld	£235.00
PX TH46E	Kenwood	70CM Transceiver	£169.00
PX TH78E	Kenwood	2M/70CM Transceiver	£359.00
AX C5608D	Standard	Transceiver	£500.00
AX C844	Comunique	Handheld	£50.00
AX FT225RD	Yaesu	2M Transceiver	£599.00
AX FT290R	Yaesu	2M Transceiver	£275.00
PX TS790E	Kenwood	2m/70cm Base station	£1295.00
AX FT290R2	Yaesu	2M Transceiver portable	£414.80
AX FT480R	Yaesu	2M Transceiver multimode	£295.00
AX IC2GE	Icom	2M Handheld	£160.00
AX KT22	Kenpro	2M Handheld	£119.00
AX KT400	Kenpro	2M Handheld	£119.00
AX KT44E	Kenpro	70CM Handheld	£129.00
AX MX2		Handheld	£80.00
AX TH28E	Kenwood	2M Handheld Transceiver	£235.00
AX TR2100M	Trio	Transceiver	£125.00
AX TR751E	Kenwood	2M Transceiver	£549.00
AX TR9130 (X2)	Trio	Transceiver	£350.00
AX FT225RD	Yaesu	2M Transceiver	£525.00
AX FT26	Yaesu	2M Handheld	£195.00

AX TH78E (X2)	Kenwood	Dualband Handheld	£385.00
AX DJ500E	Alinco	Handheld	£189.00
AX FT208R	Yaesu	2M Handheld	£115.00
CX FT290	Yaesu	2M Transceiver Multimode	£299.00
CX FT470	Yaesu	2M/70CM Transceiver	£399.00
CX FT73R	Yaesu	UHF Transceiver	£159.00
CX TH205E	Kenwood	2M VHF Transceiver	£175.00
LX FT2400	Yaesu	2M Transceiver	£310.00
LX FT736R	Yaesu	Transceiver	£1199.00
LX FT811	Yaesu	UHF Handheld	£220.00
BX FT290R2	Yaesu	2M Transceiver Multimode	£389.00
BX FT470R (X2)	Yaesu	Dualband handy TXA	£325.00
BX FT690R2	Yaesu	6M Transceiver	£350.99
BX TH77E	Kenwood	Dualband Handheld 2M/70CM	£299.00
BX FT811	Yaesu	70CM Transceiver Handheld	£165.00
RX 204		Transmitter	£135.00
RX IC4SRE	Icom	70CM Transceiver	£330.00
RX C500	Standard	2M/70CM Handheld	£150.00
RX FT290/1 (X2)	Yaesu	2M Transceiver	£249.00
RX FT290R	Yaesu	2M Mobile	£225.00
RX FT290R2	Yaesu	2M Transceiver	£350.00
RX FT727	Yaesu	2/70 Transceiver	£295.00
RX FT76	Yaesu	70CM Handheld Transceiver	£249.00
RX FT790R	Yaesu	70CM Portable multimode	£165.00
RX IC24ET	Icom	2M/70CM Transceiver	£350.00

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PX ICR7000	Icom	Receiver	£685.00
PX MVT6000	Yupiteru	Scanner	£220.00
PX PRO2005	Realistic	Scanner	£229.00
PX PRO80	Sony	Handheld Scanner	£169.00
PX PRO9200	Realistic	Scanner	£108.99
AX ICF2001D	Sony	Receiver	£169.00
AX 800XLT	Bearcat	Scanner	£169.00
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AX HP200E	Fairmate	Scanner	£199.00
AX ICR1	Icom	Scanner	£285.00
AX ICR70	Icom	HF Receiver	£450.00
AX ICR71	Icom	Receiver	£625.00
LX MVT800	Yupiteru	Mobile Scanner	£265.00
LX R5000	Kenwood	HF Receiver	£695.00
AX MVT8000	Yupiteru	Scanner	£289.00
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AX R532	Signal	Airband Receiver	£100.00
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AX ICR1	Icom	Scanner	£275.00
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CX D2935		Receiver	£152.75
CX ICF2001D	Sony	Receiver	£188.00
CX ICR71	Icom	HF Receiver	£564.00
CX R100	Icom	VHF Receiver	£395.00
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LX FRG7	Yaesu	HF Receiver	£185.00
BX VT125MK2	Yupiteru	Scanner	£139.00
RX 200XLT	Bearcat	Scanner	£185.00
RX AR2002 (X3)	AOR	VHF Receiver Scanner	£299.00
RX FR400	Yaesu	HF Receiver Amateur	£150.00
RX FRG9600	Yaesu	Scanning Receiver	£299.00
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PX TNTERM (X2)	ICS	Software (BBC)	£19.00
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AX PK232MBX	ICS	Modem 7 mode Data Terminal	£249.00
AX PP1		Phone patch	£139.00
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LX ICR100	Icom	Scanner with SSB	£450.00
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PX FRB757	Yaesu	Relay	£10.00
PX FS500V (X2)	Yaesu	Power meter	£79.00
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PX FL7000	Yaesu	HF Linear 500W	£1495.00
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AX EP2500	Alinco	PSU	£69.99
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AX RS3050		Power supply	£99.99
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AX FC902	Yaesu	HF Antenna tuner	£200.00
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CX ARA60	Dressler	Active AE	£135.00
CX FL2010	Yaesu	2M Linear amp	£51.70
CX SB1000		HF Linear	£423.00
LX 12/25	Bnos	12V/25A PSU	£160.00
LX FP757HD	Yaesu	PSU	£240.00
LX G-1000SDX	Yaesu	Antenna rotator	£348.00
LX TB3MK2	Jaybeam	HF 3 Element beam	£350.00
BX FRT7700	Yaesu	RX Antenna tuner	£59.00
RX 12/25A	Bnos	12V 25A PSU	£194.99
RX 12/6A	Bnos	12V 6A PSU	£60.00
RX 144/28	Yaesu	Convertor	£85.00
RX BC72	Icom	Charger	£75.00
RX FL2025	Yaesu	2M Linear FT290R2	£110.00
RX FL2025	Yaesu	2M Linear	£85.00
RX FL2100Z	Yaesu	HF Linear	£750.00
RX FL400	Yaesu	HF Transmitter amateur	£150.00
RX FRA7700	Yaesu	Active antenna	£45.00
RX FTV107R/2	Yaesu	Transvertor	£135.00
RX FV101	Yaesu	Ext VFO	£105.00
RX LF30A	Trio	Low pass filter	£25.00
RX MMB49	Yaesu	Bracket	£16.00
RX NC15	Yaesu	Base charger	£50.00
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KEY

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PROJECT YEAR FEATURE

Young Amateur of the Year Award 1994

FOR THE SEVENTH YEAR running the RSGB is pleased to announce the Young Amateur of the Year Award. This is again 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 and is awarded for the most outstanding achievement by a young amateur. He or she need not necessarily be a licence holder.

Do you know a suitable candidate?

APPLICANTS MAY LIKE TO CONSIDER the following areas of activity:

- radio construction
- operation of radio
- community service (eg helping in emergency communications or helping the disabled).
- encouraging others (eg through the Novice licence scheme)
- school projects

The idea behind the scheme is to generate interest in amateur radio and to encourage people to become involved themselves.

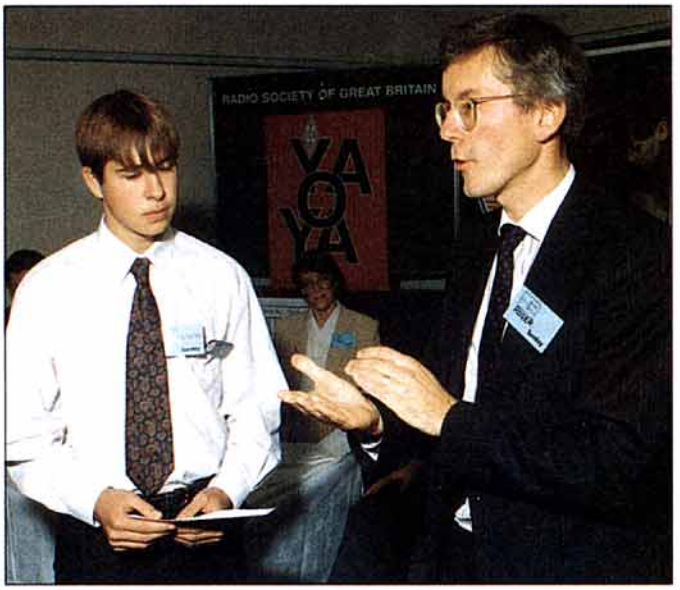
All entrants will receive a copy of the RSGB's amateur radio log book.

The £300 cash prize, for the most outstanding achievement between 1 August 1993 and 31 July 1994, will be awarded by the Radiocommunications Agency and presented at the RSGB's HF Convention in October. The runner-up will recieve 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.

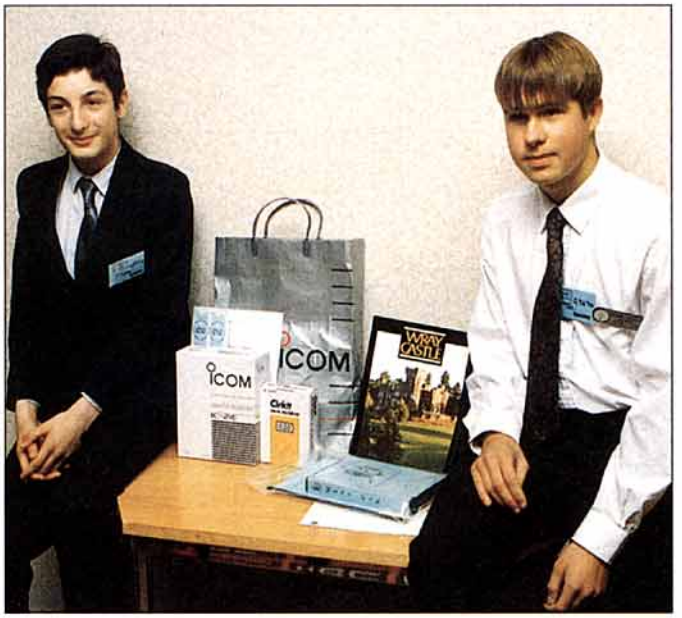
Additional prizes will be awarded by the RSGB and, as in the past, the radio communications industry have been very supportive of this Award.

The closing date for applications is 31 July 1994. 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 1994 (Att: Justine Hodges) Radio Society of Great Britain, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE.



Roger Louth from the Radiocommunications Agency applauds the 1993 Young Amateur of the Year, Tim Munn, G7OTO.



Showing off some of their prizes are last year's winners Tim Munn, G7OTO (right) and Simon Kahn, G0STU.

The Prizes

ALONG WITH THE PRESTIGE of becoming the Young Amateur of the Year 1994, the winner also receives:

- A cheque for £300 from the Radiocommunications Agency and an invitation to tour the DTI Monitoring Station at Baldock.
- A Sony general coverage receiver from the RSGB presented by our President, Ian Suart, GM4AUP.
- Siskin Electronics have kindly donated a Mini Pak packet radio modem.
- The Mobile Radio User's Association will award the winner a week's residential course at Wray Castle College in the Lake District.

And, for the Runner Up:

- Icom (UK) have donated a hand portable transceiver.
- 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's amateur radio log book.

IDEAS FROM ABROAD

TRANSLATED AND EDITED BY ERWIN DAVID, G4LQI

Raise your voice and fill your channel! That is the prescription of **Jan Kliffen, G0ACA, ex-PA0KC,** for more effective SSB transmission in the overcrowded lower HF bands. From *Electron* (NL) of 1/94 with additional information from the author.

AFTER 40 YEARS OF SSB operation, you would not expect much improvement in exploiting that mode of transmission; but yet . . . .

QRM has driven us to shrink the voice bandwidth from 300-3000Hz to 500-2000Hz. That does not make signals sound very nice, but cheaper crystal filters are a minor compensation (1500Hz –3dB bandwidth comes easier than 2700Hz for a given pass band ripple and –60dB width).

Speech compression and clipping, 'processing', is used to get more speech power from equipment or licence-limited peak envelope power, but sometimes this results in worse rather than improved intelligibility and, worse yet, splatter.

Much has been published, albeit outside the amateur domain, about the nature of human voice communication. Telecom institutions have spent billions on studies of voice and ear, and with good reason: poor telephone performance cuts profits!

The suggestions that radio amateurs with modest means could do better than the professionals smacks of arrogance, but individuals do have one enormous advantage. While phone companies have to cater to any and all voices, from Shakespeare's Shrew to Santa Claus, individuals do not. Where telephones must 'fit all', an amateur can custom-tailor his equipment to his own voice.

INVESTIGATIONS

HOW IS YOUR VOICE power distributed in the 500-2000Hz range? Take a microphone and a spectrum analyzer at £10k. No, the job does not require that kind of outlay, nor one of those top-of-the-line transceivers with a panoramic display.

I used an ordinary oscilloscope, a CW IF crystal filter 250 or 300Hz wide, a voltage controlled oscillator which can be swept a few kHz either side of the filter frequency and a balanced mixer as can be found in many receivers and SSB transmitters. The 'scope's Y-response must go beyond the filter frequency and its X-sawtooth must be brought out **(Fig 1).** An audio generator, replacing the microphone in the diagram, is handy to calibrate the display.

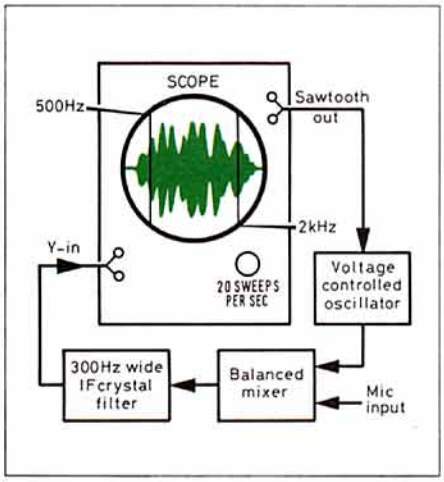
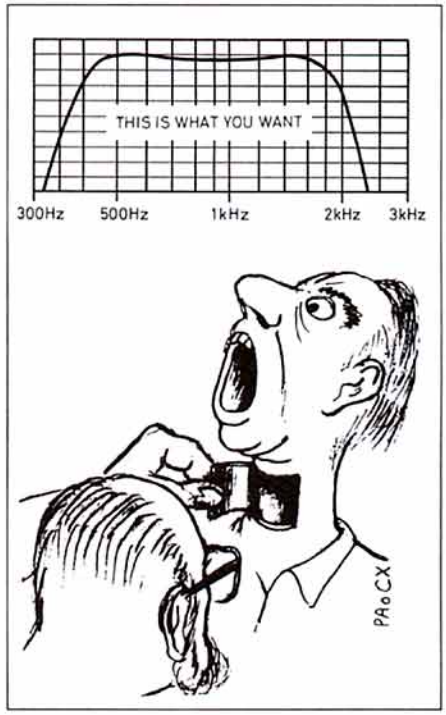


Fig 1: A test circuit to view the frequency spectrum of a voice. The 'scope shows the ideal voice spectrum.



Telecom institutions have studied voice and ear.

The result? Though I do not have a particularly low voice, most of its power is between 300 and 600Hz. The area between 800 and 2000Hz, three-quarters of the range, produced only 1/10th the scope deflection, ie is 20dB down; and that at the frequencies which produce most of the intelligibility!

The usual tricks of compressing and/or clipping (and filtering out harmonics above 2kHz generated by clipping) do not help; if overdone, they make a voice 'come from the cellar'. Most of the power in my SSB signal was concentrated within a few hundred Hertz below (on LSB) my carrier with virtually nothing in the important 800-2000Hz range. Not surprising that some would consider that part of 'my' channel clear and call CQ just 1kHz below my frequency!

THE REMEDY

F2ZI/PA0CX, WHO HAS DONE, and published, much research on affordable pano-

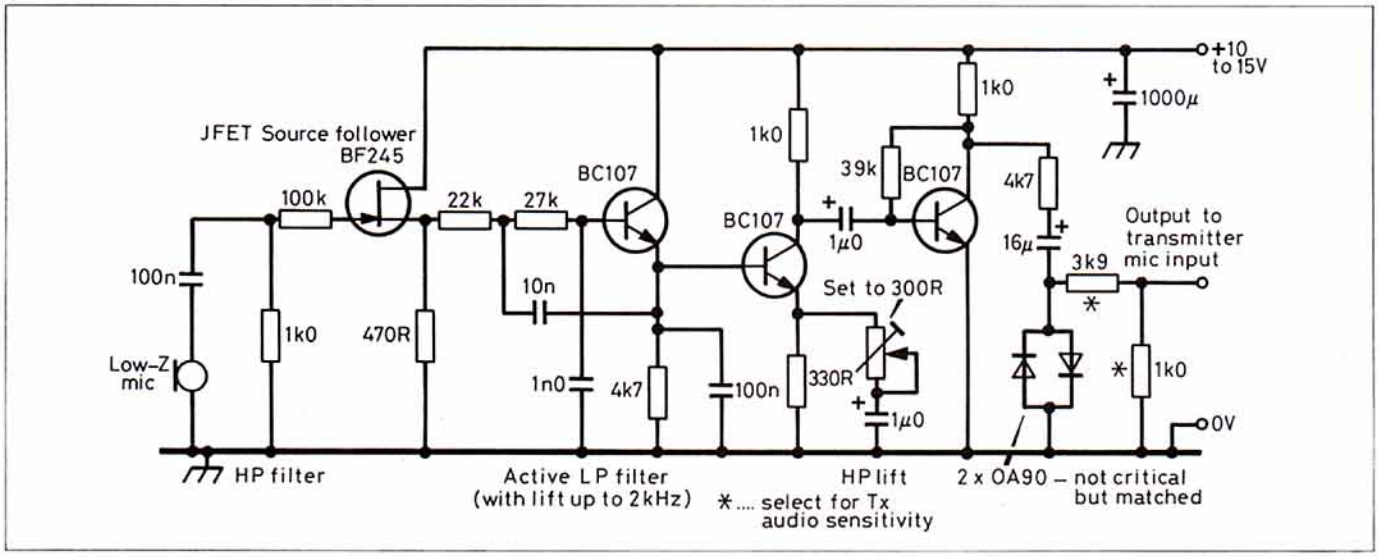


Fig 2: Custom-compensation for G0ACA's voice: in effect three 6dB/octave high pass sections plus an active 2kHz low pass filter.

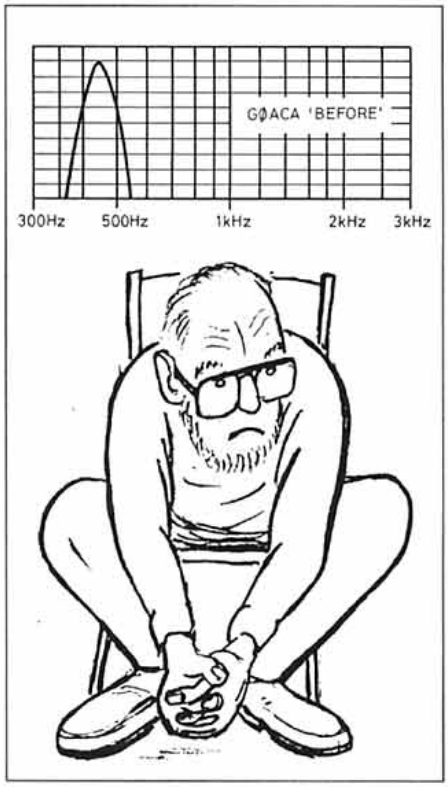
ramic receivers (and drew the caricatures for this article!) noted that the clearest sounding SSB signals appear as trapezia on his panoramic 'scope.

A different microphone? No, that does not help. Almost any properly matched microphone is flat from <500 to >2000Hz.

The response of the audio chain between microphone and modulator must be shaped so that peaks throughout the desired band are of roughly the same height. I thought of using a graphic equalizer, but found its one-octave segments too coarse. I did the job with the circuit of **Fig 2**. It has the effect of three 6dB/octave high-pass sections plus an active 2kHz low-pass filter. The latter is necessary as the applied 'top lift' does not stop at 2kHz. Breath hiss, with this extra amplification, might overload the transmitter circuitry between microphone input and SSB filter, thereby distorting the speech signal below 2kHz.

After all that, a bit of compression is applied. The pair of back-to-back germanium diodes do this. Germanium provides a more gentle onset of compression than silicon.

This circuit was designed to compensate *my* voice and the resistor values were rather critical. It would be coincidence if they would be appropriate for your voice.



Most voice power is between 300 and 600Hz.

THE RESULTS

PA0SE AND F2ZI, BOTH knowledgeable weekly 40m QSO partners, confirm that my signal now has more punch. But isn't all that a lot of work? Yes, but any check of SSB signals on 40 or 80 will show you that 80% of these stations do need this treatment – and so, perhaps, does yours.

Simply Silicon

by Paul Lovell, G3YMP

MITSUBISHI M67705M RF POWER MODULE

- Wide band: 430-470MHz
- High total efficiency >= 40% minimum
- High gain >= 25dB
- High output: Po >= 7W at V_{cc}=9.6V and P_{in}=20mW
- Small package: 45 x 12 x 6.3mm
- Applications as the output stage of UHF portable transceivers

ALTHOUGH THIS MONTH'S RF module may not be familiar to readers, it is quite likely that many of you will have used one! Mitsubishi are a major supplier of RF semiconductors for VHF and UHF handheld transceivers for both commercial and amateur radio use.

This months device, the M67705M, provides the ideal basis for a 3-watt output Novice FM transmitter, although full licensees may choose to drive the device to its full 7W RF output. Dimensions and terminal connections are shown in **Fig 1**, with **Fig 2** showing the internal circuit of the unit. Changes in the operating characteristics with frequency are detailed in **Fig 3** – note that the efficiency should be in excess of 40% on the amateur 70cm band.

Operation of the final PA is in class-AB and although this implies that SSB operation is possible, it is recommended that the output in this mode is kept below maximum to maintain linearity. The precise operating point may be determined by adjustment of the base bias voltage on terminal 3.

KEEPING COOL

AS WITH ALL RF POWER devices, adequate heatsinking is essential – the M67705M dissipates approximately 10 watts at full output.

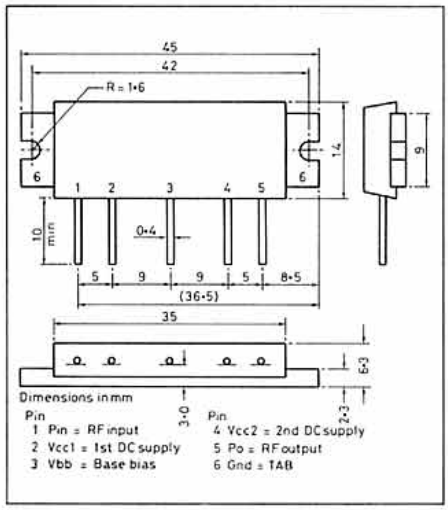


Fig 1: M67705M dimensions and terminal connections.

The distributors strongly recommend the use of thermal compound between the module's fin and its heat sink to achieve good heat conductance. Recommended maximum operating temperature is 60°C. When screwing the module to a heat sink, the recommended torque is 4.6kg/cm when using 3mm diameter screws.

The terminals should be soldered to the circuit board *after* screwing the module to the heat sink – this reduces strain on the pins. Mechanical shock, such as dropping the module on a hard surface, must be avoided as this can destroy the device.

STABILISED POWER SUPPLY RECOMMENDED

BOTH THE INPUT AND OUTPUT impedance of the M67705M are specified as 50Ω and terminals 2,3 and 4 should be by-passed to ground with low-impedance 'chip' capacitors. The manufacturers specify operation at supply voltages in the region of 9.6V and this module should *not* be used with an unstabilised 12V supply. In fact a fully stabilised supply is recommended, with RF output power being determined by either the supply voltage as shown in **Fig 4**, or the input drive (**Fig 5**).

Finally, a suggestion for a 432MHz 70cm transmitter. The Motorola MC13176D phase-locked loop (*RadCom* Jan '94) followed by one of the Mini-Circuits MAR series amplifiers (*RadCom* Dec '93), with an M67705M as the output stage. Would anyone like to give it a try?

MANUFACTURER'S DATA

MITSUBISHI RF POWER MODULES for mobile radio applications have high reliability and good performance, as they are designed and manufactured under strict quality control. To obtain good stability and electrical performance, it is necessary to ensure correct

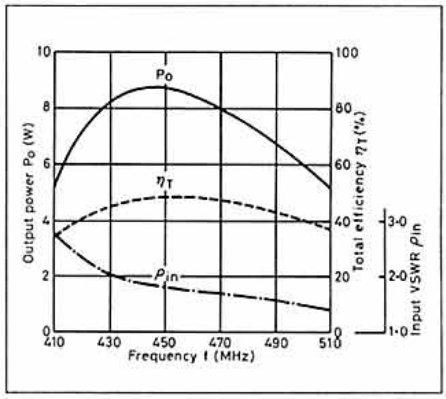


Fig 3: Variation of output power, total efficiency and input VSWR with frequency.

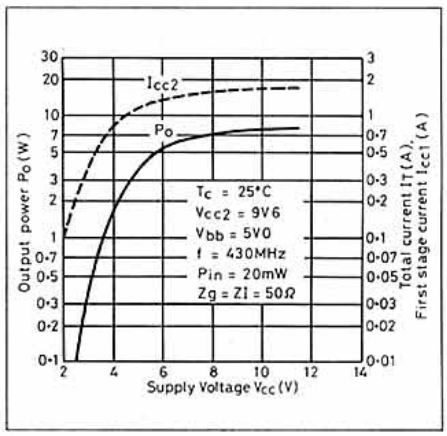


Fig 4: Change of output stage current and output power with supply voltage at 430MHz.

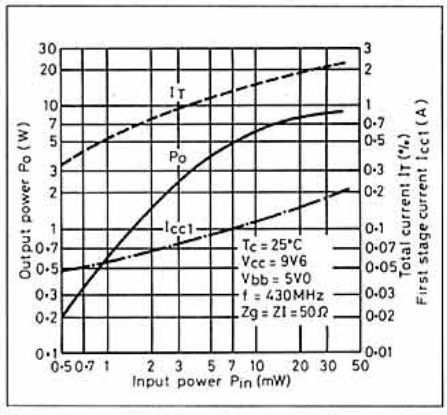


Fig 5: Input power plotted against output power and device current. This graph could prove useful for low power battery operation.

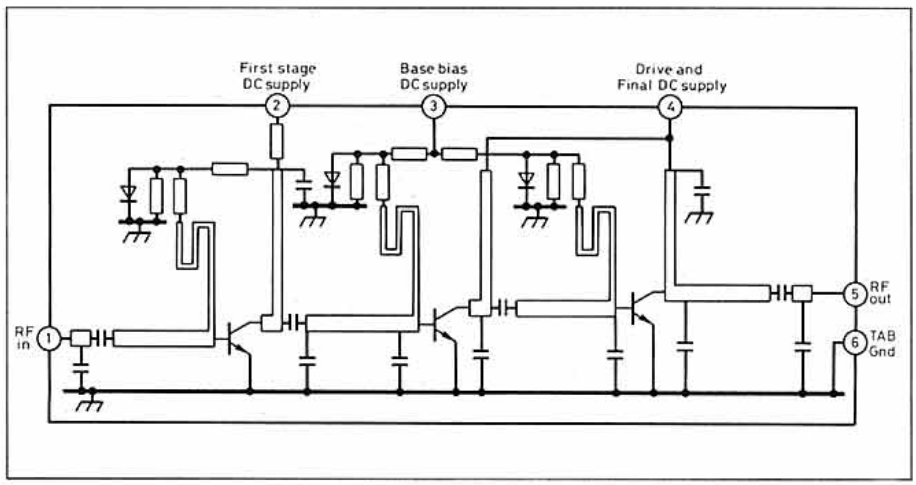


Fig 2: Equivalent circuit of the UHF power module. Note the stripline techniques used for interstage matching.

earthing of the module. As the fin is also the ground terminal, it should be securely bonded to the radio's RF ground.

Values of input and output VSWR indicated in the manufacturers specification are guaranteed when the input and output leads are straight and connected to a 50Ω load less than 10mm from the respective terminal.

If the device is used under different conditions from these, parameters such as output power and efficiency may be degraded unless suitable impedance matching circuits are added.

The M67705M has three terminals for DC power. If any of these terminals are combined without RF chokes or if each terminal is not by-passed with a suitable capacitor, parasitic oscillations may occasionally occur. Therefore, the DC power supply terminals should have series RF chokes and decoupling capacitors. The test configuration for this device shows 22µF [presumably tantalum] in parallel with 2200pF UHF by-pass capacitor.

OPERATING CHARACTERISTICS

ABSOLUTE MAXIMUM RATINGS at T_o=25°C unless otherwise stated

Symbol	Parameter	Conditions	Ratings	Unit
V_{cc}	DC Supply Voltage	V_{BB}<=5V	13	V
V_{bb}	Base DC bias voltage	V_{cc}<=9.6V	6	V
I_{cc}	Total Current		4	A
Input Power	Z_G=Z_L=50Ω	40	mW	
Output Power	Z_G=Z_L=50Ω	10	W	
T_o (op)	Operation case temperature		-30 to 110°C	

ELECTRICAL CHARACTERISTICS at T_o=25°C unless otherwise stated
P_{in}=20mW, V_{BB}=5V, V_{cc}=9.6V, Z_G=Z_L=50Ω

Symbol	Parameter	Limits		Unit
		Min	Max	
f	Frequency Range	430	470	MHz
P_o	Output Power	7		W
ηT	Total Efficiency	40		%
$2f_o$	2nd harmonic		-25	dB
$3f_o$	3rd harmonic		-30	dB
$VSWR_{in}$	Input VSWR		2.5	-

Load VSWR tolerance of 20:1 (All phase) for 2 seconds at:
V_{cc}=9.6V, V_{BB}=5V, P_o=7W (P_{in} controlled), Z_G=50Ω

AVAILABILITY

MAINLINE ELECTRONICS of Leicester have kindly arranged to make the Mitsubishi M67705M available to *RadCom* readers at a **specially reduced price** until the end of June 1994.

The fully inclusive price is £39.95, a saving of £18.09 on the normal cost of single units. Should new stocks have to be ordered, the price will be honoured for all orders up to the end of June.

It is most important that you mention *RadCom* when ordering, to qualify for the discount. Mainline Electronics, Dept RC, PO Box 235, Leicester LE2 9SH; tel 0533 777648/780891.

The M67705M is one of a number of such modules available from the company. These cover a number of microwave frequencies as well as all of the amateur VHF and UHF bands.

NOTE: Device characteristics and application notes in *Simply Silicon* are compiled from manufacturers' published data. Circuit diagrams are included for experimental purposes only, and have not been proven by *Radio Communication*. Transmitting equipment must be operated in accordance with national regulations. All data is copyright of the device manufacturer.

RADCOM Helplines FOR MEMBERS

● Mr D A Jowett, G8FJR, is trying to trace the present address of **Hoka Electronics (UK)**, who used to trade from Bury Road, Shillington, Hitchin. They marketed amateur communications software and peripherals and appeared to be a subsidiary of a Dutch company, Hoka Electronics, Oude Pekela, Holland. If anyone has any knowledge of Hoka Electronics or what has happened to them, write to G8FJR who is QTHR.

● John, G3IJS, wants a circuit diagram, service manual or any information on a **Yaesu UHF mobile radio** type FTC-4610. Contact John, G3IJS by tel: 0243 861578 or write to him QTHR.

● Mr K Sundararajan, a beginner in amateur radio, needs a circuit diagram and/or manual for an HF Tx and Rx made by **Rees Mace Marine** Ltd, England. Tx details: Adm Patt: 100337; Tx HF; Ser No RMM 2468; year 1954. Rx details; Adm Patt: No 100334; Rx MF/HF; Ser No RMM4437; year 1954. This equipment does not have a power supply. If anyone can help, please contact him at: Sharp Industrial Training Institute, Sitra Road, Kalappatti (PO) Coimbatore - 641 035, South India.

● KA6CHP, wants **Tube (valve) sockets**; one each - Type 'T', as used on the AZ11, EF11, etc and a Type 'V' as used on the AB2 tube, for use on a Military Surplus TV7/B tube checker to carry out restoration work. Also a copy of a tube manual covering 'Types of the 30's thru 60's', such as published by Mullard, Philips or Telefunken. If you are able to help, please write to Jim Green, KA6CHP, Box 1173, South Gate, CA 90280, USA.

● Roland, G4NGW, wants a circuit diagram which shows component values for a **KW1000 Linear Amplifier**, twin 572B valves. All costs will be reimbursed. Any information to Roland, G4NGW, tel: 0702 710000 (any time) or QTHR.

● Dr Ivan Sova, UN2PI, would greatly appreciate regular **contact/schedules with other doctors of medicine**, particularly in the UK. If anyone is interested, contact him at: PO Box 129, Karaganda 470055, Kazakhstan or initally contact Ray, G3MTL on 0942 818940 evenings or 0706 229909 (weekdays) or Fax: 0706 221144.

● Can anyone shed any light on the acoustic illusion known as **'Shepherd Tone'** or **'Continuously rising Tone'**. It consists of an audible note which the brain interprets as a note steadily rising in frequency. It is somehow achieved by mixing a steady fundamental with its harmonics which then change - but which harmonics and how? If you can help please write to Stephen Dyke, G3ROZ, QTHR.

● Ian, G3JQL, wants to acquire an original set of **PA knobs** for the **B2 Tx**, even the brass skirts from broken knobs would do! If able to help please contact Ian on 091 386 1116 or write QTHR.

TECHNICAL UPDATE

The G3ROO Amateur Band Synthesizer, December 1993

Ian Keyser, G3ROO, has written to inform us that capacitor Cx is connected in parallel with oscillator coil L1, shown in Fig 2, on some of the bands. The bands for which Cx is required, together with the value, is shown in Table 1 on page 35, of the December 93 *RadCom*.

Top Band on the G3TSO 80m Transceiver, December 1993

A letter from Mr A Turbutt, G8ZDO, notes that transistor TR10 on Fig 1 should be a BC327 not a BC237 as shown. It is correct in Fig 6 (*Radcom*, July 1991, page 31) which described the original design.

The Tripus, *Novice Notebook*, February 1994

With reference to the Tripus meter tester instructions in the second column of February's *Novice Notebook*; Dick Biddulph, G8DPS, has pointed out that the movement of the meter under test should be 200µA FSD (full scale deflection) not 200mA as shown.

HOT NEWS FROM SISKIN...

GTOR HAS ARRIVED! ... If you are an existing HF AMTOR/PacTor operator or perhaps contemplating HF we've an exciting new development which will revolutionise HF Data communications! If you thought the recent RadCom feature about Clover was interesting then GTOR will further impress you and at less than half the price too! The new mode is a development by Kantronics which significantly outperforms PacTor and is comparable (if not better!) than Clover. Unfortunately at the time of going to press prices and update details were sketchy but by the time you read this we should have GTOR on the shelf. The option may be installed to any KAM PLUS or original KAM fitted with the recent expansion board. Please call for up to the minute details.

PACTOR PTCplus ... By the time you read this we should be receiving shipments of the new PCTplus from Germany. This new 68000 series based unit clocks at an incredible 14.7456MHz offering enhanced PACTOR from the inventors of the mode, AMTOR modes ARQ, FEC and L, RTTY and full CW Transmit and receive. Other features include a much larger on-board mailbox facility (32K to 256Kbytes), real time clock and the promise of WA8DED compatible Host Mode for applications such as FBB mailboxes! **Price TBA.**

GATEWAY FIRMWARE FROM AEA ... In fact this update for the PK-232MBX, PK-900 and DSP units has been available from December 1993 but we decided to let it settle down a little before releasing it. The update offers nothing particularly spectacular for the PK-232 (basically just a non-conventional node of sorts and some minor AMTOR/PACTOR listen features) but for the PK-900 and DSP units does now support TRUE dual port multi-mode Gateway facilities (I.E. VHF packet in, HF PACTOR/AMTOR OUT!). **Available now — £39.95.**

PK/KA GOLD VERSION 9.00 (at last!) 6 months after it was promised the V9.00 update has arrived and the initial reaction has been ... WOW, WELL WORTH THE WAIT. The new features are quite stunning including support for CD roms such as the BuckMaster callbook, Full ANSI Graphics support, even more Microsoft Windows 3.1 compatibility plus lots more. If you own an AEA or Kantronics unit and have not yet sampled this program please send an SAE and diskette for a free sample! **KPC-3/PK-88 version £59.95, KAM/PK-232 £69.95.**

BUT WHAT ABOUT US NEWCOMERS? ... Sorry, we didn't mean to leave until last. If you are a regular reader of RadCom you've probably already spotted the fact that we'll try very hard to make your introduction to digital modes such as Packet, AMTOR and PACTOR etc. as painless as possible. In most cases we'll provide you with the cables READY MADE for both your computer and transceiver plus software and access to our out of hours support line at no extra charge! Prices start at around £69.95 for PC users so why not call or write for a catalogue. We support just about every popular home computer by the way, not just PCs!

TIP FOR THE MONTH ... *Are you fed up with trying to log onto the local Packet BBS to list the mail at 6.30 p.m. when everyone and his dog gets on the channel?* Here's a neat solution: Many popular packet programs support *SCRIPT* files which are not as complicated as they sound. You simply write a 3 or 4 line text file that tells your TNC to log on to the BBS at say 4.30 a.m. in the morning (when the frequency is clear), LIST the mail, SAVE it to disk and DISCONNECT. You can then view the mail list at your leisure with a simple text viewer "off line". Please consider giving it a bash, it really is a super way to get bang up to date with what's happening in the world of Amateur Radio, Satellite TV, Computing and even the odd recipe, without slaving over a hot keyboard! Next month we'll tell you how to replace yourself with a Maplin "build-it yourself Robot" enabling you to spend more time with the XYL and harmonics!

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QRP

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

THE ANNUAL HANDBOOK of the G QRP Club contains an innocent little entry explaining how to be enrolled as a QRP master. The QRP Master is presented to any member who holds awards for contacts with: 60 members, 75 DXCC countries and 20 countries with two-way QRP. QRP being defined as not more than 5W output (CW) or 10W PEP (SSB). Just two lines, but what a lot of work it takes to achieve the QRP Master status. A plaque is given to every QRP Master but less than 80 have been presentedso far. The good news is that many of those achieving Master status have done so using average equipment, sometimes from poor locations.

One such recipient is Michael James, G3GVY, and I quote extracts from his letter after he had been presented with his plaque: "I was QRV from 1950 to 1952 and then QRT for 37 years. Reading about the G QRP Club encouraged me to return to the sport towards the end of 1988. I became 'airborne' with a Howes QRP kit at the end of March 1989. I think I squeezed about 35 DXCC countries with 3W from my CTX40 on 7MHz with a poor little antenna in my 16ft garden. The QRP Master seemed impossible. Then, in March 1992 my *RadCom* arrived much earlier than usual, and Vic, G8QM, was selling his Argonaut 509 (a dedicated QRP Transceiver). Could I afford it? I thought about it, slept on it, and later the next day I rang to see if he still had it. He had! I don't think I have seen an Argonaut 509 advertised before or since and when I drove to Vic's QTH, he told me lots of people had been after the rig.

"I was soon on 14MHz (for the first time in my radio amateur life) and notching up lots of new DXCC countries. Getting up to 60 wasn't much trouble. but getting from there to 75 seemed quite beyond reach. However as the months went by ever so slowly the needed countries came in. This QRP is real magic! I suppose I put in some pretty hard work, but making the QSOs was really child's play compared with getting the QSL cards. I think I worked 85 DXCC countries before I finally got my 75th card. My sincere thanks go to all who keep the G QRP Club going and all the operators who had the patience to devote their undivided attention to me . . . . and to tidy up the transactions by sending a QSL card. In four fun-filled years, I have exchanged many letters and made many friends with QRP and my old straight key."

NEW CW OPERATORS

STILL ON THE SUBJECT of awards I make no excuse in commending the G QRP Club's CW Novice Award to those recently licensed. This award is to encourage the continuing use of CW after the Morse test has been passed. It is so easy, and sadly common, for the use of the key to lapse after the licence has been achieved. The award is open to any class of licence that permits the use of CW and can be gained during the first year the licence is held.

The CW Novice Award is available to any radio amateur, who during the first 12 months of holding a licence contacts 50 different stations while using CW. Send a log of the 50 contacts, verified by one other licensed radio amateur, together with three first class stamps or three IRCs. A Class A Award is available if the applicant encloses a signed statement that when making the contacts the power did not exceed 5 watts RF output. For the Class B Award any power may be used.

Applications for the CW Novice Award may be made to The G QRP Club Awards Manager, Mr A D Taylor, G8PG, 37 Pickerill Road, Greasby, Merseyside L49 3ND.

YEOVIL QRP FUNRUN

IN CONJUNCTION WITH the 10th Yeovil QRP Convention on 8 May, the Yeovil Amateur Radio Club is organising their 'FunRun' Contest. There are three Club FunRun Stations: GB2LOW, G3CQR and G3GC.

The event runs from Monday 2 May to Friday 6 May, 8 – 10 pm UK clock time on 3560kHz and 7030kHz, plus or minus 10kHz. All contacts must be between QRP stations, maximum 5 watts output. Call 'CQ FR'. Stations may be worked only once on each band during the FunRun but the FunRun Stations (all operating each evening randomly for one hour on each band) may be worked once each evening on each band.

The QSO exchange is RST, Serial Number, Output Power and G QRP Number. The three-figure serial number should start at a random number of your choice not less than 100 and must be incremented by one for each QSO. The three FunRun stations listed above will all commence at 001 in the usual way. Each QSO with another QRP station scores 10 points, each QSO with G3CQR or G3GC scores 20 points, each with GB2LOW scores 50 points. The score for each band will be the total of the four best evenings. The overall score will be the sum of these two. All duplicates must be marked and no points claimed. Points will be deducted for unmarked duplicates at twice the QSO value.

Separate log sheets for each band, with sub-totals for each evening, preferably in RSGB format and a separate signed RSGB style cover sheet stating output power, rig and antenna used must be submitted. Bring the entries to the Convention by 1pm on Sunday 8th May or make postal entries to G3CQR, 9 Quarr Drive, Sherborne, Dorset DT9 4HZ. Certificates for the highest score on each band, the highest overall score and the station consistently using the lowest power will be awarded. Separate certificates will be awarded to the top postal entries.

The Yeovil QRP Convention is on 8 May at the Preston Centre, Yeovil, admission £1.50. The doors open at 9am with GB2LOW offering talk-in on S22. The convention includes a range of QRP-oriented trade stands and a programme of lectures.

QRP BIKE FUN

THE SECOND ANNUAL 'QRP-hamming Bicycle Tour' along the USA's Pacific Crest Bicycle Trail will take place in August or September 1994. The week-long trip will begin at Crescent Lake, Oregon and end near Mount Shasta, California. QRP operators who have bicycle touring experience are invited to join the group. There are no fees. The group will average 50 – 60 miles per day in hilly and mountainous terrain, and camp and cook in camp-grounds. Last year KD6UKC, N0DA, AA7QZ and KD6JUI made the trip from southern Washington State to Crescent Lake. QRP equipment from MFJ and Oak Hills Research was used on 40, 20 and 15 metres, and several of the cyclists used solar panels to charge up batteries during the ride.

A monthly newsletter will go to those interested in going on the trip, and an exact date will be announced later. For more information write to Bil Paul, KD6JUI, PO Box 5183, San Jose, CA 95150-5183, USA, or telephone (0101) 415-345-7021.

Manuela Groger, DL2MGP, and her own home-made 2 watt QRP transceiver built in a tool box.

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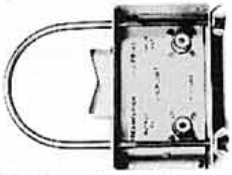

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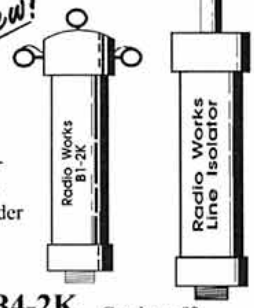

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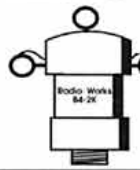

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EMC

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THIS MONTH THE spotlight falls on PIR (Passive Infra-Red) operated security lights, some of which have little immunity to RF. The designers of some of these products do not appear to have been aware of the need for RF immunity or they may have thought that it didn't matter if the light comes on occasionally due to a passing police car or taxi. It certainly does matter if your neighbour's security light is on continuously whenever you are transmitting. They might even have a model with a buzzer indoors to let them know when the light is triggered! When they find out what is triggering it, you will probably get the blame even if the problem is caused by a design fault in the product.

EMC Committee member Dave Lauder G0SNO, has been testing some of the many different models of PIR security light which are on the market. He has also been in contact with several manufacturers of such lights, Smiths Industries Environmental Controls Co Ltd, Tasley Ltd and OML (suppliers of the 'Synapse' lights sold by B&Q).

At 144MHz, G0SNO has a problem with his neighbour's PIR lighting sensor, a Smiths model DL05, installed in July 1992. It is triggered at a distance of 20m by under 10W on 144MHz into a 5-element 'ZL special' antenna or at a distance of 5m by 1W into a halo. This suggests that the immunity is under 2V/m. It is far from adequate for use near an amateur radio transmitter and would probably need improvement to meet the generic immunity standard which will be required for such equipment from 1 January 1996. Another Smiths model is the DL01 (upper photo). Dave reports that one of these near him has a similar level of immunity at 144MHz to the DL05.

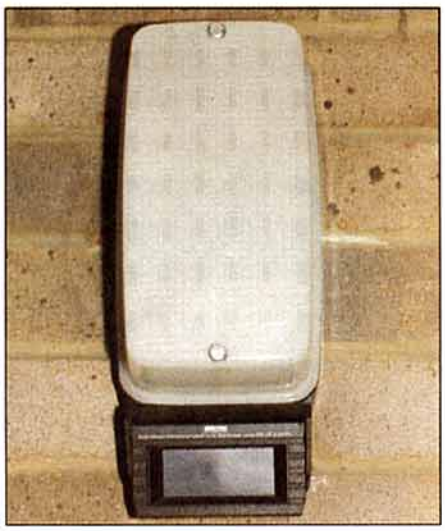
The Smiths model DL05 consists of an indoor switch unit and an outdoor sensor (lower photo) with a four core low voltage cable connecting the two units. Extra outdoor sensors (model DL09) can be be added and are supplied with a leaflet which states: "Note: this sensor can also respond to electrical interference caused by radio transmissions (taxis etc), interference on the house wiring and lightning discharge. They are infrequent and should not be confused with a malfunction of the sensor product. In this regard the unit must be earthed. In the event of a problem please ring our service department 081-450 8944 ext 202 or 262 in the first instance because we are anxious to assist with field problems."

So Dave rang Smiths' Service Department for assistance with his RF 'field' problem and was told that they could only offer a trade-in or a discount on a new model. He sent a fax to the Technical Director who replied: "We no longer manufacture the DL05 but we have replaced this with an SL055 which as well as offering a high level of immunity to interference, provides two separate zones and is easier to install. The connection between the sensors and the controller is by an unmarked line pair. We have constructed our own facilities for EMC measurements at Cricklewood. We are liaising with ERA in our program to achieve compliance on all products."

Mike Whitaker, G3IGW, of Halifax has given us a good report on HF immunity of his three new Smiths PIR operated halogen floodlights. He says that they are Smiths model SL032 which were fitted in Autumn 1993 and that they are immune to his transmissions of up to 400W on 7, 14 and 28MHz. He fitted them because of a problem with his old PIR security lights which were triggered by RF.

The Tasley 'Weathermaster' model is a twin spotlight with built-in PIR sensor which is sold by the Do It All DIY chain and Argos shops. G0SNO tested one and found that at 144MHz, its immunity is a good deal better than the Synapse range (see below) and the Smiths DL01 and DL05 although it can still be triggered by 10W ERP at a distance of 1.8m (a theoretical field strength of 12V/m). It is also fairly immune at HF as it is not triggered at a distance of 5m from a dipole fed by 100W at 14MHz. If the immunity is not sufficient for a particular situation, there appears to be no way of opening the sealed plastic case to modify the electronics. Dave wrote to Tasley Ltd of Leeds enclosing a draft of this article and asking what they would advise in cases where the immunity was insufficient. He received no reply.

Dave Collins, G4ZYF, has a problem on all HF bands from 3.5 to 28MHz with three PIR lights made by Everspring Electronics Ltd. Two are 'Fox' brand sold by Maplin (Stock No GK05F) and the third is an Everspring ES34 which is sold under the brand name 'Owl Knight' (Registered Trade Mark) and also by Maplin as 'Outdoor PIR Light Control Device', BZ18U. G4ZYF reports that all have poor immunity to triggering by RF and in some cases can be triggered by as little as 3W. He has tried screening them and putting ferrite rings on the mains cables but without success. He wrote to Everspring Electronics Ltd about this problem but got no reply. He did manage to get a circuit diagram from Maplin however and G0SNO is now investigating.



Smith's DL01 sensor light.

Sensor for Smith's DL05 PIR light switch.

G0KGU had a problem with his neighbour's 'Harry Moss' PIR operated twin security light which was triggered when he used 100W on any band from 3.5 to 28MHz into a trapped dipole or Cushcraft R5 vertical 30ft away. However as he had originally fitted the system for his neighbour, with whom he is on good terms, there was no problem with fitting ferrite rings. As all good amateurs should, G0KGU took out *The Radio Amateur's Guide to EMC* and referred to page 110. Taping two ferrite rings together and winding the mains flex as per the diagram, he installed the choke as near the light as possible. Doing tests proved that the light still came on but took rather longer to do so. Doubling up on the ferrite rings eliminated the problem and he can now use 150W without lighting up the neighbourhood. Interestingly enough, this is the only PIR case we have heard of where ferrite rings were effective.

We have reports from Mr R F Redhead, G4FXG, and Fred Robins, G3GVM, who both have 'Synapse' brand security lights sold by the B&Q DIY chain. Some models are also marked 'Original Marketing Services'. G4FXG reports that 10W on 144MHz into a 'Slim Jim' antenna 4.5m from the light switches it on. G3GVM reports that he can trigger his light from a distance of 3m with 1W from a 144MHz hand-held transceiver (a theoretical field strength of 2.3V/m). These lights can also be triggered by mains borne spikes, a fact which is mentioned in the instruction leaflet.

G0SNO tested a Synapse SN3000A twin spotlight and found that it had poor immunity at 144MHz and also at HF, being triggered by under 10W on 14MHz at a distance of 5m. These lights are distributed in UK by OML Ltd, of Unit 3, Epsom Business Park, Kiln Lane, Epsom, Surrey KT17 1JF; tel 0372 749275.

G0SNO devised some modifications for an SN3000A and the modified light now has good RF immunity both at HF and at VHF. It has been tested at my QTH right underneath a 3.5MHz dipole fed by 400W of CW and it was not triggered. Dave sent details to the Service/Quality Engineer at OML who wrote and thanked him for the information and said that he had just sent a copy to another radio amateur who has three Synapse lights which were triggered by RF. OML then supplied Dave with two customer returned SN2000-01 models for testing.

These units do not have a built-in light but are designed for controlling separate floodlights. The principle of the modifications which follow could be applied to many other brands provided they are not sealed and can be dismantled.

HOW THEY WORK

Fig 1 shows part of the Synapse SN2000-01 circuit. IR1 is a dual infra-red detector with built-in FET buffer amplifier. Any variation in the relative amounts of infra-red falling on each half of its detector, causes a fraction of a millivolt change in the voltage on the 'S' (source) pin. This is amplified by a two-stage amplifier with a total voltage gain of up to 25,000 at maximum sensitivity and a bandwidth of about 1Hz.

With such high gain, RF getting into the amplifier stages, the infra-red detector or even into the supply voltage regulator can alter the DC conditions slightly. Any *changes* in RF field, such as keying a carrier on OR off can trigger the light. Like many others, this model uses a DC supply which is *not* isolated from the mains, so everything on the circuit board is 'live' and must not be touched when the mains is connected. A 78L08 regulator provides an 8 volt DC supply for ICs U1 and U2 which are LM2902 or LM324 quad op-amps.

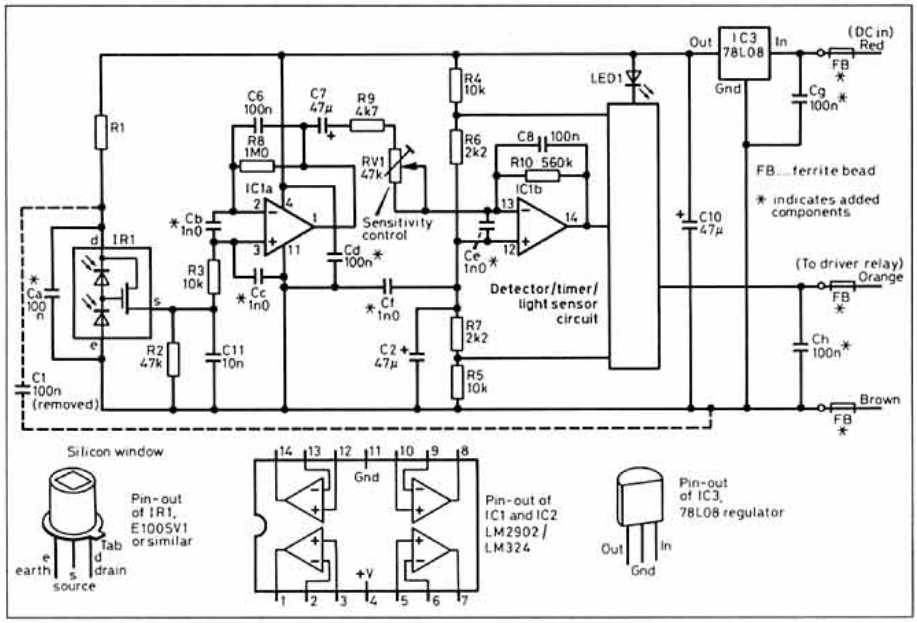


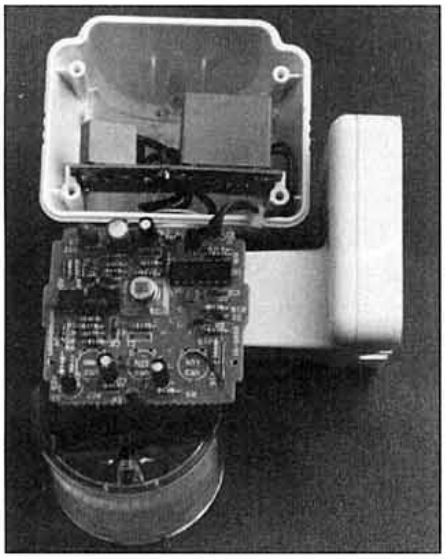
Fig 1: Modification to improve immunity of 'synapse' SN2000-01 PIR light controller.

IMPROVING IMMUNITY

These lights are normally wired permanently into the mains supply, so before doing any modifications, it is essential to switch off the mains at the main switch and disconnect the light completely. Remove the cover and circuit board as shown in the photo. Remove C1 (100nF) from the PCB as it is connected via a 130mm long loop of ground track which can act as an unwanted receiving antenna. Reconnect C1 directly across the d and e pins of detector IR1 as shown by Ca in Fig 1.

Connect two 1nF capacitors as follows: Cb pins 2-3, Cc pin 3-11. In some cases, particularly at HF, this may be all that is needed. For a greater improvement in immunity, connect a 100nF decoupling capacitor (Cd) between pins 4 and 11 of U1, close to the IC and two more 1nF capacitors, Ce pin 13-12 and Cf pin 12-11. A further improvement is possible, particularly at VHF, by adding two more 100nF ceramic capacitors Cg and Ch and threading a ferrite bead on each of the three wires leading to the PCB.

For the Synapse SN3000A twin spot model, everything is on one compact PCB and modifications are simpler. All that is needed is to add a 1nF capacitor between pins 11-12 and another between pins 12-13 of the LM324 IC which is marked U1 on the PCB. The infra-red detector IR1 also requires a 100nF decoupling capacitor directly across its supply (d) and earth (e) pins.



Synapse SN2000 PIR light controller dismantled.

Many other makes of PIR light use standard op amps such as the LM324/LP324. First, follow the track from the centre (s) pin of the detector to ascertain which of the amplifiers in the package is being used as the first stage. Connect a 1nF ceramic capacitor from the non-inverting (+) input to the inverting (-) input of the op-amp and another from the (+) input to the negative supply pin. Finally, fit a 100nF capacitor between the d and e pins of the detector as above.

Paul Schon-Pedersen, OZ3LQ, writes with information on similar modifications which he has made to his 'GRIPO' PIR light which was triggered by 25W on 3.5MHz and 70W on 7MHz. Having had no success with external ferrites, chokes and filters, he turned his attention to the PIR sensor containing a special IC with two op-amps. Adding a 10kΩ resistor in series with the (+) input of the op-amp together with a 10nF capacitor between the (+) and (–) inputs cured the problem.

ON A LIGHTER NOTE

Recently, we heard of a police officer in Leicestershire who was called to a house where a suspect had been reported in the back garden. He took advantage of the fact that with the mobile radio in his patrol car acting as a repeater, he could use his hand-held transceiver to cause nearby security lights to switch on. This forced the suspect in the garden to beat a hasty retreat over the back wall where the officer was waiting for him!

IARU EMC LINK

ON A RECENT VISIT to London, Christian Verholt, OZ8CY, the Chairman of the IARU Region 1 EMC Working Group dropped in at my QTH to meet members of the RSGB EMC Committee. The meeting turned out to be very productive and positive with a number of issues being discussed ranging from general EMC standards for radio equipment and the possible product-specific standards for amateur radio equipment, to telephone immunity in the context of the TTE (Telecommunication Terminal Directive). Immunity of existing telephones and of ISDN (Integrated Services Digital Network) terminals was also discussed.

The following day, Christian and I met up with David Wardlaw, VK3ADW, Director of IARU Region 3 to discuss the latest European EMC developments. David is particularly interested in EMC matters and is keeping a watching brief on the situation in Europe.

MAKING INDUSTRY AWARE

THE DTI EMC NATIONAL Awareness Campaign which runs until 31 March 1995 is designed to draw the attention of industry to the legal implications of the EMC Directive and the routes available for achieving compliance. They are doing this in the following ways:

- EMC Helpline (061-954 0954)
- EMC Clubs – where companies can get together to talk about EMC
- EMC seminars, courses
- EMC Workbook

A TOUCHY SUBJECT

GW4BYA IS CONCERNED at the interference being caused to medium wave broadcast and the amateur radio bands particularly 1.8 and 3.5MHz by his recently acquired 'Touch Lights'. These are table lamps which are switched on and off by touching a plate at the base. GW4BYA reports that they generate interference even when plugged into the mains but not actually alight. The brochure from Carramar Lighting Pty of South Australia (trading as Touch Lights) boasts among other features:

- No wearing parts
- Built-in radio suppression
- Ideal for mothers as a feeding light
- Not operated by insects

This is not an April fool but something which needs further investigation. Any reports to me QTHR please.

CONTEST CLASSIFIED

All rules should be read in conjunction with the General Rules published in *Contest News* January 1993

HF RULES

SUMMER 1.8MHZ 1994

1. The General Rules for RSGB HF Contests (*RadCom* Jan 1994) apply.

2. When: 2100UTC Saturday 25 June - 0100UTC Sunday 26 June 1994.

3. Sections: (a) UK **(b)** Overseas (including Eire). Single- or multi-operator entries will be accepted in both sections.

4. Frequency & Mode: 1820 - 1870kHz, CW only.

5. Exchange: RST + serial number commencing with 001. UK stations must also send their County Code (see *RadCom* Jan 1994).

6. Scoring:

Overseas stations work only UK stations for points.

Section (a) Three points per QSO plus a bonus of five points for (i) the first QSO with each UK County worked and (ii) the first QSO with each Country (outside the UK) worked.

Section (b) Three points per QSO plus a bonus of five points for the first QSO with each UK County worked.

7. Address and closing date for logs: RSGB HF Contests Committee, c/o S V Knowles G3UFY, 77 Bensham Manor Road, Thornton Heath, Surrey CR7 7AF, England. Send within 15 days of end of contest.

8. Awards: Certificates of Merit to the winner and runner-up in each section.

LOW POWER FIELD DAY 1994

1. The General Rules for RSGB HF Contests (*RadCom* Jan 1994) apply.

2. When: Sunday 17 July 1994, 0900-1200 and 1300-1600UTC.

3. Sections: (A) 10W RF output maximum. **(B)** 3W RF output maximum. Single- or multi-operator entries will be accepted in both sections.

4. Mode & Frequencies: 3510-3560kHz and 7010-7040kHz CW only. Both bands may be used during each session. Any station (including Overseas) may be contacted once on each band for points.

5. Special conditions:

(i) The power for all parts of the station must be derived from batteries, pre-charged accumulators or natural sources such as solar cells or wind driven generators. Float charging accumulators from petrol, gas or diesel driven generators is not permitted.

(ii) The transmitter or outboard PA must not be capable of RF output power in excess of 15W.

(iii) Antennas must not exceed 35 feet (10.66m) above ground and may have no more than 2 elevated supports.

(iv) The station must be 'Portable' (Rule 10, General Rules).

6. Exchange: RST, serial number, county code (*RadCom* Jan 1994) and RF output power in Watts. Serial numbers commence at 001 and continue through both sessions. Output power should be expressed as one or two digits plus 'W' in place of the decimal point, eg '10W', '1W', '1W5' (1.5W), '0W1' (100mW). Participants using more than 10W may send 'QRO' instead (QRO stations are not eligible to enter the contest but are welcome to 'give away points').

7. Scoring: 15 points for each QSO with a QRP Portable or Mobile station; 10 points for a QRP Fixed station; 5 points for all other QSOs. For the purposes of scoring, 'QRP stations' are those using 10W RF output or less.

8. Address for entries and **Posting:** As in General Rules.

9. Awards: The *Houston-Fergus* and *Southgate* Trophies to the winners of sections A and B respectively. Certificates to the first three entrants in each section and to the QRP Fixed station submitting a checklog and giving the most points to entrants.

2ND 1.8MHZ CONTEST 1993

It's a clean sweep! Congratulations to Ron Stone, GW3YDX who won this event making a total of 3 wins in RSGB events on the band in 1993. However, the opposition made it a close run thing. Just look at the tally of bonuses turned in by both Peter Miles, G3KDB and Fraser Robertson, G4BJM. The leading entrants worked some excellent DX, including W4 and 5 call areas, Canada and Oman. Just as importantly, all entrants seem to have enjoyed themselves judging by the positive comments included on many cover sheets. In the overseas section, the EIs were oh-so-close with Don Walmsley, EI4HM just pipping Michael Mc Loughlin, EI6GF to the post. I was disappointed to see only one SWL entry - but thanks to Jean-Jacques, ONL-383 for his efforts. Logging standards varied enormously, from entries where great care had obviously been taken to those that, if the letter of the law had been strictly applied, could have been heavily penalised for excessive errors. A high dipole, 80ft plus is a must for serious contenders, though lower systems can still prove competitive. Noise generated from power lines can be troublesome as commented on by G3SJJ who suffered an S9 plus 20 noise as snow started to fall. Thanks to all entrants for participating in the fun and congratulations to the winners.

VE3/G4VXE

Posn		Station	QSOs	Bonus	Score
1	*+	GW3YDX	212	67	969
2	*	G3KDB	198	72	950
3	*	G4BJM	191	69	917
4		G4BWP	196	62	895
5		G3ZEM	183	66	863
6		G3OZF	177	64	846
7		G0IVZ	154	66	781
8		GW4IOI	151	60	749
9		G4BUO	143	57	713
10		G4IFB	143	57	712
11		G3WGV	144	58	710
12		G3UFY	130	58	680
13		G3VYI	136	54	669
14		G3SQX	128	58	668
15		G3PDL	128	53	643
16		G3UUV	121	55	632
17		G4KGG	119	49	599
18		G4OFR	115	53	598
19		G3SJJ	120	50	596
20		G3RSD	113	49	584
21		G3HEJ	110	49	574
22		G0ORH	110	50	567
23		G4ERW	104	50	561
24		G4RCG	101	47	535
25		G2HLU	91	48	513
26		G3YAJ	89	49	512
27		G4TLS	92	48	510
28		G2MJ	91	46	500
29		G3WRR/P	93	43	494
30		G0OPB	83	45	464
31		G3VRY	82	43	461
32		G3KNU	79	46	458
33		G4CZB	82	40	446
34		G3BPM	78	41	436
35		G3KKQ	76	39	417
36		GM3CFS	70	40	410
37		G3XTT	64	40	392
38		G0ADH	69	34	376
=		G3ZBU	64	38	376
40		G3FVW	57	35	346
41		G3GMS	54	30	312
42		G3BGM	52	31	303
43		G3HQX	52	31	302
44		G3ZGC	51	29	298
45		G3GMM	49	30	294
46		G0LKX	47	30	289
47		G3HKO	45	33	286
48		GM3KHH	76	42	270
49		G3ZDD	40	27	259
50		G3VNG	47	30	256
51		G4BJQ	43	26	252
52		G4DDX	40	28	251
53		GM3UM	37	24	230
54		G4JSN	35	25	215
55		GW0KZW	36	25	193
56		G3ILO	17	16	131

OVERSEAS

1	EI4HM	74	42	432
2	EI6GF	75	41	428
3	DF3OL	56	34	338
4	OK1FPS	49	29	284
5	DJ9WH	32	23	211
6	DL0EKO	33	22	203
7	DL5KUD	31	21	198
8	DL5MHC	27	19	176
9	UV3DRU	23	20	163
10	ES5RY	16	14	118
11	SP9KRT	11	8	73

LISTENER

1	ONL383	49	29	286

Checklogs gratefully received from: G2CIL, G5LP, OK1FMY.
+ = Trophy winner, * = Cerificate winner.

APOLOGY - NFD 1993

My sincere apologies to the Melton Mowbray ARS, G4FOX/P. An error in keying data into a spreadsheet gave them 295 points less for their 7MHz score, leading to a lower overall position. The group actually made 707 points on the band contributing to a total score of 2770. This should have placed them 14th overall. G3YRC/P's score for the band should have been 386 and not 821, making them 24th. Positions 14 to 17 move down one place, positions 18 to 24, move up one place. *G3SJJ*

HF CONTESTS - 1994

2/3 Apr	*SP-DX SSB*
5 Apr	QRS Cumulative (Jan 94)
10 Apr	ROPOCO-1 (Mar 94)
13 Apr	QRS Cumulative
17 Apr	Low Power (Feb 94)
21 Apr	QRS Cumulative
23/24 Apr	*Helvetia* (Apr 94, p19)
29 Apr	QRS Cumulative
7/8 May	*ARI DX (Mixed Mode)*
9 May	QRS Cumulative
14/15 May	*CQ-M (Mixed Mode)*
28/29 May	*CQ WPX CW*
4/5 Jun	NFD (Rules from G4IQM)
18/19 Jun	*All Asia SSB*
25/26 Jun	Summer 1.8MHz CW (Apr 94)

VHF RULES

2ND BACK PACKERS 144MHZ

Date: 12 June

Time: 1100-1500UTC

Rules: see separate rules.

Adjudicator: G4DHF

432MHZ FM FIXED AND OPEN

Date: 18 June

Time: 1800-2200UTC

General rules apply.

Sections: F Single Operator Fixed; O All Others; L Listeners.

Adjudicator: Mr M J Platt, G4XUM, 451 Newcastle Road, Shavington, Cheshire CW2 5JU

VHF FIELD DAY

Date: 3/4 July

Time: 1400-1400UTC

Rules will be published later.

3RD BACK PACKERS 144MHZ

Date: 4 July

Time: 1100-1500UTC

see separate rules.

Adjudicator: G4DHF

432MHZ LOW POWER/SWL

Date: 24 July

Time: 0800-1400UTC

Rules: General rules apply. Plus rule 14c. County/Country/QTH Locator Multipliers.

25W PEP output from TX

Sections: F Single operator fixed; S Single operator portable; O All others; L Listeners.

Adjudicator: Mr Platt, G4XUM, 451 Newcastle Road, Shavington, Cheshire CW2 5JU

CONTEST CLASSIFIED CONTINUES ON PAGE 82

HF RESULTS

CLUB CALLS CONTEST 1993

This event is definitely growing in popularity with an increase of 60% in entries received over last year. Fifty three Club stations were active, 235 Club members involved either at the club or operating from home and a further 105 non-members appeared in submitted logs. It was good to see a sprinkling of non-UK callsigns listed.

Clear winners again were Evets Communications ARC, G0JBX, based in Derby, with Lichfield ARS, G3WAS/P and Ariel Radio Group, Birmingham, G2BBC. All three stations being based in central England enjoyed good north and south propagation using efficient dipoles at around 30 metres high. Crawley ARC, G6RC, retained their fourth place and newcomers, Newbury RC, G3WOI/P were rewarded for their efforts in erecting a 20m high dipole.

The best supporting non-member was GM0TGE with 49 club contacts and the SWL fraternity were represented by RS95258, Philip Davies who submitted a well presented log. G4FRS (G3HEJ) sent in details of a novel antenna which he used comprising of a horizontal diamond shaped loop 7m high with 20m long sides. Two loading coils with 25 turns each were placed in opposite corners and the whole system was fed with 450ohm line.

Several groups commented favourably on the revised timing of the contest and it is unlikely that any further changes in rules to this well established event will be made. The Ariel Trophy will be awarded to G0JBX and certificates to the runners up and GM0TGE. *G4FDC*

Pos	Call	Status	Club	QSOs	Points
1	G0JBX	Club Stn	ECL ARC	194	1867
2	G3WAS/P	CS	Lichfield ARS	164	1722
3	G2BBC	CS	ARIEL Radio Group, Birmingham	159	1622
4	G6RC	CS	Crawley ARC	130	1615
5	G3WOI/P	CS	Newbury Club Station	131	1523
6	G4IFB	M	Flight Refuelling ARS	112	1516
7	G8FC/P	CS	RAF ARS (Luffenham)	117	1506
8	G5BK	CS	Cheltenham AR Association	110	1490
9	G0OCE/P	CS	Charnwood Contest Club	129	1487
10	G4MRS	CS	Martlesham RS	97	1456
11	G4FRS/P	CS	Farnborough & District ARS	104	1447
12	G3PRC/P	CS	Plymouth RC	125	1420
13	G4NOK	CS	North Wakefield RC	105	1385
14	G3PPG	CS	ARIEL Radio Group, Evesham	100	1375
15	G4HRS/P	CS	Horsham ARC	89	1312
16	GW4CC	CS	Swansea ARC	95	1290
17	G4DDC/P	CS	Dunstable Downs RC	105	1284
18	G4RFR	CS	Flight Refuelling ARS	97	1261
19	G3OFM	M	Flight Refuelling ARS	79	1192
20	G3SRC	CS	Surrey Radio Contact Club	76	1173
21	G3RR	CS	Rolls-Royce ARC	95	1160
22	G4TLS	M	Horsham ARC	54	1117
23	G3ULT/P	CS	Reading & District ARC	66	1108
24	G4ENA	M	Cheltenham AR Association	71	1103
25	G3FFH	M	Axe Vale ARC	68	1069
26	G3RAL/P	CS	Loughborough ARC	76	1063
27	G4OYY	M	Axe Vale ARC	63	1059
28	G4AYM/P	CS	Gloucester ARS	75	1055
29	G3VMO	M	Flight Refuelling ARS	55	1005
30	G6RGH/P	CS	Harwich AR Group	80	970
31	G3SQX	M	Flight Refuelling ARS	59	962
32	G4OAY	M	Worthing & District ARS	43	934
33	GW4WVO	CS	Wenvoe AR Group	52	931
34	GM0TGE		Non Member	49	907
35	GW0SYG	CS	Cleddan ARS	47	901
36	G3WOR/P	CS	Worthing & District ARC	46	863
37	G4DDX	M	Stevenage ARS	38	814
=	G3GMM	M	Stockport RS	33	814
39	G3XYZ	CS	Kings Lynn ARC	44	812
40	G3FNM	M	South Manchester RC	34	807
41	G3SAD	CS	Stevenage & District ARS	39	802
42	G3WTP	CS	Bedford & District ARC	36	788
43	G0BRC/P	CS	Bredhurst R & ATS	31	783
44	G3LRS	CS	Leicester RS	46	781
45	G4SLE	M	Worthing & District ARC	32	711
46	G0LKX	M	G-QRP-Club	29	707
47	G2BDV	M	Flight Refuelling ARS	32	671
48	G0GAZ	M	Stevenage & District ARS	26	623
49	G/OZ7SM	M	Stratford ARC	24	592
50	G3KNU	M	Scunthorpe ARC	23	564
51	G3XTT	M	Reading & District ARS	23	539
52	G3NKS	M	Cheltenham AR Association	20	525
53	G4OGB	M	Scunthorpe ARC	22	511
=	G3NDJ	M	Worthing & District ARC	22	511
55	G0FIG	M	Worthing & District ARC	21	503
56	G8CA	CS	Axe Vale ARC	31	497
57	G4POF	M	Flight Refuelling ARS	20	470
58	G4YTA	M	Flight Refuelling ARS	21	423
59	G0CZG	M	Flight Refuelling ARS	19	382
60	G0DAY	M	Lichfield ARS	13	324
61	G0IWZ	M	Flight Refuelling ARS	12	291
62	G0NLP	M	Echelford ARS	11	288
63	G0OFE	M	Flight Refuelling ARS	12	276
64	G3XYF	M	Bridlington Club	16	243
65	G3NAS	M	Lichfield ARS	8	224
66	G0TYX	M	Flight Refuelling ARS	8	204
67	G3KDB	M	Lichfield ARS	10	195
68	G0IRL	M	Flight Refuelling ARS	6	84
69	G0IJE	M	Flight Refuelling ARS	5	45

Check Log: G4JTR

SWL SECTION

1	RS 95258	Philip Davies	50	895

RADCOM NEWS FEATURE

RSGB 160m ARDF National Final

A report on the 1993 final by the RSGB ARDF Committee

MORE THAN FIFTY eager competitors assembled at Yarningdale Common near Reddich. With receivers set, monitors tuned and maps at the ready, Morse code of good strength was detected right on cue from three hidden transmitters. With bearings plotted, the seventeen teams scattered in all directions across four counties in their search for the hidden transmitters.

The Stations

STATION A, G3TRY/P operated by Dave Fuller, was located 35km SSE of the start in a remote woodland near to Moreton in Marsh. An excellent signal was received at the start, as a result of the 400m long aerial high in the treetops. Only nine teams visited this location, many expecting the station to be much closer to the start than proved to be the case. The open woodland allowed competitors to chase around at ease, running the length of the aerial several times before locating the hidden station. Afterwards competitors faced a long uphill trot cross-country back to the cars.

Mike Standen (right) and his assistant take bearings at the start.

The winner, Alan Simmons, G1THD, received the 1950 Council Trophy.

From Mid Thames: Bob Grey (right), Dave Burden (centre) and James North.

Station B, G4CUE/P operated by Mick Mallinson, was located 23km SE of the start within steeply sloping woodland at Edgehill near Banbury. Despite using over 500m of aerial this station was the weakest signal at the start. All teams visited this location, some spending a considerable period searching. All were greeted with thorn bushes, brambles, glimpses of aerial wire and radiating earth spikes. As if this were not enough, competitors who chose the short dash in from the main road were rewarded with a near vertical clamber down one of the muddiest bridleways ever seen.

Station C, G4MDF/P operated by Gordon Reason, was located 32km east of the start on a disused railway line near Daventry. Around 75m of aerial wire was placed in a loop underneath power lines crossing bramble bushes and encircling the hidden transmitter. A combination of aerial design and re-radiation from power lines gave navigators untold problems finding a route to the transmitter, resulting in many teams running considerable distances from every point of the compass. On arrival competitors were greeted with a direction finder's delight – canal, power lines, navigable mud tracks and bramble-covered railway line, all centred on a small area of land. Whilst up on top of the track some vicious bramble bushes ensured that few of the teams departed without cuts and scratches.

RESULTS

Pos	Name	Club	Time of Arrival at Transmitters (UTC) A	B	C
1	A Simmons	Mid Thames	1547	1459	1420
2	C Plummer	South Manchester	1549	1503	1422
3	G Foster	Mid Thames	1423	1513	1556
4	G Whenham	Coventry	14.35	1524	1611
5	B Bristow	Mid Thames	1422	1524	1614
6	C Wells	Mid Thames	1434	1529	1617
7	A Collett	Chelmsford	1623	1528	1422
8	A Mead	Chelmsford	–	1424	1521
9	M Hawkins	Colchester	–	1451	1548
10	R Brocks	Chelmsford	1446	1553	–
11	J Hall	Ripon	–	1611	1521
12	M Standen	Mid Thames	1432	1612	–
13	R Grey	Mid Thames	–	1613	1351
14	C Merry	Dartford Heath	–	1617	1448
15	D Holland	South Manchester	–	1627	1545
16	C Boyce	Mid Thames	–	1628	1547
17	R Goodearl	Mid Thames	–	1629	1547

Awards

AFTERWARDS TEAMS assembled at Hardwick Community Centre, Banbury, with RSGB General Manager Peter Kirby, G0TWW, and Council Member Julian Gannaway, G3YGF.

Peter Kirby presented the 1950 Council Cup to the winner Alan Simmons. Andy Collett was presented with a plaque to commemorate winning last year's final and Brian Bristow received the Bert Simmonds Memorial Rosebowl for accumulating the most points during the qualifying events.

Mike Hawkins, G3WMM, takes a bearing whilst navigator Paul Clark (seated) looks at the map. Pictured centre is Phil Cunningham.

CONTEST CLASSIFIED CONTINUES FROM PAGE 80

144MHZ LOW POWER/SWL

Date: 23 July

Time: 1400-2200GMT

General rules apply. Plus rule 14c. County/Country/QTH Locator Multipliers.

25w pep output from TX

Sections: F Single operator fixed; S Single operator portable; O All others; L Listeners.

Adjudicator: Mr Platt, G4XUM, 451 Newcastle Road, Shavington, Cheshire CW2 5JU.

NOTES FOR CONTESTERS:

All entries must be postmarked at the latest by the 16th day after the end of the contest, ie if contest ends on a Sunday (say the 1 Octember) then the entry must be postmarked on or before the third Tuesday after that Sunday (17 October). For VHF Field Day an extra week is allowed, ie the fourth Tuesday. Any late entries can only be accepted at the discretion of the adjudicator.

No recorded delivery or registered post.

Entrants can obtain a proof of posting certificate from the Post Office which we will honour if an entry has been delayed in the post.

QTH information to be exchanged on 70MHz only, however not all 70MHz contests require this information, see individual rules and General Rule 24 (1994).

General rules: 1 through to 9, 11,12,13,15 to 23,25,26, apply to all contests any changes will be noted in individual contest rules.

Adjudicators will not normally enter contests which they are adjudicating, however if the adjudicator does wish to enter then his entry will be vetted by a subcommittee before final adjudicated list is published.

Every contest is open to foreign entrants who will be listed separately from UK stations, certificates will be issued to section winners (and runners-up, if enough entries).

THE 1994 MICROWAVE CUMULATIVES

FIRST, DUE TO lack of support, there will be no Summer 5.7GHz Cumulatives this year. The 10GHz Cumulatives will take place on 24 April, 29 May, 26 June, 31 July, 28 August, 25 September and 30 October, 1994. The rules will be the same as in 1993 with the following changes/clarifications:

1 Contest exchange RS(T), Serial Number, QTH Locator (6 or 8 character IARU standard); exceptionally, NGR may be sent. No QTH location is required.

2 An entrant may submit /P and home station logs, to be aggregated as one entry. For the purpose of awards, this would be counted as a /P entrant.

3 There is no restriction on the number of locations used. Where contact is made with another station more than once, then only the highest scoring contact counts, even if the other station has moved and changed country prefix.

4 All logs should be submitted and the best four adjudicated scores to count.

5 Logs may be optionally submitted on computer disk, to either the G4JNT or the VHF Committee formats. An SAE will ensure return of the disk, if required.

The 24GHz Summer Cumulatives will take place on 10 April, 8 May, 12 June, 10 July, 14 August, 11 September and 9 October, 1994. The rules are the same as for the 10GHz Cumulatives, except that all logs to be submitted, the best three adjudicated scores to count.

Whilst we're talking about the Summer Cumulatives, I should also include the Winter Cumulatives involving all bands from 2.3GHz upwards. These will take place on 27 November, 18 December, 29 January, 1995, 26 February, 1995 and 26 March, 1995, from 0900 UTC to 2100 UTC. As there are no awards there need be no formal rules, although the results will be tabulated and published in the Newsletter and RadCom, provided there are enough entries. This is your Committee's attempt to encourage a little friendly activity at coordinated times and dates throughout the winter - traditionally the time when many microwave enthusiasts hibernate!

The Microwave Committee apologises in advance if some of these dates clash with other events in the Rallies calendar or with Bank Holiday weekends: unfortunately it is proving impossible to please all of the people all of the time.

VHF NATIONAL FIELD DAY 1994

1. Duration: 1400UTC Saturday 2 July to 1400UTC Sunday 3 July 1994.

2. Site Notification: Each Group intending to compete must send details of the site to be used to: VHF Contests Committee, c/o B Llewellyn G4DEZ, 110 South Avenue, Southend-on-Sea, Essex SS2 4HU, to arrive no later than **10 June 1994**. The appropriate site registration form can be obtained from G4DEZ or photocopied from the *RSGB Call Book*, and should contain the following information. The name and address of the person responsible for the entry, a **contact telephone number**, the name of the group, the callsigns to be used on each band, the section (Open, Restricted or Low power), the locator and national grid reference of the site, and sufficient access information for an inspector to locate the site (preferably a sketch map). Each group may only register one site. **Two copies of registration forms and maps/directions *must* be included in your registration.**

3. Bands: Up to four separate stations may operate simultaneously on the 70, 144, 432, and 1296MHz bands. Single band entries will be accepted. The 70Mhz CW section will take place in the period 1400-2200UTC, and the 70Mhz SSB section will take place in the period 0600-1400UTC, with close down between 2200UTC and 0600UTC.

4. Operators: Any RSGB member or group of members operating from the British isles (excluding Eire) may enter. Visiting foreign amateurs may also operate field day stations as long as they are members of IARU member societies. Groups operating from the same site may combine their scores subject to rules 3 and 5.

Affiliated RSGB societies may enter (operators *must* be members of the Affiliated Society, but not neccesarily members of RSGB themselves). A signed declaration (as required in other AFS contests) that the operators are members of the society is required with the entry (not at registration), this must be signed by the club secretary or chairman,if entering as an AFS society. This rule has been amended to help clubs overcome possible manpower problems.

RSGB members are allowed to operate in AFS groups whether or not they are actually members of that AFS group.

5. Stations: All the stations forming one entry must operate from within a circle of 1km radius centred on the operating position of any of the stations. All equipment including antennas, must be installed on site not more than 24 hours before the contest, and the site must not be used by the entrant for transmitting activities during the five days prior to the contest. Only portable accommodation can be used to house the stations. Power for all equipment must be derived from an on site generator or battery. **The public mains supply must not be used.**

6. Scoring: Contacts will be scored by the radial ring system. The overall score will be determined as per general rule 10 using the final 70Mhz, 144Mhz, 432Mhz and 1296Mhz scores.

7. Contest exchanges:

(a) On 70Mhz QTH information must be exchanged. It must be given in a different form on each mode.

(b) On 144, 432, and 1296 Mhz QTH information need not be exchanged.

(c) Contacts with stations whose callsigns appear on any of the group's cover sheets will not count for points.

8. Sections: There will be four sections:

Restricted section (R)

(i) The height of any antenna must not exceed 10 metres above ground level.

(ii) Only one antenna per band may be used (eg no stacked, bayed or colinear arrays or switching between two or more antennas). A slot fed Yagi or Quad antenna is permitted. Dish or Backfire antennas must not exceed 2m diameter.

Low Power Single Antenna section (LS):

(i) The power output of any band must not exceed 25W PEP at the transmitter, (includes any amplifiers).

(ii) The height of any antenna must not exceed 10 metres above ground level.

(iii) Only one antenna per band may be used (eg. no stacked, bayed or colinear arrays or switching between two or more antennas). A slot fed Yagi or Quad antenna is permitted. Dish or Backfire antennas must not exceed 2m diameter.

Open section (O): as per General Rules.

SWL section (S): as per General Rules.

9. Inspections: All stations are subject to inspection by members of the VHF Contests Committee or nominated representatives. **Should the inspector be unable to locate the site due to inadequate or incorrect information, the entry will be disallowed. In the event of a last minute change it is the responsibility of the group to make suitable arrangements for the inspector to find the 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.

10. Entries:

(a) All entries must be **postmarked** no later than **31 July 1994**.

(b) Entries must be addressed to: VHF Contests Committee, c/o B Llewellyn G4DEZ, 110 South Avenue, Southend-on-Sea, Essex SS2 4HU. **No recorded delivery or registered post, any such entry will be disqualified.** Separate cover sheet for each band, one cover sheet for 70Mhz CW and one cover sheet for 70Mhz SSB.

11. Awards: The Surrey Trophy will be awarded to the overall winner of the Open section, the Arthur Watts Trophy to the overall winner of the Low power section, the Tartan Trophy to the leading resident Scottish entry in the Open section, the Scottish Trophy to the leading Scottish entry in the Low power section, and certificates will be awarded to the winners and runners-up on all bands in each section, and to the leading stations in each county. The Martlesham Trophy will be presented to the winners of the Restricted Section.

12. REQUIRED DOCUMENTATION:

1) TWO (2) copies of Registration Form (REG 1 as in 1993/4 *Call Book*, or REG 2 VHFCC), completed in **full**, please quote contact telephone number.

2) Separate Cover Sheet for each band (427-86 or later).

Note: 70Mhz SSB and CW sessions require cover sheet for each session.

3) Summary Sheet (4422). Separate entry line for each band, separate entry line for 70Mhz CW & SSB sessions.

4) And of course the log sheets!

Please do not forget to put adequate postage on your entry.

If you have any queries as to how to enter, forms, change of site, please telephone me or my XYL Shirley, G0ESO, on 0702 460747 where we will do everything we can to make your entry acceptable.

Note - VHF field day rules supercede General Rules, in any conflict.

B C S Llewellyn, G4DEZ

VHF RESULTS

432MHZ FM 1993

This contest continues to attract interest from young and old alike, although the actual number of entrants remains at a constant level. It was very interesting to see a mini battle develop between Jack, G5UM, and a newcomer 2E1BEP and in the end the difference was really one QSO with experience pipping youth to the post. In the open section the Wirral and District had a good win over Geoff GW1ATZ who is the contest stalwart having won it on several occasions in the past. DX was scarce and most stations had to rely on many local QSO's with Wirral making 83 and probably a record in this contest. Congratulations to all winners and runners up, and the VHFCC hope to see you again next year. *G4XUM*

SINGLE-OP

Posn	Callsign	Score	Locator	DX	Ant/Pol
1	G5UM	27	IO92MP	155	H
2	2E1BEP	24	IO83PM	135	V
3	G1WAC	23	IO91XG	114	H
4	G1APV	19	IO92WU	73	H
5	G0NVZ	16	IO91UR	188	X

OPEN

1	GW4MGR/P	241	IO83JA	194	H&V
2	GW1ATZ/P	178	IO82KX	283	H
3	G0RSB/P	135	IO92BN	221	H
4	G4WYJ/P	116	IO91XG	283	H
5	G4CRA/P	48	JO01IT	119	H&X
6	G0DJA/M	26	IO93EO	>50	H&V

144MHZ LOW POWER 1993

This event was very well supported with the regulars and a few newcomers adding to the fun. Unfortunately serial numbers seemed to be down this time and many groups were heard to be struggling in the latter hours. The skill is of course picking up the multipliers but quality of QSO counts as well, rather than quantity. Therefore the win in the 'Others' section by The Northern Lights comes as little surprise. Although their QSO total was down on a lot of the groups they paid great attention to multiplier 'hunting'. That, along with the high points per contact gained, earned them the win - beating the Wirral and District into second place. It must be taken into account that the QTH at G4KUX (which is 1200 feet ASL) is better than the majority of portable sites! In the fixed section G4PIQ took the honours again with a score which would beat most of the /P's as well. Is there a lesson to be learnt? With fixed stations taking the leading places - Maybe time spent optimising your station at home would be better spent rather than throwing a few bits and pieces together on a hill-top! Congratulations to all winners and runners-up and start looking for those 'dream fixed sites' for next year. Thanks to GI4KSO/P for the checklog. As with the 432Mhz results, logs were vetted by other VHFCC members prior to release. *G4XUM*

OTHERS

Position	Call	Score	Locator	Qso	Mult	Dx(km)
1	G4KUX	130032	94BP	172	72	760
2	GW4MGR/P	106812	83JA	213	71	710
3	G4ZAP/P	95151	93DC	224	69	637
4	G8LNC/P	78352	90JO	163	59	647
5	G4BRA/P	58469	80ST	127	59	648
6	GW4ALG/P	49147	81NV	139	59	511
7	G4DSP	47372	92WS	137	54	512
8	G6SRC/P	44865	01JG	114	47	602
9	G1WKS/P	42630	01ED	137	52	612
10	G8PNN/P	40911	95CK	101	39	686
11	G6ARC/P	38826	92FM	137	54	437
12	G6CTU/P	36500	91XG	138	50	532
13	G6ZTT/P	35100	93AD	120	54	520
14	G4FBS/P	34650	90MX	119	50	54
15	G4DDL/P	29400	91MQ	120	49	537
16	G4SSO	28552	80FI	88	43	653
17	EI/G8PAW/P	27144	63UE	58	39	526
18	G4TSW	22840	80FV	85	40	657
19	G4IRC/P	20394	02OD	76	33	519
20	G6QM	16524	94DB	64	34	388
21	G1XYZ/P	9669	02DS	48	33	448
22	G5LK	6832	91WF	52	28	517
23	G4CW/P	5486	01BK	52	26	381
24	G7JCW/P	5278	93IL	45	26	329
25	GW4CC/P	4900	71XO	30	25	–

SINGLE-OP PORTABLE

1	G0CLP/P	74786	93AF	208	61	682
2	G8JAY/P	35616	91AW	114	53	489
3	GM0KD/P	20560	85RU	52	40	613
4	GM7GUC/P	18648	86JF	42	37	653
5	GW8ZRE/P	13110	83JA	65	38	356

SINGLE-OP FIXED

1	G4PIQ	108350	01MU	208	55	727
2	G6HKM	37344	01FT	119	48	633
3	G0NYL	30448	93QN	104	44	500
4	G6FQZ	13760	91JR	64	40	430
5	G3MEH	13338	91QS	73	38	457
6	G0CDA	13200	83SJ	52	40	459
7	G0ADH	8960	91KO	56	32	429
8	G7AZP	6966	90AS	45	27	519
9	G0TCD	6560	91SS	41	32	466
10	G3FIJ	4876	01KV	28	23	531
11	G5UM	2520	92MP	24	21	391
12	G8IFU	2096	90BT	23	16	427
13	G3YSX	1904	91WF	22	17	262
14	GM7LVJ	1534	85JV	21	19	326
15	GU4HUY	448	89RL	8	7	410

OVERSEAS

1	PE1EWR	6042	11SL	24	19	564

SWL

1	BRS25429	5740	93FX	41	28	–

432MHZ LOW POWER 1993

Most entrants thought conditions were poor to flat with the majority of DX being worked on the N/S path. With a contest average of 400Km, conditions were obviously not too flat, although activity at this sort of range was hard to find, especially for stations in the south. Presumably due to a lack of continental activity. The quality of logs on the whole was good, but stations need to listen carefully with a major problem being the missing off of /P on callsigns. In a contest such as this - with little continental activity, the majority of contacts can be cross-referenced and adjudication is easier. Of the leading stations in each section over 98% of contacts could be checked, increasing the need for accurate logging. Congratulations to all winners and runners-up - certificates will be on their way. Many thanks to Eddie, G0EHV, for his useful checklog. As G4XUM was a non participating member of the leading group in the 'Others' section, results were passed to G4PIQ for vetting prior to release. *G4XUM.*

OTHERS

Posn	Call	Loc	Score	Qso	Mult	Dx(km)
1	G4KUX	94BP	17721	48	33	516
2	GW0MGR/P	83JA	14144	67	34	344
3	G8LNC/P	90JO	11687	57	31	539
4	G8PNN/P	95CK	10212	34	23	539
5	G4DDL/P	91MQ	9145	57	31	420
6	G4BRA/P	80ST	7826	45	26	516
7	G6SRC/P	01JG	4807	35	23	493
8	G6CTU/P	91XG	4800	53	24	477
9	G6ARC/P	92FM	4152	36	24	325
10	G1WKS/P	01ED	2527	31	19	417
11	G4CW/P	01BK	528	16	11	222
12	G4DSP	92WS	500	16	10	183
13	G6ZTT	83QE	297	11	9	315
14	G7JCW/P	93IL	156	8	6	220

SINGLE-OP PORTABLE

1	GW8AWM/P	81LS	8425	49	25	518
2	G0TDF/P	92BN	7917	69	29	389
3	G7LWZ/P	91WF	126	9	6	106

SINGLE-OP FIXED

1	G4PIQ	01MU	13454	54	31	662
2	G8JXV	91VE	854	19	14	401
3	G3YSX	91WF	792	18	12	481
4	G3YHF	92AJ	612	13	12	244

OVERSEAS

1	PE1EWR	11SL	448	8	8	455

SUMMER MICROWAVE CUMULATIVES 1993

Table 1 gives the results of the 1993 Summer Microwave Cumulatives using the 10GHz band and Table 2, the 24GHz band. Thanks are due to Lehane Kellett, G8KMH, for the adjudication. On 10GHz, congratulations must go to Neil, G4BRK, the overall winner by a margin of some 1300-odd points, who operated also as GW4BRK/P from IO93JA.

For the first time since the Dain Evans (G3RPE) Memorial Award was instituted, Mike Walters, G3JVL, has failed to win the Award, although he came a close second and remained the leading Fixed Station in the cumulatives!

The number of QSOs per session (maximum 36) and the best DX (781km) have both dramatically increased with over 70 UK callsigns appearing in the logs received and analysed. The growing use of low-noise RX HEMT preamplifiers and TX power output above the 1W level has helped this trend.

However, the winner's use of a 1W TX coupled with a gainy antenna and the skilful use of a good portable site enabled him to compete effectively with the fixed stations (and some portable stations) running much more power. It is hoped that this will encourage others, especially less well equipped newcomers, to use portable sites. Logs were of variable quality but were generally accurate. Most, having read the rules, scored four qualifying sessions but not everyone submitted logs for all active sessions as was intended - a complaint made by adjudicators in the past! G3BEX and G3WDG (operating as GM3WDG/P) are thanked for their check-logs.

I found it very disappointing to hear that there were no wideband entries at all this year even though, overall, entries were up on last year. The reason I found it disappointing is that WB represents the simplest, basic 'entry' level to 10GHz operating where we might expect Novice entries: there were no Novice entries!

In the 24GHz band, Steve, G4KNZ once again achieved the leading position, being active in all sessions and from no less than 12 different sites. Peter, G3PHO, is to be congratulated on being runner-up with a very respectable score using low power.

Whilst the best DX and the number of entries is slowly increasing, it is rather disappointing to note that several of the operators who appeared in last year's tables were not active this year. Whilst the predominance of activity is again wide-band, it is felt that 24GHz narrow-band is likely to follow the same course of development, over the next few years, as the 10GHz band has done in the last few!

Posn	Call	Points	QSOs	BestDX	km	Equipment
1	G4KNZ/P	1062	16	G3PHO/P	120	50mW/0.3W wb/nb60cm dish
2	G3PHO/P	711	12	G4KNZ/P	120	7mW Gunn, 20" dish
3	G4MAP/P	681	11	G4KNZ/P	90	n/a
4	G3FYX/P	661	8	G4KNZ/P	118	50mW Gunn, 18" dish
5	G8AYY/P	448	9	G3FYX/P	86	5mW Gunn, 30cm dish
6	G3UYM/P	372	7	G3PPF/P	85	5mW Gunn, 18" dish
7	G3ZTR/P	149	2	G3PHO/P	81	5mW Gunn, 18" dish
8	G8KMH/P	65	1	G4KNZ/P	65	500uW nb, 18" dish

1993 24GHz Summer Cumulative Results

CHRISTMAS FUN CONTEST 1993

It never ceases to amaze me, the number of people who want to complain about something or other. This time it is the turn of those that did not want the contest to run on the 26th, and that the timing was wrong for them, because of family commitments. OK, but it is supposed to be a Fun Contest for those of you who want to get away from the commercialisation that surrounds Christmas, and for those that do not want to sit in front of the TV and vegetate. If you do not wish to enter then it is up to you! For those that took the contest in the spirit in which it was conceived, I hope you had a good time. Logs were generally good with no glaring errors. Certificates to Band/Day winners, overall band winners overall contest winner and to the runners-up, also to the Leading 25W or less stations with single antenna, (that should give away a fair number of certificates!) Also a Certificate for Frank, PE1EWR, for our most active and consistent foreign entrant! Please note that all scores were normalised this year, as per many requests by entrants. Thanks to G0TDF for info, he knows what I mean!

70MHZ

Call	26th	27th	28th	29th	QSO	Pwr	Ant	B/DX	Km	Total	D/Norm
G4SEU	6	1050	1245	896	54	80	8	G4CAY		3197	3034
G0AEV	176	414	682	396	36	10	5	G3GAQ	265	1668	2384
G8APB	0	90	96	108	17	15	6	GI8AYZ	298	294	283
G1EHF	0	0	119	0	7	60	HB9	G3APY	197	119	96
G0MJW	0	12	6	36	6	1W	HF di	G3UKV	125	60	56

144MHZ

G4PIQ	15190	26325	26281	36214	276	400	4X15+	DK0OG	906	104010	3974
G0GXT	14430	22806	21156	22950	277	400	2X17	DC6DY	674	81342	3231
G0MJW	15588	15648	11873	9657	221	100	14	G4GDN	370	52766	2229
G4DSP	12540	15192	8820	7150	205	400	2X9	DH0YAZ	596	43702	1915
GW0PZT	5300	9482	11424	1199	118	100	2X9	PE1EWR	584	27405	1168
G8ZRE	3818	9009	5643	3696	136	100	8XY	G8BQX	348	22166	904
G4IDF	2142	2337	1680	1456	97	12	11	G4KUX	-	7615	330
G8APB	0	858	1488	6552	82	35	16	G4PIQ	257	8898	280
G7AZP	1552	1806	1274	1905	69	100	9	G4KUX	430	6537	269
G1TWS	792	1392	682	2052	73	25	8	GW0PZT	-	4918	186
G0UCU	0	1215	936	1140	59	25	-	GW0PZT	385	3291	113
G3JJZ	0	1358	780	852	72	25	8/8	G4KUX	383	2990	105
G0THY	441	770	988	130	37	25	9	G4KUX	317	2329	99
G0TDF	1504	0	0	0	20	100	8	PE1EWR	383	1504	96
G2CZS	42	820	540	1118	32	25	—	GD7HEJ	440	2520	85
G0PZO	0	935	650	570	40	10	12	G4PIQ	325	2155	76
G7MFV	674	136	301	180	20	25	8	G4KUX	485	1291	65
G4DEZ	0	0	0	2176	22	400	17	GD7HEJ	450	2176	60
G7LPK	0	0	384	0	6	20	9	GW0PZT	390	384	15
G7OZE	40	21	133	96	20	10	Halo	G0MJW	-	290	11

432MHZ

G4PIQ	54	3654	2224	3384	57	250	2X17	DG9NBT	670	9316	2878
G0TDF	616	2806	2814	1802	94	100	21	GI8AYZ	358	8038	3300
G0MLY	333	1360	1162	858	77	75	2X21	G0FIG	230	3743	1579
G4JZF	189	852	350	203	52	25	21	G0FIG	-	1594	724
G8APB	0	430	400	203	32	35	21	GI8AYZ	298	1062	328
G7AZP	92	106	225	378	22	100	17	G4DHF	317	803	371
G0MJW	0	198	273	115	21	10	19	G0FIG	339	586	151
G1EHF	0	0	279	0	19	50	19			279	99
G3JJZ	0	26	161	45	13	25	19	GW8VHI	217	234	78
G0THY	0	2	48	95	10	25	13	G4DHF	177	145	46

FOREIGN SECTION

144MHZ

PE1EWR	920	413	700	546	28	10	10	GW0PZT	2579	4000

432MHZ

PE1EWR	0	14	14	14	3	10	21	G4PIQ	-	3000

OVERALL POSITIONS

1	G4PIQ	6852	9	GW0PZT	1168	17	G1THY	145
2	G0TDF	3396	10	G8ZRE	904	18	G0UCU	113
3	G0GXT	3231	11	G8APB	891	19	G1EHF	99
4	G4SEU	3034	12	G4JZF	724	20	G2CZS	85
5	G0MJW	2436	13	G7AZP	640	21	G0PZO	76
6	G0AEV	2384	14	G4IDF	330	22	G7MFV	65
7	G4DSP	1915	15	G1TWS	186	23	G4DEZ	60
8	G0MLY	1579	16	G3JJZ	183	24	G7LPK	15
						25	G7OZE	11

Thanks to all those that sent in check logs they were most usefull.G4DEZ

Posn	Call	Points	QSOs	Sessions	Pwr(W)	Antenna	Best DX	km
1	G(W)4BRK/P	20922	122	4	1	1.2m	G4DDK	324
2	G3JVL	18599	129	4	20	0.9m	G3NWU	436
3	G4KGC	14705	107	4	20	n/a	G3GNR	296
4	G3FYX/P	14638	111	4	3	0.9m	HB9MIN/P	781
5	G4FCD	14270	117	4	10	0.9m	F6DKW	428
6	EI/G4ZME/P	13982	90	4	0.8/20	0.8m	G4RFR/P	377
7	G4RFR/P	13776	92	4	10	1.6m	F1HRY	414
8	G3PHO/P	11438	77	4	0.23	0.6m	G4BCH/P	304
9	G4BCH/P	9477	73	4	0.15	0.4m	F6DKW	320
10	G3JMY	9298	84	4	6	n/a	G3LQR	278
11	G3ZTR/P	7770	43	4	1	0.6m	G4RFR/P	355
12	G4MAP/P	6252	64	4	n/a	n/a	G4KNZ/P	287
13	G8LSD/P	6198	65	4	0.125	0.8m	F6DKW	304
14	G0API	6059	47	3	15	0.6m	G3PYB/P	405
15	G3GRO	4828	48	3	15	0.6m	GW4BRK/P	296
16	G4KNZ	4416	55	4	20	0.4m	GW4BRK/P	247
17	G3JMB/P	4299	66	4	0.125	0.6m	GW4BRK/P	304
18	G8KMH/P	3663	56	4	0.04/0.7	0.3m	GW4BRK/P	197
19	G3LYP(/P)	3058	47	4	16	0.6m	G3ZME/P	138
20	G4ZXO/P	1859	20	2	n/a	n/a	G4RFR/P	170
21	G1MPW/P	1492	24	4	0.05	n/a	G4KGC	117
22	G6KIE/P	979	19	4	0.05	n/a	G4KGC	117
23	G4KNZ/P	911	6	1	3	0.6m	G4MAP/P	284

1993 10GHz Summer Cumulative Results

DIRECTION FINDING

CHELMSFORD/ COLCHESTER QUALIFYING (HF)

Date: 27 March 1994

Map: 155 (Bury St Edmunds)

Assembly: 1300 for start at 1320

Location: Great Green, 1.5 miles NE Cockfield, NGR 916560

Competitors requiring supper should notify Mike Hawkins, tel: 0787 880887 no later than 20 March

COVENTRY/ NORTHAMPTON QUALIFYING (HF)

Date: 24 April 1994

Map: 152 (Northampton and Milton Keynes)

Assembly: 1300 for start at 1320

Location: Irchester Country Park, NGR 912658

Competitors requiring supper should notify George Whenham, tel: 0926 812367 no later than 17 April.

VHF CONTESTS

PLEASE NOTE:

Logs must be sent to the correct adjudicator. Failure to do this will automatically disqualify your contest logs.

G4DEZ

RSGB 1994 VHF/UHF CONTESTS CALENDAR

27 Mar	70MHz Fixed/SWL (Feb 94)
10 Apr	1st 23cm & 13cm Fixed/SWL (Feb 94)
7 May	70cm Trophy (Feb 94)
7/8 May	432MHz to 24GHz (Feb 94)
21/22 May	144MHz/SWL/Single/All Others (Feb 94)
22 May	1st Back Packers 144MHz (Jan 94)
4 Jun	50MHz Trophy (Feb 94)
4/5 Jun	IARU 50MHz (Feb 94)
12 Jun	70MHz CW (Feb 94)
18 Jun	432MHz FM Fixed & Open
2/3 Jul	VHF NFD
3/4 Jul	VHF Field Day
4 Jul	3rd Back Packers 144MHz
23 Jul	144MHz Low Power/SWL
24 Jul	432MHz Low Power/SWL
21 Aug	432MHz Fixed/SWL
30 Aug	144MHz CW Cums
3/4 Sep	144MHz Trophy/SWL
4 Sep	4th Back Packers 144MHz
14/29 Sep	144MHz CW Cums

For details of rules for European contests, contact G4PIQ, QTHR.

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SUNDAY MAY 1st

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(on the junction of the A445 and the A423)

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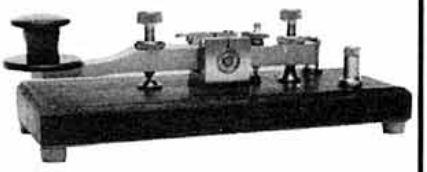

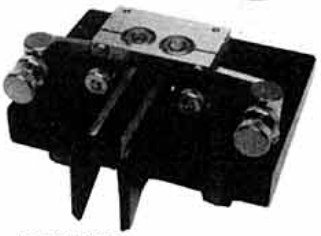

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KENWOOD R-2000, bxd, manuals, exc condx, guaranteed by Lowes until January 1995, complete with Datong indoor ant: £450ono. G1AMM (Leeds) 0532 822013.

KENWOOD TS130S, DFC230 Digital VFO, MC35, service manual, boxed, exc condx: £425. PW Meon 50MHz, 144MHz IF, Spectrum 20w PA: £60. Wood and Douglas 70cm ATV Rx converter: £10. Seavoice RT100 Marine VHF 12ch: £40. (Stockport) 061 487 2282.

KENWOOD TS140S: £550. Spkr SP430: £30. Powerpack PS430: £110. All as new, standby rig little used. Accept £650 for lot. Antenna mast 35ft of thickwall alum tube, 2.5inch diameter, tapers to **1 and 1/8inch** dia Dismantled to 20ft overall: £30. (Cardiff) 0222 757556.

KENWOOD TS430S fitted with FM board, included with Kenwood HS-5 Headphones: £650. BNOS 25A PSU: £100. Racal RA1772 HF Rx. Offer or exchange for AR3000A. Plessey TF550 FSK/DFS IF/AF Demodulator: £100. (Stamford) 0780 720447.

KENWOOD TS440S Auto ATU plus 1.8kHz SSB filter, exc condx Tx + Rx 0 - 30 Narrow FM Filter: £850 ono inspect and collect. (Halesowen) 0384 65614.

KENWOOD TS440S with Auto ATU, boxed with hand Mic, manual, DC lead. In as new condx: £790. Kenwood TS140S with built in Electronic Keyer, CW filter, manual, DC lead, hand Mic: £620. EP-925 PSU: £60. Phone Martin, G0HRZ. (Romford) 081 597 0234.

KENWOOD TS440S, ATV, PS50, YK88S YK88C filters, MC-60 mic, pristine: £825ono. HQ-1 minibeam: £50. CD-45-2 rotator: £60. G3PYP (Melksham) 0225 708816.

KENWOOD TS450SAT HF tcvr, mic, manual, mint condx: £950. 3-el Yagi for 4mtrs: £10. G4EHT QTHR (Lichfield) 0543 251133.

KENWOOD TS530SP HF Tx/Rx 160-10m inc WARC. SSB/CW filters and notch filter, super condx: £500. G3TCO, QTHR. (Bristol) 0272 681068 evenings.

KENWOOD TS850SAT, Auto ATU, SSB filter, matching PS52 h/duty Power supply and Spkr. Very little used and as new. Manuals, boxed, genuine bargain: £1,565 ono. Kenwood RZ1 0.5-950MHz wideband Rx, exc condx, manual, boxed: £185. (Dunstable) 0582 605693.

MAGNETIC LOOPS one pair by CapCo, covers 80-10 Metres plus WARC Bands, inc Control box and cable: £250. Buyer collects. Ring Keith, G0RQF. (Hereford) 0432 276545.

MITAC IBM compatible PC, 8088, 5.25FD, 20Mb HD, DOS 4.01, VGA colour monitor, mouse, word processor and drawing packages. Bargain: £190. (London) 081-950 0382.

MORSUM MAGNIFICAT. Complete 1 to 27 with binders. Sensible offers, write to G0EVJ, QTHR. (Lichfield) No Phone.

MOVING MUST Sell, Icom IC451E Tcvr 430MHz. Trio TS700 144MHz. Both mint condx. Also Belcom Linear 144MHz Amp. WW2 German Callsign Senders. AR88. ICF2001D Super Scanner. Yupiteru Scanner MVT7000 H/held, super quality. Sony Video recorder EV-A300EC/UB Video 8. Heathkit LCR/ Bridge and Audio Gen. Fax 5W Phax PXSC3 (black box). Amstrad PCW8256 Word Processor. David, G3BGA. (Huddersfield) 0484 450982.

MX294 2m 25W .3uV. Choice of two: £75. MX295 2m 40-chann 14W .3uV Eprom controlled: £75. MX296 70cm 10W 48-chann mics T/B spkrs: £75. Tait T500 series 2m 80-chann T/B .3uV 25W: £80. Crystal controlled rigs OK. 2m suitable Packet complete with spkrs etc: £15. All prices ovno. Snowy G0HZE (Peterborough) 0733 342439 any time (answerphone).

NELSON QUAD as new, eight extra Rods. Complete, except for some wire: £210 ono. Buyer collects or carriage extra. G4KPT, QTHR. (Wiveliscombe) 0984 624212.

OSCILLOSCOPE 100MHz D/trace 5-ch: £350. HP power supply 0-40V 5Amps: £70. TEK transistor curve tracer: £150. Various other test items. (Rickmansworth) 0923 776382.

OSCILLOSCOPE Kikusui COS5020 20MHz Dual beam, with H/book, padded bag, protective front cover, with Probes and original invoices, vgc: £120. 136B2 Noise Blanker for KWM2/2A, rare and desirable accessory: £75, with handbook photocopy and special Potentiometer. 6BL6 Klystron, new: £100. (Portsmouth) 0705 596836.

PACKET Tx/Rx Pye Westminster 10ch xtalled on 144.650 144.675: £30. Pye Europa 3ch xtalled on 144.650: £30. G8GYO (Worcester) 0905 796253.

PACTOR and mailbox upgrade for MFJ 1278 complete cost: £81 now £40. Wanted Tentec auto tuner model 254. G3IJL QTHR (London) 081 749 1454.

PAKRATT PK232 MBX M/mode Data Controller, boxed with leads, manual: £240. Yaesu FT290R: £160. Heathkit HM102 Power Meter: £25. (Morecombe) 0524 822125.

PHILIPS PRC2000 'Callpac' Military Tactical HF Manpack Tcvr 1.6-30MHz, SSB and CW modes, 20 or 4 watts o/p, complete and working set with Antenna, Nicad and Handset with data etc: £600 ono. Or Swap for Icom R7000 or IC901 or Kenwood SM230 Panadaptor or Racal Military Radio equipment or WHY. Open to offers. Vic, G7PYR, QTHR. (Blyth) 0670 355170.

PSION organiser II LZ64 C/W leather case 2 x 32k Rampacks spreadsheet and finance progs Computer interface and formatter, exc condx: £100. G0NJO QTHR (Eastleigh) 0703 327320.

PYE PFX UHF h/held, converted to 70cm, fitted toneburst, 85 channels programmed, C/W, 3 batteries spkr/mic etc: £130. Pye Olympic M212 UHF, single channel, converted to 70cm, ideal packet rig. Unit only £25. Burndept BE470 UHF h/h xtalled on RB14, C/W, batteries, mint condx: £35. All plus carr at cost. Mark, G7HVN (Portishead) 0275 818566.

R-4C Fox-tango and CW Filters, T-4XB Full set spare valves, AC4, MS4: £500. IC32E and Accessories: £300. G4AOS, QTHR. (Newcastle Upon Tyne) 091 236 2013.

RADCOM complete volumes 1977 to 1992: £19 the lot. John, G4DMX QTHR (Wilmslow) 0625 524122.

RADCOM MAGAZINES January 1984 to date inclusive, mint condx with 5 binders: £40. Parcel post at cost. G1FXD, QTHR. (Bodmin) 0637 880404.

RTTY SYSTEM: TI99/4A computer, interface, terminal unit, resident s/ware, also cassette recorder and many programs: £50ono. Sony 12inch colour TV with A/V inputs, ideal for amateur TV etc: £40ono. NEMS Clarke 130Z VHF Rx, REU300 range extender, panoramic display adapter, covers 55-905MHz continuous AM/FM with BFO: £300. Also many components, heatsinks, large capacitors, fans etc. Ring for details. Dave, G0CAD (Oxford) 0865 890066.

SHACK CLEARANCE: Trio TR7010 2m SSB Tcvr: £75. H/brew PSU for TR7010: £10. Racal 9837 Counter: £25. Vacuum Variable Capacitors 1000pf and 2000pf: £35 each. Buyer collects or post extra. (Staines) 0784 450947.

SILENT KEY. Icom-725, FM, Mic: £485. Rotator AR2200: £110. Kent Paddle Key: £25. All as new. Buyer inspect, collect. G3CVK, QTHR. (Malvern) 0684 562552.

SPECTRUM 48K professional k/board data recorder. G1FTU Tx/Rx RTTY/CW s/ware h/ware. Scarab SSTV Rx s/ware h/ware. RTTY 8 s/ware deluxe terminal unit Tx/Rx. All leads instructions. Various other ham s/ware h/ware. All items working. Lost interest: £85. John, G3OAZ QTHR (Basingstoke) 0256 465126.

STANDARD C78 c/w CPB78 Linear Amp for 1/ 10w o/p, gd condx, boxed with manual and accessories. Ideal for 70cm Mobile or Portable: £165. Yaesu FT23 2m H/held Tcvr 2w o/ p, c/w spare battery, charger, carrying case: £140. Icom IC4E 70cm H/held Tcvr 2w c/w spare battery, cheap way onto 70cm. Ideal for Novice or Packet: £85. Buyers to collect or pay carriage. (Watford) 0923 229042 6-8pm only.

STANDARD C828M 2m FM Mobile 12 Xtal Channels 10W: £85. M/M 144/28MHz Converter: £20. Kokusai Mechanical Filters 455kHz +/- 3kHz: £5. (Wilmslow) 0625 531803.

T1154M, R1155B installation, Rotarys, J switch, Key, external RF Meter, Loop Antenna, cables etc. Offers invited. Vectronics Vector 500 HF Amplifier, only a few hours use, with 4 spare 811A valves and manual: £450 ono. G0JNT, QTHR. (Grimsby) 0472 752794.

TEN-TEC ARGONAUT 515 QRP Tcvr with Mic: £275. Hy-Gain 14AVQ Vertical Antenna for 10, 15, 20 and 40 metres: £55. SEM Z-Match ATV with E21 Tune: £95. G4MET, QTHR. (Hereford) 0432 355297.

TH215E 144MHz Hand Portable with case and charger. Exc condx, hardly used on Transmit: £150. G4RWL, QTHR. (Carlisle) 0228 513227.

TOKYO HT120 20m Tcvr 20watts SSB/CW: £130. (Shepton Mallet) 0749 830926.

TRIO TR9000 2m multi/m plus linear 10/80 (preamp) incl 9-el Tonna 20809. All equipment exc wkg order with instructions: £285. G7FKD (Banstead) 0737 360045.

TRIO TS-510 and PSU, new valves ex-PA fault on band switch, spares repair. Offers - best secures. G0OEB (W Mids) 0922 57833.

TRIO TS-510 and PSU, new valves ex-PA fault on band switch, spares repair. Offers - best secures. G0OEB (W Mids) 0922 57833.

TRIO TS510 180w PEP, 80-10m, good cond: £300. Hygain Beam 3ele 10m: £30. 9ele 2m Beam: £30. Atari ST520FM, 1Mb, boxed + bits: £175. (Telford) 0952 612709.

TRIO TS530S HF Tcvr, VGC: £395. Also Trio TS830S in VGC: £495. All boxed, etc. Can arrange delivery FOC. (Colchester) 0206 575258.

TRIO TS830S, gwo: £450. Kenwood TS450SAT, as new: £850. Home-made HF linear two 3-500s, gwo: £400. Microset 144-432MHz power amp, as new: £120. Philips Pro 9CM073 colour monitor: £140. All + carr or buyers collect. G4XTD (Norwich) 0603 624573.

TS830 Tx/Rx, mic, good condx, second owner purch from Lowes 1993, collect please: £510. Prefer play with old gear. G3JJU (Fleet) 0252 615831.

TS830S fitted CW Filter, vgc, manual, boxed: £525. Oskerblock SWR200B: £25. LF30A Lo-Pass Filter: £20. Bencher Paddle: £25. Katsumi EK150 Electronic Keyer: £50. 6146B Valves, pair: £15. 3 Way Co-axial Switch: £8. 813 Valves: £10 ea. Prefer buyer collect. All carriage extra. G3HSL. (Hartlepool) 0429 261632.

TS830S, exc condx, orig packing, 600Hz filter, mic, instruction man, service man: £550. Carlton kit: £20. KW2000 Low Tx: £75. (Stockport) 061 477 6702.

TS930S, 2 CW filters, VGC: £750. TS700 2m M/mode: £160. IC32E 144/430MHz H/held: £200. Terminal Unit Pakratt 232: £150. Heath Monitor SB610: £100. ATU Capco SP300: £125. Bencher Paddle, chrome: £35. Superkeyer 2, boxed: £40. Megger 500v, leather case: £25. (Gravesend) 0474 833010.

VACUUM variable capacitors 5-1000pF 5kV WKG ideal for QRO linear or magloop antenna: £60. Yaesu MD-IC8 mic, new, bxd: £80. (Horsham) 0403 864222.

WW2 Radar, Radio Sets. T3065, R3170A, R3118, R3090, R1132A, BC342J, BC348Q, APN-1, APS13, ID-6B/ APN-4, R9A/ APN-4, Indicators 62A, 6B, H2S Equipment. Indicators: 162A, 182A, Switch Unit type 207, Waveform Generator type 26, Modulator type 64, 68. Tuning unit type 207A, Drive Unit type 114. Test Set 74. Early Xtal Set. Air Ministry Compass type 6A. Offers invited. G0JNT, QTHR. (Grimsby) 0472 752794.

YAESU 200, Sommerkamp 250, Shure PSU 80-10m plus QM70: £99. Codar ATS, T2B, PSU: £20. Variacs 8/2 amps: £15. Transformer 6.3V @ .6 amps. All as seen. Collect. G4INX (Chester) 678679.

YAESU 747GX CW filter, FM board, Mic, c/w H/B VSWR Bridge plus QRP Power Meter, VGC, only used QRP: £499. Drae 12V 24A PSU: £70. Pye W15FM Dashmount Xtalled on 2m: £12. Eddystone 730/4 HF Rx: £35. Trio TS520 Tcvr for spares: £30. Barlow Wadley XCR30 Rx: £7.50. Class D Wavemeter: £7.50. TV Aerial Rotator, boxed: £12.50. G4DWC, QTHR. (Brackley) 0280 701562.

YAESU FR101DD Rx, FL101 Tx, matching Spkr with all options and filters, complete with manuals and leads, VGC: £400. G4NQQ, QTHR. (Somerset) 0458 45179.

YAESU FRDX400 Rx FLDX400 Tx: £250. Amstrad PPC640 Laptop: £125. 32Mb H/Disc for PC1512 with Wordstar. Pace Modem with S/ware: £40, and EPROM Programmer: £40. Both for BBC-B. Wanted Shure 444, Mic. G4DPF. (Aylesbury) 0296 715526.

YAESU FRG-7700 0-30MHz Rx, FRT-7700 Antenna Tuner, FRV-7700 VHF Converter, YH-77 Headphones, Datong, Morse Key, Instruction Manual, Boxed: £350. G0HTN. (Stanmore, Middx) 081 954 1871.

YAESU FT-767GX incl 6m/2m/70cm modules. As new condx: £1400. Gavin, G0SXB QTHR (Basingstoke) 0256 478771 (work).

YAESU FT-ONE gen cov all-mode s/state tcvr. Fitted FM board, memory board, XF-8:9KC CW filter. C/W Yaesu YM-38 desk mic, operating and tech manuals, PCB extender board kit recently checked by Castle Electronics. Exc condx: £775. G3RDG QTHR (NW London) 081-455 8831.

YAESU FT200, vgc: £220. Also ATU wide spaced caps roller coaster coil 1KW max: £65. GW0LAY QTHR (Cardiff) 0222 843372.

YAESU FT290R 2 Linear, Bracket, Beam, 5/8 whip, Altai Headset, batteries etc. Sell complete: £495. (Somerset) 0823 323015 6.30-10.30pm.

YAESU FT470 dual band h/held, complete with FNB10 nicad bttry pack, car adapter/ charger, 5/8 mobile antennas with magmount, manual, bxd, as new, 70cm transmit only used whilst novice: £345. Peter, G7RAA QTHR (Bridport) 0308 897313.

YAESU FT707 HF Tcvr 80 - 10m plus WARC bands, handbook and Mic: £350 ono. (Ripon) 0765 640229.

YAESU FT747GX with FM board and H/Mic. As new condx, handbook, boxed: £550. PSU 12.5V 25A: £30. Try before buying. (Saffron Walden) 0799 530763.

YAESU FT890 with Keypad for direct entry of Freq, little used (never on Transmit) boxed as new: £900. Nick, G7IYG. (Uxbridge) 0895 236397.

WANTED

AP1086 Issue 1 (RAF Radio Stores Ref No's) Also Air Publications relating to Radio, Radar equipment. Excellent price offered. Would purchase Post-War to current Magnetrons, Klystrons, T/R cells, Photo-Multipliers, Microwave and special CV types. Required Static or Rotary Inverter, AC or DC I/P with O/P of 80/ 115v 1500/2000Hz. Also Rx Type R1355 10D/ 13032 unmodified. Please phone any time. (London) 071 511 4786 or 071 790 2846 or Fax.

130V OR 120V Kenwood tcvr. Also any small one band QRP rig. (London) 071-935 7119 (weekdays).

AM/FM Board for FT102 or scrap Tx-Rx with working board, SP102 spkr, any other FT102 spares. G3RKZ QTHR. (Derbys) 0332 883035.

BOOK WANTED CP/M Assembly Language Programming, Ken Barbier. Handbook required for Scope Telequipment DM63. Also Sideband Adaptor RA98D for RA117E. (Solihull) 021 745 2915.

MEMBERS' ADS

CIRCUIT DIAGRAM wanted for Advance Signal Generator type P1. Phone anytime. (Stockport) 0625 874952.

COLLINS TCS PSU any variation and condx considered. Also any Rx or remote control cables. Collection possible. Please give price. (New Romney) 0679 62775.

EDDYSTONE WAVEMETER 696/1, EY11, EB35, EC10, EC10 Mk2, 960, 358X, 870A, plus £10 offered for scrap sets. Lepino. Fax: 0372 454381 or tel: (Surrey) 0374 128170.

FL110 linear wanted as backup for next trip to Croatia. G7EUL QTHR (Slough) 0628 664537.

FL50B Transmitter or similar. Valve HF Receiver. R5 Vertical. Quad spreaders. Pair 572B's. ATU. 2m Beam. Copy of 73 Vertical and Triangular Antennas by Sams. Morse memory Keyer. Write to Ed Kelly, Cregganavar, Breaffy, Castlebar, Co Mayo, Eire.

FOR 19 SET Mk2, round type front Panel Handle and Rx Mods to cover all of 1.8MHz. Also Wanted manual for Seikosha SP-1900 Printer. G4JRB, QTHR. (Rainham, Essex) 0708 520564.

FT101B MATCHING Speaker, VFO, Monitor Scope. Any condx. Also circuit diagram and info for Hewlett Packard Scope HP180A. G4IIX, QTHR. (York) 0904 410013.

FT726 or FT736, must be in pristine condition, with 6 metres. Phone after 5pm. (Londonderry) 0504 352804.

HEATHKIT LINEAR Power Supply HP25, WHY? G0EHQ, QTHR. (Bromsgrove) 0527 879636.

OUTPUT Transformer or Complete Quad 2 Amplifier (valve). Also Wobbulator. (Wolverhampton) 0902 781726.

QRO AUTO ATU - Must be able to Tune up anything.. (Edinburgh) 031 447 9979.

SERVICE manual, circuit or copy for Trio Rx 9R59DE; also information on Joystick aerial. Expenses reimbursed. (Lytham St Annes) 0253 780591.

SN72709DN Dual Op Amps also KW EeZee Match ATU. Write G3INZ, QTHR. (High Wycombe) No Telephone number.

STEEL CABINETS for Racal Receivers RA17C and RA1217. Your price paid. John, GM8MLH, QTHR. (Dalmally, Argyll) 0838 200304.

TRIBAND Yagi 10/15/20m plus rotator, must be in good condx and reasonably priced. South/South East only. G7MGT QTHR (Steyning) 0903 815412.

WANTED: Manual/circuit diagram AVO Multimeter Type 73. Write G4HQE, QTHR.

WEATHER SATELLITE Converter as MMC 136/28 or Receiver capable of reception of 136-138MHz. (Huntingdon) 0480 300737.

EXCHANGE

INFORMATION and Programs. The Wizard BBS (24hr) +44 (0) 704 821420 (14,400BPS) The Amateur advert BBS +44 (0) 515 243407 (9600BPS). Loads of Shareware, plus TPK, TCP/IP, BPQ, FBB, games and more! No charges, no membership, but please make sure whoever pays the phone bill has given permission. (Nr Ormskirk, Lancs).

INFORMATION by telephone BBS. The Wizard BBS 0704 821420 (14,400bps) Amateur Radio Programs, Utility, Communications, Pictures etc. The PD+S BBS 051 524 3407 (9600bps). Public domain shareware, Amateur Radio, Pictures etc. Full access first call, no charges of course! Amateur Radio is our hobby too, so why pay extra for it? SysOps G7EVY + G0LZX. (Nr Ormskirk, Lancs).

EDDYSTONE EC10 vgc, Sony Betamovie video camera, colour, macro zoom lens, quality carrying case, mains/ptble, chrgr, batteries etc, all vgc, 20 films full size tapes. Also FT727 dual band h/held radio, needs attention, not working, bxd, manual etc. Exchange all for HF gen cov radio. Hoping to pass RAE, use as Rx meantime, or accept eg FRG-7700M etc WHY? 38 Ochilview, Devonside, Tillicoultry, Clacks, Scotland. 0259 751724.

EXCHANGE I dont want your eye teeth! But WHY? Have Serviscope Double Beam Oscilloscope also Transistor RC Oscillator TG150D. Total value approx £500 will accept Radio related equipment in exchange HF or other. (Co Antrim) 0266 878385.

MARCONI RC1210 19inch rack VHF-Amp incl PSU. 2xBLY90 5x2N3055 + 8DB gain. Required 6m Rx/Tx or PC-386 or sensible offer. G3PMJ QTHR (Manchester) 061 790 0650.

EVENTS DIARY

CLUB NEWS

DEADLINE - Items for inclusion in the **June** 1994 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

NORTH BRISTOL ARC - 1, **NO MEETING** (Good Friday); 8, Committee meeting; 15, Chat & relax; 22, How to use an SWR Meter; 29, Naval Communications by Lt/Cdr R Love, RNR. Club meets every Friday at 7 Braemar Crescent, Northville at 7pm. Details 0272 513573.

RSGB CITY OF BRISTOL GROUP - ***NEW VENUE*** now New Friends Hall, Purdown, Bell Hill, Stapleton, Bristol, BS16 1BG; 26, Somerset range of Kits by Tim Walford. Details G4NKT 0272 672124.

SHIREHAMPTON ARC - 1 & 8, Club Closed(Easter); 15, Digital Direction Finding by G0CJG; 22, Chat night; 29, PCB Techniques by G4DVV. Details 0272 770504.

SOUTH BRISTOL ARC - 6, 40m Activity evening; 13, 10GHz Exhibition by Bill, G6PJS; 20, Radio Controlled Model Boat Exhibition by Ralph Fletcher; 27, History of WD & HO Wills by Fred, G7LPP. Details 0275 834282.

WESTON-SUPER-MARE - 4, Talk 'Incidents not Accidents - radio operating on a commercial airliner' by John, G0JQN; 18, 'Workshop' night. Details 0934 415700.

BEDFORDSHIRE

SHEFFORD & DARS - Meets every Thursday in the month. Details 0462 700618.

BERKSHIRE

BRACKNELL ARC - 13, Basic Electronics (Contest Stations postponed). Details 0344 420577.

MAIDENHEAD & DARC - 7, Talk 'SSB, four Way Phasing method' by Peter, G4UMB; 19, DIY Satellite TV by Mike, G3VXZ; May 5, Talk & Demo 'Static Electricity' by Paul, G3BGL. Details 0635 863310.

NEWBURY & DARS - 27, Annual General Meeting. Details 0635 863310.

READING & DARC - 10, RoPoCo Contest. (How about a Club team); 14, DF what its all about by G8NXJ and G1JEJ; 28, TBA. Details 0734 733745 after 7pm.

BUCKINGHAMSHIRE

AYLESBURY VALE RS - 6, Surplus Equipment Sale; May 4, Direction Finding by Alan Simmonds. Details 0296 81097.

CHESHAM & DARS - 6, General meeting; 13, Night on the Air (HF & 144MHz); 20, Tech Topic - Computers in Amateur Radio (part 2) by Alan, G6CDV; 27, Construction Contest. Details Ian, G0RTF 0494 676391.

CAMBRIDGESHIRE

CAMBRIDGE & DARC - 1, Club Closed; 8, Imperial War Museum Radio Project - talk by Ron, G4HQD; 15, Talk 'A home brew HF Transceiver' by Mark, G4AXX; 22, Talk 'The Measurement of Time' by Ian, G4AKD; 29, Operating and Morse training evening. Details 0763 243570.

CENTRAL

DOLLAR ACAEMY ARC - Meets most afternoons at the Academy after 5.15pm. Details GM0LOD 0259 742126.

STIRLING & DARS - Meets every Thursday at 7.30pm in the Clubrooms, Bandeath Industrial Estate, Throsk, Nr Stirling. Morse instruction available when requested. Details 0324 636235.

CHESHIRE

MID-CHESHIRE ARS - 6, On-Air/Construction night; 13, Rally Planning night; 20, tba; 27, Rally planning night; May 2, Midcars Rally, Winsford. Details 0606 331210.

CLWYD

RHYL & DARC - Club meets every 1st and 3rd Monday of each month, WRVS Centre 116, Vale Road, Rhyl at 8pm. Details 0745 351362.

WREXHAM AMATEUR RADIO - 5, Talk 'Antenna Maintanance'; 19, Quiz Night; May 3, Annual Constructors Contest. Details 0978 845858.

CO ANTRIM

CARRICKFERGUS ARG - 19, Quiz night in Downshire Secondary School at 7.30pm. All are welcome. Club meets every Tuesday at 7pm. Details 0960 351807.

CO DOWN

BANGOR & DARS - 8, Presentation on 'Workshop Practice' by Crawford, GI0EZD and Harry, GI4JTF; followed by judging of the Construction Contest. 8pm at Winston Hotel, Queens Parade, Bangor. Visitors welcome at all meetings. Details Keith, GI0SSA 0247 883315.

CORNWALL

CORNISH RAC - 7, Annual General Meeting. Details 0209 820118.

NEWQUAY & DARS - **Change** Meeting day to be changed from alternate Wednesdays to alternate Friday. Anyone intersted in Amateur Radio is welcome to attend. Details G0KEM 0726 882752.

PENZANCE RAC - Club has regular meetings on Mondays. Details Brian, 0736 61427.

POLDHU ARC GB2GM, GX0PZE - Regular Meetings on Tuesdays and Fridays 7.30pm. Visitors welcome. HF net Wednesdays 7.30pm around 3.75MHz. All welcome. Details 0326 290638.

CUMBRIA

EDEN VALLEY RS - Club meets, ODD months at BBC Club, Penrith. Details 07683 52106.

DERBYSHIRE

BOLSOVER ARS - 27, 1st DF contest; May 18, 2nd DF contest. Details Colin, G0RXT 0246 822856.

BUXTON RA - 12, FD discussion; 26, Talk 'My best radio contact'. Details Derek, G4IHO on 0298 25506.

DERBY & DARS - 6, Surplus Sale; 27, Quiz. Details 0773 856904.

DEVON

APPLEDORE & DARC - 18, Talk 'Tesla' by Ian Moore; meets 3rd Monday of each month, at Appledore Football Clubroom. Details 0237 477301.

EXETER ARS - 11, Quiz Night. ***NEW VENUE** Club now meets in the Moose International Centre, Blackboy Road, Exeter. Details from Ray, G3YBK 0392 78710.

EXMOUTH ARC - 13, Discussion on Licence Conditions (Bring your BR68 with you); 27, Talk 'Amateur Radio' by G3VNG, the local RSGB Regional Liasion Officer (RLO). Meetings are still held at the Scout Hut, Marpool Road, Exmouth on alternate Wednesdays at 7.30pm. Details 0395 279574.

PLYMOUTH RC - 5, A night on the Air (GX3PRC, G8PRC); 12, Knockout 1st round of the Club Quiz; 19, business meeting and natter night; 26, Quiz - final night. Details 0752 563222.

TORBAY ARS - 22, monthly meeting (Speaker not yet announced). Details 0803 526762.

DORSET

DORSET POLICE ARS - 7, RAE revision; 21, RAE revision and committee meeting; 23, Wimborne St John Ambulance Badgers visiting HQ. Club meets at Dorset Police HQ on 1st and 3rd Thursday of each month. Details from PC915 Richard Newton, Ferdown Police Station, Dorset on 0202 229351.

FLIGHT REFUELLING ARS - 3, Video presentation by G4FDS; 10, DF and the wild life by G4NWJ; 17, The Little Brown Book by G4VCQ; 24, Construction Trophy. Details G4POF 0425 653404.

SOUTH DORSET RS - 5, Annual General Meeting, constructors competition and presentation of society's awards. Meets 1st Tuesday of every month. New members and visitors welcome. Details from Mike, G7HNY 0305 773860.

DYFED

ABERYSTWYTH & DARS - 14, Raynet AGM at 7.30pm followed by more construction from Les, GW3SON. Club meets 2nd Thursday each month at 8pm, Scout Hut, Plascrug Avenue, Aberystwyth. Details 0545 580675.

EAST SUSSEX

CROWBOROUGH & DARS - 24, Talk 'Concorde' by Keith, G8HGM. Details 0892 661807.

HASTINGS E&RC - 20, Junk Sale. Details 0424 830454.

SOUTHDOWN ARS - 11, 'Bring your own Thing' (home brew not essential). Details 0323 484282.

WORTHING & DARC - 6, Question Time; 9, (Sat) Worthing Leisure '94 Exhibition; 13, Video 'DX-Pedition to North Pole' G0UFP; 20, Discussion evening; 24, (Sun) Treasure Hunt. Details 0903 753893.

ESSEX

BRAINTREE & DARS - 4, Construction Contest; 18, TBA. Details 0376 327431.

CHELMSFORD ARS - 5, Talk 'RADAR' plus 'The Atlantic Battle' by Stan Woods, Marconi Historian. Details G0GJS 0245 256654.

LOUGHTON & DARS - 1, **NO MEETING** (Good Friday); 15, Annual General Meeting. Details 081 508 3434.

VANGE ARS - 7, Junk Sale; 14, Steam Trains by Bob, G7JJX; May 5, NO MEETING (Local Elections in hall). Details 0268 552606.

FIFE

DUNFERMLINE & DARC - 7, Natter night; 14, HF operating evening (An ideal time for class "B" amateurs to gain some operating experience); 21, A demonstration of JVFAX, a Weather FAX program by Graham, GM6WBV; 28, The Packet System, a SysOps prespective by Stuart, GM1VBE. Club meets every Thursday at 7.30pm, at the former RAF Radio station at Outh Muir. Anyone intending to visit during the Winter/Spring months are strongly advised to listen to

GB3FF (R0) after 7pm, in case meeting has to be postponed due to bad weather conditions. Details GM0GNT, QTHR.

GRAMPIAN

ABERDEEN ARS - 1, Junk Sale; May 6, Junk Sale. Club meets every Friday at Queen Mother House, Aberdeen. Details 0224 780591.

MORAY FIRTH ARS - Club meets every Thursday at 7.30pm. Details 0343 86395.

GLOUCESTERSHIRE

CHELTENHAM ARA - Meets 1st Friday of each month at Charlton Kings Library. Details 0242 242336.

GREATER LONDON

BROMLEY & DARS - 19, Talk 'TBA'. Details 081 777 0420.

COULSDON ATS - 11, Practical use of Test Equipment by Derek, G6MFM and Dave, G8VXB; May 9, Sale of Surplus Equipment. Details 081 684 0610.

CRAY VALLEY RS - 7, Talk 'Test Equipment' by G0FDZ; 21, Annual General Meeting. Details 081 850 1386.

CRYSTAL PALACE & DRC - 16, Training sessions: workshop practice, design techniques and use of Test gear(hands on experience where possible). Details 081 699 5732.

EDGWARE & DARS - 14, Computer PC's by John, G4RMD; 28, Morse training evening + Station on Air. Details 081 204 1868.

GRAFTON RS - 13, Talk 'An introduction to ATV by Adrian, G0OJY; 27, Half hour Tution on CW, then 'An evening on 2m'. Details 071 272 2328.

KINGSTON & DARS - 20, 'The Seventh Cavalry, the Pogo Stick and a Guide to Personal Communications' by Brian, G8DIU. Details 081 398 1128.

SILVERTHORN RC - Club meets every Friday at 7.30pm. Details Dave, G0KHC 081 505 1871.

SOUTHGATE ARC - 14, The Grand Surplus Equipment Sale; 28, LAR and CS debrief. Details 081 360 2453.

SURREY RCC - 11, Annual General Meeting; May 9, Construction Contest. Details 081 660 7517.

SUTTON & CHEAM RS - 21, Junk Sale; May 19, AGM. Details 081 644 9945.

WHITTON ARG - 22, AGM. Whitton Community Centre, Percy Road, Whitton at 8.30pm prompt. Details G0RNW, QTHR.

WIMBLEDON & DARS - 8, Book Fair. Details 081 540 2180.

GREATER MANCHESTER

ECCLES & DARS - 5, Discussion 'HF NFD Contest'; May 3, Lecture 'Using databases' by G0KLF.. Details 061 773 7899.

MANCHESTER & DARS - 3, Talk 'Fault Finding and repairs' by Ken, G8BEQ. Details G3IOA, QTHR.

SOUTH MANCHESTER RC - 1, Closed; 8, TBA; 15, TNC Clinic; 22, Debate -High Power should be banned; 29, QSL cards by G0BJK. Details 061 969 1964.

TAMESIDE ARS - Now meets every Wednesday night at 7.30pm at the ATC Hut, Moorcroft Street, Droylsden, Tameside. Details from: A N Laughlan, 8 Kempton Close, Droylsden, Tameside, M43 7JL.

GWYNEDD

DRAGON ARC - 4, A sale of Surplus equipment; 18, VK2WAH video and preparation for GB4MD. Details 0248 600963.

PORTHMADOG & DARS - 21, Talk 'Moon Bounce'. Details 0766 770546.

HAMPSHIRE

ANDOVER RAC - 5, Surplus Equipment Sale; 19, Live ATV Demo by Steve, G7DVK; May 3, Quiz night (Salisbury v Andover). Meets at Wildhearn Village Hall, 1st and 3rd Tuesdays of each month. Details 0264 773547 evenings.

FARNBOROUGH & DRS - 13, Shareware for radio amateurs; 27, 27, Component Evening by John, G3KND. Details 0252 715765.

HASTINGS E&RC - 20, Junk Sale. Details (Crowhurst) 830454.

HORNDEAN & DARC - 7, Ordnance Survey by Ray Tarling. Details 0705 472846.

ITCHEN VALLEY ARC - 8, Open meeting & natter night; 22, Visit by Peter Kirby, G0TWW , General Manager RSGB. Other clubs welcome. Details 0703 732997.

WATERSIDE ARS - 26, Annual General Meeting. Meets 4th Tuesday in the month. Details 0703 843491.

HEREFORD AND WORCESTER

BROMSGROVE & DARC - 8, Construction Competition. Details 0562 710010.

BROMSGROVE ARS - 12, Antenna Construction (2m DF); 26, Technical Topics; May 10, AGM. Details 0527 542266.

HEREFORD ARS - Club meets on 1st and 3rd Friday of each month. Details G4MET, QTHR.

VALE OF EVESHAM RAC - 7, Talk 'The work of the RIS, by a visitor from the DTI. Start 8pm at BBC club Evesham. Details 0386 41508.

REDDITCH RC - 14, Visit by C0MJY, Council Member Zone B and G0OWT, RLO, Hereford & Worcester for a talk 'Workings of the RSGB'. Club meets 2nd Thursday each month. WRVS Centre, Ludlow Road at 8pm. Details 0789 762041.

HERTFORDSHIRE

CHESHUNT & DARC - 6, Taking the Can back by Eric, G7PCK; 13, Natter night & Members forum; 20, An introduction to TCP/IP by Dave, G4POI; 27, natter night. Details 0992 464795.

HODDESDON RC - 14, Inter club Dart match (v Stevenage & DARC); 28, Talk and video presented by John Taylor of the Radiocommunications Agency, on the work of the Radio Investigation Service. Details 0920 466639.

STEVENAGE & DARS - 5, Junk Sale,12, Demo/ talk 'Weather Satellites' by Dennis, G1UBO; 19, HF/VHF On Air, Morse Instruction; 26, Video evening (Contact Ralph, G7HFD on 0438 724509 for video directory). Details 0438 350882.

VERULAM ARC - 26, Test Equipment evening. Spectrum Analyser available for checking Tcvr and filters. Visitors and local clubs welcome. Details 081 449 1553.

HUMBERSIDE

GOOLE R & ES - 1, 'On Air' evening; 8, Talk 'ARDF' by Ken, G6YYN; 15, Talk 'Packet' by Neil, G4DBN; 22, Construction evening; 29, Social evening (Old George Inn). Details 0405 769130.

GRIMSBY ARS - 7, Grimsby Packet Group - AGM; 14, Visit & talk 'QRP matters' by Rev George Dobbs, G3RJV. This is an Open meeting to clubs and amateurs from South Humberside and North Lincs; 28, Contest Logging by computer. Details 0472 825899.

HORNSEA ARC - 16, Lecture 'Oscillators' by G8EQZ. Details 0964 534283.

KENT

DARENTH VALLEY RS - 13, talk 'Medical Electronics' by G1UKH; 27, Kent Repeater Group. Details 0474 703322.

DOVER RC - March 30, April 6, & 13, ***NO MEETINGS***; 20, Video choiceb y G7NOR; 27, Annual General Meeting. Meets Wednesday evenings 18.30 - 22.00 during term time. Novice, full RAE and Morse classes. All ages (over 8) welcome. Details 0304 825030.

EAST KENT RS - 7, No Novice class, Novice candidates invited to join club meeting at Parkside. Talk by a member of Nuclear Electric; 24, Short talk 'How I became a Radio Amateur' by Nick, G7FUM, followed by operating session. Details 0227 364606.

MAIDSTONE YMCA ARS - 1, (Good Friday evening) Clearing out shack and aerial repairs; 8, RAE & CW. Operating procedures for new licensees; 15, TBA; 19, Thursday - Dummy Morse test; 22, RAE class and CW. Packet for members use; 26, Tuesday - Dummy Morse test; 29, TBA; May 7, Saturday RSGB Morse Test. Details John, G0RHO.

MEDWAY AR & TS - 1, Meeting night; 15, 'Radar the Heavy Weight Radio' by Alistair, G7IET; May 6, 'Satellite TV' by Colin, G3VTT. Details 0634 710023.

WEST KENT ARS - 1, **NO MEETING**; 15, Annual General Meeting. Details 0892 664960.

LANCASHIRE

BURY RS - 12, 'The Clive Data Base' by Colin, G6WHL and helpers, Rally preparations; 19, Rally discussion; 26, RSGB video. Details 0204 883212.

FYLDE ARS - 12, Equipment Sale; 26, informal evening. Details 0772 635464.

NORTH SEFTON ARC - Meets 2nd Wednesday of each month. Details G1DFT on 0704 579017.

ROCHDALE & DARS - 18, Talk 'Contests' by G3RTU. Meetings held every Monday, except Bank Hols. Details 0706 376204.

LINCOLNSHIRE

GRANTHAM RC - 5, QSL Card night - bring along your QSL cards; 19, Visit to Lincolnshire Police HQ - name to Secretary now! Details 0476 65743.

LINCOLN SHORTWAVE C - 20, Trip to Clayton Forge; May 11, AGM. Details 0427 788356.

LOUTH & DARS - Meet on 3rd Tuesday in month at The Wellington, Louth.. Details G1XWD, QTHR.

SPILSBY ARS - **Change of date of monthly meeting.** Meetings now held at The White Hart Hotel, Spilsby, 1st Thursday in month at 7.45pm. Details 0790 52712.

MERSEYSIDE

LIVERPOOL & DARS - 5, Oliver Lodge Centenary Arrangements; 12, GX3AHD on the Air; 19, Demonstration by Radiocommunications Agency; 26, Surplus Sale; May Novice course Post-mortem. Details Ian, G4WWX, QTHR.

NORFOLK

DEREHAM ARC - 14, Discussion on your own Antennas; May 12, Trip to Eastern Communications. Meets at the St Johns Ambulance Station, Yaxham Road, nr new Tesco in Dereham. Details 0362 691099

ARC FAKENHAM - 5, Video night '75 Glorious Years of the RAF' by Paddy, G0MQU; May 3, Used Equipment Sale. Details 0485 528633.

NORFOLK ARC - 6, Committee meeting, On Air QRP; 'Basic Digital Electronics' by Mike, G4EOL; 20, NoA, Construction QRP, Morse practice; 27, Club Quiz, Sheila, G0KWP - rescheduled from Jan 5th. Details 0603 618810.

YARMOUTH RC - 7, Visit to Happisburg Emporium; 14, informal; 21, Films of Olde Yarmouth; 28, informal; May 5, Used Equipment Sale. Details 0493 721173.

NOTTINGHAMSHIRE

ARC OF NOTTINGHAM - 7, Annual General Meeting; 14, forum & NoA; 21, Fox Hunt Number 1; 28, Construction/Activity night. Details 0602 501733.

MANSFIELD ARS - 11, Talk 'The Novice Licence - a new dimension' by Gerald, G0NRA (Novice Instructor) Meet at The Polish Catholic Club, Off Windmill Lane, Woodhouse Road, Mansfield at 7.30pm. Details 0623 755288.

NORTH YORKSHIRE

HAMBLETON ARS - 14, Practical Ops night; 21, RAE Course; 28, Talk 'Morse Code Revisited' by Tony, G3MAE. Details 0609 776608.

OXFORDSHIRE

OXFORD & DARS - Meets 2nd and 4th Wednesdays of the month. Details 0865 863526.

VALE OF WHITE HORSE ARS - 5, Club meets 1st Tuesday of every month, 8pm, the Fox, Steventon. Visitors Welcome. Details 0235 531559.

SHROPSHIRE

SALOP ARS - 14, A talk by SAS of Oswestry at 8pm; 21, Fox Hunt - chase 1; 28, Construction Competition (under a fiver) at 8pm. Details 0743 361935.

TELFORD & DARS - 6, Morse and equipment evening. Details 0952 588878.

SOMERSET

TAUNTON & DARC - 1, RSGB Video 'CQWW Contest'; 15, QRP by Robert, G3MYM; Other Fridays in month Operating, Morse, discussions. Details 0823 680778.

SOUTH GLAMORGAN

CARDIFF RSGB G - 11, Computer PCB manufacture by John, GW4HWR; May 9, Visit to Rhoose Air Traffic Control. Details 0222 810368.

SOUTH YORKSHIRE

BARNSLEY & DARC - Details 0226 203448 between 6-7pm Mondays, 6-8pm other days.

SHEFFIELD ARC - 4, **NO MEETING**; 5, RAYNET meeting at Sheffield Univ 197 Club; 11, Talk on crashed planes on the moors around Sheffield; 18, Talk by Ron, G4UMQ; 25, Operation of Club's rig and meeting. Details 0742 446282.

STRATHCLYDE

CENTRAL SCOTLAND FM G - 17, Annual General Meeting at the Golden Circle Hotel, Bathgate, West Lothian. Trade Show (open to all) 1100 - 1400 UTC. Business meeting (restricted to members and those joining at the door) 1415 - 1700 UTC. Talk in on S22. Full information from GM3AXX 0560 482720.

PAISLEY (YMCA) ARC - 13, Fuzzle Party; 27, The Junk Sale. Details 0505 335195.

WEST OF SCOTLAND ARS - 1, Club night; 8, Fox Hunting by Jack, GM4COX; 15, Club night; 22, VLC - CAD/CAM 40/30M Tx by G3AXX; 24, Visit to Hunterston Power Station; 29, Club night. Details 0698 350926.

SUFFOLK

FELIXSTOWE & DARS - 4, Easter Monday - ***NO MEETING***; 18, Chocolate Factory Visit, names to Ken, G4RHR; May 2, A talk 'Chinese Cookery' by Paul, G4YQC. Detail 0394 273507(evenings).

IPSWICH RC - 6, Talk and video 'Trinity House' by Colin, G0STW; 13, Social evening; 20 Annual General Meeting; 27, CW evening. Details 0473 742072.

SUDBURY & DRA - 1, Fun Run; 5, Equipment exchange and junk Sale; 19, Natter night. Details 0787 313212.

SURREY

ECHELFORD ARS - 14, Annual General Meeting; 28, Auction Sale. Details 0344 843472.

DORKING & DRS - 26, Lecture and demonstration 'Bonsai Antennae' by Derek, G3GRO at 'Friends Meeting House', South Street, Dorking. Details 0306 631236.

THREE COUNTIES ARC - 13, Talk 'Aeronautical Communications' by Duncan, G1OEQ; 27, Annual General Meeting. Details 0428 606298.

TAYSIDE

DUNDEE ARC - 5, 12, Holiday; 19, Construction night; 26, Lecture by members of MEGS (Morse enthusiasts Group Scotland). Meets on Tuesdays in the College of Further Education, Graham Street at 7pm. Details from GM4FSB, QTHR.

TYNE AND WEAR

HAZELLRIGG ARC - 25, Talk 'Working HF bands'. Meets every Monday, Hazellrigg Community Centre at 7pm. Details 091 264 4608 after 6pm.

WARWICKSHIRE

COVENTRY ARS - 1, NoA and Morse code tuition; 8, Talk (tba); 15, NoA & Morse tuition; 22, Indoor DF contest (2nd round); 29, Preparation for Rally talk-in and NOA & Morse tuition. Meets every Friday, 8pm at Baden Powell House, 121 St Nicholas Street, Radford. Details 0203 311468.

STRATFORD on AVON & DARS - 11, Talk 'Spice-Computer Circuit Simulation' by Clive, G0CHO; 25, Talk 'Cables & SWR etc' by Peter, G3RZP. Meets 2nd & 4th Mondays the Home Guard Club, Main Street, Tiddington, Stratford u Avon, at 7.30pm. Details 0789 450623.

WEST MIDLANDS

ALDRIDGE & BARR BEACON ARC - ***NEW NAME & NEW MEETING PLACE*** (Was the Bar Beacon ARC). New venue Aldridge Central Community Association Hall, Middlemore Lane, Aldridge, Walsall WS9 8AN. Meets 1st & 3rd Mondays in the month. Details G0NOL 0922 36162.

RS of BLOXWICH - 11, VHF/UHF Locator Systems by G0TDF; 25, Talk 'A Low-Power Award' by G0MLY. All meetings and events are Non-Smoking. Details 0922 683877.

SOLIHULL ARS - **New Secretary** Paul Gaskin, G8AYY, QTHR. Details 021 783 2996.(Nov 10th notified)

WEST SUSSEX

CHICHESTER & DARC - 5, Annual General Meeting, also the Talbot Trophy, so bring along your home built equipment; 19, Talk 'Map-making, past and present' by Ray Tarling of the Ordnance Survey. Details (Chichester) 573541.

HORSHAM ARC - 7, Home Brew evening. Details 0737 842150.

WEST YORKSHIRE

DENBY DALE ARS - 6, Talk 'The Duties of an RLO' followed by 'Dangers of drink driving' by Derek, RLO West Yorks; 20, Talk 'A day in the life of the Wakefield Coroner' by David Hinchliff. Postponed from Feb 2nd); 27, (Provisional) Visit to Police Air Support Unit. Details 0484 429238.

HALIFAX & DARS - 19, Talk & video by Peter, G0JKW RAFARS. Details 0274 496222.

KEIGHLEY ARS - 7, Natter night; 14, Talk 'Computer Logging' by G0MDO; 21, NoA, G0KRS & G7KRC; 28, Talk 'Log Periodic Yagis' by G3FDW. Details 0274 496222.

KEIGHLEY ARS Raynet G - 10, - Blubberhouse Moor. Details 0535 645929.

NORTH WAKEFIELD RC - 7, natter night; 14, Talk by Mike Green Crime Prevention Office; 19, Visit to Radio Aire FM Leeds; 21, NoA; 28, Talk 'EME and Meteor Scatter' by John, G0EVT; May 5, Official Opening of the Club new Shack. Details 0924 362144.

SPEN VALLEY ARS - 7, Contest Operating by John, G4RCG; 21, Amateur TV on Air by 'ET' Group; May 5, Spring Surplus Sale. Details 0924 497767.

WILTSHIRE

SALISBURY R & ES - 5, Talk 'Microwave, part 1' by Martin, G8OFA; 12, Marconi Day Planning; 19, Construction evening & Advice Clinic; 23, Marconi Day International, venue to be announced; 26, Marconi Day Debriefing; May 3, Talk 'Microwave, part 2' by G4LDR and G8OFA. Details 0722 330971.

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'.

3 APRIL

LAUNCESTON 8th AR Rally - Launceston College. Doors open 10.30am. Features trade stands, bring and buy and hot snacks. Talk-in on S22. Details Roy, G0IKC 0409 221624 or Rodney on 0566 775167.

28th WHITE ROSE ARS Rally - Allerton High School, Links Lane, Leeds. Submit Morse Test applications to RSGB HQ. Details G7ELS on 0850 690189.

4 APRIL

CENTRE OF ENGLAND Rally, Satellite Computer & Electronics Show - Sports Connection Centre, Leamington Road, Ryton. On Dunsmore, Coventry A45/A423. Doors open 10.30am. Admission £1.50, Senior Citizens £1. Held in two large halls. Over 80 traders, bring & buy. Talk-in on S22. Bar & hot food all day. Ample parking. Details Frank, G4UMF 0952 598173.

10 APRIL

LEISTON ARC Car Boot Sale - Solar Car Park, off Sizewell Road, Leiston, Suffolk. Doors open at 10am to 4pm. A radio-oriented car boot sale. Further details from G3MYA, QTHR.

LOUGH ERNE ARC Mobile Rally - Killyhelvin Hotel, Enniskillen. Doors open 12 noon. Trade stands & bring and buy. Talk-in on S22 by GI0LEC. Details GI6JPO 0365 87761.

SWANSEA ARS Rally - Swansea Leisure Centre, situated on the Swansea/Mumbles coast road, the A4067. Doors open 10.30am to 5pm. Usual attractions, trade stands, bring and buy, repeater groups, operational HF/VHF multimode stations and Talk-in on S22 using GB2SWR. Full catering and bar. Details Roger, GW4HSH 0792 404422.

EVENTS DIARY

16 APRIL

SPRING ALL MICRO Show, Radio Rally and Electronics Fair - Bingly Hall, Staffordshire Showground, Weston Road, Stafford. (A518 Stafford/Uttoxeter Road) Signposted from Jn 14 on M6. Doors open 10am. Features many trade stands covering the computer spectrum. Also accessories, S/ware, books, components, shareware, media, hardware. Radio & satellite and a bring & buy stall. Refreshments, free parking. **RSGB Members half price, £1 off.** Details 0473 272002 or Fax 0473 272008.

17 APRIL

BURY RS Radio Rally - Castle Leisure Centre, Bolton Street, Bury, Lancs. Doors open 11am, 10.30 disabled visitors. Bring and buy, hot food available and bar. Talk-in on S22. For booking forms and more details Laurence, G4KLT 061 762 9308.

CAMBRIDGE Repeater Group Amateur Radio Rally - Philips Telecom - Catering Centre, St Andrews Road, Chesterton, Cambridge. Doors open 10.30am. Trade stalls, bring and buy and the usual Auction. Details Darren Salter 0223 358985 ext 3265 work hours.

MARSKE-BY-THE-SEA Radio Rally - Marske Leisure Centre, High Street, Masrske-by-the-Sea, near Saltburn. Doors open 11am. Usual traders, bring and buy and refreshments. Details Alister, G4OLK, 0642 475671.

23 APRIL

INTERNATIONAL MARCONI Day - Special exhibition station at the Wireless Museum in Puckpool Park, Seaview, IOW. Details G3KPO, QTHR or 0983 567665.

23/24 APRIL

IRISH R & T Society Annual Radio Rally - Jacksons Hotel, Ballybofey, Co Donegal. Large trade presence expected, bring and buy, leisure facilities on site, special accommodation rates available in Jacksons Hotel. Hosts to the Irish Radio Transmitters Society Dinner/AGM on 23/24 April. Details Ken, EI4DW, QTHR or Tel: 074 31109.(UK 010 353 74 31109)

1 MAY

11th ANGLO-SCOTTISH Rally - Tait Hall, Kelso. Doors open 11am. Features the usual traders, bring and buy, catering and many other attractions in historic Kelso. Entrance still one pound. Talk-in S22 via GM4KHS. Details GM4UFP, 0750 20006 after 6pm.

BRITISH AMATEUR TELEVISION CLUB (BATC) Rally. ***NEW VENUE*** The Sports Connexion, Leamington Road, Ryton-on-Dunsmore, Coventry. Details Tel: 0788 890365 or Fax 0788 891883.

2 MAY(MONDAY)

DARTMOOR Radio Rally - Yelverton Memorial Village Hall, Meavy Lane, Yelverton, Devon. Doors open 10.30am. Parking for 600 cars, access for disabled. Trade stands, bring and buy, etc. Refreshments and playground for children. Talk-in on S22. Details Ron on 0822 852586.

MID-CHESHIRE ARS Rally - Civic Hall, Winsford, Cheshire. Doors open 11am, 10.30 for disabled visitors. Full catering facilities. Entry fee: £1. Ample car parking. Details Dave, G4XUV, tel: 0606 77787.

8 MAY

MARS/DRAYTON Mobile Radio Rally - Drayton Manor Park, Tamworth, Staffs on the A4091. Doors open 10.30am. Usual traders, club stands, flea market, car boot area. 'The family rally'. Details G6DRN on 021 443 1189.Trade stands G8BHE 021 422 9787.

10th YEOVIL QRP Convention - Preston Centre, Yeovil. Doors open 9am to 5pm. Traders orientated to QRP kits, components etc. Club bring and buy, Bob's QRP Club stand (bring your QSL's), on Air QRP stations. Talks on propagation, construction, oscillators, RSGB matters. Displays of DIY Rigs, vintage Ham radio and communication equipment. Admission one pound and fifty pence, free car park. Talk-in on S22 by GB2LOW. Details G3CQR, QTHR. Tel: 0935 813054.

15 MAY

DUNSTABLE DOWNS RC 11th Annual National AR Car Boot Sale - Stockwood County Park, Luton. Near Jun 10 M1. 10am to 5pm. Talk-in on 2m. Attractions include admission to the Environmental Open Day, free entry to The Mossman Collection of Horse Drawn Vehicles, Craft Museum and carriage rides. Plot details on 0582 451057 (6-8pm only). Pre booking for plots available until May 8th. Plots can be purchased on the day.

MID-ULSTER ARC PARKANAUR Rally - Silverwood Hotel, Lurgan. Starts at 12 noon. Trade stands, bring and buy, RSGB Book stand, refreshments available. Admission at least one pound. Proceeds in aid of The Stanley Eakins Memorial Fund - to provide additional comforts for pupils at 'Pakanaur School for the Handicapped'. Details Bill, GI7BQH 0693 61298.

21/22 MAY

INTERNATIONAL KITE Festival - With kite aerials flown from the Wireless Museum at Puckpool Park, Seaview, Isle of Wight. Details from Douglas, G3KPO 0983 567665.

22 MAY

The 37th NORTHERN Mobile Rally - Details G0MKK. Tel: 0423 507653 eve.

29 MAY

EAST SUFFOLK WIRELESS REVIVAL (ESWR), East Anglia Radio & Computer Rally - The Maidenhall Sports Centre, Ipswich, Suffolk. Attractions include, Novice stall, RAIBC, BYLARA and Raynet stands. And lots, lots more. Refreshments available. Talk-in on S22 by GB4SWR. (ESWR - a joint Felixstowe & DARS, Martlesham RS & Ipswich RC venture) Details 0394 271257.

PLYMOUTH RC Annual Radio Electronics Fair - Plymstock Secondary School, Church Road, Plymstock, Plymouth. Doors open 10.30am. Over 25 stalls selling electronic, computer and radio components, a large bring & buy stall. Bookstall. Grand raffle. Refreshments available through the day. Admission one pound. Talk-in on S22. Details Derek, G7ESZ 0752 364150.

5 JUNE

SPALDING AR Exhibition & Rally - Springfields Exhibition Centre, Spalding. Doors open 10am. Trade stands, car boot sales, restaurant, ample on-site parking. Details G4TWR 0775 722940 or G7CWM 0775 680447.

6 JUNE

D-DAY EXHIBITION - Details G3KPO, QTHR or 0983 567665.

12 JUNE

The 25th ELVASTON CASTLE National Radio Rally - Elvaston Castle Country Park, nr Derby. Details Ken, G3OCA, 0332 662818. Trader enquiries to Keith, G1ZLQ, 0332 662896.

ROYAL NAVAL ARS Annual Mobile Rally - HMS Collingwood, Fareham. Details Clive, G3YTQ 0705 3327621(daytime) 0329 234143(eve).

19 JUNE

BURY ST EDMUNDS ARS Car Boot Sale - Scout Pavilion Stanton (A143). Open 10am. Trade stands and Raynet supplies. Light refreshments available. Talk-in on S22 by G2JO. Free parking and admission. Details Jim, G0MEV 0359 50271.

DENBY DALE & DARS Annual Mobile Rally - Details 0484 644827.

NEWBURY Car Boot Sale - Acland Hall, Cold Ash, Nr Thatcham, nr Newbury. 9am to 3pm set up after 8am. Plot price: £8. No advanced bookings. Free admission & parking. Talk in on S22 by GB4NBS. Details Richard, G3ZGC on 0635 46241.

25/26 JUNE

WREXHAM Amateur Radio Society Mobile Rally - Details 0978 845858.

26 JUNE

37th LONGLEAT Amateur Radio Rally - Prices to both visitors & trade will be frozen at 1993 levels. Details Shaun, G8VPG on 0272 860422 (office hours), 0225 873098 (eve & weekends), FAX 0272 869387.

NORFOLK RAYNET BARFORD Rally - Village Hall and Playing Field, Barford, 7 miles west of Norwich, B1108. Starts 10am. Trade stands, refreshments, car boot pitches available. Book your pitch now, contact Bill, G4TWT, 0603 427008.

2/3 JULY

HAMFEST-UK - The County Showground, Weston Road, Stafford. Details 0923 893929.

3 JULY

YORK Radio Rally - Tattersall Building, York Racecourse, Knavesmire, York. Details 0904 790079.

9 JULY

CORNISH RAC Rally - Details from Ted 0872 222605 or Ken on 0209 821073.

10 JULY

HORNCASTLE AR Electronics and Computer Fair - Details from G6CZV 0507 522482.

SUSSEX AR and Computer Fair - Brighton Racecourse, Sussex. Details GBVEH, QTHR Tel: 0903 763978 or 0273 417756 office hours.

17 JULY

The 11th McMICHAEL Rally and Car Boot Sale - Trade bookings contact G7JTV 0734 732059 Fax 0734 733721. General details contact Neil, G0SVN or Roy, G4XYN on 0628 25952.

24 JULY

COLCHESTER Radio & Computer Rally - St Helena School, Sheepen Road. Details Richard, G7BIV, QTHR.

1st HUMBER BRIDGE AR Rally - Details & booking contact Roly, G0UKS on 0482 837042.

28-31 JULY(THURSDAY-SUNDAY)

AMSAT-UK Colloquium - The University of Surrey, Guildford. Details from Ron, G3AAJ 081 989 6741.

31 JULY

RUGBY ATS 6th Annual Amateur Radio Rally - Details Peter on 0455 552449 or Steve (for bookings) on 0788 824214.

7 AUGUST

RSGB WOBURN Rally - Details from Norman Miller, G3MVV, 0277 225563.

14 AUGUST

DERBY & DARS Annual Radio Rally - Littleover Community School, Pastures Hill, Littleover, Derby. Details Martin, G3SEJ 0332 556875.

FLIGHT REFUELLING ARS HAMFEST'94 - Flight Refuelling Sports Ground, Merley, Wimborne. Details Richard, G4VCQ 0202 691021.

21 AUGUST

5th GREAT EASTERN Rally - ***NEW DATE*** (organised by the Kings Lynn ARC) - Cattle Market, Hardwick Narrows, Kings Lynn. Details 0553 765614.

WEST MANCHESTER Radio Clubs "RED ROSE RALLY" - Details Dave, G1IOO 0204 24104(evenings only).

29 AUGUST(MONDAY)

SCARBOROUGH Radio Electronics and Computer Fair - The Spa, South Foreshore, Scarborough. Details Ross, G4NZ, 0723 514767.

3 SEPTEMBER

ANNUAL WIGHT WIRELESS RALLY - Details G3KPO, QTHR or 0983 567665.

4 SEPTEMBER

BRISTOL Radio Rally (Incorporting Bristol Computer & Electronics Market) - Details G4YZR 0275 834282.

PRESTON Amateur Radio Society 26th Annual Rally - Details George 0772 718175 or Godfrey on 0772 253810.

TELFORD Radio Rally - Details 0743 249943.

VANGE Amateur Radio Society Rally - Details Stuart, G1VWB 0375 859632.

11 SEPTEMBER

BARTG Rally - Details Peter, G8VXY 021 453 2676.

13th LINCOLN Hamfest - Details Sue, (XYL G8VGF) 0522 525760.

25 SEPTEMBER

HARLOW Amateur Radio Rally - Details Mike, 0850 487863 or Ken 0279 426647(home).

THE THREE COUNTIES Rally - Details G4PQZ 0905 773181.

NORTH WAKEFIELD Radio Club Rally - Details G4RCG 0924 362144 or G0EVT 0924 825443.

PETERBOROUGH Radio & Electronics Society East of England Rally - Bookings and further details contact Ted, G0REM 0733 66471.

2 OCTOBER

GREAT LUMLEY AR & E S Radio Rally, Co Durham - Details Barry, G1JDP 091 388 5936.

7-9 OCTOBER(FRIDAY-SUNDAY)

RSGB INTERNATIONAL HF & IOTA CONVENTION. Details G3NUG. Tel/fax 0442 62929.

16 OCTOBER

HORNSEA ARC (East Yorkshire) Radio Rally - Details Duncan Heathershaw on 0964 532588.

12 NOVEMBER(SATURDAY)

THE ALL MICRO Show - Details 0473 272002.

13 NOVEMBER

MARS-STOCKLAND Radio/Computer Rally - Details Norman, G8BHE 021 422 9787 or Peter, G6DRN 021 443 1189 evenings.

20 NOVEMBER

BISHOP AUCKLAND Radio & Computer Annual Rally -. Details G0PRQ 0388 766264.

27 NOVEMBER

WEST MANCHESTER Radio Clubs 'WINTER RALLY' - Details G1IOO 0204 24104(evenings only).

11 DECEMBER

VERULAM CHRISTMAS Rally - (**NEW VENUE**) Watford Leisure Centre, Horseshoe Lane, Garston, Watford, Herts. Details from Walter, G3PMF on 0923 262180.

GB CALLS

The list below shows all special event stations licensed for operation during this month and up to 8 August. It was taken from the HQ computer on 6 June. These callsigns are valid for use from the date given but the period of operation may vary from 1-28 days.

19 MARCH

GB0LWS	Leicester West Scouts
GB2SW	Science Works

1 APRIL

GB2GMM	Guglielmo Marconi Memorial
GB2SEG	Scottish Expedition Group
GB2SR	Stelar Radio

2 APRIL

GB4HP	Hooton Park
GB4RSG	Raywell Scouts Guides
GB5MEH	Mount Edgecumbe Hospice

3 APRIL

GB0IMD	International Marconi Days

4 APRIL

GB0COE	Centre of England Rally
G0LCP	Langrish County Primary School
GB2NCL	North Carr Lightship

7 APRIL

GB2ESF	Edinburgh Science Festival

9 APRIL

GB2CDT	Coastal Defences
GB2SGS	Suffolk Guides

17 APRIL

B2AMN	Air Museum Newark

21 APRIL

GB4MD	Marconi Day

22 APRIL

GB0GAF	Great Alne Festival

22 APRIL

GB4IMD	International Marconi Day
GB5CB	Chesham Bois - Scouts

23 APRIL

GB0IOW	Isle of Wight
GB1IMD	International Marconi Day

24 APRIL

GB4EA	European Awareness Week

27 APRIL

GB4CRO	Cave Rescue Organisation

30 APRIL

GB1ATV	Amateur TV

25 JUNE

GB4HP	Hooton Park

SILENT KEYS

WE HAVE BEEN advised of the deaths of the following radio amateurs:

EI9J	Mr P J Smyth	03.01.94
G0DDB	Mr A R Galvin	June 93
G0MQZ	Mr M C Dickman	20.08.93
G0RTO	Mr J W Longley	05.01.94
G1BZC	Mr J Willis	
G1OQD	Mr E J Wall	03.07.93
G1XEE	Mr P Harris	
G2DPQ	Mr C W Pettifar	08.02.94
G2FFB	Mr H R Whitfield	15.02.93
G3DFK	Mr T G Thornton	29.11.93
G3JXH	Mr T Dutton	19.01.94
G3KEN	Mr K J Porter	24.01.94
G3KYX	Dr C Maxwell	20.01.94
G3NHM	Mr R S W Manns	
G3RGF	Mr R D Young	June 93
G3YBW	Mr D A Watson	04.01.94
G4IFF	Mr J Tootill	16.01.94
G4IJW	Mr J Woodham	25.01.94
G4KEH	Mr E Frost	28.01.94
G4PXK	Mr A S Nichols	24.01.94
G4XPG	Mr T Groves	12.09.93
G6ZKA	Mr A S Usher	16.11.93
G7OVU	Mr V (Dick) Hallett	14.02.94
G8ADJ	Mr P J Parker	17.01.94
G8AX	Mr T C R Littlemore	27.12.93
G8HV	Lt Cmdr J R D Sainsbury	01.02.94
G8LN	Mr W Kempton	19.10.93
GD6APL	Mr K E Scott	17.01.94
GW3GXY	Mr L J Lester	Dec 92
GW3LIY	Mr R W Price	21.01.94
GW4IQL	Mr H W H Fleischmann	10.12.93
GW4JAT	Mr T A Davies	
OH3NY	Mr I M Paivio	
RS94233	Mr J H Wells	
VE3PT	Mr L Marsh	16.08.93

NOTICE TO OUR READERS

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While the publishers will give whatever assistance they can to readers having complaints, under no circumstances will the magazine accept liability for non-receipt of goods ordered, or for late delivery, or for faults in manufacture. Legal remedies are available in respect of some of these circumstances, and readers who have complaints should address them to the advertiser or should consult a local Trading Standards Office, or a Citizens' Advice Bureau, or their own solicitor.

Readers are also reminded that the use of radio transmission and reception equipment (including scanning) is subject to licencing and the erection of external aerials may be subject to local authority planning regulations.

RSGB – at Your Service

SOME OF THE RSGB'S TEAM OF VOLUNTEER EXPERTS — AVAILABLE TO HELP YOU

Council, Committees and Honorary Officers

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 focussing 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*.

• RSGB Policy Matters (Zonal Council member):-

Zone A (North of England):

Peter Sheppard, G4EJP, 89 St Catherines Drive, Leconfield, Beverley, North Humberside HU17 7NY. Tel: 0964 550397.

Zone B (Midlands):

D. Gourley, G0MHY, 4 The Serpentine, Kidderminster, Worcs DY11 6NX. Tel: 0562 862374.

Zone C (SE England and East Anglia):

Neil Lasher, G6HIU, 8 Highwood Drive, Mill Hill, London NW7 3LY.

Zone D (SW England):

Julian Gannaway, G3YGF, Dean Hill Barn, East Dean, Salisbury, Wiltshire SP5 1HJ. Tel: 0794 40008.

Zone E (Wales):

Clive N Trotman, GW4YKL, 19 Park View, Dolau, Llanharan, Pontyclun, Mid Glamorgan. CF7 9RZ. Tel: 0443 226198.

Zone F (Northern Ireland):

Ian Kyle, GI8AYZ, 1 Portulla Drive, Pond Park Road, Lisburn, Co Antrim BT28 3JS. Tel: 0846 665034.

Zone G (Scotland):

Frank Hall, GM8BZX, 45 Priory Cottages, Lunanhead, Forfar, Angus DD8 3NR. Tel/Fax: 0307 467565.

• For general advice and details on local clubs, or if you don't know who to contact:-

Your RSGB Liaison Officer. See the *RSGB Call Book*, your membership card or *RadCom*, May/June 93.

• Antenna Planning:

Need for permission and how to apply – booklet free to members from the Amateur Radio Dept at RSGB HQ.

Planning application refused – RSGB Planning Panel, via RSGB HQ.

Planning Advisory Committee Chairman: Geoff Bond, G4GJB, QTHR.

• Awards:

For contest awards, refer to the appropriate contest committee. For other awards, enquiries and applications go to either:

HF Awards Manager – Position vacant.

IOTA (Islands on the Air) Awards Manager – Roger Balister, G3KMA, QTHR.

VHF (and Microwave) Awards Manager – Ian L Cornes, G4OUT, QTHR.

• Band Plans and operating practices:

See the *RSGB Call Book* or March 93 *RadCom* for latest bandplans. For policy, contact the appropriate spectrum manager or committee chairman:

HF Manager – Position vacant.

HF Committee Chairman – David Evans, G3OUF, PO Box 599, Hemel Hempstead, Herts HP3 0SR.

VHF Manager – Dave Butler, G4ASR, Yew tree Cottage, Lower Maescoed, Hereford HR2 0HP.

VHF Committee Chairman – Peter Burden, G3UBX, 2 Links Rd, Penn, Wolverhampton, WV4 5RF.

Microwave Manager – Mike Dixon, G3PFR, Woodstock, Gaze Bank, Norley, Warrington, WA6 8LL.

Microwave Committee Chairman – Steve Davies, G4KNZ, 14 Herondale, Birch Hill, Bracknell, Berkshire RG12 7ZT.

• Beacons:

See *RadCom*, Oct 93

• RSGB Contests:

First contact the contest adjudicator (see the contest rules). For policy, contact the respective Committee Chairman:

HF Contest Committee – Chris Burbanks, G3SJJ.

VHF Contest Committee – Bryn Llewellyn, G4DEZ, QTHR.

ARDF Committee – Brian Bristow, G4KBB, QTHR.

• EMC:

Advice on solving breakthrough and other electromagnetic compatibility matters:

Committee Chairman: Robin Page Jones, G3JWI, QTHR.

Local EMC Coordinators - see *RadCom* Feb 94.

• Emergency Communications:

Emergency Communications Officer: Gregg Reilly-Cooper, G0MAM, 0606 783270.

• Exhibition & Rally Committee:

Chairman: Norman Miller, G3MVV, QTHR.

• Honorary Historian:

George Jessop, G6JP, QTHR.

• IEE:

Liaison Officer – Prof Peter Saul, G8EUX, QTHR.

• Intruder Watch (IARUMS):

Non-Amateur Service operation in exclusive amateur radio bands.

Co-ordinator – Chris Cummings, G4BOH, QTHR.

• Licensing:

Licensing Advisory Committee Chairman (RSGB Policy) – Peter Chadwick, G3RZP, 'Three Oaks', Braydon, Swindon, Wilts, SN5 0AD.

Renewals – Subscription Services Limited, PO Box 885, Bristol BS2 8RH.

New Licence Applications - Subscription Services Ltd, PO Box 884, Bristol BS2 8RH. SSL Help Desk – 0272 258333.

• Membership Liaison:

Membership Liaison Committee Chairman – Peter Sheppard, G4EJP (see Zone A above).

• Morse:

GB2CW Co-ordinator – David Pratt, G4DMP, QTHR.

Chief Morse Examiner – Roy Clayton, G4SSH.

• Novice Licence/ Project YEAR:

Hilary Claytonsmith, G4JKS, QTHR.

N.B. For details of training courses and examinations, write direct to RSGB HQ, quoting your postcode.

• Packet Radio:

Datacomms Committee Chairman – Tom Lilley, G1YAA, QTHR.

• President:

Ian Suart, GM4AUP, 37 Meldrum Mains, Glenmavis, Airdrie, Lanarkshire ML6 0QG. Tel: 0236 765937.

• 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*).

• 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.

• Technical queries:

Technical and Publications Committee Chairman: Dick Biddulph, G8DPS, QTHR.

• Training and Education:

T and E Advisory Committee Chairman - John Case, GW4HWR, QTHR.

• Trophies:

Trophies Manager – Bob Harrison, G4UJS, QTHR.

The LAST WORD

PREFIX CENTREFOLD?

I sympathise with John Edwards, GM7NVA (*The Last Word*, March) and was surprised at the Editor's reply. It seemed to be extremely offhand.

I would also like to know what the latest prefix changes are, and yes, I do regularly read the *HF News* section in *RadCom*, but have not seen evidence of that many prefix updates. Moreover, in common with other amateurs, I do not have packet or DX Cluster facilities and the *RSGB Call Book* is out of date when it is printed due to the long lead time.

I have only a very small QRP station, located in a shed in my back garden. My aerial is a simple long wire about 15ft up and my operation is confined to 7MHz. I therefore do not aspire to working DX in the commonly accepted sense; Europe is my playground. So for me at least, and perhaps many others, a pull-out centrefold covering at least the countries of the former Soviet Union and Yugoslavia would be extremely welcome and would not, I am sure, be that costly to produce. You might even get one of the regular advertisers to pay for it.

Dick Chapman G3RHN

[Sorry to have sounded offhanded; it was probably a result of my concern not to use up too much of the precious Last Word *space with my reply. Since, we've two pages this month, I'll try to explain further. I frequently receive letters which ask for additional information in* RadCom*; not only prefixes but maps, lists of abbreviations, repeater lists, GB2RS schedules, pages of basic communications theory, RAE material and so on. There is considerable demand on space in* RadCom *so I try to avoid repeating something which is readily available in popular standard RSGB reference works such as the* UK Call Book, *the* RSGB Handbook, *the* Amateur Radio Operating Manual, *etc. Quite apart from the waste of space caused by this duplication, those who had bought those books would be understandably miffed to see the most useful bits repeated free in* RadCom. *I see the job of the magazine as supplementing those works, not duplicating them.*

I have great sympathy with your desire for up-to-date prefix information about Europe; as a regular HF operator I share your frustration. Unfortunately, these prefixes (particularly in the former countries of Yugoslavia and the USSR) are still changing very rapidly and I fear that any attempt to produce a definitive map would only lead to demands for an update in a very short time. HF News *contains prefix information almost every month, and I recommend January's column, page 18, to anyone confused by the new and (worse) re-allocated former-USSR prefixes. I will discuss with John Allaway the possibility of making this information more accessible, perhaps by including maps which are much scarcer in* HF News *than in former times* - Ed*]*

ADVERTISING OVERPOWERED

G3ROZ (*The Last Word*, March) still possesses the voice of sanity. I remember his articles, in similar vein, in the newsletter of the South Essex Amateur Radio Society ten or so years ago.

The trouble is, advertising copywriters are such skilled manipulators of the 'want' factor. Skimming through *RadCom*, I am momentarily persuaded that a new rig for only £1,849 is absolutely essential for my continued existence as a radio amateur. The life-sized colour picture triggering all kinds of desires and illogical impulses, such as the belief that my credit card, the very personification of negative equity, could cope with a couple of grand over the next two years.

Thankfully, reality takes over when I remember that my second- or third-hand fifteen-year-old valve rig (currently available in large numbers at around £300), which I have successfully serviced and repaired with just a soldering iron and circuit diagram, regularly elicits favourable comments from around the world on its audio quality, and possesses at least five of the advertised super rigs' 'wish factors'.

Well said Steve. Keep the 'amateur' radio flag flying.

Albert Smith G4FMK

EASY CW ON VHF

Fred Barrell pleads for a CW-only VHF rig (*The Last Word*, March 1994). Simple: Start with an ex-PMR rig, throw away the microphone, and away you go. The rest should be easy for a bloke of his calibre.

Paul Thompson G6MEN

AMATEUR INNOVATION

I write in response to your comment tailed to *Data Stream* (March) item about commercial packet radio. You say: "So why does amateur packet have to be so complicated for the end user?" Here's my answer.

One basic code of amateur radio is that it is used for experimentation and self improvement. That sometimes seems to have been forgotten when considering the packet mode.

An attitude seems to have developed that packet radio is to provide a service to users. I'd like to challenge that idea. Is the FSTV enthusiast expected to transmit a professional TV program or should the HF enthusiast provide a 'Gardeners Question time' for their listeners?

No, I think not. Certainly they should operate with listeners in mind, but in these modes all transmitting participants seem to realise that some technical knowledge of the mode is required, and it is the technical aspects of the mode that is of the primary interest.

It is true that packet radio is unique in that it does seem to have advanced to the point where it can provide a reasonably reliable complement to an amateur's 'first choice of mode' (the prime example here is the DX Cluster activity).

But this *does not* excuse the amateur user from learning at least the basics about the mode, and this includes things such as building your own data cables, knowing that the deviation settings are different from those used for voice, and perhaps a more widespread knowledge of basic networking and the OSI models would not go amiss.

Packet radio is a wide subject, and technical specialisms within the mode should, and do develop. We can learn a lot from looking at the commercial world, and I believe they have learned a lot from us. If you do consider yourself to be a basic 'user' don't sit back and expect a service to be provided; even if you are a member of your local packet radio group, and pay your subs you still have a responsibility to learn the basics of the mode to ensure that your station is efficient, and to use the amateur resources effectively. This can seem complicated. That's the challenge of amateur radio.

If you don't want it to be "complicated" buy a commercial packet radio terminal from Cognito, Ram, Paknet, or the like and *pay* for it! That's what they're good at. If you want to be a part of the technical development of the mode and be part of the innovations that we amateurs are achieving, even if they are a little rough round the edges, then use the amateur packet radio network. That's what we're good at.

F Pattinson G7ANH

VIEW FROM THE FLOWERPOT

It is with dismay and disbelief that I read the missive from G3FDW (*The Last Word*, March) alleging a conspiracy perpetrated by G4PIQ, the VHF Contest Committee and the Editor of *Radio Communication*.

From my perspective, I have, along with a group of friends, striven to achieve success in various VHF Committee organised contests for the past 15 years. This has all (of necessity) been done on what I regard as a shoestring budget. My belief is that, as results will show, the Flowerpot Men Contest Group has achieved what could reasonably be described as quietly persistent success.

It is difficult for me to extract from Mr Gibbings' letter precisely where he takes issue with the organisation of contests. Is it that it is possible for someone to invest ". . . between £2,000 and £3,500" in a single-band antenna? It is the belief that county and country multipliers actually ". . . . (make) it possible for the bully boys to more easily win contests from the London area"?

Turning to the first possibility, so what if someone wants to spend a large sum of money in the belief that they can make their station competitive in amateur radio contests? You can take it from me that, regardless of the investment, if you lack the fundamental operating skills and determination to succeed, the investment is meaningless. The belief that the second possibility is feasible is, frankly, laughable. Due to the high activity levels and subsequent QRM it will be a long time before anyone wins a major VHF contest from the London area, regardless of any currently applied multiplier scheme.

When a County and Country multiplier is in effect, I choose to operate portable from Powys, because being away from the centre of activity has a distinct *advantage* under those circumstances. Besides which, it is possible to have contacts with all of the active stations in IO91 and JO01 at 7,9 or 11 points per QSO, rather than the 1 or 3 points which Mr Gibbings is intimating would create an advantage. It should also be clearly understood that the laws of radio physics outlined by Mr Gibbings may be perfectly demonstrable during times of low activity and QRM but are not applicable in a contest scenario.

Please understand that I do not, in any way, attempt to defend the VHF Contest Committee. In my own opinion, they are guilty of many sins, and where appropriate it is my choice to confront them directly with those sins. This, I have found, is far more productive than writing ill-informed and ill-conceived letters to people who have little or no control over such a committee.

Ian Philipps G0RDI

CONTESTED VIEW

With reference to the letter from Mike Gibbings, G3FDW, (*The Last Word*, March), I think that Mike has lost his direction in radio or is it just jealousy? I think that the contest groups whose antennas and linears he refers to are to be praised not knocked, he says that the antennas systems that they use cost thousands of pounds. *So what!* They have to be paid for, the groups have to raise cash to pay for them and the same for most of their equipment, it just does not appear out of thin air and if these guys can get a station like that up and working it's a feather in their hat.

I belong to the North Wakefield Radio Club and we take part in whatever contests we can. We know that we may never win but we take part for the fun and comradeship. We go out to enjoy ourselves and to get the members involved in putting up antennas, getting all the equipment up and running, and picking all the pieces up when the mast collapses! It's all part of the fun of a contest. We do not want to go up to the top of mountains and set up a super mega contest station, we just want to enjoy ourselves. This is what contests are to us, so I would suggest that if G3FDW feels so strongly about the way the contests are run he should pack them in and stop moaning about the contest groups whose dedication to the hobby should be admired by all.

John Muzyka G4RCG,
Chairman North Wakefield RC

DISCONTINUED

Regarding G7JYG's letter (*The Last Word*, March), I remember a few years ago hearing a question put to a panelist on a BBC radio quiz programme: "What does CW stand for in the radio context?". Quickly came the response "Continuous Wave". Wrong! "It stands for Morse", and a point was lost.

R J Buckstone G5JR

RAE COURSES DOOMED?

As an RAE instructor, I am concerned at the trends in Further Education regarding the delivery of RAE courses.

Recently the college where I work as a lecturer became 'incorporated', ie divorced from the local County Council and now funded by the Further Education Funding Council (FEFC). It now appears the college has to run as a business, ie make a profit. The funding from the FEFC depends on a number of factors, amongst which are the number and type of students (full time, part time, evening) and the type of courses offered. It would appear that non-vocational, part-time, evening courses do not count for much with the FEFC and are therefore not to be funded. As a result the only way the RAE course can be offered is if it is 'fully economic', ie the course costs are covered by the students (not forgetting the profit). As these costs are calculated at this college at £45 per hour, a 2-hour class for, say, 28 weeks would work out at about £175 per student, taking an average class of 15.

The Customs & Excise people are talking about adding VAT to non-vocational courses. This would take the cost of an RAE course at this college to over £200. If the cost of the examination fees (approx £35 at the moment) and a few books are taken into account, the result is a formidable expense. As a result, newly licensed Novices will be discouraged from progressing to a Class A or B licences.

Alternatives such as the local community colleges appear to charge comparable fees and they can be expected to be comparable in the future.

This leaves the possibility of local radio clubs putting on the courses but it may be difficult to attract instructors of the required calibre to commit themselves to 60 hours or so, together with the preparation for an on-going year-by-year basis with little reward.

I am worried that just as the Novice licence seems to be getting going with new blood coming into the hobby - these problems with the RAE are bound to thwart the efforts of the Society to encourage more youngsters to take up the hobby.

F Whitehead G4MLL, Novice and RAE instructor

CARAVAN CONUNDRUM

If you are thinking of attending the Elvaston Rally and staying at the adjacent caravan site, read on.

Bookings on all Caravan Club sites are from mid-day to mid-day so if you stay on Saturday night you are expected to leave before noon on Sunday. Naturally if you have come to attend the rally you probably do not wish to leave for home until evening. Provided the warden has sites available on which to place his Sunday arrivals he will generally give permission to overstay but if he already has a full site and everyone wishes to overstay, he cannot give permission or he would have no sites available for his Sunday arrivals. This is what happened in 1993.

Elvaston, in common with many 'non-holiday' sites is well used by weekenders but has relatively few Sunday arrivals so the 'regulars' have come to expect to be able to stay on Sunday afternoon as long as they wish. The warden's solution on being faced with the problem last year was that everyone wishing to stay after noon would have to pay for a further day. This produced a storm of protest; some subsequently tried to get a refund from Caravan Club HQ who refused and stated that the warden was entirely in order.

I think there is little doubt that in 1994 the site will again be full so be prepared to pay for the Sunday night as well as Saturday. I hope to attend again with my van but, being retired, I stay over Sunday night in any case and pack up quietly on Monday morning.

C Drinkwater G3FNK

CARING ATTITUDE

I am presently taking my Novice course. As I am disabled I had put this off for a long time. I was then introduced to Mike Stott, G0NEE, without whose help I would not have been able to pursue this hobby. He has been so very flexible in fitting in with my condition. There are times when I go down to the Torch Centre in Hexham and Mike gives me my tuition there, but at other times I am housebound and it has been no bother to him at all to come to my home to help me with my course. This is at no expense to me, and he must be making round trips of about 90 miles.

I would very much like to thank and compliment the Radio Society on their caring attitude towards the disabled student.

Jonny Kennedy

HARDER MORSE TEST

To Morse or not to Morse, that was the testing question last year. The survey of the amateur world undoubtedly favoured the retention of the test, which I personally support. Many hold the view that with no test the HF bands would become inundated with incompetent operators whilst others are concerned that more needs to be done to encourage new recruits to the hobby. Those who hold the latter view will, like me, be disappointed to learn that the new test, whilst taking the format of a simple QSO, has become much more difficult.

I would be very surprised indeed if the proponents of test retention really wanted the test to be made more difficult and I would ask them to reflect upon the impact of the changes. Mixing letters and numbers is a major problem for the newcomer as anyone who recently passed the old test will confirm. Add to this the increased vocabulary for other special characters, eg BK, CT, AR, KN, VA, /, ? etc and the problem is compounded. The use of Q Codes does not present a serious problem but contractions such as bnd, cndx, wid, fer, rprt, rpt etc can throw you when you are looking for a logical progression to support your ongoing translation.

The old format split the test into plain language and numbers leaving the new 'A' Licensed operator to take on the alphanumeric mixture and language of the air at his or her own pace. World-wide radio broadcasting is undoubtedly the most public way of making a fool of yourself and I would be surprised if history reveals that the freshly licensed amateurs of yester-year burst into instant incompetent CW transmission. Indeed my observation is that the newcomer has to be encouraged to use Morse and sadly many favour the mic and never take to the air with the key.

Having taken up Morse from scratch some 15 months ago I had made reasonable progress but was not ready for the old style test before its demise. I must now face the greater test which I reckon will take me some months to prepare for and I would hazard a guess that the increased difficulty will prove too much for many and the volume of test applicants will fall as will the pass rate.

Cooper Hodge GM7NJY

[For what it's worth, RadCom *June 93 reported a slightly higher pass rate for the new-style test, and a reduction in time taken from nine minutes to four -* Ed*]*

ATV SITE NEEDED

Several radio amateurs in the Midlands are regularly active on Amateur Television and are looking for a suitable site in Birmingham at which to locate an ATV Repeater using the 24cm band. Because the use of microwave frequencies is involved, height is essential to achieve adequate coverage. Although the roof of a high-rise building would be ideal, a location on high ground could possibly be suitable.

A transmitter and other hardware is already available so tests could begin very quickly if a favourable site were offered. All costs would be met by the radio amateurs concerned. If anyone is able to offer a suitable location, please contact Graham Hankins, G8EMX @ GB7SOL, 021-707 4337 or QTHR.

G J Hankins G3EMX

HIGH CHARGE

Last weekend I was shocked when told that children aged *ten* and over must now pay the *full* entrance charge to a Rally hosted by a particular radio club. Whilst radio rallies have generally changed, have the radio clubs that organise them also changed? Has the radio club lost its true purpose, to promote amateur radio?

Like many other fellow novice instructors I give my time and effort free to encourage the future generation of amateurs. May I plead to other rally organisers not to allow this to become a trend. When the cost of a rally or the coffers of a radio club have to be fully supported by 10, 11 and 12-year-old children then the radio club has lost the basic principles of this hobby.

Keith Kahn, G3RTU (Novice instructor - no charge)

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.

NOT REALISTIC

As a Novice Class A Licence holder who has passed the RAE in December 1993, I have been looking at my options. After two years as a mainly HF operator I have worked much DX including W, VK, CX, ZS etc but over the last six months conditions are dropping out for communication on the higher bands, so only the lower bands are workable. Unfortunately the Novice allocation at 30m is 10.130 - 10.140MHz which is filled at most times with Fax, SSB and RTTY. Over the last two years I have only had a handful of QSOs on this band. 80 metres is filled with many big guns, although QRP QSOs can be worked very late at night or early in the morning (but too late and early for many youngsters) and then on 160m the band can be so noisy that 3W and a quarter-wave can't get you above the noise, except when using CW (many contacts I have made on this band have been cross-mode).

So, to a newcomer (Novice) the HF bands don't look too realistic. Surely now we should consider a power output increase to 5W (or even 10W PEP) and allow more frequencies, to include the 14 and 7MHz QRP frequencies.

At the moment the hobby is now taking me closer to VHF and satellite work, but I would still like to use the HF bands now and then, but unless I pay for another Morse test (12WPM) I will have to pay for two licences, ie a G7 call and my current 2E0. Although I am sure I would pass the 12WPM test, why should I be bullied into doing so - and pay more money. Many Hams I am sure could pass the 5WPM test but have to pay for a Novice callsign - why? Surely we can have a half-way HF licence for those who have a Class B, and are capable of running 5WPM and issue them with a new callsign for HF and VHF (of course using the current Novice HF power and frequencies).

With a young family and a small purse it is hard enough convincing the XYL to pay for the licence fee, never mind yet another Morse test etc.

J A Hemming 2E0ACN

DIY CONTEST SECTION

Before I start please be aware that this letter is designed to be constructive towards contesting. When one looks at the results or reports of contests it becomes apparent that there is a very large financial involvement necessary to amass a winning score. "Ah", I hear you mutter, "but there are various sections which are less demanding on either High Street Banking or Flexible Friends?" Very true, but I would like to see another section added to all contests: the 'Homebrew Section'.

At present the deciding factors between sections are the number of operators or the power output. My idea is to have a section in which all the equipment is home-made with the power output of the transmitter not limited to QRP levels.

If the scoring system can be made to give a real incentive to run a home-made station it may be just the answer that we need to encourage more people to get involved with amateur radio by showing them that contests can be fun without spending lots of money on all the latest equipment.

In practice the building of an amateur radio station has never been easier, with dedicated communication ICs being available, component shops in most large cities and the many mail order companies advertising. Coupled with many books and articles on building everything from the audio stage to the 100W RF power output module I am sure that even a single band home-made transceiver can be made in a short time. The thrill and satisfaction of operating a home-made station in a contest must be immense. Just ask any of the QRP gang who use home-made equipment.

Obviously this is just a starting point for discussion and hopefully it will stimulate some response from readers.

Pete Milsom G4GSA

LUCK OF THE IRISH

On 12 June last, conditions were excellent towards GI and GM on six metres. I heard an Ulster lass, callsign GI0P** or GI1P**, with a delightful lilt in her voice, bemoaning the fact that few southern Gs pointed their aerials north-westwards in her direction. She then announced she was going to QSY. But she did not indicate to which frequency!

She should be given to understand that we *do* point her way, and call, when her local beacon is audible, or when there are other indications, but seldom do we get a reply! And neither will she if she pushes off to frequencies unknown.

John Ridd G8BQX

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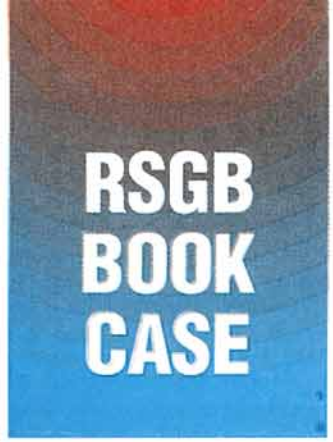

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G4TJB QSL CARDS, CARDS printed to your specifications, send large S.A.E. for samples and full product list. Unit 6, Worle Industrial Centre, Coker Road, Worle, Weston-super-Mare, BS22 0BX. Tel: (0934) 512757, (0850) 707257, Fax (0934) 512757.

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YAESU OR ICOM? FT840 (now £769 cash) is terrific, but IC728 is even better (sold one to son-in-law!). Switchable pre amp, AM filter & variable selectivity — not just IF shift — cash/cheque £875. I/C737 13.5v base station with key pad entry and an auto ATU that actually works! Cash/cheque £1,349. FT990, best rig Yaesu have ever made since 101ZD? Basic DC version with good auto ATU. Cash/Cheque £1,660. AC version + CW filter, £1,919. Keen prices on Yaesu & Icom see below...

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APRIL COUNTER OFFERS. SAJE 400MHz counter (was £105) £79 pp, 1300MHz (was £129) £99 pp. Bench model 1300MHz (was £175) £129 pp cash/cheque. Holdings Amateur Electronics, (G3LLL), 45 Johnston Street, Blackburn BB2 1EF (0254 59595). Normally open Tues, Wed, Fri & Sat. Lunch 12-1.30 pm but phone and check. (Company est 1953).

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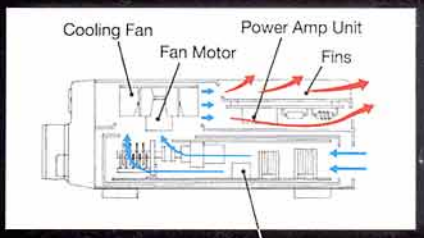

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