

**100
PAGES**

Radio Communication

May 1993



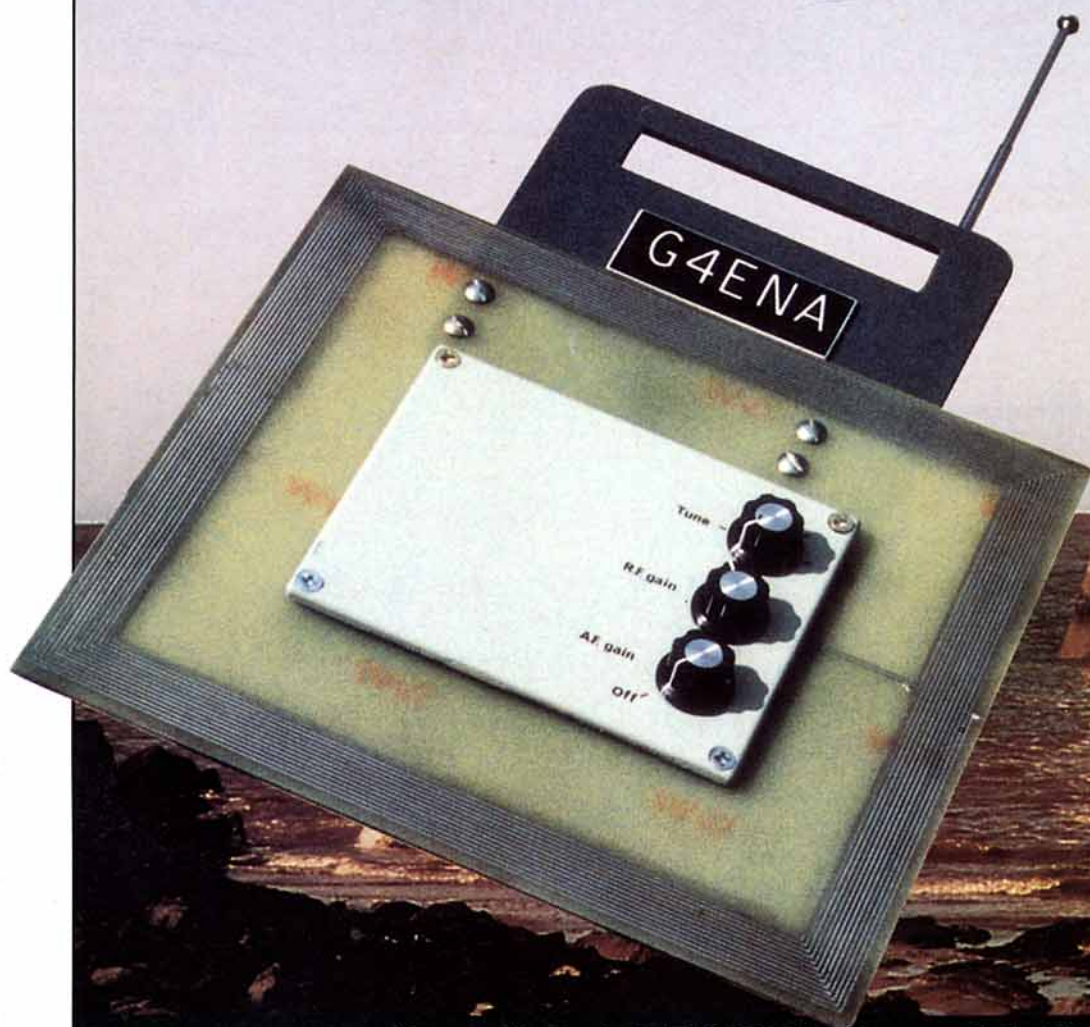
The Journal of the Radio Society of Great Britain

Volume 69 No 5

THE VOICE OF AMATEUR RADIO FOR 80 YEARS

DIRECTION FINDING

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Design**



See You at RSGB'93 — 16 May

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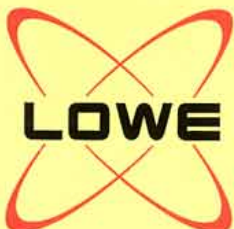
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Radio Communication



NEWS AND REPORTS

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General Manager Peter Kirby says it's budget time.

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TECHNICAL FEATURES

29 NOVICE NOTEBOOK

The first feedback from this new column has reached Ian Keyser, G3ROO, so this month he features your ideas. Includes a 70cm antenna and a way of keeping a small shack neat and tidy.

30 IN PRACTICE

Ian White, G3SEK, provides help and advice on a wide variety of technical matters. This month: Baluns and HF Verticals ● PCBs from Printed Layouts ● Measuring Frequency ● TNC Amnesia? ● Read All About It!

34 DF RECEIVER FOR 160 METRES

A novel PCB forms the heart of this Top Band receiver designed by Peter Asquith, G4ENA, for the increasingly popular Direction Finding (ARDF) Competitions. A colour feature.

36 DF TRANSMITTER FOR 160 METRES

G4ENA's companion transmitter to the receiver above. All your club needs to start DFing. A colour feature.

39 SIMPLY SILICON: GEC-Plessey SL6652

This chip will work as a complete FM receiver up to 100MHz or as an IF complete with built-in S-meter. Details are given of component values for use at 50MHz.

43 THE PETER HART REVIEW: Kenwood TS-50S

The very latest multi-feature all-band HF transceiver is so tiny it is ideal for use in the car or at home where space is at a premium. Is performance compromised by the size? G3SJJ finds out. A colour feature.

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The PA0SE Comudipole Multiband HF Antenna ● Radiating Light Bulbs ● Potato Soldering Aid ● 200W FM/CW Amplifier for 70MHz ● Coax Off-cuts and Mobile Antennas ● Non-Equalising Power-Supply Resistors ● Secure ATU Coil Taps ● Here and There ● Electrolytic Capacitors

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Designing printed circuit boards has never been easier. We look at just what this inexpensive package for the PC can do for you. A colour feature.

62 COMPLEX NUMBERS EXPLAINED

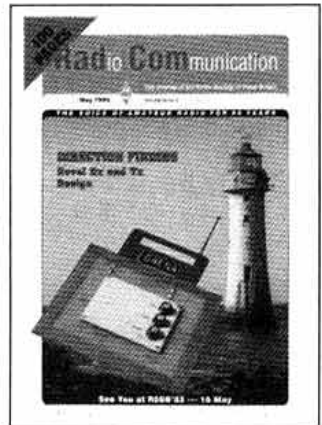
Clive Smith, G4FZH unravels the mysteries of complex numbers and shows that they're really quite useful.

65 A TWO-METRE SSB/CW TRANSCEIVER: Part two

Sorry but we've had to make this a three-parter owing to space limitations this month. In part two Bernie Pallett, G3VML introduces four more modules. A colour feature.

65 EUROTEK - ideas from abroad

Erwin David, G4LQI, revisits the world of loop antennas as originally described by PA2JBC in Q-Five.



COVER PICTURE:

This month we've combined two methods of finding your way around: Peter Asquith's Direction Finding receiver with its novel PCB is featured on page 34; and the Perch Rock Lighthouse GB8WA operation is on page 6.

Lighthouse Photograph: G8TRY.

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RADIO SOCIETY OF GREAT BRITAIN

THE NATIONAL SOCIETY WHICH REPRESENTS UK RADIO
AMATEURS

Founded in 1913 incorporated 1926. Limited by guarantee
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Membership is open to all those with an active interest in radio experimentation and communication as a hobby. Applications for membership should be made to the Membership Services Department from which full details of Society services may also be obtained.

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UK associate member under 18: £15.00. **Family member:** £12.00

Corporate (Concessionary): £25.00 over 65 or full time student under 25. (Applications should provide proof of age at last renewal date and/or include evidence of student status.)

Affiliated club or society/registered group (UK): £15.00 (including *Radio Communication*). (Subscriptions include VAT where applicable.)

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

Membership application forms are available from RSGB HQ

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The RadCom Leader

Balancing the Books

THIS TIME OF YEAR the thoughts of Council, the Finance and Staff Committee and myself turn towards the Society's budget for the next financial year which commences in July.

This is a complex process which takes a great deal of time and effort, but it is important for the Society's future that we get our sums and the balance right.

Over the last three years the country has seen one of the worst economic recessions on record. Thousands of businesses have folded and there have been unprecedented levels of unemployment. The bulk of the Society's income comes from membership subscriptions and book sales. Both these areas have been affected by the recession. The Society, during this difficult period, has cut its cloth according to its means and, with sound financial management, has weathered the storm.

As always before the budget is finalised, the Council reviews the level of subscription for implementation during the next financial year. Following this review it was decided at the March Council meeting that from 1 July 1993 the subscription would rise by £2 to £32 for Home Corporate members, with all other rates rising pro-rata subject to suitable rounding.

This decision was taken with some reluctance. However, this will be the first rise in subscription rates since October 1990. The Society has been able to maintain subscription rates over this period due to a one-off 'windfall' in VAT refunds of £175,000 after lengthy negotiations with the Customs and Excise Department. This 'windfall' has allowed the Society to make significant improvements to Lambda House and to carry out essential maintenance. Also it enabled improvements in computing facilities and in the service to members and to amateur radio. All of this whilst maintaining subscription levels for two-and-a-half-years.

The last time that subscriptions were raised it resulted in an emotive response from the membership. I would ask you on this occasion to view these increases in a positive manner. Over the last few months HQ services have been improved. Direct Debit has been introduced and *RadCom* has been improved and increased in size. New and better services to the membership are planned but these can only be introduced if the Society remains on a firm financial footing.

The aim of the Council, committees and volunteers throughout the country, along with the HQ staff, is to work hard to provide the best possible service to our members in support of amateur radio. *Per aetheris undas.*

Peter Kirby
General Manager

Past Presidents Eleven at HQ

● GB0LBL WILL PROMOTE Enterprise Lewisham's 'Euro Week' during the first week of May. Local operators, fluent in European languages are invited to assist. Contact Malcolm Williamson, G0EGA, on 081 852 9207 if you can help.

● SPALDING AND DISTRICT Repeater Group offers talk-in for the 10-day Flower Festival, including the Float Parade on 1 May. They will monitor S20 and the new Spalding repeater, GB3TL, on 433.350MHz.

● ARNOLD AND CARLTON College, Nottingham, is running a Construction Course on Tuesdays at 7pm from 11 May. Details from Course Tutor Alan Lake, G4DVW, on 0602 382509.

● STOLEN (along with car: Fiesta, red, F119EOD!) Alinco DR112EM, S/N 0001602. Information to John Davey, G7LMH on 0423 500326, or Wetherby Police on 0937 582667.

● GB0MIR WILL BE USED on Bigyn Hill, Dyfed to mark the second anniversary of the first Briton in space, Helen Sharman.

● HAROLD BEVERAGE, formerly W2BML and inventor of the Beverage receiving antenna has died, aged 99.

● 17 MAY IS World Telecommunications Day commemorating the founding of the ITU in 1865.

● ISRAEL IS proposing to reallocate 2MHz of the 70cm band to the Mobile Service.



PHOTOGRAPH: RAYMOND IRONS

RSGB Past Presidents outside Lambda House: (l to r) John Bazley, G3HCT (1979); Don Baptiste CBE (1983); Geoff Stone, G3FZL (1964); George Jessop, G6JP (1974); John Case, GW4HWR (1991); Joan Heathershaw, G4CHH (1985, 1987); Willie McClintock, G3VPK (1986); Julian Gannaway, G3YGF (1989); Fred Ward, G2CVV (1971); Terry Barnes, G13USS (1992) and Tim Hughes, G3GVV (1972).

ELEVEN RSGB Past Presidents, spanning nearly thirty years, joined this year's President at the Society's Lambda House Headquarters on 14

April for a lunch. Although gatherings of Past Presidents have occurred before, this was the first time that the Headquarters building has been used.

The most 'senior' Presi-

dent was Geoff Stone, G3FZL, whose Presidential Year was 1964 and who is still very actively involved in the Society as one of the organisers of the highly successful VHF Convention.

The gathering was hosted by Immediate Past President Terry Barnes, G13USS. After lunch, the General Manager Peter Kirby outlined the long and distinguished history of the Society and some of the exciting plans for the future. The day was rounded off with a tour of Lambda House.

Radio Amateurs Emergency Network Ltd and the Radio Society of Great Britain

BECAUSE OF much uninformed rumour and speculation circulating at the present time about the Society and emergency communication activities, it will be of interest to members to have an unvarnished and accurate account of events which have led to the current position.

The Society is most concerned that all radio amateurs should be allowed to participate freely in emergency communication activities. It is important to note that whilst 'RAYNET' has become synonymous with this particular aspect of amateur interest its use is not mandatory. However, for emergency communication groups wishing to affiliate to the Society it is a requirement of the insurance cover that the word 'RAYNET' is included in the affiliating group's title. RAEN Ltd made

application to the Society for affiliation and this was approved and processed by the Council of the Society. The affiliation, however, was restricted to the management committee of RAEN Ltd and did not extend to the various groups associated with that company. RAEN Ltd sought to affiliate the company, and all groups associated with that company, for a once-only payment of a composite fee. For a number of reasons the Society was reluctantly unable to agree to that request.

Foremost in Council's mind when considering the application was the very real sense of grievance which might have been felt by the many hundreds of groups and clubs, not concerned with emergency communications, that have already affiliated under the usual and well-publicised condi-

tions. To have set such a precedent in respect of RAEN Ltd might well have created more problems than it solved.

However, the Society made it quite clear to RAEN Ltd that any emergency communications group may seek to affiliate to the RSGB. Such affiliated groups will have free and unrestricted use of the registered logo and will be covered by insurance - the cost of which will, for the foreseeable future, be borne by the Society. The Society earnestly hopes, now the position has been made quite clear, that all amateurs, whether they be affiliated to the Society, RAEN Ltd or independent of either organisation, will be allowed to participate in emergency communication activities without rancour or hindrance in the true spirit of the amateur service.

A Date for Your Diary

**RSGB
Headquarters
Open Day
Saturday
19 June**

Full Details Next Month

Zone B RLOs Get Together

ON 27 MARCH, EIGHT ZONE B RLOs, two guest speakers and Zone B Council Member John Allen, G3DOT, got together in Ashby-de-la-Zouch, Leicestershire for a Zonal Meeting. The guests were the Repeater Management Committee Chairman, Geoff Dover, G4AFJ, the retiring EMC Committee Chairman, Bob Peace, G8SOZ, and the Audio Visual Library Coordinator, David Simmonds, G3JKB. Two RLOs, G0MJK for Northants and Warcs and G8HXR for Cambridgeshire could not attend owing to work schedules. The Coordinator of the RSGB Amateur Radio Observation Service (AROS) was invited but had a previous engagement.

Geoff Dover, who had been briefed by the Observation Service Coordinator, gave a resumé of the work of the service, especially with regard to repeater abuse which is prevalent in certain areas of Zone B.

The afternoon session was taken up chiefly by a question-and-answer session. The majority of RLOs asked for more routine information. This demand would be satisfied by a new newsletter being prepared by Ian Kyle, G18AYZ. The RLOs would also like a computer print-out of all RSGB Members in each of the Zone's counties.

Geoff Dover brought the meeting up to date with the repeater licensing arrangements [see opposite page - Ed]. Bob Peace explained the latest EMC matters, especially in the light of recent regulations being issued from the European Community. He asked for RLOs' help in recruiting EMC Coordinators from the Zone. A number said that they would act as coordinators themselves as well as getting others to volunteer.

New RLOs

THE NEW RSGB Liaison Officer for Northern Ireland (South) is Raymond Ashe, G18RLE, 49 Deans Walk, Sleepy Valley, Richhill, Co Armagh BT61 9LD; tel 0762 870423.

RLO for the Lancashire/Greater Manchester area is Bob Catlow, G4ARP, 137 Haven Lane, Moorside, Oldham, Lancs OL4 2QQ; tel 061 652 8617.

RLO for Merseyside is Keith Brookes, G0SPH, 43 Northwood Drive, Windmill Hill, Runcom WA7 6QG; tel 0928 701096.

A full list of RSGB Liaison Officers appears on page 91.



Putting the GB8WA aerials high up on Perch Rock Lighthouse are Phil Jones, G6IIM, and Neil McLaren, G4OAR.

Western Approaches 50th

THE WIRRAL and District ARC will be operating as GB8WA from 27 to 31 May to mark the fiftieth anniversary of the battle of the Atlantic. One of the largest ever peacetime gathering of naval vessels has been planned and the Queen and other members of the Royal Family will be in attendance.

For this event, the club will be using the same unusual venue as they used for last year's Columbus celebration: Perch Rock Lighthouse at New Brighton. The callsign 'WA' stands for Western Approaches, the large sector of the North Atlantic which was controlled from Liverpool.

The *HMS Plymouth* Group of the Royal Naval Amateur Radio Society (RNARS) will be celebrating the occasion with GB50WA and GB50BA (Battle of the Atlantic) operated from a trailer parked in Liverpool's Albert Dock complex.

Committee Officer Changes

ACTING CHAIRMAN OF The Propagation Studies Committee is Charlie Newton, G2FKZ whose work in producing the weekly Propagation News and Forecast is well known to listeners to the RSGB's GB2RS News Service. He replaces Geoff Grayer, G3NAQ.

The Microwave Committee has had a change round: Former Chairman Mike Dixon, G3PFR, is now Microwave Manager, the new Chairman being Steve Davies, G4KNZ. The outgoing Microwave Manager is Charlie Suckling, G3WDG.

The RSGB Planning Advisory Committee also has a new Chairman. He is Geoff Bond, G4GJB, who replaces Bob Peace, G8SOZ.

All retiring officers are thanked for their valuable voluntary work on behalf of RSGB members and radio amateurs in general.

Hilary Claytonsmith is HRT's Amateur of the Year

HAM RADIO TODAY magazine has bestowed the title '1993 Amateur of the Year' on RSGB Council Member Hilary Claytonsmith, G4JKS, "for her untiring work in helping our hobby". She was the unanimous first choice of the judges who selected her from many nominations.

Hilary is well known for her voluntary efforts in the fields of EMC, HF Contests and recruiting young people into amateur radio. As well as being a Council Member, she is the RSGB's Project YEAR Coordinator and a member of a number of committees.

The Amateur of the Year award was sponsored by the London Hamstore.



London Hamstore Manager Doug Goodison, G0LUH, presents HRT Amateur of the Year Hilary Claytonsmith, G4JKS, with an IC2IE transceiver. On the right is Ham Radio Today's Editor Sheila Lorek, G8IYA.

BT Supports Project YEAR

FOLLOWING THE ANNUAL Meeting of the Association for Science Education at Loughborough University, British Telecom has generously agreed to support the RSGB's Project YEAR by donating 70 'Radio Communications' videos and 70 copies of the 'Pioneers in Telecommunications' booklet as support material for the Novice Licence training scheme. Each County Senior Instructor will hold the video, which covers among other things, propagation, radio waves current flow, transmitters and receivers. They will also hold a copy of the booklet which deals with the lives of Wheatstone, Cooke, Morse, Maxwell, Hertz, Marconi and Heaviside. These will be on loan to registered Novice Instructors via their County Senior Instructor.

Novice Instructors

NEW SENIOR NOVICE Instructors are: For Wiltshire, Keith Chambers, G0HKC; for West Glamorgan, Alan Hearne, GWONKH; for Bedfordshire, Brian Elliott, G4MEO; for the West Midlands, Peter Morrall, G4TMK; for Cambridgeshire, John Hammond, G0FLP and for Cumbria, Fred Chidlow, G3WCM.

There are vacancies for Novice Instructors in the counties of: Central, Cornwall, Co Armagh, Dumfries and Galloway, Fife, Isle of Man, South Glamorgan and Somerset. Anyone who feels they would like to participate in the Novice Licence Training Scheme, please send an A5-size SASE to RSGB HQ, marking the envelope 'Novice Training'.

RSGB Secures More Licence Improvements

ON 1 APRIL 1993 two changes to the amateur licences were announced by the Radiocommunications Agency (RA) which enabled better use to be made of the 430 to 440MHz band.

(1) The restricted zone in the North of England which prevented operation in the sub-band 430 to 432MHz has been removed (this was the area bounded by 53°N 02°E, 55°N 02°E, 53°N 03°W and 55°N 03°W).

(2) Unattended operation for digital communications purposes on the sub bands 432.6 to 432.7 and 433.6 to 433.7MHz is now allowed.

The second change is part of a package discussed with the RA in order to allow more dynamic management of the digital communications sections of the VHF/

UHF bands. The total package consisted of:

(a) changes to the mailbox NoV scheme to allow extra frequencies in 430 - 440 and 1240 - 1241MHz bands to be issued under NoV,

(b) a new NoV scheme for nodes to enable much speedier issuing of callsigns in the GB7xx series, and

(c) changes to frequencies allowed for unattended operation in the 430 - 440MHz band.

The frequencies now available for unattended operation were considered primarily to be of use to allow better user access to the mailbox/BBS network, particularly with regard to automatic forwarding to Personal Message Systems (PMS). It should be noted that the sub-bands as defined in (2) above include the extremes of

modulation and do not indicate allowed centre frequencies. The extra frequencies when available under NoV should allow the sub-bands 430.6 to 430.8 and 439.8 to 439.999MHz to be better used for linking purposes and allow the separation of user access and linking frequencies thereby enabling better network management.

All the above changes and prospective changes have been the result of a tremendous amount of work by the Society's Data Communications, Licensing Advisory and VHF committees.

The changes

The following is the text of the *Gazette* notice which also includes a change concerning Emergency Planning Officers:

Wireless Telegraphy Act 1949

Notice of Variation

The Secretary of State gives notice pursuant to sub-section 1(4) of the Wireless Telegraphy Act 1949 to all those who are licensed under the Amateur Radio Licence (A) or (B) which have been issued and remain in force, that, from 1 April 1993 each licence (the Terms, Provisions and Limi-

tations booklet BR68) shall be varied as follows:

In sub-clause 2(4)(c)(iii) insert sub-bands '432.6-432.7MHz and 433.6 - 433.7MHz';

In sub-clause 12(1)(o) delete 'County,' and 'Regional or Islands' and insert after 'Officer' '(Chief Emergency Planning Officer means an Emergency Planning Officer who is not responsible to any higher Emergency Planning Officer, such as a County, Regional or Islands Emergency Planning Officer)';

In the Schedule in column 2 against 430.0 - 431.0 delete 'Not available for use within the area bounded by: 53° N 02° E, 55° N 02° E, 53° N 03° W and 55° N 03° W' and against 431.0 - 432.0 delete ': a) within the area bounded by: 53° N 02° E, 55° N 02° E, 53° N 03° W and 55° N 03° W; b)'

R. Louth, On behalf of the Secretary of State for Trade and Industry, 11 March 1993

● JIM NORTON has been appointed Chief Executive of the Radiocommunications Agency by Michael Heseltine, President of the Board of Trade. Mr Norton, whose background is in the telecommunications industry, succeeds John Michell who is transferring to other duties on 4 May.

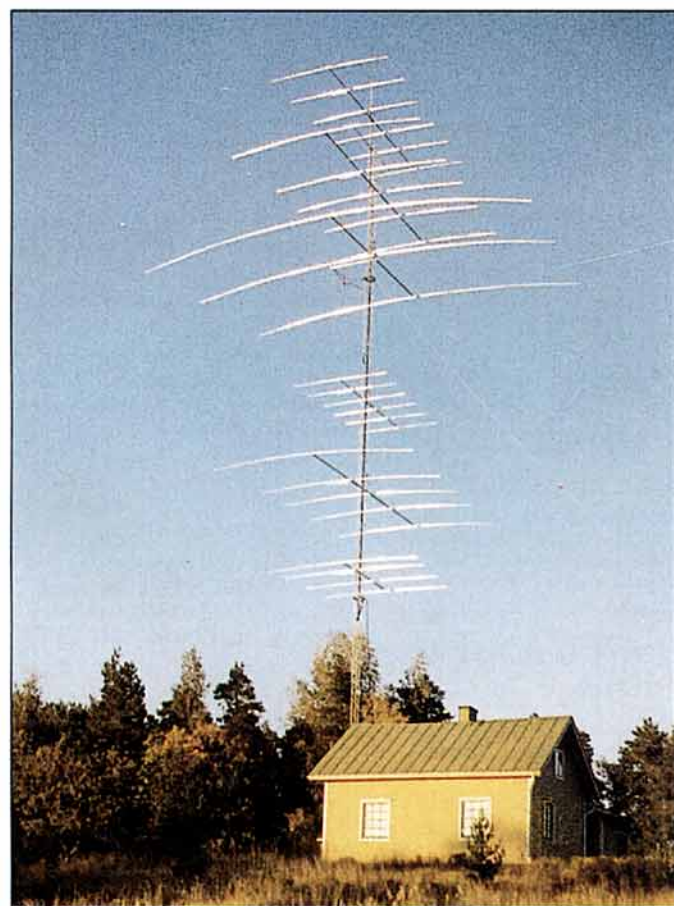
Repeater Licensing Latest

LAST AUTUMN, the RA decided to issue individual repeater licences directly to keepers [those nominated as being responsible for a particular repeater - Ed]. It felt that this would help to solve the problems of administration and abuse by placing the responsibility directly on the groups. Details of these arrangements were discussed during the following months. At a meeting on 21 January, the RA informed us that it would be impractical to issue separate repeater licences as they would have to charge a very large fee for this new category of licence. As an alternative, they have proposed issuing Notices of Variation to the keepers' individual licences. The RSGB will still be involved in the

technical management of the Repeater Network and will be issuing the NoVs on behalf of the RA; the RA propose to reimburse RSGB for this work. The RA have informed keepers that their repeater licences will be extended until 1 August while the details and implications are worked out.

There will be no additional fee for the NoV, but this arrangement does put the entire burden on the keeper. We are concerned that this may be imposing too much responsibility on the keeper, and that he needs to be able to share some of this with the rest of the repeater group.

Please send any comments to the Chairman of the RSGB Repeater Management Group, Mr G Dover, G4AFJ, QTHR.



Adrian Wood, G3VJM, visited Finland and was made very welcome by Kari, OH2KU. This is Kari's summer house. The mast, which can be seen five miles away, carries (top down): a 2m/70cm vertical at 151ft, a 2m 15-ele at 137ft, a 20m 5-ele at 129ft, a 40m 3-ele at 116ft, a 2m 14-ele at 112ft, a 10m 6-ele at 87ft, a 20m 5-ele at 72ft and a 17m 4-ele at a mere 55ft. The station is a TS440S driving a Henry's 1.5 kilowatt linear.

The RSGB — Working for You

Slow Morse Coordinator

MIKE THAYNE, G3GMS, the Slow Morse Coordinator who has run the service for many years, has informed the Society that pressure of work owing to promotion has caused him to resign from this post. The Society wishes to thank Mike for all his hard work in coordinating the many Slow Morse senders to ensure that the many amateurs who use the GB2CW service are successful

in obtaining their 'A' licence. The Council also extend its thanks and good wishes for the future in his new job.

Consequently the post of Slow Morse Coordinator is now vacant. If any member is interested in applying for this post, please send an application as soon as possible to Clive Trotman, GW4YKL, Chairman Membership Liaison Committee, QTHR.

Dam Busters Remembered

THE 50TH ANNIVERSARY of the famous 'dam busters' raid takes place in mid-May and is being commemorated by several RAF Amateur Radio Society special event stations. On 15/16th May,

GB50DAM will be on the air from RAF Scampton in Lincolnshire which was the base of 617 Squadron. GB50DWD and GB617SQN will be at Derwent Reservoir in Derbyshire, used by Barnes Wallis to perfect his 'bouncing bomb'. The 1943 raid led by Wing Commander Guy Gibson breached the Ruhr Dams, flooding the many factories in the Ruhr Valley. The Derwent Reservoir now has a permanent museum containing 617 sqn memorabilia. During this year's event, a Lancaster is expected to simulate a low-level pass over Derwent Water.

● A NEW BAND is proposed for the USA. 219 - 220MHz would be used for packet network backbone links, relieving congestion in the 222 - 225MHz band.

Calls wanted?

THE RA IS reviewing its policy on special or personalised call signs, and may lift the ban on the holding of more than one call sign per person. The Society has been asked to prepare a paper outlining the level of demand for this and what sort of special calls would be required.

The ITU specifies that amateur call signs must commence with one or two characters (a letter followed by a digit, or digit followed by a letter), then a single digit and, lastly, a group of not more than three letters. UK calls must start with the country identifier: 'G', 'M' or '2'.

Within those ITU constraints, the RSGB Licensing Advisory Committee would be pleased to receive comments and suggestion from members concerning special call signs. Write to the LAC Chairman, John Bazley, G3HCT, QTHR.

● SOUTHGATE ARC's newsletter mentions a state of the art power supply which emits Morse to indicate various alarm states.

More Intruder Watch Successes

DAVID OWEN, G0OES, Coordinator of the RSGB Monitoring System (Intruder Watch) reports four recent successes. An Argentinian fax, naval data and two diplomatic stations have been removed from the 18MHz band. This has been achieved on behalf of amateurs worldwide as a result of the continuing cooperation between the RSGB and the Radiocommunications Agency.

The Monitoring System is looking for new members to join the existing team. RSGB members

with the following qualifications are invited to apply: The time available to submit monthly reports, good quality receiving equipment preferably with data receiving terminals (eg CODE-3) and an ability to distinguish between the various types of transmission. Applications should go to G0OES, QTHR.

Full details of the role of the Monitoring System can be found on page 78 of the *RSGB Call Book* and in *RadCom*, December 1992.

VHF/UHF Awards News

THE FIRST 50MHz certificate to be endorsed 'All Auroral Contacts' went to Paul Baker, GW6VZW, when he claimed the Standard Transmitting Award. Paul already has the Standard and Senior Awards on 50MHz and a whole host of others includ-

ing 250 squares on 6m. The 2m Standard Transmitting award is challenging under any conditions but particularly notable when endorsed 'All SSB QRP' (2.5W), as was the certificate issued to W F Meinerts-Hahn, G3UOL.

Three applications came from overseas: Franklin Polidano, 9H1FP; Wim Moest, PA1AED, and Walther Matzke, DD9RY. Franklin was awarded the 10 countries certificate on 50MHz while Wim and Walther each achieved 80 squares/18 countries on 144MHz.

Listeners concentrated their efforts on 50MHz with Jan Steenberg, NL213, getting 120 countries and 200 squares confirmed. Bob Treacher, BR32525, attained 90 countries and 125 squares confirmed, and Michel Monteil, F11ATZ, was granted a 25 squares certificate.

In early March I received from John Ridd, G8BQX, a bumper package of over 400 cards which resulted in certificates for 40 countries on 6m, 150 squares on 6m, 150sq on 2m and 50sq on 70cm. Bernard Jayne, G8BFL, updated his 50MHz awards to include 50c, 125sq, DX 50 countries and a Standard Award on 70MHz. Another amateur receiving multiple awards was Jon Acton, G0NFH, whose totals are now 20c and 75sq on 6m, 20sq/4c on 4m and 40sq/10c on 70cm.

Congratulations to all award recipients who included the following:

50MHz: 10 countries G7DTD. 20c G8GMC, G0PEU, G1AVE. 50c G0MZZ. 60c G5JJ, G0LCS. 100c G4MKF. 25 squares G5UM. 50sq G8GMC, G1AVE, G0SAY. 75sq G6FQZ. 100sq G3KPT, G1UGH. 125sq G0KUX, G4SEU, G1EHJ. 300sq G6HKM. DX 25 countries G6FQZ, DX 50c G0SAY. Standard transmitting G1EHJ.

144MHz: 100 squares/20 countries G4ZTR, G0AFH. 125sq/20c G4AEP. 150sq/20c G0EHV. 200sq/30c G0EVT. 450sq/50c G3IMV.

432MHz: 30 squares/6 countries GW6ZUQ. 50sq/13c G0EVT, G4SEU. 60sq/15c G1EHJ.

Microwave: 1.3GHz 10 squares GW8CMU/P; 70sq G6LEU; Distance (600km+) GW8CMU/P. 10GHz Distance (150km+) G6XM/P.

Details of the RSGB VHF/UHF awards are in the 1993 *RSGB Call Book* or may be obtained from the Awards Manager (on receipt of an SASE).

Ian L. Cornes, G4OUT.

AMSAT-UK Colloquium

THE EIGHTH AMSAT-UK Annual Colloquium will be held from 29 July to 1 August at the usual venue of the University of Surrey. **Anyone wishing to present a paper should submit an Abstract no later than 1 May** to Doug Loughmiller, G0SYX, Colloquium Programme Chairman, Centre for Satellite Engineering Research, University of Surrey, Guildford GU2 5XH.

For visitors to the Colloquium, booking forms will be available from 15 May from Ron Broadbent, Hon Sec AMSAT-UK, London E12 5EQ. Please include a large SASE (overseas 2 IRCs).

● LIVERPOOL and District ARS celebrate their 80th birthday with an award involving as many contacts as possible with LDARS members and club stations G3AHD and G8WCL from 1 Jan to 31 Aug. Details and membership list from G0IFK.



HMS Bronington is a Ton class wooden mine-sweeper which is preserved as a floating museum at Quay West, Trafford Park, Manchester. Peter Greenhalgh, G3XGE, has refurbished the radio room and installed an amateur radio station, G0TON. Further details of the museum can be obtained by calling 061 877 7778.

RadCom for the Blind

Radio Communication is available on an audio tape, free of charge to our blind members. This is being coordinated by Enterprises by the Blind (Bedfordshire) on behalf of the Society. Members requiring this service should contact: Roy Gerrard, G3LAZ, 46 Hadrian Avenue, Dunstable, Bedfordshire LU5 4SP; tel 0582 275888.

● KENYAN AMATEURS may now use 18MHz. 5Z4FM is active.

AMATEUR RADIO DATA COMMUNICATION

State of the art data communication products and accessories from ICS and AEA

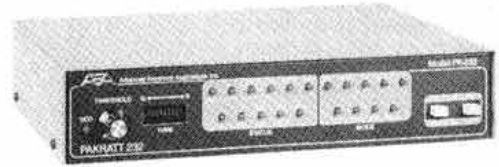
PK-232 MBX

The world's most popular multi-mode data controller. Over 60,000 shipped world wide. Superb front end demodulator digs weak signals out of the noise. Covers Morse Code, Baudot, ASCII, AMTOR, HF and VHF Packet, WEFAX and Navtex. Includes unique SIAM signal identification mode. **FACTOR option now available**, also superb new Windows software for the IBM-PC.

PK-232 MBX: £369.95

FACTOR: £69.95

Windows Software: £129.95



PK-900

The latest multi-mode radio data terminal unit from AEA with backlit LCD display, software selectable radio ports. Optional 9600 baud modem, FACTOR and grey scale facsimile. Covers all principal amateur radio data communications modes in transmit and receive. **The new AEA flagship product.** Send for details.

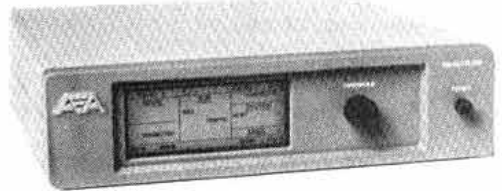
PK-900: £549.95

FACTOR: £69.95

9600 Baud: £79.95

Wefax Software: £69.95

Windows Software: £129.05



DSP-1232/2232

The ultimate future-proof multi-mode data controllers. All modems are implemented in firmware so upgrades are quick and easy. All of the PK-232 communication modes are now implemented plus PSK satellite modems and 9600 Baud packet. The DSP-1232 has one radio port, the DSP-2232 has two.

DSP-1232: £799.95 **DSP-2232: £999.95** **FACTOR: £69.95**

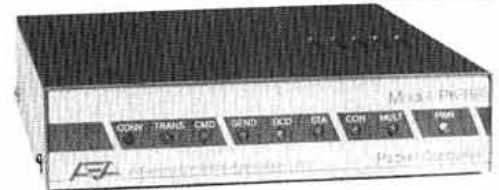


PK-88 and PCB-88

All of the advanced packet radio features of the PK-232 MBX in one inexpensive package. Includes HF modem, modem disconnect, mail box facility and 32K battery backed memory. The PK-88 comes in a rugged RFI proof case. The PCB-88 mounts inside an AT bus IBM-PC computer.

PK-88: £159.95

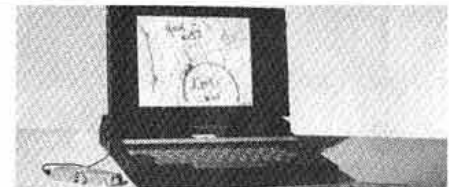
PCB-88: £169.95



ICS-FAX III

All you need to produce superb reproduction of weather maps and amateur transmissions on the VGA screen of an IBM-PC. Extremely easy to use. The hardware to interface between your PC and an SSB receiver is included. Covers weather facsimile, Navtex, RTTY, CW and FEC.

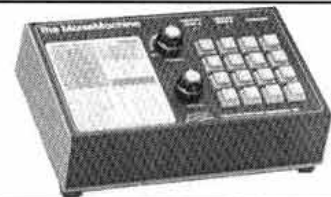
ICS-FAX III: £139.95



MM-3

The ultimate Morse keyer. 8,000 characters in 20 memories, auto contest serial number generation, automatic beacon mode, computer interface, Morse proficiency trainer mode plus on-line QSO and contest simulators. **Simply the best Morse keyer there is.**

MM3: £189.95



IsoLoop 10-30

The perfect HF antenna for restricted spaces. Similar performance to a dipole, even at low heights. Only 43" in diameter. Covers 10-30 MHz, 150 watts. Complete with remote antenna tuner control. Rugged plastic moulding for long life. No user assembly.

IsoLoop 10-30: £339.95



Prices include VAT at 17.5%

Add £6.00 post and packing

Data on any product available on request

Callers by appointment

Our products are available direct and from dealers throughout Europe. Callers by appointment.



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

No. 2

Fighting for the No. 1 spot, the NEW IC-737 from ICOM. Auto atn & Keyer built in as standard, no silly "slider controls" and wonky plastic doors on this one! At last a real successor to the IC735, read what Henry F. Lewis, G3GIQ has to say...

Deposit £475.00 & 12 payments of £85.00

No. 3

My favourite for months, the Yaesu FT-890. With or without Auto ATU, a real winner for BASE or MOBILE H.F. Did you know that it is now available with SPEECH ANNOUNCEMENT, (as an option), for blind operators? Only from LYNCH!

**Without Auto ATU, Deposit £320.00
& 12 payments of £75.00
With Auto ATU, Deposit £495.00
& 12 payments of £75.00**

No. 4

Probably the best selling H.F. transceiver in the world, the TS850S from Kenwood. Certainly one of the most reliable. A true base station radio from a world beating company.

**Without Auto ATU, Deposit £510.00
& 12 payments of £95.00
With Auto ATU, Deposit £540.00
& 12 payments of £105.00**

No. 5

It's crept up in price, but it's now only the same cost as an old TS940S listed at, 4 years ago! The radio? Yaesu's FT990. For Peter Hart to use words like "thoroughly recommended", I can't really comment anymore.

**Without int. PSU & CW filter, Deposit £522.00
& 12 payments of £125.00
With both options, Deposit £600.00
& 12 payments of £135.00**

No. 6

At the budget end of the market, the Icom IC-728 offers excellent performance together with the quality feel from this famous manufacturer.

Deposit £195.00 & 12 payments of £66.66

No. 7

For those of you who want a good, no frills H.F. package but also want to dabble on 6 Metres, how about the Icom IC-729? Identical to the IC-728 at No. 6, but with 10 watts on 50MHz as well as a full 100 watts on H.F.

Deposit £275.00 & 12 payments of £85.00

No. 8

Performance and flexibility of the "big boys", the TS-690S from Kenwood is still up in the TOP-TEN, and there's good reason. The price. Closely compare the spec of the '690 with other H.F. machines and the rig scores high up the ladder. Throw in a SIX METRE option giving a massive 50 watts output in addition to 100 on H.F., and you can see why this one is so popular.

**Without Auto ATU, Deposit £480
& 12 payments of £85.00
With Auto ATU, Deposit £510
& 12 payments of £95.00**

No. 9

Want the No. 8 slot, but without SIX Metres? You got it with the TS-450S. 100 watts, General Coverage, All Mode, Selectable filtering in both I.F.s. Big radio features in a mid-sized package.

**Without Auto ATU, Deposit £449.00
& 12 payments of £75.00
With Auto ATU, Deposit £480.00
& 12 payments of £85.00**

No. 10

A joint entry at No. 10, The Flagships from YAESU & KENWOOD, the FT1000 & TS950SDX transceivers. Both have features for the really serious amongst our H.F. operators, including 150-200W output, Dual Receive, Built in Power supplies & Auto Tuners as standard, the list goes on forever. If your serious, ring me for a tailored quotation to suit your needs. If your not, ring someone else!

FT1000 & TS950SDX, deposits from as little as £700.00.

MARTIN

G4

THE AMATEUR RADIO

THE MARTIN LYNCH H.F. TOP TEN

No. 1



Straight in at No. 1 is the new TS-50S from Kenwood. A real MINI-MOBILE H.F. Transceiver, no bigger than a TR751E 2M Multi! 500kHz to 30MHz, 100w out, matching auto ATU available as an option.

**DEPOSIT £199.95 & 12 payments of £66.67
With matching Auto ATU, Deposit £295.00 &
12 payments of £83.75**

Twelve Months ZERO IN

Still saving up for that new RADIO, but worried about (you should be). Have no fear, LYNCHY's here! I've been deposit, (no 50% as required by my competitors), and with NO INTEREST. The whole shabbang is subject to who have to wait for you to pay them each month, chappy! (or lassie as the case may be). Beaten the price the wait. Don't be shy, give it a try. I promise I'm

HIGHEST PRICES PAID FOR



IF YOU DON'T WANT TO TAKE ADVANTAGE OF MY FREE FINANCE AND WOULD RATHER PAY CASH, CHEQUE, CREDIT CARD OR TRADE-IN, THEN CALL 081 566 1120 TODAY FOR YOUR TAILOR MADE QUOTATION.



I promise you the best overall deal in the U.K. Get ringing, or you'll miss the bargains!



*Please NOTE prices & monthly payments are based on 17.5% VAT & no more price increases! E&OE

286 NORTHFIELD AVENUE, EALING, LONDON W5 4

MARTIN LYNCH

HS

EXCHANGE CENTRE

THE MARTIN LYNCH V.H.F. TOP TEN

It's got to be the LYNCH + muTek FT736RDX from Yaesu. The most flexible multiband 2/6/70/23 all mode transceiver available today. Complete FRONT END REPLACEMENT DESIGNED BY muTek, push this transceiver to the No. 1 slot. The performance is now exceptional - expect to see these being used in "VHF CONTESTS" around the world.

FT736RDX, with muTek, 2/70 operation,
Deposit £495 & 12 payments of £125

FT736RDX/6 with 6m extra,
Deposit £600 & 12 payments of £134.50

FT736RDX/23 with 23cm extra,
Deposit £624.00 & 12 payments of £150.00

FT736RDX/6/23 with all bands fitted, 2/6/70 & 23cm,
Deposit £733 & 12 payments of £165.00.

No. 1

* muTek FRONT END BOARDS available as "after fit kits",
£199.95, plus £59.00 fitting charge if required.

How To Pay At INTEREST

Without beating the next PRICE INCREASE?, (if you're not advertising it for months. There's no catch, a small spread the balance over a whole TWELVE MONTHS the ladies at TRICITY FINANCE, (they're the battalion), giving approval and there it is - another happy price increase and got your new WIRELESS SET without much better at doing deals than I am at poetry!
OR SECOND HAND GEAR!

CALL, WRITE OR FAX - SPRING NEWSLETTER
NOW AVAILABLE

Packed with interesting goodies, including 'First Impressions' by Ken Feather and Henry Lewis, an insight into using all the latest Handies and H.F. products from Japan, also a look at the latest HF Mini Mobile from KENWOOD, plus much, much more, TOGETHER WITH THE LATEST MARTIN LYNCH SECOND-HAND LIST!! WRITE OR PHONE FOR YOUR FREE COPY TODAY!!



No. 2

Not a transceiver, but a WIDE BAND ALL MODE PORTABLE RECEIVER, the NEW MVT7100 from Yupiteru. As supplied by MARTIN LYNCH to the M.O.D. and countless other customers, this new model from Japan is truly amazing. 500kHz to 1650mHz, ALL MODE, in your hand? Are they serious? Yep. I'm handing them out like confetti. It's not a toy, it's the most incredible miniature receiver available.

Deposit £49.00 & 9 payments of £44.45

No. 3

First the FT727, then the FT470 and now the FT530. YAESU get better and better at Dual Band portable design. Complete with CTCSS fitted as standard, (NONE of the others have), extended RX, AM/NB/M selectable, Auto Repeater facility, it's been the choice for hundreds already.

Nicads & Charger included.

Deposit £79.00 & 9 payments of £50.00

No. 4

Icom were the first company back in 1980 to bring you a fully synthesised solid state transceiver - their technology in digital design carries on - witness the NEW IC-W21ET dual band Handie. Massive dual display, Extended RX, superb "feel" to the user.

Nicads & Charger included.

Deposit £74.00 & 9 payments of £45.00

No. 5

Alinco have been knocking the "big three" for several years now and they continue to do so with the DJ-580. Ask around the Dual-Band Handie users and the odds are they'll be using one. All the bells and whistles, well built and very reliable.

Nicads & charger included.

Deposit £49.00 & 12 payments of £30.00

No. 6

When Angus McKenzie, G3OSS said this is THE transceiver for Two metres all mode, he wasn't kidding. I've been selling them for years and there's still nothing to touch it. Full 25W out and don't forget the matching 70cm version, the TR851E!

The TR751E 2M, Deposit £149.00

& 12 payments of £50.00. For the TR851E 70cm,

Deposit £199.00 & 12 payments of £50.00

No. 7

Kenwood's TH-78E marches into the TOP TEN because of its performance, excellent ergonomics, (if SONY ever designed a dual band Handie, this is what it would look like), beautiful build quality and endless user features. For people who like mind blowing "ADVANCED" facilities, wait no longer.

Deposit £49.00 & 12 payments of £35.00

No. 8

Want a simple to use, REMOTE HEAD DISPLAY, High-Power Dual-Band Mobile, that doesn't blow your brains away whilst QUEUING ROUND THE HANGER LANE GYRATORY? (WHERE?) - Well get your cheque book out lads & ladies, the TM-732E from KENWOOD is for you! Yes, it's got all the gizmos if you want them, but if you don't, then it's got to be the easiest mobile/base FM 2/70 transceiver available.

Deposit, £69.00 & 12 payments of £50.00

No. 9

Hands up those who want a SINGLE BAND HANDIE, but quite fancy the thought of being able to listen to the "other mob" on 2 or 70? Thought so. Kenwood thought so as well. The NEW TH28E & TH48E. Single band FM Handie, but press one button, and instantly monitor the opposite band to the one your transceiving on. They're lower priced so I can offer them on my nothing to pay (but small deposit), for 3 months scheme.

TH28E Transceiver on 2M, rx on 70cm,

Deposit £39.00, £250 in 3 Months

TH48E Transceiver on 70cm, rx on 2M,

Deposit £49.00, £280 in 3 Months

No. 10

Still a firm favourite for people who want MULTI-MODE PORTABILITY on 2 Metres, the FT290R mk11, still has the market to itself. The rest have given up! Available with a "clip on" 25W linear, the FT290R is the perfect all rounder for 2M operation, either portable, base or mobile.

Without matching linear,

Deposit £100 & 12 payments of £35.75

With Matching FL2025 Clip on Linear,

Deposit £124 & 12 payments of £45

...THE MARTIN LYNCH V.H.F. TOP TEN...THE MARTIN LYNCH V.H.F. TOP TEN...

UB. Tel: 081 566 1120 FAX (24Hr): 081 566 1207



HF NEWS

JOHN ALLAWAY G3FKM
10 Knightlow Road, Birmingham
B17 8QB

SOMETHING VERY good which has come about as a result of the actions of some prominent HF DXers can be reported this month. Marenglen Mema ('Geni'), Z1AB, who was one of those involved in the legalisation of amateur radio in Albania, was found to be suffering from a serious kidney condition. 'Project Goodwill Albania' - a combination of considerable effort by - amongst others - Martti, OH2BH, and Warren, KF7AY, who arranged to get him taken to the United States and successfully treated thereby almost certainly saving his life. No suitable facilities were available in Albania. Swissair provided transportation for him and two surgeons at the hospital in Mesa, Arizona, carried out the procedure free of charge - the cost otherwise would have been nearly US\$18,000. A fine example of the DX fraternity giving something back in exchange for services rendered!

A plea from Andrew Cunningham, G1MOWI, (QTHR). He would specially welcome a QSL for a contact made with BY5RY in October 1991. IRCs and dollars have been sent to the Call Book address - does anyone know the secret formula?

GEOFF WATTS DX PUBLICATIONS

GEOFF HAS reminded me that it is some time since I mentioned these - and that is a pity because they really are a good buy for the real DX enthusiast. There are four of them - the first being *The DXNS CQ & ITU Zones Guide*. This is 15 pages full of information about DXCC countries and Antarctic stations in each CQ and ITU zone. The *DXNS USSR Oblast Guide* (also 15 pages) lists all oblasts in numerical and prefix order together with information on CIS contests and awards, an R-150-R list, and information on QSL bureaux. The *DXNS DXCC Countries Guide* (14 pages) lists all DXCC countries (current and deleted) as well as IOTA numbers for islands on the list. Lastly, the *DXNS Radio Amateur Prefix-*

Country-Zone List (15 Pages) gives full information about each country with current and obsolete prefixes used within the past ten years. Each publication is produced in single or double-sided form and costs £1.25 or £1.50 respectively from Geoff Watts, 62 Belmore Rd, Norwich NR7 0PU.

DX NEWS

I HAD A LETTER from Nusret Adadzic, DJ0JV, on behalf of the Amateur Radio Union of Bosnia & Hercegovina. He said that (at the time of writing) the QSL bureau in Sarajevo was still intact but advises that 4N4 cards be sent to a temporary address (58000 Split, Croatia) or via himself (enclosing SAE and IRCs).

JX3EX, on Jan Mayen Is was expecting to have a linear and antenna tuner soon which will enable operation on the WARC bands.

The ARRL Awards Committee has now voted unanimously to remove the **Abu Ail Is** from the DXCC countries list.

According to the *Long Island DX Bulletin*, FO4OK in **French Polynesia** appears quite often near 14.175MHz at around 0900.

9X5JA, in **Rwanda**, has been found near 21.325MHz around 1900 but sometimes uses the 14.250MHz area at similar times. K5LBU (ex 9J2CF) is in **Sierra Leone** for two years - he has his TS440 and a three element beam and hopes to become 9L1CF soon. TN1AT has - until recently - been allowed to operate only from his work site. He now has permission to have his station at home but has no equipment yet. *RSGB DX News Sheet* says that his work is 10km from his home and he has had to walk back and forth in order to operate which has caused problems at weekends! The same news source reports that amateur call signs in **Mozambique** have now been regularised and that C9RJJ is now C91J and C9RDM C91S. There are now call areas which are as follows: C90 = commemorative and special event calls, C91 = Maputo and environs, C92 = Gaza - Inhambane, C93 = Sosala - Manica, C94 = Nampula - Zambezia, C95 = Tete - Niasa, C96 = Cabo, C97, C98, C99 = for VHF use only. The club station call sign is now C91TDM. I4LCK is expected to visit Mozambique at the end of April and early May. He was hoping to activate Ibo Island (IOTA AF-061), Angoche Is, and Inaca Is Gerard, with the call sign C9LCK but in view of the changes it may be different. Ex-

BAND REPORTS

This time I have to thank G2S AFV, HKU, G3s GVV, KKJ, GJ4GG, G4DJC, GW4KGR, G4s MUW, NXG/M, XRV, G0s KDS, MHC, NYD, and the UK DX Packet Cluster via G4PDQ. As always stations which were using CW are listed in italics:-

- 1.8MHz**
 - 0600 *T14CF, T19CF.*
 - 0700 *HH2B, WN4KKN/T14, ZL7AA.*
 - 1800 *A45XF.*
 - 2200 *JA4s DND, LXV, 9V1ZE.*
 - 2300 *A92BE, UJ8JMM, 9K2MU.*
- 10MHz**
 - 0000 *OD5/SP7LSE, P40AA, PJ2/PA0VDV, VP5P.*
 - 0700 *VK9LM, ZL4HB, 5T5CJ.*
 - 1600 *BV2DQ, KC6GG, Z1A1B.*
 - 1800 *N9NS/KH5, XX9TFN.*
 - 1900 *A71CW, FK8CP, VK8AV, 9K2ZZ.*
 - 2000 *TA2BK, V85KX, VK9LM.*
 - 2100 *FR5GG, 6O/G3K0X, 7Q7TA.*
 - 2300 *PJ2MI, ZD8ZEZ, 5H3XX, 7Q7XX.*
- 14MHz**
 - 0700 *H44MS, KH5K, N9NS/KH5K, P29AI, YJ8RN, ZL7AA, 3D2AA.*
 - 0900 *BV5OC, FO4OK, H44JS, SORASD, V85PB, VK9LM, VR6BB, ZK1UO, ZL7AA, 9M8DB.*
 - 1200 *N9OQS/T5, V63OM.*
 - 1600 *FT4WD, S21B, XU5DX, 9M8FH.*
 - 1800 *FR5ZN, N9NS/KH5K, KH6CF, VK9LM, 5W0CW.*
 - 1900 *EL2PP, FY5FE, KH8/DL7UJO, V73EX, ZD9CQ, 5R8DJ.*
 - 2200 *T5/KF6BL, VP8CKB.*
- 18MHz**
 - 0900 *H44MS, KC6GG, XX9MD.*
 - 1000 *AL7MX, VK9LM, Z1A1B.*
 - 1300 *A71CW, KH2FT.*
 - 1400 *JY9ZK, P29DX, S21ZL, 6O/G3K0X.*
 - 1700 *FR5GG, KL7HF, S21ZK, VP2E/WB9HRO, VU2ZAP.*
 - 1800 *N9NS/KH5K, SORASD, KJ6QQ/T5, VQ9AC.*
- 21MHz**
 - 0900 *BY3AB, JT1BG, SORASD, T5/N9OQS.*
 - 1000 *BY8AC, EP2MHB, KC6JC, XX9TFN.*
 - 1100 *BZ9AAA, C56/DL8UZ, HL0NGS, V63OM, 6O/G3K0X.*
 - 1500 *A22EX, T5B, T11JR, Y11OMR, 9M8YL.*
 - 1700 *D2/N6QHO, S79FIR, XU7VT, 5R8DG, 7Q7JL.*
 - 1800 *D2/AA4HU, FR5ZM, T5/K3OQF, VR6BX/P.*
 - 1900 *TZ6NU, VP8COC, W6-W7, ZD9CQ, 9X5HC.*
 - 2000 *T5/KJ6QO, ZD7SM, 5X1A.*
- 24MHz**
 - 0900 *KC6GG, XX9AW, 3X0HLU, 5H3XX.*
 - 1200 *TL8NG, VK9LM, XX9AW, 7Q7ZZ.*
 - 1400 *AP2JZB, FR5GG, 6O/G3K0X.*
 - 1500 *P43FM, SORASD, 3B8CF, 3C1EA.*
 - 1600 *BV2A, OX3KM.*
 - 1700 *VQ9AC, ZD8LII.*
- 28MHz**
 - 0900 *KC6GG, P29DX, TZ6FK, VK6MV, VR2GC, XU1SS, ZLs, 3X0HLU, 4S7EF.*
 - 1100 *A71BY, C9RJJ, S79FIB, SORASD.*
 - 1200 *FR5EL, SORASD, S21A, SU1AL/2, Y11DZ.*
 - 1300 *A22EX, AP2JZB, T5CB, 5H3AS, 5R8DJ.*
 - 1400 *P43WLP, PY0FM, S92YL, T11JR, XE2SO.*
 - 1600 *C91J, KL7GLK, VP8CMP, UA3CKY/ZS6.*
 - 1700 *C9RJJ, KG4CB, W6 - W7.*

QTH CORNER

- F6FNU** A Baldeck, Box 14, F-91291 Arpajon Cedex, France.
- N9NS/KH5K** N9NS, 10340 Broadway, Indianapolis, IN 46280, USA
- N0AFW/KH5** WA2FIJ, 10628 Grandview Place, Rancho Cucamonga, CA 91730, USA.
- W5IJU/KP1** via W5IJU, 2618 Mc Gregor Blvd, Fernandina Beach, FL 32034, USA.
- LZ/3W3RR** Box 812, Sofia 1000, Bulgaria.
- S21ZJ, ZK, ZL, ZM, ZN** all to SP5IUL, Hanna Osuch, ul Lowiecka 14, 05-400 Otwock, Poland.
- VK6ANC** PO Box 244, North Beach, W Australia 6061, Australia
- 4N4 QSLs** via DJ0JV, Erminoldstr 189, 8000 Munich 83, Germany.
- 5X1A** DL0MAR, MAR Clubst, Riesenkopfweg 7, D-8209 Schlossberg/Sltkn 1, Germany.
- 9M0S** Int'l DX Ass'n, John Parrott, W4FRU, POB 5127, Suffolk, VA 23435, US

3X0HBG/9X5BG/TZ6BG, is now in **Angola** as D2BG and has a licence valid until 1 August. He hopes to be on all bands mainly using SSB. *DXpress* reports that the only valid D2ACA QSLs are those signed by UT3UY, LZ2DF, or UT5UL. There seems to have been some problems involving some of the operators connected

1993 WARC BANDS TABLE

	10MHz	18MHz	24MHz	Total
G3KKJ	62	78	95	235
G3IAR	46	57	38	141
G2AFV	56	40	32	138
G0MHC	32	52	25	109
GJ4GG	15	34	27	76
G4MUW	-	33	18	51
G4XRV	43	-	-	43
G3IQF	14	16	8	38
G0KDS	-	-	12	12

with this operation. Christian, ex-TR8SA/TT8SA, is also in Angola and will be there for two years - he hopes to become D2SA or D28SA. N9OQS/T5 in **Somalia** will continue to be on the air until he leaves either this month or in June. F6FNU has advised *RSGB DX News Sheet* that since last December all officially issued callsigns in **Madagascar** must have a 'D' as the first letter of their suffix and that so far 5R8DA - 5R8DH have been issued. Evidently there are now more because 5R8DJ has been very active recently. There may have been some recognition of amateur radio in **Uganda** - Both 5X1A (previously 5X5WR) and 5X1B (who is KB9CR) have been worked recently [see also 'Late News' page 14].

VP8CFM has now left **S Orkney** and his replacement chief base operator is a lady who is not expected to be on the amateur bands for quite a while. CE9RDS is active from Teniente Rodolfo Marsch Base in **S Shetland**. Another newcomer in **Antarctica** is FT5YE who is located on Petrel Is and expected to be there for one year. *DXpress* gives a list of other stations in the Antarctic area which includes ZS7ANT (Sanea), CE8CPD (Yelcho), ZX0ECF (Ferraz Base, S.Shetland) and LU4ZS (Maranido Base, Seymour Is), and CE9OJ (Bernardo O'Higgins). The last is said to be found on Saturdays around 14.190MHz. Finally, 3Y2GV was on Coats Is and IA0PS at Terra Nova Bay. FT4YD on **Crozet Is** tends to stay in the lower 20kHz of the CW bands but does appear on SSB to work French speaking stations in the French speaking area just above 14.100MHz. ZD9CQ, on **Gough Is**, is to be found near 14.298MHz between 1800 and 1900.

9G1AP/9N1 is presumably located in **Nepal**. However, the operator is said to be "waiting for his reciprocal licence". I am certain that there is no reciprocity agreement between the two countries involved - one of which does not even permit its own nationals to operate at present. QSLs from the recent **North Korea**, P5RS7 operation were due to start going out last month.

ZK1DT has been reported on 14MHz SSB around 0600 and is believed to be on **North Cook Is**. He should be there until 1996.

NEW IOTA DIRECTORY

THE NEW 1993 version of the IOTA Directory is now available.

It has been updated to include the 44 new island reference numbers issued since April 1992 and the 129 since May 1991 when the last major revision took place. It consists of 60 pages and includes separate listings for the Arctic Islands and West Indies, an article on Geoff Watts (the programme's founder), some historical notes and the new IOTA logos. The new Directory includes a number of important rule clarifications and if you have a question about any aspect of IOTA you will probably find the answer here! Directories cost £6, US\$10, or 15 IRCs to European subscribers, £7, US\$12, or 18 IRCs to others. Apply to RSGB IOTA Director Roger Ballister, G3KMA, La Quinta, Mimbridge, Chobham, Woking, Surrey GU24 8AR, to whom all UK cheques should be made payable (please note that foreign cheques cannot be accepted). French, Italian, German, and Polish versions of the Directory will be available very soon.

AWARDS

VA1S AWARD

All through December 1992 the Marconi Amateur Wireless Society operated a special event station, VA1S. It celebrated the 90th anniversary of the first successful west to east transatlantic transmission by Marconi on 15 December 1902 - which used the callsign VAS. If you were one of the 10,000 who contacted VA1S you can apply for a certificate - send US\$4.00 or 8 IRCs to MARS, 846 George St, Sydney, NS B1P 1L9, Canada. It is different from the one issued in 1991.

IARU REGION 1 AWARD

Issued by RSGB and available to licensed amateurs and listeners

for QSOs/confirmed reports since November 1945. There are three classes - Class 1 for all countries on the current list, Class 2 for 45 member countries, and Class 3 for 30 countries. A special version is available in the same three Classes for confirmed QSOs on the 28MHz band since 1 July 1983. The current countries are: - Albania, Algeria, Andorra, Austria, Bahrain, Belgium, Botswana, Bulgaria, Croatia, Cyprus, Denmark, Djibouti, Egypt, Estonia, Faroe Is, Finland, France, Gabon, Germany, Ghana, Gibraltar, Greece, Hungary, Iceland, Ireland, Israel, Italy, Ivory Coast, Jordan, Kenya, Kuwait, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Malta, Mauritius, Monaco, Mongolia, Morocco, Namibia, Netherlands, Nigeria, Norway, Oman, Poland, Portugal, Romania, Russia, San Marino, Senegal, Sierra Leone, Slovenia, South Africa, Spain, Swaziland, Sweden, Switzerland, Syria, The Gambia, Turkey, United Kingdom, Yugoslavia, Zambia, and Zimbabwe. RSGB members send cards plus £1.50, 6 IRCs, or US \$2 (non-members £3, 12 IRCs or US \$4) to RSGB Awards Manager, Bill Ricalton, G4ADD, 4 South Road, Longhorsley, Morpeth, Northumberland NE65 8UW.

CONTESTS

RESULTS OF the 1992 **CQ WW WPX SSB Contest** have now appeared. Special congratulations to **GW4BLE** who won the N5FA Trophy by being top European single-operator all-band entrant. In the multi-operator single transmitter class **GB6BT** came European fourth with 12,001,386, **GB8LC** 10th with 9,087,636, and **GX0OBS** scored 5,971,680, **GX0PNW** 4,955,720,

G0FDX 1,808,313, **GX5QK/P** 1,581,832, **GB0WOX** 859,876, and **GS0AAE/P** 396,664 points. All band single-operator scores were **GW4BLE** 7,231,872, **GM3BCL** 466,284, and **GM0/AB4ZS** 10,080. In the low power listing of this category **G4ENZ** scored 275,650, **GWOAJI** 42,174, **GI0KOW** 15,960, and **G4XKR** 12,397. In the QRP class **G4MET** scored 24,282. On 1.8MHz (low power) **G4PKP** scored 36,080. On 14MHz **GB8FX** scored 4,984,488, and on 28MHz **G3UFY** 59,092, and **GM3CFS** 23,520. **G0NIF** entered on 21MHz but unfortunately his score is not given clearly in the results.

Results of the **ON Contest 1992 (3.5MHz SSB)** show **G4IQM** as third in Section D with 4950 points and **G4OGB** eighth with 270. In the **CW** section **G4OGB** came second with 2706 points.

ARI INTERNATIONAL DX CONTEST

2000 1 May - 2000 2 May
No rules received so I suggest following the 1992 procedures.

CQ WW WPX CW CONTEST

0000 29 May - 2400 30 May
Rules are the same as for the SSB contest - see March 1993 HF News.

AGCW-DL-ACTIVITY WEEK

0000 24 May to 2400 28 May
HF - 1.8 to 28MHz with WARC bands. CW only normal QSOs - no number exchange and use straight keys only. Each QSO counts one point. Copy of rules - please send SASE. Everyone scoring more than 50 points will receive an award.

DXPEDITIONS

G4LJF REPORTS that the **AH1A** expedition made 283 contacts with the UK and 52,600 in total during the seven days - not a bad performance for a team which received quite a lot of criticism!

Another international group of DXers has formed a team with the intention of activating **Mellish Reef** this autumn - probably in mid or late September. The group includes **VK4CRR**, **VK2RQ/VK2BJL**, **P29DX/G4JVG**, **WA4DAN**, and **KB7NW** who will captain the yacht *Banyandah* on yet another Pacific expedition (he did so previously during the 1982 Mellish Reef expedition and others). It is hoped to have three or four stations operational round the clock during the eight day stay, and the group hopes to cover

continued on page 16 ▶



Yunus Chaudhry, AP2MYC, at home in Islamabad. He is very active on 14, 21 and 28MHz. Yunus also holds the call G4UTE.

NEVADA

EVER

YAESU RADIO

Yaesu FT747GX - Still an unbelievable performer across the H.F. bands and one of the top 5 in budget H.F. Transceivers. Top Band to Ten, you won't be disappointed..... **£785**

Yaesu FT-890 - Recent reviews answer all your questions. Based on a winning combination, available with or without auto A.T.U..... **£1175**

Yaesu FT-530 - A Twin Band Handheld and a host of features including Dual In-Band RX, CTCSS DTMF all fitted. Wideband coverage plus optional speaker mic with LCD display. Guaranteed to be the next No. 1..... **£449.95**

Yaesu FT-1000 - You will never want another H.F. Transceiver! The FT-1000 does it all. This has to be the ultimate word in H.F. communications.

Full brochure available..... **£3275**

Yaesu FT990 All mode HF TCVR..... **£1995**

Yaesu FT757GX HF TCVR..... **£995**

Yaesu FT767GX HF + VHF/UHF... **£1597**

Yaesu FL7000 500 Watt HF amp... **£1795**

Yaesu FT736R VHF/UHF multimode... **£1569**

Yaesu FT650 6/10/12 mtr TRCVR... **£1221**

Yaesu FRG8800 receiver..... **£599**

Yaesu FRG100 HF receiver

A superb new radio covering 50kHz to 30MHz - our top selling general coverage receiver... **£559**



DRAKE

Drake R8E - Number one in the U.S. since 1943. Drake is known right across the globe for its technology and above all, reliability - remember the "B" line separates (mine are still going!). Wide frequency coverage, excellent dynamic range Superb filtering In fact it's simply the best shortwave clarity you'll find. Outperforming many other receivers costing much more. Whatever your interests - Drakes' R8E can handle it!!!

- Fully filtered with AMS as standard
- 99 programmable memories with Scan
- Computer control option
- I.F. Pass-band offset facility

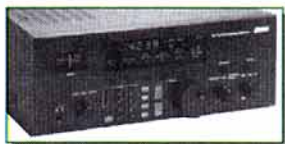
Options

R8E Matching Speaker..... **£49.95**

VHF Conv. (35-54 & 108-174MHz)..... **£225.00**

P.C Computer Drive Software..... **£59.95**

Full Technical W/Shop Manual..... **£29.95**



£1195

SCANNING RECEIVERS

NEW - MVT-7100, Set to be THE handheld of 1993. This radio must be heard to be believed. It provides effortless reception of SSB and CW signals using TRUE carrier injection with 50Hz resolution. It can even (with accessories) be hooked up for FAX and DATA reception.

- 100kHz-1650MHz
- 1000 memory channels
- All mode reception (incl. SSB & CW)

Each set is supplied with all accessories including: UK Charger, NiCad Batteries, Earphone, Telescopic Antenna, Original Yupiteru English Manual..... **PRICE £449**

YUPITERU MVT 7000 HANDHELD

- Receives 8 to 1300 MHz 100kHz-1300MHz (at reduced sensitivity)
- 200 Memory channels
- Rotary or keypad freq. control
- AM/FM/NFM
- Large display with strength meter

Each set is supplied complete with:- Full set of high power NiCads, AC charger, DC power lead and carry strap..... **£369**

MS1000 Base/mobile

- A mobile version of the HP2000 handheld but with added features.
- ★ Tape recorder voice activated switching
 - ★ Audio squelch
 - ★ 500kHz-600MHz, 805-1300MHz
 - ★ Supplied with mains adaptor..... **£279**



AR1500 HANDHELD

Covers 500kHz-1300MHz receiving NFM/WFM/AM and SSB. Supplied with a large selection of accessories including:-

- Charger
- Dry Cell Battery Case
- Long Wire Antenna
- Ear Piece
- Soft Case..... **£339**



HP2000 HANDHELD

Still our most popular handheld scanner.

- 500kHz-1300MHz
- 1000 Memory channels
- AM/FM/WFM Modes
- Sensitive Receiver
- Supplied with all accessories & UK charger..... **£299**



HP2000 SUPPLIED WITH FREE UK SCANNING DIRECTORY VALUE \$16.95

MVT-8000

Mobile version of the 7000 c/w mains adaptor. Especially sensitive @ UHF. Recommended..... **£389.00**

AR3000A

Our most popular base scanner. Latest updated version. (100kHz-2036MHz) **£899**



SCS computer software

New software for IBM/clones. Gives logging, monitoring and control of AR3000..... **£59.95**

ACE PAC-3 software

Full feature software for AR3000..... **£119**

KENWOOD RADIO

Kenwood R-5000 - Tried and tested in all corners of the world. This receiver keeps going and going. 150kHz-30MHz. All mode with many options - what more could you want..... **£949**

Kenwood TS450/690S - Two superb H.F. Transceivers capable of delivering the "punch" when necessary. 100W O/P, optional Auto A.T.U., plus general coverage receive..... **TS450 - £1249: 690S - £1399**

TH28/48/78E's - The family of 3 "designer-type" handhelds that feel comfortable in the hand whether Two Meters, 70 Cms (ideal novice band) or 2/70 Twin Bander is what you're after - take a serious look at the "TH" range..... **£Call**

Kenwood TS850S - Another sure winner from Kenwood! Designed with the serious operator in mind and built to last... why not consider upgrading or part-exchanging your old TS830 **£1599**



Kenwood TS50 - Just arrived. This new "micro" 100 watt HF mobile rig is in short supply because of its popularity. We have purchased large quantities - call for info or part exchange price on your old HF rig..... **£999**

- Kenwood TS140S** HF transceiver..... **£849**
- Kenwood TS950SDX**..... **£3499**
- Kenwood TS790E**..... **£1799**
- Kenwood TS711E**..... **£1099**
- Kenwood TR751E**..... **£699**
- Kenwood TM741E**..... **£758**
- Kenwood TL922**..... **£1699**
- Kenwood TM702E**..... **£499**
- Kenwood TM732E**..... **£599**



EXTENDAMAST 10 METRE RETRACTABLE MAST

Suitable for: Dipoles, Long Wires, VHF/UHF Beams, G5RV and many other antennas. A new and inexpensive aluminium 10 metre retractable mast that may be used at home or for portable use. Easy to erect in minutes - your antennas can now be independent of trees, buildings and other make shift fixing points! The steel guying rings are corrosion protected to provide years of useful life. Because individual requirements vary guy wires are not included. A base fixing plate is available as an extra.

Introductory Price £69 Plus £8 Carriage

MICROPHONES

Adonis 508G

- Desk mic
- ★ FM/SSB audio selector
- ★ Electret insert
- ★ Slide switch to allow selection of 2 radios **99.95**



Kenwood MC50 Desk mic..... **£49.95**

Kenwood MC60A Desk mic..... **£99.95**

Kenwood MC80 Desk mic..... **£59.95**

Kenwood MC85 desk mic..... **£119.95**

Kenwood MC435 Hand mic..... **£22.95**

Kenwood MC44E h/mic..... **£29.95**

Kenwood MC45E h/mic..... **£29.95**

Kenwood MC44 DME h/mic..... **£45.95**

Kenwood MC45 DME..... **£49.95**

Adonis 308 low noise desk mic..... **£84.95**

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microphone. Made in Spain especially for Kenwood Icom and Yaesu radios - The electret insert gives outstanding clarity. **£46.00**



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High quality Japanese manufactured - outstanding performance.

End fed zepp antennas Using vinyl coated annealed copper wire - supplied with matching unit for coax feed.

ZA3.5F (39 mtrs long)..... **£79.95**

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COM RADIO

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Icom R-100 - The mobile monitoring station. 500kHz to 1.8GHz. What more is out there? 100 mems, AM, FM & WFM modes **£565**

Icom R-7100 - An affordable - professional grade receiver. Hosting 25-2000MHz coverage & a whole 900 memories to play with! Full colour brochure available **£1259 incl. free disc**

Icom R-72 - Let's not forget all the S.V.L's - Icom haven't with this general coverage H.F. receiver 100kHz-30MHz. All mode (FM optional) with 99 mems for favourite frequencies **£759 incl. free antenna**



KENPRO RADIO

KT-44 - 70 cms handheld. Thumb wheel frequency control. Full 10MHz! Ideal novice or repeater user. c/w NiCad, beltclip & charger **£159.00**

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Revox W520 (1.8-200MHz) 200W **£79.95**

PM30 3KW peak reading **£86.68**

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Vector 500. "Canadian Punch!" A full 1000 Watts PEP on SSB enables you to beat the pile-ups. Now available here in the U.K. Top band to 10 from only 60-80 Watts input. Call now for your brochure!



- 4x8 11A Low Cost Tubes
- 600W C.W. 1000W PEP
- Compact 24lb weight

£865

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We buy as well as sell new and used radio equipment, please feel free to call Paul or John on our Hotline for an instant quote on either P/X or Buy-Ins.

Yaesu FT200 HF Rig, slight fault on 10m.....	£195
Yaesu FT101ZD.....	£495
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Trio R2000RX.....	£475
Yaesu FRG9600 Desktop Scanning Receiver, av. cond.....	£365
Kenwood TS4405 C/W Matching Speaker, excellent cond.....	£845
Yaesu FT102 Mains Powered HF Transceiver av. cond.....	£525
Waltz SWR Meter Model SP400.....	£59
Mirage B1016 2m Amp 150W.....	£150
Trio JR500/S Shortwave Receiver, good for beginners.....	£149
Trio R1000 Digital RX, 0-30MHz (choice of two).....	£265
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Standard C5800 2m. Mobile, reasonable condition.....	£345
MM33/LS 2m. Amp.....	£59
Tokyo HP, HC200 ATU, 80m thru' 10m.....	£99
Yaesu FT220 2m, M/M Base.....	£275
VC300LP ATU, boxed.....	£110
Trio TS700G 2m. Base av. cond.....	£375

Call us now - even if we haven't listed your radio, for what we know to be unbeatable P/X deals.

EARTALKER

Eartalker - A completely new concept in microphone technology. The Eartalker is a combination of earphone and microphone which is worn within the ear. It provides outstanding transmitted audio quality and is suitable for all leading brands of handheld (Call for details on your particular model). Separate volume, PTT switch and control box **£39**

MICRO-READER

ERA Microreader - Data Communications Decoder - decodes RTTY, CW, AMTOR (A) & AMTOR (B). 16 character LCD display needing only connection to receiver extension speaker socket. Shortly to become available will be the large 4-line LCD display with built-in parallel printer driver port. Variable in-built Morse tutor. Call and reserve your optional display now) **£169.00**



SCANNING ANTENNAS

NB1300 Discone - (2.5-1300MHz) Stainless steel top of the range "N" type connector. Complete with short mounting pole and clamps. 8 elements with vertical whip. Suitable for transmit on 6m, 2m, 70cm, 32cm, and 23cm bands. Length 1.7mtrs **£49.95**

Nevada Scanmaster

(500kHz - 1500MHz). New high quality wideband receiving antenna uses fibre glass/stainless steel with 4 small radials. "N" type connector. Length 1.1 metres **£39.95**



Micro-Scan - (180-1300MHz). New low cost budget ground plane antenna **£12**

Skyband - (2.5-1300MHz). Our most popular stainless steel economy wideband discone. Recommended. Bargain Price ONLY **£27.95**

SONY ACTIVE ANTENNAS

ANT1 - An external active antenna with built-in pre-amp, covers 150kHz-30MHz. Fully portable with easy to mount fixing brackets. **£57.95**

ANT3 - Active antenna for Aircraft and VHF reception, suitable for Sony Air 7 plus many others **£54.00**

ALINCO & STANDARD

Alinco DJ-580 - Fast becoming the top selling Twin Band handheld here in the U.K. Complete with all "mod-cons" including AM Airband RX. Comes ready to go just plug-in and charge - the perfect way to operate 2M & 70 Cms **£399**

Alinco DJ-F1E - Don't take my word for it but my customers agree that this is the perfect companion when considering a 2M handheld. Full coverage and again offered with Airband receive **£249**

Alinco DR-599E - Replacing the 590E - This little unit has an impressive 50W on each band, automatic remote repeater function (ideal raynet exercises) and a host of extra facilities including ext.RX. Full colour brochure available - call us now! **£599.95 incl. free duplexer**

Standard C528 - This Twinband handheld is the model the others were based on! Still a popular choice with many features including remote cloning and repeater talk-thru! **£365**

Alinco DJ-F4E - A popular novice band radio on 70cms. Simple to operate handheld with 40 memories and 5 Watts output. **£269**

LOW LOSS CABLE

Superb Japanese low loss cable with aluminium foil and braid double earth screening, tough weather resistant yet flexible. Fantastic low loss - suitable for high power and frequencies up to 3GHz.



5D-FB (8.1mm - 0.055dB/mtr) **£0.75/mtr**

8D-FB (11.1mm - 0.039dB/mtr) **£1.79/mtr**

10D-FB (13.1mm - 0.031dB/mtr) **£2.75/mtr**

Losses quoted at 100MHz

CONNECTORS (for above)

"N" Types **£3.56**

BNC **£3.75**

PL259 **£1.50**

VECTRONICS

Vectronics - Canadian based - producing High Quality affordable Amateur accessories including:-

ANTENNA TUNING UNITS	
VC300 - 300 Watt ATU with X pointer metering of FWD/REV/SWR readings. Select 2 coax antennas plus balanced line (4:1 balun included).....	£139.00
VC300DLP - As above but with built-in Dummy Load.....	£149.00
VC300DL - As above but with built-in Dummy Load.....	£169.00
VC300D - Deluxe model with peak reading bar graph, X pointer meter	£399
HFT1500 - 3KW ATU with built-in 4:1 balun. Peak reading bar graph, X pointer meter matches just about anything!	£89
PM-30 - 3KW Power/SWR meter covers 1.8-60MHz.....	£39
LP30 - Low pass filter rated 1.5KW.....	

NEVADA ATU COMPONENTS

VARIABLE CAPACITORS	
Either - 150pF, 170pF or 250pF variables (7.8KV rating).....	£19.95
TC48 - 48 turn mechanical turns counter 1 count/rev.....	£15.95
Control Knobs - large graduated 1-9 indicator knobs.....	£3.57



HF NEWS

continued from page 13

all bands 1.8 to 50MHz with 'legal limit' amplifiers and mono-banders, verticals, and wire antennas. The estimated cost of the affair is US\$30,000 and donations are solicited. UK stations can send donations via RSGB DX News Sheet, 123 Reading Rd, Finchampstead, Wokingham RG11 4RD. Please no international cheques - US or UK cash or sterling cheques made out to 'B McCartney'.

Three amateurs from the Northern Corridor Radio Group in W Australia (VK6s UE, BFI, and VZ) were hoping to be on from the **Houtman Abrolhos** group of islands (OC-71) for four days at the end of April. Special call signs have been applied for and frequencies to watch are 3.795, 7.075, 14.195, 21.295, and 28.495MHz (SSB) and 5kHz above band edges on CW. They will also visit the IOTA frequency (14.160MHz). QSLs go direct to VK6ANC.

At the time of writing the planned expedition to **Revilla Gigedo** had been postponed because of volcanic activity on Socorro Is.

LATE NEWS

JUST AS I WAS writing the column I heard that Romeo Stepanenko was planning an imminent visit to **Libya** and **Tunisia** at the end of March. No call signs were being given but if the expeditions take place QSLs will be produced by INDEXA and will be mailed from Bulgaria - please send yours to the address for LZ/3W3RR given in 'QTH Corner'.

More good news from Africa. The Uganda Posts & Telecommunications Corporation wrote to the IFRB on 4 March 1993 to say that the Government of Uganda

has lifted the ban which was imposed in the early 1970s on amateur radio communication.

Visiting amateurs holding valid station licences and operator's certificates issued by their home administration will now be given a Letter of Authority to operate in Uganda for the duration of their stay. Applications must go to the Ministry of Works, Transport and Communications, PO Box 10, Entebbe, with a copy to the Managing Director, Uganda Posts & Telecommunications Corporation, PO Box 7171, Kampala, well in advance of the intended visit.

PROPAGATION

THIS MONTH G8KG reports as follows: "Last month I reported that solar indices were on something of a plateau since May 1992 and this situation still persisted at the end of the third week in March. The average monthly sunspot number over the past ten months had risen slightly to 76.5 (range 59.1 to 91.8) and even the 27-day running mean solar flux had flattened out at close to 139sfu for the past 15 days.

"At the same time there are some signs that a small upward trend may be developing in average geomagnetic activity but it is too early to be able to say whether this is significant. In the first three weeks of March there were only four days on which the Boulder A index was below 10.

"The overall effect of these trends has been that conditions on the higher bands have become less reliable and to this will now be added the effects of the seasonal decline in northern hemisphere MUFs. Just how long solar activity will remain on a plateau remains to be seen but it has certainly gone some way towards making up for the steep decline in the first half of 1992. Smoothed monthly sunspot numbers, available only up to August 1992 at the time of writing, had fallen from 146 to 84 in just 12 months, a most unusually steep fall, but they should now begin to fall less steeply."

THANKS

TO EVERYBODY who contributed this month and to the editors of *DXpress* (PA3DZN), the *Long Island DX Bulletin* (W2IYX), *RSGB DX News Sheet* (G4DYO), the *Lynx DX Bulletin* (EA2KL), and the *EA DX Boletin* (EA1QF). Your input for the July issue please to reach me by 17 May. **Please note that this is a very early closing date!**

VHF/UHF NEWS

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

A PART FROM a few auroras, there was little to get excited about in March. The 50MHz band brought nothing of interest as far as British Isles operators were concerned, and tropospheric propagation was generally dull. This may explain why interest in moonbounce activity seems to be steadily growing.

VHF CONVENTION

SINCE WE FIRST discovered Sandown Park Racecourse as a suitable venue for the annual RSGB VHF Convention, it has become so popular with promoters of other events that we now have difficulty in booking a satisfactory date. Although 6 March coincided with the 144/432MHz contest, the attendance was similar to the 1992 figure. Apart from the lectures, all activity was accommodated on the ground floor and by mid-morning, parts of the hall were quite crowded with bargain hunters. As usual, there was a comprehensive variety of equipment on offer, antennas and feeder cable seeming to be among the favourite buys.

There was a steady stream of visitors to the VHF Committee stand and I was pleased to meet some of the regular and occasional contributors to *VHF/UHF News*. The examples of Yagi antenna design using DL6WU's doubly-optimized method, and the tabular and graphical analyses of them using K4VX's Yagimax software, created a lot of interest.

The President's convention address in the afternoon was followed by the presentation of trophies. As usual, The Northern Lights Contest Group collected several trophies. This year there were two lecture streams but, as I was on stand duty all afternoon, I was unable to attend any of them; I gather they were reasonably well supported.

CONTESTS

IVAN STAUNING, OZ7IS, notified rules alterations for the Scandinavian Activity Contests,

which now all take place on Tuesdays as follows: 1st 144MHz, 2nd 430MHz, 3rd Microwaves 1.3GHz only or all bands, 4th 50MHz. Ivan states the times as: "1900-2300 local time. 1800-2200 UK time (not GMT)" so I imagine he means BST now. Printed rules were promised but had not arrived by 3 April.

QRP buffs should enter 20 June in their diaries. That's the date of the 11th *Practical Wireless* 144MHz QRP Contest, 0900-1700GMT. Tx output power is limited to 3W with all rules as in previous years. This year there is a listeners' section. Full rules from the PW office at Arrowsmith Court, Station Approach, Broadstone, Dorset, BH18 8PW.

In his Contest Exchange column in April *RadCom*, Andy Cook, G4PIQ, stated how he plans to develop this new feature. Henceforth I do not propose to devote space to discussions about the fairness, or otherwise, of rules. I will continue to mention the dates of non-RSGB contests, but details of Society events can be found in the Contest Classified pages towards the end of *RadCom*. Naturally, contest activity and conditions will still be fully reported.

PUBLICATIONS

THE MARCH edition of *The VHF-UHF DXer* comprises 28 pages including several devoted to contest scoring and activity; a report on the GB3LER beacons; the first part of 'The Ionosphere Strikes Back' by John Regnault, G4SWX; technical notes on measurements by Sam Jewell, G4DDK, and the usual band reports. The editor/publisher is G8ROU (QTHR).

Issue 1/1993 of the quality-printed *DUBUS* magazine features technical articles on everything from updating the DF9CY 50MHz transverter to a 24GHz transverter by DB6NT. The computer section comprises a piece on the use of the TESLA - Transient Electronic System Level Analysis - software for simulating block diagrams. As always, there are comprehensive activity reports. The new editor-in-chief is Rainer Bertelsmeier, DJ9BV. Ken Hatton, G4IZW, is the UK rep; see March *RadCom* page 17 for further details.

FM NEWS is the newsletter of the Central Scotland FM Group. Editor Dennis Cram, GM3NIG, says that issue number 81, Spring 93, is the biggest ever at 36 pages. However, several of them are devoted to HF matters but relatively few to FM and repeaters. A

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section headed 'SWAMP-On' left me guessing and appears to be something connected with mountain climbing. Surely editors should give casual readers a clue about such topics? The secretary of the CSFMG is Alistair Fraser, GM3AXX (QTHR).

The March *Newsletter* 77 published by the Worked All Britain Awards Group comprises 24 pages, though they are not numbered and there is no contents page. In June I note there is a 70MHz Phone contest scheduled for the 6th, 1400-1800GMT, and that the 144MHz QRP Phone event is on 27th, 0900-1700GMT. The contest manager is Gordon Horsfield, G4SKQ, and the membership secretary is Brian Morris, G4KSQ - both QTHR.

The British Amateur Television Club (BATC) looks after ATVers' interests and its magazine *CQ-TV* is one of the finest examples of a specialist amateur publication that I know of. The February issue, number 161, has 96 pages packed with very relevant technical information. I was fascinated by Andy Emmerson's, G8PTH, article on ADV (Amateur Digital Video) pioneered by Dr John Champa, K8OCL. *CQ-TV* is edited by Mike Wooding, G6IQM, using a 386 PC, Protext WP and Timeworks DTP software.

DX NOTE

A GROUP OF amateurs plans operation from the Belarus Republic from 20-30 June, plus/minus two days. The operators include DJ9YE, DL5BAC, UC2AKP, members of the UC1AWZ club and possibly UC2AAB. They envisage operation from KO33, 41, 42 and 43, and activity on 2m and 6m is contemplated using call signs UC1AWZ and EV5B, C, D, K, M and N, depending on the QTH and band.

REPEATERS

THE NW LONDON UHF relay GB3NW (RB5) was temporarily closed down for maintenance and improvements, including the addition of a CTCSS tone facility and increased power output. The Sussex Repeater Group's UHF repeater GB3HO (RB1) at Horsham and VHF relay GB3WS (R6) at Crawley are QRV again following re-engineering. Send reports to Mike Mundy, G0GNV (QTHR). A new UHF voice repeater, GB3CG, was due to become operational on channel RB14 at 1200 on 27 March. It is located near Blaenau Ffestiniog (GDD). For more details, contact

its keeper GW6IMS (QTHR); he would welcome reception reports.

BEACONS

THE WROTHAM 2M beacon GB3VHF (KNT) on 144.925MHz was restored to service on 25 February after a four months shutdown. It runs 60W ERP. Andy Steven, GM4IPK, sent a status report on the Lerwick beacons to *The VHF-UHF DXer*. The 6m GB3LER is now running 45W to a N/S dipole on 50.06394MHz. The previous dipole broke last January but has now been rebuilt. The 70cm beacon suffered antenna damage but all attempts to get the mast clamp off, using WD40, had failed at the time of his report.

GB3LER on 2m has been back at full licensed power to both the NE and SE antennas since 17 March. The antennas are now on a new mast, the concrete base for which was ready at the end of last year; bad weather, especially in January, prevented any work being done till recently. The measured frequency is 144.965034MHz, the expected drift +/-50Hz. The PSU has been modified and the keying sequence slightly modified to send: "GB3LER IP90JD" every 40s approximately.

METEOR SCATTER

ACCORDING TO the International Meteor Organization's 1993 *Calendar*, the Eta Aquarids meteor stream should peak on 3 May. The radiant is above a mid-UK horizon 0200-1300GMT. Best times are: NE/SW 0330-0830; E/W 0500-1030; NW/SE 0700-1130 and N/S around 0500 and 1100. This stream can produce quasi-Es propagation, ie strong bursts that sound like fleeting sporadic-E. The next recognized shower is the Arietids, predicted to peak on 7 June; details next month.

MOONBOUNCE

DEVOTEES OF UHF/SHF moonbounce will be familiar with AlKatz's, K2UYH, publication *432 and Above EME News*, familiarly known as 'The Newsletter.' Now in its 21st volume, it confirms the considerable and growing interest in the mode. Hundreds of call signs are mentioned in the April issue, including very many in Europe.

Although some use large dishes or big Yagi arrays, the majority achieve encouraging results with modest systems and power. While it is great to have a big tower to support all the ironmongery, it is by no means es-

sential. With four well-designed and built Yagis on a low support, using the 'armstrong' method for aiming the array, it is quite possible to work a few dozen stations with 100W at the antennas.

NEWS

LU7DZ should be QRV by now on 70cm with a K2RIW PA and four DJ9BV Yagis. YV5ZZ expects to be active again in a few months with a 6m dish, first on 23cm, later on 70cm. Edgar's new QTH is PO Box 4920, Caracas 1042A, Venezuela; QSLs via K8EFS. CO2KK is developing a 70cm system. UA4API plans operation from LN39, 10-15 August. G4DDK is setting up for 23cm and Dave Robinson, G4FRE, who I met at the Convention, hopes to get going on 70cm soon. He operated as WG3I during his work sojourn in the USA.

HEARING AID

Much EME work involves listening for very weak signals. WB2VVV runs a two-Yagi station and listens on AKG K45 headphones. Chris has wired the two drivers out of phase and finds it "... a big improvement for copying very weak CW. Psychoacoustically, the difference is that the signal is placed 'deep in the centre of your head' so that you can concentrate on it better, as opposed to just outside of both your eardrums." He has had good results rewiring cheap Walkman-type headphones this way.

CONTEST

The second leg of the French REF Contest has been changed to the 1/2 May weekend. From London, at 0000GMT on the 1st the Moon will be at 258° azimuth, 18° elevation, setting around 0150 at 279°. Saturday moonrise is around 1350 at 85° reaching a maximum, due southerly elevation of 40° at 2008 and setting at 271° at 0215. Sunday moonrise is at 1510 at 94° with maximum elevation of 34° at 2100. Moonset is around 0235 on Monday morning at 261°. The declination varies from +6.7° to -4.9° in this period.

144MHZ ACTIVITY

G4SWX is pleased with his March results, even though he was unable to be on for the whole of the first leg of the REF Contest on the 6/7 weekend. On the 5th John worked VE1ALQ on sked and SM2CEW on random. Next morning at 0000 his sked with CX9BT was completed "... in straight sets." He wrote: "This was exceptionally pleasing as I had calculated the Faraday rotation and

spatial offset and adjusted the sked time for the best moment." Later completions were with EA2LU, K5GMW, AI1K (FN41) and WB0GGM.

Saturday moonrise brought SM, S5, LA, F and GM contacts, plus JL1ZCG. He didn't get on again till 2000 on the 7th and quickly completed with DL, OK1, LZ, EA3, IK2 and SM stations, and with VE1KG who runs 700W to two Yagis. On the 8th John completed with JA4BLC at 1950 and EA3ADW at 2130, but spent a lot of time listening to and calling UB3EE. Despite a small aurora at 1700 on the 9th, he detected his own echoes at 2000 moonrise when less than 15% of the Moon was above his visible horizon. He completed with DF7KF, a new initial, and IK0BZY who runs 750W and two 17-ele Yagis.

Ian White, G3SEK, has pointed out that the WA1JXN, GM4ANB and VK3UM Moon position software *does* take into account the Moon's 5.15° orbit inclination to the ecliptic plane. In his *VHF Communications* article, to which I referred in the January column, HB9ANI was illustrating the resulting errors when the rather simple amateur satellite programs - eg for Oscar-13 - were used by plugging in the Moon's Keplerian elements. Sorry I misled everyone!

50MHZ

ACTIVITY HAS been very low in recent weeks. Tim Kirby, G4VXE, wonders where to call in flat band conditions, remarking that calls on 50.200MHz seem to go unheeded, with the best chance of a reply on 50.110MHz. This suggests that people prefer to monitor the inter-continental calling frequency, just in case there is an opening, rather than listen to white noise on the 'national' one.

Even FM activity on 51.510MHz seems to be lacking in parts of the country so, if there are any local nets in operation, please tell us when and where. Of course, some local groups may not want outsiders to join in, but those that do could invite such calls in between overs.

PROPAGATION

It is often stated that tropo propagation on this band is poorer than that on 2m. If so, why? Are results inferior because generally, higher gain antennas are used on 2m? The majority of SSB/CW operators on 2m seem to use 9 to 17-ele Yagis, whereas on 6m, 3 to 5-ele Yagis are likely to be the norm.

There is scope here for pairs of stations to carry out simultaneous long term propagation tests on the two bands, using identical design antennas for both bands at the same height in wavelengths above ground to nullify different 'horizon gain' phenomena. Such tests would be a useful exercise to conduct in flat conditions, if only to give the participants something worthwhile to do.

In his February report, Ray Cracknell, G2AHU (HWR), wrote that, while there were no major geomagnetic storms, there were frequent disturbed conditions and minor ones. A notable feature was the number of X-ray flares and the high X-ray background figures, in the high B, and even C, range in the first half. For explanations of these solar activity terms, see the Propagation section in the 1993 RSGB *Amateur Radio Call Book and Information Directory*.

In his Solar Factual Data script for the 4 April GB2RS News Broadcast, Charlie Newton, G2FKZ (YSW), wrote: "Solar cycle 22 is still giving us surprises. After month 77 it is recording the second highest mean level of solar flux, surpassed only by the highest cycle ever recorded, cycle 19. It is also higher than the mean level of all past cycles at this time since solar flux has been measured."

ACTIVITY

So what did all this mean for British Isles operators? Well, not much really! As G2AHU commented about the higher than predicted solar flux: "This upturn accounted for the increase in transequatorial propagation at 50MHz, but it was insufficient to open up F-layer propagation at 50MHz from Britain . . ."

Ted Collins, G4UPS (DVN), sent his usual, very detailed monthly report covering the period to 21 March. The last week in February brought virtually nothing. In March, the first useful event was an aurora on the 11th, to which he was alerted by a telephone call from Sweden. EI, G, GD, GI and GM stations were very auroral, but the GWs were T9. Beacons GB3NGI and GB3RMK were quite auroral, but GB3NHQ remained T9.

In February, Ted reported propagation between ZS6 and OD5 on the 24th, and ZS to I and Z2 to 9H/SV on the 25th. In March, PY5CC worked into 9H and 7Q7RM got into northern France on the 1st; 7Q7 into the Mediterranean on the 2nd and 3rd; 7Q7 to I on the 9th. On 10m on the

16th, 7Q7RM reported that, despite unsettled conditions, there was TEP into 9H, EA, etc every evening.

In the 11 March aurora, which she discovered at 1650, Ela Martyr, G6HKM (ESX), made 13 QSOs including one with OZ9AFN (JO44). Other countries worked were G, GD, GI and GM and squares IO68, 74, 75, 77, 85, 93 and 94. Roger Betts, G1EHJ (SFD), wrote after a long interval and awaits his A callsign, G0TRB, this month; he was VK6TRB in 1989. He runs 10W to a 5-ele beam.

NEWS

G4UPS passed along details of proposed June operation from five rare squares in Quebec by N8NQS, K8WKZ and N8PYO. Calls will be VE2/own call. The schedule is: 20/21 2300-0200 and 1100-1400 FN16; 21/22 FN26; 22/23 FN27; 23/24 FN17; 24/25 FN18, all at the same hours. QRG 50.125MHz also monitoring 28.885MHz; 350-400W and 5-over-5 Yagis at 35ft, with mobile operation en route. QSLs to Dave Bostedor, K8WKZ, 8030 Greenes Dr, Jackson, MI 49201, USA. This is billed as an Es Season Expedition.

YO4BZC (KN45AK) is a new Romanian station on the band; he is Dorin Iatan, Box 82, R-6200 Galati, Romania. When JX7DFA ended his winter tour of duty on Jan Mayen on 17 April, JX3EX should have taken delivery of an Icom IC-505 transceiver for use in the following four months; good news for Es enthusiasts. 5R8DG's QSL route is via F6FNU at PO Box 14, F-91292 Arpajon Cedex, France. His locator is LH31.

70MHZ

NIGEL WILSON, G4VVZ (HFD), reported on his Cumulatives activity with Tony Lemay, G4NBS. Their portable site was in Therfield, 4km SW of Royston (HFD), 168m ASL looking out over the Cambridgeshire fens. Their call was G4ZAP/P and they used an FT-726R, transverter, homebrew Rx and 4CX250B amplifier.

They only operated in three of the five sessions, best DX being EI9ED/P, GI8AYZ, GM3TAL, GD7HEJ/P and G3YJX.

Michael Michaelis, DK1MM, is keen to try some crossband tests using 50MHz at his end. His QTH is Waldetzenberg, Birkenstrasse 6, D-8411 Laaber, FRG. G1EHJ is QRV on the band and Roger runs 10W to either a half-size G5RV or his 5-ele 6m beam without any matching unit. [The Yagimax program suggests that this beam would have a 'gain' of -2.1dBi on 4m and that it would show more gain off the back.]

144MHZ

G1EHJ RETURNED to the band last December and hopes to finish various awards this year; Roger runs 10W and a 7-ele Yagi. Terry Chaplin, G1UGH (SFK), worked LX2DX (JN29) on 17 March and, in the Belgian contest on the 28th, his best DX was ON5OF/P (JO30). G6HKM also contacted LX2DX, who used to sign LX/ON1KTE. In the 17 March aurora, Ela worked G8GXP (IO93). Shane Hogarth, G7EWL (NHM), found conditions quite good to the west on 17 March with GIs and EIs coming through; he worked EI3GE (IO63) for the first time this year. Beacon GB3ANG was strong on the 28th and he had QSOs with G4MQV (DHM) and G7EKV (YSS).

In February, Arlen Pardoe, GM0HUO (FFE), noted auroras on 1, 4, 7-10, 17 and 22, mostly of very short duration with only beacons heard. In March he worked LA4XGA (JP33) on the 8th and 9th. On the 11th he made auroal contacts on CW with LA0GH (JO38), GW0PZT (IO72), F1LUW (JO10), OZ8ZS (JO55) and FC1DBE (JN09) between 1550 and 1804. Beacons were copied on 12, 13 and 15 from OY, SK4 and GB3LER. On the 16th GS1XOI (IO85), GM0NXP (IO75) and LA4XGA were worked on the key. More auroras were noted on 17, 25 and 28.

Edward Allely, GW0PZT (GDD), worked FF6KFP/P (IN98) on Chausey Is on 24 February.

GM3JFG (IO77) and GM4UFD (IO97) was worked via aurora on 11 March for two new squares. He was called by SP3BCA who faded before completion. A handful of GMs were worked in the 15 March event. F1CYB (JN17) was contacted on tropo on the 15th and 17th; F6FLE (JO00) and FC1BUO (JN29) were also worked on the 17th.

Clive O'Hennessey, GW4VVX (GWT), has a noisy home QTH so travelled to Rogart (HLD/IO87WA) on March 3 with two friends. He was QRV by 1900 with 140W and a 9-ele Yagi, but heard nobody. Next day GB3VHF was heard throughout the day but no QSOs were made till 2015. By the start of the contest on the 6th, conditions had deteriorated so much that, after nearly eleven hours, only five stations had been worked - all GMs. Things livened up on the 7th and G8LNC/P (IOW) was best DX at over 800km. However, Clive only made 22 QSOs in the entire contest. Of course, there was a good aurora on the 8th which provided QSOs with JP33 and nine other continental and British squares.

430MHZ UP

VERY LITTLE to report up here. On 14 February, G1EHJ, with 10W and a 19-ele Yagi, worked two HB9s, 14 DLs, six PAs and three Fs. On 25 February, G6HKM worked the special event station GB00SH at the Great Ormond Street Children's Hospital on both 70cm and 23cm. G7EWL hopes to have installed a 23-ele Cue Dee Yagi by the time you read this.

DEADLINES

SO THAT'S IT for another month. Pity there were so few entries for the Annual Table though. The July deadline is 27 May and the August one is 1 July. E-mail to CompuServe on 70630,603 or BT Gold on 76:MSX021. The fax number is 081-668 5582 and, although I never get such messages, the telex number is 9312111074(CN).

**ANNUAL VHF/UHF TABLE
JANUARY TO DECEMBER 1993**

Callsign	50MHz		70MHz		144MHz		430MHz		1.3GHz		Total Points
	Cty	Ctr	Cty	Ctr	Cty	Ctr	Cty	Ctr	Cty	Ctr	
G6HKM	15	10	-	-	32	12	33	9	2	5	118
G7EWL	11	1	2	1	36	6	7	4	-	-	68
G3FIJ	-	-	16	2	23	6	14	7	-	-	68
GW0PZT	-	-	-	-	40	11	-	-	-	-	51
G1UGH	6	3	-	-	16	6	-	-	-	-	31
GU4HUJ	-	-	-	-	16	6	-	-	-	-	22
G3FPK	-	-	-	-	4	6	-	-	-	-	10

British counties are those listed on page 65 in the January 1993 *RadCom*; 77 in all. Up to three different stations allowed in all 12 GM regions. Do not include EI counties. Countries are the current DXCC ones plus IT9. Deadline for the next appearance is 27 May.



there for a long time and is not operating on a temporary basis.

● Carl Mulisch, OE6UI, has written to let me know that he is QSL manager for 4N4BMN located in Bosnia - Hercegovina. He can be reached through the bureau or at Harterhoe 20, Gratkorn 8101, Austria.

● Ted Lingard, G3WNQ has written me again to say I misquoted him as saying that he thought VE was the starting signal whereas he actually said that CT was the starting signal. His phone has not stopped ringing since! Sorry about that but at least it shows that somebody out there reads the column!

● Ryszard Grabowski, SP3CUG, President of the Polish Radio Society, says that the HQ of PZK has moved to the following address: Sekretariat ZG PZK, PO Box 61,64-100 Leszno 1, Poland. However the Polish QSL Bureau is still located at PO Box 320,00-950 Warsaw 1, Poland.

● All outgoing cards received at the RSGB Central Bureau from UK amateurs are first checked against the membership database to see whether the originator is a member of the Society. If he is not we put the cards to one

side and write to invite the person to join. The Bureau is a jealously guarded membership service and free-loaders are not encouraged. In most cases the lapse of membership is just an oversight and the matter is soon put right but in those instances where the correspondence is ignored we destroy the cards.

● The QSL Bureau in Taiwan has moved and its address is now: CTARL QSL Bureau, PO Box 93, Taipei, Taiwan. The QSL Bureau in India has also moved and its new address is: ARSI QSL Bureau, PO Box 6143, Madras 600017, India.

● Gennady, UA9MA, has written to let me know that with the problems in the former Soviet Union continuing he has had to find alternative QSL routes. He tells me that if anyone requires a QSL from the calls listed below then they should route the request through DK8FS: UA9MA, EZ9MA, XV9MA, UQ/UA9MA, UH/UA9MA, UM/UA9MA, UL/

UA9MA, UJ/UA9MA, UA1OIL, 4K2OIL, 4K2BDU, 4K2OKV, 4K2BAZ, 4K4AB, R9MWS, UA0B/UA9CDE, 4K2/UV6ABL, UL9C/R9MWS.

● It is worth mentioning a few golden rules to be observed when using the RSGB bureau.

1. Please sort your outgoing cards alphabetically except for the ones going to the USA. They should be sorted according to call area number, the prefix letter can be ignored.
2. Use the recommended size of card - 5.5" x 3.5".
3. Do not send collection envelopes larger than 7" x 5" to your sub-manager.
4. Please inform your sub-manager if you do not wish to collect your cards.
5. Please mark any 'routing' instructions clearly.

Provided these simple guidelines are followed you may rest assured that your precious cards will be dealt with efficiently.

DC J GREEN, GW3MRI, is not now the QSL Sub Manager for the GW1, 6, 7, 8 & 0 series. He unfortunately had to give up due to ill health after performing sterling service. We wish him a speedy recovery. He is still, however, getting envelopes from customers. These should go to Keith Hudspeth, GW0ARK, 67 Bloomfield Road, Blackwood, Gwent NP2 1LX.

● Tony Waltham, HS0/G4UAV, writes to let me know that the best route for a QSL card for him is either via the Bureau or at the following address: T Waltham, The Post Publishing Co Ltd, 136 Na Ranong Road, Off Sunthron Kosa Road, Klong Toey, Bangkok 10110, Thailand. Tony is out

AWARDS

HERE IS another RSGB award to go for. It's the 50MHz Countries award and is given for proof of completed two-way QSOs on 50MHz with 10 countries. Stickers are available for increments of every ten countries worked. Only contacts with countries permitting 50MHz operation are eligible. The rules for the award are as follows:

1. All contacts must be after 1 June 1987
2. QSL cards submitted must be arranged in alphabetical order of countries claimed, together with a checklist.
3. No mixed categories
4. Fixed, portable or temporary location stations are eligible.

Charges are:

RSGB Members: £3, US\$6 or 12 IRCs

UK Residents non RSGB Members: £6, US\$12 or 24 IRCs

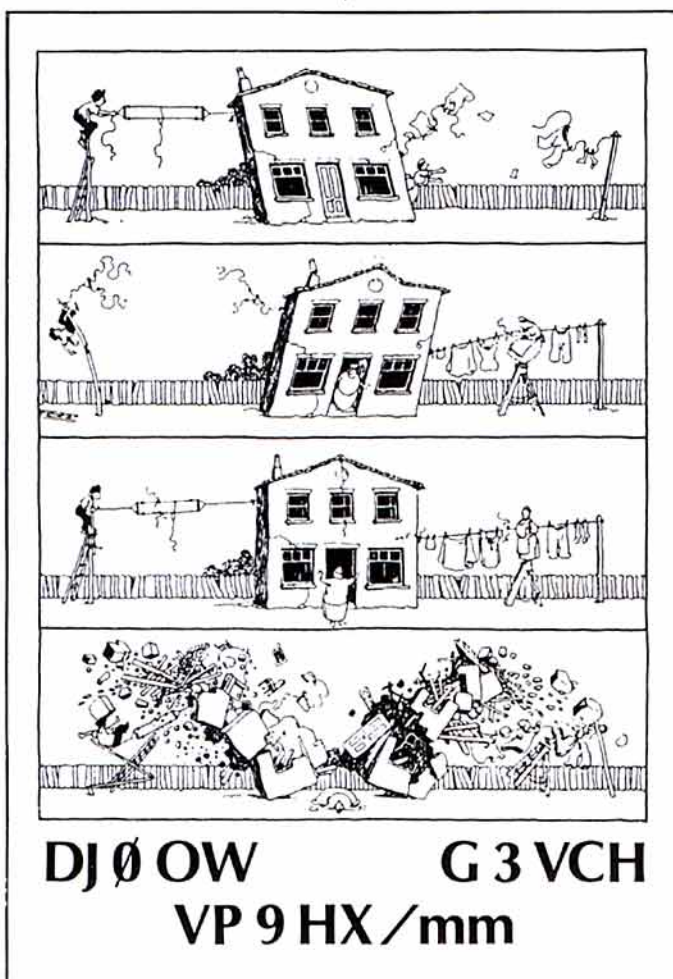
Overseas applicants who are members of their national society (proof of membership required): £6, US\$12 or 24 IRCs

Other overseas applicants: £9, US\$18 or 36 IRCs

NB: Remember - No cheques!

Applications should be sent to: Ian L Comes, G4OUT, 6 Haywood Heights, Little Haywood, Stafford ST18 0UR.

Don't forget that if you want your QSL cards returned safely then enclose a self addressed envelope with adequate postage on it with your application.



Roy Philpott's card must have made many people smile.

RADIO SOCIETY OF GREAT BRITAIN	
<h1>50MHz COUNTRIES AWARD</h1>	
This is to certify that the undermentioned has satisfied the Society that he/she has complied with the regulations governing this class of certificate.	
50 10 Countries min. 2-Way	NAME _____ CALLSIGN _____ NUMBER _____ DATE _____ BY ORDER OF THE COUNCIL <small>REGISTRAR GENERAL MANAGER</small>

HF F-LAYER PROPAGATION PREDICTIONS FOR MAY 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		24MHz		21MHz		18MHz		14MHz		10MHz		7MHz		3.5MHz	
	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802
** EUROPE																
MOSCOW	.....	.....	.....11111111.	.....	.....23333443.	.....	.....1.2456556762	.....	.....546666667897	.....	.....876433334689	.....	.....753111112368	.....	.....42.....35	
MALTA	.....1.	.....	.....1111121.	.....	.....244444541	.....	.....2.1566667874	.....	.....756776677898	.....	.....998644445789	.....	.....886321112478	.....	.....++3.....4+	
GIBRALTAR	.....	.....	.....1.	.....	.....1112232.	.....	.....244444652	.....	.....522676667897	.....	.....987765455789	.....	.....987432222478	.....	.....++42.....24+	
ICELAND	.....	.....	.....	.....	.....	.....	.....1111231	.....	.....2..145555675	.....	.....755555455678	.....	.....776432222356	.....	.....443.....23	
** ASIA																
OSAKA	.....	.....	.....1111.	.....	.....12222312.	.....	.....1243334342	.....	.....1..131114574	.....	.....1..1452	.....	.....13.	.....	.....	.....
HONGKONG	.....1..11.	.....	.....12222221.	.....	.....1244335531	.....	.....1.1244346763	.....	.....2...1124686	.....	.....1...1475	.....	.....142	.....	.....	.....
BANGKOK	.....1111111.	.....	.....23333332.	.....	.....1345446651	.....	.....112234346874	.....	.....41...1124788	.....	.....3...1477	.....	.....145	.....	.....22	.....
SINGAPORE	.....1121122.	.....	.....123333442.	.....	.....2345456752	.....	.....212244446884	.....	.....41...1124788	.....	.....3...1477	.....	.....145	.....	.....22	.....
NEW DELHI	.....1121121.	.....	.....123433432.	.....	.....2345456652	.....	.....223324446775	.....	.....641...1124788	.....	.....62...1478	.....	.....146	.....	.....23	.....
TEHERAN	.....22322331.	.....	.....1344445531	.....	.....114545557763	.....	.....435433446886	.....	.....8641...114789	.....	.....852...1478	.....	.....62...156	.....	.....3...23	.....
COLOMBO	.....22322331.	.....	.....1344445531	.....	.....113444557763	.....	.....333324446886	.....	.....741...1114789	.....	.....72...1478	.....	.....4...156	.....	.....4...23	.....
BAHRAIN	.....22333332.	.....	.....1445555641	.....	.....214544557875	.....	.....546333446897	.....	.....8741...114789	.....	.....852...1478	.....	.....73...156	.....	.....4...24	.....
CYPRUS	.....22333342.	.....	.....1455555641	.....	.....214777778875	.....	.....546777778997	.....	.....987654456899	.....	.....985321123589	.....	.....862...1367	.....	.....53...34	.....
ADEN	.....3344444421	.....	.....1.2545666753	.....	.....434545567886	.....	.....756433346898	.....	.....9851...114789	.....	.....873...1478	.....	.....74...156	.....	.....4...24	.....
** OCEANIA																
SUVA/S	.....	.....	.....	.....	.....1111121.	.....	.....122223431	.....	.....2431113651	.....	.....231...132.	.....	.....1...1.	.....	.....	.....
SUVA/L	.....1..52	.....	.....2113...74	.....	.....43361...85	.....	.....335731...185	.....	.....115631...1452	.....	.....231...33.	.....	.....1...1.	.....	.....	.....
WELLINGTON/S	.....	.....	.....	.....	.....1111..1.	.....	.....123322..41	.....	.....113432112363	.....	.....331...1341	.....	.....11.	.....	.....	.....
WELLINGTON/L	.....1.....1	.....	.....2112...13	.....	.....5434...36	.....	.....65561...57	.....	.....446631...275	.....	.....12331...342	.....	.....11...12.	.....	.....	.....
SYDNEY/S	.....11.....	.....	.....1221....	.....	.....1444311..1	.....	.....113654322213	.....	.....212531113545	.....	.....3...1463	.....	.....141	.....	.....	.....
SYDNEY/L	.....1.....1	.....	.....1...3	.....	.....4212...16	.....	.....533531...47	.....	.....323641...176	.....	.....141...263	.....	.....1...141	.....	.....263	.....
PERTH	.....2232....	.....	.....14443....	.....	.....11356541....	.....	.....32346442....	.....	.....63123111233.	.....	.....41...1463	.....	.....1...155	.....	.....1...22	.....
HONOLULU	.....	.....	.....	.....	.....1111111.	.....	.....122223321	.....	.....1233111341.	.....	.....331...1.	.....	.....11.	.....	.....	.....
** AFRICA																
SEYCHELLES	.....333445211	.....	.....1.2445666443	.....	.....424545567777	.....	.....756433446888	.....	.....9751...114789	.....	.....862...1478	.....	.....73...156	.....	.....4...24	.....
MAURITIUS	.....334555531	.....	.....2.1546667754	.....	.....5.4656567887	.....	.....816434446899	.....	.....9662.1113789	.....	.....873...1478	.....	.....74...156	.....	.....42...24	.....
NAIROBI	.....1..334556632	.....	.....211545677864	.....	.....644645567988	.....	.....876533346899	.....	.....9973...13789	.....	.....884...1478	.....	.....762...156	.....	.....43...24	.....
HARARE	.....1..334666642	.....	.....31.555778865	.....	.....753743446899	.....	.....975743446899	.....	.....99851.113689	.....	.....9862...1478	.....	.....773...156	.....	.....44...24	.....
CAPETOWN	.....23366762.	.....	.....455778852	.....	.....2..776567885	.....	.....4..764346898	.....	.....85.631113689	.....	.....9823...478	.....	.....7731...156	.....	.....44...24	.....
LAGOS	.....1..133567742	.....	.....32.355678874	.....	.....753665557997	.....	.....985753336899	.....	.....99862...3689	.....	.....9863...478	.....	.....7741...146	.....	.....44...24	.....
ASCENSION Is	.....33346751	.....	.....11..54567872	.....	.....452175557996	.....	.....774264335898	.....	.....998531...2689	.....	.....98631...378	.....	.....7741...146	.....	.....44...3	.....
DAKAR	.....1..32455651	.....	.....211254567873	.....	.....643575556897	.....	.....876764334799	.....	.....998641...1589	.....	.....98731...268	.....	.....7741...46	.....	.....44...3	.....
LAS PALMAS	.....2123343.	.....	.....1..143455652	.....	.....311476677885	.....	.....744687777898	.....	.....988766555799	.....	.....998543223479	.....	.....88531...257	.....	.....+52...25	.....
** S. AMERICA																
Sth SHETLAND	.....46663.	.....	.....57786.	.....	.....1567982	.....	.....2446895	.....	.....412.11113688	.....	.....86521...368	.....	.....7741...136	.....	.....44...3	.....
FALKLAND Is	.....35651	.....	.....1567873	.....	.....3567897	.....	.....8321.3446899	.....	.....976321113679	.....	.....88731...358	.....	.....7741...26	.....	.....44...3	.....
R DE JANEIRO	.....1..2354641	.....	.....21..4566773	.....	.....543115555787	.....	.....875334434699	.....	.....9985311.1379	.....	.....88731...158	.....	.....7741...26	.....	.....44...3	.....
BUENOS AIRES	.....2344541	.....	.....21.1.3466763	.....	.....5324.5566787	.....	.....8656.4444688	.....	.....998622111369	.....	.....88731...47	.....	.....7741...15	.....	.....44...2	.....
LIMA	.....122231	.....	.....1..2.343453	.....	.....421142454466	.....	.....743353343357	.....	.....98764211..27	.....	.....88741...4	.....	.....6741...1	.....	.....34	.....
BOGOTA	.....1111121	.....	.....1..12233343	.....	.....41.1344444456	.....	.....742354333347	.....	.....98654211..26	.....	.....88741...3	.....	.....5741...1	.....	.....24	.....
** N. AMERICA																
BARBADOS	.....1122231	.....	.....1..13233453	.....	.....411145444466	.....	.....743354332368	.....	.....9876421..37	.....	.....88741...15	.....	.....7741...2	.....	.....44	.....
JAMAICA	.....11111	.....	.....1..1122232	.....	.....31...3333345	.....	.....631123332246	.....	.....87543211..15	.....	.....78641...2	.....	.....4741...4	.....	.....4	.....
BERMUDA	.....1111	.....	.....1..1122232	.....	.....3...3333355	.....	.....621124332357	.....	.....87543211..36	.....	.....78641...3	.....	.....5741...1	.....	.....24	.....
NEW YORK	.....	.....	.....11121	.....	.....2...1222244	.....	.....52...2232246	.....	.....76432211.125	.....	.....68631...3	.....	.....3641...4	.....	.....4	.....
MEXICO	.....1	.....	.....11121	.....	.....2...222233	.....	.....41..1.232224	.....	.....66432111..2	.....	.....37631...2	.....	.....1541...2	.....	.....2	.....
MONTREAL	.....	.....	.....1111	.....	.....2...1222234	.....	.....41..2222246	.....	.....764222111125	.....	.....68631...3	.....	.....3641...3	.....	.....3	.....
DENVA	.....	.....	.....	.....	.....1...112	.....	.....31...11123	.....	.....5432..111112	.....	.....25631...341	.....	.....231	.....	.....	.....
LOS ANGELES	.....	.....	.....	.....	.....1...1111	.....	.....21...12122	.....	.....33321..121.1	.....	.....14631...131	.....	.....131	.....	.....	.....
VANCOUVA	.....	.....	.....	.....	.....	.....	.....1...1111	.....	.....23321..12111	.....	.....13631...131	.....	.....131	.....	.....	.....
FAIRBANKS	.....	.....	.....	.....	.....	.....	.....11111111	.....	.....112331112321	.....	.....1331...1.	.....	.....11	.....	.....	.....

The provisional mean sunspot number for March 1993 issued by the Sunspot Data Centre, Brussels was 70.5. The maximum daily sunspot number was 105 on 5 March and the minimum was 40 on 25 March. The predicted smoothed sunspot numbers for May, June and July, are respectively: (classical method) 64, 62, 60; (SIDC adjusted values) 63, 60, 55.



SWL NEWS

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

UNFORTUNATELY, September's WARC Band challenge was not as well supported as others which have been organised. I received two logs - one from Philip, G1EMD, and the other from Peter, BRS88887. Philip logged 214 stations on 18MHz and 62 on 24MHz. These included 54 and 18 different countries respectively. Peter logged 66 and 21 stations.

Many listeners still do not monitor the WARC bands, but they are here to stay and they do provide another 650 band countries to log! Some seem reluctant to stray from the six traditional bands but 18MHz tends to mirror 14MHz, without the noise and hassle (and the big expeditions now operate on this band). You will hear a good many old-timers from the States, and signals from the West Coast and JA when conditions are right. 24MHz opens less frequently (at least at present) and when it does it is normally around lunchtime and through the afternoons. This band seems to mirror 28MHz, rather than 21MHz. If more enthusiasm is shown in reporting these bands, I will arrange another challenge for later in the year.

CQ WORLDWIDE 160

IT IS UNUSUAL to have four top class reports on Top Band happenings, but David Whitaker,

Arthur Miller, Philip Davies and myself all listened 'seriously' to this year's CQ Worldwide 160 Metre Contest. We all felt that this was the first year for sometime that the band would be worth monitoring. We were not disappointed as between us we heard 62 countries. There was plenty of European activity, especially in the first few hours of the contest. Some of the rarer European countries were active too - T77, UA2, UO5, C31, GU and IS0. The best DX stations were T14CF, HH2V, UJ8SCH, A45ZZ, A92BE and CN8GI. It is unfortunate with so much interest shown, that CQ magazine continue with their policy of no SWL section in their prestigious contests.

VHF NEWS

MICK TOMS, BRS31976, provided an update on his VHF activity during the Winter months. Business trips to the States had prevented very much listening, but HB9AMH/P (JN37), PA0AD (JO22) and F1CYB (JN17) were some of the stations heard on 432MHz during tropospheric conditions on 13/14 February.

On 50MHz the ES season will be upon us by now.

HF NEWS

THE MAIN interest during the weeks under review was the DXpedition to Kingman Reef and Palmyra Is. Unfortunately their signal was weak in the UK. They were, however, heard on 14 and 18MHz SSB. The proposed Spratly operation was postponed, but S2 was activated in a big way, and the S0 expedition was heard by several listeners on eight bands. Pick of the period for me was hearing XQ0X (San Felix Is) and CEOZAH (Juan Fernandez Is) on 7MHz SSB on consecutive evenings in mid-March.

Elsewhere, the Dutch PACC

Contest provided activity from Flevoland, Limburg and Zeeland - three Provinces with least amateur activity. Lithuania had been celebrating the 75th Anniversary of Independence, using LY75. Stations in Kuwait were allowed to add the suffix 'NLD' after their call signs on 25 February to celebrate National Liberation Day, and 3Z9WU was heard promoting the Winter Sports in Poland.

Now for a quick look at the best DX around -

28MHz: A22MN, BV2FR, KP2/VE4GV, ZF2TT, VP8CMX.

21MHz: S79FIB, T5CB, V2/VE3ODC, YS1AG.

14MHz: FK8FA, FR5ZN, S21ZM, TN1AT, TU2XZ, V63OM, V73C, VU3BRC, 7Q7ZZ.

7MHz: FK8CR, HC8A, 9K2HA/HZ1, KL7XD, PY0FF, PK7AAB, VS6FU, 6W7OG, 9Q5BG.

3.5MHz: CE8ABF, J69J, JT0AJ, T14CF, TL8WZ, V21AN, VK5HB, VP5JM, XE1ILI, YA1AR, 9M2DM, 9V1XQ.

BOOKWORMS?

AXDON BOOKS have sent their new catalogue. There are books for all tastes, ranging from aeronautical, maritime and military radio to broadcasting and utility stations, to the short waves and the satellites. To get your free catalogue, write to Axdon Books, 32 Atholl Street, Perth, PH1 5NP.

RARE WAB SQUARES

GM0GKR WROTE about access to Bac Mor (Dutchman's Cap). He was sailing in the area a few years ago, and anchored on the east side of the island and a small party went ashore. Not particularly difficult, remembers Roger.

From stories he has heard, the local fishermen will always say it is difficult to land on any island

that they do not have any reason to land on themselves. Roger suggests the best local knowledge for a landing of this sort would be found by contacting one of the local amateurs who works /MM from their own boat.

CONTEST RESULTS

EVERYONE HAS waited patiently for the results of the Society's SWL contest last July and my SWL challenge last October.

It is most pleasing to see from these listings that there seems, at last, to be something of a revival in SWL contest activity.

SWL CONTEST - JULY 1992

POS	CALLSIGN	SWL	STNS HRD	MULTI-PLIERS	SCORE
1	ONL383	794	284	225496	
2	BRS52543	581	189	109809	
3	BRS8841	262	227	59474	
4	RS94221	399	131	52269	
5	RS42360	350	139	48650	
6	RS94346	351	126	44226	
7	BRS94154	319	127	40513	
8	RS88887	258	111	28638	
9	ONL6945	207	116	24012	
10	BRS20249	171	108	18468	
11	BRS93790	168	69	10695	
12	BRS94560	155	69	10695	
13	RS94433	110	78	8580	
14	RS94535	94	43	4042	
15	G7HIA	61	25	1525	
16	BRS94474	25	10	250	
17	ARS94512	11	4	44	
18	RS94509	4	2	8	

SWL CQWW CHALLENGE

POS	CALLSIGN	SWL	COUNTRIES	MULTI-PLIERS	SCORE
1	ONL383	530	1678	889340	
2	G-5218	499	1543	769957	
3	BRS8841	407	1247	507529	
4	BRS25429	378	1111	419958	
5	BRS32525	346	1003	347038	
6	ORS45992/CT	286	756	216216	
7	G1EMD	341	611	208351	
8	BRS28198	341	611	208351	
9	G1FYC	258	685	176730	
10	ONL3997	195	543	105885	
11	BRS94610	222	458	101676	
12	ONL4335	184	514	94576	
13	RS88887	195	475	92625	
14	BRS62088	132	435	57420	
15	ONL2372	134	322	43148	
16	F-10370	91	243	22113	
17	RS90926	66	110	7260	
18	ONL8977	14	26	364	

FINALE

NEWS FOR the July column must be with me before **12 May**.



HIGH PERFORMANCE PRODUCTS FROM AMDAT



DRSI DPK-2 TNC

The DPK-2 is a full feature built and tested TNC which offers you all the facilities that you will need for VHF/UHF operation. The facilities include:

- Version 1.1.8 Firmware
- Personal Message System
- CW Identification
- Low power CMOS construction

All this for only £119.00 (pp £4.50)

DRSI PC card TNC

We have been selling the DRSI PC cards for over 5 years and we have many hundreds of satisfied customers. If you want to use an IBM PC or clone on packet radio the DRSI cards offer the easiest and best way of getting on air quickly.

- Type 1 - 1 VHF/UHF port + 1 port for external modem £149
- Type 2 - 2 VHF/UHF ports £179
- Type 4 - 1 VHF/UHF port + 9600 FSK modem £299

p&p £4.50

SATELLITE TRACKING

Kansas City Tracker cards in stock. Please call for full details.

DSP-12 Multimode Controller

The DSP-12 is the ultimate Data communications controller. It comes complete with all the satellite communication modes and offers the facility to add a new mode by downloading software into its 1Mbyte of RAM. We also offer a free EPROM upgrade service to all our customers. Just some of its facilities are:

- HF Packet
- VHF Packet
- RTTY
- ASCII
- 400 BPS PSK
- 1200 BPS PSK
- 9600 BPS FSK
- UOSAT11 ASCII

Watch this space for details of the new features which will be coming soon.

All this for only £789 (pp £6.75)

JUNGHANS RADIO CLOCKS

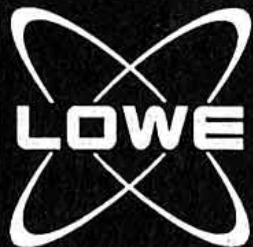
AMDAT still keeps a large stock of Junghans Radio Controlled clocks which use MSF or DCF77. Digital alarm, mantel and wall clocks are available.

Prices start from £53.95. Send an SAE for a full information pack.

All Prices subject to change VAT Included @ 17½% Post and packing extra

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KENWOOD'S TS50S



NOW YOU CAN *REALLY* GO HF MOBILE!

Kenwood's new mobile HF rig has caused a real stir in the market place. At last, an HF rig that will fit under your car's dash and still leave room for a passenger! Let's face it, the so called HF mobiles that have been available of late have hardly been portable, let alone mobile, but the new TS50S will set new standards in size and performance. You can really do that DXpedition now as you can take the rig *and* the auto ATU as hand luggage!

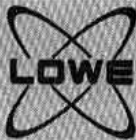
Quite how Kenwood have squeezed so much into such a tiny package, I can only marvel at. They haven't, however, skimped on performance: All modes, gen. cov. RX, 0.25µV sensitivity on ssb, a dynamic range of 105dB and a full 100W output. Words are not enough but we'll be happy to send you the brochure. Best of all, pop into one of our many branches and try one out. Take some money though — it is seriously tempting!

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27 Gillam Road,
Northbourne,
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Tel: 0202 577760



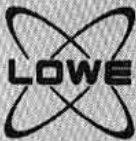
Dave G4KFN at
NEWCASTLE
Newcastle Airport,
Woolsington,
Newcastle upon Tyne
NE20 9DF
Tel: 0661 860418



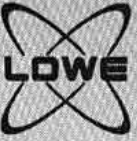
Tony G4CYE at
BRISTOL
79/81 Gloucester Rd
Patchway
Bristol
BS12 5JQ
Tel: 0272 771770



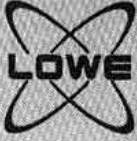
Fred G4RJS at
LONDON
223/225 Field End
Road,
Eastcote,
Middlesex HA5 1QZ
Tel: 081 429 3256



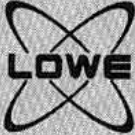
Tony G4NBS at
CAMBRIDGE
162 High Street,
Chesterton,
Cambridge
CB4 1NL
Tel: 0223 311230



Sim GM3SAN at
CUMBERNAULD
Cumbernauld Airport
Cumbernauld,
Scotland
G68 0HH
Tel: 0236 721004



Head Office
Main Showroom
and Mail Order

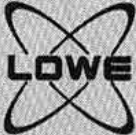


DERBYSHIRE

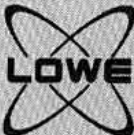
Here to help you are:
Rob G8MPT, Bill G8LXN
Beryl G7LME, Julie
Tom G6PZZ, Richard G3OQT
John G3PCY

Chesterfield Road, Matlock,
Derbyshire DE4 5LE
Tel: 0629 580800
Fax: 0629 580020

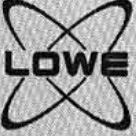
Steve G6URJ at
KENT
Chatham Road,
Sandling,
Maidstone,
Kent ME14 3AY
Tel: 0622 692773



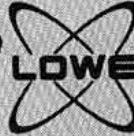
Tom G4LAR at
LEEDS
New Briggate,
Leds
LS1 6NU
Tel: 0532 452657



Steve G1WSY at
HEATHROW
6 Cherwell Close,
Langley,
Slough, Berks
SL3 8XB
Tel: 0753 545255



Derek Foster G7ESZ
Peter Thornhill G6ZKQ
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NEW

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- New User and Expert command sets.
- On-line help messages for each command.
- 128K RAM.
- 1 Megabit EPROM.
- Socketed lithium battery to back up RAM and on-board clock.
- Expanded personal mailbox.
- PACTOR now fitted as standard. (V6.1)
- Enhanced CW operation — dot/dash weighting, Farnsworth spacing, tone transmission, and programmable CW filter bandwidth and centre frequency.
- Programmable mark and space tones.
- Extended RTTY and AMTOR character sets.

The **KAM Plus** should be available about now but you don't need to throw away the old one! Simply buy the new **KAM Expansion Board** to upgrade to all the new features. Both still run with Hostmaster software, now available for the PC, C64 and the Mackintosh.

Full datasheets available on request

Some people still regard Packet as a difficult mode to operate, probably when they see their friends' TNC manuals! Don't worry, it's a lot easier than you think! We'll also help you out by providing an RS232 lead, a lead to your radio and some free terminal and fax software to get you on the air with the minimum of fuss and delay. Ask for your **FREE** Packet Package when buying a TNC at any of our branches. Don't forget our Branch Managers if you need help in setting up — many of them have been doing this for years and will happily help you out. Specialist help available at our **Maidstone, Cambridge, Cumbernauld and Matlock** branches.

The **KPC3** continues to be the world's most popular VHF TNC. Designed to be user friendly (even to new Packeteers!), this amazing TNC delivers high performance in a very small package. It's less than half the size of its nearest rival but manages to pack in many more features.

The KPC3 features an improved **DualLevel™** command set that gives new users just 23 commands (all most people will ever need!) that get you up and running but with the full 130 plus commands available in Expert mode for those wishing to exploit the full potential of Packet.

The power consumption is so low it can be run from a PP3 battery, ideal for portable operation and Raynet use. Runs on 6-25V.

Additional features include Kantronics PBBS with reverse forwarding, message header editing, a mail waiting led, remote sysop access and Kantronics KA-Node. Kiss mode and Kantronics Hostmode are also included for TCP/IP compatibility and advanced operation. If that's not enough, it also decodes WEEFAX with appropriate software.

Hostmaster software, expandable RAM and Real Time Clock are a few of the options.

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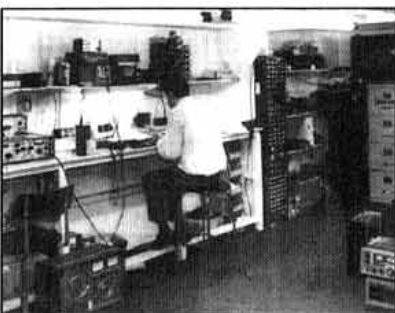


Just working out another special deal for some lucky customer (notice the whip on the wall, that's to keep the staff in line!) . . . Peter

Not only do we have all the current range of new equipment on display, but also an exciting selection of secondhand/commission items, all fully checked out by Frank, our Engineer.



We pride ourselves in providing a relaxed and comfortable atmosphere where Richard is always eager to demonstrate equipment (it means he can sit down for 5 minutes!)



We hope nothing does go wrong with any of your equipment, but rest assured, if it does we have one of the best equipped workshops in the country, 98% of all our servicing is done in-house. We find customers appreciate the fact that, if possible, their equipment will be repaired while they wait . . . Frank



Always a good range of accessories on our shelves. We are authorised dealers for:

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- ★ FAIRMATE ★ YUPITERU
- ★ ALINCO ★ AOR ★ TONNA
- ★ JAYBEAM ★ KENWOOD
- ★ SANDPIPER ★ BNOS ★ AKD
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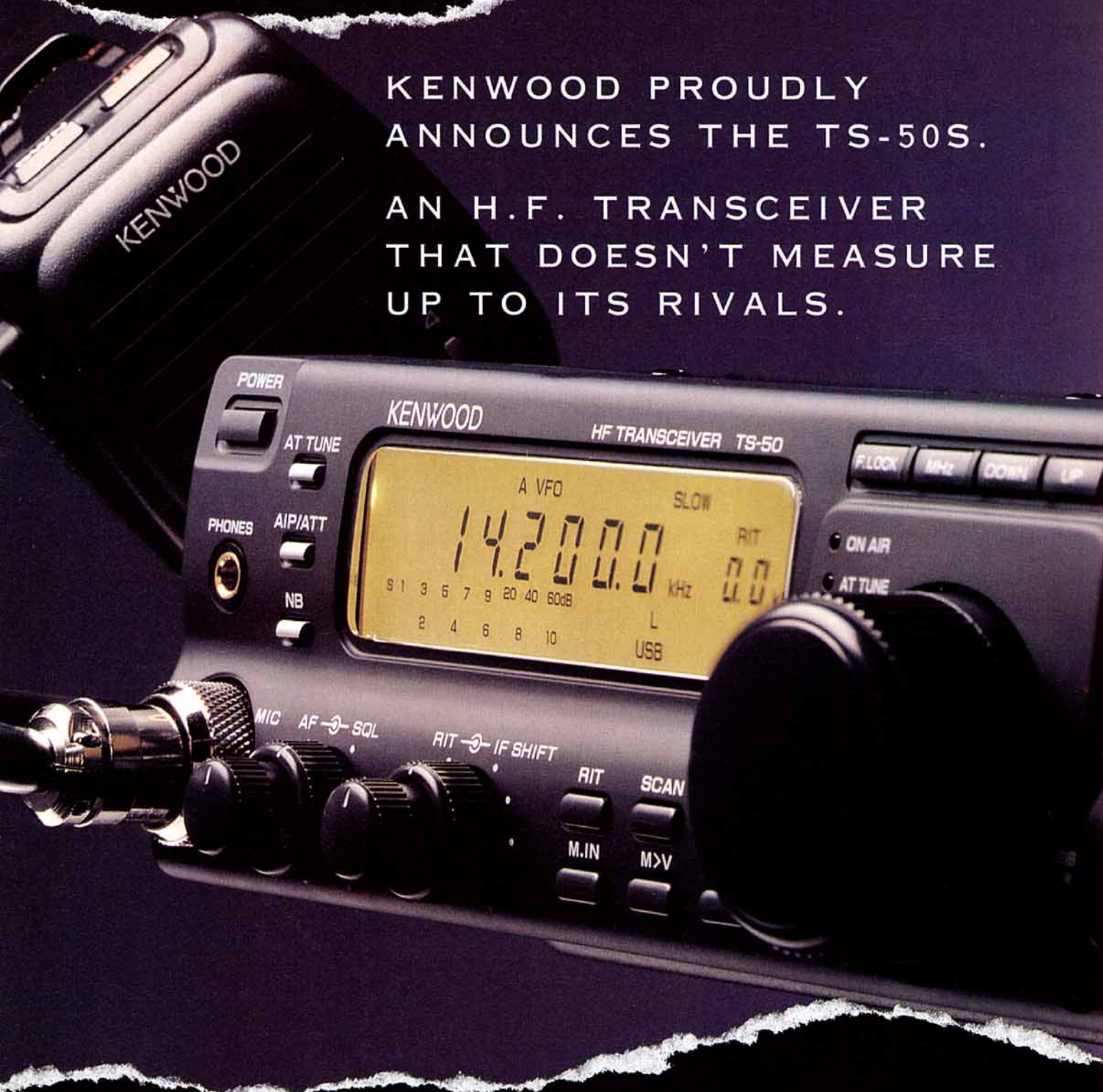
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Novice
NEWS

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

LISA IS PHYSICALLY disabled but she has high ambitions. She attends a DART (Disabled Access to Resources in Technology) course in Sheffield on Information Technology. Finding work is not easy for anyone at present, but for the disabled it is a great deal more difficult. By undertaking specialised training Lisa is hoping to put her considerable computer skills to good use for the future. From her achievements now, I would say that her chances in her chosen field are good.

Lisa typed a letter on her computer and sent it off by one of the communications satellites not knowing where it was heading – or even if it was going anywhere. Imagine her delight when replies came from the USA, Canada, Sardinia, Russia, Israel, Holland and France within two days.

Since then, Lisa has taken some excellent advice – she has started on a Novice training course. I wish you luck Lisa, and hope that one day we can meet on the air.

PROGRESS REPORT

IT IS NICE to hear of progress and I am grateful to David Fuller for telling me of his.

Last year David wrote to me asking for information on how to become a Novice, and I sent him the card to fill in to send to RSGB Headquarters adding as much encouragement as I could.

He joined the course at Lowestoft College under the tuition of M Baldry – callsign unknown. He sat the December exam – and passed. At the time of writing to me, he had not received his callsign but by now, no doubt, he is meeting new friends on the air. Congratulations David.

STRAIGHT KEY EVENING

YOU MAY HAVE read elsewhere in *RadCom* the advance publicity about Edgware Club's 'straight key evening' using the special

callsign GB2SKE later this month, but here is an extra reminder for Novices.

John, G3SJE, informs me that one of the two stations will be operating above 3.56MHz, specifically to encourage Novice participation. This is not a contest – SKE is for anyone who fancies a relaxed and friendly contact using a straight key. This takes place on Friday 21 May from 1900BST, on 3.5MHz (particularly around 3.55MHz).

For all those who have said they have never heard/worked a Novice, this is a golden opportunity. Novices – make their day!

NEWS FROM AFAR

GEORGI VODENITCHAROV, LZ1ZF (GOSHO) wrote from Bulgaria to tell us about LZ1KVZ, the radio club of the Vladimir Zaimov Technical School which specialises in subjects connected with electronics and electro engineering.

Licensed since 1983, the school has made over 315,000 two-way contacts with stations in over 300 countries, nearly half of them confirmed. From 463 contacts in 1983, to 100,000 in 1990 shows the growth in activity. As they are very keen to participate in contests, using the callsign LZ5G, many 'G' stations have answered which is a bonus, as English studies are among the school's subjects and they prefer to work in our language.

The club members are between fourteen and nineteen years old and started with forty members. Now, about fifteen Novice licences are issued a year and, since 1983, forty 'B' and ten 'A' licences have been awarded. Lis-

ten for LZ-2UW, 2MR, 3CC and 3ND – that will be Nick, one of their best operators.

The club is very active on the air, but construction is not forgotten. Sixteen year old Stoyan makes good use of the well equipped workshops and laboratories – he is the star constructor – he fixes anything that needs attention. Soon, he will be heard as LZ3JH. Gosho is keen on fox-hunting and has won many awards. He is also a keen QSL fan and tells me that the operators at the school would like to communicate with school radio clubs here. If any school is interested, the address is: Vladimir Zaimov Technical School, P O Box 8, Sopot 4330, Bulgaria.

I have sent information on Kidlink to him, so you may hear LZ1KVS – they are active on all bands – if you would like to know their regular frequencies, drop me a line (SASE please).

KIDLINK UPDATE

THE DATES for this event are nearly upon us and many schools are already prepared. I have compiled a list of known schools and sent a copy to each school on it. If you would like one, please ask – a SAE would be appreciated.

Peter, G0GTE QTHR, is very busy arranging links, contacting those in high places and generally trying to ensure that this year's event is hugely successful. In the end, however, success depends on your participation. Not only for your presence in a school, but in contacting stations where there are youngsters in attendance.

Schools: If you have an IBM computer, there is a Kidlink demo disk available from Exon Soft-

ware, 21 Great Tower Street, London EC3R 5AQ. Please send your request for this on headed paper – or at least indicate that it is for school use – as it is free. A hard drive and VGA monitor is essential, and please state whether a 3.5" or 5.25" disk is required.

Success reports and comments from schools taking part would be appreciated for inclusion in this column.

STOP PRESS: Information just received from Peter: Although normally adults are barred from sending messages through the 'KidCafe' network, an exception was made for President Bill Clinton recently. His message was addressed to all American youngsters expressing his support for this venture.

Peter is organising amateur radio links globally and is coordinating UK activity. Up to the present, twenty UK schools are on my list and there are some callsigns from overseas including America, Canada, Russia, the Baltic States, and of course, Bulgaria. There will be world-wide activity – HS1JC 'Apple' from Thailand would be an exciting catch. On 12 February, 27 countries were known to be actively interested and the frequencies 14.283MHz (SSB) and 14.033MHz (CW) – plus or minus QRM of course – have been arranged as possible meeting points. If that band is being unkind, try 21.283 and 21.033MHz.

Last year, around 3,100 youngsters from 37 countries took part in Kidlink, only a small percentage on amateur radio as that was the first year we knew about it. I wonder what the statistics will show for '93?



Members of the LZ1KVZ Radio Club. Left: Gosho and Donka. 1st row: Krassi, Donka, Daniel. 2nd row: Ina, Maria, Sveta and Rossy. 3rd row: Nikola, Krassin, Stan, Peter, Deyan, Vladi, Dishko, Stoyan and Tihomir.

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Contest Exchange

Andy Cook, G4PIQ
Fishers Farm, Colchester Road,
Tending, Clacton-on-Sea, Essex,
CO16 9AA

AS I WRITE THIS, I am in the throes of recovering from the second biggest contest of the year *CQ WPX* and, after the best part of 100 hours setting up, operating, trying to recover from potential disasters, and taking down, I am busy searching for some matchsticks to prop my eyelids open! It was good to see a fair number of UK stations entering the event reasonably seriously, and there is little doubt in my mind that international events such as *WPX* and *CQ WW* are the ultimate competitive events within amateur radio.

In a column nearer to the October *CQ WW* event, we will take a look at the workings of these enormous contests, and show that you don't have to have stacked monobanders from 80m thru' 10m, to enjoy them – although it does of course help!

VHF NFD

LAST MONTH WE discussed HF NFD and I'm sure that your preparations are well underway for that particular late spring party! I'd like to take this opportunity to remind you that you are also invited to an early summer party known as VHF NFD. You never know what will happen during this event – it may thunder or there may be baking sunshine; propagation may be flat, or you may have tropo, sporadic-E and aurora all in the same weekend; but this is the whole beauty of the event.

The contest covers 4m, 2m, 70cm and 23cm and this year there are four sections to cater for groups of all capabilities and dispositions. The rules have changed slightly this year, so do take care to have a look at page 82 of the March *RadCom* for detailed information. In particular, single band entries are now accepted, so perhaps if there are just a couple of you, and you feel that you cannot manage to cover the entire spectrum, you can go out with just one band, have fun, and still enter the contest. The most important thing to do now is to register your intention to enter

– again refer to the full rules for details on how to do this.

CHAMPIONSHIPS

FOR A NUMBER OF years the HF Contests Committee have run an HF Contests Championship. This is effectively a contest which runs for the whole of the year and for which you do not have to produce any paperwork – this in its own right must make it a wonderful invention! At the end of the year, the HFCC look at the scores which the entrants to a prescribed set of contests have achieved during the previous year, and construct an overall championship result.

The VHFCC has also decided to take up this concept, and indeed within a number of European countries, this idea is already running at VHF, and is very successful at promoting the levels of activity. Unlike the HF event, there will be two separate VHF championships, one for single operator fixed stations, and another for all other classes of entrant. The following contests will count towards the final result, and for each contest the leading station will be awarded 1,000 points, and the lower placed stations a pro-rata amount.

2m/70cm Contest (March) – the overall two band score will count.

432MHz Trophy
144MHz (May)
50MHz Trophy
144MHz Low Power
432MHz Low Power
144MHz Trophy
70MHz Trophy

1.3GHz and 2.3GHz Trophies – an overall normalised score for the two contests.

The accusation you may immediately want to level at this championship is that it will be

won by the same old major groups or stations. However, my analysis of the system is that the major groups do not currently enter all of these individual contests. Therefore, other groups and individuals stand a good chance if they are prepared to put in the effort to turn out for a fair proportion of the events. Championship trophies are currently under negotiation, and it is hoped to have one for the single operator fixed station, and another for the 'all others' section. We hope that this championship will encourage people to come on for more of the contests, and in spite of not being publicised at the start of the year, we see no good reason not to run the championship during 1993.

Just like the HF event, you do nothing (other than enter the individual contests of course!) – the calculations will be automatically performed by the VHFCC, and the results will be published as soon as possible after the last valid contest. The mix of contests is of course only one possible collection from an extensive calendar and there will, no doubt, be some people who are unhappy that their own particular favourite contest is not included. However, a significant amount of thought went into generating this list but, unfortunately, the detailed reasoning behind the decision takes more space than I have available here!

VHF SCORING

THERE HAS BEEN some discussion over VHF contest scoring of late. For those of you new to these events, most RSGB VHF contests are scored according to what is known as a 'Radial Ring' system. This means that contacts up to 50km score one point, 51-100 km score three points,

101-150 km score five points etc. This system is chosen firstly, because distance is a very important parameter in VHF contests and secondly, because being based on 50km rings, it is possible to score directly from a map. This could be done by taking a large scale QTH locator map, such as the RSGB Locator Map of Western Europe which shows squares right down to the smallest resolution (ie it shows JO01MU separately from JO01NU), drawing a set of concentric circles at 50km intervals from the home location, and seeing inside which boundary the distant station falls.

Within most of Europe, contacts are scored at one pt/km and there are some suggestions that we should move to this system. Although we use one pt/km for a few contests, the reason for not changing to this on a universal basis is that the overall results are not significantly affected by which scheme you use. Although both systems are pretty trivial if you are scoring by computer, the one pt/km system is very unwieldy if you are using a map to score with – imagine 750 circles on your map – and around 10% of our entrants do not use computers to score their logs.

There have been some very complex new schemes proposed and the VHFCC has carefully considered these. However, my view is that the system which we have at present is fair in the vast majority of cases. It is very important that you bear in mind that there is no absolutely perfect scoring system, but the one we have at the moment is good, and people win contests from all extremities of the country using it. What affects a station's overall position are three main factors – the quality and size of the equipment, the quality of the station's take-off, and the skill and experience of the operator. A handicapped scoring system could be devised which could reduce the effects of, say equipment performance, on the result, but then is not one of the major skills in contesting the development of a better station? For those people who are limited in what they can do on the equipment front, on VHF there is an award for the top station using 25W and only one antenna.

SIGN-OFF

THAT'S IT for this month – now you can go off and shop for the field-days. A trip to the chemists to get the suntan lotion, and to the outdoor shop to get the water-proofs should suffice!



"This is where the salt comes out . . ." If you enter contests you may well win a prize. RSGB Trophies Manager, Bob Harrison, G4UJS, proudly shows off one of the Society's cups.



Novice Note Book

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

THIS MONTH we have the first input from our readers, and it started with a rush - let's hope it continues! I say readers as I have also had a lot of letters from non-Novices saying that they like the column with its simple but practical ideas. Many thanks for the feedback and keep it coming as it's important to know that we're responding to your needs.

Let us begin with the interesting point that circuit simplicity does not necessarily mean a low component count. It's important that, firstly, you understand how the circuit works and secondly - perhaps more importantly - that it works when you've built it! Better by far to add a few components to a design if they remove tricky setting up procedures. Keeping it simple is a good approach, but there's always a limit to how far you can go!

BUILD AN ANTENNA

THIS MONTH WE HAVE an antenna design for the 70cm band. It's a type known as a collinear and was sent in by David Berry, G4DDW, and Ken Coleman, 2E0ABG. What they've come up with is a practical, easy to build aerial that is self explanatory in its construction. Fig 1 gives all the necessary information and materials required. David says in his letter that it gives a very useful increase in range to a three-watt handheld when mounted in the loft. If waterproofed with polythene and PVC tape it could be used outside.

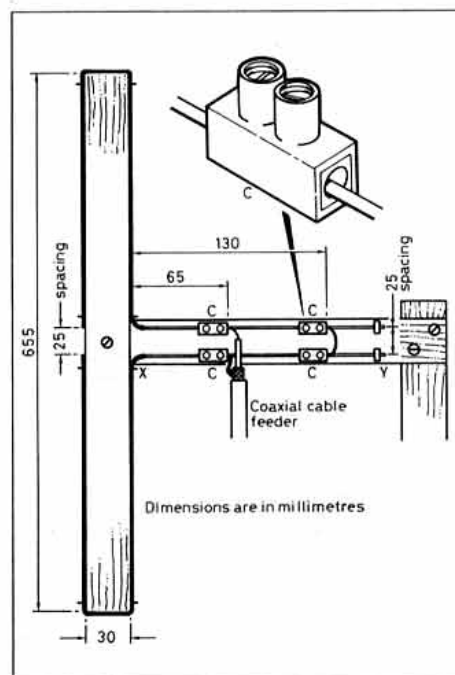


Fig 1: A simple, cheap but effective 70cm collinear antenna. Note that the insulation should be stripped from the wire between points X and Y.

The standing wave ratio (SWR) is finely adjusted with the aerial mounted in its normal operating position. This is done by moving the shorting bar and feed points along the bare copper wire between X and Y, as shown in Fig 1. An SWR meter is essential to set up the antenna for transmitting - usually it's no problem to borrow one from your club or a local amateur.

Personally, I don't like working in wood if I can avoid it as I never seem to cut it quite right! An alternative idea would be to use solvent weldable water waste pipe of 30mm diameter and PVC tape to hold the elements in place, this would avoid the problems of waterproofing. Finally when the correct feedpoint and shorting positions are known the terminal blocks could be removed and the wires soldered to ensure long life without corrosion.

TV SPACE-SAVER

SEVERAL NOVICES HAVE REMARKED that they only have room for a small shack, so here's a useful idea from Les, G0NMD. In his letter he says: "I had just stripped an old colour TV and got many good parts from it. It seemed a shame to have to throw away the cabinet along with the tube. My shack is small and space is at a premium, so I decided to use the cabinet as a shelf unit. I left as much of the strengthening as I thought was necessary, including the wood surround for the screen. I turned the cabinet around so that what had been the back became the front and fitted two shelves inside by screwing and gluing supports onto the inner sides (Fig 2).

"The shelves were arranged to suit my own needs, giving a low section for 'QRP' power supplies, and audio filters, then a bigger space for my transceiver and home-made transmitter, then another narrow shelf for my station log book, club membership lists and clock. The ATU stands nicely on top. It's saved me loads of space by allowing me to stack things up in four layers and the best of all, it only cost me a little time and a bit of chipboard (salvaged from an old wardrobe). Some TVs have wooden cabinets, some have chipboard and some are plastic, but most can be used in a similar way."

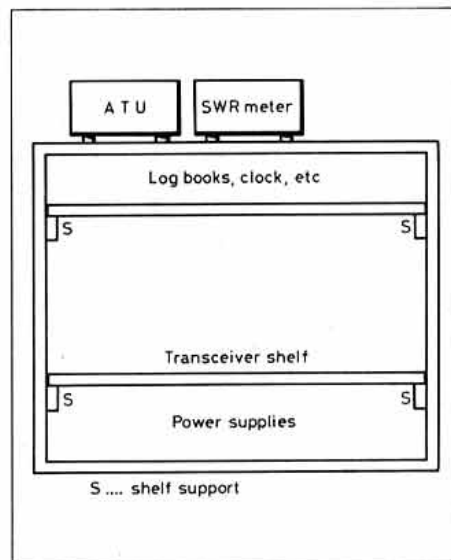


Fig 2: An old TV cabinet used, ingeniously, by G0NMD to make the best use of a small shack.

BRIGHT IDEAS

TO ME, THESE ARE JUST two ideas which typify real home construction. In other words, taking simple, often scrap material and making very useful pieces of gear that will give years of service. Most novices are full of bright ideas, so why not write in and share them with others?

70CM COLLINEAR

MATERIALS REQUIRED

- Wood: One piece 655 x 30 x 15mm
One piece 250 x 30 x 15mm
- Copper Wire: Approx 2 metres, solid, insulated 2.5mm diameter (from power cable)
- 4 'chocolate block' connectors (see Fig 1)
- 10 small wire staples or clips
- 3 wood screws



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BALUNS AND HF VERTICALS

I HAVE AN HF VERTICAL antenna mounted on the ground with a ground post and a couple of wire radials. The coax runs away from the feedpoint along the ground. Should I feed the antenna with a balun?

CAN WE CHANGE the question, please? You almost certainly need something at the feedpoint, though you're confusing yourself by asking about a 'balun'. Strictly speaking a balun is a 'balance-to-unbalance transformer', and when connected to an antenna such as a dipole which is supposed to be balanced (ie symmetrical) with respect to ground, it provides a proper transition to an unbalanced coaxial feedline. Since a vertical antenna isn't balanced with respect to ground, it doesn't need a 'balun' as such. Having straightened-out the question, let's look for some answers!

So-called 'ground-plane' antennas are particularly susceptible to RF currents flowing along the outer surface of the coax, where they can lead to TVI, RF feedback and all sorts of other problems [1, 2]. Some form of choke on the feedline is generally needed to prevent these unwanted currents. This is definitely true in the quoted case (Fig 1) because the RF ground system is very inadequate, giving stray RF currents every incentive to flow along the coax outer instead. It is even more true of elevated 'ground-plane' antennas which use a small number of resonant wire radials. Much of these antennas' reputation for TVI and for picking up local noise is because of uncontrolled currents on the outside of the coaxial feedline.

The cure for this problem is two-fold. First you need to prevent the unwanted currents from flowing along the outer surface of the feedline, by fitting some form of choke. At its simplest this could consist of 6 - 10 turns of the cable wound into a coil of about 30cm diameter. For a more effective choke, thin coaxial cable can be wound on to ferrite rods or rings, and [3] gives several good suggestions.

Also suitable would be a 'choke balun' consisting of a length of cable threaded through several large ferrite beads, or you might care to experiment with the lower-cost alternative suggested in March *Technical Topics* which uses ordinary steel wool. Note that the choke only affects currents flowing on the outside of the feedline's outer braid - the normal currents inside the coaxial cable are completely unaffected. This is because of the skin effect, which makes RF currents flow only on the surfaces of conductors, and thus allows entirely separate currents to flow on the outside and inside of the braid.

The second part of the cure is to improve the ground system, so that the RF currents have somewhere more useful to go. This is extremely difficult when the antenna and its radials are all mounted far above ground, but when adding radials to a ground-based vertical the rule is to use as many as possible and make them as long as possible. Resonant lengths are not relevant for radials on the ground, because what you're trying to do is to create a reasonably large and effective ground 'mat' against which the quarter-wave vertical element can radiate.

Taking the idea of a mat to its logical conclusion, why not try galvanized chicken-



IAN WHITE, G3SEK

52 Abingdon Road, Drayton, Abingdon,
Oxon OX14 4HP - or @ GB7AVM

mesh? One or two 10m rolls can create a considerable area of RF ground-plane, greatly increasing the effectiveness of a vertical antenna. Although difficult to use in an established garden, laying a new lawn can be an excellent opportunity to create a really effective ground. It's preferable to mount the antenna near the centre, but this isn't a strict requirement. Note that chicken-mesh can also make an excellent roll-up ground-plane for portable use.

Any significant improvements in controlling unwanted feedline radiation and extending the ground-plane will almost certainly change your VSWR - and not necessarily for the better. If you have reduced the ground losses in the region beneath the antenna, you have also removed a source of damping so the antenna will tune more sharply and the VSWR bandwidth will almost certainly decrease. These effects are quite normal, and

you should welcome them as a sign that the antenna is working more efficiently.

Tip: To lay wire radials across the lawn without any digging or slitting, try using a wooden or metal 'needle' to thread the wire through the grass-roots, just above the soil surface. The needle can be 5-6mm diameter and 150mm long, though an old archery arrow is quicker if the lawn is flat. In a mature lawn the needle will generally find its own level through the root-mat, well below the lawnmower blades. Work the needle along with your fingers, pulling the wire along after it. Finally, draw the wire tight and anchor the far end. But be careful how you rake the lawn in future!

PCBS FROM PRINTED LAYOUTS

HOW DO I MAKE Printed Circuit Boards from layouts printed in books and magazines?

FIRSTLY, DO YOU REALLY need a PC board at all? PCBs were invented for mass-production, and for a one-off project it might be easier to use a more informal constructional technique such as 'wired-track', 'pin-and-wire' or 'dead-bug' [4]. It's worth at least a moment's thought before you commit yourself to laying down tracks and etching a board.

Secondly, do you really need an accurate copy? The simplest way to copy a board is to take a 1:1 photocopy of the layout, prick through the photocopy to mark the locations

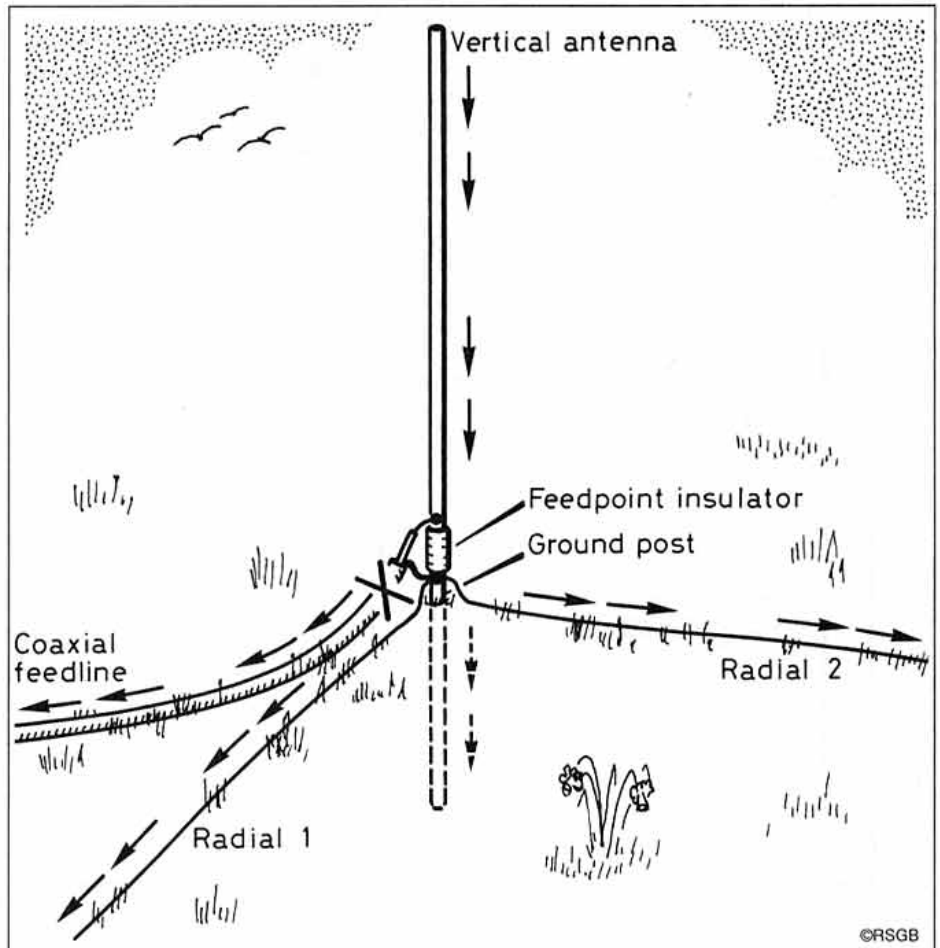


Fig 1: Arrows show RF current flow in an HF vertical system with inadequate grounding. To stop unwanted outer-surface currents on the coax feedline, wind the cable into a choke at 'X'. Also add many more radials to form an effective ground-mat.

of the holes on bare copper-clad board, and then draw in the tracks by hand using etch-resist ink. The Dalo etch-resist pen [5] has especially thick ink which adheres well to copper; for finer work you could use a Staedtler Lumocolor Permanent pen intended for writing on overhead-projector transparencies, though the ink is thinner and does not adhere so well.

However, if the board is very complex or the circuit uses transmission-line techniques where the dimensions of the striplines are critical, it will be easier, on balance, to use the photo-etching technique. For this you need copper-clad board coated with a photosensitive etch-resist material [6], and a copy of the layout diagram printed on ultraviolet-transparent film or paper.

The board is exposed to ultra-violet light using the layout diagram as a mask. Where the photosensitive material has been exposed to light, a chemical change takes place which allows it to be rinsed away using a dilute solution of sodium hydroxide, revealing the unwanted areas of bare copper. Where the black areas of the mask prevented exposure to light, the coating is unaffected by the sodium hydroxide 'developer' and stays behind to protect the wanted areas of copper from the etching solution.

It's nothing like as complicated as you'd imagine! With a little practice you can produce several good-quality boards in a single evening. For more details of techniques using photo-resist board, and a DIY design for an inexpensive ultraviolet light-box, take a look at the 1988 *RadCom* article by GW4HWR [7]. For example, one very simple way to use a layout from a book is to photocopy it on to translucent drafting paper [8]. This paper is transparent to ultraviolet light and gives a high-contrast image if the photocopier is set up correctly.

The *ARRL Handbook* (see pages 94/95 for how to order from RSGB) goes one step further by including PC masks for many of its projects, ready-printed on UV-transparent paper. That's about as far as I can take the topic within the confines of this column. GW4HWR's article and the *ARRL Handbook* contain plenty of practical information, so why not try making your own PC boards?

MEASURING FREQUENCY

MY RIG HAS A DIGITAL frequency display, so why do I need a separate frequency counter?

MOST FREQUENCY DISPLAYS on modern transceivers don't actually count frequency: they display what the microprocessor controller 'thinks' the frequency ought to be. In other words, when the microprocessor sends instructions to the frequency-synthesizer, it sends corresponding instructions to the frequency display - but in many transceivers it doesn't *measure* any frequencies at all.

As I explained in last month's column, the relationship between the transmitted and received frequency displays is not always straightforward. It depends on the mode in use, the setting of the clarifier control and the assumptions built into the programming of the display. In addition, many transceivers contain several independently-adjustable

oscillators, each of which contributes something to the frequency that finally emerges from the antenna socket. Some rigs have three or four internal adjustments which affect the transmitted frequency on one mode or another, yet none of them affects the digital display.

All of these uncertainties mean that if you want to check your true transmitted frequency you need an accurate, independent frequency counter.

TNC AMNESIA?

MY PACKET TNC occasionally loses its settings and reverts to default mode. What's the problem?

THE USER-DEFINED 'PERSONALITY' settings of most TNCs are stored in battery-backed Random Access Memory, so it seems like your TNC is intermittently losing its battery backup. Some TNCs have nickel-cadmium backup batteries which are recharged when the TNC is in use, but will eventually become discharged and may permanently lose their capacity if left in that state. More modern TNCs overcome this problem by using lithium backup batteries, which are not rechargeable but should last for several years. Intermittent failures could thus be due to a faulty contact or a dry soldered joint anywhere between the battery and power-supply pin on the RAM chip, or possibly an internal fault in the battery itself.

Fortunately, all need not be lost! If your terminal software supports downloading, uploading and editing of ASCII files, it's very easy to 'record' your TNC configuration to a disk file. You may have noticed that when you use *DISPlay* to obtain a list of the current TNC settings, the responses from the TNC look exactly like the equivalent commands that you would type in.

For example, when my own TNC reports *MYcall G3SEK*, that is exactly what I typed in to set *MYcall* in the first place.

To create a backup configuration file, all you need to do is invoke your download-to-file facility and enter *DISP* at the TNC's *cmd:* prompt. The TNC will then recite its entire configuration into the file. Edit the file so that it begins at the line *3rdparty OFF* and ends at the *XON* line, and then save it. Then, if ever you lose the battery backup and the TNC forgets its 'personality', you can simply use your upload-from-file facility to play this data back into the TNC. Note that all these transactions are between yourself and your TNC - the radio needn't be switched on at all.

READ ALL ABOUT IT!

YOU MAY HAVE noticed that this month's column contains several references to other magazine articles and books. Partly this is because of limitations of space, but mostly it's because the answers to the most frequently-asked questions about amateur radio are already available somewhere in print. In such cases, my job is to explain the background to the question and give a brief answer, and then to point you towards sources of information where you can find out more for yourself. If you can't see how the information in the book relates to your particular problem, contact this column!

In future months we'll be looking at some favourite books which have taught me a lot about amateur radio and electronics in general, and I'd be very pleased to hear about your nominations too. But the prize for 'best value' surely goes to the huge professional component catalogues, which are full of useful data. Since they're frequently updated for industrial customers, it isn't difficult for us amateurs to get hold of discarded previous editions. Although the price-lists may be out of date, the rest of the information is still valid and you can learn a great deal simply by browsing.

For example, if you want to know the pin-out data for any common semiconductor, or the drilling details for a 4-hole BNC socket, the easiest place to look is in one of the big catalogues. The RS Components and Farnell Electronics catalogues are particularly good for electromechanical and semiconductor data, while the Maplin catalogue is strong on IC application information.

Maplin Electronics and the Electromail branch of RS Components deal directly with the public, and their catalogues are available to buy. Although many component suppliers are reluctant to hand out free catalogues to non-professional customers, those such as Farnell Electronics and STC Electronic Services are perfectly willing to accept small orders if you deal with them in a businesslike way. I'll be giving some pointers in next month's column, together with suggestions on how to stock up your junk-box with 'ordinary' components at low cost.

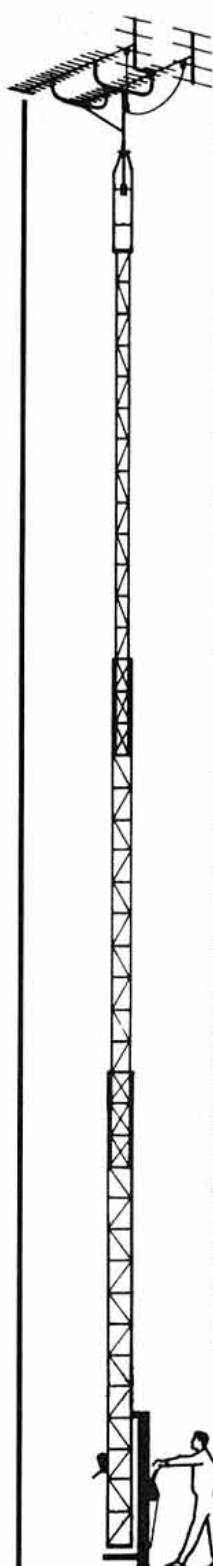
Meanwhile, try to get hold of a few big catalogues for yourself or, if you're a professional, how about trying to find good homes for your discarded copies?

UNTIL NEXT MONTH

IF YOU HAVE ANY comments on this month's column, or any new questions, I'd be very pleased to hear from you by mail or by packet (see head of column). But please remember what I said in the first 'In Practice' column (April *RadCom*): I can only answer questions through this column, and they have to be on topics of general interest. Sorry, but regretfully I cannot give individual advice.

REFERENCES

- [1] *HF Antennas for All Locations*, Les Moxon, G6XN, RSGB Books.
- [2] Baluns - more than a match, Ian White, G3SEK, *RadCom*, December 1989.
- [3] Controlled feeder radiation revisited, B Sykes, G2HCG, *RadCom*, July 1991.
- [4] How to lay out RF circuits . . . and how to build them (part 2), Ian White, G3SEK, *RadCom*, March 1991.
- [5] Farnell Electronics code DALO33RED or DALO33BLUE, Maplin DALO PEN code FP40T or RS/Electromail code 554-305.
- [6] Available from many suppliers, eg those above [5], in various sizes and single- or double-sided.
- [7] John Case, GW4HWR, *Making Printed Circuit Boards - A Different View*, *RadCom*, March 1988.
- [8] RS/Electromail Drawing Paper, code 561-448 (A4 size).



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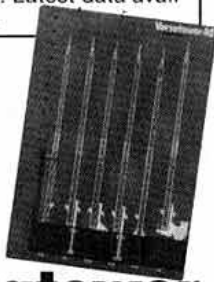
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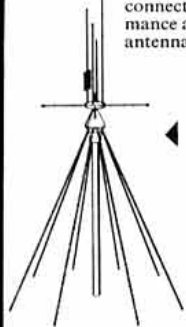
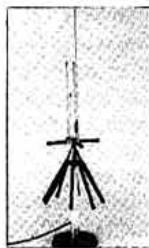
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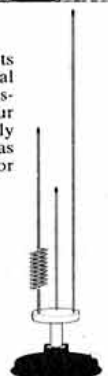
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DF Receiver for 160 Metres

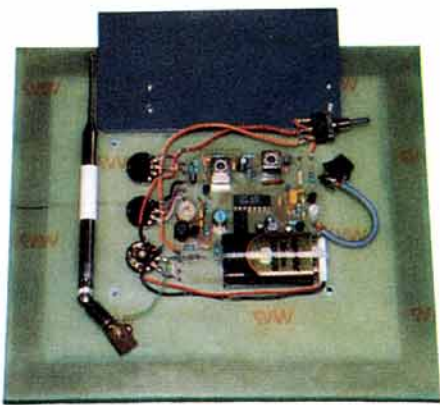
by Peter Asquith, G4ENA

THE HEART OF THE RECEIVER is a TDA1072 integrated circuit which is a high performance medium-wave receiver chip with good sensitivity and wide dynamic range (see Fig 1). The IF is 455kHz with selectivity provided by a ceramic filter, F1. Inductor T2 and capacitor C7 resonates between 2.355 and 2.455MHz to set the local oscillator. Variable resistor RV1 tunes both T1 and T2 by controlling the voltage to the two varicaps, VC1 and VC2. Capacitors C4 and C8 are set to give band coverage and maintain resonance tracking of T1 and T2.

The audio output stage, TR4, is suitable for driving a pair of headphones – RV3 controls the volume. RF gain is set by RV2 which can be adjusted to attenuate the most 'rock-crushing' transmissions to a level which the receiver can handle.

BFO TR3 runs at 455kHz and can be switched in (via S2) to provide a beat signal. This is often easier to null than working with just receiver noise and a modulated signal. The sense circuit TR2, amplifies RF from the whip aerial and feeds a portion of it into TR1, together with the RF from the main loop.

The loop antenna on its own will have two sharp nulls separated by 180° indicating the line of direction to the transmitter. Of course, this gives an ambiguity in direction but it can be resolved by switching in the sense antenna. The result is a single broad peak and a null at 90° to the nulls from the loop alone. The basic principles of HF direction finding,



including an explanation of the role of the sense antenna, can be found in [1].

Power for the receiver is supplied by a PP3 battery mounted on the PCB. The current consumption is about 30mA.

CONSTRUCTION SEQUENCE

ASSEMBLY OF THE RECEIVER is very simple. Just proceed as follows:

- 1) Fit all components to the printed circuit board (PCB). Remove flux after assembly. Component layout is shown in Fig 2.
- 2) Wire up the pots and switches. Do not leave large loops of wire in the box.
- 3) Drill the diecast box (see the drawing – Fig 3).
- 4) Test the PCB for correct operation.

- 5) Assemble into box and carry out field trials!

TESTING AND CALIBRATION

HAVING FITTED ALL of the components and cleaned the PCB, check as follows:

- 1) Inspect the PCB for possible assembly or soldering errors.
- 2) Connect the battery and the headphones. Check that the supply current is about 30mA.
- 3) Adjust T2 for 2.355 to 2.455MHz coverage when tuning with RV1. This point can be monitored on another receiver, or lightly coupled into a frequency counter. Alternatively, calibration may be done by injecting a 1.9 to 2MHz signal and listening to the receiver noise.
- 4) Inject a 1.95MHz signal into the receiver and tune RV1 for 1.95MHz. Adjust T1 to peak the signal. The S-meter drive on terminal 14 can be used for this purpose. R7 can be selected to drive a small meter, bearing in mind that the voltage at Pin 9 of IC1 is 2.2V for maximum signal.
- 5) Peak T3 for maximum signal.
- 6) Close S2 and check the BFO (note that the S-meter will not function properly when the BFO is on).
- 7) Check tuning of the loop aerial by adjusting C15. The loop must be kept clear of metalwork, and it may be necessary to

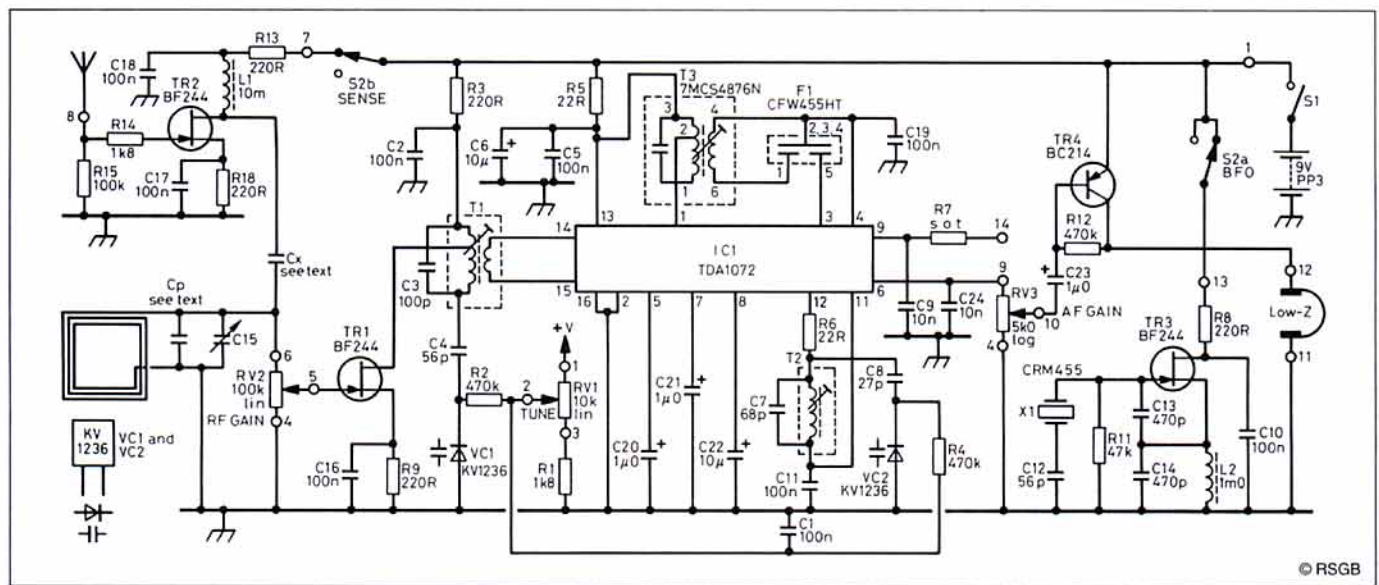


Fig 1: The loop antenna is etched on the same PCB as the components. An S-meter may be connected between R7 and ground.

add additional parallel capacity to C15 (ie capacitor Cp)

- 8) Sense operation. Create a capacitor by twisting approximately 25mm of 0.4mm enamelled copper wire together and solder in as Cx. The exact value of this capacitor may require modification for optimum sense performance. Also, try varying the length of the whip.

Note: Only make adjustments to the sense circuits using a signal greater than 1km away and during the day.

MAKING SENSE

HERE ARE A FEW HINTS and tips for obtaining best results from the receiver.

- a) Taking bearings very close to the wire/loop aerials can often be very misleading. Do not attempt to DF signal sources in the shack!

- b) Adjust the RF gain control so that the AGC of IC1 is not overloaded. This will only happen with those 'rock-crushing' stations.
- c) Nulling a very weak signal is best done with the BFO on.
- d) Keep fingers off the loop. Fit a handle (iron free) to keep hands clear of the receiver during nulling.
- e) If you do fit an S meter – don't use it for judging the distance. The strengths will vary at different locations all the same distance from the fox station.
- f) And finally . . . Remember that the receiver is only as accurate as your map and compass reading!

REFERENCE

[1] 'HF Direction Finding', Chris Plummer, G8APB, *RadCom* June 1991.

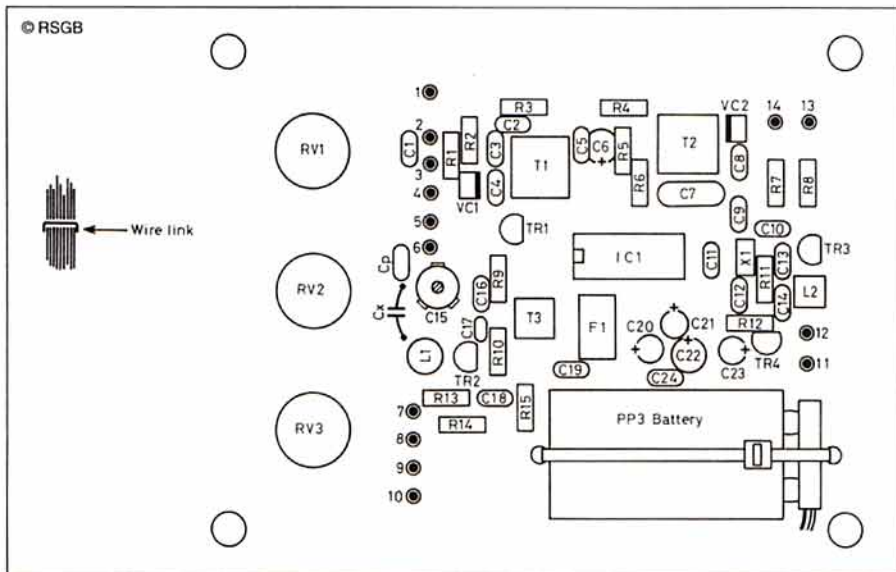


Fig 2: Receiver component layout. Note the wire link on the PCB loop antenna.

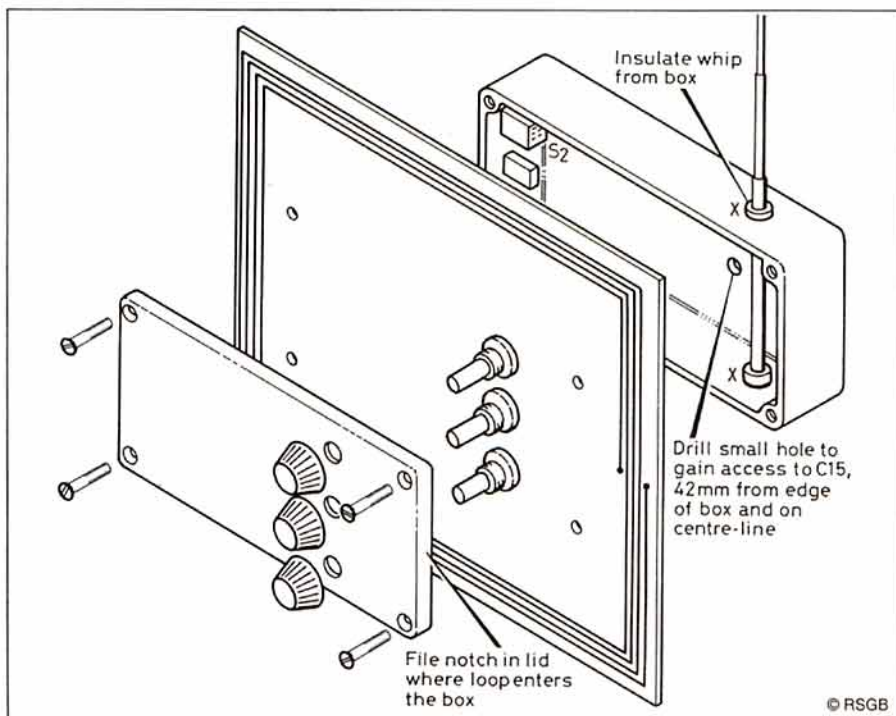


Fig 3: Components and front panel are located on either side of the PCB, as shown.

COMPONENTS LIST

Resistors

- All Carbon film/metal film
0.25W, 5% or better
- R1,14 1k8
R2,4,12 470k
R3,8,9,10,13 220R
R5,6 22R
R7 SOT See text
R11 47k
R15 100k

- RV1 10k linear (Alps)
RV2 100k linear
RV3 5k log + switch (S1)

Capacitors

- C1,2,5,10,11,16,17,18,19, 100n multilayer ceramic, pitch 2.54mm
C3 100p ceramic plate, 2%, pitch 2.54mm
C4,12 56p ceramic plate, 2%
C6,22 10µ aluminium radial, 16V
C7 68p polystyrene
C8 27p ceramic plate, 2%
C9,24 10n multilayer ceramic
C13,14 470p medium K ceramic
C15 5-60p variable, foil, yellow, pitch 0.3 x 0.2 inches
C20,21,23 1µ 63V aluminium radial
VC1,2 KV1236* (1 off)

Inductors

- L1 10mH Toko 8RB*
L2 1mH Toko 7BS*
T1,2 38µH Toko KANK3426R*
T3 455kHz Toko 7MCS4876N*
F1 455kHz Toko LFH6S/Murata CFW455HT*
X1 455kHz ceramic resonator, CRM455*

Semiconductors

- TR1,2,3 BF244B
TR4 BC214 not BC214L
IC1 TDA1072*

Miscellaneous

- S1 Combined with RV3
S2 Double pole c/o ON-OFF-ON, panel mount
Diecast box 121 x 95 x 34mm (Eddystone 9830P)
Knobs, 3 off
Telescopic whip 600mm (eg Tandy 2701413)
3.5mm jack socket
PP3 battery clip
PP3 battery (9V)
Tie wraps, 2 off
PCB or DF RCVR

Individual components are obtainable from the usual suppliers, such as Maplin, Farnell, *Cirkit, Tandy etc.

A kit of parts for this project (including PCB) is obtainable from JAB Electronic Components, 1180 Aldridge Rd., Great Barr, Birmingham B44 8PB Tel: 021 366 6928. Price is £32.50 inc VAT and p&p. The kit does not include the die-cast box.

PCBs are also available separately from JAB Electronic Components. Phone them for price information.

DF Transmitter for 160 Metres

by Peter Asquith, G4ENA

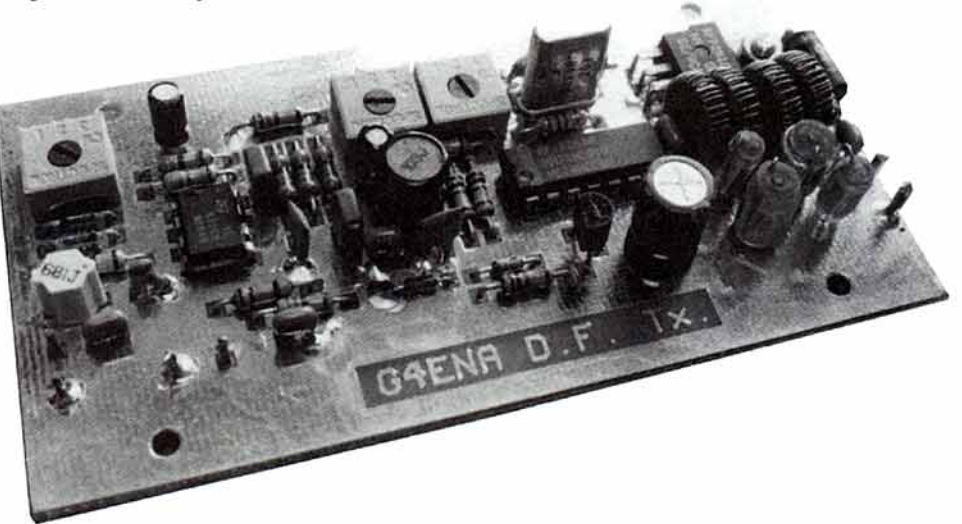
MANY 160m DF TRANSMITTERS IN USE today consist of either expensive Japanese transceivers, unsuitable for hiding in a ditch, or elderly transistor AM designs.

The transmitter design described in this article employs the modern technique of generating AM by pulse width modulation, thus permitting the application of a high efficiency and very compact switching VMOS power amplifier stage. The PCB outline is only 100 x 50mm.

CIRCUIT DESCRIPTION

THE MICROPHONE SIGNAL is RF filtered and amplified by IC1a. A simple diode clipping arrangement limits high audio peaks to prevent over-modulation. RV1 sets the mic gain. Unwanted high frequencies are filtered by a three pole low-pass filter, IC1b. RV2 controls the modulation depth. RF is generated by a single gate oscillator, IC2f, directly at the transmit frequency. R12 and C10 convert the square wave at IC2e into a triangle wave which is modulated by the amplified microphone signal to produce a varying threshold point at the input of IC2a. At full power, positive peak modulation, the mark-space ratio of IC2c and IC2d will be 50:50. At negative peak modulation, zero power, the ratio is 0:100. With no modulation, ie at standing carrier level, the ratio should be 25:75 which is adjusted by means of RV3.

IC2c and IC2d drive the gate of a logic level input VMOS power FET, TR1. For output powers less than 100%, a flyback voltage will be generated by L3 when TR1 turns off. D5 catches this negative pulse to maintain the



current flow in L3 and prevent damage to TR1. A 7 pole low-pass filter attenuates the unwanted harmonics.

The standing carrier power level is about two watts. To achieve more output power the supply voltage can be increased to a maximum of 24 volts. TR1 would need additional heatsinking at these levels, however.

CONSTRUCTION

ASSEMBLY ON A PCB should be straightforward, and a ground plane on the component side provides stable operation. Fit all components, isolating the tab of TR1 from the groundplane. Ensure that earth connections on the track side are connected to the topside ground plane. Mount the transmitter in a diecast box. The 4-pin mic connector could also be used to supply +12V, and a switch can be used to control Tx on/off. Install a 1A fuse in the supply for safety.

Remember: Observe static handling precautions for FET and CMOS devices.

TEST AND CALIBRATION

FIRST CHECK THAT all components are fitted correctly and there are no solder splashes. Initial testing should be undertaken with inductor L3 removed.

Next, continue as follows:

- 1) Set all potentiometers half way.
- 2) Apply power, check current consumption is approx 20mA.
- 3) Observe waveform on scope. This should be at the crystal frequency, rectangular in shape, and about 6V amplitude.
- 4) Adjust RV3 and check that mark/space can be varied over the range 0:100 to 50:50. Set RV3 for mark/space of 25:75 (high:low).

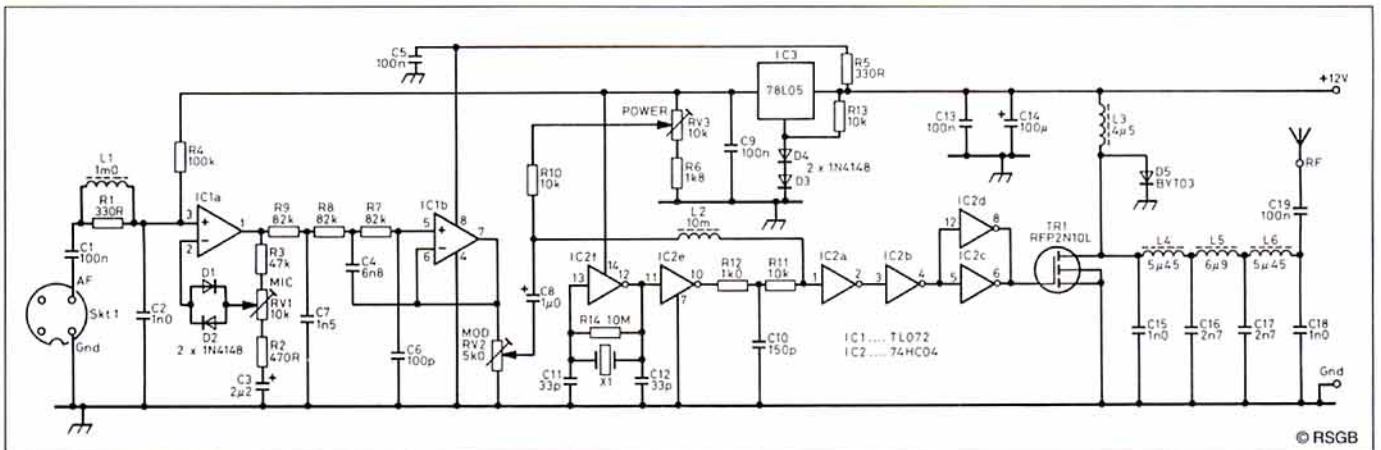


Fig 1: Pulse width modulation is used for the DF transmitter, which has an output of about 2 watts.

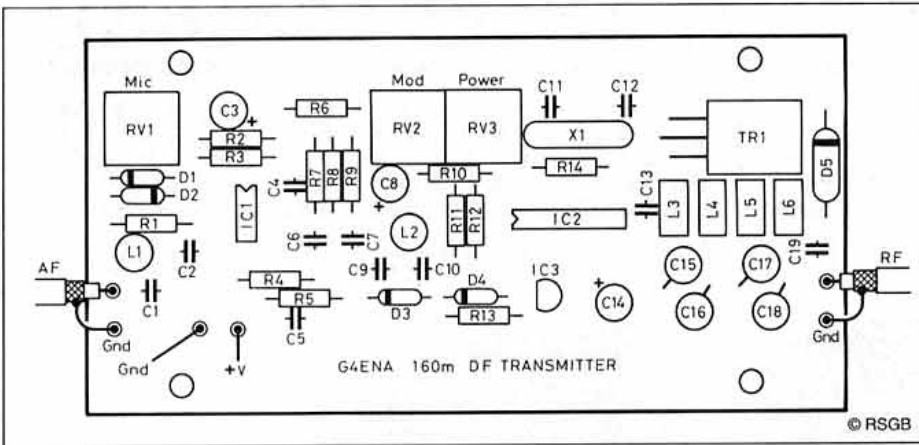


Fig 2: Component layout on the PCB. The transmitter could also be built on a prototype board.



Direction finding can be fun! Many clubs hold events on a regular basis.

- 5) Switch off power and replace L3. Connect dummy load and scope probe to RF output. Switch on and adjust RV3 for a 50% of maximum output voltage.
- 6) Connect microphone and observe waveform on scope.
- 7) Increase RV1 until the modulation depth limits and then adjust RV2 for 75% modulation. Fine adjustment of modulation and power will maximise output.
- 8) Monitor signal on AM receiver to check the audio quality.

FIELD OPERATION

THE OUTPUT STAGE of the transmitter is fairly rugged and will withstand reasonably poor aerial matching. However, an ATU is recommended to maximize efficiency.

All the controls on this unit are preset so the only task in the field is to switch the Tx on and off. This keeps the packaging requirements very simple. The prototype unit was constructed in a diecast box with a 4-pin microphone socket and on/off switch.

If it is desirable to modulate the transmitter from a tape recorder a second audio feed socket with an attenuator could be fitted and switched to the mic socket.

The power supply can be any form of wet or dry battery. A capacity of about 1Ah is sufficient to last the duration of the longest DF exercise. The range of the transmitter will depend on many factors - with a good aerial system up to ten miles is possible.

COMPONENTS LIST

Resistors
Carbon film/Metal film 0.25W, 5% or better.

R1,5	330R
R2	470R
R3	47k
R4	100k
R6	1k8
R7,8,9	82k
R10,11,13	10k
R12	1k
R14	10M 10%
RV1, RV3	10k 9.5mm sq horiz single turn preset
RV2	5k

Capacitors

C1,5,9,13,19	100n	Multilayer ceramic Pitch 2.54mm
C2	1n0	Multilayer ceramic Pitch 2.54mm
C3	2µ2	Aluminium radial
C4	6n8	Polyester, Wima MKS02 Pitch 2.54mm
C6	100p	Ceramic plate
C7	1n5	Polyester, Wima MKS02 Pitch 2.54mm
C8	1µ	Aluminium Radial
C10	150p	Ceramic plate
C11,12	33p	Ceramic plate
C14	100µ	16V Aluminium Radial
C15,18	1n	Polystyrene, axial
C16,17	2n7	Polystyrene, axial

Inductors

L1	1mH	Toko, 7BS
L2	10mH	Toko, 8RB
L3	4µ5H	33T, T37-2, Amidon 0.315mm wire, 30SWG
L4,6	5µ45H	36T, T37-2, Amidon 0.315mm wire, 30SWG
L5	6µ9H	41T, T37-2, Amidon 0.315mm wire, 30SWG

Semiconductors

D1,2,3,4	1N4148, signal diode
D5	BYT03, fast recovery diode
*IC1	TL072
*IC2	74HC04
IC3	78L05 (5V)
*TR1	RFP 2N10L
X1	1.9 - 2.0MHz HC18U xtal

* Static sensitive device.

Components may be obtained from the usual suppliers such as Maplin, and Cirkuit.

A kit (excluding case) is available from JAB electronic Components, 1180 Aldridge Road, Great Barr, Birmingham B44 8PB. Tel: 021 366 6928. Price: £25.30 incl VAT and P&P.

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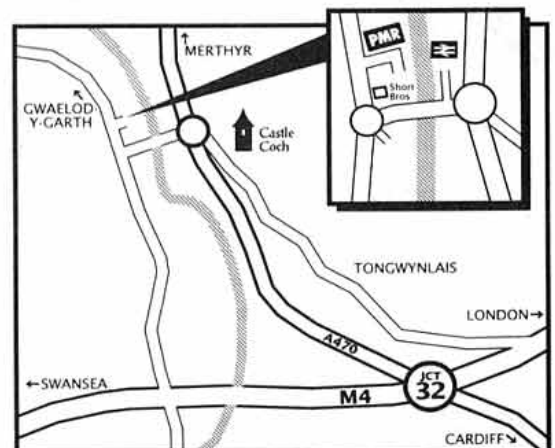
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THE SL6652 IS A COMPLETE single chip mixer/oscillator, IF amplifier and detector for FM cellular radio, cordless telephones and low power radio applications. It features an exceptionally stable RSSI (Received Signal Strength Indicator) output using a unique system of detection. Supply current is less than 2mA from a supply voltage in the range 2.5V to 7.5V

Features

- Low Power Consumption (1.5mA)
- Single Chip Solution
- Guaranteed 100MHz Operation
- Exceptionally Stable RSSI

Applications

- Cellular Radio Telephones
- Cordless Telephones

Quick reference data

- Supply Voltage 2.5V to 7.5V
- Sensitivity 3µV
- Co-Channel Rejection 7dB

GENERAL DESCRIPTION

THE SL6652 IS A VERY low power, high performance integrated circuit intended for IF

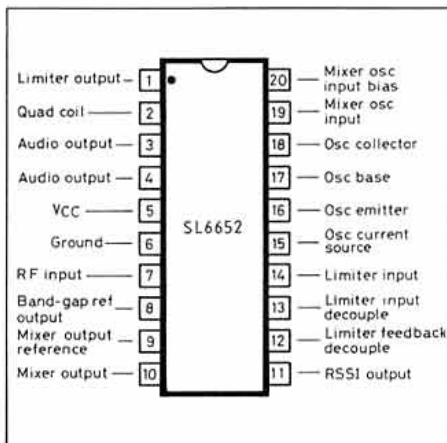


Fig 1: Pin connections for the SL6652.

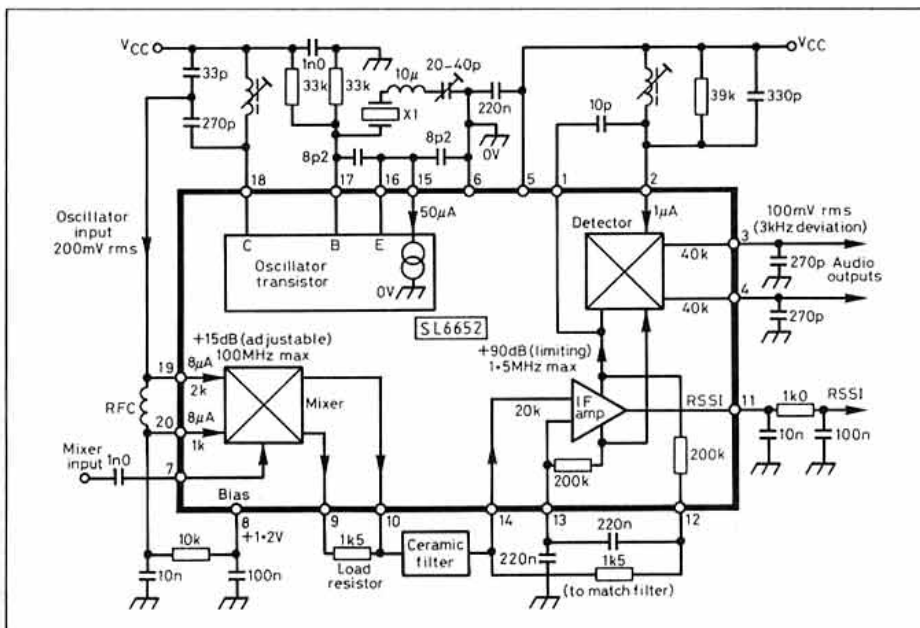
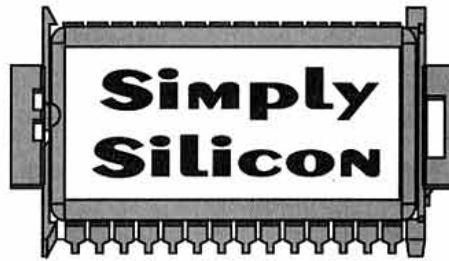


Fig 2: Typical application for the SL6652. The inductor on pin 2 could be approx 390µH at 455kHz and the oscillator coil on pin 18 is approx 330nH for 50MHz operation.



GEC-PLESSEY SL6652 - A high performance FM receiver chip is featured this month. It could form the basis of a simple receiver for 50MHz, or take an input at 10.7MHz from a higher frequency converter. The RSSI gives a linear output from a logarithmic input range of 75dB to the IF amplifier. It has been suggested that this could have uses for simple test instruments.

amplification and demodulation in FM radio receivers. It comprises:

- A mixer stage for use up to 100MHz
- An uncommitted transistor for use as an oscillator
- A current sink for biasing this transistor
- A limiting amplifier operating up to 1.5MHz
- A quadrature detector with differential AF output
- An RSSI (Received Signal Strength Indicator) output

Mixer

The mixer is single balanced with an active load. Gain is set externally by the load resistor, although the value is normally determined by that required for matching into the ceramic filter. It is possible to use a tuned circuit but an increase in mixer gain will result in a corresponding reduction of the mixer input intercept point.

The RF input is a diode-biased transistor with a bias current of typically 300µA. The

oscillator input is differential but would normally be driven single-ended. Special care should be taken to avoid accidental overload of the oscillator input.

Oscillator

The oscillator consists of an uncommitted transistor and a separate current sink. The user should ensure that the design of oscillator is suitable for the type of crystal and frequency required: it may not always be adequate to duplicate the design shown in this data sheet.

IF amplifier

The limiting amplifier is capable of operation to at least 1MHz and the input impedance is set by an external resistor to match the ceramic filter. Because of the high gain, pins 12 and 13 must be adequately bypassed.

Detector

A conventional quadrature detector is fed internally from the IF amplifier. The quadrature input is fed externally using an appropriate capacitor and phase shift network. A differential output is provided to feed a comparator for digital use, although it can also be used to provide AFC.

RSSI output

The RSSI output is a current source with value proportional to the logarithm of the IF input signal amplitude. There is a small residual current due to noise within the amplifier (and mixer) but beyond this point there is a measured and guaranteed 70dB dynamic range. The typical range extends to 92dB, independent of frequency, and with exceptionally good temperature and supply voltage stability.

Supply voltage

The SL6652 will operate reliably from 2.5V to 7.5V. The supply line must be decoupled with 470nF using short leads.

Detector

The internal band gap reference must be externally decoupled. It can be used as an external reference but must not be loaded heavily: the output impedance is typically 14Ω.

AVAILABILITY

THE SL6652 IS AVAILABLE from GEC Plessey Semiconductor distributors, and from Electromail (RS Components): Tel: 0536 204555.

See overleaf for electrical characteristics ►

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.

ELECTRICAL CHARACTERISTICS

Test conditions (unless otherwise stated):

 $V_{cc} = 2.5$ to $7.5V$; $T_{amb} = -30^{\circ}C$ to $+85^{\circ}C$; $IF = 455kHz$; $RF = 50MHz$; Quadrature coil working $Q = 30$

Characteristics	Min	Typ	Max	Units	Conditions
Overall					
Supply current		1.5	2.0	mA	
Sensitivity		3		μV	12dB SINAD
AM Rejection		40		dB	RF Input $<T 500\mu V$
V_{bias}	1.0	1.2	1.4	V	$T_{amb} = 25^{\circ}C$
Mixer					
RF input impedance		1		$k\Omega$	
Osc input impedance		2		$k\Omega$	
Mixer gain		15		dB	$R_{load} = 1k\Omega$
3rd order i/p intercept		-10		dBm	
Osc input level	180		300	mV	
Osc frequency	100			MHz	
Oscillator					
Current sink	40		70	μA	$T_{amb} = 25^{\circ}C$
H_{fr}	30				40-70 μA
f_r		500		MHz	40-70 μA

Characteristics	Min	Typ	Max	Units	Conditions
IF Amplifier					
Gain		90dB			
Frequency		455	1500	kHz	
Diff. i/p impedance		20		$k\Omega$	
Detector					
Audio Output Level	75		125	mV	5mV into pin 14
THD		0.5	5	%	5mV into pin 14
Output impedance		40 $k\Omega$			
RSSI Output ($T_{amb} = +25^{\circ}C$)					
Output current			20	μA	No input pin 14
Output current	50		80	μA	pin 14 = 2.5mV
Current change	0.9	1.22	1.5	$\mu A/dB$	See note 1
Linear dynamic range	70			dB	See note 1

Note 1: The RSSI output is 100% dynamically tested at 5V and $+20^{\circ}C$ over a 70dB range. First the input to pin 14 is set to 2.5mV and the RSSI current recorded. Then for each step of 10dB from -40 to +30dB the current is measured again. The current change in each step must meet the specified figure for current change. The RSSI output is guaranteed monotonic and free from discontinuities over this range.



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Complete set of 3 boards	1189SSA	£17.62

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Main IF/Audio	028945	£11.75
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Complete set of 7 boards	0289TXQ	£27.61

BRS54049 DUAL CONVERSION MULTIMODE RECEIVE IF/AF STRIP (May/June 1985)

PCB LAYOUT	643585	£12.75
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All prices include VAT, postage and packing

These PCBs are not available from RSGB HQ, but direct from Badger Boards, 87 Blackberry Lane, Four Oaks, Sutton Coldfield, B74 4JF. Tel: 021 353-9326.

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G4PMK	Spectrum Analyser	£53.00
G3RVM	Ultimate Keyer	£13.90
G3TDZ	White Rose Rx (Main Board)	£18.50
G3TDZ	White Rose Con Fundamental*	£7.10
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* Converters exclude crystals which must be ordered as a separate item

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Prices shown are inclusive of P&P.

Kits for D-i-Y Radio projects also available

The above prices are for full component kits. The bigger kits are produced in module form if the constructor wishes to spread the cost. Please telephone for a full list. JAB's aim is to have kits available off the shelf. When demand may be high following publication you are advised to allow up to 28 days or check availability by phone first.

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*The
Peter Hart
Review*

KENWOOD TS-50S

MOBILE HF TRANSCEIVER

IN MOST CASES, when a new transceiver is launched, it is based on a previous design but with improvements in performance, features or styling. Every once in a while, something really different is unveiled and the new TS-50S HF transceiver from Kenwood falls into this category. There are now many small HF transceivers around which can be used at home or in the car but the TS-50S has been designed primarily for mobile operation. It is smaller than anything else on the market today, yet has all the usual features together with ergonomics tailored to meet the requirements of the mobile operator. Although small, it still delivers the standard 100 watt RF output. Small size is of crucial importance in a mobile rig as anyone who has attempted to install a transceiver into the average car will confirm.

I was pleased to have the opportunity of reviewing the first TS-50S to be seen in the UK.

PRINCIPAL FEATURES

THE MOST STRIKING feature about the TS-50S is its size. Measuring only 179mm (W) by 60mm (H) by 233mm (D), it has a front panel area less than half that of other so-called compact radios such as the TS-450, FT-890 etc. It is also light, weighing only 2.9kg, which is an important consideration for mounting in places such as under the front fascia of a car.

The TS-50S is a 12 volt transceiver combining the usual general coverage receiver tuning 30kHz to 30MHz together with a 100W transmitter limited to the exact amateur allocations. Local variants are sold to suit US, mainland Europe and other market areas, differing only in the Tx coverage on 160, 80 or 40m.

The radio covers SSB, CW, AM and FM modes. SSB can be set to select, automatically, LSB below 9.5MHz and USB above or to allow the user to select the sideband.

Up/Down buttons select amateur bands or, alternatively, 500kHz/1MHz steps for receiver general coverage. Each band store returns the last used frequency, mode and front-end setting on each band. The rotary tuning knob functions in a rather different way to normal. The basic resolution is 100 steps per revolution of the knob but the step size is directly related to the speed at which the knob is turned. Many radios employ a single speed-up feature but the TS-50S gradually increases the step size from 5Hz at very low speeds up to 200Hz at high speeds. On FM, these tuning rates are ten times higher.

Fuzzy logic control is used in the tuning control circuitry. This is a relatively new technique developed to handle efficiently logic situations which are not a clear cut yes/no or



The TS-50S is shown above with the optional AT-50 Auto ATU underneath.

1/0 but include an element of 'in-between'. It is interesting to note that the frequency to which the radio is tuned need not be a direct multiple of the minimum step size of 5Hz but can be set to within 1Hz by suitably moving the tuning knob up and down at different speeds. Interesting to note maybe but not particularly useful!

More rapid frequency changes are achieved by using the UP/DWN buttons on the microphone. These step in 10kHz increments by default or may be programmed to step in smaller increments down to 10Hz. Using AM mode in the MW broadcast band, 9kHz step size can be automatically selected. The microphone UP/DWN buttons can be used to select channels in memory channel mode or menu items in menu set-up mode.

100 battery backed memory channels are provided storing receive and transmit frequencies, mode, filter bandwidth, front-end setting, AGC and tone frequency. Channel 99 is also used to store program scan start and end frequencies. Memory transfer functions are incorporated including memory scroll to preview the contents without changing the receive frequency. Memory channels may be protected to prevent accidental overwriting or deletion - useful in 'button-fumbling' mobile operation. There is a quick select mode giving access only to the empty channels or only to the channels where data is stored.

Scanning may be performed between pro-

grammed limits, across all memory channels or across groups of 10 channels. Scanning may be set to stop or dwell on signal present and the scan speed is adjustable.

The usual twin A/B VFOs are provided and, in split frequency operation, the transmit frequency may be monitored and set via a single touch key on the microphone. This is the Kenwood TF-SET function which is included on all their current radios. It is particularly useful for finding and netting onto the working channel in a split frequency DX pile-up.

The RIT clarifier (no transmit XIT) operates over the range +/- 1.1kHz in 10Hz steps or +/- 2.2kHz in 20Hz steps and this control also doubles as scan speed. There is no RF gain control but the front end is switchable between full sensitivity and AIP (Advanced Intercept Point). The result is improved signal handling at the expense of reduced sensitivity. A 20dB input attenuator may also be selected. IF filter bandwidths of 2.4kHz are selected on SSB, 6kHz on AM and 2.4kHz on CW, unless the optional narrow CW filter has been fitted for 500Hz bandwidth. The 2.4kHz filter setting can also be selected for AM. An IF shift control is provided for SSB and CW and on CW, reverse sideband can be selected if heavy interference is experienced within the normal (upper) sideband. However, this is not quick to select, and involves delving into the set-up menus which rather negates the value of this facility.

Noise blanker is optimised for short pulse interference such as ignition noise. Fast or slow AGC is pre-settable for each mode from the set-up menu. Default settings are slow on SSB and AM and fast on CW. The pitch on CW is adjustable between 400Hz and 1000Hz in steps of 50Hz with a default of 800Hz.

Transmitter power is switchable to 100, 50 or 10W output and there is a miniature internal fan for cooling the finned heatsink. Two switchable transmitter audio gain settings suit a variety of 600Ω impedance microphones. If these settings are unsuitable there is an internal adjustment for microphone gain. There is no speech processor or VOX but audio frequency response is adjustable by shifting the carrier point -100 to +200Hz. On CW full break-in can be selected or semi break-in with a selection of return to receive delays between 100mS and 1.8S. CTCSS is included for use with some 10 meter FM repeaters.

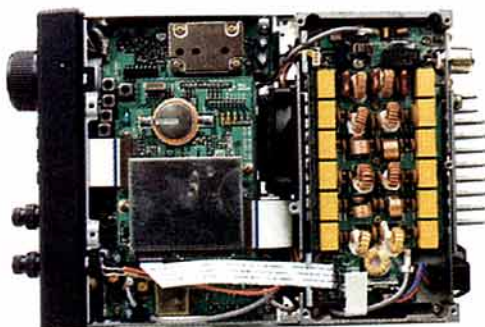
A liquid crystal display is used with adjustable back lighting, indicating frequency to 100Hz resolution, RIT offset, memory channel selected, S meter bar graph display and a host of status messages. The meter display may be set to include a peak hold.

The radio is provided with the MC-47 microphone. This includes the normal up/down buttons and also four additional programmable function keys. 27 different functions may be assigned to these function keys, for example transmit power, mode select, TF-set, band change etc. One function enables the RIT display to indicate 10Hz and 1Hz resolution digits for the main frequency display!

Two set-up menus are provided which enable some 41 functions to be tailored to individual preferences. These include step sizes, scan parameters, CW pitch and delay characteristics, beep and alarm messages to name just a few. Automatic power off may be selected whereby the radio is turned off if no control is operated for three hours.

The TS-50S is directly compatible with two auto ATUs. The AT-50 is housed in a matching style case and the AT-300 is intended to be mounted remote at the base of the antenna. Both ATUs are auto-sensed from the TS-50S and are fully controlled from the radio. The AT-50 was provided with the review unit. The tuning time is typically less than three seconds but can be up to thirty seconds on the initial tune. If the tuning does not finish within 30 to 45 seconds then an alarm lights on the AT-50 and warning beeps sound from the TS-50S radio. The settings for each amateur band are stored in EEPROM which eliminates the need for a backup battery.

The TS-50S provides switching for a linear



TS-50S with bottom cover removed.

KENWOOD TS-50S MEASURED PERFORMANCE

RECEIVER MEASUREMENTS

FREQUENCY	SENSITIVITY SSB 10dBs+n:n		INPUT FOR S9	
	NOR	AIP	NOR	AIP
1.8MHz	0.13µV (-125dBm)	0.32µV (-117dBm)	28µV	89µV
3.5MHz	0.11µV (-126dBm)	0.28µV (-118dBm)	25µV	89µV
7MHz	0.11µV (-126dBm)	0.25µV (-119dBm)	22µV	79µV
10MHz	0.11µV (-126dBm)	0.28µV (-118dBm)	24µV	79µV
14MHz	0.11µV (-126dBm)	0.28µV (-118dBm)	25µV	84µV
18MHz	0.11µV (-126dBm)	0.25µV (-119dBm)	21µV	79µV
21MHz	0.11µV (-126dBm)	0.25µV (-119dBm)	21µV	75µV
24MHz	0.13µV (-125dBm)	0.25µV (-119dBm)	24µV	75µV
28MHz	0.13µV (-125dBm)	0.25µV (-119dBm)	25µV	75µV

S-READING (14MHz)	INPUT LEVEL	
	SSB	FM
S1	0.7µV	0.4µV
S3	1.1µV	0.6µV
S5	2.2µV	0.8µV
S7	6.3µV	1.0µV
S9	25µV	1.3µV
S9+20	220µV	2.0µV
S9+40	2.2mV	3.2µV
S9+60	18mV	5.0µV

AM sensitivity (28MHz): 0.9µV for 10dBs+n:n at 30% mod depth
 FM sensitivity (28MHz): 0.2µV for 12dB SINAD 3kHz pk deviation
 AGC threshold: 0.35µV
 100dB above AGC threshold for +1.5dB audio output
 AGC attack time: 5-10ms
 AGC decay time: 0.1-0.2s (fast), 2-3s (slow)
 Max audio before clipping: 1.9W into 8Ω at 1% distortion
 Inband intermodulation products: -26 to -37dB

MODE	IF BANDWIDTH	
	-6dB	-60dB
SSB,CW	2480Hz	5120Hz
AM	7550Hz	25.2kHz
FM	13.5kHz	18.4kHz

Frequency	INTERMODULATION (50kHz Tone Spacing)			
	NOR		AIP	
	3rd order intercept	2 tone dynamic range	3rd order intercept	2 tone dynamic range
1.8MHz	+5.5dBm	94dB	+6dBm	89dB
3.5MHz	+7.5dBm	96dB	+12.5dBm	94dB
7MHz	+8dBm	96dB	+13dBm	95dB
14MHz	+12dBm	99dB	+20dBm	99dB
21MHz	+10.5dBm	98dB	+24dBm	102dB
28MHz	+12dBm	98dB	+24dBm	102dB

TONE SPACING (7MHz BAND)	3rd ORDER INTERCEPT	2 TONE DYNAMIC RANGE
3kHz	-35dBm	67dB
5kHz	-33dBm	69dB
10kHz	-25dBm	74dB
15kHz	-17dBm	80dB
20kHz	-10dBm	84dB
30kHz	+2dBm	92dB

FREQUENCY OFFSET	RECIPROCAL MIXING FOR 3dB NOISE	BLOCKING		TX NOISE IN 2.5kHz BANDWIDTH
		NOR	AIP	
3kHz	78dB	-32dBm	-20dBm	-74dBC
5kHz	84dB	-32dBm	-20dBm	-79dBC
10kHz	95dB	-32dBm	-20dBm	-85dBC
15kHz	blocking	-28dBm	-15dBm	-90dBC
20kHz	103dB	-22dBm	-8dBm	-93dBC
30kHz	104dB	-13dBm	-1dBm	-97dBC
50kHz	105dB	-7dBm	+6dBm	-99dBC
100kHz	112dB	-7dBm	+6dBm	-101dBC
200kHz	118dB	-7dBm	+6dBm	-103dBC

TRANSMITTER MEASUREMENTS

FREQUENCY	CW POWER OUTPUT	SSB(PEP) POWER OUTPUT	HARMONICS	INTERMODULATION PRODUCTS	
				3rd order	5th order
1.8MHz	115W	122W	-60dB	-24dB	-40dB
3.5MHz	112W	120W	-59dB	-24dB	-40dB
7MHz	110W	117W	-62dB	-20dB	-35dB
10MHz	110W	115W	-58dB	-21dB	-35dB
14MHz	110W	112W	-60dB	-16dB	-34dB
18MHz	110W	115W	-58dB	-21dB	-32dB
21MHz	110W	115W	-75dB	-21dB	-34dB
24MHz	109W	116W	-64dB	-26dB	-37dB
28MHz	108W	116W	-70dB	-24dB	-40dB

Carrier suppression: 60dBC. Sideband suppression: 70dBC at 1kHz. Transmitter noise: see table above. Transmitter AF response at -6dB: 220-2750Hz. Transmitter AF distortion: <1%. Microphone input sensitivity for full output: 4mV (low), 1.3mV (high). T/R switching speed (SSB): mute-TX 18ms, TX-mute 4ms, mute-RX 22ms, RX-mute 3mS. Power into load mismatch: 2:1 VSWR 53-75W, 3:1 VSWR 22-31W.

NOTE: All signal input voltages given as PD across antenna terminal. Unless stated otherwise, all measurements made on SSB with the receiver preamp switched in (NOR) and operating from a 13.6V PSU. All two-tone transmitter intermodulation products quoted with respect to either originating tone.

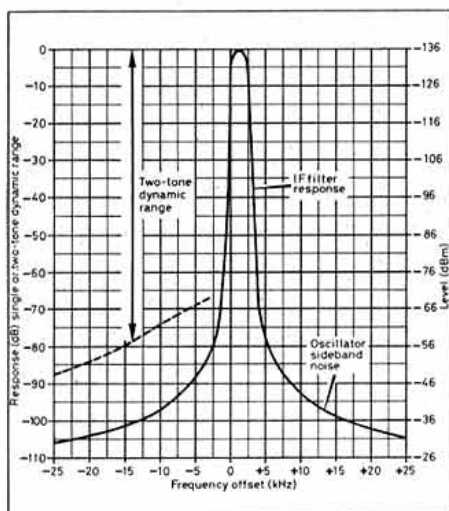


Fig 1: Dynamic range combined results.

and can be controlled from a computer via the IF-10D interface connector. This is perhaps a bit of an afterthought as it requires unsticking a patch on the bottom cover to gain access to a PCB connector.

Included with the TS-50S is a mobile mounting bracket and 60 page instruction manual. This is the usual well thought out and informative document. A set of circuit diagrams is included but no block diagram or technical description. A second manual in German and Italian languages was also supplied.

DESCRIPTION

SOME CRITICAL THOUGHT has obviously gone into the design of this transceiver. It provides all the features in a small unit and the front panel layout is kept simple to help the mobile operator. Indeed, the essential controls can be assigned to the microphone function keys to provide a basic operational mode entirely from the microphone.

In a radio of this size, the construction is naturally quite compact. There are several PCBs mounted in a pressed steel framework and miniature surface mount technology is used throughout. The rear half of the unit comprises the PA and filter sections housed in a substantial finned diecast assembly. A thin 6.5cm diameter speaker is mounted upward facing through the top of the case.

The receiver is double conversion on SSB, CW and AM with IFs of 73.045 and 10.695MHz. On FM, there is a third conversion to 455kHz. All the main selectivity is achieved at 10.695MHz. The receiver first mixer uses a quad balanced FET arrangement with a dual balanced FET in the second mixer. Two parallel FETs are used in the RF amplifier which is by-passed in the AIP position. The transmit signal is generated at 10.695MHz and then mixed via 73.045MHz to final frequency. The frequency synthesiser uses the now universal combination of DDS and PLL techniques to give small step size, smooth tuning characteristic and low spurious output levels. A single battery backed microcontroller is used and the lithium battery is easily accessible.

MEASUREMENTS

WERE MADE WITH THE TS-50S powered

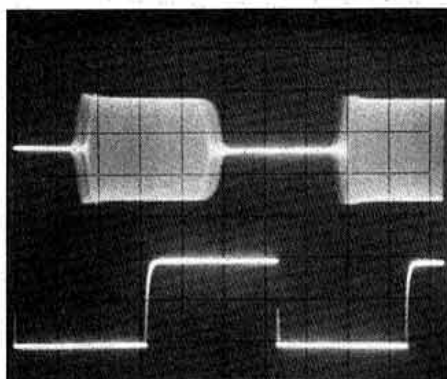


Fig 2: CW Keying waveform at 40WPM. Horizontal scale 10m/div.

from a 13.6V PSU and are detailed in the table. Additional comments are as follows.

RECEIVER MEASUREMENTS.

SENSITIVITY

A good sensitivity has been achieved which is important for mobile operation.

S-METER CALIBRATION

Performance is reasonable (except on FM) within the limits of the bargraph display.

SPURIOUS REJECTION

The receiver appears to be fairly clear of spurious responses. Rejection of all IF related signals was in excess of 85dB and first mixer image rejection in excess of 95dB. When connected to the AT-50 ATU some beat frequencies were audible, mostly outside of the amateur bands but the strongest were up to S8.

SELECTIVITY

The IF filter skirts are poor compared with most radios.

STRONG SIGNAL PERFORMANCE

The performance is quite reasonable where the intended use is for mobile operation. The front end dynamic range is excellent but the close-in dynamic range could be better and shows the rather wide response to the first IF filter. The reciprocal mixing performance is very reasonable (Fig 1).

Recently I have had a couple of letters from Germany highlighting a problem which is experienced there with most radios. Spurious signals, at 5kHz intervals, are found particularly on the 15m band due to intermodulation from broadcast stations in the 25/31m and 19/31m bands. I have never seen this problem myself, in the UK. DL1BU in his reviews in *CQ-DL* reports that this is due to second and third order intermodulation generated by the input filter switching diodes from widely spaced signals which are not protected by any filtering from the antenna. I have checked the TS-50S under these conditions at 21.1MHz (test signals 11.6 and 9.5MHz) and 14.3MHz (test signals 7.2 and 7.1MHz). Indeed there was quite a substantial response, at a level some 10dB worse (generator levels) than the normal 50kHz spacing intermodulation measurement levels. I will monitor this parameter in future reviews. This is primarily a concern with wideband antennas and definitely not a problem with mobile antennas.

TRANSMITTER MEASUREMENTS.

POWER OUTPUT

The table gives the figures in the highest power setting. The two lower settings gave about 55W and 10W respectively.

SSB PERFORMANCE

The PA intermodulation level is rather poor but did improve substantially at lower output powers.

CW KEYING PERFORMANCE

Fig 2 shows the CW keying envelope at 40WPM. This seems quite acceptable.

ON-THE-AIR PERFORMANCE

I COMPARED THE TS-50S with the main station rigs and also a brief try out in the car on my mobile G whip. As a mobile rig in the car, it performed well with good sensitivity and no real strong signal problems. On the main station antennas, it was generally necessary to switch to AIP on the LF bands and at times also to switch in the attenuator. The rather wide filter skirts and degraded close-in dynamic range made the radio somewhat noisier and more prone to overload problems than I would normally have expected. The noise blanker was most effective in reducing car ignition noise but on the larger main station antennas gave added overload problems.

At switch-on, the radio greets you with a 'Hello' on the display. Within constraints imposed by the size limitations, the ergonomics were very good but a finger indent for the main tuning knob would be a great help. I found the variable speed-up on the tuning rate to be an advantage over the fixed speed-up found on many radios.

The transmit audio quality was good and the CW reasonably clear of clicks. The rear heatsink could become quite hot with extensive transmit use and the radio should be mounted to provide good rear ventilation.

The AT-50 auto-ATU introduced a few spurious signals. Although the stronger ones were outside of the amateur bands, these were plainly audible on 15m and 20m when band conditions were quiet, and particularly so using small mobile whip antennas. There are, however, definite advantages in using such ATUs on mobile antennas to ensure that maximum power is transmitted away from the sharp resonant frequency of the antenna.

CONCLUSIONS

FOR A MOBILE RIG, the TS-50S is in a class of its own, being designed primarily for mobile operation. Being small and light, it is also attractive to take as hand luggage on holiday, a business trip or mini DXpedition but in this situation with larger antennas, the performance limitations of close-in dynamic range and filter skirt selectivity become more apparent. The current list price of the radio is £999.95 inc VAT and for the AT-50 ATU £299.95 inc VAT.

ACKNOWLEDGEMENTS

I WOULD LIKE TO thank Kenwood for the loan of the equipment.

Peter Hart, G3SJK

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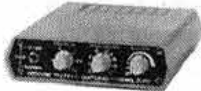


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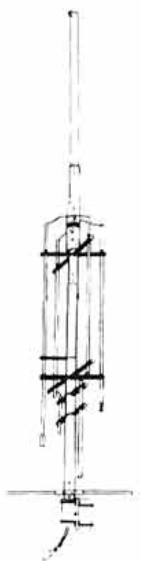
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THE BIG talking point at this year's show could well be something rather small - the latest HF transceiver from Kenwood. Before you ask, it's just 179 x 60 x 233mm and weighs a mere 2.9kg. But size isn't everything - the rig has a whole range of features which the manufacturers claim are ideal for either base station or mobile operators. Maximum output is 100W and there are 100 memory channels which no doubt save a lot of frequency twiddling and function switching when on the move. Heard of fuzzy logic? Well this transceiver has it, for situations which are not simply yes/no but require an extra degree of intelligence. A good example of this is the tuning control (100 steps per revolution). Steps are dependent on the tuning knob's speed of rotation. The microphone has up/down buttons which can be used

PRODUCT NEWS

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

to select channels in memory mode, or to set up options from a menu of some 41 functions.

The LCD display on the TS-50S is truly comprehensive, incorporating a signal strength meter, RIT and status/mode information as well as the frequency information from one of the two VFOs. A switchable function even enables the display of frequency information down to 1Hz if required. Incidentally, CTCSS is incorporated for use with some 10m FM repeaters or when transverting. Two optional auto-ATUs are available, and the AT-50 is particularly useful for small mobile whip antennas. The alternative AT-300 ATU



is intended to be mounted remotely at the base of an antenna. Another one to look out for . . . Don't miss it at RSGB'93!



general coverage reception in CW, SSB, AM and FM modes from 50kHz to 30MHz. The latest microprocessor technology is claimed to merge performance and reliability with easy operation and functional simplicity. The FRG-100 incorporates features that both casual and serious short-wave listeners will appreciate.

Reception modes and most receiver functions are push-button selectable from the front panel, which has an adjustable-brightness LCD display. Selectable tuning steps of 10Hz, 100Hz and 1kHz are standard, with other tuning steps user-programmable. Fifty memories store frequency and mode information, with two additional memories providing band-edge information for scanning. If you happen to nod off whilst listening to a long QSO, a programmable timer will wake you up in time for the start of the next contest!

The FRG-100's adjustable SSB carrier offset is claimed to permit custom tailoring of the audio response, and CW enthusiasts will no doubt appreciate the reverse BFO offset and selectable CW sideband. Standard features include a noise blanker, all-mode squelch and S-meter. Optional 250Hz or 500Hz filters are also available.

So if you're in the market for a top value receiver . . . visit RSGB'93.

Icom IC-737 HF Transceiver

THIS NEW HF transceiver has all the features you would expect from a modern all-band, all-mode rig - plus a few more! It offers 100W of SSB, CW or FM (40W AM) on the nine HF amateur bands and complete receive coverage from 500kHz to 30MHz. There's also a built-in auto antenna tuner and automatic antenna selector for two antennas, which memorizes which antenna is used on which bands.

Add to this a Double Band

Stacking Register, quick-split function plus 101 memory channels and you have a rig for the discerning DXer.

Another interesting feature is the passband tuning and its associated notch filter, which effectively narrows the receiver IF bandwidth to reduce interfering signals. This is claimed to be very effective in crowded band conditions. As with most modern transceivers, a speech compressor (adjustable) is also included.

CW enthusiasts are well catered for. The IC-737 has a full break-in (QSK) function together with an internal electronic keyer - all you need is a paddle! For contesters, two optional plug-in CW filters are available as well as fast/slow AGC selection and selectable pre-amplifier or attenuator. A host of other useful accessories are also available for the rig.

This is certainly one to see . . . at RSGB'93.



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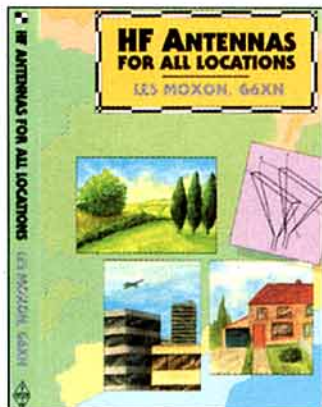
HF Antennas For All Locations

Second edition by Les Moxon, G6XN

This popular and thought-provoking book written by an acknowledged expert has been completely revised and greatly expanded. It contains a wealth of practical information on the choice and construction of antennas, explaining the 'why' as well as the 'how' of HF antennas.

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Radio Amateur's Guide to EMC

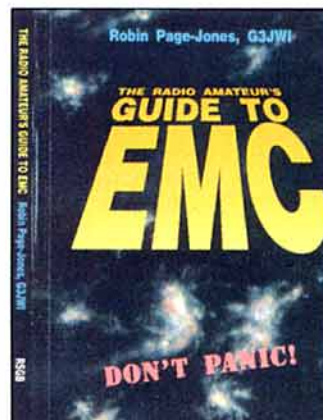
by Robin Page-Jones, G3JWI

Recently published, this book is a must for every shack. The Radio Amateur's Guide to EMC will help you avoid EMC problems and assist in the cure of any which do occur. There's even a chapter on how to deal with neighbours!

Written in a light-hearted way, it's a good

read. However, the concise chapter summaries also make the Guide an essential reference work should trouble ever come to your door.

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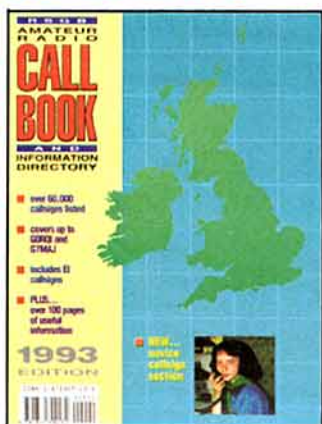
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Edited by Brett Rider, G4FLQ

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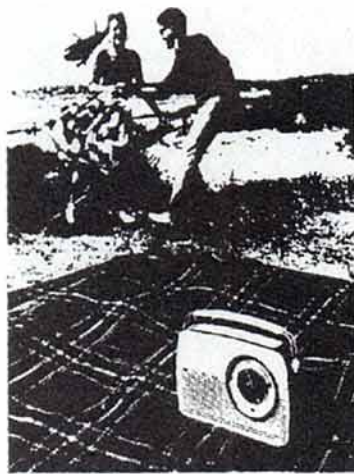
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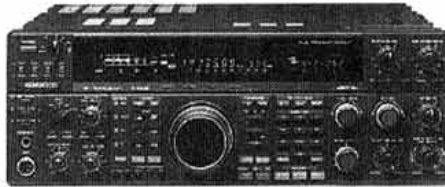
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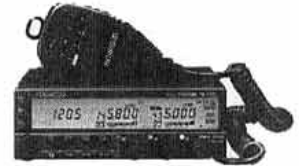
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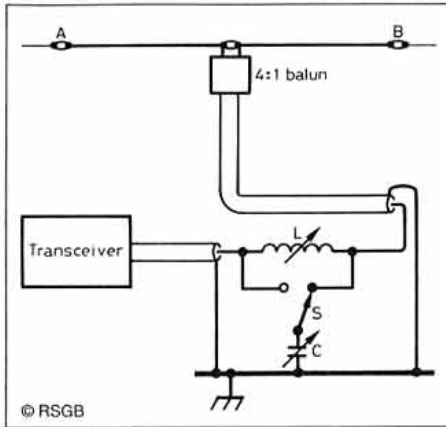


Fig 4: PA0SE's Comudipole (coaxial cable fed multiband dipole). The length AB can be of any value, but preferably not less than about 40% of the wavelength on the lowest frequency band to be used. L can be a roller-coaster or a coil with multiple switched taps. C can be one of the old style three-gang (3 x 500pF) receiver capacitors with the three sections in parallel (the PMU reduces the need for a special high voltage capacitor). If a proper match cannot be obtained with S in one position, the other position should be tried.

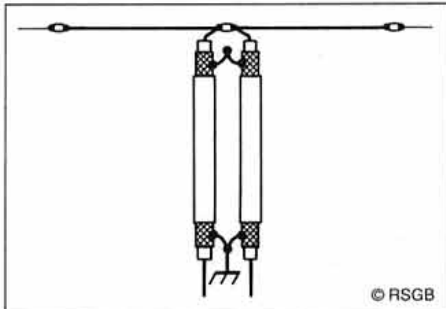


Fig 5: An alternative method of feeding a multiband dipole with parallel coaxial cables used to provide a balanced transmission line less affected by nearby metal objects than open wire line. Radiator should be at least 40% of the wavelength of the lowest frequency to be used. The cables can have any characteristic impedance and in principle can be of any length, but experience has shown that it is advisable that they should be somewhat longer than a quarter-wave of the lowest frequency to be used (ie about 17m for 3.5MHz with cables having a velocity factor of about 0.66). In practice this form of multiband dipole has not been found by PA2ABV as satisfactory as the single coax-fed Comudipole.

generation etc. (Additionally, toroidal baluns are not really suitable with reactive loads). A coaxial balun can tolerate very high standing-wave ratios and/or high power. The only limiting factor is the maximum voltage the cable can withstand and this is considerable with the cable noted in the Eurotek article.

"The PMU takes care of the transition from balanced to unbalanced feed and at the same time limits the SWR on the cable to a maximum of about 20:1. This may seem high but the FMU reduces it to 1:1 at the output port of the transmitter. The losses in the cable remain quite low provided that feeder length is not excessive and a cable with a low-loss under matched conditions is used. Even if the extra loss due to the 20:1 SWR on some frequencies amounts to a few decibels this is a small price to pay for the convenience of a simple all-band antenna without traps, fed by coaxial cable. Should an extremely long feeder have to be used, it is advisable to select a type with minimal inherent loss, such as the new Aircorn Plus.

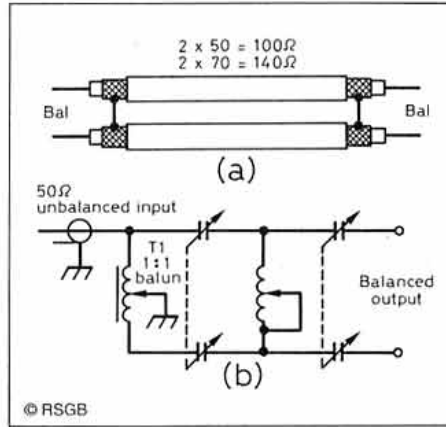


Fig 6: (a) Showing how two coaxial cable lengths can be used as a balanced transmission line. (b) Flexible ATU providing balanced output from 50Ω unbalanced input in such a manner that losses in a 1:1 ferrite balun tend to be minimised. Choke 1:1 baluns would be preferable.

"The rather complicated FMU unit devised by G3LHZ can for amateur bands be replaced by a simple L-network with a switch (S) to change from matching to high or to low impedances as shown in Fig 4 which shows the complete comudipole antenna system."

PA0SE adds: "Following publication of this system in *Electron* (December 1992) this form of multiband dipole is now being used successfully in The Netherlands by several amateurs. One is Ton Verberne, PA2ABV, who lives on the second floor of a five-storey apartment building. On the roof he has an inverted-Vee dipole of about 2 x 19m and a 4:1 coaxial balun as described in Eurotek, August 1992, but with the connection between the flange of the coax socket and the boom of the quad deleted. From there some 30m of RG-213 coax leads to the shack where an L-network takes care of matching to the transceiver. In practice PA2ABV can match perfectly on all nine amateur bands from 3.5MHz-50MHz. Even on 1.8MHz a match is possible but efficiency is low. On all bands 28-3.5MHz results are excellent (and much better than the previously used double-coax balanced feed system shown in Fig 5).

Further information on the use of twin coaxial cables to form balanced line is shown in Fig 6.

RADIATING LIGHT BULBS

AN ITEM IN THE August 1991 *TT*, 'New induction light bulbs and their RFI potential' drew attention to the development of high-efficiency, long-life electric light bulbs in which there is no filament and which are powered by RF energy from compact generators (trans-

mitters) working in the ISM (industrial, scientific and medical) bands at either 2.65MHz or 13.56MHz. At the time I concluded "One does not have to be a pessimistic soothsayer to recognise that widespread use of such lamps could significantly affect the reception of weak signals on HF and even VHF . . ."

The item included information on the Philips QL and the Sylvania (IWCF - Induction Wave Compact Fluorescent) lamps based on articles in *Electrical Review* and *New Scientist* but it was made clear that at that time such lamps were still in the development stage. Also, their high cost would tend to make them financially attractive in situations where lamps are switched on for thousands of hours per annum, a situation seldom found in domestic situations. But I added the warning that: "Nevertheless, it seems likely that they will be heavily promoted for both commercial and domestic use on account of their considerable energy saving ('green') characteristics."

A year later, *QST* (August 1992) ran a short item 'Amateurs concerned about RF lightbulb's design' which noted a Californian firm, Intersource Technologies Inc, had announced their intention to manufacture and market high-efficiency bulbs powered by some 25 watts of 13.56MHz RF. *QST* reported that in reply to the concern expressed by many radio amateurs a company spokesman claimed that the bulbs should not be a matter of concern for amateurs. The bulbs would use a crystal oscillator, power amplifier and a coil-type antenna to "couple high-frequency electrical energy into a mercury vapour plasma" as shown in Fig 7. The bulbs, it was stressed, were expected to meet FCC Para 15 rules regarding incidental interference.

Evan Heaton-Jones, G3CJ, was far from convinced that amateurs have nothing to fear from the introduction of RF-powered fluorescent light bulbs - even those designed to minimise EMC problems. In the October 1992 issue of his local Cheltenham club newsletter he foresaw a time when a town of some 100,000 inhabitants could be generating up to a total of some 10MW of RF power and that if only 1% of this radiates it would represent some 100kW.

In residential areas of London, I have been bothered by intermittent, unstable ISM signals for many years. I suspect these largely emanate from medical equipment or possibly industrial equipment at some distance. Fortunately the interference largely disappears outside working hours and hopefully will gradually reduce as more ISM equipment becomes crystal-controlled rather than using very crude and unstable power oscillators.

But I cannot help feeling that with RF-energised lamps - no matter how carefully

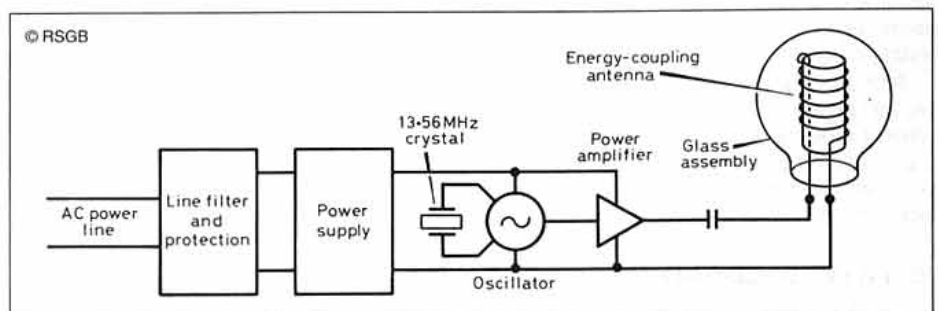


Fig 7: Block diagram of the RF energised lightbulb as developed by Intersource Technologies.

designed (and G3CJ points out that there is the real danger that future low-cost designs from the Far East could dispense with crystal-control and other EMC precautions) - it seems inevitable that a 25W 13.56MHz 'transmitter' in the immediate vicinity of the shack would at least *desensitise* most solid-state receivers with broad-band or even sub-octave RF input filtering in their front-ends, and that covers virtually all current HF transceivers, tuned to the 14MHz band. This would presumably not infringe the European EMC directive since it could be argued that blocking, cross modulation and intermodulation characteristics are inherently 'receiver faults'.

Even the compact fluorescent lamps now marketed in the UK can be a problem - possibly even more troublesome than future RF-powered types. Tim Saxton, G3LJR, writes: "For some time I have been slowly exchanging the filament lamps in my house with the new miniature fluorescent replacement types now available. Initially, these were Philips units about the size and weight of a half brick. They worked well, but their size/shape seriously limited where I could use them. They had an inductive choke and normal neon starter.

"More recently 'electronic' units have come along in which the choke and starter functions are achieved electronically. I put a 23W unit - light output equivalent to a 100W filament lamp - made by Osram in the shack some months ago with no problems. In March, I discovered that my local supermarket was selling a new range made by Mazda (GE Lighting Ltd) at significantly lower cost than most of the others. I bought some 4-tube and 2-D 13W units (equivalent to 60W filament lamps).

My son soon discovered that it was impossible to use his portable radio tuned to the Irish long-wave station *Atlantic 252* (252kHz) within several feet of the Mazda lamps. Even VHF/FM stations received on the portable's whip antenna showed significant noise. I suspect that it is radiation from the gas since the cable to the lamp did not appear hot. On LF the effect is an unpleasant 50Hz buzz, at VHF more like 'white noise'.

With a scanner receiver (50MHz AM) I checked the lamps throughout the house. All units with an inductive choke and normal starter caused no noticeable noise. The German Osram electronic unit produced measurable noise on 50MHz only if the antenna was within a couple of inches of the tubes; the Mazda units could be detected at 12 inches. Only the Mazda units wiped out *Atlantic 252* which was not affected by any other lamps. The Mazda units appeared to produce very broad-band noise with a peak about 90MHz. Admittedly this was only a crude test. It would be interesting to analyse results using an RFI testing room.

"Perhaps this indicates that RFI standards are still higher in Germany than in the UK. When I took the Mazda lamps back to the shop I had no problem but was told nobody else had complained. I'll stick to the more expensive but *quieter* types in future."

POTATO SOLDERING AID

VIC SAVIN, RS43387, writes: "A young friend was finding it extremely difficult to solder a six

200W FM/CW AMPLIFIER FOR 70MHZ

DAVID BOWMAN, G0MRF, writes: "70MHz is one of the few popular bands where home construction and home conversions of ex-PMR equipment still accounts for most of the amateur radio activity. Recently, a large amount of PMR equipment has become available at low cost and a number of articles have appeared on 70MHz conversions, resulting in a number of my friends joining in the exodus from the crowded 144MHz and the setting up of local communication links and packet stations in the relative peace and tranquillity of 70MHz.

"Unfortunately, the output power on some PMR equipment can be as low as 4W, marginal for packet particularly in London where high-gain antennas tend not to be used on this band. This has encouraged the development of a solid-state amplifier using two relatively low cost SD1407 bipolar transistors, providing a gain of some 13dB and producing 200W output. Since these transistors are not specified as VHF devices they are reasonably priced (currently available from Richardson Electronics Europe, Tel: (Lincoln) 0522 542631). The pair I used were not matched, but did come from the same production batch as identified by a number on the ceramic cap.

The amplifier (Fig 8 and Table 1) should be built symmetrically using identical inductors and track lengths for sides; this along with two resistors coupling the bases and collectors (R2, R3) ensures that the two devices are balanced. I produced a small PCB with the two transistors mounted side by side, approximately 35mm between centre. The output trimmers are 100pF film types with PTFE dielectric. Good quality mica compression trimmers would also be suitable. The series output trim-

C1	6-65pF film trimmer
C2,C5,C7	10-100pF high voltage
C3,C6,C8	47pF silver mica (350V)
C4	4 x 100pF (each base has 400pF to ground)
Cx	100µF + 0.01µF + 1nF in parallel
R1	10R 0.5W
R2	47R 1W
R3	100R 2W (R1, R2 and R3 carbon film resistors)
L1,L2	2t 18SWG, 10mm ID
L3,L4	8t 22SWG, 2.5mm ID
L5,L6	6t 18SWG, 6.5mm ID
L7,L8	2t 16SWG, 10mm ID
RFC	2t 22SWG enamel copper through FX1115 ferrite bead.
TR1,TR2	SD1407

Table 1: Component list for 70MHz Amplifier

mer tunes very broadly and could be replaced by a parallel combination of fixed values.

"The SD1407 transistors require a 28V collector supply. I used a simple, unregulated supply with a 12 + 12V toroidal from which I removed four turns to give the correct on-load voltage. The circuit for a similar power supply was given in my HF amplifier article in the March 1993 *RadCom*.

"At 200W the amplifier dissipates approximately 100W of excess heat. I chose to use a small heatsink rated at 1.4°/watt, with an 80mm fan to cool it. This combination works perfectly, even for 15-minute key-down periods. Switching 200W needs careful consideration with hot switching out of the question. I used a 15A PCB mounted relay from RS Components and used the PTT line for switching. Whatever system is used, the output relay must be fully closed before power is produced."

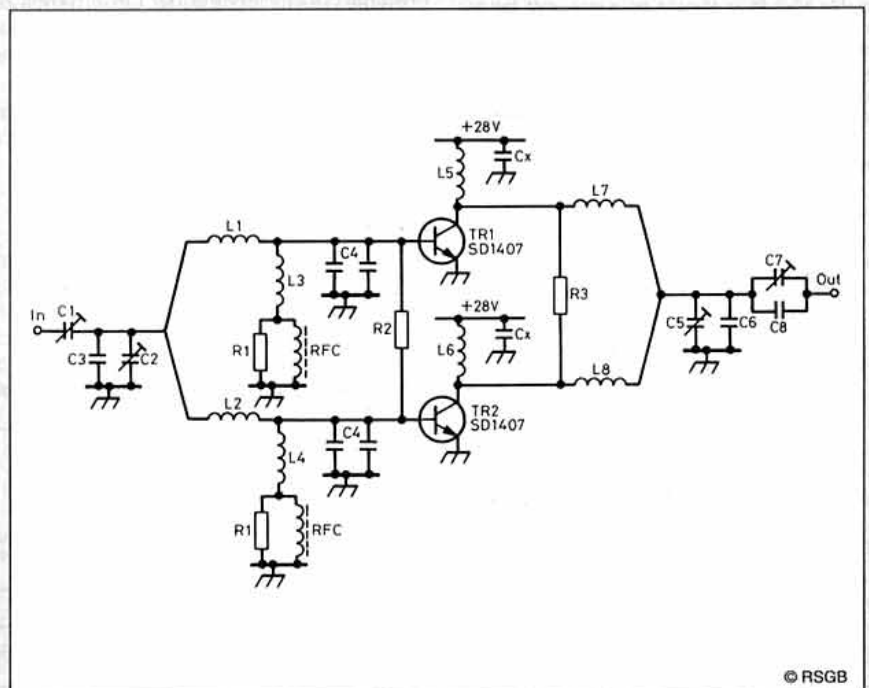


Fig 8: G0MRF's 200W FM/CW amplifier for 70MHz. Components are given in Table 1.

COAX OFF-CUTS AND MOBILE ANTENNAS

PAT PAINTING, G3OEC, adds a further suggestion on the use of odd short lengths of coaxial cable. For many years he has been constructing mobile antennas for 1.8MHz or other bands using the outer braiding of scrap cable and the top section blanks of fibre glass fishing rod with its light weight, flexibility and good strength. He writes: "Obtain a 4ft long tapering hollow or solid fishing rod top section (bland): Fig 9(a). Remove the centre core from a length of 50 or 75Ω coaxial cable, preferably using the method described by G3GDU in the March 77.

"Push the point of the rod blank through the outer braid from which the plastic outer cover has been removed: Fig 9(b). Varnish with clear polyurethane varnish.

"Then a useful 1.8MHz mobile whip can be constructed with the braided fibre glass rod mounted above a 90cm length of plastic electrical conduit wound with sufficient turns of 18SWG enamel wire to resonate the whip antenna as in Fig 9(c)."

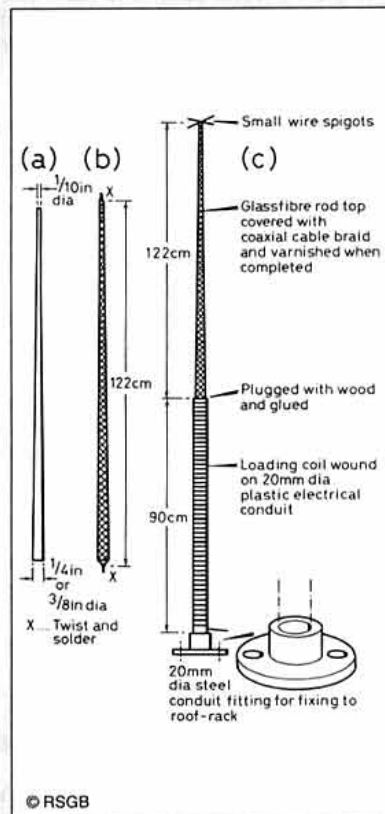


Fig 9: How G3OEC uses the copper braid from off-cuts of coaxial cable for 1.8MHz mobile antennas (the same principle could be used for other HF/VHF bands). (a) 4ft length of tapered, hollow or solid fishing rod (top section, blank). (b) The point of the rod is pushed through the copper braid and this is then varnished. (c) The finished 1.8MHz antenna with the rod section mounted above the loading coil. Wire spigots at the top form a small capacitance cap and can be used for small changes of frequency (wires bent down to raise frequency).

core flex to a six pin DIN plug. He was using a small vice and a 15W iron and experiencing the problem that most of the heat was being lost via the vice or melting the phenol-type plastic body. He sought my help.

"I asked him to give me a potato which I cut in half, placing the cut end on the work-bench the DIN plug was pressed into the top where it was firmly held. I then had no difficulty in soldering the six cores without any overheating or burnt fingers etc. The potato starch was removed from the pins using a switch-cleaning fluid. Sockets may be held similarly by inserting a few pieces of wire into the socket leaving enough length to press into the potato.

"I have used this method successfully for sixty years when soldering various components."

NON-EQUALISING POWER-SUPPLY RESISTORS

HARRY LEEMING, G3LLL, points out that a common fault in valve power amplifier rigs is the short-circuiting of the HT rectifiers resulting, if you are lucky, in the blowing of a fuse; if you are unlucky you find too late that a previous owner has fitted the wrong fuse resulting in the blowing of the mains transformer.

He warns against just replacing the rectifiers without finding out why they short-circuited in the first place after working satisfactorily for years. Most high voltage power supplies depend on the use of four, eight or twelve silicon diodes in various full wave or bridge arrangements. The peak inverse voltage rating is then increased by connecting two or more diodes in series across each arm with, typically, 470k resistors across each diode in order to equalize the voltages across each diode. Similarly there are often a number of series connected electrolytic smoothing capacitors, typically 500V working voltage, again with equalizing resistors.

The problem often lies in these resistors. Composition-type resistors tend gradually to increase in value in situations where they carry current, even when this is within their rated value (note also that most resistors are intended for use only when there is less than 300V across them). This ageing effect can cause a dramatic increase in resistance over the years but will vary from component to component. So a string of equalizing resistors may no longer equalize the voltage across the diodes or electrolytic capacitors; if they have differing inverse leakage currents then there is a real risk that one component may fail (short circuit) bringing about further failures. Before replacing any diodes or smoothing capacitors it is advisable to check the values of the equalizing resistors - ageing will virtually always causes the values to increase rather than decrease. One or more of the 470k resistors may prove to be well over a megohm!

SECURE ATU COIL TAPS

THE HIGH COST of variable 'roller-coaster' inductors suitable for flexible, multiband ATUs encourages the use instead of multiple coil taps. It is not a simple matter to solder such taps securely. J D Bolton, G4XPP, recently

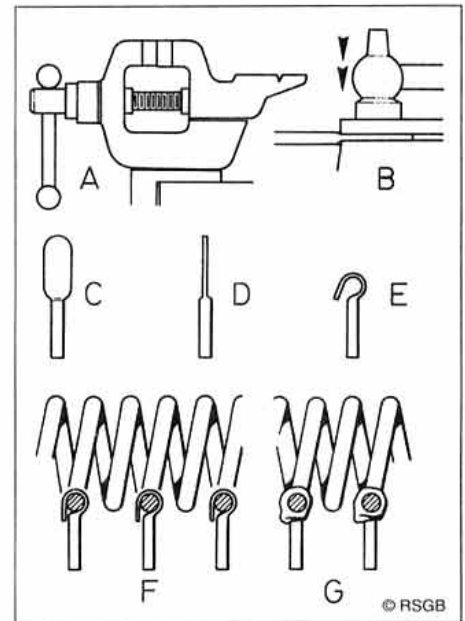


Fig 10: Making secure taps to an air-spaced coil as suggested by G4XPP.

decided to build an ATU suitable for end-fed antennas. In accordance with a published design, he obtained a suitable case, a substantial 12-way switch, 24 turn air spaced coil, 750pF high-voltage variable capacitor and the necessary sockets, wire, nuts and bolts etc.

All went well until the time came to attach securely the twelve taps from the switch to the coil. A few experiments showed that simply attempting to solder substantial wires of the same diameter as the plated copper-wire coil without affecting the adjacent turns etc would not be easy and unlikely to result in mechanically sound taps. The situation required a more thoughtful approach.

Fig 10 shows how G4XPP cracked the problem. His small hobby bench vice (A) has a small anvil on the back. With the vice screwed on the bench, the ends of the twelve wires were flattened (B,C,D) with a hammer. [Presumably any other suitable metal plate or 'anvil' could be used instead of a bench vice - G3VA].

Then, with a pair of snipe-nosed pliers he formed the flattened ends into open ended circles (E) and one by one these were slipped on to the coil (F) and clamped tight, at the tapping points, with the snipe nosed pliers. Finally, he snipped off the excess wire and securely soldered the wire circles to the coil (G). Result - no fear of the taps snapping loose the solder or short-circuiting to adjacent turns.

HERE AND THERE

CONTINUING THE SAGA of one bypass capacitor or two (77, October, December 1992), Brian Bower, G3COJ, sends along BBC Technical Memorandum R.1027 (90) *Supply rail by-passing in video circuitry* with which he was involved before his retirement. This is introduced with the statement:

"In video circuitry (frequencies up to about 6MHz) one sometimes sees supply rails with an electrolytic capacitor used for by-passing together with a smaller capacitor, typically a 22nF ceramic, across it to improve HF per-

formance. The drawback to this has long been known but is not always appreciated."

The report concludes: "Supply rail by-passing in video circuitry should be by a single capacitor, never by two in parallel. A tantalum capacitor is preferable and arrangements must be made to limit inrush current on switch-on. In more general applications a parallel combination can provide lower impedance decoupling at higher frequencies than a single electrolytic provided component values are chosen so that the parallel resonance frequency is placed where it will not be a problem - a series element is then optional."

Reg Moores, G3GZT, points out that if you received one of those Christmas cards that plays out musical notes, then you have one of the simplest and cheapest (about 50p) code oscillators ever. When connected to a Morse key, the musical notes do not have time to operate and just a single note is produced even at low speed. Ideal for anyone starting to learn the code. Perhaps we should send some to those who apparently want to write off Morse code as obsolete!

John Ridd, G8BQX, much interested in wartime radios, points out that the excellent American signals vehicles - SCR299/399/499 - fitted BC-312 and BC-342 receivers and not the Hammarlund Super Pros (BC-779, BC-794, BC-1004) suggested in September 1992. The BC-312, BC-342 and mains version BC-348 were all popular 'surplus' buys in the late 1940s despite their upper frequency limit of 18MHz.

ELECTROLYTIC CAPACITORS

THE RECENT *TT* items on the use of electrolytic (preferably tantalum rather than aluminium types) bypass capacitors at HF make it appropriate to recall that electrolytics have long had the unenviable reputation of being among the least reliable of components. Low impedance bipolar transistor circuitry has led to an enormous number of such components being used, although fortunately accompanied by improved reliability, though perhaps not as much as might be desirable.

An article 'All about Electrolytic Capacitors' by Ray Porter in the January 1993 issue of

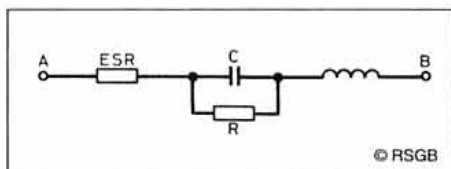


Fig 11: Simplified equivalent circuit of an electrolytic capacitor. A and B are the terminals, C is the effective capacitance, R is the shunt resistance (insulation resistance) through which DC leakage current flows. ESR is the equivalent series resistance and L the capacitor's self-inductance due to its terminals, electrodes and geometry, (*Television*, Jan 93).

Television has been followed in the April issue by the same author's description of a 'Simple ESR meter for Electrolytics' designed to measure the ESR values of PCB-mounted electrolytics.

In the January article, Ray Porter notes that manufacturers seem to regard the life of components used in consumer electronic products as being a minimum of three-to-five years. This is checked by testing at maximum temperature for up to 10,000 hours. But he adds that degradation limits with bottom-of-the-range electrolytics are specified for only 500 hours. This means that significant deterioration may occur after about a year if the capacitor is operated with a high internal temperature (in the UK ambient temperatures for consumer equipment are normally 20-30°C). Manufacturers consider the end of an electrolytic capacitor's useful life to be when 40% of the electrolyte has evaporated and escaped through the end seal, but catastrophic failures may occur before this point is reached. He writes: "The most common cause of failure when electrolytic capacitors are being tested for life expectancy is a short-circuit through the dielectric because of voltage stress. In field servicing the most common cause of failure is the absorption of hydrogenated hydrocarbon cleaners, which attack the aluminium foil, through the end seal. Current 'green' practices in industry are to use no wash or water washable fluxes while soldering, which should reduce this type of failure."

The equivalent circuit of an electrolytic capacitor is shown in Fig 11. The shunt resistance R represents the effect of DC leakage. A very small amount of power is dissipated in R although this is negligible compared to the power dissipated in the equivalent series resistance (ESR). Ripple current or AC passing through the capacitor produces a power loss in the ESR which results in heating. The ESR also affects the effective impedance of the capacitor with increasing frequency - making electrolytics unsuitable for by-passing at VHF etc. The demand for low impedance, high frequency capacitors with high ripple current ratings has greatly increased due to the popularity of switch-mode power supplies for which low ESR is necessary. Ray Porter writes: "A capacitor with a higher voltage rating tends to result in longer dielectric life because of the voltage derating factor, while the drying up process will be slower because the internal temperature will be lower. Internal temperature is reduced because high voltage capacitors have a larger case size and a lower ESR value. Because of the heat handling capability of higher voltage capacitors their ripple current rating increases with voltage rating for a given capacitance value."

It is worth noting that an increase in ESR can occur without affecting the capacitance of the unit, so that a check with a high value capacitance meter may not reveal that the capacitor has become 'lossy' and no longer represents a low impedance to RF.

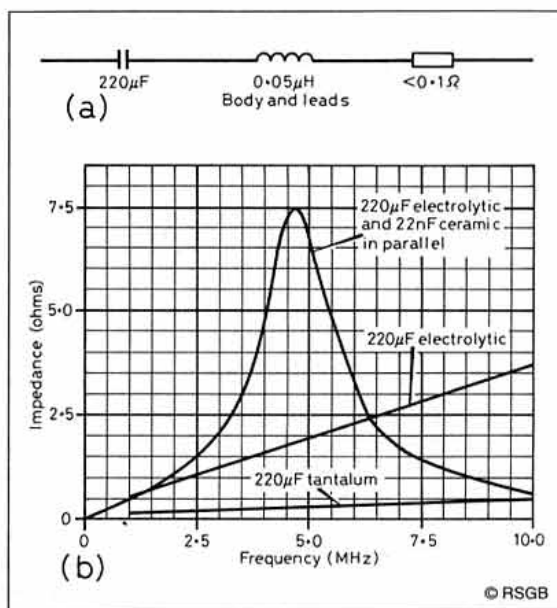


Fig 12: (a) Equivalent circuit of a 220µF electrolytic capacitor with (b) showing the impedance at frequencies 0-10MHz when used alone or in parallel with a 22nF ceramic capacitor showing the large increase in impedance of the pair around 5MHz. From *BBC Technical Memorandum R.1027 (90)*.

Ray Porter gives the following glossary of the terms used for electrolytic capacitors:

- a) Dissipation factor (DF): The ratio of the effective series resistance (ESR) of a capacitor to its reactance at a specified frequency.
- b) Effective series resistance (ESR): This is the 'lumped' element that's used for purposes of calculation to explain the power loss within a capacitor when it passes AC.
- c) Etching: An electrochemical process that roughens the surface of the aluminium foil, thereby increasing its surface area in comparison with unetched foil.
- d) Quality factor (QF): The ratio of capacitive reactance to ESR at a specified frequency and thus the inverse of DF.
- e) Working voltage: The maximum DC voltage that can be applied to a capacitor for continuous duty at the maximum rated temperature.

He provides a table showing typical characteristics of electrolytic capacitors. This indicates that the ESR of a 220µF capacitor measured at 120Hz has an initial specification of 1.5Ω for a 10V 105° type and 0.5Ω for a low ESR type in a 16 x 31.5mm case, and would cope with a maximum ripple of 1.1A. In life tests the permitted dissipation factor for a 105°C type after 500 hours would be 1.5 x initial value; for a low-ESR type after 2000 hours twice the initial value.

It would seem that for critical applications, such as by-passing or filtering, there is much to be said for using tantalum electrolytics with a generous voltage rating in a reasonably large can. Fig 12 from the BBC report provided by G3COJ shows how resonance effects can impair the by-passing capabilities when an electrolytic capacitor is paralleled with a ceramic capacitor.

Advice that has been given before in *TT* is to mount electrolytics away from sources of heat such as power amplifier valves. They remain in better shape longer when running cool. **G3VA**

Amateur Radio Techniques
by Pat Hawker, G3VA
See page 94

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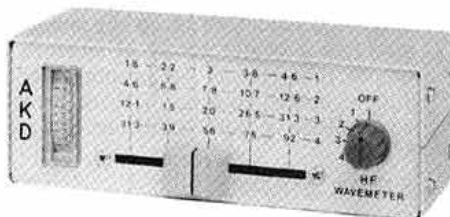
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Quickroute PCB Designer

A user review by the RadCom team

QUITE A NUMBER of printed circuit board design packages have emerged over the last few years. Initially they had limited facilities and tended to be too expensive for occasional use by the home constructor. Now, however, there are several priced at under £100 and usable by anyone with an IBM-PC or compatible, and a printer.

FIRST IMPRESSIONS

QUICKROUTE, FROM POWERWARE Software Design, is sold in two versions: Quickroute 1.5 for MS-DOS and Quickroute 2.0 for use with Windows 3 or 3.1. Let's start with a look at the features offered by the DOS version, and then list a few of the extra facilities for Windows users.

The software package is supplied on either 3.5 or 5.25in disk, and comes with a comprehensive A5 loose-leaf manual. It runs on an IBM-PC or compatible computer, with either CGA, EGA, VGA, SVGA or Hercules monitor. A high resolution monitor has an obvious advantage for this type of software, as does a Microsoft compatible mouse. Although the program could be run on the most basic XT, screen displays in this case would be very slow - a 286 or (preferably) 386 or 486 machine is a definite advantage for serious use.

A hard disk drive is also very useful - the files supplied occupy approx 450k bytes for the DOS version. A wide range of printers are supported, from 9-pin Epson types to HP Laserjets and compatibles. Some users may have access to a plotter, and Quickroute can use a subset of the industry-standard HPGL commands to output the finished design.

MAKING TRACKS

INSTALLATION OF QUICKROUTE onto a hard drive or another floppy is straightforward using the special installation program supplied. Once installed, a number of pull-down menus are provided, together with a 'button-bar' at the top of the window. These give access to a large range of facilities such as file selection, block based editing, filled polygons for copper areas (useful for earth planes on RF circuits) and pan/zoom. Eight pre-set zooms are provided, or a custom zoom level may be set.

Five types of object can be included in the design: pads, tracks, integrated circuit pin-outs, symbols and graphic primitives. Examples of symbols are connector pin-outs and surface mount components as well as groups

of pads or tracks stored as single units. Graphic primitives on the other hand, are a range of basic shapes for use in designs such as ellipses, rectangles, arcs and text. These are accessed from the 'Tools' menu at the top of the screen. Other component types can be defined by the user, as required.

Unusually for such an inexpensive package, a simple auto-router has also been provided. Lets assume that the user starts with a 'rats-nest' of connections crossing each other at all sorts of angles from start point to destination. The routing algorithm will then attempt to find the shortest routes between the lines at node angles of 45° and 90° to give a neat layout. This process may involve the use of up to eight PCB layers where available.

WINDOWS VERSION

USE IS MADE of the Microsoft Windows extended memory to facilitate designs of up to 200,000 pads or track nodes. This assumes the computer has 4 Mbytes of RAM, but even with 2 Mbytes complex designs of up to 50,000 tracks/nodes should be possible. Both this and the DOS version can handle eight standard layers, plus two silk screen layers and a solder mask. One of the files supplied is 'DEMO.PCB', which enables new users to experiment with the techniques and facilities on offer.

The Windows version of Quickroute can use files generated by the DOS version, so upgrading should not cause any problems. It also has a bigger library of symbols and graphic primitives as well as support for over 150 printers and plotters. The Windows files supplied use approx 700k of hard disk space.

BOOK MARKS

MANY WOULD CONTENT that new users of well designed software shouldn't need to continually refer to the manual. Nevertheless, if you do come up against a problem, it's nice to know where to start looking! Rest assured that the Quickroute manual is well laid out, and divided into three sections. Firstly, there is an overview of the software with installation



instructions. Secondly a step by step tutorial, and finally a reference section and index.

CONCLUSIONS

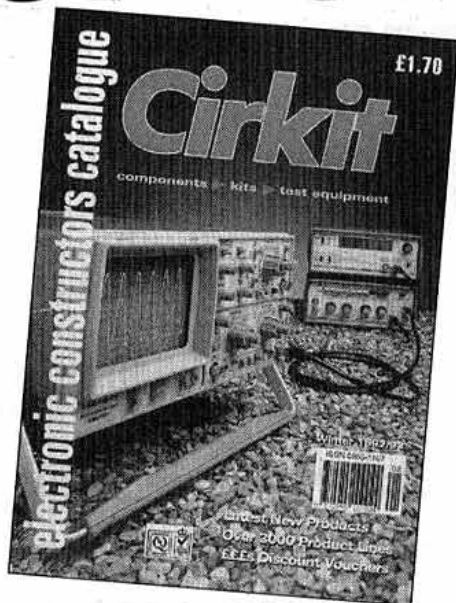
QUICKROUTE PROVIDES A comprehensive and effective introduction to PCB design, which is a pleasure to use. There are no obvious bugs, and although it is not in the professional 'top league' there is little, if anything, to match it in the value-for-money stakes. From initial installation, it took about an hour for the review team to produce a usable single-sided layout. Most functions were straightforward, using the 'pull-down' screen menus, and only occasionally did we need to refer to the manual.

Prices are: Quickroute 1.5 for DOS, £39; Quickroute 2.0 for Microsoft Windows 3.0 or 3.1, £59. These are inclusive of VAT and P&P. Postage outside the UK is £4 extra, and disk size should be stated when ordering. Available from: Powerware, 14 Ley Lane, Marple Bridge, Stockport SK6 5DD. Tel: 0860 602486.

TECHNICAL UPDATE NOVICE NOTEBOOK

We have received a number of enquiries concerning kits for the 6 metre converter in the April issue. These are now available from JAB Electronic Components (see page 40). The price of the full kit is £11.85 inc VAT and P&P.

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	Original Spec.	Mutek
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Image Reject.	>60dB	>70dB
Itermod. free dynamic range	80dB	90dB
70cm Section		
Noise Figure	>18dB	<1.5dB
Image Reject	>60dB	>70dB
Itermod. free dynamic range	70dB	80dB

The SO239 connector for 2m is replaced with an N-type. Selectivity is also improved by use of an 8-pole xtal filter.

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Complex Numbers Explained

by Clive Smith, G4FZH

I WROTE AN ARTICLE ENTITLED 'The "j" Operator and Impedance' in *RadCom*, June 1990, and this received a favourable response. I hope it showed readers the usefulness of this operator. The following article develops the use of the j operator, and enables users to manipulate circuit equations they may derive or come across. Various problems are presented and small computer programs provided to perform the analysis. Some calculators can cope with complex numbers and switch between polar and cartesian coordinates.

The computer programs in the listings have been tested on an IBM-PC (GWBASiC) and a BBC computer. It should be easy to convert them to other dialects of BASIC.

THINK OF A NUMBER

LET'S START WITH a little revision. In mathematics, numbers can be classified into three basic types – real numbers, imaginary numbers and complex numbers. Real numbers are numbers such as 3 (an integer), rational numbers (fractions) and irrational numbers such as π and $\sqrt{2}$. An imaginary number is a real number but prefixed by the operator j (eg j5). A complex number is a combination of these two, eg $3.5 + j7.6$.

PROPERTIES OF THE J OPERATOR

IT WAS SHOWN IN the June 1990 article that j can be used for a term at 90° (or quadrature) to another term – eg in calculating impedance. Its use, however, is not restricted to electrical theory, though this is a major application.

If a quantity of value A is taken, when multiplied by j it will assume a value of jA and be in the direction shown in Fig 1, ie a rotation of 90° anti-clockwise. A further multiplication by j rotates jA by a further 90° , this is now in the opposite direction of A and hence equals -A. The implication of this is that $j \times j = -1$. Further multiplication by j provides -jA (Fig 1)

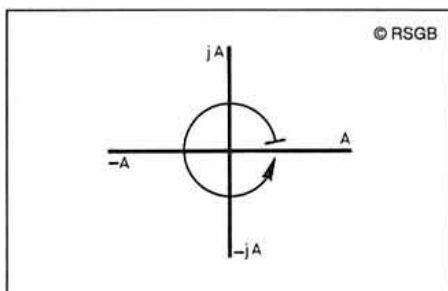


Fig 1: Graphical representation of impedance.

and a further rotation of j brings one back to A, i.e. $-j \times j = +1$.

The fact that $j \times j = -1$ gives the implication that $j = \sqrt{-1}$ – the concept of the square root of a negative number! Some readers may recall being told at school that you cannot take the square root of a negative number. However, this is a convenient mathematical concept for dealing with complex numbers.

Taking j as the square root of -1, then the following are true:

$$\begin{aligned} j &= \sqrt{-1} \\ j \times j &= -1 \\ j \times j \times j &= -1 \times j = -j \\ j \times j \times j \times j &= -1 \times -1 = +1 \end{aligned}$$

Next, we'll consider the concept of vectors – a quantity that has both magnitude and direction – eg Force. In many engineering problems a vector is split into two components at right angles (90°) to each other – the x and y or real and imaginary components or whatever they are called. This often makes further analysis easier and it is also where the j operator can help. Remember that 90° phase shifts come into electrical theory when capacitive and inductive components are introduced into circuits.

SOME BASIC RULES

THERE ARE VARIOUS rules for using complex numbers, which are necessary for calculations. These are:

ADDITION

$$\begin{aligned} (a + jb) + (c + jd) &= (a + c) + j(b + d) \\ \text{eg } (3 + j4) + (5 - j8) &= 8 - j4 \end{aligned}$$

SUBTRACTION

$$\begin{aligned} (a + jb) - (c + jd) &= (a - c) + j(b - d) \\ \text{eg } (5 + j6) - (3 + j2) &= 2 + j4 \end{aligned}$$

COMPLEX CONJUGATE

The complex conjugate of a complex number is defined by:

Number	Complex Conjugate
$a + jb$	$a - jb$
$a - jb$	$a + jb$

ie the sign of the j term has been reversed. If z is a complex number, the conjugate is normally written as z^* . One property of adding a complex number to its conjugate is that the result is a real number.

$$\text{eg } (3 + j6) + (3 - j6) = 6$$

(note that there is no j term)

MULTIPLICATION

$$(a + jb)(c + jd) = ac + jad + jbc + j^2bd$$

However, $j^2 = -1$, therefore this reduces to:

$$\begin{aligned} (ac - bd) + j(ad + bc) \\ \text{eg } (5 + j7)(2 + j3) = -11 + j29 \end{aligned}$$

An interesting result occurs when a complex number is multiplied by its complex conjugate:

$$(a + jb)(a - jb) = a^2 + jab - jab + b^2 = a^2 + b^2$$

Listing 1 will multiply two complex numbers together.

DIVISION

This is somewhat more arduous and requires the complex number to be only on the top line. The form of a division is:

$$\frac{(a + jb)}{(c + jd)}$$

To proceed, multiply the bottom line by its complex conjugate, to balance this the top line must also be multiplied by this number.

$$\frac{(a + jb)(c - jd)}{(c + jd)(c - jd)} = \frac{(ac + bd) + j(bc - ad)}{(c^2 + d^2)} =$$

$$\frac{(ac + bd)}{c^2 + d^2} + j \frac{(bc - ad)}{c^2 + d^2}$$

$$\text{eg } \frac{(2 + j3)}{(4 + j2)} = 0.7 + j0.4$$

Listing 2 will divide two complex numbers – try it!

CARTESIAN AND POLAR COORDINATES

THESE TWO FANCY SOUNDING names are the terms used for two different ways of defining a point. The cartesian coordinates system uses distances at right angles to specify a position – for instance, three steps right, four steps forward. The polar coordinate system uses a distance and an angle – for instance walk five steps at a bearing of 53° .

These two methods are equivalent and you would arrive at the same position. This situation is shown on Fig 2. By considering these two plots it can be seen that either set of coordinates is adequate and there must be a way of converting from one to the other.

Putting it all on a mathematical footing, the cartesian system is equivalent to the familiar x – y graphs, the other form is a magnitude and an angle – an example is the radiation pattern of an antenna. The general forms are depicted on Fig 3, the relationship between the two forms being given by:

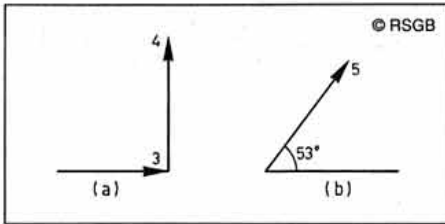


Fig 2: Cartesian and Polar coordinates.

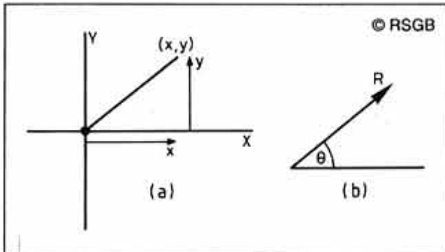


Fig 3: Resultant magnitude and angle.

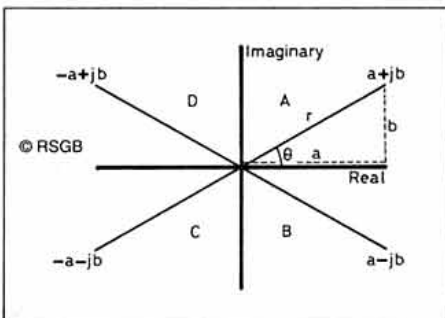


Fig 4: Complex number in graphical form.

$$x = R \cos\theta$$

$$y = R \sin\theta$$

Conversely:

$$\tan\theta = x/y \text{ or } \theta = \tan^{-1}(x/y)$$

$$R^2 = x^2 + y^2$$

Note that if the values of x and y are known, then calculation of the angle requires the use of the inverse tan function (\tan^{-1}). This is available on many calculators or in BASIC as the ATN function. Listings 3 and 4 provide simple programs that will convert between the two coordinate systems. Having established these relationships, the next step is to relate it to complex numbers.

MODULUS AND ARGUMENT OF A COMPLEX NUMBER

THE MODULUS OF A complex number ($a + jb$) is what has been previously referred to as magnitude and is defined by:

$$r = \sqrt{a^2 + b^2}$$

The argument is also the phase angle and is given by:

$$\tan\theta = \frac{b}{a}$$

These are the familiar forms when converting from rectangular to polar coordinates.

It is important to take great care when using the ATN function on a calculator or computer to determine the angle, because it normally only caters for angles in the range -90° to 90° .

THE ARGAND DIAGRAM

THIS IS A GRAPHICAL representation of a complex number and Fig 4 shows how the point $a + jb$ is plotted and how the modulus and argument are defined. This figure also shows how points in all four quadrants are represented.

In the Argand diagram the ATN function copes only with quadrants A and B. Additional lines must be inserted in the listings testing the values of a and b to cope with quadrants C and D.

ADDITIONAL PROPERTIES

COMPLEX NUMBERS HAVE a number of features, and there are four important identities which are worth knowing. These will occur in later circuit theory. If two complex numbers are to be added or subtracted it is easiest to perform it using:

$$(a + jb) + (c + jd) = (a + c) + j(b + d)$$

$$\text{and } (a + jb) - (c + jd) = (a - c) + j(b - d)$$

If two complex numbers have to be multiplied or divided it may be easier to perform it by converting the complex numbers to magnitudes and angles and using the following relationships:

$$A \angle \theta_1 \times B \angle \theta_2 = A \times B \angle (\theta_1 + \theta_2)$$

$$A \angle \theta_1 / B \angle \theta_2 = A / B \angle (\theta_1 - \theta_2)$$

Where A, B and θ_1, θ_2 are respectively the modules and angle of two complex numbers.

Listings 1 to 4 can be found on page 67 ▶

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72 & 73 from Dave G4KQH, Technical Manager.



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QUALITAS RADIO

A 2 metre SSB/CW Transceiver

The second of three parts by Bernie Pallett, G3VML

THIS MONTH WE will look at four more modules for the transceiver. These are the receive RF pre-amplifier, audio filter, 144MHz band-pass filter and the tone oscillator for CW operation.

The modules to be described are all built on double-sided PCBs, with the component side used as a ground plane. Page 37 of last month's *RadCom* (April '93) shows all four modules secured to the top side of the chassis.

RF PREAMPLIFIER (MODULE 6)

THIS PRE-AMPLIFIER (Fig 6) is built around the dual-gate Mosfet device TR1 (3SK88), and is capable of delivering a small-signal gain exceeding 15dB consistent with very low inherent noise. The amplifier input and output circuits are adjustable to provide an impedance match to 50Ω coaxial cable. Input tuning (TC1 and TC2) and output tuning (TC3) will be discussed in the alignment procedure in the final part of this article.

RF preamplifier (module 6) Components list

Capacitors

C1,C2,C4,	1nF min monolithic ceramic
C5,C6,C9	ceramic
C3	10nF min monolithic ceramic
C7	5.6pF sub-min plate ceramic
C8	15pF sub-min plate ceramic

Resistors 0.25W 5%

R1	220k
R2	150k
R3	39k
R4	33R
R5	33R

Semiconductors

TR1	3SK88
D1,D2	1N4148

Inductors

L1	3.5 turns, 0.375in ID, 0.5in long, 16SWG tinned copper.
L2	3.5 turns, 0.19in ID, 0.375in long, 22SWG tinned copper.



750Hz Audio filter (module 7) Components list

Capacitors

C1,C8	10nF min monolithic ceramic
C2,C3,C5,C6	1nF min monolithic ceramic
C4	100μF 16V electrolytic
C7	10μF 16V electrolytic

Resistors 0.25W 5%

R1,R5	680k
R2	24k
R3,R6	1.8M
R4	1k0
R7,R8	27k

Semiconductors

IC1	NE5532N
D1	1N4001

Additional Items

Relay RLA	SPCO type RS 345-038
-----------	----------------------

750HZ AUDIO FILTER (MODULE 7)

THIS CIRCUIT USES dual operational amplifier IC1. Fig 7 (see next page), shows the circuit, configured as an active band-pass filter. The dual polarity power supply is derived from a potential divider formed by resistors R7 and R8. Capacitor C7 is for decoupling.

When de-activated, the +12V supply is absent, relay RLA is de-energised, and the input audio is switched directly to the module output via relay contacts A1. To activate the filter circuit, a +12V supply is applied to relay RLA. This transfers the output to the filter via relay contacts A1 and places it in series with the audio path of the SSB module (Fig 2).

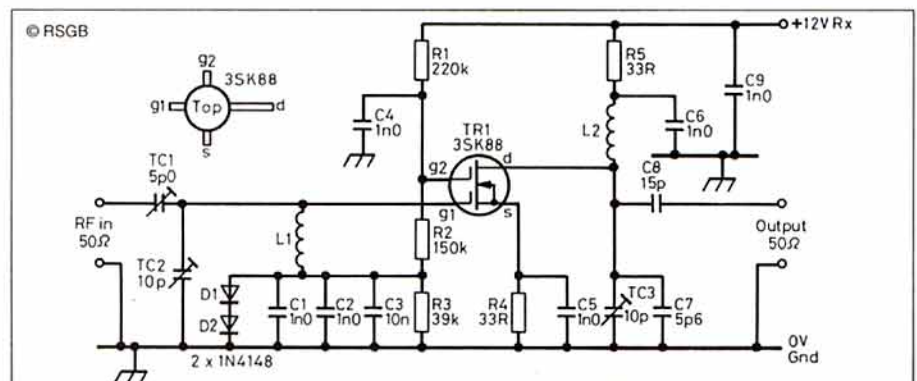
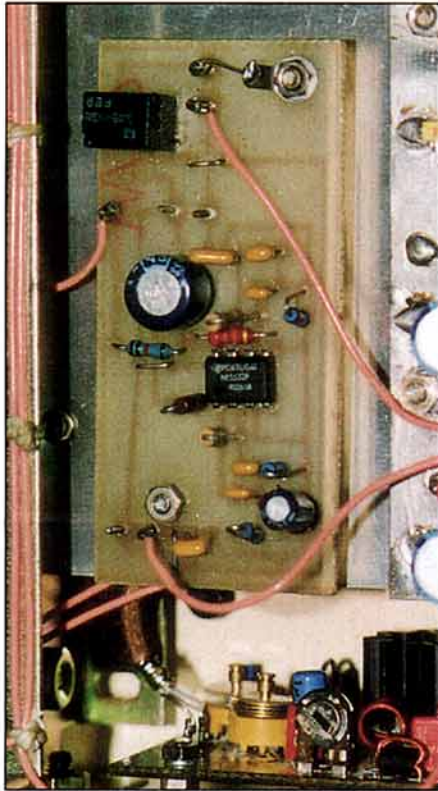


Fig 6: the RF receive preamplifier has tuned input and output.



The receive pre-amp uses a 3SK88 Mosfet for low inherent noise.



The CW filter board. Below this is the power amplifier to be described next month.

144MHZ BAND PASS FILTER (MODULE 8)

THE BAND PASS FILTER consists of three parallel tuned circuits formed by inductors L1, L2, and L3 plus associated capacitors (shown in Fig 8).

The three tuned circuits are inductively coupled, with the signal input and output circuits derived from the tapped portion of inductors L1 and L3 respectively.

The Transmit/Receive signal routing is controlled by the pin-diode switching circuits, formed by D1 and D2 respectively.

On transmit, D2 is forward biased and provides a low impedance to RF. On receive, D1 is conducting and D2 presents a high impedance.

144MHz Band Pass Filter (module 8) Components list

Capacitors

- C1 10nF monolithic
- C2,C3,C4 8.2pF 100V miniature ceramic

Resistors 0.25W 5%

- R1,R2 1k8

Semiconductors

- D1,D2 BA479

Inductors

- L1,L2,L3 Toko S18 series, 0.114µH (Orange) Cirkit Pt No 35-10303 L1 & L3 tapped ¾ turn from grounded end.

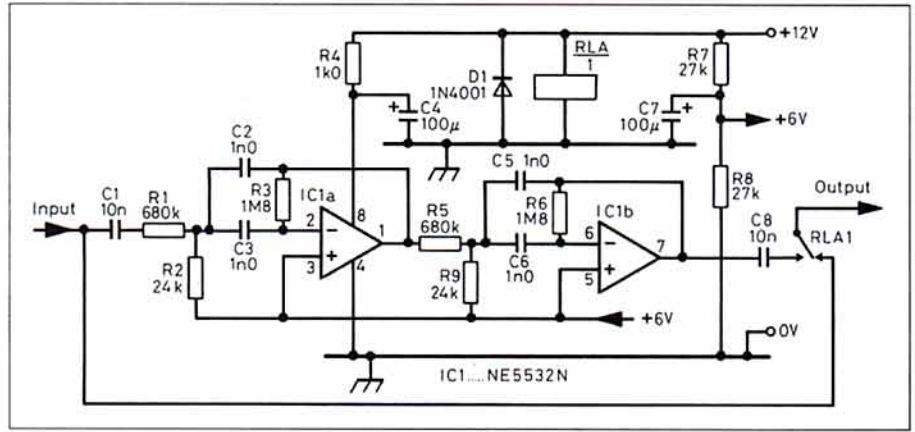


Fig 7: An effective audio filter for CW operation, using a dual op-amp.

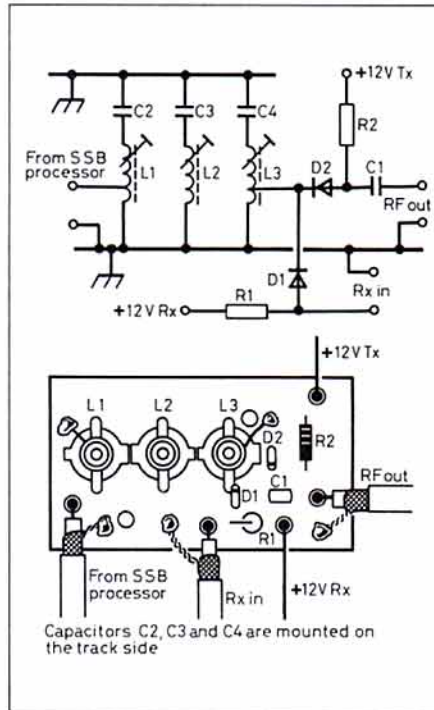
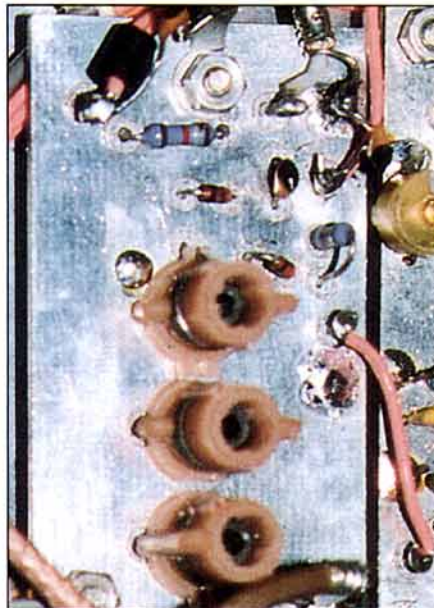


Fig 8: 144MHz band pass filter, with diodes for transmit/receive switching.



The 144MHz filter gives good rejection of out-of-band signals.

TONE OSCILLATOR (MODULE 9)

TRANSISTOR TR2 AND ASSOCIATED components form a 1kHz audio oscillator circuit as shown in Fig 9. Its +12 volt supply is controlled by a solid state switch, transistor TR1. The output of this audio oscillator is both amplified and buffered by transistor stage TR3.

There are two separate signal outputs from this module, via potentiometers RV1 and RV2 respectively. In the de-activated state, transistor switch TR1 is reverse biased to the 'off' state, which cuts the power supply to the audio oscillator. When the key input is grounded, the transistor switch TR1 will become forward biased to the 'on' state which supplies +12 volts to the audio oscillator. This, in turn, results in oscillation while the key input is grounded.

Tone oscillator (module 9) Components list

Capacitors

- C1,C3,C4,C5 10nF min monolithic ceramic
- C5,C7,C8 10nF min monolithic ceramic
- C11,C12,C13 10nF min monolithic ceramic

Resistors 0.25W 5%

- R1,R2,R3 56k
- R4 4k7
- R5 10k
- R6 100k
- R7 39k
- R8 1k2
- R9 1k0
- R10 2k7
- R11 470k
- R12 390R
- RV1,RV2 4k7 linear

Semiconductors

- TR1 2N2905
- TR2 BC108
- TR3 2N3819
- D1 1N4148
- D2 6.8V 0.5W zener diode

... to be concluded

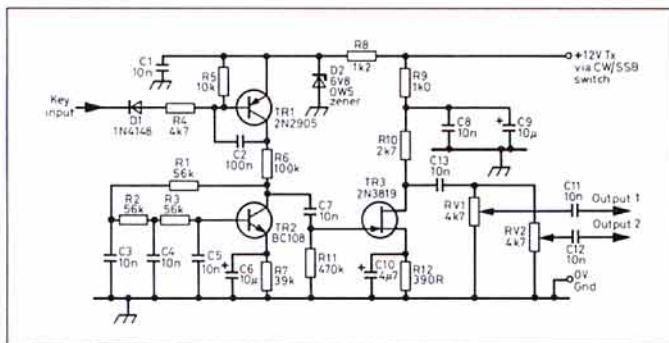
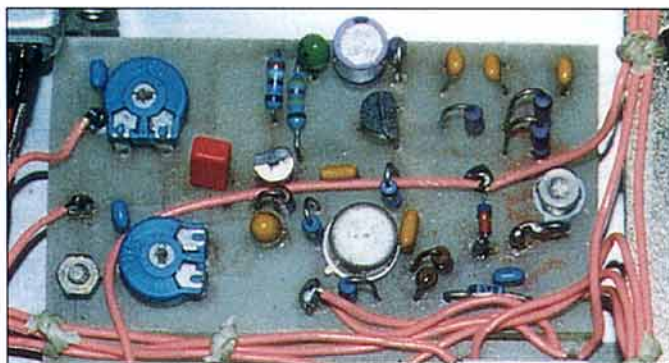


Fig 9: Tone oscillator module with output at 1kHz.



The tone oscillator uses a BC108 or similar plastic case transistor in the TR2 position. The phase shift oscillator gives a near-perfect sine wave output.

NEXT MONTH

IN THE FINAL PART the Power Amplifier and Low Pass Filter will be featured, with alignment details. An external linear amplifier which will boost the output to 10W PEP is available from Wood & Douglas. (Tel: 0734 811444).

Complex Numbers Explained

continued from page 63

LISTINGS

The following computer programs provide a useful way of experimenting with complex numbers. Minor changes to the listings may be required for some versions of BASIC.

Listing 1

```

10 REM multiply two complex
   numbers
20 CLS
30 INPUT "First no, real part",A
40 INPUT "First no, imaginary
   part",B
50 PRINT
60 INPUT "Second no, real part",C
70 INPUT "Second no, imaginary
   part",D
80 AA = (A * C) - (D * B); BB = (A *
   D) + (B * C)
90 PRINT
100 IF BB<0 THEN SS="-j" ELSE
   SS="+j"
110 PRINT "Result is"; AA; SS;
   ABS(BB)
    
```

Listing 2

```

10 REM divide two complex
   numbers
20 CLS
30 INPUT "Numerator, real part",A
40 INPUT "Numerator, imaginary
   part",B
    
```

```

50 PRINT
60 INPUT "Denominator, real part",C
70 INPUT "Denominator, imaginary
   part",D
80 ZZ = C^2 + D^2; AA = ((A * C) +
   (B * D))/ZZ;
   BB = ((B * C) - (A * D))/ZZ
90 PRINT
100 IF BB<0 THEN SS="-j" ELSE
   SS="+j"
110 PRINT "Result is"; AA; SS;
   ABS(BB)
    
```

Listing 3

```

10 REM convert cartesian to polar
   form
20 CLS
30 INPUT "X",R
40 INPUT "Y",X
50 Z = SQR(R^2 + X^2)
60 THETA = (180/3.14159) *
   (ATN(X/R))
70 PRINT "Magnitude is",Z
80 PRINT "Angle is",THETA
    
```

Listing 4

```

10 REM convert polar to cartesian
20 CLS
30 INPUT "Magnitude",Z
40 INPUT "Angle (-89 to +89) in
   degrees",THETA
50 THETA = THETA * 3.14159/180
60 R = Z * COS(THETA)
70 X = Z * SIN(THETA)
80 PRINT
90 PRINT "Real part is",R
100 PRINT "Imaginary part is",X
    
```

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- 13B22m 13el Boomer
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 - 2M13LBA2m 13el Beam
 - 2M22C2m 11XY Oscar
 - 2M14C2m 7XY Oscar
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- EB1442m Eggbeater
- 432-13WL70cm 39el Beam
- 432-9WL70cm 28el Beam
- EB43270cm Eggbeater
- 23CM3523cm 35el Beam
- 2M2P2m 2w Power Divider
- 2M4P2m 4w Power Divider
- 70CM2P70cm 2w P.Divider
- 70CM4P70cm 4w P.Divider
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As RF currents only flow in the surface layer of a conductor - the skin effect - the surface of the tubing should remain unmarked. According to PA0SU, the drawn surface conducts better than one restored by polishing.

Tubing of 28mm would raise the Q and efficiency but it would also reduce the bandwidth; fine for CW, but too narrow for 80m SSB! As it is, the loop must be re-tuned for every QSY.

THE TUNING CAPACITOR

THE TUNING CAPACITOR is assumed to be practically loss-free, true only if all precautions are taken. To cover 3.5 - 3.8MHz, the required capacity variation is small: 300pF to 360pF. It was made up of a fixed capacitor of 260pF and a 100pF maximum variable in parallel. Making only a small part of the capacitor variable has advantages: variables are more expensive and bigger per pF, only a fraction of loop current passes through the variable and band-spread eases tuning.

Even a 100pF variable at 100W must handle up to 9kV peak and 13A RMS. A wiper

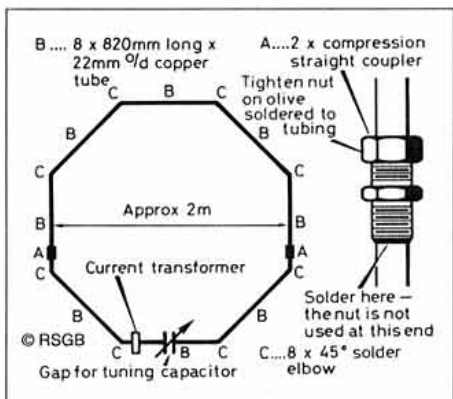


Fig 1: The 80m magnetic loop antenna which can be taken apart at A for transport on a roof rack.

L:	5.8uH
Loaded Q:	1273
Resistance:	7.4mΩ
Loss resistance:	46mΩ
Efficiency:	14%
Bandwidth -3dB:	2.94kHz
C at resonance:	314pF
Capacitor voltage:	8.3kV peak
Loop current:	43.3A RMS

Table: Calculated data at 100W and 3.74MHz

A magnetic loop for 80m mobile was described by Loek d'Hont, PA2JBC, in the Angry-Nine magazine Q-Five (NL) of 12/92.

connection to the rotor would be suspect at 13A so a 2 x 200pF split-stator capacitor was used. Even then, the current path between all rotor plates must be low resistance, preferably soldered or brazed; the same goes for the stator plates and their connections to the loop tubing. At 9kV, conservative design requires 9mm between plates, or 4.5mm in a split-stator (each half takes 50% of the voltage). Indoors and using only 85W PEP, I got away with 2 x 2mm! An insulated shaft coupling is used and tuning can be motor-driven or by hand.

The fixed capacitor was home-made from 51 x 0.3mm copper strips interleaved with slabs of dielectric. Fig 2. Polyethylene works well as a dielectric and is inexpensive; if it gets hot, it is not polyethylene! The capacity can be set by adjusting the meshing of the two sets of copper 'plates', but the dielectric must extend beyond the copper by at least 6mm. After adjustment, the capacitor was wrapped with glass-fibre-reinforced tape. Four parallel 3mm copper wires connect the fixed capacitor to the loop tubing. The 3mm-thick polyethylene is barely adequate for 100W. At 180W, it eventually broke down.

LOOP-TO-FEEDER COUPLING

I COULD NOT GET a gamma-match to work; a coupling loop also proved unsatisfactory as its shape had to be adjusted when changing frequency. The solution was a current trans-

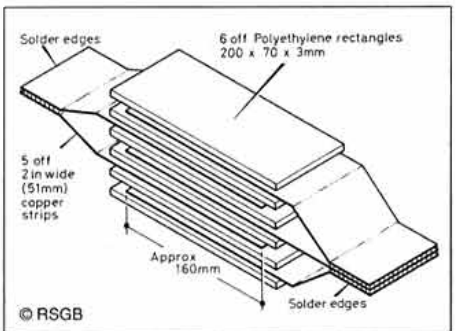


Fig 2: This fixed 260pF home-made capacitor is good for 8kV @ 40A.

former. This transformer must match the 53mΩ loop to a 50Ω coax, an impedance ratio of 940:1 - a turns ratio of $\sqrt{940} \approx 30:1$, in which the '1' is the loop tubing stuck through the hole of the toroid. The coupling of the transformer is not 100%, so with the loop at resonance the feeder sees inductance. By increasing the transformer winding to 36 turns and adding a series capacitor a 1:1 SWR can be obtained anywhere in the band. This capacitor is a receiver-type air-dielectric 250pF variable. A 1:1 balun keeps the outside of the coax 'cold' (Fig 3).

Construction of the current transformer is not trivial; 6 x 6 turns of 1mm PTFE-insulated copper wire gave the best results. Ferrite (Philips 4C6, violet) and iron powder (Amidon, red) both work (Fig 4). The transformer can be placed anywhere on the tubing, eg next to the capacitors where they and the coupler can be in a weatherproof box.

OPERATION

THE ANTENNA IS in my loft 3m agl and above all wiring. Being close to wooden rafters and clay roofing tiles does not noticeably affect the Q of the loop, even when the roof is wet. The loop is supported on good insulators; wood will not do! For outdoor use, the loop should be de-greased and painted. **WARNING: Loops can give nasty RF burns even on low power!**

With 100W PEP, of which only 14W is being radiated from indoors, the results are astounding. Best SSB DX was the Ukraine with 5-9 both ways. The high-Q also helps to beat all but adjacent-channel QRM and reception is much quieter also in man-made and atmospheric noise.

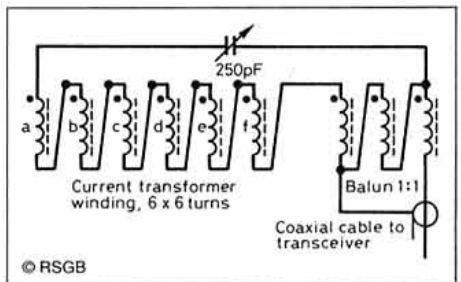


Fig 3: A current transformer couples loop to feeder. The balun keeps RF off the outside of the coax.

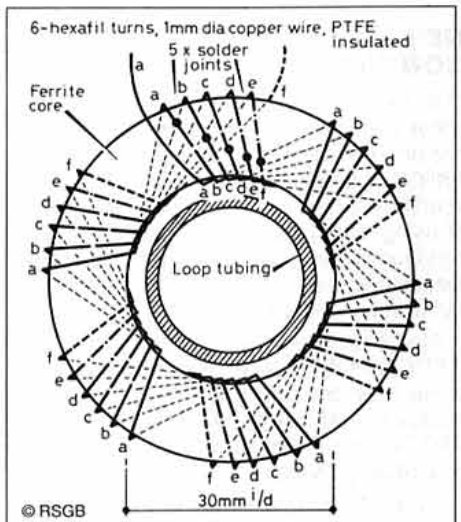
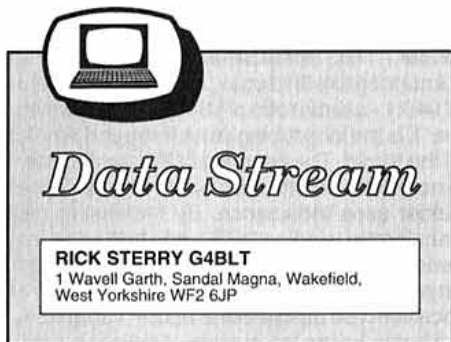


Fig 4: The construction of the current transformer.



THE COLUMN HAS NOW been expanded to include all aspects of datacomms and computing in amateur radio. I hope that the new title of DATA STREAM suitably reflects this wider coverage, and that readers will welcome the change.

PACTOR FOR THE PK232-MBX

A PACTOR UPGRADE is now available for the AEA PK232 controller. If you have a PK232, you must first upgrade it to a PK232-MBX, by installing the Packmail daughter board at a cost of £84.50 inclusive of VAT. The upgrade to PACTOR is then simply a matter of replacing the EPROMs, at a cost of £69.95 inclusive. This isn't cheap at nearly £155 in total if you are upgrading a PK232, so the BMK-MULTY upgrade mentioned in the March 1993 column may be more cost-effective at £79 inclusive of software and postage.

For upgrades, contact ICS Electronics on 0903-731101 (Fax 731105), or Siskin Electronics on 0703-207155 (Fax 847754). The PACTOR upgrade has been available in the USA for a few months, and according to a report from Dick, W1FYI, it works well, and he is very pleased with the performance. The computer software has yet to be upgraded for PACTOR by AEA, though.

Thanks to Ken, G4RIA, for keeping me up-to-date on the PACTOR scene. I haven't been very active on HF data modes lately, but the acquisition of new equipment is changing all that. Mind you, Ken uses an old FT101Z, (not even digital readout), so although the new technology makes equipment much easier and more convenient to use, it is by no means essential for most datacomms applications!

NEW AEA PK900 CONTROLLER

THE PK232 HAS BEEN available for quite some years now, and is still in production, but has now been joined by a bigger brother, the PK900. This is very different in appearance, in that it makes use of an LCD panel instead of using lots of LEDs. Almost everything is configurable in software, and even critical testpoint voltages can be interrogated without using an external multimeter.

Modes catered for include CW, ASCII, RTTY, AMTOR, Packet, Wefax, Navtex, plus some new ones such as TDM, (a sort of frequency-sharing AMTOR), ARQ-E3 AMTOR, and Wefax Analogue, (which gives you 16 grey levels).

Two radio ports are fitted, one for HF/VHF, and one for VHF only. Both ports can be in simultaneous use, and a 9600 baud add-on

board for VHF packet is to be made available at an estimated price of £80 inclusive. PACTOR is an option at £69.95 inclusive. The price of the basic PK900 unit is about £546, thus placing it between the PK232-MBX, which would set you back £370, and the more expensive DSP units.

NEW NOSINTRO BOOK

TCP/IP PACKET IS a somewhat impenetrable mode for the beginner, so any help is very welcome. Ian Wade, G3NRW, has already written the NOSview PD online help system for the KA9Q NOS, (Network Operating System). Now, he has published a book, called NOSintro. This gives details on such things as installing NOS on a PC, setting up the control lines, checking basic operations off-air before going live, and using NOS commands for transferring files, logging in to remote systems, sending mail, and so forth.

The book is a paperback of some 350 pages, with many diagrams etc, and it is clear that Ian has made a big effort to provide relevant, practical detail, without bogging the reader down in unnecessary theory etc. In fact, I couldn't find a single page where the text was not broken up with at least one example, diagram, or table. There is nothing more off-putting than acres and acres of plain print, and Ian has obviously taken this to heart.

NOSintro is published by Dowermain, ISBN 1-897649-00-2, and is available through the RSGB. [See BookCase pages 94 and 95]. At rallies it'll cost less of course, as there is no postage.

TNC KITS

I BUILT A BSX2 TNC BOARD some three or four years ago, and it's still giving excellent service, especially after modification to 'true' DCD. (This allows operation with the squelch open or closed, and only responds to true data, not to random noise, weak carriers, etc).

I believe that it is still available from a number of sources, including YAXPAK, (Yorkshire AX25 Packet Group). The price is £18 for the board, inclusive of UK postage, and £5 for programmed State Machine EPROM and original TAPR v1.1.5 firmware. The address is YAXPAK, P O Box 73, Leeds LS1 5AR.

The similar KFN2 board is now available from Alan Baker, G3KFN, 37 Boulter Close, Roborough, Plymouth, Devon PL6 7AY, tel: 0752 770045. The price quoted for the board itself is £14 inclusive of UK postage. I haven't seen one myself yet, but I gather that it is slightly larger than the BSX2 board, but of very good quality. For convenience, even the component numbering is the same as the BSX2, and the two are fully compatible.

Another interesting TNC board is the MAXPAK (Midlands AX25 Packet Group) TNC2-DL Mk4 board, which was reviewed in the March 1993 issue of *HRT*. Like the BSX2 and KFN2, this is a so-called 'TNC2 clone'. The price is £18 for the board, inclusive of postage, plus £12.50 for an EPROM programmed with the PacComm firmware. (These may change, so check before ordering). The address is MAXPAK, c/o Richard Nicol, G1NZZ, 37 Thicknall Drive, Stourbridge, West Midlands DY9 0YH, tel: 0384 373682 at

weekends, or between 7pm and 9pm during the week. Kits, including boxes, are available from JAB Electronic Components in Birmingham, tel: 021 366 6928 (Fax 021 366 6237). Check before ordering, but the kits were about £52 and the boxes about £13.

Shopping around for the components can be a bit of a pain. However, you can obtain a complete kit of components for the BSX2 and KFN2, with blown State-Machine EPROM and blank 27256 for firmware. The source is Ron Mallett, G0NJD, 71 Ollivet Road, Woodseats, Sheffield, South Yorkshire S8 8QR. The price quoted is £46 fully inclusive of UK postage, but again, it would be wise to check before ordering.

Pre-drilled metal cases for the BSX2 are available from H J Morgan-Smith, Unit 3, Vernon Building, Westbourne Street, High Wycombe, Bucks HP11 2PX, tel: 0494 532421. The current price is £7.60 inclusive of postage etc. Cases for the KFN2 and TNC2-DL were planned at the time of going to press, so may be available by now. Indeed, anyone producing a project which needs a case of some sort, is very welcome to get in touch with Mr Morgan-Smith, even if the quantities involved are small.

Siskin Electronics can supply suitable PacComm firmware for the BSX2 & KFN2. The current version, including PMS (personal mailbox) facility, costs £12.50, fully inclusive of VAT and UK postage, or £7.50 if you send a blank 27256 EPROM with your order.

RIGS FOR CLOVER

THE FIRST CLOVER specification that I read stipulated that the rig must be very stable, and stay within +/-10Hz of the net frequency. This seemed a very strict requirement, even for synthesized rigs.

In practice Fred, HB9NP, says that the stability should be within +/-25Hz during the QSO, but that using his standard Kenwood TS450 he has managed to work someone who was 50Hz off frequency. The on-screen tuning display is very good, apparently, and gives a clear indication of frequency offset.

Bill, WA7SJM, confirms that the ability to tune in 10Hz steps (or less) is very important. He finds that using his Drake TR7 with an external frequency meter is hard work; the tuning knob operation is simply too coarse, even though the VFO stability is good.

Hank, W0RLI, reports that he has handled several thousand messages via Clover, and that it certainly works better than HF packet, provided of course, that it is a one-to-one link, with no frequency sharing. Hank goes on to make the point that it will probably be some months before there are sufficient stations QRV on the mode, and sufficiently good software, to judge just how well it performs in practical everyday operation.

Hank also confirms that older rigs simply don't have the required frequency stability, and that being able to set the operating frequency from the computer could be very important in the future. I did see a report that someone had completed a Clover QSO without being able to detect the other station by ear at all! That is quite impressive, and perhaps does illustrate the point that manual tuning may not be the way to get the best from the mode.

Noting the way the wind is blowing, I have finally acquired a synthesized transceiver. As for Clover - I'm waiting to see if a stand-alone controller will become available, or whether it will always be available only as a PC card. There's also the small matter of the price!

Some of the Clover pundits are already saying that PACTOR is as good as dead, but AMTOR and Packet have failed to remove RTTY from the HF bands, so perhaps it's a bit early to book the funeral! The large numbers of users upgrading to PACTOR on their KAMs and PK232s, plus the fact that even quite old rigs with analogue VFOs can be used, must surely mean that PACTOR stands a good chance of getting a firm foothold. However, who'd be a prophet in this game?

ATARI USER GROUP

GRAHAM, G7KCT, IS STARTING a user group for radio amateur and SWL users of Atari computers, such as the ST, XE and XL. He hopes to assist other users who are having problems obtaining good software, and to raise interest in these very capable machines.

Anyone interested in joining should send an SASE to Graham Rayner, 38 Brockhurst Road, Chesham, Bucks HP5 EJE.

NGR TO LOCATOR CONVERSION

I FREQUENTLY SEE wanted bulls on the packet network, requesting details of converting the UK Ordnance Survey National Grid Reference (NGR), to QTH Locator code. This is far more convenient than converting from Latitude and Longitude, if you are using

an Ordnance Survey map. The conversion from Lat/Long is relatively simple, as the Locator is based upon it, so no complex mathematics is required. However, the National Grid is not based upon Long/Lat, and the conversion involves some nasty trigonometry, which is not for the faint-hearted.

The method is described in some detail in an interesting Ordnance Survey publication (leaflet number 72), entitled 'The Transverse Mercator Projection, constants, formulae and methods'. You can skip all the maths if you want, because in the back there's a computer program listing, in fairly 'standard' BASIC. I used the formulae as the basis for my own programs, and they work very well.

However, on page 862 of the October 1984 issue of *RadCom*, John Morris, GM4ANB, gave a program listing in his article on the new universal or 'Maidenhead' locator system. I still hear the occasional operator talking with nostalgia about the original QRA locator, though why anyone should feel any affection for such a limited and eccentric system is beyond me.

I don't intend to make a habit of it, but I thought it worth reproducing the listing (see below). It is written in a pretty 'standard' BASIC, and should run unmodified under almost any 'dialect' of BASIC. Users of Sinclair machines may have to replace the expression `MID$(N$,PT,1)` with just `N$(PT)` in line 520, and users of some early Acorn/BBC machines may have to remove the semicolons (;) from the INPUT statements, and use commas (,) instead. Other than this, there shouldn't be any problems. Of course, it is possible to rewrite the program in a far more

elegant form to suit one particular dialect, but the portability of John's version is more important.

Error-checking is included, and it is important to type the NGR using upper-case letters, without spaces, eg SE345174. It would be quite simple to modify the program to allow lower case letters as well, or a mixture.

Many dialects will have a built-in pseudo variable called PI, in which case line 20 can be 'REMmed out' or deleted altogether. Indeed it may cause a syntax error if it is not. The listing has been imported directly from the original BASIC program, with no subsequent editing, so if you encounter problems it is probably caused by minor typing errors. Here is a sample of the program output, so you can check that you get the same result.

SAMPLE PRINTOUT

NGR to Locator conversion

NGR ?SE345174

53 degrees	39.1 minutes North
1 degrees	28.7 minutes West

Locator IO93GP

TNC TIMEKEEPER

THOSE OF YOU WITH A BSX2 TNC, may have discovered that the internal software realtime clock isn't what you would call accurate. I suspect that other TNC2 clones are much the same. I cheated by fitting a PacComm realtime clock module to my BSX2, and this is very accurate.

However Andy, G4JXL, has found that setting the CLKadj parameter to 4 reduces the error on his BSX2 from over one hour per day to less than one minute. This figure makes no sense according to the formula given in the TNC200 instructions, but Andy assures me that it works. Worth a try?

```

5 REM *** NGR to Locator. John Morris, GM4ANB, 1984 ***
10 DIM T(9):CA=ASC("A"):CS=ASC(" "):C0=ASC("0"): REM Constants.
20 REM PI=3.14159265: REM Not needed if a PI is available.
30 PRINT:PRINT "* NGR to Locator conversion *"
100 PRINT:INPUT "NGR ";N$:GOSUB 500:IF EF>0.5 THEN GOTO 150
110 T2=INT(N):T3=INT(600*(N-T2)+0.5)/10: REM Pretty print.
120 PRINT:PRINT T2;" degrees ";T3;" minutes North"
130 T1=ABS(E):T2=INT(T1):T3=INT(600*(T1-T2)+0.5)/10
140 T$="East":IF E<0 THEN T$="West"
150 PRINT T2;" degrees ";T3;" minutes ";T$
160 GOSUB 1000:PRINT:PRINT "Locator ";L$:GOTO 100
170 PRINT:PRINT "Sorry, that is not a valid NGR":GOTO 100
180 REM
500 PT=1:L=LEN(N$):EF=0: REM NGR to Lat/Long initialise.
510 FOR J=1 TO 9: REM Get characters, skipping spaces, first.
520 T1=-1:IF PT<=L THEN T1=ASC(MID$(N$,PT,1))
530 PT=PT+1:IF T1=CS THEN GOTO 520
540 T(J)=T1:NEXT: REM Ascii array 'T' is now full.
550 FOR J=1 TO 2: REM Check leading characters are both ok.
560 T(J)=T(J)-CA:IF T(J)<0 OR T(J)>26 OR T(J)=8 THEN EF=1
570 IF T(J)>8 THEN T(J)=T(J)-1: REM 'I' is not used
580 NEXT
590 FOR J=3 TO 8: REM Now check all 6 digits are there.
600 T(J)=T(J)-C0:IF T(J)<0 OR T(J)>9 THEN EF=1
610 NEXT: REM Complete NGR now examined. Should be nowt left.
620 IF T(9)>=0 THEN EF=1: REM Check end of input reached.
630 IF EF>0.5 THEN RETURN: REM Give up if an error found.
640 TA=INT(T(1)/5):TC=T(1)-5*TA: REM Deal with 500km square.
650 TB=INT(T(2)/5):TD=T(2)-5*TB: REM Deal with 100km square.
660 E=-1000+500*TC+100*TD+10*T(3)+T(4)+T(5)/10: REM Eastings.
670 N=1900-500*TA-100*TB+10*T(6)+T(7)+T(8)/10: REM Northings.
680 T1=(N+5548.79)/6371.28: REM Use transverse Mercator trig.
690 T2=2*ATN(EXP((E-400)/6389.70)): REM to convert to lat/long.
700 E=ATN(-COS(T2)/(COS(T1)*SIN(T2)))*180/PI-2
710 N=SIN(T1)*SIN(T2):N=ATN(N/SQR(1-N*N))*180/PI
720 RETURN: REM NGR to lat/long conversion complete.
730 REM
1000 N=N/180+0.5:E=E/360+0.5:L$="":T=CA:F=18:GOSUB 1020
1010 T=C0:F=10:GOSUB 1020:T=CA:F=24:GOSUB 1020:RETURN
1020 N=F*(N-INT(N)):E=F*(E-INT(E)):L$=L$+CHR$(T+E)+CHR$(T+N)
1030 RETURN: REM Lat long to locator conversion complete.

```

Packet Radio Primer

by

Dave Coomber, G8UYZ and
Martyn Croft, G8NZU

A light-hearted guide to packet radio, containing plenty of practical advice and reference information.

Members Price:

£5.95

(SEE PAGE 95)



RSGB, Lambda House,
Cranborne Road, Potters Bar,
Herts. EN6 3JE



Microwaves

MIKE DIXON G3PFR

'Woodstock', Gazebank, Norley, Warrington, Cheshire WA6 8LL

ON 31 JANUARY 1993, Charlie Suckling, G3WDG, and his wife Petra, G4KGC, made two EME QSO's, believed to be the first on the 10GHz band from the UK.

The contact was made, at the second attempt, with WA7CJO in Phoenix, Arizona, at 2230 on 31 January. The first test on 30 Jan failed due to a receive preamp problem at the American end which was sorted out in time for the test next day. SM4DHN was monitoring and effectively 'tail ended' the tests.

Using the usual EME reporting system of 'O' (easy copy) and 'M' (difficult copy), the results were WA7CJO - G3WDG (O/M) at 2230z followed by SM4DHN (O/O) at 2300z. In RS terms, WA7CJO was 53 and SM4DHN was 52. The latter would have been 3dB stronger but for G3WDG/G4KGC running linear polarisation for the USA contact: the SM station was running circular polarisation.

Charlie and Petra noted that copy off the moon on this band was not dissimilar to rain scatter - a rough note, but not as rough as rain scatter. This is caused by libration (moon 'wobble') fading and spectral spreading which, on the lower bands, cuts up CW badly (missing dots etc!). In some ways the signals seemed easier to copy than, for example, on 432 or 1296MHz.

Echo testing was carried out after the successful QSOs and Charlie reported receiving immediate own-echoes, weak but consistent enough to be worked had they come from another station (M levels). The doppler shift (about 14kHz), due to the relative motions of earth and moon, was calculated by the VK3UM EME computer program with sufficient accuracy to allow the receiver to be set on frequency to copy these echoes.

WA7CJO was running 350W (output) to a 5m dish and SM4DHN 70W to a 6m dish. Charlie and Petra's station ran about 28W from a Hughes TWTA (driven by a G4DDK-004 source/G3WDG-001 transmitter) to a 3m (10ft) Andrew solid dish originally designed for 11GHz. Both WA7CJO's and SM4DHN's signals should be readable with a much smaller dish - provided a really good preamp is in use (0.75dB or better). Charlie calculates a dish as small as 1.2m (4ft) should suffice!

Charlie and Petra's 3m dish was steered by motorising the el/az drive, using a modified ex-SATTV mount and splitting the output from the receive converter (needless to say a G3WDG-002 design, and an early prototype HEMT preamplifier with 1.25dB NF) into the normal narrowband tuneable 144MHz IF and a 2MHz-wide, 70dB-gain block feeding a power meter. This was to allow the dish to be tracked using moon (thermal) noise which registered about 1.7dB above cold-sky noise. This method of tracking was recommended

by WA5VJB and KY7B and worked extremely well, despite the extremely narrow beamwidth (approx 0.7°) of the dish and the need to update the dish position every minute! The sun noise of the system has yet to be checked accurately: even through a windbreak hedge, the low angle winter sun registered about 3dB relative to the cold sky.

Charlie remarked that, although a sighting telescope had been fitted to the dish, it was 100% cloudy during the tests and optical sighting could not be used! Foundations for the dish mount were laid over the Christmas break and the mount itself was put into place only a week before the tests.

Time now needs to be spent "to make the installation a little more permanent. It takes both of us to use the system, one in the shack and the other at the dish as, at the moment, we do not have the facility to control the dish remotely. Next plans are to put readouts on the dish and to arrange for the EME equipment to be permanently mounted on the dish. Then it will take about 15min to get on - instead of the present two hours (and robbing the tropo system!). However, we are happy to run skeds now. Window limits are elevation 36° max, azimuth 230° to 278° (station located 52° 16' N, 0° 32' W). Tel: +44 933 411446."

I can add that Lyle, VK2ALU, spurred on by these results, is planning to get onto 3cm EME just as quickly as possible - the next target could be Worked All Continents! It has been done on 1.3GHz by GW3XYW (and others on lower bands), so why not now on 10GHz? Charlie and Petra wish to record their thanks to WA5VJB and KY7B for their help in acquiring the Hughes TWTA and in refurbishing the power supply! My thanks to Charlie for supplying the above information and I'm sure that all readers of the column will join me in wishing both Charlie and Petra congratulations on their latest achievements.

TECHNICAL CORNER

IN THE JANUARY 1993 issue of *RadCom*, I made reference to G4JNT working on an 'updated' SMD version of the G4DDK-001 1.1/1.3GHz oscillator source. Sam, G4DDK, the original designer of this popular unit, pointed out that he had already explored this avenue not long after the original design was published in this column. Although it worked, it was not as good as the original design: several reasons were found for this, including more critical coupling between the SM trimmer capacitors, poorer through-board ground-

ing and the wrong (at that time) choice of SM transistors. It was also found, after discussion with many other amateur microwave enthusiasts, that not everyone was in favour of using 'fiddly' SMDs for all components, some constructors choosing to use existing components for their own 'version' of the design! A compromise was reached where the size of the design was reduced to fit into one of the popular tin-plate boxes (rather than a diecast box) and some modern SM devices are used to substitute for older, more critical standard devices: notably decoupling capacitors and transistors. The 'difficult' trapezoidal capacitors and right-angled coaxial output connectors have been eliminated and the results obtained were entirely consistent with those of the original design: if anything, the spectral purity, already excellent, is slightly better!

The circuit of the new design, known as the G4DDK-001B, (Fig 1) retains the original, well-established Butler oscillator but with the addition of an improved on-board modulator which is now suitable for 9.6kb/s FSK modulation. The varicap circuit (Fig 2) pulls the crystal directly and is biased to optimise linearity. If modulation is not needed, simply omit R15 - R18, C9, DC10 and D1, but note that C8 is still required. C8 was chosen to suit most types of fifth overtone crystal, so that it can be pulled accurately onto frequency. Even so, some crystals may refuse to pull onto frequency. In this case, the value of C8 may be increased to 1000pF. If this does not work, change the crystal! The Toko S18 coil has been changed to one from the Toko MC120 range with a screening can. An aluminium core *must* still be used and, since these are not normally supplied with this range, must be purchased separately. The BFY90 transistors are replaced with more predictable SM transistors, type BFS17 and the BFR91 mul-

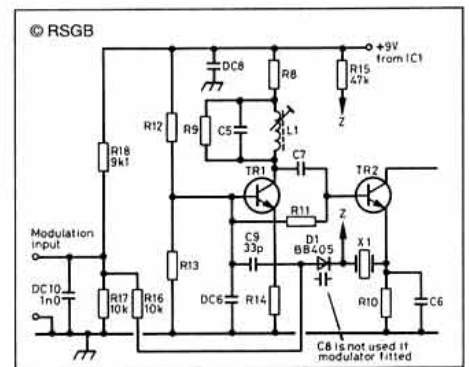


Fig 2: Modulator circuit for G4DDK-001B source.

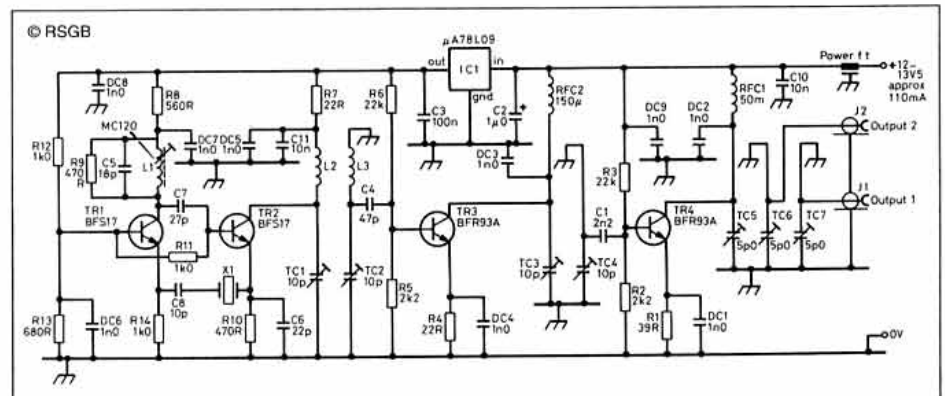


Fig 1: Circuit of the G4DDK-001B 1.3GHz source.

multiplier transistors by SMBFR93A. SKY (black) 10pF trimmers are preferred for positions TC1 - TC4 and SKY (green) 5pF for TC5, 6 and 7. Murata TZ03 20pF (red) could be used for TC1 and 2 and 10pF (white) for TC3 and 4. It should be possible to use Murata 2.3pF (black) for TC5, 6 and 7, although this has not yet been tried. Note that the Murata black trimmers will *not* work for TC1 and TC2!

Sam tried using a two-pole helical filter in place of the three-pole microstrip filter and found the output spectrum to be noticeably less clean. Because of the use of a tin plate box, it is now possible to use ordinary panel mount SMA, SMB or SMC connectors. The two output sockets are too close together to use larger types, but, if a single output is required (cut the output track 2 where it leaves the line, as in the original design), it is possible to fit a BNC or TNC socket.

You could produce your own PCB from the actual-size artwork given in Fig 3: Sam is prepared to make 1:1 laser-printed paper 'masters' available for a limited time until a ready-made PCB source is available (SAE please!). Although a groundplane mask was included in Sam's write-up, I have not reproduced it because it is easier for home etching to avoid the use of double masking and to make clearance holes, where needed, after etching and drilling. There are no immediate plans to make the board available from the Components Service [1] at the moment.

I won't fully detail the construction methods, as these should be familiar to most, although I will describe them in more detail in future if requested! The PCB should be soldered into the tinplate box (see the Components List) with the groundplane 17mm below one rim of the box after marking its position and drilling holes for the output socket(s) and feedthrough capacitor(s). Take your time with these operations and get them right! Fit the output socket(s) by soldering the spill(s) to the track(s) first, then the body(s) to the box.

Next, solder all resistors and ceramic plate capacitors, followed by tantalum capacitors, chokes, trimmer capacitors, IC1 and D1 (if fitted). Positions are shown in Figs 4 and 5. Make groundplane earth connections where needed.

Where the chip decouplers are to be fitted, through-board grounding links are needed. These can be short lengths of discarded component leads (such as those cut off the resistors) or you might use small PCB pins such as those used in all the G3WDG designs. Whichever is used, be sure to solder both sides! Fit both the 1nF decoupling capacitors and the transistors on the track side of the board where indicated. The transistors have a 'right way up' as shown in Fig 6. Fig 7 shows the suggested layout of the connectors and feedthrough capacitors. Actual placing is by measurement from the soldering line of the board in the box and the position of tracks relative to the end walls of the box.

Alignment is similar to the original design, except that since L1 is in a screening can, you can no longer easily couple an absorption wavemeter to the coil to check the crystal oscillator is working! However, there is greater coupling into TR3 than before and the emitter voltage of TR3 increases from about 100mV to about 300mV when the oscillator is working correctly. When remaining stages are correctly aligned, TR3 emitter should be at 500 to 700mV and the emitter of TR4 at 1.0 to 2.0V. The only 'critical' tuning operation is TC2.

Sam acknowledges the help of Dave, G8KKB, in developing the new modulator circuit and the local packet fraternity for providing the modulator in 9.6kb/s packet links in the Suffolk Data Group area.

REFERENCE

[1] RSGB Microwave Committee Components Service, 314a Newton Road, Rushden, Northants NN10 0SY.

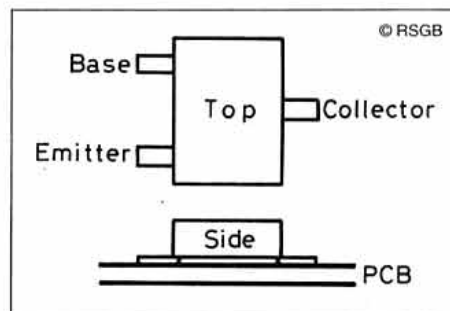


Fig 6: Details of the surface mount transistors.

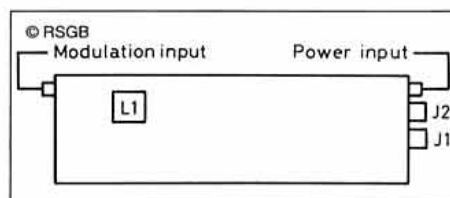


Fig 7: Top view of the approximate positions of the feedthrough capacitors and connectors.

G4DDK-001B SOURCE COMPONENT LIST

Resistors: all 1/4W carbon or metal film.

R1	39R	R7	22R
R15	47k		
R2	2k2	R8	560R
R16,17	10k		
R3	22k	R9,10	470R
R18	9k1		
R4	22R	R11,12	1k0
R5	2k2	R13	680R
R6	22k	R14	1k0

Ceramic plate capacitors: Philips 682 Series, 2.5mm lead pitch.

C1 - 2p2, C4 - 4p7, C5 - 18p, C6 - 22p, C7 - 27p, C8 - 10p, C9 - 33p

Philips 629 series, 2.5mm lead pitch. C10, C11 - 10n

Tantalum bead capacitors:

C2, 1µ 35V wkg, AVX, Kyocera etc.
C3, 0.1µ 35V wkg, AVX, Kyocera etc.
SMD decoupling capacitors: all 0805 size DC1 - 10, 1000p, AVX, Philips etc.

Trimmer capacitors:

TC1 - 4, 10p SKY (black), see text
TC5 - 7, 5p SKY (green), see text

Semiconductors

TR1 and TR2: BFS17 (Philips) SOT23 outline
TR3 and TR4: BFR93A (Philips) SOT23 outline

IC1: 78L09 (Philips, Motorola etc)
D1: BB405 (Philips)

Miscellaneous:

X1: 96MHz fifth overtone, HC18/U case, overtone frequency = output frequency/12

L1: MC120 Toko part number E526ANA100075 (green) with screening can and aluminium core. It may be necessary to order with a ferrite core and buy an aluminium core separately. Alternatively, use S18 type, part number 301AN0500

L2/L3: 3 turns of 1mm diameter silver plated wire. Internal diameter of coils, 3mm, turns spaced one wire diameter. Coil mounted 2mm above groundplane.

RFC1/2: 150uH axial lead choke (Cambion, Toko)

Tinplate box: type 7754 (37x111x30mm) from Piper Communications

Coaxial sockets: 3, type SMA/B/C (see text)

Leadthrough capacitor for power: 1000 to 5000p

Leadthrough for modulation (low capacitance): Oxley

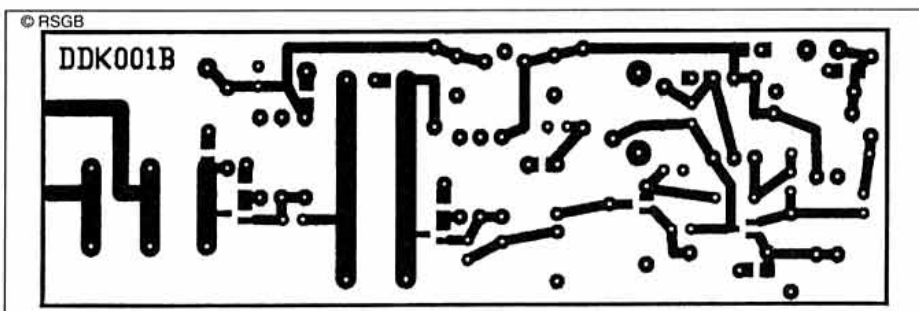
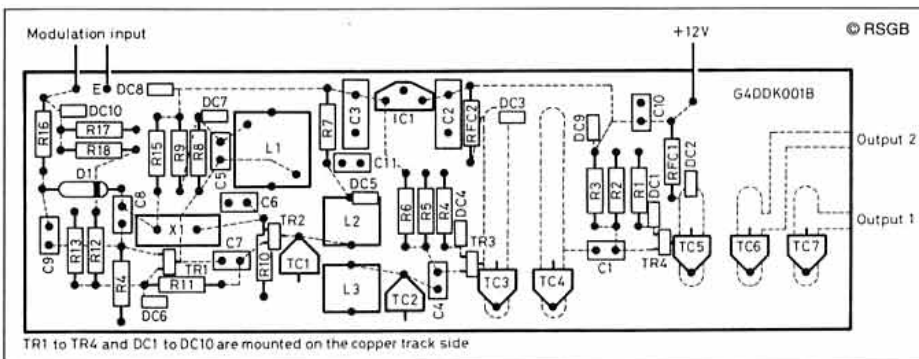


Fig 3: Artwork (actual size) for the G4DDK-001B source.



Figs 4 and 5: Component overlay for the G4DDK-001B source and 'transparent' view of the G4DDK-001B source.



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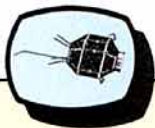
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Satellites

ARTHUR GEE G2UK
21 Romany Road, Oulton Broad, Suffolk
NR32 3PJ

IN A RECENT BBC RADIO 4 'Start the Week' programme, Helen Sharman had some very interesting things to say about Russian Space programmes, which had a bearing on the future of the Russian Amateur Radio Satellite programme.

It seems that for the Russian 'man in the street', space activities are of paramount importance. Their success in this field boosts their confidence in the future of their country more than any other field of their government-sponsored activities. With the chaos the changes in their reorganisation has caused, their success in space is one field in which they can congratulate themselves.

Helen described the way in which being confined in the spacecraft with the Russian cosmonauts gave her a very clear appreciation of their dedication. This communicated itself to the country as a whole and thus to those who determine Russia's future. Their space activities are likely to remain top priority.

This is indeed good news for the Russian amateur radio satellite future. The authorities in this field realise that a healthy future for their space programmes needs not only dedicated astronauts now, but a steady stream of young people for future astronaut teams. As we have said before, the RS series of Russian Amateur Radio Satellites has provided the best introduction for amateurs into space activities and any curtailment of these activities would be an enormous set-back for the future of amateur satellites.

THE PHASE 3D SPACECRAFT

BILL BYNAN, W3XO, AMSAT-NA's President, recently said about this project: "The job of building the Phase 3D Spacecraft is indeed a formidable one. The technical challenge is awesome to say the least. Although we pride ourselves on doing much of the work of building amateur satellites in our basements on our own, Phase 3D will require considerably more than that.

A satellite of this sophistication cannot be built entirely with volunteer labour. Some things will require money and lots of it. Even with a lot of volunteer help the total job is estimated at about four million dollars."

AMSAT-NA have pledged about a third of this, so over the next few years about

US\$1.5 million has to be raised. "Raising that kind of money, especially in the troubled economic times, is a task almost as daunting as the technical job of designing and building this mighty satellite", writes W3XO.

Such a project is certain to come up with many difficulties. Not only is it a mammoth task, but the facilities needed and the costs involved would seem to many to be insuperable. It has been designed by a group of enthusiasts who have had much experience in such matters and who have tried to take into consideration the problems which a new satellite may face in providing useful and reliable communications within circumstances which are difficult to foretell for the future. Going along with their proven ability to create successful satellites in the past, we should be able to support them with confidence through to completion of their new project.

AMSAT-NA is asking that the amount needed to supplement the amount pledged by them should come from other AMSAT groups throughout the world. AMSAT-UK has always helped financially to many satellite building projects in the past and is making a special effort to raise funds for Phase 3D. Various inducements have been initiated to encourage further contributions to a special AMSAT-UK Phase 3D Fund and it is understood that contributions have been coming in quite well, considering the present worldwide recession. Details from Ron Broadbent, G3AAJ, 94 Herongate Road, Wanstead Park, London E12 5EQ.

HOW DID IT ALL START?

READERS WILL NO DOUBT have observed from the photo which appeared in the January *Satellites* column, that I have retired from my assignment as Hon Chairman of AMSAT-UK. It would seem, therefore, an opportune moment to recall how satellite activities in the amateur radio field came about, as I was 'in at the beginning'. I am so often asked "How did it all start?" and how did we get from there to the present successful situation as illustrated by the healthy state of AMSAT-UK, the body now responsible for amateur radio satellite interest in this country.

It is now over 25 years since the idea of an

amateur radio satellite was considered. As far as development in this country is concerned I remember having a chat with Roy Stevens, G2BVN, [who handled the RSGB's liaison with the licensing authority at the time - Ed] at an RSGB Exhibition just after the Sputnik launch, during which we discussed the possibility of amateur radio becoming involved in satellite communications some time in the future. This conversation did, in fact, have consequences which eventually saw the concept of the UoSAT satellites. Roy's final years were spent getting amateur radio satellites off to a good start.

The beginning of amateur radio satellites probably took place when a group of radio amateurs in Los Altos, USA, being keen VHF enthusiasts and dissatisfied with the short range of communication on these frequencies, decided to attempt to build a satellite from which they could relay their signals down to earth and thus reach out to distant VHF stations.

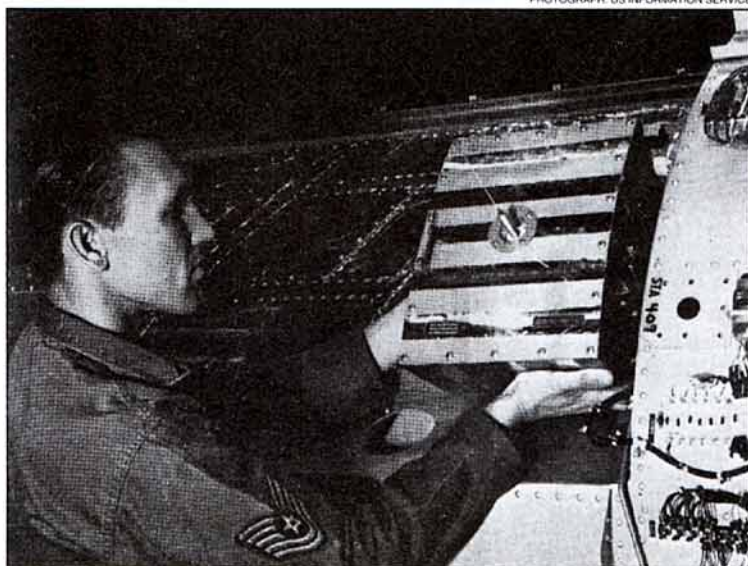
One of them, Don Stoner, wrote an article outlining his ideas, which resulted in a committee being set up to see what could be done. This became the 'Project Oscar' organisation - OSCAR standing for 'Orbital Satellite Carrying Amateur Radio'.

After two years of voluntary work, with each member of the group applying his own specialist skills to the project, the satellite was successfully built. It weighed 10lb and carried a simple radio transmitter sending the Morse signal 'Hi-Hi' on the ten metre amateur band.

Its launching probably presented more problems than the construction of the satellite itself. Tradition has it that, due to the fact that a launch vehicle has to come up exactly to its designed weight at take-off, adjustments had to be made before launch, by adding some extra weight in the form of ballast. So OSCAR 1 went along as part of the ballast! Another vital problem was how to separate the OSCAR from the rocket to put it into orbit, the rocket of course being primarily intended for its official satellite load, which was to be launched into a higher orbit. This problem was solved by means of a spring purchased from a local hardware store!

Over 5000 listener reports were sent in, from over 570 amateurs in 28 countries. It completed 312 orbits before re-entering the earth's atmosphere and burning up.

This success started things going in no uncertain terms! As far as AMSAT-UK was concerned, a group of satellite enthusiasts met at Roy Stevens' house regularly and plans were made to set up an organisation which became AMSAT-UK. Its subsequent history would take up pages of *RadCom*. Suffice it to say that through the hard work of Prof Martin Sweeting at the University of Surrey and Ron Broadbent, G3AAJ, AMSAT-UK is now one of the leading amateur radio satellite organisations world-wide; and I am very proud to have been its Honorary Chairman.



The OSCAR 1 satellite being loaded on to the Discoverer 36 rocket at Vandenberg Air Force Base, California.



Emergency!

RONALD M COWAN, GM4SRL
85 Eastwoodmains Road, Clarkston,
Glasgow G76 7HG

DURING THE RECENT severe flooding, the Central Fife RAYNET Group, (Controller Jim Burke, GM4TNP) was called out by the Senior Emergencies Planning Officer of Fife Regional Council to assist in manning the Communications and Support Unit Vehicle (CASU), and to provide a tactical radio network in the town of Auchtermuchty and at the Regional Emergency Control Centre in Glenrothes.

The CASU was underway within ten minutes of the call-out, and other members of the team were alerted using Vodaphone whilst underway. On arrival at Auchtermuchty the speed and volume of the water racing into the village was quite frightening. Many roads were blocked, some by flooding and others by fallen trees. Nevertheless, communications were quickly established using two cellular phones, amateur transceivers, and regional department radios for water, drainage and roads.

Simplex contact with the Regional Control Centre in Glenrothes was established even though the hill of East Lomond (1400ft) was in a direct line and cross-band was used to allow mobile (portable) working around the sites. RAYNET was used until 2300 on the Saturday, and 1710 on the Sunday.

As well as providing flood relief radio traffic, they were used to provide communications for the delivery of meals by keeping catering personnel up to date on the ever changing 'road closed or open' situation, with 120 meals being dispatched.

During the emergency ninety residents had to be evacuated from twenty eight houses, and nine RAYNET members were used, with another six on standby. In addition, adjoining groups also placed members on standby in case they were needed. The CASU vehicle, which is available to other Scottish Local Authorities, and to RAYNET, is divided into three units, a conference room, a communications room and a laboratory/galley.

FLOODING IN THE STATES

RADIO AMATEURS CAME to the rescue recently when flooding hit the tiny community of DeLuz, midway between San Diego and Los Angeles in California. All power and telephones were lost, and all major roads were blocked by the floods, with only four wheel drive vehicles able to get around in a very limited fashion. Local amateur George Shippey, N6YMH, opened up his

station and began passing emergency traffic via the Fallbrook repeater's autopatch.

He was then joined from the Fallbrook end by Marv Druskoff, K2VIV, who owing to the large volume of traffic, took control of the operation, based in Fallbrook Fire Station. Every hour, and sometimes also on the half hour, links were made passing details of those who were safe. Concern for the safety of family and loved ones in DeLuz had been growing as many people had left the community in the morning to work in Fallbrook and could not return.

Numerous other amateurs became involved in the operation, but for seventy two hours, George Shippey, (69) continued to not only man the radio, but also moved about the washed out roads and mud slides, checking on the safety of residents and ensuring that they had food, drinking water and medication. Included in his 'successes' were residents who required insulin, and had it delivered by the sheriff's helicopter, and a resident who was flown to hospital for kidney dialysis. For eight days the efforts of the local radio amateurs provided the backbone of communications until the telephone system was up and running again.

EXERCISE 'SPLASHPOINT'

THE SCENARIO FOR Exercise 'Splashpoint', North Yorkshire's major exercise, was the evacuation by Lifeboat and Search & Rescue helicopter of one hundred and ten casualties from a ship in distress in the North Sea.

RAYNET's principal role was to provide two metre voice and packet communications from HM Coastguard's regional headquarters at Bridlington to Scarborough Lifeboat Station. A second packet link was also needed on 70cm from the lifeboat station to the Scarborough Coastguard station. RAYNET

also supplied a comprehensive two metre voice net, which included a station at Scarborough Hospital.

It was the first time that RAYNET had worked with HM Coastguard on the Yorkshire Coast, but a good relationship had been established at a series of planning meetings and path tests leading up to the exercise. RAYNET's task of providing an exercise control network was not easy as Bridlington is separated from Scarborough by the 340ft 'obstacle' of Flamborough Head. Simplex operation between Coastguard headquarters and Scarborough lifeboat station was not possible and a voice relay and temporary packet node site had to be established at a coastguard look-out post at Beacon Hill, Speeton. Early contact was made with Humberside RAYNET Groups, who had little packet experience and no knowledge of the formal message handling used by North Yorkshire, in preparation for interfacing to the now abandoned MSX national message switching system.

As a result of this, North Yorkshire Emergency Planning Department's communications Officer, Barry Wilkinson, G0GBG, and the RAYNET exercise coordinators, Brian Dooks, G0RHI and Brian Tindill, G4HVA, travelled to Humberside to demonstrate portable equipment and give some training. Final tests were carried out the day before the exercise but, on the exercise day itself, poor visibility prevented the designated pleasure boat, with her 110 casualties from leaving harbour.

The twenty eight RAYNET members, however, took part in the remainder of the exercise when the lifeboat made a series of journeys to evacuate casualties prepared by No 223 (Durham) field Ambulance RAMC. The lifeboat doctor carried out triage to establish a priority order for removing casualties, who

were ferried to a first aid posit and a WRVS rest centre by voluntary aid ambulances. Twenty 'seriously injured' casualties, who should have been evacuated to Scarborough Hospital by helicopter to test its MAJAX plan were disappointed to be taken there by minibus!

In his report to North Yorkshire's Public Protection Committee, the County Emergency Planning Officer, Duncan Harvey said that RAYNET provided a most effective exercise control radio network. Listing a series of lessons learned from 'Exercise Splashpoint' he said, "The comprehensive radio communications support from RAYNET was fundamental to the successful management of the exercise."

AUGUST EMERGENCY COLUMN

CONTRIBUTIONS FOR the August Column should be sent to Ron Cowan, GM4SRL at 85 Eastwoodmains Road, Clarkston, Glasgow G76 7HG as soon as possible.

Photographs would be particularly welcome.



Mark Hill, KC6UGU, helps the sheriff to call his base at the DeLuz Emergency Operations Centre. See 'Flooding in the States'.

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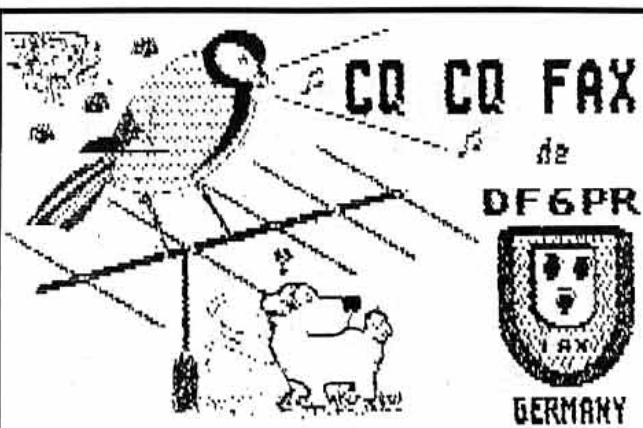


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● Paul Holland, G3TZO is looking for information on the **TET 3 Element** Multiband HF beam. He has some bits but no measurements to convert an existing 2-ele antenna. His address is Chatterton, Chapel Lane, Threapwood, Nr Malpas, Cheshire, SY14 7AX or tel: 0948 81429.

● A circuit diagram/service manual is required by Andy Jackson, G8JAC, for a **digital frequency counter** model 6246A, made by Systron Donner, Concord, California USA. Copying expenses will be reimbursed. Andy's address is 27 Ellesmere Drive, Sanderstead, Surrey CR2 9EH.

● Bert, G13EVU, has a bug problem with his **G3WHO RTTY/AMTOR program** for the BBC Master 128 computer: one prevents the disk message-storage system from closing correctly, and the other inhibits the inclusion of control codes in stored text. All replies will be acknowledged promptly, please write QTHR or Tel: 0232 668979 (evenings/weekends).

● Circuit diagram/manual needed for a **Macrotronics M80** interface for TRS80 produced by Nicomtech of Saltash, Cornwall. Information to G2TA, QTHR.

● A circuit diagram/manual or other information is required for a **TAXAN KAGA 12** Monitor Display Unit model No KX 1202B Jan 1985. Manufacture was Data Efficiency Ltd, Hemel Hempstead. Expenses will be refunded. Information to Mr D F Thompson, G8SBU: Tel: 0395 265059.

● Alex Massie, G3HZX, is looking for a program to generate the Keyboard Interrupt in an

Einstein Computer (any language but preferably machine code) If any one has any information please contact Alex on Tel: 0289 306824.

● Users manual/circuit diagram for **Tektronix T992** Double Beam Oscilloscope is sought by Mr A J Russell, G3MFL, QTHR. Tel: 0275 463269.

● David Baldwin, G8NJX, requires the service/users manual for a **Lunar 2m Linear**, type VHF10-70P/C. Tel: 06477 222.

● Circuit diagram for a **Fluke 8600A Digital Multimeter** is required by Neil Johnson. He is happy to reimburse any costs. His address is 62 Stanley Crescent, Gravesend, Kent, DA12 5SY.

● Circuit diagrams and/or other data, layout diagrams for **PYE Base station**, Rx type 3LRU 190A and Tx type 4LMU 8A/1089 is wanted by G8DPS, QTHR. Tel: 081399 8787.

● Les Hickingbotham, G3HZG, requires the Service Manual for the Portable Stereo Recorder model **ITT 740 AV**. Please telephone Les on 0527 27914.

● Circuit diagram/other information on the **RACAL Aerolyte Aviation** headset with particular reference to the WR721 in-line Amplifier is required by Mr Reg Smith, G3XXJ, QTHR, or tel: 0507 442613.

● Instructional manual/circuit diagram for FOX transmitter type **FOX 60T** is required by G3LYP. Expenses will be reimbursed. Please write to M D Scott, The Magnolias, Marlow Road, Lane End, High Wycombe, Bucks HP14 3JW.

● Andrew Smith, G4OEP, has a **Microscribe 300** series terminal unit, which has become dumb, he now needs a new EPROM for a 310 or 320 unit to make good. The company is now out of business. If you can help please tel: 0272 428594

● Manual or circuit diagrams for a **Swan 100MX Transceiver** is required by Mr R J Leeves, G2LV, QTHR or tel: 0769 572495.

● Jason Ingram, G7BSK, is after **photocopies** of 'A Laser Communications primer' parts 1 and 2 from QST Sept and Oct 1990; 'Laser Comms - Transmitting & Receiving' from HAM Radio - March and April 1990; and 'Laser Communications Range', QST April 1989. All costs will be covered. Any one experimenting with Laser Comms? Please write to 31 Carr Lane, E Stockwith, Nr Gainsborough, Lincs DN21 3DP.

● David Wright, G4BKE, needs a circuit diagram/Manual for a **Heathkit Valve Millivolt Metre** model AV-3U. Postage and copying refunded, and he is QTHR or tel: 0202 697338.

● Manual/Circuit diagrams for the **Hewlett-Packard** Signal Generator Type 606A/612A is required by Mr Bob Wright. Expenses reimbursed or anything loaned returned. His address is 247 Sandy Lane, Hindley, Wigan WN2 4ER or tel: 0942 55948.

NOTE
NEW DATE

RSGB INTERNATIONAL HF CONVENTION

It's the place to be

Friday 8 - Saturday 9 - Sunday 10 - October 1993

EARLY INFORMATION

- **Location:** The Beaumont Conference Centre, located a few minutes drive from the M25 and Heathrow Airport. Nearby Windsor with its famous castle and shopping facilities is a must.
- **Programme:** An extensive programme of talks on topics such as DX-peditions, Equipment, IOTA, DX-Clusters, EMC, HF DX-ing, Antennas & Contesting.
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- Ladies programme
- Young Amateur of the Year award

- The 1993 International HF Convention is organised by the HF Committee of the RSGB in association with the HF Contest & IOTA Committees, and the Chiltern DX Club
- Overseas visitors reception
- Saturday evening DX dinner
- Invited Traders and Special Groups
- A full convention prospectus will be published by April which will include an advance booking form. Send an SAE to - HF Committee, PO Box 599, Hemel Hempstead, Herts HP3 0SR, UK.

Radio Society of Great Britain

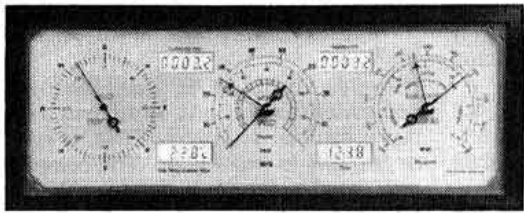
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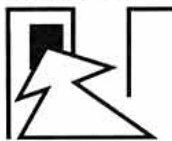
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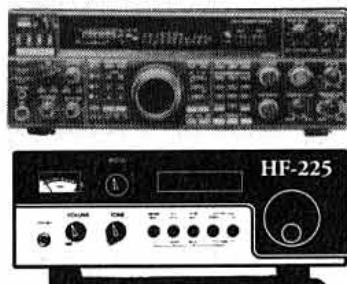
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CONTEST CLASSIFIED

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HF RULES

SUMMER 1.8MHZ

1. The General Rules for RSGB HF Contests (*RadCom*, January 1993) apply.

2. When: 2100GMT Saturday 26 June - 0100GMT Sunday 27 June 1993.

3. Sections: (a) UK (b) Overseas (including Eire). Single- or multi-operator entries will be accepted in both sections.

4. Frequency & Mode: 1820-1870kHz, CW only.

5. Exchange: RST + serial number commencing with 001. UK stations must also send their County Code (see *RadCom*, Jan 1993).

6. Scoring: Overseas stations work only UK stations for points.

Section (a) Three points per QSO plus a bonus of five points for (i) the first QSO with each UK County worked and (ii) the first QSO with each Country (outside the UK) worked.

Section (b) Three points per QSO plus a bonus of five points for the first QSO with each UK County worked.

7. Address and closing date for logs: RSGB HF Contests Committee, c/o S V Knowles, G3UFY, 77 Bensham Manor Road, Thornton Heath, Surrey CR7 7AF, England. Send within 15 days of end of contest.

8. Awards: Certificates of Merit to the winner and runner-up in each section.

LOW POWER FIELD DAY

1. The General Rules for RSGB HF Contests (*RadCom*, Jan 1993) apply.

2. When: Sunday July 18 1993, 0900-1200 and 1300-1600GMT.

3. Sections: (A) 10W RF output maximum. (B) 3W RF output maximum. Single- or multi-operator entries will be accepted in both sections.

4. Mode & Frequencies: 3510-3560kHz and 7010-7040kHz CW only. Both bands may be used during each session. Any station (including Overseas) may be contacted once on each band for points.

5. Special conditions:
(i) The power for all parts of the station must be derived from batteries, pre-charged accumulators or natural sources such as solar cells or wind driven generators. Float charging accumulators from petrol, gas or diesel driven generators is not permitted.
(ii) The transmitter or outboard PA must not be capable of RF output power in excess of 15W.
(iii) Antennas must not exceed 35ft (10.66m) above ground and may have no more than two elevated supports.
(iv) The station must be 'Portable' (Rule 10, General Rules).

6. Exchange: RST, serial number, county code (*RadCom*, January 1993) and RF output power in watts. Serial numbers commence at 001 and continue through both sessions. Output power should be expressed as one or two digits plus 'W' in place of the decimal point, eg '10W', '1W', '1W5' (1.5W), '0W1' (100mW). Participants using more than 10W may send 'ORO' instead (ORO stations are not eligible to enter the contest but are welcome to 'give away points').

7. Scoring: 15 points for each QSO with a QRP Portable or Mobile station; 10 points for a QRP Fixed station; 5 points for all other QSOs. For the purposes of scoring, 'QRP stations' are those using 10W RF output or less.

8. Address for entries and Posting: As in General Rules.

9. Awards: The *Houston-Fergus* and *Southgate* Trophies to the winners of sections A and B respectively. Certificates to the first 3 entrants in each section and to the QRP Fixed station submitting a checklog and giving the most points to entrants.

HF CONTESTS CHAMPIONSHIP

1. The Championship is decided on the basis of RSGB HF contests held between 1 January 1993 and 31 December 1993 (single-operator entries only).

2. Every UK station entering two or more of the events listed below will automatically be entered for the Championship. For each event the entrant will be awarded points according to their score expressed as a percentage of the score achieved by the leading UK station in that contest. These points will then be multiplied by the appropriate factor for the contest:

LF Phone	20
1st 1.8MHz	10
7MHz CW	20
Commonwealth	30
ROPOCO 1 & 2	10
County Roundup	10
21/28MHz Phone	30
21/28MHz CW	30
2nd 1.8MHz	10

The winner will be the station with the highest number of points at the end of the year.

3. Awards: The G2QT Trophy will be awarded to the winner, and the runner-up will receive a certificate of merit.

21/28MHZ CW

Intending entrants please note the inclusion of 28MHz in this event. Please remember that UK contestants making use of packet, or any other spotting assistance must enter as Multi-operator stations.

1. The General Rules for RSGB HF Contests (*RadCom* Jan 93) apply.

2. Eligible entrants: Overseas (inc EI); all licensed amateurs. UK: as per General Rules. Single-op or Multi-op entries accepted in the transmitting sections.

3. When: 0700 to 1900GMT, Sunday 17 October 1993.

4. Sections:

- (a) UK
- (b) Overseas
- (c) UK QRP
- (d) Overseas QRP
- (e) UK Receiving
- (f) Overseas Receiving

QRP stations may use 10W RF OUTPUT or less.

5. Frequency/Mode: 21MHz & 28MHz bands, CW only. Entrants are requested not to operate in the sub-band 21.075-21.125MHz.

6. Contest Exchange: RST and serial

number, commencing with 001. UK stations must also send their County Code (*RadCom* Jan 93).

7. Scoring:

(a) UK stations work only Overseas stations; 3 points per QSO. Multipliers: as per General Rules.

(b) Overseas stations work only UK stations; 3 points per QSO. Multipliers: 1 for each UK County worked.

The final score is the total of QSO points times the number of Multipliers worked.

8. Logs: Overseas entrants may use the stationery provided by their National Society. UK entrants see General Rules.

9. Address for logs: RSGB HF Contests Committee c/o G3UFY, 77 Bensham Manor Road, Thornton Heath, Surrey CR7 7AF, ENGLAND.

10. Closing Date for logs: UK entrants, postmarked by 15 November 1993; Overseas entrants, delivered by 13 December 1993.

11. Awards: T.E. Wilson G6VQ Trophy to UK single-op overall winner. Certificates of merit to leaders and runners-up in each section, overall and on each band; also to the highest-placed multi-entries from UK and Overseas. Additional certificates may be awarded (at the discretion of the HF Contests Committee) to the leading stations from each Overseas continent/country.

RECEIVING SECTION

Single-operator entries only will be accepted. Rules as for the transmitting section except where specified below. Holders of transmitting licences for frequencies only above 30MHz may enter the receiving section.

7. Scoring: UK SWLs log only Overseas stations in contact with UK stations participating in the contest. Overseas SWLs log only UK stations in contact with Overseas stations participating in the contest. Scoring and multipliers as for the transmitting section.

8. Logs: Columns to be headed: time GMT; callsign of station heard; report/serial number sent by that station; County Code sent by that station (if applicable); callsign of station being worked; multiplier (if new); points claimed.

NOTE: In the column headed 'station being worked' the same callsign may only appear once in every three contacts except when the logged station contacts as a new multiplier.

11. Awards (At the discretion of HFCC, dependent upon the level of support): Certificates of merit to the leading three entrants from each section, and to the leading entrant from each Overseas country.

HF RESULTS

21MHZ CW CONTEST 1992

Comments on conditions this year varied from "excellent" to "very poor", with the scores suggesting they were below average. There was confusion over the multiplier status of the new Balkan States. As a proposal to add them to the DXCC list was approved by the DXAC before the contest it was decided to accept them and all the UK logs were checked and rescored as necessary. The change to the county-based multiplier scheme for the UK still has not filtered through to some overseas societies - again the relevant logs were rescored. The standard of log-keeping was generally good, but computer-users should note that they are not infallible. A careful check before submitting the entry is well worthwhile. Although most of the leading stations used multi-element Yagi or Quad antennas, many good scores were made using simple wires or verticals. Very creditable results can be achieved with a modest antenna, even when conditions are less than ideal. No UK receiving entries... a great disappointment. Perhaps the challenge will be taken up in 1993. G4CZB

UK TRANSMITTING

Posn	Call	QSOs	Mult	Score	Eq Code
1	G4BWP	532	84	132808	4Y6
2	G3KDB	559	78	130260	3Y59
3	G0VZV	495	84	123228	4Y57
4	G3RTE	489	82	118654	4Q25
5	G3TBE	500	78	115674	4Y75
6	G4ZVJ	475	74	105154	4Y4
7	G3HEJ	377	84	94752	4G12
8	G3SQX	430	74	94720	4Y64
9	G3UFY	408	75	90450	4Y54
10	G4BUO	413	72	89136	4Y4
11	G3PSM	413	74	88504	4Y3
12	G3SYM	430	69	87837	4Y34
13	G3GLL	372	72	79272	4Y33
14	G3RXP	396	68	79220	3Y46
15	G4NOK (+)	384	69	75141	4Y4
16	G0FDX (+)	379	52	68626	4Y3
17	G3PVA	331	71	68586	4Y3
18	G4MSID	342	65	66105	4Y-
19	G3YEC	324	66	62700	3Y2
20	G5LP	309	67	59630	3C11
21	G4IQM	301	65	58110	3Y33
22	G2QT	254	63	47439	3-
23	G3LHJ	284	54	45468	3Y3
24	G0JNZ	266	56	43792	4C1
25	G5MY	244	58	41702	3C14
26	G3MPB	205	54	32994	3C1
27	G3NOM	207	53	31588	3Y2
28	G0CGV	194	53	30687	3Y2
29	G4NXXIT	198	52	29848	3C11
30	G3QF	188	51	28152	3C1
31	G3HJF	185	48	24672	3Y3
32	G3VYI	171	43	21758	4W23
33	G3IMP	160	37	17242	3Y3
34	G2AFV	130	43	16598	3C1
35	G3ESF	149	38	16454	3C1
36	G0ADH	114	42	13860	3C1
37	G4HZV	126	37	13838	3G1
38	G3GMM	89	36	9468	3Q12
39	G3WRR	108	28	8764	4W11
40	G4TKW	106	28	8456	3C1
41	G3KKQ	101	31	7967	3Q1
42	GW3SB	91	29	7743	3W1
43	G3AWR	78	30	6990	3C1
44	G3QF	71	29	5796	3W13
45	GW4HBK	74	26	5564	3C1
46	G3ZDW	67	25	5000	3G1
47	G4PTE	70	22	4510	3G1
48	G2HDR	65	23	4416	3G1
49	G2BLA	48	28	4004	3-
50	G0KKG	64	23	2852	3C1
51	G4ZME	42	19	2394	3G1
52	G3NKS	33	18	1782	3G10
53	G4FVK	33	18	1692	3Q13

UK TRANSMITTING - QRP

1	G3OYY	150	48	21600	2Y3
2	G3KAF	183	36	19620	2Y4
3	G2HLU	159	37	17390	2C12
4	G4WUS	136	43	15781	2Q23
5	G4ARI	126	38	14212	2G13
6	G03RFH	119	31	10881	2G1
7	G3BPM	100	34	9860	2C1
8	GMAHQF	80	29	6873	1C1
9	G4ETJ	27	12	924	1Q1

UK Receiving: no entries

OVERSEAS TRANSMITTING

1	Z08LJ	184	57	31122	
2	RA3KA	139	52	22088	
3	R85QDP	130	50	20000	
4	N2KW	129	48	18048	
5	HABEK	134	47	17813	
6	UV1AD	116	48	16176	
7	LZ1FI	120	45	15660	
8	RT9I	140	49	15239	
9	9A2OB	111	48	14208	
10	UA3DPX	105	46	13846	
11	UA3RT	102	46	13800	
12	LZ1ZX	114	42	13650	
13	OK2PAY	108	48	12720	
14	HABFK	102	51	12282	
15	K9BG	92	46	11924	
16	UA3MIF	91	42	10662	
17	VE3JKZ	89	41	10824	
18	K2FE	81	39	9009	
19	UL7BAY	78	40	8680	
20	K3ZO	74	39	8580	
21	UA9KW	71	38	7904	
22	UW9TM	74	34	7140	
23	W4YDD	69	38	6992	
24	N8FU	77	38	6954	

continued on page 82

HF CONTESTS CALENDAR

1/2 May	ARI DX (Mixed Mode)
8/9 May	CQ-M (RSF [Russia] Mixed Mode)
15 May	County Roundup SSB (Feb 93)
16 May	County Roundup CW (Feb 93)
29/30 May	CQ WPX CW
5/6 Jun	NFD (Feb 93)
19/20 Jun	All Asia SSB
26/27 Jun	Summer 1.8MHz CW (May 93)
3/4 Jul	Venezuela SSB
10/11 Jul	RSGB SWL Contest
10/11 Jul	IARU Championship
17/18 Jul	SEANET CW
17/18 Jul	HK DX CW
18 Jul	Low Power Field Day (May 93)
24/25 Jul	Venezuela CW
24/25 Jul	OTA SSB
1 Aug	RoPoCo-2 (note change of date)
7/8 Aug	YO DX (CW/SSB)
14/15 Aug	WAE (CW)
4/5 Sep	SSB Field Day
4/5 Sep	JARL AA SSB
5 Sep	LZ DX CW
Sep/Oct	ORS Cumulatives
11/12 Sep	WAE SSB
18/19 Sep	SAC CW
25/26 Sep	SAC SSB
2/3 Oct	CQ WW RTTY
2/3 Oct	VK-ZL SSB
3 Oct	21/28MHz Telephony (note change of date)
9/10 Oct	VK-ZL CW

RSGB 1993 VHF/UHF CONTESTS CALENDAR

1 May	432MHz Trophy (Feb 93)
1/2 May	432MHz-24GHz (Feb 93)
15/16 May	144MHz (Feb 93)
27 Jun	50MHz Trophy (Feb 93)
19 Jun	432MHz FM
20 Jun	70MHz CW
3/4 Jul	VHF/NFD
24 Jul	144MHz Low Power
25 Jul	432MHz Low Power
22 Aug	2nd 432 MHz Fixed
30 Sep	144MHz CW Cumulative
4/5 Sep	144MHz Trophy
15 Sep	144MHz CW Cumulative
7 Sep	70MHz Trophy
30 Sep	144MHz CW Cumulative
2 Oct	1296MHz Trophy
2 Oct	2320MHz Trophy
2/3 Oct	432MHz-24GHz & IARU Contest
5 Oct	1.3/2.3GHz Cumulative
13 Oct	432MHz Cumulative
15 Oct	144MHz CW Cumulative
20 Oct	1.3/2.3GHz Cumulative
28 Oct	432 MHz Cumulative
31 Oct	2nd 1296/2320MHz Fixed
1 Nov	144MHz CW Cumulative
4 Nov	1.3/2.3GHz Cumulative
6/7 Nov	144MHz CW, Marconi/6/24 hr
12 Nov	432MHz Cumulative
18 Nov	1.3/2.3GHz Cumulative
29 Nov	432MHz Cumulative
5 Dec	144 AFS / Fixed
6 Dec	1.3/2.3GHz Cumulative

CONTEST CLASSIFIED

HF RESULTS

continued from page 81

25	OG7NW	66	35	6650
26	YO8MI	76	36	6516
27	OH2EJ	73	42	6384
28	UV3DRU	63	35	6650
29	HP1AC	65	35	6370
30	YO9AGI	81	39	6318
31	UL8CWC (+)	66	33	6237
32	LY2BKA	71	35	6090
33	R85QI	63	34	5984
34	V2/G6QQ	58	36	5976
35	VK8AV	58	33	5440
36	OK2BND	52	34	5168
37	UA4YG	56	32	5024
38	VE3FH	56	31	4991
39	OH8KHZ	59	28	4844
40	UA4OK	56	30	4770
41	LY1CX	56	28	4676
42	LY2BKM	50	31	4588
43	VE3ORN	55	28	4396
44	WB4UBD	50	30	4350
45	W9HE	56	35	4340
46	UA3TAM	53	28	4116
47	UM8MCF	51	29	4060
48	LU6EF	47	29	4060
49	ZC4IW	52	33	4059
50	OHSRZ	53	29	3422
51	JA7DLE	46	26	3406
52	UA3VRP	49	30	3150
53	W1END	41	26	3146
54	DJ9WH	40	25	2925
55	RB5EX	34	27	2673
56	YL7KM	39	24	2616
57	SM0BDS	38	22	2024
58	YU7SF	41	25	2175
59	VK4TT	33	22	2024
60	UB4EYT	45	21	1995
61	IK3QAR	29	21	1806
62	JA3ARM	31	21	1785
63	N18V	31	21	1764
64	UL7IDB	27	19	1539
65	JA2TBS	28	19	1444
66	3DA/G3SXW	26	18	1404
67	LA1IE	25	17	1190
68	OG6JP	20	18	1080
69	UH8BO	21	14	945
70	JM5VVR	19	14	756
71	JK2VOC	20	13	741
72	JA5APL	18	23	650
73	JH1NXU	15	14	616
74	VE6BF	19	13	611
75	OH3FM	16	13	611
76	JA8AJE	14	12	504
77	HL5LP	15	11	451
78	JF0SGW	13	10	340
79	JA0BMS/1	11	10	330
80	JF7QUE	12	8	288
81	JA3UWB	12	10	270
82	7L2UOY	8	8	178
83	JK6ISK	8	6	102
84	JG1ROV	2	2	2

Entry disallowed: OH6RC - No County Codes recorded.

OVERSEAS TRANSMITTING - QRP

1	RA3RFH	82	40	9480
2	RA9CGJ	72	36	7164
3	UB5XAN	73	38	6726
4	OH2YL	73	31	6479
5	SP4GFG	53	31	4650
6	SM0DZH	46	24	3144
7	JA6GCE	39	24	2448
8	AM2CR	22	17	1054
9	JA1AA	20	16	832
10	WB8OWM	19	14	728
11	JF2WXS	20	15	720
12	OK3TYQ	17	14	714

OVERSEAS RECEIVING

1	ONL 383	37	22	231
2	UB5-070-732	27	17	1360

Disallowed: UA9-154-2454 (Transmitting licence held). Checklogs gratefully acknowledged from: DF3OL, EI5DI, G3KNU/P9, G3RSD, G4ODV, GM3UM, LY3BA(ORP) and LZ3FN.

+ Multi-operator, # Trophy winner, * Certificate winner.

VHF RESULTS

JANUARY 1993 2M CW

Conditions for this contest were described by contestants as poor. Just goes to show what can be worked on a flat band, (see best DX).

Congratulations to G4HUP and G0CUZ in single op section and to G4DSP and G4FKA/P in the others. Certificate also to G4OUT for highest placed station running 25W or less to single yagi. It is a great pity that there were not more entries as the number of stations active was quite high.

Bryn, G4DEZ

SINGLE OPERATOR

Pan	Call	Pts	QSO	Mult	Pwr	Ant	Best DX	km
1	G4HUP	15805	54	29	400	2X18	DL3SBH	826
2	G0CUZ	10296	48	36	400	5	ON4ASL	490
3	G0AFH	9152	53	26	250	2X17	FC1NNE	651
4	G4NDG	8667	35	27	350	15	PA3ECK	584
5	G4OUT	5200	32	25	25	12	ON4ASL	490
6	G3FLJ	2214	22	18	15	9	DK5DQ/P	449

OTHERS

1	G4DSP	11235	51	21	400	2X9	DJ7OF	726
2	G4FKA/P	10948	52	34	150	16	DJ2JA	642

Thanks to G0PAE for checklog

CHRISTMAS FUN CONTEST 1992

A reasonable entry again this year, with some big surprises. Clive Penna, GM3POI, wrote to me complaining about the multiplier rule saying that it was unfair as from his location in the Orkneys it was too far away from the activity for him to be able to get contacts let alone multipliers. He forgot to mention the aurora that he worked, the DX, and the number of different countries. The fact that he came second on 2 metres really does negate his argument! Perhaps we should disallow /A QSOs!

Seriously though, it really doesn't matter where you are in the country, it depends on how well you can operate, and the prevailing propagation conditions. Sometimes I listen to all those stations in the Midlands and West working the DX, whilst on the East coast there is nothing, sometimes it's the other way around. It really is the luck of the draw.

Congratulations to G3APY and G0AEV on 70MHz, G4ASR and GM3POI on 144MHz, and G1GEY and G4DSP on 432MHz, to Frank, PE1EWR, for his Overseas entry. The overall winner was G4ASR with a single band entry as was the entry of GM3POI who takes the overall runners-up certificate. You see 'luck of the draw' again.

Now the bad news, G1GCT and G8JWF were both unfortunately disqualified, (not for cheating or any skulduggery, just for scoring errors), I did try to contact both stations by telephone but directory enquiries had never heard of you! The scoring algorithm that you are presumably using on your computers is totally inaccurate. I checked various locators and found variance of anything between 10 and 70% in claimed score and actual score.

Please get in touch and I will sort out your program for you or supply you with a new one that works correctly! Please note that the VHFCC are here to help you and will do all we can to make things easier, but we cannot re-score logs, we just do not have the time.

70MHZ						
Pos	Call	26th	27th	28th	29th	Total
1	G3APY	888	1670	1106	1200	5064
2	G0AEV	264	897	650	564	2375
3	G4DSP	100	360	1339	238	2037
4	G4LDR	0	196	12	44	252
4	GM4AFF	48	0	204	0	252

144MHZ						
Pos	Call	26th	27th	28th	29th	Total
1	G4ASR	73267	52724	35972	26316	188279
2	GM3POI	0	66275	27300	31467	125042
3	GM4AFF	1512	87507	7329	5360	101758
4	G4DSP	1116	37510	24480	2112	84218
5	GDBEXI	14756	23219	22413	17226	77614
6	G0MLV	0	9099	25704	13504	48307
7	G0RTL	5244	20328	9044	9125	43741
8	G8ZRE	5858	5590	9174	5330	25952
9	G7MLB	11568	2618	4600	5750	24536
10	G0RRR	7328	0	4572	3723	15623
11	G4LXU	720	2208	2800	9240	14968
12	G7EXX	3276	3792	2100	2280	11448
13	G4IDF	2040	2420	1998	1887	8345
14	G7AZP	18	464	1196	1404	3082
15	G4LDR	0	210	804	836	1850

432MHZ						
Pos	Call	26th	27th	28th	29th	Total
1	G1GEY	0	1480	11575	20900	33055
2	G4DSP	552	5184	2831	16675	25242
3	G1GHA	8096	5856	4576	1680	20208
4	GDBEXI	1060	2758	3904	840	8562
5	G0MLV	0	1258	742	342	2342
6	G0RRR	588	0	336	69	993
7	G4LDR	0	690	64	24	778
8	G7AZP	0	24	145	52	221
9	G4IDF	22	119	4	21	175

OVERSEAS SECTION 144MHZ						
Pos	Call	26th	27th	28th	29th	Total
1	PE1EWR	553	3952	900	0	5405

OVERSEAS SECTION 432MHZ						
Pos	Call	26th	27th	28th	29th	Total
1	PE1EWR	742	1130	78	576	2526

OVERALL POSITIONS								
Pos	Call	26th	27th	28th	29th	Total		
1	G4ASR	188279	8	G1GEY	33055	15	G4IDF	8520
2	GM3POI	125042	9	G8ZRE	25952	16	G3APY	5064
3	GM4AFF	102010	10	G7MLB	24536	17	G7AZP	3303
4	G4DSP	101487	11	G1GHA	20208	18	G4LDR	2880
5	GDBEXI	86176	12	G0RRR	16616	19	G0AEV	2375
6	G0MLV	48307	13	G4LXU	14968	20	G0MLV	2342
7	G0RTL	43741	14	G7EXX	11448			

1992 2ND 1296MHZ FIXED CONTEST

A modest entry conceals a busy evening with at least 50 stations active. Conditions were poor in the North, average elsewhere, with a few lifts to the South. At least one (unidentified) station used telepathy to counteract the conditions confirming a locator even before it was sent. Many stations missed useful points by not beaming North or West. Virtually all lost points were due to errors in locator letters; try using CW or non-standard phonetics when signals are poor. A check of radial ring boundary scores resulted in one score being increased.

Congratulations and certificates to G3XDY and G3WHK as winner and second in the single op. section, Sutton & Cheam RS as multi-op. winners, and G0JDL as the leading single op. running below 25W and one aerial.

There were no SWL entries.

GW8GSQ

SECTION S								
Pos	Callign	Points	QSOs	Loc	Pwr	Ant	Best DX	km
1	G3XDY	190	26	J002	300	4 x 23	DD9DU	432
2	G3WHK	149	31	IO91	100	55	GD4GNH	426
3	G0API	130	18	IO80	150	4 x 50	PA3FPS	498
4	G3MEH	123	27	IO91	100	48	PA3FPS	370
5	G4ZTR	121	21	J001	100	2 x 55	GD4GNH	449
6	GD4GNH	76	6	IO74	10	4 x 23	G4ZTR	449
7	G0CFM	55	10	IO81	50	23	G3XDY	267
8	G0JDL	4	2	J002	1	23	G3XDY	57

SECTION M								
Pos	Callign	Points	QSOs	Loc	Pwr	Ant	Best DX	km
1	G0GZQ	113	30	IO91	10	55	G3JYP	382
2	G3LRS	95	22	IO92	100	2m	G0API	218

DIRECTION FINDING

MID ESSEX TROPHY EVENT

The Mid-Essex Trophy is a two station event using RSGB Qualifying Rules. For the 1992 event the hidden station operators were Mike Hawkins and Alan Williams.

The start was at Long Melford, with Pat Hawkins as official starter. There was a good turn out from Chelmsford and Colchester as well as George Whenham who had driven down from Coventry.

We heard two good signals from the hidden stations, with bearings to the SE and SW, the teams divided evenly - 4 to each transmitter. Transmitter A was located in a cove at Topplefield with the aerial wire going all around the edge, connected to an earth stake at one point. Transmitter B was hidden under the roots of a fallen tree adjacent to a footpath near Little Wenham.

While the competitors were busy hunting, Pat had turned the 'bring-a-bite' tea into a real feast which was much appreciated by all the competitors. There were the usual tales of what might have been, 'if only!' The visitor now know the tough standard of this Essex local event, as did the National Champion who only found one station. Times were very close and for the second year running the operator's watches had to be compared before results could be confirmed.

Pos	Name	Time of arrival at Transmitters	
		A	B
1	Dick Brooks	15.03	16.27.20
2	Peter Larbalestier	16.28	15.04
3	Roy Emery	15.06	16.29
4	George Whenham	16.29.30	15.16
5	Andrew Mead	15.07	16.30
6	Peter Graves	15.09	16.30
7	Andy Collett	15.39	-
8	Philip Cunningham	16.10	-

TOP BAND ARDF START DETAILS

MID THAMES QUALIFYING EVENT

Date: 9 May 1993

Map: 165 (Aylesbury & Leighton Buzzard)

Assembly: 1300 for start at 1320

Location: Great Kingshill Common Car Park, NGR 876 982

Competitors requiring tea should notify Colin Boyce, tel: 0494 712083, no later than 2 May.

SOUTH MANCHESTER QUALIFYING EVENT

Date: 23 May 1993

Map: 118 (Stoke on Trent)

Assembly: 13.00 for start at 13.20

Location: Barley House Farm, NGR 906 605.

Competitors requiring tea should notify Chris Plummer, tel: 0782 514630, no later than 16 May.

COVENTRY/NORTHAMPTON QUALIFYING EVENT

Date: 13 June 1993

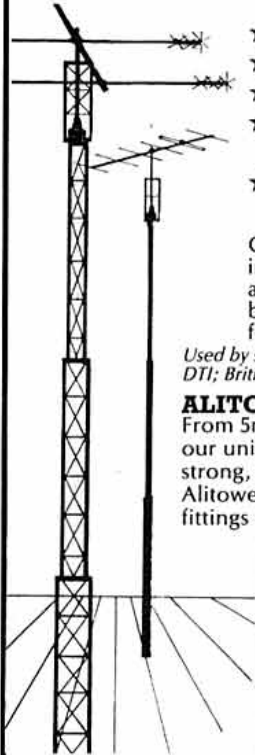
Map: 152 (Northampton & Milton Keynes)

Assembly: 1300 to start at 1320.

Location: Daventry Country Park, NGR 576 641.

Competitors requiring tea should notify George Whenham, tel: 0926 812367, no later than 6 June.

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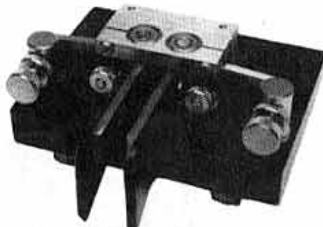
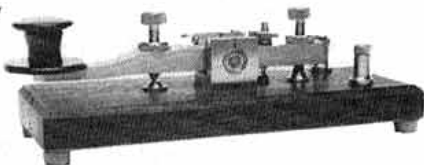
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FOR SALE

AMIGA 500 1.3 with Philips Colour Monitor. As new: £325. (Southend, Essex) 0702 345171.

ASTATIC D104 Base Mike: £50. Icom 228H 50W, boom Mike with T/burst: £250. Standard C150E 2 Mtrs H/Held, charger + extras: £175. Kenwood MC80 Base Mike: £40. All in Good condx. Phone Day 0992 624429, evening 081 904 3282. (North Wembley).

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CUSHCRAFT R7 2 months old, Planning problems, all instructions: £300. No offers. MFJ Antenna Analyzer HF 2 months old: £70. After 6pm. Buyer collects. (Woking) 0483 481202.

ICOM IC575H All filters fitted 26-56 Tx/Rx plus Auto=Antenna switch, workshop manual. Cost £1500 18 months ago, sell for £1200 own. Yaesu FT101B plus spares valves: £350 own. 28MHz multimode plus Base Mike, Datong Speech Processor, Workshop Manual plus HA375 HF Pre-Amp: £380 own. No Splits Silent Key Sale's. G4XPP, QTHR or phone 0388 745787, use answerphone if nobody in Please. (Willington, Durham) 0388 745787.

ICOM ICR7100 brand new: £650. ICR72 new: £425. YAESU FT102, with FM: £350. Trio TM231 FM Mobile: £225. AEA PK232: £175. All as new, boxed with manuals. Phone. (Harlow) 0279 445718.

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YAESU FT101Z, fan, YD148 Mic, Manual, original packaging, NO WARC bands. Very clean, low mileage: £395. Sommerkamp FL200B FR100B TCVR pair: £150. Buyers inspect, collect, Pay Cash. David, G4IPW, NOT QTHR. Phone evenings or weekends (Oldham) 061 652 0330.

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AVT All Mode SSTV, FAX Interface and Programme, UK version for Amiga Computer: £225. G3TRB, QTHR. (Worcester) 0905 775206.

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ICOM IC28H 50 watt FM Tcvt, very little use, as new, boxed with Microphone, manual, etc: £125. (Northampton) 0604 881971.

ICOM IC3200E Dual Band FM Mobile, voice synthesizer, box, instructions: £295. Icom IC24ET VHF/UHF FM Handportable, three Battery Packs, charger, soft case, power lead, box, instructions, mint condx: £285. Lucas 10m FM Mobile: £30. Pair of Dymar 883 VHF three Channel Handportables, three battery packs, speakers, mics, leather cases, good condx, both working: £50 the Pair. Chris, G0BRH. Tel 24hours. (Leominster) 0568 615348.

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TONNA 2mtr 9 Element Crossed, 8 months old, also 70cm 19 Element crossed, 8 month old. Total price new: £135. For Sale at: £58. Phone Keith, G7NDB evenings. (Basingstoke) 0256 397326.

TONO 5000E CW, RTTY, AMTOR Terminal with built-in Monitor and keyboard, as new: £375ono. (Wokingham) 0734 781938.

TOWER Altron AT42 Post MTG 45t complete: £295. KR400RC Rotator: £95. Datong Morse tutor: £35. TR7500 FM Mobile: £95. Alan. (Nr Colchester) 0621 815978.

TR9000 and TR9500 both in excellent working order and visual condx: £250 apiece or £475 both. Ring 0780 783164 anytime.

TR9130 25w 2m Multimode, boxed, Manual, etc, GWO: £275. No offers. Prefer buyer inspects/collects. G4XNS, QTHR. (Preston) 0772 612910.

TRIO 8300 UHF 10W converted for talkthrough Packet and RTTY, crystallised 23 chans (6 repeaters, 17 simplex), handbook, car mounting: £97 inc P&P. PK232 Multimode TNC, mint condx, handbook, cables: £189 inc P&P. Bronze Cellnet telephone batteries: £16 inc P&P. Charger for Varta 9v and 18v batteries, built-in condx tester: £11 inc P&P. Mike Watson, G8CPH. (Ipswich) 0473 831448.

TRIO 9500 new and unused(boxed), c/w brackets and all leads: £325. 70cm Base Collinear, Ant new, boxed: £25. BO9A Beam: £20. Dily, by arrangement. Bob, GM0DZW, QTHR. (Crathie, Ballater) 03397 42341.

TRIO 9R-59DS Rx (1960's vintage) suit collector. No reasonable offer refused. Buyer sees/collects. Derek, G6OEW, QTHR. (Nantwich) 0720 668111.

TRIO SG-402 Signal Generator 0-30Mhz, new in original packing: £28, plus P & P at cost. Mark Robinson, G7ETP. (Warrington) 0925 727889.

TRIO TS530SP 180w Tcwr with IFCW filter and Sure Mike, ex condx: £400. Butternut HF5B 2 ele compact Beam: £130. G4CHM, QTHR. (South Normanton) 0773 813446.

TRIO TS700 Multimode, etc: £200. Matching 50W PA (No PSU): £30. TR2200G fully stalled: £50. Microwave Modules 144/432 Trsvr: £50. Eimac 4CX250B plus SK600 (new, boxed): £25. EGA Monitor and Display adaptor: £50. G3KVA, QTHR. (Milton Keynes) 0908 604217.

TRIO TS830S, beautiful condx, CW filter, instruction and Service manuals, orig pkg: £610. Wanted TS520S, G3TPW HF Linear. John, G4ILA. (Stockport) 061 477 6702.

TS520 Transceiver, gwo, complete with MC10 Mic, original box and spares: £275. (Beckenham) 081 777 3134.

TS530S vgc, boxed, manuals, AT230, MC60, brand new: £550. Phone Daren, G0LVE. after 8.30pm. (Stanmore) 081 954 7923.

TS830S, manual, MC35S Mic: £595. Kenwood SP230 Speaker: £100. Kenwood HS-5 Headphones: £20. Ten-Tec Century 122: £200. HF5 Five Band Vertical: £75. Carlton Rx Kit, unused: £40. Vibroplex Key: £40. Kent Key: £20. AR88D, manual: £60. DAIWA DK210 Electronic Keyer: £40. KW103 SWR Meter: £15. HI Mound Paddle Key: £20. Buyers inspect and collect. (Stockport) 061 429 8995.

TS850SAT c/w filters, boxed as new: £1260, ovno. KW1000: £275. 144/1296 Trsvr: £150. Telephone Days. (Aberdeenshire) 0224 254374.

VERSATOWER 40ft + Heavy Duty Galvanised Telescopic tilt, Rotator, Controller, HY-Gain HF Beam TH3 MK3, all cables, etc included. Price: £700, ovno. (Ruislip, Middx) 08956 77017.

VT125 AIRBAND: £115. Sony SW-55: £200. Kenwood TH7BE, S/C: £375. All as new, boxed etc. Seiko Pulsar watches, offers. John. (Diss) 0379 652043.

WAVEGUIDE + Ancillary apparatus. Directional

couplers, circulators variable attenuators, detectors. All in WG16 Marconi/Sperry. (Looe) 0503 72967.

YAESU FRG7 Gen Cov Rcvr, gd condx: £100. Microwave Modules 50Mhz Rx Converter 28Mhz IF: £15. Contact Graham, G8WUI, QTHR. (Nottingham) 0602 632841.

YAESU FRG7700 Digital General coverage Rcvr, 0-30Mhz, AM/FM/CW/SSB in excellent order: £250, inc delivery (UK). BNOS 6m Linear Amp and Pre-amp 10W to 50W, as new: £85, inc delivery (UK). Datong FL1 Automatic Filter: £35. (Abingdon) 0235 532653.

YAESU FT-ONE Solid State G/C all Mode TCVR, FM board, etc. Separate Professionally built PSU fitted fan and Ammeter. Just overhauled and Re-aligned by Castle Electronics. C/w Mic, operating and technical Manuals. Excellent: £625. ICESFAX-1 Weather Map Decoder. Also decodes RTTY and Navtex, c/w cables and Manual: £250 post paid. G3RDG. (NW London) 081 455 8831 anytime.

YAESU FT101ZD Mark 3, narrow CW filter, FM, YD844A Desk Microphone plus Hand Mic, very little use, therefore pristine condx, nonsmoker: £425. Icom 229E, 25-5W Mobile, scanning Mic, many function, less than five hours use, in orig pkg: £225. Sorry No offers, but will pay Parcel Force 48 Hr delivery service. (Wirral) 051 608 1504.

YAESU FT101ZDFM WARC: £425. FV101: £70. FT290R with accessories: £200. MM144/30 Linear: £50. FP12 PSU: £50. FT203 2 metre H/held: £90. HF 3-element Tri-Bander: £50. DAIWA Rotator, controller and cable: £90. Heathkit OS-2 Oscilloscope and unused CRT: £20. 50 metres UR67: £20. (Thurrocks, s. Essex) 0375 361210.

YAESU FT102 with AM/FM board fitted: £460. Yaesu FL2100Z Linear Amp, new valves fitted: £470. Or both for: £900. Bocaram AT plus Memory expansion Board, 2 meg installed, total of 8 meg can be fitted. Software driver expanded, extended or both: £80, or £45 with 0 meg installed. Graham, G0EIR, QTHR. (Alsager) 0270 876149.

YAESU FT102, FV102DM, FC102 and SP102, little used, exl condx: £600. G3LLE, QTHR. (Sheffield) 0742 482847.

YAESU FT209R 2m FM Hand Held, excellent condx, soft case and manual. Boxed: £130. GOAWM, QTHR. (Lancaster) 0524 63060.

YAESU FT736R, 2m, 6m, 70cm boxed and immac. c/w SP767 Speaker filter: £1200. No offers. G6FDG. (Bradford) 0274 545799.

YAESU FT7757 GxII Cat System. Yaesu FC757 ATU. Yaesu FP757HD. All new condx, boxed, up & down, fast scan. Mike. (Nuneaton) 0203 349156.

YAESU FT767GX, vgc, bought mid 1991: £875. Also FT711RH 70cm Mobile, top condition, with bracket, etc: £225. (Dorking) 0306 887057.

YAESU FT790 complete with Nicads and carrying case. Complete alignment carried out by SMC: £225. KOS 7632 Dumb Terminal: £30. (Cleethorpes) 0472 697334.

YAESU FTDX401 Tcwr, mint condx with Desk Mike: £275. Cheetah Telex with Pag Terminal modified for 50 Bauds: £100. Dumb Terminal: £30. Silver Reed electric Typewriter: £80. Codemaster CWR600 for RTTY and Morse. G4EMT. (Oakham) 0572 85457.

YAESU ROTATOR G400RC brand new and boxed with 10 month warranty + 20 metres 6 core cable: £180. (Looe) 0503 72967.

ZX/SPECTRUM two Keyboards with interfaces, PSUs, 3 Microdrives, Asstd Amrad software microtapes, cassette tapes, datascrump, Alphacom Printer/PSU, H/books: £190ono. Sangean ATS803A SW Rcvr, new: £80. Eagle valve SW comm/rcvr: £30. 10" Mono TV: £15. P&P extra. (Aberaeron) 0545 580675.

VIBROPLEX Lightning Bug. Vibroplex Champion Bug. CW Enthusiast seeks well loved example of each. Please dont let your Bug die in a Collectors cabinet. Let it live on in the hands of a caring user. All replies answered. John, G3JVC, QTHR. Or please phone after 6pm. (Surbiton) 081 398 0939.

QTHR(1993 Edt) (Leigh-on-Sea) 0702 521973.

COLLINS S LINE Any u/s S-Line required regardless of condx, provided outer perforated case is in reasonable state. G3ONU, QTHR. (St Albans) 0923 676344.

DIAGRAM and Alignment details for Pye / Philips MX290 series PMR set. G8ALM, QTHR. (London) NO phone number.

DRAKE 2B and clarifier in good working condx. G4ILR. Please QTHR93. (Norwich) 0603 782396.

DRAKE 2LF for my Drake 2C, Please someone must have one laying about. GM0KMG, QTHR. (Glasgow) 041 649 4345.

FOUR Fibreglass Antenna Spreaders nine foot long, approx one inch diameter. Please give price including carriage. G4KPT. (Wiveliscombe) 0984 23762.

FT707 Must be VGC, unmodified. Good price paid for right rig. Also Mobile HF Ant. Derek, G0EOW, QTHR. (Nantwich) 0270 668111.

GOOD home waiting for Marconi type 365 Key. Prepared to negotiate very good price. Would consider collection. G3RRN, QTHR. (Lincoln) 0522 751557.

GREEN Painted Elstone MT/M1 50mA Mains transformer. Bernard Litherland, G4IMT, Old School House, North Waaxall, SN14 7AB. (Chippenham) 025 891254.

HALICRAFTERS Rcvr Model S-20-R. Please telephone anytime. (Blackburn, Lancs) 0254 822222.

HF MINI Beam, any type considered. G4APV. (Sheffield) 0742 363641.

ICOM AT500 Auto ATU. Icom Micro 4 H/held 70cm. Trailer Mounted Versa-Tower. Please leave telephone message at any time. (Inverurie) 0467 25365.

KENWOOD TM241E Must be mint condx. Also manual for HAMEG 512. Ring after 5pm. (Londonderry) 0504 352804.

KENWOOD TM531E 23cm Tcwr also Jay Beam D15 23cm Beams or similar. G4ZEK. (Colchester) 026 851343.

KENWOOD TS440S with Auto ATU. GWO essential. Details to G0JZY, QTHR. (Nr Bristol) 0275 846343.

OPERATING Manual for Wayne Kerr CT530 Universal Rig. PSU for KW2000A Sphinx Tx. (Derby) 0332 671536.

R1155 in working order with Power Supply. If required phone 061 366 0927 G4PYQ, QTHR. (Hyde) 061 366 0927.

RACAL Dana 9302 RF Millivolt Meter with accessories. Racal 1792 ISB IF/AF Module type ST08109, filters BD81057, BD81085 and BD81084. G3YFK. (Shrewsbury) 0743 884858.

RACAL TA349E Linear Amp. Complete Unit or parts, including cabinet and wiring trays. Also require Racal made 19 inch Rack Cabinets with 'Picture Frame' front and TA127 Cabinet. Please write: Nigel Boyd, 2 Church Close, Lower Willingdon, Eastbourne, East Sussex BN20 9QY.

SERVICE Information or Workshop Manual for D61 Teletype Oscilloscope. All expenses paid. G4OUJ, QTHR. (Rochdale) 0706 373339.

TEN TEC Corsair Model 10211 with filters, power supply an advantage but not essential. Must be clean and FWO. (Wing, Bucks) 0296 681109 or 0736 753676.

TRIO/KENWOOD or Heathkit Solid State DIP Meter. Must be complete, all coils, operating instrs and fully serviceable. G8RW, QTHR. (Bromley) 081 462 1592.

WANTED Base Station 2m/70cm with PSU. Rx must have high interconnect point. G3BDV. (Chelmsford) 0245 223403.

WANTED Frequency Display from FT301D or complete set for spares. Possible could collect. G3SCD, QTHR. Phone anytime. (Louth) 0507 343283.

YAESU Counter Unit (PB-1734, PB-1735) Digital Frequency readout Module for Yaesu FT225R. Ask for Nick, G7GNQ or leave a message. (Yeovil) 0935 706102.

EXCHANGE

EXCHANGE Spectrum +2 Computer with RAMS IV Tape Ready to decode RTTY, AMTOR, SITOR, S5TV, Morse up to 250wpm. Also B40 Rcvr 0 - 30Mhz for Racal ATU. (Derby) 0332 372696.

LOWE HF150 Rcvr, mint condx, with NiCads and IBM-PC Interface. Swap for 23cm Rig or sell for: £290. (Southport) 0704579017.

PANASONIC MC30 Video Camera stereo sound, case and batteries charger etc. Cost: £990. Sell: £450. Or Exchange good HF Rcvr or 70cm 2m Tcwr. (Cambridge) 0223 263670.

SK400 SWR PWR 140/525 5-20-200W, fitted N-type Skts. Exchange SX200 SWR Meter or Similar. Andy, GDOTEP. (Douglas, IOM) 0624 626080.

WANTED

10 MTR Multimode Uniden HR2510 or similar, must be in good condx. G4XGT. (St Ives) 0480 465912.

40ft CRANKUP Tiltover Tower. Your reasonable price paid. G3RXW, QTHR. (Hitchin) 0462 812611.

70CM Hand Held. G4BJN, QTHR. (Hemel Hempstead) 0442 241281.

ALPHA Tcwr 20m or 160m. Poss Working. Also KB4412 chip details, exs refunded. G4OKS, QTHR. (St Austell) 0726 813935.

ANYONE SELLING a Marconi/Redifon/Pye etc ex-marine Tx/Rx 160/80 AM good wkg order. Please write/phone G3RCX,

CLUB NEWS

DEADLINE - Items for inclusion in the July 1993 issue must be sent to HQ marked "Club News - DIARY", to be received by 18 May 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 - 2, Half yearly General Meeting. Details 0272 672124.

BEDFORDSHIRE

DUNSTABLE DOWNS RC - 7, Informal; 14, Car boot sale preparation; 21, Informal; 28, Talk - subject TBA; June 4, Informal. Details 0525 211249.

SHEFFORD & DARS - 3, Pedestrian DF hunt; 17, National Field Day planning; July 4/5 NFD. Details from G1GNS on 0462 700618.

BERKSHIRE

BURNHAM BEECHES RC - 1-3, Spring DX picnic (Stafford); 17, Science Museum Station G3JUL; June 7, Quiz Night. Details 0628 25720.

MAIDENHEAD & DARC - 6, Talk 'Bracknell 70cm Repeater GB3BN' by Tim, G4EMO; 18, Preparations for HF and VHF Field Days. Details 0628 25952.

NEWBURY & DARS - 26, Home Construction hints. Details 0635 863310.

READING & DARC - 13, HF NFD Planning; 27, Construction & Alignment evening; June 10, VHF NFD Planning. Details 0734 476873.

BUCKINGHAMSHIRE

AYLESBURY VALE RS - 5, talk 'The Blechley Park Trust; 19, Surplus equipment auction. Details from G4XZJ on 0296 81097.

CAMBRIDGESHIRE

CAMBRIDGE & DARC - 7, HF operating evening; 14, Talk 'The GSM Cell Phone System' by G6RWT; 21, Film & video evening 'Railway Nostalgia'; 28, Talk 'Baluns and Traps - Theory and construction' by G3KBR. Details from G6IGI on 0763 243570.

CHESHIRE

CHESTER & DARS - 4, Discussion - Radio ideas; 11, Video - History of Radio, part 2 by G3ETH; 18, Outside operation on the Yeld; 25, Construction Techniques. Soldering & Desoldering by G8OJO & G4BDM. Details 0244 336339.

MID-CHEESHIRE ARS - 5, talk 'Theatre make-up' by Len Moss; 12, On-Air Night; 19, talk 'Setting up an HF station'; 26, talk 'Identifying Components' by G0IRA; June 2, Junk Sale. Details from M Baguley, G7LOD, QTHR.

STOCKPORT RS - 13, talk 'Introduction to Packet Radio' by G4UJD; 27, Clinic Evening; June 9, DX-peditions by H50/G3NOM. Details 061 439 4952.

CLWYD

WREXHAM ARS - 4, Talk by Peter Williams of the Whittington Astronomical Society; 18, Annual Constructors contest; June 1, Junk sale. Details 0978 845858.

CO DOWN

BANGOR & DARS - 7, talk 'Medical Electronics' by G4BXB. Details 460251.

DERBYSHIRE

BOLSOVER ARS - 12, 2nd DF hunt; June 9, 3rd DF hunt. Detail 0246 822856.

BUXTON RA - 11, talk 'Packet BBS Network' by John, G0HMC; 25, talk 'SWL - An Enjoyable Hobby' by G1OHD; June 8, Quiz night. Details G4IHO, on 0298 25506.

DERBY & DARS - 5, Junk sale; 12, Vintage Equipment night. ****NEW SECRETARY**** Mrs Haley Winfield, 2E1AJ of 2 Hitts Cottages, Crich, Matlock, Derbyshire DE4 5DD. Details 0773 852475.

<DEVON

APPLEDORE & DARC - 4, Construction evening; 17, talk 'Radio Noise' by Ken Symonds, G0DLC; 18, Construction evening. Details 0237 477301.

EXETER ARS - 10, Surplus sale. Details 0392 214204.

SOUTH DEVON RC - Club address for direct QSL cards: PO Box 4, Brixham, Devon TQ5 8QH. Details 0803 522995.

EXMOUTH ARS - 12, Visit to Couty Information Room; 26, Demonstration of ATV. Details 0395 279574.

DORSET

DORSET POLICE ARS - June 3, Visit to Bournemouth International Airport Tower and Radar. Details 0202 229351.

EAST SUSSEX

CRAWLEY ARC - ****NEW SECRETARY**** Mr M E Bath, G3YAB 25 Barring Road, Crawley, West Sussex RH10 6DO.

HASTINGS E&RC - 19, Talk 'Police Forensic Techniques' by G7GHP. Details 0424 830454.

SOUTHDOWN ARS - 10, talk 'Mercury Communications' by John Vamperlow; June 7 Talk 'Antennas from Slim-Jim to HF Beams'. Details 0323 412699.

ESSEX

BRAINTREE & DARS - 17, Annual General Meeting. Details 0376 327431.

CLAFTON RC - 12, Quiz Night. Details 0255 672606.

DERGIE HUNDRED ARS - ****NEW CLUB**** - meets on the First and Third Monday of the month at the Henery Samual Hall, Maylawdsea, Essex. Details 0621 783629.

VANGE ARS - 6, NO Meeting (Local Elections in Hall); 13, X-Rays (Part 2); 20, Bert's Bugs; 27, Port Connections by G3ASH. Details 0268 552606.

FIFE

DUNFERMLINE RS - 6, Junk Sale at Outh; 13, HF evening and Working party; 20, HF evening with Class B Supervised Operating; 27, Society Barbeque. Details 031 331 4340.

GRAMPIAN

MORAY FIRTH ARS - meets in the New Elgin & Ashgrove Hall, Land Street, New Elgin, Elgin, Moray every Thursday evening at 7.30pm. Details 0343 86395.

GREATER LONDON

ACTON, BRENTFORD & CHISWICK RC - 18, open discussion 'GRP Problems'. Details 081 749 9972.

BROMLEY & DARS - 18, talk 'TV Principles' by Ian Daniels. Details 081 658 2988.

COULSDON ATS - June 14, Talk 'Secret Listeners' by Brian Cannon, G8DIU. Details 081 684 0610.

CRAY VALLEY RS - 6, Surplus equipment sale; June 3, talk 'Receivers (part II)' by G6WRP. Details from Bob on 081 850 1386.

CRYSTAL PALACE & DARC - 15, HF/VHF 'On Air' evening + preparation for NFD. ****NEW SECRETARY**** Mr W E Taylor, G3DSC, 39 Woolstone Road, London SE23 2TR. Details 081 699 6732.

EDGWARE & DARS - 13, talk 'Using the Straight Key' by G3SJE; 21, Straight Key evening (SKE), 80m CW; 27, Constructors Contest + NFD briefing, by G4IUZ; JUNE 5/6, National Field Day. Details 081 204 1868.

KINGSTON & DARS - 19, Surplus Equipment sale. Details 081 398 1128.

SOUTHGATE ARC - 13, talk 'Early Radar, part 3' by Stan Wood; 27, DF Workshop, equipment & technique explained. Details 081 360 2453.

SURREY RCC - 3, Construction Contest; June 7, talk 'History of the Original London Aerodrome' (Croydon). Details 081 660 7517.

SUTTON & CHEAM RS - 4, visit to Didcot Power Station, Oxfordshire; 20, Annual General Meeting. Details 081 644 9945.

GREATER MANCHESTER

ECCLES & DARS - 4, talk 'Effective Car Alarm Systems' by G0KLF; June 1, Discussion '432MHz Low Power Contest'. Details 061 773 7899.

HAMPSHIRE

BASINGSTOKE ARC - 3, Talk and demo 'Magnetic Loop Antennas' by G3MAO; 23, 2m Direction Finding Competition - OS174 - Fox; Eddie, G4SQZ; June 7, Construction Competition & VHF NFD Planning. Details 0256 25517.

HORNDEAN & DARC - 6, Visit by Peter Chadwick, G3RZP, 1993 RSGB President; June 3, talk 'Astronomy' by Mr A Dowdell. Details 0705 472846.

ITCHEN VALLEY ARC - 14, talk 'Radio Investigation Service' by DTI Radio Agency; 28, talk 'A Pakistan Tour' by Mike Homer, G6AIQ. Details 0703 736784.

SONY BROADCAST ARTG - Details from Stephen Harding, G4JGS, 0256 483454 (office hours).

SOUTHAMPTON ARC - Club now reactivated. Meets 1st Monday of the month at Millbrook Community School, Green Lane, Maybush, Southampton. Details G1UWL, QTHR or SARC, PO Box 249, Southampton, SO9 7SR.

SUBMARINE ARC - Meets on Thursday evenings at HMS Dolphin Gosport, Hants. Details 0329 283646.

WINCHESTER ARC - 21, talk 'Radio Astronomy' by Alan Dowdell. ****NEW SECRETARY**** Peter Simpkins, G3MCL, 6 Compton Way, Olivers Battery. Details 0962 860807.

HEREFORD AND WORCESTER

BROMSGROVE & DARC - 9, stand at Drayton Rally; 14, talk 'PMR Conversion' Bill, G3TJM; 21, Annual Car Boot Sale. Details 0562 710010.

BROMSGROVE ARS - 11, Annual General Meeting; 25, Technical topics; June 8, Aerial Construction. Details 0527 546075.

HEREFORD ARS - 7, Informal meeting; 21, Annual Construction Contest. Details 0432 355297.

HEREFORD WOODPECKER ARC - Meets 1st

and 3rd Tuesdays, 8.00pm at the Richmond Place Club, Edgar Street, Hereford. Details Bob, G1HWP on 0432 277591.

HERTFORDSHIRE

CHESHUNT & DARC - 5, talk 'Instant Morse' by Steve White, G3ZVV; 12, Members' Forum; 19, Outdoor meeting, Baas Hill Common, Broxborne; 26, Contest Primer - NFD. Details 0992 464795.

DACORUM AR&TS - 18, talk by Mr Armstrong from AKD. Details 0442 259620.

HODDESDON RC - 13, talk 'Hints & Tips' by G3JNJ; 27, talk 'Learn Morse in One Hour' by Steve, G3ZVV. Details 081-804 5643.

STEVENAGE & DARS - 4, talk 'Designing and Constructing PCB's at Home' by G0EVZ; 11, practical night - component Testing; 18, talk on HF Operating with advice on Antennas, by G3HEA; 25, Practical night - HF/VHF night on Air - Morse practice. Details 0438 724509.

WELWYN-HATFIELD ARC - 3, Bank Holiday - Lemsford Village Fete / Bar-B-Q Hill Farm T.B.C.; 17, Preparation for HF NFD; June 7, OHMS by G7JKN. Details 0920 462241.

VERULAM ARC - 25, Antiques Road show by Keith Goodchild. Details 0923 262180.

HUMBERSIDE

BRIDLINGTON & DARS - 13, talk 'Microwaves' by G3TRT. Details 0262 673635.

GOOLE R & ES - 14, DF practice; 16, Bill Richards DF event; 21, Contest Planning; June 4, 5, 6 NFD. Details 0405 769130.

GRIMSBY ARS - 13, Talk 'Weather Satellites' by Phil, G0KUD; 27, NFD Planning; June 5/6, NFD at the Ciba Geigy sports ground site. Details Grimsby 825899.

NORTH FERRIBY ARS - 14, Surplus equipment sale; 28, Discussion. Details 0482 650410.

ISLE OF MAN

ISLE OF MAN ARS ****NEW VENUE**** The Royal Navy Assn, Regent Street, Douglas. Club meets every Monday 8.30pm. Society also meet every Thursday at the Royal Legion Club, Peel. Details from Mrs J Wrigley, G07DPG.

KENT

DARENTH VALLEY RS - 26, Station on the Air; June 9, Construction Contest. Details 0474 703322.

EAST KENT RS - 6, talk 'RAYNET' by G6RMA, at Parkside; 20, talk by Dennis, G4SOT, held at Iloom(UK). Details 0227 364606.

HILDRSTONE RS - 14, talk and demo 'Surface Mount for Amateurs'. Starting late September, RAE course by G3JIX. Details 0843 869812.

MAIDSTONE YMCA ARS - 4, Dummy Morse Tests; 7, Construction Competition, (open); 8, RSGB Morse Tests; 14, RAE and CW; 21, Practical evening, bring soldering irons etc. G0RJC; 28, Rally '93 Final meeting; 30, Club Bi-Annual Rally. Details 0622 670936.

MEDWAY AR & TS - ****NEW SECRETARY**** Mrs Gloria Ackerley, 40 Linwood Avenue, Stroud, Rochester, Kent ME2 3TR. Tel: 0634 710023.

SEVENOAKS & DARS - 17, talk 'PC Boards for the Amateur' by G1TVJ.

LANCASHIRE

BURY RS - 11, Alarms (not clock!); Bury Radio Society are still meeting at the Mosses Community Centre, Cecil Street, Bury, at 8pm Tuesday evenings. Details from G3HII on 0204 883212.

HESKETH ARC - 11, talk 'Quads'; 25, Radio Quiz night; June 8, talk 'Honey in the Ether'. Details 0704 63344.

THORNTON CLEEVELEYS ARS - 10, talk 'The Lightning Fighter' by Trevor Tarr; 17, Construction evening; 24, Final preparation for HF Field Day. Details from G4BFH, QTHR.

ROCHDALE & DARS - 10, talk 'Five Million Volts - Aftermath'; June 7, Talk 'HF Airband' by G0PUD. Details 0706 32502 or 061 653 8316.

LEICESTERSHIRE

CHARNWOOD ARCC - 2, 20m ORP nite on air at Albion; 16, 160m nite on Air at Albion; 30, Club Field Day; June 6, Contest planning VHF. Details 0509 232927.

LEICESTER RS - 3, VHF Contest Review, VHF NFD preliminary planning; 10, talk by the Radiocommunications Agency; 24, Quarterly progress, open meeting & HF NFD final arrangements. Details Leicester 762241.

LOUGHBOROUGH & DARC - 4, 2m DF 'Local Pub'; 11, 'Wymeswold' Aerials experiments; 18, talk by ITC Commission - all visitors welcome; 25, talk 'The Other Man's Shack' by G0LCU. Details Loughborough 218259.

LINCOLNSHIRE

GRANTHAM RC - 4, Club Quiz; 18, Talk 'HF Antennas' by Mike, G3PJR; June 1, Inter Club Quiz. Details 0476 65743.

LOUTH & DARS - 17, Junk Sale at the British Legion Hall, Louth. The Club meet on 3rd Tuesday of each month at The Wellington, Louth, 7.30pm. Details G1XWD, QTHR.

SPALDING & DARS - 14, talk 'Procedure and CW operating' by G4OO; June 6, Jubilee Mobile Rally at Springfield Gardens. Details 0775 750382.

MERSEYSIDE

LIVERPOOL & DARS - 4, Video 'Radio Control of Model Aircraft'; 18, NFD Preparations; 25,

Surplus Sale. Society meets at 8.00pm every Tuesday evening at the Church Hill Club, Church Road, Wavertree. Details 051 722 1178.

NORFOLK

NORFOLK ARC - 5, talk 'Radio Bygones' update by Tim Christianson; 12, GB3NB Repeater Annual General Meeting; 16, Club trip to RSGB '93 Exhibition at NEC; 19, Real Radio; 26, Final HF NFD briefing. Details 0603 618810.

YARMOUTH RC - 6, Used Equipment Sale; 13, Informal; 20, Caravan Maintenance Party Bradwell. At informal meetings HF and VHF Operating is carried out, also Morse practice. Details Yarmouth 721173.

NORTHAMPTONSHIRE

KETTERING ARS - 25, talk 'Amateur Radio Direction Finding' by George Whenham, G3TFA. Club meets every Tuesday at 7.30pm at the Electricity Sports & Social Club, Eskdak Street, Kettering. Details 0536 514544.

NOTTINGHAMSHIRE

ARC OF NOTTINGHAM - 6, Forum/talk on WAB Awards by Kate, G0FEZ; 20, Foxhunt No 2 / Activity; 27, Construction Evening. Details 0602 232604.

MANSFIELD ARS - 6, Annual General Meeting, 7.30pm. Details from G0NZA, 0623 755288.

POWYS

POWYS ARC - 6, Visit by Clive Trotman, G4YKLL, changes in the RSGB over the last two years; 13, talk 'Computers in the Shack' by Simon, G0W7CV; June 3, NFD Briefing. Details G4WJ3UW, QTHR.

SOMERSET

TAUNTON & DARC - 7, Skittles evening, Royal Oak Inn, Hillcompton (7.30pm for 8.00pm); 21, Visit to Stockland IBA Station, 8.00pm at the station. Details from G3WNI on 0823 680778.

WEST SOMERSET ARC - 4, Visiting speaker; June 1, Fox Hunt. Details G4AJU, QTHR.

SOUTH GLAMORGAN

CARDIFF RSGB G - 10, Visit to PMR Ltd at Gwaelod-y-Garth at 8.00pm. Details 0446 773212.

SOUTH YORKSHIRE

BARNLEY & DARC - 3, Bank Holiday (club open); 10, talk 'Badger Boards'. Details 0226 203448 6-7pm Mondays, 6-8pm other days.

SHEFFIELD ARC - 10, Quiz round 4; 17, RSGB Video; 24, Practical night. Club meets at 7.30pm at Fifth Park Pavilion, Fifth Park Road. Contact via PO Box 365, Sheffield, S1 1BY.

STAFFORDSHIRE

CANNOCK CHASE ARS - 5, talk 'By Train to Vladivostok' by G0ESB. Details 0543 262495.

STRATHCLYDE

KILMARNOCK & LOUDOUN ARC - 4, Talk 'Radio History' by GM3AAX; 18, RSGB Video; June 1, Field Day Preparations. Details from GM4ULP. Tel: 0563 820052.

WEST OF SCOTLAND ARS - 7, Strathclyde Police Communications Networks; 14, Club Night; 18, Visit to BBC MWLW Transmitting station at Wester Glen; 21, Annual General Meeting. Details 0698 350926.

SUFFOLK

FELIXSTOWE & DARS - 10, Talk 'Repeaters' by Clive, G6MCG at OPS; 24, ESWR Planning at FOX; 30, East Suffolk Wireless Revival rally at MSC; June 7, Night on the Air at OPS. Further details from Paul on 0394 273507.

IPSWICH RC - 12, Practical 'Basic radio measurements' by Alan, G3NYK; 26, ESWR Planning Meeting; 30, East Suffolk Wireless Revival rally; June 9, Talk 'How to lay out printed circuits that work' by Ian, G0OZS. Details 0473 742072.

LEISTON ARC - 4, talk 'Use of test equipment (GDO, Wavemeters, Oscilloscopes, etc) around the shack' by Alan, G3NYX; June 1, 'TVI' Ray, GOAT. Meeting are on the first Tuesday of each month at the Sizewell Visitors Centre at 8.00pm. Details 0986 874800.

SURREY

THAMES VALLEY ARTS - 4, 'Antenna Forum' held by G4FKA. Details 0483 284279.

THREE COUNTRIES ARC - 12, Lecture 'Liquid Crystal displays and their development' by Dr Cotes of Merck; 26, ORP; June 9, Demonstration of sweep generator techniques - including tuning an Antenna by Graham, G4WNT. Details 0428 642930.

TAYSIDE

DUNDEE ARC - 4, talk by Harry Matthews, Museum of Communications BoNESS; 11, Construction evening; DARC Awards Evening; 25, Construction evening. Details from GM4FSB, QTHR.

WARWICKSHIRE

MID-WARWICKSHIRE ARS - 11, Talk 'Oscilloscopes' by Terry, G3MXH; 25, Home-Brew evening; June 8, Talk 'Metalwork & Mechanical construction' by John, G8JHS. Details 0926 424465.

STRATFORD UPON AVON & DARS - 10, Preparing for the 2m DF Foxhunt; 24, DF Foxhunt. Details 060 882 495.

WEST MIDLANDS

MIDLAND ARS - ****NEW SECRETARY**** Mr R E Smith, G4YUJof 27 Laburnum Road, Bourneville, Birmingham B30 2BA. Details 021 628 7632
 SOUTH BIRMINGHAM RS - 5, Badger Boards, G4YZO; June 2, talk 'My Radio Experiences' by G3YKO. Details 021 458 1603.
 SOLIHULL ARS - 20, Packet Radio by Derek Waller, G0FPN. Details 021 777 9965 (eve).
 STOURBRIDGE & DARS - ****NEW SECRETARY**** Mr J French, G7HEZ, 2 Pepper Hill, Stourbridge, West Midlands, DY8 1BJ. Club normally meets on the 1st and 3rd Mondays of the Month at Robin Woods Centre, Scotts Road, Stourbridge.
 WEST BROMWICH CRC - Meets each Sunday at 7.30pm. Further details from G0PAI, tel: 021 561 2884.

WEST SUSSEX

HORSHAM ARC - 6, talk 'Electronic components' G3NPF. Details 0737 842150.

WEST YORKSHIRE

DENBY DALE ARS - 5, talk 'Clocks' by David Poole; 19, Fox Hunt at 7.30pm. Details 0484 429238.
 HALIFAX & DARS - 18, Visit - Police Headquarters, Richmond Close. Details 0422 202306.
 KEIGHLEY ARS - 13, horse racing at the cricket club/natter night; 27, horse racing at the cricket club/natter night. Details 0274 496222.
 TODMORDEN & DARS - 3, talk 'Pony Express the real thing', by Tony G0DDB; June 7, talk Fault Finding, by Tony, G8LTC. Details 0422 882038.

WILTSHIRE

TROWBRIDGE & DARC - 5, Data mode symposium; 17, event planning. 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'.

2 MAY

ANGLO-SCOTTISH Rally - Tait Hall, Kelso. Details Bruce, GM4UIB, 0573 224654 (eves).
 BAC Rally - Harlaxton Manor, Nr Grantham, just off the A1 (signposted). Usual traders, Bring & Buy, bar and refreshments, lecture programme, demonstrations and flea market. Talk-in. Family venue. Details: Paul G8MJW, 0522 703348.

3 MAY

DARTMOOR Radio Rally - Yelverton Memorial Village Hall, Meavy Lane, Yelverton, Devon. (New larger venue - parking for 600 cars) Doors open 10.30am. Access for disabled. Refreshments available. Talk-in on S22. Playground for children. Details G7LLG 0822 852586.
 MIDDLESEX ARS Rally - Civic Hall, Winsford. Doors open 11am (10.30 for disabled visitors). Full catering and ample car parking. Details: David G4XUV, 0606 77787.

9 MAY

MARS/DRAYTON Mobile Rally - Drayton Manor Park, Tamworth, Staffs, on A4091. Doors open 10.30am. Usual traders, flea market, bring and buy, club stands, a family rally. Details: Peter G6DRN, 021-443 1189. Traders bookings Norman G8BHE, 021-422 9787 (eves).
 9th YEOVIL QRP Convention - Preston Centre, Monks Dale, Yeovil. Doors open 9am. Admission £1.50. QRP related lectures; display of home-made QRP equipment; on-air QRP stations using callsign GB2LOW; trade stands orientated to QRP components etc; a chronological display of working vintage radio; refreshments available throughout the day. Admission £1.50. Details: G3CQR, 0935 813054.

16 MAY

DUNSTABLE DOWNS Radio Club - Annual National Amateur Radio Car Boot Sale at Stockwood Park, Luton. Nr junction 10 M1. 10am until 5pm. Talk-in 2m and 70cm. Attractions include admission to the Environmental Open Day, free entry to Mossman collection of Horse Drawn Vehicles, craft museum, Falconry displays, Rare Breeds exhibition and carriage rides. Plot details on 0582 451057 (6-8pm ONLY please)
 36th NORTHERN MOBILE Rally - The Flower Show Hall, Great Yorkshire Showground, Harrogate, North Yorkshire. Entry and parking off Wetherby to Harrogate Road. Separate arrangements for disabled visitors off Hookstone Wood Road. Showground open 10.00am, doors open 10.45am. 100's of stands; bring and buy, bar, cafeteria and free parking. Details from Mike, G0MKK; tel 0423 507653 eve; Fax 0423 500747 or packet G1UXP @ GB7CYM.
 RSGB'93 Exhibition - NEC Birmingham. Details

from Norman Miller, G3MNV, 0277 225563. See pages 49-52 this issue.

21 MAY

EDGWARE & DRS - Straight Key Evening Listen out for GB2SKE on 80 and 40 metre. Also G3ASR will be on. Novice call on 3.56MHz. Further details from John, G3SJE, QTHR or tel: 081 204 1034.

23 MAY

GLOUCESTER Radio Rally - Car Boot Sale. NASS Lane, Quedgeley, Glos. Off the old Bristol Road, look for signs. 10.00am to 4pm. Details from Mike on 0452 503786.
 HAMBLETON Amateur Radio Society - Family Radio Gathering at Allertonshire School, Brompton Road, Northallerton, N Yorkshire. Bring your own picnic. Car boot sale, no traders. Talk-in on S22. Activities for children and club station operational. Details Nigel, G0HNM on 0609 776608 or Nick, G7COC on 0709 780476.

30 MAY

17th EAST SUFFOLK Wireless Revival - Maidenhall Sports Centre, Ipswich. Doors open 10am-4pm. Car boot sale, Bring & Buy; all usual traders and displays. Talk-in on S22 GB4SWR. Organised jointly by Ipswich RC, Martlesham RS and Felixstowe & DARS. Details: Bob Baal G7HZV, 0394 271257.
 MAIDSTONE YMCA Radio Rally - Route: M20 jct 4, 5, 6 or 7, then A229 Loose Village 2 miles south of Maidstone. Doors open 10.30am (10am for severely disabled visitors). Entry £1 per adult. QXG 8TRF (S22) and G3YSC (10FM & SU22). Exhibition station GX3TRF (on HF). All day video show etc for juniors. Refreshments available. Bring & Buy tables for hire (DIY). YMCA Sports Centre. Details 0622 743317 for pre-Rally booking of camping/caravanning facilities. Trade bookings etc 0622 750709 (before 9.30pm).
 PLYMOUTH RC Rally - Plymstock Secondary School, Church Road, Plymstock, Plymouth, Devon. Doors open 10.30am. Many trade stalls, a large bring & buy, raffle, refreshments, talk-in on S22, car parking and many other items of interest. Details from G7ESZ, 0752 787181.

6 JUNE

25th SPALDING Mobile Rally - Springfield Gardens, Spalding. All trade stands and flea markets will be under cover in the new Exhibition Halls. Details: Mr T Kettlewell, G4TWR, 0775 722940.

13 JUNE

24th ELVASTON CASTLE National Radio Rally - Elvaston Castle Country Park, nr Derby. Details from John Robson, G4PZY, tel & fax: 0332 767994; trade enquiries: Peter Neat, G3WPU, tel & fax 0332 700265 (eves).
 33rd RNARS Annual Mobile Rally - new venue Sports Field, HMS Collingwood, Fareham, Hants. Doors open 10.00am to 5.00pm. Details: Cliff G4UJR, 0703 557469.

20 JUNE

4th ANNUAL BELFAST Radio Rally - ****CHANGE OF DAY AND VENUE****. Held at Chimney Corner Hotel, 630 Antrim Road, Glengormley. This is convenient to the Glengormley turning off the M2 motorway. Doors open 12 noon. Disabled admitted at 11.30am. Trade stands, bring & buy, lucky dip and meals available. Talk-in on S22. Further details 0232 471370 or FAX 0232 471980.
 DENBY DALE & DARS Annual Mobile Rally - Shelley High School (6 miles SE of Huddersfield on B6116). Doors open 11am (10.30am for disabled visitors), traders, car boot sale, refreshments and ample parking. Talk-in S22 and SU22. Details from Phil, G4FSQ, 0484 644827.
 NEWBURY & DARS Annual Car Boot Sale - Ackland Hall, Cold Ash. Details: N Jaques, 0635 863310.

27 JUNE

36th LONGLEAT AR Rally - Longleat House, near Warminster, Wiltshire. Details from Shaun, G8VPG, QTHR 0225 873 098.
4 JULY
 KINGS LYNN ARC Rally - Cattle Market, Kings Lynn. Details 0553 841189.
 NEWPORT ARS 1993 Junk and Boot Sale. Details from GW7BSC, QTHR or Tel: 0633 262488
 YORK Radio Rally. Details from Andy Suter, G0GX1 0904 708164.
 CORNISH RALLY - Penair School, Truro. Details 0872 862046.

11 JULY

GALWAY Radio Experimenters Club - Annual Radio Rally. Convent of Mercy, New-Townsmlyth, Galway.
 HORNCASTLE Amateur Radio, Electronics and Computing Fair. Queen Elizabeths Grammar School Sports Hall, Horncastle, Lincs. Further info and booking forms from T Nightingale, G6CZV, 0507 522482.
 SUSSEX AR&C Fair. Details & traders' booking: Ron Bray, G8VEH, QTHR 0903 763978 (H) 0273 415654 (W).

18 JULY

McMICHAEL RALLY and Car Boot Sale - Details from Neil, G8XYN 0628 25952.

RSGB WOBURN Rally. Details from Norman Miller, G3MNV, 0277 225563.

25 JULY

COLCHESTER Radio & Computer Rally. Details: Frank, G3FUJ, 0206 851189.
 RAIBC Romsey Picnic at Broadlands. All members, families, friends and supporters welcome. Grand draw, junk sale and refreshments. Talk-in on S22. Details John, G4COM 0703 693017.
 NORFOLK ARC & Hewett School Radio and Electronics Group Rally. Details Sheila, G0KWP, 0603 618810.

29 JULY/2 AUGUST

AMSAT-UK Colloquium: See page 8. Details from G3AAJ 081 989 6741.

1 AUGUST

McMICHAEL Rally and Car Boot Sale. Details Neil, G0SVN or Roy, G4XYN, 0628 25952. (This rally was originally scheduled for 18 July).

8 AUGUST

DERBY & DARS Mobile Rally. Details from Martin Shardlow, G3SZJ QTHR 0332 556875.
 FLIGHT REFUELLING ARS Hamfest'93. Details Richard Hogan, G4VCQ 0202 691021.

15 AUGUST

SOUTHEND & DRS Rally - Details G0DFE, 0702 202216.

22 AUGUST

WEST MANCHESTER RC Summer Rally. Details: G11OC, 0204 24104 (evenings).

29 AUGUST

GALASHIELS & DARS Open Day. Details John, GMDAMB 0835 22686.
 TORBAY ARS Mobile Rally. Details G3HTX QWTHR, 0803 526762.

5 SEPTEMBER

BRISTOL Radio Rally (incorporating Bristol Computer & Electronics Fayre). Details from Muriel Baker, G4YZR, 62 Court Farm Road, Whitchurch, Bristol BS14 0EG, tel: 0275 834282.
 MILTON KEYNES & DARS 7th Annual Radio Boot Sale. Details Ray, G1LRU, 0908 660798.
 TELFORD AR Rally - Usual venue. Contact Bob, G7BQW 0952 770922/ 0836 739903.
 VANGE ARS Annual Rally. Details Mike Musgrave, G4NVT, 0268 543025.

11 SEPTEMBER

SCOTTISH AR Convention. Details Tom Hughes, GM3EDZ, 041 882 5753.

12 SEPTEMBER

BARTG Rally - Sandown Exhibition Centre. Details Peter Nicol, 38 Mitten Avenue, Rubery, Rednal, Birmingham B45 0JB, 021 453 2676.
 LINCOLN SWC Hamfest. Details from Denis, G1XZG, 0522 684214.

19 SEPTEMBER

PETERBOROUGH R&ES East of England Rally. Details from Mike, G0CVZ 0733 222588.

26 SEPTEMBER

THE THREE COUNTIES Rally Malvern, Worcestershire. New Event. All trade enquiries and bookings to Eddy Cotton, G4POZ, 0905 773181.
 9th NORTH WAKEFIELD RC Rally. Details from John, G4RCG, 0924 362144.

3 OCTOBER

GREAT LUMLEY Radio Rally. Details Barry, G1JDP, 091 388 5936.
 BLACKWOOD & DARS Rally - Details from Norman, GW0MAW, 0495 227550.
 WINCANTON RALLY - details Norman, G4YXX 0749 850432.

8/10 OCTOBER

RSGB International HF Convention - NEW DATE - See ad on page 79.

10 OCTOBER

KIDDERMINSTER & DARS - NEW DATE, NEW VENUE.

17 OCTOBER

HORNSEA (East Yorkshire) RC Rally. Details Duncan, G3TLI, 0964 532588.

29/30 OCTOBER (FRI/SAT)

LEICESTER Amateur Radio Show - Granby Halls. Details G4PDZ 0533 871086.

31 OCTOBER

BISHOP AUCLAND Radio Amateur Clubs Rally. Details Mike, G0PRQ, 0388 766264.

6/7 NOVEMBER

7th NORTH WALES Radio & Electronics Show. Details B Mee, GW7EXH, 0745 591704.

14 NOVEMBER

BARNSELY & DARC AR Rally. Details Ernie, G4LUE, 0226 716339 (6pm-8pm please).
 MARS/STOCKLAND Radio Rally. Details Norman, G8BHE 021 422 9787.

21 NOVEMBER

WEST MANCHESTER RC Winter Rally. Details 0204 24104 (eves).

GB CALLS

The list below shows special event stations licensed for operation during this month. These callsigns are valid for use from the date given but the period of operation may vary from 1-28 days.

1 MAY

GB0DC Durham Cathedral
 GB0KVH Kingston Village Hall
 GB0LBL London Borough of Lewisham
 GB0PBB Perth Boys Club
 GB1ALW Adult Learners Week
 GB2CDW Fort Wallington
 GB2GMM Guglielmo Marconi Memorial
 GB4ESC Evesham Sea Cadets
 GB4HC Harpenden Carnival
 GB4WHR Walsall Hospital Radio

2 MAY

GB2BMF Bocking Mayday Fayre
 GB2CCW Combined Charity Walk

3 MAY

GB2LOW Yeovil QRP Convention

6 MAY

GB4CPC Castlehill School Cupar
 GB0PSJ Planetarium Silver Jubilee

7 MAY

GB0MIR Mir Anniversary
 GB0RNS Royal Naval Special

8 MAY

GB2SKE Straight Key Evening
 GB4AC Air Cadets
 GB50DAM 50 Years Dambusters

11 MAY

GB0HLC Harrogate Ladies College
 GB1HLC Harrogate Ladies College

12 MAY

GB4HS Hirst School

13 MAY

GB2RCC Radio Caravan Club
 GB617SQN 617 Squadron

14 MAY

GB2CPC Castell Penrhyn Castle
 GB2SEM Southern Electric Museum
 GB8RC Rockingham Castle

15 MAY

GB0CCC Castell Chirk Castle
 GB2AMF Astbury Mayday Festival

16 MAY

GB8NEC RSGB '93 Show

20 MAY

GB6OL Over-Lord
 GB8WA Western Approaches

21 MAY

GB4AAC Army air Co-operation
 GB50WA Western Approaches

22 MAY

GB0AMS Alderney Middle School

23 MAY

GB2RTS Roots 93

26 MAY

GB2AWM 200 Years Abide With Me

27 MAY

GB2LBC Lyte Bicentenary Festival

28 MAY

GB2RCC Radio Caravan Club

29 MAY

GB2AF Vintage Wireless Museum
 GB4SWR Suffolk Wireless Revival

31 MAY

GB5SAW Seevic Activities Week

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- RG174U, 2.3mm, 50 ohm, miniature coax.....30p/m
- UR95, 2.3mm, 50 ohm, mini nylon coax.....30p/m
- UR111, 2.3mm, 75 ohm PTFE mini coax.....40p/m
- UR57, 10.3mm, 75 ohm low loss coax.....70p/m
- UR70, 6mm dia, 75 ohm transmitting coax.....30p/m
- Double screened, 75 ohm coax, 8mm dia.....40p/m
- UHF low loss TV downlead, 75 ohm.....25p/m
- 75 ohm twin balanced feeder, 400 w PEP.....20p/m
- 300 ohm standard ribbon.....20p/m
- RG62AU, 6mm dia, 95 ohm coax.....50p/m
- Single core screened cable, 2.3mm dia.....12p/m
- Two core screened cable, 5mm.....30p/m
- 3 core mains, 5 amp, cable.....25p/m
- 6 core rotator cable, heavy duty.....45p/m
- 8 core rotator cable, heavy duty.....65p/m
- 14 SWG HD copper.....25p/m 16 SWG HD copper.....20p/m
- PVC coated AE wire, light duty.....8p/m
- Red/black DC power cable, 8 amp.....30p/m
- Red/black DC power cable, 15 amp.....45p/m
- PVC coated AE wire, heavy duty.....12p/m
- NEW UR67 50 ohm HD with robust outer sheath.....90p/m
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● **RSGB Policy Matters**
Zonal Council members:
See page 4

● **For general advice and details on local clubs, or if you don't know who to contact:-**

Your RSGB Liaison Officer

AVON (Zone D) - Shaun O'Sullivan, G8VPG, 15 Witney Close, Salford, Bristol BS183DX. Tel 0225 873098.

BEDFORDSHIRE (Zone B) - Post vacant - refer to Zonal Council Member.

BERKSHIRE (Zone D) - Dave Chislett, G4XDU, Hilltops, 2a St Marks Road, Maidenhead, Berks SL66DA. Tel Home: 0628 25720; Work: 081 540 0600 ext 2086.

BORDERS (Zone G) - Ian Wilson, GM4UPX, 30 Howdenburn Court, Jedburgh, Roxburgh TD8 6JP. Tel 0835 62656.

BUCKINGHAMSHIRE (Zone D) - Ron Ray, G3NCL, Flat 4 Victoria Villas, Gladstone Road, Chesham, Bucks HP5 3AD. Tel 0494 776420.

CAMBRIDGESHIRE (Zone B) - Mr Michael Brooke, G8HXR, 70 Wooton Avenue, Old Fletton, Peterborough PE29EG. Tel 0733 340485.

CENTRAL (Zone G) - Brian Waddell, GM4XQJ, 'Carsemount', 3a Polmont Road, Laurieston, Falkirk FK2 9QQ.

CHESHIRE (Zone A) - Dave Glover, G1VJP, 216 Alder Street, Newton-le-Willows, Merseyside WA12 8HS. Tel 0925 225445.

CLEVELAND (Zone A) - Post vacant - refer to Zonal Council Member.

CLWYD (Zone E) - Peter Higgs, GW41GF, Oulton, Parkside, Rossett, Wrexham, Clwyd LL12 0BP. Tel 0244 570212.

CORNWALL & ISLES OF SCILLY (Zone D) - Bert Hammett, G3VWK, 'Rosehill', Ladock, Truro TR2 4PQ. Tel 0726 882758.

CO ANTRIM (Zone F) - Belfast: Gordon Curry, G16ATZ, 4 Rocklands, Annhill, Hillsborough, Co Down BT26 6NU. Tel 0846 638896. Co antrim: Albert Henry, G14CRL, 23 Long Common, Ballymena, Co Antrim BT42 2NU. Tel 026641068.

CO ARMAGH (Zone F) -

RSGB Liaison Officers (A-I) and Honorary Officers

The Society has a large number of volunteer experts available to help and advise members on a wide variety of subjects. Each month we will be focussing on a different section of the volunteer workforce, whilst still giving brief details of the main office-holders. See also the Information Directory section of the *RSGB Call Book*.

Raymond Ashe, G18RLE, 49 Deans Walk, Sleepy Valley, Richhill, Co Armagh BT61 9LD. Tel 0762 870423.

CO DOWN (Zone F) - North: see under Co Antrim, Belfast. South: see under Co Armagh.

CO DURHAM (Zone A) - see under Cleveland.

CO FERMANAGH (Zone F) - see under Co Armagh.

CO LONDONDERRY (Zone F) - Victor Mitchell, G14ONL, 1 Myrtlefield Road, Londonderry, Northern Ireland BT47 1PG. Tel 0504 311019.

CO TYRONE (Zone F) - see under Co Londonderry.

CUMBRIA (Zone A) - Mike Gibbings, G3FDW, 5 Meadowbank Lane, Grange over Sands, Cumbria LA11 7AT. Tel 0539 532433.

DERBYSHIRE (Zone B) - refer to Zonal Council Member.

DEVON (Zone D) - Mr D Hinds, G3VNG, Greengates, 4 Thornyville Villas, Oreston, Plymstock, Plymouth PL9 7LA. Home Tel 0752 401511.

DORSET (Zone D) - Ken Powell, G1NCG, 17 Shipstal Close, Hamworthy, Poole, Dorset BH16 5AU. Tel 0202 666050.

DUMFRIES & GALLOWAY (Zone G) - refer to Zonal Council Member.

DYFED (Zone E) - Martin Goodall, GW8ZMU, 91 Uzmoston Road, Haverfordwest, Dyfed SA61 1UA. Tel 0437 764009.

EAST SUSSEX (Zone C) - Jim R Harris, G4DRV, Upton, Crowborough Hill, Crowborough, East Sussex TN6 2DA. Tel 0892 655894.

ESSEX (Zone C) - Malcolm Salmon, G3XVV, 54 Church Road, Rivenhall, Witham, Essex CM8 3PH. Tel 0376 514377.

FIFE (Zone G) - Martin Hobson, GM8KPH, 17 Well Brae, Pitlochry, Perthshire PH16 5HH. Tel 0796 2140.

GLOUCESTERSHIRE (Zone D) - Post vacant - refer to Zonal Council Member.

GRAMPIAN (Zone G) - Mr Stewart Cooper, GM4AFF, Grytviken, South Cookney, Stonehaven, Kincardineshire AB3 2RX. Tel 0569 31182.

GREATER LONDON (Zone C) North: Roy Charlesworth, G4UNL, 6 Curzon Avenue, Enfield, Middlesex EN3 4UD. Tel 081 804 5643. South: Robin Sykes, G3NFV, 16 The Ridgeway, Fetcham, Leatherhead, Surrey KT22 9AZ. Tel 0372 372587.

GREATER MANCHESTER (Zone A) - Bob Catlow, G4ARP, 137 Haven Lane, Moorside, Oldham, Lancs OL4 2QQ. Tel 061 652 8617.

GUERNSEY & DEPENDENCIES (Zone D) - Brian Ayres, GU1HTY, Rousey, Bailiffs Cross Road, St Andrews, Guernsey, CI. Tel 0481 36104.

GWENT (Zone E) - Peter Dombrowski, GW1NYO, 30 Hillary Road, Newbridge, Newport, Gwent NP1 5DD. Tel 0495 246359.

GWYNEDD (Zone E) - North: Dewi Roberts, GW0ABL, 23 Lon Hedydd, Siglan Farm Estate, Llanfairpwll, Anglesey, Gwynedd LL61 5JY. Tel 0248 713647. South: Mr T P Vernalls, GW6IMS, 5 Min-y-Traeth, Minffordd, Penrhyndeudraeth, Gwynedd LL48 6EG. Tel 0766 770546.

HAMPSHIRE (Zone D) - John Irving, G4XJT, 5 The Thicket, Fareham, Hants PO16 8PX. Tel 0329 827051.

HEREFORD & WORCESTER (Zone B) - Dave Gourley, G0MJY,

4 The Serpentine, Kidderminster, Worcs DY11 6NX. Tel 0562 862374.

HERTFORDSHIRE (Zone C) - Peter Fairhurst, G0KLU, 6 Audwick Close, Cheshunt, Herts EN8 0RF. Tel 0992 633036.

HIGHLAND (Zone G) - refer to Zonal Council Member.

HUMBERSIDE (North Humber-side: Zone A, South Humber-side: Zone B): North: Norman Bedford, G4NJP, 44 Hilderthorpe Road, Bridlington, N Yorks YO15 3BG. Tel 0262 673635. South: (also for Lincs) Ray Degg, G0JOD, 42 Hawthorn Road, Cherry Willingham, Lincoln LN3 4JR. Tel 0522 750316.

ISLE OF MAN (Zone A) - Brian Brough, G4PTV, Kimmeragh View, Ballacorey Road, Bride, Isle of Man.

ISLE OF WIGHT (Zone D) - Doug Byrne, G3KPO, 'Lynwood', 52 West Hill Road, Ryde, Isle of Wight PO33 1LN. Tel 0983 67665.

RSGB Liaison Officers (J-Z) will appear in next month's At Your Service.

HF Awards Manager - Bill Ricalton, G4ADD.

VHF (and Microwave) Awards Manager - Ian L Cornes, G4OUT.

HF Manager - Martin Atherton, G3ZAY.

VHF Manager - Dave Butler, G4ASR.

Microwave Manager - Mike Discon, G3PFR.

Emergency Communications Officer - John Irving, G4XJT.

Intruder Watch Co-ordinator - David Owen, G0OES.

Morse Practice Transmissions Co-ordinator - Post Vacant.

Project YEAR Coordinator - Hilary Clayton-Smith, G4JKS.

Amateur Radio Observation Service Co-ordinator - Geoff Griffiths, G3STG.

Trophies Manager - Bob Harrison, G4UJS.

IEE Liaison Officer - Peter Saul, G8EUX.

Chief Morse Test Examiner - Roy Clayton, G4SSH.

Society Historian - George Jessop, G6JP.

Audio Visual Library Co-ordinator - David Simmons, G3JKB.

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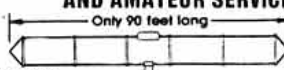
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The LAST WORD

HANKS FENLAND SAINTS

Can I through *The Last Word* report on the work of three 'saints':

First, Sam, G0ECL assisted by Don, G0DMF, who have proved that miracles can still happen. For over five years I have continually struggled to pass the dreaded Morse test. Unlike all the "I know best" brigade who all say "anybody can pass the Morse test in six months if they really try"; these two saints recognise that for some of us that may not be the case. Even though I kept failing to pass the test they never gave up on me, always being encouraging and supportive. So at last I've got my ticket which, without their help and support, would have been totally impossible. However, my wife reckons I was given a pass certificate for long service as opposed to good conduct! And one wag at the RSGB asked whether I would be interested in taking out a monthly direct debit to cover my test appointments. So next time you come across someone who feels defeated by Morse, don't tell them how clever you were to pass in a couple of months - it doesn't help. Rather be like the Fenland saints and encourage them to keep plodding on. Sam and Don invest a terrific amount of time helping those like me who might otherwise be put off.

Having passed the terrible test I came up against problem No 2. I had just moved into a house where the only possible HF antenna had to be a vertical. I looked at lots of ads but verticals were either too expensive or I found people that had tried them but were not impressed with them. Then I had the good fortune to meet saint No 3, Ron, G3KBR. He made me an amazing three-band vertical called a DX TRI-STAR to work on 10-15-20 metres with an amazing 1:1 VSWR at the centre of each band progressing to 1.6:1 (at worst) at the band edges. He helped me put it up, cleared up some TVI (due to earth problems, not the antenna) and a number of other small problems, all of which only cost me £115. So if anyone needs an exceptional aerial that will outstrip the best in a pile-up during the next lift, why not drop Ron a line?

So thank you to the saints of this world; it's people like them that really make our hobby very special.

Michael Nokes G0TDT

PROUD OF NOVICES

I and my fellow G QRP Club Officers were stone cold proud to see that two Novices had received first and second placings in the excellent RSGB QRS/CW Contest. They were: 2E0ABI, young Phil in North Yorks, with whom I have corresponded many times, by post and 2-way QRP/CW; and Jenny, 2E0ABC, aged 13 years, QTH Liverpool, also a QRP contact and corresponding friend. We must also not forget the good efforts of John, 2E0ACY (Northampton) for a creditable performance.

These youngsters have been members of G QRP Club since their introduction into the hobby - and we are very proud of them all and would like to say to Phil, Jenny and John - a very hearty "Well done" from our club.

Those who knocked the Novice Licence - go try some QRP CW yourselves. You may get no come-backs from your early 'CQ QRP' calls - and you may have to adjust your antennas/ATUs etc before you achieve results as these youngsters did - but you'll sure as heck get remarks such as "Ur 2W doing FB hr OM" and "best 72s from all here".

It is also encouraging to note from my several letters weekly that many Novices are looking towards the full Amateur Radio Licence - which is what Project YEAR is all about.

David Gosling G0NEZ

Novice Services Manager G QRP Club.

ONE-VALVE TRANSCIVE

I can confirm that transmission and reception using a one-valve regenerative receiver was not confined to youthful American amateurs (*Technical Topics*, March). I recall, as a schoolboy in the mid-1940s, running a highly illegal net in Peterhead using exactly this technique. The microphone was a carbon granule type widely advertised for 'Home Entertainment' via the PU or 'Gram' socket of any contemporary radio. The price was five shillings (25p). The net came to an abrupt end when QRM reports from irate neighbours began to reach my parents! The surprising range of transmission - a number of miles - was due, no doubt, to the very generous 'longwire' antenna and an efficient earthing system which were pre-requisites to good reception on a single valve receiver.

Kinnear Macdonald GM6KWX

GB LOCATIONS

Many thanks for the new style *Radcom* now with its 100 pages. I must say that I like the new section in it: *Helplines, At Your Service* etc.

One very minor moan, which also concerned the old style *Radcom*, is the GB Calls. I feel, and so do quite a few other amateurs I have spoken to, that we would like to see locations added to the list or locator squares to aid making contact with these stations. For example I presume that GB0CAT Cheshire Cat is to broadcast from somewhere in Cheshire and GB0HLC is from Harrogate but some of the other callsigns give no clues whatsoever. GB75RAF is a fine example, along with GB0MID and GB2GOC, all of these are reported as stations for April but there must be more information supplied that could be of assistance to us all in locating these stations.

Many thanks again for the good work that you all do up at HQ.

Bob Waters GORSW

[Thank you for your kind comments, Bob. We are looking at various ways of improving the GB Calls information and will bear your comments in mind - Ed]

QSL PRINTING

RSGB caters for almost every need of radio hams except providing a QSL card printing service. QSL cards being a very important part of amateur radio activities, is it not time that the RSGB started looking into providing some sort of QSL card printing service to meet the needs of people like me?

I know there are quite a few people advertising this kind of service in the *Classified Advertisements* section of *RadCom*, but judging from my own experience some of them are not very reliable, are they?

Over the last three months I have sent nearly five or six self-addressed and stamped envelopes to different people who have been claiming to be providing efficient and fast QSL card printing services. So far only one has bothered to send me some sample cards. The rest of my stamped envelopes have disappeared.

P Bakrania, G0MHA

[The Society is currently looking at the viability of providing this service - Ed]

SUPERHUMAN JOHN

I am dropping you a line today in praise of John Allaway (*HF News*) and the Post Office. I sent a package of QSL cards for checking to John at 12.30 on Monday morning and received them back, fully checked, at 08.45 on the Wednesday morning. I could believe the superhuman efficiency. Very well done to John and the Post Office.

Stuart Perry G0LRX

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.

LAMENT OF AN EX-CHAIRMAN'S WIFE

Forget golf widows, fishing widows and cricket widows. I was a member of a modern breed - a Chairman's widow.

Who heard more from my husband than me? His Committee! Where was he when his favourite TV or radio programme was transmitted? Answering letters or returning telephone calls! I was, of course, watching the TV alone - except when my unpaid advice was requested to check spelling or grammar.

Being electronically minded and knowing how electronic gadgets function, my darling husband (Chairman - unpaid) rushed to help others who had problems, but my electronic gadgets, vacuum cleaner, toaster, spotlights and items of that ilk, had to be fitted in after other, more pressing jobs. "I'll do that at the weekend" or "Remind me tonight" are phrases I came to know (and hate).

If I had a pound for the times friends and neighbours have said "You are so lucky to have a handyman in the house", I could spend a week at a health farm, but then who would look after my 'Chairman' and tell him which tie to wear with which shirt or tell him brown shoes do not go with that suit.

At the end of the day it was not all bad. I had the satisfaction of knowing he was at home and only a few feet away in the study and not chatting up the 'birds' down the local hostelry.

Finally, next time you ask for assistance, please make sure you have done all you can to solve your problems, before contacting the EMC committee members. Their wives would probably like to spend some time with them, too!

Irene P Peace

ODE TO CODE

G0KHB(stroke QRP) 'tis me G0RGB
The times we worked were very hard
I still don't have
The treasured card
Please send it urgently

You say your power is low
Compared to mine? It's QRO
My sixty milliwatts
Or less, transceive
I don't expect you to believe

But, QRM and QRN abound
With other noises all around
One Watt will just add to the mess
And so my power gets less and less

The spots you use are crystal fixed
Not the best that could be picked
The answer is of course to go
And buy yourself a VFO

Without the rocks, the world all round
Comes crashing in; turn down the sound
The VFO appears to be
The answer to cacophony

The dream's short lived, it's very sad
The noises here are just as bad
So, finding problems still prevail
Try VHF you'll never fail!

Did I detect a haughty snort
"A boys' band
Where I'll ne'er be caught"
Or is the truth more hard to tell
There's A1A up there, as well

With dedication, and a key
Some work the States on EME
Many more, don't sit and natter
They log DX on meteor scatter

When tropics comes into its own
They'll still be there
No not on phone
"Not impressed", I hear you say
You've never heard of CQ A?

Before I go, a final plea
Hush, listen oh so quietly
A weak, DX sig on the key
It's not Class 'A'
Just (real) Class 'B'

Callsign supplied

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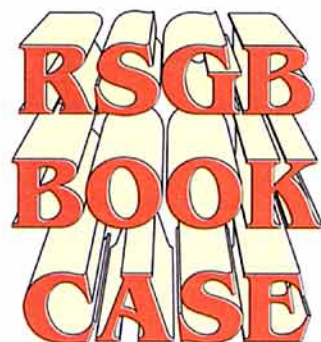
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NEXT COPY DATE

The display advertisement copy date for our July 1993 issue will be 12th May 1993

GET A MOVE ON!

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Ease-of-use and hi-tech features in a compact body make the ICOM IC-229E an easily installed VHF FM mobile (IC-449E UHF version also available). Features include: one-touch function access, illuminated switches for night use, programmable remote control, programmed scan, memory scan and skip, priority watch, 20 memory channels, and a host of other user-friendly functions.



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Display, Simple Operation For New Hams.

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