Radio Communication

The Journal of the Radio Society of Great Britain

October 1993

Volume 69 No 10

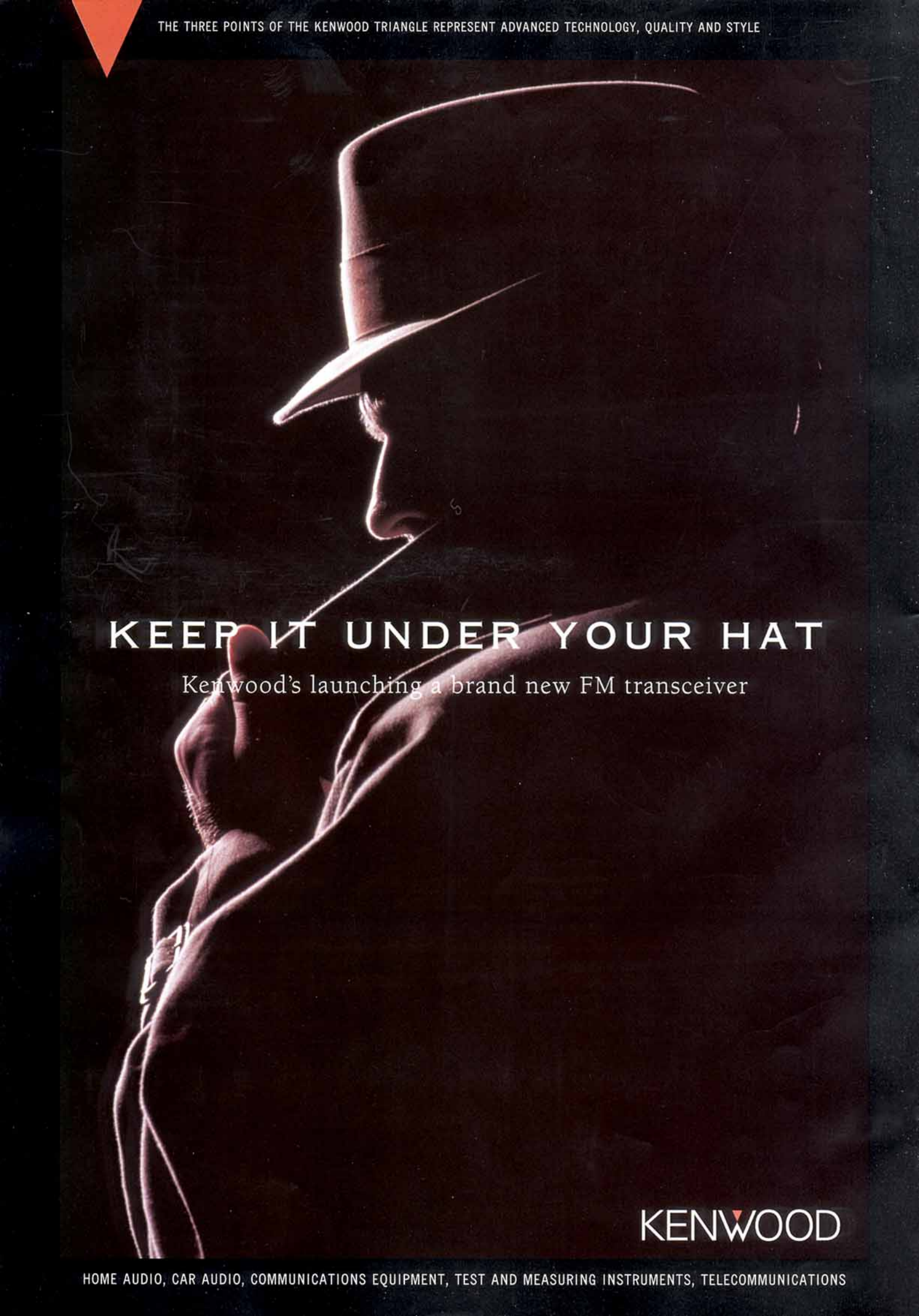
THE VOICE OF AMATEUR RADIO FOR 80 YEARS

RSGB International HF and IOTA Convention

8 - 10 October

Lectures include the AH1A Howland Island Expedition by G4LJF — see page 12

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



HOME AUDIO, CAR AUDIO, COMMUNICATIONS EQUIPMENT, TEST AND MEASURING INSTRUMENTS, TELECOMMUNICATIONS

Managing Editor
Mike Dennison, G3XDV

Assistant Editor
Marcia Brimson

Production Editor
Sid Clark

Technical Editor
Paul Lovell, G3YMP

Technical Illustrator
Derek Cole

Editorial Assistant
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

Radio Communication is published by the Radio Society of Great Britain as its official journal on the first day of the relevant month and is sent free and post paid to all members of the Society.

Closing date for contributions, unless otherwise notified, is five weeks prior to publication date.

Filmset by JJ Typographics Ltd, Southend, Essex.

Printed by Southernprint (Web Offset) Ltd, Poole, Dorset.

RSGB membership at 31 August 1993: 31,061

Radio Communication

NEWS AND REPORTS

TECHNICAL FEATURES

COVER PICTURE:

Amongst the lectures at this year's RSGB International HF and IOTA Convention, expeditioner Ian Shepherd, G4LJF, gives a first-hand account of the AH1A trip. Turn to page 12 for late booking details. Photograph: G4LJF.

REGULAR ARTICLES

LEICESTER SHOW GUIDE

RADIO SOCIETY OF GREAT BRITAIN

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

PATRON: HRH PRINCE PHILIP, DUKE OF EDINBURGH, KG

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

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
Company Secretary: John C Hall, OBE, G3KVA

COUNCIL OF THE SOCIETY
PRESIDENT: P E Chadwick, MIEEE, G3RZP
PRESIDENT ELECT: I D Suart, GM4AUP
IMMEDIATE PAST-PRESIDENT: J T Barnes, GI3USS
HONORARY TREASURER: R P Horton, FCA, G4AOJ

ORDINARY MEMBERS OF COUNCIL
E J Allaway, MB, ChB, MRCS, LRCP, G3FKM
J Bazley, G3HCT
G L Benbow, Msc, CEng, MIEE, G3HB
M H Claytonsmith, G4JKS
J D Forward, MIMgt, G3HTA
J Greenwell, AMIEE, G3AEZ
T I Lundegard, G3GJW
Eur.-Ing. N Roberts, BSc, CEng, MBCS, G4IJF

ZONAL MEMBERS OF COUNCIL
Zone A: P R Sheppard, G4EJP
Zone B: J Allen, G3DOT
Zone C: N Lasher, G6HIU
Zone D: J G Gannaway, G3YGF
Zone E: C Trotman, GW4YKL
Zone F: I J Kyle, GI8AYZ
Zone G: I D Suart, GM4AUP

ANNUAL SUBSCRIPTION RATES
Corporate Members: UK and Overseas (*Radio Communication* sent by surface post): **£32.00.** Airmail rates on request.
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

Get Them To Join

IT GIVES RISE for concern that there has been a drop in the number of Amateur Radio Licences issued over the past twelve months.

This comes at a time when pressures are increasing for frequency allocations to meet commercial needs. In a recent article in a well-known computer magazine amateur radio was dismissed as "trivial" and, for amateur radio to continue to enjoy such a large allocation of frequencies, was "a waste".

There is a danger that as numbers in the hobby fall Government Departments and European Agencies will quickly pick up on this and will be unable to resist the commercial pressure being applied, however vociferous the amateur radio community is in opposition.

The RSGB holds a unique position within the UK in that it is the voice that the Government listens to when dealing with amateur radio matters.

Over 31,000 amateurs are members of the Society. This is over 50% of all licence holders. However, this is not enough. If the RSGB is to be effective in the fight to protect the amateur radio bands, and to increase and protect other benefits we currently enjoy, we need to increase our membership further.

I know that I am preaching to the converted as the majority of people who read this column are already members of the RSGB. However, I feel strongly that all members have a part to play in the 'recruiting drive'. We all know someone who enjoys the same privileges as ourselves, (privileges fought hard for over the years by the RSGB), without being a member of the National Society. Perhaps at times we feel annoyed at this. The clarion call is let's work on these people and get them to join us. *A strong RSGB can protect and promote the amateur radio cause, both within the UK and worldwide.*

I think this is what we all want. The decreasing numbers of licence holders must not be the signal that the hobby is in decline. We all have a duty to promote and encourage new blood into the hobby and to protect amateur radio interests by encouraging the doubters to join the RSGB.

Peter Kirby, G0TWW
General Manager

NEWS & REPORTS

● RECOVERED by Hampshire Police: FT-470, Icom IC-2E, Icom IC-A2, Alinco DJ-580, Alinco DJ-180E, Alinco DJX1 and Icom IC-2SE. If any of these have been stolen from you, contact PC Hastings on 0730 262666, Petersfield Police Station.

● THE UK Counties Award from AMSAT-UK is available to licensed amateurs or short-wave listeners for contacts with 26 UK counties via amateur satellite on CW or SSB. For full information, send five IRCs or US$3 to G7AZP, QTHR.

● ROCHDALE and District Amateur Radio Society will be holding Morse courses on Mondays at 8pm from 4 October. Venue is the Cemetery Hotel, Bury Rd, Rochdale. Details from Dave on 0706 32502.

● GB93AM is sponsored by the Scottish Tourist Board Radio Group and will be on air 17/18 October at the launch of the year-long Airdrie Mod, the 101st Gaelic Festival.

Direct Debit

WE HAVE RECEIVED a number of direct debit mandates from banks, with no indication of who they refer to. Please send these forms to RSGB HQ, *not* to your bank, and use your call sign or RS number as the originator's reference.

Licence Renewals

MEMBERS HAVE asked the Society what they should do if they have not received a reminder from Subscription Services Ltd that their licence fee is due. If your licence is about to expire and you have not received a reminder, the recommended course of action is to send payment together with details of your name, address, callsign and licence expiry date to SSL, PO Box 885, Bristol, BS99 5LF.

Future Renewals

The Radiocommunications Agency has announced that in future licence renewal reminders will be sent out by SSL six weeks in advance, instead of four. However, if this and a final reminder are ignored the licence will be cancelled and pass slips for the RAE and Morse Test (where appropriate) will have to be produced to support the application for reinstatement.

Listener to Novice to Full Licensee to Instructor – at less than sixteen years old.

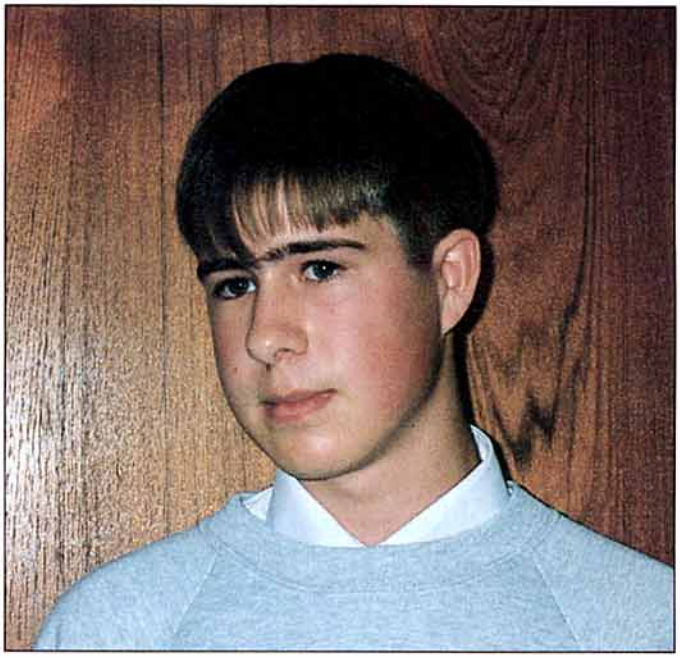
100% Success for Top Youngster

FIFTEEN-YEAR-OLD Tim Munn, G7OTO/2E1AMX, was chosen as Young Amateur of the Year 1993 by representatives of the RSGB and the RA after informal interviews held at RSGB Headquarters on Wednesday, 1 September.

Tim has been interested in amateur radio since he was 10. Through the Isle of Wight Radio Society and with the encouragement of Alan Ash, G3PZB, the Senior Novice Instructor for the Island, Tim's involvement grew, culminating in his passing the Novice exam in January 1992 and the RAE a year later.

To encourage others into the hobby Tim started up a radio club in Sandown High School. Other pupils showed an interest in becoming licensed so Tim applied for, and became, one of the youngest RSGB Novice Instructors. His Novice courses are over-subscribed following his 100% pass rate so far.

He participates in many Special Event Stations including International Marconi Day. He enjoys construction and has made an 80m receiver as well as a 50MHz transmitter/receiver. Packet radio is Tim's main interest: He runs a BPQ node on 2m with plans to be on 70cm and 4m in the future. He has made contacts via 70cm packet as far afield as Australia.



Young Amateur of the Year: Tim Munn, G7OTO/2E1AMX.

Runner Up

THIS YEAR'S runner-up is Simon Kahn, G0STU/2E1AAB, who passed his RAE at the age of 11. In 1991 he passed the NRAE and spent the summer of 1992 learning Morse. In January 1993, on his 14th birthday, Simon obtained his G0 callsign.

Simon, like Tim, is very involved with packet radio – message handling, node operation, DX cluster and TCP-IP use.

He is heavily involved in the Bury Radio Society (G3BRS). At 13 he was elected to the committee and became the society's magazine editor. A keen exponent of the art of CW, Simon has taken an active part in contests, including HF NFD and the IARU HF Contest. He is very keen to involve other youngsters in the hobby and has become an instructor within the Novice Licence scheme.

Runner up: Simon Kahn, G0STU.

Prizes

BOTH YOUNGSTERS will receive their prizes from the RSGB, the RA and Industry at the RSGB HF Convention held at the ICL Beaumont Conference Centre, Old Windsor on 10 October.

New Nevada Catalogue's Just for RSGB Members

ENCLOSED WITH this edition of *RadCom* is a free 48-page catalogue from Nevada Communications. Packed with goodies for the radio amateur, this catalogue has been specially prepared for RSGB members. Nevada's Managing Director Mike Devereux, G3SED, says he's proud to be the first to cooperate with the Society in delivering a catalogue direct to your door. And make sure you keep your copy handy because there's a chance to win one of three super prizes, each worth about £200, if you place any order with Nevada between now and 20 December.

RSGB Microwave Committee Vacancy

THE SOCIETY'S **Microwave Committee** is looking for additional help in a number of areas, in particular maintenance of various databases and records (bandplans, beacons, bibliography, component sources, etc), preparation of exhibition publicity material, and software librarian (public domain software). The committee is also looking for help with technical developments for the lower microwave (2.3, 3.4, 5.7GHz) and millimetre wave bands.

At least one new full member is envisaged, plus one or two corresponding members. The posts are voluntary but essential travel and out-of-pocket expenses are recoverable. A full member would need to attend around four meetings per year in London, while a corresponding member probably only once a year.

Interested members should send a brief resume of their experience and interests and areas where they are keen to help, to the chairman, Steve Davies, G4KNZ at 14 Herondale, Birch Hill, Bracknell RG12 7ZT. Other suggestions or offers of help are also welcome.

AMSAT-UK Fund Raising

AMSAT-UK, the amateur satellite organisation of the UK have informed us that they have recently placed £32,000 into the AMSAT Phase 3D Fund. This has been sent to AMSAT-DL to secure the launch of the Phase 3D satellite in July 1995.

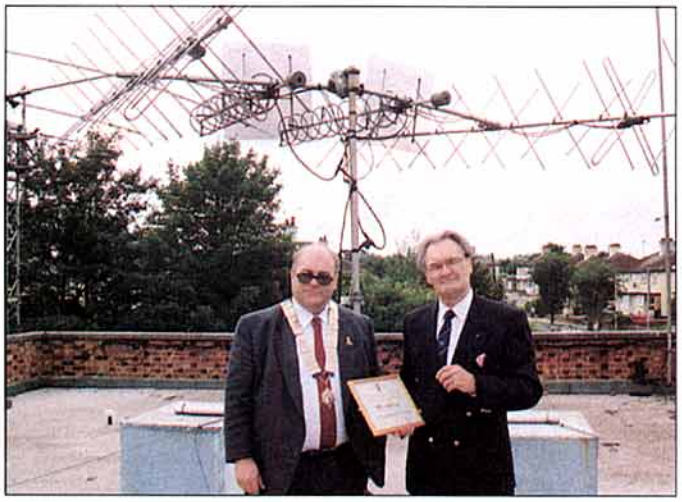
This has somewhat depleted the coffers of AMSAT-UK and donations are sought from any member of RSGB, clubs, schools or other organisations.

Fine Certificate

IF REQUESTED, a very fine laminated certificate will be sent as a receipt for your donation. AMSAT-UK aims to make a final design, building and launch payment of £1M by 1995. Please send all donations to AMSAT-UK P3D Fund, The Secretary G3AAJ, AMSAT-UK, London E12 5EQ, England. Payments can be made by cheque, credit card or cash. All cash donors will be sent a receipt as well as their certificate.

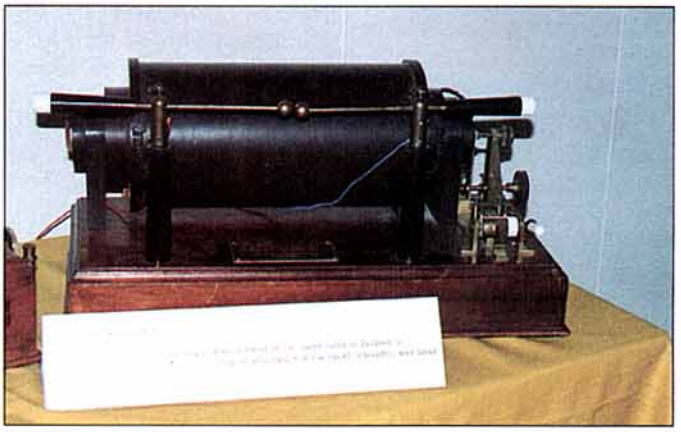
AMSAT-UK are going all out for a membership drive. To this end all new members will, for a limited period while stocks last, receive a free copy of the AMSAT-UK Software *USAT-P* (the Universal Satellite Tracking Prog) by G4FIP. *USAT-P* is normally priced at £12.50 plus VAT and £1.00 postage. This offer is for IBM 5.25in format disk only, unless a formatted 3.5in IBM disk is supplied at time of joining.

RSGB members wishing to join, or re-join, AMSAT-UK should write in the first instance, with a self addressed stamped envelope, for a copy of the *Constitution, Application Form and Services to Members*. This will be returned with a recent copy of the magazine *Oscar News*. Overseas members should include three IRCs.



Ron Broadbent, G3AAJ (right), accepting a donation of £1000 to AMSAT-UK from the RSGB represented by Peter Chadwick, G3RZP. They are shown beside the satellite antennas on the roof of RSGB HQ.

RSGB Past President Len Newnham, G6NZ, and his wife Margaret, G4HSV, on the deck of *HMS Warrior*.



Among some of the oldest items on display was this spark transmitter used by Marconi. It was the first to use an adjustable spark gap.

Old Wirelesses on Old Warrior

AT THE END OF August, a radio exhibition was mounted by the Fareham and District Amateur Radio Club using material supplied by *HMS Collingwood* Wireless Museum and Len Newnham, G6NZ, who was RSGB President in 1958.

The stunning location for this show was the 19th century *HMS Warrior*, Britain's first and last iron-clad warship, which is now a floating museum in Portsmouth Historic Dockyard. Over 1000 visitors a day saw the radio exhibits.

Special event station GB4HMS was established in the original Assistant Surgeon's cabin, running on the HF, VHF and UHF bands with aerials disguised as part of the rigging.

Malvern Hills Repeater

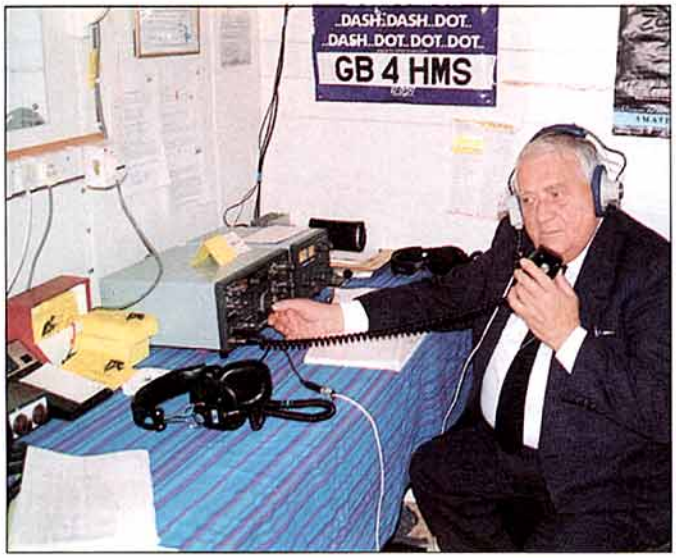
THE MALVERN Hills VHF repeater GB3MH has been on the air for more than twenty years, being one of the very first repeaters in the UK. (The first was GB3PI near Cambridge.)

Throughout that time it has been funded entirely by donations from grateful users. If you have used GB3MH at any time and would like to say "thank you" by contributing to its upkeep, please write to Bob Fisher, G3PWJ, QTHR.

WHARC was at HQ Open Day

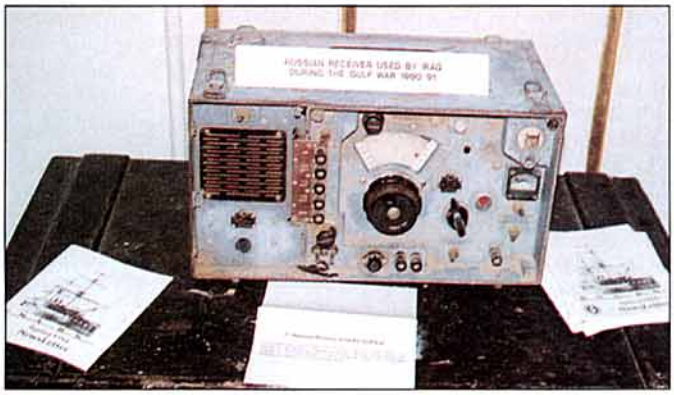
IN OUR report on this most successful event, we inadvertently omitted to mention the Welwyn-Hatfield Amateur Radio Club in the list of those who put on stands in the HQ car park. Our apologies to them.

The WHARC meets on the first and third Mondays each month at 8pm in Lemsford Village Hall, Brocket Road, Lemsford, Welwyn Garden City, Herts. Details from Jeff Dixon, G6YIQ, on 0707 325447.



Ray McLean, G0JVE, from the Fareham and District Amateur Radio Club, operates GB4HMS on board *HMS Warrior*.

Some of the historic items from the G6NZ collection: Receiving valves pre-1922 (rear left); a very early coherer receiver (front right); and Len Newnham's own 10W transmitter of 30s vintage which gave worldwide coverage on the quiet short-wave bands of that day.



One of the more interesting modern exhibits was this Russian receiver used by the Iraqis in the Gulf War.

Fresher's Fair's on Frequency

EDINBURGH UNIVERSITY Amateur Radio Club is running GM7NSD and GM0TSZ during the University's Fresher's Fair which takes place on Wednesday and Thursday, 6/7 October.

The aim is to introduce as many young people as possible to the joys of amateur radio. HF and VHF stations will be operational and contacts with other universities would be especially welcome.

The station will try to show the younger face of the hobby, so if you're young and keen, call Spud McSpadden, GM7NNK, on 031 229 0776 to see how you can help promote the hobby.

Annual Report from the RA

THE Radiocommunications Agency has published its *Annual Report and Accounts* for 1992-3. As usual it is very accessible, containing a wealth of information about the various radio services which the RA provides. Highlights for amateurs are as follows:

The Good News and the Bad News

Out of the 218,545 licences which the RA issued, amateurs have, for the first time in many decades, topped the list with 59,243 licences; ship radios are second with 54,568. In 1991-2 the most licences went to CB radio but these have plummeted by 11,000 during the year.

The report shows that there were 32,410 Class A, 25,791 Class B, 106 Novice A and 935 Novice B licences (plus one repeater licence, issued to the RSGB). Despite gaining the lead overall, amateur licence numbers have dropped for the first time in more than twenty years, a net loss of 2,200. A gain of 617 as a result of the Novice programme was more than offset by losses of 870 Class A and 1,947 Class B licensees.

Changes

Three changes affecting amateur radio are highlighted in the report: The appointment of SSL as the licensing agency, the revised repeater licensing arrangements and the extension of facilities available to Novices.

Prosecutions

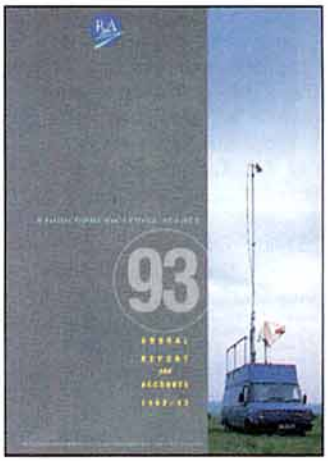
According to the report, during the period 1 April 1992 to 31 March 1993, there were three prosecutions involving amateur radio and these resulted in three convictions. A total of £450 in fines and £500 in costs were awarded by the courts. One order for forfeiture of equipment was made. In addition, two warning letters were sent out. By comparison, of the 203 prosecutions (resulting in 200 convictions) pirate radio accounted for 69, CB FM for 50 and CB AM for 48.

1994 – 96 RLO NOMINATIONS: See page 79

Information Sheets

The report concludes with a list of the leaflets and forms available from the RA. The following amateur radio documents were issued or revised during the year under review:

RA165: Novice Licence Application Form
RA180: Licensing
RA181: Morse
RA182: Amateur radio Call Signs
RA183: Clubs and Societies
RA184: Examinations (RAE and NRAE)
RA185: Local District Offices
RA186: CEPT – UK Licences
RA187: CEPT – Visitors to the UK
RA188: Amateur Radio Licence Application Form
RA189: Application for a Temporary Licence for non-UK Residents
RA190: How to become a Radio Amateur
RA234: Electromagnetic Compatibility and the Radio Amateur



Operate in Romania

THE RA HAS informed us that the Romanian Inspectorate of Radio Communications has implemented CEPT recommendation TR61-01. This means that UK Class A and B full licensees need not apply for a reciprocal licence for short term operation, such as a holiday. YO/ should prefix your own callsign. Similar facilities also apply, of course, to YO visitors to the UK. Licence conditions can be obtained from: General Inspectorate of Radio Communications, 202A Splaiul Indepentei, Bucharest, 77208, Romania; fax 40 1 3124797.

Aerial Auction

IN APRIL we announced that a 144MHz 14-element long Yagi had been donated to the GB0OSH Great Ormond Street Hospital Appeal by Phoenix SMD, and that it would be auctioned by postal bid.

We are pleased to announce that the highest bid was received from the Royal Naval Amateur Radio Society. The aerial is now in their hands and the appeal is £130 better off. Thanks to both Phoenix SMD and RNARS for their generosity.

Any member wishing to make a donation to this worthwhile appeal should send it to: Great Ormond Street Children's Hospital Fund, 19 Great Ormond St, London WC1N 3HZ, making sure the envelope is clearly marked 'GB0OSH'.

Meet the SysOps

THE SOUTHERN User Network Packet (SUNPAC) Group is holding a 'Meet the SysOps' morning on 9 October between 9am and 1pm, near Southampton. The meeting will be informal and is suitable for beginners and experts alike. The event will feature demonstration stations, expert advice, free information sheets, and mini-lectures on topics such as "What can packet do for me?", "The DX Cluster System" and "How to Get the Best out of your TNC".

This is also a good day out for the rest of the family as woodland walks and a family pub with playground are nearby, and the New Forest is a short drive away, too.

The venue has been kindly provided by South Midlands Communications Ltd, whose premises are just off the A335 M3/A33 junction, on the Chandler's Ford Industrial Estate. Phone SMC on 0703 255111 or see local packet bulletin boards for directions, or write to: SUNPAC c/o PO Box 73, Eastleigh SO5 5WG for full details and a map.

Taunton Radio Club is Twenty-Five

TAUNTON AND District ARC celebrates its Silver Jubilee this month. Its first AGM was held on 4 October 1968 in the Technical College, Taunton. At this meeting Chairman D Rowe, G3NNE, welcomed 31 people, 21 of whom were licensed. H P Jones, G3WPS was the club Secretary.

In November 1968, a constitution was agreed and the callsign G3XZW was obtained. The club then affiliated to the RSGB. There has also always been a very close liaison with Raynet.

At one time, there was a close association and regular skeds with Taunton, Massachusetts. A highlight for the club was when Mayor Johnson of Taunton, Mass, paid a civic visit to Taunton, Somerset, in April 1990. To much interest from the media and public, GB0TRC was used to pass fraternal greetings from both mayors to the USA.

Special callsign GB2TRC will be aired during the whole of October. RSGB President Peter Chadwick, G3RZP, and Council Member John Forward, G3HTA, will visit the club on the 3rd.

Highlight of the Taunton and District ARC's first 25 years: In 1990, Mayor Johnson of Taunton, Massachusetts, passed greetings to the USA via special event station GB0TRC, watched by Mayor Richards of Taunton, Somerset and members of the radio club. Chairman D Hall OBE, G5JJ, and Secretary W A Lindsay-Smith, G3WNI (far right), can be seen standing behind Mayor Richards.

Radio's Tops at the ATC II

THE ATC WOULD like to thank some sponsors who were missing from their original report on the Royal Tournament stand covered last month. A TS-950S was loaned by Lowe Electronics Ltd and this fed an AV5 vertical provided by Specialist Antennas.

They also point out that it was originally planned not to operate on 2m, but by popular demand a station was put on thanks to G0KPU. Contacts were made around the London area. A good VHF set up will definitely be on the agenda for next year.

An important visitor was the Air Cadets' Air Officer Commanding who seemed most interested in the Novice licence. He took away several samples from the piles of literature provided by the RA and the RSGB, and a QSL card which was this year sponsored by the British Forces Broadcasting Services.

PHOTOGRAPH: G0JOD

A new feature of the ATC's Royal Tournament stand was a weather satellite display using equipment provided by the Remote Imaging Group. Pictured is Albert Fisher, G4VBH, checking the weather before starting work.

Medway Amateur Receiving and Transmitting Society Secretary, Gloria Ackerley, G7OVI, holidayed in Como where she met avid DXer Paolo, IK2MLY, and his friends. Copies of *RadCom* and *Radio Rivista* were exchanged.

EI Jubilee Award

1992 WAS the Diamond Jubilee of the Irish national society IRTS and an award was available to anyone who worked or heard twenty EI counties during the year. From the UK, 27 licensees and 4 SWLs qualified for the award, including G0KJW and G0LUQ who operated mobile.

● THERE ARE NOW MORE than 600,000 licensees in the United States.

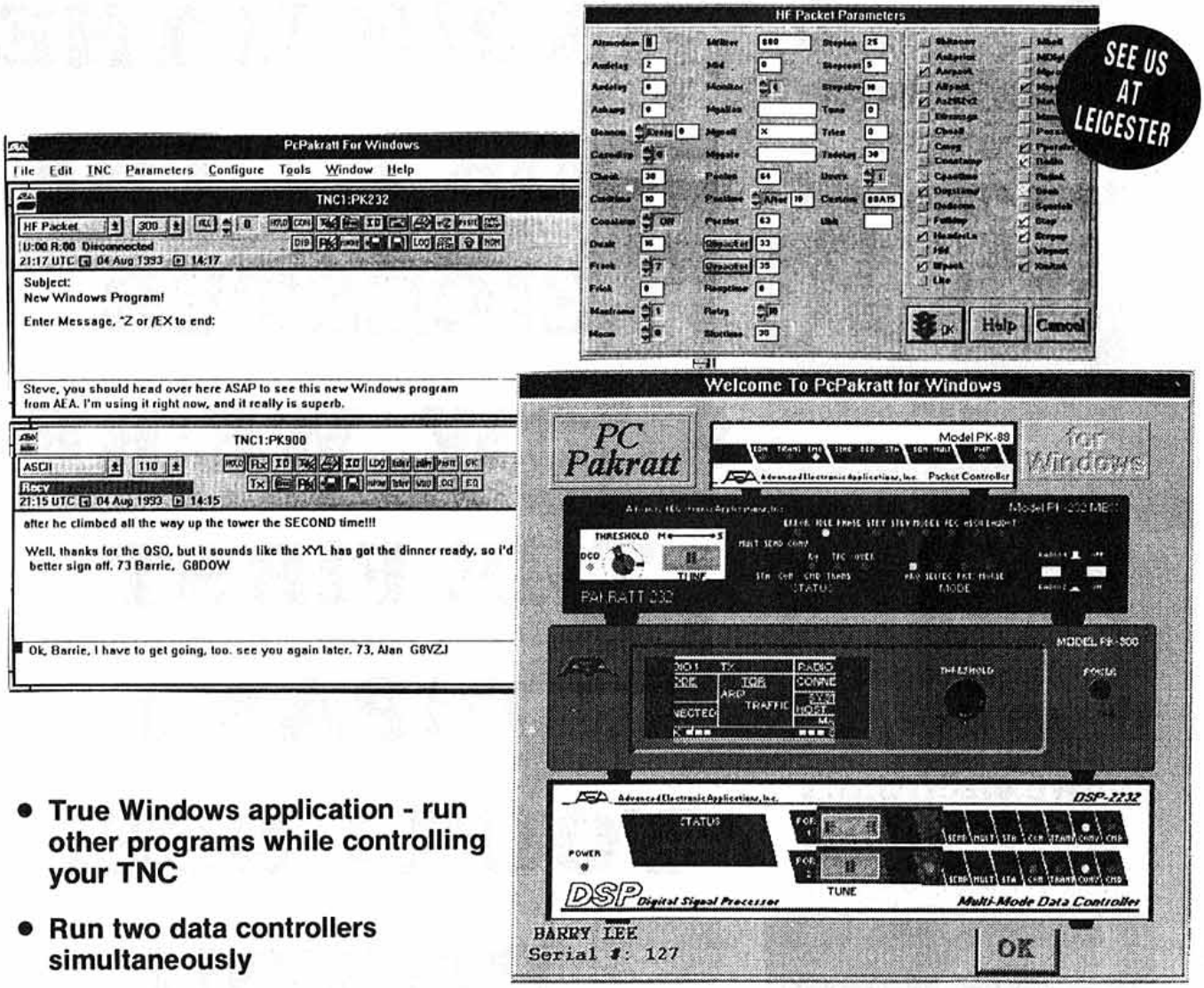
IARU Region 1 Conference

AS WE GO to press, the RSGB team will be on their way to the triennial IARU Region 1 Conference in de Haan, Belgium. A full report on the Conference, including any decisions which affect UK amateurs, will be published in *RadCom* just as soon as it is available.

● NEW HON SEC of Rotarians of Amateur Radio is Donald Cliffe, G0JWE.

PC-PAKRATT FOR WINDOWS HAS ARRIVED!

The Ultimate User Interface for Amateur HF/VHF Data Transmission



- **True Windows application - run other programs while controlling your TNC**
- **Run two data controllers simultaneously**
- **Point and click technology for ease of use**
- **Supports AEA's complete data controller family: PK-232 MBX, PCB-88, PK-88, the DSP 2232/1232 and the new PK-900**
- **The most powerful, complete TNC control program available**

Only £89.95 plus post and packing

PACTOR IS NOW STANDARD ON ALL AEA HF DATA CONTROLLERS.

Upgrades available for existing units.

Call for the latest AEA colour catalogue and price list. See why AEA are world leaders in amateur radio data transmission.

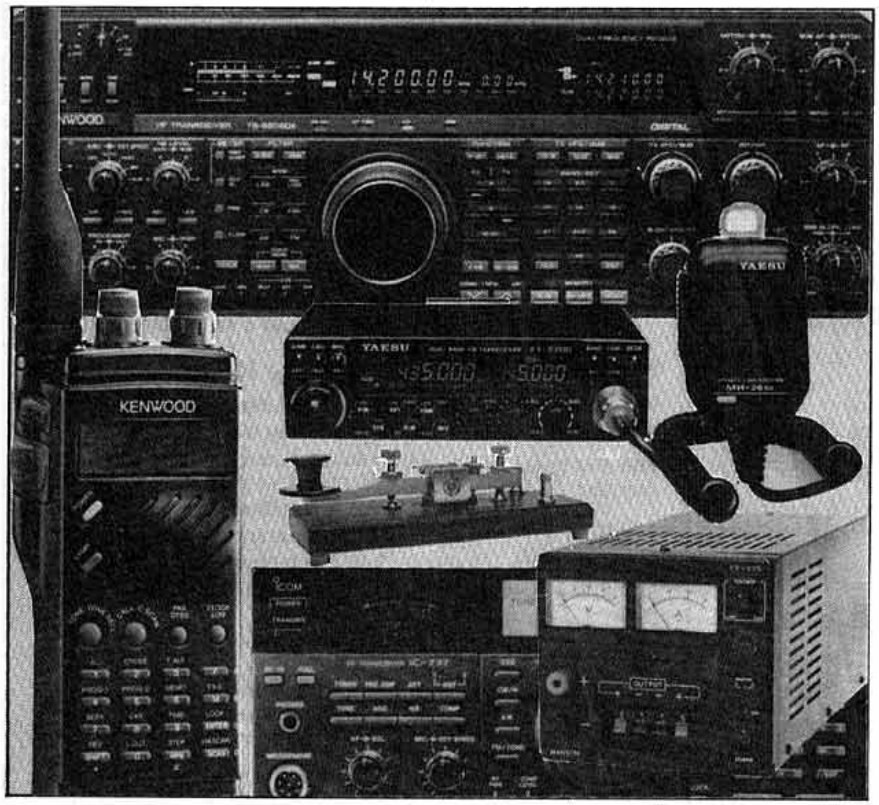
VISA

ICS Electronics Ltd. Unit V, Rudford Industrial Estate, Arundel, West Sussex BN18 0BD
Tel:(0903) 731101 Fax:(0903) 731105

ALINCO, AKD, AOR, ARRL, BARENCO, BENCHER, BNOS, BUTTERNUT, CUSHCRAFT, DATONG, DEECOMM, DEWSBURY, DIAMOND, EMOTATOR, ERA, GLOBAL, HITACHI, HY-GAIN, HIMOUND, ICOM, ICS, JIM, JRC, KANTRONICS, KENT, KENWOOD, LOWE ELECTRONICS (WHO?), MALDOL, MANSON, MFJ, MICROSET, MOMENTUM COMMUNICATIONS, OPTOELECTRONICS, PANASONIC, PERMANOID, REVCO, REVEX, RF CONCEPTS, RF SYSTEMS, RSGB, SIGNAL, SONY, SSC, SSE, TONNA, TOYO, WIN, YAESU, YUPITERU.

ALMOST THE WHOLE A TO Z !!

In that little lot, you'll find HF rigs, VHF rigs, both mobile and hand held, power supplies, rotators, aerial hardware, dummy loads, swr/pwr meters, linears, Morse keys, paddles and keyers, filters, frequency meters, scanning receivers, connectors and connecting leads, antenna accessories like baluns and low-pass filters, books, maps, videos, software, pre-amps, TNC's and other datacomms equipment, test gear, ATU's, HF beams and verticals, VHF beams, verticals and mobile mounts with a huge range of mobile antennas - if it is worth having, you can be sure we've got it - and we can support it!



Leicester's here once again and you're all hoping for fantastic bargains. Well, look no further, we've got 'em all! We've really butchered the opposition for the last few years and this year we will do the same again — but maybe we'll do it differently. See you there, I hope!

REMEMBER!

We stock, display, demonstrate, sell, and more importantly for you, we repair and support everything we sell. Here at Lowe's the emphasis is on support. Professional engineers look after your repairs. Our workshop turn-around time at the moment is under a week — despite guided tours!

AT MATLOCK WE OPERATE THE BIGGEST AND BEST SHOWROOM IN THE COUNTRY, AND OUR FULLY-STOCKED WAREHOUSE MEANS WE CAN RESPOND IMMEDIATELY TO YOUR MAIL-ORDER REQUESTS. BACKED BY THE FINEST ENGINEERS AND WITH EXPERT SALES STAFF, YOU CAN HAVE ABSOLUTE CONFIDENCE THAT WE WILL LOOK AFTER BOTH YOU AND YOUR PURCHASE FOR A LONG TIME TO COME

LOWE ELECTRONICS LTD

CHESTERFIELD ROAD, MATLOCK, DERBYSHIRE, DE4 5LE
TEL 0629 580800 FAX 0629 580020 FAXINFO 0629 580008

SEE US AT LEICESTER

or try our nationwide network of branches.....

BOURNEMOUTH 0202 577760	BRISTOL 0272 315263	CAMBRIDGE 0223 311230
CUMBERNAULD 0236 721004	HEATHROW 0753 545255	LEEDS 0532 452657
MAIDSTONE 0622 692773	NEWCASTLE 0661 860418	PLYMOUTH 0752 607284

International HF and IOTA Convention

8, 9 & 10 October, 1993

The RSGB 1993 HF and IOTA Convention is the second to be held at the Beaumont Conference Centre, near Windsor. The 1992 Convention was judged to be a first class event with a terrific atmosphere in which to meet fellow HF enthusiasts. The 1993 Convention takes another leap forward with a ***full 2-day Lecture Programme plus a 2-day Ladies Programme*** (contact G3PJT – QTHR – for Ladies Programme if not on a package). ***One or two nights accommodation packages are available or Convention registration on its own*** (advance registration for two days cost less). Registration includes: all DX sessions & facilities plus free parking and free hot beverages during the event.

This Year's Convention Will Feature

- **Visitors reception on Friday evening** (prior booking required if not on a package)
- **DX Dinner on Saturday evening** (a sell-out in 1992 – prior booking required)
- **Over 20 high-class presentations**
- **Hospitality suites** by CDXC, HFCC & FOC meeting point
- **RSGB bookstand**
- **Representation from** the RAFARS, UKCWG & AMSAT-UK
- **On the air station** – GB1OTA
- **Morse Tests on demand** from 14:00 – 17:00 (Two passport photos are essential for a test)
- **Amateur Radio Software demonstrations**

Lecture Programme

Saturday 9 October

IOTA Welcome and Introduction – G3KMA & G3ZAY

IOTA First Contest review – IOTA Committee / HFCC

IOTA Policy, Questions & Answers – IOTA Committee

IOTA Holiday operating from Islands

IOTA Serious Island Operation

Computer Contest Logging – EI5DI

DXpedition Videos

40m Phased Arrays – G3PJT

Working DX by HF Satellite Paths – G3IOR

HF Linear Amplifiers – GW3NWS

Recent DXpeditions – 3W3RR

Sunday 10 October

Low Band Antennas – ON4UN

IOTA Queries Workshop

Contest College (2 hours) – HF Contests Committee

IOTA – handling pile-ups

40m Phased Arrays – G3PJT

HF Awards Presentation

Computer Antenna Modelling – G3SEK

Cluster Workshop – G4PDQ (UKCWG)

HF Linear Amplifiers – GW3NWS

KH5/KH5K DXpedition – G0LMX

HF & EMC – EMC Committee

AH1A DXpedition – G4LJF

Young Amateur of the Year Presentation Ceremony

LADIES PROGRAMME – visits to:

Windsor Town Centre (for shopping & Castle) – Saturday

Hampton Court Palace – Sunday

Raffle First Prize

Kenwood TS-50S Transceiver

Donated by Trio-Kenwood UK Ltd

This Year's Convention has been sponsored by:

MARTIN LYNCH G4HKS
THE AMATEUR RADIO EXCHANGE CENTRE

KENWOOD

LATE BOOKINGS

Accommodation Packages:

Tel: 0753 858633
Fax: 0753 832657

DX Dinner and Advance Registration:

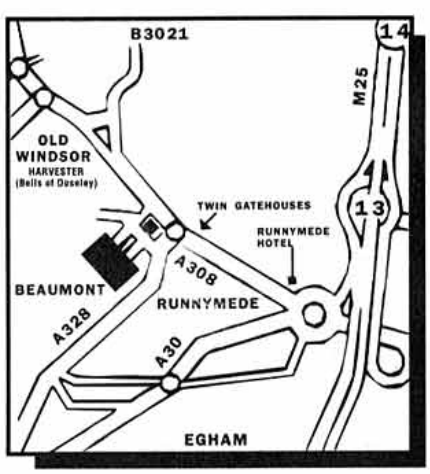
Tel: 0442 832959

Travelling to the Beaumont

By road – The Beaumont is at Old Windsor near the junction of the A308 & A328, within easy reach of the M25, M3, M4, M40, A4 & A30.

By Rail – the nearest stations are Egham, Windsor Riverside and Windsor Central. All are a short taxi ride to the Beaumont Conference Centre

By Air – Heathrow airport is less than 15 minutes drive from the Beaumont by taxi or a friend's car.



HF NEWS

JOHN ALLAWAY G3FKM
10 Knightlow Road, Birmingham B17 8QB

IT IS VERY disappointing to look at lists of contest results because I rarely see the name/membership number of a British *listener*. This is a pity because sorting out callsigns in contests is very good practice for keen DXers ! So – SWL readers – how about it? There is a good opportunity in the VK/ZL/Oceania test to show your mettle.

DX NEWS

ACCORDING TO A *DXAC News Release* dated 12 July from ARRL the DXAC voted 6 'yes' and 10 'no' on the question of adding band or mode-specific Honor Rolls to the DXCC programme. They also voted unanimously against a proposal that would have changed the Countries List Criteria Point 2 (separation by water). The distances would have been reduced from 225 [2(a)] and 500 miles [2(b)] to 100 and 100 miles respectively. Documentation has been approved for the following operations (effective from the dates listed): 4S7/NZ9Z (13.1.93), 6Y5/VE1AI (23.3.93), 8Q7AF (17.3.93), AH1A (25.1.93), D2SA (18.3.93), S75S (28.12.92), TU4EA (14.4.92), T5HLL (15.3.93), VP5/W2IQ (1.1.93), XU7VK (1.12.92), and ZB2JL (8.1.93). It seems that documentation for the 9M0S operation has also been approved and that QSLs may be submitted.

I have received a list of Turkish Amateur Radio Nets. These are operated by TA1A (Unal), TA2B (Cemal), TA2BU (Huseyin), and TA1AN (Yusuf) and take place daily starting at 1600 on 14.270MHz. On Saturday/Sunday at 0800 there is one on 7.092MHz, at 0900 on 28.540MHz, at 1000 on 21.270MHz, and at 1100 on 14.270MHz. CW nets are held daily on 14.030MHz from 1600 and at weekends on 7.015MHz at 0900, 28.015MHz at 1000, and 21.030MHz at 1100.

GW4VIB has forwarded information received from Z32FK (who was operating special station Z30C) that YU5 and 4N5 prefixes are now obsolete and that in future individual amateurs will be given Z31 and Z32 prefixes. Z30 will be used by special event stations. It seems that there may be a problem over future operations from 1A0KM – I0IJ is quoted by *RSGB DX News Sheet* to have said that no amateur activity is planned for the SMOM station in the foreseeable future.

ZX0ECF is located at the **Brazilian Antarctic Base** and according to *DXPRESS* can be found every Monday, Wednesday, and Friday on 14.330MHz for a short time between 1900 and 1930. At weekends he joins the Brazil DX Net on 28.530MHz or on 21.223MHz.

9G1MR, in **Ghana**, is reported to frequent the area of 14.245MHz daily between 1800 and 2000. ZS8MI on **Marion Is** has been appearing quite frequently near 14.195MHz between 1000 and 1100. According to the *Long Island DX Bulletin* 3C1TR, in **Equatorial Guinea** is to be found on 7.062MHz at 0445 and will make schedules for 14 and 21MHz – he often appears near 21.335MHz around 1400.

WA4FGY should be in **Thailand** by now and using his HS0ZBJ callsign. Stations in **S Korea** are permitted to use the HL93 prefix until the end of next month on the occasion of the Taejon International Exposition. There will be a special station at the Exposition which will use the callsign 6K93XPO and a special award will be available to those who work at least one HL93 station. The *Long Island DX Bulletin* gives a list of operating times announced by VQ9AC on **Chagos Is.** They are: 14.153 or 14.260MHz at 0530 and 2000, 7.008MHz at 1200, 21.030 at 1400, and 14.026MHz at 1730.

KH3/NH6D, on **Johnston Is**, is said to be active most days from 0100 to 0400 and again from 1030. He seems to favour 14.005 or 21.005MHz. T32LN is said to be doing construction work on **Canton Is** and he expects to be there several times in the coming months. His likely T31 call is not known.

BEACONS

JOHN TROSTER, W6ISQ, IARU International Beacon Coordinator, says that four more radio societies will be joining the 14.1MHz network soon – Venezuela, Peru, New Zealand, and Sri Lanka. Australia has also been invited to take part. W6WX/B should be back on to the air by now having been completely redesigned and rebuilt by N6EK. It feeds a five band vertical antenna specially designed by Force-12 Antenna Systems. However – it will initially transmit only on 14.100, 21.150, and 28.200MHz because it is not licensed for 18 or 24MHz. It will transmit for one minute every ten minutes on 14.100MHz and then switch to 21.150MHz for a 12 second transmission and then to 28.200MHz for another 21 seconds. The 21 and 28MHz transmissions will repeat every two minutes. The 12 second transmissions will consist of a 'sign on' plus four short power-stepping dashes. The ultimate idea is that transmissions from all beacons on all bands will be for about 12 seconds so that a complete report from all beacons throughout the world can be heard every three minutes. John mentions that he often hears the beacons even when running at their 0.1W level but no other signals coming from the part of the world they are located in – like 28MHz with everybody listening and hearing nothing and declaring the band dead !

DXPEDITIONS

G0GCW RECEIVED a message from VK9CB which said that a German group would visit **Christmas Is** for a one and a half week visit beginning 22 September. After that they will go to **Cocos Keeling Is** for a similar period.

Not exactly a DXpedition but a group of amateurs from Amsterdam will visit Pampus Is in the Ijsselmeer (JO22MI) on 2 and 3 October. Pampus is a fortress built in 1895 as one of a ring of defence works around Amsterdam. The callsigns PA6PAM and PA6PUS have been requested and if you work or hear both stations you can apply for an award (see *Awards*). Likely frequencies are 3.650 – 3.700MHz, 7.050MHz, 14.190MHz, 21.250MHz, and 28MHz. 145.375MHz FM and 144.375MHz SSB will also be used.

According to *RSGB DX News*

continued on page 16 ▶

QTH CORNER

C56V	KD7E, Gary McClellan, 3422 E.Altadena Av, Phoenix, AZ85028, USA.
E31A	JH1AJT, P O Box 8, Asahi-ku, Yokohama 241, Japan.
VR2UW	(formerly VS6UW) P O Box 62316, Kwun Tong Post Office, Hong Kong.
ZS8MI	Christie de Koch, P O Box 244, Stellenbosh 7599, CP, Republic of South Africa.
ZS0PI	via DJ4LK, Roland Hagmann, St Jakobusstr 6, D-7092 Rosenburg, Germany.
9E2A	JH1AJT (see under E31A).

1993 WARC BANDS TABLE

	10MHz	18MHz	24MHz	Total
G3KKJ	122	175	146	443
G3IZD	93	140	115	348
G3IAR	112	136	76	324
G0MHC	55	113	55	223
G2AFV	87	86	48	221
G4XRV	88	–	77	165
G4OBK	64	74	21	159
GJ4GG	35	56	35	126
G4MUW	–	64	36	100
G3IQF	40	29	13	82
G0KDS	2	62	3	67
G4CMZ	17	–	–	17

BAND REPORTS

NOT A VERY GOOD month but no doubt things will be improving by the time that this reaches readers! Thanks go to G2HKU, G3s GVV, IZD, YRM, G4s CMZ, DBN, DJC, GW4KGR, G4s MUW, OBK, G0GCW and G0MHC. As usual callsigns listed in italics were of CW stations:-

1.8MHz	
2100	*ZS1JX, 5B4ADA.*
2200	*C31LL, YB6AVE, Z21HS, ZD8Z, 9M2AX.*
2300	*VQ9AC, 4L1AA.*
10MHz	
1900	*A22XW, C3/F6AUS, RI8AA.*
2000	*HL1IUA, HV3SJ.*
2200	*J3/CT3FN, ZS6QU, 5H3FOE, 7Q7XX.*
2300	*D2EYE, E31A.*
14MHz	
0600	KH6ALF, W6-W7.
0700	5W1GC.
1400	BY5RT.
1700	NL7XO, *4S7WP.*
1800	SU1CS, V73C, ZS0PI, 6O0A.
1900	A41KR, E31A, JA, *OX3GX*, ZD9BV.
2000	A71BV, E22DX, VP8COI, 3C1TR.
2100	A61AC, PY0TM, 9G1SB.
2200	D2SA.
18MHz	
1200	E31A, PJ8AD.
1500	*AD6C, VP5M, 7Q7XX.*
1600	D2EYE, D68CA, 9M2DM.
1700	*ZS9/DJ2ZS/P.*
1800	CN8MC, CY9CWI, VE7IM, YB6AVE, 5N0MRD/6W1.
21MHz	
0700	BZ4RBV, C91AI, ET3DX, TJ1CR, ZS0PI.
0800	FO4OK, ZS8MI, 5W1MM.
0900	HL, HS1BV, P29SC, VS6GA.
1000	ET3SID, KH0AC, P29DX, TR8LVP, 3D2RF.
1100	BY5QA, TL8MS, V63CS, V63OM.
1300	AP2JZB, C91J, V7A, 5H3TW, 6O0A.
1400	A71AN, D2SA, 9V1WW.
1500	YI1MH, 5R8DG, 7Q7JL.
1700	BV0MM, E31A, TU2QW, VP8COI.
1800	ZD7DP, ZS9/DJ0WQ.
1900	FY5FP, TJ1MS, 3X0HHW, 5X1B, 9G1MR.
2100	P43A, 5X1B.

PRESENTING . . .

NEVADA'S 'FREE'

"Nevada . . . the nicest people to do business with!" BOB CORNISH, G0DOK

After nearly twenty five years of serving our British and overseas customers, I am thoroughly convinced that it is the personal touch that is our key to success. Nevada's friendly team are themselves active and LICENCED AMATEURS. They just can't help being genuinely interested in YOUR ideas and problems! The experienced advice and knowledge available at our fully stocked showroom and the guaranteed same-day despatch on mail orders, has put the company at the forefront of the trade.

Now, NEVADA take another giant stride! It is with pride that we publish, in conjunction with the RSGB, a special catalogue for the licenced amateur. In the wrapper with this month's RAD COM is your personal copy. We do hope that you will find it of interest. Note that use of the special order form it contains will automatically enter your name in the monthly prize draw, detailed below . . . a little something we have organised for just a bit of fun!

BCNU at Portsmouth? CU at Leicester?

73 - Mike Devereux

Mike Devereux G3SED
Nevada Communications

HOW TO WIN THESE SUPER PRIZES!

Simply place any order between 20th September and 20th December '93, using the special order form from the Catalogue (photocopies and faxes of the form are OK) and you could win one of these prizes! The lucky winners will be announced in future NEVADA advertisements.

1st MONTH

Up to 20th October

STARTEK ATH30
handheld frequency counter

WORTH £269

2nd MONTH

Up to 20th November

MS1000 Wideband BASE/ MOBILE Receiver

WORTH £299

3rd MONTH

Up to 20th December

CT145
2 meter handheld

WORTH £199

'Pop Your Cork' at LEICESTER!

A FREE BOTTLE OF BUBBLY will be yours if you buy yourself a new or secondhand HF/VHF transceiver from our stand at **LEICESTER**

STAND S34

CHEQUE NOW . . . PAY LATER!

Why not spread the cost of any purchase from NEVADA over 3 months and enjoy **INTEREST FREE CREDIT!** Simply send us three cheques — one dated currently and two more post dated for the following two months and we will supply you immediately. NB. Please see page 13 in the Catalogue for the necessary details!

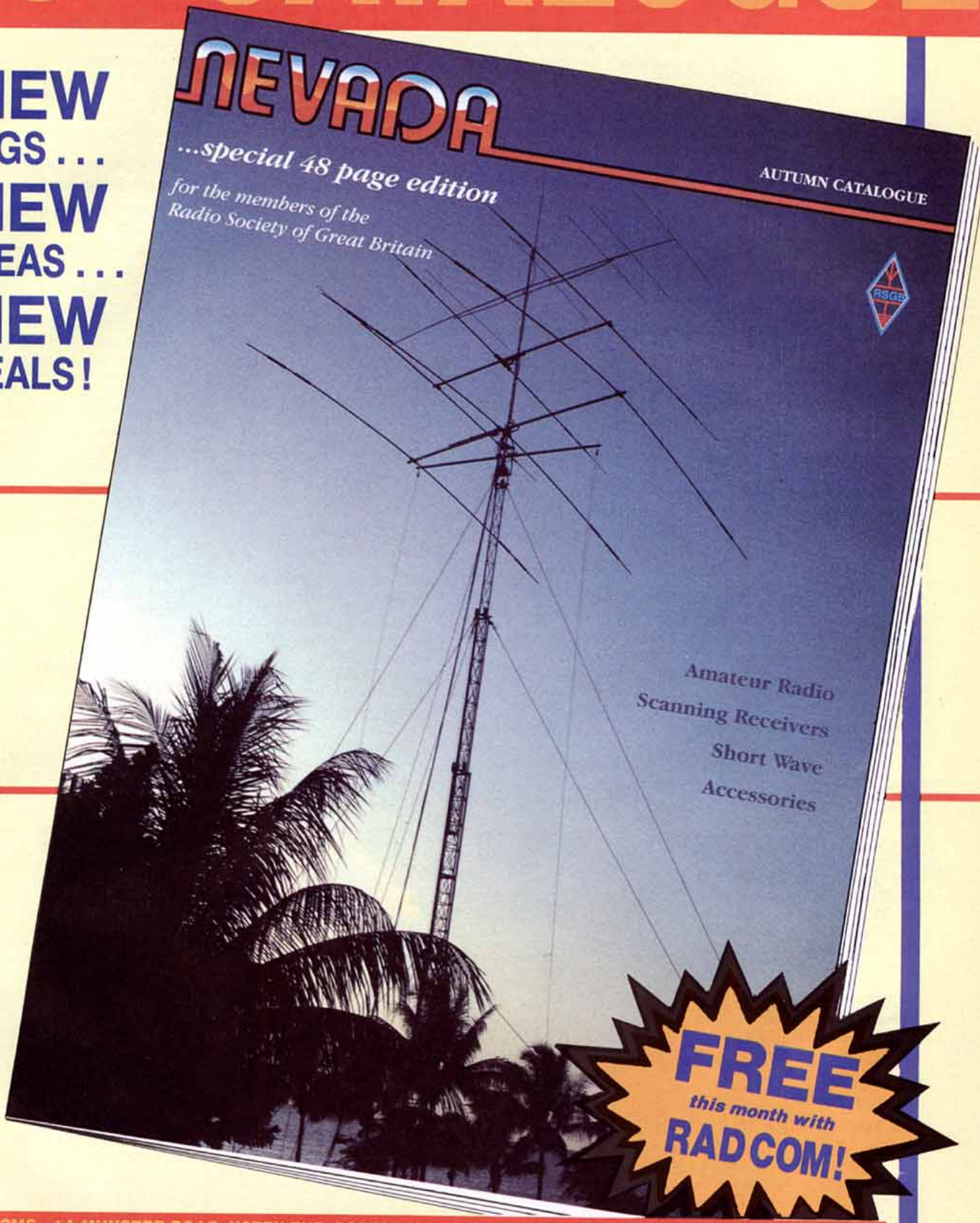
NEW ORDER HOTLINES!

0705-613900
662145

THE FASTEST MAIL ORDER COMPANY VISA RSGB **USE YOUR CREDIT CARDS FOR SAME DAY DESPATCH**

48 PAGE CATALOGUE

NEW RIGS . . .
NEW IDEAS . . .
NEW DEALS!



SHOWROOMS:- 1A MUNSTER ROAD, NORTH END, PORTSMOUTH PO2 9BS
Open Six Days A Week!
MAIL ORDER:- 189 LONDON ROAD, NORTH END, PORTSMOUTH PO2 9AE

HF NEWS

continued from page 13

Sheet a copy of a fax from the Chinese Taipei Amateur Radio League which had been sent to *QRZ DX* said only that an application to operate from **Pratas Is** was still being considered by the Ministry of Communications. In view of the fact that the typhoon season in the area lasts from September until November this could well mean that any expedition would be further delayed. The same news source suggests that the possibility of the island counting separately for DXCC might depend on the accuracy of the map being used when the decision is taken – the critical distance of 225 miles of open water from Taipei is under some doubt.

DXPRESS says that the government of **Yemen** will not issue a licence or operating permission to any intending expedition which contains American operators. This will have an impact on the expedition planned for this month because the support of ICOM and Force 12 Antennas has been suspended. The same source reports that a team of German amateurs will visit **Christmas Is** starting 22 September and continuing for ten days. They then hope to go to **Cocos Keeling Is** until 13 October.

AA7NO, KF7AY, and N7BG, all of the Central Arizona DX

Association, will be in **The Gambia** from 28 October until 3 November and should be active on all bands (including WARC) 3.5 to 28MHz CW and SSB. During the CQ WW SSB DX Contest they will use the callsign C56V, at other times C56/home call. Note that for low-band operation the local sunrise will be at approximately 0615 and sunset at about 17.45.

CONTESTS

1993 VK-ZL-OCEANIA DX CONTEST

1000 2 October – 1000 3 October (SSB)

1000 9 October – 1000 10 October (CW)

1.8 to 28MHz (no WARC bands). Contact as many stations in VK/ZL/Oceania as possible. Single-operator single and multi-band, multi-operator multiband and listener sections. Exchange RS/T plus serial number from 001. Multipliers are the number of different prefixes worked on each band added together. QSOs count 20 points on 1.8MHz, 10 on 3.5MHz, five on 7MHz, one on 14MHz, two on 21MHz, and three on 28MHz. Use a separate log for each band and show new prefix multipliers the first time worked. Logs may be submitted on disk using DOS and an ASCII format but the summary must be on paper. Logs must be postmarked no later than 15 November (SSB) or 22 November (CW) and sent to Peter Nesbitt, VK3APN, VK/ZL/Oceania DX Contest Manager, c/o WIA, Box 300, Caulfield South, Victoria 3162, Australia. Please use air mail and indicate 'SSB' or 'CW' on the envelope. I can supply copies of the full rules.

In the **1992 UBA SWL Competition** (phone) RS 22643 came eighth with 139,821 points, G-ILA097 (13th) scored 118,592, RS 25209 (14th) 106,408, RS 91529 (23rd) 36,890, and G-ILA764 (34th) 8,073. In the CW Section RS 84869 was 13th with 27,606 points, and in the All Mode/Multi-Operator class G-ISWL led with 307,470 points. I understand that there will be no SWL competition in 1994.

THE CQ WW DX CONTEST

0000 30 October – 2400 31 October (SSB)

0000 27 November – 2400 28 November (CW)

All bands (excluding WARC) 1.8 to 28MHz. Categories are single operator single and multiband, multi operator single and multi-transmitter, and QRP (up to 5W *output*). Exchange RS/T plus *CQ* zone (UK is in zone 14). QSOs with own continent count one point, with others three. Own country may only be credited as a multiplier. Multipliers are the total of DXCC and WAE countries plus *CQ* zones worked on each band and added together. Use separate logs for each band and if you make more than 200 QSOs on any band you must submit a 'dupe' sheet. Logs must show date, UTC, station worked, numbers in and out, and points claimed. Clearly mark new multipliers and carefully check for duplicate QSOs – the presence of these can result in disqualification. QRP entrants must mark this clearly on their cover sheet and give the actual power used. All entries for the SSB section must be postmarked no later than 1 December 1993 and for the CW section by 1 January 1994. Send to *CQ Magazine*, 76 North Broadway, Hicksville, NY 11801, USA. Sample log and summary sheets are available from that address in exchange for a large SASE and IRCs. (Unfortunately *CQ* does not provide me with a supply). [See also this month's *Contest Exchange – Ed*]

XVI CONCURSO IBEROAMERICANO

2000 9 October – 2000 10 October

1.8 to 28MHz (no WARC Bands) phone only following IARU band plans. Single and multi operator and QRP (less than 5W output) multiband and listener sections. Exchange RS plus serial number from 001. Three points for QSOs with Latin America, one for other places. Multipliers are Latin American DXCC countries – for the purpose of this contest these include CE, CO, CP, CT, CX, C3, C9, DU, EA, HC, HI, HK, HP, HR, HT, KP4, LU, OA, PY, TG, TI, XE, XX9, YS, YV, ZP, 3C "and DXCC dependencies". Final score is total of points times the sum of multipliers on all bands. All logs go to Concurso Iberoamericano, Concepcion Arenal 5, 08027 Barcelona, Spain, before November 30. I have photocopies of the rules (SASE please).

Bill Ingleby, G4TQV, (r) during a recent visit to Graham, VK6RO. Bill says that Graham and his wife Vera were perfect hosts.

AWARDS

THE HOLYLAND AWARD SCHEME

The Holyland Award is a plaque issued by the Israel Amateur Radio Club to licensed amateurs and listeners. It is a gold anodised aluminium sheet 17 by 12.4 inches in size showing an old panorama of Jerusalem. The award scheme is based on the geographical and administrative division of Israel – it is divided into a grid system of 10km x 10km squares. There are 23 administrative regions. A special record book is available and this contains full information and costs US $10 (or sterling equivalent) from M Webman, 4X4JU, P O Box 8181, Petah Tiqwa, 49651 Israel. Additional material including maps are available for $18 or equivalent. Look for Israeli stations near 7.060, 14.265, 21.320, and 28.655MHz. I do have more information if you are interested – SASE please.

THE PAMPUS AWARD

Work (or hear) PA6PAM and PA6PUS (see above) and send a log extract plus US$5 or £2.10 (no IRCs) to Rob de Visser, PA3AGT, Glorianstraat 17-3, 1055 CV Amsterdam, The Netherlands. The proceeds go towards the restoration of the Pampus fortress.

THE FIELD AWARD

For verified contacts with fields (as defined by the locator system) since it's adoption on 1 January 1985. Listeners may also apply. Bronze requires verified QSOs with 100 fields, Silver 150, Gold 200, Platinum 250, and there is a plaque for 300 fields and a plaque with gold seal for 324. Apply as above.

SWEDISH LOCATOR AWARD - SLA

For verified contacts with *locator squares* since 1 January 1988. Also issued to listeners. Basic award needs 25 squares and stickers are issued at 35, 45, 55, 60, 61, 62, 63, and 64 squares. Apply as above.

I have heard from Steve Hodgson, G0LII/ZD8LII, that after 31 May 1993 the route for Ascension Island Awards will be via G0LII (QTHR).

100 OK & OK SSB AWARDS

I have received notice from CRCC that, due to the split up of the Czech and Slovak Republic, the 100 OK and OK SSB Awards will cease to exist after 2300 on 31 December 1992 and contacts with OK stations after that time will not count towards them. Applications based on valid QSOs will continue to be processed until 31 December 1993 by Awards Manager, CRCC, Box 69, 113 27 Praha 1, Czech Republic. The **S6S** and **P75P** awards will continue to be issued by the Czech Radio Club without any changes.

RTTY WORKED ALL ZONES

For confirmed two-way RTTY contacts with all 40 *CQ Magazine* zones since 15 November 1945. There are single band awards for 3.5, 7, 14, 21, and 28MHz and in this case the starting date is 1 January 1973. Use standard WAZ application forms and send these - with the QSLs - to me for certification together with a suitable SASE for return of the cards and signed application form to you. You then send the application form to John Dionne, K1MEM, 31 DeMarco Rd, Sudbury, Mass 01776, USA.

PROPAGATION

G8KG'S REPORT this month is longer than usual and in it he does a little crystal ball gazing. It goes as follows: "Average solar activity continued to decline in the second half of July and the first half of August with the 27-day average solar flux hovering at or just below the 100 sfu mark and a low of 97 for the period centred on 19 July. This is, of course, the stage in the solar cycle when geomagnetic disturbances often repeat at 27 or 28 day intervals and the period under review ended with one of these. The event of 16/17 August can be traced back through the past eight solar rotations though with varying intensity.

"HF band conditions during the period have been much as reported last month with 21MHz the highest band to provide reliable F2 contacts though when events such as the WAE CW Contest brought out the DX there were some probably F2 plus Es openings to the south.

"With the 1993/94 DX season upon us what are the prospects on the HF bands ? Boulder is currently predicting a smoothed sunspot number of 50 for December this year and a slow decline thereafter. SIDC Brussels using the 'classical' method is slightly less optimistic with the smoothed number down to 40 by April 1994 while the 'SIDC adjusted' value is down to a mere 30 at the end of the year. My own best guess is for an average of in the high 40s during the winter.

"What does this mean for HF band conditions? If you are equipped with a good computer forecasting programme it is only necessary to remember that even if the prediction of the smoothed number turns out to be correct individual monthly numbers may be as much as 50% above or below the predicted value. If you are without such luxuries but have good records, the level of solar activity in the 93/94 season looks like being similar to that in the 1987/88 season so conditions should be generally similar. The main uncertainty is whether this cycle will show a marked increase in geomagnetic activity in its declining phase as did cycles 18 and 20. There is as yet little sign of this but should it happen we could be in for an unsettled time as Cycle 22 has already shown a higher average level of geomagnetic activity than any this century.

"To summarise for the benefit of newcomers, MUFs this winter will be down on average as compared with last year and very much down on those at the cycle peak. Daylight absorption on the lower bands will be less so that signals on a given path will be higher when that path is open but openings will be shorter and less frequent because of lower MUFs. On the higher bands the duration and frequency of openings will be less but not so much so as to prevent even 28MHz from being open for DX working on the better days though the more difficult paths such as those to eastern Australia, ZL, and the US West Coast will be rather short-lived and rare."

THANKS

TO ALL of you who wrote and also to the editors of the following for information extracted : the *Lynx DX Bulletin* (EA2KL), *DXPRESS* (PA3FQA), the *Long Island DX Bulletin* (W2IYX), the *EA DX Boletin* (EA1QF), and the *RSGB DX News Sheet* (G4DYO). Please send everything for the **December** issue to reach me by **20 October.**

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

ALTHOUGH THE Sporadic-E season on 144MHz seems to have ended in July, on 6m there was still plenty to work in August. There is a progress report on a long-term transatlantic test project on 2m, but the main event was the Perseids meteor shower. So let's begin with that.

PERSEIDS 1993

IN THE JULY issue I gave a fairly detailed account of the Perseids meteor stream, referring to the possibility of a 'storm' this year. It is too early yet to make an overall appraisal since relatively few reports have been received. Nevertheless, reflections were significantly up on normal years, a trend observed since 1991.

IMO REPORT

Alastair McBeath, the vice-president of the International Meteor Organization (IMO), issued a preliminary report on 14 August. He prefaced his *Perseid News Update* with: "Europe seems to have been best-placed to catch the highest activity . . . . and predictions of higher than normal activity have been borne out by visual observations from around the world."

Shower rates 3-5 times normal were seen and the visual peak most probably occurred 0315-0345GMT, with 6-10 Perseid meteors per minute. Unfortunately, much of mainland Britain was covered by thick cloud, but Alastair wrote: "I was exceptionally fortunate, since skies miraculously cleared over Morpeth between 0130-0330GMT . . . . and I spotted some 202 meteors (176 Perseids) in that time."

At the peak, much higher rates of bright Perseids were recorded than in past years. Estimates are twice as many negative magnitude (brighter than the star, Sirius) and three times as many fireball-class (brighter than planet Jupiter at its best) were occurring. Alastair recorded trails that lasted for 40s and some that were visible for over two minutes.

Reports from IMO observers from The Canary Islands, through Europe, Japan, California and eastern USA all put the peak at around 0330GMT. A full report and analysis of the shower will be published in a few months time in the IMO's journal *WGN*. For details of the IMO, send an SASE to Alastair McBeath at 25 West Park, Morpeth, Northumberland, NE61 2JP.

RADIO RESULTS

I monitored 144.2 and 144.4MHz till 0015GMT on the 12th. There were frequent short, strong bursts, and some long enough for completion in one burst. Many were calling 'CQ MS' but the majority of so-called contacts were not completed in accordance with IARU Region 1 procedures. To those new to MS mode, these procedures, and what constitutes a valid QSO, are defined in the *Amateur Radio Operating Manual*. [Available from RSGB Sales – *G3FPK*].

The following reports all refer to 144MHz. Colin Morris, G0CUZ (WMD), records the peak around 0200 and reckons it was as good as he can remember. On 12 August, he completed about a dozen random SSB and CW QSOs in the 0000-0400 period, but none of his long distance and difficult skeds came off. He sums up the shower as: "Very good Perseids but not great." His sole new square was the ED5TOR expedition in IN90.

Alec Trusler, G0FIG (SXW), confirms 0200-0400 on the 12th as the best period for reflections but didn't think the shower was any better than in 1992. His biggest disappointment was not completing with G4DHF/TF/P after receiving a 14s burst with both callsigns and a '26' report; he sent 'R26' for eight periods but failed to receive the final 'Rogers.' He completed with 18 stations including S51AT (JN75), EA6FB (JM08) and 9A1EZA (JN86).

Alan McMillan, G4SSO (LDN), concludes it was a pretty average shower after all the media hype. He found conditions chaotic around the two SSB calling frequencies; ". . . . until most of the bigger continental stations decided to spread out and ignore the even minutes calling period." Thereafter: ". . . . business was conducted more or less like a Sporadic-E opening." G4DHF/TF/P, worked in IP24NK on 6 August, was an outstanding signal on 144.215MHz on the 12th as were HG1DRD and F/G0RDI/P who parked nearby. Alan worked UZ2FWA at 0052 and again eight minutes later when he was S9+60dB. He remained S9 for

the next 40 *minutes*. There were plenty of stations on from EA, HA, I, OK, SM and YU.

Between 2314 and 0137 on 11/12 August, Mark Holloway, G4YRY (DOR), completed random QSOs with IK3TPP, GM4ZAP/P (IP90), 9A1CBE, S51JY and IT9TVF. The only way he could make contacts was by keeping off the 144.400MHz random QRG and operating 10kHz higher. Lyn Leach, GW8JLY (GNS), reports that reflections were not as good as he had expected, though conditions were good around 0200 on the 12th. He completed 20 QSOs on SSB with DL, EA, F, I, OM, YU, S5 and 9A stations but only IN90 was a new square.

Edward Allely, GW0PZT (GDD), failed to complete with OH2TI (KP20) on 8 August in spite of receiving six bursts, max 2s, in the 60 min sked. Reflections up to 2100GMT on the 11th were very poor and he did not get on again till 0430 on the 12th, so missed the peak. In a 5 min session from 0613 he completed random contacts with DL3IAV, IK1MTZ (JN35) and I1KTC (JN45), the two Italians being worked in one 40s burst. At 0943, DK1KO (JO53) and SP3MFI (JO91) were worked in a 2.5 min burst. His last Perseids QSO was with IW5CGX at 1400.

On 50MHz, Geoff Brown, GJ4ICD, completed in 6 min with GM4WND/P (IO78) on the morning of the 11th thanks to a 2 min burst. Others worked that morning were G4ZYQ and G4XNS on SSB and G0JHC on CW, all in IO83. Things got going from 2100 on the 11th but the only stations heard around the band plan calling frequency were GM4WND/P and S59AM. Countries worked later were DL, F, G, GM, I, LA, OE, OK, PA, SM, S5, 4U1 and 9A, but Geoff's best DX was OY9JD.

SUMMARY

Astronomers and meteor specialists were quite right to alert us to the possibility of a Perseid storm. It was a pity that this was rather overdone in some newspapers. The IMO issued press releases to the media but as Alastair McBeath wrote: "Media coverage .... was mediocre in Britain. The BBC's main 9pm news did have an almost serious item of reasonable sense tacked on at the very end on 11 August, but then totally ignored what had happened the following day."

Professor Iwan Williams' (Queen Mary and Westfield College, London) model predictions suggest that this year's Perseids should have been almost twice as active as they were and that next year's activity should be twice this year's. However, this shower is a very dynamic one and, after the return of parent Comet Swift-Tuttle last November, it is difficult to make accurate predictions. This year's radio and visual observations will enable the model to be fine-tuned. Meanwhile, please send in more reports.

TRANSATLANTIC TESTS

IN THE MEMORABLE aurora on 13/14 March 1989 Derek Hilleard, G4CQM, then living in Surrey, worked VO1QF on 10m via auroral-E mode. This inspired him to work towards the ultimate goal of the very first 144MHz transatlantic QSO. His present Devon QTH (IO70ST) is 8km from the sea, on a hill sloping to the northwest and Bude Bay.

His original Canadian partner is VE1MQ (FN65) with whom he keeps regular skeds on 20m. Derek monitors the W3VD (FM19) beacon on 28.296MHz to detect transatlantic E-layer propagation. He also monitors the 88-108MHz FM broadcast band. On 25 July at 1409, W3VD was increasing rapidly in strength and unidentified DX stations were copied on the North American Band II frequencies. He telephoned VE1HD (FN96) and set up an MS-type sked for 1430 with 2 min periods. At 1445 a voice appeared in the noise but he was unable to identify any callsigns.

VE1KG (FN84) has also joined the Canadian group. In late July and early August they all agreed on MS procedures, since the IARU Region 1 and 2 protocols differ. At 0925 on 11 August, beacon GB3RAL (BRK) on 28.215MHz was already displaying long MS bursts in the run-up to the Perseids peak. A sked with VE1HD was arranged for 2200-2220 on 144.490MHz SSB during which Derek heard weak, garbled signals coinciding with Clarence's transmit periods.

In a following telephone call, VE1HD said: "I heard you. I recognized your accent. I heard your callsign and mine three S-points above noise in your 2207 period." (I hope that VE1HD made a tape recording of this since I find it almost impossible to believe that Derek's 5kW ERP SSB signal could propagate some 4100km by MS mode. The longest distance meteor scatter contact claimed by a European operator in the *DUBUS* Top List is 2510km. UZ2FWA runs a very big EME station and he is 'only' claiming 2125km).

Further tests were arranged from 2245, four with VE1HD, three with VE1KG and two with VE1MQ. Although significant bursts were observed on the 88-108MHz band at 0035 and 0300, apparently no more identifiable 144MHz signals were recorded at either end.

BEACON NEWS

IN CASE YOU missed the item on page 5 in the September *RadCom*, the Jersey beacon GB3IOJ (IN89WE) on 50.065MHz has failed and will be re-built. As reported in the *GB2RS* News Broadcast on 15 August, GB3ESB (JO00HV) on 1296.970MHz was taken out of service the previous day following the loss of permission to use the site. The Hastings Repeater Group has a new site in mind. The keeper is Mick Worsfold, G4PRJ whose address is correct in the *RSGB Call Book*.

MOONBOUNCE

"THE SUMMER doldrums are upon us," to quote Al Katz, K2UYH, in his August *432 and Above EME News*. However, the first leg of the ARRL EME Contest should liven up things on 9/10 October. VE3ONT, using a 46m dish, will be on 432.050MHz on the 9th, 0445-1830, listening on 432.050-432.060, and next day, 144.029MHz, 0550-1900, QSX 144.025-144.030.

Peter Etheridge, G4ERG (IO93), is QRV on 70cm using four DJ9BV antennas with open wire feed and an MGF1302 preamp. Up to 5 July, he had 49 initials in the log, including two on SSB. Ian White, G3SEK (IO91), is working on his 12 DJ9BV antenna array in his limited spare time.

The only 144MHz report was from G4YRY (IO90); Mark heard G4XBF on 24 July and worked LA8YB on 7 August for initial number 23.

LOCATOR SQUARES TABLE
STARTING DATE: 1-1-1979

Callsign	50MHz	70MHz	144MHz	430MHz	1.3GHz	Total
G4YTL	–	38	279	37	–	354
G0EHV	–	35	191	82	–	308
G1SWH	245	33	179	63	9	529
G4TIF	310	28	207	112	–	657
G0NFH	133	26	101	51	18	329
G4MUT	186	25	158	97	34	500
G3FIJ	17	24	81	27	3	152
GW4LXO	440	23	261	108	48	880
G6MXL	110	23	115	64	28	340
G4OUT	–	21	100	–	–	121
G8LHT	196	20	202	93	17	528
G0EVT	230	12	249	65	1	557
G3IMV	434	15	501	125	52	1127
G6ODT	–	3	57	62	–	122
G7EWL	54	2	79	6	–	141
G4OBK	21	1	45	–	–	67
GJ4ICD	605	1	264	121	68	1059
G6HKM	438	–	240	118	57	853
G4RGK	167	–	319	182	58	726
G6HCV	468	–	250	–	–	718
G0CUZ	125	–	388	80	–	593
G4DEZ	201	–	255	71	62	589
G4SSO	191	–	279	100	–	570
G0JHC	506	–	48	–	–	554
GW6VZW	368	–	143	6	–	517
GU7DHI	363	–	111	5	–	479
G3XDY	–	–	224	153	100	477
G0MGA	249	–	216	–	–	465
G0FIG	200	–	192	46	–	438
G4SWX	–	–	404	–	–	404
G0GMB	66	–	216	108	–	390
G0HVQ	310	–	71	–	–	381
G4RRA	–	–	299	80	–	379
G1UGH	231	–	122	–	–	353
G1GEY	–	–	179	125	35	339
GW8JLY	–	–	277	36	–	313
G8XTJ	176	–	126	–	–	302
GW4VEQ	–	–	267	–	–	267
G3FPK	–	–	246	–	–	246
GW4FRX	–	–	235	–	–	235
G4DOL	–	–	226	–	–	226
GM1XOG	181	–	–	–	–	181
GI1CET	95	–	60	3	–	158
GW0PZT	–	–	157	–	–	157
G7LIJ	–	–	153	–	–	153
G7CLY	70	–	60	2	–	132
G1JDU	93	–	39	–	–	132
GM0GDL	–	–	122	–	–	122
GU4HUY	–	–	81	–	–	81
G0HDZ	11	–	67	–	–	78
GM0NXP	–	–	69	–	–	69
G7JAF	–	–	53	3	–	56
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 October**. Band of the month 70MHz.

432MHZ

WAY BACK in 1968, John Tye, G4BYV (NOR), and G8BAV (DYS) started daily skeds on 70cm using AM, later SSB. They never used more than 50W and a single Yagi and have now passed the 4000 QSO milestone. John has tried many different antennas and the best, so far, is the 13-ele K2RIW design.

G0FIG is QRV on 70cm and Alec's contacts in late July through 19 August include G8PNN/P (IO95), F5JKK (IN87), F6IPR/P (JN27), F6CGB (JN18), F1UO (JN16), F6CGJ (IN78), DL3EAG (JO31) and TM1MH (IN87). With the October contests and cumulatives under way, some activity reports would be welcome. The IARU UHF/SHF contest entries should go to ÖVSV-HQ at Theresiengasse 11, A-1180 Vienna, Austria. The Austrian national society is managing this year's event.

144MHZ

A GROUP of Dutch amateurs from Amsterdam propose to operate from Pampas Island (JO22MI) from 1100GMT on 2 October for 24 hours. This is a fortress built in 1895, one of 42 around Amsterdam. They will be QRV on 144.375MHz SSB and 145.375MHz FM, conditions permitting, as well as the HF bands. For details of the Pampas Award, contact PA3AGT at Glorianstraat 17-3, NL-1055 CV Amsterdam, The Netherlands.

On page 18 in the April *RadCom* I mentioned the Charnwood ARCC's proposal for an AM experiment on 144.5625MHz on 11 July. Mike Mather, G0LBP (LEC), reports that the experiment was not very successful with only a G4FF? and G8XLH heard with any certainty. It would seem that interest in AM mode on 2m is minimal.

G0CUZ caught the 18 July Es opening to the Canary Islands and Iberia from 1730 and worked EB8s ALZ and BTV (IL28), four CT1s and a couple of EA1s in what Colin concludes must have been a double-hop phenomenon to EB8. They were audible for the whole period, 1730-1850, mostly quite weak, which suggests there could have been a tropo path, from EB8 to CT. His most interesting tropo QSOs of the year were on 9 August with GW0KZG/MM in IN66, 67 and 68, 0654-1605; nice to know that Andy is QRV again from 'wet' squares. He also completed on MS in July with LA6HL/TF when Johannes was in IP13, 14, 34 and HP93.

Geoff Brown, GJ4ICD, received the Harold Rose Trophy at this year's RSGB VHF Convention for his contributions to the 50MHz band.

Another who worked a new wet square was G0FIG who found EA2AWD/MM in IN75 on 28 July. Alec worked three EA1s on 19 August and F5JRK (JN25) on the 21st. G4SSO also contacted GW0KZG/MM (IN68) on 9 August using CW, following a tip-off from John Hunter, G3IMV. G4YRY also hooked both these mariners. At 0800 on 19 August, beacon EA1VHF was audible at GW0PZT wherever Edward beamed. He worked EA1DKV (IN53), then F1UO (JN16) till the duct disappeared at 0900. At 1054 he contacted EA1DDU (IN73), then in the evening, EA1TA (IN53) and EA4ELF/1 (IN73).

70MHZ

THE KETTERING and District ARS runs an AM net on 70.275MHz using vertical polarization; ". . . . to utilise the very cheap and abundant low-band AM PMR rigs available on the surplus market." Skeds are welcome so contact Alan Larkin, G1JNY, either on 70.275MHz, or through GB3CI (RB2) or by telephone to Kettering (0536) 743496.

Gerry Schoof, G1SWH (LNH), mentions a couple of 4/6m crossband QSOs; on 28 June with UA2F/DK2ZF (KN04) and on 16 July with DL8MCG (JN68).

50MHZ

BEACONS

Neil Carr, G0JHC (LNH), advises that Portuguese beacon CT0SMB operates from IM59SK and runs 0.25W to a quarter-wave vertical. The July report of *The Six and Ten Reporting Club* – see page 18 in the September *RadCom* for subscription details – carries the late news that: "The beacons S55SIX (50.013), 4N3ZRS (50.047) and S55TEN (28.250) seem to have been closed down. They were last heard at G2AHU on 10 August."

PROPAGATION

Commenting on the July geomagnetic conditions, Ray Cracknell, G2AHU (HWR), wrote: "July was a relatively quiet month with only mild magnetic disturbance. The one on the 1st/2nd followed one solar rotation (27.5 days) that of 4/5 June and the one on 29 July was one rotation after the 1st/2nd. Conversely the more severe disturbance of 10-14 June, although bringing more active magnetic K-indices on 8-10 July, brought very good Sporadic-E conditions, just as its precursor did one rotation previously (herein lies a clue to the prime source of Es ionizations)."

ACTIVITY

Richard Chatwin, 2W1CCK (GWT), sent a very interesting letter describing how he and his son, Chris, 2W1CCP, were first introduced to the hobby by regular contributor Paul Baker, GW6VZW. At Paul's instigation, they joined the Pontypool ARS and its Novice Training Course, took the June exam and passed. They are very grateful to the club for all the support and guidance its members gave, and mention GW0FJH, GW3XJA and GW0PUH in particular.

Their station comprises a TS690S running 3W output to a temporary dipole inside the shack; a 5-ele Cushcraft Yagi has been on order for some time. On 19 August, 2W1CCP contacted GW6VZW for his very first QSO. Since then some Es DX has been worked including EH3LL (JN01), 9A1CCY (JN85), OK2BGW and OK2KK (JN89), SP6BTI, LA9ZV (JO59) and OH1NSJ (KP11). 2W1CCK also opened his account with Paul and his DX includes OK1VQ (JO60), SP5CCC (KO02) and OH1LEU (KP01). They have now started an RAE course and hope to take the exam next May.

Terry Chaplin, G1UGH (SFK), lists August Es QSOs. CQ7CBI (IM59) was an unusual one on the 1st, with EH7AJ (IM87) also worked. YT1 and S5 were worked on the 8th, but the 14th produced a good spread of contacts with DL, EH3 and 7, HB9, IK0, IV3, OE, OK, S5 and SP3, 5 and 6, which brought four new squares. On the 21st he made QSOs with EH1 and 7, S5, YU1 and 9A stations and on the 24th, EH5 and 7 and IT9.

Dave Hewitt, G8ZRE (CHS), has just started on the band with 10W from an FT690R to a 5-ele Yagi. On 14 August, 1750-2032, he worked into EH5 and 7, OK2, SP5 and 6 and IK0. He wrote: "I was totally amazed; Poland and Italy never worked on 2m." GJ4ICD, monitoring the band for MS activity on 11 August, found some Es from 1900 for a few hours with SP4TKK (KO04), YUs, S5s, 9As and the 4N1SIX beacon. Geoff records the first England/Crete QSO as being made by G1SSL and SV9ANJ on 26 July.

Al Harvey, GU7DHI (GUR), now has 56 countries confirmed on the band. His latest new ones are OM3ID (JN88), EV8A (KO34), C31HK (JN02), SV5TS (KM46), T70A (JN63) and LY/DF1ZE (KO05). All his work is on SSB. G4SSO is now back on the band and Alan admits to ". . . . grabbing all the DX . . . ." on this band instead of 144MHz. Byron Fletcher, G6HCV (SFD), sent a short note to update his squares tally.

FINALE

PLEASE NOTE I have transferred my fax/answering machine to a new number on a digital exchange to 081 763 9457, commencing on 27 September. The CompuServe ID remains 70630,603 and the BT Gold mailbox is 76:MSX021. Call me on Internet on 70630.603@compuserve.com. The copy deadline for **December** is **27 October** and for **January** it is **25 November**.

HF F-LAYER PROPAGATION PREDICTIONS FOR OCTOBER 1993

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	....45542...	....67774...	...289987 3..	...5888996..	1..777778952	7546555557898	9863222224799	+53.....24++
MALTA	....44333...	....675552..	...1888885..	...49888982.	22.877789973	8867555577998	9985222235799	+++2....25++
GIBRALTAR	....13211...	....354331..	....687675..	....8888872.	.1.38778789 71	6648755577897	9987432224799	+++4.....4++
ICELAND	.....21....	.....2432...	.....57652..	....2788851.	....6888985.	44.2766678796	9866533356 88	+++42...235+
** ASIA								
OSAKA	....32.....	....54.....	...1862.....	...38741....	...46544 3321	...132225773	....1...2562	.....23.
HONGKONG	...16651....	...27872....	...4888521..	...47777 43..	...155457742	2...22125886	2585	252
BANGKOK	...277762...	...488875...	...4788872..	...3577785 1.	1...2545 7852	3....2125887	2.....2587	254
SINGAPORE	...377763...	...488885...	...5788883..	...3577786 1.	1..1254578 53	3....2125897	1.....2586	253
NEW DELHI	...37775....	...588871...	...5688 83...	...4577761 1.	2121244577554	73...1125798	61.....2588	3.....25+
TEHERAN	...477773...	...6888851..	...7778883..	..1655778621	4244224578 75	9641..125899	851.....2588	+2.....25+
COLOMBO	...477774...	...5788861..	...5678884..	...3467787 21	211.134579 75	62....125899	5.....2588	2.....25+
BAHRAIN	...487773...	...6878851..	...7668883 1.	1.1644778631	6343114578 86	973...125899	851.....2588	+2.....25+
CYPRUS	...388776 1..	...5988883..	...8888997 1.	1.1888899 42	6557556668987	9974323468 99	9852..113688	++2.....4++
ADEN	...4877761..	...6778883..	...6667897 21	2.1533578853	7442112577998	974....25899	861.....2578	+3.....25+
** OCEANIA								
SUVA/S	.....122....	.....244....	.....257611..	.....467743..	...26555662.	..1542225 5..	...31...22..	.....252.
SUVA/L	.....1....2.	.....21...141	11.3542..362	2215754 2.663	1137643337 31	..2531114 51.	...21...12..	.....252.
WELLINGTON/S	.....1331....	.....2552....	.....577521..	...1777643..	...4655566 2.	...4422255 2.	...11...22..	.....252.
WELLINGTON/L	.....1.......	.....1....22	11.11.....243	2213411..243	1236631.1552	..2432113 52.	...21...12..	.....252.
SYDNEY/S	...16543....	...387652...	...5887751..	...6877774..	...4654578 31	...1321258 41	.....1...252.	.....252.
SYDNEY/L	.....1....1.	.....41....31	.11.631...63	1112642 2.363	...2421136 41	.....1...141.	.....252.	.....252.
PERTH	...477521...	...588742...	...6887652..	...4677752 1	2.1235457864	2...1212588 5	2573	.....252.
HONOLULU	.....1.....	.....14..	.....11..361.	.1..4321662.	.2344222 43..	..341...2...	...2.....	.....
** AFRICA								
SEYCHELLES	...455774 1..	...6668863..	...6557887 21	2114336788 53	7431.135 7998	962....25889	83.....2578	+.....24+
MAURITIUS	...477776 2..	...5778884..	...6668897 31	3114467 8964	7431114 57998	951...124799	72.....2588	4.....25+
NAIROBI	...377787 3..	...5777885 1.	1..6656898 42	3215334 7897 4	8643 1.157998	984....24799	872.....2588	+4.....255
HARARE	...256788 41.	...4677996 2.	1..6666899 52	4316444 7898 6	8743 1115 7999	9851...24799	872.....2588	+4.....25+
CAPETOWN	...155788 61.	...2677898 31	11.5666799 73	4317544 6899 6	8845 2113 6999	9962....4799	873.....1578	+5.....25+
LAGOS	....888886 2.	...1887898 41	21.4866689 73	4416643 4899 7	8857 3111 5899	9995 1...2799	7882....478	4+5.....25+
ASCENSION Is	....776577 2.	....877688 51	12..8656798 3	4512843 4589 6	8966 1112 699	9997 3....489	8884....168	5+5.....4+
DAKAR	....688787 2.	....888788 5.	11..8766798 3	3422854 4689 6	8876 6211 3799	9997 3....489	7784 1....168	5552.....3+
LAS PALMAS	....587676 1.	....798888 3.	....9988996 1	1212988 8898 3	6756 8666 6898	9998 5333 4699	888631..1489	+++3.....5+
** S. AMERICA								
Sth SHETLAND	.....367762.	....157887 5.	11..4778787 3	3422676 6667 5	7866 6534 3457	7887 3211.134	4664 1.....2	.332.....
FALKLAND Is	....167787 3.	....288888 5.	.1..5887677 2	2421776 5467 5	7876 6532 1357	8997 321...35	6884 1.....3	3+52.....
R DE JANEIRO	....754573.	....187668 5.	.1..4865677 2	2321674 4685	7875 6511 1368	9997 32....48	8884 1.....16	++52.....3
BUENOS AIRES	....676773.	....188778 5.	.1..4876677 2	2321676 4575	7874 6531 1257	9997 42....26	7885 1.....3	5++2.....
LIMA	.....86662.	.....87774.	1866562	111..274 3354	5652 3441 1.26	8996 421....4	6885 1.....1	3++2.....
BOGOTA	.....76662.	.....87764.	2865561	11...474 3354	5651 2541..36	8985 321....5	7875 1.....2	4+42.....
** N. AMERICA								
BARBADOS	....486662.	....687774.	8865672	111.176 43474	5652 4541.158	9986 421...27	8875 1.....4	+542.....2
JAMAICA	.....76652.	.....87763.	1875561	.1...375 3353	554.2542 1136	8984 321....4	7875 1.....2	4+42.....
BERMUDA	....176652.	....387774.	5876761	.1...775 5673	553.2542 2367	9984 421...36	8885 1.....4	++52.....
NEW YORK	.....45541.	.....67762.	1787751	....377 6672	442.1544 3356	8983 3211.136	7885 1.....3	4+52.....
MEXICO	.....5541.	.....7652.	.....28654.	....1.47 5442	342.4145 2114	5873 4212...2	3885 1.....	.552.....
MONTREAL	.....45541.	.....67762.	.....2787 75.	....477 6772	442.1544 3466	8873 3211 1136	7885 1.....13	4+52.....
DENVER	.....132..	.....2541.	.....5763.	67641	331...254 334	5863 1121..2	3784 1.....	.452.....
LOS ANGELES	.....32..	.....541.	.....2762.	47531	231.1..55 322	4762 3112 2..1	1584 1.....	.252.....
VANCOUVER	.....1..	.....12..	.....352.	.....1663.	22....3654 3	4653 1123 212	1474 1...1...	.252.....
FAIRBANKS	.....	.....	.....12..	.....1352.	21..2223664 2	3434 4222 4433	1254 1...2111	..2.....

The provisional mean sunspot number for August 1993 issued by the Sunspot Data Centre, Brussels was 42.0. The maximum daily sunspot number was 73 on 11 August and the minimum was 21 on 16 August. The predicted smoothed sunspot numbers for October, November and December, are respectively: (classical method) 52, 50, 48; (SIDC adjusted values) 33, 31, 29.

SWL NEWS

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

AS I WROTE THIS, the Perseids Meteor Shower was a rather distracting element. Liking the challenge that meteor scatter brings and, as the event had received such wide media coverage, it appeared that this year's event was not to be missed. However, it took its time materialising, but was well worth the wait. Predictions had suggested that the event would be more like a Sporadic E event, and at its peak - in the small hours of the morning - it was. The DX just rolled in in waves from all over Europe. Some signals were strong and lasted long enough for the station to make several QSOs before the signal was gone, others were simply lost in a wall of QRM that reminded me of a really good pile-up for some exotic DX on 14MHz. Some good DX was logged on 144MHz, the best was possibly G4DHF/TF/P. Others included HG1DRD, HG2NP, HG4GBG, HA5KDQ, I7IWN, IT9TVF, OZ6OL, S51WO, S53VV, S57TW, SP2SGZ, TK5EP, UZ2FWA and YU1IO.

David Whitaker, BRS25429, spent his time looking for DX on 50MHz. He was not disappointed, but logged nothing really rare. The most frustrating getaway was 4U1ITU on CW MS. Unfortunately, David's knowledge of Morse did not enable the relevant details to be logged. However, he was pleased to have heard two 'legal' HB9's to take his 50MHz countries tally for Society award purposes to 89.

OCTOBER SWL CHALLENGE

AS USUAL, there will be a challenge to coincide with the CQ World-Wide SSB contest on 30 and 31 October. The rules have had wide publication this year so the entry should be the best yet. The full rules are included as part of this column. They are simple enough and I hope that the 'Home' entry will be more sizeable this year.

RULES - OCTOBER 1993

THE IDEA of the challenge is to log as many countries as possible in the 48 hours from 0000 on 30 October to 2359 on 31 October. The challenge takes place at the same time as the SSB leg of the CQ World-wide Contest.

1. There are no time restrictions. An SWL may listen at any time during the 48 hours.
2. Only one station from each DXCC country can be logged on each of the main amateur bands (No WARC bands).
3. Points will be as follows: Countries in SWL's own continent score 1 point on each band. Countries outside SWL's own continent score 5 points on each band. Final score is total points on all bands multiplied by total DXCC countries on all bands.
4. Entries must show: Date; Time (GMT); Callsign of station heard (the callsign of the station being worked is not required); RS of station heard at SWL's QTH (the minimum report will be 4x4).
5. Logs should be sent to: Bob Treacher, BRS32525, 93 Elibank Road, Eltham, London SE9 1QJ, England.
   Logs must be postmarked no later than 29 November.
6. Prizes will be awarded provided 20 logs are received.

HF HAPPENINGS

CONDITIONS ON the whole have been quite good for the time of year and in view of the sorry state of the Sunspots. Indeed, it has not been unusual to find numbers in the 80's and 90's. However, 3.5MHz has been interesting with good signals from Africa, the Far East and North and South America. The German expedition to Penguin Island (ZS0PI) was arguably the best catch, but TU5DX and 7Q7XX have been heard, too.

On 7MHz the Italian DX Net (7.070 has thrown up some good DX) but I was somewhat put out when I did not hear the ZSO expedition on that band. They were also using 7.070MHz. Some listeners did catch the ZSO, and PY0TM on Trindade Island. Other good catches were CE0YFL, V51BI, XQ8ABF, YS1AG, 3C1TR and 9J2MT.

While on the low bands, TF3GB/1 provided one or two with a new one on 1.8MHz. He was actually a very good signal in amongst all the summer static.

18MHz had produced some good DX, especially FT4WD from Crozet Island. Other DX on that band included the ZSO operators using ZS9/various callsigns from Walvis Bay and E31A from Eritrea, which may well be a new DXCC country by the time you read this. The all important vote was scheduled for 30 August. Also worthy of note were HK0TCN, KH0/JP1UEE and PA3CXC/STO.

There seems to be even more island activity these days thanks to the IOTA Awards, and some SWLs chase them avidly. Robert Small, BRS8841, appears to have joined them. His letter this month lists KL7OH, HL93A/2, LA/DL1SCQ/P, VE8PW/P, E22DX, 4K4BEU/P, AA5ZA, WB1CBY/VE8, I2YDX/DU8, 4K3/RN8A, CO2HR/CO4, 4K3WQ, V63CS/P, 5Z4IOTA, 3D2RF, C50BI, PP5AVM and NU2L/VE8.

21MHz had apparently been quite interesting, but by the time I returned from the office the band always seemed to be closed! ZS0PI had been heard by several listeners, and there had been openings to the Far East and Pacific, too.

FREE COMMUNICATIONS RECEIVER

MALCOLM, A92EV, had written about a DR48 communications receiver which he was willing to pass on to either a young, disabled or blind SWL gratis. It is a fully transistorised receiver capable of resolving SSB, which works from either 240V AC or 12V DC. Interested parties should write to me including a telephone number on which they are contactable, and I will liaise with Malcolm. The listener selected would be expected to collect from Potters Bar, Hertfordshire.

Rev Graham Smith, G4NMD, is starting his son off as an SWL at an early age. Crispin was 12 months when this picture was taken by proud grandad G8KVU.

50MHZ REPORT

I WAS ON holiday for much of the period being reviewed, but SV5TS was a welcome new addition early in July. David Whitaker took the opportunity to close the gap a little and caught OD5SK, TK/F5EMT and LZ1KDP. On the QSL front, he now has 246 squares confirmed and will soon be giving G4OUT (the Society's Awards Manager) some more work to do.

ISWL

I AM OFTEN asked if the ISWL still caters for the SWL. Having had dealings with the Secretary recently, I can say quite categorically that it does. The ISWL has an excellent monthly magazine and other associated publications. One is their *Standard Frequency and Time Signal Stations of the World*, which is an invaluable reference book for the shack. It provides an explanation of the various time systems, transmission systems used, standard frequency and time signal stations in frequency order from 16 to 22536kHz and from 95 to 171.13MHz, callsigns in alphabetical order (including location and frequencies), and an A-Z of countries in alphabetical order with frequencies, transmission times, addresses, systems used and QSL card policies. The book costs only £2, and can be obtained from ISWL Headquarters at 10 Clyde Crescent, Wharton, Winsford, Cheshire CW7 3LA.

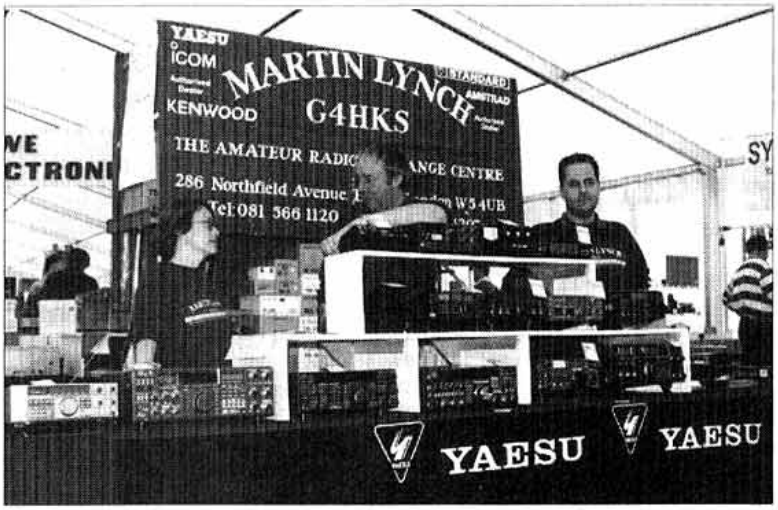
BBC COMPUTER PROGRAMS

ROGER, G7CSE at GB7XJZ, is writing an SWL item for a postal computer club. He is particularly interested in the BBC range of computers and has asked if any readers could supply information about radio related PD software.

FINALE

DEADLINE FOR the **December** issue is **13 October**.

LYNCH AT LEICESTER



I know you want...

The best price...

The largest selection of new and used equipment choose from...

The very best part-exchange deal...

The easiest and cheapest way of paying for it...

A FULL guarantee...

And to leave me wondering "HOW DID HE GET A DEAL LIKE THAT?"

Come and visit the Lynch Mob at the Granby Halls in Leicester on the 29th & 30th in October and make *yourself* happy. I'm not going to give all the secrets away before, so I guess you'll have to visit.

In the mean time here's a selection of carrots, sorry, wirelesses.

MARTIN LYNCH
G4HKS
THE AMATEUR RADIO EXCHANGE CENTRE

LYNCH AT LEICESTER FOR KENWOOD

TS450S	TR751E	TS430S	TS530S	TS930S	TS940S	SM220	TL922
USED FROM £1150	USED FROM £529	USED FROM £589	USED FROM £529	USED FROM £849	USED FROM £1250	USED FROM £279	UNUSED ONLY £1350
				One Only		One Only	

BUY AT LEICESTER - PAY AF

On all new and used equipment over £200, pay

BARGAIN OFFERS AT LEICESTER

Brand new boxed Icom ICW21E dual band handie, list £499, **Lynchy's price £369**... Brand new boxed Icom IC21E miniature 2m handie, list £295, **Lynchy's price £239**... Brand new boxed AR3000A, the ultimate all-band scanner, list £949, **Lynchy's price £849**... Brand new Yaesu FRG100 receiver, ideal shack second RX, list £599.95, **Lynchy's price £549**...

286 NORTHFIELD AVENUE, EALING, LONDON W5 4UB

TEL
081 997 4476
FAX 081 991 2565

ARE COMMUNICATIONS '92

When it comes to selecting a rig from the vast amount of gear on the market, we have to sympathise at the difficulty that even the most experienced amateur has to face; where do you start? By selecting a make, or a price tag? or most important of all the specification. Well at ARE we are here to help you, we stock all the top names and we do not push you to buy a rig for £2000, when one for less than half the price will do more than you ever expected. Trust us, we have been around a long time, and our reputation for fair dealings and good prices have never been surpassed.

TS50S

The smallest HF tranceiver available. The same size as a 2M multimode but with all the features and spec. of a much larger HF transceiver.

FT7476GX

Still extremely popular as the most simplest of HF tranceivers to use (especially mobile) and still represents very good value.

IC737

If your an IC735 owner and wish to upgrade? then look no further. This is the one for you, it offers all the same facilities plus lots more. Phone now for your part ex price.

SEE US AT THE LEICESTER SHOW
STAND No. 41

FT736R

As before Yaesu offers another unique transceiver which is yet to be beaten on sales. It is still the only VHF/UHF base station which can have four bands at he same time. (2m, 70cm, 6m, 23cm). Each band offering no compromise on performance.

TS950SDX

Better that the FT1000? maybe, maybe not. Only you can decide. Come in and see them, they're both in stock for you to try and really make your mind up.

There are simply no words to describe how good this radio performs. The thousands of Yaesu man hours that went into designing this has certainly paid off. - Phone now for your 10 page brochure.

FT1000

TS850S

One of the best middle range HF tranceivers to be released from Kenwood, it has sold in abundance, as well as the smaller TS450S. Come in and try one and you will see why.

Outstanding performance from a Tri Band Base station. Dual receiver with sub display, high power, 23cm option, super sensitive receiver. A DX ERS delight.

TS790E

These are just some of the many items kept in stock at ARE COMMUNICATIONS and believe us there are many, many more. Phone now for any other enquiries you might have, or if second hand is your interest, we have lots to choose from. All at prices that will knock you sideways. (JUST LIKE THIS AD)

FT990 ac/dc

No it's not heavy metal, just a choice between having the best middle range HF tranceiver on the market, with or without power supply. - Yes you have the choice.

TM742E

2nd hand list sent daily

Kenwood still have the only TRJ BANDER mobile. No bigger than the TR751E, but offers 2/70 as standard and the choice of having 23cm, 6m or 28 MHz as another band. - Unbeatable.

Yet again, another unique couple. The only two VHF/UHF multimode mobiles left on the market. But, there are no comprises with these two. 25 watts on each and a receiver which takes some beating.

TR751E/851E

Simply put in one word (Bombproof). This is one of the most rugged dual band mobiles since the release of the FT4700. One of the most selective receivers out of all the Dual Banders, and the only one with a removable front control panel.

FT5200

TM732E

Another versatile dual bander. Extremely wideband receiver, remote head, AM facility, Dual reception in the same band. High Power, where does it all stop?

SEE US AT LEICESTER

ARE COMMUNICATIONS '92

6 Royal Parade, Hanger Lane, Ealing, London W5A 1ET

Easy parking at the rear of the shop. Part exchange and equipment purchases welcomed! Credit facilities available subject to status APR from 37.8%. Located next to Hanger Lane tube station (Central Line) and on the junction of the A406 and A40.
Open Monday – Friday 9.30 – 5.30 Saturday, 9.30 – 1.00pm

Don't delay phone or fax today!

Tel: 081 997 4476

Fax: 081 991 2565

QSL

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

● Harry James, G3MCN, has received a number of cards for C2IDD and he doesn't know who he or she is! He thinks it must be a pirate. Harry is QSL Manager for ZK1DD and his own call which is ZK1HJ, and no others!

● On the subject of piracy I have received a letter from Bill Guy, G4ZSD, who has received many QSL cards from all over the world for QSOs he has not made. Whoever is out there using Bill's call would they please desist because he is fed up with it!

● John Hunt, G2FSR, has written to tell me that he was awarded the Empire DX Certificate (No 22) in 1949 and wonders when that particular award ceased. Can anybody help? I was 14 years old at the time so I am not much help! I am not quite sure what the requirements for it were. Again, if anybody knows perhaps they could enlighten me. The award is reproduced below.

● Richard Stanley, RS95294, says that he has received cards from UT4JWC for QSOs with G3DKD, GI0OUM and GW0FJU. We are attempting to get the cards to their respective destinations one way or another.

● Bernie Donders, G3UXJ ex A92FB, has returned from Bahrain and writes to say that if there are any stations who worked him whilst he was out there and who have not received a QSL card, Bernie will be happy to oblige either via the bureau or to his home call address.

● It should be noted that Aruba is *not* part of the Netherlands Antilles so QSL cards for that island bearing the prefix P4, should not be sent to the Dutch QSL Bureau. The correct address is: Aruba Amateur Radio Club, PO Box 2273, San Nicolas, Aruba. The Dutch Bureau (Veron) will handle cards of local amateurs with the following prefixes only if they are Veron members and have expressed the wish that Veron handle their cards: PJ2 PJ4 PJ5 PJ6 PJ7 PJ8 and PJ9.

● John Ridd, G8BQX, tells me that he has some comprehensive records on QSL rates. Recently he became interested in the Six Metre and Down Award and also WAC. In his quest for the relevant cards for the former award he sent out QSL cards accompanied by IRCs but, in many cases, the cards were not replied to and, to add insult to injury, the IRCs disappeared! So John went out and personally collected QSL cards from the defaulters, travelling as far afield as Scotland, Dyfed and Nottingham to do so and he says he is going to target the Continent of Europe shortly! Actually he is a sort of one-man paramilitary wing of the QSL system. For information he is about two metres tall and weighs over 18 stone!

Such dedication is almost unknown and John goes further and says that if anyone has not received a QSL card from G8BQX a quick call to him will ensure one is on its way.

John Hunt's, G2FSR, hand-coloured Empire DX certificate. Does anyone know what the award qualifications were?

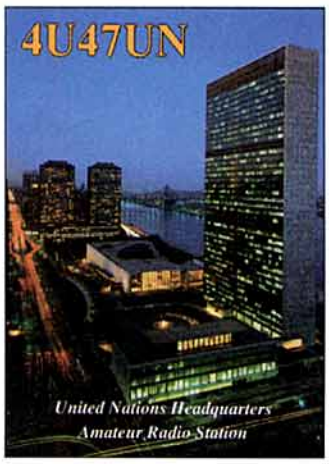
● I have received a letter from Victor Bondarenko, UV3BW, President of the Krenkel Radio Club of Russia, saying that his club now exercises the duties formally carried out by the old Radio Sport Federation of the USSR, including the QSL Bureau. However, the QSL address remains as P O Box 88 Moscow, Russia. So things seem to be settling down now out there. We have noticed at the Central Bureau here that cards from P O Box 88 are starting to come through again after a long period. Let us hope it keeps up.

● We do not normally have any problems with the postal service into and out of Potters Bar although a Post Office van was hijacked last year en route to HQ. A fair amount of mail destined for us was lost but the perpetrators left the incoming QSL cards alone and they were delivered safely. However a couple of incidents of late have served to disturb that picture. Cards sent to us by a member in Northern Ireland and another in Doncaster were vandalised in transit and some of the cards, which had been properly packaged and addressed, were returned to the senders with a rubber band round them stamped by the Post Office 'please use correct address' or words to that effect. Isolated occurrences, but we are at a loss to explain them and we hope they will not be repeated.

● Richard Wolley, G4HIJ, says his QSL return rate is 42% with Norway and Finland coming out best. Japan closely follows with 75% but Australia and New Zealand only rate 25%. Richard says he is most disappointed with the return rate for GB Special Event Stations which is less than 48 per cent.

● Bob O'Hara is currently operating as ZC4BO and 5B4AEV. Bob has previously been G0NWK and ZD8BOB. Outstanding QSLs for ZD8BOB are still arriving at the *Call Book* address and Bob asks anyone who wants a card from him to write to PO Box 2824, Larnaca, Cyprus.

● John Rozentals, YL3GAU/G6TBN, and his wife Linda, YL3AV/G4YGJ, have written from Latvia to say that QSL cards destined for YL are still being sent via Moscow. The message from them is *do not* send them by that route as they invariably fail to reach their destination. The correct address for YL cards is Latvian Amateur Radio League QSL Bureau, PO Box 164, RIGA 98, LV-1098, Latvia. So you have been warned.



This night scene of the United Nations Headquarters in New York was sent in by GW0RTA/JA3AER.

● G Stancey, G3MCK, tells me that an FOC member has recently suggested the use of QIN as a means of indicating that a card will be sent if one is needed. Anything that reduces the number unwanted cards being sent is to be applauded especially as most QSL sub-managers will tell you that their biggest problem is uncollected cards. Whilst on this subject, *please* let your sub-manager know if you do not want to collect your cards. I know they make excellent compost but no sub-manager enjoys destroying QSL cards and yet there is no alternative once they have been retained for the relevant period and remain uncollected.

● One or two bureaux have closed down for the time being. They are: C9 Mozambique, D2 Angola, VP2M Monserrat, XY Myanmar, 9G Ghana and 9O Zaire.

● The Italian National QSL Bureau is divided into three Sub Bureaux and Mario Ambrosi, I2MQP, has provided the following information.

One Bureau deals with outgoing cards whilst the other two handle the incoming ones. However, all three are run by one person who is paid on the basis of weight of cards handled.

The incoming cards are sorted first into I, IK and IW stations. A second sort splits them into suffixes based on the suffix letter. They are then checked against a database to ascertain to which area of the country they are to be despatched.

Next they are sent out to one of 270 sub-branches throughout Italy and are collected by the members. On the outgoing side the cards are sent to the central bureau in much the same way as this country and then sent out to the overseas bureaux in bulk.

IARU

JOHN ALLAWAY, G3FKM
and
TIM HUGHES, G3GVV

A WARM WELCOME this time to the following National Societies which have been elected recently to membership of the International Amateur Radio Union: the Czech Radio Club (CRC), the Slovak Amateur Radio Association (SARA), and the Turks and Caicos Amateur Radio Society (TCARS). Due to the changes in the former Czechoslovakia the former CRCC ceased to exist and the two new Societies have been elected by the other members to replace it. In the current state of flux it is difficult to be exact about the number of Member Societies but it is certain that when this is being written the number in Region 1 alone now exceeds 70. Much is happening in the former USSR and the only certain thing so far is that the Ukraine Amateur Radio Union has submitted an application for membership. The Radio Sports Federation of the USSR no longer exists although the Krenkel Central Radio Club of Russia has taken over its address.

The Association of Radio Amateurs of Bosnia and Herzegovina (SRBiH) and the Qatar Amateur Radio Society have recently been formed and are undergoing the election process.

PROCEDURE

A NATIONAL radio society which wishes to join the IARU first has to submit an application to the Secretary of the relevant Region – G3FKM, YV5BPG, or JM1UXU. The Executive Committee of that Region then considers the application by noting that it has a suitable constitution, can meet its financial commitments, and can honour the duties and obligations of membership. Approval then having been given the application is forwarded to IARU HQ with a positive recommendation and the latter then sends details and voting sheets to all Member Societies. When the required majority has been obtained, the applicant is admitted.

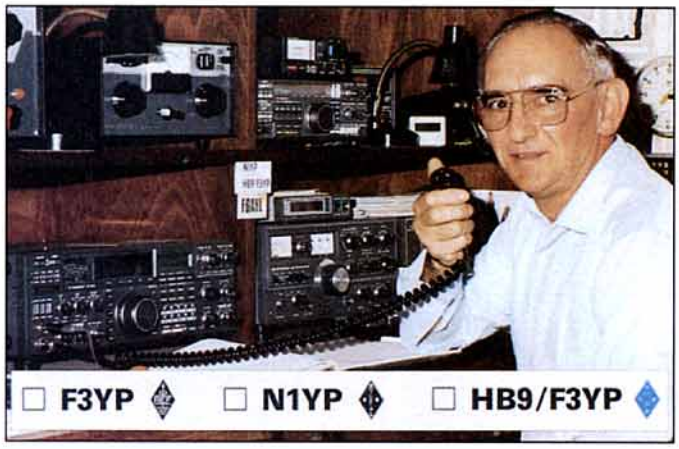
This might *seem* to be a fairly routine process but an application was recently received via fax from an apparently genuine society, in an African country, which gave no mailing address. The fax did not originate from the country applying for membership!

The new organisation, Radio Amateurs of Canada (RAC) has been accepted by IARU Region 2 as the successor to CRRL as Member Society for Canada. A representative of the new Society was to attend the De Haan Conference, and RAC will host the IARU Region 2 Conference in Niagara Falls, Ontario, in late 1995.

REGION 2

A MEETING of the Executive Committee of Region 2 took place recently and it discussed a number of items of world-wide importance. Region 2 is very anxious to develop the 'common licence' and a paper has been prepared for consideration by a meeting of a Permanent Technical Committee of the Organisation of American States due to take place in late September. This asked the committee to "appoint an ad hoc working group to be set up to develop a document similar to CEPT Recommendation T/R 61-01 for the Americas".

There already exists the *Lima Convention* which was drawn up in 1987 and signed by Argentina, Bolivia, Brazil, Canada, Chile, Colombia, Guatemala, Haiti, Mexico, Peru, Surinam, the United States, Uruguay and Venezuela. This allows temporary operation by citizens of the signatory countries in the other countries but only after formal application for permission from the country to be visited. Regions 1 and 2 are working closely together on this project and who knows – in due course – the idea of an 'international driving licence' type document for amateurs may become a reality!



Jean-Marie Gaucheron, F3YP, newly elected President of the French National Society, REF.

TRAINING

A 'LEADERSHIP Course for National ARS Officers' has been devised by Dr Larry Price, W4RA, who is Secretary of IARU. The intention is to be able to train those responsible for organising a national amateur radio society – either existing or in formation. It is very comprehensive and is sure to be a most useful tool, particularly where several candidates can be assembled together to share it.

AC MEETING

THE 1993 MEETING of the IARU Administrative Council was due to take place immediately following the Region 1 Conference in Belgium which meant that any urgent business raised at the Conference could be discussed. Its agenda included reports to be given by each officer and by each Region.

IARU participation in ITU meetings TG 12/4, TG8/2, the VGE (Voluntary Group of Experts), and others was scheduled to be fully reported and any required actions decided on.

There are a number of ad-hoc Committees which have been set up to study IARU participation in international organisations, common licensing, future action on the WRC 7MHz outcome, and BDT (Telecommunications Development Bureau). Reports will have been given by Tom Sprenger (PA3AVV) who is IARU liaison officer for contact with CISPR and Freddy de Guchteneire (ON6UG) who holds a similar position with respect to the Amateur-Satellite Service. Bob Knowles, ZL1BAD, International Amateur Radio Monitoring System Coordinator (who will be in Europe on holiday) should also have given a first-hand account of progress in this particular direction. A report from Jack Troster, W6ISQ, International Beacon Coordinator, was also to be discussed. Attendance at WRC 1993 by at least one IARU observer has been agreed.

Delegates to the 1981 IARU Region 1 Conference assemble in front of the Palace Pier, Brighton.

NOVICE NEWS

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

CONDITIONS WERE not kind in May when young people in schools tried to contact other schools during the Kidlink event, and it was felt that waiting a year for the next one was too long. However, there is to be a repeat event in October when more schools will be able to take part with greater success. The dates for your diary are Monday 4 to Friday 8 October. This means that there is a weekend before and after for setting up and taking down.

Peter Daly, G0GTE, has contacted all interested schools, but there may be others who would like to take part for the first time. To find out more about the occasion, read *Novice News*, April and May. If you need more advice and information ring Peter on 0438 724991 or me on 0422 882038 and we will do our best to help you.

Propagation conditions *must* be better this time (they can't be worse!). This is an excellent opportunity to give youngsters their first introduction to the hobby where they need not only listen, but can actually speak briefly to someone far away. Many Novices first had their interest aroused through contact with JOTA, TDOA and Special Event stations at a local outdoor event.

Amateur radio links well with other areas of the curriculum as many schools have proved – and there's not a text book in sight! I hope to hear many schools in contact – and I shall join you!

MORSE HELP

THAT WAS a heading in *Novice News*, June describing a computer instruction disk. Unfortunately, the item was not complete and, until now, there has been no opportunity to put that right. If you are interested and possess or have access to a 'Beeb' (BBC Microcomputer) read June's *Novice News* and then read on.

In this program you are first asked for your name and callsign so that you can receive a personal QSO. Next, you are asked what background noises you would like in order to make the experience more like the real thing. Options include Radio Prague, static crashes and RTTY type QRM. Choose speed (from the very slowest to 68WPM) and spacing to suit yourself and receive a unique QSO. A good memory will not help as each QSO is different.

Rae, G4JMT, sent me the information along with a copy to play with and asked for comments. The next meal was late. Bob, G3WWF has thought of everything and the result is impressive – he developed the program for the BBC computer because of its sound capabilities. *Morse QSO* is available on 40 or 80 track 5.25" disk or cassette and costs £9.95 inc P&P.

No Beeb? You can get tapes of QSO type transmissions at 5, 8, 10, 12, 14 or 16 words a minute with a choice of three at each speed. These tapes cost £4.95 each or £11.95 for any three with £1 P&P per order. All these items are available from: Firsoft, 6 Eastfield Drive, Woodlesford, Leeds LS26 8SQ, tel: 0532 825519.

AGE IS RELATIVE

GEORGE, GM3GG, is a member of the Banff and District ARC and has been instructing Novices for the past year. He runs the class at his home but, unlike many instructors, has found that the home made cakes he provides aids the learning!

Four Novices, four passes – including the three happy ladies in the photograph – Christine, Grace and Sandra. The fourth, Martin, is now 2M1BQN and has – like the ladies – ambitions to become 2M0— after George's Morse classes later in the year. George is hoping to repeat his success rate with his next Novice class. All run of the mill stuff – but wait. George is 81 and has impaired sight and hearing – which makes his achievement all the more noteworthy.

George, GM3GG, with three of his successful Novice students: Christine, Grace and Sandra.

George stays in constant contact with the many friends he has made world-wide with regular CW skeds. Obviously, the hobby has given him great pleasure through the years and he has opened the way for others to do the same. Congratulations, George, keep up the good work. My thanks to Martin GM6VXB for this information and the picture.

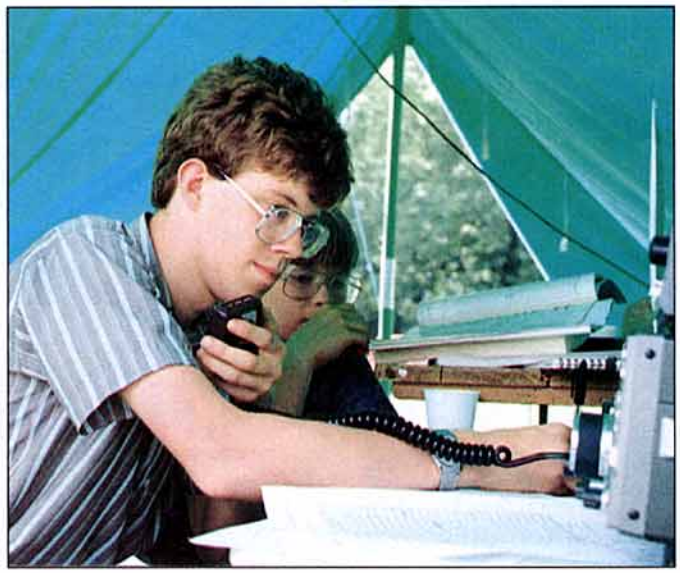
OLD TOOLS

OVERHEARD AT a recent rally, "I have just treated myself to some new tools, I am giving my old ones to that lad at the Club who has just got his Novice licence". My first reaction was "What a generous thought", but then I started thinking. I went and inspected our tools – old friends which are tried and tested – but which do have one or two odd characteristics that any new owner (or indeed my Novice students) would need to know about. The dainty pliers which nip the user, the wire cutters which do have a blind spot to mention but two.

Presumably the amateur mentioned above had tools which were past their 'best-by' date or he would not be replacing them. In that case, is it fair to pass them on to someone who is less experienced in their use? In inexperienced hands, their peculiarities may not just be a nuisance – they may be downright dangerous.

Nowadays, manufacturers are more safety conscious and of course they did not envisage youngsters – children in some cases – using them. I know there is supervision on a Novice course – but youngsters do not stay on such courses for ever and want to experiment at home.

So, if you are in the position of re-organising your toolbox and are intending to replace some or all of your tools – stop and think. Are they completely safe for a youngster to use unsupervised? If you have any doubt, do not give them to a novice (in the general sense) user – you would feel guilty if there was an avoidable accident. A far better idea would be to donate them to your club where they could be put to use on construction evenings or – if your club trains Novices – after a safety check, they could be used in a class when extra equipment is always handy.



Operation Chris Read, G7JIK, and John Whitley, 2E1BWY, at the VHF NFD station of Christ Church Purley Amateur Radio Club, G7NXQ.

RADIO ACTIVITIES IN PURLEY

YOUTH LEADER Richard, G4AOJ, gave a talk and demonstration to the Youth Group at his local church back in 1988 when Project YEAR was announced. As a reasonable amount of interest was shown he formed a small amateur radio club as part of the Youth Club activities.

Three of the older teenagers are now G7s following Richard's RAE course. There are five Novice licensees in the Club also – four youngsters and the mother of one of them. The next step was a club name and callsign, so now Christ Church Purley Amateur Radio Club operates with the callsign G7NXQ.

The Club took part in VHF National Field Day gaining experience as the picture shows. Friends saw the station in operation and the fun they too could have, so future tuition is planned – with Ben, Richard's eight year old son, in the next class. As Ben can already read slow Morse, he is on his way to a Novice 'A' licence.

DRAKE R8E
Communications Receiver

FEATURES FITTED AS STANDARD

★ Wide frequency coverage (l00KHz to 30,000KHz) plus additional VHF bands (35-55MHz and 108-174MHz) with the optional VHF converter. Multi-mode reception includes AM, FM, RTTY, CW, USB and LSB.
★ Five built-in filter band widths... for reception of most signals under virtually any conditions.
★ Synchronous detector... for improved quality of received AM signals, especially under severe fading conditions.
★ Non-volatile memory . . . for information retention during power outage.
★ Built-in, multi-voltage power supply... for operation in most parts of the world on nearly any type of power line voltage.

★ RS232C serial interface... for remote control of receiver functions.
★ Multiple scan functions... for scanning by carrier, time or seeks modes of frequency or selected memories.
★ 100 channel memory capacity... for storing of frequency, band, and mode data.
★ Two operating VFOs... for increased flexibility and convenience.
★ Built-in pre-amp and attenuator... for improved reception of extremely weak signals, as well as very strong signals.
★ Timer function . . . for automatic operation. Very useful for recording purposes.
★ Dual time zone built-in clock.
★ Built-in dual mode noise blanker... for reduced electrical interference.
★ Passband offset... for the reduction of nearby interfering signals while maintaining maximum intelligibility.
★ Selectable AGC . . . for improved reception of fading signals.
★ Built-in speaker. ★ PLL synthesised.
★ Dual antenna inputs.
★ Optimum tuning step selection for each operating mode.
★ Connections for an external speaker and tape recorder.

THE EARS HAVE IT!

"The R8 is a highly sophisticated receiver. We'd call it professional grade, or about as close to it as receivers get these days."

Staff Review - Popular Communications

"Overall, the Drake R8 is simply the best radio we have evertested for quality listening to programs ... There's nothinglike it."

Lawrence Magne - Monitoring Times

"The R8 is like a breath of fresh air, with its ground-up engineering and up-to-date digital control from the frontpanel. I am very pleased to see a quality HF receiver of American manufacture that should successfully compete one world market."

Bill Clarke - 73 Amateur Radio Today

"The best of the best for high-quality listening to news, music and entertainment from afar. Superb for reception offaint, tough signals too."

Editor's Choice - Passport to World Band Radio Tabletop Receivers for 1992.

When Drake introduced the American made **R8E** Worldband Communications Receiver, they knew it would be judged by some very discerning ears, experts accustomed to the finest in short-wave listening equipment from around the world.

After listening to the world on the **Drake R8E** loud and clear, they have delivered a decisive verdict.

They appreciated the R8E's sensitivity, clarity and simplicity so much that many of them declared the **R8E** simply the best of its class. High praise, indeed, from very well-travelled ears.

The **Drake R8E** has been designed as a "complete package" - infact, the only peripherals you may wish to add are a VHF converter, an external speaker or computer control through the RS232 serial interface.

But why take the word of mere experts, put the **Drake R8E** to the test yourself. Our UK distributors, **Nevada Communications**, will be pleased to demonstrate the radio or direct you to your nearest Drake stockist.

We are confident that once you have listened to the **Drake R8E** your ears will hear of nothing else.

PRICE.....£995 including VAT

DRAKE®

R.L. DRAKE Co., Miamisburg, Ohio 45342, USA

Available from selected Drake dealers throughout the UK or:

UK Distributors:

NEVADA COMMUNICATIONS

189 London Road, Portsmouth, PO2 9AE Order Direct Line 0705 613900

Contest Exchange

ANDY COOK, G4PIQ
Fishers Farm, Colchester Road,
Tendring, Clacton-on-Sea, Essex,
CO16 9AA

HAVING JUST returned from spending a weekend adjudicating a very large pile of VHF NFD logs, I think that a column devoted to how to generate accurate logs may be a worthwhile experience, but we shall leave that until another occasion!

CQWW CONTEST

OCTOBER HAS ARRIVED, and to the serious HF contesting community, this means one thing – it's CQWW time. The *CQ* Worldwide Contest is certainly the Big Daddy event of the contesting year, and when operating in it, it does often seem that comparing it to an all-in wrestling bout is fairly accurate. The contest operates on a truly international scale, with tens of thousands of stations active on 160, 80, 40, 20, 15 and 10m, and it is the enormity of the whole event which makes it such an excellent challenge and opportunity. This month, I'm going to dedicate the entire column to this event, firstly because the contest has not traditionally been well supported in the UK, and it is possible to do very well from here; and secondly because it is basically a very straightforward contest, and many of the principles embodied in it also apply to other events.

The very fact that CQWW is the biggest HF contest of the year means that even for those people not directly interested in competing in the contest, there is vast opportunity to work new countries on the various bands. This is because many of the rarer countries are activated by expeditions trying to win, or at least do well in the event. Just as one very small example, Easter Island was active during last year's SSB event, and one of the most amusing points for me was when they called me on 15m for the second time – a duplicate QSO. To give some idea of the scale of activity from the various countries, during last year's SSB event, the top UK stations worked around 130 countries on 40m, and around 150 – 160 on each of 10, 15 and 20m during the 48 hours. Indeed, one of the big US stations worked 179 countries on 15m. Not bad going to be approaching a double DXCC on 4 bands in 48 hours!

There are two legs to CQWW, one during the last weekend in October (this year, 30/31 October) which is the SSB event, and the other on the last weekend in November (28/29 November), which, not surprisingly is the CW session. Over each of these weekends, the contest runs for a full 48 hours starting at 0000GMT on the Saturday morning. [There's also an RTTY event, see September *HF News* for details – *Ed*]

The Six Metre Cup went to the winner of the Single Operator Section of the 50MHz Trophy Contest, Nick Peckett, G4KUX. The presentation took place at this year's RSGB VHF Convention.

Dennis Andrews, G3MXJ, receiving the G8KW Trophy at the 1992 RSGB HF Convention. He was the leading single operator in the CW section of the CQ WW Contest.

Band	160	80	40	20	15	10	TOTAL
Europe QSOs	87	213	435	654	210	180	1779
Non Europe QSOs	12	23	235	1012	1123	312	2717
Countries	34	65	102	135	132	125	593
Zones	7	20	31	37	38	36	169

The final total score
= ((European QSOs) x 1 + (Non European QSO) x 3) x (Countries + Zones Worked)
= (1779 * 1 + 2717 * 3) * (593 + 169)
= 7,566,660 points.

Table 1: How the CQ WW Contest scoring system works.

Each contact with your own continent counts 1 point, and with other continents 3 points, and the final score is the product of QSO Points x Multipliers. The exchange is report and *CQ* zone. Incidentally, contacts with your own country do not count for points. The number of multipliers is the sum of countries worked on each band (as per the standard DXCC list and the WAE list, so places such as Shetland count), and *CQ* zones worked on each band. There are 40 *CQ* zones in the world – the UK, and most of the North-West of Europe is in zone 14. [A map showing the *CQ* zones can be found in the *RSGB Operating Manual*, see this month's *Book Case* pages – *Ed*] Some zones such as our own are very well populated, however, others are very rare, and pile-ups for these can be very fierce. **Table 1** shows how the overall score is calculated, perhaps for a fairly successful single transmitter station in Europe.

This sort of scoring system is very typical of that employed in many contests, and it has the result that getting a big multiplier score is absolutely key to achieving a good result. If you look back at previous years' results, the tables are littered with the corpses of stations who had huge QSO totals, but blew out totally on the multiplier front.

SECTIONS

For the single operator station, chasing multipliers can be a time consuming process, and the advent of the DX Cluster network makes this process very much easier since it is no longer necessary to break off from calling CQ to go and scour the bands for new multipliers. However, as a normal human reaction, not everyone wants to take advantage of the onward march of technology, and so to cater for those people who do not wish to use DX Cluster and other spotting systems, this contest makes the sensible move of having Single Operator Assisted and Single Operator Unassisted categories. Also, for flea-power advocates, there is a QRP section allowing a maximum of 5W output.

For the multi-operator followers, there are also two sections to consider – Multi-operator Single Transmitter (Multi-Single, or MS) and Multi-Operator Multi-Transmitter (Multi-Multi, or MM). Multi-Multi is just as it sounds – a bunch of stations allowed to transmit one signal on each of the six bands simultaneously. This is very much the big-boys section, and not for the faint-hearted – you need a lot of hardware, time, and experienced people to be successful in this section, and the inter-station problems do seem to multiply with the square of the number of stations running (especially those associated with networked computers), but it can be done, and it is great fun!

So – I bet you think you know what multi-single is then – obvious – a one transmitter multi-operator station – WRONG – that would be altogether too logical. You can actually have two transmitters running simultaneously in a multi-single setup – one sitting on one band, probably calling CQ and running a pile-up (the 'run' station), and the other tuning the other bands, searching for those precious multipliers, but which is *only* allowed to work stations who constitute new multipliers. This makes for quite a powerful station arrangement – the run station generally remains on the band which will produce the biggest number of QSO points, and the multiplier station can search the bands itself for new multipliers, but can also go off and work the spots which come up on the DX Cluster. For any serious multi-operator entry, unless you are going somewhere *very* rare where everyone will come to you, access to the DX Cluster network is essential – there will be several thousand DX spots appearing on the system during the course of a CQWW contest.

The multi-single section is a really good option for clubs or groups of people to have a go at. The ability to have a second station looking for multipliers gives the opportunity to involve many more people, and of course if you are feeling really ambitious, the multiplier station could actually consist of several rigs, so long as only one transmits at a time.

EQUIPMENT

The antenna requirements to be a reasonable signal in this section are not too horrendous either. Some possible options are; for the main station, a tri-bander (the bigger the better) for 20, 15 and 10; preferably a small beam for 40, but if that isn't possible, there are lots of clever things that can be done with wires; and for 80 and 160, dipoles or loops will make reasonable compromises. For the multiplier station, a lot can be done on 20, 15 and 10 with simple antennas like verticals, and even dipoles. However, it is useful to

78

WATERS & STANTON

UK's LARGEST SELECTION

SEE US AT LEICESTER

ALINCO

DJ-180EB £209

Two exciting handhelds that give you top performance at a very reasonable price. ALINCO now dominate the VHF and UHF market and you won't find better value anywhere. The DJ-180 gives you a full specification 2 metre handheld at a cost and performance that no other product can match. Ideal for shack, car or out walking, you'll be amazed at its sensitivity and ease of use.

For the operator who wants everything in one package, let us recommend the DJ-580SP now with CTCSS free of charge. You get 2 metre and 70 cms operation with full duplex and automatic repeater modes. Also included is DTMF and there is no extra charge for ni-cads or AC charging unit. We can offer both these lovely rigs from stock with full parts and labour warranty.

DJ-580SP £449

New Ham Radio Catalogue

From the Super Store with all the goodies and friendly staff!

It's completely free for the asking. Pick up a copy at the Leicester show or from one of our shops. If you cannot collect in person then send 2 x 1st class stamps to cover postage. Packed with goodies and more information about ham radio products than any other catalogue. And it's FREE.

Mail Order Code

Immediate despatch
24 Hour delivery on request
Full Value carriage insurance
10 days option to return if not satisfied
12 months parts and labour warranty
No grey imports - just honest prices
Free after sales help
3 full time engineers

Nobody beats our Service!

It's the Leicester Show Again!

See us at Stand S15 Middle of Main Hall

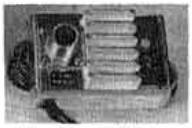
Once again it is time for the annual Leicester Show. We'll be there as usual with lots of gear, both new and old. ALINCO will be joining us with their new **2m Panoramic Handy** and we will have all the usual top brands on sale. We reckon that we can offer you a deal that will make your trip worthwhile. Why not call over, meet the gang and check out our show prices. This year we will be quoting prices on some gear that will wipe the floor with our competitors and remember, we have full time service engineers and are happy to show you round our service department because we actually have one! Worth a lot when things go wrong. You have the security of our own "no quibble" warranty!

If you can't make Leicester . . .

Give me, Mark Francis G0GBY a ring. I can promise you a good deal over the phone. We never forget, customers are our most valuable asset!

2m 30W Mobile for £59!

This amplifier converts your 2m FM handheld into a 30W output mobile or base system.



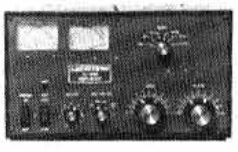
Model P335

- ★ RF sensing
- ★ 1.6W Input
- ★ Ideal for FM
- ★ 12dB power gain
- ★ SO-239/BNC plug
- ★ 12-14V DC
- ★ 74 x 50 x 24mm

This is a well made unit which we have purchased at a silly price. We have limited stocks at this price and you have a full 12 months UK warranty. Ask us nicely and we'll send it post free!

Ameritron Linears

HF linears 160 - 10m From £839



Ameritron linears are used by contest groups and expeditions throughout the world. They are rugged and well reviewed in all the magazines. Each one gives you top performance with built-in AC-240V power supply. They match all modern HF transceivers with a genuine 50 Ohm input. On request we can supply a set of matching leads for your rig!

AL-811 This uses 3 of budget class 811 tubes to give a rated output of 600 Watts. Back off the gain slightly for UK power limits. Operates from 160 - 10m and gives you up to 9dB of gain! Fully metered and very reliable. **£839.**

AL-80BX The model that uses a single 3-500Z tube that is ultra stable. You also get a front panel power control that can be adjusted up to 1kW output. The special zero current circuit ensures low power dissipation between syllables and means longer life and better efficiency. A lovely linear! **£1,499.**

New Dip Meter "203"

Unlike other models this needs no plug-in coil sets. A brand new design that works from 1.8MHz-30MHz. We've checked it out and it can be used for all manner of resonance tests. Just think, no more plug in coil sets. Very stable and no frequency pulling! Another fine product from MFJ.

£119.95

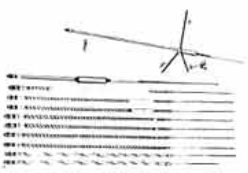
Ten-Tec from USA

We have now got good supplies of the OMNI-VI transceiver reckoned by many to be the ultimate in HF designs. The transceiver is a real dream and Ten-Tec enthusiasts will not be disappointed. It's certainly not in the budget class but then neither is the performance. You get true DC-100 Watts power control which makes it ideal for QRP as well. Present price for the OMNI-VI is **£2,599.** We can also supply most filters from stock at **£69.95 each.**

Also in stock is the Ten-Tec Argonaut ultimate QRP machine at **£1,449** and the Delta 100 Watt equivalent at **£1,659.** The new Scout single bander is expected at any time now but no price has yet been fixed. Full colour brochures on most items available on request.

Pro-Am HF Mobile Aerials

Single banders
Multibanders
Rugged
Low Cost



This range of aerials has really caught the imagination of HF enthusiasts. And no wonder! When you look at the cost and see the construction it is a clear case of "no contest". For occasional use or economy, there is the single bander. These are very efficient and we use them ourselves when we go mobile. They use 3/8" stud fixing for strength and we can supply matching mounts or a converter for SO-239 mounting. Height is 7ft approx. with adjustable whip.

PHF 10, 15 or 20m models	£19.95
PHF-40m	£22.95
PHF-80m	£24.96
PHF-160m	£54.95
Multibander AB-5 covers 160-10m with all coils and is auto-switching. Amazing value at	£79.95

We can also supply a mammoth magnetic mount that really works and will never fall off! It uses three separate magnets and has good capacity through 80-10m £39.95

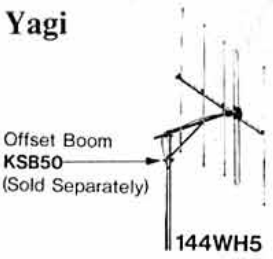
ADI - 145 & 450 budget handhelds

2m or 70cm
20 Memories
2 Watts Output
Wideband Rx.

The ideal answer to those on a budget, ADI gives you superb performance at a very reasonable cost. The price is held down by direct import and direct selling. You get key-pad entry and all the usual facilities that make this a serious consideration. The 70cms version is ideal for the NOVICE. You get 4 and 6 way battery boxes but chargers and ni-cads are available.

ADI-145 £199
ADI-450 £219

MASPRO Yagi Aerials



What lovely antennas these are. We introduced them about 3 months ago and they have been an instant hit. The first Japanese vhf beam antennas to be offered in the UK, the construction is quite superb. There is no compromise and they can be mounted vertically or horizontally. For FM vertical operation you can purchase the optional bracket to make mounting easy and keep detuning and gain loss to zero.

144-WH5 2m 5 element SO-239	£29.95
144-WH8 2m 8 element SO-239	£39.95
435-WH8 70cm 8 element SO-239	£29.95
435-WH15 70cm 15 element SO-239	£44.95
KSB-50 offset boom kit (only fits Maspro)	£7.95

ELECTRONICS
OF HAM RADIO PRODUCTS

0702 206835 or 204965

OptoElectronics "M1"

10Hz - 2.4GHz!
Ni-Cads
Charger
Antenna.

NEW!

This counter is powerful and has the latest LCD counter for clear and accurate display. Just switch on and wait for it to lock onto local transmissions. It can read a handheld at about 100ft. Base stations over much greater distances.

This is the latest model to come from OptoElectronics of the USA for whom we are UK distributors. Features include digital random noise filter, 3 memories, 5 hour battery life, PC port, 10 digit display, back lighting, high speed 250MHz direct count, 16 segment RF meter, 50 Ohm impedance.

HF Transceivers

Yaesu, Kenwood, Icom, Ten-Tec

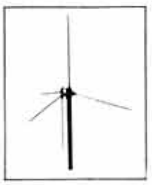
We can offer you all the latest models and accessories from stock. Our prices are highly competitive and every item is checked and guaranteed by us. You get the no quibble parts and labour 12 month warranty. If goods are not satisfactory or faulty, we offer a 10 day refund or exchange. We value your custom and want you to be totally happy with your purchase. We can offer instant credit subject to status and in many cases no interest is possible. Full written details upon request. If you want to part exchange, no problem. Call in or telephone for an instant quotation. It's that easy.

PHONE 0702 206835 for QUOTE

Buy before the end of November and get an extra year's warranty FREE on any HF Rig.

DIAMOND Co-Linear Antennas

The world's best selling antennas for FM operation are made by Diamond for whom we are exclusive distributors in the UK. There is a model to suit every pocket and every requirement. And remember the gain you get is both on transmit and receive. All are fibre glass encapsulated and pre-tuned with excellent bandwidths. We can send you the complete catalogue but list below the main models.



X-30 2m/70cms 3/5.5dB 1.3m long	£64.95
X-50 2m/70cms 4.5/7.2dB 1.7m long	£79.95
X-300 2m/70cms 6.5/9dB 3.1m long	£129.95
X-510N 2m/70cms 8.3/11.7dB 5.2m long	£189.95
X-700H 2m/70cms 9.3/13dB 7.2m long	£299.95
X-5000 2m/70cms/23cms 4.5/8.3/11.7dB long	£159.95
V-2000 6m/2m/70cms 2/6.2/8.4dB	£119.95

KITS from USA & UK

We can now supply a wide range of kits from stock. These include Ramsey of USA and Howes from UK. All are listed in our price list which accompanies our catalogue. Send for full information today on the wide range of items including receivers and QRP rigs. All backed up by us!

Rally Demo Stock Huge Savings! Trade Prices!

SEE US AT LEICESTER

It's the end of the rally season and we have some real bargains. All rigs are brand new and have never been used! They carry a 12 months' warranty and are complete with all accessories and handbooks. But as they are ex display we are not allowed to sell them as new. This is good news for you. There's too much to list and many of them are "one offs'. But here are some examples of what we had when the advert was prepared.

Diamond X-7000 Antenna	~~£299~~	£249
Yupiteru MVT-7000	~~£369.95~~	£309
Alinco DR-599E	~~£699~~	£599
Alinco DJ-S1E	~~£195~~	£229
Alinco DJ-F1E	~~£279~~	£239
Kenwood TL-911	~~£1749~~	£1399
Alinco DJ-180E	~~£209.95~~	£179

It's first come or first phone for the bargains. Ask for Mark Francis who has all these goodies and much more under lock and key in his office!

Ear Talker £29.95!

Models for most brands now in stock.

Connects to most modern handhelds and provides receive audio plus transmit audio via ear vibrations. Quality is superb and our prices are unbeatable! State which model when ordering.

Revex Power Meters

Everyone needs a VSWR and power meter to check their transmit power and aerial VSWR. Revex make some of the best in the industry. They are well respected and more Revex VSWR meters are sold into the professional market in the UK than any other similar product. But that doesn't mean they are expensive. Far from it. So if you are looking for a good power meter that will last a lifetime look no further then Revex.

W-160	Handheld 144/430MHz 15/60 Watts	£49.95
W-150	1.6-30MHz 200W/2kW/5kW	£109.95
W-520	1.8-200MHz 2/20/200W	£84.95
W-540	140-525MHz 5/20/200W	£89.95
W-544	140-460MHz 7/40/400W	£169.95
W-560N	1.8-525MHz 3/20/200W	£139.95
W-570	1.8-1300MHz 5/20/200W	£165.95

Microset VHF/UHF Linears

Microset make some of the best VHF and UHF amplifiers in the business. Some of the UHF models are regularly used by government departments in the UK. That says much for their performance and reliability. If you want to increase your transmit power and work the DX take a closer look at this range. We now have their latest colour catalogue which is crammed with information on the complete range. Most models also include a GaAsFET receive pre-amps and all models offer rf sensed switching.

R-25	2m 1-4W input, 30W output	£84.95
RV-45	2m 3-15W input, 45W output	£99.95
R-50	2m 1-7W input, 50W output	£109.95
SR-100	2m 4-25W input, 100W output	£169.95
SR-200	2m 10-50W input, 200W output	£319.95
RU-20	70cms 1-3W input, 20W output	£129.95
RU-45	70cms 3-15W input, 45W output	£175.95
R-432-95	70cms 6-12W input, 95W output	£489.95

MFJ Product Range

Here we introduce you to just part of our range of MFJ products for whom we are sole UK distributors. More detailed information about them is contained in our new catalogue.

949 ATU

★ *1.8-30MHz*
★ *300W* **£169.95**

A lovely atu and one of our best sellers. Handles coax, balanced feed and long wire. You also get cross needle power and VSWR meter plus built-in dummy load. A real bargain.

948 ATU £149.95

Same as above but does not have built-in dummy load and is finished with cream front panel.

962C ATU £279.95

★ *1.8-30MHz*
★ *1.5kW*
★ *All Antennas*

This tough unit is ideal for those who have a linear and want to be able to match any antenna. The cross needle meters give you RMS and PEP measurements and everything is heavy duty for maximum reliability.

16010 Tuner £49.95

★ *1.8-30MHz*
★ *Long Wire*
★ *Very Compact*

A delightful little unit that will handle 300W and matches random end fed wires. I use one myself for portable operation. At the price it is a real bargain!

921 2m ATU VSWR/Power Meter

★ *144-146MHz*
★ *200 Watts*
★ *Low Loss*

You only get maximum power transfer from your rig when the aerial is matched. This unit does just that and lets you match into all kinds of odd antennas. Very useful for portable work. Any why not try a wire antenna on 2 metres? You can get some really good power gains. Ideal for the experimenter. **£89.95** 70cms Version 924

249 Aerial Analyzer

★ *1.8-170MHz*
★ *VSWR*
★ *Resonance*
★ *Frequency counter*

This product is quite simply, amazing! It allows you to adjust your antenna on site with minimum of fuss and great accuracy. Battery powered it gives you precise digital readout of resonant frequency plus accurate VSWR. All in seconds and without the need of a transmitter. Saves hours of work!

£229.95

1278BX Data Terminal

*** Pactor * SSTV * FAX * Packet**
*** AMTOR * RTTY * ASCII**
*** Navtex * CW * 32k Mailbox**

The MFJ-1278BX is now the world's leader in sales and no wonder. You get a complete terminal that will handle all the popular modes. The 1278 will take you into the new world of data communications and what fun it is. All you need is a PC and a transceiver or receiver. In minutes you can be joining in the fun. You also get a comprehensive manual and there is optional software available too.

1278BX	Data controller for PC	£339.95
1289	Optional software (state disc size)	£69.95

Head office: Retail and Mail Order: 22 Main Road, Hockley, Essex SS5 4QS.
Tel: (0702) 206835/204965. Fax: 205843
Retail only: 12 North Street, Hornchurch, Essex. Tel: (0708) 444765

VISA ACCESS

Novice Note Book

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

SOLAR PANELS ARE THE SUBJECT of our column this month.

I really enjoy taking a portable radio station out for a spot of field operating. There's nothing like finding a field, throwing an aerial up in a tree and working some stations. However, whether it be on HF or VHF we have the problem of a suitable power supply. But do we really need to carry heavy batteries when operating a station out of doors?

An interesting question, especially considering the fact that our handheld transceivers draw a few tens of milliamps on receive but considerably more on transmit. To start with, considerable increase in battery life can be obtained by ensuring that you use the lowest possible transmitted power for communication – and this can have other advantages, too. In some cases, however, the contact is so brief that it is impossible to judge the power level required.

What we really need is a small battery sufficient to maintain communication for say one hour and a system for recharging the battery while we are operating. Solar cells are the ideal charging system as they're lightweight, reasonably efficient and not too difficult to carry.

I find that on a typical summer day of sun and cloud my FT290 transceiver with a small gell (rechargeable) battery and a 12 inch square panel will last all day. In fact for SSB operation where the duty cycle (*average* operating power) on transmit is low, the battery will still be fully charged on return home! I also have another 'bank' of panels consisting of four 12 inch cells which I use to maintain charge in my caravan battery!

A typical charge rate from one 12 inch panel is 250mA on a very sunny day, but this figure can vary from panel to panel within wide limits. Unfortunately you have to accept the rate that you get from the panel you buy!

So how can we use our panel once we've bought it? Well, if we are just going out in the field using a gell cell or 'nicad' (Nickel-Cadmium) pack, we can safely connect our solar panel via a diode (**Fig 1**). We'll cover this in detail a little later, but you can be reasonable confident that the cell will not suffer damage from overcharging.

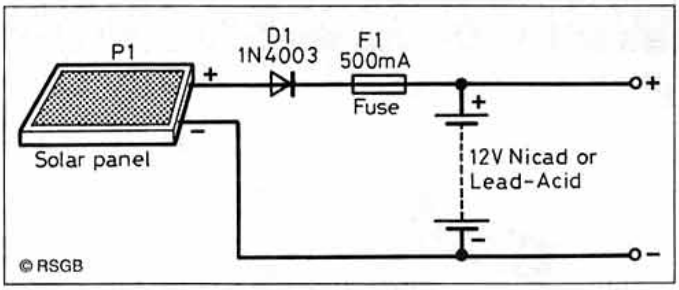


Fig 1: The circuit shown here is suitable for occasional field use.

CHARGE AND DISCHARGE

IF WE ARE GOING TO USE the panel to charge a battery continually it becomes necessary to use a charge regulator as overcharging cause problems. It is most important that charging of the cell ceases prior to the gell gassing, as that would greatly increase the internal resistance of the cell and make it useless. I have found that charging the cell to a terminal voltage of 13.2 volts does not seem to cause any problems – a simple circuit using a voltage regulator and a few diodes satisfies this requirement. A further problem with solar cells is that if the battery voltage is greater than the output of the cell, current will flow back into the cell discharging the battery. A diode is included to stop this happening.

Fig 2 shows the circuit of the charge regulator that I use with my gell cells, IC1 is a 7812 regulator chip which gives a regulated output of 12 volts at a maximum current of 1 amp. Of course our panel cannot supply one amp even on the brightest of days so the current limiter will never be needed. As we require an output of about 13.2 volts I have included three diodes, D1, D2, and D3 in the earth return of the regulator. This effectively 'jacks up' the output voltage to 13.8 volts.

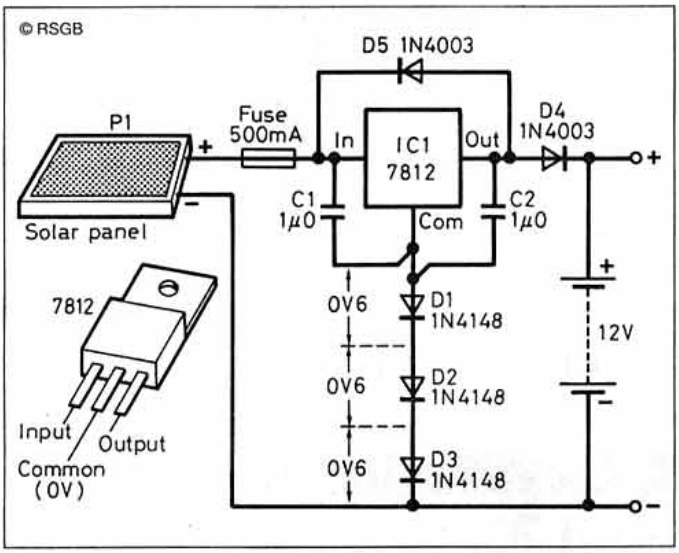


Fig 2: This arrangement is for continuous charging or 'topping up' the battery.

D4 is included so that the battery cannot discharge back into the regulator and solar panel but of course current can flow from the regulator into the battery. In doing so the 0.6V voltage drop of the diode has to be subtracted from the output of the regulator so giving a charging voltage of 13.2V. D5 is included to protect IC1 if D4 fails and goes short circuit. If D4 was not present and the sun went in, it would be possible for the battery to hold the output pin at +13.2 volts and for the solar panel to have an output of say 10 volts.

In that situation, it is likely that IC1 would take a dim view of proceedings and act as a fuse! With D5 present and the output pin at least 0.6V more positive than the input pin, the diode will conduct to maintain the input voltage at V_{OUT} – 0.6V. This small reverse voltage will not harm IC1 and this component will now be protected. The 500mA fuse is included to protect the solar panel under extreme conditions. It doubles as a very convenient point to measure the charging current by replacing the fuse temporarily with a suitable meter.

I know that I will be proved incorrect, but at present the only UK suppliers of 12in solar panels which I can find are :

Keysolar Systems, 4 Glamorgan Crescent, Newport, Gwent NP9 8AX. Tel/Fax: 0633 280958

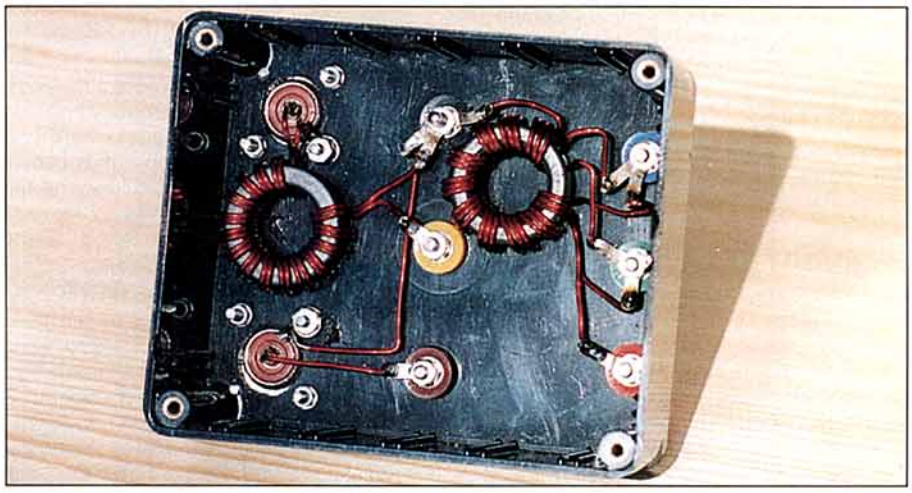
Maplin Electronics, PO Box 3, Rayleigh, Essex SS6 8LR. Tel: 0702 554161

RADCOM TECHNICAL FEATURE

Two Useful Non-Baluns

by Alan Chester, G3CCB

SCANNING RECENT RADIO literature, the reader might be excused for regarding any multi-filament wire wrapped round a piece of iron or ferrite material as some kind of balun. *Solid State Design* points out [1] that the bifilar isolating current transformer often referred to as a 'balun' does not really deserve the name. More recently, the idea has suffered some further bad press [2] and [3] which seems a pity since the basic function of the device is perfectly sound and satisfies a genuine need. This article sets out to restate the principle of the isolator and goes on to describe a wide-band matching transformer of similar construction which can just as easily be mistaken for a balun.



RF ISOLATOR

FROM **FIG 1(a)**, IT SHOULD be clear that normal RF current flow (indicated by the arrows) in the bifilar windings will produce a mutually opposing flux in the core and no transformer action will take place. On the other hand, current induced in one line alone or both lines simultaneously, and in phase, will produce a net flux and choke action will result.

The device will in effect be 'transparent' to normal signal flow, including reflections from any mismatch further down the line, whilst isolating undesirable features such as the presence of mains earth on the input side. Note that the isolating property is, of course, limited to the RF bandwidth of the device and will do nothing for lower frequencies or DC. It should *not* be confused with the isolating properties of the mains safety transformer.

The isolating transformer is easy and cheap to make using the right kind of powdered iron or ferrite core. The principle of design is that the reactance of the bifilar windings should be large compared with the line impedance at the lowest operating frequency. This puts a mutual constraint on core material, shape and size, number of turns for inductance required and wire gauge for normal current flow. After some juggling with these parameters, it was quickly determined that Ferrite 61 material in toroid form provided the best solution and Amidon FT 114 (1.14in dia) was chosen for a 100 watt rated device. 15 turns of bifilar 18SWG enamelled copper wire were needed to give an inductance of 18μH.

CONSTRUCTION HINTS

CONSTRUCTION FOLLOWED conventional 'balun-like' techniques (**Fig 1(b)**) with conductors closely paired and terminated neatly to give short connections of equal length at each end. The inductance is not critical and a little more would have done no harm except that core space was at a premium and it was necessary to leave a gap between the two ends of the winding to avoid additional self-capacitance at a particularly sensitive point. The problem of saturation does not arise with normal current flow since, under this condition, the flux is self-cancelling in the core.

The isolator can be checked if required by measuring the inductance of each winding separately at 18μH. If all is in order, a check of inductance at one end across the bifilar pair with the other end shorted should result in a zero reading. In use, the two ends of the transformer are interchangeable as are the conductors of the bifilar pair at each end.

THE AUTO-MATCH

AN RF WIDEBAND impedance-matching device constructed on similar lines to those of the isolator but acting as a voltage auto-transformer is shown in **Fig 2(a)**. The trifilar

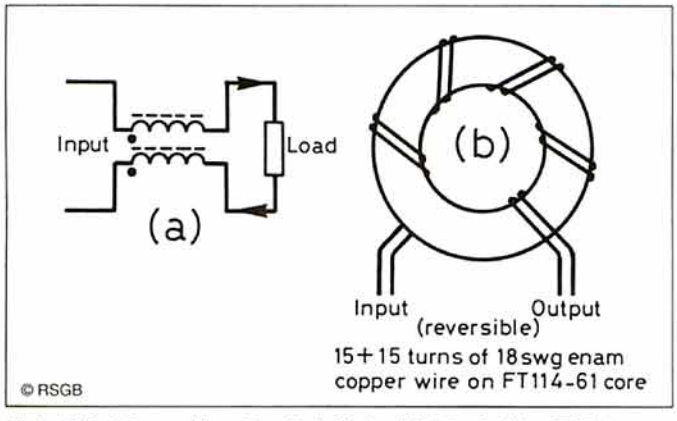


Fig 1: RF Isolator configuration. Suitable toroid is the Amidon FT114.

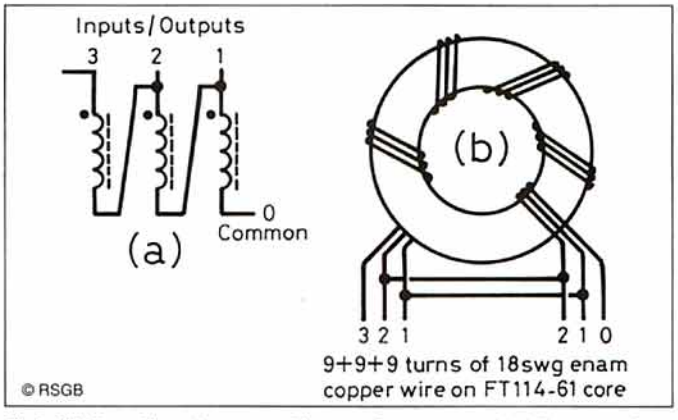


Fig 2: Wideband impedance matching transformer to match a 50Ω transceiver.

winding provides simple impedance transformation ratios of 1:1, 1:4 and 1:9 from a 50Ω source applied between tap 1 and the common terminal. By connecting the input to tap 2 and taking the output from tap 3, an impedance ratio of 1:2.25 is obtained, thus completing a series of fairly equal steps. By using the transformer in its step-down mode, a corresponding series of inverse ratios was obtained. The complete set of all output impedance values in rounded figures relative to 50W input is given in **Table 1**. Note that the impedance transformation ratio is equal to the turns ratio squared.

The seven selectable positions (not including the two options) allow resistive loads from 5 to 500Ω to be matched within a maximum of 1.5:1 VSWR. The transformer itself plays no part in the matching of a 50Ω load but is left in circuit for simplicity of switching when such a load is required.

A set of six dummy loads at 5 watt rating in the values required has been made up to check the performance.

WINDING DETAILS

THE REACTANCE OF each winding should be at least twice the source impedance at the lowest operating frequency to give a loss at the input of less than 1db, nine turns per winding were required to give an inductance of 6.4μH. The method of construction shown in **Fig 2(b)** follows that of the isolator except that the lower inductance required enables three windings to be accommodated in the space previously occupied by two on the same size of core.

Transceiver Input	Antenna Output	Antenna Impedance
1	1	50Ω
1	2	200Ω
1	3	450Ω
2	1	12Ω
2	2	50Ω (optional)
2	3	112Ω
3	1	5Ω
3	2	22Ω
3	3	50Ω (optional)

Table 1: Input and output impedances for different coil taps, relative to 50Ω.

Since the lower windings of the auto-transformer are shared between primary and secondary (depending on the transformation ratio in use) some cancellation of flux occurs which helps to combat saturation. The top limit of frequency is governed by leakage inductance and self-capacitance of the windings, but, with careful construction, operation up to 30MHz can readily be achieved.

Both the isolator and the auto-match are in combined use at G3CCB. They provide decoupling of mains earth from a tuned aerial system, and offer seven steps of impedance transformation over the nine HF bands. The photograph shows the complete aerial terminal housed in a 120 x 100 x 40mm box, with dummy load connector.

FURTHER IDEAS

IN SPITE OF THE emphasis given in this article to the 'non' aspect of certain baluns, some readers will realise that the three-winding assembly can be turned into a genuine 1:1 or 1:4 ratio balun by simply changing over a few connections. For a ratio of 1:1, put tap 1 to common or ground, 3 to input, 2 and 0 to balanced output. For a 1:4 ratio, proceed as above but make an additional connection tap 2 to input (tap 3 is not used).

REFERENCES

[1] *Solid State Design for the Radio Amateur*, p55, Wes Hayward W7XOI and Doug DeMaw, W1FB, ARRL.

[2] *HF Antennas for All Locations*, p54, L A Moxon, G6XN, RSGB.

[3] 'Balanced to Unbalanced Transformers', Ian White, G3SEK, *RadCom*, Dec 1989, RSGB.

Readers may also be interested in the feature 'Multi-Ratio Baluns for HF' by Graham Spinney, G0IFF, which was published in the June '92 issue of *RadCom*. Reprints are available to members, price £2.00.

SUPPLIERS

AMIDON CORES and a variety of other ferrite products can be obtained from the following Company: Ferromagnetics, PO Box 577, Mold, Clwyd CH7 1AH.

ALINCO ELECTRONICS

Unbeatable Value and Performance - Check it out at your local store!

Sole UK Distributors:

Waters & Stanton Electronics

22 Main Road, Hockley, Essex, SS5 4QS Tel. 0702 206835 Fax 0702 205843

RADCOM EQUIPMENT REVIEW

The MFJ-8100 World Band Receiver

A review by Dave McQue, G4NJU

THIS LITTLE SHORT WAVE receiver kit certainly deserves consideration if you're looking for reasonable performance on both amateur and broadcast bands. It's a regenerative TRF circuit, covering the range 3.5MHz to 22MHz in five switched bands. Reception on six amateur bands is possible and you should also be able to receive a good selection of broadcast stations. The circuit comprises three FET stages and an IC audio amplifier, but despite its simplicity, results were surprisingly good.

A complete kit down to the last washer is supplied, with ready punched metalwork and printed front panel. There's also a 40 page, instruction manual which describes the function and assembly of all components in great detail. I was reminded of the style of the Heathkit products, which many readers will remember from a few years ago.

BUILD BY THE BOOK

THE MANUAL IS A textbook in itself and well worth an evenings study before you start to build the radio. A full description of components, circuit diagram and operating instructions are provided. The receiver can be considered a modern version of the 'regenerative' receivers of the old days when valves were used instead of transistors. On the MFJ-8100 positive feedback, sometimes called 'reaction', is used to increase the gain of the detector stages. This also improves selectivity by increasing the effective Q of the tuned circuit.

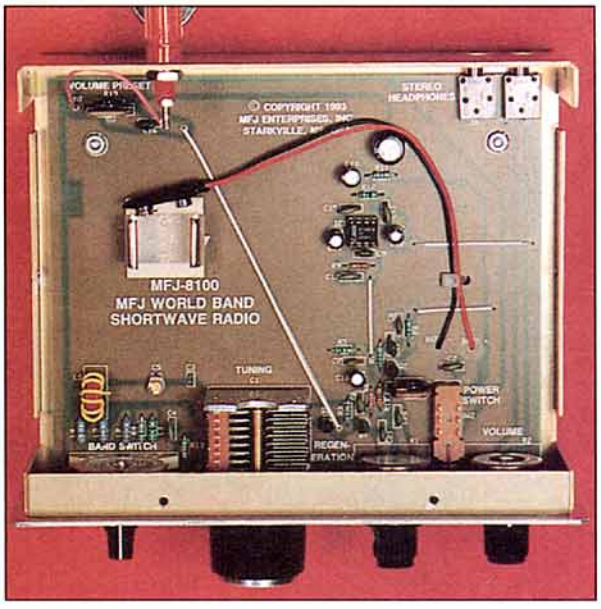
The technique does not usually seem to work so well with transistors, so I was pleasantly surprised at the smooth operation of the regeneration control. Although the tuning would benefit from a bandspread control, the 6:1 vernier-reduction drive makes reception a little easier. Careful adustment of the regeneration control also helps with resolving amateur SSB and CW stations.

CONSTRUCTION TECHNIQUES

THE ONLY TOOLS required are a soldering iron, pliers, cutters, screwdrivers and Allen keys. Of course, access to a multimeter would be useful, as with any construction project. The single-sided circuit board is silk screened with all component positions marked, including those for four link wires which are provided ready cut to length.

I let my group of novices identify all the components. Only one confusion arose, with a 47pF capacitor marked 470 – the zero stands for 'no noughts' in this case. This should really be explained in the parts list. However other markings such as 104 for 100,000pF (100n), are described.

Assembly procedure is fully detailed with provision for check marks, as you progress through each stage. It is divided into six 'phases' where components in groups near to each other are fitted rather than everything in a numerical sequence. The only mistake in the manual was a small one on page 20 where L3's 1.0 microHenry code was incorrect. However it *is* correct in the parts list on page 15. If you do find a problem, a helpful fault-finding guide is included in the manual.



TAKING THE LEAD

ONE SMALL TIP, it's easier to position the components on the board by gently pulling their wires with pliers, rather than trying to push them from the top. Leads should be soldered onto the board before cutting off surplus wire, which also helps prevent damage to the components.

It took me two hours to assemble the set including checking each step in the manual. All that was needed was a PP3 battery and a pair of 'Walkman' 'phones. A good selection of signals could be heard even using a small antenna!

Checks with a signal generator showed that a 1 microvolt signal could be copied, which is a very good result for a simple set. The only improvement I would like, is for the RF gain control to be variable rather than preset, even if it was still at the back.

FINALLY, FOLKS!

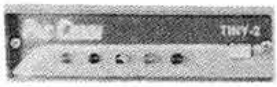
ALL IN ALL, a fascinating receiver. The step-by-step construction with pre-drilled chassis, together with simple alignment make this kit a most interesting 'weekend project'. As well as the beginner, it is also suitable for the more experienced constructor with limited time and workshop facilities.

The MFJ-8100 is available from Waters and Stanton Electronics, 22 Main Rd., Hockley, Essex SS5 4QS Tel: 0702 206835/204965. Price is £71.95 inc VAT, plus £5 p&p.

SISKIN ELECTRONICS IS PLEASED TO ANNOUNCE THE MARRIAGE OF COMPUTERS AND AMATEUR RADIO .....

The growth of Digital Communication in Amateur Radio over the past 10 years has been quite staggering yet many people are still wondering what all the fuss is about! If you haven't got a clue what all those funny buzz words are but would like to join in the fun we would like to help you get going as painlessly as possible.

SEE US AT LEICESTER

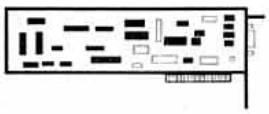


TINY 2 MKII

The UK's best selling TNC now includes FREE ready-made computer and transceiver cables for YOUR set up when ordered from Siskin direct (this offer may not be available through other dealers). Lots of bolt-on goodies available too. Just **£139.00** (plus £4 P&P).

TNC2-H 9600 BAUD

At last TNC designed specifically for 9600 baud at a sensible price. Superb German Engineering coupled with licensed G3RUH 9600 technology makes the TNC-2 H the ideal power house for OSCAR 22 & high speed trunking etc. **£179.00** including ready made computer cable (plus £4 P&P).



PC PLUG-IN CARDS

We offer a range of PC Packet cards for a variety of applications. One of the advantages of a PC card is that you do not lose a precious COM port.

□ The PC-320 supports VHF and HF operation + Personal Mailbox which can be run even while the PC is switched off! The list price of the PC-320 is £179 but at Leicester we'll be offering it for just **£159** including a ready made cable for your transceiver(s) and of course free software.

□ The Thor RLC-100, a full size card offering two or 4 VHF/UHF ports for more serious applications such as Network Nodes, BBSs and DX Clusters. 2 port version **£165,** 4 port version **£285,** both supplied with BPQ software.

□ The BayCom USCC 4 port card — card packs a lot of punch including 1200, 300 and 9600 (G3RUH compatible). Supplied with G8BPQ and BayCom terminal software. **£269** (all cards are £4 P&P).

ICS FAX III

This superb PC software/hardware package produces quite stunning Radio Facsimile reception with up to 16 Grey levels on a VGA Screen. Other modes supported include RTTY, Navtex, FEC & now CW. Send a formatted 1.44PC disk for a demo of the program or you can order the demo by credit card for just £2.50 incl. postage (redeemable on purchase). Available now **£139.95** (plus £2.50 P&P).

PK-GOLD & KA-GOLD

Since we first mentioned Interflex's PC software in RadCom over 150 amateurs have "switched" to Gold, this program virtually sells itself! The features seem endless but perhaps the most interesting aspect is its ability to run in true multi-tasking installations such as Windows 3.1, O/S and Deskview allowing you to transfer ASCII or binary files (including .PKZIP and YAPP formats) whilst you carry on with other non-radio tasks. A demo version of the program is available free of charge by simply mailing us a formatted disk or if you really can't wait you can order the demo for just £2.50 by phone with your credit card (refundable on purchase of the complete program of course). In stock now from just **£69** (KAM/PK-232 version) (plus £1.00 P&P).

YOU'VE READ OUR AD, NOW WATCH THE MOVIE.

Well, not quite. CQ Magazine have produced a superb video entitled *"GETTING STARTED IN PACKET RADIO"*. This professionally produced video includes the basic steps to setting up a Packet station, gives simple step by step instructions about accessing Packet bulletin boards and the DX Cluster and even a taste of satellite communications (if you look closely you can even spot Roddy G3CDK in it!). This video would make an ideal contribution to a club library or perhaps a good grounding for Packet lectures on cold winter nights. To tempt the newcomers we are including a £10 discount voucher with every video redeemable against any TNC or multimode product we sell. Available now — **£19.95** (plus £1 P&P).

VISA RSGB

SCRATCHING YOUR HEAD?

We at Siskin are very much aware that climbing on the Digital band-wagon can be somewhat daunting. We recognise the fact that you will probably need help somewhere along the line and this is reflected by the fact that as far as we are aware we are the ONLY company in the UK Packet Radio business to offer an after hours sales and support line when most of the other dealers have gone home. Siskin staff are generally available on our regular office number from 8am to 8pm Monday to Saturday.

We also hold the largest selection of ready-made TNC-TO-COMPUTER and TNC-TO-TRANSCEIVER cables in Europe and cater for a wide variety of computers, not just the PC. In many cases we actually supply leads FREE with a TNC or Multi-mode purchase. We also supply FREE software with every unit purchased directly from us and what's more if you change computer at a later date we'll ensure you have suitable software at no extra charge.

HOT OFF THE PRESS...

"A PRACTICAL GUIDE TO PACKET RADIO IN THE UK" – revision 6. Now up to 230 pages with updated sections on BBS maps, BBS commands, Hierarchy forwarding and AMTOR. Available now ... £9.95 (plus £2 P&P).

"NOS INTRO" by Ian Wade G3NRW. A layman's Guide to TCP/IP over the radio. One of the most difficult topics ever approached in the amateur press written in plain English and professionally produced. £11.50 (plus £1.50 P&P).

"BEYOND THE BROADCAST BANDS" by Richard Wilmot GW3RRI. Yes indeed, Packet is just the tip of a bloomin' enormous iceberg in the world of digital communications and Richard's book goes a long way to plugging the gaps. Topics covered include FAX, RTTY, AMTOR, CW, SSTV and er ... yes, it covers packet too. Available now ... £12.95 (plus £1.00 P&P).

WHAT ABOUT THE LEICESTER EXHIBITION?

Yes, we'll be manning stand E17 with a full complement of staff and lots of goodies to tempt you. If you are considering upgrading to a multi-mode such as the KAM, PK-232 or PK-900 then please visit our stand first. We will be supplying all the usual SISKIN FREE extras such as ready-made cables and software and for Leicester only we'll be giving away a free copy of Jo Kasser's book *"BASIC PACKET RADIO"* normally on sale for £19.95! (Don't forget, just buying one book at Leicester could save you the cost of the entrance fee).

STOP PRESS ... PC PAKRATT FOR WINDOWS NOW IN STOCK ...

SISKIN ELECTRONICS Ltd.
2 South Street, Hythe, Southampton SO4 6EB.
Tel: 0703 207155/207587. (Fax: 0703 847754).

RADCOM TECHNICAL FEATURE

The Shape of Bits to Come

The conclusion of a tutorial by James Miller BSc, G3RUH

THE TERM 'RAISED COSINE' means several things, a fact which causes a lot of confusion. A raised cosine is just that. A cosine function raised above its mid point. The formula for a raised cosine is (1 + (cos x))/2. Drawn as a graph, it's merely a shape. But it has a number of analytical properties that make it convenient to employ. These are simplicity, left-right and upper-lower symmetries.

'Raised cosine' can for example, describe the shape of the isolated bit – see **Fig 6a**. Since the isolated bit is cosine shaped, the 'scope trace is composed entirely of sine waves and straight lines. Indeed, the following bit sequence . . 10101010 . . actually creates a pure tone at a frequency R/2 at baseband, or at RF, two frequencies spaced by ± R/2.

The isolated bit shape is very similar to FO-20's, occupying 2 bits. Not surprisingly the spectrum is very similar too. In fact 99.9% of the energy is contained within 1.69R (compared with 1.75R for FO-20). An important practical point to remember is that the shape of the bit is completely specified in time. This means that it can be precisely generated using real finite hardware, such as a look-up table. The microsats AO-16/WO-18/LO-19 use a filter not unlike this (**Fig 7**).

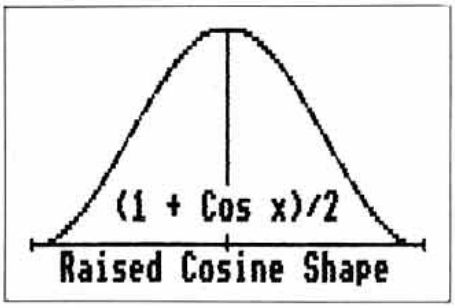


Fig 6a: A raised cosine shape. There's nothing mysterious about a raised cosine. Just get out your calculator and plot y = (1 + cos x)/2 for x = –180 to 180°!

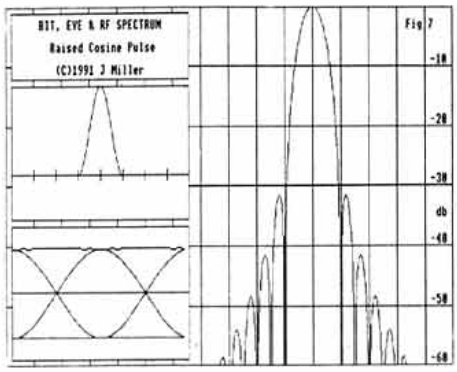


Fig 7: Raised cosine bit TIME shape used (in principle) on PacSats AO-16/ WO-18/ LO-19.

RAISED COSINE SPECTRUM

ALTERNATIVELY 'RAISED COSINE' can also be used to describe the shape of the spectrum. This is illustrated in **Fig 8**. It doesn't look much like a raised cosine spectrum because of the logarithmic scale, but the response is unity (0db) at f=0, 0.5 (-6db) at f = $^{R}/_{2}$ and exactly zero at f = R, the bit rate. 99.9% of the energy is contained within 1.56R.

Because the spectrum is absolutely band limited to ± R, the isolated bit shape that gives rise to that spectrum has infinite time duration. This means that it cannot be synthesized with real finite hardware. On the other hand, as Fig 8 shows, it has negligible amplitude beyond T = ± 2 bits, so that discarding the tails has little effect other than to bring in some very minor spectral sidelobes. So synthesis turns out to be highly practical.

You will also notice that the isolated bit also has precisely the desired properties for zero inter-symbol interference. Is this fortuitous? Certainly not! In fact it is a direct consequence of the two symmetries of the cosine shape mentioned earlier. That's why the raised cosine spectrum is so widely used in data transmission system design.

9600 BAUD PACKET RADIO & UOSAT/OSCARS 22/23

AS A PRACTICAL EXAMPLE of narrowband 'raised cosine' spectrum shaping consider **Fig 9**. Here only the middle $^{3}/_{8}$ths of each half of the spectrum is given a raised cosine shape. From f = 0 to $^{5}/_{16}$ R the spectrum is flat (0db), from $^{5}/_{16}$ R to $^{11}/_{16}$ R it follows the cosine shape, and from $^{11}/_{16}$ R onwards the spectrum is zero.

This is used in the baseband filtering of UoSat/KitSat/OSCARs 22/23 which use the G3RUH 9600 baud Packet Radio modem [1]. The isolated bit shape spans some eight bit periods. That is to say a bit transmitted 'now' will actually have an influence on up to eight other bits, four before and four after 'now'. Hence the title of this article! Note also that the isolated bit has the desired form for minimising inter-symbol interference. A peak at T = 0, zero at all other T points. So the received 'eye' shows good convergence at the sample point.

The spectrum is almost rectangular ('brick-wall') and sidelobe free. 99.9% of the spectral energy is contained within 1.2R, or ± 5.6kHz at 9600bps.

The zero-crossing dispersion is a direct consequence of the narrow bandwidth, and great care is needed in the design of the receiver bit-clock recovery circuits that perform time bit detection. You can see that sampling only $^{1}/_{8}$th bit away from the convergence point means bit detection half way down to the zero threshold, and so the instantaneous noise tolerance would be reduced by 6db. Narrow bandwidth bit-clock recovery circuits are essential. For implementation details see [1].

The actual signals transmitted by UoSAT/ KitSat are slightly different to that shown; they are pre-adjusted (in time) so that when they pass through a real bandwidth limited receiver the final 'eye' is as illustrated.

In the G3RUH/PacComm/Kantronics/

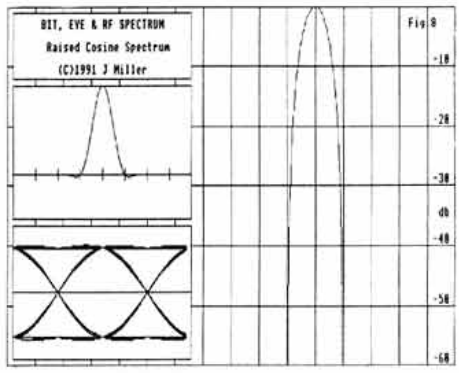


Fig 8: Raised Cosine SPECTRUM Shape. There is a family of these shapes, with the raised cosine part centred on the middle of each side of the spectrum. This synthesis gives a range of shapes from the gentle one shown above to the theoretical minimum 'brick wall' (Bandwidth = data rate).

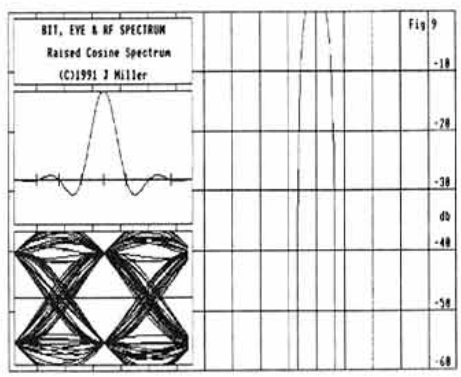


Fig 9: UoSats 14, 22 and KitSat OSCAR-23 have almost 'rectangular' raised cosine spectra (see text). The narrow single main spectrum lobe implies a bit that is some 8 bit periods long. There is no ISI.

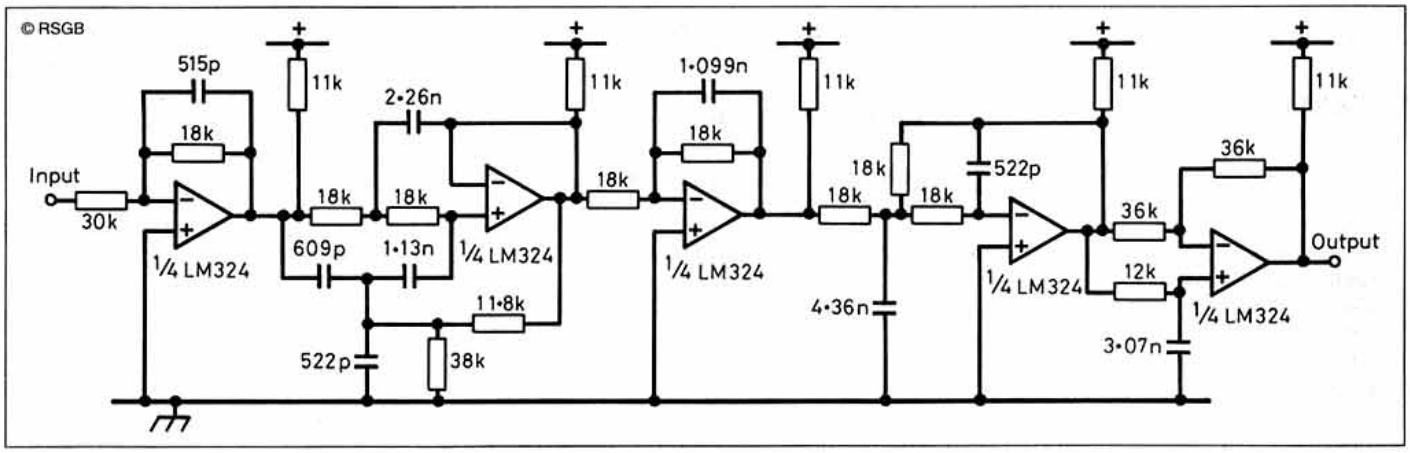


Fig 10: Data filter used in RUDAK-2 'RSM' transmitter. This comprises three cascaded sections; a 3rd order Cauer, a 3rd order Butterworth and an all-pass (refer to text). This transmit filter is used in association with an almost identical filter at the receiver. These filters are thus 'matched'. For spectrum and bit shapes see Fig 11.

Symek/Tasco Telereader embodiment of this modem, transmit bit-shape is referenced from a table of values in an EPROM and passed to a DAC. This data filter is known as an FIR for Finite Impulse Response. UO-22/23 use a tapped digital delay line (shift register) and summing op-amp – EPROMs do not always travel well in spacecraft. This implementation of an FIR is called a Transversal Filter.

In UOSAT/KitSat the signal also FM modulates the carrier (as opposed to PSK). FM is simple to generate, much simpler to process on receive in the presence of mistuning such as doppler shift or receiver drift, and is very robust. Though FM does require slightly stronger signals, 6-8db perhaps, this is not a disadvantagous for amateurs where we are rarely power limited.

Finally note that this precision data shape could trivially generate BPSK via a DSB balanced modulator. Such PSK would have all the narrow-band and non-ISI attributes detailed above.

TX PLUS RX FILTERING

SO FAR DISCUSSION HAS mostly been about spectra and bit shapes in association with transmitters. It was implicit that the receiver was infinitely wideband. For analytical purposes, if there were any RX filtering, we assumed it to be merged with the transmit filtering.

In many amateur applications this is indeed the case. For example, the current flock of PSK packet satellites confine their bit rates to those which can be passed through a typical SSB receiver. RTTY users assume the same thing.

Now we come to an important question. If the overall filtering were to be deliberately split between transmitter and receiver, what form should the filters take? We know from the forgoing, the kind of overall response required. But how should we partition it?

Obviously, the overall response can be apportioned in any ratio whatsoever. However one can prove that in the presence of random noise the optimum split, so as to maximise detector signal-to-noise ratio, is with exactly half the frequency response in the transmitter, and the other half in the receiver. These are known as a 'matched filter pair'.

Conceptually, one can first imagine a desired overall frequency response dictated by inter-symbol interference requirements, spectral constraints and ease of implementation. Then as it were, you take the 'square root' of this, and put the resulting filter into both transmitter and receiver.

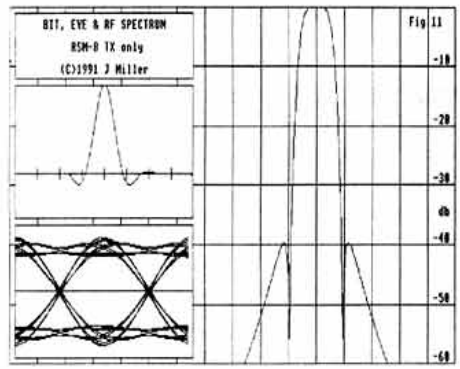
AO-21/'RSM' BIT SHAPING

A VERY GOOD EXAMPLE OF THIS is the bit shaping scheme used on one of the RUDAK-2 links of AO-21 (**Fig 10**) [2]. Dubbed 'RSM' Rectangular Spectrum Modulation by its creator, its transmit filter properties are shown in **Fig 11** (left). Both transmitter and receiver have essentially identical filters. This bit shape is used to phase modulate (BPSK) the RF carrier. Bit rate is R = 9600bps.

99.9% of the spectral energy is contained within a bandwidth of 1.5R, which is consistent with the isolated bit span of about 3 bits. This means that there are about $2^3 = 8$ trajectories in the 'scope trace, which can be seen quite clearly. It is notable that this isolated bit shape is created using analogue filtering rather than more accurate and repeatable digital synthesis.

The transmit filter (Fig 10) has 3 sections, comprising a) a Cauer Chebychev type CC0315/41 which is flat up to a frequency f = R/2, and then plunges down to the zero at f = R. But above this there is a rise to only –15db. So part b) is a 3rd order Butterworth that's smooth to the –3db point at f = R/2, and then –18db at f= R and –36db at f = 2R; c) an 'all-pass' network that has a dead flat frequency response, but a tapered phase characteristic which is used to flatten out the filter delay vs. frequency curve, called 'linear phase'. Linear phase filters result in a transmit bit shape that is left-right symmetric. This filter is not driven directly by the rectangular bit stream, but by short + or – pulses of polarity corresponding to the data bits' polarity.

When cascaded with an identical analogue filter in the receiver, the overall response is as per Fig 11 (right). The overall isolated bit shape is almost perfect, spanning some 5 bits with remarkable symmetry. The 'scope trace shows an excellent eye. The sample point convergence has about ± 8% scatter due to the slight non-zero values of the isolated bit shape at T = –2 and T = +2.



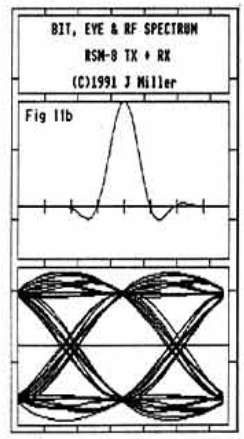


Fig 11(a): Performance of RUDAK-2's 'RSM' Tx filter (above). Fig 11(b): The signal after passing through complementary 'matched' Tx + Rx filters (right). The eye is as wide as possible at the detection point, and regardless of neighbours, all bits have the same amplitude at this instant (i.e. no ISI).

TO THE FUTURE ?

THE 9600 BAUD RSM-PSK implementation is near optimal in performance, probably within 1db of the theoretical limit. [approx 20 Log (1 – $^{6}/_{100}$)]

It is flying on RUDAK-2/AO-21 so AMSAT experimenters (ie you!) can evaluate the effectiveness of high speed PSK with or without coding [3] from the associated on-board Harris RTX2000 RISC processor. This will help determine what is practical and realistic for amateur spacecraft and other digital links of the future.

The G3RUH 9600 baud FM system is not only in daily use by many satellite stations on UO-22/KO-23, but also hundreds of terrestrial packet radio links world wide. Indeed, the outstanding German packet radio [4] network thrives on it. The modem represents a design that pushes the fastest possible binary data through a basic FM radio. 9600bps throughput is astonishing to behold, especially on a full duplex satellite link. Who will predict that

one day even our voice repeater links will be entirely digital. I will!

REFERENCES

[1] Miller J R, '9600 baud Packet Radio Modem Design', Proc. 7th ARRL Computer Networking Conference, Oct 1988, pp 135-140

[2] Meinzer K & Haas W, 'RUDAK 2 – The Radio Links', Amsat-DL Journal No. 1/17, March 1990 pp 9-12. (German). English translation in Oscar News No. 83, June 1990, pp 16-21

[3] Miller J R, 'Shannon, Coding and the Radio Amateur', Oscar News No. 81, Feb 1990, pp 11-15

[4] Rech W & Kneip J, 'The German (Central European) Packet Radio Network: An Overview', Proc. 11th ARRL Computer Networking Conference, Nov 1992, pp 52-56.

USEFUL CONTACTS

AMSAT-UK, 94 Herongate Road, Wanstead Park, London E12 5EQ, England. (Oscar News).

AMSAT-DL, Holderstrauch 10, W-3550 Marburg 1, Germany. (A-DL Journal)

PacComm Inc, 3652 W Cypress St, Tampa, FL 33607-4916, USA. (NB-96 Modem)

Kantronics Co Inc, 1202 E 23rd St, Lawrence, KS 66046, USA. (DE9600 modem).

Symek GmbH, Johannes Kramer Str. 34, W-7000, Stuttgart 70, Germany (TNC2H).

Tasco Telereader, 38 Minami-Youchi, Higasibata, Anjo-City, Aichi 444-12, Japan. (TMB-965 modem).

Technical Update

TWO-METRE SSB/CW TRANSCEIVER

***RadCom* (Apr/May/June 93)**

G3TSO SSB GENERATOR (MODULE 1)

THE AUDIO AMPLIFIER integrated circuit used in this project (ULN2283) is now obsolete, but there is a lower voltage pin-compatible alternative. This is the ULN3718N, available from Cirkit (Tel 0992 444111). Part no for this component is 61-03718.

As this is not suitable for 12V operation, we contacted Cirkit and were informed that a low voltage zener diode of 2.4V or 2.7V should be inserted in series with the supply (**Fig 1**).

Carrier crystals for this module (X101, X102) should be 10.6985MHz and 10.7015MHz as given in the text, not as shown in the components list.

MIXER/VFO MODULE (MODULE 2)

INDUCTOR L7 ON THIS MODULE should be Toko part No KXNSK613BM 1.7uH, Cirkit order no 35-46130. Mixer crystals X1 and X2 are 63.15MHz and 63.25MHz respectively.

RX PRE-AMP (MODULE 6 INPUT)

EVEN BETTER PERFORMANCE, especially rejecting unwanted interference is possible by connecting a Bandpass filter before the Receive preamplifier (**Fig 2**). BPF is Toko type 271MT1008, Cirkit no 17-01008.

Thanks to Bob Fox, G7LHX, and the author Bernie Pallett, G3VML, for these updates.

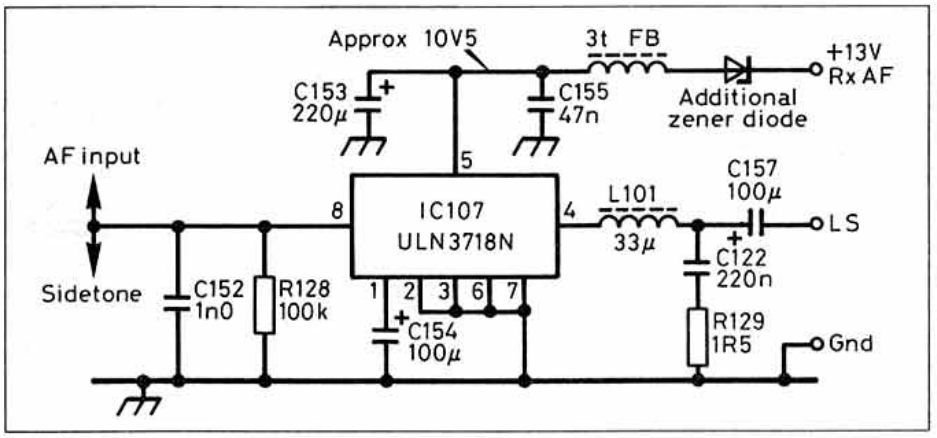


Fig 1: A 2.7V zener diode in series with the supply enables the ULN3718N audio IC to be used.

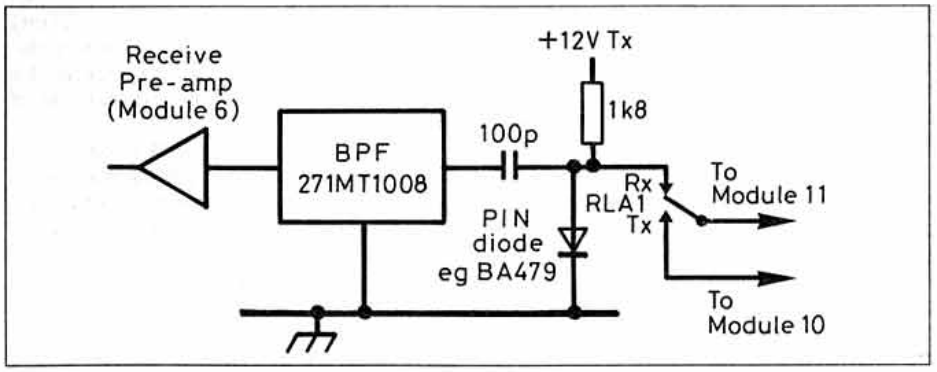


Fig 2: An additional filter gives extra suppression of unwanted signals.

RADCOM Helplines FOR MEMBERS

- Manual and/or circuit diagram for an Ex Army **R208** is required by Mr R Hannan, G4RQJ. Contact him on tel: 0229 471334.
- Tom Holbert, G3DXJ needs a circuit diagram, complete with components values for a Receiver using the **TDA 1083/3** IC. Please reply to: 92 Conway Drive, Shepshed, Leics LE12 9PP.
- G3XPH is looking for an add-on Digital frequency display circuit for a **YAESU FT200**. Information should be sent to Mr R S Grant, G3XPH, 43 Catisfield Lane, Fareham, Hants PO15 5NT.
- G0LPT requires a schematic diagram, with components list of a Crowbar protection unit using a thyristor, suitable for a 20A power supply with output variable from 8 to 15 V. Information please to Mr G Wegg, G0LPT, 23 Kerdane, Dane Park Road, Hull HU6 9EB.
- Manual and/or circuit diagram for a **Totsuko TR2100M** 2mtr sideband transceiver, possibly also marketed under the Shimuzu name, is required by Tom Burke, G1LXU. All costs reimbursed. He can be contacted on tel: 0472 602335.
- Gianluigi Portinaro, I1POR, needs a manual/circuit diagram for a **Boonton L-C Meter**, model 71A. He can be contacted at: Via Deandreis 52, 13040 Palazzolo Vercellese (VC), ITALY.
- Brian Devlin, GM0EGI, needs advice/information for 'deaf' and high SWR readings on a **KLM KT34** Tribander Antenna. Feedline, connections and Balun check out OK. Suspect Bi-metallic corrosion. Any advice would be appreciated. Contact Brian at: 5 Birksburn Avenue, West Mains Estate, Stonehouse, Lanarkshire ML9 3QW.
- G1JZK is looking for a manual/circuit diagrams for the **Maxon SL70** UHF h/portable tcvr also a copy of programming s/ware for (IBM PCs) and info/circuit of the tcvr to computer Interface, cable/adaptor used to program the transceiver. All costs reimbursed. Any inf etc to A Austin, G1JZK, 5 Stour Way, North Brickhill, Bedford MK41 7BD. or tel: 0234 360961.
- Robert, 2E1AXZ needs a circuit or block diagram for a **Welz SP425** SWR/Power Meter (frequency range 140-525MHz). All costs will be reimbursed. Please write to Robert Aley, 39 Westwood Avenue, March, Cambrigdeshire, PE15 8AX.

G3BIK ELECTRONIC KEYER

***RadCom* (Aug 93)**

THE AUTHOR, E Chicken MBE, G3BIK, has informed us that the crystal earphone sounder should be connected between rows R and Q of the stripboard (hole 24 in each case), via the optional switch. This involves a small change to Fig 4 on page 37 of the original article, and ensures that the stripboard layout agrees with the circuit diagram.

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

KENWOOD APPROVED DEALERS

AVON
AMDAT, 4 Northville Road, Northville, Bristol. Tel: 0272 699352

Lowe Electronics, 79 Gloucester Road, Patchway, Bristol. Tel: 0272 771770

BERKSHIRE
Lowe Electronics, 6 Cherwell Close, Langley. Tel: 0753 545255

BUCKINGHAMSHIRE
Photo Acoustics, 58 High Street, Newport Pagnell. Tel: 0908 610625

CAMBRIDGESHIRE
Lowe Electronics, 162 High Street, Chesterton, Cambridge. Tel: 0223 311230

DERBYSHIRE
Lowe Electronics, Chesterfield Road, Matlock. Tel: 0629 580800

South Midlands Communications, 102 High Street, New Whittington, Chesterfield. Tel: 0246 453340

DEVON
Reg Ward & Co, 1 Western Parade, Axminster. Tel: 0297 34918

DORSET
Lowe Electronics, 27 Gillam Road, Northbourne, Bournemouth. Tel: 0202 577760

ESSEX
Coastal Communications, 19 Cambridge Road, Clacton. Tel: 0255 474292

Waters & Stanton, 22 Main Road, Hockley. Tel: 0702 206835

Waters & Stanton, 12 North Street, Hornchurch. Tel: 0708 444765

EIRE
Intronic Ltd, Windsor Hall, Glounthaune, Cork. Tel: 010353 2135 4422

HAMPSHIRE
Nevada, 189 London Road, North End, Portsmouth. Tel: 0705 662145

South Midlands Communications, S M House, School Close, Chandlers Ford Industrial Estate, Eastleigh. Tel: 0703 255111

HUMBERSIDE
Peter Rodmell, Field Head House, Leconfield. Tel: 0964 550921

KENT
ICOM UK, Sea Street, Herne Bay. Tel: 0227 741741

Lowe Electronics, "The Corner House", Chatham Road, Sandling. Tel: 0622 692773

LONDON
A R E, 6 Royal Parade, Hanger Lane W5A. Tel: 081 997 4476

Radio Hamstore, 11 Watford Way NW4. Tel: 081 202 0073

Martin Lynch, 286 Northfield Avenue W5. Tel: 081 566 1120

MERSEYSIDE
Amateur Radio Communications, 38 Bridge Street, Newton le Willows. Tel: 0925 229881

MIDDLESEX
Haydon Communications, 132 High Street, Edgware. Tel: 081 951 5782

Lowe Electronics, 223 Field End Road, Eastcote. Tel: 081 429 3256

NORFOLK
Eastern Communications, Cavendish House, Happisburgh. Tel: 0692 650077

NORTHUMBERLAND
Lowe Electronics, Newcastle Airport, Woolsington. Tel: 0661 860418

NORTHERN IRELAND
GM Electronics, 1 Evelyn Avenue, Belfast. Tel: 0232 671876

Tyrone Amateur Electronics, 44 High Street, Omagh, County Tyrone. Tel: 0662 242043

NOTTINGHAMSHIRE
R A S Nottingham, 3 Farndon Green, Wollaton Park. Tel: 0602 280267

SCOTLAND
Lowe Electronics, Cumbernauld Airport, Cumbernauld, Strathclyde. Tel: 0236 721004

Jaycee Electronics, 20 Woodside Way, Glenrothes, Fife. Tel: 0592 756962

WEST MIDLANDS
Dewsbury Electronics, 176 Lower High Street, Stourbridge. Tel: 0384 390063

Radio Hamstore, 963 Wolverhampton Road, Oldbury. Tel: 021 552 0073

South Midlands Communications, 504 Alum Rock Road, Birmingham. Tel: 021 327 1497

Ward Electronics, 422 Bromford Lane, Birmingham. Tel: 021 328 6070

WEST SUSSEX
Bredhurst Electronics, High Street, Hand Cross. Tel: 0444 400786

YORKSHIRE
Lowe Electronics, 34 New Briggate, Leeds. Tel: 0532 452657

South Midlands Communications, Nowell Lane Industrial Estate, Nowell Lane, Leeds. Tel: 0532 350606

Alan Hooker, 42 Nether Hall Road, Doncaster. Tel: 0302 325690

WALES
P M R Limited, Industrial Estate, Gwaelod-y-Garth, Cardiff, South Glamorgan. Tel: 0222 810999

KENWOOD

HOME AUDIO, CAR AUDIO, COMMUNICATIONS EQUIPMENT, TEST AND MEASURING INSTRUMENTS, TELECOMMUNICATIONS

NEW IMAGE SMC

We aim to give the genuine offer. So why not pop into your nearest SMC shop.

With the value of the pound falling daily price rises on equipment must be imminent this means these offers are probably unrepeatable.

THE PRICE BUSTERS

SAVE £550

LIST £3695 SMC PRICE £3149

FT1000 Carr. E

SAVE £360

LIST £2399 SMC PRICE £2039

FT990. DC model £1829
Carr. D

SAVE £206

LIST £1375 SMC PRICE £1169

FT890 c/w Auto ATU £1339

Options	Carr. D	Carr.
ATU2 Auto ATU	£239	B
FP800 AC PSU	£295	D

SAVE £270

LIST £1769 SMC PRICE £1499

Carr. D

FT736R

Options		Carriage
736/50 6m module	£299	B
736/1.2 23cm module	£525	B

Dual Band mobiles

Carr. C

	LIST	SMC PRICE	
FT5100	£669	£569	SAVE £100
FT5200	£699	£599	

VHF/UHF Multimode Mobiles / Portables

Carr. C

	LIST	SMC PRICE	
FT690R2	£539	£459	SAVE £80
FT290R2	£549	£469	SAVE £80
FT790R2	£649	£549	SAVE £100

Handhelds

SAVE £80

FT530 2m/70cm Carr. B — LIST £529 SMC PRICE £449

SAVE £50

	LIST	SMC PRICE	
FT415 2m	£325	£275	SAVE £50
FT26 2m	£289	£245	SAVE £44
FT411 2m	£309	£265	SAVE £44

	LIST	SMC PRICE	
FT815 70cm	£349	£295	SAVE £54
FT76 70cm	£315	£265	SAVE £50
FT811 70cm	£329	£279	SAVE £50

Carr. B

All handhelds supplied with 7.2V 600ma Nicad and charger as standard

All offers subject to availability Carriage B=£5.00 C=£7.50 D=£12.50 E=£16.50

Access

2 year warranty on all new Yaesu, Icom and Kenwood Transceivers.
We can also offer No interest finance on the manufacturers list prices of many items.

VISA

S.M. House, School Close, Chandlers Ford Ind. Est., Eastleigh, Hants SO5 3BY

HQ & Mail Order ***Southampton*** *(0703) 255111* ***Leeds*** *(0532) 350606*

best prices! and will endeavour to match any competitors

There's never been a better time than NOW to get a great deal!

NEW FROM REXON RL102

2 M FM Handy
Special Introductory price

ONLY £179 inc.

supplied c/w antenna and battery case

- Frequency range 144 - 146MHz (130-170) capability
- 5 Watt output at 13.8V DC
- Multi-function keypad
- 20 memory channels
- Dual watch
- Pause and busy scan
- 6 selectable tuning steps 5 - 50 KHz
- High sensitivity
- Battery save facility

LOW PRICE

Rexon Technology are the communicating division of a large Taiwanese company. They employ about 140 dedicated employees including engineering and R&D staff. *"sounds like some well known Japanese companies of approximately 10-15 years ago".*
See review in November HRT.

Quotations from H.R.T. Review.
"superb receiver sensitivity"
"outstanding audio quality"
"Excellent value"

IC 735

SAVE £246 was £1195 now only £949

IC 229H

SAVE £46 was £445 now only £399

IC 781

SAVE £1000 was £4995 now only £3995

ICOM HANDIES

ICW21E SAVE £50 was £449 now only £399

ICW21ET SAVE £30 was £479 now only £449

IC2SRE SAVE £66 was £525 now only £459

IC 970H

SAVE £329 was £2979 now only £2650

KENWOOD HF TRANSCEIVERS

Some items still available at pre-increase prices

		Carr.
TS 950SDX	CALL FOR LATEST PRICES	E
TS 850S		D
TS 850S AT		D
TS 450S		D
TS 140S		D
TS 50S		D

LEICESTER AMATUER SHOW
STAND 8 IN THE SALES HALL

NEW "QUICK CLIP" £14.95 incl. V.A.T

A quick release help clip suitable for most makes of hand-held transceivers and scanners. Just rotate through 90 degrees to release or to attach "no more fumbling"

Showroom hotline 0703 251549 HQ showroom hours 9.30–5 weekdays 9–1pm Saturday

Birmingham *021-327 1497* ***Axminster*** *(0297) 34918* ***Chesterfield*** *(0246) 453340*

RADCOM NEWS FEATURE

The Novice Licence - A Good Start

by Peter Thornhill, G6ZKQ

IN 1990 the RSGB tried to get the DTI to agree to a new Novice Licence scheme.

As far as some of the licensed amateurs were concerned, the concept of the Novice was not a good one, but the SWLs couldn't wait. Who was going to win?

I have taught the RAE for ten years with the Plymouth Radio Club, and I've enjoyed a reasonably high pass rate.

By 1991, the enormous amount of work and negotiation by the RSGB led to the go ahead for the Novice Licence with its own RAE and the requirement to attend a registered training course. It was the talk of all the radio clubs and the Plymouth Radio Club Chairperson asked for members to come forward and help with starting a Novice group. I couldn't help, as I had already got two RAE classes but eight put forward their names. Then some weeks later, we asked if these people were still prepared to run a Novice course. It was as if they had never existed in the first place.

I then read in *RadCom* that Devon did not have a single Novice Instructor. Trying to work out what time I had available, and with my RAE Courses coming to an end for the May Exam, I felt I could possibly run a Novice course or two so I telephoned the RSGB Project YEAR Coordinator, Hilary Claytonsmith, G4JKS, for the forms. A week later, Hilary telephoned and asked if I would be prepared to be the Senior Instructor for Devon. My reply was "certainly", as I was the only Instructor.

Video Success

I needed somewhere to run a class and as I felt that it should be youngsters that needed teaching, I telephoned three local schools. The Headmaster Ray Tarleton said the course could take place after school every Wednesday.

At a parents' meeting we showed the RSGB video *Amateur Radio for Beginners* and I tried to select four children from the nine in the room (the tenth was a teacher). I tried to make it sound as difficult as I could with the hope that some would drop out. They didn't! I thought "to hell with the ideal rules, I'll take the lot including the teacher!"

I had a week to get organised, so I made a components board, numbered and named each component, made wall charts with Ohms Law, Resistance and Capacitance in series and parallel, colour codes etc, and made a twenty minute video on how power supplies work. As for equipment, I had some circuit board donated by a Plymouth electronics firm, a communications receiver and antennas.

Be Prepared

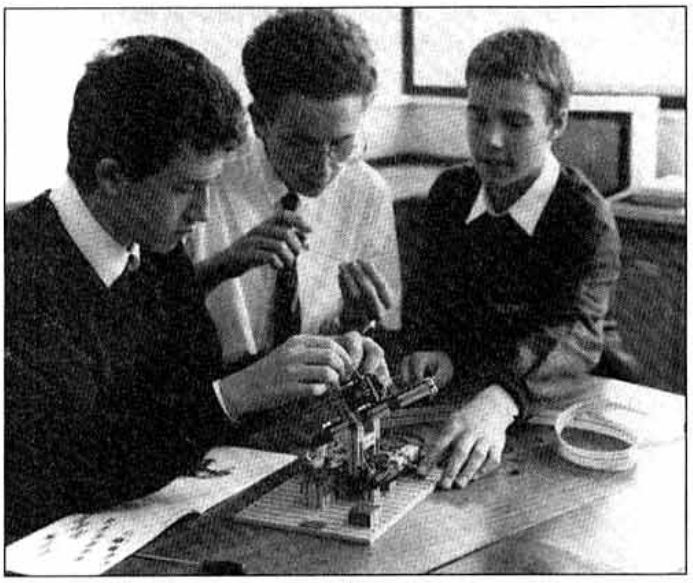
I arrived at the school for my class, armed with all the bits that I had prepared. The children seemed a little subdued but Peter Kensington of the science department said: "you are lucky, wait till they get to know you". He was right!

I set up each of the prepared units around the classroom. and did an introduction to amateur radio. Then each child went to each unit in turn. Each week I added other units, and ticked them off on the progress report as each child covered them, all with the help of Peter Kensington. I kept all of the units in the classroom so that they could revise at any time they were at a loose end.

We had quizzes on radios, transmitters and antennas plus mini-mock examinations. Then the eagerly awaited amplifier kits arrived. Ray Tarleton had decided that the school would pay for the books, kit and exam, and the children did not have to pay a thing.

The students had all done plenty of soldering practice and they were good at it, so we started to make the kits. I told them not to rush as it was easy to make a mistake, but at the end of the session they were so keen to finish that I could not get rid of them!

I took in a music keyboard so that the amplifiers could be tested; this caused a certain amount of interest. Some of the children could play, but not without their amplifier, as I had turned the speakers off; they had to complete before they could play. All of the amplifiers worked.



Practical training: (l to r) Simon Morley, Gavin Callard, and Tim Keast. They became 2E1AGC, 2E1AEX, and 2E1AEZ respectively.

Then we went on to see how harmonics worked, demonstrating them with the keyboard. Some of the items we were to teach, the children already knew as it was part of their normal education, so I spent less time on these and more on the things they did not know.

First Class Operators

I gave all the children a callsign each for use in the classroom, and we went through operating procedures, which was quite amusing, as they felt quite foolish having mock QSOs with their classmates.

It was also very easy to get side tracked from the subject in hand, as like all bright children, they wanted to know more about everything, far beyond what I had planned for the course.

The Headmaster, stopped me one evening, and said "I suppose we will have to have a transceiver in the school now; that is something I would like to put money into". This was to be the beginning of a new phase, a school radio club. Letters were sent to various organisations, to let them know what we were doing, and seeking a little help with the setting up of the shack. Several local businesses answered the call.

The Committee of the Plymouth Radio Club have also given money and their support. Members of Torbay Amateur Radio Society offered assistance with putting a station on at the school, others wanted to teach Morse and construction.

The club now has a callsign G7KSX and the school is registered with the City and Guilds as an examination centre. The children all want to go on to do the RAE.

Meanwhile I have also had a class of five from the Knowles Hill School, Newton Abbot, and we have now got half a dozen Instructors in the county. I think we can safely say that we have made our mark down here in Devon.

ICOM YAESU KENWOOD ALINCO

RADIO

HAMSTORES

ICOM PRICES ARE DOWN

SNAP UP A BARGAIN AT HAMSTORES *AND* AT THIS YEARS LEICESTER SHOW - STAND 2

N.B. Savings based on June 1993 prices. Offer for limited period only.

EXCLUSIVE!!!
IC-U101 12 CHANNEL 70CM. MOBILE
ONLY £179!

These brand new ICOM transceivers have been factory modified to 25kHz specification and come complete with mobile-mount and hand mic. The IC-U101 will be programmed with 12 frequencies of your choice, CTCSS is an extra £18. 15 watt RF output can be reduced for novice use, ideal for PACKET radio. So there you have it, ICOM have reduced the prices of selected popular models and made it even easier for you to own a radio by the market leader. But don't forget HAMSTORES also stock AEA, AKD, Alinco, AOR, Barenco, Comet, Cushcraft, Davis, Dee Comm, Diamond, JRC, Kenwood, Lowe, Microset, MFJ, RSGB Books, Toyo, Yaesu and Yupiteru, so whatever you want HAMSTORES will have it! Low deposit, interest-free credit is available on most radio purchases.

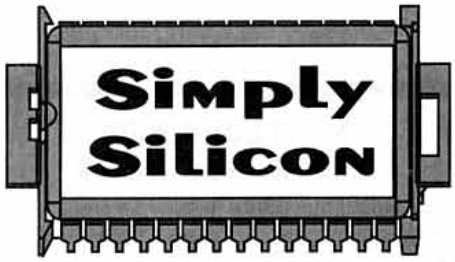
RSGB VISA MasterCard ICOM SWITCH

BIRMINGHAM: (STORE IS JUST OFF M5 MOTORWAY JUNCTION 2) - GORDON & JOHN
International House, 963 Wolverhampton Rd. Oldbury, West Midlands B69 4RJ. Tel: 021 552 0073 Fax: 021 552 0051. -

LONDON: - DOUG & 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: Mondays to Fridays: 09:00-17:00 & Saturdays: 09:00-16:00.



HARRIS HSP45102 DIRECT DIGITAL SYNTHESIZER

- 33MHz, 40MHz versions
- 32 bit Frequency Control
- BFSK, QPSK Modulation
- Serial Frequency Load
- 12-bit Sine Output
- 0.009Hz Tuning Resolution at 40MHz
- Spurious Frequency Components < -69dBc
- Low Cost

DIRECT DIGITAL SYNTHESIS has become a common technique in commercial transceivers for amateur use, but until recently the integrated circuits employed have tended to be very expensive for home constructors. Recently, the Harris HSP45102 has become available at a reasonable price in a 28 pin DIP package (**Fig 1**). This device takes two serial 32 bit control words from a microprocessor or read-only memory (ROM), and can be rapidly switched between two frequencies.

The output requires a high-speed D/A converter, which should preferably be of 10 or (better still) 12 bit accuracy. The purity of the sine wave output is largely dependent on the accuracy of this component, and a low spurious content is most likely to be acheived when the DDS output is applied to a Phase Locked Loop. Careful selection of clock and output frequencies could result in useful circuit configurations, and we would be most interested to hear from readers who have experimented with DDS techniques.

MANUFACTURERS DATA

THE HARRIS HSP45102 is a Numerically Controlled Oscillator (NCO) with 32 bit frequency resolution and 12 bit output. With over 69dB of spurious free dynamic range and worst case frequency resolution of 0.009Hz, the HSP45102 provides dramatic improvements in accuracy over other frequency synthesis solutions at a competitive price.

The frequency to be generated is selected from two frequency control words. A single control pin selects which word is used to determine the output frequency. Switching from one frequency to another occurs in one clock cycle, with a 6 clock pipeline delay from the time that the new control word is loaded until the new frequency appears on the output.

Two pins, P0 and P1, are provided for phase modulation. They are encoded and added to the top two bits of the phase accumulator to offset the phase in 90° increments.

The 13 bit output of the Phase Offset Adder is mapped to the sine wave amplitude via the sine ROM. The output data format is offset binary to simplify interfacing to D/A converters. Spurious frequency components in the output sinusoid are less than –69dBc.

The HSP45102 has applications as a Direct Digital Synthesizer and modulator in low cost digital radios, satellite terminals and function generators.

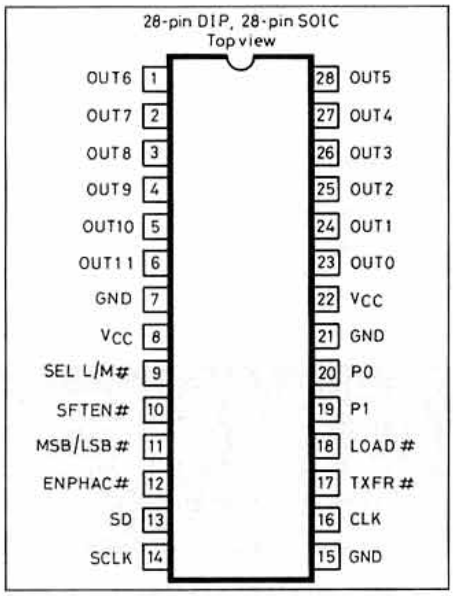


Fig 1: Pin connections for the HSP45102.

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.

FUNCTIONAL DESCRIPTION

THE HSP45102 produces a 12 bit sinusoid whose frequency and phase are digitally controlled. The frequency of the sine wave is determined by a 32 bit word, clocked into the 'SD' input. Selection of the active word is made by SEL_L/M#. The phase of the output is controlled by the two bit input P0-1, which is used to select a phase offset of 0°,90°,180° or 270°.

As shown in the Block diagram (**Fig 2**), the HSP45102 consists of a Frequency Control Section, a Phase Accumulator, a Phase Offset Adder and a Sine ROM. The Frequency Control section serially loads the frequency control word into the frequency register.

The Phase Accumulator and Phase Offset Adder compute the phase angle using the frequency control word and the two phase modulation inputs. The Sine ROM generates the sine of the computed phase angle. The format of the 12 bit output is offset binary, and ranges from 001 to FFF hexadecimal, centred around 800 hexadecimal.

PHASE P0-1 CODING

P1	P0	Phase Shift (Degrees)
0	0	0
0	1	90
1	0	270
1	1	180

The output frequency is equal to $N^* F_{CLK}/2^{32}$, where N is the selected 32 bits of the frequency control word. for example, if the control word is 20000000 hexadecimal and the clock frequency is 30MHz, then the output frequency would be $F_{CLK}/8$ or 3.75MHz.

AVAILABILITY

ELECTROMAIL (RS Components) stock the HSP45102PC-33 (33MHz DIP version) – stock no. 284-977. Price (1 off) is £16.17 inc VAT plus £2.95 p&p per order.

Reprints of the article 'Direct Digital Synthesis' by Dr P H Saul, G8EUX, *RadCom* (Dec 1990) are available to members, price £3.00 inclusive from the *RadCom* editorial office.

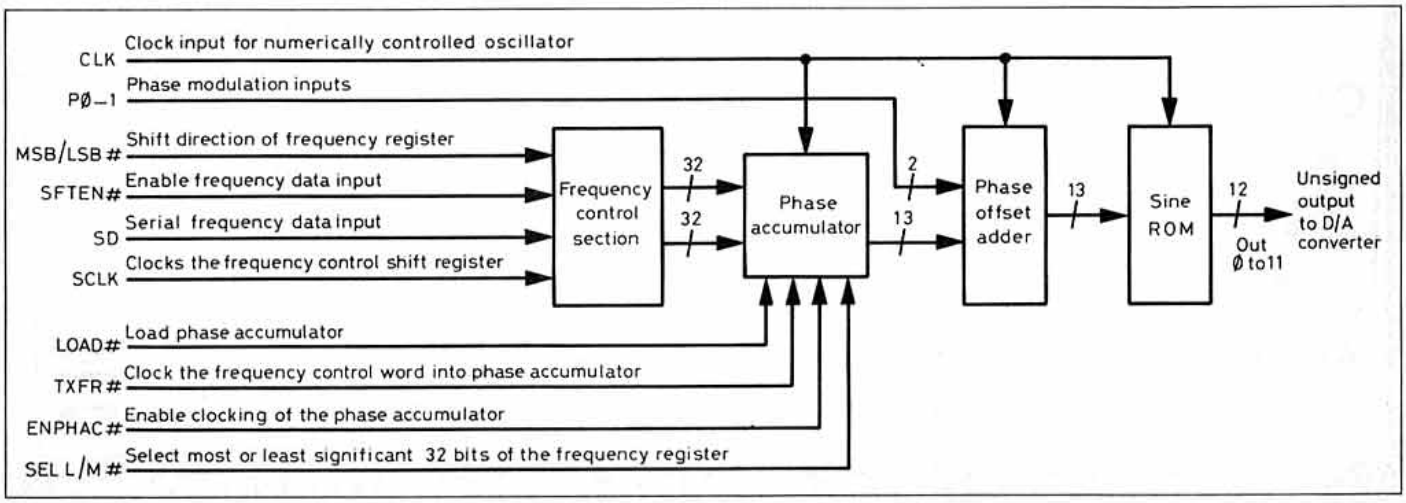


Fig 2: Input and output connections to the HSP45102 DDS. Note that inputs marked # are active-low.

47 OUR SECOND CHIP this month, the National Semiconductor LM35DZ, has many applications. The most obvious is in conjunction with a comparator circuit (eg 741 op-amp) and power mosfet to switch on a cooling fan at a given temperature. Temperature compensation for VFOs etc is another possibility. The device is convenient to use as it doesn't require any initial calibration. Just adding a resistor and 1mA meter between the output and ground gives an accurate thermometer. An alternative version, the LM35CZ has a temperature range from -40°C to 110°C.

MANUFACTURERS DATA

THE LM35DZ (**FIG 3**) IS a precision semiconductor temperature sensor giving an output of 10mV per degree Centigrade. Unlike devices with outputs proportional to the absolute temperature (in degrees Kelvin) there is no large offset voltage which, in most applications, would have to be removed.

The circuit shown in **Fig 4** is a basic single ended temperature sensor capable of measuring between +2°C and +100°C or 110°C depending on version.

To measure negative temperatures a negative supply is required as shown in **Fig 5**. Note that this circuit uses the LM35CZ.

R1 should be selected as follows:

$$R1 = \frac{-V_S}{50 \times 10^{-6}}$$

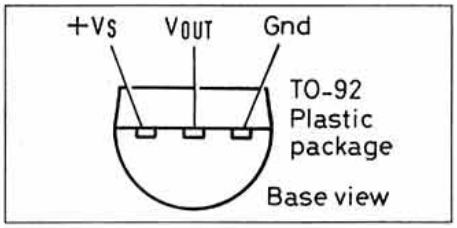


Fig 3: Pin connections for the LM35DZ.

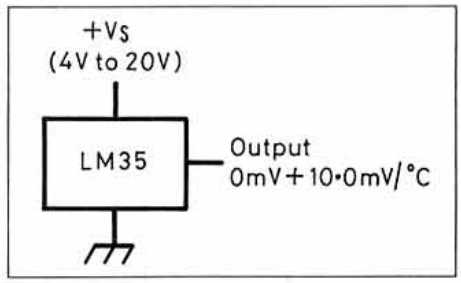


Fig 4: Basic temperature sensor.

NATIONAL LM35DZ TEMPERATURE SENSOR

- Output proportional to °C
- A Wide temperature range 0°C to 100°C
- Accuracy 0.25°C typ at room temperature
- Output linearity 0.2°C typical
- Low quiescent current drain (60µA typical)
- Output impedance 0.1Ω at 1mA

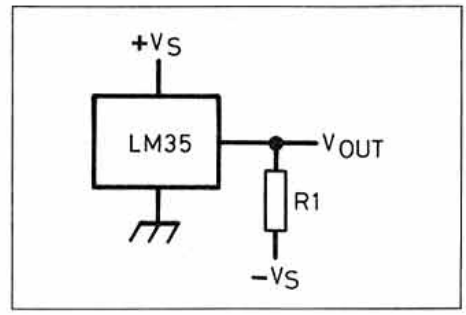


Fig 5: This will measure temperatures below 0°C.

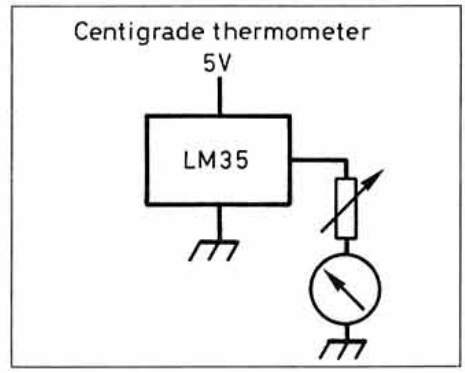


Fig 6: A simple but accurate thermometer.

AVAILABILITY

THE LM35DZ IS available from Maplin Electronics - order code UF52G, tel: 0702 554161; or Electromail (RS Components) - order code 317-954, tel: 0536 204555.

The Leicester Show Guide 1993

Leicester Amateur Radio and Electronics Exhibition

Granby Halls, Aylestone Road, Leicester

Friday 29 October – 10am to 6pm (disabled 9.30am)
Saturday 30 October – 10am to 5pm (disabled 9.30am)

Admission price £1.50, concessions £1 (discounts for block bookings)

- **Extensive Trade Exhibition**
- **RSGB Book and Information Stand**
- **Bring and Buy Stand**
  (run by the Leicester Radio Society)
- **RAOTA AGM**
  Conference Room, Saturday
- **Talk-in by GB2GH on S22 and SU22**

SPECIAL HOTEL ARRANGEMENTS

Block booking terms have been negotiated with the following hotels for the duration of the show.

GRAND HOTEL: £25 per person per night. Tel: 0533 555599.
ALEXANDRA HOTEL: £28 (single), £40 (double/twin room). Tel: 0533 703056 (G6HSF Andy).
POST HOUSE: £19.50 per person per night. Tel: 0533 630500
PARK INTERNATIONAL: £22 per person. Tel: 0533 620471.
HOLIDAY INN: £25 per person (twin room), £35 (single room). Tel: 0533 531161

To Qualify For These Concessionary Prices It Is Essential To Quote The Amateur Radio Exhibition At Granby Halls

The Leicester Show Product News

We asked exhibitors to tell us what products would be launched or featured at Leicester. Here are their replies . . . .

The information below is compiled from information sent in by the manufacturers and distributors concerned. Details are published in good faith but the RSGB cannot be held responsible for false or exaggerated claims made in the source material.

Nevada Communications
Stand S34

PRIDE OF PLACE on the Nevada stand looks like going to the **TM-750A** 40m HF Mobile Transceiver. This low cost budget rig has digital readout and 30W PEP SSB or CW output. There are also separate controls for RIT and mic gain, together with frequency lock, noise blanker and attenuator switches. The whole transceiver is no larger than the average 2m mobile multimode and comes complete with mobile fixing kit and bale arm for desktop mounting.

Right, so you've got your HF Mobile rig - now you need an antenna! Nevada can now supply the **Outbacker** range of multitap helical whips to cover all bands from 10m to 80m, with power ratings up to 300W PEP. Versions for 1.8MHz are also available.

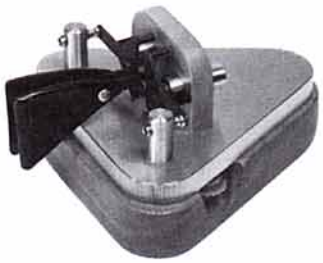
Also from Nevada is a rather useful **Docking Booster** (right) which turns your handheld into a powerful 60W base station. The manufacturers claim it is suitable for *all* leading brands of VHF handheld transceiver. The unit is supplied with five adaptors to suit various rigs.

Accurate, reliable test equipment tends to be expensive, but the **Startek ATH** range of frequency counters is most economically priced. And the counter can trigger and hold a frequency reading - even on signals of very short duration. The range covers up to 2800MHz and an eight digit display.

Eastern Communications
Stand S22

VIBROPLEX ARE renowned for being the "oldest name in amateur radio".

Their precision engineered range of Morse keys have now been around for over 100 years. However new products continue to be successful, and the **Vibroplex 'Brass Racer'** twin paddle is no exception. This one's available with an electronic keyer built into the base. As well as these Eastcomm say they will be showing a wide range of other products. These will include all that's new from the Icom, Yaesu, Alinco, AOR and Kenwood ranges.



Waters and Stanton — Stand S15

PRODUCTS FROM Alinco and MFJ should arouse plenty of interest on this stand at Leicester. Since the demise of the Kenwood and Heathkit dip meters, MFJ have been aware of constant demand for a replacement. So they've come up with the **MFJ-203** - a completely new design which uses a single element to cover the complete HF range from 1.8MHz to 30MHz. This does away with the need for coil sets and has eliminated the problems of frequency pulling and internal spurious resonances. Apart from resonance, the unit can also be used for measuring inductance and capacitance. It is self powered from an internal PP3 battery.

Something new in handheld VHF transceivers has just been announced. The **Alinco G-1** is a conventional 2m rig which can receive on both 2m and 70cm. But the feature of particular interest is the ability to monitor not only the frequency in use, but also the three channels either side - ie a total of 7 channels at any one time. Channel activity is displayed by a series of vertical bar graphs in the upper part of the window display. As the receiver is tuned so the active channels move across the display with the centre one always being the demodulated one. There is no detectable delay when tuning, response of the spectrum display is instantaneous.

Alinco also have a new 50W 2m mobile transceiver. The **DR-130**'s big feature is it's ability to change the display from frequency to channel numbers as required. These correspond with the memory numbers and make it easier to read at a quick glance when out mobile.

Diamond have announced their new RH-536 highly flexible dual band hand-held antenna for 2m/70cm. Plenty to see on this stand at the Leicester show!

South Midlands Communications
Stand S8

BLENDING THE HIGH performance digital frequency synthesis techniques from the FT-890 with the operating convenience and affordability of the FT-747GX, the **Yaesu FT-840** adds a choice of two optional remote automatic antenna tuners and a wealth of convenient functions. For compact base and mobile stations, the FT-840 sets the new standard for high performance affordable transceivers. As a first-time rig, back-up or main station transceiver, the FT-840 has the features and dependability that both beginners and seasoned operators will appreciate. A wide range of accessories are available including desktop microphone, matching external antenna tuner and narrow band FM unit for both transmission and reception. This rig is also expected to be a major

attraction on the YAESU stand (E4). Don't miss it!

The **Yaesu FT-2200/FT-7200** series are compact, fully featured transceivers providing selectable power output of 5, 20 or 50 watts on VHF and 5, 20 or 35 watts on the UHF version. 49 tunable memories offer flexible programming and scanning functions, such as odd-split Tx/Rx frequencies, programmable repeater offset and scan limits, selectable scan resume modes and memory skip. Backlighting for the large (LCD) display, knobs and major buttons is controlled using a photo-sensor to adjust automatically to ambient light conditions. A 38-tone programmable CTCSS encoder is built-in, and an optional unit (the DVS-3) permits digital voice recording and playback. For remote operation, the optional MW-2 wireless remote control unit duplicates most front-panel controls (including volume and squelch), adding a DTMF keypad and microphone. A tiny panel plugs into the microphone jack of the radio to receive commands from the unit.

ICS Electronics — Stand E7

THE **AEA PK-900** Multi-Mode Data Controller heralds the next generation of such units from the USA. ICS say it's a step up from their popular PK-232 and has a performance comparable with units costing much more. The controller has dual simultaneous ports with HF or VHF standards on either port. There are 20 selectable 'software modems' and an optional 9600Bd modem board gives the user even more power. Then there's the new PACTOR option which opens up a universe of capabilities. Excellent filtering of the channel 1 demodulator is acheived using a high-performance Bandpass Filter-Limiter Discriminator design. Finally, a unique status/mode tuning LCD display tells you everything at a glance.

Software? Well, how about **PC-Pakratt for Windows**. Claimed to be the first and only data controller program for Microsoft Windows on the market today. The host of useful features are listed in the AEA catalogue, available from ICS. A DOS version of this program is also available.

HF operators can now get a graphical display of their antenna's SWR over the range 1-32MHz with the **AEA SWR-121 HF Antenna Analyst**. This has automatic scaling, internal self-test and calibration as well as an RS232 interface for saving plots to an IBM-PC or compatible. The unit is compact, battery powered and looks very useful for field day and portable operations.

The Leicester Show

FLOOR PLAN AND LIST OF EXHIBITORS

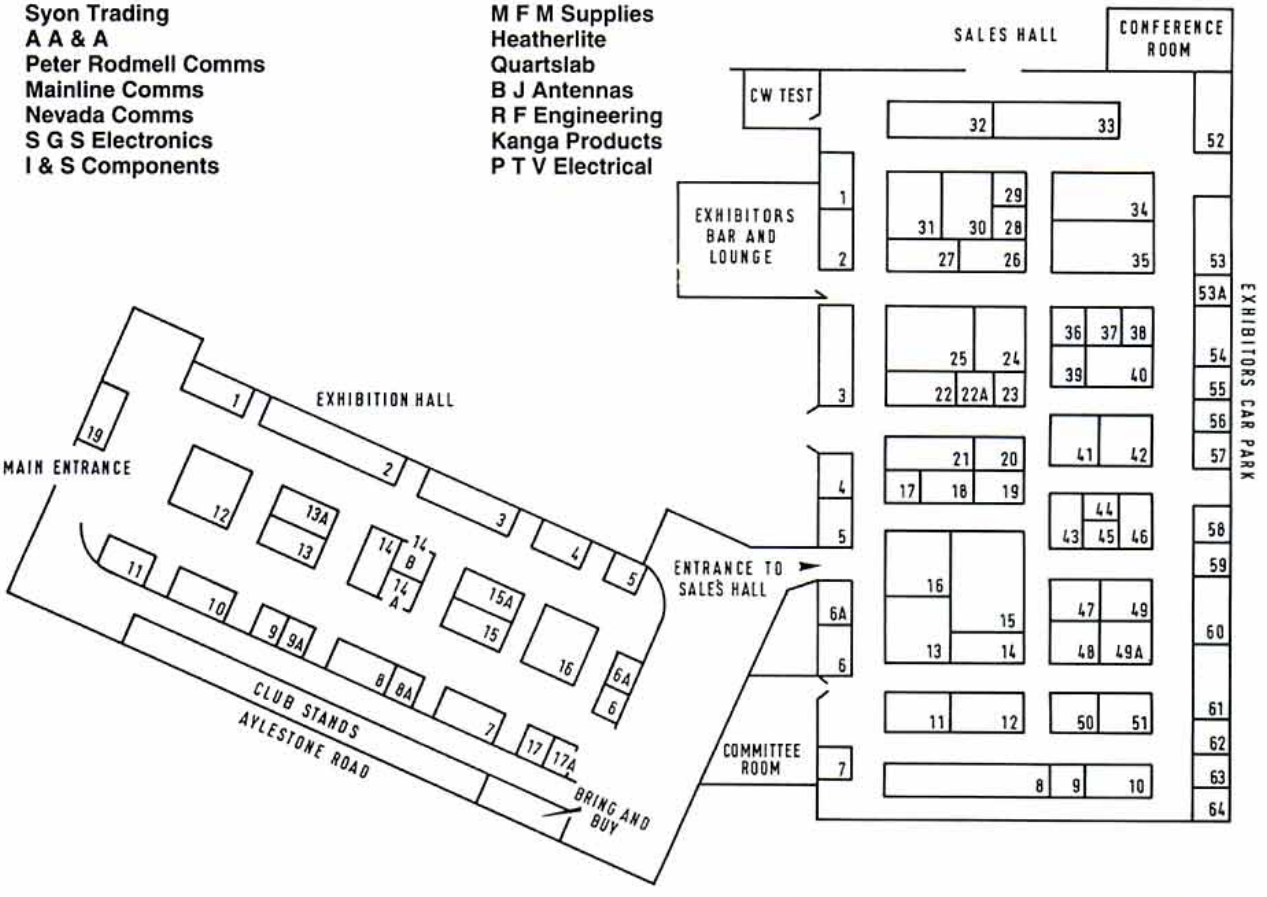
SALES HALL

1/2	Gemini Electronics
3	Taurus Electrics
4	Dewsbury Electronics
5	Greens Telecom
6	LMW Electronics
6a	Lake Electronics
7	KM Publications
8	South Midlands Comms
9	JPE Computers
10	Amateur Radio Comms
11	Sandpiper Communications
12	Weirmead
13	Display Electronics
14	Strumech Eng
15	Waters & Stanton
16	Telford Electronics
17	Mutek
18/19	Trident Systems
20	J M G Electronics
21	J A B Electronics
22	Eastern Comms
22a	Castle Electronics
23	H Morgan Smith
24	U M F
25	Martin Lynch
26	Barenco
27	J Birkett
28/29	R J Holderness
30	Syon Trading
31	A A & A
32	Peter Rodmell Comms
33	Mainline Comms
34	Nevada Comms
35	S G S Electronics
36	I & S Components
37	Ham Videotronics
38	J & P Electronics
39	Stevens Electrical
40	M & B Radio
41	A R E Comms
42	Marco Trading
43	Brial Services
44	Coltec
45	Amstrutt
46	A J Paddon
47	R A S (Nottingham)
48	Computer Junk Shop
49	Oasis Computers
49a	Giocommelli
50	Westlake
51	Radiotronics
52	New Cross Radio
53	Lee Electronics
53a	Strikalite
54	Specialist Antenna Systems
55	SEM
56	G C Arnold Partners
57	Badger Boards
58	RN Electronics
59	Micro Magic
60	Dee Comm
61	Radio Shack
62	Loutronics
64	Bonex

Qualitas Radio
M F M Supplies
Heatherlite
Quartslab
B J Antennas
R F Engineering
Kanga Products
P T V Electrical

EXHIBITION HALL

1	RSGB
2	Icom
3	Practical Wireless/Shortwave
4	YAESU
5	Wilson Valves
6	2J Sound
6a	R & D Electronics
7	I C S Electronics
8	A1 Electrical
8a	Poole Logic
9	Jandek
9a	Howes Comms
11	Videquip
12	Lowe Electronics
13	Rich Electronics
13a	T W Wraith
14	Hayden Communications
14a	R A Kent
15	Amdat
15a	Tennamast
16	Dataphone
17	Siskin
17a	Microgenesis



Pat Hawker's Technical Topics

G3SBI'S HIGH PERFORMANCE MIXER

LAST MONTH'S *TT* ITEM on G3SBI's investigation of N6NWP's 'High-dynamic-range MF/HF receiver front end' (*QST*, Feb 1993, pp23-28) revealed that he had subsequently developed an entirely new way of using an SD5000 DMOS quad-FET array that promised to provide even greater dynamic range, particularly on the higher HF bands. His new 'H-mode' configuration fulfils this promise and seems to open the way to a multiband HF receiver of superlative performance.

In presenting information on this new mixer configuration, it should be made clear that Colin Horrabin, G3SBI, is a professional scientist/electronic engineer at the Science and Engineering Research Council's Daresbury Laboratory which has supported his investigative work on the H-mode switched FET mixer and consequently holds intellectual title to the new mixer. This does not, of course, prevent readers from taking the development further or using the information presented in September or this current *TT* item.

G3SBI writes: "The previous information covered an investigation of all the component parts of a high-performance front-end including a note on the limitations of the crystal filter intercept point. Although the intercept point of the filters readily available on the UK amateur market appeared to limit the performance of a front end to some degree, this could be made compatible with high-performance mixers if no post-mixer amplifier was used in front of the filter and a quadrature hybrid network with two low-loss SSB filters immediately followed the mixer. The SD5000 DMOS FET mixer described in the September *TT*, followed basically accepted practice in commutation (switching) mixers and achieved a +50dBm input intercept point on 7MHz with the use of square-wave drive.

"However, as noted, it was not possible to achieve this performance on all amateur HF bands, including bands lower and higher in frequency than 7MHz. The results were improved on the lower frequency bands by altering the capacitive balance of the RF input transformer, but this had no significant effect on 14MHz and above. It was felt that a configuration for the mixer where the RF input signal was not in the gate source switch-on path would prevent modulation of the true gate-to-source local oscillator voltage by the RF input signal.

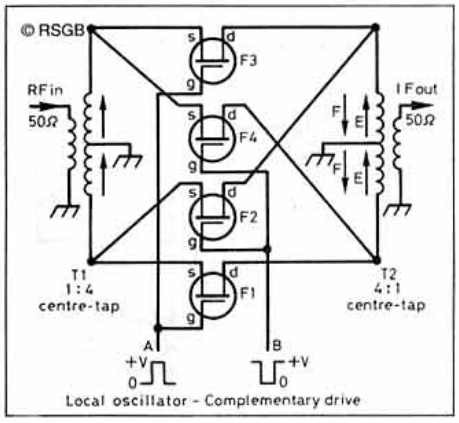


Fig 1: Conventional commutation mixer arrangement based on quad-FET array.

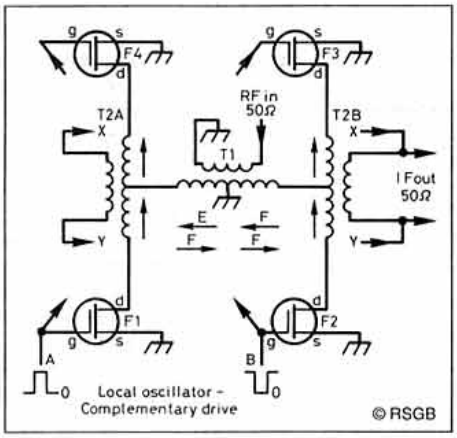


Fig 2: The new 'H-mode' commutation mixer.

"The performance of the new mixer is as follows: With an input RF test level of +11dBm (0.8V RMS two tones spaced at 2kHz or 20kHz); conversion loss 8dB; RF to IF isolation -68dB; LO to IF isolation -66dB. Input intercept points: 1.8 to 18MHz +53dBm; 21 to 28MHz +47dBm or better; 50MHz + 41dB. These results were achieved with a gate-to-source DC bias of +1.95V and -8V substrate bias, a square-wave local oscillator amplitude of 9V and an IF at 9MHz.

"**Fig 1** shows a conventional commutation ring mixer: if A is 'on', FETs F1 and F2 are 'on' and the direction of the RF signal across transformer T2 is given by the 'F' arrows. The main deficiency of this classic circuit is that as the RF input signal level increases, it has a significant effect on true gate-to-source voltage needed to switch the FET 'on' or keep it switched 'off'. Larger local oscillator amplitudes are then required, but linearity problems may still exist because of the difference in the FET 'on' resistance between negative and positive RF signal states.

"The alternative arrangement is shown in **Fig 2**. The shape of this diagram illustrates why the new mixer has been named 'H-mode'. Inputs A and B are complementary square wave inputs derived from the sine-wave local oscillator at twice the required frequency. If A is 'on' then FETs F1 and F3 are 'on' and the direction of the RF signal across T1 is given by the 'E' arrows. When B is 'on', FETs F2 and F4 are 'on' and the direction of the RF signal across T1 reverses (arrows 'F'). This is still the action of a commutation mixer, but now the source of each FET switch is grounded, so that the RF signal switched by the FET cannot modulate the gate source voltage.

"In this configuration the transformers are important: T1 is a Mini-Circuits type T4-1; T2 is two Mini-Circuits T4-1 transformers with their primaries connected in parallel. It is possible that a special five-windings transformer might give even better results, but so far the intercept points achieved with a home-made transformer have been unsatisfactory; it is probably a question of having the right ferrite material. However, the parallel-connected transformers give good balance and perform well.

"The practical test circuit is shown in **Fig 3**. It is constructed on an earthplane board and all transformers and ICs are mounted in turned pin DIL sockets. The printed circuit tracks connecting T1 to T2 and from T2 to the SD5000 are kept short and of 0.015-inch width to minimise capacitance to ground. Operation is as follows: The local oscillator is divided by two in frequency and squared by a 74AC74 advanced CMOS bistable similar to the SD5000 mixer described in the September *TT*. However the bistable is run from +10V instead of +9V and a cut-down RS Components ferrite bead is inserted over the ground pin of the 74AC74 to clean up the square wave.

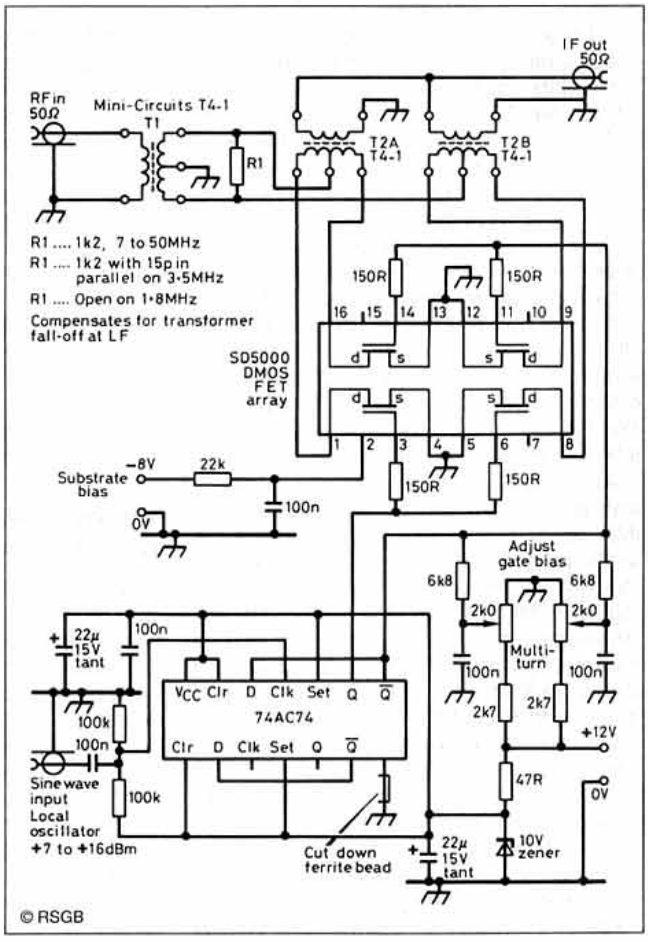


Fig 3: Test assembly for 'H-mode' mixer as investigated by G3SBI.

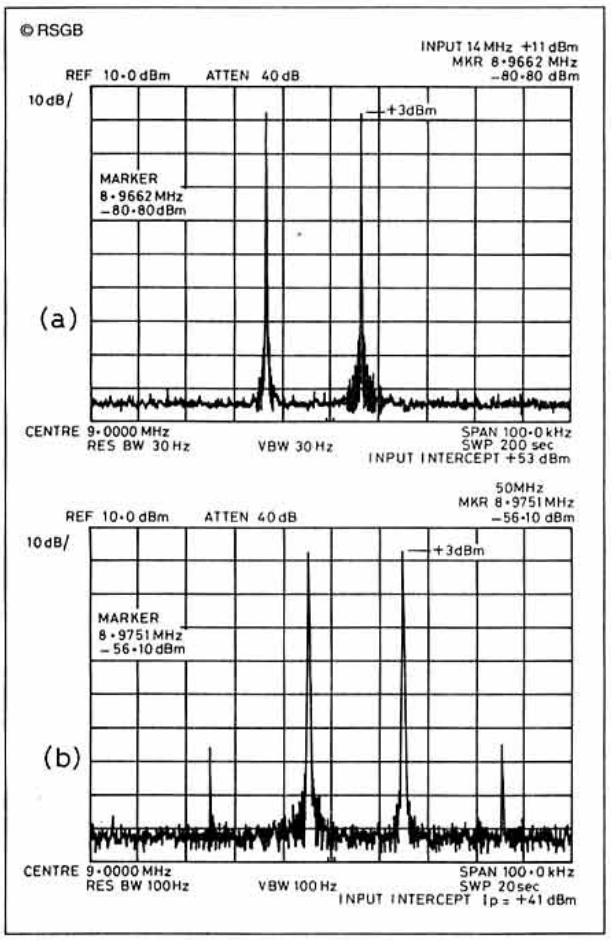


Fig 4: (a) 14MHz input intermodulation spectrum for output at 9MHz of the 'H-mode' mixer showing an input intercept of +53dBm. (b) 50MHz input spectrum showing an input intercept of +41dBm.

"The professional test equipment set up used to determine the H-mode mixer intercept points was the same as that noted in the September *TT* for the N6NWP-type mixers, including two Hewlett-Packard signal generators and spectrum analyser and a Rohde & Schwarz SMG signal generator to provide the LO sine wave input.

"The best method of setting the gate bias potentiometers proved to be as follows: One is set to the desired bias voltage for a specific test run, the other is then set by looking at the RF-to-IF path feed-through on the spectrum analyser at 14MHz, and adjusting the potentiometer for minimum IF feedthrough. The setting is quite sharp and ensures good mixer balance.

An RF test signal of 11dBm (0.8V RMS) was used for each test signal for the two-tone IMD tests. The results obtained were the same with 2kHz and 20kHz tone spacing [an indication of the purity of the LO source]. All the major HF amateur bands were used as RF sources in these tests and the spectrum analyser results recorded. The gate bias level chosen enabled an input level of +12dBm to be reached before the IMD increased sharply, breaking away from the normal 3:1 slope on a log plot.

"Spectrum plots for 14MHz and 50MHz are shown in **Fig 4**, indicating input intercept points on these bands of +53dBm and +41dBm respectively. These are excellent results but it is probable that even larger RF input signals might be handled with a lower gate voltage bias and a larger amplitude square wave injection. The use of the 74AC74 bistable as a square-wave generator is convenient, but the characteristic curves of the SD5000 suggest that a higher gate-to-source 'on' voltage would give a superior FET 'on' resistance for positive and negative drain-to-source signal voltages, possibly giving even better linearity, particularly on 50MHz."

G3SBI also concludes that an H-mode mixer does not have to be driven from a square-wave drive and suggests that it is likely that good results could be obtained with transformer-driven sine waves provided the injection was via capacitors so that the bias pots could still be used. Similarly he believes there is no reason why such a mixer should not be used in an up-conversion arrangement (rather than the 9MHz IF used with both his N6NWP-type and H-mode test mixers) as employed today in most factory-built receivers. The same approach could probably be applied at VHF/UHF with resonant-lines and GaAs FETs as switches. He is convinced that his work proves that the H-mode FET switching mixer is capable of extremely good intermodulation performance at HF with a 9MHz IF and merits further investigation for other applications. Development of the H-mode mixer has been a sideline to his professional work at SERC and it is unlikely that he will take its development further. However, he feels he has enough information to design a complete high-performance HF receiver, after first building and testing the necessary antenna input bandpass filters to ensure that they have intercept points in the +60dBm region.

Some initial tests by G3SBI with a simple two-crystal 9MHz ladder filter suggests that, as forecast in the September *TT*, this approach is likely to overcome completely the intercept limitations of most available lattice-type crystal filters.

THOSE REFLECTOMETER DIODES, IPS & HARMONICS

SEVERAL READERS HAVE pointed out that G3RZP's investigation into 'SWR bridges and Harmonics' (*TT*, August) leaves some unanswered questions. For example, when the antenna is not ideally matched, so that there will be reverse current flowing through the bridge diodes, a by-no-means unusual situation. Then, as Dennis Lisney, G3MNO, points out, there is the possible effect of the SWR-bridge diodes on incoming signals. He writes: "A few years ago I switched on my FT301 on 3.5MHz to find the band apparently full of 'rubbish', seemingly broadcast-based. This turned out to be generated by a non-linear Belling-type coax connector. A gentle wipe with wire wool provided a cure for another year or so. But some time later I changed the ATU for a pi-network to find the problem reappearing. The 'cure' this time was to remove the reflectometer after tuning up.

"Unfortunately, this does work with the FT290 and HX-240 transverter. The transverter seems to have a hard-wired protection reflector built-in. In my case, the problem seems to be connected with the very strong signals on 1.6MHz from the Capital Radio MF transmitter only a few miles away. This provides some 1V into 50Ω when my [low-pass pi-network] network is set to 3.5MHz. I have ducked the problem by using a link-coupled ATU of more 'classical form' (I have a preference for ATUs which isolate the antenna-earth from the mains-earth as experience suggests that this reduces interference from TV receivers etc). I have tried a number of reflectometers of several types. With a low-pass, pi-network ATU, I just cannot leave any in circuit and receive on 3.5MHz – on higher bands no problem – although I could not detect any meter deflection in either forward or reflected positions.

"There is a basic problem with reflectometers and ATUs in that one tends to think of them as working at the chosen frequencies, not the out-of-band frequencies!"

QUICKIE TRANSISTOR CHECKER

MANY YEARS AGO, *TT* described the ZL2AMJ Kwik-Sorta Mk 2 as a simple test set for bipolar transistors and diodes. It can sort out good from bad devices, identify lead connections and determine whether a transistor is a p-n-p or n-p-n device (details can still be found in *ART7* pp363-364).

A rather difference approach is described by Brian J Field, VK6BQN (*Amateur Radio*, August 1993, p26): **Fig 5**. He writes: "Almost all parts can be found in the junk-box and none is critical. The principle is that the transistor acts as an oscillator using the centre-tapped primary of a low-voltage [mains] transformer. The secondary (240V winding) drives a meter to indicate oscillation. If the transistor is a dud nothing happens and the meter doesn't move."

VK6BQN points out that some versions use a NE51 neon bulb instead of a meter, but the 1mA FSD meter is more sensitive since the NE51 requires about 60V to strike. He adds: "The transformer I used was 10-0-10V but 6V or 12V either side of centre tap should work. The only thing is to make sure there is something on the 240V winding that can be

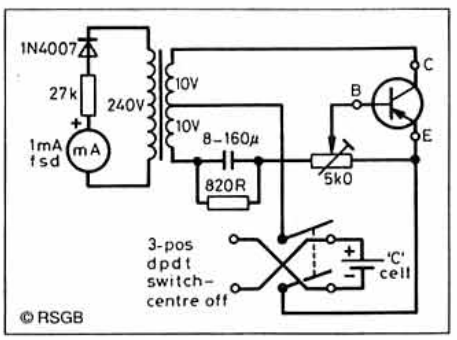


Fig 5: VK6BQN's 'Quickie Transistor Checker' (Amateur Radio).

measured. Use your scope initially to make sure the device oscillates by connecting the probe to the total of the low voltage side and if necessary adjust the value of the 8µF capacitor to whatever is a suitable value for reliable operation. Once you are sure it is oscillating there is the matter of getting the meter to indicate. This is best done experimentally depending on the meter sensitivity and voltage obtained. There are some hefty spikes but since the meter is only going to read average voltage it should be set to about 30V full scale (ie 27k resistor with 1mA FSD)."

In construction various transistor sockets (TO3, TO66 and TO220) or crocodile clips etc are mounted on a Bakelite panel: "Mount the sockets for TO3 and TO66 with round head screws so that they will touch the transistor case to make the collector connection. I also reamed out the holes for E and B on these two sockets to accommodate devices with solder traces on their pins. The switch should have a centre-off position to avoid draining the battery. In operation it is merely a matter of plugging in the transistor and twiddling the pot to get it to oscillate."

Although VK6BQN used a conventional 8µF electrolytic, he points out that more reliable operation with polarity reversals when switching from NPN to PNP would be obtained with a bipolar or a plastic dielectric capacitor. He warns that at one extreme of the pot travel, the base collector junction may be damaged if reverse polarity is applied. The current is limited only by the transformer winding and the internal resistance of the C cell. VK6BQN has not experienced trouble but warns that the possibility exists.

RAZOR COUNTER-MEASURES

THE STORY OF THE development of British radar (RDF/radiolocation) as a means of defending the country against the air attacks of the second world war has been told a number of times, both by those who were concerned and by historians. But there has been relatively little written about the equally impressive development of naval radar. William Hackmann writes, in reviewing in *Nature* (29 July, 1993) the book *Radar at Sea: The Royal Navy in World War 2* by Derek Howse (Macmillan, 1991, pp383, £25): "In March 1935, the only instrument available on Royal Navy ships for detecting aircraft was a pair of binoculars of magnification x7. Shortly after the Munich crisis [September/October 1938], the battleship Rodney and the cruiser Sheffield could detect aircraft 60 miles away with apparatus that had not even been on the drawing board four years before.

"This book chronicles the evolution and influence of naval radar during the nine momentous years from late 1936, when the first experimental set (type 79X) was fitted for trial in the elderly mine-sweeper *Saltburn*, to 1945, when the cruiser *Norfolk* was fitted with the latest radars (type 274 for gunnery and types 277, 293 and 181B as warning sets) and other electronic gear for action information and target indication, such as the plan position indicator, skiatron and automatic plotting table."

It has been said recently by Lord Jenkins of Hillhead, Chancellor of Oxford University, that "Meticulous historical research is almost always the enemy of good anecdote". Derek Howse, however, would probably disagree since his book is clearly carefully researched yet apparently finds room for the following anecdote:

"In late 1943 the Germans started attacks on the British fleet using aircraft-launched radio-controlled glider-bombs, assaults that caused consternation. A naval scientist happened to switch on his electric razor during one of these attacks in the Bay of Biscay, and to the amazement of the ship's crew the bomb began to gyrate about the sky and eventually gave chase to the very aircraft that had launched it. An order was issued by the Admiralty Signal Establishment that when ships came under these attacks, all able-bodied men who had electric razors should rush on deck, plug their instruments into the nearest power point and wave them wildly at the offending missile(s). The effectiveness of this counter-measure is not recorded, but it must have boosted morale until electronic jammers were developed." If not true, it surely deserves to be!

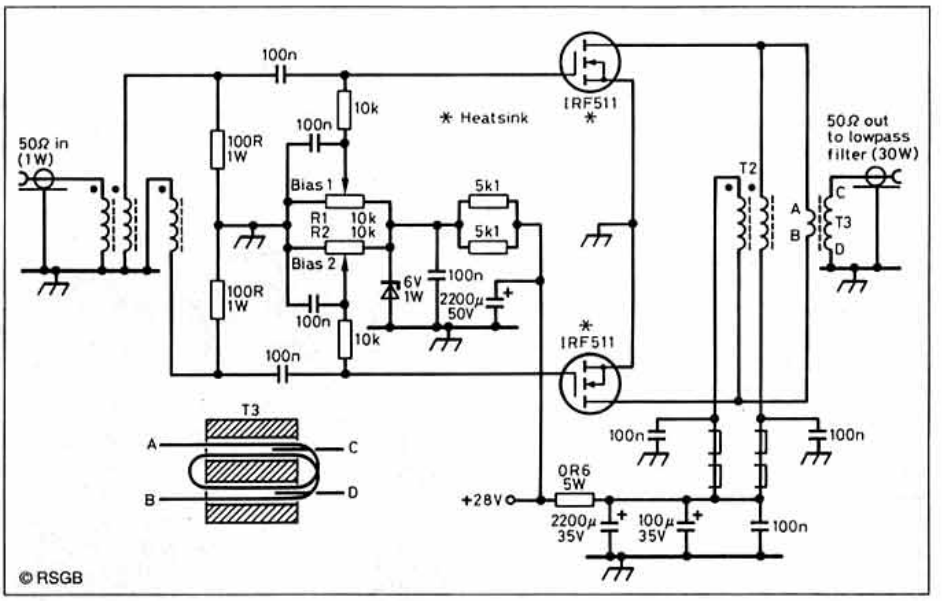


Fig 6: AA3X's' '1W-in, 30W-out on 3.5MHz' amplifier based on push-pull IRF511 low-cost power MOSFETs. An NTE Nr TP0006 insulating wafer was used between each IRF511 and the 'chassis heat sink' and their mounting bolts were wrapped with insulating tape to avoid short circuits. It is essential to use a low-pass filter following this amplifier. T1 12 trifilar turns of No 26 enam wire on FT-50-43 (Amidon) or F-50-43 (Palomar) toroidal ferrite core. T2 12 bifilar turns of No 22 enam wire on two stacked FT-50-43 or F-50-43 cores. T3 as shown, wound with No 18 plastics-insulated hook-up wire on Amidon BN-43-7051 jumbo balun core. Primary (AB) 2 turns. Secondary (CD) 3 turns. Z1 – Z4 ferrite beads (Amidon FB-43-801 or Palomar FB-8-43).

BOOSTING THE QRP RIG

ALTHOUGH THE QRP ENTHUSIASTS demonstrate the ability to make contacts with outputs of less than five watts of RF, I suspect that there must be times when most would willingly fit a broadband linear amplifier that can provide some 30 watts on 3.5MHz with 1W drive, reducing to about 10W on 14MHz or 5W on 18MHz using two inexpensive IRF511 MOSFETs in push-pull. To achieve these powers the supply voltage needs to be 28V rather than the 13V used for RF power bipolars. The high drain-to-earth capacitance of these devices is probably responsible for the relatively low output on the higher frequency bands, but the amplifier provides useful output powers on 3.5, 7 and 10MHz.

Such an amplifier is outlined by Jim Wyckoff, AA3X, in the 'Hints and Kinks' feature of *QST*, January 1993, derived from a 1983 design by Doug DeMaw: **Fig 6**. He writes: "Because I heat sink the MOSFETs directly to the chassis enclosure with insulating wafers, no expensive heat sink need be purchased. An 8 x 8 x 2in aluminium enclosure is adequate for shielding and sinking purposes. I originally mounted and heatsinked this amplifier on an old frying pan . . . . Since the MOSFETs' turn-on voltages may differ slightly from device to device I bias each one separately by employing a scheme designed by Wes Hayward and Jeff Damm (*QST*, November 1989).

"To adjust this amplifier for Class B linear operation, remove drive and terminate the output with a 50Ω dummy antenna. Insert an ammeter in the drain supply line and adjust RV1, Bias 1, and RV2, Bias 2, to the threshold at which quiescent current just starts to flow. If you prefer class AB operation, tweak RV1 to show, say, 10mA, and then tweak RV2 to double this current – 20mA in this example. The quiescent current level is not critical if kept small, but the device-to-device balance is. I suggest that you do not exceed 3.5V bias on either gate; I prefer a value in the 2.5V region.

"The amplifier's stability is excellent. Proper power supply decoupling and keeping the input impedance low (200Ω or less) were the only steps necessary to achieve what I call unconditional stability."

POLYSTYRENE SOLUTIONS

THE AUGUST *TT* ITEM 'D-I-Y Polystyrene Solution' originating from Graham Thornton, VK3IY, in WIA's journal *Amateur Radio*, suggested that polystyrene coil dope was no longer readily available from component distributors but could be made by dissolving styrofoam in ordinary turpentine.

This item has attracted comments from several readers. Lorin Knight, G2DYK, points out that there is still no real need to make

one's own coil dope. He writes: "I have found the polystyrene cement made by Humbrol, and sold in handy 12ml tubes by model shops, to be ideal for this purpose. It appears to be nothing more than polystyrene dissolved in trichloroethane and dries in about ten minutes at room temperature.

Similarly, Ray Loveland, G2ARU, writes: "For some time now I have been using the general-purpose polyurethane varnish available in all DIY stores for treating coils. This needs some hours to harden but only one coat is normally required and it really does lock the turns firmly in position. As far as I can tell it has only a negligible effect on the Q of the coil."

However, Don Symonds, G0PRZ, adds further information on making your own liquid styrene, although he warns that the apparatus involved would be regarded with deep suspicion by the Customs and Excise! He writes: "I was interested to read about VK3IY's use of turpentine as a solvent for polystyrene. This must be genuine oil of turpentine and not turpentine-substitute or white spirit which is not a solvent for polystyrene.

"With the almost complete non-availability of suitable solvents due to toxicity, ozone-layer-damage or their involvement in solvent abuse, there is a need for alternatives since solvents are useful in a variety of ways. However, I have used quite successfully styrene monomer (ie the raw material from which the polymer is made) as a solvent for polystyrene.

"Polystyrene can be readily depolymerised to styrene by heating in what I can describe only as a 'Heath Robinson' still. This consists of a lever lidded tin about 500ml capacity to which a copper tube (6mm diameter) is fixed by brazing, either through the lid or the side at the top. This joint must be gas-tight and must be brazed and not soft soldered. The tubing (about 1m in length) can be coiled and mounted vertically and immersed in a water container with the lower end of the tube projecting very much in the manner of a still.

"Pieces of clear polystyrene, not coloured or pigmented, are placed in the can and heated gently with a gas burner. A colourless liquid will drip from the end of the tubing but use only sufficient heat to produce a slow drip. The whole operation is best done outside the house or in a very well ventilated area. Styrene has a strong and penetrating odour as anyone who has used styrene-polyester resins for car repairs or boat building can testify.

"The liquid styrene will keep for some days but in time will thicken and solidify. It is a powerful solvent of the polymer and not much is needed. Expanded polystyrene can be used in the still but has to be squashed to get even a few grams into the can."

A BATTERY SAVER

MODERN TEST EQUIPMENT is often run from batteries which can soon be run down by forgetting to turn off the instrument after it has been used briefly. A good example is the portable digital multi-meter but there are many other instruments that can easily be left running.

In the January 1993 issue of *Electronics Australia* (pages 111-113), Peter Murtagh in his 'Experimenting with Electronics' feature described an extremely simple 'battery saver' comprising little more than an RC timing circuit and a VN10K power MOSFET, **Fig 7(a)**, in which the charge stored in capacitor C1 keeps TR1 switched on until C1 is gradually discharged through a high resistor, R2. The time constant C1 x R2 determines how long will elapse after pressing PB1 before the MOSFET is turned off, remembering that the rate of discharge decreases exponentially. With the values shown, the switch off time is about 6.5 minutes (much longer switch off times are possible by increasing the value of C1).

In the July issue of *Electronics Australia*, p51, D S Chambers in the 'Circuit & Design Ideas' feature comes up with a more sophisticated design (**Fig 7(b)**) that gives a rapid switching action and a more definite turn-off threshold for the FET. These improvements are gained by using two of the Schmitt trigger gates on a hex inverting 74C14 chip. He writes: "Integral to these gates is a well-defined and temperature-compensated switching threshold. This gives a high impedance RC timing, with t = 1.13 x R1 x C1. Diodes D1 for switching 'on', and D2 for 'off', are needed to ensure rapid switching of the gates. The values of R3 and R4, and transistors TR1 and TR2 allow TR2 to be either an FET or a bipolar transistor to handle any magnitude of load. The VN10K of the simple circuit was retained for its low on-resistance, resulting in only an 18mV voltage drop for my DMM. The extremely low 'off' battery drain was not measurable on my meter."

***TT* columnist Pat Hawker, G3VA, was a welcome guest at this year's HQ open day. He chatted to visitors and signed copies of his popular book *Amateur Radio Techniques*.**

SIMPLE 50MHZ CONVERTER

ALTHOUGH THE Signetics/Philips NE602 mixer-oscillator IC is not suitable for use in cases where a wide dynamic range is essential, it has rightly become an extremely popular device for use in simple receivers (direct-conversion or superhet). Its main advantage is that its input and output are available in either balanced or single ended form. Also, the current consumption is very low (2 to 3mA) and it has a price tag much lower than that of devices intended to achieve the widest dynamic range. As SN Larsen, ZL4THO puts it in 'A simple 6-metre converter' (*Break-In*, Oct 1992, pp6-7): "I think the big plus with this device is the small number of external components required to form an operational circuit."

In view of the seasonal nature of DX on this band, ZL4THO often confines his 50MHz activity during the summer months to listening. For this reason he prefers an economical approach to equipment for this band. He has built a number of MOSFET converters which perform well but found that they can be rather difficult to get up and running. "A typical converter can have two or more stages and can be fairly complex. In order to reduce complexity to an absolute minimum, I decided to use the NE602 in the simple arrangement shown in **Fig 8**." It should be appreciated that ZL4THO's design is not for a high-performance converter of wide dynamic range but rather for listening on the band ahead of a fairly simple HF receiver.

ZL4THO writes "Signals in the 50MHz band are coupled to L1 via C1. The latter is included to provide DC isolation from any additional stages which might be added later. Signals

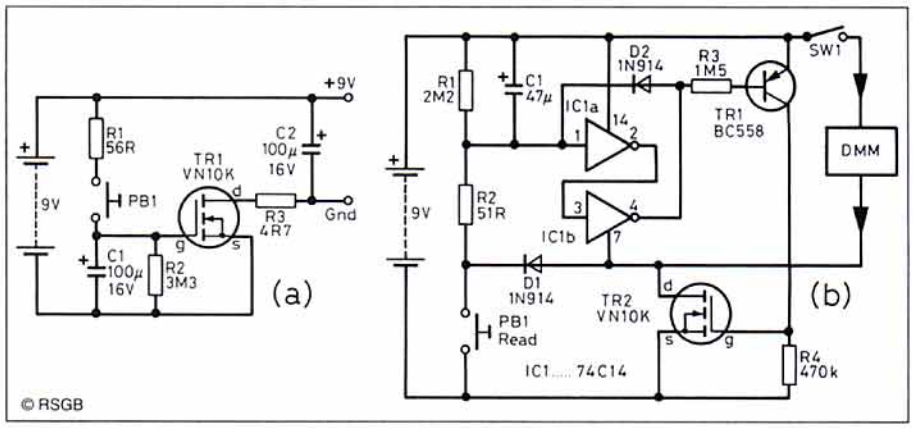
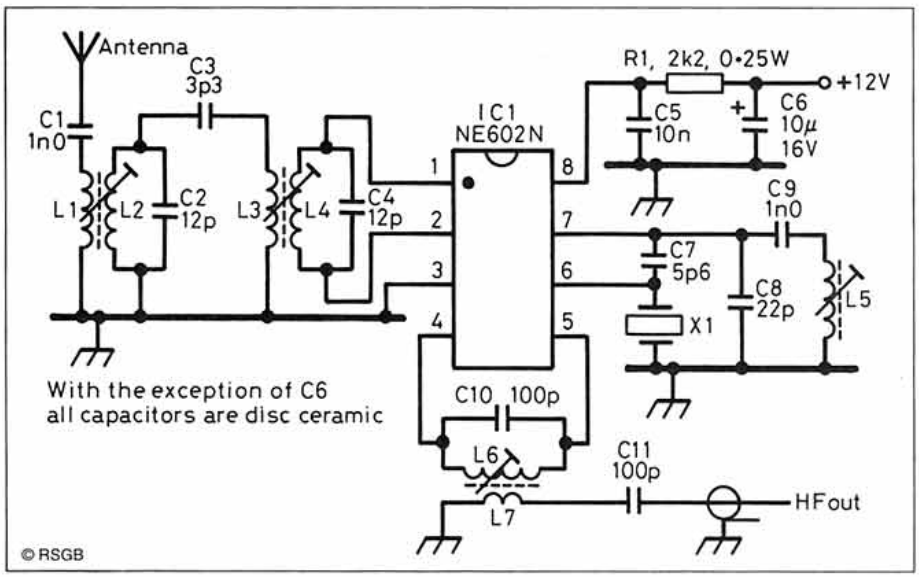
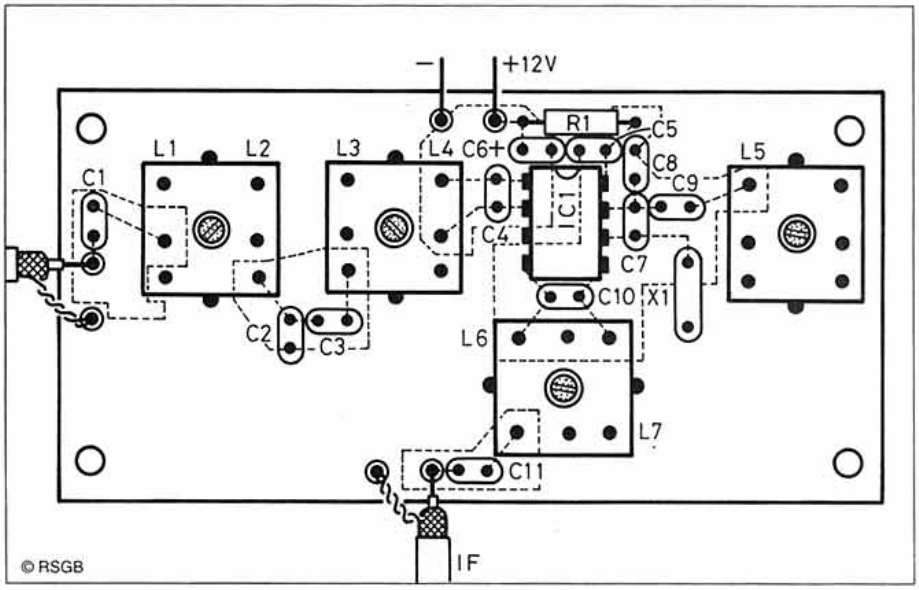


Fig 7: 'Battery Savers' that automatically switch off, for example, test instruments after a few minutes. (a) Simple circuit described by Peter Murtagh in *EA*, January 1993, p111. (b) Improved design outlined by D S Chambers in *EA*, July 1993, p51.





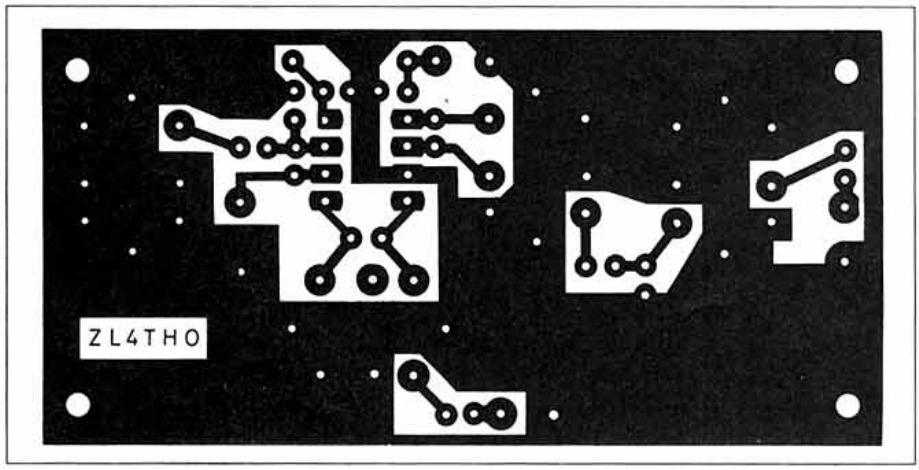


Fig 8: ZL4THO's simple 50MHz converter based on the Signetics NE602 mixer/oscillator IC.

are then inductively coupled to L2 with a simple bandpass filter formed from L2 through L4 and C2 through C4. A balanced connection to pins 1 and 2 is made available from each side of L4. The oscillator is a Colpitts type formed around pins 6 and 7 using C7, C8, C9, L5 and X1. The crystal is a third overtone type, with the correct overtone selected by adjusting the slug in L5.

"The output from the mixer is available from pins 4 and 5 and is tuned to the required resonant frequency (IF) by L6 and C10. Inductive coupling to a low impedance link winding completes the arrangement. C11 is used for DC isolation. Supply is through a current limiting resistor R1, with C5 and C6 as supply bypass capacitors.

"Alignment can be achieved using a GDO or signal generator. Set the latter to the signal frequency of interest and adjust all inductances for best overall response. The crystal may be adjusted to frequency by light inductive coupling to L5 before the shield (can) is put in place. A frequency counter or scanner may also be used for this. Coil details for alternative IFs are provided. For the prototype, the IF was made 7MHz to allow the converter to be used with an existing 7MHz direct-conversion receiver. Although this project is offered as a novelty, its performance is most reasonable. Optimizing the circuit configuration or component values may even improve results further."

There is, of course, no reason why with suitable component changes such a simple NE602 converter could not be used for 28MHz or 21MHz in front of a simple 7 or 3.5MHz receiver. The crystal frequency will be F(xtal) = F(signal) - IF. A low IF, however, could result in excessive image response unless additional pre-mixer selectivity were added.

Coils are wound on standard slug-tuned formers with metal shielding cans. L1 and L3 1.5 turns of 26SWG enamel wire; L2, L4 and L5 11 turns of 26SWG. L6 and L7 depend on the tuneable IF output which in the ZL4THO was 7MHz with L6 75 turns of 42SWG, L7 10 turns of 42SWG, with a 43.000MHz (third overtone) crystal. Alternative values for outputs on 14, 21 and 28MHz are:

Band (MHz)	L6 (turns)	L7 (turns)	SWG	C10 (pF)	Crystal (MHz)
14	20	3	32	47	36.000
21	20	3	26	33	29.000
28	20	3	26	15	22.000

REVERSE – POLARITY PROTECTION

FOR MANY YEARS it has been desirable to provide polarity protection for solid-state equipment operated from batteries that could be connected the 'wrong way round'. As noted in *ART7* [see *BookCase* p94 to order your copy – *Ed*], the most common arrangement is simply to connect a diode to block the supply from the load when wrongly connected: **Fig 9(a)**. The inclusion of an extra diode and indicator bulb (**Fig 9(b)**) provides a reversal indicator, with the bulb lighting only when the supply is wrongly connected. A full bridge circuit (**Fig 9(c)**) makes it possible to forget about battery polarity but means that two diodes are always in circuit.

The addition of one silicon diode in circuit reduces the voltage delivered to the load by 0.6V and thus brings forward the 'end point' of the battery discharge. The voltage drop can be reduced significantly by using a germanium power diode but even this may not always be acceptable. With silicon diodes, the bridge circuit drops the voltage by more than a volt. Michael A Covington, N4TMI, in 'Reverse-Polarity Protection for Your Gear' (*QST*, July 1993, pp40-41) shows how the problem can be largely overcome.

The simplest method of eliminating the diode-voltage drop, although one that is not truly 'fail-safe', is to connect the diode in parallel with the load instead of in series (**Fig 10**). If the supply is reverse connected, the diode conducts heavily and blows the

fuse or trips a circuit breaker. It is clearly essential that the fuse blows before the diode! N4TMI gives as a rule of thumb that the diode should be rated for three times that of the fuse (ie for a 1A fuse, use a 3A diode). But he does not mention that should for any reason the diode become disconnected or open-circuit the load will no longer be protected.

However N4TMI points out that another way to eliminate the mandatory diode-voltage drop is to use a power MOSFET instead of a diode as the switching element, **Fig 11**: "When power is applied correctly, the FET conducts and becomes the equivalent of a low-value resistor. [The voltage-drop then follows Ohm's Law and can be very low for moderate loads]. If the power supply is applied in reverse, the FET doesn't conduct and no current flows.

"**Fig 11(a)** shows how to use this approach with cheap, readily available N-channel MOSFETs; **Fig 11(b)** shows how to use similarly a P-channel MOSFET. Although P-channel MOSFETs are presently more expensive than N-channel MOSFETs, a P-channel device is often preferred because it interrupts the positive supply lead rather than the negative one; this lets you use the negative rail as ground in the more conventional way.

"The FET must be an enhancement-mode device, with a turn-on voltage ($V_{GS(th)}$) substantially lower than the power-supply voltage, and with an on-resistance ($R_{DS(ON)}$) low enough that the voltage drop is negligible. Because the FET operates as a switch, it dissipates little power and no heat sink is required. Suitable MOSFETs are listed in **Table 1** . . . . Notice that the current flows backward through the FET (from drain to source). That's okay; FETs are inherently bidirectional devices. Fig 11 shows a diode inside each FET. That's the parasitic diode formed by the source and substrate and is why we have to use the FETs backwards. Otherwise the diode would be incorrectly orientated and would allow reverse-polarity current to flow."

N4TMI also notes that some of the newer voltage-regulator ICs have built-in reverse-polarity protection: see **Table 2**. A practical circuit is given in **Fig 12**. N4TMI writes: "These regulators are often known as PNP voltage regulators, and the capacitors at the input and output are required for stability. The main selling point of PNP voltage regulators is that they have lower drop-out voltage than earlier types. For example the conventional 7812 has a 2V drop-out rating. That means that if you want 12V out, you have to supply at least 14V in. But the newer LM2940CT-12 has a drop-out voltage of only 0.5; you can get 12V out with just 12.5V in – a real convenience when using battery power."

HERE & THERE

THE APRIL 1992 *TT* carried a note that Tony Smith, G4FAI, was compiling information on the many varieties of the wartime British Army Morse key, known generally as type 'WT8 Amp' but manufactured by a number of different firms in different countries. Results of his mammoth efforts, though he admits that there are still gaps to be filled, occupy 17 of the 48 pages in the June 1993 issue (No 28) of *Morsum Magnificat* and form a major source of reference for the increasing number of dedicated collectors of Morse keys. The earliest version so far identified is a 1935 Key WT8 Amp No 2 made by Willis & Co Ltd, installed with a wireless Set No 1 at the Royal Signals Museum in Dorset. Later, over 100 different versions were made in the UK, Canada, Australia, New Zealand, South Africa and the USA. G4FAI lists all versions reported under 16 basic group headings, using 8 different characteristics to assist in identification as well as providing information on the key and plug assemblies in which many of the keys are mounted; where identified the uses of the different types of key is shown. Single copies of *Morsum Magnificat* No 28 can be obtained from G C Arnold Partners, 9 Wetherby Close, Broadstone, Dorset BH18 8JB, price £2.20 (cheques payable to G C Arnold Partners). While personally not a fan of the WT8 design, I continue to be enthusiastic about the contents of the bi-monthly *MM*, proudly 'Flying the flag for Morse'. ***G3VA***

Type	Polarity	Max V	Max A	$V_{GS(th)}$	$R_{DS(ON)}$	Max A for Fig 99	
IRF510	N-chan	100	4	2–4	0.54	1	
IRF511	N-chan	80	4	2–4	0.54	1	
IRF520	N-chan	100	8	2–4	0.27	2	
IRF30	N-chan	100	14	2–4	0.16	3.4	
IRF540	N-chan	100	27	2–4	0.09	6	
IRF9Z10	P-chan	50	4.7	2–4	0.5	1	
IRF9521	P-chan	80	6	2–4	0.6	1	

Table 1: Power MOSFETs for Polarity Protection.

Type	Volts	Max A with heat sink	Input Voltage
LM2940CT–5	5	1	5.6 to 26
LM2940CT–12	12	1	12.6 to 26
LM2940CT–15	15	1	15.6 to 26
LM2941	5 to 20	1	(O/p + 0.5) to 26

Table 2: Voltage Regulator ICs with Reverse-Polarity Protect.

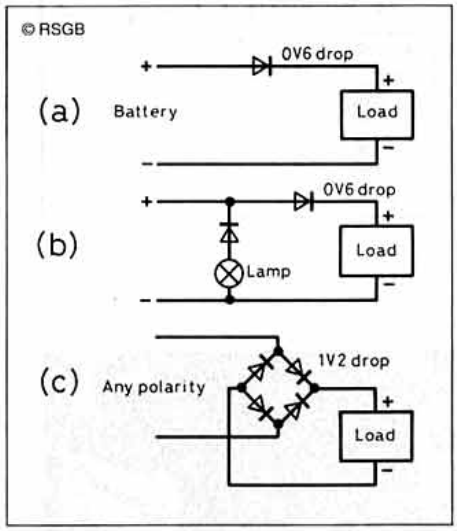


Fig 9: Reverse-polarity protection for battery-operated equipment – simple and effective diode protection for use where the forward voltage drop of 0.6V per silicon diode can be tolerated, but raising the battery discharge 'end-point'.

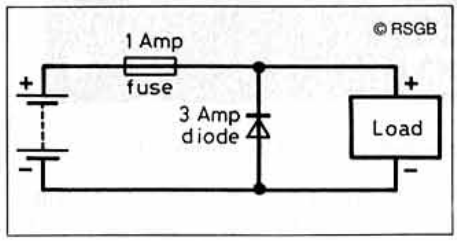


Fig 10: With this arrangement, there is no forward voltage drop across the diode but it is necessary to ensure that the fuse blows rapidly if the input-voltage polarity is reversed. The diode should be capable of handling significantly more current than the fuse. However if the diode becomes open-circuit or disconnected there is no protection for the equipment.

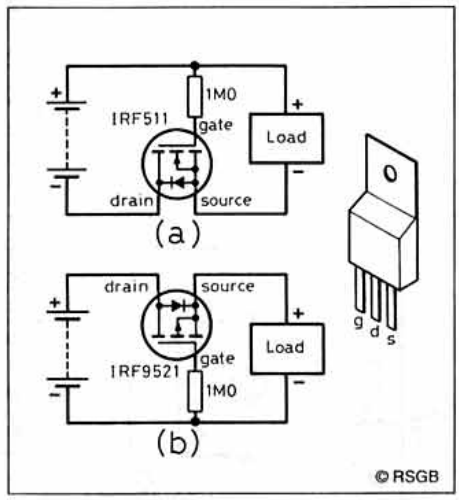


Fig 11: (a) The N-channel MOSFET input-voltage protection circuit turns power on only when the input-voltage polarity is correct. The voltage drop across the MOSFET is low. (b) Using a P-channel MOSFET puts the input-voltage interruption in the positive line which is preferable where the battery is directly connected to chassis as usual practice in mobile installations. The reason why the FETs appear to be connected 'backwards' is given in the text.

TECHNICAL TOPICS

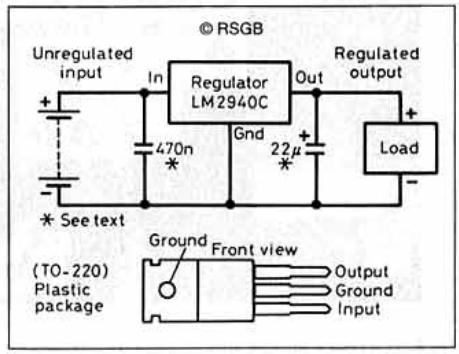


Fig 12: An LM2940 or similar low-voltage-drop PNP IC voltage regulator provides 'built-in' reverse-polarity protection. With these regulators, the capacitor shown at the input of the device is required if the distance between the regulator input and PSU filter capacitor is more than 6 inches. For stability, the capacitor connected to the output pin must have a value of at least 22µF, an equivalent series resistance (ESR) of less than one ohm, and be located as close as possible to the regulator output pin. It must also be rated over the same operating-temperature range as the regulator.

LARGE HOLES IN SHEET METAL

IN THE JUNE COLUMN you gave some tips about drilling holes. What about larger holes and really big openings?

THERE ARE SEVERAL WAYS to make large holes. The most obvious is to use a screw-up sheet metal punch (**Fig 1**). Having marked out the centre, you drill a pilot-hole of the right size. Assemble the punch on either side of the panel, following the instructions, and then tighten up the central bolt to punch a neat round hole. Screw-up punches are available in inch and metric diameters from 3/8in to at least 75mm, and also in a variety of square, rectangular and special shapes. The problem, of course, is that you need a separate punch for each size, and they aren't cheap. However, special punches for particular items such as IEC mains connectors are a good investment if they are likely to be used often enough (club committees take note).

Multi-diameter cone or step drills are very good (**Fig 2**) [1], though the larger diameters require a pillar drill. The step drills are easier to use than the continuously-expanding plain conical type, and drill and de-burr in a single operation. Step drills only offer a range of discrete sizes but you can get up to ten sizes for the cost of three or four screw-up punches. Besides the high initial cost, the other main drawback is that these drills are almost impossible for amateurs to re-sharpen.

If you don't mind some manual effort, a very good way of making large round holes is a tank cutter (**Fig 3**). This is used in a carpenter's hand brace, and unlike a punch or a cylindrical hole saw it can be adjusted to any diameter, up to 100mm or more. Begin by marking the centre and the perimeter of the circle, and set the cutter to produce a hole somewhat smaller than required. Essential precautions are to use a firm hardwood backing piece which supports the entire area of the sheet around the hole and prevents the centre drill from wandering. It takes some practice to prevent the sharply-pointed bit from digging in at certain points around the circle, but with a little care you can produce quite a clean hole. Make the hole a few millimetres smaller than the final required diameter, and then finish it to the previously marked circle using a half-round file. Tank cutters will stand many years of heavy use and are also extremely easy to sharpen.

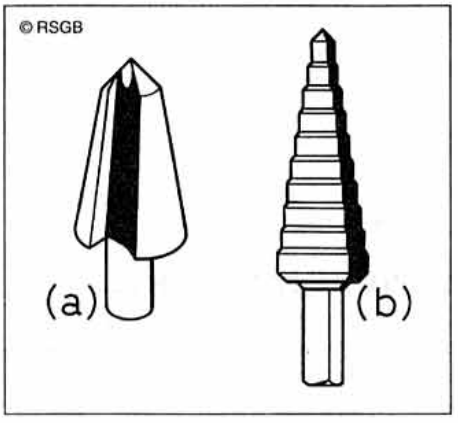


Fig 2: Cone-cut drills or step drills are more versatile than punches, but difficult to handle without a drilling machine.

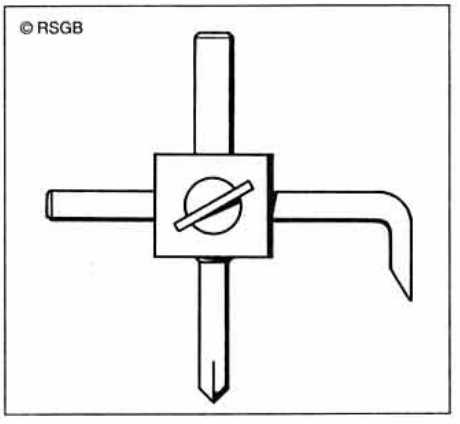
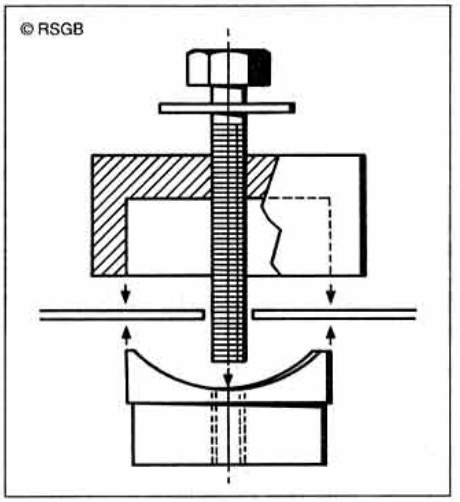


Fig 3: An adjustable tank cutter in a carpenter's hand-brace is an economical, versatile and effective tool.



IAN WHITE, G3SEK
52 Abingdon Road, Drayton, Abingdon, Oxon OX14 4HP – or @ GB7AVM

Fig 1: Screw-up punches are the best way to make large round holes – but only if you happen to have the right size.

Large irregular-shaped holes have to be sawn out. When marking-out a large hole for sawing, drill pilot holes at strategic locations such as the corners (**Fig 4**). These will allow you to insert the blade, and give each cut an end-point to aim for. Always drill your pilot holes completely inside the waste material that will be discarded.

If the line is straight, use a hacksaw. Begin by drilling four 3mm or 1/8in pilot holes, almost touching (**Fig 4**), and open them out into a slot using a thin round file. Insert a hacksaw blade through the slot and re-assemble the hacksaw; most hacksaws allow you to turn the blade sideways in the frame, which is often more convenient. If the line is curved, use 'Abrafile' tension file blades [1]. These will fit in a hacksaw frame, or a coping-saw or fretsaw frame for greater clearance, and will saw in any direction. With the panel firmly supported by a piece of wood clamped behind the part you want to keep, you can then make your cut.

TIP – For those times when your marking-out and drilling weren't quite right, Abrafile also make 'semi-rigid' round files with conventional handles in diameters of 1/8in, 3/16in and 1/4in [1]. These are very fast-cutting in sheet aluminium and are just the thing for 'shifting' a hole into the right place!

PEAK ENVELOPE POWER

A BUNDLE OF QUESTIONS on this topic, beginning with:

WHAT IS PEP?

PEP STANDS FOR 'peak envelope power', or more fully, 'the RMS RF power at the peak of the modulating waveform'. That's quite a mouthful, so let's look at each part of it in turn.

Even at the lowest frequencies we use, an RF waveform passes through several million cycles in a second; in other words, each cycle takes only a few hundred-millionths of a second. When we talk about 'RF power' we're not interested in events taking place inside any individual cycle – we're only interested in power averaged over several complete RF cycles. The term 'RMS' (root-mean-square) describes a particular method of averaging power, and when we measure RF power in amateur radio we always mean the power averaged over very many RF cycles by the RMS method.

In contrast, modulation takes place at much lower frequencies – generally a few kilohertz at most for speech, and much more slowly for keyed CW. In the case of keyed CW, the RF power remains constant for as long as the key contacts are closed, so you can measure the RMS RF power very easily. Even with speech, on SSB for example, the region around the peak of the modulating waveform will last for several hundreds of microseconds, which gives us several complete RF cycles in which to take a meaningful measurement of the RMS RF power. In both cases, CW and SSB, we have measured the RMS RF power at the peak of the modulating waveform – we have measured the PEP.

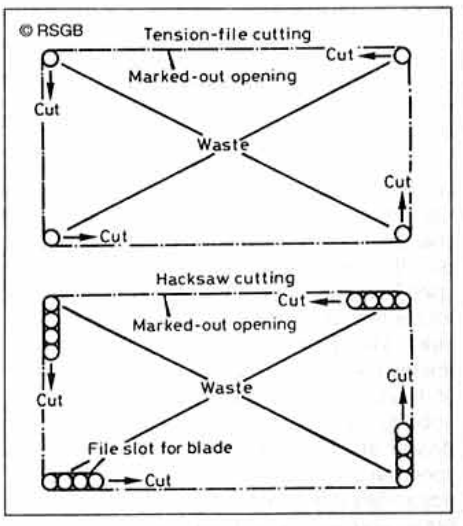


Fig 4: To saw out a large hole, drill 3mm pilot holes in the waste material at the corners. Start a straight hacksaw cut by filing out four holes to make a slot.

For regulatory purposes, PEP is very straightforward. A power limit of 26dBW (400W) PEP on all modes is simply saying: 'Whatever form of modulation you use, even when you're trying your very hardest to be heard, your RMS RF output power must never at any time exceed 400 watts.' PEP is as simple as that.

WHAT IS A PEP-READING wattmeter?

LET'S LOOK FIRST AT what the wattmeter indicates with a steady carrier (CW). The meter scale will be calibrated in watts, and no matter how the meter detects the RF, the scale calibration represents RMS power averaged over at least one complete RF cycle. In most cases the calibration will be referenced to a laboratory-standard thermal wattmeter which terminates the RF energy in a resistive load and measures the heat energy released; such wattmeters are automatically RMS-responding.

So your wattmeter generates an electrical signal which is related in a known manner to the RMS RF power at the input socket. Simple wattmeters connect this signal straight to the meter display, but they cannot be used with fluctuating waveforms such as speech because the meter needle won't keep still. PEP-reading wattmeters overcome this problem by means of a circuit which 'holds' the display at the highest level that the modulation ever reaches.

HOW DOES 1.414 COME into the definition of PEP?

IT DOESN'T. THE ONLY way that 1.414 (the square root of 2) can creep into this topic is through confusion about which waveform the word 'peak' in PEP applies to. I repeat: the word 'peak' applies to the *modulating* waveform, not the RF waveform. Although the RF waveform is a sine-wave, and the number 1.414 relates the RMS power in a sine-wave to its peak amplitude, this interesting fact is totally irrelevant to the meaning of PEP!

One source of confusion about PEP is that the term was first introduced into the licence when SSB was a new mode. The licence conditions at that time included examples of how to measure PEP using an oscilloscope, and because a 'scope indicates the peak value of the RF sine wave, this sowed the seeds of confusion about 1.414. My best advice to anyone still tangled up in this is to forget everything you thought you knew about PEP, and start again from the top of this article.

Likewise, as far as your licence is concerned you can forget about 'DC input'. There may be other reasons for measuring it, but your licence talks exclusively about RF *output*. It's regrettable that certain equipment specifications have increased the potential for confusion by coining the term 'PEP power input'. I know of no rig with facilities to measure the PA supply voltage or current on peaks of modulation, for the simple reason that nobody cares except perhaps the original designer. In other words this is pure specmanship: '200W PEP input' can be quite accurately interpreted as 'We're trying to impress you with a number that looks bigger than 100W PEP output, and it also lets us out of guaranteeing what the power output is.'

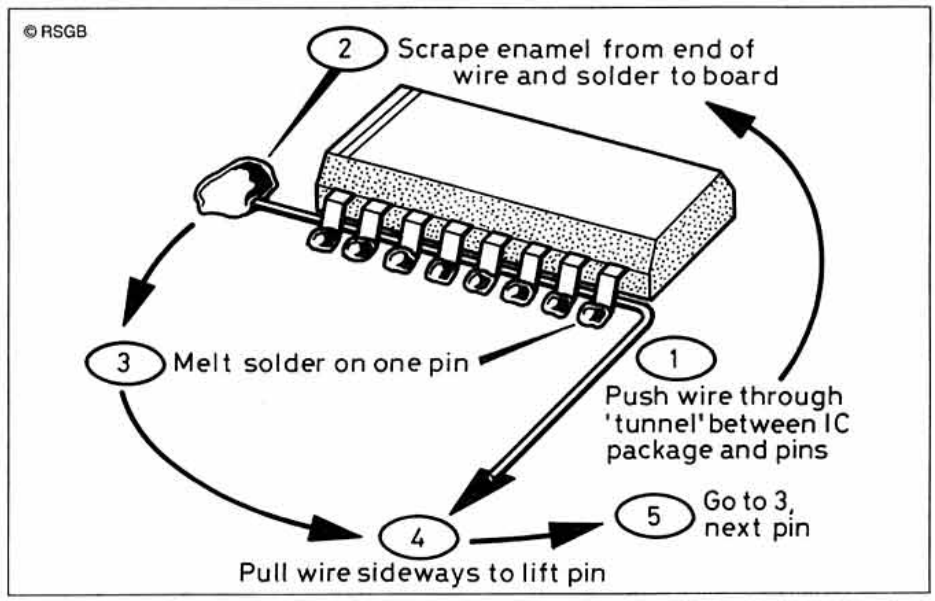


Fig 5: How to remove a surface-mount IC without breaking the pins.

VCR REPAIRS – THE INSIDE STORY

HOME VCR REPAIR ILLUSTRATED springs from the talents of Richard C Wilkins, a practical repairman who has seen everything that can possibly happen to a video recorder [2]. The book starts with the wise advice that most problems with video recorders don't involve the electronics at all, and then explains in illustrated practical detail how to find and fix almost every conceivable fault in the mechanism.

For example, one chapter describes seven different ways to get inside a VCR. There are other whole chapters on real-life problems such as extracting jammed cassettes (including a highly creative use for a fish-slice) and repairing damage caused by spilt water or 'beverages'.

Although this book is nothing to do with amateur radio, and contains next to nothing about electronics either, it could still do wonders for your reputation!

PROPAGATION-SPEAK

PLEASE CAN YOU EXPLAIN the terminology used in the GB2RS propagation broadcasts? What are 'Spread-F' and 'Darkness hour lows'?

GB2RS PROPAGATION REPORTS can sound somewhat cryptic, rather like the daily met reports for shipping, and for exactly the same reason: they need to put across a great deal of information in strictly limited air-time. If you're interested in propagation there's a lot to be said for taking the weekly reports by packet radio, so that you can study them at your leisure. Even so, you'll need some background knowledge to make sense of it all.

You can find most of what you need in the Information section of the RSGB *Call Book* [3]. For example, it explains that 'Spread F' is the breaking-up of the normally smooth ionospheric layers into patches, often producing deep fading. 'Darkness hour lows' are the minimum values of critical frequency which occur during the hours of darkness. As for what 'critical frequency' means . . . . well, you'll have to look it up!

REMOVING A SURFACE-MOUNT IC

HOW CAN I REMOVE A surface-mount IC without breaking off the pins?

THIS CLEVER TRICK comes from an article in the *VHF/UHF DXer* by DF7IT, who learned it from "a Polish guy." All you need is a length of thin enamelled copper wire – the old-fashioned brown kind with solder-resistant enamel. **Fig 1** shows exactly how to use the wire to 'unzip' each side of the IC without breaking the fragile pins.

TAPE TIP

WHEN FINISHING OFF a binding using PVC tape, never break the tape by stretching it – it will 'remember' its original length, and after a few days it will have pulled loose and be flapping in the breeze. If you **cut** the tape and press the end down under no tension, it will stay there forever.

REFERENCES

[1] All the tools mentioned are available from specialist tool shops, as well as mail-order tool dealers such as Graham Engineering Ltd (021-525-3133) and Farnell Electronics or Electromail. Prices vary, so shop around.

[2] Richard C Wilkins and Cheryl A Hubbard, *Home VCR Repair Illustrated*. TAB Books, 1991. ISBN 0-8306-3711-7. Available by mail order from Cirkit and Maplin Electronics.

[3] *RSGB Amateur Radio Call Book*, RSGB Publications.
The 1994 edition will be available in a few weeks time.

UNTIL NEXT MONTH . . .

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

IDEAS FROM ABROAD

TRANSLATED AND EDITED BY ERWIN DAVID, G4LQI

The sequencing of transmit/receive switching was addressed in *Electron* (NL) 4/'86 and recently updated by **Harke Smits, PA0HRK**. Some 1940s KISS methods, old-fashioned but still useful, are recalled by **Erwin David, G4LQI** (previously **PA0CG**).

IN HOME-BUILT TRANSCEIVERS, insufficient attention is often paid to T/R switching; frequently one multi-contact relay, operated by the PTT switch, is expected to do all. This can result in RF output being produced before the antenna is connected, endangering both the PA and the relay. These problems get worse with increasing power levels. Upon release of the PTT switch, the receiver may be working before the antenna has been reconnected to it; this may make the RF stage oscillate and cause disagreeable switching transients in the headphones or speaker.

Fig 1 shows an ideal switching sequence. In it, 'h' stands for 'present' or 'activated'; 'l' is 'absent' or 'not activated'.

While receiving, the PTT switch is not activated, supply voltage to the receiver is present, the transmitter B+ is absent and the antenna relay is not activated.

At time = T_T, the PTT switch is pressed (activated); this immediately removes the supply voltage to (parts of) the receiver and activates the antenna relay. Only after the relay has reached its transmit position to stay, ie after any 'bounce', the transmitter may be activated; this happens at time = $T_T + t1$.

When the PTT switch is released at time = T_R, the supply to (parts of) the transmitter is removed immediately. The antenna relay is de-activated only after the transmitter output has gone to zero, ie at $t = T_R + t2$. The receiver is reactivated after the relay has bounced out at $T_R + T3$, in which $t3 > t2$.

The time delays required for t1, t2 and t3 depend on the properties of the transceiver and the antenna relay and are generally of the order of tens of milliseconds (too long for AMTOR).

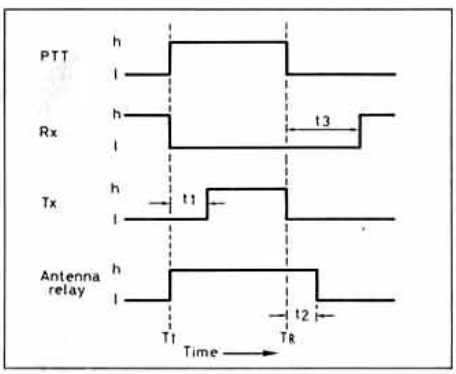


Fig 1: Timing diagram for ideal transmit/receive switching of a transceiver or transverter.

A UNIVERSAL CIRCUIT

IN **FIG 2**, TIME DELAYS t1, t2 and t3 are set by R1, C1; R2, C2 and R3, C3 respectively. With R1 = R2 = R3 = 100kΩ, C1 = C3 = 470nF and C2 = 100nF, the delays t1 and t3 were approx 40ms and t2 was 10ms. The NAND gates must have Schmitt-trigger inputs.

The driver for the antenna relay is an N-channel power FET which goes well with the CMOS logic. As no P-channel FETs were available, PNP Darlingtons were used to switch B+ to the receiver and transmitter. Due to the greater saturation voltage drop across the Darlingtons, a heat sink was required on the one switching the transmitter current.

Transceiver switching is initiated by a PTT switch. If the circuit is used between a transceiver and a transverter, the PTT switch is replaced by the switching transistor on its left which is activated by the +TX DC output available on most transceivers.

THE KISS IS IN THE SWITCH

A DELAY, AS ACHIEVED BY PA0HRK electronically, can also be made by mechanical means. In the microswitches used in industrial machinery and home heating systems, the snap-action SPDT switching takes place in the middle of the travel of the plunger. By mounting two such switches under one thumb lever or treadle so that they switch at different points of the lever's travel, a similar switching sequence can be instrumented (**Fig 3**). The set screw permits a rough but usually adequate adjustment of the delay.

At G4LQI, S1 is used to key a linear amplifier while S2 keys the transceiver driving it. When the linear was keyed from the Remote T/R socket on the transceiver, the linear would trip out; I believe this was caused by an RF pulse generated in response to a switching transient from the regular PTT switch arriving at the linear before the latter had completed its R/T sequence.

MORSE KEY T/R SWITCH

DID YOU EVER WONDER WHY the rest contact of most straight morse keys is insulated and brought out to a binding post? It is (was) for muting the station receiver. In the 1940s and before, there were no HF transceivers; only transmitters and receivers. Before pressing the key (or PTT button on the microphone) one would manually switch the antenna from receiver to transmitter and vice-versa. To prevent a howl, the receiver had to be muted (disabled) while transmitting; this was often done by an extra contact on the antenna switch, eg by removing the screen grid voltage from one or more valves.

For break-in keying, separate transmitting and receiving antennas eliminated the antenna switching; few stations had beams anyway. The back contact on the key was then used to mute the receiver when the key was down, sometimes by opening the voice coil or headphone circuit. (**Fig 4**). Be sure *not* to try this with those primitive receivers where the plate current of the audio valve passed through the head phones *at HT!*

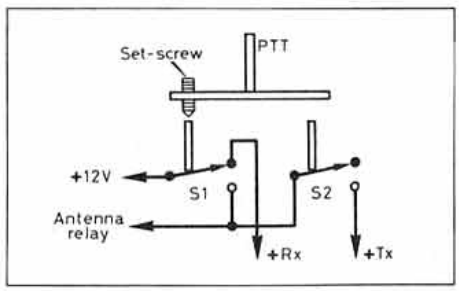


Fig 3: Proper T/R sequencing by electromechanical means. Two microswitches flip at different positions of the common actuating lever.

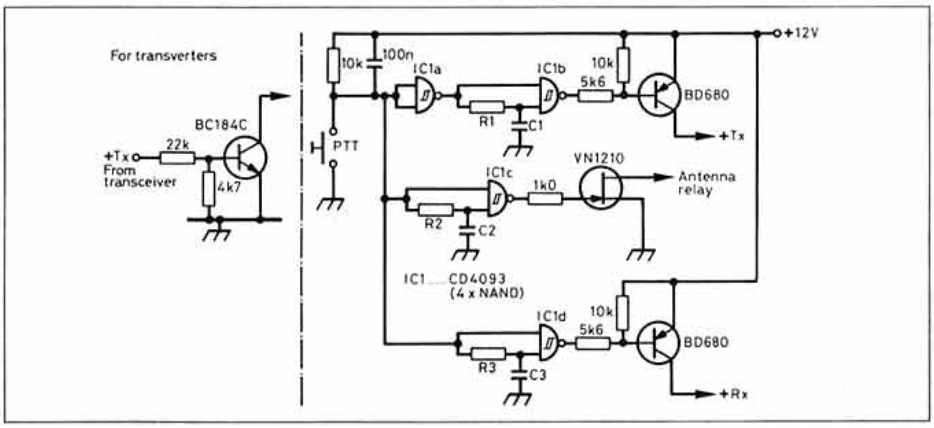


Fig 2: Universal transceiver T/R timing circuit. To switch a transverter, the BC184C transistor replaces the PTT switch. R1, C1; R2, C2 and R3, C3 determine the delays t1, t2 and t3 of Fig 1.

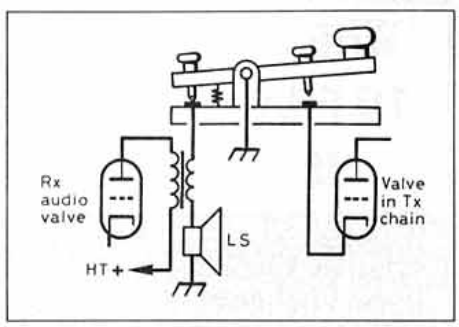


Fig 4: The back (rest) contact of a straight morse key mutes the receiver at key-down. Key-click filtering and RF decoupling omitted.

HAYDON COMMUNICATIONS

LEICESTER '93 "OUR SALE BEGINS"

SEE US AT LEICESTER

ALINCO SAVERS!

DJ-580SP
2m/70cm Handy + wideband RX! Incl's CTCSS.
FREE XTRA NICAD WORTH £39!
P&P Free
£435

DJ-180EB
2m Tx + Ext Rx incl's Nicads/chgr +
EXTRA NICAD FREE!
£209

Free P&P

KENWOOD – STILL AT OLD PRICES!

TM-732E
The ultimate mini 2m/70cm's FM mobile, detachable front, 50W O/P + ext. Rx. Incredible! Autumn special.
£[illegible]

HANDHELD BONANZA!

TH-78E
Our best selling 2m/70cms Handy with ext. Rx! Incls Nicads/chgr + Extra Nicad FREE
£465

TH-28E
2m Tx Handy + 70cm's Rx + airband Rx! Amazing — Nicads/Chgr + Extra Nicad FREE!
£259

HF 'AFFORDABLES'!

TS-50S
Show Special £ PHONE

FT-747 GXII
Budget HF TCVR, tried and tested.
Show Special £ PHONE

SAVE £70!

SONY 2001D
0.1 > 30MHz All Mode + AM Airband/FM broad'st.
£269
While Stocks Last!

FRG-100
Award winner 0.1 > 30MHz
All mode! Incls:- Free PSU/Long wire + P&P
£549

SCANNER BARGAINS!

AR-3000A
0.1 > 2GHz All Mode! A marvel of modern day technology.
£849
Incls free PSU/Long wire/Freq guide

MS-1000
0.1 > 1300MHz AM/FM/WFM
£299 (incls PSU)
£259

"OUR THREE MOST FAVOURITE HANDHELDS"

MVT-7100
The two in one Receiver 0.1→1650MHz. (All mode) Put one to the test! (It's brilliant)
£399
INCL'S FREE LONG WIRE

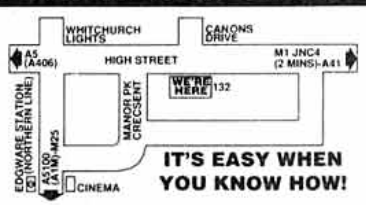
AR-1500EX
Now with enhanced performance 0.1→1300MHz (All modes) Incl SSB
£315
INCLS FREE LONG WIRE

HP-2000E
0.1→1300MHz All modes Incl's Nicads/Charger
£269
Incl's free p&p

INTEREST FREE CREDIT ON SELECTED ITEMS!
WRITTEN DETAILS AVAILABLE ON REQUEST

ALL LEADING BRANDS IN STOCK!

WHERE TO FIND US



IT'S EASY WHEN YOU KNOW HOW!

★ 24 hour salesline **0850 586313** ★ Mail Order: Same Day Despatch ★

Sales/service:– (Phone/Fax) – **081-951 5782**

132 High Street, Edgware, London HA8 7EL

Close to Edgware underground station (Northern Line). Close to M1, M25, A406.

VISA SWITCH

★ OPEN:– ★
MON-SAT 10-6PM

S.E.M.

8 FORT WILLIAM, HEAD ROAD, DOUGLAS, ISLE OF MAN.
'PHONE 0624 662131

SEE US AT LEICESTER

S.E.M. Q.R.M. ELIMINATOR MKII. This device can phase out completely local interference of any kind. Connects in your aerial feeder and covers 100 KHz to 60 MHz, you can transmit through it, £98.50 incl. Ex-stock.
V.H.F. Q.R.M. ELIMINATOR 130-180 MHz, £119.50.
HI Q RECEIVER AERIAL MATCHING UNIT. Provides a high selectivity impedance match for wire or co-ax aerials to your receiver, £66.50 incl. Ex-stock.
S.E.M. TRANZMATCH MKIII. The only Aerial Matcher with UNBALANCED and TRUE BALANCED OUTPUTS. 1kW 1.8-30 MHz, £179. Built-in EZITUNE (see below), £59.50. Built in Dummy Load, £10.90.
EZITUNE. Allows you to TUNE UP on receive instead of transmit. FANTASTIC CONVENIENCE. Stops QRM. Boxed unit, £65. P.C.B. and fitting instructions to fit in any ATU, £59.50.
FREQUENCY CONVERTERS. V.H.F. to H.F. gives you 118 to 146 MHz on your H.F. receiver, Tune Rx, 2-30 MHz, £79.50. Ex-stock. H.F. to V.H.F. gives you 100 kHz to 60 MHz on your V.H.F. scanner, £69.50. Ex-stock. Plug in aerial lead of any receiver. Tuning from 100 MHz up.
2 or 6-METRE TRANSMATCH. 1kW, will match anything, G2DYM or G5RV? on VHF. £55.00. Ex-stock.
DUMMY LOAD. 100W THROUGH/LOAD switch, £39.50. Ex-stock.
VERY WIDE BAND PRE-AMPLIFIERS. 3-500 MHz. Excellent performance. 1.5dB noise figure. Bomb proof overload figures. £49.50 or straight through when OFF. £59.50. Ex-stock.
R.F. NOISE BRIDGE. 1-.170 MHz. Very useful for aerial work measures resonant freq and impedance. £65.00. Ex-stock.
COSMIC MEMORY KEYER. The most comprehensive keyer available. 4 x 48 character memory messages which can be combined or call each other and contain operational commands. Many more facilities all being called or interrogated via the key! £117.90 inc.
IAMBIC MORSE KEYER. 8-50 w.p.m. auto squeeze keyer. Ex-stock. Ours is the easiest to use. £65.00. First class twin paddle key, £39.50. Ex-stock.
TWO-METRE LINEAR/PRE-AMP. Sentinel 40: 14x power gain, e.g. 3W — 40W (ideal FT290 and Handhelds). £135. Sentinel 60. 6x power, e.g. 10 W in, 60 W out, £145. 10 W in, 100 W out, £175.
H.F. ABSORPTION WAVEMETER. 1.5-30 MHz, £55.00. Ex-stock.
MULTIFILTER. The most versatile audio filter. BANDPASS Hi Pass, Lo Pass and two notches. £95.00. Ex-stock.
HIGH PASS FILTER/BRAID BREAKER. Cures T.V.I. £9.95. Ex-stock.
CO-AX SWITCH. Three-way + earth position. D.C.-150 MHz, 1kW. £39.50. Ex-stock.
12 MONTHS COMPLETE GUARANTEE INCLUDING TRANSISTORS
Prices include VAT and delivery. C.W.O. or phone your CREDIT CARD No. Ring or write for further data or catalogue. Orders or information requests can be put on our Ansaphone at cheap rate times.

NEW

THE DEFINITIVE 'OFF-AIR' FREQUENCY STANDARD

Special Introductory Price
Only **£195**+ VAT carriage extra

★ Provides 10MHz, 5MHz & 1MHz
★ Use it for calibrating equipment that relies on quartz crystals, TCXOs, VCXOs, oven crystals
★ Phase locks to DROITWICH (rubidium controlled and traceable to NPL)
★ For ADDED VALUE also phase locks to ALLOUIS (cesium controlled and traceable to BIPM — French eq to NPL)
★ British designed and British manufactured
★ **Now with sine wave option. Output 1 volt nominal into 50Ω.**

Output frequencies — 10MHz, 5MHz, 1MHz
Short term stability — better than 1×10^{-9} (1 sec)
Typical — $\pm2\times10^{-9}$ (1 sec)
Long term — tends to 2×10^{-12} (1000 sec)

See it at rallies on the SYON TRADING stand. For more information contact

VISA

HALCYON ELECTRONICS
423 Kingston Road, Wimbledon Chase, London SW20 8JR
Tel: 081-542 6383

HALCYON ELECTRONICS

NOW ON-AIR FROM BEDFORD!

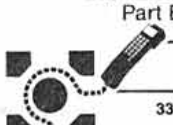
For all your Amateur and Shortwave Listening requirements

G O Unbeatable BargainBuys!

Whatever your interest — HF, VHF, UHF, Transmit or Receive

CALL NOW — (0234) 364004

Part Exchange & Mail Order Welcome



WELLAND COMMUNICATIONS

33 HIGH STREET, BEDFORD MK40 1RY
FAX: (0234) 364054

RSGB

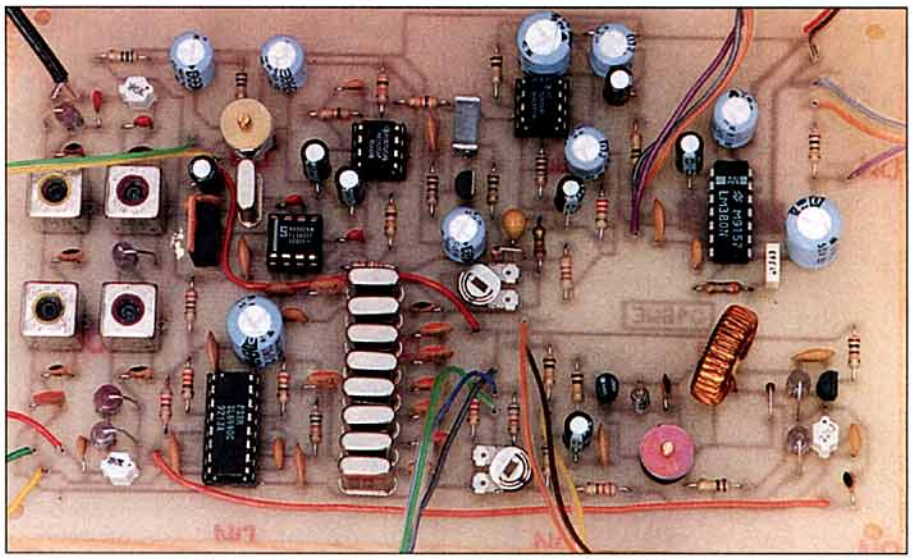
RADCOM CONSTRUCTION FEATURE

A Two-band Superhet

Concluding a two part article by Steve Price, G4BWE

THE PHOTOGRAPHS give a good idea of the layout which I adopted (see also September issue) – note the central position of the main tuning control (RV1) and the row of LEDs directly above this. The band-change switch (S1) and fine tune control (RV2) are mounted to the left of the front panel, and the LSB/USB switch (S2) plus the AF gain control (RV3) and headphone socket (JK1) to the right. The main PCB is mounted on the base using 6BA nuts and bolts with 6mm spacing pillars – when deciding on the position of this PCB remember to check that there is sufficient clearance for the panel mounted components.

The antenna and power sockets (SK1 and SK2) are fixed to the rear panel. Finally, the loudspeaker (LS) is bolted to the case lid underneath some pre-drilled ventilation slats (the slats are not really large enough to act as an efficient vent for L51 and so a pattern of round holes has been drilled in the rear panel to allow some sound to escape from the rear of the speaker).



TESTING AND CALIBRATION

THE RECEIVER REQUIRES a regulated power supply of 12 volts DC. Quiescent current consumption is around 75mA, rising to approximately 300mA in the presence of a strong signal with the AF gain fully advanced. Constructors who do not already possess a suitable mains power supply unit may wish to consider building one. A simple fixed voltage design using a type 7812 12 volt 1 amp regulator IC is quite adequate.

Firstly, set RV2, RV3, R15, R28, C32 and C60 at mid travel. After connecting the power supply, check with a multimeter (negative test probe to ground) that there is around 12 volts on pins 8 of both IC4 and IC5 and also on pin 14 of IC6. There should be a slightly lower voltage on pins 3 and 14 of IC1 and 6 volts on pin 8 of IC2. Initially there will be very little sound from the loudspeaker, but after a few seconds the background noise will gradually fade up as the AGC voltage settles.

After allowing five to ten minutes for the VFO to warm up, it may be calibrated using a digital frequency meter (DFM). Connect the DFM probe to the junction of C65 and IC1, pin 5. Constructors who do not have access to a DFM could use a general coverage receiver in SSB/CW mode. A short length of cable should be connected to the test receiver's antenna socket and the other end allowed to dangle inside the superhet's case.

Proceed as follows:

a) Set RV1 fully clockwise and check that there is 6 volts at the junction of RV2, R29 and R30 – this confirms that the track of RV1 has been connected the right way round.

b) Adjust C60 using a brass or plastic trimming tool to obtain a VFO frequency as close as possible to 5.483MHz (if you are using a general coverage receiver instead of a DFM, simply tune the RX to 5.483MHz and listen for a heterodyne as the VFO is tuned onto frequency).

c) Set RV1 fully anti-clockwise and adjust R28 to obtain a VFO frequency of 5.017MHz.
The VFO is now adjusted for coverage of 3.384 to 3.85MHz and 13.884 to 14.350MHz plus or minus the 2kHz latitude provided by the fine tune control (RV2). This explains why RV2 must be set at mid-travel during calibration. The next task is to align the input bandpass filters:-

d) Connect the antenna which will normally be used with the receiver. A single wire of between 25 and 40 feet, reasonably elevated, is fine. An earth connection is beneficial, but if this is already provided via the mains power supply unit then there is no need to bother further.

e) Set S1 to 20 metres and S2 to USB (ie the contacts of S2 should be closed). With RV1 near mid travel, tune around to locate an amateur SSB signal. Having found one, use the trimming tool to adjust the core of T3 for maximum level. Now adjust T4 in the same way (T4 may not 'peak' quite as sharply as T3, this is OK).

f) Tune away from any signals so as to obtain a steady background hiss. Change to LSB by opening S2 and adjust C32 so that the tonality, or 'pitch', of the background noise is the same as when S2 is set to USB.

g) Set S1 to 80 metres and find an amateur signal near the centre of this band. Now adjust the cores of T1 and T2 in the same way as you did for 20 metres.

If you have difficulty in finding a signal on either band, remember that this may be due to poor propagation conditions. Be prepared to wait a few hours and try again. If possible, use a second receiver to check. Alternatively, constructors who have access to an RF signal generator may use this instead.

Preset R15 is now set so that the AGC starts to operate when the signal level reaches approximately S5 to S7 (signals of this level will sound about five times louder than the normal background noise on 20 metres). There will be a degree of trial and error involved in finding the best setting for R15, but it should be possible to arrive at a point where the AGC is effective at preventing overload for signal strengths up to around S9 + 30dB. Signals weaker than S5 to 7 will not, of course, sound as loud as those which are stronger, but this should not prove a problem – simply increase the AF gain using RV3!

Finally, adjust R36 on the frequency meter board so that LED1 is illuminated when RV1 is fully anti-clockwise.

FINISHING TOUCHES

THE TWO-BAND SUPERHET works particularly well within the limitations of such a

simple design and should provide many hours of listening pleasure. Possible additions include an ATU – this will improve antenna matching and also provide extra rejection of out of band signals – and a crystal calibrator to give a more accurate indication of frequency. The June 1993 edition of *RadCom* (page 41) features a calibrator design boasting some novel features – why not take a look at this?

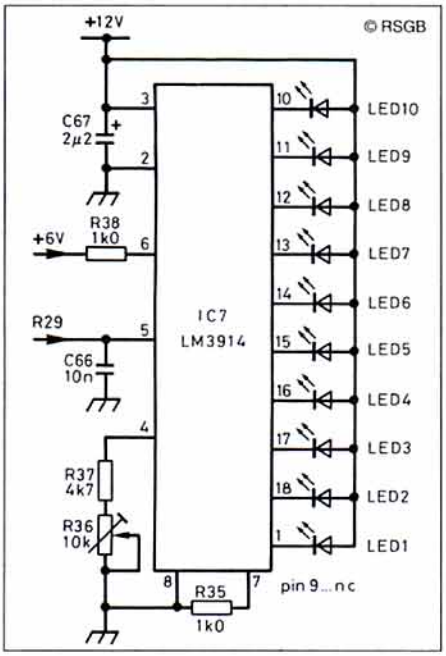
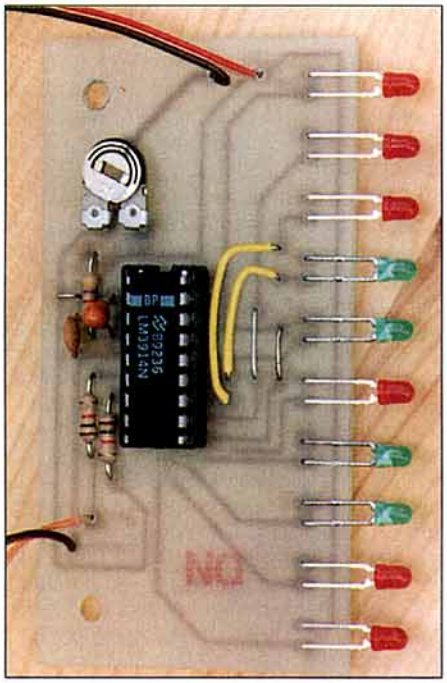


Fig 3: The LED bargraph tuning meter.



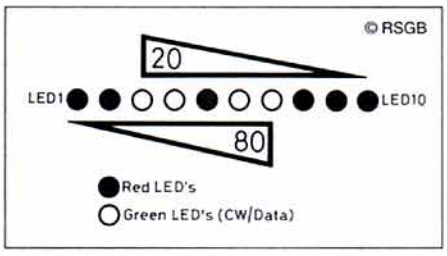


Fig 4: Suggested scale markings to enhance the LED tuning display.

COMPONENTS LIST

Resistors

All fixed resistors are 0.25W, 5% carbon film.

R1	820R
R2, 3	330R
R4	1k5
R5	27R
R6	390R
R7, 8, 9, 12	47k
R10, 11, 21, 22	56R
R13, 14	1M
R15, 28, 36	10k pre-set (horizontal)
R16, 25, 34	100R
R17, 23, 29, 31, 32	100k
R18	2k2
R19, 27, 37	4k7
R20	1M2
R24	2R7
R26	6k8
R30	680k
R33	220R
R35, 38	1k0
RV1	10k lin, 10 turn (wirewound)
RV2	5k lin
RV3	10k log

Capacitors

C1, 2	330pF ceramic plate or polystyrene
C3, 5, 11	47pF ceramic plate or polystyrene
C4, 9	470p ceramic plate or polystyrene
C6	2n2 polystyrene
C7	680pF ceramic plate or polystyrene
C8, 38	820pF ceramic plate or polystyrene
C10, 12	22pF ceramic plate or polystyrene
C13	150pF ceramic plate or polystyrene
C14, 28, 29, 51, 63, 66	10n disc ceramic
C15, 16, 17, 33, 34, 41, 50, 57, 64	100n disc ceramic
C18, 48, 54	220µ 16 or 25V radial electrolytic
C19, 21, 22, 23, 24, 25, 27	82p ceramic plate or polystyrene
C20, 26	68pF ceramic plate or polystyrene
C30, 31	220pF ceramic plate
C32	5 – 60pF foil trimmer
C35, 36, 37, 44, 47, 52, 56	10µ 25V radial electrolytic
C39, 40, 43, 45, 49, 55	100µ 16 or 25V radial electrolytic
C42	470n Siemens style polyester (10mm lead spacing)
C46	10µ 16 or 25V tantalum bead electrolytic
C53	100n sub-miniature polyester (5mm lead spacing)
C58	47pF polystyrene
C59	39pF NPO plate ceramic
C60	3 – 90pf foil trimmer
C61, 62	680p polystyrene
C65	10pF plate ceramic
C67	2µ2 35V tantalum bead electrolytic

Inductors

L1	1µ5 Toko 7BS (part number 283AS – 1R5)
L2	2µ7 Toko 7BS (part number 283AS – 2R7)
L3	7µ8 41 turns of 26SWG enamel on T68-6 powdered iron toroid
L4	220µ Toko 7BS (part number 283AS – 221)
T1, 2	Toko KANK3333R
T3, 4	Toko KANK3334R

Semiconductors

D1	OA91
D2	BB212 varicap
D3	1N4148
LED 1 – 10	3mm round (colour(s) of choice)
TR1, 2	2N3819
IC1	SL6440C
IC2	NE602AN
IC3	7806
IC4	NE5532
IC5	TL072
IC6	LM380N
IC7	LM3914

Additional items

JK1	Headphone Jack socket (see text)
LS1	8R loudspeaker (Maplin YT25C suitable)
SK1	SO239 socket
SK2	2.5mm DC power socket
S1	SPDT miniature toggle
S2	SP or SPDT miniature toggle
Crystals	
X1 – 9	8.867MHz

3 x 8pin DIL IC sockets
16pin DIL IC socket
18pin DIL IC socket

Metal case, eg Maplin 2108, size: 225mm(w), 175mm(d), 89mm(h), order code XJ30H is suitable)

Knobs for RV1 – 3, insulated cable for flying leads, short length of RG174A/U miniature coax for connection between SK1 and PCB, 6BA nuts and bolts and 6mm spacers for PCB mounting.

✦ ✦ ✦

The two printed circuit boards and further constructional details for this project may be ordered from the author by sending a cheque for £10.50, made payable to S Price, to: Steve Price, 9 Spurcroft Road, Thatcham, Berks RG13 4XX. The price includes the cost of return postage and packing. Please allow up to 28 days for delivery.

✦ ✦ ✦

A full kit of parts is available from JAB Electronic Components. This includes the case and all components. JAB Electronic Components, The Industrial Estate, 1180 Aldridge Road, Great Barr, Birmingham B44 8PE. Tel: 021 366 6928

✦ ✦ ✦

Most of the components, including Toko inductors and the foil trimmers, are also available from Cirkit Distribution Ltd, Park Lane, Broxbourne, Herts EN10 7NQ.

The NE602AN (IC2) may be obtained from MACRO Ltd, Burnham Lane, Slough SL1 6LN. Alternatively, it should be possible to substitute the older NE602N in this design.

8.867MHz quartz crystals are available from Maplin Electronics, PO Box 3, Rayleigh, Essex SS6 2BR.

RADCOM TECHNICAL FEATURE

A Wide Range Capacitance Bridge

by Dick Biddulph, G8DPS

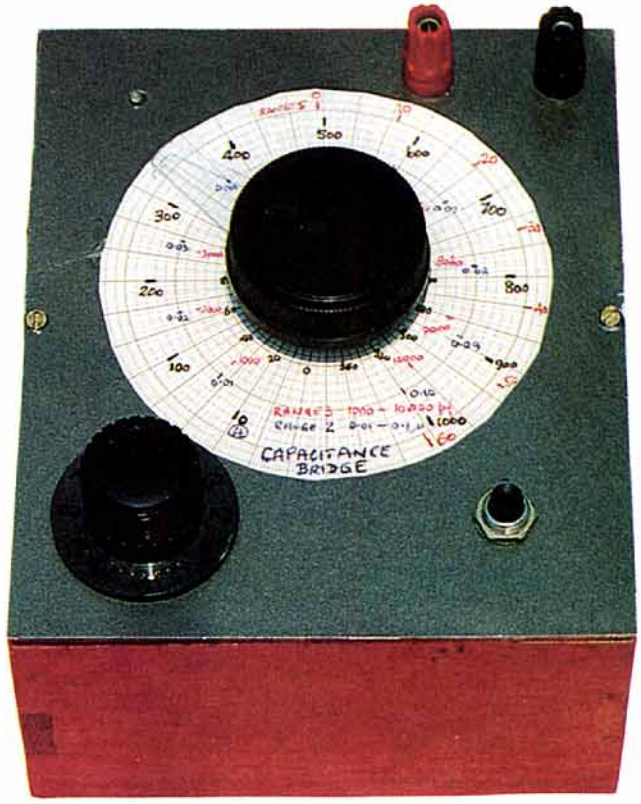
ACCURATE MEASUREMENT of capacitance over a wide range is a useful capability for the amateur shack. It can be especially worthwhile with capacitors which have poorly defined markings. Also it is important when matching capacitors for use in circuits where the absolute value is not very important. A case in point here is the phasing network of Gingell [1] for generating SSB signals. The bridge described covers the range 0 to 100 nanofarads (0.1μF) in four ranges. On the lowest range, it is possible to measure one picofarad!

Most capacitance bridges need a high frequency supply (the circle with the 'squiggle') and a corresponding detector ('D' see **Fig 1**) which must respond to the bridge supply frequency for determining the balance point. They require accurate standard capacitors for the bridge arm. Also, they have a horribly non-linear calibration in the form shown since C.U.T. (the capacitor under test) is equal to C_s x R1/R2. The bridge described needs a few accurate capacitors for calibration but they need not be specific values.

A QUESTION OF BALANCE

BACK IN ABOUT 1860, Clerk Maxwell devised a bridge [2] which can be used for measuring capacitance using a DC bridge supply and a DC galvanometer as a detector ('G' in **Fig 2**). He used it to determine the relationship between electromagnetic and electrostatic units. This bridge seems to have been forgotten and I have only found one reference to it in a text book [3]. It is not to be confused with the other Maxwell bridge for measuring inductance which is similar to a Wheatstone bridge but with the inductor in one arm and a variable capacitor in the arm diagonally opposite.

His bridge was quite simple (Fig 2), and used a 'commutator' (change-over switch) to alternately charge and short-circuit the capacitor. With a mechanical switch, he could only achieve a switching frequency of up to a few hundred hertz. However, modern semiconductor switches such as the CMOS 4066 can be switched at rates of up to 10MHz (with a 10 volt supply). Of course, these have the disadvantage of a small residual 'on' resistance. This is specified as typically 120Ω per switch at 25°C using a 10 volt supply. The bridge is balanced when the average voltage at point 'A' is equal to that at point 'B'.



The bridge balance condition ie zero galvanometer current or zero voltage across the bridge, is rather complex (see appendix) but can be simplified to:

C = (k R1)/(n R2 R3)
if (R2 + R3) is much greater than R1

where:

k is a constant for each range
C is the capacitance in Farads
R1, R2, R3 are resistances in Ohms
n is the switching frequency in Hertz

There are three ways in which the bridge can be realised in practice:

(a) We can build a bridge as in **Fig 3** with a low, variable resistor for R1, higher, fixed resistors for R2 and R3, a selectable frequency for the electronic switch and a DC galvanometer or centre zero microammeter connected between 'A' and 'B'. 'C.U.T.' is the capacitor under test. This will have a nearly linear calibration.

Calibration of the four ranges of the bridge is described below.

(b) We can build a bridge in which a potentiometer forms two of the arms of the bridge and the galvanometer connected

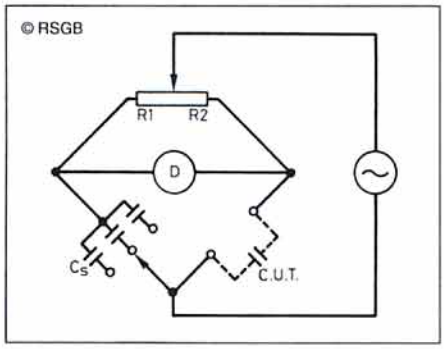


Fig 1: This capacitance bridge has the disadvantage of non-linear calibration.

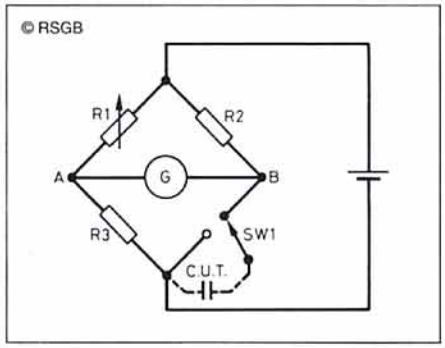


Fig 2: Clerk-Maxwell's bridge used a galvanometer to determine the balance point.

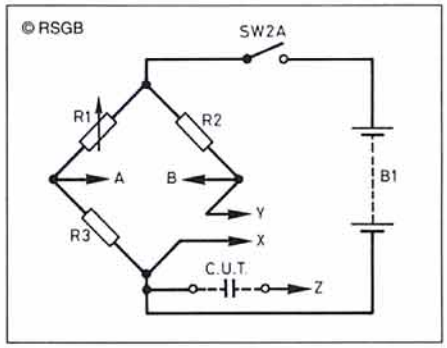


Fig 3: A more practical arrangement with near-linear calibration.

between 'A' and 'B' (**Fig 4**). The calibration will be very non-linear but will cover a wide range in each range of the bridge.

(c) We can add an op-amp (**Fig 5**) to either of the above bridges and use back-to-back LEDs (bicolour or two of a different colour) as the balance indicator instead of the galvanometer. Note that the op-amp is used as a DC amplifier only so its response at AC of any frequency is irrelevant.

PRACTICAL CIRCUIT

THE CIRCUIT OF THE capacitance Bridge (Figs 3, 5 and 6) has a 5k linear wirewound or conductive plastic variable resistor (the essential thing is that it is accurately linear) for RV1 and 20k metal film (± 1%) resistors for R2 and R3. The switching waveform is generated by a CMOS 4047 in its astable mode (**Fig 6**) and varies from about 30Hz to 100kHz in factors of 10. This drives a 4066 quad switch with two pairs of switches wired in parallel and connected as a changeover switch. The full scale readings are from 100nF (0.1μF) to practically zero and the relationship is linear as shown in the graph (**Fig 7**).

The op-amp used in this type of bridge needs a separate power supply. It does, however allow the use of a cheap bi-colour LED as the detector. This must be of the type where the red and green LEDs are connected back-to-back ie there are only two leads - it is, of course, possible to use separate LEDs. It is also necessary to short the input to set its output to zero (by means of RV2, Fig 6) when the bridge is initially set up. Balance is indicated by a sharp change from red to green.

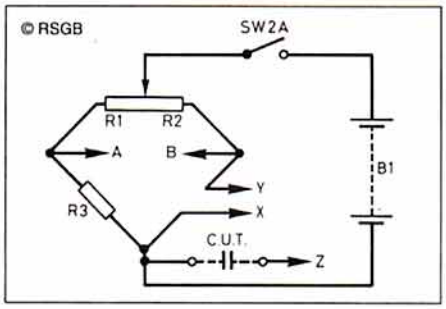
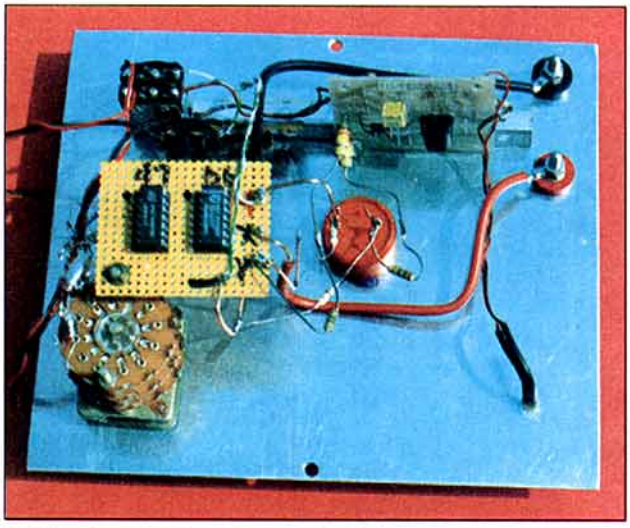


Fig 4: Although this circuit has a wide range, calibration needs care.



Stripboard construction gives good performance.

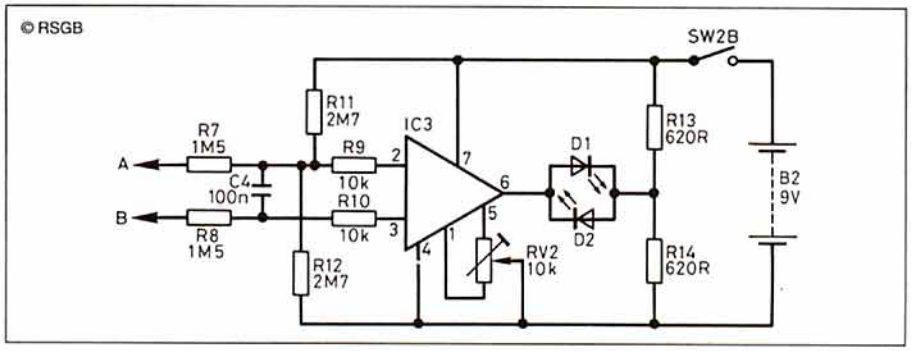


Fig 5: A general purpose op-amp is used in the detector.

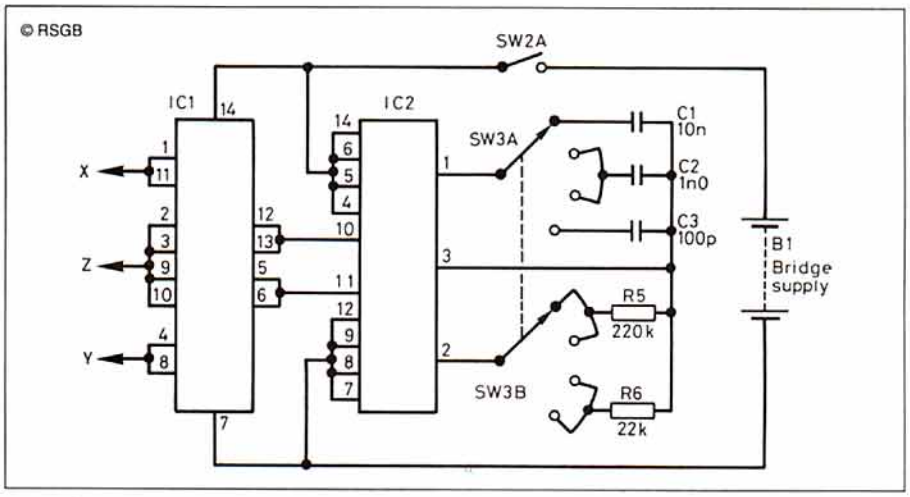


Fig 6: The CMOS astable is connected to an analogue switch as shown.

The input network, R7, R8, and C4 smooths the bridge output and gives a better transition from red to green. It is necessary to use an op-amp with a high input resistance. The CA3140 specified is good but one with a j-FET input such as the TL081 would do equally well. The exact type is not critical.

ASSEMBLY DETAILS

NO SPECIAL PRECAUTIONS were found necessary in the construction. I used an aluminium panel with the main components mounted on it. The op-amp was mounted on a small PC board made by RS Components (or Electromail, Catalogue no 434-065) and the square wave generator (a CMOS

continued on page 77 ▶

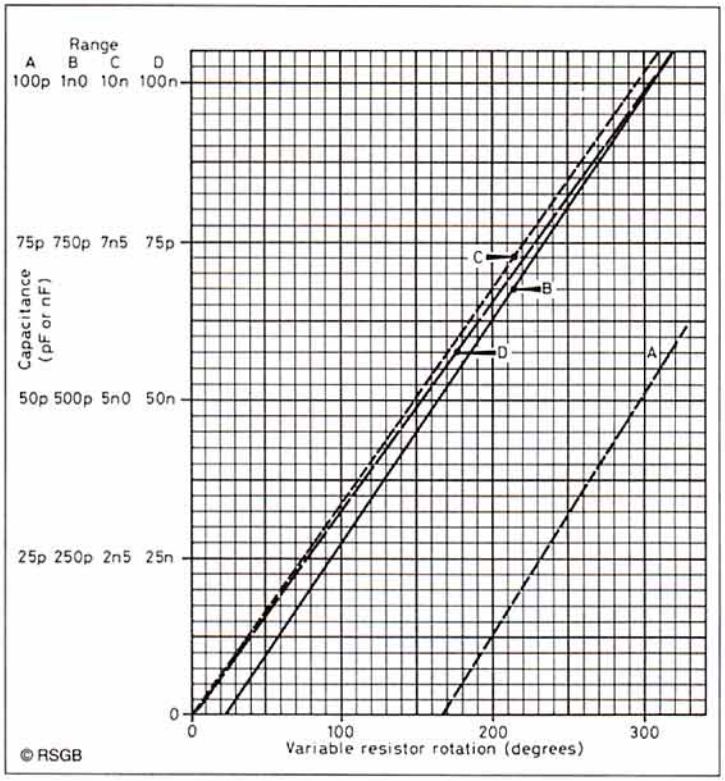


Fig 7: Calibration curve for the configuration of Fig 3.

RADCOM TECHNICAL FEATURE

Hamtenna With the Lot

by Ron Holmes, VK5VH

This article is reproduced by courtesy of the Wireless Institute of Australia and first appeared in their journal *Amateur Radio*, October 1987.

IF YOUR FAVOURITE antenna is the inverted Vee - this has a double helping. If you like phased verticals, there are four of them: and if you go for 80 metre loops, here is another version - all in one antenna! What is more, it fits into a normal size backyard, is only 10m high, and you feed it with 50Ω coax.

Performance wise, a number of tests with a G5RV as reference antenna, and immediate switching facilities, are the basis of a claim that on 80 metres it is superior, on 40 it compares satisfactorily, being better in some directions and worse in others, while on 20 metres the great majority of reports surprised me by indicating two S points improvement, even in directions favoured by the G5RV.

The 'Hamtenna' is similar to the Stepped Loop Antenna of VK5XI (*Amateur Radio*, June '86) but has some significant differences (See **Fig 1**). At each end is an inverted Vee 10 metres high at the apex and 3 metres high at the ends. The Vees are approximately 14 metres apart. In my case the distance between the pergola and the shed.

On the permapine poles to which the bottom ends of the Vees are anchored are erected aluminium verticals, 2.75 metres (9 feet) long. The tops of these are joined with horizontal wires 14.5 metres long, ie the verticals are 14.5 metres apart.

Without a calculator you can work out that 2.75 twice, plus 14.5, makes 20 metres: so that along each side of the loop we have, on 20 metres, a pair of quarter wave verticals. The top 2.25 metres of each is bent over, and they are joined to each other by 10 metres of wire. The ends of the Vees are joined to the bases of the verticals.

The total length of the loop is about 84 metres and it is fed at the top of the most convenient Vee. In my case this is at the Western end. My block runs approximately East/West but the back of it is a little North of East.

I use 70Ω coax to a transmatch, but tried it with a 4 to 1 balun and 50Ω coax, then with 50Ω coax direct. Without a tuner the SWR on the direct 50Ω coax was as good as with the 4 to 1 balun on the five regular bands. Also it compared favourably with the G5RV SWR figures.

GUYS IN THE BACKYARD

A WORD OR TWO about the engineering. My backyard is 18 metres (60 feet) wide and about 16 metres deep (52 feet). The rear Vee is a couple of metres in from the back fence to allow room for guying. I use aluminium poles which require only light guys and can be put up and down on my own. The main guys are the legs of the inverted Vees which are tied to insulated crew eyes on the permapine posts fixed to the fence. The light verticals need only 'invisible' nylon fishing line to put a strain on the wire joining their tops.

The base of each vertical is insulated with PVC tubing and fixed to the post with a couple of saddle brackets. Wires are well tinned at the ends and fixed to the aluminium with PK screws. It might be noted that the whole antenna is fitted in a space which will take only one leg of a G5RV.

The exceptionally good results on 20 metres possibly stem from the fact that we have two pairs of 'in phase' vertical sections at the diagonal corners (**Fig 2**). The vertical sections are indicated by the heavy lines on the dotted circle which represents the total loop. Note the end of each labelled 'base'. The current flow and direction at 20 metres indicates that the current is flowing 'up' in vertical sections 1 and 3 while it is flowing 'down' in sections 2 and 4. Note also that the vertical sections come at points where there is maximum current.

The radiation pattern of the antenna is of course very complicated, but on 20, 40 and 80 it appears to have a good all round operational area. I have made comparatively few tests on 10 and 15, but it does work on those bands.

Experience on 20 metres suggests that the radiation pattern tends to be a cloverleaf formation. My antenna runs East/West and I get good propagation to Europe long path (SE) and USA short path (NE). Due north, ie off the side of the antenna, signals were scarcer, especially on the original lower arrangement. This was overcome by running a 20m dipole between the masts to cover the Northern null.

It would seem that the size of the antenna could be adapted to whatever space you have available, so long as the lengths of the

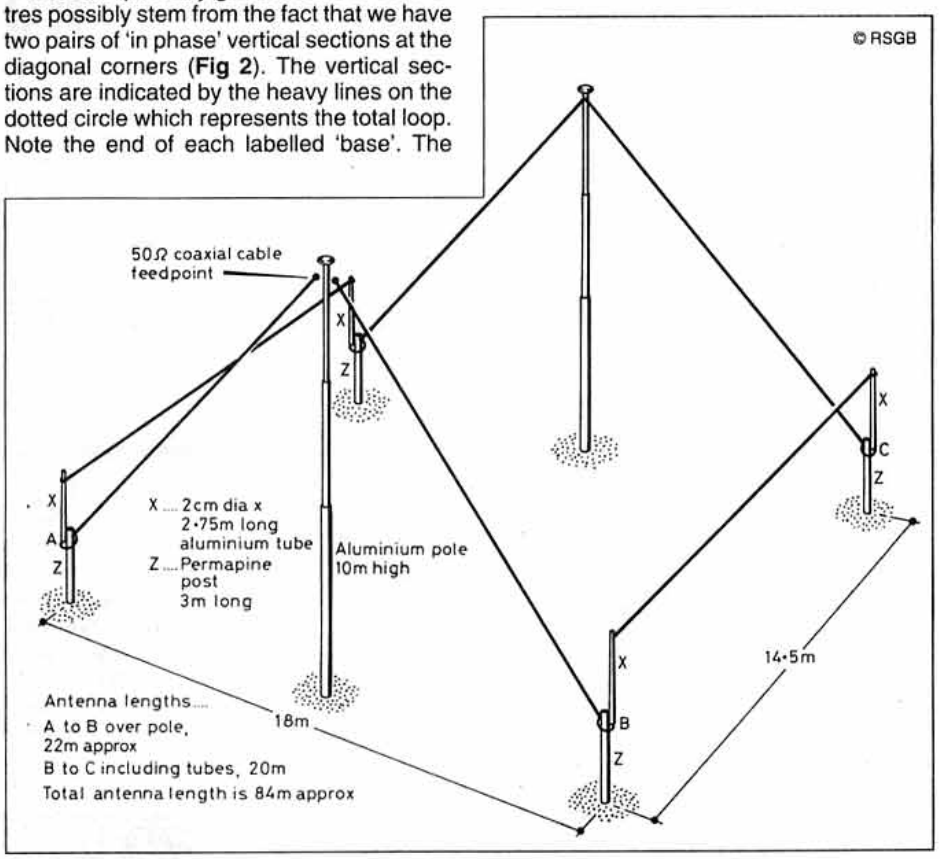


Fig 1: This antenna has current anti-nodes at its highest points, for maximum effectiveness.

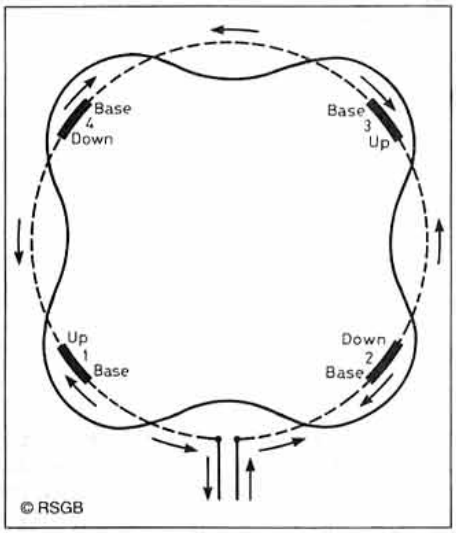


Fig 2: Current distribution around the antenna.

side and end sections each total approximately 20 metres.

VARIANTS OF THE ANTENNA

I HAVE TRIED IT without the inverted Vees by running the wires from the base of the verticals straight across the yard lifted only to a height sufficient to clear obstacles. It works nearly as well on 20m; down about half an S-point on average. It may be necessary to fold a portion of the wire each side of the feed point to maintain the full 80 metre resonance. Another alternative would be to make the verticals 5m long and the space between them along the side only 10m. I have not tried this but it could work even better on some bands. If you only have one mast or one high point an inverted Vee could be used at that end and straight across at the other.

It could be convenient to feed it at one corner. The main reason for feeding at the top of the inverted Vee is to provide maximum current at the highest points for the 80 metre bands. It is worth noting that at either of these points the feed line can be strapped to the mast (if my type construction is followed) or to the short pole in any case. Thus the problem of a swinging piece of coax is avoided. Heavy grade coax can also be used more easily. If desired, a balun can be used at the feed point. I have tried both 1 to 1 and 4 to 1 without noting much difference in the result.

Since first erecting the antenna some 3 years ago I have made a couple of improvements to the engineering side. Instead of fixing the verticals directly to the posts I have used a 2 metre (6ft 6in) length of 2in by 1in Oregon (pine) fixed as in **Fig 3** with the aluminium verticals held to these by hose clamps. This not only raises the height of the side sections of the antenna but also makes it easier to lower the verticals to work on them.

This is an all band antenna and will tune up on the WARC bands as well using my transmatch. If you don't have an ATU the SWR is low on all the harmonic bands with the arrangement as shown. While this antenna is more complicated than the '5RV, it would appear to work as well, or better, and in many locations could be as easy to build, and easier to fit in the space available. Antennas are like motor cars - there is no best car. It is a question of what will best do what you want: what you can afford; and what will fit in your car port. For an all-band, omnidirectional antenna, to fit the average back yard, the 'Hamtenna ' is worth trying!

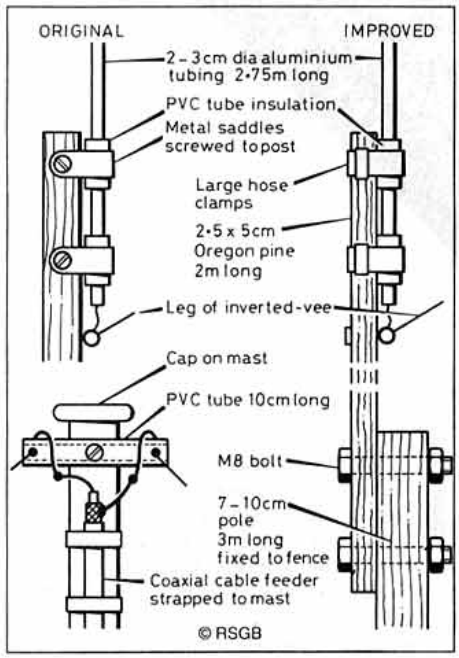


Fig 3: Detail of the coaxial feed point, and the four side posts.

Q R P

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

THE G QRP CLUB WINTER Sports have established themselves as perhaps the single most popular low power activity event. I say 'activity event' because this is not a contest. No brief meaningless exchanges, no standard '5NN' reports and no sleepless nights. It is a social event, a party, which enables as many low power operators as possible to contact each other over a week.

The event runs from 26 December to 1 January inclusive. There are no set periods or set bands. The usual frequencies used are on and around the International QRP Calling Frequencies of 1843, 3560, 7030, 14060, 21060, 28060kHz. It is common practice to use the highest band open at the time and two way trans-continental contacts are common.

The procedure is to call "CQ QRP" and then enjoy making as many two-way low power contacts as possible. To count as a QRP contact both stations must be using powers of 5W RF output or less. Although the Winter Sports are not a competition, stations taking part are invited to submit logs and notes to G8PG: Mr A D Taylor, G8PG, 37 Pickerill Road, Greasby, Merseyside L49 3ND. The G4DQP Trophy is presented to the person thought to have made the best overall contribution to the event. So activate your QRP transceiver or turn down the power on the QRO rig to less than 5W and enjoy the fun!

THE MICHIGAN QRP CLUB 14TH ANNUAL CW CONTEST

Following close behind the QRP Winter Sports is the Michigan QRP CW Contest. It runs from 1200GMT on 1 January to 2359GMT on 2 January and is open to all radio amateurs. There are four power output classes:

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

The exchange is RST, QTH (State/Province/Country) and Michigan QRP Club number or in the case of non-members the power output. Frequencies are 1810, 3560, 7040, 14060, 21060, 28060 and 50060kHz.

Scoring stations can only be worked once for each band. Member contacts are 5 QSO points (all bands) non-member contacts are 1 point. Multiply the total QSO points (all bands) by the number of States/Provinces/Countries worked for total points.

Bonus points can be gained for home-made equipment : Total points x 1.25 for a home-made receiver or transmitter and x 1.5 for a home built transceiver, or transmitter and receiver. (Kit built transceivers, the HW7,8 or 9, do not count).

Award certificates are issued for the highest score in each State/Province/Country. A separate log is required for each band, with name, callsign, address, equipment description and power output. Logs must be received by 5 February 1994 by Mr L T Switzer, N8CQA, 654 Georgia, Marysville, MI 48040, USA.

WHAT'S NEW?

1) UPDATE ON THE KIRSTA KEYER

In my last column I briefly mentioned the Kirsta Keyer, a small, 1.5 by 2 inches, iambic keyer board. The keyer is based on a Generic Array Logic chip (GAL16V8) programmed with all the necessary keying logic and character memories to generate Morse. This is clocked with a NE555 timer chip and the only control is a single potentiometer for keying speed.

I suggested that a kit of parts was available from Kirsta Computers Ltd in Dunfermline. This is no longer the case. The Kirsta kits are now sold by Kanga Products at Seaview House, Crete Road East, Folkestone, CT19 7EG, tel: 0303 891106. Kanga sent me a kit to try and it is an excellent little unit. I do not recall seeing a full iambic keyer packed into such a small space. The kit is very easy to assemble and the factory-set character weighting and dot-dash ratio seem fine. An ideal keyer for the portable station, although the current drain on a PP3 battery does make an on-off switch essential.

2) SSB FOR THE CONSTRUCTOR

The majority of home built transceivers in use on the amateur band are for CW operation. Very few home built SSB signals can be heard on the bands. In recent years a number of very buildable designs have appeared in the amateur radio press, some of them in *RadCom*. I suspect that many amateur radio constructors have felt daunted by the thought of trying their hand at SSB construction.

Over the last several months I have been engaged in discussion with Hands Electronics about the production of a series of modules in kit form which may encourage more SSB construction. The result is the RTX SSB/CW Transceiver System. The system is modular and constructors can opt for various combinations of the modules according to frequency requirement, application and sophistication. The basic starting point would be a QRP SSB Transceiver for one band. No special test equipment or tools are required apart from a multimeter and a soldering iron, although access to a general coverage receiver is particularly useful.

The RTXIF, RTXRF and RTXVFO modules produce a very simple, but effective, milliwatt SSB transceiver and adding the RTXAMP and RTXLPF makes this into a 10 watt transceiver. Other modules add AGC, change-over, CW and RIT facilities. Further modules are being developed for multiband use and variable bandpass and notch facilities. There is already a 50MHz transceiver version at the air testing stage.

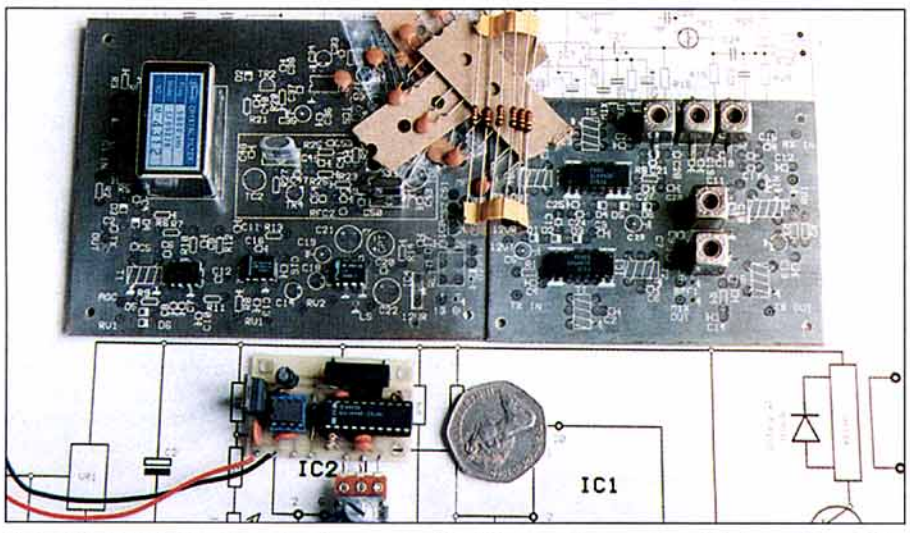
The kits are supplied with all board branded components, epoxy glass double sided printed circuit boards with screen printed component locations and a comprehensive manual. I hope these kits will encourage more radio amateurs to build their own SSB equipment. Information can be had from: Hands Electronics, Tegryn, Llanfyrnach, Dyfed, SA35 0BL, tel: 023977-427.

3) THE QRP PLUS TRANSCEIVER

On the day I began to write this column, I received a leaflet about a new QRP Transceiver shortly to be marketed by Index Laboratories. The QRP PLUS is a 5W CW and SSB transceiver that covers the HF bands from 160 to 10 metres. Described as "a fully synthesized, processor controlled, all band CW/SSB transceiver . . . . with a unique single conversion up-converting design, the *QRP Plus* is priced at $595 in the USA.

The leaflet says that the *QRP Plus* has SCAF digital audio filters (100Hz to 2400Hz variable bandwidth) with 20 memories, split operation, RIT and full break-in. The low power consumption, 12 volts at 140 mA on receive and 1 amp on transmit, make it useful for portable operation. It is also small : 5" wide, 4" high and 6" deep. The photograph shows it as an unusual shape with its almost square front supported by a single tilt-up leg.

The information is titled "A Quality Transceiver for the Serious Low Power Operator". If so, it should generate quite a lot of interest on this side of the Atlantic. I have requested more information and hope to have further details in a future column. Watch this space.



The compact Krista Keyer board is shown against the 50p coin. Above are the printed circuit boards for the Hands SSB Kit Modules: the IF/SSB Generator Board and the Transmit/Recieve Mixer Board.

E M C

HILARY CLAYTONSMITH, G4JKS
115 Marshalswick Lane, St Albans,
Herts AL1 4UU

MY FIRST JOB AS COLUMNIST is to thank Megan Smith, G0MEG, for her excellent work in producing the *EMC* column since June 1991.

TOWARDS 1996 . . .

I GLANCED BACK AT the first *EMC* column in June 1989 to see what the burning issues were at that time and noticed that the first heading was 'Towards 1992' and the implementation of the EMC Directive. I can remember being shocked at that time whilst visiting electronics exhibitions to find that the majority of companies had not heard of EMC, never mind the EMC Directive. This year, at the NEPCON Electronics Exhibition, I attended the EMC Forum and was amazed at the lack of awareness which still exists four years on. Senior management will have to realise that products must be designed with EMC in mind.

Because of pressure brought to bear by industry, and the time required to produce the necessary standards, there is now a transitional period – up to 31 Dec 1995. During this time, manufacturers and importers can;

(a) Comply with the EC EMC Directive, affix the CE mark to their products and consequently trade freely throughout the European Community – a reward for having taken EMC on board in the lead up to 1992.

(b) Continue to meet national regulations in the countries where the product is sold, whilst working out how to develop electromagnetically compatible designs and how to modify existing product designs to meet the regulations.

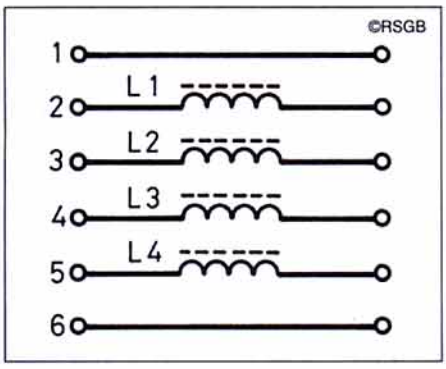


Fig 1: Circuit diagram of 'Freelance' RFI filter.

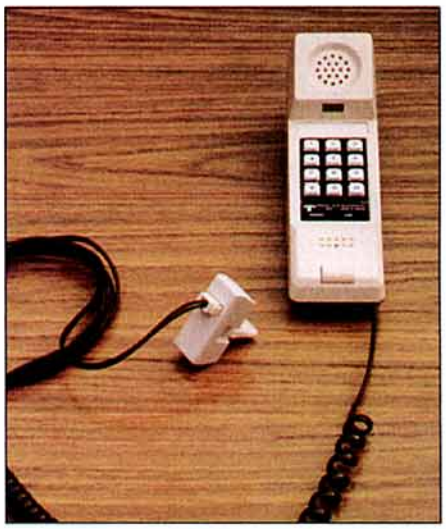
RF FILTERS FOR TELEPHONES

CONSIDERABLE INTEREST has been aroused by the BT 'Freelance' plug-in RFI filter which was mentioned in the June 1993 *EMC* Column. It is available from BT retail shops but is not normally on display and the sample which we tested was not accompanied by any information. The photograph shows this filter (lower left of telephone).

Although these filters are intended to prevent local medium wave AM radio broadcasts from causing breakthrough in telephones which have poor RF immunity, a number of amateurs have reported that the 'Freelance' RFI filter has solved telephone breakthrough problems on various HF amateur bands. Another use for these filters is to prevent RF interference generated by FAX machines, modems etc from getting out onto overhead telephone wires which can radiate efficiently at HF.

EMC Committee member Dave Lauder, G0SNO, has tested a 'Freelance' RFI filter and the results are shown below. The filter contains a choke in series with each of the four lines 2-5 as shown in **Fig 1**. Although lines 1 and 6 pass through without filtering, this doesn't matter in domestic telephone installations where lines 1 and 6 are not normally used. The filter not only provides rejection of common-mode signals (RF on all lines relative to earth) but also of differential mode signals (RF between one line and another). The alternative approach of winding a telephone cable through a ferrite ring is only effective against common-mode signals.

Fig 2 curve 'A' shows the characteristics of one of the chokes used in the 'Freelance' RFI filter up to 30MHz. The loss was measured in a 50Ω test circuit using the test method described in Appendix 3 of Robin Page-Jones's book *The Radio Amateur's Guide to EMC* (RSGB). The corresponding impedance is also shown. As with any choke, these have a Self-Resonant Frequency (SRF) at which the inductance resonates with the stray capacitance of the winding giving a very high impedance. In the case of the chokes L1 – L4 in the 'Freelance' RFI filter, which appear to be Toko 8RB series 2.7mH, the SRF is typically 1.3MHz. This gives very good performance in the 1.8MHz amateur band but the chokes become progressively less effective at higher frequencies because they are being operated above their SRF. Nevertheless, in practice this filter may still be reasonably effective to 21MHz or higher. Although lower inductance chokes would improve the performance on the higher HF amateur bands, these filters *must not* be modified as this would invalidate their BABT approval.



Telephone with 'Freelance' RFI filter (lower left).

At VHF this filter is not likely to be effective because the chokes are unsuitable for such high frequencies and because there is more chance of direct pickup in the telephone itself which cannot be cured by means of a plug-in filter. Obviously, modifications to any telephone, even your own, are out of the question because of BABT approval implications.

Another type of BABT approved telephone line RF filter, called a 'Signal Filter Box RF2', is available from Farnell Electronic Components of Leeds (Order code 106-285). This type is designed to be wired in, normally where the telephone line enters the building and can therefore only be fitted by BT engineers. BT may fit these where RF is being picked up on telephone wiring outside a building but it is not effective against RF picked up on inside telephone wiring. In this instance a plug-in filter may also be required for an affected telephone. The RF2 contains two 2.2mH chokes, one in the 'A' line and one in the 'B' line but the earth wire (if any) is not filtered. The chokes have similar characteristics to those in the 'Freelance' RFI filter.

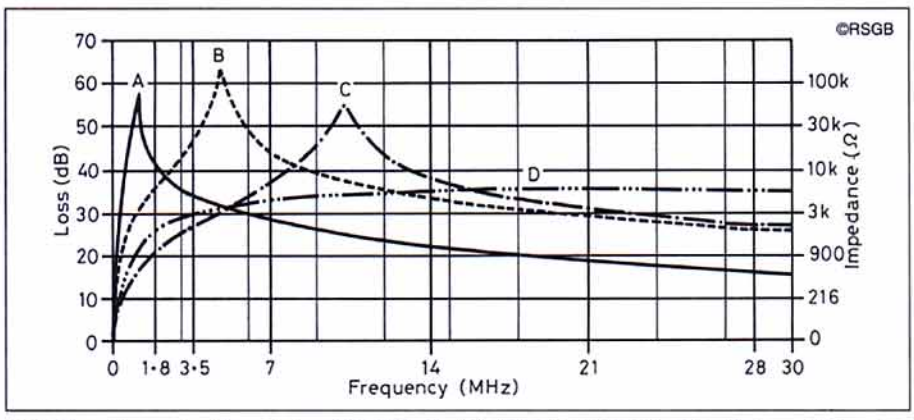


Fig 2: Impedance of various chokes at HF. (a) 2.7mH; (b) 470μH; (c) 100μH; (d) ferrite bead (15 turns).

RF FILTER CHOKES FOR AUDIO

IF YOU NEED to make an RF filter for use with *low level* audio signals (such as amplifier inputs, *not* loudspeaker outputs!) a series choke may be all that is required, particularly if you choose one with a suitable self-resonant frequency (SRF). Fig 2 curve 'B' shows the characteristics of a 470μH 8mm diameter ferrite bobbin type choke intended for PCB mounting (RS Components/Electromail Stock no 228-309). This is specified as having a

minimum SRF of 3.2MHz and a DC current rating of 100mA. The example tested had a measured SRF of 4.7MHz, making it particularly effective on the 3.5 and 7MHz amateur bands and reasonably effective from 1.8 to 21MHz. A 100µH choke (RS No 228-286) (Curve 'C') gives very good performance on 10MHz and slightly better performance than 470µH on 14MHz and above but is poorer on 7MHz and below. A 220µH choke, 228-292 (curve not shown) has a typical SRF near 7MHz.

If you use chokes of a different construction, their SRF is likely to be different, even for the same inductance. The SRF of a choke can be checked with a dip oscillator provided the choke is not of a screened construction. Alternatively, you could wind a choke on a ferrite bead such as FX1115 [available from Cirkit – *Ed*] or RS components No 238-283 (in packs of 50!). For HF, at least 15 turns of fine enamelled copper wire are recommended (38 SWG, 0.15mm) on a ferrite bead. The characteristics of 15 turns on an RS 238-283 are shown in Fig 2 curve 'C'. It is reasonably effective at 14MHz and above but for the lower HF bands, the 470µH choke mentioned above gives better results.

MIND HOW YOU TUNE

VHF POWER AMPLIFIERS which use discrete bipolar transistors as opposed to 'block' modules can sometimes produce 'frequency halving' if mis-tuned. **Fig 3** shows the spectrum of a 1W 2m transceiver with its PA correctly tuned. The second harmonic is at least 60dB below the fundamental and the third harmonic is at an even lower level.

Fig 4 shows the frequency spectrum of the same transceiver when the PA transistor had been replaced but the trimmer capacitors associated with the PA stage had not been correctly tuned. There is a major spurious output at 72.5MHz, which is half the fundamental frequency, and a larger spurious output at 217.5MHz which is only 20dB below the fundamental. This is the third harmonic of half the fundamental! This transceiver does not use frequency multipliers; the 72.5MHz is generated purely by frequency halving in the PA.

Another example of frequency halving which we have come across was with an ex-PMR (Private Mobile Radio) transceiver used for packet radio on 70.325MHz. A mis-tuned PA produced spurious outputs on 35.1625MHz and 105.4875MHz. We wouldn't wish to discourage anyone from modifying inexpensive surplus ex-PMR transceivers for use on amateur bands but it is important to check for spurious outputs, not only at two and three times the fundamental frequency, but also at half and 1.5 times. It is also advisable to check that the PA is tuned well away from the point of frequency halving. This is because if it is just on the borderline, it could work correctly into a matched 50Ω load but misbehave when feeding an imperfectly matched antenna or when it warms up.

BRIEF CASE

FOR MR P NUTKINS, G0HET, of Dorset who missed his 80 metre Monday evening sked for the third week running due to S9 + 10dB of arcing noise from overhead power lines, self-help has proved invaluable.

On contacting the SWEB, to see if anything could be done, G0HET was told to contact the DTI. Being an owner of a PMR system which was also affected by 'the noise', he felt justified in doing so as the PMR service is 'protected' from interference whereas the amateur service is not. The DTI (RIS) man arrived but could not locate the problem.

Our amateur then began the job of tracking down the noise himself armed with an airband/MW receiver with 'S' meter. Apart from finding that higher readings on the meter were obtained from all poles fitted with transformers, no conclusions were reached. The interference was also received on the car radio at the HF end of the MW band (1.5MHz and above). Driving up and down the lanes close to the power lines, a point was reached where the lines crossed, here the noise was strongest but by this time it was getting dark.

Next day, clutching the airband radio plus signal strength meter, G0HET began tramping across fields under the power lines, with the permission of the farmer who watched the goings-on with interest. The readings on the meter were the same the whole length of the field so it was back to the drawing board.

G0HET had noticed the noise disappeared when it was raining and reappeared when it stopped. It also faded after a prolonged dry spell. He reasoned this could be due to leakage from the HV cable to the pole being conducted away when wet and having no path to earth when dry. In a desperate attempt to solve the mystery, our intrepid amateur packed his PMR set with speaker and a portable 12V battery into a haversack and clutching a three element 2m FM beam he climbed to the highest point and scanned the horizon.

Eureka! The meter peaked when aimed at one particular pole. On examination, he found the lines were attached to the cross-bar by end-on insulators with a jumper lead under the bar connecting the lines. One line had rotated through 180 degrees causing the jumper lead to be pulled tight against the bar which was therefore at 11kV! Being fitted to a wooden pole, this was 'potentially' dangerous when wet. The next day, the SWEB was contacted and within hours the fault had been fixed and peace reigned on 80 metres.

This seems to confirm the advice given in the August 1993 EMC column which was that it is best to search for QRM on the highest frequency on which it is detectable.

I would like to run 'Brief Case' as a regular feature and as such, I am asking readers to send details of EMC problems which they have encountered and solved. It would help if facts could be stated succinctly as space is limited, but photographs are still welcome.

HELP WITH EMC

ROBIN PAGE-JONES, G3JWI, EMC Committee Chairman has asked me to make a request to members. The RSGB has a successful scheme with EMC Co-ordinators in various parts of the country who offer first class advice by phone. However, some members feel that no-one but an EMC Committee member or even the Chairman himself will suffice in solving their problem. This, needless to say leads to overload at the top end hampering work on urgent 'high level' cases such as those involving the RIS, county councils, solicitors or MPs.

Robin's book, *The Radio Amateur's Guide to EMC* will provide most of the advice you may need. If you have an *RSGB Call Book*, turn to the EMC pages (p 65-70 in the 1993 edition) where basic advice is given. The list of EMC Co-ordinators is on page 70.

If you live in North or South Yorkshire, Hereford and Worcester, Norfolk or Suffolk and feel that you could give EMC advice over the phone to members, please write to G3JWI, QTHR giving details of your background.

SOLICITOR WANTED URGENTLY

THE EMC COMMITTEE Chairman, G3JWI, would like to hear from any radio amateurs who are practising or retired solicitors and who would be prepared to advise the EMC Committee on legal aspects of EMC cases as the need arises. Please write to Robin Page-Jones, G3JWI, QTHR.

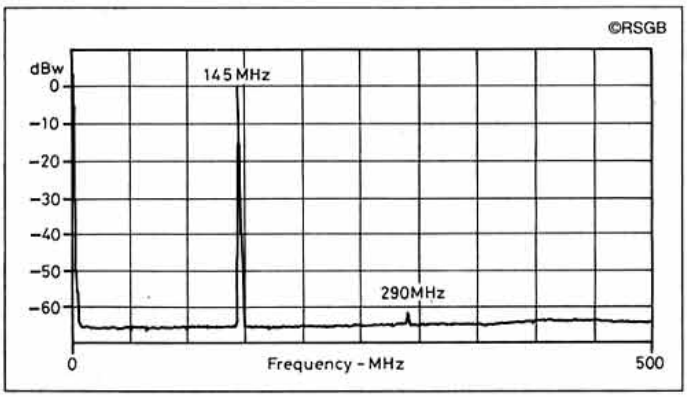


Fig 3: Output of correctly tuned 144MHz PA.

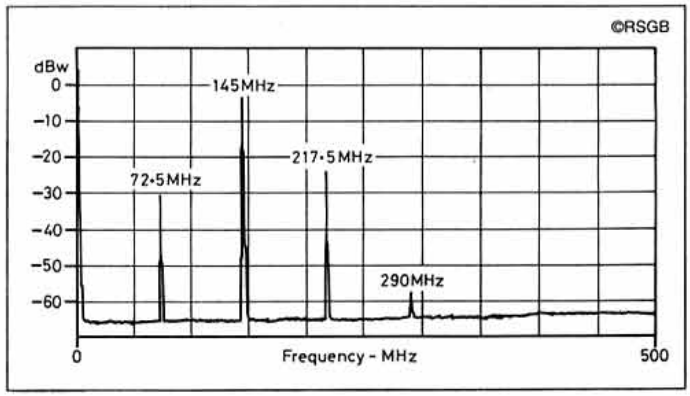
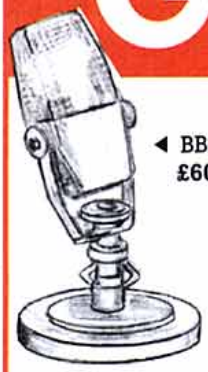


Fig 4: Frequency halving in mis-tuned 144MHz PA.

WANTED!
EARLY RADIO GEAR



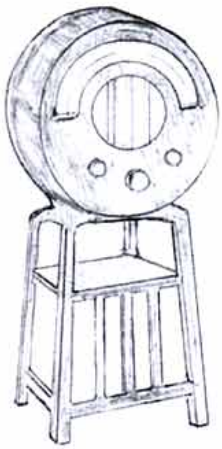
◄ BBC MIKE £600

TOP CASH for W.W.I equipment, 1920s & 1930s domestic wireless, W.W.II spy sets and pre-war television.

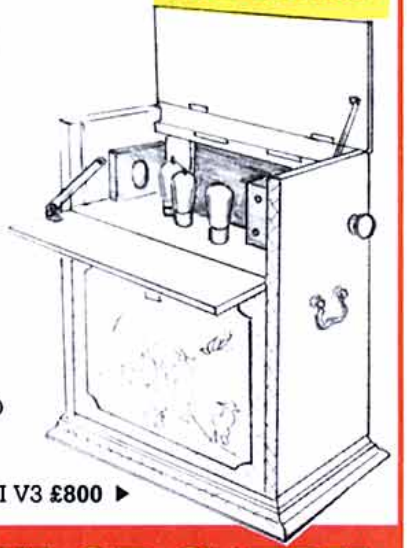
▼ PHILLIPS £300

► RI £600

Call anytime
0202-510400
0850-605-383



▲ EKCO ON STAND £500



MARCONI V3 £800 ►

JIM TAYLOR G4ERU
5 Luther Road, Winton, Bournemouth BH9 1LH

Special 24 Hour Clocks

"Zone View Global Clock"

This rotating World Map Clock shows times in 30 colour differentiated time zones. 24-Hour dial.

10" Dia Quartz **£39** + P&P

"Orbit 24"

24-Hour clocks can be confused with 12-Hour clocks. BUT NOT THIS ONE!

10" Dia. Quartz **£29** + P&P

WRITE, RING OR FAX FOR FULL QUOTE, COLOUR BROCHURE AND MORE DETAILS:

Phone & Fax
010-61 3 439-5825

VISA MasterCard

RESEARCH ENG. CO.
1319 Main Road
Eltham, Vic.
Australia 3095

Hands KITS for RF constructors

TCV cw tcvr 6w for 40, 30, 20, 15
RTX ssb/cw 10w 80, 40, 20, 15 and 6mtrs
+ many other kits for RX, TX and Test

Send a 1st stamp or 2 irc for FREE catalogue

HANDS ELECTRONICS
Tegryn, Llanfyrnach, Dyfed SA35 0BL. Tel: 0239 77427

THE INTERNATIONAL GROUP FOR APT, HRPT, ETC. INNOVATIONS, CONSTRUCTION, HARDWARE, SOFTWARE

REMOTE IMAGING GROUP JOURNAL
PUBLISHED QUARTERLY

For All **WEATHER SATELLITE** *Enthusiasts*

For a Free Information Pack and Membership details send a large SAE to the Membership Secretary, Ray Godden, Rig-Sub, P.O. Box 142, Rickmansworth, Hertfordshire, WD3 4RQ, England

PC SCIENTIFIC SOFTWARE

Would you like to see the best range of low cost technical and scientific public domain and shareware for IBM PC in the UK?

HUGE RANGE includes: PACKET, FAX, RX/TX control, PCB design, Circuit and ANTENNA analysis, QSO logging, CAD ELECTRONIC & MECH engineering, SCIENTIFIC, MATHS & STATS, MEDICAL, PROGRAMMING, SOURCE CODE, DATA, EDUCATION, WINDOWS, BUSINESS and lots more.
Write, phone or fax today for our extensive printed catalogue.

The Public Domain Software Library, Winscombe House, Beacon Road, Crowborough, Sussex TN6 1UL. Tel 0892 663298. Fax 0892 667473

JAYTEE

Toroidal Transformers for 13.8V DC Power Supplies

9T845 16.1 VOLT AT 42 AMPS (PW MARCHWOOD PSU)
8C267 18 VOLT AT 27.8 AMPS (500VA)

Complete standard range of 107 types of ILP Toroidal Transformers and the full range of ILP Audio Amplifier Products

UK DISTRIBUTORS FOR ILP

Write, phone or fax for free Data Pack

Jaytee Electronic Services

143 Reculver Road, Herne Bay, Kent CT6 6PL
Telephone: (0227) 375254 Fax: 0227 365104

Access VISA

A WIDE RANGE CAPACITANCE BRIDGE

continued from page 68

4047 low power monostable/astable) and the switch (a CMOS 4066 quad switch) was mounted on a small piece of Veroboard which was, in turn mounted on the switch which carried the resistors and capacitors of the timing circuit. S2A and B are a pair of microswitches operated by a single push button. The appearance of the panel can be considerably enhanced by a coating of cellulose paint. For this purpose I normally use 'Ford Pearl Grey Metallic' because it covers the scratches. The photograph of the finished instrument shows the use of polar coordinate graph paper for the bridge scale, which simplifies the calibration. The capacitor under test is connected to the terminals (upper right); the range and on-off switches are lower left and right respectively. The bi-colour LED is in the upper left section.

COMPONENTS LIST

The Bridge

VR1	5k linear potentiometer, plastic track (173-754) or cermet type (173-833)
R2	20k 1% metal film
R3	20k 1% metal film
B1	9 volt battery. (PP3 in the original)

Oscillator and Switch

C1	10nF 1% polystyrene
C2	1nF 1% polystyrene
C3	100pF 1% polystyrene
R5	220k 1% metal film 0.25W
R6	22k 1% metal film 0.25W
IC1	CMOS 4066B quad switch (640-620) (SW1 in the bridge, above).
IC2	CMOS 4047B IC (306-651) Monostable/astable used as an astable.
SW2A	D/P switch biased 'Off' (320-635) (SW2B is part of the detector)
B1	9 volt battery. (PP3 in the original). This is the same battery as that in the bridge.

Detector

Resistors all 2% 0.25W

R7	1M5
R8	1M5
R9	10k
R10	10k
R11	2M7
R12	2M7
R13	620R
R14	620R
VR2	10k
C4	100nF
IC3	Harris CA3140 op-amp IC (308-130)D1/D2 Red/green bi-colour LED (590-632)
SW2B	See above, (oscillator section)
B2	9 volt battery. (PP3 in the original) Suitable Battery connectors

The part numbers in brackets are for components ordered from Electromail, PO Box 33, Corby, Northants NN17 9EL

Notes: *The conductive plastic potentiometer has a linearity of ±2% but is expensive at about £11; the cermet one has slightly poorer linearity but is much cheaper.

Electromail supply resistors and small capacitors only in packs of 10. Most components are available from a number of other suppliers.

CALIBRATION

THE BEST WAY TO calibrate the unit is to use close tolerance (say ±1%) capacitors. A graph of the results is then drawn by plotting capacitance against degrees of rotation of the variable resistor. A scale of polar coordinate graph paper (eg Chartwell graph sheet no 7506) is a great help provided a 'professional' finish is not needed. Alternatively, a degree scale can be used with a calibration graph for each range. The scale is linear (**Fig 7**) and it will be seen that the two lowest ranges have an offset zero. This is to be expected and is due to stray capacitance. In fact, the lowest range has its zero at 168° rotation (ie just over half scale!) but it is still useful since the full scale reading is only 60pF. A further consequence of the linearity is that it is possible to use a 10-turn variable resistor and to adjust the switching frequency so that the full scale reading is a multiple or sub-multiple of 1nF. The capacitance can then be read directly. The switching frequency of each range can be measured with a digital frequency meter or with a calibrated oscilloscope.

BRIDGE OPERATION

THE BRIDGE IS VERY simple to use. Just connect the capacitor to the terminals, press the on-off switch and rotate the balancing variable resistor until the colour of the LED changes. This is a sharp change owing to the gain of the op-amp. Since it is battery operated, it may be possible to measure capacitors 'in situ' but this should be attempted with care because the effect of other components may have a serious effect on accuracy.

REFERENCES

[1] M J Gingell, *Electrical Communication*, 1973, 48/21-25.

see also: Technical Topics, *RadCom*, 1973, pp699 & 852.

see also: JR Hey, G3TDZ, *RadCom* 1976, pp656-659.

[2] J Clerk Maxwell, 'Electricity and Magnetism', Article 775, p420, published by Clarendon Press, Oxford, 1892.

[3] Golding and Widdis, *Electrical Measurements*, p69, published by Pitman, London, 1963.

[4] F A Laws, *Electrical Measurements*, pp364-369, McGraw-Hill, New York, 1917.

APPENDIX

The full balance equation for this bridge is:

$$C = \frac{R1}{nR2\ R3}\left[\frac{1 - \dfrac{R1^2}{(R_b + R1 + R3)\,(R2 + R_g + R1)}}{\left\{1 + \dfrac{R1\ R_b}{R\,(R_b + R1 + R3)}\right\}\left\{1 + \dfrac{R1\ R_g}{R3\,(R1 + R2 + R_g)}\right\}}\right]$$

Where:

R_b = internal resistance of the battery

R_g = resistance of the galvanometer or detector. In the case of the op-amp detector described, this is virtually infinite. The derivation of this equation is beyond the scope of this article but is given in detail in [4]. The writer (G8DPS, QTHR) has a copy of this and will be pleased to send a photocopy on receipt of an SASE.

PROOF OF THE APPROXIMATE BALANCE EQUATION

Assumptions (see Fig 2):

(a) R2 is approx equal to R3 and each is much greater than R1.
(b) Resistance of the detector is very large.
(c) The capacitor (C.U.T.) charges and discharges fully during the relevant parts of the switching cycle.
(d) Potentials are measured with reference to junction of the capacitor and R3.

The Capacitor Under Test (C, from here on) charges through R2 to E volts; the charge is C * E coulombs (C in farads, E in volts, all resistors in ohms). It does this N times a second (where N is the switching frequency), therefore the apparent current is N C E which flows through R2. Therefore the voltage across R2 is N C E R2 and the potential at point 'B' is E - (N C E R2).

Now, the potential at the juntion of R1 and R2 is (E R3)/(R1 + R3).

If the bridge is balanced, these are equal, therefore:

E(1 + (N C R2)) = (E R3)/(R1 + R3)

And C = 1/(N R2)(1 - R3/(R1+R3)) = 1/(N R2)(R1/(R1+R3))

If R1 is much less than R3, this reduces to:

C = R1/(N R2 R3). *QED*!

have another beam in order to crack the pile-ups more quickly. On the low bands, it is usually possible to use the 'run' stations' antennas since you will not both be on the same band simultaneously. As usual, anything you can do to improve upon these basic requirements by using big monobanders, or by using more sophisticated low band antennas is always worthwhile. Your signals will be up against the best of the best – it is always interesting in the run-up to the event listening to some of the big expeditions coming on and just checking out their 4-element 80m beam to make sure it's working!

In terms of the station equipment itself – you obviously need a transceiver for the run station, and another for the multiplier station, and preferably linears which are easily capable of running 400W for both – but again, if only one is available, put it on the run station. Most of the modern rigs should be satisfactory, however, some of the rigs produced in the last ten years or so produce a significant amount of broadband transmitter noise, with the effect that, for example, every time the run station goes to transmit on 15m, the mult station gets S9 of white noise right across 10m, and the level of the noise is relatively unaffected by the speech level on the main station. A useful solution to this problem is to insert bandpass filters between the rig and linear which will reduce the amount of noise radiated on the other bands. Another sensible move is to try and place your antennas as far apart as possible. However, sometimes even taking these precautions is insufficient. A few years ago our group was using a new synthesised transceiver on one band, and we had this problem. The only full solution was to replace that rig with an old FT901 which has a narrowband tuned preselector between the driver and PA stages! Having said this, the newest rigs do seem to be improving in this regard, and you just need to be aware of what can happen – it is one area where you never really know what will happen until you try it. My personal advice is to keep a rig or two of the FT901/TS830 generation handy in case you get in trouble!

NETWORKS

To make a multi-single station run smoothly, the mult station has obviously got to know what has been worked by the run station. It is quite possible to devise a paper system to do this, but if you choose this route, make sure that you have enough bodies to man the station! To my mind, a much better option is to use a pair of computers, networked together and running suitable contest software. As far as I am aware, the only package available which will support networking and CQWW is CT by K1EA, although SuperDuper by EI5DI and LOG by G3WGV both support CQWW in a non-networked form. The two computers are linked together by their serial ports, and it means that QSOs made by either the run or the mult station are visible to each other, and each station has a on-line copy of the complete log. It is also possible to send 'talk' messages between the stations, and if extra serial ports are available, the TNC feeding PacketCluster information can be linked into the network as can labour saving devices such as voice keyers etc. For the CW event, this software also offers a keying interface to the rig which sends all the standard messages and dramatically reduces the strain level in CW contests.

Using real-time logging software also has the major advantage of not having to spend hours deciphering handwriting and getting writers' cramp after the contest. In the first major contest which our group did, we made 3,600 QSOs, but never sent an entry in since we did not write-up the log – what a waste – don't let this happen to you!

INCENTIVES

The leading single operator station in the CW event will be awarded the G8KW trophy by the RSGB HFCC, and in previous years, the Chiltern DX Club has awarded plaques to the leading stations in the CW and the SSB events. Certificates are awarded to the leading stations in each country, and in each section – and that means both the all-band sections, and (for the single operator entries) each of the single band options.

HAVE A GO

The contest of the year really is an excellent opportunity to have a great weekend participating in an exciting event, and to work some real DX. Very good luck to you all, and I look forward to seeing more UK entries in the final listings this time next year. You will find more details on the rules in this month's *HF News*.

Sutton and Cheam Radio Society members receiving the Arthur Watts Trophy from RSGB President Peter Chadwick, G3RZP. The award, for winning the Single Operator Section of the RSGB 50MHz Trophy Contest, was presented at this year's VHF convention.

Great Radio Hams of the Past

Reproduced from *Vital Spark*, the newsletter of the Hastings Electronics and Radio Club.

No 13: Hiawatha

Let me tell to you a story
Of the people of the prairie,
Of the Choctaws and
Comanches,
Of the Hurons and Ojibways.
How they spread the word
from hill-tops
With the smoke from many
camp-fires,
How the young brave
Hiawatha
Saw the signals curling
upwards
Wishing winds would blow the
stronger
Making smoke to go the faster
Bringing peoples close
together.
He had heard the talk of white
men
Of the marvels of the Icom,
Of the Yaesu and the
Kenwood,
Wonders of the shining boxes
Making all men into brothers,
Making Japanese the richer.
In the wigwam close beside
him
Minnehaha Laughing Water
Making burgers from the
bison
In the ways of wise
McDonald.
Soon it was that Hiawatha
Trod the footsteps of the
white man
Sent much wampum off to
Matlock
For the host of magic boxes
And the many hidden extras.
While he waited in the night-
time
He did build a mighty tower
Fashioned from the forest
beech-wood
Straighter than the hunter's
arrow,
Higher than the sacred totem.
At the sun of early morning
From the lodges of the mighty
came
The Elders looking, blinking
As they spoke to one another,
"Who has placed this thing
before us
Fashioned from the forest
beech-wood
Straighter than the hunter's
arrow

Higher than the sacred totem?"
Then did answer Hiawatha,
"It is written in the writings
Of the Kenwood and the Yaesu
That a tall tower pointing skywards
Fashioned from the forest beech-wood
Straighter than the hunter's arrow,
Higher than the sacred totem
Shall be built that many peoples
In the lands across the waters
Shall speak peace to one another."
Then The Elders spoke together
In the lodges of the council.
They then said to Hiawatha,
"You have made the giant tower
From the beech-wood pointing skywards
Without the sanction of The Elders,
Without permission of the planners
Or the forms in triplication.
You must make the tower more distant
From the presence of our people
To the land of far-off mountains,
To the never-ending wastelands
So our eyes no more behold it."
So the exiled Hiawatha,
With his loyal Minnehaha,
Took their tower unto the wastelands
Far from the place of the Ojibways,
Where they spoke to many nations,
Friendships formed across the oceans,
Men of many tongues did greet them.
Saddened though was Hiawatha,
For in spite of all these friendships,
Not one word from his own people,
From the braves of the Ojibways,
Men who grew with him as brothers.
He cried aloud to the great Spirit,
Gitche Manito the mighty,
For his comfort and his guidance.
"It is written," said the wise one,
"That he who seeks to bring together
Men of all the many races,
Building towers reaching skywards
With the rhombic and the Yagi,
With the ground-plane and the dipole
Shall be lauded by the nations,
Revered across the many oceans
But sadly, true is this I tell you,
This man's brothers will not love him
And his neighbours will revile him,
Faces will not smile upon him."
Sadly then did Hiawatha
And the lovely Laughing Water
Turn their faces from the Kenwood,
From the Yaesu and the Icom
To the Scrabble and the Ludo
And the burgers made of bison.

Or, to put it another way, radio hams have friends all over the world but none in their own street!

Stan G41TM

RSGB Liaison Officers

NOMINATIONS FOR 1994-1996

THE NOMINATION procedure for RLOs was detailed on page 7 of the August edition of *RadCom*. Valid nominations have been received as shown below. As no more than one valid nomination was received for any post there is no requirement for elections to be held.

It should be noted that the Society's Membership Liaison Committee is authorised by Council to fill vacancies on an 'appointment' basis, and the first list of RLOs for 1994 - 1996 will be announced at the Society's Annual Meeting in December.

ZONE A

Cheshire: D B Glover, G1VJP
Cleveland: C Flanagan, G7NRO
North Humberside: C Reynolds, G8EQZ
West Yorkshire: D W Allan, G0RZP
No nominations were received for Cumbria, Co Durham, Greater Manchester, Isle of Man, Lancashire, Merseyside, Northumbs, Tyne and Wear, S Humberside, S Yorks, N Yorks.

ZONE B

Cambridgeshire: M Brooke, G8HXR
Hereford & Worcester: D Gourley, G0MJY
Leicestershire: D G Harries, G4WYN
Lincolnshire/S Humberside: R Degg, G0JOD
Northants/Warks: D Linnell, G0MJK
Nottinmghamshire: M Lowe, G0NZA
Shropshire: D Whalley, G4EIX
Staffordshire: K Parkes, G3EHM
No nominations were received for Bedfordshire, Derbys, West Midlands.

ZONE C

Essex: M Salmon, G3XVV
No nominations were received for East Sussex, Greater London, Herts, Kent, Norfolk, Suffolk, Surrey, West Sussex.

ZONE D

Berkshire: D Chislett, G4XDU
Buckinghamshire: R Ray, G3NCL
Cornwall & Isles of Scilly: A H Hammett, G3VWK
Devon: D T Hind, G3VNG
Guernsey: B Ayres, GU1HTY
Isle of Wight: D Byrne, G3KPO
Jersey: S W Smith-Gauvin, GJ0JSY
Wiltshire: Mr I Lloyd, G0GRI
No nominations were received for Avon, Dorset, Gloucs, Hants, Oxon, Somerset.

ZONE E

Clwyd: P Higgs, GW4IGF
Dyfed: M T Goodall, GW8ZMU
Gwent: P D Dombrowski, GW1NYO
Mid Glamorgan: D T Jones, GW1SQT
North Gwynedd: D E Roberts, GW0ABL
Powys: P Essery, GW3KFE
South Gwynedd, Arfon & Merioneth: T P Vernalls, GW6IMS
West Glamorgan: E A Hays, GW3RGL
No nominations were received for S Glamorgan.

ZONE F

Antrim: A Henry, GI4CRL
Belfast: G Curry, GI6ATZ
N Ireland (S): J R Ashe, GI8RLE
No nominations were received for Co Armagh, Co Londonderry.

ZONE G

Central: B Waddell, GM4XQJ
Orkney: G Christie, GM7GMC
No nominations were received for Borders, Fife, Grampian, Lothian, Shetland, Strathclyde, Tayside.

CONTEST CLASSIFIED

All rules should be read in conjunction with the General Rules published in *Contest Classified* January 1993

HF RESULTS

COMMONWEALTH CONTEST 1993

In the States, the phenomenon of 'guest operators' at contest stations is very common: a skilled operator is matched with a suitable host station, either in his home country or by travelling overseas. Gnerally, BERU operators prefer to stay at home but last year's UK leader Dennis Andrews, G3MXJ, went to Malta and used 9H1EL's station, winning the Senior Rose Bowl by a large margin over last year's winner, John Sluymer, VE3EJ. From the south Atlantic Steve Hodgson, ZD8LII, moved up one position from last year to come third. G4BWP made full use of his own facilities to win the Colonel Thomas Rose Bowl.

Overall, scores are comparable with last year's but there is a very noticeable shift away from 28MHz towards 7MHz and 3.5MHz. For the next four/five years extra attention will have to be paid to LF antennas, while during the contest an eye must still be kept on 21 and 28MHz for those all-too-brief openings. For the casual UK operator, BERU provides an excellent opportunity for QSOs with VK, ZL and other Commonwealth DX on all bands, but particularly on LF. Forget the half-sized G5RV, instead put up a 33ft vertical with a few radials and contacts on Sunday morning with the antipodes are virtually guaranteed in the bottom 10kHz of 40 metres.

Sadly, the 1993 event was overshadowed by the untimely death of Al Slater, G3FXB, a few months beforehand. Al had made this contest his own, and had chalked up 18 wins including an outright win in 1990 when he guested at ZC4ESB. Much of his success was due to extensive knowledge of propagation built up over the years, giving the ability to exploit brief band openings which yield those vital additional bonus points. BERU was undoubtedly the RSGB contest closest to his heart and the best memorial amateurs throughout the Commonwealth can give to his memory is to continue to give support to this unique event.

Posn		Call	80	40	20	15	10	Total
1	*	9H1EL	915	1735	2225	2170	830	7875
2	*	VE3EJ	575	1790	1795	1840	1050	7050
3	*	ZD8LII	215	1170	2220	2025	1315	6945
4	*	VK2BJ	755	1380	2130	1855	675	6795
5		ZD8VJ	25	845	2025	1785	1300	5980
6		VK2APK	805	1375	2250	955	175	5560
7	#	G4BWP	730	1555	1620	1185	455	5545
8	*	VE2ZP	490	1265	1820	1180	760	5515
9	*	VE7CC	935	1270	1315	1035	850	5405
10		G4BUO	795	1110	1495	90	480	5370
11	*	VK4XA	595	950	1705	1170	405	4825
12	*	ZL1MH	515	1195	1255	1230	615	4810
13		VK2AYD	625	1155	1455	1020	425	4680
14		G3OZF	430	1320	1300	1210	355	4615
15	*	ZL2BR	525	1035	1320	1035	640	4460
16	*	VK8AV	345	700	1750	1245	290	4330
17		VE3VHB	240	1080	1105	1115	750	4290
18		G3TBK	225	1115	1265	1185	330	4120
19		G0IVZ	300	1175	1190	1035	400	4100
20	*	VK5GZ	545	760	1210	1020	375	3910
21		G3SYM	250	1090	1320	985	250	3895
22		G3PJT	325	1045	1220	1040	200	3830
23		VE7UZ	400	1080	805	920	555	3760
24	*	9J2BO	185	515	1270	890	865	3725
25	*	ZB2EO		760	1330	1275	250	3615
26	*	VK7TS	575	850	1050	680	50	3205
27	*	VU2PTT	220	945	1005	735	200	3105
28		VK5BN	465	715	755	960	175	3070
29		VE3ST	230	885	895	890	150	3050
30		G3GLL	275	530	1075	930	200	3010
31	*	VK3ZC	710	965	815	435	75	3000
32		VK2BQQ	355	825	1035	630	75	2920
33		G2QT	200	785	1025	670	200	2880
34		G3UFY	75	505	975	990	325	2870
35		G3IAF	75	690	910	815	250	2740
36		VK4OD	500	485	935	580	175	2675
37	*	VE6BF	25	855	645	785	350	2660
38		VK2EL	75	680	1005	640	225	2625
39		VK2DID	450	730	785	630		2595
40		VE3JKZ		50	1015	980	425	2470
41		G3IGW	75	760	755	595	250	2435
42		G4WYG	175	175	995	800	225	2370
43		VK3DQ	490	695	655	455	50	2345
44		VK4XW	505	670	780	345	25	2325
45		G3BPM	175	200	900	660	200	2135
46		VK3XB	405	460	760	455		2080
47		G0HSD	25	375	595	885	150	2030
48		G3KMQ		505	630	620	225	1980
49		G5MY	100	660	525	480	200	1965
50		VK4LV		335	680	725	200	1960
51		VK3BXA	225	640	665	315	75	1920
52		G3GC	75	275	830	505	200	1885
53		G0IDE	100	500	600	430	225	1855
54		GW3HGJ	100	400	650	500	200	1850
55		G3JKY		275	915	605	50	1845
56		G3NAN	25	300	735	480	275	1815
		VE1EP	195	480	395	340	405	1815
58		G3KSH	100	325	725	465	175	1790
59		G3SEP	50	375	610	550	200	1785
60		GW3JI	125	425	600	475	150	1775
		G3EBH		175	860	615	125	1775
62		G3DEF	50	300	725	575	100	1750
63		G3MPB	100	490	275	750	125	1740
64		G3VDL	50	275	655	450	275	1705
65		G2HLU	50	225	585	680	150	1690
66		GM3CIX	50	430	555	540	75	1650
67		G3VW	50	150	760	460	225	1645
68		G3SWH	50	100	710	550	225	1635
69	*	5Z4FN	50	225	335	470	510	1620
70		G3JJG	25	150	700	590	125	1590
71		G3ESF	50	200	635	465	175	1525
72		G0LZL	50	175	600	425	200	1450
		ZL1HV	225	595	410	220		1450
74		G3HKO	100	300	550	415	75	1440
75		G2BLA	25	325	450	440	175	1415
76		G3KNU		50	735	420	200	1405
77		G2AFV	50	225	450	360	225	1310
78	*	VO1CA	340	305	235	405		1285
79		G4CZB		225	450	380	225	1280
		VK7RY	540	330	285	125		1280
81		G3HAL	50	275	475	360	100	1260
82		G3WRR		250	500	335	125	1210
83		VE1JMM	80	250	400	420	25	1175
84		G3NKS	75	200	500	175	75	1025
85		VE1AGB	125	225	375	260		985
86		G3VDH	50	100	475	250	75	950
87		VK3KS		405	355	125		885
88		G3AWR		35	370	330	145	880
89		VE3NXB		125	200	400	150	875
90		VU2JOS		415	325	125		865
91		VE3YBH		150	125	280	275	830
92		G3GMS		150	375	200	50	775
93		VK3XF	230	180	360			770
94		VK6AZY			490	275		765
95		G3ZDW		255	200	200	100	725
96		GW3SB		25	325	285	75	710
97		G3VYI		125	530	50		705
98		VK3AMD		385		225		610
99		G3GMM		50	275	175	100	600
		G8QZ	25	100	300	175		600
101		G3ILO	75	25	250	125	100	575
102		VE2EM/CY3			475		50	525
103		VK2SU		275	125			400
104		G4ZYF			100	150	50	300

SINGLE-BAND ENTRIES
7MHZ

1	*	VK2ETM	1170
2		ZL4GV	1135
3		VK3APN	1060
4	*	GW4HBX	615

14MHZ

1	*	ZL2VS	2040
2		VK8HA	1545
3		VK4TT	1420
4		VK5AGX	1120
5		VK3IY	240

21MHZ

1	*	G4IQM	625
2		G3HQX	545
3	*	VU2UR	900

28MHZ

1	*	VE3HX	970
2		Z23JO	790
3	*	G3KSK	225

There were no entries for the Receiving Contest.

\# Col. Thomas Rose Bowl
* Certificate Winner

Checklogs gratefully acknowledged from: ONL-383 (SWL), G4ZMF, G3LIK, VE3HX, VK6LW, ZL3GQ, ZL6A.

LF CUMULATIVES (1.8MHZ)

(The full report and tabulations for 3.5MHz, 7MHz and the combined event will be published in a subsequent issue when they become available from HFCC.)

Posn		Call	4/1	12/1	20/1	28/1	5/2	Total
1	*	G0IVZ	264	ck	215	252	ck	731
2		G3NKC	-	-	218	261	207	686
3		G3HEJ	230	ck	ck	195	222	647
4		G4OGB	207	ck	198	201	ck	606
5		GW3JSV	ck	ck	194	200	191	585
6		G3RSD	-	ck	178	192	201	571
7		G3YAJ	185	ck	195	ck	165	545
8	=	G4ENA	208	ck	184	141	-	533
		GM0MYV	207	ck	162	ck	164	533
10		G2HLU	ck	171	ck	179	174	524
11		G0JQN	171	ck	178	170	ck	519
12		G3KNU	168	ck	153	174	ck	495
13		GM4SID	147	128	-	210	-	485
14		G3ZGC	158	ck	168	ck	153	479
15		G3BPM	179	129	-	169	-	477
16		G4RCG	ck	ck	159	157	143	459
17		GW4HBK	149	-	143	156	-	448
18		G3HQH	159	ck	156	121	ck	436
19		G3GLL	98	-	-	186	150	434
20		G3AWR	ck	ck	141	147	138	426
21		G3NEO	125	-	ck	137	156	418
22		GW3JI	ck	ck	128	129	138	395
23		G0LZL	117	-	-	114	152	383
24		G3ZBU	ck	ck	137	126	119	382
25		G3LIK	128	ck	130	119	ck	377
26		G0ADH	ck	ck	117	117	134	368
27		G3JSR	ck	ck	141	91	127	359
28		G0ORY	81	ck	135	ck	138	354
29		G4BUO	144	ck	86	120	ck	350
30		G0AMY	130	103	-	ck	112	345
31		G3GMS	ck	-	126	102	105	333
32		GM3UM	105	ck	-	111	116	332
33		GW3SB	108	-	-	119	98	325
34		G3GMM	101	ck	127	ck	83	311
35		G3VNG	33	-	130	-	120	283
36		G0LKX	ck	67	98	-	105	270
37		G0AIZ	76	74	-	94	ck	244
-		LA1IE	75	ck	57	88	-	220
38		GW0KZW	ck	70	77	ck	70	217
39		G0HZG	ck	-	31	89	88	208
40		G3DPX	-	-	-	87	112	199
41		G3SQX	-	-	120	-	-	120
42		G4ARI	95	-	-	-	-	95
43		G0NID	-	-	19	21	37	77
44		G6QQ	1	12	28	-	-	41
45		GI4SRQ	-	-	29	-	-	29

Checklogs gratefully acknowledged from G0KZO and G3MCX
* Certificate of Merit

HF RULES

COMMONWEALTH CONTEST 1994

1. General: This contest is intended to promote contacts between stations in the British Commonwealth and Mandated Territories. Intending UK entrants are advised to study the General Rules for RSGB HF Contests, published in January *RadCom*, which apply to this event. *Overseas entrants especially are requested to note the address to which logs must be sent.*

2. Eligible entrants: British Isles - Class A licence holders, who must be members of RSGB. **Overseas** - Licensed Radio Amateurs within the British Commonwealth or British Mandated Territories.

Single-operator entries only will be accepted and entrants may not receive any assistance whatsoever during the contest, including the use of spotting nets, packet clusters or other assistance in finding new bonuses. Entries will not be accepted from Headquarters stations, nor from stations using GB or other special event callsigns or operating maritime or aeronautical mobile.

3. When: 1200GMT Saturday 12 March 1994 to 1200GMT Sunday 13 March 1994.

4. Sections:

(a) Multi-band

(b) Single-band

Single-band entrants should claim points for contacts made on one band only, but are requested to submit details of QSOs made on other bands, for adjudication purposes. Multi-band entries will not be eligible for single-band awards.

5. Frequencies/Mode: CW only in the 3.5, 7, 14, 21 & 28MHz bands. Entrants should operate in the lower 30kHz of each band, except when contacting Novice stations operating above 21030 and 28030kHz. Crossband contacts will not count for points or bonuses.

6. Contest Exchange: RST and serial number, commencing with 001.

7. Scoring: Contacts may be made for points with any station using a British Commonwealth prefix (see accompanying list) except those within the entrant's own call area. Note that for this contest, the entire UK counts as *one* call area, and therefore UK stations may not work each other for points. Each completed contact scores 5 points, with a bonus of 20 points for each of the first three contacts with each Commonwealth Call Area, on each band.

8. 'Headquarters' Stations: A number of Commonwealth Society HQ stations (although not eligible as entrants) are expected to be active during the contest and will send 'HQ' after their serial number, to identify themselves. Every HQ station counts as an additional call area (and therefore attracts the 20-point bonus) and entrants may contact their own HQ station for points and bonuses.

9. Logs: Overseas entrants are welcome to use log sheets to the format specified by their national society. UK entrants are referred to the General Rules. **Separate logs and lists of bonuses claimed are required for each band.**

Duplicate contacts must be clearly marked and not claimed for points. Each unmarked duplicate contact found for which points have been claimed will result in the deduction of 55 points. Entries containing more than 5 such duplicates will be liable to disqualification. Entrants making more than 80 QSOs are requested to include a checklist of the callsigns appearing in the log, sorted into alphabetical order and with either the serial number sent or the time of contact beside the callsign.

Each entry must be accompanied by a cover sheet (HFC2 or equivalent) indicating the section entered and the scores claimed on each band (also don't forget details of equipment, your correspond-

ence address and any interesting photographs for publication!).

10. Address for logs: RSGB HF Contests Committee, c/o S V KNOWLES, G3UFY, 77 Bensham Manor Road, Thornton Heath, Surrey CR7 7AF, ENGLAND.

11. Closing Date for Logs: Logs should be posted to *arrive* before 17 April 1994. Overseas entrants are advised to forward their logs by Air Mail, as late entries may be treated as checklogs.

12. Awards:

(a) Multi-band - The Senior Rose Bowl will be awarded to the overall leader, and the runner-up will be awarded the Junior Rose Bowl. The Col. Thomas Rose Bowl will be awarded to the highest-placed UK station. Certificates of Merit will be awarded to the third-placed entrant overall, and to the leading station in each Call Area.

(b) Single-band - Certificates of Merit will be awarded to the leading Overseas and UK entrants on each band.

RECEIVING CONTEST

Rules as for the transmitting contest except where specified below.

2. Eligible entrants: British Isles - RSGB members only. **Overseas -** all SWLs in the British Commonwealth or Mandated Territories.

Holders of transmitting licences for frequencies only above 30MHz may enter the receiving section.

7 Scoring: To count for points, stations heard must be outside the entrant's Call Area, and in Contest QSO. CQ or TEST calls, non-contest contacts and stations within the entrants call area may not be claimed for points. Scoring and bonuses as for transmitting contest.

9 Logs: Columns to be headed: time GMT; callsign of station heard; report/serial number sent by that station; callsign of station being worked; bonus points; points claimed.

NOTE. In the column headed 'station being worked' the same callsign may only appear once in every three contacts. If both stations in contact are heard, they may both be logged separately as 'Station Heard'.

12. Awards: The overall winner will be awarded the Receiving Rose Bowl. Certificates of Merit will be awarded to the overall runner-up and to the leading entrant in each continent.

HF CONTESTS CALENDAR

2/3 Oct	*VK-ZL SSB*
3 Oct	21/28MHz Telephony (Apr93) (note date changed)
9/10 Oct	*VK-ZL CW (Oct 93,p16)*
17 Oct	21/28MHz CW *(May 93)*
30/31 Oct	*COWW DX SSB (Oct 93,p16)*
1/7 Nov	*HA-QRP*
13 Nov	Club Calls (CCC) *(Aug 93)*
12/14 Nov	*JARL Int'l DX SSB*
13/14 Nov	*WAE RTTY*
14 Nov	*OK DX (Mixed)*
20/21 Nov	2nd 1.8MHz CW *(Aug 93)*
20/21 Nov	*All Austria CW*
27/28 Nov	*COWW DX (CW)*
4/5 Dec	*ARRL 160m*
12 Dec	*ARRL 10m*
1994	
Jan/Feb	LF Cumulatives
7/9 Jan	*JA International DX CW (LF Bands)*
9 Jan	AFS (CW)
15 Jan	AFS (SSB)
15/16 Jan	*HA DX CW*
15/16 Jan	*AGCW-DL QRP*
29/30 Jan	*CQ WW 160m (CW)*
29/30 Jan	*UBA SSB*
29/30 Jan	*REF CW*
12/13 Feb	1st 1.8MHz CW *(Aug 93)*
12/13 Feb	*PACC*
19/20 Feb	*ARRL CW*
25/27 Feb	*CQ WW 160m (SSB)*
26/27 Feb	7MHz DX *(Sept 93)*
26/27 Feb	*REF SSB*
26/27 Feb	*UBA*
5/6 Mar	*ARRL SSB*
12/13 Mar	Commonwealth *(Oct 93)*
19/20 Mar	*Bermuda*
19/21 Mar	BARTG Spring RTTY
26/27 Mar	*WPX SSB*
2/3 Apr	*SP-DX SSB*
3 Apr	ROPOCO-1
8/10 Apr	*JA International DX CW (HF Bands)*
17 Apr	Low Power

COMMONWEALTH CONTEST 1994 CALL AREAS

The following call areas are recognised for the purpose of scoring in the Commonwealth Contest 1994:

A2	Botswana
A3	Kingdom of Tonga
AP	Pakistan
C2	Nauru
C5	Gambia
C6	Bahamas
CY9	St Paul Island
CY0	Sable Island
G,GB, GD,GI, GJ,GM, GU,GW	United Kingdom (all one area)
H4	Solomon Is
J3	Grenada
J6	St Lucia
J7	Dominica
J8	St Vincent
P2	Papua New Guinea
S2	Bangladesh
S7	Seychelles
T2	Tuvalu
T30	W Kiribati
T31	C Kiribati
T32	E Kiribati
T33	Banaba
V2	Antigua, Barbuda
V3	Belize
V4	St Kitts, Nevis
V5	Namibia
V8	Brunei
VE1	Maritime Provinces
VE2	Quebec
VE3	Ontario
VE4	Manitoba
VE5	Saskatchewan
VE6	Alberta
VE7	British Columbia
VE8	North West Territories
VK1	Australian Capital Territory
VK2	New South Wales
VK3	Victoria
VK4	Queensland
VK5	South Australia
VK6	Western Australia
VK7	Tasmania
VK8	Northern Territory
VK9C	Cocos (Keeling) Island
VK9L	Lord Howe Is.
VK9M	Mellish Reef
VK9N	Norfolk Is
VK9W	Willis Island
VK9X	Christmas Is
VK0	Heard Is
VK0	Macquarie Is
VK0	Antarctica
VO1	Newfoundland
VO2	Labrador
VP2E	Anguilla
VP2M	Montserrat
VP2V	British Virgin Is
VP5	Turks & Caicos
VP8	Falkland Is
VP8	S Georgia
VP8	S Sandwich Is
VP8	S Shetland Is
VP8	S Orkney Is
VP8	Antarctica
VP9	Bermuda
VQ9	Chagos
VR6	Pitcairn Is
VS6/ VR2	Hong Kong
VU	India
VU4	Andaman & Nicobar Is
VU7	Laccadives
VY1	Yukon
YJ	Vanuatu
Z2	Zimbabwe
ZB2	Gibraltar
ZC4	Cyprus (Sovereign Bases)
ZD7	St Helena
ZD8	Ascension Is
ZD9	Tristan da Cunha, Gough Is
ZF	Cayman Is
ZK1	North Cook Is
ZK1	South Cook Is
ZK2	Niue
ZK3	Tokelau
ZL0 or /ZL	New Zealand Reciprocal Calls
ZL1	New Zealand
ZL2	New Zealand
ZL3	New Zealand
ZL4	New Zealand
ZL5	Antarctica
ZL7	Chatham Is
ZL8	Kermadec Is
ZL9	Auckland & Campbell Is
3B6/7	Agalega & St Brandon
3B8	Mauritius
3B9	Rodriguez Is
3DA	Swaziland
4S	Sri Lanka
5B4	Cyprus
5H	Tanzania
5N	Nigeria
5W	Western Samoa
5X	Uganda
5Z	Kenya
6Y	Jamaica
7P	Lesotho
7Q	Malawi
8P	Barbados
8Q	Maldives
8R	Guyana
9G	Ghana
9H	Malta
9J	Zambia
9L	Sierra Leone
9M2	W Malaysia
9M6/ 9M8	E Malaysia
9V	Singapore
9Y	Trinidad & Tobago

GB5CC RSGB HQ Station + Various other Commonwealth HQ Stations.

VHF RESULTS

1993 144MHZ CONTEST

A good turnout for this contest, especially for the 6hr sections. It looks like the short contests or 6hr sections have proved a winner - we will try a few more next year. Some good DX was worked as can be seen from the tables. No real problems with signals, some reports of wide bandwidth, but these were quickly rectified. Some stations lost some good DX because of silly logging errors, they will know who they are by the reduction in claimed multipliers and points! Congratulations to all band leaders and runners-up, and also to the station running 25W or less to a single antenna, G0RRC. Thanks also to those stations who sent in checklogs. *G4DEZ.*

SINGLE OPERATOR FIXED

Psn	Callsign	Points	Loc	QSO	Mult	Pwr	Ant	Best DX	Km
1	GM8ORG	14421	IO74	41	33	80	17	—	—
2	G0SYK	13489	IO81	57	41	50	12	GM4ZUK/P	610
3	G8IFU	5238	IO90	32	27	25	2Q	GM4ZAP/P	476
4	G5UM	2852	IO92	20	23	12	8	GM4ZUK/P	490

SINGLE OPERATOR PORTABLE

1	GW4BVY/P	395070	IO81	473	78	400	3X17	DC7UT	781
2	G8FBG/P	225996	IO91	308	74	400	2X16	GM4YXI	685
3	GM4ZUK/P	211760	IO86	181	80	400	17	GU8NIS	833
4	G8ZQB/P	71431	IO92	180	61	60	10	DL3SBA/P	583
5	G0CLP/P	23306	IO93	86	43	50	8	DB6BX	622
6	G4KDL/P	14154	JO02	79	14	100	9	DJ7OF	599

FOREIGN SECTION

1	PE1EWR	16399	JO11	47	31	10	10	GM4ZAP/P	666
2	PA3FPS	4768	JO22	19	17	—	—	GD4IOM	—

SIX HOUR SECTION

1	G6HKM	77112	JO01	161	51	160	15	DJ7OF	683
2	G4DEZ	27222	JO01	94	39	350	17	GM4ZUK/P	633
3	G0ODQ	25944	IO91	86	47	180	9	GM4ZUK/P	593
4	G4ZDA	24783	JO01	87	33	350	17	DJ2JA	570
5	GW3JXN	24252	IO72	52	47	400	13	GM4ZUK/P	553
6	G7MLB	18278	JO01	84	38	100	9	GI1CET/P	521
7	G8ZRE	17243	IO83	63	43	100	8	GM4ZUK/P	415
8	G0SAH	11910	IO91	102	30	400	14	GD4IOM	396
9	G0ADH	7821	IO91	56	33	50	13	GM4ZUK/P	600
10	G0RRC	7290	JO02	37	30	25	14	GI1CET/P	534
11	G4TJE	3648	JO01	42	24	50	5	GW3JXN	324
12	GM0NXP	3366	IO75	15	18	50	4X11	G8LNC/P	604
13	G0TCD	2806	IO91	32	23	10	7	GM4ZAP/P	434
14	GU4HUY	970	IN89	7	10	15	10	GM4ZAP/P	—

OPEN SECTION

1	G8LNC/P	661752	IO90	623	84	400	4X19	DL8OBU	797
2	G0CDA/P	626226	IO93	594	87	400	4X18	OK1KRY	1142
3	GD4IOM	620782	IO74	518	79	400 2X17	4X9	DB0BIT	890
4	G4DSP/P	583050	JO03	565	78	400 2X16	80 CO	F1JRX	852
5	GM4ZAP/P	554400	IO74	430	90 6X9	400	6X17	DB4ET	893
6	GW0RDI/P	475405	IO82	494	85	400 2X17	4X9	F6AFC	793
7	G2BQY/P	474978	IO91	590	86	400	4X9	DL6AM/P	757
8	G4CRA/P	209385	JO01	357	55	180 1X17	2X14	DL8CMM	765
9	GI1CET/P	205560	IO74	204	72	250	4X11	PA3CNX	759
10	G6CTU/P	201206	IO91	359	74	400	2X17	DK5OZ	826
11	G4BRA/P	200480	IO91	318	70	400	2X17	DG1NEX	769
12	G0SEA/P	144210	IO92	266	55	80	10	FC1PPG	677
13	G4SRS/P	118858	IO81	252	67	80	2X13	DF2VJ	695
14	G4UHF/P	109740	IO91	250	62	100	17	DF2VJ	626
15	G7FDC	77728	IO80	196	56	400	2X12	DF2VJ	760
16	GU8NIS	68992	IN89	106	49	100	14	GM4ZUK/P	932
17	G1MDG/P	62816	IO91	203	52	400	13	DJ2JS/A	539
18	G4FUR/P	43356	IO91	161	52	25	13	—	—
19	G6QM	26708	IO94	89	44	12	4Q	G7FDC	431
20	G6ZTT	11160	IO83	58	36	10	10	GM4ZUK/P	417

RSGB 1993 VHF/UHF CONTESTS CALENDAR

30 Sep	144MHz CW Cumulative (Feb 93)
2 Oct	1296MHz Trophy (Apr 93)
2 Oct	2320MHz Trophy (Apr 93)
2/3 Oct	432MHz-24GHz & IARU Contest. (Apr 93)
5 Oct	1.3/2.3GHz Cumulative (Apr 93)
13 Oct	432MHz Cumulative (Apr 93)
15 Oct	144MHz CW Cumulative
20 Oct	1.3/2.3GHz Cumulative
28 Oct	432 MHz Cumulative
31 Oct	2nd 1296/2320MHz Fixed (Apr 93)
1 Nov	144MHz CW Cumulative
4 Nov	1.3/2.3GHz Cumulative
6/7 Nov	144MHz CW, Marconi/6/24 hr (Apr 93)
12 Nov	432MHz Cumulative
18 Nov	1.3/2.3GHz Cumulative
29 Nov	432MHz Cumulative
5 Dec	144 AFS / Fixed /SWL (Apr 93)
6 Dec	1.3/2.3GHz Cumulative
14 Dec	432MHz Cumulative
26,27,28	
29 Dec	70/144/432MHz Fixed (Apr 93)

For details of rules for European contests, contact G4PIQ, QTHR.

DIRECTION FINDING

RESULTS OF SLADE HF QUALIFYING EVENT

Bridgenorth, on the Kidderminster and Wyre Forest map was chosen for this event, with sixteen teams ready for the first transmission at 1320.

Both hidden stations were more than 20km south, with bearings passing through the Wyre Forest.

Station A was located in woodland at Abberley, east of Stourport-on-Severn. Station B was located on a wooded hillside near the village of Neen Sollars, a long way on foot, with a steep, slippery climb to find the transmitter.

The lack of cover did not seem to spoil the competitors' fun, with many finding out how fit they really were.

Pos	Name	Club	Time of Arrival at Transmitters A	B
1	B Bristow	Mid Thames	1500	1429
2	A Simmons	Mid Thames	1500.30	1430
3	D Holland	South Manchester	1504	1437
4	C Wells	Mid Thames	1443	1512
5	C Boyce	Mid Thames	1444	1515
6	J Hall	Ripon	1431	1524
7	G Wheriham	Coventry	1525	1501
8	G Foster	Mid Thames	1525.30	15.01
9	C Merry	Dartford Heath	1536	1436
10	P Clark	Torbay	1539	1500
11	G Nicholls	Banbury	1543	1453
12	P Tyler	Mid Thames	1544	1524
13	M Standen	Mid Thames	1553	1530
14	A Collett	Chelmsford	1556	1500
15	T Gage	Mid Thames	1621	1515
16	R Gray	Mid Thames	1501	-

Brian Bristow and Alan Simmons qualified for the National Final in September.

ERIC MOLLART MEMORIAL TROPHY

Date: 23 October 1993

Map: 175

Assembly: 1900 for start at 1930GMT

Location: Lane End Car Park

Competitors requiring supper should notify Min Standon, tel: 0734 723504 no later than 16 October.

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

NORTH WALES RADIO RALLY

AND ELECTRONICS FAIR

7th two day event to be held in North Wales at the

ABERCONWAY CONFERENCE CENTRE, LLANDUDNO

on

Saturday/Sunday, 6th & 7th Nov 1993
10.00am-4.30pm

Bring and Buy at ground floor level in the new Arcadia Theatre, raffles, snack bars, etc.

188 stalls including RSGB Book Stall, many Club Stands, Computers, Components, Radio Electronics, 27/234MHz, Satellites, Data Transmission, TV and lots more.

Bring the family for the weekend. Ample accommodation at low winter rates. One hour from Manchester via new dual carriageways all the way to rally.

Ample Free Parking. Talk-in on S22 and SU8
Admission £1.00
(Children under 14 free)

TEST EQUIPMENT MAINTENANCE AND TECHNICAL CONSULTANCY

- **Service manuals**
- **Spare parts**
- **Comprehensive repair service including complete instrument refurbishment at highly competitive rates for radio amateurs**

Distributors for:
WAUGH INSTRUMENTS
RAMTEST LTD
KRENZ ELECTRONICS

- We support scientific, commercial and industrial equipment manufactured by over 100 different companies
- New and second-hand test equipment also available at competitive prices
- Components, valves and miscellaneous items

Hesing Technology

Cromwell Chambers, 8 St. John's Street, Huntingdon, Cambs PE18 6DD
Tel: 0480 433156 Fax: 0480 413357

G3TPW 'CobWebb'

The best small antenna for 14, 18, 21, 24 & 28 MHz. See Review June

OMNIDIRECTIONAL. No 20-30dB nulls that normal horizontals have. Talk to ALL the world, without having a rotator.
PURE HORIZONTAL POLARISATION. Vast reduction of EMC problems compared with verticals. Choke balun feed. No feeder radiation.
5 FULL SIZE ELEMENTS. No traps, stubs or loading coils, so no losses. Full size dipole performance on all 5 bands. No losses means no power limit (1kw).
PROPER 50Ω MATCH. No compromise. Double gamma tee match gives low SWR resonance on all 5 bands. PL259 plug fitted on short lead.
SMALL SIZE & WEIGHT. Only 8 foot square (2.5 metres) and under 6kg. No need for tower or heavy mast. U bolt fixing to vertical pole (2¼in max).
FIBREGLASS CONSTRUCTION. No corrosion or metal fatigue. 100 mph tested.
SIMPLE ASSEMBLY. All holes pre-drilled. All elements pre-cut. No pruning.
MANY TESTIMONIALS — Just ask anybody who has one!
LOW PRICE. Still only £149 + £8 p&p (GB & NI) direct from the designers.

For more information call or write

SRW COMMUNICATIONS LTD
Astrid House, The Green
Swinton, Malton, N. Yorks YO17 0SY
Tel Malton (0653) 697513

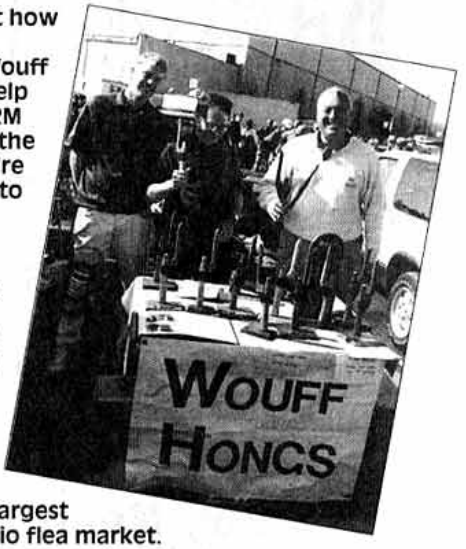
Access VISA

BOOK NOW

Come Fly With Practical Wireless To The 1994 Dayton HamVention!

Find out just how the famous American 'Wouff Hong' can help eliminate QRM and QRN on the bands. They're guaranteed to work!

And, by travelling to the HamVention you too can really get down to finding many bargains in the world's largest amateur radio flea market.



Join the **Practical Wireless** party, led by Editor Rob Mannion G3XFD when we fly out from Gatwick on a scheduled Delta Airlines flight on Monday April 25 1994 direct to Cincinatti. From there our private coach will take us direct to the Holiday Inn in Dayton.

We'll be staying for a week, and there'll be several day trips by coach, including a day at the amazing United States Air Force Museum just outside Dayton. There's lots for the whole family to do, and if you're keen on shopping.....make sure you bring an extra luggage trolley!

Book your seat on the **PW** HamVention holiday for only £630 per person sharing a twin-bedded room. Single rooms are available at a further cost of £205. The price includes return flight, meals on the aircraft, transfer, seven nights Hotel accommodation, two day excursions by coach and admission ticket to the HamVention.

The **PW** party returns home on Monday May 2, arriving at Gatwick on the morning of May 3. See the largest amateur radio gathering in the world, come fly with **Practical Wireless** to Dayton HamVention 1994!

Although Rob Mannion G3XFD is leading the party, the complete holiday is being organised by the Bristol based professional tour operator RCT International. Annette Oxley at RCT is waiting for your enquiry and will send you a full itinerary and booking form. Don't delay, send away today and fly with **PW** to the greatest amateur radio adventure of 1994!

I am interested in joining the **Practical Wireless** 1994 Dayton Ham Vention Holiday, please send me further details.

Name: _____

Address: _____

_____

_____

How many seats required: _____

To Annette Oxley
Practical Wireless 1994
Ham Vention Holiday
RCT International
44 College Green
Bristol BS1 5SH
Tel. (0272) 230933,
Fax. (0272) 226912

ANNIVERSARY BARGAINS!

We are 10 years old this year and to celebrate we are offering unrepeatable bargains on our most desirable products. For example:

FOR BBC COMPUTERS:
RX-8 8-mode receive system **£100 off**
GX-2 FAX/SSTV transceive system **£50 off**

These and other amazing offers are available during **October and November ONLY**, so

Buy Now!

Full information available on everything. Please ask.

technical software

Fron, Upper Llandwrog, Caernarfon LL54 7RF
Tel: 0286 881886

HERE IT IS! **HERE IT IS!**

Advanced Antennas & Ancillaries Ltd

YES! Two magnetic loop antennas for the price of one! 80 to 10 continuous. No TVI. No BCI. Used worldwide by various civilian and military organisations. **ONLY £399.50** plus £20 p&p.

NOW for the long awaited good news! The ARC-1 is our new fully automatic magnetic loop controller. Contains a visual analog meter for SWR and can be used on any DC motor driven capacitor — as in our loops or your own home brew loop. Introductory offer **ONLY £149.50** plus £5 p&p.

ALSO! Our ALL BAND VFA vertical antenna. Up to 2KW all bands 160 to 10. Use it mobile, on holiday, field day or even as main antenna. **ONLY £75** plus £5 p&p!

MORE NEW PRODUCTS!

For info on above antennas send large SAE. To order just phone with your plastic friend!

Remember you've tried the rest — this is the best!

SEE US AT LEICESTER

We also make Baluns, ATUs, the world famous SPC300/3000D.

Tel: 0948 75666
Fax: 0948 75668

AA&A Ltd
Sycamore House
Northwood, Wem
Shropshire SY4 5NN

THE KITS WITH ALL THE BITS!

Guaranteed complete to the last nut!

COMPACT 80m CW QRP Tx/Rx
DTR3 Kit — £87.50 Ready Built — £140.00
★ Stable VFO ★ Sidetone ★ Audio Filter
★ Requires 12/14 VDC ★ Very detailed Instructions ★ Black steel case ★ Printed panel
Please add £4 p&p to all prices

SEE US AT LEICESTER

COMPANION ANTENNA TUNING UNITS
TU1 Kit — £41.25 Ready Built — £57.50
TU2 Kit — £51.00 Ready Built — £72.00
Please add £4 p&p to all prices

★ Large dia. coil ★ High grade capacitor ★ Built in balun ★ Circuits to match your antenna ★ Up to 30 Watts of CW ★ TU2 has sensitive QRP/SWR meter.

Send SAE for brochure or call Alan G4DVW on 0602 382509

LAKE ELECTRONICS
7 Middleton Close, Nuthall, Nottingham NG16 1BX
(callers by appointment only)

PROFESSIONAL

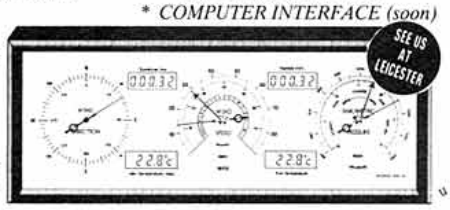
WEATHER MONITORING

Prices from only £199
WIND SPEED & DIRECTION only

Made in England

Features (dependent on model)
* *WIND SPEED & DIRECTION*
* *ELEGANT MAHOGANY CABINET (choice of light or dark)*
* *BAROMETRIC PRESSURE*
* *OUTSIDE TEMPERATURE with MIN & MAX - C & F*
* *HUMIDITY & DEW POINT*
* *RAINFALL*
* *COMPUTER INTERFACE (soon)*
* *SUNSHINE Hrs.*
* *12-24V or MAINS*

Simple Installation



SEE US AT LEICESTER

Send for colour brochure now to -
R & D ELECTRONICS
Tel. (0843) 866662
Fax.(0843) 866663
Beaufort House, Percy Ave, Kingsgate Broadstairs, Kent. CT10 3LB

G6XBH G1RAS G8UUS

R.A.S. (Nottingham)

VISIT YOUR LOCAL EMPORIUM

Large selection of New/Used Equipment on Show
AGENTS FOR:
YAESU • AZDEN • ICOM • KENWOOD • ALINCO
Accessories, Welz Range, Adonis, Mics, Mutek Pre-Amps
Barenco Mast Supports, DRAE Products, BNOS Linears & PSU's
* ERA Microreader & BPS4 Filter, SEM Products *
* Full range of Scanning Receivers *
AERIALS, Tonna, Full Range of Mobile Ants, Jaybeam
BRING YOUR S/H EQUIPMENT IN FOR SALE

SEE US AT LEICESTER

JUST GIVE US A RING

Radio Amateur Supplies

3 Farndon Green, Wollaton Park, Nottingham NG8 1DU
Off Ring Rd., between A52 (Derby Road) & A609 (Ilkeston Road)
Monday: CLOSED Tuesday-Friday 10.00 am to 5.00 pm
Saturday 9.00 am-4.00 pm

Tel: 0602 280267

R.A.S. (Nottingham)

Treat yourself to the bargain priced

Adapt-A-Mast

* Lifts to 25ft * Wall mounting
* Complete with all brackets, cable and winch
* Accepts 2in stub mast * Adaptable to tilt-over
* Available bare steel or hot dip galvanised BS729
* Simple four bolt installation

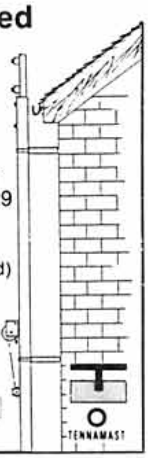
Only £150 (self finish) **£180** (galvanised)

Call 0505 503824
or write to

SEE US AT LEICESTER

TENNAMAST SCOTLAND
81 MAINS ROAD
BEITH, AYRSHIRE KA15 2HT

Also Eurocard



This Month's Book Choice

By Pat Hawker, G3VA

A FIRST CLASS JOB!

The Story of Frank Murphy written and published by Joan Long (Greenleas, 5c Weybourne Road, Sheringham, Norfolk NR26 8HF)

First published 1985, reprinted 1992. 210 + xiv pages, soft covers. Price £8.50 from the author or from specialist radio bookshops.

THIS FASCINATING, non-technical story of Frank Murphy (1889 - 1955) "radio pioneer, furniture designer and industrial idealist" excellently and lovingly written by his daughter has been out of print for several years and this reprint is much to be welcomed. Only a few of us will remember the radical changes to the radio industry that were pioneered in the 1930s by Murphy Radio - "Murphy Dealers are People you can trust" - contemporary style cabinets designed by (Sir) Gordon Russell and his brother Dick Russell - the determined attempts to phase out the 'hire-and-fire' of factory staff resulting from the seasonal nature of receiver sales - the emphasis on good industrial relations reflected in the firm's dealer magazine *Murphy News* (of which Jack Hum, G5UM, was the first assistant editor and later for many years editor).

During the first World War, Frank Murphy had been a Squadron Wireless Officer and later set up a Wireless Training School at Farnborough. After a spell in engineering publicity, he formed Murphy Radio with 'Ted' Power who had been a wartime Navy radio operator and afterwards with McMichael Radio (the firm set up by Leslie McMichael, one of the founders of the RSGB) as chief engineer. Later, in early 1937, following boardroom differences, Frank Murphy abruptly resigned from the company he had founded (and was personally identified with by the public from the prominent use of his photograph in Murphy Radio advertisements in the *Radio Times*). Ted Power became Managing Director and continued with many of the policies so firmly advocated by Frank Murphy.

The firm continued to provide its customers with value for money, technical reliability, and exclusive dealerships. They declined to join the rush to 'all-wave' sets until they were ready with one of the first double-superhets - and the engineering team included Dr (later Professor) R C G Williams and (if I am not mistaken) Les Moxon, G6XN, and a number of others who combined their professional interest in broadcast radio with their interest in amateur radio.

Joan Long has produced an interesting biography rather than a hagiography. Frank Murphy, despite his regard for good industrial relations, must at times have been a difficult man to work with, convinced as he often was that he was right - a benevolent and idealistic dictator.

This Year's Friedrichshafen Trip was a Tremendous Success

AND THERE'S ANOTHER ONE PLANNED FOR 1994

Barnsley and District ARC members show off their RSGB bags in Reims en route for Friedrichshafen.

THIS YEAR, for the first time, the Society has been associated with a trip for members to visit the Ham Radio '93 show at Friedrichshafen, Germany. All of the organisational work was done by members of the Barnsley and District Amateur Radio Club, notably Nicky Cappelluto, G0PVC.

The show really is large with over twenty thousand visitors, a quarter of them from outside Germany, coming to see the 280 exhibitors. According to the event organisers, almost 30% came to see computer exhibits as well as radio.

Next Year's Show

THE COACH trip to Ham Radio 94 is already planned. The cost will be under £300 including travel, two nights at Reims and five nights at Lindau near the exhibition. Accommodation is Bed and Breakfast and the standard cost is for double (not twin) rooms. Singles are available for a small supplement. Insurance is included in the price. Details are available from Nicky Cappelluto, G0PVC, on 0532 555488.

Members' Advertisements

RSGB Members wishing to place an advertisement in this section must use the official form incorporated on the label carrier of Radio Communication. This will prove membership and must be for the current month. No acknowledgment will be sent. Ads not clearly worded, or which do not comply with these conditions will be returned. If an ad is cancelled no refund will be due. An advertisement longer than 60 words will be charged pro rata. Trade or business ads, even from members, will not be accepted. Traders who wish to use this facility must send a signed declaration that the items for sale are part of, or intended for, their own personal amateur station. The RSGB reserves the right to refuse ads, and accepts no responsibility for errors or omissions, or for the quality of goods for sale or exchange. Ads for CB equipment will not be accepted. Each advertisement must be accompanied by the correct remittance, as a credit card payment, cheque or postal order made payable to the Radio Society of Great Britain. Please note that because this is a subsidised service to members, no correspondence can be entered into. Licensed members are asked to use their callsign and QTHR, provided their address in the current edition of the RSGB Amateur Callbook is correct. RS members will have to provide their name and address or telephone number. Please include your town and phone number in the free boxes provided to assist readers. Advertisements will be placed in the first available edition of *RadCom*.

Warning: *Members are advised to ensure that the equipment they intend to purchase is not subject to a current hire purchase agreement. The 'purchase' of goods legally owned by a finance company could result in the 'purchaser' losing both the goods and the cash paid.*

FOR SALE

BRAND NEW VALVES All £1 each. DAF91, DK91, DF96, EB91, EL81/85, ECC81/2/4, EF80/90, EF42/95, EF183/184, EBC90/81, EBF80/90, ECL83/4/5/6, ECH84, EH90, EZ80/81, EY51/86/87, 6AU6, 6BE6, 6AT6, 6K4, 6X4, 6F1, 12AT6, 12K7GT, 12SC7, 12SQ7, 20L1, U191/301, PL36. Plus many others, send SAE with your wants. Several available of each type. Please add £2 Postage. Cheques to:- K. Bailey, 40 Seymour Close, Selly Park, Birmingham, B29 7JD.

DRAKE TR7A with Sherwood 7SP Processor, PSU PS7, very gd condx, ALX7 Board fitted. Offers to G4PIP, QTHR. (Solihull) 0564 793200.

EDDYSTONE 1650 recent Model Racal RA1792 100 channel memories, Auto/manual tuning, scanning, top range, offer. Hammerlalad SP600 vgc: £120 ono. (Southall) 081 813 9193.

GOING QRT. Icom R9000 Receiver 100kHz - 2GHz, current price £5000, NO Offers. Bird Thruline Model 43 Wattmeter, elements for 2-30MHz 250w, 50-125MHz 25w, 100-250MH 25 & 250w, 200-500MHz 25 & 250w, 1.1-1.8GHz 25w, total 7 elements, all as new, in case: £375. PK232 with Fax S/ware for BBC B: £200. Tokyo 70cms Linear with Pre-amp 100w o/p: £175 Includes carriage. G8WYT, QTHR. (Haywards Heath) 0444 450265.

GOING QRT. Yaesu FT736R Tx/Rx for 2m & 70cm, modules for 6m, 23cm fitted: £1450. Tokyo HL90U Linear 70cms, Rx Pre-amp, 80W o/p: £150. Datong Morse Tutor D70: £40. Tono 5000E Terminal. Modes RTTY, Amtor Arq, Fec, Ascii: £400. Epson RX80Ft 9 pin Printer: £65. Tono MR250 Linear 2m, Rx Pre-amp, 200W o/p: £195. Bnos LP filter 6m: £20. Includes carriage. G8WYT, QTHR. (Haywards Heath) 0444 450269.

ICOM 735, PS55 PSU, Tokyo ATU: £895. AEA Isoloop: £200. Two G-Whips: £60. G0IPE. (Surbiton) 081 390 6384.

ICS AMT-3 AMTOR and RTTY Terminal Unit. The easy route to these modes. Needs only a Rx, a dumb VDU and Keyboard. Will also interface to IBM PC. Virtually brand new, but only: £80. Ring Dave, G3LSL after 7pm. (Andover) 0264 889579.

KENWOOD TS450SAT matching PSU + Spkr, SSB filters, Voice unit, CTCSS, little used: £1300 ono. Also Commodore 64 with D/drive, s/ware: £150 ono. (Bolton) 0204 363482.

KENWOOD TS850S, Auto ATU DRU2, 250Hz, 500Hz, 1.8kHz and 2.4kHz Filters, mic, manual and box, immac: £1200. Bob, G3VXJ. (Worthing) 0903 231466.

NEW CUSHCRAFT RV5 Vertical 80-10m 2KW, Offers? Dentron 160m Transverter 100w, suit USA rig without 160m. Offers G3JFC, NOT QTHR. (Sleaford) 0529 413547.

QUIET QTH and a Business General Store on Norfolk Coast. No competition, (only shop here) good takings with good potential. Two bed House attached, overall plot 0.8 Acre, serves 200 homes, nearest town 4 miles. 8 x 6 Shack with 50ft mast. Aerials for 2m, 70cm, 6m good take off across sea: £49,500 leasehold. (House can be purchased). Telephone Ian, (Stalham) 0692 580201.

TRIO TR3500 with h/mic, spare battery, good condx: £120. Also Marconi TF995A Signal Generator: £80 ono. (Hemel Hempstead) 0442 66878.

TRIO TS830S CW filter fitted, VFO 230, Speaker SP230 and manual: £600. G4UYA, QTHR. (Horsham) 0403 261923.

YAESU FT1000, MD1, SP5, DVS-2, BPF1, manuals, all mint, boxed, very little use: £2650. Yaesu FT4700RH VHF/UHF Mobile, mint, boxed: £375. Drake R4C, T4XC, AC PS Sure 526T, manuals: £550. Strumech 60ft, Create 318 HF Beam, Ham 2, VHF/UHF Colinear, Helix, Co-ax. The lot: £675. Early Radio Gear considered part/ex. G4ERU. Jim Taylor, 5 Luther Road, Bournemouth BH9 1LH. (Bournemouth) 0202 510400.

12AVQ by HY-Gain. One owner, gd condx, a real DXer. G3ETU. (Salford) 061 792 9144.

2M LINEAR 400 watt input with 30Amp PSU (MR250W). Bargain: £200. Wanted TS940S HF Rig. 10 to 2m Transverter. (Salisbury) 0722 743270.

2M/70CM 5ft Vertical Antenna, indoor used only: £50.(London) 071 263 2983.

ALINCO DJ560 Dual band H/held, extended receive, tone squelch, DTMF, 20 Mem, dual display, c/w Nicad pack, charger and spkr, mic. All in GWO: £285. Sadelta 10A PSU, gd condx: £35. Ian, G1HQK, QTHR. (March) 0354 660800.

ALTRON 3 ele Mini-Beam AQ6-20, covering 20/15/10 and 6 Metre Bands: £90. (Bristol) 0272 649257.

AMERITRON 811A 600 watts Amp, boxes unopened since o'haul and new tubes by SMC: £625. Wanted Lowe HF225. G3TWE, QTHR. (Gt Yarmouth) 0493 664497.

AMSTRAD PC1640 Computer, 640k ram, twin 5.25 floppy drive, Colour Monitor, Mouse, C/ with MS-DOS 3.2, GEM 2.0, Wordstar Express, Supercalc 3.21. Immac condx: £250 the Lot. G4GTR, QTHR.

ANTENNAS. Butternut HF5B: £130. Cushcraft 3 ele 10 metre Monobander: £40. H/B 2 ele Tribander(as per article in HF Antenna Collection book) Built but not tested: £35. Full size G5RV: £7.50. Half size G5RV: £5. Sagant EL40X 40/80m Trap Dipole: £10. Buyer inspects and collects. G0FOX, QTHR. (Milton Keynes) 0908 667250.

AOR AR1500 Wide Band Scanner, as new: £200 ono. Phone evening only. Keith. (Braintree) 0376 321315.

AR1500 Wide band Scanner WFM, FM, AM & SSB. 6 months old as new c/w charger, case, Nicads, etc: £225. Terry, G4OXD. (Hitchin) 0462 435248.

ATU 2KW, massive variable Capacitor, large roller coaster, reduction drive, counter, SPC Transmatch. Made by Capco predecessor: £60. G4WQO, QTHR. (London) 071 938 2561.

BOXES - Remote Antenna Tuning Unit boxes, ex-GPO, cast aluminium box, near new condx, completely sealed, weatherproof, silica gel container, two cables glands. Outside dimensions 11x7x3.5: £10 each, post extra. John, G3GTJ, QTHR. (Somerset) 0963 24319.

CLARCK SCAM40 40ft pump up Mast, with base kit and electric pump. ICS Fax 2 Weatherfax Navtek RTTY FEC new, see ICS current adverts: £100. Viglen 40/80 D/drive, almost new: £50. Microvitec 14" screen RGB Monitor, immac: £100 ono. (Brighton) 0273 418713.

COLLINS R278RX 225-400MHz: £60. Hammarlund HQ170A Rx Amateur bands: £50. Marconi CR100 Rx: £35. Racal MA7917B Driver Unit: £25. Signal Generators; Marconi TF995/2 1-220MHz AM/FM: £35, TF867 15KHz-30MHz: £15, Airmec 701 30KHz - 30MHz: £20, Advance E1 0.1 - 60MHz: £15. Avo9 Mk2: £20. Marconi Bridge TF868: £20. MJF/SSB Filter SBF2: £4. Valves, used, tested KT66: £6. EL34, 807, 6BW6, 5763, 6CH6: £2 each. (Ilford) 081 554 6631.

COMPLETE PACKET Unit. Atari 520 ST, Atari Monitor SM124 Hi Res, Kantronics Modem type KPC2, Collinear Antenna ABC-22A, mint: £250. Inspect and collect. G7GWH. (Gravesend) 0474 568974.

CUSHCRAFT A4S Tribander Beam with 40m Add-on Kit, less than 2 years old, ex condx, too big for my QTH. Would possibly consider exchange for something more compact. Tel: Tony, G7PAK. (Sunbury on Thames) 0836 343035.

D8/2 144MHz Slot 8x8 Isopole: £40. 144MHz Vertical, unused: £30. Buyer collects. G3PXX, QTHR. (Little Neston) 051 336 4452.

DECODER for PC, receives CW, FAX, RTTY inc spec codes, twinplex, ARQ-E, ARQ-S, FEC-A, piccolo etc: £120. Write to C Messina, I5XWW, Via Di Porto 10, 50058 Signa F1, Italy.

DRAKE R4C 600Hz filter fitted, gd condx: £250 ono. Japanese built 144MHz 4X150A Linear 2KW, PSU: £100 ono. (Camberley) 0276 65775.

FDK 750E 2m M/mode 10W o/p, GC: £150. R & N 1296MHz Transverter, 2m IF, 2W o/p, mint condx: £200. Anytime after 6pm. GM0BRJ. (Kilsyth) 0236 824167.

FL2000B Linear, gd condx, works well, plus a spare 572B valve. Prefer buyer collects: £350. G4NUM, QTHR. (Leeds) 0532 686016.

FOR SALE Global AT1000 HF ATU: £55. Daiwa Power/SWR Meter CN-101: £45. Racal VHF Freq Counter, model 9914: £45. Yaesu Hand Mic MHIB8, new, unused: £20. Sony 7 Band SW Radio, model ICF-7600A: £45. AVO Meter: £20. Panasonic Microcassette Recorder model RN-125, 2 speeds auto start, new, unused: £40. MM 3db In-Line Pad: £5. Yaesu SP55 Speaker: £10. Psion Organiser mark 1: £25. (Royston) 0763 262443.

FT101ZD Full HF Station. FT101ZD Mk3, SP901P, FV101Z Ext VFO, FC902 ATU, boxed, manuals, mint condx: £750 ono. Hy-Gain 5 Band Vertical 18AVT: £40. Alinco D/Band H/held, case, charger, spare pack, speaker, mic, mint, boxed: £250. After 6.30pm. (Liverpool) 051 734 0328.

FT102, many extras including 5 Band vertical aerial: £495. KAM all mode TNC: £180. Navico AMR1000S 2m Mobile: £160. All VGC. (Seaton Delaval) 091 237 4037.

FT290 complete with Mic, Nicads, case, Helical antenna, handbook, boxed, mint condx, plus 20 watt Linear Amp: £280. G3TVU, QTHR. (Ashbourne, Derbys) 0335 343201.

FT290R Mutek Board, matching 2010 Amp, Mobile bracket, Nicads, charger, soft carry case: £300. Prefer buyer inspects or carriage at cost. No split. Wanted. GPO Double current Morse Key by ATM Co Ltd. GW8KSE, QTHR. (Wrexham) 0978 759732.

FT790R 70cm M/mode, mint condx with Nicads and charger, boxed, as new, Jaybeam MBM48/70cm: £240. Ideal for Novices. (Cheltenham) 0242 231677.

FT901DM very little used, ex condx: £425. And FRG7700 General Coverage Rx 50KHz to 30MHz AM/FM/SSB: £165. G4YMS, QTHR. (York) 0904 768686.

FT901DM, CW filter, gd condx: £450. FVT901R 2/6m and 70cm Modules fitted: £375. BBC Micro, 5.25 Disc Drive: £90. All with manuals and original packing. (Chippenham) 0249 814315.

FT902-DM, x VFO CW Filters: £520. (Barnoldswick) 0282 812288.

GLOBAL AT-1000 HF ATU: £55. Daiwa CN-101 SWR Power Meter 1.8-150MHz: £45. Empcom 50MHz ATU: £25. Alan, G7CDK, QTHR. (Royston) 0763 262443.

GOING QRT. TS820 tcvr with mic, manual: £300. FT7B Mobile tcvr inc mic, 15m G-whip, 20m G-whip Magmount, boot mount, manual: £285. Yaesu YD148 desk mic: £20. Welz AC38M ATU: £35. Pye F27AM fixed station, needs attention, manual: £50. Clarke Pneu 40ft mast, needs seal: £125. 3 ele Beam 10-15-20m: £75. Or £825 the LOT. G4OZD. (Leicester) 0533 680888.

HOUSE SEMI GCH. Three beds, two rec, large kitchen. Paved front, side and rear to back garden. Carport rear. Three cellars, extra toilet. Tower Beam Mast dipole, full planning. Easy access motorway. Vacant poss: £65,000 ono. Photos available. G3RUG, QTHR. (Stockport) 061 491 3814.

HT110 10m SSB/CW Tcvr: £195. HT120 20m SSB/CW Tcvr: £195. Both 10 watts o/p. Lionel, G0GZS. (Upminster) 0708 228896.

IC720S vgc hand mic, all filters fitted, FB rig, never used mobile: £450. Wanted Tentec Corsair. G4WDZ, QTHR. (Hillingdon) 0895 421540.

ICOM 271E 2m M/Mode Base Station: £350 ono. Comcen AT, colour, 20Mb: £150 ono. All as New. (Sevenoaks) 0732 832763.

ICOM 3230H D/Band 2m/70cm (45/35 watts) brand new, unused. G4LU, QTHR. (No phone number).

ICOM AT500 Auto ATU: £300. Icom 720A Trans: £450. Kenwood MC60 Desk Mic: £45. Icom IC255E 2m Trans, just serviced: £150. Kenwood TR2500 h/held charger etc: £110. Amstrad 286 Computer, Colour Monitor, 40Mb H/disk, S/ware, c/w Printer: £375 or split or exchange WHY. For sale due to upgrades. Postage on all above extra if not able to collect. (Stoke on Trent) 0782 395017.

ICOM IC W2E 2m/70cm H/held with spare battery pack, charger, headset and handbook. Hardly used: £325 ono. Yupiteru MVT-8000 Scanner, immac condx, 1-1300MHz AM/NFM/WFM: £325 ovno. Please ring after 8pm. (Stakeford) 0670 811950.

ICOM IC-W2E 2m/70cm D/band Tcvr, battery pack, charger, Spkr/Mic, unused: £250 for quick sale. (Hastings) 0580 830558.

ICOM IC251E 2m Tcvr with Mutek board, instruction book, IC5M5 desk mic, all in ex condx: £400. Yaesu YP 150 Watts Dummy Load, Watt Meter, all connections, ex condx: £65. Buyer pays half postage on above. G8TUL. (Nelson, Lancs) 0282 618548.

ICOM IC3210E Tcvr D/band 2m/70cm, 5/25W, c/w Mic, Manual, box, D/band Mobile Antenna: £295. G7JAI, QTHR. (Kenilworth) 0926 54556.

ICOM IC725, Mic, manual, boxed: £345. Shure 444 Mic, boxed: £25. FT290 & FT2010 Linear, mic and case: £200. G3GLL, QTHR. (Tollesbury, Essex) 0621 868250.

ICOM IC900D 2m Tcvr. Silent Key. Iteal Mobile Rig with remote Display, interface, Mic and L/S: £300. Mrs Phillips. (9-5 only) (Ringwood) 0425 476211.

ICOM ICR71E general coverage Rx, gd condx, with AT-1000 ATU: £575. Yaesu FT790R Mk 1 70cm M/Mode Transceiver: £275. Manuals for both. ICR71E with box. Prefer buyer collects and inspects. Phone after 6pm. John, G4IWA, QTHR. (Atherstone) 0827 713670.

ICOM, All items mint condx and most in orig boxes. IC751 HF Tx/Rx Gen Cov Receiver: £900. IC275E 2m M/mode: £625. IC251E 2m M/mode: £400. IC AT100 Auto ATU: £350. SM8 Base Mic: £70. Also Yaesu FT290 Mk1, (New Nicads): £225. PK232 TNC: £200. BNOS 25A Stab PSU: £130. Diawa All mode Active Filter: £75. Microwave Modules 10/100 Watt 144MHz Linear Amp, slight fault: £75. (Nr Chester) 051 339 3433.

ICOM2400E Dual Band FM Tcvr 5 to 45/35 watts, ex condx with Duplexer: £350 ono. (Telford) 0952 618016.

ICS FAX-1 Weather map, Navtex, RTTY decoder with manual and cables. Ex condx: £195, carriage extra. G3KZU, QTHR. (Oxford) 0865 63000.

ICS FAX1: £200. ICS FAX2 Computer System: £90. KW107 Super match: £120. Nevada TM1000 ATU: £75. Owner emigrating. Andy. (Worthing) 0903 877254/872278.

J-BEAM TB3 3 ele 10/15/20 metres: £145. 2 x 813's US Navy 1943: £30, discone: £20 as new. PA20MAR Noise Bridge: £50. HF/VHF Freq Counter: £50. (High Wycombe) 0494 530018.

JAYBEAM 3 Ele Yagi MM3 Minimax Tribander, unused still boxed: £325 ono. Amstrad 1640 PC twin 5.25 floppys, 32Mb Hard card, ECD Colour Monitor, MS DOS, Gem, Ability login program, various packet programs, lots radio programs: £300 ono. G0JYK, QTHR. (Manchester) 061 775 1328.

MEMBERS' ADVERTISEMENTS

KENWOOD SM220 BS8: £265. Yaesu FT727R-A, charger: £295. Motorola S-1350 Thruline, 3 slugs: £225. Bird 43 Thruline, PEP, 5 slugs, leather case: £495. Marconi TF1066-B Sig Gen: £145. HF Amplifier 2 x 813's, PSU 0-4KV: £175. Drake RV7 VFO: £90. Drake 2-CS Speaker: £35. Sure 444: £50. Astatic D104 Silver Eagle: £75. Harry, G4WZD. (Stockton) 0642 550659.

KENWOOD TS440S with ATU, used only for receive: £1000 ono. Contact via Mike. Day 0689 831616 or (pm 0812 996755 or Email 081 693 4042. (S E London)

KENWOOD TS440S with Auto ATU, in superb condx, boxed with manual, hand Mic and leads: £840. Kenwood TM732E 2m/70cm FM Mobile Rig, boxed with mic, manual, Mobile Bracket, leads, as new: £450. Phone Martin, G0HRZ. (Romford) 081 597 0234.

KENWOOD TS450SAT purchased Aug 92. Absolutely as new, manuals, boxed: £1200 or exchange for TS50S with ATU. KW Ezeematch ATU: £50. (Brecon) 0874 730373.

KENWOOD TS450SAt with Voice freq sound out, as new: £1050. Also Kenwood/Trio TS830S, gwo: £520. Homemade Linear 2 x 3-500, works well, needs a little work done: £400. Philips Colour Monitor PRO 9CMOT3 as new: £150. Marconi Mobile radio Testset TF2950: £75. Buyers collect. Brian, G4XTD. (Norwich) 0603 624573.

KENWOOD TS520SE CW filter, vgc: £325. Trio TS830S CW filter, vgc: £595. Slot Fed 2 x 5 ele Jaybeam 5D/2M 75ohm, unused: £30. KW101 SWR Bridge: £35. KW PEP-meter: £40. RS(423-9423) TTL logic probe: £25. Microwave Modules Converter 144-46/4-6MHz: £15. MFJ 1701 6 way antenna switch: £25. VHF/UHF Wavemeter(Sludge-pump) 100-1000MHz: £10. Kanga freq marker kit: £10. Buyers to inspect and collect. G4LWF, QTHR. (Halesowen) 021 550 5759.

KENWOOD TS530S, WARC bands, mic, manual, box, gd condx. Must sell: £375 ono. Prefer buyer collects. (Hitchin) 0462 434552.

KENWOOD TS711E 2m M/mode as new, boxed: £600. Kenwood TS530SP, vgc: £500. AT230 ATU: £125. Two Magnetic Loops 80-10: £200. (Birmingham) 021 327 0412.

KENWOOD TS930S, internal Auto ATU, SP930 Spkr. Ex condx and perfect working order. Demo by arrangement. C/w hand mic, manual, pkg. Unwanted due to move to Digital Control. Bargain, collect price: £685. Call Roger, G3XFA evenings or w/ends. (Oundle) 0832 273123.

KENWOOD YK-88CN-1 270 CW filter: £35 carriage paid. 16 metres UR67 unused: £8. 6 Core Rotator cable, unused 50p/ metre. G4DJC, QTHR. (Chelmsford) 0245 256416.

LOUDENBOOMER SRW HF 1KW Linear Amp, spare tube, immac: £400 ono. MFJ941D Tuner: £75 ono. (Brightlingsea) 0206 302382.

MARCONI B28: £40. B29: £45. Canadian Philco 260, made 1934, gwo: £30. Marconi B47: £25. Army R107, needs attention: £20. (Burton-on-Trent) 0283 44677.

MARTELEC Sat Receiver, NOAA Meteosat Downconverter, dipole, cables. Geloso AuTx AuRx Handbooks. Offers Invited. Also 1.3 Metre Dish. G1ONZ, QTHR. (Stafford) 0785 223444.

MILITARY RADIO Collectors. Philips RT4600 VHF FM Tx/Rx 30-76MHz, user and technical manuals, two rechargable batteries, Racal Portable VHF Dipole Kit complete: £245. Buyer must inspect and collect. G0NUO. (Travistock) 0822 614682.

MILITARY RADIO Collectors. Racal Syncal 30 Tx/Rx 1.6-30MHz (mint), complete Portable station also with two reconditioned rechargeable batteries and MA945B Battery Charger. Hand books and technical manuals: £500 cash, NO offers. Buyer must collect. G0NUO after 5pm weekdays. (Tavistock) 0822 614682.

MINT TRAPS for Moseley Elan 3 Band Yagi, half price: £85. Lovely Hy-Gain TH2 3 band Yagi, mint condx, s/steel fittings throughout, works perfect: £150 ono. Gould PSU, 230 volt i/p, 15 Amps o/p, new, unused : £55. Call and collect all items. (Stockport) 0663 744087.

MM3 MORSE Machine with additional memory fitted, as new: £100, NO offers. GW4IQL, QTHR. (Cwmbran) 0633 873018.

MODULAR ELECTRONICS 432/28/8 70cm trsvtr, MML432/20 Linear, 19 ele 70cm Tonna Antenna: £135 the lot. Will not Split. Homebrew 50MHz Transverter (PW Meon/ Spectrum TA6U Linear): £60. Tonna 13 ele 2m Antenna: £20. Prefer Buyers collect. G4FOH, QTHR. (Cheshire) 0829 260860.

OSCILLOSCOPES D43R Dual Beam +Diff Plug-in: £50. Tektronix 546, 547: £75 ea plus various Plug-in's. Polyskop 2 DC-1200MHz Basic network Analyser(old): £100. PSU Fluke 415B 0-3KV precision, low current: £50. Airmel Wave Analyser Type 853: £30. KW-Atlanta HF Tcvr: £150. Home brew ATU: £25. AR88: £50. 19 Set: £50. BC794-B: £35. S36: £40. 20Mb MFM H/disk: £20. PC 286-16 20Mb HDD, Mono, No K/B: £200. G0MIA, QTHR. (Aldershot) 0252 310661.

P40 VERSATOWER Post mounting Telescopic Antenna mast complete. Overhauled, ex condx, can be easily modified to P60 version at low cost. Bargain: £275 ono. Also pair wartime Wehrmacht Field Telephones with interesting History, in gwo. Realistic offers invited. G3AUV, QTHR. (S Hants) 0329 833069.

PANASONIC KX-R194 Electronic Typewriter, spellcheck, text and address memories. Alternative Daisywheel, spare ribbons, as new: £60. Prefer collected. G4MAQ, QTHR. (Oxford) 0865 718430.

PK232 MBX Amiga 500 with Monitor: £490, will consider selling seperately. (Didcot) 0235 819038.

PRO32 SCANNER Ex condx with new Nicads: £130 ono. G3ADZ, NOT QTHR. (Felixstowe) 0394 275820.

PSION ORGANISER 2 model LZ64 with leather case and unused 32k Datapack as new with instructions: £99 ovno. (Chester) 0244 345974.

QTH FOUR BEDROOM Individual detached Double Garage. Approx Quarter Acre. 30ft Tower 10/15m Quad, room for 200ft wire. Over 300 countries conf. Offers around: £170,000. G3PLP, QTHR. (Solihull) 021 706 0759.

R5 HF VERT Antenna with additional matching unit: £149. Planning restrictions preclude present owner using. Phone. (Milton Keynes) 0908 617457.

RACAL RA17 Gen Coverage Receiver: £120. Looking for 12 Volt HF Mobile Rig. G4ADE, QTHR. (Hornsea) 0964 534365.

RACAL Transceiver Green equipment including P/S, O/put stage has synthesiser fault, offers. Atlas 210X, faulty: £100. Sony ICF2001D, boxed, all accessories: £120. Trio JR310 rcvr amateur bands only: £60. HiGain 12AVQ vertical aerial with chart: £25. G3YJD, QTHR. (Bletchley, Bucks) 0908 379250.

SEM Mk1 QRM Eliminator: £45. SEM VHF Tranzmatch: £30. Maplin Active Aerial: £35. Maplin notch filter: £20. Kent Keyer, boxed: £25. Cambridge Antenna Noise Bridge: £15. Books - HF Antennas Moxon: £7. 1986/87 ARRL Handbooks: £5 each + post(Heavy) Complete Spectrum (Alan Scott): £5.50. Satellite Experimenters Handbook: £5. Spectrum Advanced Users Guide: £3.50. Buyers Guide to AR: £3.50. Old Army Headphones SGB.CLR. G0KTN, QTHR. (Melksham) 0225 703726.

SILENT KEY SALE, G4EYS. Kenwood TS440 with Auto ATU, vgc: £795. MFJ SWR Analyzer: £145. Hy-Gain DX88 Vertical Antenna 80-10m: £95. Morse and RTTY Easy Reader DM1000 with monitor: £130. All in vgc. Contact John, G0DFE. (Southend) 0702 202216.

SILENT KEY Sale. TS830S HF Tx/Rx, ATU, Shure 444 Mic, mint condx, boxed: £650 the lot. Might split. G0GMC, QTHR. (Brighton) 0273 842937.

SILENT KEY Sale. TS830S Tx/Rx ex condx: £500. BNOS 100W 430MHz PA: £185 mint. FT101ZD Rx fine, PA faulty: £325. (Colwyn Bay) 0492 546875.

SIX METRE Antennas. Met 3 ele: £25. Tonna 5 ele: £25. Dipole of Delight 40/80M, plus 50ft of coax: £25. (Attleborough) 0953 456101.

STANDARD 828 with VFO: £85. Low Noise RF switched Pre-Amp: £15. Heathkit Linear 10-50 watts: £40. Trio 7500, 80 channels with 3.5Amp PSU, Spkr: £120. All above 2 metres. (Birmingham) 021 747 8489.

SVGA 14 inch Colour Monitor, 1024 x 768 non-int, low rad, non glare, new: £225 inc carriage. TVGA Video Board, Trident 9000 Chipset 512K DRam, manual, never used: £40. Spectrum +128k: £20. Minimitter valve Converter 80-10m, believe 4-6 IF, circ 1965: £40. Philips BM75 12 inch Green Screen Monitor: £30 + £10 carrage. ST5C RTTY Terminal Unit complete with PSU, inst: £35. Tascopy Spectrum screen copier tape. G0KTN, QTHR. (Melksham) 0225 703726.

SYSTRON Donner Freq Meter model 6316A-29, 0-12.5GHz. This is a laboratory style instrument and is c/w manual. Reasonable offer secures. Phone Ron after 6pm. (Melksham) 0225 706362.

TELEQUIPMENT D83 50MHz oscilloscope, 2 Y-amps, twin T/Bases, manuals, in gd order: £125. G3TCU. (Godalming) 0483 423272.

TENNAMAST 41ft Fully extended plus stub. All Galv, free standing or wall mounted. 2 yrs old, gd condx: £225 ono. (Southend) 0702 346826.

TET HB23SP 2 ele Tribander Beam, good condx: £150 ono. Buyer collects and inspects, including full instructions. R Guest, 16 Shakespeare Close, Braintree, Essex CM7 7OB. (Braintree) 0376 349908.

TONO 5000E CW, RTTY, Amtor "B" Arq, test your own CQ on screen: £380. Kenpro Rotor model KR400RC, c/w controller, orig pkg, new, unused, no planning permission: £65. Tet Swiss Quad SQY-08S assembled, never used: £30. G4YPN, QTHR. (Rainham, Essex) 0708 523487.

TRIO 830S fitted CW filter, vgc, boxed, etc: £575 ovno. Trio R1000: £175 ovno. FL2100B: £450. IC AT500: £400. (Stourport) 0299 878956.

TRIO TS520 Tx/Rx: £350. Mic, operating manual, spare pair PA valves 6146, unmarked, perfect wrkg condx. GM3GQH, QTHR. (Aberdeen) 0224 318541.

TRIO TS711E 2m M/mode, 25W, Base Station, built in PSU, 40 memories, mic, box and manual, gd condx: £525 ono. (Solihull) 021 745 8222.

TRIO TS830S, spare 6146's, hardly used: £525. SM220 with BS8: £275. G3UEY, QTHR. (Pershore) 0386 553037.

TRS80 mod 4, Console 128k/RS232 Computer 2 drive + DM printer, Tech & users manuals, RTTY etc programs, plus sackful Mk 1 + 3 programs + manuals (tape). Exc starter kit with TRSDOS NUDOS LDOS (+ manuals) and CP/M WP system. In urgent need of space. Hence :£150 the Lot. G8OTW, QTHR. (Enfield).

TS120S 100W o/p, with CW filter, recently serviced, ex condx: £350, prefer buyer collects. G4NUM, QTHR. (Leeds) 0532 686016.

TS830S: £575. FT101ZD: £495. FL2100Z Linear: £495. All Ex condx. Third (Top) Section of Versatower P60: £100. (Swansea) 0792 817957.

TV/VIDEO ENTHUSIASTS. Almost every copy of Television Magazine since April 1983 with ECS fault index: £30 ono. G8PAI, QTHR. (Harwich) 0255 880672.

VALVE SALE. 1000 types, battery, minature, octal, loctal, VHF transmitting etc. First class SAE for list. G3MDQ, QTHR. (Birmingham) 021 354 9972.

VERSATOWER P30, 3-Section Telescopic Tiltover. Post mount with standard and h/duty heads, gd condx. Buyer collects: £275. 5-9pm please. (S Essex) 0375 361210.

VERSATOWER P60 complete with ropes, winches and top section with Bearing. Buyer to arrange collection: £450. Syhinx SSB Tx 160/80/20m: £60. (Wickford, Essex) 0268 764317.

VERTICAL DX Antenna, eight Band 80-10m, only 6.5ft long. NZ worked with half watt. Attic or mast mounting: £55. (Mablethorpe) 0507 477842.

VSWR POWER Meter, range 400-500MHz 7.5 & 75W: £40. G3VGO, QTHR. Phone (Truro) 0872 864255.

YAESU FASI-4R, new: £75. Altai DIP Meter: £35. Butternut HF5B Antenna, never used (cost £300): £210 ono. (Bristol) 0275 892627 or 541071.

YAESU FR101D Receiver HF bands plus 2, 4 and 6 metre Boards fitted, condx as new: £180. Ray, QTHR, eve/w end. (Billericay) 0277 625649.

YAESU FRDX400 Receiver HF + 2 Metres: £65 ono. HF M/mode Manpack Tcvr 20W PEP + ATU: £110. Evenings only. G8NXB, QTHR. (Sutton) 081 642 1359.

YAESU FT690 Mk2 with 25W Linear, ex cond: £350. (Seaford) 0323 893278.

YAESU FT757GX with hand mic, MFJ Deluxe Versa Tuner 2, Datong Auto Woodpecker Blanker, Datong FL1 freq agile Audio Filter, Palomar engineers Rx noise bridge, CDE Ham II CD44 Controller, plus various misc items. Whole Lot: £400. Buyer collects. G4FIJ, QTHR. (Bedford) 0234 781393.

YAESU FT77, all band amateur tcvr, mint, boxed, handbooks, used reception only: £300. (London) 071 935 7119.(days).

YAESU FT990 Tx/Rx, only 7 months old, plus SP6 Speaker and narrow Filters: £1750. Yaesu FT650 Tri-band Tx/Rx 6, 10 and 12 metres 100 watts: £100. Cushcraft D3 Rotary Dipole 10, 15 and 20 metres, as new: £75. Microset 2m Linear 100w: £50. Datong M-mode Filter FL2: £100. (Ashton u Lyne) 061 681 2020.

YAESU FV901DM Scanning VFO for 101/901: £120 ono. J-Beam 12 ele X 70cms, J-Beam 5 ele X 2m, Rotator plus steady bearing: £75. G0JJO, NOT QTHR. (Rugeley) 0889 586354.

YAESU SEPARATES FRDX400 and FLDX400 with cables and manuals, very little Tx use good working order. Prefer not to split: £400 ono. (Bath) 0225 465557.

WANTED

AP1086 Issue 1, (RAF Radio Stores Ref No's). Also Air Publications Relating to Radio, Radar Equipment. Ex 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 Input with Output of 80/115v 1500/2000Hz. Also Rx Type R1355 10D/13032, Unmodified. Please phone anytime. (London) 071 511 4786 or 071 790 2846.

EDDYSTONE General Coverage HF Receiver, valve model, like 830 or 940. Good price for good condx (Not AC/DC Models). Also 1950's ARRL and Radio (Editors and Engineers) Handbooks. G3JWW, QTHR. (Harlow) 0279 436660.

EDDYSTONE Receivers 556, 710, 770R Mk2, 820, 930. Also any Pre-War model and Eddystone accessories. Graham, G7OJM. (Barnsley) 0226 288718.

TS930/940 late model preferebly with filters, extras. Vibroflex/Mcelroy Bug. Write please to T Bucknell, 7 Cavendish Drive, Clowne, Chesterfield, Derbys.

YAESU FT75B or FT77. Complete or for Spares. Power pack especially welcome and any accessories. G4FQP, QTHR. (Caistor) 0472 851604.

ANTI VIBRATION Base for BC348. German rectifier valves type RG12D60. Borrow (or buy) Receiver Type UKWE-e. (London) 0895 270772.

ANY LAPTOP Computer Items manufactured by GRID, especially external expansion Box. Complete Laptop purchased if VGA Display. Some GRID items for P/ex. Also a Radio shelter(cabinet) approx 2.5 metres long. Please ring if you know where one of these might be found! Bob. (Redditch) 0527 64885.

BUTTERNUT HF6V 30/35ft Lattice Tower, Rotator, 2 ele TB2, all VGC. Wanted for OAP. (Lutterworth) 0455 557263.

CANADIAN C52 Tx/Rx Spares and Technical Handbook wanted. Anything considered. Tel evenings. (Norwich) 0603 860452.

CUSHCRAFT R5 Vertical, Cobweb Antennas and 20Amp+ PSU, preferably Icom but all considered. Boxed, unmarked and gwo only please. G0OPG. (Wilmslow) 0625 531154.

COMPLETE HF Base Station FT ONE/TS850S or similar tscvr and associated items including Paddle Key etc. Contact Graham, G0IIC. (Plymouth) 0752 790557.

CONNECTORS, Male or Female "N" Type for LDF550 Coax, new or used. (March, Cambs) 0354 741168.

DRAKE Rxs RR3, MSR2, DSR2, any condx. Also seeking Racal 1779 and 1778 Receiver. Seeking network science Drake Filter. Thanks. (Shrewsbury) 0743 884858.

FOR TEN-TEC Paragon, 250Hz Filter model 282, 500Hz Filter model 285, FM Board model 256. G4TLK, QTHR. (Norwich) 0603 410229.

HEATHKIT HW101 HF Tcvr and Power Supply, gd condx. G3ONL, QTHR. (Debenham) 0728 860607.

HEATHKIT MA-12 Audio Amplifier for spares. G3PHT, QTHR. (Aldeburgh, Suffolk) 0728 452007.

ICOM AH-2A Auto ATU in gd wrkg order. Contact Howard, G7EWW, QTHR. (Southend on sea) 0702 582861(fax).

INFORMATION Required. Design Freq coverage of Coil Pack type 606, MW/SW1/SW2 465KHz IF, manufactured by Wearite circa 1950. G3JSP, QTHR. (Nottingham) 0602 604563.

KENWOOD RZ-1 Receiver. Must be in mint cond. GI3YDH, QTHR. Tel anytime. (Belfast) 0232 795783.

LOW BAND DXing ARRL. Recent ARRL Handbook. National HRO tired/scrap to rebuild. Collins TCS Rx/Tx. John, G3GTJ, QTHR. (Castle Cary) 0963 24319.

MORSE KEY Type M100 US Signals Corps. Using not collecting. G3OKD, QTHR. (Market Drayton) 0630 638306.

OT PLEASE NOTE: Required Marconi/Osram HL2 and P2 first Style, full labels. Bernard, G4IMT, QTHR. (Chippenham) 0225 891254.

PSU for C42 R210 Receiver 24 volt case for WS18. Racal Sincal 30, Racal 4031, Racal 4051. (Grantham) 0476 74047.

RACAL RA217 Receiver, working or NOT, or parts of. Can collect. March, (Cambs) 0354 741168.

RACAL TA349 TX. Must be complete and in gd condx. Your price paid. Racal factory Cabinets, Table Top and 'Picture Frame' Types. Creed 75 Teleprinter with Reperforating and Automatic Tape transmission attachments. Creed Toolset 75, lubricants, unused spares, repair and training manuals. Information on the history of Creed Company. Nigel Boyd, 2 Church Close, Lower Willington, Eastbourne, East Sussex BN20 9QY.

SINGLE TRACE Service Scope. Telequipment S51E or similar in good working order, c/w service manual. G3ADJ, QTHR. (Wokingham) 0734 734882.

TAIT VHF Base station Receiver T375 or T355. For Sale. Tait T296 plus T348 PSUs. G4AJE after 6pm pse. (March, Cambs) 0354 741168.

CLUB NEWS

DEADLINE - Items for inclusion in the December 1993 issue must be sent to HQ marked 'Club News - DIARY', to be received by 15 October 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

RSGB CITY OF BRISTOL GROUP - 25, Annual General Meeting. Details 0272 672124.

SOUTH BRISTOL ARC - 6, 10th Anniversary of SBARC, special evening; 13, CW with club members; 20, Home Brew, 2nd evening for Terry's Trophy; 27, Simple Computer Programming Workshop. Details 0275 832222 Wednesday eve only.

THORNBURY & DARC - Meets every Wednesday at 8pm at the United Reformed Church, Thornbury. Details 0454 415215.

BEDFORDSHIRE

SHEFFORD & DARS - 7, Talk 'HF Noise Bridge' by Hugh, G0LVG; 14, Coopering; 21, CQ World Wide planning; 28, Junk Sale - support of AMSAT UK Phase 3D; Nov 4, Members activity. Details 0462 700618.

BERKSHIRE

NEWBURY & DARS - 27, Visit by Peter Kirby, G0TWW, General Manager RSGB. Details 0635 863310.

READING & DARC - 22, Annual Dinner. Details 0734 476873.

BUCKINGHAMSHIRE

AYLESBURY VALE RS - 6, Surplus equipment auction; 20, Test Equipment evening; Nov 3, Mini-construction evening. Details 0296 81097.

MILTON KEYNES & DARS - 11, Annual General Meeting. Details MK & DARS, PO Box 817, Milton Keynes MK6 3LE.

CAMBRIDGESHIRE

CAMBRIDGE & DARC - 1, Modulation by G1TFK; 8, 'The Mosquito Aircraft' by Mike Blower; 15, Industrial uses of RF by John; 22, Maritime Radio by G3BYW; 29, Visit 'The Medical Physics Dept at Addenbrookes Hospital. Details 0763 243570.

CHESHIRE

CHESTER & DARS - 12, John Wilson from Lowe's; 19, Surplus equipment Sale; 26, Report of Survey of Events(membership feedback). Details 051 608 3229.

STOCKPORT RS - 13, RIS by Alan Clayton; 27, The G3FYE Memorial Lecture 'Home built Receivers' by Rev George Dobbs, G3RJV. Details 061 439 4952.

CO ANTRIM

CARRICKFERGUS ARG - 12, Talk 'Protective Multiple Earthing' by Roy Coulter,(7.30pm). Details 0232 835650.

CORNWALL

CORNISH RAC - 7, General Meeting Perranarworthal Village Hall, commencing at 7.30pm, followed by a slide Show by G0KSF. Details 0872 222605.

DERBYSHIRE

BUXTON RA - 12, Home Brew night; 26, Events 1994; Nov 9, Annual General Meeting. Details 0298 25506.

DERBY & DARS - 6, Junk Sale; 27, Practical Demo - Terminating & waterproofing Co-axial cables and connectors by G6ABU; Nov 3, Junk Sale. Details 0773 856904.

DEVON

APPLEDORE & DARC - 18, Talk 'Work of RNLI' by 3 members of the Appledore Station. Details 0237 477301.

AXE VALE ARC - 1, Annual General Meeting. Details 0297 33756.

EXETER ARS - 11, Annual General Meeting. Details 0392 214204.

EXMOUTH ARC - 13, Junk Sale; 27, Talk 'Amateur Satellites' by G8EKW. Details 0395 279574.

PLYMOUTH RC - Details D C Perryman, G7NMA, 50 Bellingham Crescent, Plympton, Devon PL7 3QP.

SOUTH DEVON RC - 10, Computercations 93 Rally. Details 0803 522995.

TORBAY ARS - 22, Visit by Peter Chadwick, G3RZP, RSGB President. Details 0803 526762.

DORSET

SOUTH DORSET RS - 5, 'Technical Forum' by Bill, G3EAT. Details 0305 773860.

EAST SUSSEX

CROWBOROUGH & DARS - 21, Proposed talk by G4BCO on Hastings repeaters. Details 0892 661807.

SOUTHDOWN ARS - 4, Equipment Sale. Details 0323 412699.

ESSEX

BRAINTREE & DARS - 4, Video Show by G3TGB; 18, Junk Sale; Nov 1, Talk 'Wavemeters - Design & construction part 1'. Details 0376 327431.

CHELMSFORD ARS - 5, Annual General Meeting; Nov 2, Junk Sale. Details 0245 260831.

LOUGHTON & DARS - 1, Confessions of a CW addict' by Frank, G0LWI; 15, Inter Club trivia Quiz. Questions by John, G1DJI; 29, 'What is Word Processing' by John, G1DJI. Details 081 508 3434.

VANGE ARS - 7, Junk sale; 14, Steam trains by G7JJX; 21, discussion 'THe PX4 Computer; 28, Construction Contest. Details 0268 552606.

FIFE

DUNFERMLINE RS - 7, Annual General Meeting; 9/10 GB4DHX Hobbies Exhibition; 14, HF Operating evening; 21, VHF Operating evening; 28, Special event Preparation evening. Details 031 331 4340.

GRAMPIAN

MORAY FIRTH ARS - Meets every Thursday, 7.30pm. Details 0343 86395.

GREATER LONDON

ACTON, BRENTFORD & CHISWICK RC - 19, Mobile Radio Equipment by G0IIP. Details 081 749 9972.

BROMLEY & DARS - 19, Junk Sale. Details 081 658 2988.

CIVIL SERVICE ARS - 11, Video 'Amateur Radio in Sri Lanka' at 12.30pm; 19, Video 'Expedition to VP8 South Sandwich Islands' at 5.30pm. Details 071 276 3976.

COULSDON ATS - 11, Talk 'Secret Listeners' by Brian, G8DIU; Nov 8, 'Home Entertainments up to 1925' by Jon, G0GNA. Details 081 684 0610.

CRAY VALLEY RS - 7, Surplus Sale; 21, The History of JOTA by G4NOW; Nov 4, China by G3DCC. Details 081 850 1386.

EDGWARE & DARS - 14, Operating QRP by Wayne, G0JJQ; 28, Morse Training. Details 081 204 1868.

KINGSTON & DARS - 20, Talk 'The Novice Training Scheme - Practical Experiences' by Tony, G7DGW. Details 081 398 1128.

SOUTHGATE ARC - 14, 2nd Great Junk Sale; 28, Talk ' The finer points of DXing' by Doug, G0LUH; Nov 11, Construction judging for the G6QM Trophy. Details 081 360 2453.

SURREY RCC - 4, Surplus Sale. Details 081 660 7517.

WIMBLEDON & DARS - 8, Desert Island Radio; 29, Annual General Meeting. Details 081 397 0427.

WHITTON ARG - Club meets at Whitton Community Centre, Friday evenings. Details 081 995 6553.

GREATER MANCHESTER

ECCLES & DARS - 5, Discussion 'NARSA contribution to RSGB Annual Meeting'; Nov 2, Lecture 'The Lincolnshire Poacher' by G4AEQ. Details 061 773 7899.

SOUTH MANCHESTER RC - 1, Contest preparation; 8, Table Top DF; 15, Visit to Jodrell Bank; 22, Aerials 1963/93 by G3SVW. Details 061 969 1964.

TRAFFORD ARC - 7, Lecture 'Amateur Satellite Communications' by Dr M W Dixon. Details 061 748 8046.

GWYNEDD

DRAGON ARC - 4, Annual General Meeting; 18, Talk by George Preuss; Nov 1, Amateur Radio Videos. Details 0248 600963.

HAMPSHIRE

ANDOVER RAC - Club meets on the 1st & 3rd Tuesday of the month at 8pm, at Tangley Hall, Wildhern, Nr Andover. Details 0264 339218.

HORNDEAN & DARC - 6, Annual General Meeting.(***A change of date***); Nov 4, Video evening. Details 0705 472846.

ITCHEN VALLEY ARC - 8, Talk 'Modifying PMR gear for Amateur Bands' by Chris, G4HCL; 22, Talk 'Wild life radio tracking' by Brian Cresswell. This meeting open to visitors. Details 0703 732997.

WATERSIDE ARS - 26, Talk 'Tour of the Universe (Astronomy)'. Details 0703 843491.

HEREFORD AND WORCESTER

BROMSGROVE ARS - 12, EMC problems; 26, Video 'Electromagnetic Waves'. Club meets on 2nd & 4th Tuesday in the month. Details 0527 546075.

VALE OF EVESHAM RAC - 7, Talk 'Micro Electronics' by G4EYJ. Details 0386 41508.

HERTFORDSHIRE

CHESHUNT & DARC - 13, Talk 'Packet Nodes & Node Hopping' by Roger, G4OAA; 27, Construction Contest. Details 0992 464795.

DACORUM AR&TS - 19, Visit by Mike Dennison, G3XDV Managing Editor *RadCom*. Details from D Boast, 8 Juniper Green, Warners End, Hemel Hampstead HP1 2NQ.

HODDESDON RC - 14, Talk 'The Schneider Trophy Air Race' by Rex, G3NQT; 28, Visit to Hertfordshire Display Company with John, G4VMR. All visitors welcome. Details 081 804 5643.

WELWYN-HATFIELD ARC - 4, Claire's Conundrum!; 18, Raynet; Nov 1, Constructors Contest. Details 0920 462241.

HUMBERSIDE

GOOLE R & ES - 8, Construction competition; 15, Video 'Microwaves'; 22, The Junk Sale. Details 0405 769130.

GRIMSBY ARS - 14, Annual General Meeting; 28, Junk Sale. Details 0472 825899.

NORTH FERRIBY ARS - 1, The Way ahead meeting; 15, Visit of Rob Mannion, G3XFD, Editor of PW; 29, RSGB video. Details 0482 650410.

ISLE OF MAN

ISLE OF MAN ARS - Meets on Mondays at the Douglas Motor Boat & Sailing Club, South Quay, Douglas and on Thursdays at the British Legion Club, Peel. Details from 0624 834257.

KENT

DARENTH VALLEY RS - 13, Video; 27, Talk by Ray Petri; Nov 10, Back to Basics. Details 0474 703322.

MEDWAY AR & TS - 1, Junk Sale; 15, Talk on 'Interference' by Ray, G0OAT. Details 0634 710023.

SEVENOAKS & DARS - 18, Talk 'Air Crashes' by Dick Vance. Details from:- The Secretary, S&D ARS, c/o Sevenoaks District Council Offices, Argyle Road, Sevenoaks TN13 1HG.

SOUTH EAST KENT (YMCA) ARC - 6, Novice Evening; 13, Talk 'Constructional techniques'; 20, Surplus equipment Sale; 27, ICOM(UK) presentation or video (prov.). Details 0304 852030.

WEST KENT ARS - 15, Talk 'The Crowborough Radio Station' by Les, G3FET. Details 0892 664960.

LANCASHIRE

BURY RS - 12, Construction Contest; 26, Video evening; Nov 9, Junk Sale. Details 0204 883212.

FYLDE ARS - 14, Equipment Sale. Club meets 7.45pm, every 2nd & 4th Thursday at South Shore Lawn Tennis Club, Midgeland Road, South Shore, Blackpool. Details G7CUL, QTHR.

HESKETH ARC - 12, Talk 'Vintage Wireless; 26, Talk 'Logic Gates. Details 0704 63344.

NORTH SEFTON ARC - Club meets 2nd Wednesday of each month. Details 0704 579017.

THORNTON CLEVELEYS ARS - 4, Talk by Mick, G4EZM; 11, Video, last year at the Club; 18, Annual General Meeting; 25, Construction evening. Details from G4BFH, QTHR.

ROCHDALE & DARS - 18, Bring and Buy sale; Club meets every Monday at 8pm at the Cemetery Hotel, Bury Road, Rochdale. Details 0706 32502 or 061 653 8316.

LEICESTERSHIRE

CHARNWOOD ARCC - 17, Discussion 'HF Antenna development; 24, Annual General Meeting. Details 0509 232927.

LOUGHBOROUGH & DARC - 5, Annual General Meeting; 12, DX HF Aerials; 19, Visit to British Geological Survey HQ, Keyworth, Notts details Derrick; 26, Construction Contest Judging (All enteries welcome). Details 0509 218259.

LINCOLNSHIRE

GRANTHAM RC - 5, Instrumentation by G0STT; 19, Antennas by G3PJR; Nov 2, Trunked Radio Systems by G8WWJ. Details 0476 65743.

LOUTH & DARS - Meets on 3rd Tuesday each month at The Wellington, Louth. Details G1XWD, QTHR.

MERSEYSIDE

LIVERPOOL & DARS - 5, Annual General Meeting; 12, GX3AHD Calling; 19, Construction Contest; 26, Surplus Sale. Details 051 722 1178.

WIRRAL & DARC - 13, Talk; 20, Visit to Mersey Tunnel, 6.25pm Wallasey entrance. Limited Numbers Contact Gerry, G8TRY; 27, Talk 'The Friedrichshafen Adventure' by Ron and the crew of German rally explorers. Details 051 648 5892.

NORFOLK

NORFOLK ARC - 6, Construction Competition; 13, Video 'Glimpses of Norwich 1909 - 1939' by Jack, G3NJQ; 20, Real radio, night on air; 27, Talk & Slides 'Construction of 12ft EME Antenna' by Mike, G4EOL. Details 0603 618810.

YARMOUTH RC- 7, Visit to Anglia Television - limited number *** All places must be booked with Secretary ***; 21, Inter Club Quiz; Nov 4, Family History Research by G3YYQ. Details Gt Yarmouth 721173.

NORTHAMPTONSHIRE

KETTERING & DARS - 12, Talk 'The NEW UHF Scheme' by a Radio Communications Officer, Northants Police Force. Details 0536 514544.

NORTH YORKSHIRE

HAMBLETON ARS - 7, Practical/Ops night; 14, RAE Course; 21, Talk 'Marconi Comms Test Equipment' by Peter, G0ASG. Details 0609 776608

NOTTINGHAMSHIRE

ARC OF NOTTINGHAM - 14, Talk 'Introduction to Satellite Communications by G4IIO; 21, An evening of Morse; 28, Talk and demo on Doublet & Mini-doublet Antennas by G3WQW. Details 0602 501733.

MANSFIELD ARS - 11, Demonstration of PCB manufacture by G8EHX and G6CUK. Details 0623 755288.

SOUTH NOTTS ARC - 1, Talk 'WAB Award Scheme' by Kate, G0FEZ; 8, Construction(+ On Air); 22, Construction(+ On Air); 29, Junk Sale. Details 0602 216342.

OXFORDSHIRE

OXFORD & DARS - Club meets on the 2nd and 4th Wednesdays of the month. Details 0865 863526.

VALE OF WHITE HORSE ARS - 5, Annual General Meeting. Details 0235 531559.

POWYS

POWYS ARC - 7, Fox Hunt; 14, Junk Sale. Details GW3JSW, QTHR.

SHROPSHIRE

TELFORD & DARS - 13, Junk Sale; 20, The Irish Portable Expedition. Details Telford 588678.

SOMERSET

TAUNTON & DARC - 1, Silver Jubilee Special Event Station GB25TRC to run during October; 8, Talk by RSGB President Peter Chadwick, G3RZP, about the RSGB; 15, Annual General Meeting, 8pm at County Hall, Taunton. Details 0823 680778.

WEST SOMERSET ARC - 5, Talk 'Direct Conversion Receiver' experiences of a club member. Details G4AJU, QTHR.

YEOVIL ARC - 7, QSL Cards; 14, Inter Club Quiz - South Dorset Club; 21, Raynet within the Club; Nov 4, Antenna Problems Aired. Details 0258 473845.

SOUTH GLAMORGAN

CARDIFF RSGB G - 11, Annual General Meeting; Nov 8, Talk 'Reflections (RF)' by John, GW4HWR. Details 0446 773212.

SOUTH YORKSHIRE

SHEFFIELD ARC - 4, Annual General Meeting; 18, Meet the new committee, discussion on the club's next year's events; 25, Quiz night; Nov 2, Sheffield & Rotherham Raynet meeting. Details 0742 446282.

STAFFORDSHIRE

CANNOCK CHASE ARS - 6, Annual General Meeting and Award of Trophies. Details 0543 262495.

STOKE ON TRENT ARS - Club meets every Thursday at The White Swan, Honeywall, Penkhull, Stoke on Trent at 7.30pm. Details 0782 638801.

STRATHCLYDE

PAISLEY (YMCA) ARC - 13, The RSGB Update; 27, Early Radar. Club meets 7.30pm alternate Wednesdays. Details 0505 335195.

TELEGRAPH RC - 5, Talk 'CAA Traffic Control; 12, Visit to Prestwick Air Traffic Control Centre. Club meets every Tuesday 7.45pm. Details GM0RSF 0506 31645.

EVENTS DIARY

SUFFOLK

FELIXSTOWE & DARS - 11, Talk 'The Radio Investigation Service' by a member of the Suffolk RIS; Nov 8, Talk 'Radio Propagation' by Jim Bacon, G3YLA. Detail 0394 273507.

IPSWICH RC - 6, talk 'Oscilloscopes' by G3NYK; 20, Whats in the Bag?; 27, Morse Practice. Details 0473 742072.

LEISTON ARC - 5, 'The use of Computers in Amateur radio' another hands-on talk by Paul, G4YOC; Nov 2, Annual General Meeting. Details 0986 874800.

TAYSIDE

DUNDEE ARC - 5, (Holiday); 12 Construction night; 19, Members night (Mini lectures by club members); 26, Construction night. Details from GM4FSB, QTHR.

WARWICKSHIRE

MID-WARWICKSHIRE ARS - 12, Presentation 'Satellites and Amateur Radio' by Brian Slatter. Details 0926 424465.

STRATFORD UPON AVON & DARS - 11 'Badger Boards & Kits' with John Badger, G4YZO; 27, Talk 'BATC' by Mike, G6IQM. Details 0608 682495.

WEST GLAMORGAN

SWANSEA ARS - 3, Killay Site RSGB 21/28MHz SSB Contest; 30, Coach trip to Leicester Rally. Details 0792 403527.

WEST MIDLANDS

RS of BLOXWICH - 11, Annual General Meeting; 25, Trip to West Midlands Police Motorway Control Centre; 29, Trip to Leicester Radio Rally; Nov 8, Annual Quiz. 0922 683877.

COVENTRY ARS - 1, Annual General Meeting; 8, Public open evening; 22, Rig Test Evening (3GHz Spec Analyser); 29, Morse code Tuition. Details 0203 311468.

SOUTH BIRMINGHAM RS - 6, (tba); Nov 3, Annual General Meeting. Details 021 458 1603.

SOLIHULL ARS - 21, Annual General Meeting. Details 021 777 9965 (eve).

STOURBRIDGE & DARS - 18, Talk 'Road Safety' by Mick Bayliss. Club meets on 1st and 3rd Mondays each month. Details 0384 374354.

WEST SUSSEX

HORSHAM ARC - 7, Surplus equipment sale. Details 0737 842150.

WEST YORKSHIRE

HALIFAX & DARS - 19, Pete Sheppard, G4EJP, Equipment from Peter Rodmell, G3ZRS. Details 0422 202306.

KEIGHLEY ARS - 28, Junk sale; Nov 11, Talk 'Raynet' by G3RXS. Details 0274 496222.

SPEN VALLEY ARS - 7, Surplus sale; 21, WRG Facilities by G0COA, G4BLT and G3VMW. Details 0532 534437.

WILTSHIRE

TROWBRIDGE & DARC - 6, Film 'Earth disaster Relief' by G0KRJ; 20, talk 'Antenna Systems Matching' by G0DAB. Details 0225 864698 (evenings).

RALLIES AND EVENTS

This is a list of all rallies, hamfests, exhibitions and conventions notified to HQ (as at press date). Items are given in detail for the next three months inclusive and in brief thereafter. Please send detailed information, including contact callsign and telephone numbers direct to HQ and marked 'Rally News - DIARY'.

3 OCTOBER

GREAT LUMLEY Radio Rally - Great Lumley, near Chester-le-Street, Co Durham. Doors open 11am, 10.30 for disabled. Many varied trade stands, bring & buy, refreshments. Entrance fee £1 inc a programme, children under 14 accompanied by an adult free. Details 091 388 5936.

BLACKWOOD & DARS Rally - Oakdale Community College, Blackwood, Gwent. Doors open 10.30am. Traders, bring & buy, Raffles. Talk-in on S22. Details Norman, GW0MAW, 0495 227550.

WINCANTON RALLY - Wincanton Racecourse, Somerset. Doors open 10am. Trade stands (under cover), car boot, refreshments, ample free parking. Talk-in on S22. Details Norman, G4YXX 0749 850432.

8/10 OCTOBER

RSGB International HF Convention: The Beaumont Conference Centre, Old Windsor, Berks. Talks, latest amateur radio software, ladies' programme; Young Amateur of the Year Award; invited traders and Special Groups; overseas visitors' reception. Send SAE to: HF Committee, PO Box 599, Hemel Hempstead, Herts HP3 0SR. Details G4BWP, 0638 552080.

9/10 OCTOBER

The ALL IRELAND INTERNATIONAL Radio & Hobbies Exhibition - First Major exhibition of its kind to be held in Ireland, North or South and is hosted jointly by Dundalk Amateur Radio Society and the Armagh & Dungannon District Amateur Radio Club. Trade stand, many from the UK mainland, amateur TV, radio, computers and much more. The Presidents of the IRTS and the RSGB President will attend. Features many side shows and entertainments to cater for all tastes. Details GI8RLE on 0762 870423 or EI4HX on 042 32641.

10 OCTOBER

KIDDERMINSTER & DARS - *** NEW DATE, NEW VENUE ***: Stourport on Severn High School. Usual traders, bring & buy, flea market. Refreshments. Talk-in on S22. Details: Malcom, G8JTL 0384 894019 or Jeff, G0RJP 0299 822206.

SOUTH DEVON RC Computercations 93, Amateur Radio & Computer Rally - Hillhead Campsite, Kingswear Road, Brixham, Devon. Doors open 10am. Trade stands radio & computer, bring & buy, raffle, refreshments. Talk-in on S22. Details Bill, G6ZRM on 0803 522216.

16/17 OCTOBER

36th JAMBOREE ON THE AIR. Details from Activities Office, The Scout Association, Gilwell Park, Chingford, London E4 7QW. Tel: 081 524 5246. Participants are asked to complete a registration form so that they can be sent the full information available.

17 OCTOBER

HORNSEA (East Yorkshire) RC Rally - Floral Hall, Hornsea. Doors open 11am. Traders, radio clubs, bring & buy, Slow Scan TV. Good parking. Talk-in on S22. Bring the family and have a day at the seaside as well. Details Duncan, G3TLI tel: 0964 532588.

17/18 OCTOBER

SCOTTISH TOURIST BOARD RG - Launch of 1993 Airdrie MOD - GB2STB. Airdrie MOD is the 101st Annual Gaelic Festival held in a different town in Scotland each year, to promote the culture and heritage of the Scots nation, through its language, drama, music, dance etc.

29/30 OCTOBER(FRI/SAT)

LEICESTER Amateur Radio Show - Granby Halls, Aylestone Road, Leicester. Just off M1, junc 21. Doors open 10am, 9.30 for disabled visitors. Extensive trade exhibition, RSGB Book and Information Stand, bring & buy, RAOTA AGM (Saturday only). Talk-in by GB2GH on S22 and SU22. Details Frank, G4PDZ 0533 871086.

6/7 NOVEMBER

7th NORTH WALES Radio & Electronics Show - Aberconwy Conference and Exhibition Centre. Entrance £1 adults, under 14 free. Details GW7EXH, 0745 591704.

7 NOVEMBER

BISHOP AUCKLAND Radio and Computer Rally. ***NEW DATE***. Originally scheduled for Sunday 31 October. - Spennymoor Leisure Centre. Doors open at 11am, 10.30 for disabled visitors. Usual stalls, all on one level. Bar & refreshments available. Details Mike, G0PRQ on 0388 766264.

DONEGAL TIR CONAILL ARS Annual Radio Rally - Jacksons Hotel, Ballybofey, Co Donegal. Details Ken, EI4DW, QTHR or Tel: (from UK) 010 353 74 31109 or 074 31109.

13th NORTH DEVON Rally - Holsworthy Memorial Hall. Doors open 10.30am. Bring & buy stand etc. Details G8MXI, QTHR.

TYNE & WEAR REPEATER GROUP AUCTION - Fence Houses & District Community Centre, Fencehouse, Nr Chester-le-Street, Co Durham. Doors open at 10.30am for booking goods in. Auction starts at 12 noon. Details Brian, G8FBQ, QTHR or Tel: 091 388 2913.

13 NOVEMBER

ALL MICRO SHOW, Electronic Fair and Radio Rally - Details 0473 272002.

14 NOVEMBER

BARNSLEY & DARC AR Rally. Details Ernie, G4LUE, 0226 716339 (6pm-8pm please).

BRIDGEND DARC Amateur Radio Rally - Bridgend Recreation Centre, Bridgend, Mid Glam. Details Mike, GW7NIS, 0656 722199 or GW3RVG on 0656 860434.

MARS/STOCKLAND Radio Rally - Stockland Green Leisure Centre, Slade Road, Erdington, Birmingham. Doors open 10am. Trade stands, bring & sell tables. Refreshments and bar. Free raffle. Details Peter, G6DRN 021 443 1189. Trade stands info from Norman, G8BHE 021 422 9787.

21 NOVEMBER

WEST MANCHESTER RC 'Winter Rally' - Bolton Sports & Exhibition Centre, Silverwell Street, Bolton (town centre). Doors open 11am, 10.30 for disabled visitors. All the usual trade stands, societies, bring and buy, etc. Refreshments/meals available. Admission £1, children free. Details Dave, G1IOO on 0204 24104 (evenings only).

4 DECEMBER

RSGB ANNUAL MEETING, Manchester Conference Centre, UMIST, Manchester.

5 DECEMBER

LEEDS & DARS (Pudsey Rally). CHANGE of VENUE: now Allerton High School, Kings Lane, Leeds 17. Details 0532 552344 or FAX 0532 393856.

12 DECEMBER

CENTRE OF ENGLAND CHRISTMAS Radio, Satellite Computer & Electronics Rally - ***NEW VENUE***. Details tel: 0952 598173.

23 JANUARY 1994

OLDHAM ARC Radio Rally - Details 061 652 8617 home or 061 633 0550 work.

6 FEBRUARY

SOUTH ESSEX ARS Radio Rally - Details G0BBN, 0268 755350.

13 FEBRUARY

CAMBRIDGE & DARC Radio and Computer Rally. Details 0954 719273.

20 FEBRUARY

TRAFFORD Rally at G-MEX - Details 061 748 9804.

13 MARCH

WYTHALL Radio Club Rally - Details G0EYO on 021 430 7267.

13/14 MARCH

LONDON AR & Computer Show - Picketts Lock Centre. Details 0923 893929.

20 MARCH

NORBRECK AR Electronics & Computing Exhibition - Details G6CGF on 051 630 5790.

27 MARCH

MAGNUM Rally - Magnum Leisure Centre, Irvine. Details GM0FCI on 0294 72253.

3 APRIL

28th WHITE ROSE ARS Rally - Details G7ELS on 0850 690189.

17 APRIL

BURY RS Radio Rally - Details 061 762 9308.

8 MAY

MARS/DRAYTON Mobile Radio Rally - Details G6DRN on 021 443 1189.

10th YEOVIL QRP Convention. Details G3CQR, QTHR. Tel: 0935 813054.

19 JUNE

NEWBURY Boot Sale. Details G3ZGC on 0635 863310

10 JULY

SUSSEX AR and Computer Fair. Details G8VEH, QTHR. Tel: 0903 763978 or 0273 415654(office hours).

24 JULY

COLCHESTER Radio & Computer Rally. Details Frank, G3FIJ, QTHR 0206 851189.

29 AUGUST(MONDAY)

SCARBOROUGH AR Electronics and Computer Fair. Details Ross, G4ZNZ.

GB CALLS

The list below shows all special event stations licensed for operation during this month and up to 28 Oct. It was taken from the HQ computer on 3 Sept. These callsigns are valid for use from the date given but the period of operation may vary from 1-28 days.

SEPT 27
GB2RST Radio Scouting Team

OCT 1
GB2CDR Coastal Defence 'R'
GB2CDX Coastal Defence X
GB2SEG Scottish Expedition Group
GB4BIG Big Games
GB4WO Walsh's Own
GB4XXX 'X' Nett DXpedition

OCT 3
GB0KLD Kidlink Dollar
GB0TJI Thornhill Junior & Infant Sch

OCT 4
GB0CSR Civil Service Radio
GB4CPC Castlehill Primary Cupar

OCT 6
GB2RCC Radio Caravan Club

OCT 8
GB2PG Paul Godley
GB4DHX Dunfermline Hobbies Xhibition
GB6HF Houghton Feast

OCT 10
GB4CPU Computercations

OCT 14
GB93AM 1993 Airdrie MOD

OCT 16
GB2SFB Strathclyde Fire Brigade

OCT 23
GB0ACS Age Concern Scotland

OCT 28
GB40SAM 40 Years of Samaritans

SILENT KEYS

WE HAVE BEEN advised of the deaths of the following radio amateurs:

G0AEH	Mr A E Hill	
G0IGV	Mr C E Willcock	07.07.93
G0NVH	Mr R J MacKenzie	19.05.93
G1VVW	Mr F M Bell	
G2DM	Mr A S Binks	
G2FCV	Mr G Leigh	01.01.93
G3BHS	Mr F A Russell	10.06.93
G3ECR	Mr L Harrington	05.07.93
G3FZG	Mr A Treanor	25.06.93
G3GBF	Mr S Oake	
G3GFU	Mr W H Otley	27.06.93
G3KMR	Mr T Heslop	27.05.93
G3MBQ	Mr S J Scarbrough	18.05.93
G3YFQ	Mr A E Chivers	
G4EYS	Mr W H Fielding	21.06.93
G4FWL	Mr B A C Bastable	18.07.93
G4NBB	Mr B Hodgson	24.06.93
G4PLO	Mr C R Baigent	Jan 93
G4UYO	Capt E R Rose	02.06.93
G4WEB	Mr E Webb	03.10.92
G4ZGK	Mr F Smith	
G6CAK	Mr J J Allen	
G7JDJ	Mr F Webster	10.02.93
G8BIY	Mr T J H Hancox	16.07.93
GD2HDZ	Mr A E Breese	
GI8OLV	Mr J O'Kane	
GM0OFG	Mr D G Gittings	17.07.93
GW3RIL	Mr M L Lewis	14.05.93
GW4KRP	Mr I Williams	17.06.93
RS17426	Mr T Brown	22.05.93
RS50113	Mr D R J Goodwin	

Jamboree on the Air 16 - 17 Oct

THE 36TH JAMBOREE On The Air is scheduled to take place during the weekend 16/17 October, from 0000 on the Saturday to 2400 on the Sunday (local times). Scouts and Guides all over the world will be using amateur radio to celebrate their shared interest. Many administrations have relaxed their greetings message regulations just for this event.

Any participating station not using a GB callsign should notify RSGB HQ by Friday 1 October to be included on the JOTA list. This list is available only on receipt of a large SASE sent to: Sylvia Manco, RSGB, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE.

AJH ELECTRONICS

G8AQN *Est. 25 yrs*

PYE C12 TRANSCEIVERS inc 24 volt PSU & ATU with interconnecting leads (no headphones or mic), with copy of manual **£175**, prefer buyer to collect or carriage at cost.

C13 TRANSCEIVER with 24 volt vibrator PSU on mounting tray (no accessories) used condition **£100**, buyer to collect.

VIBRATORY 24 volt PSU as used with the C13 transceiver used **£35**, carriage £10.

R209 RECEIVERS 2 to 20MHz AM/FM/CW int speaker, requires 12 DC supply, tested used cond, no info, **£65**, carriage £9.

A40 MANPACK TRANSCEIVERS 47 to 54.4 MHz in 6 crystal controlled channels. FM modulated 250 m/W output size 5½ x 3½ x 11", requires 1.5 to 90v dry battery. No info, as new cond (no accessories). **£30**, carriage £8.

A41 No2 MANPACK TRANSCEIVERS 38 to 54MHz FM cont tunable with crystal cal points, 750 m/W RF output, requires battery 1.5v, 67v, 135v, size 10½ x 3½ x 19" used cond (no aerial). **£35**, carriage £8.

NUMBER 88 SETS. 4 channels crystal controlled between 38 to 42 MHz. FM, requires battery 90v & 1.5v, size 9½ x 3½ x 6" (no accessories), used cond. **£23**, carriage £7.

PLEASE NOTE due to their age no guarantee can be given as to working condition of the above radios except they have been visually checked internally as to being complete.

RACAL RA1771 RECEIVER. 15KHz to 30MHz all solid state decade switched tuning, AM/SSB/CW. Perfect working order, superb rx, v/good cond. **£695**.

RHODE & SCHWARZ SIGNAL GENERATOR type no BN41314 400KHz to 484MHz AM/FM/CW all solid state size 19 x 9 x 11" deep, v/good cond, perfect working order. **£325**, carriage £11.

ICOM IC-2 SET HAND PORTABLE for 2 mtr FM. 1½ watt RF output, extended Rx up to 170MHz inc AM airband. Used but in v/good cond with copy of inst book. Only **£175**. 3 months warranty.

WANTED WW2 spy sets and unmodified BC342 Rx.

UNIT 12, HUNTERS LANE, RUGBY, WARKS CV21 1EA
Ph: 0788 576473. Fax: 0788 551763

COMPUTER PARTS

MOTHERBOARDS

386SX-33Mhz	£59.00
386SX-40Mhz	£66.00
386DX-40Mhz	£99.00
486DLC-33Mhz	£159.00
486SX-25Mhz	£150.00

CASES

Slimline	£52.00
Lanstation	£52.00
Desktop	£50.00
Mini Tower	£50.00
Midi Tower	£71.00
Full Tower	£86.00

VIDEO CARDS

256K VGA	£20.00
512K SVGA	£26.00
1Mb Trident	£42.00
True Colour	£49.00
ET4000	£68.00

HARD DISKS

42Mb	SEAGATE	£72.00
85Mb	CONNER	£103.00
107Mb	SEAGATE	£125.00
120Mb	CONNER	£125.00
130Mb	SEAGATE	£131.00
170Mb	SEAGATE	£140.00
170Mb	CONNER	£155.00
213Mb	MAXTOR	£189.00
213Mb	SEAGATE	£184.00
261Mb	SEAGATE	£203.00
245Mb	W.DIGITAL	£225.00
340Mb	SEAGATE	£272.00
452Mb	SEAGATE	£392.00
540Mb	SEAGATE	£538.00

WE ALSO SUPPLY:

Monitors, Memory, Floppy Disks, Simms etc... Please call for details.

PART EXCHANGE ON UPGRADES AVAILABLE
ALL PRICES EXCLUDE VAT AND DELIVERY.

Teepee Technical Services
0816992624

KITS AND READY BUILT PRODUCTS

A wide range of quality kits & modules for the home constructor

LINEAR WITH PREAMP, 2 or 4 or 6 metre versions, RF switched, all mode SSB/FM/CW/DATA. Powers available, 2.5W in 25W out, 5W in 25W out, 5W in 40W out, 10W in 40W out, state requirements when ordering. RX adjustable gain 0-20dB. RX NF <1dB typical. Types TARP2S, TARP4S, TARP6S. **BOX KIT £72.75, BOX BUILT £98.25.**

LINEAR AMPLIFIER, 2 or 4 or 6 metre versions, RF switched, all mode SSB/FM/CW/DATA. Powers available, 2.5W in 25W out, 5W in 25W out, 5W in 40W out, 10W in 40W out, state requirements when ordering. Types TA2S1, TA4S1, TA6S1. **BOXED KIT £56.25, BUILT £70.50.**

TRANSVERTERS from 10 metres for 2, 4 or 6 metres. 0.5W output RX gain 15dB, NF <1dB. Large box allows inclusion of 25W linear amplifier, see below. Types TRC2-10, TRC4-10, TRC6-10. **PCB KIT £55.50, PCB BUILT £89.50, BOX KIT £78, BOX BUILT £116.**

TRANSVERTERS for 1mW 10 metre drive, including buffer board, otherwise as above. Types TRC2-10b, TRC4-10b, TRC6-10b. **PCB KIT £64.25, PCB BUILT £100, BOX KIT £85.75, BOX BUILT £132.**

TRANSVERTERS from 2 metres for 4, 6 or 10 metres, 0.5W output. Includes interface to accept 0.5-5W drive. Types TRC4-2i (built only), TRC6-2i, TRC10-2i. New larger box to include linear. **PCB KIT £64.25, PCB BUILT £100, BOX KIT £85.75, BOX BUILT £132.**

LINEAR AMPLIFIERS to suit the transverters above. 0.5W in 25W out. Types TA2S3, TA4S3, TA6S3. **PCB KIT £60, PCB BUILT £80.75.**

FOUNDATION TRANSMITTER, FTX201 144MHz, 6 channel, 0.5W, CW & FM. Supplied with S20 crystal. **PCB KIT £36.50, BOX KIT £49.50.**

COMMUNITY BROADCAST TRANSMITTER, 88-108MHz, 0.5W. Wideband FM, meets the requirements of the DTI Restricted Service Licence. Synthesized 40 channel in 50KHz steps giving a 2MHz portion of the broadcast band. Audio passband 150Hz to 15KHz. Types CTX100, ready built **£110.00**. Also 25W continuous rated matching Class C amplifier type TA100C3, ready built **£110**. Omnidirectional folded "J" aerial for the above, **£30** inc P&P.

VAT & P&P inc prices. Send SAE for free full catalogue

SPECTRUM COMMUNICATIONS

Unit 4 Grove Trading Estate, Dorchester, Dorset. Tel 0305 262250
Opening times: 9-1 2-5 Tue-Fri, 9-1 Sat. Closed Sun & Mon

HATELY ANTENNA TECHNOLOGY GM3HAT

1 Kenfield Place, ABERDEEN AB1 7UW, Scotland, U.K.
ACCESS, VISA, Mastercard orders may be telephoned any day 08.30 to 21.30 on 0224 316004

CAPACITOR DIPOLES. Following the publication of the UK Patent Application 2,112,579 in 1983, we commenced the sale of this antenna design with various versions for HF Amateur Bands. These antennas are very efficient and have low SWR on 1, 2 or 3 or even 4 bands allowing modern "protected" PA transceivers and linears to be pulled up to full power without an ATU.

We believe we are still the only company publishing SMITH CHART plots of antenna input impedance of multiband and mono band capacitor dipoles. See for yourself.

Send TWO First Class stamps (or 2 IRC's outside the U.K.) for technical details and prices.

Or alternatively look back in this magazine for our advertisements.

Proprietor:— Maurice C Hately, M Sc FIEE Chartered Electrical Engineer.
Licenced since 1950

EX-WD PLUGS & SURPLUS BARGAINS!

Thousands of Plugs & Sockets for all types of Radio Equipment used in Aircraft & Ground Stations, incl P.O. Plugs & Sockets, Original Morse Keys. Ref No. 10A/7741 used with T1154 and R1155 Gee Sets. Braided covered cable 2-24 strands, Earphones, Microphones etc., Over 750,000 different Ref No's and appx 2000 tons of equipment in stock. Why not visit one of our four warehouses and see for yourself our vast stockholding! Phone or fax for appointment.

METHODICAL ENGINEERS LTD

Manor Trading Estate, 4/6 Armstrong Road, Benfleet, Essex SS7 4PW. England.

Tel. (0268) 792681 Fax. (0268) 795375 Telex 99214

RSGB – at Your Service

SOME OF THE RSGB'S TEAM OF VOLUNTEER EXPERTS — AVAILABLE TO HELP YOU

• RSGB Policy Matters (Zonal Council member):-

See *RadCom*, September 93.

• 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*, or *RadCom*, May/June 93 *(Not as list on p79)*.

• 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 – Bill Ricalton, G4ADD, QTHR.

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. See *RadCom*, September 93.

• Beacons

HF Beacon Coordinator – Prof Martin Harrison, G3USF, QTHR.

VHF Beacon Coordinator – John Wilson, G3UUT, QTHR.

Microwave Beacon Coordinator – Graham Murchie, G4FSG, QTHR.

• RSGB Contests:

First contact the 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.

Committees, Honorary Officers and EMC Coordinators

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*.

ARDF (direction finding) 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:

L J Parry, G8AMK, **Bracknell**, 0344 423704

C G Barry, GW3BUT, **Cardiff**, 0222 628430

R P Harrison, G4UJS, **Nantwich**, 0270 627620

R P Smith, G3SVW, **Sale**, 061 9693999

A Armstrong, G0FBW, **Peterlee**, 091 586 4500

G Halse, G3GRV, **Hemel Hempstead**, 0442 214972

A D Maish, G4ADM, **Worcester Park**, 081 337 2123

R M Allsopp, G1YFT, **Leicester**, 0533 833714

D A Hopkins, G0MXI, **Hull**, 0482 210763

P Daly, G0GTE, **Stevenage**, 0438 724991

L K Ayre, G3DPR, **New Milton**, 0425 615676

K Hendry, G0BBN, **South Benfleet**, 0268 755350

R Sykes, G3NFV, **Leatherhead**, 0372 372587

M Goodfellow, G4KUQ, **Bristol**, 0272 716093

K N Watkins, G3AIK, **Martock**, 0935 825266

S O'Sullivan, G8VPG, **Bristol**, 0225 873098

Mrs S Morley, G0MCV, **Loughborough**, 0533 374999

S M Wood, G4OWI, **Newark**, 0636 72625

G Brooks, GM4NHX, **Caithness**, 084 783570

Rev S Bennie, GM4PTQ, **Stornoway**, 0851 703609

D W Smith, G3LIS, **Ormskirk**, 0695 77960

R Adam, GM4ILS, **Elgin**, 0343 545842

N Carr, G0JHC , **Preston**, 0772 742710

C Barnes, GW4BZD, **Bangor**, 0248 351151, ext 2750

D Morris, GM3YEW , **Perth**, 073 885533

J Lawrence, GW3JGA, **Prestatyn**, 0745 853255

• Emergency Communications:

Emergency Communications Officer – Post Vacant.

• Exhibition & Rally Committee:

Chairman: Norman Miller, G3MVV, Tel: 0277 225563, QTHR.

• Honorary Historian

George Jessop, G6JP, QTHR.

• IEE:

Liaison Officer – Prof Peter Saul, G8EUX, QTHR.

• Licensing:

Licensing Advisory Committee Chairman – John Bazley, G3HCT, 'Brooklands', Ullenhall, Nr Henley in Arden, Warwickshire, B95 5NW.

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 – Clive Trotman, GW4YKL, QTHR.

• Morse:

GB2CW Coordinator – 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, please write direct to RSGB HQ, quoting your postcode.

• Packet Radio:

Datacomms Committee Chairman – Ian Suart, GM4AUP, 37 Meldrum Mains, Glenmavis, Airdrie, Lanarkshire, ML6 0QG. Tel: 0236 765937.

• President:

Peter Chadwick, G3RZP, 'Three Oaks', Braydon, Swindon, Wilts, SN5 0AD.

• 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*).

Liaison Officer – John Hall, G3KVA, Corfe Lodge, Ipswich Road, Long Stratton, Norfolk NR15 2TA.

• Repeaters:

Repeater Management Group Chairman – Geoff Dover, G4AFJ, QTHR.

• Spectrum Abuse:

Amateur Radio Observation Service Co-ordinator – Geoff Griffiths, G3STG, QTHR.

• Technical Queries:

Technical and Publications Committee Chairman: Dick Biddulph, G8DPS, QTHR.

• Training and Education:

T and E Advisory Committee Chairman – John Case, GW4HWR, QTHR.

Radio Amateur's Examination – George Benbow, G3HB, QTHR.

• Trophies:

Trophies Manager – Bob Harrison, G4UJS, QTHR.

The LAST WORD

PSE QRS

Well, I finally decided to get my feet wet after months of practice and took the home-brew keyer and paddle out portable for the 144MHz Cumulatives. I decided to listen around first to get an idea how it was done and what a revelation.

Within minutes of take-off there were three QSOs in full flight and a fourth station calling CQ, all on 144.050! I tuned around and heard several stations calling but not much chance of getting their callsigns, they're too fast for me.

I tried my callsign at a nice steady 8WPM or so, the GJ prefix usually raises a few eyebrows in a contest. A station comes back so fast I don't even recognize my own call, and I still haven't got his. I tried once more, and could actually hear the Morse slowing down as he turned the speed control on his keyer. I was still having enormous trouble reading him, there didn't seem to be any spaces between his letters, but we just about completed the contact. I was getting flustered by this time and probably sent more 'error' dits than actual information, but he gave me an 'R' so he must have been happy. Phew! I was almost sorry I had started this, It had to get easier.

Anyway, with the first A1A contact in the log, I was feeling fairly pleased with myself. I tuned round once more and found a signal I could read, quick letters but well spaced. I went for it and he came straight back, 579 both ways and not too many mistakes from me. That was easy.

And so it went on. After an hour I'd made three contacts and had to leave a couple of weaker stations wallowing in the QSB. Sorry chaps, but the stations I do feel for are the ones who I never even tried for, the '299s' as I've decided to term them, big QRO signals who are so fast.

If the point of a contest is to work as many stations as possible entrants may well improve their scores by calling CQ a little slower, with a bit of space between the characters. I certainly found it very intimidating to call a station whose call I didn't have first time. I would suggest there are quite a few other 'B' licensees, and probably some 'A' licensees as well, who are in the same boat.

So chaps, how about keeping the high-speed stuff for the HF bands, or QSOs where you know the fellow on the other end can handle it, and introducing a bit of Farnsworth *[quick characters, long gaps - Ed]* into VHF contesting, I bet your scores go up.

C R Eve GJ7AOG

OLD NEWS

I have just read through *RadCom* for August, scanning likely pages for current HF callsign information. Sadly I can find little and I am rapidly coming to the conclusion that the *HF News, QSL* and *SWL News* are all really depositories for archive material. The real news seems to be going out in the RSGB *DX News Sheet*. Yes, I know the news sheet is posted weekly but surely one page in *RadCom* could carry brief snippets on likely HF activity by individuals and groups with projected dates and likely frequencies applicable to the month on the cover of *RadCom*.

And would it not be a sound idea to take contests and awards out of *HF News* and put it altogether with *Contest Classified*?

David A Ramsey G3UAA

[John Allaway, G3FKM, compiler of HF News *replies: If you need really current information then you cannot expect to read it in a magazine which has copy dates several weeks before the nominal publication month, though I always try to see ahead as far as possible. I don't think that overseas contests and awards should be taken out of* HF News *because they are nothing to do with* Contest Classified *which deals with RSGB sponsored events.]*

SORTED OUT

Would you please inform members that I am now out of hospital and able to continue as QSL Sub-Manager for the G0S series. I would like to thank both Mr Tyler, G0ITI and Mrs Tyler, G0AEC for their help and support during my absence.

J Anderson G0DWL

RALLY ROUND

The August *RadCom* contains a panel listing nine suggestions for improving rallies (page 89). Please may I include the tenth: "Circulate Clockwise". My 90 year old toes testify!

R J Leeves G2LV

HELPING HAND-HELD

You frequently publish letters describing how amateur radio has helped people in distress, here's one that can serve as a timely lesson.

Today I was within 1 metre of my car, just back in time to remove it from its bay before incurring a fine, when a woman in distress stopped me. She had seen me talking into the remote speaker/microphone of my FT23 and, coupled with the fact that I was wearing a money bag round my waist, she had mistaken me for the car park attendant. In poor English she explained her car was broken or broken into. In my English I explained that car park attendants don't dress as I was in tee-shirt, shorts and sandals.

We couldn't find an attendant; the lady wouldn't or couldn't tell me where her car was, but she was clearly upset. I left her with the advice that she should look for a policeman (not wearing a tee-shirt, shorts and sandals!)

On returning to my car, yes you've guessed it. The car park attendant was there busy writing me a ticket. So the motto is, if you are going to work portable do it secretly (then you might be rated as an undercover policeman) or stand the chance of being seen as a source of help to all and sundry. My fine for being a good samaritan is £30.

A Harada G4INX

HELPLINES EXCELLENT

In the August edition of *Radio Communication* you kindly published my request for help in *Helplines*. I am delighted to say that there was a very good response and within a short while the required copper film was in my hands - free of charge.

An incidental benefit was the opportunity to swap notes with other builders of the G3TSO transceiver, one being an old Southgate Radio Club friend with whom I lost touch many years ago.

This is an excellent feature of the magazine and it demonstrates what a jolly good bunch your readers are. Many thanks.

Alan Dutton G3TIE

RECORD SILVER JUBILEE

On behalf of Colchester Radio Amateurs I would like to thank the traders and visitors to our 25th Radio and Computer Rally for their continued support. We are especially pleased as this was our Silver Jubilee Rally. Our new venue of St Helena School seems to have been a hit with visitors as we again broke our attendance record.

It would be very useful to the club if we had some feedback from traders and visitors as to any points they consider could be improved for our 1994 event. We look forward to meeting friends old and new next year.

Richard Hudson G7BIV

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.

DEATH KNELL

Packet is the 'death knell' of 2m operation. Since it was introduced, the lack of 2m operation using a microphone has reduced dramatically. The packeteers have become a legion of screen watchers!

Not so long ago one could put out a call on S20 and be assured of contacts whether mobile or fixed station. A mobile with problems could always be assured of a helping hand if lost. Now put a call out and it is a very lucky person who gets a reply. Some regular mobile operators are even installing CB transceivers in their vehicles to get help when needed. Packet, while interesting as a means of passing bulletin information or general information to all and sundry, is *not* a chat mode, while RTTY or AMTOR are.

G1VCY (*The Last Word*, September) makes the comment that VHF Packet is efficient. It is, if one merely wishes to read screens of information or put out a request for information. It is not, however, if one wants a QSO as such. I understand that there are those who wish to use some of the simplex channels for packet. This is not on!! Packet should remain in the area around 144.650.

Packeteers will not admit that they have caused the lack of operation elsewhere but if they only have the one transceiver they find it tiresome or difficult to disconnect it so do not use it for other modes. However, many are now using a cheap second rig, such as a Pye Base station with a couple of channels, thus releasing the expensive set for general use.

Packet, like computer operating, is a time stealer and addictive, causing the packeteer to become glued to the screen for fear they might just miss something. Use and enjoy packet by all means but not to the exclusion of all else. Pick up a microphone or a key and use it - you might just rediscover the pleasures of their use. You will certainly revitalize the VHF/UHF bands.

E G Knight G4NVD

OPEN DAY

I enjoyed the HQ Open Day and I found the offices all very smart indeed, but still friendly! I did have one moan and that was refreshments. I was not expecting the free and very good grub of last year because this costs money but I was expecting to be able to buy sarnies and snacks, and for this reason I did not bring my own food. I was very upset that only burgers and hot dogs were being sold as I cannot eat this sort of food. However, the food and drink was very good value and the Scouts serving it were very helpful and friendly. Having only QRP CW at home at the time I was thrilled to have access to SSB in the GB3RS shack.

I support the Society, and indeed the IARU, one hundred percent plus, and I will be at Open Day 1994.

Angie M Sitton G0HGA

AERIALS FARMED

The SSB Field Day station was set up in an ordered manner, everything going absolutely to plan. All was set up, tested and working well 18 hours in advance of the start time. A good night's sleep and a lazy morning followed. One hour before the contest the barbecue started and all steaks were consumed by twenty minutes before start time.

Then it happened! The tractor popped over the hill and rotated the tower and operating tent at high speed, gathering in its hay-making equipment feeders, dipoles and supply cables in its wake. It eventually came to a halt when the rotating parts became clogged with coax. I seem to remember the words "Don't Panic" quite vividly! We still had a good time.

Keith Reid G0TIO
Rolls Royce Amateur Radio Society

OZONE DEAD ZONE?

The recent peaking of the solar cycle should have made a great improvement to DX propagation, but apparently did not. Indeed the far-away signals on the whole seem fainter these days than I have ever known them (or are my rig and antenna not up to scratch?).

The depletion of the ozone layer continues to have greater effect on the northern hemisphere. Can the two phenomena be connected?

G MacNeill GM0DLZ

GIMME THE FAX

Can you please ask your advertisers to include FAX numbers in their adverts. It makes contact and ordering so much easier.

A E Smith G6HPO

RSGB BOOK CASE

PRICES NO LONGER INCLUDE POST AND PACKING

Antennas

ANTENNA COMPENDIUM VOLUME 1 (ARRL)
G L Hall, K1TD, P Rinaldo, W4RI, M Thompson, KA1DYZ
A collection of antenna articles with something for everyone. 175 pages. **(£10.25) £8.72**

ANTENNA COMPENDIUM VOLUME 2 (ARRL)
Jerry Hall, K1TD
208 pages. **(£10.25) £8.72**

ALL ABOUT VERTICAL ANTENNAS (BPI)
William Orr, W6SAI/Stuart Cowan, W2LX
Packed with down to earth facts about all types of vertical antennas. Theory, design, construction and operation. **(£8.18) £6.95**

BEAM ANTENNA HANDBOOK (RPI)
William Orr, W6SAI/Stuart Cowan, W2LX
Everything you need to know about beam design, construction and operation in this new 2nd edition. 268 pages. **(£7.50) £6.38**

THE ANTENNA EXPERIMENTER'S GUIDE (DD)
Peter Dodd, G3LDO
The book deals with the practicalities of objective antenna measurements for the amateur. It also gives buildable designs for simple homemade instruments. Anyone with RAE standard knowledge should be able to follow the book. **(£9.75) £8.29**

HF ANTENNA COLLECTION (RSGB)
Erwin David, G4LQI
RadCom articles from 1968-89. A wealth of information on antennas, feeders, tuners, baluns, testing, modelling and the mechanics of mounting an antenna safely. 233 pages. **(£9.50) £8.08**

HF ANTENNAS FOR ALL LOCATIONS (RSGB)
Les Moxon, G6XN
The completely revised and greatly expanded 2nd edition of this popular book. A wealth of practical information on the choice and construction of antennas. **(£13.50) £11.48**

PRACTICAL WIRE ANTENNAS (RSGB)
John Heys, G3BDQ
Wire antennas offer one of the cheapest ways to put out a good signal on the HF bands and this popular guide has something to interest every amateur on a budget. 96 pages. **(£8.00) £6.80**

SIMPLE LOW COST WIRE ANTENNAS (BPI)
William Orr, W6SAI/Stuart Cowan, W2LX
How to build efficient antennas that get out – 2 through 160 metres! Also how to build secret 'invisible' antennas for use in difficult station locations. **(£8.18) £6.95**

W1FB'S ANTENNA NOTEBOOK (ARRL)
Doug DeMaw, W1FB
Explores the many aspects of simple antennas and related matters. 130 pages. **(£7.00) £5.95**

Awards

AMATEUR RADIO AWARDS BOOK (RSGB)
Cris Henderson, G4FAM
A compilation of all the world's popular and obscure awards which is suitable for the avid parchment chaser. Fully referenced and with many checklists. (RSGB). 188 pages. **(£9.50) £8.08**

ISLANDS ON THE AIR DIRECTORY
Roger Balister, G3KMA
Post Free ***NEW!*** **(£6.90) £6.00**

Beginners and Novices

AMATEUR RADIO FOR BEGINNERS (RSGB)
Victor Brand, G3JNB
Suitable for all ages, this new book explains how to build a crystal set, how to listen to shortwave radio, and how to become a radio amateur. 65 pages. **(£3.50) £3.50**

D-I-Y RADIO SUBSCRIPTION (RSGB)
A 24-page magazine for beginners of all ages. Published six times a year,
Six copies: **(£9.00) £7.65**
Price includes UK postage.

FIRST STEPS IN RADIO (ARRL)
Doug DeMaw, W1FB
(£5.50) £4.68

HOW TO PASS THE RAE (RSGB)
Clive Smith, G4FZH, and George Benbow, G3HB
A companion to the RAE Manual, this book contains some excellent practical advice on how to pass the exam and has nine sets of typical papers (and their answers) on which to practice. 84 pages. **(£6.50) £5.53**

TRAINING FOR THE NOVICE LICENCE – INSTRUCTOR'S MANUAL (RSGB)
John Case, GW4HWR
The official guide for instructors. 101 pages. **(£6.00) £5.10**

W1FB'S NOVICE ANTENNA NOTEBOOK (ARRL)
Doug DeMaw, W1FB
A plain-language introduction to practical antennas for complete beginners. 130 pages. **(£7.25) £6.17**

Call Books

INTERNATIONAL CALLBOOK 1993 (RACI)
(£19.50) £16.58

NORTH AMERICAN CALLBOOK 1993 (RACI)
(£19.50) £16.58

EMC (Breakthrough)

INTERFERENCE HANDBOOK (RPI)
William Nelson, WA6FQG
How to locate and cure RFI in amateur radio, CB radio and power line problems. 250 pages. **(£8.75) £7.44**

This Month's Special Offers For Members Only

Reflections: Transmission Lines and Antennas

. . . . is written by Walt Maxwell, W2DU, to clear the air of the half-truths and outright myths you hear these days about transmission lines, standing waves, antenna matching, reflected power and antenna tuners. This book has a wealth of information on matching networks, antennas and use of the Smith Chart. Companion software is available for IBM PCs and compatibles. Hardcover. (ARRL).

NORMALLY **(£13.25) £11.27**

Special Price for Members

£10

PLUS P&P

Transmission line Transformers

. . . . is a source of practical design data covering the use of these devices for both commercial and amateur applications. Written by Dr Jerry Sevick, W2FMI, this book covers types of windings, core materials, fractional-ratio windings, efficiencies multiwinding and series transformers, baluns, limitations at high impedance levels and test equipment. Hardcover. 2nd edition. (ARRL).

NORMALLY **(£13.50) £11.48**

Special Price for Members

£10

PLUS P&P

Prices on the RSGB Book Case Pages are Valid Until 31 October 1993

THE NOVICE LICENCE STUDENT'S NOTEBOOK (RSGB)
John Case, GW4HWR
The official textbook for the RSGB Novice Licence Training Course. 70 pages. **(£5.29) £4.50**

PRACTICAL ANTENNAS FOR NOVICES (RSGB)
John Heys, G3BDQ
(£4.49) £3.83

RADIO AMATEURS' EXAMINATION MANUAL (RSGB)
George Benbow, G3HB
This is the standard textbook that almost every radio amateur needs to study in order to pass the RAE. **(£6.50) £5.53**

RAE REVISION NOTES (RSGB)
George Benbow, G3HB
A pocket-sized summary of the RAE Manual. 92 pages. **NEW (£4.00) £3.50**

REVISION QUESTIONS FOR THE NOVICE RAE (RSGB)
Esde Tyler, G0AEC
Sample questions and answers to help candidates revise and to familiarise themselves with the question style. A sample paper is included. **NEW (£5.00) £4.25**

RADIO AMATEUR'S GUIDE TO EMC (RSGB)
Robin Page-Jones, G3JWI
This essential guide helps you avoid EMC problems and assists in diagnosis and cure of any which occur, not forgetting advice on how to deal with neighbours. **NEW!(£6.50) £5.65**

RADIO FREQUENCY INTERFERENCE (ARRL)
(£12.00) £10.20

General Technical

AMATEUR RADIO TECHNIQUES (RSGB)
Pat Hawker, G3VA
Reprint of the 7th edition. A very large selection of circuit ideas and devices, information on antennas and related topics plus many constructional hints from *RadCom's* popular Technical Topics feature. 368 pages. **(£7.50) £6.38**

ARRL HANDBOOK 1993 (ARRL)
Larry Wolfgang, WA3VIL, and Charles Hutchinson, K8CH
The largest and most up-to-date guide to every aspect of amateur radio. 1215 pages hardback. **(£16.50) £14.25**

HINTS AND KINKS FOR THE RADIO AMATEUR (ARRL)
Charles Hutchinson, K8CH, and David Newkirk, AK7M
A collection of practical amateur radio ideas gleaned from the pages of QST magazine. 147 pages. **(£5.00) £4.25**

SOLID STATE DESIGN FOR THE RADIO AMATEUR (ARRL)
W Hayward, W7ZOI / Doug DeMaw, W1FB
An essential guide for the amateur designer and constructor. 256 pages. **(£9.25) £7.87**

W1FB'S DESIGN NOTEBOOK (ARRL)
Doug DeMaw, W1FB
Simple, practical projects for the HF bands. 195 pages. **(£5.75) £4.89**

History

THE BRIGHT SPARKS OF WIRELESS (RSGB)
George Jessop, G6JP
This is the story of the radio amateurs from Marconi to the 'secret listeners' of WWII, who laid down the foundations of circuits and procedures that we all now take for granted. 90 pages hardback. **(£9.75) £8.29**

Log Books and Log Sheets

LOG BOOK – TRANSMITTING (RSGB)
A4 size, spiral bound. **(£2.45) £2.09**

LOG BOOK – RECEIVING (RSGB)
A4-sized with columns for both stations in the QSO. **(£3.25) £2.77**

LOG BOOK COVER (RSGB)
Smart plastic cover to keep an A4 log in mint condition. **(£4.25) £3.62**

LOG SHEETS (RSGB)
Available for HF contests or VHF contests (specify which). 100 sheets. **(£4.00) £3.40**

Maps/Charts/Lists

BEACON AND REPEATER LISTS (RSGB)
Up-to-date lists prepared on the Society's computer. Pack of three: (i) UK beacons, (ii) Region 1 beacons; (iii) UK repeaters.
Pack: **(£1.00) £0.85**

COUNTRIES AND AWARDS LIST (RSGB)
(£1.00) £0.85

GREAT CIRCLE DX MAP (RSGB)
This popular station accessory shows the bearing in degrees from London of any DX station and is invaluable for the HF operator using a beam antenna. Available as a wall map in three colours, size approx 24 by 32in.
(£2.00) £1.70
Also available as a handy A4 card for the desk printed in black. **(£1.00) £0.85**

GRID LOCATOR ATLAS (ARRL)
(£3.50) £2.49

LOCATOR MAP OF EUROPE (RSGB)
Covers the whole of Europe from Iceland and Finland to North Africa and the Black Sea, and shows the medium locator squares, eg KN80, as well as country prefixes. Available as a wall map, size approx 22 by 24in. **(£1.25) £1.07**
Also available as an A4 card for desk.
(£0.75) £0.64

METEOR SCATTER DATA SHEETS (RSGB)
Geoff Grayer, G3NAQ, and Chris Bartram, G4DGU
Computer printouts giving the altitude/azimuth of all the major meteor shower radiants during the year. **(£2.25) £1.92**

WORLD PREFIX MAP (RSGB)
This is a superb full-colour wall map, measuring approx 1200 by 830mm. It shows amateur radio prefixes, world time zones, IARU locator grid squares, & much more. **(£2.50) £2.13**

RETAIL PRICES ARE IN BRACKETS, FOLLOWED BY MEMBERS SPECIAL DISCOUNT PRICES

SEE BELOW FOR OUR NEW ORDERING DETAILS

RSGB BOOK CASE

Microwaves

MICROWAVE HANDBOOK (RSGB)
Mike Dixon, G3PFR
Three volumes giving theory and practical designs for the microwave enthusiast.

Volume 1: operating techniques, system analysis and propagation, antennas, transmission lines and components, semiconductors and valves. 224 pages. **(£9.50) £8.08**

Volume 2: construction techniques, common equipment, beacons and repeaters, test equipment, safety, filters and data. **(£14.50) £12.33**

Volume 3, just published, contains practical designs for each band from 1.3GHz to 24GHz and beyond. A must for anyone active on the microwave bands or contemplating 'life beyond 70cm': **(£14.47) £12.32**

Special offer to RSGB members only – All three volumes for just: **£25.50**

Morse Code

MORSE INSTRUCTION TAPES (ARRL)
Three sets covering 5 to 10, 10 to 15 or 15 to 22WPM. Each set consists of two cassettes. Price each (please specify speed): **(£10.50) £8.93**

MORSE CODE FOR RADIO AMATEURS (RSGB)
George Benbow, G3HB
Completely new version of this popular guide. Suitable for UK 5WPM and 12WPM tests. 32 pages. **(£3.51) £2.98**

MORSE CODE STAGE 1 – 5WPM (RSGB)
A single cassette bringing the student up to the level required by the Novice Morse Test. **(£4.50) £3.83**

MORSE CODE THE ESSENTIAL LANGUAGE (ARRL)
Peter Carron Jr, W3DKV
All about Morse code from how to learn it to correct operating practice. **(£5.00) £4.25**

Operating aids

ARRL OPERATING MANUAL (ARRL)
Robert Halprin, K1XA
A most comprehensive and up-to-date guide to amateur operating. 684 pages. **(£11.75) £9.99**

AMATEUR RADIO OPERATING MANUAL (RSGB)
Ray Eckersley, G4FTJ
An interesting read and an excellent reference for the shack. Topics include DX, contests and mobile operating, and it features a 38-page appendix detailing each country's licensing details and prefixes. 204 pages. **(£6.75) £5.74**

DX EDGE (XANTEK)
An aid to calculation of the optimum path for grey-line communication on HF. **(£14.00) £11.90**

QRP (Low Power)

G-QRP CLUB ANTENNA HANDBOOK (G-QRPC)
Edited by P Linsley, G3PDL and T Nicholson, GW0LNQ
A compilation of antennas, matching units and associated articles from *SPRAT*, the G-QRP club journal. 155 pages. **(£5.75) £5.00**

G-QRP CLUB CIRCUIT HANDBOOK (RSGB)
George Dobbs, G3RJV
If you like construction, and want to build some simple circuits that work, this is the book. It is a pot-pourri of eight years of the best articles that have appeared in Sprat - the journal of the G-QRP Club. 96 pages. **(£6.75) £5.70**

QRP CLASSICS (ARRL)
Bob Schetgen, KU7G
Best QRP projects from QST and the ARRL Handbook. 274 pages. **(£11.00) £9.35**

W1FB'S QRP NOTEBOOK (ARRL)
Doug DeMaw, W1FB
All about QRP construction from a world expert. 2nd edition. **(£6.75) £5.70**

QST Magazine (ARRL)

One year (Airmail): **(£88.24) £75.00**
One year (surface mail): **(£34.41) £29.25**
Two years (surface mail): **(£70.73) £60.12**
Three years (surface mail): **(£103.24) £87.75**
OAP one year (surface mail): **(£30.88) £26.25**

Please wait 90 days before expecting delivery. OAPs - please send proof of age with subscriptions. Prices include postage.

RadCom Back Issues & Binders

BOUND VOLUMES
1990, 1991 and 1992. Some other years available, please ask. **(£22.00) £18.70**

BACK ISSUES
Please phone for availability. **(£3.50) £0.50**

EASIBINDERS
Keep your RadComs neat and safe in these instant binders. **£5.00**

RSGB Newsletters

DX NEWS SHEET
A 'must' for all serious DX operators, it provides details of special and rare station activities on the HF bands, as well as key solar/geomagnetic data. Weekly. **(£28.24) £24.00**

MICROWAVE NEWSLETTER
Contains technical information, operating news, events, and a sale/wanted column. 10 per year. **(£9.40) £7.99**

Free samples of newsletters (and rates for non-EC and all other overseas subscribers) are available on request from RSGB Sales. Prices include postage.

Satellites

SATELLITE ANTHOLOGY (ARRL)
The best of recent QST articles on satellite operation and hardware. 97 pages. Second edition. ***NEW!*** **(£5.75) £4.89**

SATELLITE EXPERIMENTERS' HANDBOOK (ARRL)
Martin Davidoff, K2UBC
Technical guide for the experimenter, including data on amateur, TV and weather systems. 334 pages. **(£12.75) £10.84**

SPACE RADIO HANDBOOK (RSGB)
John Branegan, GM4IHJ
The most comprehensive guide to space radio communications. Covers propagation, meteor scatter, moonbounce, satellites, manned space vehicles and even simple radio astronomy. 242 pages. **(£12.00) £10.20**

Short Wave Listener

COMPLETE SW LISTENER'S HANDBOOK (TAB) **(£18.25) £15.52**

WORLD RADIO AND TV HANDBOOK 1993 (RPI) **(£15.75) £13.39**

Special Modes

THE ATV COMPENDIUM (BATC)
Mike Wooding, G6IQM
An invaluable collection of video circuits which replaces the TV Handbook. **(£5.75) £4.89**

SLOW SCAN TV EXPLAINED (BATC)
Mike Wooding, G6IQM **(£5.00) £4.25**

NOSINTRO (DOWERMAIN)
Ian Wade, G3NRW
The definitive guide to the KA9Q Network Operating System (NOS). Practical information on using TCP/IP over packet radio. **NEW (£11.50) £10.00**

PACKET RADIO PRIMER (RSGB)
Dave Coomber, G8UYZ, and Martyn Croft, G8NZU
A light-hearted introduction to packet radio. Detailed practical advice and an operating guide, plus much reference information. 138 pages. **(£7.00) £5.95**

YOUR GATEWAY TO PACKET RADIO (ARRL) **(£9.00) £7.65**

VHF/UHF

ALL ABOUT VHF AMATEUR RADIO (RPI)
William Orr, W6SAI **(£9.50) £8.08**

RADIO AURORAS (RSGB)
Charlie Newton, G2FKZ
This new book gives a technical account of the latest research into how auroras are caused, how they can be forecast, and how best to use them to work DX. **(£7.00) £5.95**

VHF/UHF MANUAL (RSGB)
George Jessop, G6JP
The standard guide to theory, techniques and equipment for amateur radio transmission and reception at VHF and UHF. 511 pages. **(£10.25) £8.72**

Sundries (members only)

BADGES

Callsign (standard)*	**£3.00**
Callsign (deluxe)*	**£3.50**
Lapel (mini)	**£1.00**
Lapel (standard)	**£1.00**

** Includes engraving.*

MEMBERS' HEADED NOTEPAPER

100 sheets octavo	**£3.00**
100 sheets quarto	**£5.50**

RSGB TIES
New style, available in navy or maroon.
Post Free **£6.00**

RSGB SUNDRIES
Pencil, bug, bookmark, keyring and 80th anniversary RSGB badge (limited edition) – post free. **All five for £1.50**

Car Stickers

Brighten up your rear window! Styles are: 'I Love Amateur Radio', 'I'm monitoring .5, are you?' (2 colours), and 'I'm on the air with amateur radio' (4 colours). **(£0.75) £0.64**

There is also an RSGB diamond car sticker. (Members only). **£0.64**

EMC Filters

FERRITE RING TOROID
Pack of 2. **(£4.25) £3.63**
(Postage pair: UK 50p, Overseas: 75p)

FILTERS
Filter 1 - Braid Breaker. Filter 2 - High Pass for FM Broadcast Band 2. Filter 3 - High Pass for UHF TV. Filter 4 - Notch Tuned to 145MHz. Filter 5 - Notch Tuned to 435MHz. Filter 6 - Notch Tuned to 50MHz. Filter 7 - Notch Tuned to 70MHz. Filter 8 - Six Section for UHF TV. Filter 10 - Notch Tuned to 28MHz. Filter 15 - Notch Tuned to 21MHz. Filter 20 - Notch Tuned to 14MHz.

Filter 8 prices are **(£21.50) £18.28**
(Postage each: UK 60p, Overseas: £1.50)
All others are **(£8.50) £7.23**
(Postage each: UK 50p, Overseas: £1.00)

Filters are despatched post free if ordered with a book

REMEMBER TO ADD POSTAGE TO ALL PURCHASES

HOW TO ORDER

PRICES. Retail prices are in (brackets) followed by members' discounted prices. If you are a member, please quote your call sign or RS number when ordering. All prices include VAT (where applicable) and are subject to change without notice. Except where otherwise stated, please add postage as follows:

Amount of Order	UK Post and Packing	Overseas Surface
Up to £1	post free	post free
Up to £5	£1.00	£2.50
£5.01-£10.00	£2.00	£3.50
£10.01-£15.00	£3.00	£4.50
£15.01-£20.00	£4.00	£5.50
£20.01-£25.00	£5.00	£6.50
£25.01 and above	£6.00	£7.50

Newsletter and magazine prices include postage. Overseas Airmail and first class UK post prices are available on request.

AVAILABILITY. Goods are available over the counter at RSGB Headquarters 9.15am to 5.15pm, Monday to Friday. However, you are strongly advised to confirm availability of goods by telephone before visiting Headquarters.
PAYMENT. Payment may be made by post, enclosing a cheque or postal order. These should be crossed and made payable to 'Radio Society of Great Britain'. If sending cash please use registered post. We accept Visa and Access (Mastercharge) cards and our telephone number for credit-card orders is (0707) 659015. Our Giro account number is 533 5256.
DELIVERY. Goods will be despatched to UK destinations by 2nd class letter post or parcel post, or surface mail to overseas destinations. Please allow 28 days for delivery.

ORDER FROM:
RSGB SALES (CWO)
Lambda House,
Cranborne Road,Potters Bar,
Herts EN6 3JE

Access VISA **plus AMEX & DINERS CLUB**

Credit card hotline: 0707 659015

CLASSIFIED ADVERTISEMENTS

Classified advertisements 55p per word (VAT incl) minimum 14 words (£7.70). Please write clearly. No responsibility accepted for errors. Latest date for acceptance — 5 weeks before 1st of issue month.

All classified advertisements MUST be prepaid.

NB: CHEQUES SHOULD BE MADE PAYABLE TO RSGB.

Copy and remittance to: **Victor Brand Associates Ltd, 'West Barn', Low Common, Bunwell, Norwich, Norfolk, NR16 1SY.**

NB. Members' Ads must be sent to "Members' Ads," RSGB Hq.

FOR SALE

CUSTOM DRAWN QSLs etc to your instructions £12.99. GW3COI QTHR Abersoch 712675. SAE samples.

G3LLL REOPENS 6th OCT. After hols offers. HF beams — J beam TB2 (£276) £249. — Cushcraft 3EL. A3WS 18 & 24MHz (£306) £199 — TET 2EL. 15m. £65 — Black Star 600MHz counter (£170) £129 — see below...

REPAIRS & RECONDITIONED RIGS. We now close Mon & Thurs, gives us more time for bench work. We repair most ICOM & Yaesu equipment (also old Trio with valve PA). We sell good SH HF & VHF eq & specialise in FT101s. Original valves in stock. See below...

FREQUENCY COUNTERS (by request we check to 1 PPM) SAJE counters claim less but give more than some imported units. SAJE SC230 10Hz-1300MHz (typical unit drifted less than 0.5ppm cold to 6 hours). For bench use mains op. £175pp — HH bat op SC40 400MHz (typically 440) £105pp — SC130 1300MHz £129pp. SH Black Star & Thandor units for callers. SAE leaflets. See below...

CW FILTERS FT101 Mk1, B, E, Z, ZD, 901, 902, 107, 707, 102 £55.50 post paid (state which). Holdings Amateur Electronics, 45 Johnston Street, Blackburn BB2 1EF. (0254) 59595 — Closed Sun, Mon & Thurs lunch 12-1.30pm. Phone first.

SUPER ELECTRONIC MORSE KEYER, memory functions, contest serial numbers, battery powered £99. SAE Laissez Faire, Reedness, Goole DN14 8ET.

QSLS 1000 £27.50 (SWLS. Logos. Colour cards. Stamps. Patches — S.A.S.E. for samples) Currie, 87 Derwent St, Consett, DH8 8LT.

"RAYNET" YELLOW REFLECTIVE TABARDS with "RAYNET" like Police, Ambulance. Medium £10.00. Large £10.50, XLarge £11.00. "RAYNET CONTROLLER" 50p extra. EPSON PX4+ lap top computer, built in printer, charger £45 incl. pp. Non-reversible Battery Connectors Line/panel mounting (10 pairs/pack) £5.50. Mike Watson G8CPH, Ipswich (0473) 831448.

MOSLEY ANTENNAE — All the famous British Manufactured Antennae, direct from us including spares/replacements. Mustang, Elan, TA-33Jnr etc. Full details shown in our Handbook, price £1.25 refunded upon purchase of Antennae, Mosley Electronics, 196 Norwich Road, New Costessey, Norwich NR55 0EX (Administrative address only).

G2DYM CUSTOM BUILT AERIALS, trap-dipoles, anti-TVI, anti-interference, multiband, baluns, ATUs, traps, parts: Data 36p sae, aerial guide £1. Reconditioned HF/VHF, Kenwood, Yaesu, Icom transceivers, receivers, ATUs. G2DYM, Uplowman, Devon EX16 7PH. Phone 03986-215 anytime.

QSL CARDS. Gloss or tinted cards. SAE for samples to Twrog Press Penybont, Gellilydan, Blaenau, Ffestiniog, Gwynedd LL41 4P.

ALUMINIUM TUBE. Heavy-duty (scaffold) tube approx. dimensions 20' long, 2" dia, 11/64" (4.5mm) wall thickness. 20' and 10' lengths available @ £1.80 + VAT per ft. C.W.O. Rusper Hire (Crawley) 0293 87 1621 office hours only.

SOLAR/WIND POWER. S.A.E. or two 1st class stamps for catalogue/info sheets, available from GW4IED, 4 Glanmor Crescent, Newport, Gwent NP9 8AX.

AMIDON/MICROMETALS TOROIDAL CORES, Ferrite, Beads, Rods etc. Send 50p for catalogue. Ferromagnetics, P.O. Box 577, Mold, Clwyd, N.Wales CH7 1AH.

QSL CARDS. Try me for quality and price. SAE for samples. C. A. Bailey, Brean Down Press, 26 Hazeldene Road, Weston-super-Mare, Avon BS23 2XL. Tel: (0934) 644771.

CALLSIGN MUGS AND PLAQUES personalised with your name. Ideal gift. Low cost. Call 'Characteristics' on 0262 673635 or write 44 Hildethorpe Road, Bridlington, E. Yorkshire YO15 2BG.

QSL CARDS — low cost, quick delivery, superior designs, quality guaranteed, personal designs our speciality. L.S.A.E. for samples: The Standfast Press, 5 South Drive, Inskip, Preston PR4 0UT.

PMR RIGS, Handhelds, mobiles, basestations, chargers, nicads. Lowband, highband, UHF, FM, AM. 0435 830888.

ENGRAVED CALLSIGNS black plastic, white letters £5.00. Also Signs, Brass Plaques and Badges made to order, send details to GJ6RFE, ARMADA ENGRAVERS, 5 David Place, St. Helier, Jersey C.I. JE2 4TD. Telephone 0534-31318.

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.

BUDGET 2M FM RIGS with conversion data: PYE CAMBRIDGE FM10B boot unit only: £7. PYE WESTMINSTER LW15FM boot unit only: £15. UK mainland carriage £8 any quantity. VAT inclusive. Callers welcome (phone first). Garex Electronics, Station Yard, South Brent TQ10 9AL. 0364 72770.

RACAL RA-17L mint and superb working condition, not refurbished or renovated but as new £385. Aerial and mains plugs POA. Complete set valves-list. JRC NRD-535 — £965. NRD-525 — £575. Stock of RA-117, RA-1217, RA-1218, RA-1772 and RA-1792. Used Hewlet Packard and Tektronix test equipment-list. Stock of valves-list. Wanted urgently — Hallicrafters SX-28 in VGC. Europ-Navaids Ltd. Tel: 081-391 0545 Fax: 081-391 5258.

QSL. SWLS ECONOMY CARDS. Very low prices, quick delivery. Sample enquiry to: G3ETU, 34 Park Lane Court, Salford, Manchester M7 0LF. 061-792 9144.

WANTED! Your satellite equipment — either cash paid or part-ex for new up-to date equipment. Working or not. IRDs or non-IRDs. Phone for details. Also for sale — full range of BSB upgrades. New satellite equipment — unbeatable prices. Specials for this month — low noise replacements for Blue Caps — 1.2dB LNBs only £30 post free! Also Ferguson SRB1 complete upgraded to D2MAC — only £35. Send SAE for details on above/full catalogue. Gadget Computer Services, Freepost, Dunstable, Bedfordshire LU5 5UX. Tel: 0582 868687. 7-11pm.

DIY Z MATCH ATU 80 to 10 and other radio projects. SAE Rylands, 39 Parkside Avenue, Southampton S01 9AF.

AERIAL WIRES, strong PVC coated £6.50, hard drawn 14swg £14, 16swg £11.50, all per 50 metres post/VAT paid, 30p stamps for full list of cables, etc — W. H. Westlake, Clawton, Holsworthy, Devon.

RECEIVERS, ALL REFURBISHED and working. Eddystones; Lafayette HA600; BC348; R1155A; CR100s; HROs; AR88; R2000/VC10; Rees-Mace; SP600JX; Trio JR60; also transmitters, testgear. SSB Products, 0872 862291 (established 1952).

SAMSON KEYERS. PRICE REDUCTIONS. £6 off ETM-9C super CMOS memory keyer (integral paddles). SAE details of this and other models. ETM-SQ twin-paddle key £41. G5BM. QTHR (0531 820960).

YAESU 767GX. 1 to 30 meg. Built in power supply — auto SWR — variable power — filter speaker. Hardly used. £1,000. Reason for sale — other hobbies. Ring 0403 700039.

THE RIG REVIEW contains details of over 400 rigs. Unravel those small ads. Price £5 post free from Twrog Press, Penybont, Gellilydan, Blaenau Ffestiniog, Gwynedd LL41 4EP.

QUARTSLOCK MODEL 282A PMR TEST SET. Covers low, mid, highband and UHF PMR bands. Fitted with CTCSS and Selcall modules. Sensible offers please. South Coast Communications Ltd (0329) 283736.

KENWOOD TS-50S transceiver lightweight including antenna tuner £780 ono. Falmouth, Cornwall, 0326 319844.

BADGES engraved with callsign £2.99, callsign and name £3.99 incl postage. Available in yellow or white with black letters, and white with red or black letters. Prices on request for labels and panels engraved by K. Makepeace, 26 Kingfisher Crescent, Cheadle, Staffordshire ST10 1RZ. Tel/Fax 0538 754895.

RSGB AMATEUR RADIO INSURANCE SCHEME

"ALL RISKS" INSURANCE for portable/mobile/base station amateur radio and ancillary equipment. A service for RSGB members only. Also public liability and equipment insurance for affiliated clubs and societies. Details and leaflets from Jennifer Lawson, Amateur Radio Insurance Services Ltd, Shepheards Hurst, Green Lane, Outwood, Surrey RH1 5QS. Tel: 034-284-4000. Fax: 034-284-4554.

COMPUTER SOFTWARE HARDWARE

G4UXD's CELEBRATED MORSE TUTOR: IBM-PC's, BBC's. Random everything! Adustable speed, delay, letter frequency; 100 tests, attach your key. Novice/Standard modes, £9.50. SAE details/free trial. D. Brandon, 1 Woodlands Rd, Chester, CH48LB.

G4TYF LOGS, PC compatible, Amiga, Commodore, BBC. Try before you buy. SAE for free demo disk. State size. 64 Gurney Valley, Bishop Auckland, DL14 8RW. 0388 607500.

G4BMK PACTOR — See display advert this issue. Grosvenor Software, 2 Beacon Close, Seaford, Sussex.

SHACKLOG3 THE PC logging system. Real time & post event QSO logging. Country needs alert. QSL labels. Rig control. Database analysis, reports, import etc. Optional IOTA database (G3KMA). Plus lots more!! SASE for full details. G3PMR, 30 West Street, Gt. Gransden, SANDY, SG19 3AU. 0767677913. See Shacklog at the RSGB HF Convention!

MORSE PRACTICE IBM PC compatibles. Adjustable wpm/character speed. Random letters/number groups (or mixed). Tests from disk. Key morse from keyboard or attach key. Dual Media, Manual. £10. CompRad Limited, PO Box 64, Wokingham RG11 3YY. Tel/Fax 0734 733214.

GJ6RFE's NEW PC MORSE TRAINING ANALYSER, improve your Morse see sound trace on screen. State disk size and serial port 9 or 25 pin send your details and £28.00 cheque to GJ6RFE, Dept MTARC, THOMSON ELECTRONICS, 5 David Place, St. Helier, Jersey C.I. JE2 4TD. Telephone 0534 75170.

SUPER-DUPER, THE PC CONTEST LOGGING PROGRAM for RSGB and international HF Contests. "Highly recommended" — RadCom September 1993. £20.00. Paul O'Kane EI5DI, 36 Coolkill, Sandyford, Dublin 18. (01 0353 1295 3668).

HOLIDAY ACCOMMODATION

FLYING FROM GATWICK? Stay at Mill Lodge Guest House. 4 minutes from airport. Transport available. Telephone (0293) 771170.

NORTH WALES. Elevated site, B&B, caravan, bunkhouse, camping, open all year, use of shack. "Tynrhos", Mynytho, Pwllheli, LL53 7PS, (0758) 740712.

HOLIDAY GITES and B&B IN BRITTANY. Fully fitted self contained gite or B&B in rural Brittany perfect for the family holiday. Information from: F/G3NCP, Kermoran, 56310 Bubry, France. Tel: 0606 559397.

MISCELLANEOUS

COURSE FOR CITY & GUILDS, Radio Amateurs Examination. Pass this important examination and obtain your licence, with an RRC Home Study Course. For details of this and other courses (GCSE, career and professional examinations, etc) write or phone — THE RAPID RESULTS COLLEGE, Dept JT106, Tuition House, London SW19 4DS. Tel: 081-947 7272 (9am-5pm) or use our 24hr answerphone service 081-946 1102 quoting JT106.

VIDEO TAPE CONVERSIONS to and from all modes N.T.S.C.; S.E.C.A.M.; P.A.L.N.; P.A.L.M. Digital processing. Fast and economical service. Phone G4WMP 0932-846139.

WANTED: military wireless/sender (W/S)53 to restore Bedford QLR radio station. Preferably good condition. Contact: JP Delepeleire, Fonteinstraat 5, 9772 Kruishoutem, Belgium. Tel: 010 32 9 3836299. Fax: 010 32 55 300167.

ADVERTISERS INDEX

NEXT COPY DATE

The display advertisement copy date for our December 1993 issue will be 11th October 1993

DEVASTATING DX

IC-781 We are definitely talking flagships here. The IC-781 is technical excellence without compromise, a master-model HF all-band transceiver that all Amateurs aspire to. Features (short list) include: 5" CRT central information display, spectrum scope, twin passband tuning, dual-watch, auto-antenna tuning, 105dB dynamic range, DDS, 99 memory channels and 150W of output power!

IC-735 The size and weight of ICOM's IC-735 HF transceiver make it ideal for both base-station and mobile operations. The IC-735 has a 105dB dynamic range, passband tuning, noise blanker, 12 memory channels, CW full/semi break-in plus attenuator and preamp. Optional features include an electronic keyer and auto-antenna tuner. See why the IC-735 is as popular today as it ever was.

IC-729 A 50MHz/HF transceiver that allows you to discover the fun that can be had worldwide on the increasingly popular 50MHz band. Features include: 1.8-50MHz, simple all-mode operation, compact size, AF speech compressor, passband tuning, DDS, 105dB dynamic range and band stacking registers. 30kHz-33MHz and 46.2-61.1MHz Rx is possible but not guaranteed.

IC-765 DX enthusiasts will love this HF all-bander. By using the DFM (Direct Feed Mixer) the Rx circuit ensures 105dB dynamic range and a high +23dBm intercept point allowing weak signals to be received even during competition. Other features include: auto-antenna tuning with tuning data memory, Built-in CW narrow filter (500Hz to -6dB, CW pitch control and IF shift.

IC-737 This is ICOM's latest HF transceiver, a compact design using state-of-the-art technology to introduce for the first time; memo pad, DBSR, auto-antenna selector and quick split functions. These new functions will excite HF beginners who want to take the next step up and users keen on portable or mobile operations. The IC-737 is an ideal transceiver for taking on the DX world.

N.B. Photographs not to scale.

ICOM

ICOM manufacture a full range of base-stations, mobiles and handheld transceivers and receivers to cover all popular frequencies and beyond. No matter what your requirement ICOM have the radio for you. For more information and the location of your local Icom dealer contact:

Icom (UK) Ltd. Sea Street Herne Bay Kent CT6 8LD
Telephone: 0227 741741 (24hr). Fax: 0227 741742

Top of the Range

YAESU

UK Sole Distributor
South Midlands Communications Ltd, S.M. House,
School Close, Chandlers Ford Industrial Estate,
Eastleigh, Hants S05 3BY.
Tel: (0703) 255111.

To be a truly world-class competitor, you have to have a truly world-class rig. And it's here now. The versatile FT-1000 from Yaesu.

The FT-1000 will blow away your competition with a spectacular combination of power and operation flexibility. There will be no contest.

Just superb performance...yours and your FT-1000

FT-1000 HF All-Mode Transceiver

- ✔ **Direct Digital Synthesis (DDS):** Two ten-bit DDS plus three eight-Bit DDS
- ✔ **High RF Power Output:** Up to 200 Watts.
- ✔ **Dual Receiver:** Two tuning knobs.
- ✔ **Automatic Antenna Tuner:** Built-in with 39 memories.
- ✔ **Built-In Vox.**
- ✔ **100 Memories:** Independent ATU and mode/IF Filter memory.
- ✔ **CW Audio Peaking Filter:** Additional selectivity on CW for weak signal work.
- ✔ **CW Spot:** Provides audible tone for alignment.
- ✔ **High Dynamic Range:** 108dB (Typical).
- ✔ **Multimode Selection on Packet/RTTY:** Switchable FSK tone, RTTY shift and CW pitch.
- ✔ **Front Panel RX Antenna Selection:** Allows quick switching.
- ✔ **Digital Voice Storage:** Option provides instant playback.
- ✔ **BPF-1 Module Option:** Allows crossband dual receive.

SPECIFICATIONS:

Receiver Range:	**100kHz-30MHz.**
Transmit Range:	**160-10 Meters.**
Power Output:	**Adjustable Up To 200 Watts (50 Watts AM Carrier).**
Emission Types:	**LSB/USB (J3E), CW (A1A), FSK (J1D/J2D), AM (A3E), FM (F3E).**
Antenna Impedance:	**16.5-150 Ohms Nominal.**
Power Consumption:	**95 VA (Receiver). 1050 VA (Transmit).**
Sensitivity:	**SSB/CW <0.25V For 10dB S/N, 1.8-30MHz..**
Dynamic Range (Typical):	**108dB @ 500Hz BW, (Preamp off).**
Maximum Audio Power Output:	**2 Watts Into 4 Ohms with <10% THD.**
Audio Output Impedance:	**4-8 Ohms.**
Weight:	**56.2 lbs. Standard Version.**

Performance without compromise