Volume 71 No 3

March 1995

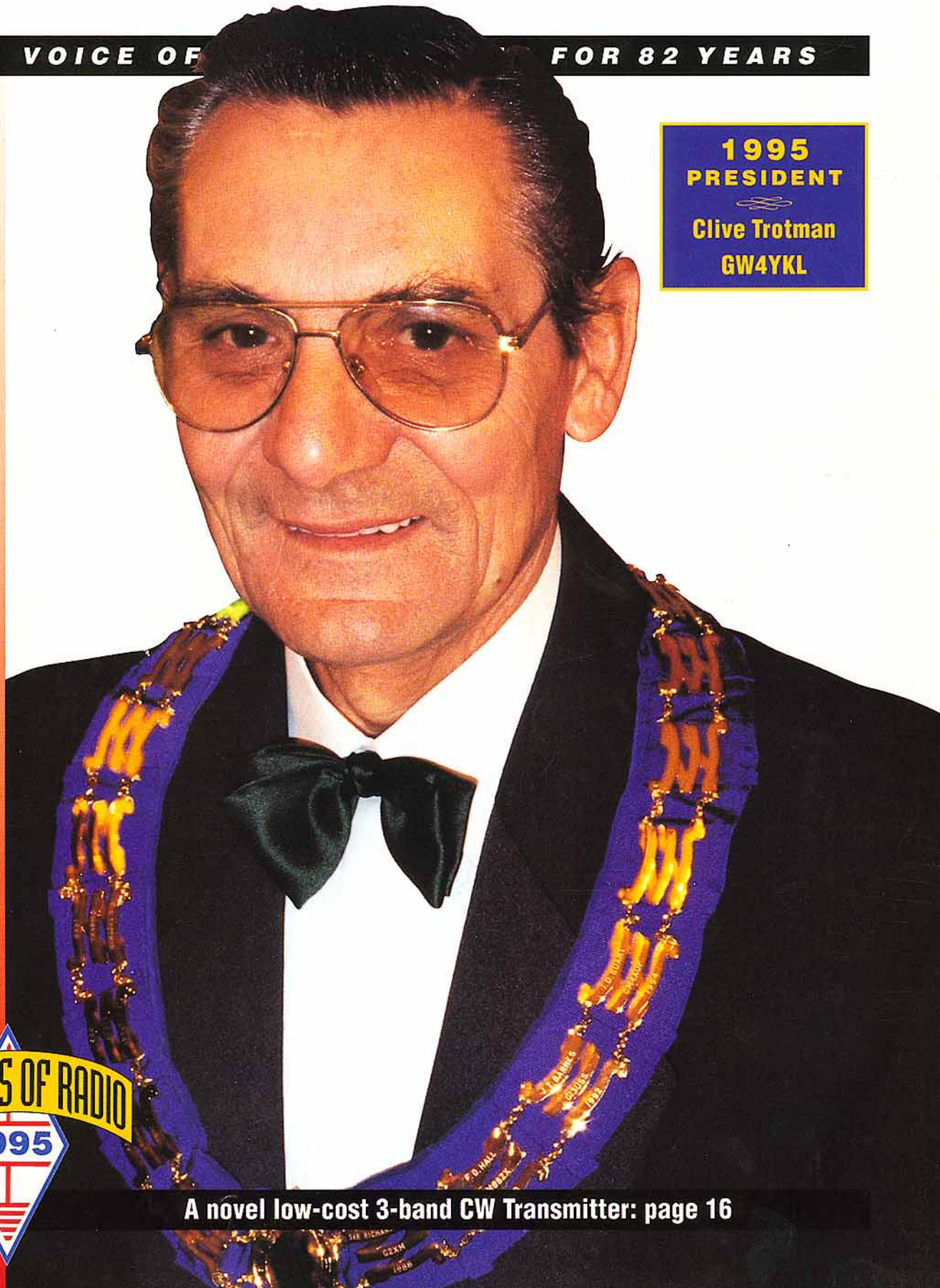
RadCom

Radio Communication

The Journal of the Radio Society of Great Britain

THE VOICE OF [illegible] FOR 82 YEARS

INSIDE: Official Amateur Radio Show Guide



1995 PRESIDENT

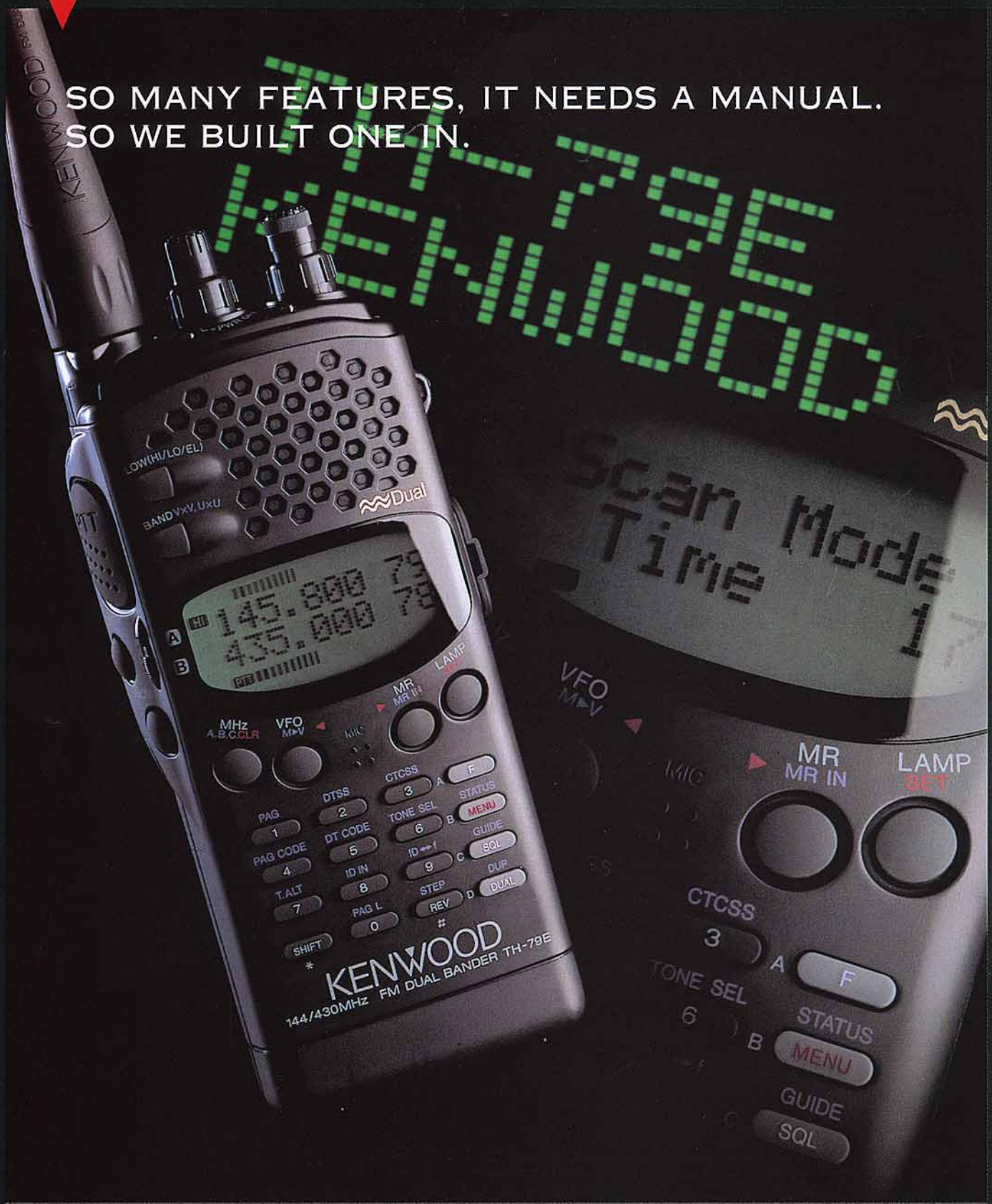
Clive Trotman GW4YKL

100 YEARS OF RADIO 1995

A novel low-cost 3-band CW Transmitter: page 16

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

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



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

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

KENWOOD

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RadCom

COVER PICTURE:
1995 RSGB President Clive Trotman, GW4YKL, shows off the new Presidential Chain of Office at his installation ceremony.
Feature : page 9.

NEWS AND REPORTS

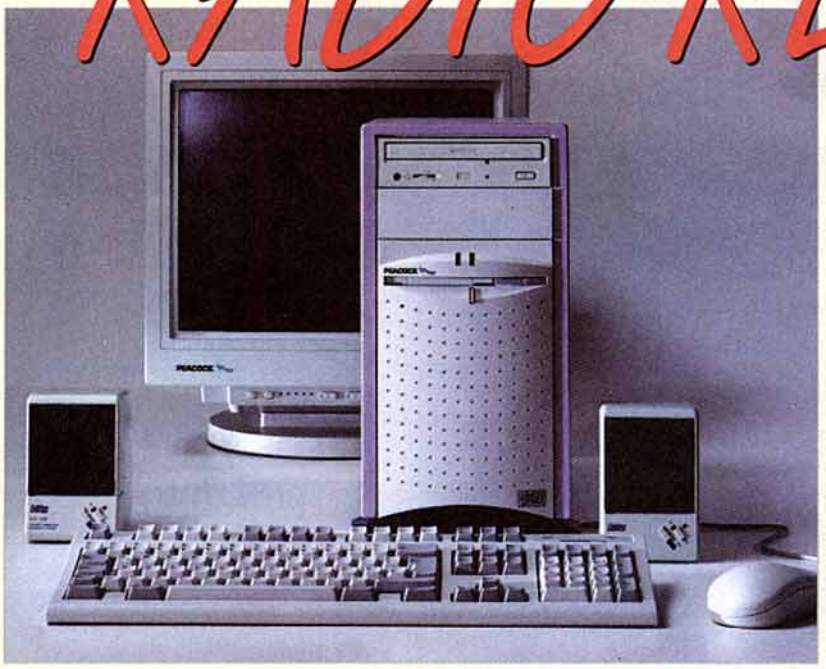
TECHNICAL FEATURES

THE OFFICIAL RSGB LONDON SHOW GUIDE

REGULARS

REVIEWS

"RADIO READY"



PEACOCK

PC's

In January 1995, Peacock Computers appointed MARTIN LYNCH as their sole retailer of "RADIO READY" PC's for the Amateur Radio market. Buying a PEACOCK PC from Martin Lynch ensures that the system is configured for your application, making it simple to employ as an ever important accessory in the modern radio shack. If you have wanted to buy a P.C., but are bewildered at the market with lots of terminology that makes you feel like a beginner to Amateur Radio, then contact MARTIN LYNCH for advice on how and why you should have a PEACOCK P.C. in your shack - TODAY! All systems include a full TWO YEAR WARRANTY anywhere in the British Isles and are compatible with the entire range of AEA, KAM and other Packet and Data Decoding products.

Model Range:

CPU	486DX-40
Motherboard	VLB
Cache	256K
RAM	4MB
HDD	210MB
Controller	VLB
VGA card	SPEA VEGA PLUS
VGA Mem	1MB, VLB
FDD	3.5" 1.44MB
Keyboard	Yes - Cherry
Mouse	Yes - Logitech
Software	DOS V6.2, WFW V3.11
Monitor	14" SVGA Non-interlaced LD

Price Incl VAT, £995

CPU 486DX2-66
As 486-40, but 420MB Hard Disk.
Price Incl. VAT, £1099

CPU PENTIUM 60
The ultimate in Home P.C's.
As 486DX2-66, but 60MHz Processor, 540MB Hard Disk & 8MB RAM.
Price Incl VAT, £1495

All the above items are available on Low Cost Finance. Carriage extra at £20 per system. Please note: The 3 speed CD-Rom, 16-bit sound card and speakers shown in the photograph above are optional extras costing £259.

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By dialling 0181 - 566 0000, via your computer and modem, listings of my NEW & USED stock are available to view. You can place orders, leave queries on a particular product or just "browse" at your leisure. There is no "log-on" fee, no monthly subscription, bar the telephone call made to the shop. As the months go by, Product Reviews will be added together with SPECIAL OFFERS that I am not allowed to print in this magazine! If you haven't got a PC (or a suitable modem), then call us about the new German made "Peacock" range of commercial grade "Radio Ready" P.C's. They are excellent value and are offered with a two year warranty!

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G4HKS
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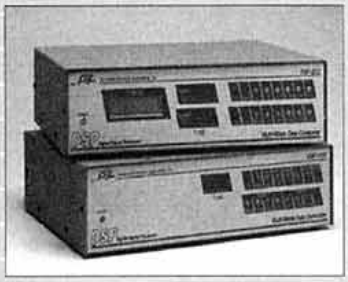
For Everything In Packet Radio,
There Is Only One Make To Choose From

When AEA appointed their U.K. distributors, they wanted to ensure maximum support to their end users. They chose MARTIN LYNCH & SISKIN ELECTRONICS for this very reason. Since October last year the retail prices have been reduced and remember, buying from either company will ensure you get products designed for the U.K. market.
Phone or fax your order through today.

DSP-2232 & 1232



The only DSP (Digital Signal Processing) Data Controller available. The DSP-1232 with 2 switchable ports, and the DSP-2232 with 2 simultaneous ports, provide a new level of performance & versatility in data controllers.

RRP £799.95 & £649.95

PK-232MBX

Probably the best selling Data Controller in the world, the PK-232MBX is the Radio Modem to choose if you want all modes, including Morse Code, Baudot, (RTTY), Ascii, Amtor/Sitor 476 & 625, Pactor, HF & VHF Packet, B&W Fax tx/rx, Navtex & Amtex. As with the PK-900, the PK-232MBX now includes "SIAM" and is compatible with the popular TCP/IP networking protocol via KISS mode.

RRP £329.95

PK-12

The very latest replacement for the PK-88, the tiny PK-12 not only comes with more features, but its cheaper too! The PK-12 is a 1200 baud VHF packet controller ideal for those of you who are looking at getting started in digital communications. Full-featured mail drop facilities including internal lithium battery back-up.

RRP £139.95

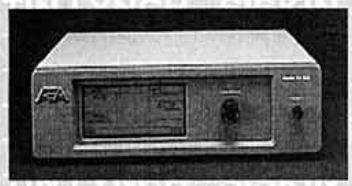
Isoloop 10-30

Magnetic Loop

This high-Q, high efficiency antenna is perfect for Amateurs (and professionals), living in areas with antenna restrictions. The IsoLoop is a compact (only 35") diameter, rugged low profile design, allowing 150 watts of RF anywhere between 10 and 30MHz. Efficiency ranges from a staggering 96% on 28MHz to 72% on 14MHz and because of the high-Q design, TVI is reduced still further over "conventional" antennas. The IsoLoop includes 50ft of control cable and a new improved antenna controller.

RRP £399.95

PK-900



When you're ready to step up from the best selling PK-232MBX, then take a look at the PK-900. Dual simultaneous ports, switchable via a single keystroke, will still allow the user to receive two signals at the same time. Internal firmware includes SIAM - Signal Identification & Acquisition Mode, automatically identifying the incoming mode of transmission - takes out the guess work! Add the optional 9600 baud modem and you're satellite ready!

RRP £479.95

PK-96

Whilst others are still having a five course lunch waiting for 1K of data to transfer, you can enjoy the incredible speed of using a new PK-96 and find yourself with hours of free time on your hands! The PK-96 takes over from where the old PK-88 left off. It comes standard with 1200 baud AFSK tone signalling, as well as 9600 baud G3RUH compatible direct frequency modulation, making the PK-96 an ideal high speed terrestrial, or satellite data controller.

RRP £199.95

PC-Pakratt for Windows

Operate the entire range of AEA controllers from one package. Run two controllers at once, run other programmes on your PC (in Windows), whilst controlling your data controller. Additional features include seperate windows for mailbox operation, QSO Logging, file transfers and more.

RRP £79.95

Other AEA Products

IT-1
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RRP £269.95

SWR-121
Digital FULL visual display 1-32MHz Antenna Analyser
RRP £389.95

SWR-121 V/U
As above, but Range: 120-175, 200-225, 400-475MHz
RRP £449.95

KK-1 Keyboard Keyer
The ultimate high speed keyboard keyer
RRP £199.95

AEA FAX 111
NEW! Computer control s/ware for DATA DECODING
RRP £139.95

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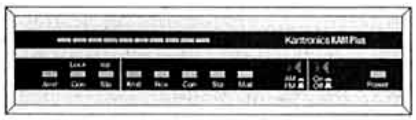
IN TOUCH WIT

If you're coming to Pickett's Lock - visit the Kantronics Packet Village on the Lowe Stand

Kantronics' experts will be on hand to offer expert advice on the Lowe stand as well as providing interesting talks as part of the lecture stream.

Your chance to make sure your views are fed back to the manufacturers.

They'll be demonstrating all the latest products and we'll have the whole lot on working demonstration showing you just what you can achieve with Packet. We'll also be demonstrating the new GTOR mode and you'll find out just what is making GTOR the real mode for h.f. data communications in the 90's, so make sure you come along.



Lowe Electronics is THE place to buy your datacoms gear. We can supply you with everything you'll need from the antenna to the rig to the TNC and everything in between, including all the leads you'll need. Whether you want a simple v.h.f. only Packet station or a full blown h.f. multimode capability, Lowe are the right people. No one else combines our expertise in datacoms products and transceivers.

P.S. - There's a new type of 'Packet' on the air. Tune to 131.725MHz a.m. and just listen to the data bursts. Wonder what it is? Well, its called ACARS, and means Aircraft Communications and Reporting System. This is a system that allows airliners and controllers to keep in touch with aircraft in flight and automatically report engineering and flight information, together with the ability to send messages in plain text. Basically, it's Packet radio for planes and you can decode it with AIRMASTER - the cheapest way to monitor ACARS. See it in action on the Lowe stand.

Check Out Our Other Pickett's Lock Goodies!

Lowe Electronics probably has the biggest range of Ham radio equipment and accessories available on the shelf in the whole of the UK, many of which we are the factory appointed distributor - (and we could do AEA too if we wanted!). Here's just a few of the goodies you'll be able to see at the show...

Manson power supplies.... We're really famous for these. Who else gives you a variable voltage supply with separate voltage and current meters rated at 25A continuous for just £99.95. Have you got your's yet?

At Pickett's Lock you'll be able to see and hear just why JPS digital audio filters are the best in the world. We'll have the full range on working demonstration so you'll be able to try them out for yourself.

With spring approaching, you'll need to think about upgrading, improving or just maintaining your antenna system. Talk to Lowe about Butternut, Hygain, Maldol, Vargarda, Tonna and don't forget our rotator range.

If you are just looking for small accessories, make Lowe your number one call at Pickett's Lock. We stock more accessories than any other dealer you will find anywhere, from crystal filters, CCTSS units to voice synthesisers, a.t.u.s to d.c. leads, cases, battery packs, headphones, speakers - just about everything you will ever need!

We've got everything the mobile operator needs from Maldol mobile antennas and a super range of antenna mounts to suit all types of vehicle. We've also got some special d.c. leads ideal for using your hand-held transceiver or scanner in your car and a perfect mobile mount to hold it in place, and if you need a bit more sound, check out our range of extension speakers.

You'll really be able to put Lowe to the test as we are now stocking Kenwood's superb range of test gear, including 'scopes, signal generators and digital meters. This really increases our usual test gear range and makes Lowe Electronics your number one choice for great test gear at affordable prices.

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LOWE

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Chesterfield Roa

H THE WORLD

We'll have the usual range of products from leading manufactures like Yaesu and Kenwood and you'll see everyone else advertising, but we'll have our own super deals and special offers, including some that our competitors wouldn't DARE to offer! We'll have super clearance lines too so make sure you visit the Lowe stand first for a real bargain. If we haven't got it, it's probably not worth having.

And if you can't make it to Pickett's Lock, all our show rooms around the country are still open on the Friday and Saturday - unlike some of our friends in the business, we don't need to close up just because there's a show on somewhere!

Great New Wire Antenna Systems From

CHELCOM Aerials

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

Chelcom Windoms - Ready To Hang!

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

Chelcom G5RV's

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

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

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

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

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

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

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RADIO SOCIETY OF GREAT BRITAIN

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

PATRON: HRH PRINCE PHILIP, DUKE OF EDINBURGH, KG

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

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Telephone: 01707 659015 - Members Hotline and book orders
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Corporate Members: UK and Overseas (*Radio Communication* sent by surface post): **£32.00.** Airmail rates on request.
UK associate member under 18: £16.00. Family member: £14.00
Corporate (Concessionary): £27.00 over 65 or full time student under 25. (Applications should provide proof of age at last renewal date and/or include evidence of student status.)
Affiliated club or society/registered group (UK): £16.00 (including *Radio Commmunication*). (Subscriptions include VAT where applicable.)

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

Membership application forms are available from RSGB HQ

RSGB Main Switchboard:
01707-659015

The RadCom Leader

Amateur Radio Admin Department

The first of an occasional series about the Society's staff and volunteers.

THERE ARE CURRENTLY four members of staff in the Amateur Radio Administration Department at HQ: Brett Rider (Manager), Lynnette Crawshaw, Sarah Stratton and myself, Fiorina Sinapi (Supervisor).

In common with other HQ departments, we have seen many changes, emerging stronger and more experienced in the many diverse and interesting facets of amateur radio. The department is overseen by Brett Rider, G4FLQ, who is responsible for the IT system at HQ and is Editor of the *RSGB Call Book*.

The principal role of the department is to carry out and assist with the various contractual agreements which the Society has with Radiocommunications Agency (RA). These tasks include the special event stations, Morse tests, Novice instruction and site clearances.

Sarah Stratton is responsible for processing special event station (SES) 'permits'. In addition to producing the notices of variation she also informs the GB QSL sub-managers of SESs issued and passes on to *RadCom* the monthly list of GB stations for publication.

Lynnette Crawshaw deals with the 1000+ RSGB Novice Licence Instructors. Course Completion Slips are issued to all candidates who have successfully completed the Novice Training Course, together with Course Completion Certificates if requested. She maintains contact with Phil Mayer, G0KKL, Project Year Co-ordinator over Novice Instructor liaison and provides direct help with the production of the quarterly *Novice Instructor Newsletter.*

Lynnette is also responsible for the administration of the 12WPM and 5WPM Morse tests, ensuring both candidates and Morse Examiners receive the correct papers. She liaises with both Roy Clayton, G4SSH (Chief), and Geoff Pritchard, G4ZGP (Deputy Chief), Morse Examiners to ensure they are kept informed and to act upon any new examiner appointments they may make.

I am responsible for maintaining records of Repeaters, Beacons, Packet Nodes and Mailboxes at HQ. Constant communication between the various committees (Repeater Management Group, Data Comms Committee) and Beacon Co-ordinators is necessary to ensure that all aspects of these, sometimes intricate, tasks are correctly executed.

On the lighter side, the department aims to provide a friendly and efficient service to members, prospective members and volunteers. Dealing with many diverse queries from "how do I get started in amateur radio?" to "how can I obtain planning permission for my aerial?" and "who do I contact for help on . . . ?" Assistance and advice is also provided on licensing at home and abroad, RAE, membership, contests, club and insurance details. HQ is also a registered City and Guilds examination centre, conducting RAE and NRAE exams for a limited number of candidates throughout the year.

The department is currently undertaking a re-vamp of the Reciprocal and CEPT licence information held at HQ. With the addition of newly formed European countries our data is in need of attention. Obtaining the necessary information from the various National Societies and IARU groups will take some time but once completed it will be a valuable service to members.

As part of the general admin duties carried out within the department, support is given to RLOs and Honorary Officers, working together to improve communication and services. This is achieved via the *RLO Newsletter* and monthly circulars accompanied by advance proofs of the *RadCom* news pages.

The Society supports its members and customers in a variety of different ways using a blend of volunteers and staff. It works through teamwork, so a big "thank you" to all other members of the team, whose praises cannot be sung here, yet whose help enables us to help the amateur community.

Fiorina Sinapi
Senior Amateur Radio Administrator

RadCom NEWS

● THE SECOND Great British Innovation & Inventions Fair takes place 9 - 12 March at Birmingham's National Exhibition Centre. This is "the largest event of its kind in the UK for new inventions, new ideas, business opportunities and technology transfer." Tickets are £6 on the door.

● THE EDDYSTONE USER GROUP publishes a newsletter six times a year packed with information on Eddystone receivers. Subscription details are available from: Eddystone User Group, c/o Eddystone Radio Ltd, Alvechurch Road, Birmingham B31 3PP.

● A YOUNGSTER ANXIOUS to get into amateur radio has persuaded Ken Hill to reapply for his call, G3CSY, which has been dormant since the early '50s. Ken expects to operate initially on 40m CW from the Morecambe Amateur Radio Club.

● THE SOVEREIGN Base Area of Cyprus has introduced a Novice Licence, virtually identical to the UK one. Calls are in the ZC4N** series with Class B Novices signing /B.

● A DX WARNING system for VHF operators has been established on E-Mail by G4MJS. Join the mailing list by addressing an E-Mail to majordomo@insite.parasoft.co.uk with the message subscribe vhf-dx-warning.

● THE LATEST CALLSIGNS issued by SSL at 8 February were in the G*0VS*, G*7UK*, 2*0AJ* and 2*1DS* series.

Shetland RLO

THE RSGB LIAISON OFFICER for the Shetlands is: Robert G Miles, GM4CAQ, 58 Fogralea, Lerwick, Shetland ZE1 0SE.

Three Committee Vacancies

THERE ARE TWO vacancies on the RSGB **VHF Committee**. Particularly sought are members with experience of VHF DXing and contest operation, and for those with experience of exhibition and rally organisation, but the Chairman will also consider anyone with good general VHF experience. Write to the RSGB VHF Committee c/o Peter Burden, G3UBX, 2 Links Road, Penn, Wolverhampton WV4 5RF, or send Internet E-Mail to jphb@scitsc.wlv.ac.uk.

The RSGB **HF Committee** has lost the valued services of Ed Taylor, G3SQX, who has emigrated to Colorado, USA. There is a consequent vacancy for an additional member to contribute to the committee's policy making activities. A project will be allocated, possibly co-ordinating adjudication, and some log checking will be necessary from time to time. Access to a PC would be helpful. Contact Chris Burbanks, Chairman HFCC QTHR.

From CB Radio to President of RSGB via RAE Instructor

First Welsh GW Installed as President

THE 1995 RSGB President, Clive Trotman, GW4YKL was installed at a ceremony on 14 January in Bridgend. In attendance were the Deputy Lord Lieutenant of Mid Glamorgan, VIPs from the Irish, Belgian, French and German national societies, and hundreds of Clive's friends, including many of his former RAE pupils.

Clive came into amateur radio from a CB background, and soon realised that he should be putting something back into the hobby he so enjoyed. Having put more than 440 through the RAE and NRAE, he was elected to RSGB Council in 1991. He becomes the first native GW to hold the office of President, though previous holders have included GW8NP, GW8HEZ and GW4HWR.

Above: Past-President Ian Suart, GM4AUP, formally hands over the chain of office to Clive Trotman, GW4YKL, at Bridgend, Mid Glamorgan.
Left: One of the VIP guests, Gaston Bertels, ON4WF, from the UBA gives an animated speech.

JASON and the Amateurs

THE BRITISH GEOLOGICAL Survey in Nottingham and the Merseyside Maritime Museum, Liverpool, will be hosts to three special event stations: GB0JAS, GB2JAS and GB6JAS in early March. The event is part of the JASON Project (Expedition Island Earth), an annual scientific expedition involving Dr Bob Ballard, who discovered the Titanic wreck, and a team of scientists and students.

In late February and early March, the team will explore the volcanic islands of Hawaii. At Mauna Kea observatories a study will be made of other planets, and from outer space NASA technology will be used to look back at Earth. Daily satellite broadcasts will bring the project live to centres in the USA, Canada, Bermuda and the UK where schools, colleges and the public will be able to see science in action.

In the UK, the JASON Project - sponsored by Barclays Life - will be received at five centres. Two of these, the British Geological Survey's HQ and the Merseyside

CONTINUED ON PAGE 10

New Executive Vice-President

AT ITS MEETING ON 14 January, RSGB Council elected T I 'Smudge' Lundegard, G3GJW, as Executive Vice-President for 1995.

CONTINUED FROM PAGE 9

Maritime Museum, will have amateur radio exhibits and special event stations. The stations aim to promote the JASON Project, demonstrate amateur radio and encourage a greater interest in radio communications, electronics and science.

Skeds are being set up with research vessels, remote research stations and other JASON Project stations.

Operating Schedules

FROM 5 to 11 March GB0JAS will operate at **Nottingham** around 3.770, 7.070, 14.070, 21.270 and 28.470MHz as conditions permit. GB6JAS will use 51.230 and 144.230MHz SSB, plus 51.550, 144.550 and 433.550MHz FM.

Operating the Nottingham station will be members of: Loughborough and District ARC, Melton Mowbray ARS, ARC of Nottingham, South Notts ARC, Hucknall Rolls Royce ARC, Erewash Valley ARG, South Derbyshire & Ashby Wolds ARG and GPT Communications ARC. Other participants include the Remote Imaging Group (live weather displays), STELAR and the RSGB.

GB2JAS will be operated by members of the **Liverpool** and District ARS on weekday evenings and all day Saturday from 27 February to 11 March. Frequencies are expected to be close to those used by the Nottingham station, though 6m may not be used.

A special aim of the JASON special event stations is to encourage a greater interest in the UK Novice Licence scheme and there will be Novices operating the stations from time to time.

Anyone wanting skeds, or who is able to help, should contact Alan Clayton, G7HZZ, on 0115 936 3253 (day), 0115 921 2857 (evenings) or E-Mail K_ARC@UK.ACNERC-KEYWORTH.VAXA; or Jim Anderson, G0TDK, 104 Mab Lane, West Derby, Liverpool L 12 6RL.

Novice RAE

THE CITY AND GUILDS' report on the December Novice Radio Amateurs' Examination has been published. RSGB members requiring a copy should send an SASE marked 'December NRAE Report' to: RSGB, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE.

● AN IRISH LANGUAGE NET is on 3650kHz on Sundays after the IRTS News Bulletin call-ins.

COUNCIL BRIEF

Notes of a meeting held on 12 November 1994

Administrative

Offers from several business schools having been received in respect of a graduate placement, it was resolved that the successful candidate should look at the Society as a whole and not simply at the working of HQ.

It was resolved that Council, at its next meeting address the possibility of a complete re-drafting of the Articles of Association.

The member for Zone B having tendered his resignation for wholly personal reasons, it was accepted regretfully and resolved that the vacancy be advertised in December *RadCom*, with discussion and decisions on applicants to be carried out at the January 1995 meeting.

A R Matters

The position of LAC Chairman was considered, as were some aspects of the LAC structure, but firm decisions were deferred to await the outcome of a Presidential meeting with officials of the RA. The recent resignation of ARDF Chairman would be taken up by the President with a view to reconsideration.

Consultation was continuing between Society officers and RA on the future shape of AROS.

GB2SM: The General Manager reported that negotiations were continuing with the Science Museum authorities and he hoped to report a successful outcome soon.

Awards: Council approved recommendations for the annual awards and prizes and that Dr J N Gannaway, G3YGF, should be nominated for the honour of Vice-President of the Society in recognition of his unstinting work in a number of areas. It was also resolved that Mrs M H Claytonsmith, G4JKS, should be awarded the Founders Trophy for her wholehearted dedication to the Society and its work.

It was felt that the terms of reference for the award of the Founders Trophy were unduly constraining and that there should be a trophy in the gift of Council that could be awarded to members of that body for services rendered to the Society. Mr N Lasher, G6HIU, generously offered to donate such a trophy.

The appointment of Mr P Mayer, G0KKL as Project YEAR Co-ordinator was approved.

Financial Matters

Council noted that the finances continued to be sound and was pleased to be informed that book sales were on the increase.

The General Manager reported that the HQ computer project was progressing according to schedule.

Rallies and Exhibitions: It was resolved that the E&R Committee be authorised to organise the 1995 Woburn Rally, and that the Society co-operate with Radiosport Ltd in a convention to be held at Bletchley Park in the summer of 1995.

The General Manager reported that he had received a number of enquiries about the recent advertisement seeking alternative methods of mounting Society events. These would be put before the Executive Committee for decision on how they should be progressed.

The President thanked retiring Council members Mr G L Benbow, G3HB and Mrs M H Claytonsmith, G4JKS for their contribution to the work of the Society.

PHOTOGRAPH: G0EAA

Jim Anderson, G0TDK (centre), Chairman of Liverpool and District ARS, presented a cheque to the Royal School for the Blind. Through sponsorship of special event station GB2RSB the club raised £732. Jim commented: "Its nice to know that we can help people who are less fortunate than ourselves through amateur radio - I would like to thank everyone who helped". He is pictured with two senior pupils of the school and the fund organiser.

Honours

TWO NEW RSGB **Vice-Presidents** have been elected by the Council. They are Past-President Julian Gannaway, G3YGF, and AMSAT-UK supremo Ron Broadbent, G3AAJ. The Society's **Founders Trophy** was presented to Hilary Claytonsmith, G4JKS.

Ron Broadbent, G3AAJ.

Dr Julian Gannaway, G3YGF.

RSGB Comes to You

IN ADDITION TO the large RSGB book and information stand at the RSGB **London** Amateur Radio and Computer Show on **11/12 March**, HQ staff will man an RSGB stand at the Norbreck Amateur Radio Electronic and Computing Exhibition in **Blackpool** on **19 March** (see this month's *Events Diary*).

Lynchline BBS

MARTIN LYNCH of the Amateur Radio Exchange Centre has put on line a Bulletin Board System (BBS) so that customers can dial direct and find details of new and used equipment 24 hours a day, seven days a week. The number is 0181 566 0000 and you'll need a PC and a modem running at a minimum of 2400BPS to gain access.

Unlicensed Op Forfeits Equipment

THE RADIOCOMMUNICATIONS AGENCY (RA) reports that it secured a successful prosecution on 13 December 1994. At South Tyneside Magistrates Court an unlicensed radio operator using amateur equipment was convicted of the unlicensed use of a 2m amateur radio transmitter/receiver. The defendant (who has not been named by the RA) was conditionally discharged and ordered to pay costs of £20. All equipment was forfeited.

More Marconi

THE WEST WIGHT Radio Society has obtained a permanent special event callsign, GB2GMM, for their station located at the Needles Pleasure Park, Alum Bay, IoW. This was the site used by Guglielmo Marconi for the first transmissions across water, firstly to a ship and later across the Solent to Bournemouth.

EMC Committee Changes

THE FOLLOWING are no longer members of the EMC Committee: J Martin, GU3YIZ, and R Sykes, G3NFV. They are thanked for their work on behalf of the Society. A list of EMC Co-ordinators will be published next month.

HQ Facilities More Available

RSGBHEADQUARTERS is now open on the third Saturday in every month from 10am to 4pm. The shack, library, museum and bookshop will be available to visitors, so if you can't make it to Potters Bar during the week, make a date in your diary for Saturday, 18 March.

And we've also made the shack, library and museum available five days a week, every week, instead of the former two days a week. Shack operation is subject to the availability of licensed HQ staff so it is still advisable to book your visit in advance to avoid disappointment.

Four members of the North Ferriby United Amateur Radio Society at the club's Annual Dinner: Back row (L to R) - Malcolm Cohen, G4XWA, Vice-Chairman; Frank Lee, G3YCC, Chairman; and Ken Kirby, G4VKK holding the G3YCC Award which he has won twice. In front is Michael Hindley, 2E0AHY (9) who, having passed the Morse test at seven, enjoys CW contacts encouraged by his father, G4VHM. Michael is holding a certificate commemorating his being the first Novice licensed member of the NFUARS.

RSGB Events for 1995

EVENTS FOR YOUR DIARY: the RSGB London Amateur Radio and Computer Show (see this month's middle pages) 11/12 March; RSGB HQ Open Day 22 April; RSGB Bletchley Park Amateur Radio and Computer Rally (NEW EVENT) 17/18 June; RSGB National Mobile Rally, Woburn, 6 August; RSGB Stafford Amateur Radio and Computer Show 19/20 August; RSGB HF Convention 8 - 10 September (note this is not the date shown in the January *RadCom*); and the RSGB Annual Meeting, London, 2 December.

Repeater Editor

THE RSGB REPEATER Management Group (RMG) is seeking an Editor for the occasional newsletter *Repeater Report* which is sent to all UK repeater groups. Applications should be sent to the RMG Chairman, Geoff Dover, G4AFJ, QTHR.

Phase 3-D

MEMBERS' ATTENTION is drawn to January's *Satellites* column which starts with a plea for funds to launch AMSAT's Phase 3D satellite. Phase 3-D isn't just another satellite - its large size will enable very modestly equipped stations to access it. Phase 3-D will replace AMSAT OSCAR-13 which is predicted to burn up in the atmosphere in 1996.

Donations to ensure the launch of this satellite should be made payable to AMSAT-UK and sent to: AMSAT-UK Hon Treasurer, 94 Herongate Road, Wanstead Park, London E12 5EQ.

GB2CW Extra

A NEW GB2CW RSGB Morse Practice transmission is available each week in the Huntingdon area. The sender is G4LHI who will operate at 7pm each Tuesday on 145.225MHz FM. A full list of the GB2CW transmissions is published in the 1995 edition of the *RSGB Call Book*.

Air Ambulance Helped

THIRTEEN SPECIAL EVENT stations throughout the West Midlands and surrounding areas operated over the weekend of 28/29 January to raise money for the County Air Ambulance.

One of the stations, GB2AAS, was run by members of Stourbridge and District ARS. Local newspapers and television stations carried reports on the station, and Stuart McKinnon, G0TBI, was interviewed by Tony Maycock of Central TV.

Last year's event raised over £3,500, and it is hoped that, together with sponsorship from Makro Self Service Wholesalers Stuart Crystal, this year's figure will be even bigger.

The County Air Ambulance - which covers five counties over an area of 500 square miles - costs £2,000 a day to run and survives on public donations.

Computer Fairs

ALL FORMATS COMPUTER Fairs take place throughout the UK. The events scheduled for March and April are listed below. Opening times are 10am to 4pm and admission costs £4 per adult (£2 after 2pm), £2 for a child and wheelchair users get in free. But you can get in free by cutting out the ticket on this page.

166 of these fairs have been held to date and on sale are CDROMs, Pentium motherboards, public domain and shareware programmes, games, second hand ATs, Amigas, etc.

Further information can be obtained from Bruce Everiss on 0181 856 8478.

Events Programme

Sat 11 Mar	Northumbria Centre, Washington.
Sun 12 Mar	Woodside Hall, St Georges Cross, Glasgow.
Sat 18 Mar	Haydock Park Racecourse, Jcn 23, M6.
Sun 19 Mar	NAC (Royal Showground), Stoneleigh.
Sat 25 Mar	Courage Hall, Brentwood, Jcn 28, M25.
Sun 26 Mar	Tolworth Recreation Centre, A3 Surbiton.
Sat 1 Apr	Northumbria Centre, Washington.
Sun 2 Apr	Woodside Hall, St Georges Cross, Glasgow.
Sat 8 Apr	Haydock Park Racecourse, Jcn 23, M6.
Sun 9 Apr	Royal Baths Assembly Rooms, Harrogate.
Sat 15 Apr	Bassetlaw Leisure Centre, Eastgate, Worksop.
Sun 16 Apr	National Mototcycle Museum, Jcn 6, M42.
Sun 23 Apr	Tolworth Recreation Centre, A3 Surbiton.

Please Help Bristol Jack

TO TRY TO REPAY a debt of gratitude to the hospice which looked after his wife during her last months, RSGB member J A 'Bristol Jack' Jenkinson, G7GDI, is to travel the well-worn path, Land's End to John O'Groats.

But Jack's achievement will be all the more remarkable because he is in a wheel chair. He will undertake the journey during May to raise money for St Peter's Hospice, and for the British Heart Foundation to whom he believes he owes his own life.

Jack is looking for help from members in the form of sponsorship, providing communications or helping to collect donations from the public on the way. Any member or club wishing to assist should contact RSGB Marketing Coordinator Marcia Brimson, 2E1DAY, at HQ.

Monaco Stamps Franked

FROM 27 FEBRUARY to 12 March, the Monaco Post Office will frank outgoing *postcards* with a mark commemorating the 40th anniversary of the Association des Radio-Amateurs de Monaco (ARM). Letters will be similarly franked from 17 to 24 April.

These franking/cancellation stamps can be obtained by mail by supplying envelopes or postcards with the appropriate stamps on them and marked with the name and address of the one requesting it and with "correspondence philatelique" written on the back. Address your requests to: Receveur du Bureau de Poste de Monte-Carlo, MC 98020 Monaco Cedex.

Operate in Latvia

LATVIA HAS SIGNED CEPT agreement T/R 61-01 which permits *temporary* operation in Latvia by the other signatories (including the UK) without formal reciprocal licensing. Visitors should append 'YL/' to their UK calls. Full details of how this scheme works can be found in Clause 11 of the *Amateur Radio Licence (A) or (B) Terms, Provisions and Limitations Booklet BR68.*

Under the same agreement, Latvian stations may now operate temporarily in the UK with the 'G/' prefix *but only after passing an examination consistent with CEPT TR61-09* (Harmonized Amateur Radio Examination Certificates - HAREC).

Award Scheme for Graduates

RACAL INSTRUMENTS and the Radiocommunications Agency have launched an award scheme to stimulate interest and encourage innovation in graduates and undergraduates studying radio communications and associated electronic engineering subjects. Open to full and part-time degree course students within the EU, trainee engineers are invited to submit their final year projects for assessment by a panel of judges drawn from industry and academia.

Entrants should provide a 300 word synopsis of their project, accompanied by pictures or diagrams as necessary, and students whose projects display the most potential will be invited to submit their completed project at the end of the academic year.

The winner will receive a trophy, a cheque for £500 and an expenses paid trip to Racal Instruments Inc in California. Runners up will receive a diploma and a cash prize. In addition, the University sponsoring the winning student will receive a £1000 innovation endowment.

Synopses, which should arrive by **28 February**, should be sent to: Racal RA Graduate Innovation Award, Racal Group Services, 62 Suttons Park Avenue, Reading, Berks RG6 1AZ, UK.

Instructors to Meet at LAR&CS

AT THIS MONTH'S RSGB London Amateur Radio and Computer Show, there will be an opportunity for all Novice and RAE Instructors to get together and compare notes.

The meeting will take place on Sunday 12 March at 11am in 'The Creche' which is being used as a lecture room. It is located on the balcony behind the Special Interest area (see plan in this month's centre spread).

MS in the *Telegraph*

METEOR SCATTER was featured in the *Weekend Telegraph* on 4 February in a large item about RSGB VHF Manager Dave Butler, G4ASR.

Together with a large picture of Dave's shack, the article explained the technicalities of MS and moonbounce and despite phrases like "Being a moonbouncer is like being a werewolf . . ." the feature was a generally positive one.

JA Quake Help

JAPANESE AMATEURS have been active in relief operations following the earthquake that struck the Kobe area on 16 January.

Over 200 amateurs have been connecting relief centres and exchanging information on road conditions, health, welfare, availability of water and food, and whereabouts of residents.

Members of the Japan Amateur Radio Equipment Association supplied two hundred handheld transceivers for 430 and 1260MHz and three repeater stations to help these efforts, at the request of the Ministry of PTT.

Calling All Caravanners

THE AMATEUR RADIO Caravan and Camping Club holds weekend caravan rallies in the Midlands and Southern England, some of which coincide with radio rallies. The next event is 14 - 17 April (Easter) at Amerton, Staffs. Details from the Secretary, Alan Gard, G4LWA, on 01494 531755.

● REPORTS OF the demise of CW at Portishead Radio (*News & Reports*, Oct) were premature. Portishead handles CW traffic from over 100 ships a day and maintains a 24-hour CW watch.

Help Make Russian Friends

KEN NORVALL, G3IFN, founded in 1987 the Club of Friendship (COF) between radio amateurs of Russia and the UK. Since then, club members have met through nets, given each other language help and some have even been to Russia (and Russians to the UK). The Club of Friendship is currently preparing a Russian/English handbook for QSOs.

Ken is now standing down from co-ordinating the UK end of the COF and a replacement is sought. Help is needed with organisation, secretarial help and just some plain good ideas. Anyone interested in the COF should contact Arseny Tarasov, RA3AKR, at PO Box 48, Moscow, 121019, Russia; Fax 010 7 095 151 5797 attn A Tarasov; Packet RA3AKR @RK3KP.

Morse Examiners Wanted

THE RSGB CARRIES out Morse testing at 12 and 5WPM on behalf of the Radiocommunications Agency (RA). There are vacancies for RSGB Morse Test Examiners in the following counties: Bedfordshire, Cumbria, Greater London (South), Greater Manchester, Gwynedd, Lincolnshire and Surrey.

RA requirements stipulate that prospective examiners must demonstrate their ability to receive at 20WPM, and send a typical test passage on a manual key. In addition, the Society looks for people with the personality to deal with candidates in a professional manner and the ability to work as part of a county team.

Applicants should contact the Chief Morse Examiner, Roy Clayton, 9 Green Island, Irton, Scarborough, N Yorkshire YO12 4RN; tel 01723 862924. Interviews will be arranged at radio rallies throughout the UK during 1995, the first being on Saturday 11 March at the RSGB London Amateur Radio and Computer Show (see this month's Show Guide).

World QRQ Championships

IT APPEARS THAT the First IARU World High Speed Telegraphy Championships (see *RadCom*, Jan) will feature national teams, rather than individuals. Any member wishing to enter on behalf of the RSGB should write to RSGB HQ as soon as possible.

PHOTOGRAPH: G3KPO

This is what can happen when you fall off a ladder - so take care with those aerial adjustments! Casualty Douglas Byrne, G3KPO is pictured with well-known QRP transceiver designer the Rev Eric Sears, ZL2BMI, at the Wight Wireless Rally.

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FT 5100	Save £100	Master Price	**£529**
FT11R	Save £30	Master Price	**£269**
FT41R	Save £40	Master Price	**£299**
FT530	Save £125	Master Price	**£375**
FT290R	Save £80	Master Price	**£459**
FT690R	Save £80	Master Price	**£459**
FT2500M	Save £40	Master Price	**£329**
FT2200	Save £50	Master Price	**£329**

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TS-450SAT	Save £170	Our Price	**£1379**
TS-790E	Save £200	Our Price	**£1649**
TM-733E	Save £70	Our Price	**£659**
TM-255E	Save £100	Our Price	**£799**
TH-79E	Save £50	Our Price	**£399**

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IC-765	Save £300	Our Price	**£2695**
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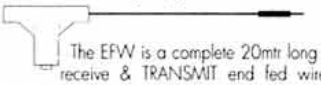

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Kenwood R1000 - Digital S/W Receiver	**£350**
Lowe HF150 - Ex demo in mint condition.	**£315**
Trio R2000 RX	**£395**
Yaesu FRG100 - Excellent S/wave RX	**£475**
Yaesu FRG7700 + VHF Conv. - G.Con	**£425**
Yaesu FRG8800 + VHF Convertor	**£495**
Yaesu FRG9600 - Basic Model	**£325**

HF TRANSCEIVERS

Icom IC701-701PSU Both Boxed	**£495**
Icom IC707 HF - Add FM if needed (1only)	**£775**
Icom IC728 - HF 100W Fitted AM/FM board	**£750**
Icom IC730 - 100W Mobile H.F	**£499**
Kenwood TS120S + VFO120S - Filtered	**£495**
Kenwood TS140S - Boxed Excellent Con.	**£695**
Kenwood TS520SE - Good Faithful H.F.	**£385**
Ten Tec Scout 555 - 1 Only New (Ex Demo)	**£475**
Tokyo H.P. - 15m H.F. Mono Bander	**£175**
Trio TS530SP - Base H.F. Excellent Cond.	**£525**
Trio TS900 - H.F. Cheap but works well!	**£275**
Yaesu FR70G - Military style HF transceiver 10W	**£395**
Yaesu FT77 - Nice condition, Good starter HF	**£475**
Yaesu FT102 - Complete H.F. Line Up	**£945**
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Icom IC 2SRE - 2m Handie Boxed	**£195**
Kenpro KT220 - 2m Handies, K.Pad+LCD	**£165**
Yaesu FT-209 - 2m Handie nice model	**£140**
Yaesu FT530 - Dual Handies, last 1 as new	**£375**
Yaesu FT709 - 70cm Handie.Ideal for novice	**£150**
Yaesu FT709 - 70cm Handie, Good	**£140**

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Icom IC290 + 40W P.A. - 2m m/mode	**£425**
Kenwood TM255 - 2m m/mode (1 only)	**£775**
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Trio 7200G - Cheap 2m Mobile - Bargain!	**£75**
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ERA Microreader - V4.2	**£125**
Tokyo HP HX640 - 6m to HF Transvertor	**£225**
Vectronics VC300DLP - Bargain A.T.U.	**£95**

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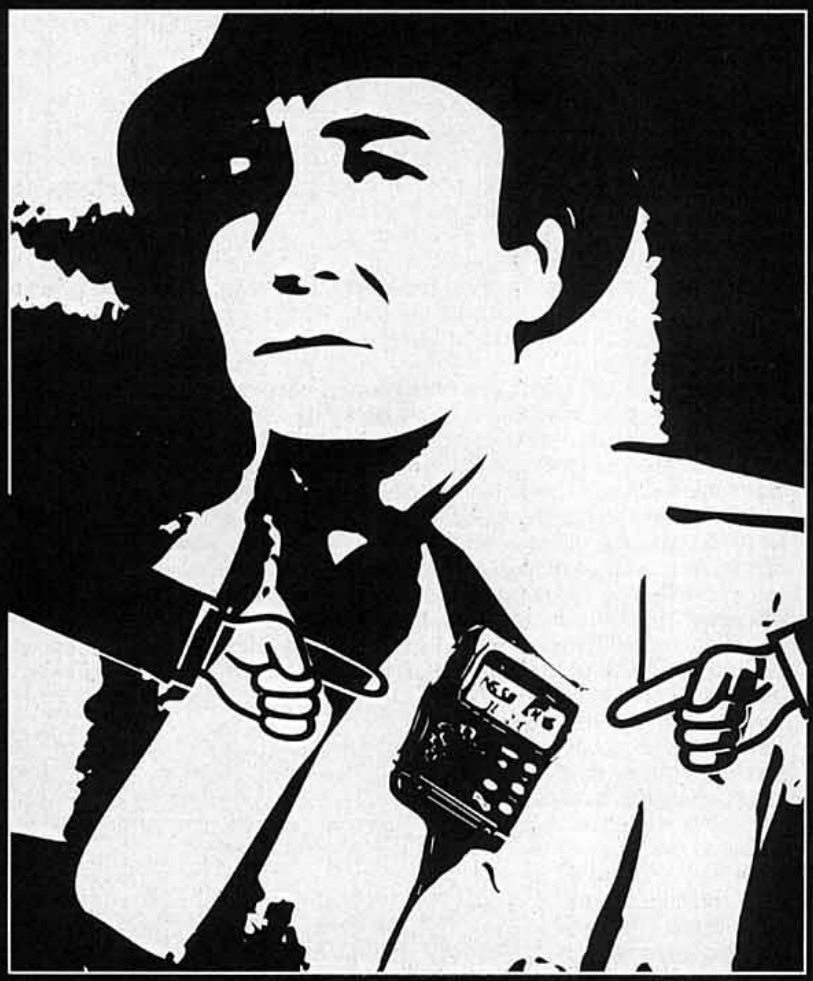
To help you to store station names etc., alphanumeric notes can be programmed into each memory channel and displayed together with the operation frequency.

Up to 6 messages can be transmitted using DTMF codes, ideal for transmitting 'secret' codes etc.



Other features include:

- Twin tuning dials for both main and sub-band control.
- Electric volume control via detached panel.
- Wide 4.5 -16 Volt operating via external DC jack.
- V/V and U/U for simultaneous 2 signal receive capability in the same band.
- Large memory capacity of 100 channels (50 channels for each band).

We anticipate that this truly innovative dual-band transceiver will catch on in a big way, just imagine being able to walk around and communicate hands-free, very 'Special Agent', in fact... *VERY SPECIAL!*

ALL ICOM HAM PRODUCTS CARRY A FULL 2-YEAR WARRANTY COVERING SPARES AND SERVICE. FOR MORE DETAILS ON THE ICOM IC-Z1 CONTACT US OR YOUR LOCAL ICOM VERY SPECIAL AGENT!

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RSGB VISA MasterCard ICOM SWITCH

THIS MONTH'S LEADING FEATURE

80 -30m Switchmode PA CW Transmitter

The first of two parts by Chas Fletcher, G3DXZ*

THIS 20 WATT, LOW COST, transmitter for the 3.5, 7 and 10.1MHz bands uses high efficiency switchmode circuits and features full QSK (break-in) operation, a properly shaped keyed RF output and sidetone. Heard on the air it is indistinguishable from the best you can buy.

WHY SWITCHMODE?

FIRST OF ALL, let me define what is meant by switchmode. RF Amplifiers are usually designed to work in a more or less linear manner. By linear we mean that the output voltage/current varies in direct proportion to the input voltage/current. If a low harmonic content (sinewave) drive is used, the amplifier is not expected to have a much greater harmonic content in the output signal. This linear mode, in the single ended stage, requires that the amplifier draws about half peak current in the quiescent state (non driven) and is known as class 'A' operation. The major drawback of running an amplifier in this way is that the amplifier itself, be it valve, transistor or MOSFET, has to dissipate as heat roughly as much power as the amplifier produces as output.

In days gone by, when power amplifiers had a tuned tank circuit, efficiencies approaching 80% were possible under class 'C' operation where using a high Q tank circuit more or less compensated for the rich harmonic output of the amplifier. Between class 'A' and 'C', amplifiers working in classes 'AB' and 'B' bias conditions provided a gradual transition from low efficiency - low harmonic content to high efficiency - high harmonic content stages, but all used tuned tank circuits. Today things are different. The use of broadband (untuned) amplifiers working into lowpass filters has traded ease of operation for efficiency. As a result, probably more than 40% of the input power to the amplifier must be dissipated as heat and thus one expects to see a heatsink as the mechanical mounting for the transistors and even a fan to blow the heat away. So is this heat output inescapable with amplifiers? If one sticks to linear amplifiers and sinewaves the answer is yes, but there is an alternative.

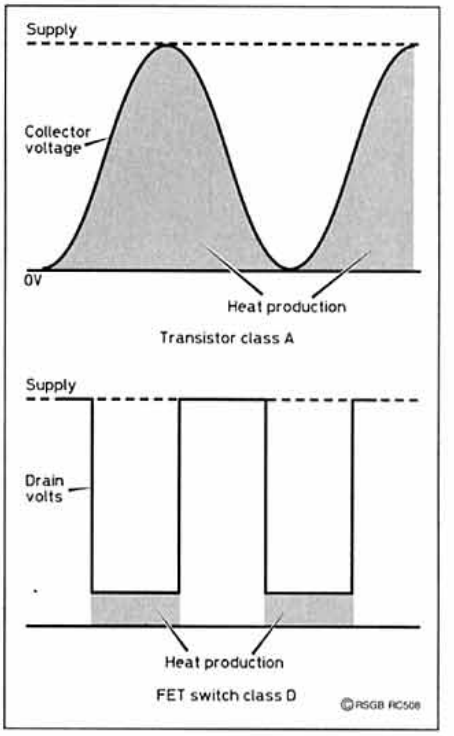


Fig 1: Class A and FET switchmode waveforms compared.

The sinewave, a pure single frequency signal, is all we hope a CW transmitter radiates from its aerial, as other unwanted stuff like harmonics and spurious 'birdies' cause pollution of the RF spectrum. This does not mean that other waveforms cannot exist within a transmitter, and one wave in particular is very useful, the square wave. The pure sinewave varies slowly from one peak to the next and so a time exists where the transistor is carrying current at the same time as it is subject to voltage. Volts multiplied by Amps means Watts and that's heat. On the other hand, the square wave ideally spends no time at all in changing from one peak to the next. It is either OFF, volts but no current ; or it is ON, current but virtually no volts (see **Fig 1**). A near ideal switching device, like the MOSFET, can thus handle high power with virtually no heat being dissipated in the switch. When the switch is ON, the only voltage across the device is equal to the drain current multiplied by the drain ON resistance, and even with low power supply voltages, like 13.5 volts, the voltage drop across the MOSFET in the ON state can be kept down to about 13% of the available supply voltage leaving 87% to do useful work. The increasing popularity of switchmode power supplies in recent years bears witness to this efficiency.

As usual, there are limitations. Rectangular waveforms with fast edges are notoriously rich in harmonics. The square wave, 1:1 mark space ratio, has the advantage over its other brethren that it has no even harmonics at all and thus a filter following the amplifier sees only the 3rd, 5th, 7th, 9th etc. The filter specification is hence not so tight as when the even order harmonics are present, eg. a 3.5MHz amplifier has no harmonic output below 10.5MHz, and cleaning up the signal is not half as difficult as it would at first seem.

One other problem is worth mention. Filters, in general, are designed to present a resistive load to an amplifier at the pass frequency but become highly reactive at others. When driven with a square wave, the 3rd harmonic in particular, being the biggest, causes the filter to ring and this shows up as high peak voltages across the amplifier. Peaks of three to four times the DC supply voltage are usual and the maximum supply voltage one can apply to the amplifier is determined by these peaks. The power MOSFETs specified will stand in excess of 100 volts giving a good margin of safety with power supplies up to 20V.

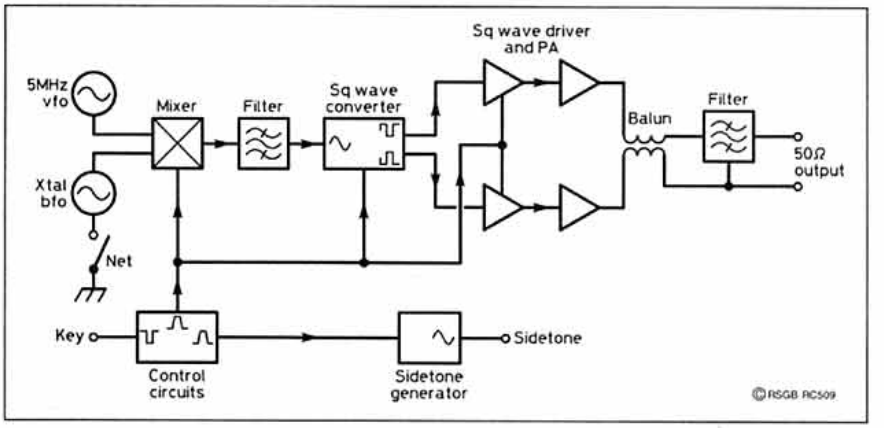
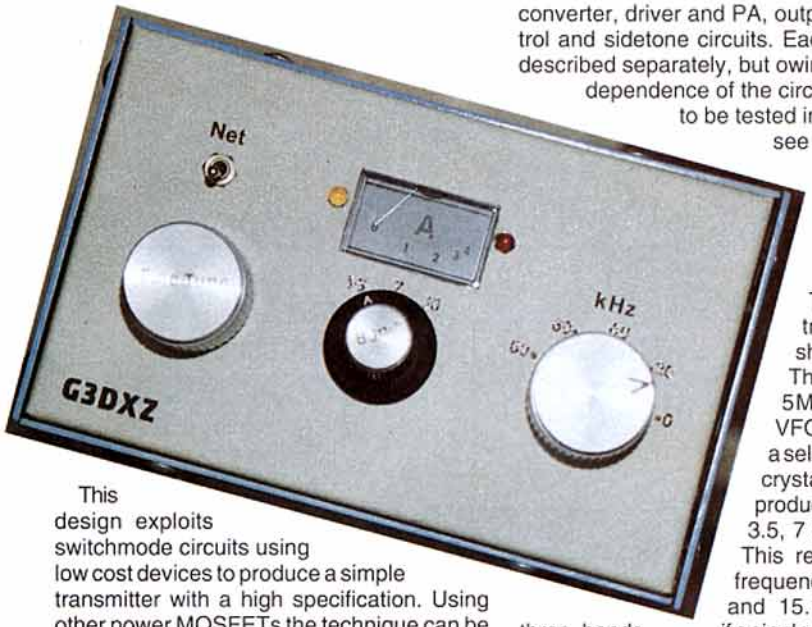


Fig 2: Switchmode transmitter block schematic.

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



This design exploits switchmode circuits using low cost devices to produce a simple transmitter with a high specification. Using other power MOSFETs the technique can be used to higher frequencies than the 10.1MHz limit of this design and some possibilities are discussed later.

HEALTH WARNING

THIS TRANSMITTER IS meant for home construction but is not a kit. As it is not a 'plug in and solder' type of project, the constructor needs to have an understanding of what each section is intended to do so that each part can be tested individually as it is completed. This way progress is more certain and confidence builds as the project evolves. Testing involves test gear and on a project like this an oscilloscope is really needed if one is to check that things are working as they should. One can proceed without such an instrument, but a simple error can so easily waste many hours when you cannot 'see' what you are doing. Building it all from basic bits might seem the hard way, but rest assured, the satisfaction level when it is up and working is incomparable.

Fig 2 is a block diagram showing the circuit structure and signal flows. It consists of a traditional mixer-style VFO, a square wave converter, driver and PA, output filters, control and sidetone circuits. Each part will be described separately, but owing to the interdependence of the circuits they need to be tested in combination; see later.

THE MIXER VFO

THIS WELL tried circuit is shown in **Fig 3**. The output of the 5MHz Hartley VFO is mixed with a selected high side crystal frequency to produce an output on 3.5, 7 and 10.1MHz. This required crystal frequencies of 8.5, 12 and 15.1MHz for the three bands if a single frequency calibration scale was to suffice. However, to keep down the cost of crystals, surplus types were used. As only the crystal for 7MHz was exactly on frequency, switched trimming capacitors (S1a, C5 and C6) were used to pull theMHz VFO a little on 3.5 and 10.1MHz. The tuning range of the VFO is just over 80kHz which just covers the CW segments. With a good sized knob on the main tuning capacitor, C3, a slow motion drive is not really necessary, but C4, the fine tuner, was added as a luxury.

The gain of the VFO amplifier, TR1, is reduced by negative feedback across R2, so that the output waveform across R4 has minimum harmonic content. Keeping down the amplitude of oscillation also helps frequency stability by limiting heat production. One drawback which might occur, if you are unlucky, and have a low gain sample of 2N3819 is that the oscillator might not start! If this should happen, short out R2. If low gain was the cause and oscillation starts, then try a smaller value for R2 until reliable start up is achieved.

The mixer (IC1) uses the useful NE602. It is normally disabled during reception by removing the supply to pin 8, which stops the crystal oscillator. To guarantee the crystal is up and running without any chirp, the control voltage T+ is applied 2 milliseconds before the main transmitter amplifiers come to life. Only a single L/C circuit is needed to filter the output of the mixer as the VFO only swings about 85kHz and the resultant change in output amplitude is not significant. The signal at S1c when the mixer is ON should be a good 0.5 volts p/p and a clean sinewave. A clean signal at this point is just as important in a switchmode transmitter as in a linear type if a clean final signal is to be produced.

SQUAREWAVE CONVERTER

THE DRIVER AND PA are push-pull circuits and require two signals 180°. out of phase. The mixer output is a simple sinewave. The circuit in **Fig 4**, does the conversion. 74HCxx logic is very useful. It is very fast, low power and tough. In this design it is run at its maximum supply voltage of 7V without complaint. The first gate of the HC00 is biased as a linear amplifier and then overdriven by the signal from the mixer. The output is quite a good square wave. The second gate then inverts the signal so that gates 3 and 4 receive square waves that are 180° out of phase. The outputs marked A and B are square waves with rise times less than 10 nano seconds, and that's fast!

Balance is important in push-pull circuits and to keep the switching points of the two

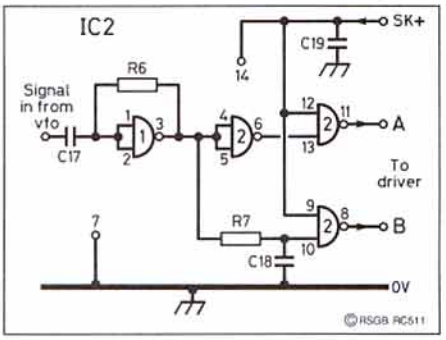


Fig 4: Square wave converter circuit.

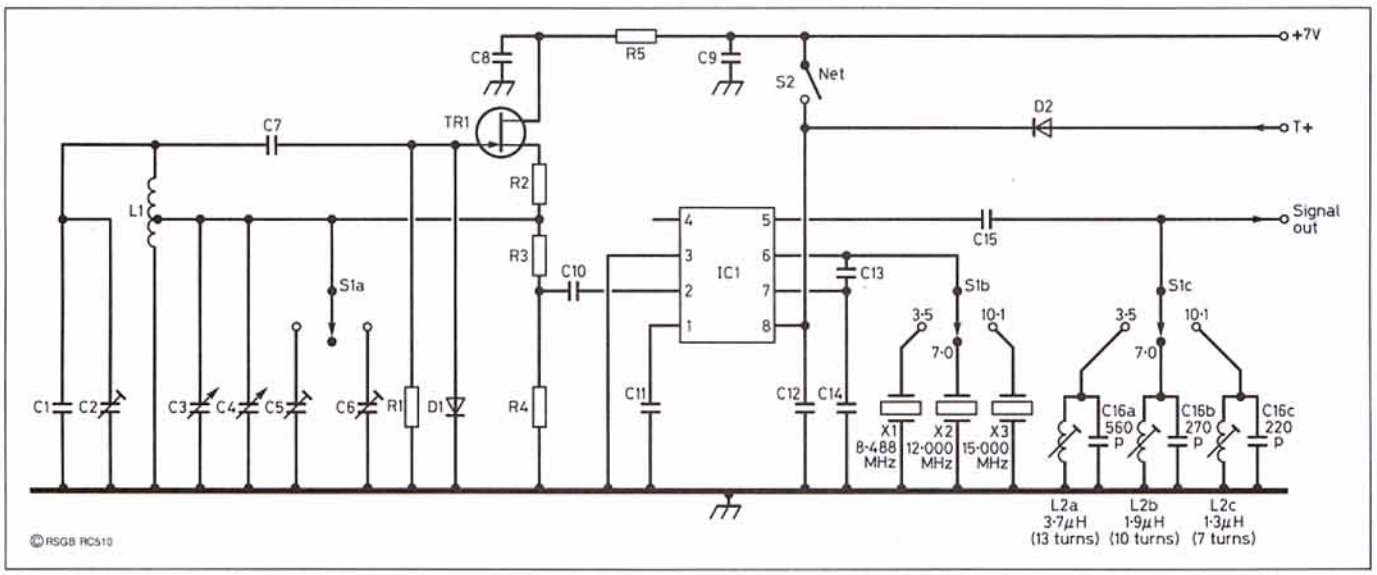


Fig 3: Mixer VFO circuit.

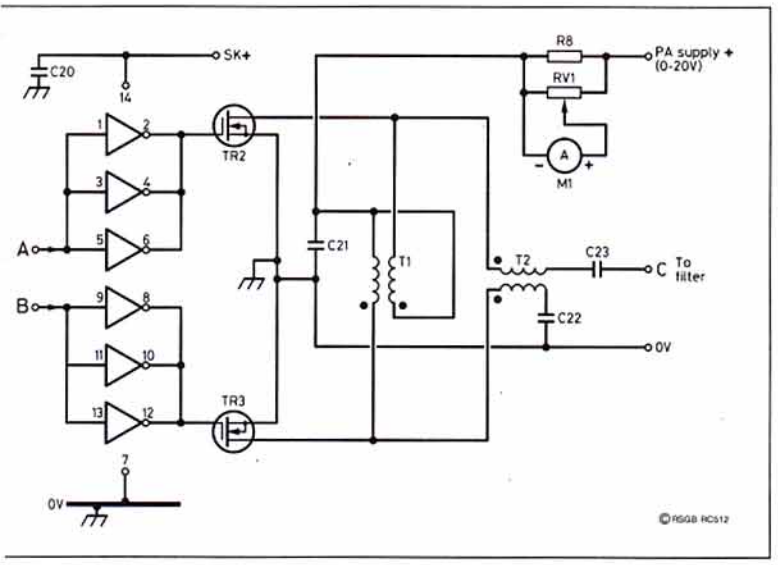


Fig 5: Power amplifier circuit.

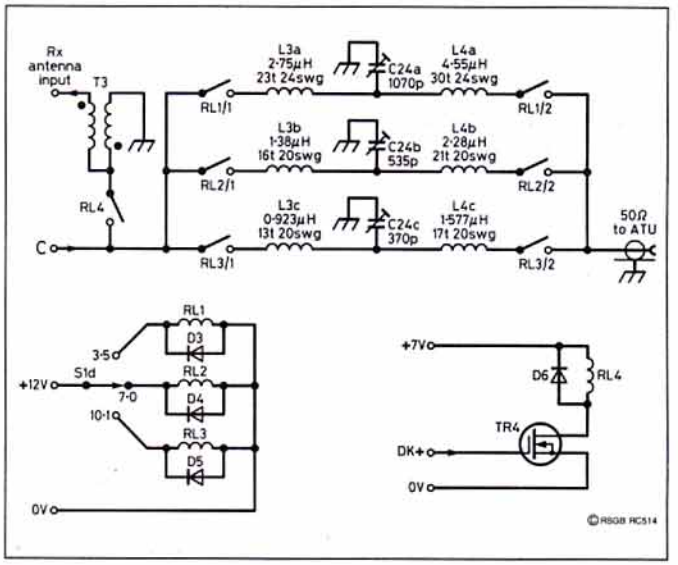


Fig 7: Output T filter selector circuit.

outputs as closely together in time as possible, a delay in the form of R7, C18 is introduced before gate 4. This compensates for the transmission delay in gate 2. Power is taken from the shaped keyed supply SK+ resulting in an output with a rise and fall time of a little over 5 milliseconds.

DRIVER AND PA

THE INPUT RESISTANCE of a power MOSFET is very high and presents no load to any driving circuit, but input capacitance is another matter. Amongst the smallest switching types, such as the SILICONIX VN10 and VN66 series, the gate presents only 50pF or so, but the input capacitance becomes greater as the current switching capability is increased. This feature limits the number of cheap switching MOSFETs that can be useful as broadband RF amplifiers.

The PA MOSFETs selected are called 'N-channel enhancement mode devices', which translates as meaning they need a positive drive voltage at the gate before they become conductive - they are normally off. They have a rated (typical) input capacitance of 135 pF. Driving a square wave into that is bad enough, but the situation is made worse by Miller effect due to inter-electrode capacitance between gate and drain. A low impedance source is needed and neatly furnished by IC3 which operates with three gates in parallel for each side, see **Fig 5**. There are no problems paralleling CMOS gates.

Again the DC supply comes from SK+, maintaining the shaped drive envelope.

The PA devices have full supply voltage applied constantly and simply come to life as drive is applied. T1 is a balancing transformer to keep the load equal on both FETs and T2 is a balun, buffering the double sided (balanced) PA from the single sided (unbalanced) filter. Drain current is measured by M1. A scale of 0-4 amps is suitable.

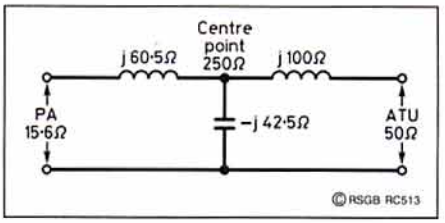


Fig 6: T filter, showing input, centre and output resistances and reactive components.

The power this amplifier will produce is determined by the load presented at 'C'. The design centre values assumed for the prototype were as follows:

Drain current (Id) = 3 amps. peak.

Min drain volts assuming 0.6Ω Rd = 1.8 volts.

Drain voltage swing = 13.5 - 1.8 = 11.7 volts.

Load resistance per side = 11.7 / 3 = 3.9Ω.

Load resistance drain-drain = 4 x 3.9 = 15.6Ω.

Thus the filter must present 15.6Ω to the amplifier balun if the 3 ampere drain current is to be achieved using a 13.5 volt supply.

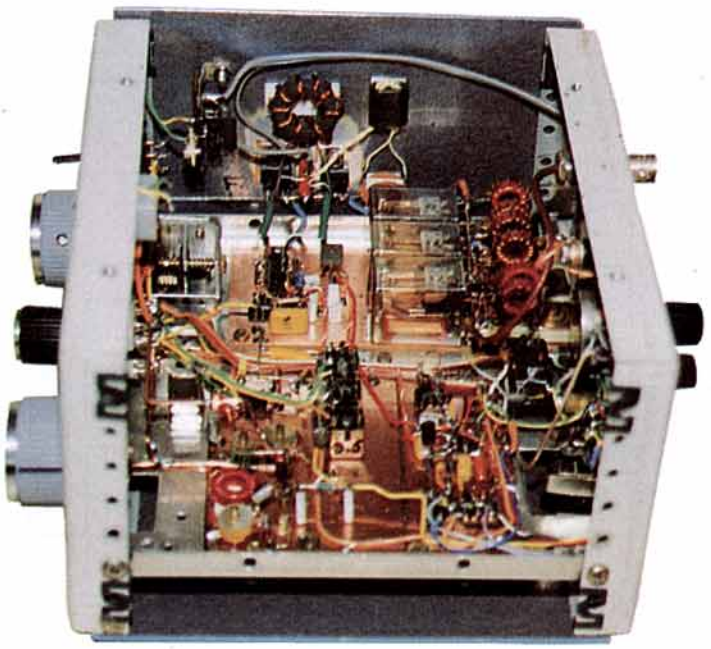
It is interesting to note that this type of push-pull square wave amplifier will not destroy itself if its load is removed, the drain current simply falls away to a low value. Short circuits on the other hand cause excessive drain current and likely damage (permanent) if sustained.

OUTPUT FILTER

THE FILTER IN THIS case must perform two tasks. Firstly it must transform the 50Ω ASTU (Aerial System Tuning Unit) impedance to the 15.6Ω required by the PA. The ASTU should present as near a resistive load as possible or the 'T' filter may not tune correctly. Secondly it must suppress the harmonic content of the PA output to an acceptable level.

Of the various designs, the 'T' filter has come to be my favourite and is used here, see **Fig 6**. The 'T' is simply two 'L' sections back to back, only the impedance level between the sections remains to be decided as the input and output are already known. In order to hold down the harmonic output, a high Q is needed in the filter and to achieve a high Q a significant change of impedance must occur within the filter. On the other hand a high Q narrows the bandwidth and the values shown are a compromise to give minimum harmonic content with reasonable bandwidth. Bench tests on the 3.5MHz filter indicate that the third harmonic content is better than 60 dB below the fundamental.

The filters, with the three band selection relays, are shown in **Fig 7**. The coils of all relays have small diodes in parallel to control switching transients. RL4 is a fast reed relay to disconnect the receiver aerial matching



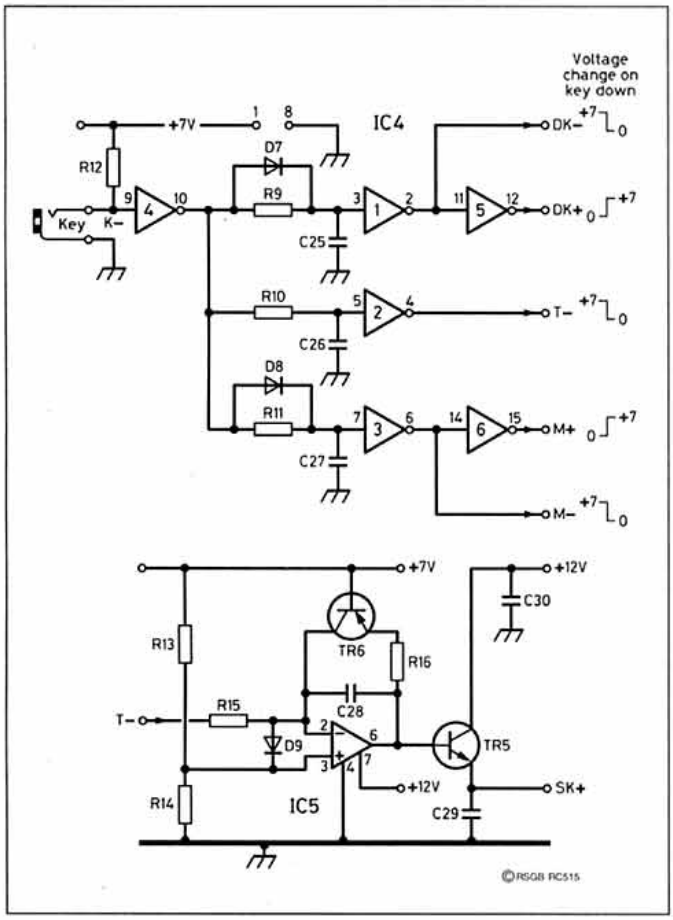


Fig 8: Control and shaper circuit.

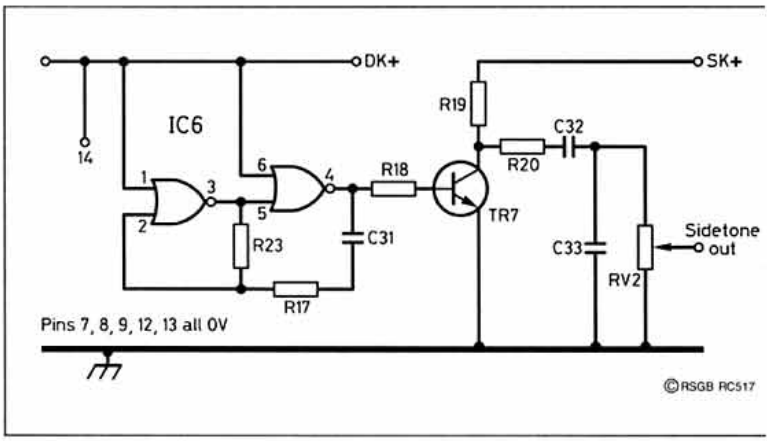


Fig 10: Side tone generator.

transformer, T3, before the transmitter becomes active. It operates at the 15.6Ω impedance level, is not subject to high RF voltages, so any reed relay will do. T3 is needed so that the receiver's 50Ω load is transformed down to 12.5Ω and presents a near match to the filter; without it, the filter will not peak at the correct centre frequency. For capacitor C24, using a ceramic compression trimmer makes for easy adjustment.

CONTROL AND SHAPER CIRCUITS

THE DESIGN PHILOSOPHY behind this design demanded that the transmitter be turned on and off only by the morse key and that an associated receiver be given time to mute before the transmitter fires and wait till all transients have died awaybefore the mute clears. Pressing the morse key causes circuits suddenly to come to life and care is needed to make sure these switching transients do not appear in the transmitted RF. The control circuitry achieves this end whilst ensuring that the dot length is not shortened as speed rises (more than can be said of some so-called ASK black boxes!)

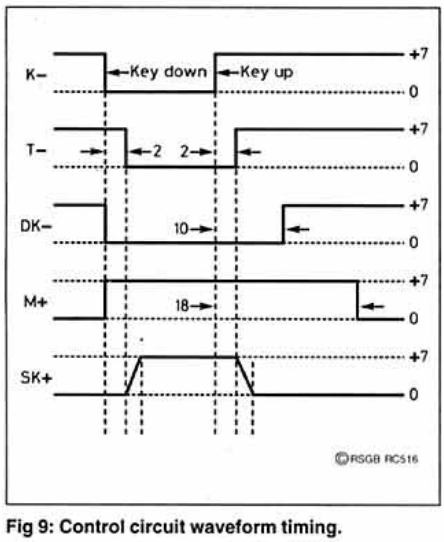


Fig 9: Control circuit waveform timing.

The circuit and the relevant timings are shown in **Fig 8** and **Fig 9**. The sequence of events following key down is as follows. Pressing the key produces the negative edge K- and simultaneously mute outputs M- and M+ and delayed key waves DK+ and DK-. The two mute outputs give a choice of negative or positive mute voltage to suit the receiver in use. DK+ activates the VFO and DK- de-energises the reed relay RL4 to disconnect the receiver aerial feed. Two milliseconds later the transmit control T- occurs, which drives the shaper to produce a linear rising edge for the driver circuits, SK+.

The same voltage is used for the sidetone oscillator giving a soft start and stop to the tone. Conditions now remain unchanged until the key is released. T- then holds at zero volts for a further 2ms so that the length of the T and K signals are the same (no clipped dots from this circuit!). SK+ then returns to zero with a linear fall, shutting down the transmitter. Some 10ms after key up, when all RF output has ceased, DK+ returns to zero turning off the VFO mixer, and DK- re-energises RL4. This timing sequence guarantees that the PA is not active until all supporting circuits are operating in a steady state and thereby avoids chirps, thumps, clicks etc. A further 8ms later the receiver mute is released. Provided the receiver can recover quickly enough, this timing sequence permits reception between the dots of a 25WPM CW transmission.

The delayed key wave DK has other uses. Muting a receiver is often best accomplished in more than one operation. The M signal is intended to kill the audio and is first on and last off. With my current simple TRF receiver and other direct conversion receivers that have been used under QSK control, the DK signal is used to disable the RF stage and protect the detector from excessive leakage from the transmitter. As DK recovers before M, the RF stage has time to settle before the receiver audio becomes live again.

All this switching and timing is easily achieved with a single hex inverter, IC4. The virtual open circuit at the input of these gates allows one to use simple RC delay networks, bypassed where necessary with diodes to achieve differing start and stop delays. Generating a linear ramp function is a little more complicated and is done by op-amp IC5. The IC is connected as an integrator, the timing resistor being R15 and capacitor C28. When inactive, T- is at +7 volts and pin 2 is held near the reference voltage on pin 3 by diode D9. R13 and R14 is the reference divider. In this state, the inverting input of the amplifier is greatest and the output on pin 6 is near zero volts. When T- goes to zero, pin 2 is dragged negative of pin 3, the amplifier becomes active, current flows from C28 via R15 to earth and the output at pin 6, and TR5 emitter, ramps positive.

When the output exceeds +7 volts, TR6 turns on and current via R16 and TR6 bypasses C28 and the ramp is held at about 7 volts. When T- returns to its positive state, the whole process reverses and a symmetrical control supply voltage is produced with rise and fall times of just over 5 ms. As the RF amplifier sharpens up this rate of rise and fall, the resultant RF envelope rises in just under 5 ms. The rise time is easily varied by changing R15.

The sidetone generator, **Fig 10**, uses part of a quad NOR gate IC6 to generate a square wave at about 650Hz (vary R17 if the tone doesn't suit). The output is via TR7 which is supplied with SK+ for a start and stop without transients. Network R20, C32, C33 remove harsh edges from the waveform and output volume is controlled by VR1. ♦

. . . to be continued

HF F-LAYER PROPAGATION PREDICTIONS FOR MARCH 1995

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

Time / GMT	28MHz 000001111122 024680246802	24MHz 000001111122 024680246802	21MHz 000001111122 024680246802	18MHz 000001111122 024680246802	14MHz 000001111122 024680246802	10MHz 000001111122 024680246802	7MHz 000001111122 024680246802	3.5MHz 000001111122 024680246802
* * EUROPE								
MOSCOW	....	.....1....	....12332...	....355641..	...3677775..	1.1655556852	7554222223688	++3.....3++
MALTA	....	....1111...	....233331..	....556664..	...37777882.	3317655578 84	8975322346 89	+++2....4++
GIBRALTAR	....	....	....11111..	....133343..	....6777783.	.1.376556882	6867533346 88	+++42...3++
ICELAND	....	....	.....1111..	.....355551.	....4665 7861	4314533346 76	+++42...34+
** ASIA								
OSAKA	....	....	....1.....	....131.....	...14531....	...14222341.	....1...1451	.........3.
HONGKONG	....	.....1....	....233.....	...14552.....	...15554 23..	....2222462.	1463	242
BANGKOK	....1111....	....3444....	...14656....	...13545 22..	1....2224632	2.......1476	244
SINGAPORE	....1112....	...13444 2...	...24666 5...	...23545 64..	1....2224742	2.......1476	244
NEW DELHI	....1222....	...13445....	...24566 1...	...23455 4...	2.1..1224443	62......1477	4........24+
TEHERAN	....1111....	....22231...	...24556 3...	...45567 61..	...53355 65..	5232.1224754	852.....1478	+3.....24+
COLOMBO	....1111....	....2223 1...	...14556 3...	...24567 61..	...22355 661.	11....224765	51......1478	3.....24+
BAHRAIN	....1112....	....23331...	...25566 4...	...45567 6...	1..42345 641.	6331..124766	862.....1478	+3.....24+
CYPRUS	....12221...	....34443...	...26667 62..	...57778 85..	1.17666 67841	7655333458 87	9852111125 89	++2.....25+
ADEN	....12231...	....34453...	...25567 61..	...35557 74..	2..42235 6731	7331...24787	862.....1478	+4........4+
** OCEANIA								
SUVA/S	....	....	....	.....11....	....1234 22..	...13222361.	...21...14..	....
SUVA/L	....	....	....1.....1.	....31....3.	.1.26321.351	..15421 1263.	...31...13..	....
WELLINGTON/S	....	....	.....1....	....1221...	....3444 32..	....3422 2451.	...21...141.	....
WELLINGTON/L	....	....	....	....1.....2.	.1..4.....51	.1234 2...431	...21....31.	....
SYDNEY/S	....1.....	....231.....	....145321...	....46544 43..	...2322 2462.	....1...143.	..........2..
SYDNEY/L	....	....	....1.....1.	....42....41	...1421..152	....1...33.	....
PERTH	....111.....	....222.....	...15551....	...36663 1...	...35554 43..	2...2222 4662	1.......1474	.....2.....242
HONOLULU	....	....	....	.....1....	.....141.	....1211341.	...21...11..	...2.....
** AFRICA								
SEYCHELLES	....12231...	....24453...	...24567 61..	...34567 74..	2..22235 6831	742...124787	851.....1478	+2.....4+
MAURITIUS	....22332...	....34564...	...15677 72..	...35577 85..	2..32245 6842	842...124787	841.....1478	+2.....4+
NAIROBI	....2344 3...	....35665 1..	...15668 73..	...35557 861.	21.42225 6852	8732...24788	883.....1478	++.....4+
HARARE	....23564...	....35676 2..	...15668 85..	...25557 872.	22.42225 6862	8732...24688	884.....1478	++.....4+
CAPETOWN	....12565 1..	....24787 3..	....56788 71.	....16567 883.	21.44334 6882	8634 1...13688	8851....1478	++2.....4+
LAGOS	....13565 2..	....35777 4..	....66678 71.	....75558 84.	23.35222 5882	7825 2...2688	8973.....478	5+5.....4+
ASCENSION Is	.....2225 3..	....14446 5..	....46557 82.	....66546 85.	131.63223 6682	6863 41...487	8884....168	+++2.....3+
DAKAR	.....2344 3..	....14566 5..	....36667 82.	....56556 85.	.21.64223 6682	5874 41...1487	8884....158	+5+2.....2+
LAS PALMAS	.....1112 1..	.....2334 3..	....36667 72.	....57778 84.	.11177667 7882	5766643346 87	9996311113 79	+++3.....4+
** S. AMERICA								
Sth SHETLAND	.....1233..	.....3455..	.....16677 2.	.....36777 4.	.21.24445 561	4774321123 45	67851.....13	3452.....
FALKLAND Is	.....3333..	.....1555 5..	.....37777 2.	.....57767 5.	.21.35445 461	4774421112 35	78841.....14	4++2.....
R DE JANEIRO	.....1212 3..	.....3424 5..	.....66457 2.	.....76456 5.	.11.15323 2461	5773321..146	88841.....16	+++2.....3
BUENOS AIRES	.....2222..	.....1444 4..	.....46666 2.	.....66656 4.	.11.15433 351	4773321..135	78851.....3	5++2.....
LIMA	.....1..	.....1123..	.....43452.	.....55443.	.....43223 1	2441312 1...3	58841.....1	3++2.....
BOGOTA	.....1..	.....1112..	.....33341.	.....54443.	.....14322 31	3331322...14	68842.....2	4++2.....
** N. AMERICA								
BARBADOS	.....1..	.....1123..	.....24345 2.	.....45445 4.	.....54223 52	3441222...25	88741.....4	++52.....
JAMAICA	....	.....11..	.....22341.	.....44443.	.....54223 1	2222221...13	68731.....1	3++2.....
BERMUDA	....	.....11..	.....22341.	.....44453.	.....34334 51	3211221...135	78731.....3	5++2.....
NEW YORK	....	.....1..	.....12231.	.....24342.	.....14434 41	21...2221124	67521.....2	3++2.....
Mexico	....	....	.....222..	.....4331.	.....24322 1	11..2.221...1	26521.....	.4+2.....
MONTREAL	....	....	.....112..	.....23342.	.....14444 41	21...2221134	57521.....2	3++2.....
DENVER	....	....	....	.....1211.	.....3432.	1.....122111	24321.....	.3+2.....
LOS ANGELES	....	....	.....1..	.....221.	.....1432.	.....231.1	13321...1...	..52.....
VANCOUVER	....	....	....	....	.....222.	13211	12121...1...	..42.....
FAIRBANKS	....	....	....	....	.....11.	....1111232.	11.31...1211	...2.....

The provisional mean sunspot number for January 1995 issued by the Sunspot Data Centre, Brussels was 23.8. The maximum daily sunspot number was 55 on 21 January and the minimum was 7 on 7 January. The predicted smoothed sunspot numbers for March, April and May, are respectively: (classical method) 19,18,17 (±4); (SIDC adjusted values) 12,11,10 (±3). December 94 SESC: solar flux 84.1 Ap 9.0 Smoothed June solar flux 86.2 Ap 17.8

HF NEWS

JOHN ALLAWAY G3FKM
10 Knightlow Road, Birmingham
B17 8QB

APOLOGIES FOR MISSING out the Propagation and Band Reports part of the column last time - they were casualties of the pre - Christmas mail rush.

FOCUS ON BERU

BOB WHELAN, G3PJT, is undertaking a research project into the history of the Commonwealth Contest (otherwise known as BERU.)

The contest has been running since 1931 and provides a link through the history and heritage of amateur radio. He is particularly interested in contacting those who took part in the early days - especially pre- and immediately post-war. If you have any particular recollections, photographs, QSLs, articles, letters etc of earlier contests please contact Bob at 36 Green End, Comberton, Cambridge CB3 7DY (tel: 01223 263137 or fax 01223 263940). He is investigating a wide range of aspects including the general history and significance of the contest in the early years, individual's own entries (equipment, antennas etc), personalities, other things going on at the time (jobs, social, political etc), and thoughts on the fascination and attraction of the contest. Quite a project . .

MACAO PROJECT

MARTTI LAINE, VR2BH, reports that operation from Macao has been very restricted in recent years with the cost of a licence being about US $200 and the importation of equipment difficult. XX9AS, XX9JN, XX9MD, VR2BH, VR2NJ and KU9C have now formed the Macao International Contesting Team and obtained the callsign XX9X which will operate from the New Century Hotel on Taipa Is. OH6RM recently installed a 40ft tower and a beam, and Yaesu and ETO have supported the project with equipment. The team will support amateurs (preferably groups) visiting Macao and wishing to operate in the ARRL DX Contests and CQ WPX Contests (fax requests to Martti Laine on +825 566 0872).

CQ AWARDS

CQ MAGAZINE CELEBRATES its 50th anniversary this year and special awards are being issued to commemorate the event. All contacts must be made between 0001 on 1 January and 2359 on 31 December 1995. There is one basic award with 10 endorsements available for special achievements and in addition there will special endorsements for completing all five activity categories, all five challenge categories, and all 10 overall categories.

Awards will not be numbered and listeners may also apply. QSLs are not required but applications must be accompanied by log forms indicating award category applied for, plus a list of all contacts/receptions claimed. Each log entry must include date, time, band, mode, and callsign, plus any other information required for the specific award or endorsement. Use of official application and log forms is recommended but is not mandatory. For official application and log forms send a large SASE to: *CQ* Golden Anniversary Awards, c/o Communications Inc, 76 North Broadway, Hicksville, NY 11801, USA. Completed applications must be mailed before 31 March 1996 to Bruce Marshall, WA1G, CQ Golden Anniversary Awards Manager, 52 Cornell St, Roslindale, MA 02131-4524, USA Note that there is no charge for these certificates.

THE BASIC AWARD (THE CQ/50 GOLD AWARD)

Contact at least 50 amateurs on one or more bands/modes. There are the following endorsements: (1) Repeater Endorsement. QSOs with 50 different amateurs via repeaters. (2) Multi-mode endorsement - work at least 10 different amateurs on each of five different modes. (3) Multi-band endorsement - contact 10 different amateurs on each of five different bands. (4) 50 (different) prefixes endorsement. (5) OSCAR endorsement - contact at least 10 different amateurs in at least five different states/countries. Details of the Challenge Awards will be given next month.

ETERNAL CITIES AWARD

For confirmed contacts with cities founded before AD 1. European and Asian stations need 50 points and others 25. A city founded in the first century BC counts one point, a city founded in the second century BC two points and so on. Send certified list with US $5 to UU5JFY, Victor Ganin, c/o Hermann Warneke, Feuerwehrstr 11, D-28857 Syke-Ristedt, Germany.

To qualify for this unusual award, confirmed contacts must be made with cities founded before the year AD1. Examples are Athens, Piraeus and Zaragoza (EA).

CONTESTS

ARRL INTERNATIONAL DX CONTEST (PHONE)

4 March - 2400 5 March

The rules are the same as for the CW section - see last month. I have copies of rules available (SASE please).

EA RTTY CONTEST

1600 1 April - 1600 2 April

Organised by URE. 3.5 to 28MHz (no WARC) observing IARU band plans. Single operator single and multi-band, multi-operator all band, and listener sections. Send RST and *CQ* zone (UK is 14). Spanish stations will send RST and their Prefijo Provincial (there are 52 of these). Work anyone - on 14, 21, and 28MHz QSOs with own continent count one point, with other continents two. On the other bands these count as three and six respectively. Multipliers are total *CQ* zones and provinces worked on each band. Use separate log for each band and send entry before 15 May 1995 to: EA RTTY Contest Manager, Antonio Alcolado (EA1MV), PO Box 240, 09400 Aranda de Duero (Burgos), Spain. I have copies of the rules (SASE please).

SP DX CONTEST

1500 1 April - 15.00 2 April

CW only. 1.8 to 28MHz (no WARC bands). Single operator single or multiband, multioperator, and SWL classes. Send RST plus three figure serial number. Polish stations will give two letters indicating their province. Each QSO with Poland counts three points. Multiplier is total number of provinces worked - each counts once only. All logs must be sent to SPDX Committee, PO Box 320,

BAND REPORTS

VERY THIN PICKINGS this month with reports received from G2HKU, G3GVV, GJ4GG, GW4KGR, G4OBK, and G0NQC. Loggings were in the period late December to mid-January and - as usual - callsigns of stations transmitting on CW appear in italics :-

7MHz	
0800	*G4VXE/C6.*
1900	*TR8XX, TU4VIR, VQ9QM, YI9CW, XX9TJZ, ZC4HA, 9N1CC.*
2200	*CX8BR, JT1BH, UA9CM, 8R1J.*
14MHz	
0800	AP2MMN, BV4AS, BY5RT, *FK8GJ,* HL5KY, JA, JD1AMA, *JU355UB,* P29DY, S01M, VK, ZL, *"1C0ZZ",* 9L3BM.
0900	A71EA, BY5VZ, *BZ1QL, FK8GJ,* FO5JV, KH2/VP9BP, T31DB, VK9NS, VP8SGP, VR2KF.
1100	HS0/G4UAV, VU2HI.
1400	ET3AA, ST2AA, SU3AM, VU2KDM, 9N1KY.
1600	*J28CI, K6KII, VK6WT,* ZD7CTO, VP8SGP, 3DA0CA.
2200	FS5PL, J52AK, VP8CPC.
18MHz	
1100	*C53HG, ZB2AZ, 7Z5OO, 8Q7BX.*
1200	ET3BN, *TU4SR, YV6AZC/3, 9Q5IY.*
1500	HI3AB, *TI2IDX, VQ9QM, 9Q5EX.*
21MHz	
0900	H5ANX.
1100	*FR5HG,* 5R8DQ, 7Q7CT, 7Q7ZZ.

00-950 Warsaw, Poland and must be received by the Contest Committee no later than 30 April 1995. I can supply copies of the rules (SASE please).

HOLYLAND CONTEST 1995

1800 15 April - 1800 16 April

CW and SSB. 1.8 to 28MHz (no WARC) following IARU Region 1 band plans. Single and multi-operator all bands, and listener sections. Exchange RS/T and serial number - Israeli stations give RS/T and area. The same station may be worked on each mode and each band. QSOs count two points on 1.8, 3.5, and 7MHz and one on the other bands. Multiplier is one for each area per band worked. Entries must be posted no later than 31 May 1995 to: Contest Manager, IARC, Box 3003 Beer-sheva 84130, Israel. I can supply copies of the rules and strongly advise anyone contemplating sending in a entry to ask for a copy!

In the **1994 ARI Contest** G4IQM scored 551,210 points in the mixed class and GM0GNT 1,200 in the CW section.

RUSSIAN DX CONTEST

1200 18 March - 1200 19 March

The SRR is dedicating this new contest to 100 Years Of Radio in 1995.

1.8 to 28MHz (no WARC bands). CW and SSB. The same station may be worked on each band and mode but not less than 10 min after the first QSO. Entries: SOMB (CW, SSB, Mixed), SOSB (Mixed), MOMB (single Tx mixed), and listener (Mixed). For MOMB entrants the 10 minutes rule applies. Exchange RS/T and QSO number starting from 001. Russian stations will send RS/T and two numbers indicating their Oblast. These are: AB, AD, AL, AM, AO, AR, BA, BO, BR, BU, CB, CK, CN, CT, CU, DA, EA, EW, GA, HA, HK, HM, IR, IV, JA, JN, KA, KB, KC, KE, KG, KI, KJ, KI, KK, KL, KM, KN, KO, KP, KR, KS, KT, KU, LO, LP, MA, MD, MG, MO, MR, MU, NN, NO, NS, NV, OB, OM, OR, PE, PK, PM, PS, RA, RO, SA, SL, SM, SO, ST, SP, SR, SV, TA, TB, TL, TM, TN, TO, TU, TV, UD, UL, UO, VG, VL, VO, VR, and YA. Each QSO with own country counts two points, with another country in same continent three and with other continents five points. QSOs with Russian stations count 10 points. Each DXCC country and each Oblast count as multipliers on each band. Logs should be sent to: RUDXC Manager, A.Melanin (UA3PDX), PO Box 9, Khimki-7, Moscow oblast, 141400 Russian Federation. Each participant who makes 200 or more contacts will receive a special 100 Years Of Radio certificate and the SOMB Mixed winner will receive a special AS Popov Cup.

NINE BAND TABLE NO 13

CALL	1.8	3.5	7	10	14	18	21	24	28	TOTAL
G3KMA	182	277	320	269	326	302	326	290	320	2612
G4BWP	159	276	310	264	325	299	321	266	310	2530
G3XTT	189	248	295	232	323	275	317	246	294	2419
G4GIR	133	262	303	233	326	280	322	248	310	2417
G3GIQ	77	223	285	168	326	274	326	235	314	2228
G4OBK	135	183	238	195	305	259	282	214	252	2063
G3TXF	96	198	257	173	307	194	306	144	273	1948
G3WGV	86	156	219	223	258	247	259	199	230	1877
										CW only
G3NKC	133	170	228	203	252	228	233	196	228	1871
GM3PPE	68	175	216	221	278	237	255	183	223	1856
G3SXW	81	181	224	191	292	193	281	141	238	1822
										CW only
G3IGW	125	183	305	196	276	224	233	45	207	1794
G3JVP	72	163	237	119	321	170	303	68	262	1715
GW3JXN	79	168	222	163	263	223	244	150	174	1686
G3NOF	5	114	113	-	325	236	325	221	299	1638
G4ODV	88	184	307	167	254	123	244	69	200	1636
G4XRX	3	48	127	112	264	179	284	153	232	1402
G3IAR	72	106	132	136	247	168	220	124	150	1355
G4NXG/M	6	42	96	-	237	128	256	137	238	1140
G4CMZ	14	45	103	83	140	67	124	18	101	695
AVERAGE	90	170	227	167	282	215	273	167	243	1835

NEXT DEADLINE - to reach G3GIQ no later than 8 April 1995.
(Prepared by G3GIQ)

1994 WARC BANDS TABLE

	10MHz	18MHz	24MHz	Total
G4OBK	**149**	**217**	**146**	**511**
G4YVV	64	148	77	289
EA5GQI	-	137	77	214
G0MHC	59	91	45	195 (CW)
G3ING	73	76	28	177
GJ4GG	42	71	45	158
EA5DQE	-	92	49	141
G2AFV	63	65	13	141
G4CMZ	55	64	18	137
G3KKJ	17	53	39	109
G0TMZ	25	32	11	68
G3IAR	40	18	2	60
G4FVK	20	26	12	58

This is the final 1994 table. A new one will be run during 1995.

CHILTERN DX CLUB ON THE UP

MANY READERS WILL already have heard of CDXC, the Chiltern DX Club and the UK DX Foundation. The club goes from strength to strength and its members play important roles in HF radio throughout the world. It is now an international club with many members from outside the UK. The club offers a great deal to its members. Virtually all those involved in the recent highly successful RSGB 1994 HF & IOTA Convention - whether as lecturers or organisers - were members of CDXC. I can recommend the club highly to all readers. If you would like more information (including a Prospectus and a copy of the latest *CDXC Newsletter*) please contact Neville Cheadle, G3NUG, CDXC Chairman, Further Felden, Longcroft Lane, Felden, Hemel Hempstead, Herts (01442 62929). No SASE is required.

28MHZ COUNTRIES TABLE

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

BEACONS

MARTIN HARRISON, G3USF, has kindly supplied updated information on the DK0WCY beacon. The transmission on 3.558MHz occurs between April and September from 0600 until 0700 and again between 1430 and 1600. Transmissions take place one hour later between October and March. Transmissions on 10.144MHz are continuous. Information is updated at 0730 (0630).

During normal propagation DK0WCY sends callsigns and four seconds long dashes. During auroral alerts it sends callsign, aurora and short dashes or callsign, strong aurora and nine second dashes. The beacon may not operate during major contests. Martin also says that the OH2TEN beacon is back on the air on 28.252.MHz with 50W to a five-eighths ground plane from KP20AG.

NEW DX BOOK

KIRSTY JENKINS-SMITH, VK9NL, has now completed her second book, *QRV - A DXer's life for Me*. It is a collection of short pieces written over the years in which she takes a sometimes irreverent look at the DX scene and amateur radio in general. The price is US $16.00 which includes postage (from the UK). Orders should be sent to HIDI-Y, PO Box 90, Norfolk Island, Australia 2899.

DX NEWS

THE DXCC DESK announced on 4 January that the number of unprocessed applications at the end of December was 183 (representing 21,082 QSLs). Some 423 applications (42,105 QSLs) had been received during December and were normally being processed in less than a week. Despite dwindling sunspots, DXCC participation continued at essentially the same level in 1994 as in 1993. In fact there was a slight increase in the number of QSL cards received!

Said Kamel, SU1SK, has written to say that IK8AUC is certainly *not* his QSL Manager. He deals with his own cards and they should be sent to the address shown in *QTH Corner. Hagal International* - the Israeli Ham News - reports several events of great significance. It says that on 22 September 1994 4Z9FHB called into a Jordanian 144MHz repeater and was answered by HM King Hussein, JY1, himself!

In early October a Jordanian amateur visited Israel - and technical co-operation between the Israeli and Jordanian societies in future looks set to take place.

RSGB DX News Sheet says that a group of Philippine operators are hoping to visit **Spratley Is** from 10 to 16 April and to operate using the callsign DU0K. PB0ALB expects to be on the air from **Sarawak** until 8 March as 9M8PFB on 3.5 to 28MHz on SSB only. *DXPRESS* reports that there is a new station on

Kerguelen Is - FT5XK - who will be there for the rest of 1995. FT5XJ has probably already left the island.

Ken Cheetham, G4RWD, will be back on **Ascension Is** this month as ZD8WD. He will be operating on all bands, mainly on CW, and promises to try to put up better LF antennas this time. QSLs sent direct to his QSL manager (his XYL!) will be answered as soon as possible but bureau cards will be answered when he returns - which could be quite a long time. Ken asks for no cards to be sent to Ascension Is.

RSGB DX News Sheet quotes *QRZ DX* as reporting on activity in **Antarctica.** KC4/KK6KO and KC4/KA6NJF are at Palmer Station on Anvers Is; KH6JNF/KC4 is at Williams Field (QSL all three to home calls); KC4USB is at Byrd Surface Camp (QSL to K4MZU); CE9MFK is at Yelcho Base on Wiencke Is; LW8EYK/Z on Livingstone Is (QSL to LU4EDL); VE3OOG/P and HC1JXC/P (QSL to K4MZU) are at Patriot Hills Base; IA0PS (QSL via IK0USA) is at Terra Nova Bay as is KC4AAG. UA3YH hopes to operate from KC4AAA during a 15 month stay - note that a number of different operators use this call so check the QSL route at the time of contact. The 19th Polish Antarctic Expedition landed on King George Is **(S Shetlands)** on 27 November 1994. It will be there for a year and the party contains two licensed amateurs - SP2QOH and SP2GOW (ex-JW0F). The Polish authorities were only prepared to let them use the callsign HF0POL which is that used by the club station on the island. They have applied for VP8 licenses and have been allocated VP8CQR and VP8CQS respectively. Both are active on all HF bands and modes and will operate on RTTY for the first time from S Shetlands.

J55UAB has returned to **Guinea-Bissau** and will be active on all bands and modes once more until January 1996. Didier, ex-3X0DEX, is now on the air from **Ivory Coast** as TU4EX.

According to the *DX Bulletin* K8VIR is likely to operate from several Pacific locations in the near future. He was starting in **New Caledonia** in January and other stops should include **Western Samoa** and **Tonga** (as A35VI). *DXPRESS* says that ZL1AMO still has the logs for his previous operations as 3D2RW, ZK1CQ, ZL7AMO, ZL8AMO, FW0BX, 5W1CW, A35EA, ZK3RW, YJ0ARW, ZL9AMO, T28RW, ZK2RW, H44RW, ZM7AMO, C21/ZL1AMO, and T30BH. QSLs for all of these should only be sent *direct* to his home address.

VP2V/W2GUP will be in the **US Virgin Is** until 14 March. He operates CW only near the low ends of the bands 3.5.to 28MHz (including WARC).

PROPAGATION

SMITHY'S PIECE last month got caught up in the Christmas mail. However, for the sake of completeness it read as follows: "It was too much to hope that the upturn in HF band conditions in October was going to last. The monthly sunspot numbers tell it all - 44 in October down to 18 in November and there was little improvement in the first week of December. But the solar flux did peak at 99sfu on 13 December, 20 points up on the value 27 days earlier. The odds are that this will prove to be a short-lived improvement and that 1995 will be a year for concentration on the low bands."

His report for this month is short and to the point! It states: "Last month's fears that the improved solar activity late in 1994 was only temporary seems to have been well founded since the daily solar flux fell below 80sfu at the turn of the year and remained there for the first two weeks before beginning to creep up again."

THANK YOU

TO ALL WHO contributed this month and to the authors of: *RSGBDX News Sheet* (G4DYO), *DXPRESS* (PA3FQA), the *Lynx DX Bulletin* (EA2KL), and the *Long Island DX Bulletin* (VP2ML). Please send everything for the **May** issue to reach me no later than **23 March.** ♦

QTH CORNER

A92BE	(new) Sheridan Street, Box 26844, Adlyia, Bahrain.
SU1SK	Said Kamel, PO Box 62, Shobra Alkima, 13411 Cairo, Egypt.
VP8CQR	DL1EEH, Danziger Str 1, D-42489 Wuelfrath, Germany.
VP8CQS	DL1EEH (as above).
VP8SGP	via W4FRU, John Parrott, PO Box 5127, Suffolk, VA 23435, USA.
XX9X	KU9C, S.Wheatley, PO Box 5953, Parsippany, NJ 07054, USA.
ZD8WD	K.Cheetham, 60 Holme Close, Hatton, Derbyshire DE65 5EE. 7S330WG via SM3CVM, Lars Aronsson, Lillfjelly 62, S-83171 Ostersund, Sweden.

VHF/UHF NEWS

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

ANOTHER EUROPEAN country will soon be active on 50MHz. The final placings in the 1994 Annual Table are published. Some auroral and E-layer propagation is reported, but first some very sad news.

VALE G5UM

FEW READERS will be unaware that Jack Hum, G5UM, died suddenly at his home in Leicestershire on 11 January. Between 1966 and 1975 he edited this monthly feature which was then known as *Four Metres and Down*. He was a frequent contributor to this column and was always keen to encourage activity, particularly among newcomers to the hobby.

The VHFs were Jack's favourite bands and he was one of the first to exploit the five metre allocation in the immediate post war years. He was a fine CW operator and was deeply involved in the establishment of the repeater network in the early 1970s. 'Uncle Mike' was a gentleman in every sense of the word and we are all the poorer for his passing. A full obituary appears elsewhere in this issue.

REPEATERS

THE JANUARY edition of *LENS*, the newsletter of the Leicestershire Repeater Group, includes a comprehensive obituary for G5UM. In 1985, Jack was elected Honorary Life President of the LRG and the Current Comment column in this issue of *LENS* was written by him.

Engineering Manager Adam Moss, G0ORY, reports that VHF repeater GB3CF (R0) could do with more activity. UHF relay GB3LE (RB4) is getting a new computerized logic system which will facilitate interlinking, trunking and remote control. The 1.3GHz ATV repeater GB3GV (RT2) has been disabled due to interference problems with the CAA radar at Clee Hill. For details of the LRG, write to PO Box 180, Leicester.

The Wolverhampton VHF repeater GB3BX is operational again on its new channel, R3. Reports to and details from keeper G4JLI. GB3TY (R6), which was located near Hexham (NLD), went QRT on 30 November last year. Any group or person wishing to continue providing a service from a new site should contact Ernie Bailey, G4LUE, the RMG Zone A manager, on 01226 716339.

The ATV repeater GB3HV, operated by the Home Counties ATG, is broadcasting the *GB2RS* news bulletin again. It is provided by Roy Powers, G8CKN, and goes out at 0930 local time on Sundays on 1.308GHz. It is available on request during the week. Photographs of events can be included in the transmission. For details of this repeater and its services contact Mike Sanders, G8LES, who is QTHR.

The Aylesbury Vale RG's AGM is scheduled for 2000 on 22 March at Stone Village Hall, Stone, near Aylesbury. The NGR is SP 795124 and talk-in via GB3VA on R4 and GB3AV on RB2 is planned. The AVRG's January *Newsletter* includes status reports on AV, VA and GB3BV on RB1. It seems that VA suffered considerable abuse, - including music, jamming and swearing - last summer.

A site, complete with mast and electricity supply, is on offer for a 1.3GHz TV repeater to serve the Oxford/Bicester area. This matter will be discussed at the AGM. For details of the AVRG contact Mike Marsden, G8BQH, who is QTHR.

BEACON NOTE

DAVE FERIGAN, G3ZYV, is the keeper of 4m beacon GB3REB. He informed RSGB VHF Beacon Coordinator John Wilson, G3UUT, that it was switched off on 4 December. Its new site is 3km south of Sandhurst in Surrey (IO91OH) and it is hoped to have it operational as soon as the necessary authority is received; April was mentioned.

PUBLICATIONS

DUBUS magazine, issue 4/1994 includes the index for 1994.

Most of the technical articles are devoted to 5.7GHz and above, but editor Rainer Bertelsmeier, DJ9BV, has a long piece on quadrature hybrids for 1.3GHz. There are the usual news columns covering MS, Es, Auroral, tropo, 6m and EME activity. On the culinary front, DJ9BV has a couple of recipes in his 'Kitchens Corner' page! The UK agent for *DUBUS* is Roger Blackwell, G4PMK, who is QTHR.

THE TABLES

MY APOLOGIES for all the errors in the Squares Table last month. I updated the wrong file. Some participants have already submitted their current scores so we should be back on course in the April issue.

Congratulations to the overall leading entrants in the 1994 Annual Table and to the individual band leaders. The first appearance of this year's Annual Table will be in the May issue, the deadline for which is 30 March.

CONTESTS

CONTESTS AFFORD an excellent opportunity to boost table scores and a full list of forthcoming events is in the monthly *Contest Classified* feature. The VHF-DX Group DL-West runs a 144MHz DX Activity Contest throughout the year, the object being to work stations 500km or more distant. Satellite, repeater and EME QSOs are invalid.

There are phone, CW and mixed classes and every QSO over 500km is worth one point, but repeat - QSOs do not count. There is a multiplier comprising all the different squares worked - eg IO91, JN37 including your own and those less than 500km distant. Full rules are on page 96 of *DUBUS 4/1994* and Guido Juenkersfeld, DL8EBW, is the mastermind of this event.

1994 ANNUAL TABLE - BREAKDOWN

50MHz Annual Table - 1994
Final Placings - Top Four

Callsign	Counties	Countries	Pts
GW6VZW	55	60	115
G0TRB	51	46	97
G6HKM	29	52	81
G3FDW	30	35	65

70MHz Annual Table - 1994
Final Placings - Top Four

Callsign	Counties	Countries	Pts
G0EHV	49	6	55
G0TRB	42	6	48
G3FIJ	37	5	42
G3FDW	38	4	42

144MHz Annual Table - 1994
Final Placings - Top Four

Callsign	Counties	Countries	Pts
G0FIG	77	30	107
G1SWH	87	19	106
G1AWF	78	21	99
G6HKM	68	23	91

430MHz Annual Table - 1994
Final Placings - Top Four

Callsign	Counties	Countries	Pts
G0TRB	48	14	62
G0FIG	46	13	59
G1SWH	46	10	56
G3FDW	36	10	46

1.3GHz Annual Table - 1994
Final Placings - Top Four

Callsign	Counties	Countries	Pts
G6HKM	18	12	30
G0FIG	10	7	17
G4MUT	4	5	9
G3FIJ	5	4	9

PROPAGATION

QUOTING FROM the poet Alfred Lord Tennyson, the editorial in the December *Report* of the Six and Ten Reporting Club begins: "The old order changeth, yielding place to new . . ." This is because editor Ray Cracknell, G2AHU, and printer and publisher Ian Brotherton, G2BDV, have decided: ". . . under no circumstances could either of them continue to produce the Six and Ten Club's reports through into Cycle 23. They have therefore decided irrevocably to stand down after the production of the June issue this year."

They hope that other members of the Club will continue their efforts in some form: ". . . using modern technology and methods . . ." So if anyone would like to discuss this, please contact Ray, who is QTHR, or telephone 01568 780614.

The mean sunspot number for December was 26.7 and the mean solar flux at 2.8GHz (Ottawa) was 84, according to the Sunspot Index Data Centre (SIDC) in Brussels. The adjusted mean flux for October was 87.7, dropping to 79 in November. The back cover of the *Report* shows solar flux predictions through 2001 based on October 1994 observed data. These NOAA data are in tabular and graphical form and suggest a minimum value of 66 SFU in September/October of next year.

AURORAL EXPERIMENT

Following the notes in the January issue about W3EP's polarization experiment proposal with auroral propagation, Lasse Melin, SM0KAK (JO89), wrote about his experiences. For several years he used crossed Yagis on 144MHz and checked the polarization of incoming signals. During auroras, horizontal - E-plane - was usually best apart from a few interesting exceptions.

From Stockholm, his longest DX were to EI, GW, OY and LO26 square, NE from Moscow. Lasse writes: "Only when I worked these DX stations, and only sometimes, did I get stronger signals from the vertically polarized part of my Yagi. It was amazing to hear all the QRM - other than distant auroral stations - disappear and the DX become strong."

Another Swedish friend has experienced this phenomenon and they conclude that, during east/west auroral DX contacts, the polarization sometimes gets twisted. He suggests that Leif Asbrink, SM5BSZ, could shed further light on this matter as he uses four crossed Yagis.

DXPEDITION

GEOFF BROWN, GJ4ICD, has now booked the flights to the Cape Verde Islands for his summer operation from D4. They will depart from the UK on 30 May for an overnight stay in Lisbon. The following day they will fly to Sal then on to St Vincente to arrive in Mindelo in the evening to stay in an hotel. Operation will be from D44BC's home (HK76MK) using an IC-736 running 100W to one or two 5-ele Yagis on 6m.

It will be fascinating to see what can be worked from this area and Geoff will be looking for multi-hop Es, after their positive results from Jordan last year. They will be QRV on the HF bands running a TS-940 with Alpha 75 PA at 1kW using assorted beams and dipoles. The return date is 14 June.

METEOR SCATTER

FOR THOSE using OH5IY's MSSOF42F program, Jukka Sirvio, OH6DD, has posted the 87MHz data for the recent Geminid, Ursid and Quadrantid showers on the Internet. One of the FTP sites is the usual ftp.funet.fi and the files are in the /pub/ham/vhf-work directory. They are gem94.m, urs94.m and qua95.m. While you are at it, there is a revised file for the 1994 Quadrantids, qua94.m.

OH5IY's 87MHz recordings indicate the peak of this year's Quadrantids occurred around 0300-0400UTC on 4 January, about 4-5 hours later than the visual peak predicted by the IMO. There are no significant showers in March and the next major one is the Lyrids in April; details next month.

MOONBOUNCE

THE FRENCH national society REF and *DUBUS Magazine* are sponsoring a European EME Contest. The first leg is on the 11/12 March weekend for the 144MHz and 1.3GHz bands, the second being on 8/9 April for 432MHz, 2.3GHz and above. The aim is to encourage worldwide EME activity. The scoring system favours random QSOs which score 100 points per completed contact whereas sked QSOs are worth 10pts on bands below 2.3GHz. The multipliers are DXCC countries plus all W, VE and VK states.

QRP stations are classed as less than 100kW EIRP on 144MHz, less than 400kW EIRP on 432MHz and less than 600kW EIRP on 1.3GHz. QRO stations are those running more than the foregoing, while the PRO category is for stations running non-amateur equipment or antennas. The referee is Ian White, G3SEK (QTHR), whose E-mail address is g3sek@ifwtech.demon.co.uk. The full rules are on pages 67-68 in *DUBUS 4/1994*.

Bob Taylor, WB5LBT, posted a message to the VHF Reflector about a proposed international conference for 2m EME enthusiasts. The venue is Baton Rouge in Louisiana over the 25-28 May period. For more details, contact Bob via the Internet. His address is wb5lbt@aol.com and he is also on the EME 20m net and the EME BBS on 001 704 2844854.

Included in the packed, 10-page January issue of Allen Katz's, K2UYH, *432 And Above EME News* are reports from G3HUL, G3LTF, G3WDG/G4KGC, G4DZU, G4ERG and G4RGK. Most of the reports from around the world are about the second leg of the ARRL EME contest last November, which saw good conditions on 70cm and above.

50MHZ

NEIL CARR, G0JHC, editor of *Six News*, reports that the Monegasque government is considering issuing 50MHz permits to residents of the Principality. A couple of 3A1 licensees - the equivalent of our B category - have applied for "temporary and revocable" permits. Power levels and the exact allocation have yet to be determined.

This is excellent news and one can imagine the pile-up when the first Es opening occurs to JN33RR this summer. *Please note that initially operating privileges will only be issued to Monaco residents who apply for special permits. 6m operation in the Principality by over-zealous foreign nationals will be quite illegal.*

ACTIVITY

Ken Osborne, G4IGO (SOM), reports short periods of E-layer propagation on 26 and 28 - 30 December. The event on the 28th, 1728 - 1914, was unusual as he could only work stations in GD, GM, OZ and SM4 on a beam

ANNUAL VHF/UHF TABLE
FINAL PLACINGS 31 DECEMBER 1994

	50MHz		70MHz		144MHz		430MHz		1.3GHz		Total
Callsign	Cty	Ctr	Cty	Ctr	Cty	Ctr	Cty	Ctr	Cty	Ctr	Points
G0TRB	51	46	42	6	61	16	48	14	-	-	284
G6HKM	29	52	-	-	68	23	25	11	18	12	238
G1SWH	5	28	26	6	87	19	46	10	3	3	233
G3FDW	30	35	38	4	60	14	36	10	-	-	227
G3FIJ	21	17	37	5	56	13	36	9	5	4	203
G0FIG	-	-	-	-	77	30	46	13	10	7	183
G0EHV	-	-	49	6	57	17	17	9	-	-	155
G1AWF	16	12	-	-	78	21	13	4	-	-	144
GW6VZW	55	60	-	-	-	-	-	-	-	-	115
G0HIK	1	1	2	1	71	14	16	8	-	-	114
G4MUT	16	9	15	2	27	7	19	5	4	5	109
GI4OWA	11	38	-	-	42	17	-	-	-	-	108
G8XTJ	15	17	-	-	52	15	-	-	-	-	99
G4OUT	-	-	30	6	47	13	-	-	-	-	96
G0EVT	5	41	-	-	3	22	10	9	-	-	90
G3UOL	18	4	-	-	53	15	-	-	-	-	90
GW0PZT	-	-	-	-	59	24	-	-	-	-	83
G4DEZ	3	16	-	-	29	13	5	5	2	2	75
G1UGH	11	16	-	-	21	10	-	-	-	-	58
G4OBK	17	30	-	-	1	1	-	-	-	-	49
GU4HUY	-	-	-	-	39	12	-	-	-	-	51
G3FPK	-	-	-	-	37	11	-	-	-	-	48
G3YHF	-	-	-	-	-	-	39	7	-	-	46
G7CLY	9	16	-	-	10	6	-	-	-	-	41
G6ODT	-	-	-	-	2	2	17	10	-	-	31

British counties were those listed on page 81 in the January 1994 *RadCom*; 77 in all. Up to three different stations were allowed in all 12 GM regions. EI counties were excluded. Countries were the current DXCC ones plus IT9. Deadline for the first 1995 scores is 30 March.

heading (QTE) of 30°. Signals weren't too strong, about a T7 note, but not auroral. Roger Horne, G4HBA (DVN), was hearing stronger T9 signals on the direct headings.

At this time, SM7FJE was working stations at good strength, beaming west, but again not auroral. At 1840 - 1900, G4HBA found the GD signals very rough, almost auroral, yet Ken did not observe this. He suggests that Roger's antenna "could be seeing a curtain invisible to me".

These observations could be explained, in part, by antenna performance. All Yagi antennas have unwanted lobes in unexpected directions. If you want to explore these, run some typical 6m designs through the Yagimax program and see what happens to the H-plane polar diagram at normal heights above ground, eg 1 - 3 wavelengths.

Yagimax has a pseudo-3D option, in glorious colour, which often reveals significant lobes at, say, 40° off azimuth and at 35° elevation. Under these circumstances, an operator in the same village, using a different antenna at a different height, could get quite different results.

The first few days of January saw consistent MS propagation from early morning to about 1300. G4IGO describes the 8th as "an interesting day..." with SM7AED heard via MS and Es in his sked at 0855 with G4UPS. Swedish TV was strong and visible with very strong Es to SM4, SM7, OZ and YL in the 0920 - 1010 period.

Ted Collins, G4UPS (DVN), reports winter Es propagation, enhanced by morning MS, in the first half of the month. At 0906 on the 6th, he worked OH0NLP (KP00AB) who was using 100W to a delta-loop antenna; QSL via OH3NLP. From 1135 to 1415 there was Es to DL, I0, 2, 3 and 6, OE, OZ, SM3, S5 and 4N, with some SP6/7s later. Most activity was in the mornings but on the 20th there was Es propagation to DL, I2, OK2, OM3, S5, YU and 9A from 1700 for 80 minutes.

G0JHC reports many openings to the east and Scandinavia in the 26 December to 20 January period with 18 countries heard or worked. An aurora on 17 January brought very strong signals from LA and SM with beacon OH9SIX (KP36) copied via Auroral-E later. VE9AA telephoned at 2250 to report copying TV video offsets in the 48/49MHz region. Tests were conducted for an hour, but nothing was heard; GW3LDH (CWD) and G4IFX (DHM) heard nothing either from North America.

GJ4ICD confirms morning Es activity on 1, 2, 4, 6 and 8 January. The afternoon of the 20th brought lots of strong signals from DL, I, OE and YU. Paul Baker, GW6VZW (GWT), found January quite productive with many short and medium range Es openings to the northeast. Random MS contacts were possible, mixed up with Es. He lists 14 countries heard/worked including, on CW, OH5NR (KP30), SK0CT (JO89), YL3AG (KO26) and ES5MC (KO38) on SSB.

Paul notes that the people who, a few years ago, "... would shout and scream at you if you dared to call on 50.110MHz are now setting a really good example by calling for MS and working people non-stop in Europe on this 'sacred' frequency". He asks if anyone has received QSLs from R3VHF and RA3YO. Direct mail has produced nothing so far. OZ1IIL (JO47) hasn't answered two requests for QSLs. Has anyone had any luck with these operators?

144MHz

ALEC TRUSLER, G0FIG (SXW), had a nice Christmas present. A CQ call on 144.300MHz at 1150 on 24 December brought an immediate '49' MS response from Henry Souchet, 9H1CD (JM75FV). After a quick exchange of information, 9H1CD called for DX. The QRB is 2,038km, Alec's best MS DX to date. It earned him the winning point in the 2m Annual Table.

Roger Betts, G0TRB (SFD), the overall winner in the Annual Table stakes, reckons his improved performance is largely due to changing from a 7-ele to a 17-ele Yagi. The December contests and lifts brought another 16 counties and three countries for 1994. Heavy work commitments at the year end curtailed Andy Wyspianski's, G1AWF (LDN), activity, but he finished an excellent third in the 2m table.

Andy Stafford, G4VPM, moved to his new QTH in south Somerset a year ago. It has a good takeoff so he has done quite well with a TS700G, 100W amplifier and 17-ele Yagi. In the Christmas Fun contests, his best DX was GM4JJJ (FFE) in pretty grim conditions. On 15 January, French stations were quite strong and some EAs were on the band. In the 17 January aurora, activity was very low, G0CUZ being the only other G heard. He worked GMs in IO85 and 86, heard others and also LA4YGA (JO48) and SK6HD (JO68).

Joe Ludlow, GW3ZTH, was out /P in IO81FP on 24 December from 0835 but the best of the tropo DX had gone by then. On 14/15 January, the band was open to the south and he heard GW6EOL/P at the IO81FP site working EA1 in the early evening.

The 17 January aurora was widespread in the USA, according to a lengthy report from Steve Harrison, KO0U/4 (FM18). One station he worked at 0129UTC was Ian Offer, W9/G4FDX (EN60), whose "...CW and operating tactics put almost all other V/UHF CW DXers I've heard to shame". Let's hear it for the Brits!

FINALE

NO REPORTS of UHF activity in January, which is not surprising in view of the never-ending succession of deep lows and fronts battering the British Isles. The **May** deadline - first appearance of the 1995 Annual Table - is **30 March** and the **June** date is **27 April**. The answerphone/fax is on 0181 763 9457. My CompuServe ID is 70630,603 and the Internet route is 70630.603 @compuserve.com. The BT Gold mailbox is 87:CQQ083. ♦

● The Chairman of the South Oxfordshire Repeater Group (SORG) is Mike Stevens, G8CUL (QTHR), and not as published in the February edition of *RadCom*. SORG is currently putting on two 70cm repeaters - one of which (GB3DI) is likely to be allocated one of the new repeater channels R61 - R67.

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A4S	3-4 ele Yagi 10/15/20m	£425.00

VHF Antennas

AR-270	2/70 Dual Band Vertical 1.13m long	£60.00
AR-270b	2/70 Dual Band Vertical 2.3m long	£89.00
AR2	2m Vertical 1.2m long	£35.00
AR6	6m Vertical 3.1m long	£48.00
A148-10S	2m 10-ele Yagi 13.2 dBd	£59.00
A144-20T	2m 10-ele Cross Yagi 12.2 dBd	£99.00
13B2	13-ele 2m Yagi	£99.95
17B2	17-ele 2m Yagi	£169.00
A50-3S	3-ele 6m Yagi	£75.95
424B	24-ele 70cms Yagi	£115.00
22XB	2m 22-ele Yagi c/w polarization switching	£199.00
738XB	70cms 38-ele Yagi c/w polarization switching	£185.00

HOKUSHIN ANTENNAS

HS-702S	2M/70CM Whip BNC	£12.50
HS430	5⅛ Wave Whip BNC	£8.50
2NE	5⅛ Wave Mobile Whip	£19.00
VM-2HP	2M ½ Wave Mobile Whip	£26.00
88F	2M 8/8 Wave Mobile Whip	£16.50
VM-727RS	2M/70CM Mobile Whip	£32.00
HS-727SS	2M/70CM Mini Mobile Whip	£17.00
EX104B	2M/70CM Mini Mobile Whip	£22.50
SMC12SE	12M Mobile Whip	£16.50
SMC15SE	15M Mobile Whip	£16.50
SMC17SE	17M Mobile Whip	£16.50
HF3	12/17/30 Base Vertical	£59.00
28HS2HB	10M 2EL ZL Beam	£65.00
HS-GP62	2 X ⅝ Base Colinear	£65.00
GP23	3 X ⅝ Base Colinear	£39.00
SQ44	2M SWISS QUAD	£45.00
WX1	2M/70CM Base Colinear	£75.00
WX2N	2M/70CM Base Colinear	£99.00
WX4N	2M/70CM Base Colinear	£129.00
WX6S	2M/70CM Base Colinear	£189.00

TOKYO HY-POWER

Tokyo Hy-Power. One can only describe their products as "Japanese design and build quality at its very best"

LINEARS

		£	Carr
HL100B/10	10M Linear, 10W in 100W out PEP Suitable for 21/24/28MHz	210	C
HL100B/20	20M Linear, 10W in 100W out PEP	210	C
HL100B/80	80M Linear, 10W in 100W out PEP	210	C
HL66V	6M Linear, 10W in 50-60W out Rx Preamp	169	C
HL166V	6M Linear, 3/10W in Auto select 80/160W out Rx Preamp	299	C
HL37VSX	2M Linear, 0.5-5W in 20-35W out variable gain preamp	109	B
HL62VSX	2M Linear, 5/10/25W in 50W out preamp	235	C
HL36U	70cm Linear, 6/10W in 25/30W GaAs FET Preamp	155	B
HL63U	70cms Linear, 10/25W in 50W out GaAs FET Preamp	259	C
HL180V	2M Linear, 3/10/25W i/p auto select 170W out Rx Preamp	389	C
HL130U	70cms Linear, 3/10/25W i/p auto select 120W out Rx Preamp	485	C

TRANSVERTORS

HX240	2M to HF 80,40,20,15,10M 2.5/10W Drive 30-40W o/p	299	B
HX640	6M to HF Specs as above	299	B
HX650	10M to 6M transvertor high performance, MGF1302 Preamp dB/12dB selectable 10/50W selectable output input selectable, 100m V/1V RMS	369	B

REXON® VHF/UHF HANDI'S

RL102	VHF handi, 138-174MHz, 5 watt, complete with cell case	£189.00	B
RL402	UHF handi, 410-470MHz, 5 watt, complete with cell case	£199.00	B
RNB111	7.2V 600mAh nicad for RL102	£21.50	A
RNB112	12V 500mAh nicad for RL102	£39.95	A
NC28/REXON	Charger for RNB111	£18.00	A
SMC18/REXON	Charger for FNB112	£18.00	A
RTN100	CTCSS unit	£25.00	A
RTS102	DTMF unit	£19.95	A
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RBX100	AA cell case for RL102/402	£8.00	A
CBB186	Univeral belt clip quick release	£14.95	A

REXON® OFFER

RL102 C/W NICAD & CHARGER ONLY

£189

RL-402 C/W NICAD & CHARGER ONLY

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DAIWA

Proven Reliability for Today's Amateur

PS120MIIA	PSU 3-15V 9/12A	£65.00
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PS304IIA	PSU 1-15V 24/30A	£119.00
RS40XII	PSU 1-15V 32/40A	£159.00
CN101L	1.8-150MHZ 15/150/1500W	£59.50
CN103LN	150-525MHZ 20/200W 'N'	£68.00
CS201	2 Way Switch SO239 1KW	£15.00
CS201GII	2 Way Switch 'N' 1KW PEP	£23.50
LA2080H	2M L/AMP 1.5-5W IN 30-80W OUT	£136.00
DLA80H	2M/70CM Dual Band Amp 0.5-25W IN 80-60W Out Pre Amps	£345.00
DX10N	2m/70cm Duplexer UHF/N	£19.50
CP10Y6	Cigar plug lead for FT530,etc.	£6.50

MORSE KEYS

HK702	Straight key,1Kg adjustable tension and contacts	£46.00	B
HK706	Straight key, 0.5Kg adjustable tension and contacts	£29.00	B
HK707	Straight key, 0.5Kg similar 706 with cranked arm	£35.00	B
HK808	Straight key 2.5Kg deluxe marble plinth	£110.00	B
HK711	Straight key, knee mounting	£36.00	B
HK802	Deluxe straight key, bearing less solid brass construction	£82.00	B
HK803	Brass high deluxe telegraph key c/w base plate	£77.00	B
HK804	Brass high deluxe telegraph key w/o base plate	£82.50	B
MK702	Single lever paddle 1.0Kg	£34.00	B
MK704	Squeeze key 0.15Kg	£42.00	B
MK706	Squeeze key 0.7Kg	£34.00	B

CREATE ANTENNAS

HF

			Carr.
714X-3	3-4 ele Yagi 15-20-40m 3Kw PEP	£1369	E
CD218	3 ele Yagi 10-15 1.5Kw PEP	£289	D
CD318JR	4 ele Yagi 10-15-20m 750w PEP	£439	D
CD318	4 ele Yagi 10-15-20m 2Kw PEP	£539	D
CD318B	5 ele Yagi 10-15-20m 2Kw PEP	£589	D
CD318C	6 ele Yagi 10-15-20m 2Kw PEP	£899	D
CL10	5 ele Yagi 10m 2Kw PEP	£299	D
CL15	5 ele Yagi 15m 3Kw PEP	£450	D
CL4B-4	3 ele Yagi 40m 4Kw PEP	£1375	E
CV730V-1	V-Dipole 10-15-20-40m 1Kw PEP	£199	D
CY103	3 ele Yagi 10m 2Kw PEP	£179	D
CY104	4 ele Yagi 10m 2Kw PEP	£239	D
CV48	40m Vertical 2Kw PEP	£275	D
AD385	40/80m Switch box for CV48	£69	B

MFJ PRODUCTS

MFJ-259	1.8-170MHz Antenna Analyzer with built in Counter, SWR and RF resistance meters	£229
MFJ264	1-650MHz Dummy load 100W continuous or 1500W for 10 seconds	£69.00
MFJ941E	Antenna tuner 1.8-30MHz 300W 8 position antenna switch +4:1 balun	£119.00
MFJ949E	Antenna tuner 1.8-30MHz 300W 8 position antenna switch 4:1 balun Built in dummy load	£159.00
MFJ-962C	Antenna tuner 1.8-30MHz 1.5kW PEP 6 way antenna switch 4:1 balun	£259.00
MFJ-986	Antenna tuner 1.8-30MHz 3kW PEP Rotary Inductor 6 way antenna switch built in current balun	£319.00
MFJ-989C	Antenna tuner 1.8-30MHz 3kW PEP Rotary Inductor built in 300W dummy load 6 way antenna switch built in balun	£369.00

SEE PREVOIUS PAGE FOR ADDRESSES AND TELEPHONE NUMBERS

SWL NEWS

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93 Elibank Road, Eltham, London SE9 1QJ

AS I AM PENNING this column a few days into 1995, it seems appropriate to look back briefly at what was on offer in 1994. **Table 1** is a DXCC countries chart showing what countries had been heard on each of the bands on SSB by David Whitaker, BRS25429, and myself. Take a while to compare the chart with your own 1994 tally of countries and see how many extra band slots you filled in.

To save you all the chore of adding up all the columns to see how many countries were heard on each of the bands, the breakdown is given in **Table 2**.

The research shows that David and I heard 253 different DXCC countries during the year. The chart does show ZS9 and ZS0, which were deleted from the DXCC list during the course of the year, and shows the Russian Republics with their old prefixes.

SUPER-DUPER FOR LISTENERS

PAUL O'KANE, EI5DI, has advised that version 6.07 of his Super-Duper for IOTA (SDI) is now available from the usual UK shareware suppliers. SDI was designed specifically for the Society's Islands on the Air contest and was used by the winners in both the 1993 and 1994 events. Super-Duper for Listeners (SDL) is the only contest logging program designed specifically for listeners in the IOTA contest and it is included with SDI for distribution.

I have used the software and I highly recommend using it if you have a computer and intend putting in an entry for the listeners section of the contest.

28MHz	156
24MHz	122
21MHz	186
18MHz	166
14MHz	223
7 MHz	203
3.5MHz	180
1.8MHz	74

Table 2: Breakdown by band of countries in Table 1.

HOLIDAY IN EA8

ONCE AGAIN, David Whitaker took his aching body to EA8 just before Christmas. Armed with a Kenwood R-2000 and 16ft of wire slung around his apartment he heard 135 countries during his two week stay. His tally on each of the bands was as follows: 3.5MHz - 10; 7MHz - 41; 14MHz - 107; 18MHz - 32; 21MHz - 53; 24MHz - 6; and 28MHz -17 countries. Some interesting DX was heard including: FR5ZQ/G, AH8A, ZD7WRG, BV4AS, FK8CP, KH2/VP9BP, WH0AAV, VK9NS and his brother, G3IGW!

WINTER LF REPORT

A FEW REPORTS of LF DX were received as a result of the comments in my January column. However, the feeling amongst those who have experienced such conditions in the past suggested that conditions were disappointing. Italians could be heard working T32J (JA DXpedition) and T31BB (DXpedition by 2 DLs) but there was no copy of either in England. The long path to W7 was not as good as in 1993 / 94. However, signals from the West Coast were heard on 17, 18, 21, 29, 30 and 31 December. Other notable DX on LF in December included DU9RG on 3.5MHz at 1537 on the 11th, JW0C on 1.8MHz SSB at 2218 on the 12th, 9M8DB on 3.5MHz at 2254 on the 14th, good signals from VK at 1930 on 3.5MHz on the 18th, VP8CQS (South Shetland Is) on 7MHz at 2336 on the 18th, 5Z4FO on 3.5MHz at 2217 on the 28th, VK9NS on 3.5MHz at 0805 on the 29th, and 9X/SM5DIC on 7MHz at 1834 on the 31st.

January started poorly, too, but good loggings on LF included UN7JID, TU4EX and 5T5JC on 1.8MHz, XX9AS, V31JU, YC2BQF and VS6WV on 3.5MHz and TI4/KB9CRY, J37LF, JF1IST (0822), VP8SGP (South Georgia) and ED0/EA7DLF (Deception Is on 7MHz). More next month, when reports should show an upsurge in conditions on 7MHz.

FINALE

CONTRIBUTIONS FOR the May *SWL News* must be received here no later than 16 March. ♦

Prefix	28	24	21	18	14	7	3.5	1.8
Antarct				O		O		
1A0			O	O	O	O	O	
1S					O			
3A					O	O	O	
3B6								
3B8	O	O			O	O	O	
3B9		O						
3C								
3CO								
3D2								
3D2								
3D2								
3DA	O		O		O	O		
3V					O	O		
3W, XV								
3X				O	O	O	O	O
3Y								
3Y0	O	O	O	O	O	O	O	O
4J/F								
4S				O	O	O	O	O
4U	O					O	O	O
4U/UN						O		O
4X, 4Z	O	O	O	O	O	O	O	O
5A								
5B	O	O	O	O	O	O	O	O
5H	O			O	O	O	O	
5N	O	O	O	O	O	O	O	O
5R				O		O		
5T	O			O	O	O	O	O
5U	O			O	O	O	O	O
5V								
5W						O		
5X	O		O		O	O		
5Z	O		O		O	O	O	
6W, 6V			O			O		
6Y			O	O	O	O		
7O					O			
7P	O							
7Q	O	O	O		O	O		
7X	O	O	O	O	O	O	O	
8P	O	O	O	O	O		O	
8Q	O				O	O		
8R	O	O	O	O	O	O	O	
9A	O	O	O	O	O	O	O	O
9G	O	O	O	O	O	O	O	
9H	O	O	O	O	O	O	O	
9J	O	O	O	O	O	O	O	
9K	O	O	O	O	O	O	O	O
9L					O	O		
9M2		O			O	O	O	
9M6,8						O	O	O
9N			O		O	O	O	
9Q				O	O			
9U	O		O		O			
9V				O	O	O	O	O
9X	O	O	O	O	O	O		
9Y	O	O	O	O	O	O	O	
A2	O	O		O		O		
A3						O		
A4	O	O	O	O	O	O	O	
A5								
A6	O		O	O	O	O	O	
A7	O	O	O	O	O	O	O	
A9			O	O	O	O	O	
AP	O		O	O	O	O	O	
BV			O		O		O	
BT, BY			O		O	O	O	
C2								
C3	O			O	O	O	O	O
C5	O	O	O	O	O	O	O	
C6			O	O	O	O	O	O
C9	O	O	O		O	O		
CE	O		O	O	O	O	O	
CE0X								
CE0Y								
CE0Z			O					
CM, CO			O		O	O	O	
CN	O	O	O	O	O	O	O	O
CP	O		O		O	O	O	
CT	O	O	O	O	O	O	O	O
CT3	O	O	O	O	O	O	O	O
CU	O	O		O	O	O	O	O
CX	O		O	O	O	O	O	
CY9					O			
CY								
D2	O		O	O	O	O	O	O
D4		O	O	O	O		O	
D6			O	O				
DA, DL	O	O	O	O	O	O	O	O
DU, DX	O		O		O	O	O	
EA	O	O	O	O	O	O	O	O
EA6	O	O	O	O	O	O	O	
EA8	O	O	O	O	O	O	O	O
EA9	O	O	O	O	O	O	O	O
EI	O	O	O	O	O	O	O	O
EL			O		O	O		
EP					O			
ES	O		O	O	O	O	O	O
ET			O		O			
F	O	O	O	O	O	O	O	O
FG	O		O	O	O	O	O	
FH	O	O	O	O	O	O	O	
FK						O	O	
FM	O		O	O		O	O	
FO				O				
FO8X								
FP								
FR	O		O		O	O		
FR,G								

Prefix	28	24	21	18	14	7	3.5	1.8
FR, J								
FR,T					O			
FS/J				O		O	O	O
FT,W								
FT,X								
FT,Z								
FW								
FY	O		O	O	O	O	O	
G	O	O	O	O	O	O	O	O
GD					O	O	O	O
GI	O	O	O	O	O	O	O	O
GJ					O	O	O	O
GM	O	O	O	O	O	O	O	O
GU			O		O	O	O	O
GW	O	O	O	O	O	O	O	O
H4								
HA	O		O	O	O	O	O	O
HB	O	O	O	O	O	O	O	O
HB0	O	O	O	O	O	O	O	O
HC, D	O		O	O	O	O	O	O
HC8			O		O		O	
HH	O		O	O	O	O	O	
HI					O	O	O	
HK, J	O	O	O	O	O	O	O	
HK0SA				O	O			
HK0M		O				O		
HL, M			O	O	O	O	O	
HP					O		O	O
HR					O			O
HS	O		O		O			
HV				O	O	O	O	O
HZ, 7Z	O		O	O	O	O	O	
I	O	O	O	O	O	O	O	O
IS	O	O	O	O	O	O	O	
J2	O		O	O		O		
J3	O		O			O	O	
J5			O		O		O	
J6	O	O	O			O	O	O
J7			O		O	O	O	O
J8				O	O	O	O	
JA, JS	O	O	O	O	O	O	O	
JD1								
JD1								
JT				O	O	O		
JW		O		O	O	O	O	O
JX								
JY	O		O	O	O	O	O	
K, W	O	O	O	O	O	O	O	O
KC6								
KG4		O			O	O	O	
KH1								
KH2						O		
KH3								
KH4								
KH5								
KH5K								
KH6								
KH7								
KH8								
KH9								
KH0					O	O		
KL7					O	O		O
KP1								
KP2	O	O	O	O	O	O	O	
KP4	O	O	O	O	O	O	O	O
KP5								
LA	O	O	O	O	O	O	O	O
LU	O	O	O	O	O	O	O	
LX	O	O	O	O	O	O	O	O
LY	O	O	O	O	O	O	O	O
LZ	O	O	O	O	O	O	O	O
OA		O	O		O	O	O	
OD	O		O	O	O	O	O	
OE	O	O	O	O	O	O	O	O
OH	O	O	O	O	O	O	O	O
OH0	O		O		O	O	O	O
OJ0						O		
OK	O	O	O	O	O	O	O	O
OM	O	O	O	O	O	O	O	O
ON	O	O	O	O	O	O	O	O
OX			O		O	O	O	
OY	O	O	O	O	O	O	O	O
OZ	O	O	O	O	O	O	O	O
P2					O	O		
P4	O	O	O	O	O	O	O	O
PA	O	O	O	O	O	O	O	O
PJ1 +	O		O	O	O	O	O	O
PJ5 +		O	O	O	O	O	O	
PY, PP	O	O	O	O	O	O	O	
PY0F	O	O	O		O	O	O	
PY0S						O		
PY0T	O	O		O	O			
PZ	O		O	O	O	O	O	O
S2					O			
S5	O	O	O	O	O	O	O	O
S7			O		O			
S9	O		O	O	O			
S0					O			
SM	O	O	O	O	O	O	O	O
SP	O	O	O	O	O	O	O	O
ST								
ST0								
SU	O		O		O	O	O	
SV	O	O	O	O	O	O	O	O
SV/A				O		O		
SV5	O	O	O	O	O	O	O	
SV9	O	O	O	O	O	O	O	
T2								
T30								

Prefix	28	24	21	18	14	7	3.5	1.8
T31								
T32								O
T33								
T5						O		O
T7	O					O	O	O
T9		O	O	O	O	O	O	O
TA	O	O	O	O	O	O	O	O
TF					O	O	O	O
TG				O		O	O	
TI	O	O	O	O	O	O	O	
TI9		O			O	O	O	
TJ		O	O		O	O		
TK	O	O	O	O	O	O	O	O
TL	O	O	O	O	O		O	
TN								
TR					O		O	
TT								
TU	O	O	O	O	O	O	O	
TY		O		O				
TZ	O	O				O	O	
UA1 - 6	O	O	O	O	O	O	O	O
UA1, 4K2						O		O
UA2	O		O		O	O	O	O
UA9 - 0	O	O	O	O	O	O	O	O
UB	O	O	O	O	O	O	O	O
UC	O		O	O	O	O	O	O
UD	O	O	O	O	O	O	O	
UF	O	O	O	O	O	O	O	O
UG	O	O	O	O	O	O	O	
UH	O	O	O		O	O		
UI	O	O		O	O	O	O	O
UJ				O	O	O	O	
UL	O	O	O	O	O	O	O	
UM	O	O	O	O	O	O	O	
UO	O	O	O	O	O	O	O	
V2	O	O	O	O	O	O	O	O
V3	O	O	O			O		
V4			O	O	O	O	O	
V5	O	O	O	O	O			
V6								
V7				O	O			
V8	O		O		O	O	O	
VE - VO	O	O	O	O	O	O	O	O
VK	O	O	O	O	O	O	O	
VK9								
VK9L								
VK9M								
VK9N				O	O	O	O	
VK9W								
VK9X								
VK0								
VK0								
VP2E	O		O	O	O	O	O	O
VP2M			O	O	O	O	O	
VP2V	O						O	
VP5	O		O	O	O	O	O	
VP8			O		O	O		
VP8			O					
VP8								
VP8								
VP8								
VP9						O	O	O
VQ9					O	O		
VP8								
VS6	O	O	O	O	O	O	O	O
VU	O	O	O	O	O	O	O	O
VU								
VU								
XE - XF		O	O		O	O	O	
XF4							O	
XT					O			
XU	O		O		O			
XW								
XX9			O	O	O			
XY, XZ								
YA								
YB, YC	O		O	O	O	O	O	
YI	O		O	O	O	O		
YJ								
YK	O				O	O	O	
YL	O	O	O	O	O	O	O	O
YN					O		O	
YO	O	O	O	O	O	O	O	O
YS				O		O		O
YU	O	O	O	O	O	O	O	O
YV	O	O	O	O	O	O	O	O
YV0	O					O		
Z2	O	O	O	O	O	O	O	
Z3	O			O	O	O	O	O
ZA	O	O	O	O	O	O	O	O
ZB		O	O		O		O	
ZC	O	O	O	O	O	O	O	
ZD7			O	O	O	O		
ZD8	O			O		O	O	O
ZD9		O	O		O	O		
ZF			O	O	O	O	O	
ZK1								
ZK1								
ZK2								
ZK3								
ZL				O	O	O	O	O
ZL7								
ZL8								
ZL9								
ZP	O	O	O	O	O	O	O	
ZS	O	O	O	O	O	O	O	
ZS6M	O	O			O			
ZS9		O	O					
ZS0	O					O		

Table 1: Countries heard on SSB by David Whitaker, BRS25429, and myself.

NOVICE NEWS

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

FOLLOWING THE DECEMBER EXAM, there are around two hundred new Novices. Three examination centres had not returned the papers before the report was compiled but, apart from those, 196 of the 243 results analysed were from successful candidates.

While this news is interesting in itself, the comments on each section give guidance on topics needing a little more attention to ensure that students are not carrying wrong ideas into the exam room.

Less than half chose the right answer to the question asking which stage follows the mixer stage in a superheterodyne receiver. Almost a third got the decimal point in the wrong place when asked to identify an 8.2MΩ resistor choosing 82kΩ instead - in spite of the inclusion of the resistor colour code.

Seven candidates still got the answer wrong when asked the colour of the wire to connect to the Earth pin of a 3-pin mains plug, choosing the brown wire. These persistent wrong answers to this safety question must be due to mis-reading the question or pure panic as I am sure the topic is well covered during the course.

Another case of not reading the question carefully enough may be seen in the Licensing conditions section. I assume Novices were asked at what point they gave their callsign. I do not know what the other options were, but two were obviously: 1) every 10 minutes and 2) when changing their transmitter to a new frequency. The only correct answer is 2) because the conditions state: ". . at the start and end of each period of communication, and - if it is a long one - every fifteen minutes". Every Novice student should have a copy of *The Terms, Provisions and Limitations* Booklet BR 68a/N, but for quick reference and revision *A Closer Look at the Novice Licence* available from the RSGB is invaluable.

Transmitters and transmitting techniques are mentioned again in the general comments. Confusion arose concerning the difference between harmonics and sidebands, and interference caused by a vacuum cleaner. City and Guilds suggest that both of these topics could be illustrated by practical demonstrations.

Despite these problem areas the results show that candidates were generally well prepared for this examination, with some improvement in performance over recent papers. Well done, all those instructors involved - your students' success reflects your own dedication.

GB0AP

THIS SECOND INTERACTIVE DAY at the University of Bradford was not the same as the first.

Almost two hundred youngsters attended with groups attending for half a day to fit more in to take part in five different workshop activities.

There were crystal sets to make (supervised by Harry, G0DQL) from prepared kits with completed, working sets being taken home. Coil-winding skills were rather lacking but there were many good working models carried home. Harry found that the girls wound beautiful coils but were less confident putting the things together.

There were working robots as used in industry. One could be programmed to simulate the complex movements of the joints in the arm, and one was programmed to move bottles round in a crate. There was also a planned outline of the processes needed to mix ingredients as in a food processing concern. John, G8OBR, explained each process then youngsters could get their hands on and try for themselves.

The workshop 'Electricity and Machines' showed how these were integrated - with a youngster pedalling a bike to provide the power. While in another lab, youngsters were presented with the experiments that first year students would face. With the audience outside the age range normally faced by the staff, I found that they had the approach exactly right. Sir Edward Appleton's talking head was demonstrated by Dr Peter Excell who told the story of his life and the importance of his discoveries.

We were less successful with GB0AP. Due to dreadful weather conditions, the antenna could not be erected - so we did our best with VHF. We had a mobile aerial on top of the coffee machine until we managed to lash together an HB9CV which showed a more acceptable SWR. We did manage a couple of contacts into the City Centre. And we did give out a lot of Novice literature and answer a lot of questions.

The schools are keen to return for the next Interactive Day and are already booking places. Dianne Excell managed to find a complete new programme and organised it to perfection. Listening to youngsters as they left, they were impressed with all they had seen and done. Perhaps some of the schools will follow up their enquiries about Novice tuition and radio club activities.

GET TO GRIPS WITH MORSE

GEO, G3ZQS, gave me some leaflets which he has prepared for the Fists CW Club. I asked for more of these to display on any Novice stands that I happen to mount, as they are of special interest to Class 'B' Novices especially those who would like to learn Morse but have so far found it hard.

One article, by W1NJM, contains so much common sense, that I asked if I may pass its contents on in this column.

Almost 200 youngsters attended the interactive day at the University of Bradford. Among the activities, children were shown how to make crystal sets.

You learned to talk at a very tender age, a process that took some time to perfect – and only your nearest and dearest could understand your earliest efforts. Hardly surprising when you consider all that is involved in speech.

There are 26 letters in the alphabet, all formed differently by the position of your lips and your tongue inside your mouth. Then of course, there are the sounds of these letters – and the different pronunciation of the letter combinations – "th", "sh", "ou", etc. This, of course, is an over-simplification; language is far more complex than that. There are many sounds formed in many different ways, different combinations of letters to form words and different combinations of words to make sentences and sense.

By the time you were two years old, you were mastering these sounds and making yourself understood by a wider circle of people. By the time you were four, you could hold a conversation using a complexity of sounds.

Morse uses a long sound, a short sound and a silent space between them and given nothing more than a combination of these, you can hold a full conversation. You have a head start too – remember, you already know the words and how they are built.

Learning the 26 combinations of those three elements – dits, dahs and spaces – is not especially difficult. With the numbers '0' to '9' and a few basic punctuation marks, you are ready to learn – as you did as a toddler – by *listening*. Amateur friends may give you help – or the local radio club maybe – by giving you practice or even recording tapes. There are many slow Morse transmissions on the air, organised by the RSGB [see the list in the *RSGB Call Book* and October's *RadCom – Ed*]. At first, you will only pull out a letter or two, but you will soon find that you identify the common words in the language. Speed and confidence will follow and, hopefully, you will take 'Q' codes and abbreviations in your stride. As everything is based on the dit, dah and space, there is not a great deal to learn.

I mentioned Novices in the first paragraph, but I am sure there are many Class B full licencees out there who only need a confidence boost before they feel ready to tackle the Morse. Think about it. If you could master speech as a mere toddler, what can you achieve now that you are older and wiser – and think of the advantages. Come to think of it, that is why you learned to talk in the first place! ♦

NEVILLE CHEADLE, G3NUG
Further Felden, Longcroft Lane, Felden, Hemel Hempstead HP3 0BN

IN THE NEXT four editions of this column I will be writing about some of the strengths of the IOTA Programme. These are based on my article 'The Twenty Strengths of IOTA - (or should it be 19 ½?)' which was published in the IOTA Anniversary Booklet, *IOTA - 30 Years On* (see page 91 for how to get this).

HIGH ACTIVITY

APPROXIMATELY 860 island groups have been activated, to date, out of the total of 1175 groups. This may seem an enormous number for the new IOTA enthusiast to target but bear in mind that well over 700 groups have been activated during the past three years. During a summer weekend some 20 - 25 island groups can be heard around 14.260MHz. An enthusiast should be able to win the IOTA 750 Plaque of Excellence in about six years operating mainly at weekends. In fact, I know of two Gs who have worked nearly 700 island groups in under three years!

Six years seems a reasonable target to go for. After all, how long does it take to get to the top of the DXCC Honor Roll?

OUTLET BOOST FOR DXERS

NOWADAYS MANY DXers find it difficult to find new countries or band-countries particularly with declining conditions. But the level of IOTA activity is still increasing rapidly as the programme attracts new participants and new island activators. Some of the IOTA DXpeditions are using low power on remote Pacific islands and chasing these is a wonderful outlet for the keen DXer. And for those who may not have that super station but are nevertheless still keen DXers there is much activity nearer home, particularly at weekends.

GOOD PUBLICITY

THERE IS NOW much advance publicity about forthcoming operations and the *RSGB DX News Sheet* is a major contributor here. IOTA columns are now published in many DX bulletins and news sheets throughout the world. The DX clusters are also an invaluable source of information as are the IOTA meeting frequencies set out below. The IOTA Committee is committed to passing on any reliable information it receives; we still get some surprises but fewer than in the past.

IOTA MEETING FREQUENCIES

THE MAIN FREQUENCY is 14.260MHz. Other ones on SSB are 28.560, 28.460, 24.950, 21.260, 18.128, 7.055 and 3.755MHz. The CW frequencies are 28.040, 24.920, 21.040, 18.098, 14.040, 10.115 and 3.530MHz. No specific frequency has been nominated for 7MHz CW but it is recommended that operations should include a frequency above 7.025 when the band is open to North America.

14.260 is used by IOTA nets around the world, primarily for the passing of information about island activity, QSL routes, etc. This and other nominated frequencies are not reserved exclusively either for IOTA nets or for the making of island contacts but are shared with others on a normal non-interference basis.

A NEW PLAN

AS A RESULT OF much debate within the IOTA Committee, a development plan has been unveiled to set out the way forward to the year 2000. It is a far reaching plan and deals with matters such as marketing, quality control, finance and organisation and provides an important framework to drive the programme into the next century.

Its purpose is to establish a way forward which:

- Promotes the growth of interest in the IOTA Programme world-wide.
- Encourages a higher proportion of island chasers to apply for certificates and gives better feedback to applicants.
- Addresses the question of programme resourcing, both manpower and finance.
- Makes management of the programme less labour intensive.
- Provides a high standard of service to participants.
- Emphasises positive perceptions of IOTA.
- Sustains the high integrity of programme management.
- Ensures the long-term survival of IOTA.

I would be pleased to send copies of the Development Plan to any reader. Readers in the UK should send a 38 pence stamped self-addressed C5 envelope and those abroad US$1 to cover postage.

The CO9OTA DXpedition team basking in their triumph on the Jardines de la Reina Archipelago off Cuba.

YAESU FUNDING

THE IOTA PROGRAMME is all set for new developments thanks to a three year sponsorship agreement with Yaesu (UK) Ltd. The programme is in the process of creating highly reliable computer systems to process the ever-increasing number of awards applications.

Furthermore, with correspondence set to increase as the programme develops, the funding will provide invaluable secretarial support. This, in turn, will give committee members time to concentrate on matters of policy. Further benefits will of course flow to Yaesu and to IOTA but the financial stability now provided to the programme is of prime importance.

An example of the stronger links being formed with Yaesu occurred at last October's RSGB HF & IOTA Convention. On the Friday morning of the Convention I had a call from Barry Cooper, G4RKO, who is the Sales and Marketing Manager of Yaesu UK Ltd. Barry asked me whether we would like to raffle a Yaesu handheld transceiver that evening at IOTA's Birthday Party so as to build up IOTA funds. I readily agreed! With the proceeds of this (£517) and an auction for a 3Y0PI tee-shirt (£35) the IOTA Committee was able to raise sufficient funds to purchase a new Yaesu FT-747 rig. This rig has been loaned for use on island DXpeditions in the Russian Arctic. We hope that several new ones will be activated. QSLs will be handled in the UK by Phil Whitchurch, G3SWH.

SUPER-DUPER FOR IOTA

PAUL O'KANE, EI5DI, has advised me that version 6.07 of Super-Duper for IOTA (SDI) is available from the usual UK shareware suppliers. SDI was designed specifically for the RSGB Islands On The Air Contest and was used by the winners in both the 1993 and 1994 events. Paul has now added a separate program for listeners in this contest. It's called Super-Duper for Listeners (SDL) and is included with SDI.

CASH BOOST FOR DXPEDITIONS

TO DATE, THE IOTA Committee has made contributions to two IOTA DXpeditions, namely to the CO9OTA DXpedition to Jardines de la Reina Archipelago off Cuba (NA-201), and to the one by ZK1KH to Pukapuka Atoll (OC-098) in the Northern Cook Is. The 15 man CO9OTA team achieved more than 5000 QSOs in just a few days. This island had not been activated previously.

When contributing to the costs of DXpeditions we now ask DXpeditioners to confirm that they will respond to bureau cards. ♦

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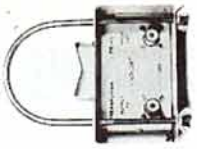

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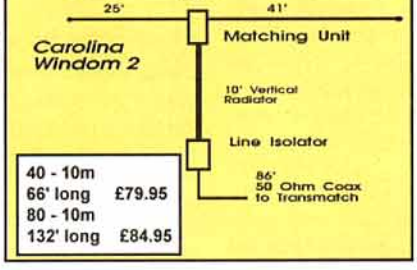

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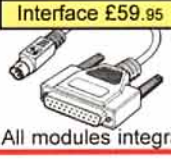

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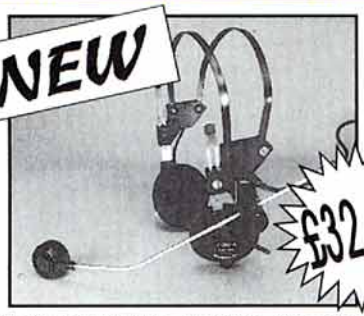

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QSL

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

THE TRADE MARK notice in February's *RadCom* caused a punter to enquire whether that affected members putting the RSGB emblem on their QSL cards. Let me hasten to assure *all* members of the Society that they are welcome to use the emblem on their cards: in fact, we are flattered that they do. Sorry if any false impression was given, but the statement was drafted by lawyers who, in fairness, wouldn't know a QSL card from a 5-element beam!

RSGB QSL BUREAU

NEIL ENTWISTLE, G0BRM, who is the QSL Sub Manager for the G3I - G3K series, is on the move around Easter. His new address will be Park Garden House, Friday Street, West Row, Bury St Edmunds, Suffolk, IP28 8PB. He will clear out all uncollected cards when he moves and has as many as 1.5kg for some people! So if you are one of the offenders and want your cards, you had better get in touch with Neil.

AWARDS

THE SOLENT FORTIFICATIONS Amateur Radio Group (SFARG) is resuming activities after a year's absence from the Special Event scene. For those of you that are awards collectors, SFARG have standardised their points system.

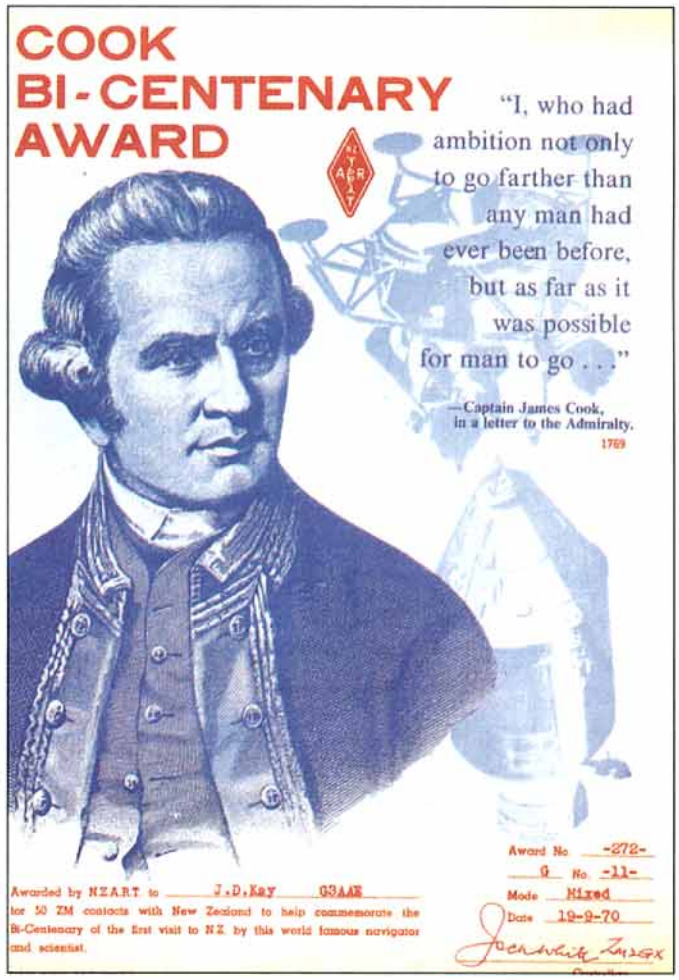
RSGB PREFIX GUIDE

WHAT WAS FORMERLY Geoff Watts' Prefix List has been updated, revised and expanded on behalf of the Society by John Forward, G3HTA. John, who needs no introduction to the DXing fraternity, has done a really superb job and produced a quality production which is a must for all DXers. Anyone else who is confused by the numerous new prefixes that have come into being over the last few years will also find it a mine of information. It will be launched at the RSGB London Amateur Radio and Computer Show at the Lee Valley leisure Centre (Picketts Lock) on 11/12 March [just in time for the CQ WPX SSB contest at the end of the month, when there will be dozens of unusual prefixes about - *Ed*] and is well worth buying. I give you my word that you will not be disappointed. See page 91 for further details.

FROM ABROAD

GEORGE BOOTHROYD, G4AWT, has kindly informed us that Werner Schröder, DF4XW, Hermesweg 29, 21075 Hamburg 29, Germany can issue QSL cards for contacts with the RS 12 Russian satellite. Applicants for QSLs should enclose an SAE and one IRC. Werner is an avid stamp collector and no doubt would be pleased to receive foreign stamps from QSL applicants.

Victor Covell-London, G0APV, has sent me evidence of a scam which, if successful, must be the easiest way to obtain DXCC that I know. Victor received a QSL card from an Indonesian 'ham' for a totally non-existent QSO and was asked for two QSL cards in return: one for a fictitious CW QSO and the other for an equally fictitious SSB QSO, because as he so disarmingly said "my antenna isn't good condition" - really! Needless to say Victor passed the correspondence on to me and kept the stamps! Pass me the sick bag please!



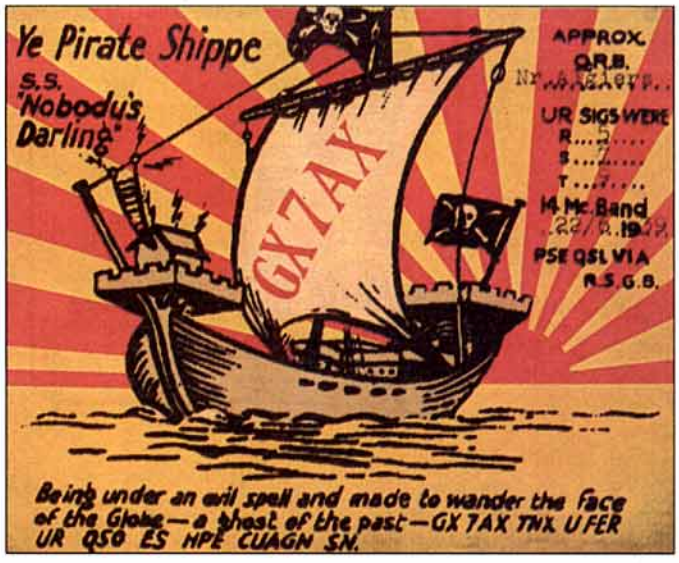
One of a number of awards from New Zealand collected in the 70s by John Hey, G3AAE.

OVERSEAS BUREAUX

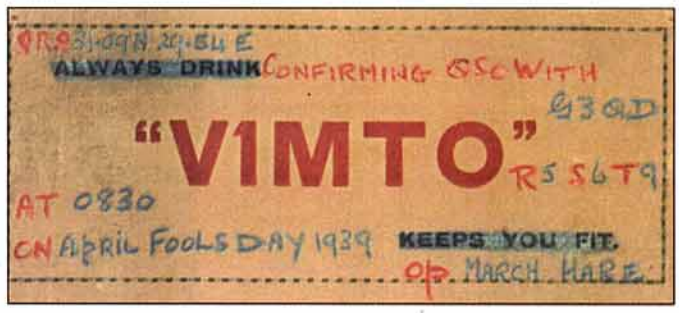
DOUGLAS BYRNE, G3KPO, tells me that he has heard that the French QSL Bureau is no longer in business. That's news to me and I guess it's news to the French national society too! However, if anyone has any further information then please let me know.

The Belgian QSL Bureau appears to have changed its address to PO Box 1630, 1000 Brussels, Belgium.

I have said in this column on previous occasions that the alternative to Box 88, Moscow is Box 49 and that is incorrect. It's Box 59. I am sorry about that minor error but it's all part of growing old I suppose! ♦



Gordon Treece, G3QD, sent me the two fascinating cards reproduced here. Below is an April Fool's Day scam QSL which Gordon says he fell for hook, line and sinker. On the left is one for a QSO with GX7AX somewhere near Algiers in June 1939. The back of the card says: "Regret OM that European war has put a stop to my activities".



Contest Exchange

ANDY COOK, G4PIQ
Fishers Farm, Colchester Road,
Tendring, Essex, CO16 9AA.
G4PIQ @ GB7MXM.#36.GBR.EU

I HOPE THAT BY the time you're reading this column, winter will be starting to loosen its grip on the country and your minds will be able to start turning to the contest season once again! I've spent part of a weekend watching the spots on the DXCluster for the *CQ* WW 160m CW contest and wishing that my schedule had enabled me to get in some operating. Conditions, it seems, have been really good for the event this year with lots of genuine US 7th call area stations being worked from G, along with a few Californians and KL7, and a good collection of other DX. Maybe it was just water in the soil giving people efficient antenna systems!

At this point in the sunspot cycle, although life on the higher HF bands can be hard going, the low bands make up for it to some extent and are well worth a look during forthcoming contests. You don't even need complex antennas to work a lot of the DX.

There are a couple of major international contests during March. In the ARRL SSB leg the rest of the World works the US and Canada. Meanwhile, in *CQ* WPX (Worked All Prefixes) everyone works everyone, but no-one can figure out where anyone is because of all the crazy prefixes in use.[But help is at hand - see the ad for the new *RSGB Prefix Guide* on page 91 - *Ed*] I'm sure 80 and 160 will be a riot in both these contests, so, even if you aren't planning an entry, take a listen and see what you can work - you may well be shocked. I've worked lots of US stations on 80m with just 100W and my 2m feeders before. For these SSB contests, don't forget to listen above 3800kHz and 7150kHz for most of the USA stations - they will announce where they are listening.

CHAMPIONSHIPS

AS THE MAIN CONTEST season gets into full swing, don't forget that there are both HF and VHF championships which enable the scores from a number of contests throughout the year to count towards an overall championship score. The HF championship covers most of the major single operator HF contests, with a weighting system which means that your performance in particular contests counts more than in others. The Commonwealth Contest and the IOTA contest get the top weightings. The VHF championship has an even weighting system, but only includes a subset of the total contest calendar. Those events which count are the March 2m/70cm, May 2m, 70cm and 2m Low Powers, and the 6m, 4m, 2m, 70cm and 23/13cm trophies. Stamina is the key to doing well in these events, and it doesn't have to be those who seem to dominate the top of the tables who will take away the silverware. Reasonable performances in many of the contests can be just as effective as top notch scores in a few.

BERU ROLLS ON

MARCH IS HOME TO one of the longest running contests in the calendar - the Commonwealth Contest or BERU (British Empire Radio Union) as many still know it. This is a rather unusual event, which retains great popularity in spite of the rather low QSO totals of the leaders (perhaps a few hundred) and the relatively specific areas which can be worked for QSO points (the Commonwealth). Winning this contest requires a lot more than just the ability to have a big signal and 'run rate'. Cunning and an excellent knowledge of propagation are essential.

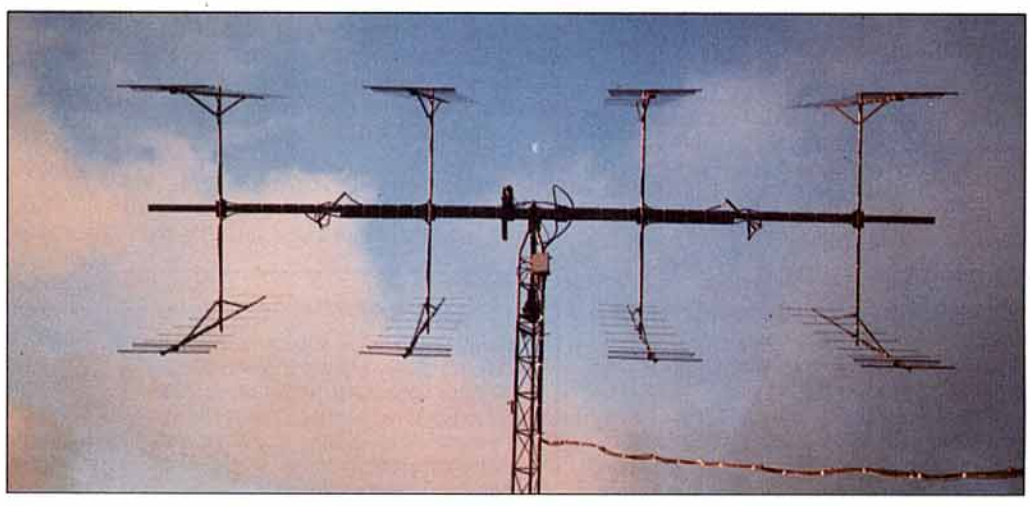
Last year's overall winner was Bob Whelan, G3PJT, although he did travel to Bermuda to pull off this feat. Some may say that this was a very sensible plan in the middle of a British March! Bob is now starting a research project into the history of this event, with a view to producing a book or a series of articles. Rather like HF CW NFD, the Commonwealth Contest has seen many changes in amateur radio over its lifetime, including huge variations in the areas of equipment size and performance, the intensity of activity on the bands, operating techniques, the level of automation, and not least the personalities involved and the surrounding political environment. This whole package should make fascinating reading when it is complete, but to make it happen Bob does need your input. If you have, or know anyone who has, recollections, photographs, QSLs, articles, letters etc regarding the earlier contests (particularly the pre- and immediately post war events) perhaps you could contact Bob who is QTHR, or on tel: (01223) 263137 or fax: (01223) 263940.

MORE HASTE . . .

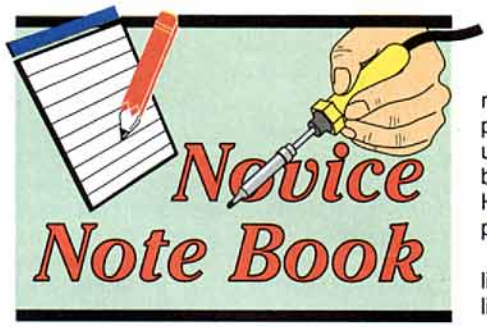
AFTER THE SSB leg of the *CQ* WW contest I was chatting to Dave Lawley, G4BUO, and he raised the issue of some stations who give the contest exchange at the same time as they first call you. Almost without exception, when answering a station calling CQ Contest, it is best to just give your callsign once or, if signals are weak, twice - don't try to pass the report and serial number or whatever the exchange is at this point, but wait until the calling station has replied with your callsign, and probably sent a report and number to you. At first sight, it may appear quicker to try to send it all in one go, but, particularly if there is more than one station calling, this technique can result in major confusion! When several stations reply at once, the CQ-ing station may not want to reply to the loudest one, but rather to a weaker one who he has identified in the pile-up as being a new multiplier, or, perhaps a more distant station who, at VHF, scores more points. However, instead of being able to tell you to standby, work the weak one and then come back to you; he probably can't copy the weak station properly through your signal as you try to send a report and number to him! This means that he has to ask the weaker station for another repeat which all takes time and delays everyone - yourself included! It gets even worse if you don't realise that he has replied to someone else and you repeat all your information over again! The only exception I can think of to this of 'call-only first' rule is if you are trying to complete a contact on a single meteor burst at VHF. I have vivid memories of the occasion when HG1YA came up on a meteor burst on my frequency in a 2m contest and I just went 'HG1YA G4PIQ 59545 JO01MU Break' as quickly as I could - we got part way there, but didn't complete unfortunately, but it's a great adrenalin stimulant!

SET REALISTIC GOALS

I HAVE SAID before that a good way of gaining maximum enjoyment out of contests is to set yourself some realistic goals and go for them . But that word, realistic, is very important - don't expect to beat P40V in *CQ* WW with 100W and a G5RV. Success against your own measures can fire you to improve your station so that you will do better in next year's event - and in doing this you get ever closer to those people at the top. However, don't expect these leaders to stand still either - they set their own targets to give them a challenge, and I maintain that it is when you stop improving that you start losing. ♦



The 8 x 9 element OZ5HF array used on 2m by GD4IOM in the ARRL EME Contest this year.



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

WHY PRINTED CIRCUIT BOARDS?

I AM SURE THAT every Novice has seen a printed circuit board, but why do we use them? For years, in the age of the valve and in the start of the transistor era, radio equipment construction used a metal chassis and the components were mounted on insulated tag strips. While this construction method worked well the result was relatively bulky and assembly took time and effort.

The radio and electronics industry converted to printed circuit boards (PCBs) to overcome the problems described above. PCBs have copper connections pre-printed on to insulated board using an etching process. The components are soldered to these pre-printed copper strips, which ensure that the components are correctly connected together.

From a production point of view the system is quick because the components are fixed in holes on the board which line up with the copper connections. The whole board is then dipped in a solder bath, which connects all the components up at one go.

The main reasons for using PCBs are the compactness and neatness and also the reproducibility of a complex design. Even amateur home-brew gear is now getting so complex that anything to reduce the chance of errors is beneficial.

DEAD BUG OR UGLY CONSTRUCTION

THIS METHOD OF construction is similar to the old traditional chassis/tagboard method described above.

The circuit is built on a 'chassis' comprising a sheet of copper clad PCB material. The components themselves can be used as tagboards. All components that require to be earthed are soldered to the PCB surface. All other components are connected to these 'tag boards' and kept as close as possible to the surface of the copper clad PCB material without touching it.

Decoupling capacitors are of course connected to ground. This means that the decoupling capacitor can be used as a support for the supply line, or any other circuit that is to be decoupled to earth. ICs and transistors can be fixed on the PCB material ground using glue, with their legs sticking up in the air like dead bugs. Connections to these pins also provides support for components and connectors. High values resistors (10MΩ) can be used as tagboard supports if addition support is required.

This method of construction is ideal for prototype work and for experimental projects. Provided the wiring is kept short, circuits constructed this way have excellent HF or even VHF characteristics.

BACK TO THE PCB

FOR SMALL PROJECTS ugly construction is fine. Larger and more complex circuits, or projects that need to be replicated benefit from being produced from a PCB layout.

Traditional PCB construction uses copper connection tracks on the PCB surface. To obtain these tracks Ferric Chloride is used to remove unwanted copper from the copper clad PCB material. A PCB layout, such as the ones in articles or in the back pages of the *Radio Communication Handbook*, is required.

Equipment required to etch PCBs.

This layout has to be transferred to the PCB board to get the copper tracks on to the board. To do just this is not difficult. Take a piece of copper clad board and clean it thoroughly. I always use Vim and hot water and then dry on a clean cloth. Having done this avoid touching the surface of the board.

Place a piece of carbon paper, carbon down, on top of the copper surface. Now position the PCB track layout on top of the carbon and with a ball point pen mark all the tracks onto the surface of the board. Take care to ensure that nothing moves while you are doing the marking otherwise it is necessary to start again.

When the carbon paper is removed from the copper clad board a clear layout of the tracks can be seen. Using a Dalo or similar etch resist pen draw the tracks and pads onto the surface of the copper and allow to dry. When dry, check for track errors or cracks in the surface of the resist and repair where necessary.

Do the etching in an old sink and not in the bathroom. You are certain to lose many hard earned brownie points if you stain the bathroom fixtures and fittings. Take it from me it is persistent stuff, having worked hard to clean up you come back half an hour later to find a brown sink and severe staining on the towels. Having said that it can be done without trace provided care is taken at all times.

WARNING

FERRIC CHLORIDE IS used to remove the unwanted copper and this chemical should be treated with respect. Help or advice from someone who has used this chemical before is recommended. Rubber gloves and old clothes are the order of the day when etching copper clad board.

Ferric Chloride can be supplied as either a liquid or crystals. If there is a choice use the liquid because mixing the crystals is long winded and generates a lot of heat; follow the direction supplied to the letter. For an etching bath I use a Tupperware cereal container with sufficient etchant to cover the board hanging vertically, as shown in the photograph. A piece of PVC tape on the back of the PCB is used to join it to a strip of plastic and the board can easily be removed from the etchant.

At normal room temperature it takes about fifteen minutes for the unwanted copper to be removed. When you are happy with it wash the board in running water and then dry on a rag. The resist can be removed using cellulose thinners or nail varnish remover.

The board can then be drilled using a 1mm drill, this is the ideal size as most wires will go through and it is the correct size for PCB pins. A word of warning about drills. You will no doubt see at rallies boxes of PCB drills; unless you have a good pillar drill do not bother with them as they are fragile and will break very easily. A high speed twist drill will have a good life and can then be sharpened using a small sharpening stone.

This is an ideal 'one off' method of PCB production providing the board is not too complex or finely laid out. For the more complex board or a production of several boards a photo system could be set up for as little as £40, ideal for a construction group or keen constructor.

Another method is to carve the tracks required in PCB material using wood carving tools. This may sound a difficult task but it is surprisingly easy. Peter, G3PDL, uses a completely home brew contest grade transceiver constructed using this method. Peter's carving method is as equally valid as the conventional PCB system and perhaps a little easier to do than making a PCB board but one slip of the carving tool means a lot of repair.

PRACTICAL APPLICATION

I RECENTLY DESIGNED and built an HF frequency synthesiser, which was described in *RadCom*, Dec 1993. One band of the prototype was constructed 'ugly style'.

In this state the unit was tested on one band and found to work well. I could have built the whole synthesiser this way but I wanted to make the construction information available.

HINT OF THE MONTH

FOR DEAD BUG constructors it is easy to solder two component wires together without twisting them, but three or four is almost impossible. If we twist them it is then very difficult to remove a component to change its value. To overcome this we can bend old components wire off cuts around a small screwdriver shaft into close wound springs of two or three turns, these are then slipped over the wires to be joined and the whole joint soldered. To remove, heat the spring and slide it off and the component wires are then easily separated! ♦

RADCOM TECHNICAL FEATURE

HF/VHF Vee Beam Design & Performance

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

I SUSPECT THERE are two reasons why Sloping Vees aren't everywhere:

1. you will probably have to design and build the antenna yourself.

2. really good designs take up quite a bit of space.

But for anyone who enjoys experimenting with antennas and has access to even a modest amount of space, the Vee is simply one of the best. This antenna provides a splendid combination of low cost, excellent gain-bandwidth product, electrical and mechanical simplicity, ease of design, construction and installation, and the bonus benefit of inherent polarisation diversity. Although the Vee is usually thought of as an HF antenna, it's useful from MF through UHF and should be considered as a candidate for most communication links.

This article is about the nuts and bolts of Sloping Vee performance and design. Its point of view is practical and system engineering oriented, not abstract or theoretical. All factors important in Vee design are considered, and design methodology is discussed. We will also look at specific antennas: some optimised for gain (how about 16.5dBi at 10MHz or 18dBi at 56MHz!); another providing coverage of the upper HF and lower VHF bands (10-60MHz); and a prototype design covering the HF band from 5-30MHz on a typical link from Sheffield (UK) to Chicago (USA).

ANTENNA GEOMETRY

A TYPICAL VEE INSTALLATION is shown in **Fig 1**. The antenna appears schematically in **Fig 2**, which is a perspective view (resistors R are both at the same height H_t). The Vee consists of two wire radiating elements terminated by equal value resistors. A shorting wire must connect the resistors to complete the current path. The feed point is located on top of a non-conducting mast at the vertex of the two radiating elements. Either a parallel-wire (balanced) or coaxial (unbalanced) feed line can be used. The coax feed is more common for amateur radio and SWL applications but it does require a balun. If a conducting mast is used, it is advisable to place the feed point at least one metre from the mast, and run the feeder horizontally from, the feedpoint to the mast.

The Vee's key design parameters are the radiating element length (L) and diameter (D), the apex angle, the value of termination resistor (R), and the heights of the feed (H_f) and the terminations (H_t). The length of the shorting wire (S) is determined by the apex angle and element length. The terminating resistors in Fig 1 are on the ground (earth's surface, H_t=0), which is a popular implementation because of its simplicity. This isn't a requirement, however, and as a general rule performance is improved by elevating the terminations.

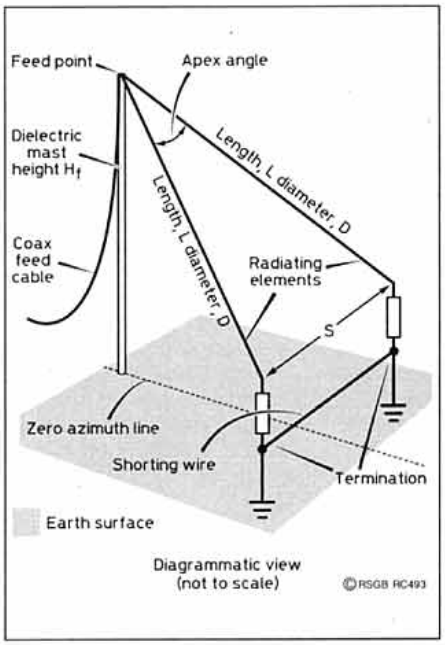


Fig 1: Typical sloping Vee installation.

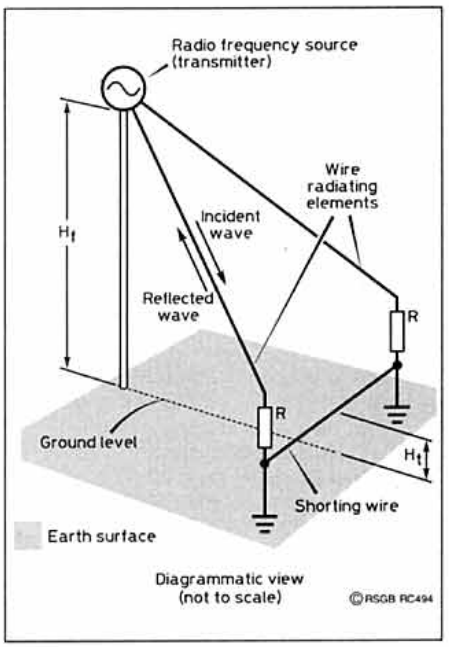


Fig 2: Sloping Vee schematic diagram.

One of the Vee's major advantages is simple installation. The antenna can be deployed almost anywhere, between trees, for example, or mounted on a building or other structure; the range of possibilities is limited only by your imagination. Most antennas don't provide the installation flexibility that the Vee does. About the only caveat is that, like any antennas, the Vee's performance is influenced by nearby metallic structures. If they're too close to the radiating elements, parasitic effects may become a problem.

ELECTRICAL CHARACTERISTICS

FOR MOST ANTENNAS, impedance bandwidth, gain, radiation efficiency, and radiation pattern are usually the electrical characteristics of greatest interest. Bandwidth and gain are frequently combined in a single figure of merit called the gain-bandwidth product (computed by literally multiplying these quantities). The term 'gain' strictly refers to directive gain, which measures only how the antenna distributes energy in space geometrically, not how much power is actually radiated. Because of this limitation, gain and radiation efficiency are almost always combined into a single performance measure called power gain (computed by multiplying the directive gain by the radiation efficiency).

In this article, bandwidth is defined as the range of frequencies where the VSWR is less than a specified threshold (typically 2.5:1 - see **Box 1** over page). Gain means power gain, not directive gain, and it is given in decibels relative to an isotropic radiator (dBi). Power gain relative to a dipole (dBd) is 2.15dB less (eg, 5dBi = 2.85dBd), because a free space half-wave dipole has a gain of 2.15dBi.

The radiation pattern of an antenna is simply a plot of its gain as a function of direction in space specified by two angles. The pattern is therefore a graphical representation of how the antenna distributes energy throughout space. Sloping Vee patterns are discussed in detail in the design examples that follow.

Still another measure of antenna performance is polarisation. Two antennas must be co-polarised (polarised in the same direction) in order to communicate; totally cross-polarised antennas cannot communicate. Polari-

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

BOX ONE

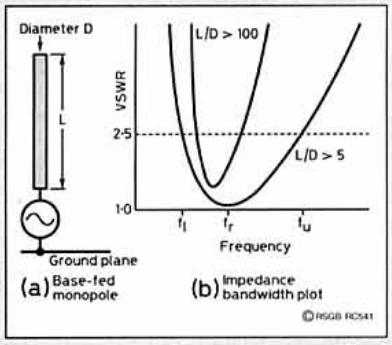
IMPEDANCE BANDWIDTH

IMPEDANCE BANDWIDTH is defined as the range of frequencies where an antenna meets a given input impedance specification. It's commonly referred to simply as the bandwidth, which is the convention adopted here. Bandwidth can be specified in terms of impedance values (resistance & reactance, or magnitude & phase), but most of the time, VSWR (voltage standing wave ratio) is used instead because the VSWR depends on the antenna's input impedance.

If an antenna is perfectly matched to its feed system (for example, a 50Ω resistive input impedance driven by a 50Ω coaxial cable), then the VSWR is 1:1. As the input impedance deviates more and more from the feed system impedance, the VSWR goes up as the mismatch gets worse. With increasing VSWR, the load absorbs less incident power and, at the same time, the transmitter output power begins to fall off. Eventually, when the VSWR is too high, the transmitter shuts down or overheats. Maximum allowable VSWR is usually set at 2.5:1 because modern transmitters can tolerate that level without serious adverse effects. But the threshold can be higher or lower than 2.5.

The bandwidth concept is best illustrated by an example. A base-fed monopole antenna is shown in **(a)** of the illustration below. It has length L and diameter D. The RF source is connected between its lower end and a large, highly conductive ground plane. A 'thin' monopole has a large L/D ratio; the element is very long compared to its diameter. A 'fat' monopole has a small L/D ratio; the radiating element diameter is a significant fraction of its length. The bandwidth of this antenna is highly dependent on the L/D ratio.

Monopole VSWR is plotted in **(b)**. The thin antenna (L/D > 100) has a narrow response curve in which its VSWR is below 2.5:1 only over a frequency range of about 15% of the frequency for minimum VSWR. This antenna's 'fractional bandwidth' is said to be 15%. By contrast, the fat monopole with L/D = 5 has a much broader response. Its VSWR is less than 2.5:1 over about 50% of the frequency for minimum VSWR; that is, $(f_u-f_l)/f_r$ = 0.5. the fat monopole's fractional bandwidth is more than three times larger than its thin cousin's. These curves illustrate the concept of impedance bandwidth and also how electrically different even geometrically similar antennas can be.



sation is important on links that don't alter the transmitted polarisation (a line-of-sight microwave link, for example). But ionospheric channels can drastically alter transmitted polarisation, and, as a rule, antenna polarisation isn't a matter of great concern.

Nevertheless, the Sloping Vee offers an advantage over most other antennas because its radiating elements are inclined wires that transmit and respond to both horizontal and vertical electric fields. The degree of this inherent polarisation diversity depends on the actual wire inclination, which, of course, varies from antenna to antenna. On links where polarisation fading is expected to be significant, the antenna designer is well advised to consider Vees that transmit and respond to vertical and horizontal fields more or less equally in the range of take-off angles of interest.

A properly designed Vee is a travelling wave antenna (see **Box 2**). Unlike resonant (standing wave) structures, travelling wave antennas provide large operating bandwidths without tuners or broadbanding networks. The usual trade-off (there's always a trade-off) is that the radiating structure bandwidth is increased by sacrificing radiation efficiency. The terminating resistors in a Vee introduce a frequency-dependent I^2R loss (joule heating) that reduces the radiated power. But the bandwidth increase over a resonant system is dramatic. One of the antennas described below, for example, provides a 6:1 bandwidth ratio (10-60MHz) with a VSWR less than 1.75:1.

The Vee's power gain varies with frequency and also with ground electrical parameters (conductivity and dielectric constant). The gain can fall off very quickly at band edges, but mid-band gain can be moderate to high, depending on the design. For example, another one of the antennas discussed below has only 1.78dBi gain at its low frequency end (5MHz), but more than 8dBi gain between 15 and 30MHz. When very high gain is the primary requirement, and bandwidth and size are secondary, the Vee can provide spectacular performance. At 10MHz, for example, 16.5dBi gain is achieved by a Vee with the following parameters: 15 degree apex; 210 metre long, 0.32cm diameter elements; feed point at 33.75m and terminations at 37.5m over average ground.

The basic Sloping Vee design methodology is to change parameters iteratively until the structure meets minimum gain, pattern, and bandwidth requirements while at the same time accommodating siting constraints, if any. For example, the desired main lobe gain might be 10dBi for take-off angles between of 12 and 16° at all frequencies from 10 to 30MHz. A typical bandwidth requirement would be a VSWR of less than 2.5:1 over the same frequency range. And a typical siting requirement might be a feed point height less than 20 metres with the terminations on the ground. To meet these requirements, an initial configuration is assumed by assigning values to all design parameters. These values are then iteratively changed to modify the gain, main lobe take-off angle, and bandwidth until the design objectives are met.

TYPICAL VEE DESIGNS AND PERFORMANCE

APEX ANGLE

The first Vee parameter that should be specified is the apex angle. Once the other design parameters are fixed, there's only one apex angle that provides maximum antenna gain. Choosing the apex angle is therefore neither arbitrary nor simply a matter of convenience. The optimum (maximum gain) apex depends on two things, the operating frequency and radiating element length. By its very nature as a broadband antenna, the Vee's operating frequency varies, and there isn't one apex angle which is optimum for all frequencies. For a specific element length, the angle that's optimum at one frequency will not be optimum at another.

Choosing the apex angle is a matter of engineering judgement based upon design objectives and how antenna performance changes as the apex is changed. Plots of the optimum apex angle versus element length and frequency are shown in **Fig 3**. Fig 3(a) includes curves for three frequencies (5, 17.5 and 30MHz), while 3(b) includes curves for three element lengths (40, 80 and 120m). To illustrate how these plots are used, at 5MHz the optimum apex angle is approximately 79° with a 90m long radiating element. But at 20MHz, the optimum value is about 60° for 40m elements. The data show that, at a fixed frequency, the optimum angle gradually decreases as the radiating element gets longer. The same effect is seen for the frequency variation; for a fixed element length, the optimum apex decreases as the frequency goes up. But the variation in apex angle is greater with changing frequency than it is with changing element length.

Curves like those in Fig 3 are used to

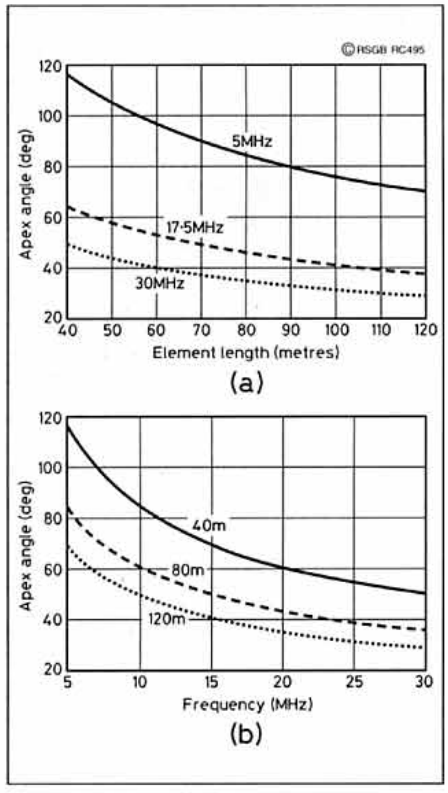


Fig 3: Optimum apex angle.

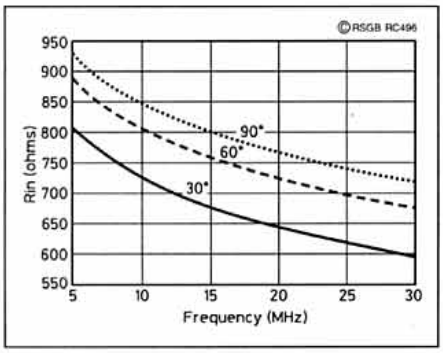


Fig 4: Sloping Vee input resistance.

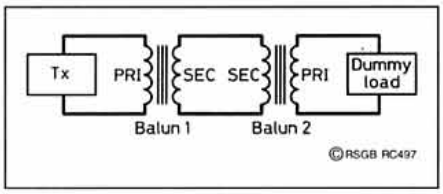


Fig 5: Balun back-to-back insertion loss test.

specify an initial apex angle, usually by doing an 'eyeball average' of the plots. For example, if long elements are acceptable, the designer might look at only the data for 120m elements. For that length, the optimum apex decreases from 70° at 5MHz to about 28° at 30MHz. If an 'average' apex angle with respect to frequency is chosen, a reasonable starting value is 40°. If performance above 15MHz were considered more important than across the entire band, then the initial apex should be reduced, say to 32°. This procedure illustrates how the optimum apex angle data would be used in the initial design step.

	Apex Angle (deg)		
F(MHz)	30	60	90
5.0	809	888	930
17.5	659	738	779
30.0	594	673	715

Table 1: Summary of resistance valves.

INPUT RESISTANCE

Professional antenna engineers think of the Vee as a '600Ω' antenna, which, as an engineering rule-of-thumb, probably isn't too bad an estimate. The problem is that it obscures what actually happens in the antenna. **Fig 4** shows the input resistance as a function of frequency for apex angles of 30, 60 and 90°. A glance reveals that the input resistance is anything but constant! It varies with apex angle, radiating element diameter (0.32cm in this case), and, of course, with operating frequency. Because the apex and element diameter are fixed in a specific Vee design, the frequency variation is what's important.

Table 1 summarises data from the plots. The table entries are input resistance (R_{in}) in ohms at 5, 17.5 and 30MHz. The table shows that the assumption of a 600Ω input resistance can be seriously in error. At the low end of the band, R_{in} is well above 600Ω for all three apex angles. This particular antenna is close to 600Ω only above 17.5MHz with the 30° apex. Average values of R_{in} with respect to frequency (using all points on the plots, not just the data in the table) are, respectively, 671, 750 and 792Ω at 30, 60 and 90° apexes.

R_{in} is important because it determines the required characteristics of the antenna coupling network. Most modern transmitters are designed for 50Ω non-reactive loads. If the load isn't a pure resistance of 50Ω, then a coupling or matching network is required. Another reason why the Vee requires a coupler is that it's a balanced radiating structure. Feeding a Sloping Vee from an unbalanced source (a 50Ω coaxial cable, for example) requires the use of a balun, which must also match R_{in} to the feed system's characteristic impedance.

The usual Sloping Vee feed is therefore a broadband RF balun whose impedance ratio (square of the turns ratio) is the average value of R_{in} divided by the coax cable characteristic impedance. For example, if the Vee in Fig 4 has a 60 degree apex and is fed with 50Ω coax, the required balun impedance ratio is 750/50 = 15 (average R_{in} of 750 divided by 50). The balun turns ratio is the square root of 15, or 3.87:1 (secondary-to-primary).

Most amateur radio books describe how to build good baluns, but a word of caution is in order. Never build just one balun. Instead, build two identical devices and test them for power handling and insertion loss using the back-to-back arrangement shown in **Fig 5**. If the transmitter has a 50Ω output, then a 50Ω dummy load must be used.

The baluns must be tested at full operating power and should be carefully monitored for any sign of overheating or breakdown. The insertion loss (power dissipated in the baluns) should be measured using an in-line wattmeter.

BOX TWO

STANDING WAVE AND TRAVELLING WAVE ANTENNAS

ANTENNAS ARE BROADLY classified as either standing wave (resonant) or travelling wave (non-resonant). Standing wave antennas are narrowband, while travelling wave systems are broadband. Resonant antennas behave like a mismatched transmission line and non-resonant antennas like a matched line.

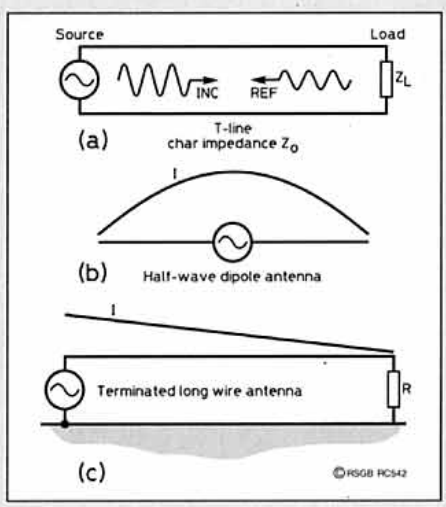
A transmission line of characteristic impedance (Z_o) connecting an AC source to a load (Z_L) is shown in (a) of the illustration below. It's assumed that the source and line are matched, which is usually the case (50Ω transmitters feeding 50Ω coaxial lines). Signals from the source propagate along the line toward the load. When the load and line are perfectly matched, all incident energy is absorbed by the load, and there is no reflected signal.

A perfect match requires that the load impedance Z_L be equal to the complex conjugate of Z_o. The conjugate match to Z_o=50-j12Ω, for example, is Z_L=50+j12Ω (just reverse the sign of the reactance). In a well designed line, reactance is not an issue because Z_o is purely resistive. The matched load is then also a pure resistance of equal value. For standard 50Ω coax cable, the perfect match is a 50Ω non-reactive load.

When Z_L and Z_o are mismatched, some of the energy incident on the load is reflected. The incident and reflected signals travel in opposite directions along the line and produce a standing wave pattern as they combine. this situation is analogous to the ripples formed on the surface of still pond when disturbances from a rock thrown into the centre combine with ripples reflected from the shore.

The signals on an antenna propagate from the feed point outward along the radiating structure. Reflected signals, which travel back along the structure toward the feed, are generated at every impedance discontinuity (the end of an element, for example). The antenna behaves like a mismatched T-line, with one major difference. It radiates energy into the surrounding space, but the T-line doesn't.

An example of a *resonant* or *standing wave* antenna is the half-wave, centre-fed dipole in (b). Signals from the source travel outward toward the ends of the elements. Because each end is electrically isolated, the current there must be zero. To meet this boundary condition, a reflected wave is generated which exactly cancels the incident signal at the end of the element. As the reflected wave travels back toward the source, it combines with the incident signal to produce a standing wave current distribution (I).



The current I is approximately sinusoidal, with its maximum at the feed point and falling to zero at the ends of the antenna. The half-wave dipole is resonant because signals of only one frequency produce a half-wave current distribution; all other frequencies produce a different one. Because the current distribution changes dramatically with frequency, the antenna input impedance changes just as dramatically. This behaviour is characteristic of standing wave antennas.

An example of a *non-resonant* or *travelling wave* antenna is the terminated long-wire in (c). Signals from the source propagate along the wire toward the end, which is terminated by a resistor (R). The current (I) decreases along the wire because energy is radiated away from the antenna and because of wire losses. Any remaining energy which is incident on the termination is absorbed by the resistor and converted to heat (I^2R loss).

By eliminating the impedance discontinuity produced by an unterminated element, the terminating resistor suppresses reflections and increases the operating bandwidth (at the expense of efficiency). Since only the incident wave propagates along the antenna, there is no standing wave to produce resonance effects. The electrical characteristics of an ideal non-resonant antenna are therefore independent of frequency, which is why the system exhibits a very wide bandwidth.

HF LINK GEOMETRY

Let's consider an HF link between Sheffield, UK and Chicago, Illinois, USA. The great circle distance between these cities is 6146km (3841 statute miles), and the bearing to Chicago from Sheffield is 296° east of north. If the link were between Sheffield and New York City instead, the distance drops to 5381km (3363 statute miles), and the bearing changes to 286°.

The normal HF propagation mode is illustrated in **Fig 6**. The transmitted signal is reflected from the D, E or F regions of the ionosphere. HF links can be single hop as shown, or, over very large distances, multiple hop. The ray path isn't actually made up of straight lines as shown. Rather it's a very complex shape determined by how the ionosphere's electron density profile bends the path of an electromagnetic wave. Nevertheless, no matter how complex the ray path actually is, an ionospheric radio link can be thought of as being made up of straight-line transmitted and received signal rays 'reflected' from a single 'virtual' point. The reflection occurs at a virtual reflection height that depends upon the propagation characteristics and the link geometry.

The geometry in Fig 6 determines the range of take-off angles needed to support a particular link. Communication is possible only if the transmit (Tx) and receive (Rx) antennas generate and respond to signals at the correct take-off angles. The relationship between take-off angle and Tx-Rx range is shown in the communication range plot of **Fig 7.** Maximum Tx-Rx range is plotted as a function of take-off angle for three different reflection heights (100, 300 and 500km). Of course, shallow angles (near the horizon) give the greatest range, while steep angles (nearly overhead) provide the shortest. These range curves have been computed for a '4/3 radius earth', which is the standard correction applied to take into account ionospheric refraction at HF.

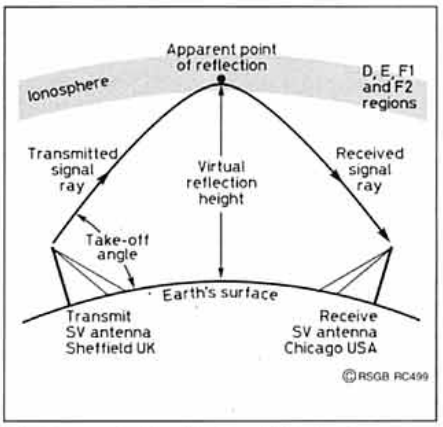


Fig 6: Ionospheric reflection of HF signals.

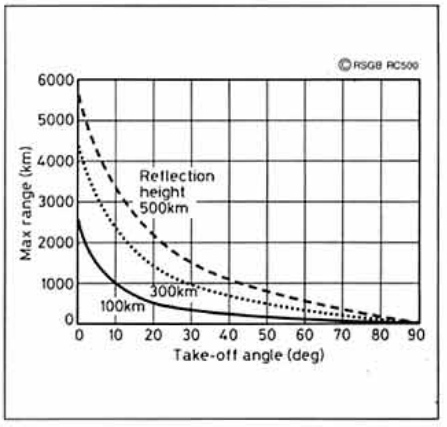


Fig 7: Communication range plot.

As Fig 7 shows, the link to Chicago is too long for a single hop even with a 500km virtual reflection height. The maximum range (zero take-off) is about 5600km, which is less than the required distance of 6146km. Two hops are therefore required. At 500km virtual height, half the path is covered by signals at a take-off angle of about 11°. But the link can also be made with signals at 6° take-off using 300km reflections. Thus, for 2-hop F-region propagation between Sheffield and Chicago, the antenna should have maximum gain at take-off angles of 6 to 11°. The corresponding angles for a link to New York City are somewhat higher (7-15°) because the link is shorter.

This analysis shows how HF link geometry influences antenna design objectives. If a Sloping Vee is intended to support HF links from the UK into the eastern half of the US, then the range of significant take-off angles is between approximately 5 and 15°. The Vee should therefore be designed to produce maximum radiation (gain) at angles in that range. ♦

. . . to be continued

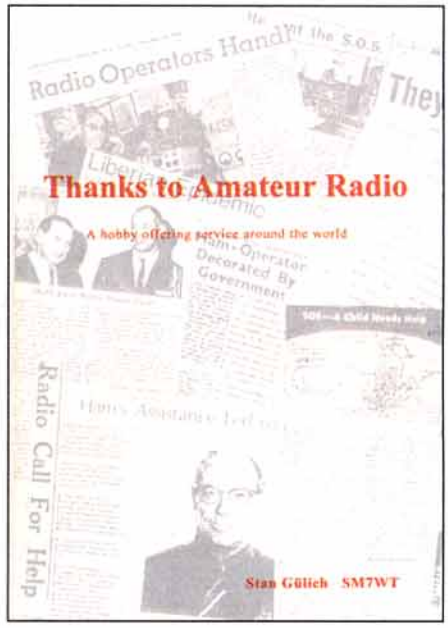
This Month's Book Choice

Reviewed by HQ staff

THANKS TO AMATEUR RADIO

By Stan Gülich, SM7WT

Published by Stan Gülich, 1994. 324 pages (210 x 150mm) softcovers. Price £16.95 from Martin Lynch and other amateur radio retailers.



SM7WT HAS PRODUCED and published a book which can be seen as his way of putting back something into the hobby from which he has clearly derived so much pleasure over the years. More than 250 pages - over 80% of the book - contain thumb-nail sketches of individual amateurs from around the world, written by the individuals themselves, and illustrated with many dozens of photographs of the operators in their shacks. While this section of the book is heavily biased towards Scandinavian, and especially Swedish, operators - some 45 SMs are featured compared with only three Gs for example - most operators in this country will recognise a number of callsigns and will undoubtedly learn something new about their QSO partners!

The remainder of the book is made up of a number of short articles which introduce different aspects of amateur radio, stressing the humanitarian aid which amateurs have been able to provide in times of emergency or natural disaster. However, this section appears rather haphazard at first glance, with articles on forest fires in Australia, a list of famous people who are radio amateurs, a couple of paragraphs on 'fox hunting' (direction finding) and a list of VHF propagation modes, all jostling for position. The presentation could have been improved by more careful division into chapters and with clearer chapter headings.

It is difficult to decide who the book is aimed at. Some of the introductory articles appear to be written for people with little or no knowledge of amateur radio, for example when talking about Q codes or defining what a transceiver is. On the other hand, it is unlikely that anyone other than radio amateurs would get much from the biographies of operators which make up the bulk of the book.

There are a few loose definitions ("a beam antenna is often called a Yagi after its Japanese inventor") and inaccuracies ("G, GB - GX and 2E - 2F [are the prefixes used] in the UK"), but for all that *Thanks to Amateur Radio* is clearly a labour of love by its author and the sheer enthusiasm which SM7WT shows for the many aspects of the hobby in which he has participated comes across well. SM7WT has not only edited the biographies and written most of the articles, but also produced and published the book himself. This is a considerable achievement by itself and, the few reservations aside, the active operator will find much in it to relate to and several stories to which he can point and also say: "yes, thanks to amateur radio". ♦

RADCOM Helplines FOR MEMBERS

● Michael Smallwood, VP8AEM, is trying to locate a circuit diagram and/or service manual for a **Thomson-CSF TRC 300** portable HF SSB Transceiver. Anyone able to help please write to him at: 105 Davis Street, Stanley, Falkland Islands, South Atlantic Ocean.

● Bill, GW3DGT, is seeking a manual and/or circuit diagram for a **KW2000A (HF Tcvr)** by KW Electronics Ltd, Dartford, Ser No A855. Anything supplied will be returned, or cost of copying will be refunded. Contact Bill by writing to: W Barrett, 'Stevina', Ludchurch, Narberth, Dyfed SA67 8JF or telephone: 0183 483 369.

● Keith, G0OZK, needs a circuit diagram for a **Western Electronics WE1145** rotator or any information. The unit rotates more than 180 degrees from south to north, then falls short of full rotation to south at the ACW end. If you are able to help, contact Keith who is QTHR.

● Geoff, G1YUQ, is seeking any information on an **AM Bubble Sextant Mk IX**, especially any instructions, spares or any bits and pieces or source of a supplier. If any one can help, then contact him by writing QTHR.

● David, G6STD, has a **Mizuho MX2 2m SSB** rig, which he wants to modify for easy tuning, and coverage of the beacon band. Unfortunately, the only instructions are in Japanese. The importers are unable to help. Any costs will be reimbursed. If anyone is able to translate or provide details of any mods they have carried out then contact him on 01736 65748 (not QTHR).

● Brian Bower, G3COJ, is compiling a list of amateurs who used to be pupils at **Hymers College, Hull,** and he would be pleased to hear from any former pupil wishing to be added to the list. Please write to Brian, QTHR.

● Mr A R Heaton, who is carrying out research on behalf of the RN Museum in Portsmouth, would be grateful to hear from anyone who has information on the **receiver** (which may have been a **'class C'**) used with a Marconi spark transmitter on board *HMS Minerva* (Monitor 33), launched in Belfast in 1915. The ship is presently undergoing restoration in the RN Dockyard in Portsmouth. Mr Heaton can be contacted at 22 Park Crescent, Emsworth, Hants PO10 7NT.

● Geoff Toulalan, G8AAP, would like to modify his **Yaesu FT-480R** to include a high/low power switch for SSB (the set already has this facility for FM.) He believes there is a recognised modification but has been unable to obtain details from the dealers. If you are able to help, contact Geoff by writing QTHR or tel: 01205 760409.

● Martin Swift, G4NCE, needs a circuit diagram for the PU410 used in the **Racal RA217D** receiver. Information on a source of service manuals for the RA329 or RA217D would also be appreciated. If you can help, please contact Martin on 0121 357 6139, or write to him QTHR.

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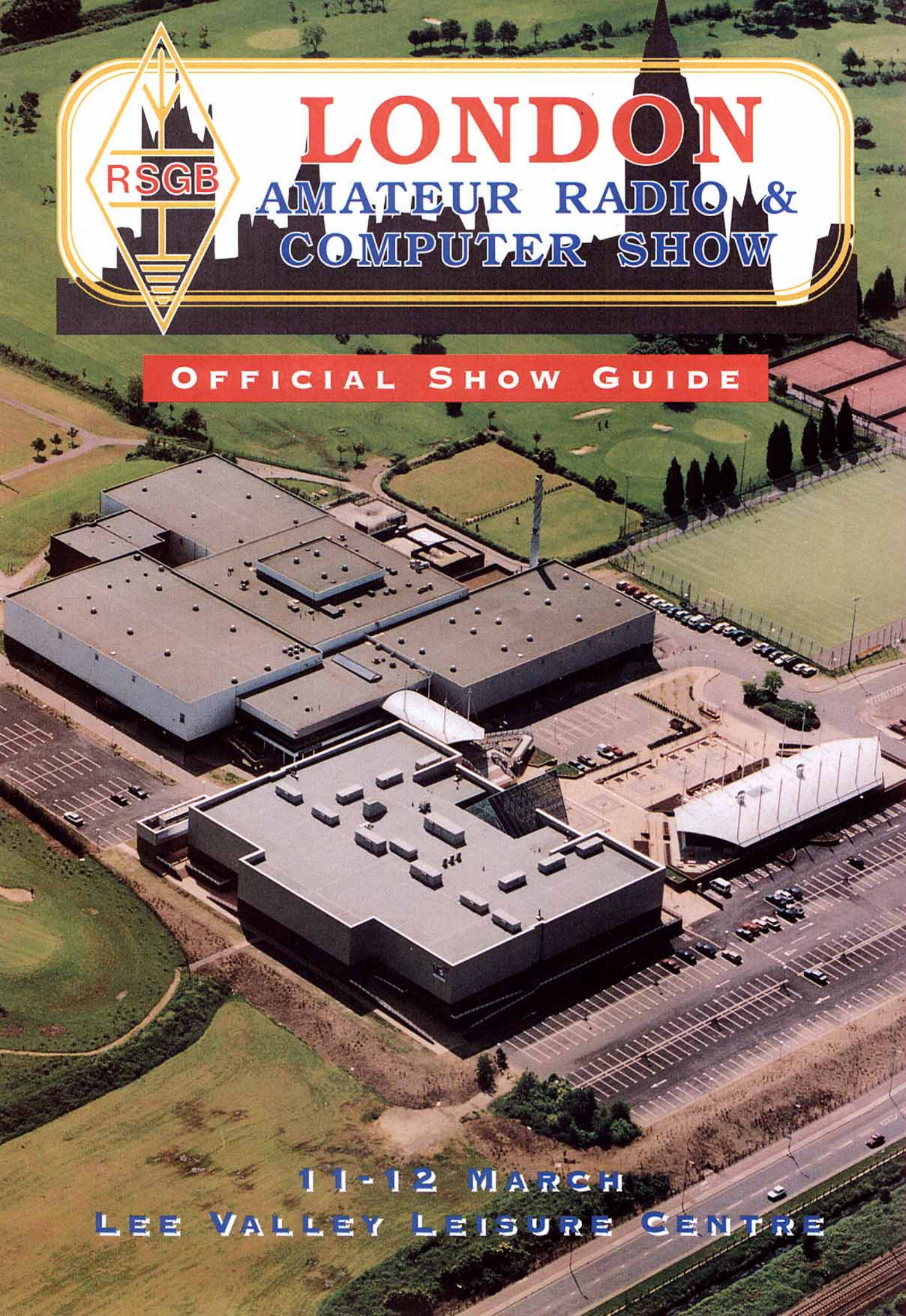
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RSGB LAR&CS PRODUCT NEWS

We asked exhibitors to tell us what products would be launched or featured at Lee Valley Leisure Centre. Here are their replies . . . .

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

Yaesu (UK) Ltd
Stand Red Q and Dealers

ADVERTISED AS "the first dual-band HT with windows!", the **Yaesu FT-51R** boasts a scrolling instruction menu to guide you through the business of tailoring a dual-band handheld to your requirements.

The FT-51R has wideband receivers covering 110 - 180MHz and 420 - 470MHz, plus up to 5W (dependent on the battery pack used) on 144 - 146MHz and 430 - 440MHz. There are two VFOs on each band.

It also packs a host of 'bells and whistles' into its tiny case, including: a 'Spectrascope' display (displays activity on adjacent channels or memories), an 8-character alpha-numeric display, 120 memory channels, a backlit keypad, automatic repeater shift, multiple scanning modes, selectable scan-stop modes and scan-skip, automatic power off, battery saver, five selectable power output levels, cross band operation, DTMF paging (with CW ID) and coded squelch.

All of these come for a UK RRP of £499.

Waters and Stanton
Stand Blue W

MORE AND MORE people are getting on 6m FM. It's just the band for local contacts and there's the added bonus of really long distance QSOs via sporadic-E and other exotic forms of propagation.

The **Alinco DR-M06** is a full-featured 50MHz transceiver at a good price. It covers 50 - 54MHz and runs 10W RF output (1W on low power). There are 100 memory channels, programmable tuning steps and repeater offset, a time-out timer and CTCSS tone encoder.

With plans afoot for experimental repeaters on 6m, why not get your radio now. The rig costs £299.

Both the **Alinco DJ-580** dual band handheld and **DJ-X1** scanning receiver are now reduced in price to £389 and £269 respectively.

Also on the Waters and Stanton stand are products from **MFJ**, including the **784 DSP filter** at £249 which is fast becoming a world best-seller.

Very few HF verticals also cover the VHF bands, but the **MFJ-1798** is an exception. Working on ten bands (2m to 80m) the MFJ-1798 is just 20ft tall and is self-supporting, allowing it to be easily mounted at ground level or on the roof. The antenna comes complete with an effective counterpoise and is available for £299.

Also from MFJ is a **Packet only transceiver** at a new ground-breaking price of £139.

DXpedition and contest operators who require 'hands free' operation should consider the new **Watson headset,** available at £32.95. The cardioid boom mic has a dynamic insert with 600 ohm impedance to match most modern transceivers. Both the headband and the mic boom are fully adjustable.

Want to convert your 2m handheld into a powerful base station? The new **Watson WS-2090H** linear amplifier may be the answer. It will provide 80W output from 5W input or 65W out from a typical handheld running 2W from Nicads. It also has an excellent pre-amp built in, which will almost certainly improve the noise figure of your handheld.

The new 2m **ADI AT-200** from Taiwan is one of the cheapest fully-featured handhelds available in the UK. It features key-pad entry, 20 memories, six programmable steps, 2 - 5W output and wideband receive. A 70cm version and the first 2m mobile from Taiwan will also be available soon.

Other companies represented on the Waters and Stanton stand include **Calvin** power supplies from Taiwan, available at budget prices of £89 and £119 for their 20A and 30A models respectively, and **Revex** and **Diamond** products are also available at reduced prices. The **Diamond D-190 discone aerial** is on display.

Siskin Electronics
Stand Red J

SISKIN ELECTRONICS will be launching their new 'enhanced' **Multi-CAT MkII CAT controller,** which allows CAT control of most Kenwood, Yaesu and Icom radios as before and also has a built-in CW keyer allowing automatic CW beaconing and CW transmission directly from a PC keyboard. Supplied complete with software, the MkII Multi-CAT retails at £79.95. Existing Multi-CAT users will be able to upgrade for a nominal fee.

Siskin will also be showing the UK's widest selection of Packet radio equipment and the latest **Buckmaster Hamcall CD-ROM** which now has callsign look-up facilities for amateurs in over 100 countries.

CONTINUED ON PAGE vi

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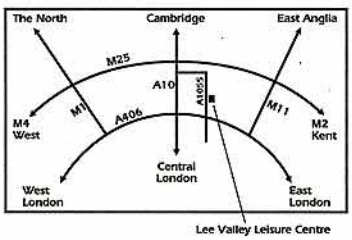

WHERE ARE THEY?

AJP Communications	Blue	X	Emerald Business Systems	Green	F
AKD	Blue	T	Expo-Drills and Tools	Blue	K
Agile Sales	Red	P	Field Electrics	Blue	I
Air Training Corps	SP/INT.10/11		Fisher Products	Green	A
Aladdin Computers Ltd	Blue	O	Garex Electronics	Red	D
Alan Hooker	Blue	P	G QRP Club	Green	A
Algebra Computers	Green	A	Grafton ARS	SP/INT	9
AMSAT UK	SP/INT.15-17		Guide Dogs for the Blind	SP/INT	20 - 22
AOR (UK) Ltd	Red	X	Ham Radio Products	Red	W
Arnold G C & Partners	Blue	R	Haydon Communications	Blue	Z
BARTG	SP/INT	5/6	Henderson Computer Supply	Green	B
Bill MacDonald	Red	P	Hoddesdon Radio Club	SP/INT	8
Bonex Ltd	Red	C	Holderness RJ	Red	J
Bring and Buy	Green		House of CD ROM	Red	e
Charles Covey	Blue	V	Howes Communications	Blue	L
Cheshunt & District ARC	Red	J	Icom UK Ltd	Red	S
Coltec Electronics	Red	O	Kanga Products	Green	A
Compelec	Red	W	Kent RA	Blue	V
Computer Junk Shop	Blue	Y	Keysolar Systems	Green	A
Deecomm	Blue	F	Keytronics	Blue	H
Discs Direct	Green	A	LCE Len Cooke Enterprises	Blue	Q
Display Electronics	Red	L	Linear Amp UK	Red	G
Dosher J	Red	P	Loutronics	Blue	J
Eagle Antenna Co	Red	O	Lowe Electronics Ltd	Red	F
Eastern Communications	Blue	P	Mailtech	Blue	H
Electrocomp	Green	A	Martin Lynch	Red	R

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RADIO & COMPUTER SHOW

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March 11th
March 12th
1995

ADMISSION

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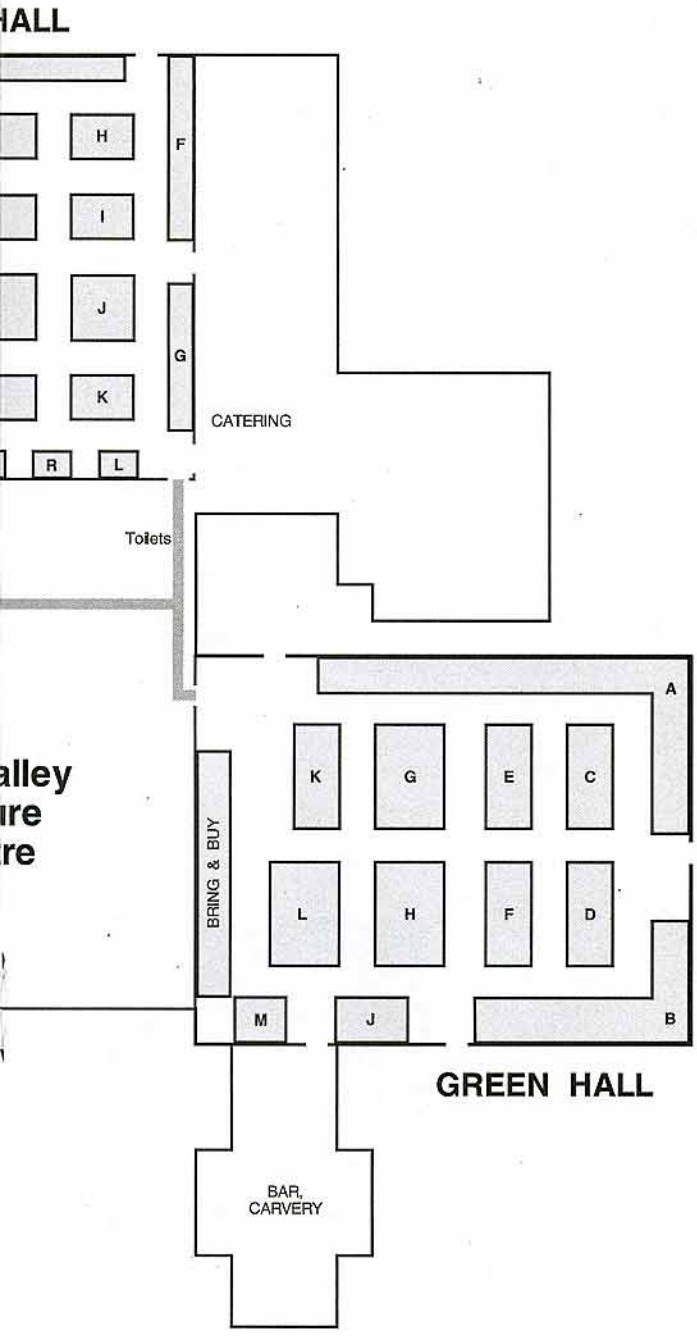
CONCESSIONS: £1.50



LECTURE PROGRAMME

SATURDAY at 12 noon

Steve White, G3ZVW, presents 'Instant Morse', a rapid learning system for Morse Code. Whether you have put off learning Morse because you think it's going to be difficult, have tried to learn and floundered, or whether you're a Morse enthusiast and would like to discover a new way of teaching someone the code in under one hour, this is the talk for you. The presentation will be highly interactive and invariably gets results.

SUNDAY at 12 noon

Data Day: Ruth Hull, N0ULD, and Ken Baker, KO0W, present a series of short lectures on Packet Radio. Whether you're a newcomer or want to find out more about the latest techniques and trends, there's bound to be something of interest in the four topics to be covered, the presenters being senior members of the Kantronics staff: Packet basics, Advanced packet activities, GPS and packet, and 9600 baud packet.

WHERE ARE THEY?

Mirage Designs	Blue	Q	SW Shareware	Green	B
Nevada	Red	H	Sandpiper	Red	M
No Nuts	Green	L	Semiconductor Archives	Red	L
Oasis Computer Systems	Red	V	Shacklog	Red	P
PTV Electrical Services	Blue	N	Silverthorn Radio Club	Blue	M
PW Publishing Co Ltd	Red	T	Siskin Electronics	Red	J
Poole Logic	Blue	S	Southern Aerial Services	Green	L
Proops	Blue	K	Squire V	Green	B
QRP Component Company	Blue	Z	Strikalite	Blue	M
Quill Marketing	Green	F	Suredata	Blue	M
R & D Electronics	Green	A	Syon Trading	Red	B
RAOTA	SP/INT	24	Telford Electronics	Blue	M
RN Electronics	Blue	U	Tennamast Scotland	Blue	U
Radio Research	Red	P	Time Step Electronics	Red	K
Radio Shack Ltd	Blue	G	Trio Kenwood UK Ltd	Red	N
Raynet North London	Red	W	UBM	Red	A
Remote Imaging Group	SP/INT	1-3	Vector Computing	Green	H
Rich Electronics	Red	K	Venus Electronics	Red	U
Ripmax PLC	Green	H	W E Software	Green	M
RNARS	SP/INT	31/32	Waters & Stanton	Blue	W
Rowland A P	Blue	V	Westlake W H	Red	P
RSARS	SP/INT	12-14	Wilson Valves	Blue	T
RSGB	Green	G &K	Woodpecker	Green	H
SEM	Red	J	Worked All Britain	SP/INT	7
SGS	Green	A	Woudstra M J	Blue	U
SMC	Red	M	Yaesu UK Ltd	Red	Q

Stand allocation are subject to change without notice.

CONTINUED FROM PAGE iii

Icom (UK) Ltd - Stand Red S and Dealers

A POWERFUL NEW 2m FM transceiver in a small package, the **Icom IC-2000H** is a 50W output rig with a number of useful features to make mobile operation more convenient.

The IC-2000H has one call channel and 60 memory channels plus six scan edge memory channels each of which can be programmed with a variety of information.

In addition, two scratch pad memories are available which automatically store your previous transmit frequencies for instant recall - great for frequencies you want to use temporarily but not store into your regular memory channels.

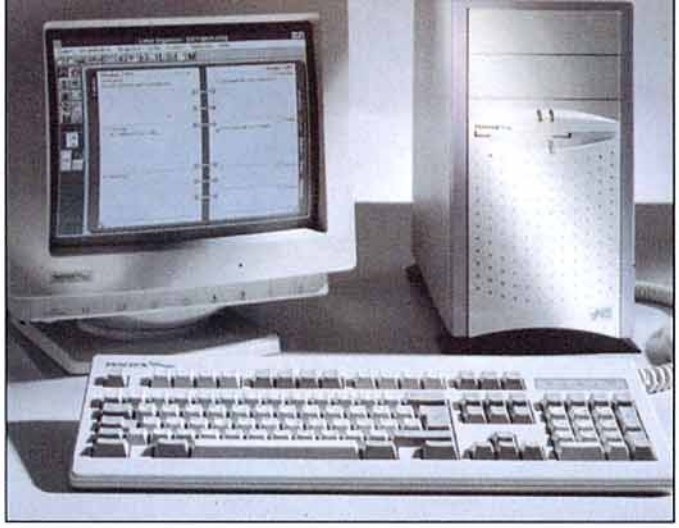
Power levels of 5 and 10W are also available, but can be increased to 50W at the flick of a switch if you need to reach that distant repeater, or pin your neighbour's S-meter.

The IC-2000H measures 150W x 50H x 151D and weighs just 1.2kg.

The **Icom IC-Z1E** is a dual band (2m/70cm) handheld with a unique feature: a detachable control panel which not only works as a speaker-mic but also provides a full display of all the operational parameters and provides control of the volume, tuning, scan, band selection, on/off and PTT. This standard feature allows you to clip the main body to your belt or, for mobile operation, to position it where it will not interfere with driving. Another useful feature: the control panel is backlit for night time operation.

The IC-Z1E allows simultaneous receive on both 2m and 70cm with separate tuning dials for each band providing convenient, straightforward operation. Full crossband duplex operation is also possible.

The IC-Z1E weighs 380g - less than 1lb - and measures just 57W x 125H x 36D (mm), complete with the BP-171 battery pack. Optional extras include additional battery packs and the BC-79 desktop charger.



Martin Lynch Stand Red R

THINKING OF BUYING a new computer? Look no further than Martin Lynch's stand, where the entire range of **Peacock PCs**, ranging in price from under £1000 to £1495 for the new **Pentium 60,** will be demonstrated. The Peacock range comes loaded not only with DOS V6.2 and Windows for Workgroups V3.11, but also with Packet control software, a logging program and other amateur radio software.

When Yaesu launched their FRG-100 receiver in 1993, there was only one major feature missing - a keypad for frequency entry. The new **MyDEL KP-100** is an instant access keypad for the Yaesu FRG-100 which is priced at £44.95 and available from Martin Lynch. The KP-100 also allows entry of memories and 'up and down' frequency shift.

Lowe Electronics Ltd Stand Red F

DO YOU HAVE a small garden, but want to get on 80m? The **Chelcom Aerials CAHFV1 80m resonant vertical** may be the answer to your problem.

Consisting of three screw-together sections, the aerial is 22ft long when assembled and will handle in excess of the UK legal power limit. It comes complete with mounting brackets and V-bolts and is completely weatherproof. It can even be used on other bands with an aerial tuning unit!

The CAHFV1 is available for £119.

C M Howes Communications Stand Blue L

SIX NEW BAND MODULES for **the Howes DXR20 communications receiver kit** will be available at the Show. Tunable modules cover the 160, 30, 15 and 10m amateur bands, plus the 5.45 MHz airband, while a further module gives fixed frequency (crystal controlled) operation on 4.488 MHz for weather data reception. All the modules feature 8-pole bandpass RF filters and FET oscillators. The DXR20 covers the 80, 40 & 20m bands as standard, so the new modules will increase the versatility of the radio and widen its range of applications.

Linear Amp UK Stand Red G

IF YOU ARE A SERIOUS VHF DXer you will be interested in the **Discovery 2m and 6m linear amplifiers** on the Linear Amp UK stand. These British-made amplifiers use the new Eimac 3CX800A7 triode, chosen for its very high stability and capability of giving full legal limit output from only 10W of drive.

Full metering of plate input and grid current is provided, as is a two minute timer to give a delay on switch-on to ensure that the valve cathode is thoroughly warmed up. The power supply incorporates an ILP toroidal transformer which has proved extremely reliable in the Hunter HF amplifiers.

The Discovery amplifiers measure 13"W x 8.5"H x 16"D and the price? - £1195 for the 6m version, while the 2m version is £1295.

Haydon Communications Stand Blue Z

IF YOU ARE LOOKING for VHF or UHF mobile or base station antennas, Haydon Communications tell us that they have a range available at very competitive prices. They may also be persuaded to offer a further discount at the Show for members who produce this issue of *RadCom*.

A full range of kits including transmitters, digital readouts, filters etc will also be on display at the show, as will the recently-introduced **CTU8 receiving ATU** which is proving to be very popular with SWLs.

Nevada Communications - Stand Red H

REMEMBER THE RANGE of **DRAE power supplies?** They haven't been around for a while, but Nevada have recently acquired the DRAE trademark and are relaunching three 'classic' DRAE power supplies.

They have invested in quantity production to substantially reduce costs: for example, the 24A power supply has been reduced from £180.00 to £139.95. 12A and 4A models complete the PSU line-up, which are the first in a new range of amateur radio products to be marketed under the DRAE name.

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11/12 March 1995

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An 8 character alpha-numeric user help menu scrolls operation instructions in the bottom of the large, backlit display.

Digital battery voltage readout displays condition of battery in use. Scan skip function allows individual memory channel lockout during scanning mode.

Spectrascope™ displays active adjacent frequencies in real time with relative signal strength.

FT-51R
2¼"W x 4¾"H x 1⅛"D
(2 Watt version shown.)

MH-29A2B
LCD Display Mic with Remote Functions. (Optional)

The new FT-51R Dual Band HT is state-of-the-art, and easy to use! So easy, you won't need an operating manual. Its exclusive, scrolling instruction menu located in the large, backlit display "window", guides you through total operation while simultaneously viewing the main display window.

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A digital battery voltage display, five power output levels, the largest backlit dual band HT keypad made, Smart Mute,™ two VFOs on both VHF and UHF, as well as available 2 Watt and 5 Watt versions, round out the exciting FT-51R. Plus, the optional MH-29A2B Display Microphone allows you to control volume and also access Memory, VFO, Call Channel, Band Selection and scanning functions. All of this in world's smallest dual band HT radio!

See the FT-51R with "windows" at your Yaesu dealer today!

"I can see two frequencies and alpha-numeric all at the same time."

"Scrolling instructions tell me what to do next!"

"I use the Spectrascope to find new contacts faster."

"Yaesu did it again!"

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  TX: 144-146 MHz
  UHF RX: 420-470 MHz
  TX: 430-440 MHz
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- Scrolling User Help Menu
- Alpha-Numeric 8 Character Display
- Up/Down Volume/Squelch Controls & Display
- Selectable Sub-Band TX Mute
- Automatic Tone Search (ATS)
- Digital Battery Voltage Display
- AM Aircraft Receive
- Scanning Light System (SLS)
- 120 Memory Channels (80 w/Alpha-Numeric)
- Large Backlit Keypad & Display
- Automatic Repeater Shift (ARS)
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- 3 Selectable Scan Stop Modes with Scan Skip
- User selectable lock function w/15 combinations
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- TX/RX Battery Savers Built-in
- Handy Cloning Feature
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- Message system with CW ID
- Selectable RX Smart Mute™
- Cross-Band & One-Way Repeat Functions
- DTMF Paging/Coded Squelch Built-in

Accessories
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Specifications subject to change without notice. Specifications guaranteed only within amateur bands.
Some accessories and/or options are standard in certain areas. Check with your local Yaesu dealer for specific details.

WALL FIXINGS

THIS CONTINUES FROM January's column on calculating wind loadings.

AS WE SAW IN January's edition of *In Practice*, even quite a small antenna installation can generate considerable wind forces on a wall mounting bracket. We analysed a 'typical' situation of a 10m mast carrying a rotator and a small 2m yagi, supported by a bracket bolted to the wall at 5m height, with a second steadying bracket farther down. The wind forces are concentrated at the upper bracket, and a cautious estimate of the force was over 120kg (270 pounds). How do we fix the bracket to a brick wall, to withstand that kind of force?

Think about the directions in which the wind force could act. If the wind is pushing the bracket on to the wall, the force is spread over several bricks, and the fixing is as strong as the wall itself. If the wind is blowing parallel to the wall, and the bracket is strong enough, most kinds of wall fixings will be extremely secure against the sideways forces. The difficult situation is when the wind is blowing away from the wall and trying to pull the bolts straight out of the bricks... or the bricks straight out of the wall! This latter possibility is a serious one unless the wall is well built. Older houses with mortar that has weakened over the years, and bricks made before the era of factory quality control, are simply not a good prospect for a mast bolted to the wall.

Assuming your house does have reasonably sound brickwork, what then? You should aim to mount the top bracket as high as possible, to reduce the wind forces (see January) but always leave at least three courses of bricks between the ones you drill and the top of the wall. Also leave plenty of sideways clearance from upstairs window openings, which considerably weaken the brickwork. Obviously the best place to mount the top bracket is quite high on a gable end wall, to shorten the unsupported length of mast and reduce the wind forces.

The bracket itself is important. Don't go down to the local TV shop and buy cheap, poorly-made wall brackets intended for UHF TV antennas - that's probably all they are fit for. Go to an amateur radio dealer and get something substantial and well made, and preferably galvanized. For example, Barenco make a good range specifically for amateur radio and similar applications, including some interesting tilt-over models (RAS Nottingham, 0115 928 0267, and at large rallies). A suitable bracket will look something like **Fig 1**, with a T-shaped piece that bolts to the wall and a well-braced arm for fixing the mast. All the component parts should be solidly double-seam welded, not just 'tacked' together. Typically there will be two or more bolt holes in the horizontal member of the T, and one or two more in the vertical member. The top row of fixings will bear almost all of the load, and **Fig 2** shows a typical drilling pattern.

To fix the bracket, you must use some kind of expanding wall anchor. These come in several kinds, but they all work by expanding outwards and gripping the sides of the holes. Here I'll mostly be writing about the traditional 'Rawlbolts', which can give a very secure fixing, but I will mention some other systems as well. I wouldn't recommend a 'DIY' fixing using large plastic wall plugs and 'coach bolts'. This is a safety-critical application, so spend some money on properly engineered fixings that are designed to work together as a system, and follow the manufacturer's instructions exactly. What size of anchors should you use? For this job, the biggest you can! When fixing to brickwork, you must drill the hole into the centre of the brick, as shown in Fig 2, and there's a limit to the size of hole that will not weaken the brick. In ordinary brickwork this corresponds to an M10 Rawlbolt which requires a 16mm diameter hole. Three or four of these should be more than adequate to withstand the wind forces we're envisaging - but only if you install them correctly. Here are a few pointers, culled from an interesting discussion on packet several months ago.

Choose a sound set of bricks for drilling, free from any hairline cracks. If necessary, be prepared to move the mast a little from its planned location. You're going to drill into the exact centre of each brick, not near the edges, and never into mortar. If necessary, make new mounting holes in the bracket to suit your own brickwork. The holes in the brackets should be 10mm diameter for M10 bolts, with some extra clearance to help the bolts line up. Hold the bracket to the wall, level it with a spirit level and mark the centres of the holes. Begin drilling with a small masonry bit. Before you use the electric drill, place the point of the bit exactly on your drilling mark and tap gently with a hammer to chip out a small dimple. This will prevent the point from wandering when you start drilling. If you're using a hammer-drill, start without the hammer action until you've made a deep enough hole to prevent the bit from wandering. Do the same at each change of bit as you open out the holes gradually, using progressively larger sizes. Use patience rather than brute force, and you're more likely to make good cylindrical holes, square to the wall and exactly where you want them. It's also kinder to your electric drill; and above all it's much safer for you on the ladder.

The final holes must be exactly the right diameter as specified by the manufacturer. For example, the hole for an M10 Rawlbolt must be 16mm diameter - not 15, not 17, but 16mm! This is very important because the entire strength of any type of wall fixing comes from the contact of the anchor sleeve against the inside of the hole. The sleeve should be a gentle tap fit, so that when you begin to tighten the bolt, the anchor will immediately start to grip hard. To sum up, you're going to need several sizes of masonry bits, and the largest one must be exactly the size specified.

Tap the anchor sleeve into place, just below the surface of the wall, so that when the bracket is bolted on it contacts the wall and isn't sitting on the end of the sleeve. Do this without the bolt inserted, and then fit the bracket. Leave the bolts slightly loose until you've levelled the bracket, and then tighten them. The tricky part is to tighten the bolts to the correct torque - enough to expand the anchor sleeve and develop the fixing strength, but not so much that it splits the brick and ruins the whole fixing. I have used Rawlbolts here as an example, but they can be very prone to split the bricks if over-tightened. You might consider alternative types, such as the Fischer bolts which use a softer plastic sleeve to grip the inside of the hole. In any case, use the type of anchor with a free bolt that screws in, and not the type with a stud that takes a nut.

If your house is built using modern bricks that have holes right through the middle,

IN PRACTICE

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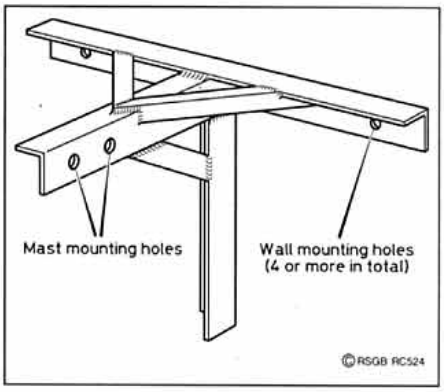

Fig 1: A typical well-braced wall bracket.

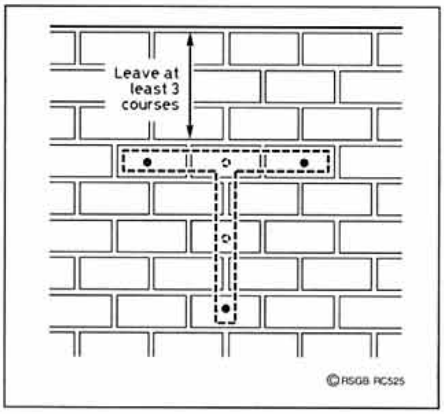

Fig 2: Typical drilling pattern for wall bracket. Patterns may vary, but always drill into the centres of the bricks.

IF YOU HAVE NEW QUESTIONS, or any comments to add to this month's column, I'd be very pleased to hear from you by mail, packet or E-mail (see head of column). But please remember that I can **only** answer questions through this column, so they need to be on topics of **general** interest.

conventional expanding anchors are no use, and you'll need to investigate other systems. Wall anchors using a chemical adhesive fixing system are also available, and have the advantage of not stressing the bricks at all, while having higher claimed strengths than conventional expanding anchors. They can also be used for fixing into hollow bricks, but the strength of the bricks themselves may become a factor. As with any adhesive bonding system, success depends on careful preparation and following the instructions **exactly**. One suggestion when using conventional Rawlbolts in ordinary brickwork is to use epoxy resin as well, to try and obtain the best of both worlds. If you are fixing to a gable end wall, yet another possibility is to drill right through the whole wall and into the loft space, and then use long bolts or studs to secure the bracket to a steel plate that spreads the load over the inside wall.

The lower bracket is much simpler, because it bears much less load than the upper one. Its main purpose is to steady the mast and prevent it from bowing below the upper bracket. Mark out and drill for the lower bracket after fixing the upper one, lining them up with a plumb-line. The bottom of the mast should also be fixed to prevent it from moving sideways.

In the longer term, wall anchors can work loose owing to either frost or thermal expansion/contraction cycles, and then the wind will work on them further. Check the fixings every spring and autumn.

WARNING - Actually, there's no such thing as the 'typical' situations I have tried to describe. You need to think carefully about every detail, as applied to your situation. As you may gather, wall anchors can be very strong, but there are a number of things you need to consider in order to do the job properly. Unless you already have some experience, check with a builder or builder's merchants (a real one that sells to the trade) and see what they recommend. Finally, if you are intending to mount a commercial mast or tower against a wall, obtain specific advice from the manufacturer and follow it exactly.

Thanks to G0PAN, G0TMD, G1ZPU, G4PMK, G4WEA, G8AMG, G8UYZ and Tennamast Scotland for their contributions.

MEASURING CHIP CAPACITORS

HOW CAN I MEASURE the values of ceramic chip capacitors? There are no markings on them.

A CAPACITANCE BRIDGE or capacitance-measuring digital multimeter often has sockets into which you can push the leads of conventional capacitors. This is no good for chip capacitors, and to make matters worse the socket contacts are often too deep inside the instrument case for short-leaded conventional capacitors. **Fig 3** shows what I did with my own multimeter, which has a row of six sockets at 0.1in pitch to accommodate lead spacings from 0.1 to 0.5in. Clipped-off component leads are pushed into the most closely-spaced pair of sockets, and each lead is soldered to a small patch of adhesive-backed copper foil. The chip cap is simply nudged into place and held down by a wooden toothpick or similar. You can use the same contacts for miniature ceramic plate capacitors supplied with short leads. Ordinary digital multimeters are not very accurate for low capacitances, but are generally good enough to identify which preferred value they are supposed to be. (Unfortunately I can't recommend a source of copper foil - it's over £30 for a 16m reel of adhesive-backed 1in tape, so this is a clear case for scrounging!) ♦

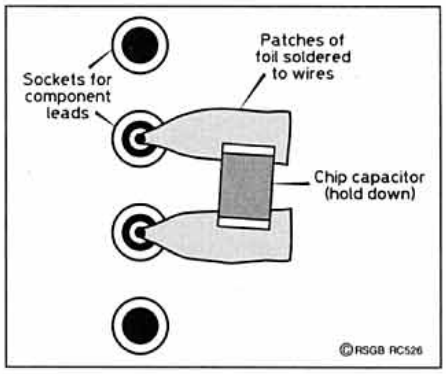

Fig 3: Two patches of adhesive-backed copper foil convert ordinary test sockets to work with chip capacitors.

CORRECTION

THE FORMULA IN Finding Coax Impedance (February) had the square-root sign in the wrong place. It should have read:

$$Z_{CABLE} = \sqrt{(50 \times Z_{MEASURED})}$$

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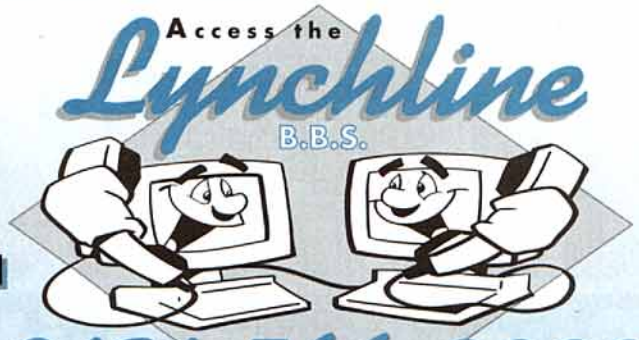

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Pat Hawker's Technical Topics

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THE ART OF QRP

ALTHOUGH PERSONALLY not a low-power devotee, I would readily acknowledge that the hobby owes much to the substantial band of amateurs who spend much of their time using powers ranging from about 5W down to a few milliwatts. They have not only tended to keep alive the use of homebrew equipment with emphasis on KISS techniques but also maintain interest in achieving the high levels of efficiency with simple wire antennas that once marked the UK scene in pre-war days when so many of us were restricted to DC-input powers of less than 10 watts.

David (Doc) Wescombe-Down, VK4CM/VK5HP in Amateur Radio (January 1995, pp10-11, who during the past 20 years has made more than ten thousand contacts using 5 watts input (or less) on CW, mostly 14MHz, with a variety of home-brew, kit and factory rigs, underlines that each time you reduce transmitter output by four-times (6dB) the received signal falls by only one S-point. For example, if, with 256 watts output, you put in an S8 signal, then (assuming the recommended S-meter calibration of 6dB per S-point) with 4 watts the signal reduces only to S5 or with 250mW to S3. By careful choice of band, propagation conditions, and a certain degree of low-cunning in operating techniques, a 250mW rig with an efficient antenna can provide acceptable HF contacts; while with 4 watts there will be many occasions when a distant QRP station should seem as strong as a QRO rig with a less efficient antenna.

VK4CMY stresses that "antenna efficiency makes or breaks any amateur radio station but especially a QRP station!". He advises that, while any antenna that works on the desired frequency is suitable, a number of constructional practices need to be 'spot on'. Near enough is not good enough. Good practice includes:

- conductive paste used in all telescoping joints in elements/radiators;
- resonant radiators;
- open wire line (300Ω TV ladder line or 600Ω air-spaced lines) are superior to coaxial cable [note this would also apply to 450Ω ladder line - G3VA]
- an antenna site clear of obstruction of at least a half-wavelength in all directions at the desired frequency;
- elevated antenna - the higher the better.
- soldered joints, including radial wires:
- avoid conductive supports for inverted vees and other wire antennas - they play havoc with absorption and patterns of radiation; and
- use a low-loss ATU when possible.

In general, VK4CMY and most other low-power enthusiasts recommend a variable-frequency rig for serious DX work. Crystal-control although providing the simplest approach, largely restricts operation to CQ-induced contacts, except possibly on the recognised QRP frequencies. While the simple QRP transceiver is good fun, there are often advantages in using a separate high-performance receiver. Send a little slower than usual on CW and speak clearly on SSB using standard phonetics: give the receiving station all the help you can. It is worth indicating that you are a QRP station as this often results in greater attention being given to your calls - but don't abuse this practice when using say 15 or 20 watts!

Many designs for simple low-power rigs have been published, for example in Sprat, but my eye was caught by the experimental 0.5 watt transmitter (*QST*, November 1994, 'Hints & Kinks' p84) with which Lew Smith, N7KSB reports working all continents and over 30 countries using just a roof-mounted ground-plane antenna. The rig is suitable for 14, 21 or 28MHz (or with suitable crystals etc also 18 and 24MHz). RF output about 0.5W on 14 and 21MHz reducing slightly to about 0.47W on 28MHz.

This transmitter is based on a 74HC240 octal inverting buffer IC with one section working as crystal oscillator, four sections as a parallel-connected amplifier and three sections unused: **Fig 1**.

N7KSB also notes that the 74HC240 can alternatively be used to drive a power MOSFET IRF15 power amplifier to provide up to 15 watts RF. The output stages in 74HC— devices are designed to have equal value pull-up and pull-down transistors. This minimises even order harmonics, simplifying the output filtering: see **Table 1.**

Among the notes supplied by N7KSB is that since the 74HC240 dissipates 0.5W on 14MHz and some 0.9W on 28MHz it must be heat-sunk; however epoxying the IC to the ground-plane in dead-bug or 'ugly' construction provides adequate cooling. L1 is a low-inductance coil and is sensitive to lead length "so if you build this transmitter with plug-in filters (Lew Smith uses phono plugs and jacks for this purpose), you may need to remove one or two turns from L1 to compensate for the extra lead length involved in wiring the coil plugs and sockets".

Table 1 gives suggested output filter component values. Note that the logic chips have built-in input and output buffers. The extra gain provided by the extra stage makes it harder to get rid of key clicks. The click-filter shown uses an unusually large (33 millisec) time constant.

Band (MHz)	28	21	14
C1(pF)	330	470	680
C2(pF)	100	150	220
L1	3turns 5/8th in long	4turns 5/8th in long	5.5turns 5/8th in long
L2	7turns 5/8th in long	10turns 1 in long	12turns 1 in long

C1 and C2 are mica or ceramic. L1 and L2 are 'air-wound' from Nr 14 wire, with an inner diameter of 3/8th inch.

Table 1: Output filter component values

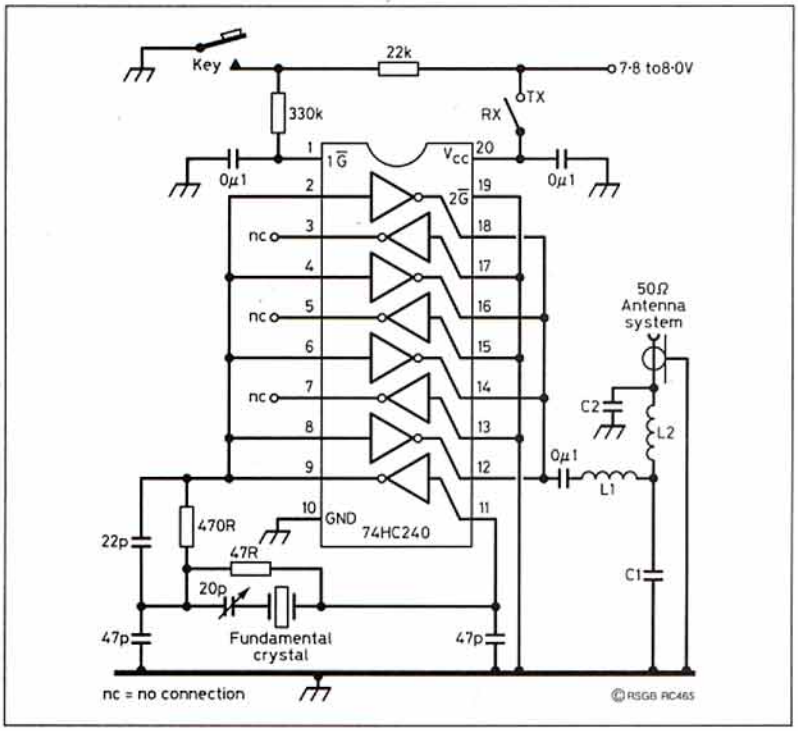


Fig 1: The experimental 0.5W CW (code) transmitter described in *QST* by Lew Smith, N7KSB and based on a 74HC240 high-speed CMOS octal buffer integrated circuit. One section serves as a crystal oscillator, four sections form the amplifier, and three sections are unused. It can put out 0.51W on 14MHz and 21MHz and 0.47W on 28MHz.

SLIM JIM & ELNEC

TT, DECEMBER 1994, pp62-63 and Fig 3(b) gave the dimensions of the original G2BCX 'Slim Jim' 144MHz antenna but noted that in 1986 Greek university authors had made a computer analysis of the design and found that these dimensions resulted in a 50Ω resistive match at 155MHz rather than 145MHz and with maximum radiation at an undesirable 22° above the horizon; modified dimensions for a 101.8MHz broadcast antenna were given.

This resulted in an interesting letter from Bernard Spencer, G3SMW which, inter alia, shows that despite the many benefits that have stemmed from the development of user-friendly versions of 'method of moments' (NEC) antenna evaluation software, some care is still needed in setting up the 'model' for

PITFALLS OF FILTER TESTING

OVER A QUARTER-CENTURY AGO, two Collins Radio engineers drew attention to the fact that the multi-section low-pass filter imposed between (valve) transmitters and the antenna were presented with attenuation characteristics that, if realised, would virtually stop any VHF harmonics from reaching the antenna: "Yet, increasingly, there have been doubts whether the high theoretical attenuation figures of these filters are always (or even often) being achieved in practice".

As still noted in *ART7* (p193) the Collins engineers (Richard Weinreich, K0UVU and R W Carroll) suggested that it is possible to increase rather than to suppress harmonics with conventional LC filters. Basically, this paradox is because such filters are designed to be driven from a purely resistive source and loaded into a resistive termination. Now, even in a correctly set up filter system, the typical transmitter output impedance tends to be resistive only at the output frequency, and is likely to be highly reactive at some at least of the harmonic frequencies. The transmitter reactance at these harmonics may partially, or even wholly, cancel the filter input reactance, and thus permit VHF power to reach the antenna elements."

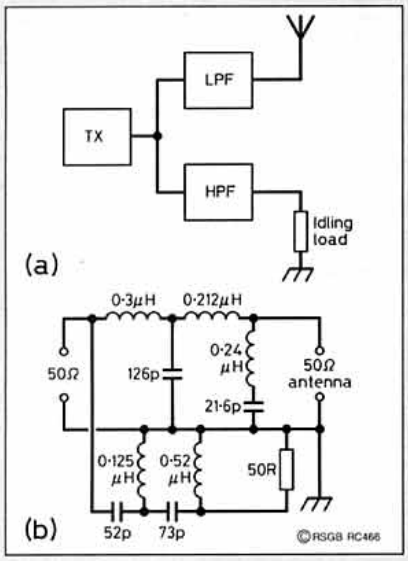


Fig 2: The absorptive type of low-pass filter proposed by Collins Radio Engineers in *QST*, November 1968. (a) General principle. (b) Representative four-pole filter with design cut-off at 40MHz and with a rejection peak in the American TV channel 2 (54-60MHz using double-clad printed board having a capacitance of 10pF per square inch for screening and capacitors. The original article gave design formulae for two to six pole filters of this type.

They presented a practical solution to this 'unhappy chapter in filtering' in the form of filters which achieve filtering by absorption of the harmonic energy, dissipating it in a resistor, rather than by attempting to reflect the harmonics back into the transmitter: **Fig 2**. This type of filter uses a cross-over filter, much as in audio loudspeaker practice, to separate the unwanted VHF harmonics from the wanted HF energy and then matching the VHF energy to an idling resistive load where it can do no harm.

Absorptive filters turn up from time to time although the technique has never been widely used. With the coming of solid-state power amplifiers, additional low-pass filters are usually built-in to transceivers, and the problem of VHF harmonics has been alleviated in the UK by the change to UHF television.

But the problem of 'over-optimistic' characteristics has not gone away, and is found to a marked degree in the insertion loss and attenuation data presented for power-line filters. John Greenwell, G3AEZ draws attention to an article 'the pitfalls of EMC filter testing; beware of half measures' by Gareth Nutt of Schaffner (*Electronic Product Design*, December 1994, pp45-47). this is introduced as follows:

"The use of powerline-filter insertion loss and attenuation curve data (as published by filter manufacturers) can be a frustrating experience. Many experienced EMC engineers consider these curves, generally prepared using data taken from a 50Ω test set-up, to be of extremely limited value. In spite of this, manufacturers continue to publish 50Ω data, as popular 50Ω equipment, connectors and test cables make these the most easily taken measurements . . . Clearly, in real-life situations, a powerline-filter is not terminated with 50Ω impedance. The filter termination is usually an unknown value that often changes with frequency. As the filter performance is largely dependent on termination impedance, the curves given in 50Ω set-ups can never represent the real live situation." **Fig 3** shows how predictions based on 50Ω testing can significantly overestimate the attenuation provided in the case of a typical switched-mode power supply.

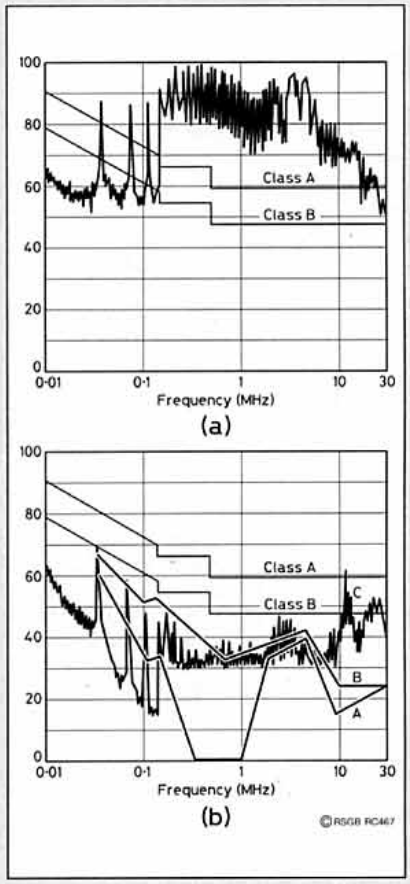


Fig 3: (a) Noise output of a typical switch-mode powder supply unit. (b) Noise level predictions and the measured results after fitting filter. (A) Noise level predicted using 50Ω test. (B) Noise level predicted using 0.1/100Ω curves. (C) Real system noise level measured after fitting filter, underlining the over-optimism of published data based on 50Ω test set-up. (Source Schaffer EMC in Electronic Product Design).

Gareth Nutt makes a strong plea for standardised, acceptable test methods to be used by manufacturers for published data. He shows that powerline filter curves based on 0.1/100Ω test systems are more realistic although even then he notes that at frequencies above 10MHz coupling effects can bypass the filter and give an unrealistic shape to the attenuation curves.

analysis. While professional antennas can usually be erected in the clear, most of our antennas are surrounded by conductive objects which affect radiation patterns etc. G3SMW writes: "I put the Slim Jim configuration of your Fig 3(b) in my ELNEC program, and sure enough got a main-lobe elevation of some 22°, and a best match on 50Ω at about 155MHz. I also got a similar elevation at 145MHz for the same antenna dimensions.

"While the Fig 3(b) configuration (without a feeder) is the obvious way to put this antenna into ELNEC, I was puzzled by the main-lobe elevation, having over the years made and tested Slim Jims and other vertical antennas without finding in practice this large elevation angle.

"So I then, in the ELNEC program, dangled a piece of wire from the bottom right-hand corner of Fig 3(b) to simulate a coaxial feeder. This had a marked effect on the main-lobe elevation. In general it made the lobe much nearer the horizontal, whether connected to the antenna at the corner, or not connected (with a small gap). Naturally the effect varied somewhat with the length of the dangling wire, being greatest for a half wavelength. With this, and for some other lengths, the main lobe given by ELNEC was within about 5° above or below the horizontal.

"This was not an exhaustive investigation, but perhaps shows that the G2BCX Slim Jim usually proves satisfactory in practice when fed as usual by vertical coaxial feeder, although admittedly this does have any bearing on the matter of the best match being at 155MHz is that it may be advisable to scale the dimensions from the Greek antenna as suggested in *TT*.

"From both my amateur and professional studies of the nasty VRPs of many vertically polarised VHF antennas, I believe that these do not arise simply from currents on the outside of the coax braid due to its connection to the antenna but also (as shown by my

ELNEC run with a gap) by currents induced on the feeder from the dipole element above. This implies that no single choke-balun or gap would prevent them. I hope to investigate this further, as this represents a nasty problem with many vertical antennas."

EARLY OVER-THE-HORIZON VHF

WHILE THE ROLE OF radio amateurs in the opening of the 'short waves' (200 metres and down) in the 1920s as a long-distance medium for international communications and broadcasting is still widely recognised, much less seems to be known about the early development of 'over-the-horizon' VHF propagation by means of tropospheric scatter and ducting in which amateurs played a less dramatic, but still useful role.

Much of the credit goes to Marconi and his work in Italy, Sardinia and on board Elettra in the Mediterranean. But hard on his heels was the British Post Office which in the early 1930s began a series of experiments leading to a fully operational good-quality radio-telephone link between the UK and the Channel Islands (Guernsey to Chaldon, a path length of some 85 miles of which some 36 miles was outside the optical range) during 1937-39. Very large antenna arrays were used and it is clear that the reliability of the circuit depended, at least in part, on troposcatter propagation.

A close observer of the Post Office progress was teenager Christopher Henn-Collins, former GU5ZC who, a few years later, as a Lt-Colonel in the Royal Corps of Signals, was responsible for the first practical use of OTH radio-relay. This was in North Africa in 1943 when he was in charge of the Radio Division of AFHQ in Algiers. He has recently published an account of how these OTH links were the result of his knowledge of the early Channel Island links combined with one of those 'happy accidents' that change the course of history: 'Over the Horizon Radio and Beyond - or Lost Opportunities', *The Journal of the Royal Signals Institution,* Autumn 1994.

This is a fascinating story of how the first military RTTY VHF radio-relay system came into being, born out of a need to prevent a serious breach of wartime signals-security and fathered by GU5ZC's interest in long distance VHF communications, first aroused by the pre-war GPO links to their station near his home in the Channel Islands. But sadly the story also emphasises how British conservatism allowed the post-war commercial exploitation of the troposcatter mode to pass largely to the USA.

To quote a few key paragraphs: "My interest in OTH radio was reawakened in 1943, not just as some esoteric planning exercise but this time with hardware. If you check the bibliography, and the source of the information is American, it is likely to credit the first successful OTH links to the work of the US National Bureau of Standards in the late 1940s; if, on the other hand, the source is British, it is likely to be credited to GPO/Telecoms trials in the early 1950s. However the earliest references I have traced were in US Amateur Radio literature (*QST*, September 1945) which credits our work in North Africa.

"From 1942 I was in charge of the Radio Division of AFHQ and early in 1943 the Americans shipped a number of high power (250 watts output) police VHF radio sets, to provide General Eisenhower with personal voice communication from anywhere in the 'Theatre' back to AFHQ (Algiers). Brigadier Willie Scott, who was then the Deputy Chief Signals Officer, took me aside and warned me that because of the total lack of security with such voice equipment the Americans must not be allowed to use it for its intended prime purpose as the implications could be appalling . . . I was faced with a dilemma . . . It was up to me to divert this new equipment to some acceptable alternative use - otherwise I was for the chop!

"It took little prompting to come up with the idea of using the equipment to provide a radio teleprinter link forward from Algiers, using 'Apparatus 2 Tone Telegraph' (which could work on a two-tone basis to provide mark and space conditions) to modulate the transmitters. The first link was to Constantine with a path length of about 130km, much the same as the prewar UK-Guernsey GPO link, and it worked well. Soon we added a couple of more links in cascade and were through to 18 Army Group HQ, near Tunis with an automatic RTTY 600km link which turned out to have excellent reliability and which often worked as a direct link without the intermediate relays.

"The success of this project was duly reported to Washington and to London but with very different responses. Soon Dr Beveridge, representing RCA, and a senior engineer from Bell Labs came to Algiers and on their return to the States, the US Army Signal Corps accelerated the manufacture of VHF equipment to take advantage of this new mode of radio communication. Within six months radio-relay systems were arriving in Algiers. By contrast, a news letter came from the British Director of Signals containing a post-script that Colonel Henn-Collins was to be thanked for his description of a radio link!

"About this time, my US No 2, Lt-Col E C Page, suggested that I should patent the idea after the war as there would be money in it, he also asked me if he could have the US rights. I remember telling him that as a regular officer I would have to assign any patent to the Crown leaving me with a lot of extra work and not a penny in royalties, but I had no objection to him exploiting it in the United States . . . Subsequently he set up Page Communication Engineers and made a fortune as prime contractor to the US Department of Defence (as the main supplier of troposcatter and long-haul VHF radio relay systems)."

After the war, the GPO believed that the success of OTH techniques was being greatly

HF CONVERTER FOR AM BROADCAST RECEIVERS

THE 'CIRCUIT IDEAS' FEATURE of the December 1994 issue of *Electronics World + Wireless World* includes a simple HF converter intended for use with medium-wave AM car radios (better screened than most domestic models with ferrite rod antennas). The converter as described by Peter Parker, Bentley Australia comprises a dual-gate MOSFET frequency converter with a separate crystal controlled oscillator: **Fig 4**. By using just two low-cost crystals and making use of oscillator-high and oscillator-low mixing, he achieves continuous coverage from 3.4 to 7.6MHz in four bands, tuned on the car radio.

Good frequency stability and easy tuning are among the benefits and he points out that if a BFO is added to the car radio, it is possible to receive SSB/CW. Inductors L are wound on ferrite toroids (14 turns on 9mm toroid, Philips 432202097180 4C6 ferrite) and the converter should be housed in a small metal box to avoid direct pick up of local broadcast signals. The car radio must have continuous tuning.

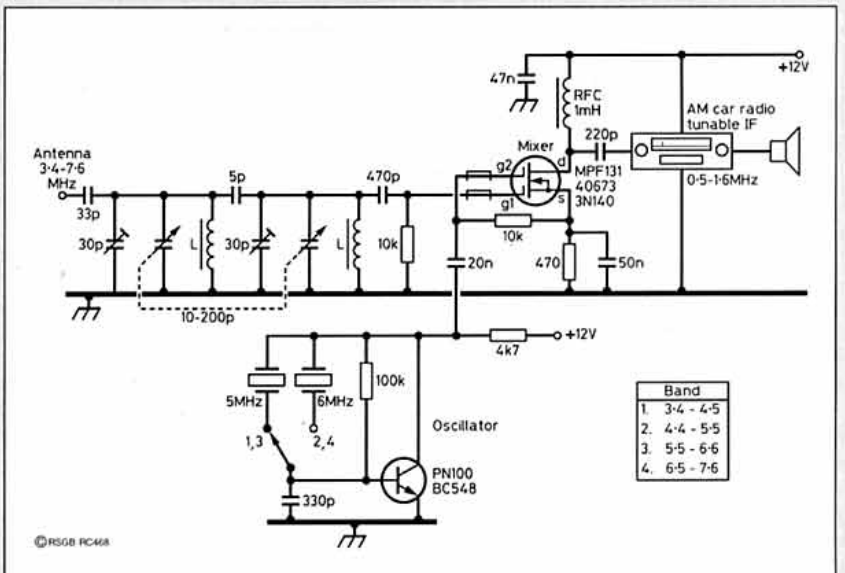


Fig 4: Band-pass tuned front-end converter suitable for feeding medium-waves AM car radio, etc. (Source EW + WW).

oversold; they considered them unreliable and of limited range. It was not until years later that the GPO re-discovered many of the techniques they had originally used in the 1930s when oil platforms in the Noth Sea became important.

I recall that about 1960 I added a section 'VHF Scatter Communications' to an edition of the *Radio & Television Engineers' Reference Book* with a bibliography that included credits to H G Booker & W E Gordon (*Proc IRE*, 1950, p401) who organised the American NBS post-war study (in which America radio amateurs participated) and to Eric Megaw (G6MU) of GEC Research (*Nature*, 1950, p1100). Dr R L Smith-Rose (RSGB President 1959) with a Miss A C Strickland published 'A study of propagation over the USW radio link between Guernsey and England on wavelengths of 5 and 8 metres (60 and 37.5MHz)' (*JIEE*, Vol 90, Part III, 1943). This noted that the first suggestion that VHF propagation over land was influenced by weather (ie troposphere) was made in 1935 by Ross Hull, the Australian radio amateur who became Technical Editor of *QST* and was later electrocuted working on TV equipment. Marconi's original work in the 1930s can be found in 'Guglielmo Marconi and communication beyond the horizon: a short historical note' by G A Isted (IEE Symposium on long-distance propagation above 30MHz, January 1958).

MEDIUM OR MESSAGE?

A NOTE IN THE November *RadCom* (p7) showed that in the year to April 1994, the total number of UK Amateur Radio licences increased by some 6% from 59242 to 63033 but the number of Full A licences actually dropped by some 600 to 31817. Even more striking was that the number of Novice A licences is only about one-tenth of the Novice B licences. Does this signify that HF operation is no longer the prime aim of newcomers, or simply the belief that the Morse barrier, even with a simple 5 word per minute practical test, may eventually disappear so that it is no longer worth the learning effort involved? For those of us who believe that CW on HF is fundamental to amateur radio this seems an unhappy state of affairs. But there is no doubt that the hobby is changing, throwing up an exciting forest of new challenges but seeing some of its traditional trees under threat.

David Sumner, K1ZZ, Secretary of ARRL and Publisher of *QST*, in an editorial (*QST*, November 1994, p9) points to the growing diversity within amateur radio as both a great strength and our principal weakness: "Sometimes it seems as if we're 50 separate interest groups marching in 50 different directions, passing up opportunities for mutual support when it's needed and bumping into one another even when collisions could be avoided . . . We must work together better . . . To do that we have to understand one another - perhaps even ourselves - a little better . . . What is more important to you, the medium or the message? Is your interest in Amateur Radio fed primarily by a sense of wonder at the magic of radio communication? Or is it derived from what that magic allows you to accomplish? . . . All too often, we amateurs denigrate one another for not being 'real hams' or for engaging in what seems to the observer to be pointless activity. Perhaps some of that intolerance is rooted in a lack of understanding what the other fellow values in Amateur Radio. Perhaps it springs from a lack of knowledge about an aspect of Amateur Radio we haven't personally experienced. Maybe we've simply forgotten how ignorant we were when we started, and how much we learned because others were willing to help us along."

Frank Merritt, VE7FPM in 'Challenges face amateur radio - New technology offers unlimited opportunities - go for it!" (the *Canadian Amateur Radio Magazine*, October 1994, pp18-19) believes "There is a crisis in amateur radio. It has been coming for a number of years and now we are in the middle of it . . . In the Chinese language, there is no difference in symbol between the word-concept 'challenge' and the word-concept 'crisis' . . . For many years, it was relatively easy to explain to a non-amateur what amateur radio was and what we do. There used to be a few HF bands and we had either code (CW) or voice (then AM - amplitude modulation) operation . . . That is the way it was and it was relatively uncomplicated.

"We have undergone a metamorphosis. The picture of amateur radio today is much more complex, a complexity that makes it more difficult to explain to a non-ham what amateur radio is all about."

VE7FPM traces the move away from AM to SSB, the emergence of VHF-FM in +/- 30kHz

LOW-DISTORTION LC OSCILLATOR

JOHN CRONK, GW3MEO has drawn attention to two designs appearing in the Maxim Engineering Journal (Volume 16) issued by Maxim Integrated Products (UK) Ltd of Pangbourne near Reading (Tel: 01734 845 2550), the UK representatives of the Californian IC manufacturers. One design, using two MAX436, provides an allpass network with 90° phase shift and by using two of these networks with different corner frequencies it is possible to obtain a wideband 90° shift (for example from 180kHz to 740kHz. All-pass networks can be used for phasing-type SSB modulation and demodulation.

The other design, based on a MAX436 single wideband transconductance amplifier (WTA) is for a negative-resistance LC oscillator which, for the 9.3MHz oscillator shown in **Fig 5**, has a claimed third harmonic output below -40dB (THD less than 1%). It is pointed out that negative resistance is easily synthesised with a WTA: "Connect the WTA's positive input to its output and its negative input to ground. Then, a positive voltage applied to the output causes current to flow out of the amplifier, in proportion to the applied voltage, the circuit acting like a resistor whose current flows in the opposite direction; hence the negative value . . . By itself, the combination of tank circuit and regenerative element (negative resistance) simply drives the output amplitude to saturation. To achieve steady oscillation the circuit needs an amplitude limiter. R4 serves that purpose; it appears (in parallel with R3) only when the amplitude is sufficient to turn on one of the diodes D1 or D2 . . . The oscillator, whose tank circuit consists of a mica capacitor [C4] and air core inductor [L1], has an output of 9.3MHz. You can trim the output frequency to any reasonable value, but above 10MHz the layout should include short connections and a ground plane."

The design note does not include any comments on the stability of the oscillator but the high C/L ratio suggests this should be good despite the use of an IC which presumably has a rather high temperature coefficient; the note does however include details of how the component values are calculated.

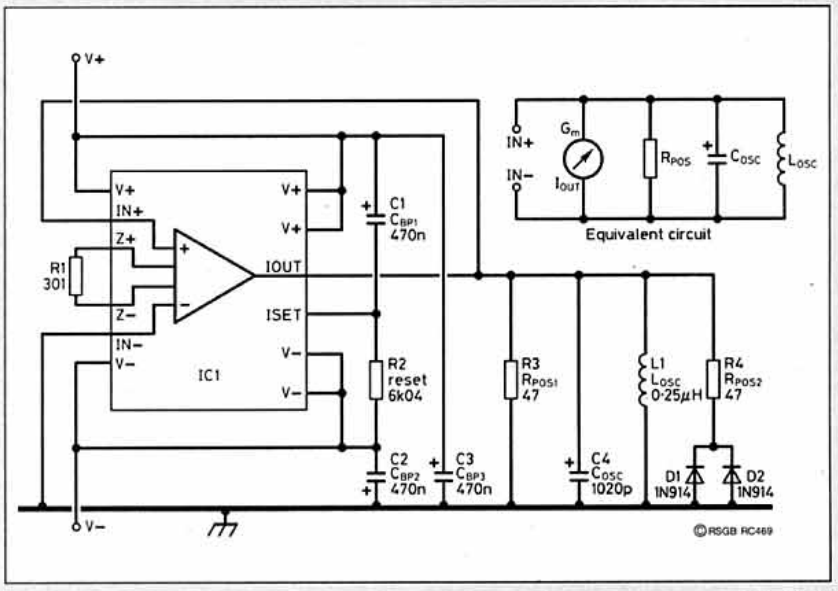


Fig 5: 9.3MHz low-distortion oscillator based on a wideband transconductance amplifier (IC1) whose negative resistance counters losses in the L1/C4 tank circuit. Total harmonic distortion less than 0.1%. (Source Maxim Engineering Journal).

systems which eliminated the problem of drift, and the steady growth of digital systems from mechanical RTTY in which the only electrical element was a selector magnet to the all-electronic PACKET (first proved in Canada by Dr John DeMercado) and more recently PACTOR and the radically new CLOVER developed by Ray Petit.

VE7FPM believes that CLOVER may in time become the dominant amateur data system and that: "We now have computer-based systems that provide hitherto unheard-of possibilities for radio communications. The biggest challenge today is not operating our systems, both digital and non-digital, but to communicate our relevancy in the modern world . . . This is where we need to sharpen up! The crisis is a challenge for us to communicate to others just what we are doing and its charm.

"Originally, virtually every amateur had to be proficient in the technology of the day. . . this has to some degree become irrelevant . . . Increased reliability puts a lot of us more firmly in the business of communicating rather than continually patching up our equipment . . . Our computers provide data-handling capabilities that were not dreamed of in years gone by. To be sure not every operator is interested in digital techniques. CW operation is still with us and giving genuine pleasure . . . There are more SSB stations than ever . . . Diversity has become the key . . . We find individuals operating in advanced areas such as moonbounce or meteor scatter . . . Modern challenges are certainly with us but so are the old ones."

Frank Merritt, VE7FPM concludes that while the future direction of amateur radio is only partially clear, a number of new vistas and pathways are evolving: "What is your choice? Go after it!"

I have to confess that, personally, I still find pleasure in keeping old, fallible but technically-understandable, pre-computer HF equipment on the air with the aid of manual Morse keys and little more than a multimeter and soldering iron. My experience of reading text off a TV screen is largely confined to a word-processor VDU and broadcast teletext. But undoubtedly K1ZZ and VE7FPM raise serious questions. The more we diversify our interests, the less we as a body will have in common, the more likely to fall out over frequencies and band-planning, and to engage in bruising mode wars. The magic of communicating by radio nowadays contributes just the provision of a link between computers to form super-highways in pale imitation of Internet! This may lead to less comprehension not only by the public but also by newcomers unaware of the traditional role of a hobby founded on technical curiosity and the wonder of unreliable but strangely fascinating radio propagation. Diversity is good and necessary, and it would be a sad day if we all opted out of state-of-the-art technology and up-to-date communication techniques but this still needs to be based on a common heritage and mutual understanding.

HERE & THERE

RICHARD FORMATO in *EW + WW* (December 1994 pp 1026-1028) shows how the bandwidth of VHF/UHF monopole antennas on ground planes can be maximised by choice of suitable length to diameter ratios. He gives some simple, easy-to-remember rules for computing maximum monopole bandwidth (50Ω characteristic impedance, VSWR less than 2.5:1: (1) Maximum bandwidth occurs when the ratio of monopole length to diameter is five; (2) maximum bandwidth is about 50% of the frequency at which the monopole is a quarter-wave long; (3) frequency of minimum VSWR is about 1.3% less than the quarter-wave frequency; (4) approximately two thirds of the bandwidth is above the quarter-wave frequency, and about a third is below; (5) VSWR minimum is a near-perfect 1.009:1.

Daisuke Yamazaki *et al* of the Sony Corporation in IEEE Trans on Consumer Electronics, August 1994 report that "For the first time in the world, a complete single-chip AM-stereo/FM-stereo radio IC which can be used for a portable radio has been developed." 2100 elements are integrated in a chip size 3.36mm by 4.00mm operating from a supply voltage of 2-12V with supply current AM 14.8mA, FM 12.2mA.

R C Arnold, G8ZDU adds to the saga of 'solid-state firsts' (*TT*, August 1994) by sending a newspaper cutting (unfortunately not dated) which was sent to him in 1953 while serving in the RAF in Egypt. This was headed 'Valveless Radios in Contact' and continued: "Two-way contact between radio sets using transistors instead of valves has been set up by amateur radio operators in Leicester. The communication was made by Mr Cyril L Wright [presumably G3CCA] and other members of the Leicester Radio Society, who received signals from a station at Maids Moreton, Bucks. The transistor is a tiny unit which consumes little power, has no filament, needs no attention after being installed and will run for well over 100 years. Mass-production of them is not expected before 1956 or 1957."

Jack Althouse, K6NY (Palomar Engineers) remains convinced that the health dangers of RF radiation (*TT*, October 1994) and low-frequency power fields have been widely exaggerated. He encloses a letter (Radio World, August 10, 1994) from a broadcast chief engineer who spent many years working in close proximity to high power broadcast antennas: "Of the hundreds of technical people that I have met or worked with in all of these years, only one man died of mysterious illnesses such as cancer. This was undeniably due to his daily ingestion of many packs of cigarettes, not his lifelong pursuit as a broadcast chief engineer . . . An organization has grown up to develop a very financially rewarding career for all concerned, with the worst yet to come. Surely there must be a way to halt this costly fiasco. Produce the corpus delicti or get off the pot".

K6NY also enclosed an article by Professor W R Bennett of Yale University 'Power Lines are Homely, Not Hazardous' (The Wall Street Journal, date unknown) and graphs from his book 'Health and Low-Frequency Electromagnetic Fields' (Yale University, 1994) which underlines that RMS magnetic fields from domestic appliance are many magnitudes lower than from electric railways [and tube trains]: **Figs 6** and **7**. Professor Bennett writes: "If fields of two milligauss really are a serious threat in Denver, Los Angeles and Sweden, then commuters on East Coast electric trains - where the fields at power line frequencies can be hundreds of times larger - ought to be dying like flies. So much for the electromagnetic hoax. To grasp how much damage it's caused, consider what useful developments in cancer research, in education, or in any other field, could have been accomplished with the $23 billion already squandered on this scare. That ought to be more shocking to people than any electromagnetic field." ♦

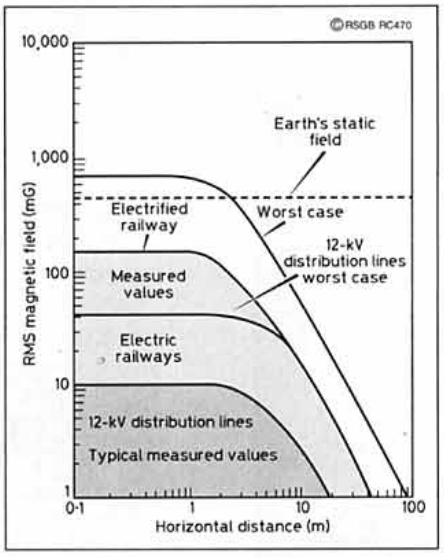


Fig 6: RMS magnetic fields at head level for electric railroads and American three-phase 12kV urban distribution lines. Note that the solid curves represent the calculated worst-case limits; the shaded curves represent the typical range in measured values obtained with a three-coil magnetometer at 60Hz. (Source 'Health and Low-Frequency Electromagnetic Fields' Yale University, 1994).

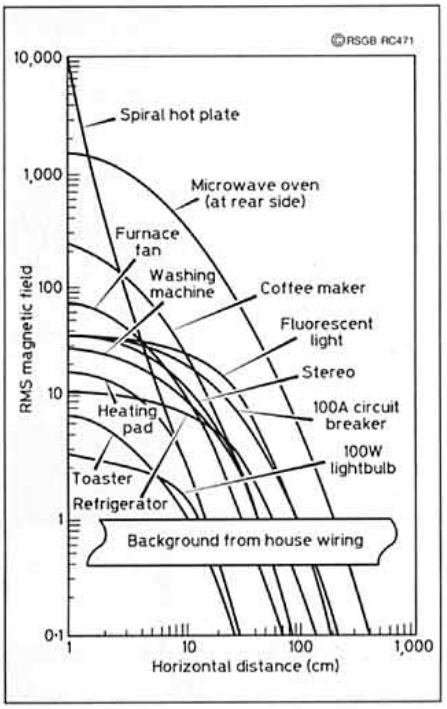


Fig 7: Measured magnetic fields from common household appliances. Note that horizontal distance is in centimetres compared with metres in the previous diagram. Calculated values are shown for the spiral hot plate because the spatial resolution of the meter available was inadequate to determine such rapidly increasing fields at small distances. (Source 'Health and Low-Frequency Electromagnetic Fields, Yale University, 1994).

RADCOM TECHNICAL FEATURE

DIY Micro-Processors

By A A Mockford, G8ZGK*

HAVE YOU EVER started a project then found that the functions required were not readily available from the chips that you could buy? Have you had to abandon a project because the number of logic chips or the board size became unmanageable?

THE ONE CHIP MPU

AN EMBEDDED MICRO-CONTROLLER or one-chip micro-processor (MPU) could be the answer. They offer amateurs an ideal medium to design, experiment and try their own unique ideas. To get started with micro-processors requires less design knowledge than analogue or digital hardware design.

There is a range of one-chip MPUs readily available. They are relatively cheap, simple to program and use, and are fully backed by development equipment and manuals. With one MPU chip you can design and build any logic circuit you desire. Just a few examples of circuits that can be constructed using MPUs are listed below:

- Controller for an antenna switcher
- LED driver
- PLL controller
- Keyboard controller
- Serial communication unit

Very few other components are required to make the MPU operate.

PIC MPU, 16C84

ALL PARTS DESCRIBED in this article may be obtained from any Maplin store. The MPUs described here are from Microchip Technology Inc and are part of their PIC range. They have been available for several years and the range is slowly being added to. Microchip also supply cost effective, well engineered and well documented development systems.

There are several MPUs in the PIC range offering different speeds, number of connections and different facilities inside. The particular PIC MPU, 16C84, described in this article has an EEPROM memory. You can program it, try its operation, change something and try it again, all within two minutes. It can be reprogrammed thousands of times, therefore is ideal for development. No UV erase light is needed to wipe the memory. In fact a project can be designed developed and put into operation with just one chip costing less than £6.50.

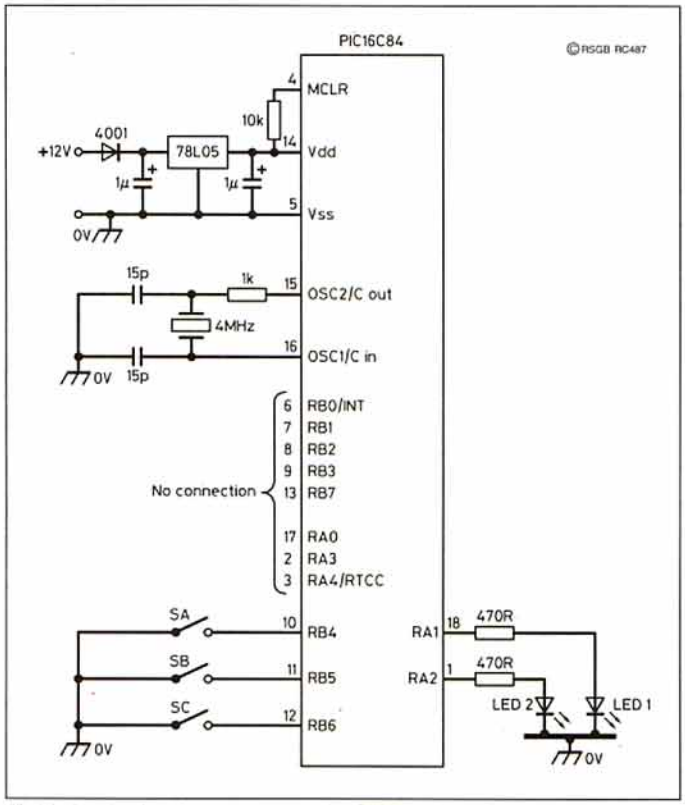


Fig 1: Simple microprocessor control of LEDs using switches.

DESIGNING A PROJECT

THERE ARE FOUR STAGES to go through to make any MPU do what you want it to do.

1. Write the instructions telling it what to do.
2. Load these instructions into the MPU.
3. Put the MPU chip in a circuit.
4. Test its operation.

(Repeat steps 1 to 4 until satisfied with the result)

To take these steps in turn:

Step 1. Writing the instructions is easiest done on a PC computer, using a text editor or word processor. Embedded microcontrollers are small MPUs that can not usually be expanded to bigger memories, their instructions are written in Low level assembler language. High level languages like Basic, Algol and C are generally, not very efficient on these small controllers. If you wish, you can plan the instructions and write then on a writing pad, then type them into the PC later. The PIC 16C84 language is very simple. It is called the 16C84 assembler language and consists of only 35 different instructions. To write a program, you use the instructions in the manual, one after the other, so that the MPU obeys them one at a time. The manuals are included in the Picstart-16B development system and give all necessary details of the hardware and software parameters of all the PIC MPUs.

Step 2. Loading the instructions into the MPU requires a PIC programmer. This is included in the Picstart-16B development system. This will cost about £170, but it may be reused for any number of projects. Maybe your local club would consider purchase so all members could use it. It connects to the PC computer and is supplied with manuals, power supply, connecting leads and software. You plug your PIC 16C84 MPU into the Picstart 16B socket, then use the PC keyboard to tell it to load the MPU with the list of instructions. You will need a PC with a serial port, and preferably a hard disk, ie practically any 286, 386 or 486 PC. The Picstart-16B has no requirement for Windows, additional memory or a colour screen.

Step 3. The PIC 16C84 has 18 pins, of which 13 can be used for input and output purposes. **Fig 1** shows the PIC 16C84 in a typical circuit. It has three switches as inputs, and 2 LEDs as outputs. Very few other components are needed to make it work. Its 13 pins can source or sink up to 20mA each, so it can drive the LEDs directly. Pull-up resistors are not necessary on the inputs as some pins can have these internally. For applications where accurate timing is not necessary a simple capacitor and resistor will operate the on-board oscillator. If your design needs accurate generation of pulses or timing, a ceramic resonator or crystal can be used with the oscillator, as shown in Fig 1. A stable 5 volt supply is required. This is easily supplied by a 7805 regulator. The low power type is ideal as the PIC 16C84 uses less than 2mA, mak-

* 47 Kendalls Close, High Wycombe, Bucks, HP13 7NN.

Label	Instruction		Notes
light1	BTFSS	portB,rb4	;is the rb4/SWA pin high or low
	GOTO	light1on	;it is low, turn the LED 1 on
	BCF	portA,ra1	;it is high, turn the LED 1 off
	GOTO	light2	
light1on	BSF	portA,ra1	;turn the LED 1 on
light2	BTFSS	portB,rb5	;is the rb5/SWB pin high or low
	GOTO	light2on	;it is low, turn the LED 2 on
	BCF	portA,ra2	;it is high, turn the LED 2 off
	GOTO	light1	
light2on	BSF	portA,ra2	;turn the LED 2 on
	GOTO	light1	;go back to the 1st instruction

Table 1: A simple list of instructions to turn LED 1 & 2 on or off in response to switches A & B in Fig 1.

ing it perfect for battery powered equipment.

Step 4. When you decide the need for the device, you need to prepare a well defined list of the things the unit will do (and not do). It sounds obvious, but the testing is to ensure that everything on the list has been achieved, no more and no less. Microprocessors are simple beasts and do exactly what they are told to do. The difference between what was meant to happen and what actually happens is called a software 'bug'. Bugs can be harmless or stop the unit from working completely, therefore testing every function of the unit is very important. Once written and de-bugged, the MPU will continue to obey its instructions perfectly every time.

THE PROGRAM

A SIMPLE LIST of instructions is shown in **Table 1** (a program) to turn LED 1 and 2 on or off in response to switches A and B in Fig 1. When the switches are closed, 0 volts or low on the MPU input pins make the output pins high or +5 volts, and the LEDs are on. The instructions are obeyed one after the other. Some instructions are identified by labels that may give some indication to their purpose and allow a jump or GOTO to that instruction.

Some instructions check the state of something, eg a high or low voltage on an input pin, or the number in a register. Other instructions change things, eg the number in a register, the voltage sent to an output pin, or the next instruction to be obeyed. After each instruction a plain language note has been added after a semicolon, to explain what the instruction is doing. Good programming is normally written in small modules (typically, no more than 100 instructions), and includes many comments. This helps writing, testing and changes which often are required at a later date.

SIMPLE APPLICATION

THIS IS A SIMPLE application and is ideal to start learning about an MPU. Each BTFSS (bit test, skip if set) instruction makes the MPU look at an input pin (from a switch) and either do the next instruction or the next but one (skip one instruction). In this way the MPU can make decisions and can take different actions by skipping the next instruction. In this example the different actions are to turn the corresponding LED on with the BSF (bit set) instruction, or off with the BCF (bit clear) instruction. BSF makes the output pin go high to +5 volts, and BCF makes it go low to 0 volts. When all the instructions are obeyed, the MPU starts to do them all over again by returning to the light1 label. Because the example is using a crystal at 4MHz, each instruction takes 1µS to work. Therefore when a switch is operated, it may be up to 10µS before the BTFSS question is asked and the LED responds. This delay is not normally noticed, so response appears to be instant. This example does not need exact timing so an R-C oscillator could have been used, saving on cost and components.

The example shown in Table 1 uses eleven instructions, the PIC 16C84 has space inside for up to 1024 instructions. In addition there are a further 64 memory locations for data, a counter that can count the internal oscillator signal or the signal coming in on pin 3, and 15 other general purpose registers. The example in Fig 1 uses only two of the general purpose registers portA and portB. These are the actual input and output pins on the chip. Only 11 instructions were used and four different ones from the 35 possible, so there is plenty of opportunity to use this controller chip for quite complex controlling functions.

By changing the instructions as shown in **Table 2**, the LEDs 1 or 2 will latch on whenever switch A or B is closed. They will remain on until switch C is closed, this will switch both LEDs off again. It is very easy therefore, to change the function of a unit by a software change without having to change any hardware.

One important feature of the 16C84 controller is an 'interrupt structure'. This enables the MPU to respond immediately to a change on one or more of its input pins. For example, Table 1 constantly checks the state of the input switches A and B and does little else, so in this case, an interrupt routine would have no advantage. If there were many more instructions it could be some time before the questions were asked about the state of the input pins. This response delay could be unacceptable in some circuits where timing is critical.

In this case, an interrupt routine could be beneficial. An interrupt works by the change on an input pin causing the next instruction that would normally be obeyed, to be stored, and a separate set of instructions (the interrupt instructions) to be obeyed instead. It would be the interrupt instructions that would do whatever was necessary, now that the change is detected. When all the interrupt instructions have been obeyed, the RETFIE instruction recovers the stored instruction, it is obeyed, then the sequence through the instructions continues as before. An example is given in **Table 3**.

Label	Instruction		Notes
light1	BTFSS	portB,rb4	;is the rb4/SWA pin high or low
	BSF	portA,ra1	;it is low, turn the LED 1 on
	BTFSS	portB,rb5	;is the rb5/SWB pin high or low
	BSF	portA,ra2	;it is low, turn the LED 2 on
	BTFSC	portB,rb6	;is the rb6/SWC pin high or low
	GOTO	light1	;its high so no action
	BCF	portA,ra1	;its low, so turn LED 1 & 2 off
	BCF	portA,ra2	
	GOTO	light1	;go back to 1st instruction

Table 2: By changing the instructions, shown in Table 1, the LEDs 1 or 2 will latch on whenever switch A or B is closed.

SOFTWARE SIMULATOR

WHEN YOU WRITE many instructions there are many opportunities for a bug to be included, sometimes many bugs. To assist testing, a 'software simulator' is included in the Picstart-16B development system. This is a PC simulation of the PIC 16C84. By loading the instructions to the simulator program instead of to the Picstart programmer, it is possible to see all the registers and internal operation of the PIC 16C84 and to step through the instructions one at a time. This enables you to see each register and the changes, at each step of the program. The simulator software is included with the Picstart-16B development system.

An embedded microcontroller is a very adaptable controlling device. **Fig 2** shows examples of a 4-digit, 7-segment display connected to the PIC 16C84, a high current 12V

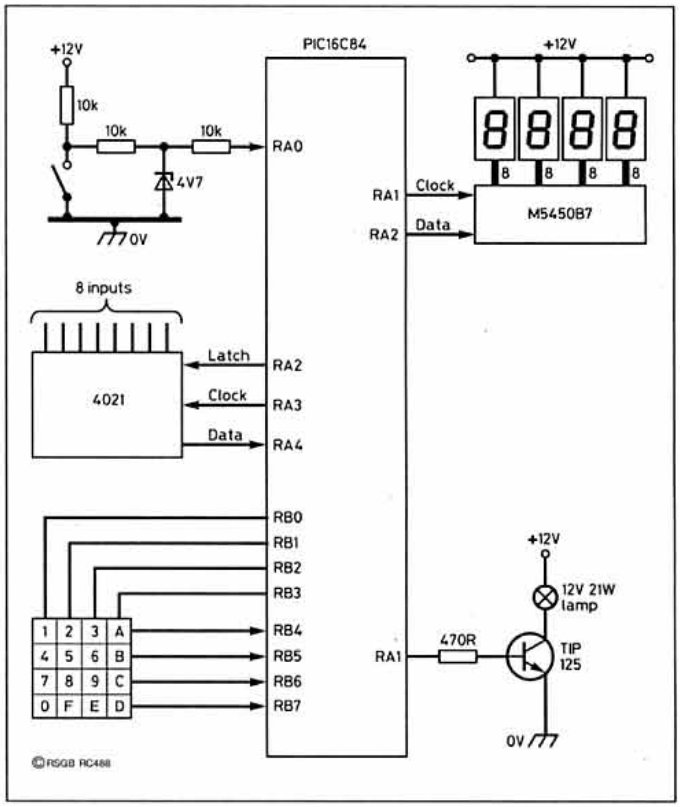
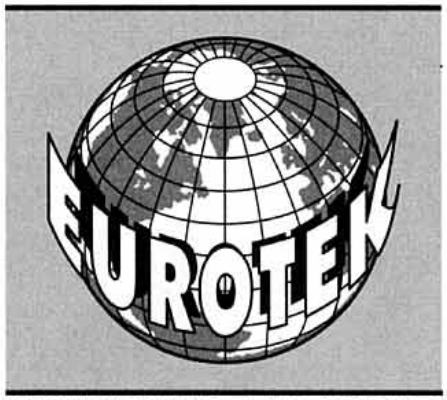


Fig 2: Microprocessor control of a seven segment displays using a keypad.

IDEAS FROM ABROAD



TRANSLATED AND EDITED BY ERWIN DAVID, G4LQI

A full-size **7MHz HB9CV** beam is not beyond the ability of the serious home constructor provided adequate mechanical precautions are observed. **Daniel Caudroy, F6BXC** described how he did it in *Radio-REF* 10/93.

THE ELECTRICAL PROPERTIES of the HB9CV can be found in earlier amateur publications [1]. These also contain mechanical designs for VHF and UHF and, less frequently, for the higher HF bands [2]. The HB9CV is just as useful for 7MHz DX. Home construction was a challenge, which I met as described. [The mechanical design of this antenna is applicable to other full-size two-element close-spaced 7MHz arrays. Available space does not permit reproduction of detail drawings and photographs - *G4LQI*].

SIZE AND WEIGHT

THE ANTENNA FITS in a rectangle of 21.5 x 5.5m. See **Fig 1**. An uncluttered assembly area of that size is required, preferably near the tower. Once aloft, the antenna has a turning radius of 11.5m; make sure it does not infringe on your neighbour's property. [In the UK, the advice of the local planning authority should be sought to avoid a planning application being rejected out of hand - *G4LQI*]

The antenna elements are made of dural tubing; the boom is a galvanized steel tube of 50 x 47mm (OD x ID), as used for central heating installations; if the boom were to be made of aluminium alloy as well, a larger diameter would be required. The assembled weight of the antenna is near 60kg. The maximum wind area is approx $2m^2$.

For a rotary array of this size, commercial hardware sold for beams for 14MHz and above is definitely inadequate. The weights and dimensions given will serve as advance notice of the magnitude of the project. If the following guidelines are adhered to, however, you will not have to worry during every gale. My beam has been up for two and a half years now and has survived winds up to 120km/h.

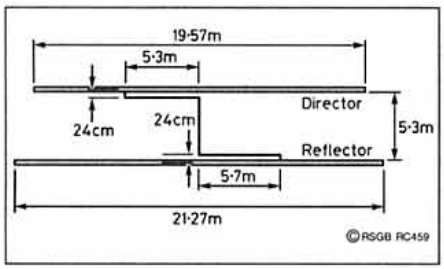


Fig 1: General layout and nominal dimensions of the 7MHz HB9CV. F6BXC got best results with elements of equal length and phasing lines as shown.

THE TOWER

FOR THE DESIRED LOW-ANGLE radiation, the antenna height should be at least a half wave-length, ie 21m. My tower is 16.5m high.

A self-supporting lattice tower should have a bottom section of 70 or 80cm across and be set on a concrete base of $2m^3$ [3].

For a guyed lattice tower, **Fig 2**, a cross section of 35 - 40cm is suitable; it should be solidly anchored to a concrete base 80cm square and 50cm deep. Its guys must take not only the wind load on the tower and antenna, but also the torque exerted by the antenna on the tower through the rotator. I use 8mm steel guys, electrically broken up by egg insulators; the guy anchors are appropriately massive [3]. I must warn against the use of nylon rope for guying. Fibreglass is OK if not stressed beyond 20% of its rated breaking strength.

To reduce the effect of the torque, an anti-twist crossbar is used. It is a 6m long tube, of the same material as the boom of the antenna, which is rigidly bolted to the base plate of the rotator. Guyed to two anchors, **Fig 3**, this crossbar has the effect of increasing the tower cross section at the level of maximum torque. Other, smaller antennas may be mounted on the cross bar.

ROTATOR AND STUBMAST

BECAUSE COMMERCIAL AMATEUR rotators are inadequate, a second-hand industrial motor with a built-on reduction gear was used. 1/3 - 1/2 RPM is about right. If too fast, an additional reduction gear may be used. The output shaft, which is directly coupled to the stub mast, should be at least 30mm dia.

The control box should provide a delay to prevent the motor from reversing direction before the antenna has stopped completely. When the antenna is not used, a servo, coupled to a wind vane, parks the antenna in the position presenting the minimum area to winds over 40km/h.

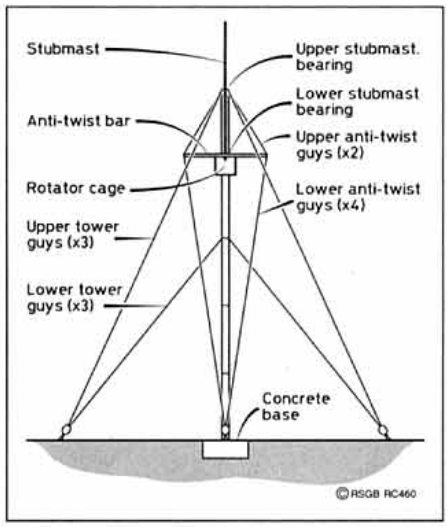


Fig 2: Diagram of the guyed tower, rotator, stub mast, and anti-twist crossbar.

---

lamp driver connection, the connection to a 16-key keypad, a serial shift register to provide eight inputs, but using only three pins on the MPU, and an input from a switched 12V source.

Label	Instruction		Notes
normal	GOTO	normal	;this simulates normal operation ;instructions that are obeyed ;repeatedly.
interrupt	BTFSS	portB,rb4	;is the rb4/SWA pin high or low
	BSF	portA,ra1	;it is low, turn the LED 1 on
	BTFSS	portB,rb5	;is the rb5/SWB pin high or low
	BSF	portA,ra2	;it is low, turn the LED 2 on
	BTFSC	portB,rb6	;is the rb6/SWC pin high or low
	RETFIE		;its high so end the interrupt
	BCF	portA,ra1	;its low so turn LED 1 & 2 off
	BCF	portA,ra2	
	RETFIE		;end the interrupt

Table 3: Program using interrupt instructions.

There have been many cases of badly designed microprocessors radiating noise over bands and disrupting communications. It is worth noting that single chip microcontrollers have all their high frequency switching elements internal. There are no bus and control lines to other chips to radiate noise, therefore they are inherently quiet. The cost of the Pic start-16B is £170 including VAT from Maplins.

COMPONENTS AVAILABLE

IT IS IMPOSSIBLE in a few pages to provide an 'introduction to programming' course, however, I hope that this article has whetted your appetite to experiment. All parts described in this article may be obtained from any Maplin store. The mail order address is Maplins, PO Box 3, Rayleigh, Essex SS6 8LR or telephone 01702 554161. If you wish to try your hand at programming PIC microcontrollers an 'Aid To Easier Programming' disk is available from the author (see below) that includes many maths routines that have been tried and tested. It is much easier to use routines that have been written and debugged than to re-invent the wheel. The disk also includes several useful programming suggestions and has a simple layout format to help your first attempts at programming to be successful.

NOTES

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SOFTWARE AVAILABILITY

FOR THE *Aid To Easier Programming* disk send a cheque for £5 to A A Mockford, 47 Kendalls Close, High Wycombe, Bucks HP13 7NN. ♦

The rotator is installed in a cage between the top section of the tower and the next lower section. The motor/gearbox should not be required to take any force other than the turning moment of the antenna. To that end, the stub mast rotates in two bearings, one at the top of the mast, the other 3m down, where the bottom of the top mast section is joined to the rotator cage.

Because the rotation speed is low, the stubmast does not require ball bearings. Sleeves of steel tubing, 100mm long and with an ID a few millimetres larger than the OD of the stub mast, are welded through the centre of steel plates the size of the cross section of the tower. The steel-on-steel friction in these bearings, with or without grease, is negligible as compared with the torque required to turn the antenna.

The stub mast is a 6m length of 76mm OD galvanized steel pipe. The upper stubmast bearing carries the weight of the antenna and stubmast. Almost half of the latter rises above the tower and doubles as a gin pole to hoist the antenna to its position just above the upper stubmast bearing.

ANTENNA CONSTRUCTION

THE ELEMENTS ARE OF TELESCOPIC construction, each comprising two lengths of dural tubing of 50, 35 and 25mm OD. Two 6m lengths of 50mm OD are butt-joined together by inserting a 1m long 45mm OD steel tube, tightly shimmed at both ends and in its centre under the seam between the two dural tubes. The centre section of this assembly fits into a 1m length of thick-wall U-profile aluminium to which it is attached by M8 stainless steel U-bolts.

2.5m long sections of 35mm tubing are spliced into the ends of the 50mm tubes. The overlap is 20cm and the space between is carefully filled with intermediate diameter tubing. This may even be PVC, as electrical continuity is assured by aluminium straps under the heads of M6 SS bolts through each splice and through the thinner tubing just outside the splice.

End sections of 25mm tubing are similarly spliced into the ends of the 35mm tubes and cut to obtain the desired director or reflector length, though it may be useful to drill several sets of bolt holes (no pun intended) in the thinner tubing to permit later adjustment of the element length. Cap the ends of the elements to prevent them howling in the wind.

Strong as each element is, you can lift its centre way above your head and the ends still will not clear the ground. They would make a sad sight if allowed to droop that much. To alleviate this, a vertical 25mm OD dural tube is fixed 1m above each boom-to-element joint. This serves as an attachment point for guy wires supporting the element at each of its four telescoping splices. These guys are made of 2mm galvanized steel wash line, broken up near each end and near the support pole by egg insulators. The guys are tensioned to give the elements the slight gull-wing shape shown in **Fig 4**.

Fixing the elements to the boom is a critical operation. Rectangular steel flanges are welded to the ends of the boom; the U-profiles holding the element centres are bolted to their respective flanges. The flange faces must be

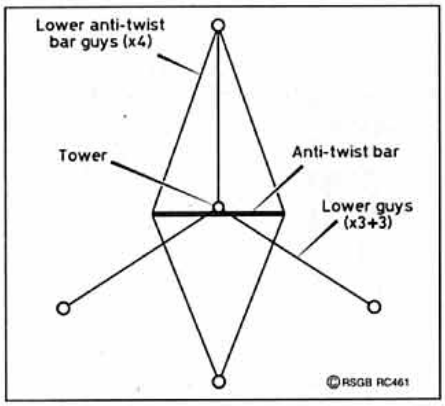

Fig 3: Guying the anti-twist bar.

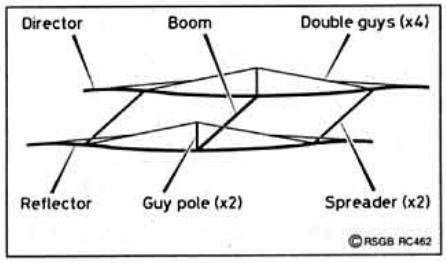

Fig 4: Guys keep the elements from drooping.

in parallel planes and the horizontal centre lines of the bolt holes must be parallel to ensure that that the elements are parallel. I did the welding on the flat concrete floor of my garage. Steel sockets for the guy poles are welded to the flange faces above where the U-profiles are to go. Drain holes are required at the bottom of the sockets. I insulated the guy poles from their sockets with PVC tubing and nylon washers at the bottom to avoid them affecting the resonance frequency.

Spreaders are installed between the director and the reflector near the ends of the 50mm sections. When the elements sway in the wind, the correct spacing between them is maintained. Each spreader consists of a 30mm OD dural tube which is cut and spliced with a fibreglass insulating section near each end. The total length is 5.5m, permitting attachment to the elements by commercial cross brackets (saddle and U-bolts).

PHASING LINES

THE PHASING LINES ARE MADE OF 5mm aluminium wire. They are spaced along the elements by 213mm long stand-off insulators, four to each element. The phasing line section between the elements runs 23mm above the top of the boom. Though the aluminium wire is light, the insulators should be robust as they are not only buffeted by wind and weather but also are vulnerable during the hoisting of the antenna.

ANTENNA TUNING

IT WAS FOUND THAT adjustments made at 3 or 4m above ground were still correct when the antenna was raised to its operating height. To make these adjustments, the boom was cradled in a U-channel clamped to a horizontal tower member. This same fixture was used to rest the antenna on its way up.

After completing the adjustments, all exposed steel should be painted, all electrical joints tightened and weather-proofed [4] with silicone paste and telescopic joints sealed to prevent water getting in.

RAISING THE BEAM

THE ANTENNA CAN be raised to the top of the tower single handed. I managed to do it, although it took two weeks, one or two hours each day after work. With an unguyed tower, it would take less time. Help was required to carry the beam from the assembly area, however. To get the centre of the boom to the foot of the tower, one of the spreaders was temporarily removed.

A rope was attached to the boom at the centre of gravity, pulled through a pulley block [5] at the top of the stub mast and down again to a winch temporarily but solidly bolted to the tower approximately one metre above ground [it might be safer to run the rope through a second block at the base of the tower and install the winch far enough away so no-one is hit by anything falling down instead of going up [6]; even so, this is a hard-hat job! - *G4LQI*].

Winch slowly, always keeping the beam from dangling out of control; its size permits resting it on one guy or another, which tends to steady it. When the boom or a spreader is about to hit a tower guy, stop and secure the boom in the cradle. Install a temporary guy to pass just below the interfering beam member, detach the permanent guy, winch the beam a little higher, cradle it again and replace the permanent guy. And so on.

BOOM TO MAST FIXTURE

TWO STEEL PLATES, 120 x 300 x 8mm are welded into a cross. The boom is attached to it with two 10mm U-bolts, the stubmast with four 12mm U-bolts.

I like the antenna to be insulated from its support. To that end, a 15mm thick plate of nylon separates the cross from the stubmast; nylon bushings and washers insulate the 12mm U-bolts from the cross. [To be prudent, a dozen or so ferrite rings should be slipped over the coax near its antenna connector - *G4LQI*]

REFERENCES

[1] Rudolf A Baumgartner, HB9CV, 17pp in *Radio-REF* 3/81 (in French).
A 2m example is shown in the RSGB. *RadCom Handbook*, 6th ed. p 13-29.
A 3.5MHz wire version is shown in [2] below.

[2] *Antennas and Techniques for Low-Band DXing*, 1994 edition, by John Devoldere, ON4UN, discusses strength-of-materials, calculations to withstand wind and ice loading; with PC programs. Sold by RSGB (see page 90).

[3] 'Wind Loading', D.J.Reynolds, G3ZPF, *RadCom* 4&5/88

[4] 'Waterproofing', J Nelson, GW4FRX, *RadCom* 1/89

[5] 'Keeping the Tower in Trim', R W Addie, G8LT, *RadCom* 5/88

[6] 'Planning your Antenna for Safety', E David, G4LQI, RSGB *HF Antenna Collection*. This book also contains the articles in [3], [4] and [5] above. ♦

Data Stream

RICHARD STERRY G4BLT
1 Wavell Garth, Sandal Magna, Wakefield,
West Yorkshire WF2 6JP

FOLLOWING MY comments on second-hand computers in January, Mike Marsden, G7NDP, asked me to point out that a good place to look for second-hand C64/128 machines and disc drives is the weekly magazine *Micro Mart*. That reminds me to mention that your local free adverts papers, (the variety that is usually yellow or pink in colour), are also very good places to look for second-hand computers.

A lot of owners either find that they have bitten off more than they can chew after buying a sophisticated machine, or else they always have to have the very latest and fastest toy. So, the unwanted machines end up as bargains in the free adverts papers. However, as with rally purchases, it's a case of Caveat Emptor, (let the buyer beware), so do be sure that both the machine and the vendor are 'above board' before parting with your hard-earned cash!

The future of Commodore as a company is very uncertain at the time of writing, and Amiga users are awaiting the outcome rather nervously. It would be a great shame if this family of fine machines was left without support, but perhaps that is an overly pessimistic outlook. I can still remember the original Amiga model being demonstrated on a BBC TV computer literacy series, almost 10 years ago; I was astonished by the superb graphics capability, which was far in advance of any home computer then available.

Amiga users can get together at the London Radio Rally on the 11th and 12th of March, at the Lee Valley Leisure Centre, (see the Rallies and Events page). Both Bob, G0LBQ, and Bob, G3LMH, of AARUG will be there to help with queries, and invite Amiga users to meet them by the RSGB stand at 12 noon on both days. They will be wearing callsign badges, and hope to have copies of the catalogue and info disc available to exchange for blank discs. The same exercise at last year's rally was successful, and the two Bobs hope to meet even more people this year. G0LBQ can be contacted on Packet radio @ GB7SOL, and G3LMH is @ GB7IOW.

Finally, I must correct a statement I made in the January column. I asserted that Windows 3.1 would only run on an IBM compatible with an 80386 or higher Intel processor. In fact, you can run Windows 3.1 on an 80286 machine if it has sufficient RAM and hard disc space, but it is very slow, (as you might expect), and not all of Windows' features are available.

LOST PACKET MAIL

THE PACKET NETWORK is not 100% reliable as we all know, and it is sometimes the case that your personal messages do not arrive at their destination; either that, or mail sent to you never arrives. The usual reaction is to either blame someone else, or the network itself, but in practice the fault frequently lies with the sender! If we were all to take just a little more care (yes, including me) a lot more messages would arrive unscathed.

GET THE CALLSIGN RIGHT

I have noticed that this common mistake takes various forms - transposition of two adjacent letters, eg G4BTL instead of G4BLT; substitution by a character which is adjacent to the correct one on the keyboard, eg G4BKT; use of the wrong prefix number, eg G7BLT; use of an alpha character which resembles the prefix number, nearly always GO (letter 'O') instead of G0 (digit zero), or sometimes Gl (letter 'l' instead of G1 (digit '1').

There are other ways in which callsigns can be incorrect. For example, some new users may attempt to use the 'SSID' in the callsign; eg G4BLT1 if they have seen the callsign G4BLT-1 appearing on their screen. Also, letters or figures can be missed out, eg GBLT or G4BL.

So, I hope I'm getting the message home that it's important to get the callsign right. If you think that you never ever get it wrong, then think again!

GET THE BBS RIGHT

Even if you have typed the callsign correctly, there is still plenty of scope for error in the addressing. If the message is only for another user of your home BBS, then all should be well, but I see plenty of mail that is wrongly addressed. It grieves me to think of all the mail that must hit the 'bit-bucket' because of this; it's such a waste.

All the things that can go wrong with a personal callsign apply equally well to the BBS callsign. I see lots of permutations of GB7 callsigns, especially transposed characters, eg GB7WGR instead of GB7WRG. If the incorrect callsign does not exist, then usually the SysOp will be alerted, and you may receive an error message. However, if the incorrect callsign does exist, you may never know what went wrong! Sometimes uncollected mail is returned after a set time, but this not always the case.

GET THE ADDRESS RIGHT

For mail within the UK, it is usually quite sufficient to use just the BBS callsign when sending a message, for example GB7ZYX as the BBS will insert the full HA (Hierarchical Address). There is no harm in using full HA if you wish, so GB7ZYX.#89.GBR.EU is perfectly acceptable. However, so many users make mistakes when doing this, that they are actually doing more harm than good! So, my advice is not to use the full address within the UK unless you are absolutely certain that you have typed it correctly - one tiny trivial-looking error and your message could be doomed. For instance, the most common mistake I notice is for users to add a full stop at the end of the address, such as GB7ZYX. #12.GBR.EU. for example. This is often caused by punctuation being confused with syntax; ie the final full stop might merely have indicated the end of a sentence; a situation that I try hard to avoid when writing about packet.

I stress that there is never a full stop on the end of a Hierarchical Address, no matter whereabouts in the World it refers to, and no matter what you may see within the message itself, so please don't add them. You may get an error message if you make a mistake, but even if your local BBS accepts the address, your message will very likely get stuck at another BBS en route, and may never reach its intended destination.

The situation is currently slightly confused because some alternative continent identifiers are starting to appear; such as .NOAM for North America, instead of the .NA used previously, and .EURO instead of .EU for Europe. The best advice I can give for the present, until these are fully agreed, is to use the address shown in the headers of the message you are replying to. One that puzzles me is the occasional use (by German stations) of .GER for GERmany, rather than the more common .DEU for DEUtschland; I always use the latter myself.

USING THE SR COMMAND

One way of avoiding problems with incorrectly-typed callsigns and addresses, is to use the SR (Send Reply) command on your local BBS. This will automatically use the origin address of the message you are replying to, and is therefore relatively foolproof. However, even this is not totally reliable, as it may possibly be that the message has been re-addressed at some stage on its journey, so your reply may go to the BBS at which this took place, rather than to the original one. So, it's a good idea to check that the BBS is addressing the message correctly; the F6FBB

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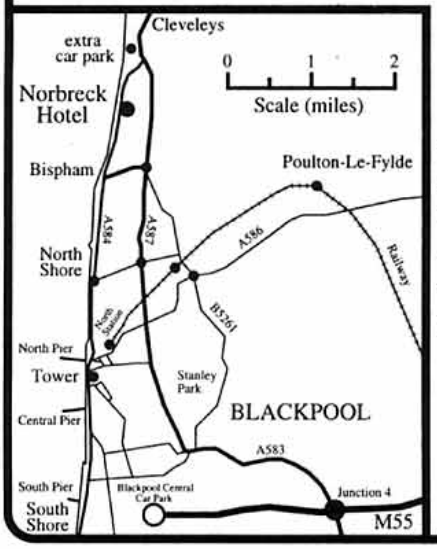

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SKY NEWS

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New Windows Callbook

SkyComm have just released a new windows based callbook programme for the PC. **SkyCall** utilises Structured Query Language (SQL) to enable very comprehensive search facilities. It also includes BBS, 2m & 70cms callsigns, and on line help. The first copies should be ready by the time you read this advert. Price £19.95.

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This month's antennas from Vine

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KT34-A - 4 elements. Gain 7dBd 14-21-28 MHz - SWR 1.5:1 max F/B 20dB. F/S 30 dB, 5kW PEP Boom : 16ft, Elements 24ft avge Wt 45 lbs. Wind area 5 sq ft.

KT34-XA 6 elements. Gain 8-11 dBd 14-21-28 MHz - SWR 1.5:1 max (All of 14, 21, and 28-29. 1 MHz) F/B 20dB F/S 35dB, 5KW PEP Boom: 32ft, Elements 24ft avge Wt 75 lbs, Wind area 9 sq ft.

What one happy user (W51Z) had to say:
"We had tornado winds at over 80 mph. The winds were so strong that the ⅜" wall 2" dia steel mast carrying the KT34XA was permanently bent some 20 degrees. The tower top section, some 5 ft above the top guys, was also bent. On lowering the KT34-XA to replace the mast and tower section, I was happily surprised to find there was NO DAMAGE AT ALL to this fine antenna."

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software will show you the address it is using for your reply, and I imagine other software works in a similar way.

Those of you with the PacComm PMS firmware, (Tiny-2, BSX2 etc.) will find that the SR command still doesn't insert the return address at all!

One further possible snag, is that the sender may not have used his/her usual home BBS for some reason, so your reply may still go to the wrong BBS. It's a good idea to have your name, callsign and full packet address in the signoff text at the end of all your messages, so that even if the header information is misleading there can be no doubt as to where to send replies to. However, make sure that it is correct, as many are not. I see incorrect addresses inside messages very often, usually with that extra full stop on the end!

In fact, some users set up their own address wrong in the configuration of their PMS, (eg TPK, FBB, Kantronics), so you might see a header with G9XYZ @ G9XYZ (incomplete address), or G9XYZ @ GB7ZYX.GBR.EU (no region identifier), or even G9XYZ @ G9XYZ.G9XYZ for example. If in doubt, ask a knowledgeable friend or your local SysOp to verify that your header information is correct. See the section on PMS addresses.

Finally, it's worth occasionally checking for any of your messages that may have remained unread on your local BBS, in case you did make a mistake. You can usually do this with the L< command, eg L< G9XYZ (remember the space). This may also list messages which have recently been forwarded as well as ones which have been read but not killed. Therefore, on FBB BBSs, the command LU (List all Unread) is more useful, and there may be an equivalent on other BBS software.

WHITE PAGE ADDRESSING

If your home BBS is using the appropriate software, it may be able to supply the address automatically if it is known to the system, so that it is possible for example to just type SP G9XYZ and the BBS does the rest. This so-called White Page addressing is not universal, and nor is it entirely infallible, but if it is available to you, and it works, then by all means use it.

The situation can become confused if users send mail from several different BBSs arbitrarily, and it's always wise to make it clear which is your true home BBS for receiving mail. Make sure that all BBSs which you do log onto 'know' your home BBS. On FBB software this is done via the NH command, NH GB7ZYX for example.

"I NEVER HAVE PROBLEMS!"

In many cases a diligent SysOp will have made the necessary correction to the callsign or address, without any fuss, and no-one except he/she is any the wiser. Apart from the extra time it would take the SysOp to inform the sender and recipient that a message has been re-addressed in some way, there is always the problem that no-one enjoys being made to look slightly foolish, human nature being what it is. So, if you take care to address your mail correctly, you will make SysOps' lives a little easier, and perhaps save yourself some embarrassment!

PMS ADDRESS QUERIES

SOME USERS ARE puzzled by the Hierarchical Addresses on mail originating from some PMSs (Personal Mailbox Systems), for example G9XYZ@G9XYZ.GB7ZYX.#89.GBR.EU. The appearance of the personal callsign in the @ field (after the @ symbol) is usually totally superfluous for addressing replies, and so you could safely omit it and just start with the BBS callsign. Technically speaking, the PMS is a subset of GB7ZYX, and so one can argue that the PMS callsign should appear in the address, but since it would normally only have one user (ie G9XYZ), it is in fact not necessary. However, on the current Kantronics KPC-3 and KAM(Plus) firmware, you have no choice in the matter anyway; the callsign is automatically added onto the address which has been set by the HTEXT parameter. Thus the PMS callsign appears in the header information (ie the path) of the message. This is especially noticeable if you use the V command (Verbose read) on the BBS, instead of the more usual R (Read) command. Note that some BBSs and PMSs use the RH (Read with Headers) command rather than V.

However, in some contexts it is essential that the address is in this form; for instance when something other than the personal callsign has to appear in the TO field, but this would not apply to normal personal messages.

DCC PERSONALITIES

IN ORDER TO HELP YOU put a few more faces to callsigns, I include a photograph taken at the December meeting of the DCC (RSGB Data Communications Committee), showing some of the committee members, plus two visitors. Clive Trotman, GW4YKL is of course the 1995 RSGB President, and David McQue, G4NJU is the liaison member from the RMG (Repeater Management Group). The BARTG liaison member, Ian Brothwell, G4EAN, is not visible as he is the one behind the camera!

KANTRONICS PMS HINT

IT ISN'T VERY well documented, but by accident I found a useful extension of the L (List) syntax on the current Kantronics PMS firmware. Normally, the L command does not display the @ field, so it may not be immediately obvious if you have addressed an outgoing message incorrectly. However, if you use the command L; instead (note the semicolon immediately after the L, with no space), then the @ field of each message will also be listed on a separate line. In the case of incoming messages, this extra line usually displays the original MID (Message ID).

CAN I RUN BAYCOM ON . . ?

I OFTEN RECEIVE, or hear of, people asking a question along the lines of: "is there a version of Digicom or Baycom to run on my BBC Micro, (or Amiga, or Atari, etc. etc.), so that I can use a simple modem instead of an expensive TNC?"

The answer is that the Digicom packet software is only for the Commodore C64/128 machines, and Baycom is only for true IBM compatibles, and they do not run on any other type of machine. However, there is a Baycom lookalike called Amicom for the Amiga, and this uses a very slightly modified Baycom modem board. There is also a similar program for the Atari ST/STE etc called Ingocom by DH5MBC, which uses a standard Baycom board. The current version of Baycom is 1.60 (not 1.70!), that of Amicom is 2.1a, and Ingocom is simply v1. Note that the next version of Baycom will be 1.80, to avoid confusion with the bogus 1.70 that has been circulating recently.

There is no theoretical reason why similar software should not be written for a wide range of other machines but, to date, I have not heard of any such versions being available. We live in hope, and of course similar sentiments apply to the excellent JVFAX and HamComm software, and also Embaycom; read on. ♦

G4EAN, BARTG

Luminaries together at a DCC meeting. L-R (rear) John Forward, G3HTA; Paul Overton, G0MHD; Dave Hough, G4WRW (TCP/IP); Dave McQue, G4NJU (RMG); (centre) Bob Evans, G8KHV; Dave Glover, G1VJP; Martin Green, G1DVU; (front) Tom Lilley, G1YAA; Steve Morton, G8SFR; Clive Trotman, GW4JKL (1995 RSGB President).

Microwaves

MIKE DIXON G3PFR
'Woodstock', Gazebank, Norley, Warrington, Cheshire WA6 8LL

IN THE JANUARY COLUMN I reported VK2ALU's record breaking 10GHz EME contact into the USA. This month it gives me great pleasure to report two more new 10GHz records from Australia - a new Australian terrestrial record and a new Australian/World terrestrial record.

Walter (Wal) Howse, VK6KZ, reported (via E-Mail/Internet, under the modest title 'Some news from Down Under') a series of remarkable 10GHz contacts, all of them record-breaking in some way! The note, addressed to G3WDG, began: "I want to thank you again for the work you (and Petra, G4KGC) have done on the 10GHz band in the way of kits and encouragement." It went on to say that Wal and Neil, VK6BHT, had, on 14 December, 1994, extended the VK terrestrial record (from 355km, held by Roger, VK5NY and Bill, VK5ACY since April 1993) to 545km, working /P from Point Moore, near Geraldton (Western Australia) to Busselton (WA). This result was the culmination of a series of gradually extending tests starting at 377km and continuing, successively to 402, 434 and 515km.

The final effort was all over water. Both stations were "amazed at the strength and persistence of the 10GHz signals . . . more reliable than two metres!" Wal ran 100mW to a 400mm dish and Neil 70mW to a 570mm dish, both stations' equipment being G3WDG designs.

It was particularly noteworthy that the two stations' first NB contact was over a 377km path, already in excess of the previous VK record! To quote Wal's note: "The next challenge is to increase this path . . . . I had the World 1296MHz record of 2289km (1980, with Chris, VK5MC) from Cape Leeuwin to near Mount Gambier, until it was overtaken by the Hawaii/ California path. I would love to beat Chip Angle (N6CA) and Paul Lieb (KH6HME) to the 10GHz record! I have visited both of them and the sites they have used for their contacts." The previous 10GHz world record was, incidentally, held by I0SNY/EA9 who, according to ARRL archives, worked a station in Capo San Vito (Sicily) in 1983 at 1000 miles, 1902km using WB FM.

No sooner said than done! On 30 December 1994 at 1232 UTC, a path of 1912km was worked, not much beyond I0SNY's contact but, nevertheless a new record. The stations involved were VK6KZ and Roger, VK5NY, both /P, the former at Torbay, near Albany (OF84TW) and the latter, close to home, near Adelaide (PF94HS). Roger used 180mW to a 400mm dish ('penny' feed based on a design by DB6NT) and Wal, 100mW to a 400mm dish with a dipole/reflector feed. At the time, "signals on 144, 432 and 1296 were quite good over the 1900km+ path. We tried to increase the distance the following night without success, the VHF paths dropping out whilst Roger drove the 250+km path to a new /P location. Obviously we were thrilled to do it and especially ahead of Chip Angle and Paul Lieb on the Hawaii/California path. That's only a matter of time!"

Fig 1 is a map showing some of the paths worked in setting up these new records. Congratulations to all concerned on a magnificent effort.

YET MORE DX!

MY APOLOGIES IF, yet again, this column seems to centre on the 10GHz band - it appears to be the only topical news I get! First, EME news. On 26 November 1994, during an EME contest, G3WDG and G4KGC worked OE9ERC for a 'first G-OE' on 10GHz, and S56UUU, SM7DHN and WA7CJO for repeat contacts. G4KGC also worked F6KSX. Overall, G3WDG worked seven different stations and G4KGC, six. Also heard, but not worked, were K9KFR and WA6EXV.

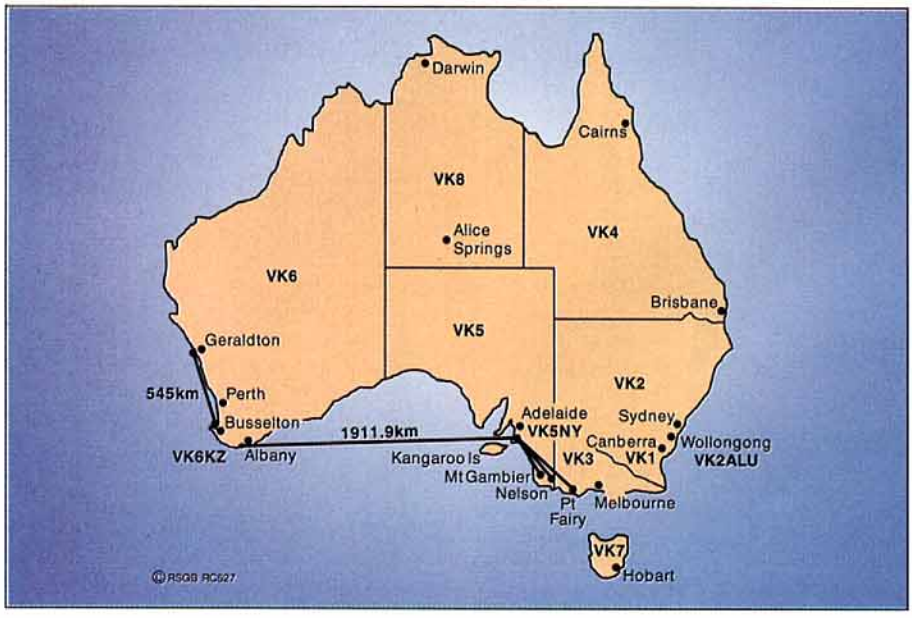


Fig 1: A map of the VK call areas, showing some of the 10GHz paths worked by the operators who recently set new Australian and World records.

More tropo openings in Europe enabled G3WDG and G4KGC to work DB6NT/A (JO50 on 28/11/94 at 872km) and OE5VRL/5 (new country, JN78, at 1135km). Updated 10GHz ladder entries were: G3WDG - 46 Squares/ 14 countries, best DX 1135km and G4KGC - 39 Squares/14 countries, best DX 1135km. It seemed quite a coincidence that the first G-OE 10GHz EME contact was on 26/11 and the first G-OE tropo contact (G3LQR - OE5VRL) was on 28/11!

To immediately contradict my earlier statement, G4KGC on the 1.3GHz band, on the same evening, using a "standard 1W system - no preamp or anything", worked DG9NCX (JN59), DB6NT/A (JO50), DG4YFK (JO31) and OE5VRL/5 (JN78).

Another report, this time from Geoff, G3TQF (Leicester) referred back to the big October opening where he worked SM7UHF (JO65QI, 1000km), DC6UW (JO44VJ, 755km), DC6LN (JO43JB, 675km), DJ8ES (JO43ES, 730km) and OZ6OL (JO65DJ, 935km), all on the 1.3GHz band. Geoff also worked PE1JBK (JO22MD, 427km) on the rarely used 3.4GHz band. An attempted contact with DJ8ES failed despite Wolfe running 7W to a 1.2m dish and having a tremendous signal on 1.3GHz. The Dutch beacon PI7SHF (3400.020MHz) was heard up to S4. Geoff also sent the information that the Leicester beacon GB3LES on 2320.955MHz is very definitely QRV!

Also in the big October opening, a new European 10GHz terrestrial NB record was set at 1218km by a contact between SM6HYG and F6DKW. The UK record is 1177km for a contact between G4BCH and SM6HYG.

THOSE 24GHZ NARROWBAND FREQUENCIES AGAIN!

THE PROS AND CONS of narrowband operation at 24,048 (IARU recommended) and 24,192MHz (as used in Germany and some other European countries) have been widely discussed at several Round Tables, most notably at Martlesham last November. The popular view was for the use of 24,048MHz as this was IARU/CEPT recommended, worldwide Amateur Primary, unattended operation permitted and amenable to the use of slightly retuned 22.5GHz ex-commercial 'white boxes' (with a 1.3GHz IF). 24,192MHz has the disadvantage that unattended operation is not allowed and will not allow such easy use of the 22.5GHz sources, requiring instead specially designed sources and multipliers such as the DB6NT designs. Be prepared to use both frequencies, although a move to the lower frequency may be an inevitable outcome of the various CEPT committees and future WRCs. On balance, the lower frequency appears, longer term, to be the more viable.

CALLSIGN OFFER

THE CALLSIGN G1GHZ is still held by Paul Thompson, G6MEN, and was at one time well known for portable work throughout the UK, particularly using low power WBFM on the 10 and 24GHz bands. Most of the group who used to use the callsign have dispersed to distant parts of the World. Paul himself is "unable to do the callsign justice" and wonders whether there is someone out there who might care to reactivate the callsign. Anyone

0Z9ZI's Portable location. On the left is a parabolic dish with a hanging transceiver. The town of Skagen is in the background. See last month's Lead Feature for 0Z9ZI's exploits.

seriously interested can contact Paul at any reasonable hour on 0(1)743-860161 as he is not QTHR.

UNATTENDED OPERATION

A QUICK REMINDER THAT - following some problems on the lower bands with unattended operation (mainly packet) and unauthorised unattended ATV operation on the 1.3GHz band - all unattended operation (including packet) must now be notified, in advance of such operation, to the manager of your local branch of the RIS. Look carefully at your licence Schedule to find out where, in the microwave bands, you can legitimately operate an unattended station.

Operation of an *attended* personal callsign beacon should also be notified in advance if it is in a part of a band where unattended operation is specifically excluded - for instance 10,368MHz. The other requirement for such a beacon is that you must be able to monitor the band segment in use, especially if it is in the 10GHz band, where there are now restrictions on several segments of the band. Other licence transgressions, such as long transmissions without callsigns are quite often heard on the UHF and lower microwave bands. Please don't let your operating get to the point where yet more strictures have to be introduced into the Schedule.

THE LADDERS

TABLE 1 IS THE ALL Time Squares table (thanks to the *Newsletter* editors), as at 12 January, expanded a little to include countries as well as best DX. It is ranked on Squares worked and best DX as previously, the countries having been added by popular demand. The 1994 Annual ladder is not yet completed and will have to wait until May.

ROUND TABLE EVENT

THE NEXT SOUTHERN Microwave Round Table event will take place on Sunday 15 March at the Rutherford-Appleton Laboratory, Chilton, near Didcot, Oxfordshire, commencing at 10am. For the first time ever, this will be a joint meeting with the British Amateur Television Club (BATC) and the theme of the meeting will be amateur microwave television, no doubt concentrating on 1.3 and 10GHz! Further details from Mike Scott, G3LYP, QTHR (SASE please) or telephone 01494881298 at any reasonable hour. The meeting will include the usual technical talks, bring-and-buy and test equipment for alignment and calibration.

NEW BOOK SPOTLIGHTS CIRCUIT DESIGN

MICROSTRIP CIRCUITS is a book (ISBN 0-471-52850-1) by Fred Gardiol of the Ecole Polytechnique Federal de Lausanne, Switzerland and published as part of the Wiley series 'Microwave and Optical Engineering'. It runs to some 300 pages divided into 14 chapters dealing with the principles and design concepts of PCBs for microwave circuits. It is essentially a 'primer' aimed at students, with 'problems' set at the end of each chapter and answers to these problems at the end of the book. I would have welcomed access to this book a few years ago whilst editing the first two volumes of the *RSGB Microwave Handbook*, because it would have supported my understanding of much of the theory content of these two volumes!

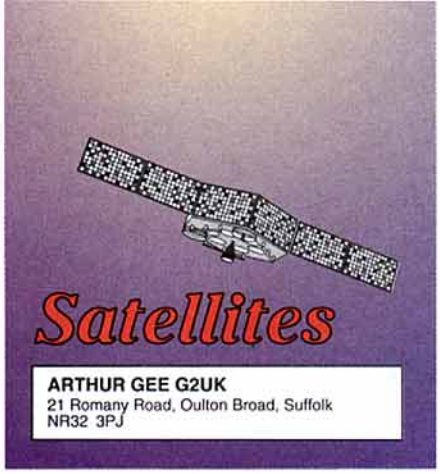
In addition to the printed microstrip circuits themselves (transitions, transmission lines, resonators, couplers, multipoint structures, materials and losses) the book also deals with semiconductor devices and passive SMD components which go to make up a complete circuit. It also reviews commercially available software which the professional designer has at his/her fingertips to make the designer's task easier. There were a couple of points I found slightly confusing. First, reference to microstrip circuits (rather than microstripline) and their discrete components as 'microwave integrated circuits (MICs)'. Most amateurs will be familiar with microwave monolithic integrated circuits (MMICs) as little four-legged semiconductors used as broadband amplifiers, mixers and oscillators! The second, early in the book, was the statement that "tuning and fine adjustments are practically impossible on printed or integrated circuits". Maybe amateurs are the exception to this rule, frequently using empirical 'tweeks' to make just such adjustments. Maybe it was the author's intention to indicate that such operations are not practical for mass-produced microwave circuits, although even here I've seen many a commercial product with such individual adjustments made! All in all, quite a nice, understandable, mainly non-mathematical introduction to microstripline technology and circuits.

Pos	Callsign	Locator	Sq	Countries	Best DX (km)
1	G3WDG	IO92RG	46	14	1135
2	G4KGC	IO92RG	39	14	1135
3	G4FCD	IO91KX	38	13	1062
4	G4BRK	IO91DP	30		1115
5	G4BCH/P	IO90JO	25	7	1177*
6	G8APZ	JO01DO	25		1026
7	G3FYX/P	IO91GI	23		787
8	G3KEU/P	IO91GI	22		787
9	G4DDK	JO02PA	20		684
10	G4LDR	IO91EC	18		1118
11	G3BNL	IO92KA	18		1027
12	G3GNR	IO70WT	18	7	819
13	G3JMY	IO81RM	17		1137
14	G4KNZ	IO91PJ	17	6	1052
15	G4MAP	IO82WJ	16		309
16	G8DKK	IO91VX	15		578
17	G8KQW/P	IO91GA	15		390
18	G3PHO/P	IO93EH	15	4	338
19=	G8LSD/P	IO90TV	15	4	304
19=	G3JMB/P	IO90TV	15	4	304
21	G4PMK	IO93GT	14		958
22	G4RFR/P	IO80UU	14		414
23	G4JNT	IO90IV	14	4	339
24	G3UKV	IO82RR	13	6	494
25	G8AGN/P	IO93EH	12		338
26	GW4MAP/P	IO82JG	11		311
27	G3NWU	IO94JQ	10	3	433
28	G3ZME/P	IO82QL	10		270
29	G0API	IO80XS	9		405
30	G0API/P	IO80UU	8		277
31	G3PHO	IO93GJ	4	3	618
32	G3JMB	IO91WA	4	1	48
33	G3NWU/P	IO94MJ	3		290
*UK Record					
24GHz					
1	G3PHO/P	IO93AD	3	2	126
2	G4KNZ/P	IO83RO	3		120

Table 1: 10/24GHz All Time Squares/Countries/DX.

DUBUS

DUBUS MAGAZINE IS well known to many microwave operators as it is devoted entirely to VHF/UHF and microwave matters. The reason I mention it here is because many new microwave operators may not be aware of it. The UK subscription for 1994 will remain at £12.50 for the four, approximately quarterly issues. Old subscribers should receive a reminder shortly whilst new subscribers should send their names, callsigns, addresses and subscriptions (cheques payable to DUBUS UK) to Dr Roger Blackwell, G4PMK, 57, Station Road, Scholes, Leeds LS15 4BY, as soon as possible. ♦



ARTHUR GEE G2UK
21 Romany Road, Oulton Broad, Suffolk
NR32 3PJ

THE LAUNCH DATE for the satellite Phase 3-D is now scheduled for 16 April 1996. It has been very difficult so far to get any definite information about how its construction has been progressing. But at last some definite facts have been forthcoming, including photographs showing a very good indication of its size. It is a truly magnificent 'bird'! At a Phase 3-D Design Team meeting held in Marburg last October, a series of detailed meetings included a top-to-bottom review of the progress on all the satellite's systems. Since then a number of interesting facts have emerged about the status of its construction. The final conclusion reached was that whilst the schedule timing was tight, Dr Meinzer was able to express his satisfaction with the progress and that the time allotted for the remaining constructional details appeared to be both realistic and achievable.

OSCAR 10

OSCAR 10, THE SECOND spacecraft of the AMSAT Phase 3 satellite programme, was the replacement for the first one, the launch of which unhappily failed six minutes after take-off, crashing into the Atlantic. OSCAR 10 had a successful launch giving a good service for several months. Unfortunately it received large doses of radiation from the Van Allen Belt, which it entered twice daily. This caused deterioration of its computers, affecting its control so that from time to time requests were made for amateurs not to try to use it. However, it is still operational in Mode B - uplink 435.1MHz; downlink 145.9MHz. Good signals are frequently available from the transponder, but few stations are using it. This may be due to the fact that it was given up as a reliable satellite but also because it seems some confusion arose between it and RS10, part of the recently launched Russian satellite COSMOS1861, frequently referred to as RS10/11. Orbital data for RS10 appears regularly in the published orbital data sources, but not for OSCAR 10. RS10 has uplinks on the 21MHz and 145MHz bands and a downlink on the 29MHz band with a beacon on 29.357MHz. The 145MHz/29MHz mode is the most popular, with good signal strength.

DOVE

FURTHER PROGRESS towards getting DOVE into its planned functions has recently been the turning on of its S-band transmitter. Jim White, WD0E of the DOVE command team, said that it would necessitate the adjustment of its two metre power and duty cycle so as to enable the S-band transmitter to be kept ON. This procedure would take some time and the S-band transmitter would need to be OFF at times whilst the satellite budget was adjusted. Normal frequency for the S-band transmitter is 2401.22MHz and reports are welcome.

Valuable data has already been acquired from DOVE's operation. Hardware components never before activated are now in use, along with new software techniques essential to the full exercise of DOVE's capabilities. It is worth noting that some of the hardware used in these S-band tests has been idle for four years or more in space.

AMATEUR SATELLITES - TOO COMPLEX?

KEN WILLIS, G8VR - whose views that amateur satellites are becoming much too complex have been mentioned before in this column - has commented on the specification of the proposed Phase 3-D satellite. He writes:

"This is scheduled for launch in April 1996 provided some half-million dollars can be found to complete its construction and pay for the launch. There are so many different mode capabilities being built into this 'bird' (some five uplinks and four downlinks according to information provided at the 1994 Colloquium) that one wonders just how much time during each orbit any one mode will be available for use."

He illustrates the point by saying that having recently invested quite a lot of money in equipment for the Mode S downlink on OSCAR 13, he finds that currently this mode is open for two-way communication only. The satellite Mean Anomaly falls within such a small range that Mode S two-way communication in a typical orbit is limited to only an hour or so at best, during which time the satellite may not even be above the horizon at his location. He feels that a much better satellite programming system would be one based on longer periods of single (or possibly dual) mode operation with a timetable (eg 'Wednesday is Mode S day') like the one adopted more recently for FO analogue operation. Operators are then in no doubt when their favourite mode is available, and know too that they have enough time to make good use of it. This was one of the attractive features of the old OSCARS 6, 7 and 8, and a feature of the current RS10/11.

SATELLITE NEWS

LAST SEPTEMBER, an Argentine team sailed on an icebreaker with a portable amateur satellite station and two AMSAT volunteers, LU2AOQ and LU9AFP, to demonstrate digital satellite communication with a view to placing permanent amateur satellite stations eventually in **Antarctica**. This demonstration was made all the more relevant because normal HF communication between Antarctic bases and the South American continent are frequently interrupted by ionospheric disturbances during this period of the solar cycle. The icebreaker is using the callsign LY7AA.

SunSat is a South African spacecraft measuring 45 x 45 x 40cm and weighing 50kg. Current plans are for a launch in January 1996 on a Delta mission for the US Air Force into an eccentric polar orbit; 400/800km altitude, period 100 minutes; not sun-synchronous. In addition to the usual VHF/UHF communications at 1200/9600BPS, it will also have mode S-band facilities with a 5W output transmitter and QPSK modulation. The spacecraft will have a conventional power system, reaction wheel attitude control and 64Mb of RAM for its 89188, 80386 computers and T-800 transputer.

Israeli satellite **GURWIN-1** is set for a 25 March launch. Orbital details are not available as yet, but it is supposed to be flying piggyback on a Russian Resurs (remote sensing) flight. These flights used to go to about 82°, 89' period, 230/240km altitude. Communication payloads will be a flying BBS at 9600BPS Pacsat protocol, with a 70cm downlink and six uplinks: three on 2m and three on 23cm. This may become OSCAR 29.

Very strong rumours were around that **RS15** was to be launched on Christmas Day, and believe it or not, this time they were true! Pat Gowen, G3IOR, alerted me on Boxing Day saying he had picked up its beacon at 1800 on 29.352MHz. Up early next morning, I found it at 0830 and spent the rest of the day checking the orbits and the telemetry. By the time you read this much more data will be available, but my early observations gave a period of 2 hours 15 minutes - a really nice long pass-time. So at least we have another satellite which the beginners to the mode will find is exactly what they want! ♦

Construction continues on the Phase 3-D satellite, to be launched in April 96.

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RADIO SOCIETY OF GREAT BRITAIN

Unaudited Income and Expenditure Account
For the 6 months ended 31 December 1994

	6 Months Ended 31/12/94 £	6 Months Ended 31/12/93 £
INCOME		
Subscriptions	644,680	652,821
Newsletters	18,463	22,542
Advertising	123,866	137,200
Book Sales	197,802	180,775
Other Income	28,338	23,705
Total Income	**£ 1,013,149**	**£ 1,017,043**
EXPENDITURE		
Cost of sales		
Cost of printing & distrib (books)	102,281	85,582
Cost of publishing & despatch staff	42,934	34,802
Cost of printing & distrib (newsletters)	21,505	24,899
Sundry	14,934	19,605
	181,654	**164,888**
Headquarters		
Rates, lighting, heating & cleaning	21,546	17,172
Repairs and maintenance	4,661	5,045
	26,207	**22,217**
Administration Costs	**211,963**	**251,061**
Finance	**15,864**	**21,169**
Membership Services		
Radio Communication	243,664	253,185
QSL Bureau	11,990	12,782
Beacons, repeaters, satellites & Int Watch	17,103	7,833
Cost of committees, regnl & Ccl mtgs	41,132	33,101
Novice Licence	2,605	8,214
Other services	62,992	50,644
	379,486	**365,759**
Exceptional expenses	**0**	**7,821**
TOTAL EXPENDITURE	**£ 815,174**	**£ 832,915**
SURPLUS/(DEFICIT) FOR THE HALF YEAR	**£ 197,975**	**£ 184,128**

RADIO SOCIETY OF GREAT BRITAIN

BALANCE SHEET AS AT 31 DECEMBER 1994

	At 31 December 1994 £	At 31 December 1993 £
FIXED ASSETS		
Tangible assets	**669,894**	**644,432**
CURRENT ASSETS		
Stocks, at lower of cost and net realisable value	145,627	130,749
Trade and other debtors	126,164	126,078
Prepayments and accrued income	24,806	46,084
Cash at bank and in hand	324,276	382,362
	620,873	**685,273**
CREDITORS: AMOUNTS FALLING DUE WITHIN ONE YEAR		
Obligations under finance leases	3,637	20,604
Trade creditors	39,479	87,362
Corporation tax	0	1,000
Other taxation and social security	11,296	8,189
Other creditors	0	6,458
Accruals and deferred income	62,818	92,877
	117,230	**216,490**
NET CURRENT ASSETS	**503,643**	**468,783**
	£ 1,173,537	**£ 1,113,215**
ACCUMULATED FUNDS		
Income and expenditure account		
Balance at 31 December	370,641	385,364
Result for period ended 30 June, 1994	(137,653)	(198,851)
Result for period ended 31 December, 1994	197,975	184,128
	430,963	370,641
Revaluation reserve	207,288	207,288
Special reserve	317,946	317,946
General reserve	217,340	217,340
	£ 1,173,537	**£ 1,113,215**

COMMENTARY ON THE HALF-YEAR ACCOUNTS

THE UNAUDITED income and expenditure account shows a surplus of £197,975 compared to £184,128 for the comparable period in 1993/94. Readers should bear in mind that the majority of the Society's subscription income is received in the first half of the year and the surplus is thus not indicative of the likely result for the year as a whole. We anticipate an overall result for the year of roughly break-even. The results for the first half are in line with our internal projections.

Income remains reasonably stable and book sales have benefited from the new *Radio Communication Handbook*. Advertising continues to be affected by the legacy of the recession and we expect this to continue for the foreseeable future. Costs remain under control and broadly in line with the previous year. Cash balances remain at a healthy level - the reduction over the previous year is due to the investment in new Information Technology for Headquarters.

Richard Horton, G4AOJ
Honorary Treasurer.

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CONTEST CLASSIFIED

All rules should be read in conjunction with the General Rules published in *Contest News* January 1993

HF RULES

ISLANDS ON THE AIR CONTEST 1995

1 General: The aim of the contest is to promote contacts between stations in qualifying IOTA island groups and the rest of the world and to encourage expeditions to IOTA islands. UK entrants must be RSGB members, see the general rules for HF contests published in January 1995 *Radio Communication*. Note: mainland G/GM/GW = EU005, mainland GI/EI = EU115.

2 When: 1200UTC Saturday 29 July to 1200UTC Sunday 30 July 1995.

3 Bands and Modes: 3.5, 7, 14, 21 and 28MHz, CW and SSB. IARU bandplans must be observed, and CW contacts must be made only in the recognised CW ends of the bands. Contest preferred segments must also be observed, ie no operation must take place on 3.56 - 3.6MHz, 3.65 - 3.7MHz, 14.06 - 14.125 and 14.3 - 14.35MHz.

4 Categories:

(a) Single operator. CW only, SSB only or mixed-mode. **(b)** Single operator limited. CW only, SSB only or mixed-mode. Operation is limited to 12 hours, and contacts on any *three* bands count for points. Off periods must be clearly marked and must be a minimum of 60 minutes in length. **(c)** Multi operator single transmitter. Mixed mode. Only one transmitted signal. Use of packet cluster or other assistance during the contest places the entrant in the multi operator category.

5 Sections:

(a) IOTA Island Stations. Stations on an island with an IOTA reference, for example AS007, EU005. This section includes the British Isles. Entrants intending to operate from a location whose IOTA status is not clear are advised to confirm validity by reference to the *IOTA Directory* available from RSGB headquarters. Please indicate on the entry whether the station is permanent or a contest DXpedition, ie antennas and equipment installed specifically for the contest.

(b) World (listed by continent). Any station in a location which does not have an IOTA reference.

(c) Short Wave Listener. See rule 10. The format of the listings will depend on the number of entries received.

6 Exchange: Send RS(T) and serial number starting from 001, plus IOTA reference number if applicable. Do not use separate numbering systems for CW and SSB. Stations may be contacted on both CW and SSB on each band. Entrants in section (a) *must* send their IOTA reference as part of each contact.

7 Scoring:

(a) QSO Points. Each contact with an IOTA island counts 15 points. Other contacts count 5 points, except contacts with the entrant's own country or own IOTA reference, which count 2 points.

(b) Multiplier. The multiplier is the total of different IOTA references contacted on each band on CW, plus the total of different IOTA references contacted on each band on SSB.

(c) Total Score. The score is the total of QSO points on all bands added together, multiplied by the total of multipliers.

8 Logs: UK stations must use a Summary Sheet and RSGB-style log sheets. Other entrants may use log sheets in local format, together with a summary and signed declaration that the rules and licence conditions have been complied with. Separate log sheets must be used for each band (but not each mode). Single mode entrants who make contacts on the other mode should submit these separately as checklogs.

Logs must show: Time, Callsign, RST/serial number/IOTA reference sent, RST/serial number/IOTA reference received, multiplier claimed, and QSO points. Entrants are encouraged to submit cross-check ('dupe') sheets and a multiplier list. Logs on computer disk are welcomed, in accordance with RSGB format. Entries must be postmarked 26 August at the latest, and mailed to the following address: RSGB IOTA Contest, c/o S. Knowles G3UFY, 77 Bensham Manor Road, Thornton Heath, Surrey CR7 7AF, England. IOTA stations must state their location, ie island from where they operated, as well as their IOTA reference number. Checklogs from non-entrants are welcome.

9 Penalties: Points may be deducted, or entrants disqualified, for violation of the rules or the spirit of the contest. This includes refusal by IOTA island stations to make contacts with their own country when requested. Use of a third party to make contacts on a list or net is also against the spirit and may lead to disqualification. Duplicate contacts must be marked as such with no points claimed. Unmarked duplicates will be penalised at ten times the claimed points, and excessive duplicates may cause disqualification.

10 SWL Contest: Scoring is as for the transmitting contest. Logs must be separate for each band, and show Time, Callsign of station heard, RST/serial number/IOTA reference sent, callsign of station being worked, multiplier claimed, and QSO points. Under 'callsign of station being worked', there must be at least two other QSOs before a callsign is repeated, or else ten minutes must have elapsed. If both sides of a QSO can be heard, they can be logged separately for points if appropriate.

11 Awards:

(a) The IOTA Trophy (non-returnable) will be presented by the IOTA Committee to the entrant, whether single-operator or a multi-operator group in the IOTA Island Stations Section (DXpedition subsection), with the overall highest checked score, regardless of mode. A trophy will also be awarded to the leading non-DXpedition IOTA entrant, and it is hoped to introduce further trophies as the contest grows.

(b) The DX News Sheet Trophy (retained for one year only) will be presented by the Editor of the *RSGB DX News Sheet* to the British entrant operating from a location in the UK (including GD, GJ and GU) with the highest checked score in the single operator SSB category, (Category A). The winner of the IOTA Trophy will not be eligible for this award.

(c) The David King G3PFS Trophy, In Memory of Geoff Watts, (retained for one year only) will be presented to the British entrant operating from a location in the UK (including GD, GJ and GU) with the highest checked score in the single operator SSB category, (Category B). The winner of the IOTA Trophy will not be eligible for this award.

(d) Certificates will be awarded to leading stations in each category and section, and in each continent, according to entry.

12 Note from the IOTA Director: Amateurs planning to activate an all-time new one for IOTA over the IOTA Contest weekend should, if possible, arrange to commence their operation in the preceding 24 hours to enable the new reference number to be issued before the start of the contest. Once the contest is under way, it will not be possible to issue a new number and, without this, contacts made will not count as island contacts.

NOTE - Contest Logging Program: Paul O'Kane, EI5DI, has generously agreed to supply a copy of the Super Duper logging program for the price of postage (2 IRCs). Self-Addressed Envelope and a blank formatted 3.5in diskette. Contact Paul direct at: 36 Coolkill, Sandyford, Dublin 18, Ireland. Super Duper for IOTA may be downloaded anywhere in the world using CompuServe. It is stored as SDI.ZIP in the software library of the HamNet forum, and may be located using the keyword IOTA.

ARDF

SOUTH MANCHESTER QUAD (TOP BAND)

Date: 4 March 1995

Map: 109 (Manchester)

Assembly: 1900 for start at 1920

Location: Sale Moor Community Centre, Norris Road, Sale, Cheshire, NGR 798 909.

Competitors requiring supper should notify Dave Holland, 32 Woodville Drive, Sale, Cheshire M33 6NF, tel: 0161 973 1837 no later than 27 February.

GT PECK MEMORIAL TROPHY (TOP BAND)

Date: 19 March 1995

Map: 175 (Reading and Windsor)

Assembly: 1300 for start at 1320

Location: Maidenhead Thicket, NGR 855 816.

Competitors requiring tea should notify Bob Gray, tel: 01494 881289 no later than 12 March.

FOREST OF DEAN VHF FOXHUNT

Once again, the Forest of Dean Direction Finding weekend took place in July. This event is steadily growing and now includes two 'walking' only VHF portable hunts on the Saturday evening and a 'test session' for 80 metres direction finding on Sunday afternoon. These were in addition to the two double foxhunts held during Saturday and a double foxhunt on Sunday morning.

The two double hunts on Saturday were set by Phil, GW7MMG, and Mike, GW7ODP. As the team positions indicate, most hunters experienced unexpected problems at some time during the day even though all the foxes were 'technically' similar.

Next year's event is already being organised and should offer even more variety for both experienced and beginner hunters. Anyone interested in attending or simply getting started in VHF direction finding can contact Phil Smith, GW1XBG on 01792 642001.

Team member(s)	Morning event	Afternoon event
GW1XBG, GW6KQC	1st	8th
GW1DTA, GW7KBP	8th	1st
G0JSB, G6SNO, 2E1CEL	2nd	9th
GW7IBT	3rd	-
G6NOI	4th	6th
G8UKT	5th	5th
GW7KKP	6th	3rd
G3ZVW, Mark	8th	4th
GW7MMH, GW7PEJ	7th	10th
G8PWE, G6HZI	10th	11th
G3UUT and Family	11th	7th
G8ZHA, Carl	-	2nd

VHF RESULTS

50MHZ TROPHY JUNE 1994

With three different 50MHz contests on this date (and HF NFD) most contestants had some comment about the timing of this event! Most groups reported flat band conditions with only the occasional period of enhanced propagation.

Several stations lost points as a result of not supplying a multiplier check list in accordance with the General Rules. Also several logs had to be completely re-scored as some stations had used the 1993 rules! Please ensure that you read the correct set of rules before you submit your entry.

Congratulations to 'The Northern Lights'(G4UJS/P) for winning the Open section and the Telford Trophy for the highest scoring entry and to GW4BVY/P for winning the Single Operator section and the Six Metre Cup.

Ian Pawson, G0FCT

MULTI OPERATOR

Pos	Callsign	LOC	QSO	Multi	Points	Best DX	Km
1	G4UJS/P	94RJ	194	28	52696	YU1NW	1897
2	G6YIN/P	92JR	190	23	47196	YU1EW	1785
3	GD4IOM	74QD	185	18	29720	DK2EA	1049
4	G4DSP/P	03AE	163	23	26450	PE1ALV	450
5	G1FYC/P	81XW	141	16	10642	SM3EQY	1531
6	G6BRA/P	91PK	129	18	10530	OH1LEU	1748
7	G1WAC	92BJ	90	16	8448	YU1NW	1897
8	G6AQP/P	91XG	101	16	6704	F1AKE	468
9	G1OGY/P	01IT	79	16	5776	GD4IOM	441
10	G5RS/P	91TF	103	12	4092	GW4BVY/P	430
11	G0GZI/P	83PF	54	12	2592	G1OGY	280
12	G3JRM/P	02UM	25	9	1503	GD4IOM	458

SINGLE OPERATOR

Pos	Callsign	LOC	QSO	Multi	Points	Best DX	Km
1	GW4BVY/P	81NV	174	21	23940	YU1EU	1866
2	G8APB	83WD	151	17	12019	GM0NAI/P	352
3	G0AEV	81WL	82	17	8160	YU1EU	1831
4	G4DEZ	01IN	63	15	5265	SP5CHY	1355
5	G0NYL	93QN	59	12	3312	G0SUK/P	343
6	G0SOO	91QG	51	11	1947	GD4IOM	418
7	G7GAB	92IJ	41	11	1475	GD4IOM	294
8	G8ZRE	83NE	27	11	1551	G0RDI/P	323
9	G1NRM	91UO	34	10	1134	GD7IOM	405
10	2E1AFN/P	81WS	33	7	917	G4UJS/P	307
11	G0LJD/P	01HH	14	7	560	G4HBA/P	295

Many thanks for check logs from: G3FYP/P, G3RQZ and PE1EWR.

432MHZ FM JUNE 1994

This is one of the events we take a look at each year when we set the contest calendar and wonder whether it should continue. Fortunately the number of entries rises ever so slightly every time and especially with added interest from the Novices this contest must remain. For next year though the VHFCC will introduce a multiplier rule and hopefully this will add to the popularity of the event. Congratulations once again to GW4MGR/P and to G1WAC, certificates to them and the runners-up. Please try to support this event next year when we hope that conditions will be a little better. A final word to Phil, G0JSB, from the Wirral Club - No I can't print your comments about the lousy conditions!

G4XUM

SINGLE-OP FIXED

Pos	Call	Loc	Score	QSO	Pol	DX(km)
1	G1WAC	92BJ	44	14	H	196
2	G3FIJ	01KV	38	6	H	297
3	2E1BEP	83PM	30	24	V	192
4	2E1CXH	92JW	25	17	V	190
5	G0HIK	84JC	12	4	H	120

OTHERS

1	GW4MGR/P	83JA	270	70	H&V	335
2	G0RSB/P	92BN	173	55	H	366
3	GW1ATZ/P	82KX	170	44	H	302
4	G3IZD/P	84KD	78	20	H	371
5	G6SRC/P	01JG	73	15	H&V	335
6	2E1DBI/P	91SU	30	10	V	216

MAY 144MHZ OPEN AND SWL

A good entry this year with some very good DX being worked. There was no SWL activity at all; do we need to keep this section? It is up to you. Congratulations to the Section winners and runners-up. Certificates to those marked.

There were a great deal of silly errors. I pass them on to you for your education; the perpetrators and I are the only ones that know who they are! No part of Eire is in IO93. One group claimed no points on logs, another group did not claim multipliers. A well known group left out many counties on the log, so lost loads of points. Another group sent the entry in very late, this lost 10%. JO14 cannot be in Essex and no part of Essex is in JO00. Brechin, Rosshire and Galway are not Scottish Regions.

A few final words. Would *all* contestants remember to give county information to our foreign friends, they need the details for when they enter our contests. It doesn't take long.

G4DEZ

OPEN SECTION

Pos	Call	Pts	QSO	Mlt	Loc	Pwr	Ant	Best DX	Km
1*	G4APA/P	1119383	705	101	94RJ	400	182E	DF6NA	880
2*	GM4ZAP/P	911859	614	103	74NQ	400	8X17 6X9+HB9CV	DL4KAE	941
3	GW0RDI/P	618210	625	90	82JJ	400	3X17	DL9YEY	803
4	G4DSP/P	517536	515	72	03CE	400	80CO+16	DK2GR	855
5	G8TIC/P	397609	456	76	02PV	400	4X17+14	DK2GR	775
6	G0MSA/P	263947	385	61	00EW	300	2X9	DL8CMM	811
7	G3PIA/P	182012	417	57	91FN	400	17	DK2BR	746
8	G6CTU/P	172018	324	77	91XG	400	2X17	GM3WOJ	768
9	G4CRA/P	164177	285	73	81WR	200	2X14	DL0WAE	726
10	G0SEA/P	109286	235	53	92PN	80	2X9	DL4VAI	660
11	G7FDC	104112	170	54	80FI	400	2X12	DL4VAI	783
12	GM0UEP/P	103884	136	66	86RW	180	17	ON4GG	814
13	G0TUQ/P	100480	258	32	02OC	250	17	DK2GR	736
14	G4IRC/P	87720	214	40	02OD	200	17	DK2GR	749
15	G4JBH	26955	81	45	80QW	300	17	PE1OGF	560
16	G4RVR/P	17160	273	65	93GH	130	2X12	DL4VAI	746
17	GI7JYK/P	1703	140	0	74BS	180	13	G1UZD	603

FIXED STATION SINGLE OPERATOR

1*	G4PIQ	653140	592	85	01MU	400	4X15+2X9	DK0OG	950
2*	G6ZWP	23092	77	46	82SQ	80	17	GM4YXI	518
3*	G1TWS	16872	86	38	01HO	25	10	GI7JYK/P	540
4	G3RHH	15408	76	36	82UB	200	9	DL0WAE	734
5	G3JRM	13110	58	19	02UC	80	17	DK2GR	729
6	G4ZTR	5478	37	22	01KW	20	4	GM4ZAP/P	489
7	G3FPK	5238	30	27	91WH	100	16	GM4ZAP/P	492

SINGLE OPERATOR PORTABLE

1*	G8FBG/P	342432	407	82	91SF	400	4X16	DJ9MT	804
2*	G8DWD/P	176817	248	51	02QV	200	13	DG0OFH/P	742
3	GM0UVJ/P	58812	90	52	74TQ	80	13	PA0GHB	
4	G1GCT/P	30958	119	23	01GR	200	2X14	DK2GR	771
5*	GJ4ZUK/P	12731	33	29	89WG	7	8	GM4ZAP/P	630
6	G6SRC/P	6896	50	16	01II	25	13	DJ2JA	568
7	G4RYV/P	5886	38	27	91OH	10	9	GM0UVJ/P	477

FOREIGN SECTION

1*	PA0GHB	89748	132	54	11WH	350	15	GM4ILS	811
2*	PE1EWR	13300	44	28	11SL	30	10	GM4ZAP/P	
3	LA1EKO	1152	9	11	16OM			G4SWX	

SUB SECTION 6 HOUR FIXED STATION

1*	G4WFR	222976	295	59	01OV	400	8X9	DK0OG	889
2*	G0GXT	91012	186	61	81RU	400	2X17	GM3WOJ	665
3	G6HKM	76100	158	50	01FT	160	15	DG9NEO	706
4	GW8OQV	71424	182	48	81QR	400	17	DF2VJ	729
5	G8LHT	22550	84	41	93JM	100	17	F6CBH	521
6	G8ZRE	22145	81	43	83NE	100	8XY	GJ4ZUK/P	438
7	G4DEZ	20300	90	35	01IN	400	17	DK0FLT	675
8	G0ODQ	16318	66	41	91NQ	150	9	GM0UEP/P	594
9	G4TVR	15656	84	38	92BJ	150	15	ON1ALJ	426
10	G0JDL	10395	45	27	02UK	100	9	GM4ZAP/P	501
11*	G4ZDA	8910	47	30	01IN	25	17	GM0UEP/P	633
12	G3FDW	6375	27	25	84ME	25	7L	PA0GHB	560
13	G7AZP	5625	39	25	90AS	25	9	GM4ZAP/P	477
14	G0TCD	5220	46	29	91SS	15	9	GM4ZAP/P	437
15	G4XPE	3680	28	23	92GU	10	10	PA0GHB	403
16	G7JHZ	2840	26	20	91UM	45	9	GM4ZAP/P	467
17	G7JCW	1504	22	16	93IL	100	8	G0SUK/P	320
18	G5UM	616	12	11	92MP	12	8	GM4ZAP/P	370
19	G7MHZ	486	10	9	01II	25	13	G4APA/P	349

HF CONTESTS CALENDAR

4/5 Mar	*ARRL DX SSB (Feb 95, p21)*
11/12 Mar	Commonwealth (Nov 94)
18/19 Mar	*Bermuda*
25/26 Mar	*WPX SSB*
1/2 Apr	*EA RTTY* (Mar 95, p21)
1/2 Apr	*SP-DX* (Mar 95, p21)
2 Apr	ROPOCO-1
4 Apr	QRS Cumulative (Feb 95)
12 Apr	QRS Cumulative
15/16 Apr	*Holyland* (Feb 95, p21)
20 Apr	QRS Cumulative
23 Apr	Low Power Fixed
22/23 Apr	*Helvetia* (Mixed Mode)
28 Apr	QRS Cumulative
1 May	QRS Cumulative
6/7 May	*ARI DX (Mixed Mode)*
13/14 May	*CQ-M (RSF[Russia] Mixed Mode)*
26/27 May	*CQ-WPX (CW)*
3/4 Jun	National Field Day
17/18 Jun	*All Asia (CW)*
24/25 Jun	Summer 1.8MHz CW

VHF CONTESTS CALENDAR

4/5 Mar	144 / 432MHz (Feb 95)
12 Mar	70MHz Cumulatives (Jan95)
26 Mar	70MHz Fixed / SWL (Feb 95)
9 Apr	1st 23cm & 13cm Fixed / SWL (Feb 95)
12 Apr	144MHz SSB Cumulatives (Feb 95)
20 Apr	144MHz SSB Cumulatives
6/7 May	432MHz to 24 GHz and 70cm Trophy (Mar 95)
20/21 May	144MHz and SWL, Single / All Others (Mar 95)
21 May	1st Back Packers 144MHz (Mar 95)
3 Jun	50MHz Trophy (Mar 95)
3/4 Jun	IARU 50MHz
4 Jun	1st 50MHz Backpackers (Mar 95)
18 Jun	70MHz CW (Mar 95)

IARU REGION 1 CONTESTS 1993

The results of the 1993 Region 1 VHF / UHF / Microwave contests (September and October 1993) have been released. The first three stations in each section have been listed along with the position of every UK entrant listed in the results.

Congratulations to GU4APA/P for first place on 144MHz, G3XDY for first place on 23cm (single operator) and to G4JAR/P for Overall first place in the Multi-operator section and for first place on 13cm.

G0FCT

144MHZ SINGLE OP (SEPT 1993)

Pos	Callsign	LOC	QSO	Points
1	F6HPP/P	JN19PG	917	358308
2	TM7C/P	IN99JP	769	304232
3	EA2LU/P	IN93IA	389	279130
4	G4PIQ	JO01MU	761	251872
5	GM4ZUK/P	IO86RW	418	204744
24	G6HKM	JO01FT	363	89616
75	G8ZQB/P	IO92ML	211	41661
77	G0MYE	IO91PV	152	41133
123	G8ZRE	IO83NE	125	29626
125	GM4JJJ	IO86GB	61	28720
286	G6HXU	IO83RF	47	12804
381	G8CDW	JO02IP	38	8087

144MHZ MULTI-OP (SEPT 1993)

1	GU4APA/P	IN89VR	1013	410582
2	F8KLW/P	JO00TN	1118	398130
3	F1AHO/P	JN37NV	949	336263
7	G4VIX/P	IN82PF	602	294095
30	G5RS/P	JO00EW	683	172292
52	GI8TSI/P	IO74AP	325	138437
55	G7PBI	JO02PD	396	132523
71	GI1CET/P	IO74CO	320	115798
72	G6WVG/P	IO84VB	377	115506
76	GM0OCG/P	IO86EE	274	112717
97	G6BRA/P	IO91PK	386	96660
106	G2XV/P	JO02EC	339	91707
110	G6CTU/P	IO91XG	369	90222
195	G8NJA/P	IO980FP	172	57500

432MHZ SINGLE OP (OCT 1993)

1	DG3FK	JN59OP	395	113916
2	F6HPP/P	JN19PG	236	87784
3	DL4MEA	JN58JD	194	61820
226	G8JXV	IO91VE	26	2899
234	G0MYE	IO91PV	28	2690
243	G0MLY	IO92AP	16	2218
245	G4DDK	JO02PA	8	2156
254	G8ZQB	IO92JN	7	1814
261	G6SPS	JO01IS	11	1583

432MHZ MULTI-OP (OCT 1993)

1	DK8VR/P	JN39NR	521	148777
2	PA3BPC/P	JO21BX	359	120325
3	G4JAR/P	JO01PU	313	116469
8	G8XVJ/P	IO93AD	188	68491

1296MHZ SINGLE OP (OCT 1993)

1	G3XDY	JO02OB	63	15439
2	DL6NAQ/P	JO40XI	101	15402
3	PA0EZ	JO22OF	77	14986
55	G4XUM	IO83SB	19	2929
79	G4EQD	IO93QN	16	2073
84	G4DDK	JO02PA	12	1902
93	G4DEZ	JO01IN	15	1778
126	G6SPS	JO01IS	13	766
130	G8ZQB	IO92JN	4	694
139	G4LRT	IO92LJ	7	467

1296MHZ MULTI-OP (OCT 1993)

1	DF0HS/P	JO31AA	138	25959
2	G4JAR/P	JO01PU	92	22357
3	OE5VRL/5	JN78DK	69	19251
12	G6PHJ/P	IO93AD	73	15128
20	G4IEV/P	JO01KJ	46	9629
44	G4DSP/P	IO92TR	24	4280
49	G3OHM/P	IO92GB	25	3468
54	G4YPC/P	JO00EW	16	2786

2320MHZ SINGLE OP (OCT 1993)

1	DK1VC	JO31RG	40	4513
2	PA0EZ	JO22OF	29	4466
3	DL1BKK	JO43NA	20	3388
36	G4EQD	IO93QN	4	597
51	G8ZQB	IO92JN	3	327
53	G4LRT	IO92LJ	3	207
57	G6SPS	JO01IS	2	84
60	G4DDK	JO02PA	1	18

2320MHZ MULTI-OP (OCT 1993)

1	G4JAR/P	JO01PU	27	5688
2	PI4GN	JO33KK	28	4656
3	DF0RB	JO51GO	24	4254
12	G3CKR/P	IO93AD	11	2284
18	G4DSF/P	JO01KJ	8	1471
24	G8ACR/P	IO92GB	8	973
26	G4DSP/P	IO92TR	5	520

3400MHZ SINGLE OP (OCT 1993)

Pos	Callsign	LOC	QSO	Points
1	PA0EZ	JO22OF	11	1304
2	DK2DB	JN48FW	7	1010
3	DL1BKK	JO43NA	4	820
12	G4EQD	IO93QN	1	99
15	G4LRT	IO92LJ	1	29

3400MHZ MULTI-OP (OCT 1993)

1	DF0SSB/P	JO40FF	11	1354
2	G4JAR/P	JO01PU	7	1202
3	DK0NA	JO50TI	6	1070
5	G0CDA/P	IO93AD	3	486
8	G8WDT/P	IO92GB	2	322

5760MHZ SINGLE OP (OCT 1993)

1	PA0EZ	JO22OF	9	1199
2	DC5GF/P	JN48CO	8	984
3	I1DDS/1	JN34NO	5	911

5760MHZ MULTI-OP (OCT 1993)

1	OK1KIR/P	JO60LJ	8	1076
2	DK0NA	JO50TI	7	807
3	PE0MAR/P	JO21BX	8	759
4	G4JAR/P	JO01PU	4	737

10368MHZ SINGLE OP (OCT 1993)

1	PA0EZ	JO22OF	26	4755
2	IK1LUT/1	JN35TL	21	4377
3	I4BER/6	JN63GN	19	3991
43	G4DDK	JO02PA	3	219
44	G4EQD	IO93QN	1	179

10368MHZ MULTI-OP (OCT 993)

1	DF0OG	JO41PU	28	6258
2	DJ7FJ/P	JN48CO	33	6108
3	IW4BTJ/4	JN54OK	29	5459
4	G4JAR/P	JO01PU	22	4934

MILLIMETRE GROUP SINGLE OP (OCT 93)

1	DL3NQ	JN49IN	2	171
2	DF9IC/P	JN49AG	2	133
3	DJ1KP	JO40JJ	3	111
15	G8KMH/P	IO91MI	1	1
16	G4KNZ/P	IO91MI	1	1

MILLIMETRE GROUP MULTI-OP (OCT 93)

1	DJ7FJ/P	JN48CO	3	370
2	DF0SSB/P	JO40FF	2	233
3	HB9MIN/P	JN37OE	2	106
6	G4JAR/P	JO01PU	1	7

OVERALL PLACINGS, SINGLE OP

1	PA0EZ	482820
2	DJ1KP	259614
3	DK2DB	250949
22	G3XDY	108073
102	G4EQD	33732
108	G3MEH	31696
146	G4DDK	21176
150	G4XUM	20503
183	G8ZQB	14847
204	G4DEZ	12446
244	G6SPS	9010
251	G4LRT	8444
327	G8JXV	2899
334	G0MYE	2690
345	G0MLY	2218
382	G4KNZ/P	666
383	G8KMH/P	666

OVERALL PLACINGS, MULTI-OP

1	G4JAR/P	618621
2	OK1KIR/P	464547
3	PE0MAR/P	370158
36	G6PHJ/P	90768
50	G8XVJ/P	68491
58	G3CKR/P	59384
63	G4IEV/P	57774
83	G4DSP/P	39200
85	G4DSF/P	38246
105	G8ACR/P	25298
120	G3OHM/P	20808
127	G4YPC/P	16716

VHF RULES

432MHZ TO 24GHZ AND 70CM TROPHY

Date: 6/7 May.

Times: 432MHz to 24GHz: 1400 - 1400UTC; 70cm Trophy: 1400 - 2200UTC

Rules: General rules apply.

Sections: 24 hour, S single op stations (same call each band), M multi op, L listeners, O all others. The 70 cm Trophy will run for the first eight hours. Stations can enter both the Trophy and the 24h event but please send a separate copy of 427 for each entry.

Scoring: Radial ring 432 and 1296, 1pt per kilometre all other bands.

Adjudicator: R J Gardner, 35 Hamsterley Park, Southfields, Northampton NN3 5DA.

144MHZ AND SWL, SINGLE / ALL OTHERS

When: 20/21 May, 1400 - 1400UTC

Rules: General rules apply. Rule 14a applies. County and country multipliers

Sections: F single operator fixed, S single operator portable, O others, L listener.

Subsection: SS single operator fixed, operation for any contiguous 6 hour period, (no breaks, continuous 6 hours) starting at any complete hour, eg 1400 - 2000 or 0000 to 0600 not 0823 to 1423. Only one such entry per station. Entry to both the full 24h and 6 hour sections is not allowed, choose one or the other, *not* both.

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

1ST BACK PACKERS 144MHZ

When: 21 May, 1100 - 1500UTC.

Rules: See separate rules to be published later.

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

50MHZ TROPHY

When: 3 June, 1400 - 2200UTC

Rules: General rules apply. Rule 14a applies.

IARU only, the first 4 characters of the locator need be exchanged ie IO91 JO01, however scoring is made a little difficult in that you can only claim to the nearest point of the distant locator - it's up to you to work out what that is. Don't blame the VHFCC - they are not our rules! Separate cover sheets and logs for the IARU event.

Sections: M multi-op fixed or portable, S single op fixed or portable, L listeners.

Trophies: The Telford Trophy will be awarded to the highest scoring entrant. The SMC 6m Cup will be awarded to the highest placed single operator station.

Adjudicator: G0FCT, 1 Pawson, 3 Orion, Bracknell, Berks RG12 7YX.

1ST 50MHZ BACKPACKERS

When: 3 June, 1300 - 1700UTC.

Rules: As per 2m Backpackers, Rule 14a.

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

70MHZ CW

When: 18 June, 0800 - 1100UTC

Rules: General rules apply. Full QTH and QRA required to be exchanged. Rule 24.

Scoring: Radial ring.

Sections: S single operator fixed. O all others, L listeners.

Adjudicator: R J Gardner, 35 Hamsterley Park, Southfields, Northampton NN3 5DA.

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Advertising Agency Opportunity

By mid 1996, the Society anticipates that our advertisement agent Victor Brand G3JNB will wish to retire, thus providing an opportunity for another independent professional to be awarded the contract.

Before approaching the advertising industry to locate such a supplier, it is sensible to enquire of our Membership if there are any suitably qualified and experienced advertising executives among us who would be interested in undertaking this role?

Clearly the executive, practical, and daily responsibilities of this post require that applicants should be widely experienced in press advertising activities at all levels. It is not a post that will permit learning on the job! Obviously, it would be advantageous to hold an amateur licence or to have a practical knowledge of electronic terminology.

Whilst our Advertisement Agent acts independently on all routine matters, it must be understood that the appointment will specify that the contract will be as an agent and not as a principal-at-law. Thus, the Society retains all responsibilities and rights.

We are accustomed to our Agent providing a total service with respect to advertisements in RSGB publications. Duties include:

1. The marketing of the media to advertisers and agencies, requiring proven sales and negotiating skills.
2. Assessment of an advertiser's business proposition and capability of writing copy and preparing typographical layouts in a variety of styles, either traditionally for trade composition or with own DTP system.
3. Preparation of advertising make-up, proofing, management of classifieds and liaison with editorial at HQ and with trade suppliers.
4. Capable of innovation and effective use of variety of mechanical production methods.
5. Administration of orders and charging processes and debt collection via HQ.
6. Provision of professional advice to the Society and an impartial complaints service to members and advertisers.

The successful applicant will be paid on a commission only basis and following a sympathetic trial period, may expect to be awarded a renewable and exclusive contract.

It is expected that applications may be received from both established practitioners and also from independents who may see this as an opportunity to start a business to service the contract.

Initial enquiries should be made in writing only and must outline the professional capabilities and relevant experience of the applicant. Total confidentiality will be observed and every opportunity for a full and frank examination of the proposition will be given to the selected applicants.

Marking your letter 'CONFIDENTIAL' please write to:

The General Manager
Radio Society of Gt. Britain
Lambda House, Cranborne Road,
Potters Bar, Herts EN6 3JE

Members' Advertisements

RSGB Members wishing to place an advertisement in this section must use the official form incorporated on the label carrier of Radio Communication. This will prove membership and must be for the current month. No acknowledgment will be sent. Ads not clearly worded, or which do not comply with these conditions will be returned. If an ad is cancelled no refund will be due. An advertisement longer than 60 words will be charged pro rata. Trade or business ads, even from members, will not be accepted. Traders who wish to use this facility must send a signed declaration that the items for sale are part of, or intended for, their own personal amateur station. The RSGB reserves the right to refuse ads, and accepts no responsibility for errors or omissions, or for the quality of goods for sale or exchange. Ads for CB equipment will not be accepted. Each advertisement must be accompanied by the correct remittance, as a credit card payment, cheque or postal order made payable to the Radio Society of Great Britain. Please note that because this is a subsidised service to members, no correspondence can be entered into. Licensed members are asked to use their callsign and QTHR, provided their address in the current edition of the RSGB Amateur Callbook is correct. RS members will have to provide their name and address or telephone number. Please include your town and phone number in the free boxes provided to assist readers. Advertisements will be placed in the first available edition of *RadCom*.

Warning: *Members are advised to ensure that the equipment they intend to purchase is not subject to a current hire purchase agreement. The 'purchase' of goods legally owned by a finance company could result in the 'purchaser' losing both the goods and the cash paid.*

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DUMMY LOAD MFJ 260B 300w 1-150MHz: £30 ono. Comet CF-30S low pass Filter: £20 ono. Kenwood MC-85 Mic as new little used, top of range with manual. De luxe model RRP £130, but now surplus to requirement so: £70 ono. All gwo. G4PVV. (Truro) 01872 79922.

EQUIPMENT SALE. Transceivers etc - Trio TM201A 2m 25W: £200. Yaesu757GX HF: £500. Icom Micro 2e 2m Handy: £195. MM 25w 2m Linear Amp: £70. Aerials etc - 2M Slim Jim: £10. Cushcraft 3ele Tribander: £300. Sandpiper 2ele 15m Beam: £25. Jaybeam 5/8 Colinear 2m: £45. Altron 30ft Tower: £250. KR400RC Rotator: £150. Skiptec SWR Meter: £10. SEM Transmatch Ant Tuner: £75. 3-way Antenna Switch: £12. Miscellaneous - Altai OST5M 'Scope: £200. Maplin Gold 7/9 A Power Supply: £20. DRAE 24A Power Supply: £100. Datong Morse Tutor: £40. Pakratt 232MBX: £225. Cam Link Video Editor VMX 2000: £50. Miranda Photo Tripod: £20. Sanyo Camcorder: £300. Fisher Video Recorder: £150. 5" Mains/Portable TV B&W: £40. Citizen 120D Printer: £50. (Windermere) 015394 46528.

EVERYTHING MUST GO! No reasonable offer refused. Approx 140 copies Practical Television, from 1950's and 1960's. RadCom's 1978 to 1992. Two Wangtek PC Tape Drives with Sytos S/ware - uses DC2000 Tapes. Three copies, SCO Xenix for PC. Mono CCTV Camera with Lens. Sinclar Spectrum+2. Commodore 64. Sharp PC1500A Pocket Computer with Cassette and Printer. Set BATC Test-Card PCB's. Thorn 8000 LOPT. RS Desk Console Case (new). Pair Vivitar Professional TV Lenses. Radio controlled model Plane (as new). Unused vintage Wearite Reel-to-Reel Tape Deck. Shelton Sig-Net multi user Computer. Large Junk Box - free to local young amateur who Home-brews. Wanted urgently: 9MHz or 10.7MHz Valve IFT's plus filters and Xtals, long Multi-bank Rotary switches. Call Simon, G8POO, QTHR. (Corbridge) 01434 633913.

FOUR BEDROOM bungalow, East Cowes, IoW: £78,950ono. Modern electricals, rewired 1994. Gas CH. Parking four spaces plus large internal garage. Conservtry, patio, plus two sheds. Near to local shops and ferries. (Isle of Wight) 01983 298154.

FRG7 Gen Coverage Rx, excl condx, manual, boxed: £95. Computer Amstrad PC1640DD two 5.25 Floppy drives, splendid B/W screen, as new, various programms, boxed: £95. Printer Star LC24-10, sheet or continous feed. As new, manual, boxed: £95. G0STP, (E Devon) 01404 815292.

FT208R Spkr and mobile mics mobile mount and PSU chrgr: £120ono. Z88 0.50MHz memory cartridge: £50ono. FT709R mobile mount and PSU spkr mic headset: £170ono. AR40 rotator: £40ono. BBC Master disk drive monitor: £100ono. (Nottingham) 0602 731036.

FT 902DM: £450. FT901R Transverter: £250. FC902 ATU: £150. SP901P: £80. All perfect, boxes and workshop manuals. Buyer collects or pays postage. (Birmingham) 0121 420 1837.

FT101EX - SMC modified to include WARC bands. Rx good, Tx fault. Mic & manual: £165. Inexpensive HF aerial wanted. (Castle Cary) 01963 240319.

FT102 Tcvr, exc condx AM/FM all filters: £320 includes carriage. PCR Rec restored: £60 inc carriage. (Rhondda) 01443 436073.

FT107M +FP107E, vgc: £400 ovno. FT290R Mk1, new Nicads, soft case: £175 ovno. (Brownhills) 01543 370663.

FT290 Mk2. FL202S Spkr/Mic, Nicads, 2M/mounts, carryicase, R/duck, boxed, gd condx: £420 ono. Phone G6YGJ, 6pm - 8pm only. (Bradford) 01274 640332.

FT290R2, vgc, bxd nicads case etc. HB9CV, SWR meter, both as new: £300 or xchange FT790R2 with cash adjust. Chris (Birmingham) 0121 443 4246.

FT901DM HF Tcvr, Mic, handbook, used for SWL only, excl condx. Call G7RTI office hours on 01628 893403 or eves (High Wycombe) 01494 438978.

FT902DM, FT902DM spare PA's, gwo, boxed: £575 ono. FT200, FP200 Spkr, PSU, gwo, boxed: £200 ono. Codar T28-Rx, AT5-Tx, 250v mains PSU. 12/MS 12v PSU, 12R/C mobile remote B40 + B41 +scrap B41 for spares: £100 ono. G0POM, QTHR. (Sleaford) 01529 460626.

GEC BRT400D with correct cabinet: £150. TF1041C VTVM: £50. RAF R1155: £40. Russian SRP5 Ships DF Rx: £30. TM6221 AF Balun: £5. Grayshaw A050 AF Oscillator: £10. 136B2 Noise Blanker for KWM2: £75. Heath IM17U FET VOM: £10. 0.5kVA Isolation Transformer: £10. Chris, G8JFJ. (Portsmouth) 01705 596836.

HEATHKIT SB300 plus SB400 with connecting cables for Tcvr working, good working order. Manuals, matching Spkr. Offers!. Buyer collects. (London) 0181 992 3778.

HENRY RADIO 2002A linear amp, new, bxd, unused: £900. Atari 1040ST, mint: £125. Disk Drive: £25. Kraft trackball: £25. Philips colour monitor 14": £125. All mint. Garrard 401, bxd: £50. Pair Gale 402: £150. MFJ 1278B with Multicom software for IBM, 3.5" disk, new unused: £300. KT34XA upgrade, new, bxd: £200. (Nr Norwich) 01953 788376.

HF ATU Vectronic VC300DLP, SWR meter, dummy load 300w PEP, new £145, sell for: £80. Tel: Ron, G0SMZ, QTHR. (Worcester) 01905 355381.

HONDA 4-stroke Petrol Generator 220v 50/60Hz 300VA or DC 12v 8A weight 40lb, 14 x 9 x 10inches. Ideal portable / caravan: £150 ono. G3CFR, QTHR. (Axminster) 01297 33062.

HP SPECTRUM ANALYZER model 851B and RF Unit model 8551B 0=42GHz: £500. Bird Thruline Model 45: £125. MM144/100 Linear: £150. MM432/50 Linear: £150. 432MHz G3ICD 1kW Linear and PSU: £300. Rohde & Schwarz Freq Meter 30-500MHz: £175. Marconi Sig Generator 10-500MHz: £400. ROBOT SSTV Converter: £150. Pye PF85 VHF H/held: £85 each. Dual PSU 0-30v @2A: £75. Ferrogaph Distortion Meter and Oscillator: £250. Video Show Professional 180: £300. Tono 7000E RTTY and Morse Converter: £200. (Welling) 0181 304 8390.

IBM PC AT 640K Ram, 20Mb H/D, 3.5 and 5.25 FDD, CGA Colour Monitor, vgc. Can deliver within reason: £150. Colin, G0VJC. (Stafford) 01785 712862.

ICOM 725 with CW filter and FM board, bought May 1991: £360. 20A Microset PSU: £65. MFJ Versa Tuner 2 type 948, bought July 94: £75. Multi-band trapped Dipole by G2DYM 80-10m: £25 ono. All manuals and original boxes. G3KWK, QTHR. (Redditch) 01527 541502.

ICOM AH2a Automatic Antenna Tuner as new: £275. Datong Active receiving Antenna AD370: £25. Phone Len. (Chesterfield) 01246 234885.

ICOM IC-490E 430MHz M/mode: £230. Yaesu FT-480R 145MHz M/mode: £220. Microwave Modules MMS2 advanced Morse Trainer/talker: £100. All gwo with manuals. Champ satellite WR 516 multi channel Rx, remote control: £30. Alba B/W 4in TV/monitor: £30 gwo. G7AKJ, QTHR. (Stoke on Trent) 01782 635588.

ICOM IC260E 2m FM/SSB/CW xcvr, gd condx, orig packing: £200. No offers. Motorola HT220 series nicads, unused: £10 ea. G4NCE QTHR. (Birmingham) 0121 357 6139.

ICOM IC765 with AM Filter, matching Spkr, Mic and data leads for PK232 TNC. Little used: £1,600 ono. G0PTO, QTHR. (Stockport) 0161 491 0721.

ICOM ICR1 scanner. 100kHz-1300MHz AM/FM/WBFM with 1000mAh bttry and BC72 desktop chrgr. Over £500, accept £299. Kemble, G3UYK QHTR (Winchester) 01962-877727.

IRC's for sale: 40p each. CWO please. Steve Hodgson, G0LII, 6 Broughton Road, West Ayton, Scarborough, N Yorks YO13 9JW. 01723 863962. (2500+ available)

JAYBEAM 'MINIMAX' Tribander HF Antenna Model MM3, two years old, buyer collects: £250. Emotator 747-SRX Rotator, little used, buyer collects: £200. (Uxbridge) 01895 234126.

JRC JST135 HF Tx 150 watts output with JRC PSU, excellent condx, original purchaser, boxes: £850. (Hayle) 01736 757721.

KAMPLUS TNC dual port VHF/HF with Packet, Pactor Gtor etc, latest Eprom, software, mint - any trial: £300. Paul (Rhyl) 01745 833847.

KENWOOD R599D HF Rx, mint unmarked, matching L/S, manual: £95. Buyer inspects and collects. G6OSG, QTHR. (Alton, Hants) 01420 83171.

KENWOOD TM-241E 2m FM mobileTcvr, 5/10/50w with DTMF, CTCSS Units fitted. Ex cond, complete with manuals, box and bracket: £210. G7NHL. (Buxton) 01298 77103.

KENWOOD TM751A VHF all-mode tcvr, 144-148MHz, new, bxd, used once briefly. Fitted CTCSS tone encoder. Complete as supplied: £595. (Northants) 01604 881971.

KENWOOD TR751E M/mode 2m Tcvr, Voice synth fitted as new, boxed: £375. Alinco DJ580E D/band H/held, two battery packs, spare battery box, soft case, boxed as new: £275. Ill health forces sale. (Washington) 0191 416 8211.

KENWOOD TS450SAT HF tcvr. Just over a year old and as new: £900. G0ISF (Isle of Wight) 01983 730292.

KENWOOD TS530S AT230 vgc, 200Hz CW Filter: £450. Buyer collects. G6OBA, QTHR. (Kingston-upon-Thames) 0181 546 6393.

KENWOOD TS850S mint condx, warranty until March 96, c/w 500Hz CW Filter: £1,150 ono. Andy, G4VPM. (South Petherton) 01460 241711.

KW E-ZEE MATCH ATU. Eagle KY102 Semi-Auto Key. BC221 with built in PSU. All excellent condx: £100. G4PJY. (Oakham) 01572 722721.

LAPTOP 386/16 40Mb H/D, 1Mb Ram, LCD VGA, DOS 6.2, Windows, MS Works, Ham Log, battery charger, PSU, carry case, manuals, excellent condx: £400 ono. Sony in-car CD player extractable 4+ watts, carry case: £150 ono. Psion series Three 128K Organisor, carry case, Finance S/ware, excl condx: £100 ono. Or swap for 2 to 6 Transverter. Telephone Max, eves only. (Wolverhampton) 01902 845054.

LAPTOP COMPUTER Sanyo 286, 60Mb H/disk, VGA, Mouse, DOS-5.0, manuals, still under manufactures warranty, very robust machine: £350. (Iver, Bucks) 01753 653866.

MANNESMAN Tally MT131/24 printer serial/parallel interfaces, menu driven, with 6 new ribbons (bxd): £30. ITT-STR25 synthesised marine band tcvr, cnvrtd to 2m, slight attn reqd, with manual, cct diags etc: £15. Ex-BT 240V isolation trnsfrmr (earth free supply), cased: £10. G7MSF QTHR (Croydon) 01689 846184.

MAPLIN GOLD MF100 multi-function counter with manual, gd condx: £40. 160m DSB tcvr with mic: £40. (Cheddar) 01934 744139.

MARTELEC JVFAX Interface Unit, supports Wx-satellites and HF/VHF FAX reception: £70, inc p/p. Selling to focus on DX'ing. Malcolm. (Hook, Hants) 01256 766558.

MAST Western Electronics two-section galvanised 42ft high: £200. 3-ele Tri-band antenna: £90. Both fair condx; buyer to arrange transport. Sale due to house move, so not QTHR. G4ODG (Sleaford) 01529 307844.

OSCILLOSCOPE Tektronix 515A manual: £20. Versatower P60 power winch top mast and bearing: £275. Buyer collects. Charles, G3UVS (Plymouth) 01752 774405.

OSCILLOSCOPE Telequipment D65 D/trace 15MHz in vgc with manual: £65 ono. Texas T199 Computer, RTTY Interface, Hamsoft S/ware, Tape recorder, many cartridges including extended Basic, ham radio programs, much documentation etc: £35. Green screen Monitor for PC: £15 ono. (Oxford) 01865 890066.

PA VALVES, new, boxed and guarenteed. QQV06 40A: £15. QQV03 20A: £10. 6146B: £10. 6KD6: £12. 4CX250B: £30. 12AT7: £1.50. 12AX7: £2. U52: £3. 6870: £2. Please include £1.50 P& P with order. Ken, G4ZLX. Cheques to A K Whillock, First come first served. Stocks diminishing. 74 Chettel Way, Blandford St Mary, Dorset DT11 9PH. (Blandford Forum) 01258 455507.

PRACTICAL WIRELESS, Every Day Electronics, Short Wave Magazines back numbers, Trio 2m SSB tcvr: £125. Also radio components - lists available. G6DJE QTHR (London) 0181 451 1611.

PRO 2006 Scanning Rx, 400ch VHF/UHF continuous. Excl condx: £180 ono. Buyer to inspect and collect.(Milton Keynes) 01908 503279.

PSION ORGANISER 2, model LZ64 plus 64K Datapack, 32K Rampack and HB games pack, all manuals, leather case, as new: £100. G3OIS, QTHR. (Royston) 01763 287378.

QRO LINEAR AMP. 3CX3000 Tube, RF Deck plus EHT PSU in compact cabinet on castors, 5 bands, Vac variable tuning, Spare tube, as new: £750. Marconi Pro. EHT PSU's 19in Rack, excellent for 4CX1500 or 8877 Linears, variable EHT taps. New and unused, tested with data. 95kg: POA. 220uF 2.5kV DC Caps: £20 ea. Further details, phone Peter, G4HSB after 7pm. (Middlesbrough) 01642 816608.

RACAL RA-952 Rx 24V Alt DC, takes fixed frequency, mint condx : any offer. Eddystone 1650 Rx direct entry 100 channel memories 6 filters, recent model auto/man tuning, too many features to mention, excellent perfmnce: offer over £1,000. Rx PX taken KWM380 51J4 75A3-A2-A1 51S1. (Southall) 0181 813 9193.

RECEIVERS HRO 12 coils sets (No PSU): offers. Trio 500S 80-10m S bands (valved) AM-CW-SSB: £55. GEC RC411/R 15-30MHz with manual: £95. Buyer inspects and collects. (Romford) 01208 342176.

REDIFON R551N Rx 0-30MHz, AM/USB/LSB/CW, solid state, excellent receiver, gd condx: £160. Wanted Butternut HF5B Butterfly Beam or HQ1. (Derby) 01332 372696.

SCANNER MVT6000 + PSU. Little used: £170. Microwave Modules 2-10m receiving cnvrtr + miniature Reg PSU: £50. G8LT QTHR (Towcester) 01327 860321 (daytime).

SEM TRANZMATCH fitted with Eazitune and dummy load. Latest model covering 160-10m, little used, mint condx: £200. HF225 Rx complete with PSU, h/book etc, unmarked condx: £380. Bob, G3MSL QTHR (Fleet) 01252 811720.

SHACK Clearance. B40 Rx: £110. B41 Rx: £110. Three RS232 Terminals with Keyboard: £15 ea. Pye Base Rx/Tx: £50. Storno Base Rx/Tx 70cm GQF664-20: £120. Scope D53: £50. WHY. Call Jim. Note: Most very heavey. (Ladybank) 01337 830477.

SHACK CLEAROUT! Kenwood TS830M HF/WARC bands, excellent: £465; FT101: £225; 2m TDK2025: £150; 25W Alinco DJ 160 h/h: £110. All look as new. Also tuners, pwr supplies, QRM filters, 486 PC: £450. Dave, G0FDV (Dunstable) 01582 606173, 01831 476210.

SILENT KEY G8UQL. IC740 HF tcvr. G4GKU HF minibeam. WE-1145 rotator. SMC170L pwr/swr meter. Sommerkamp TS280 2m 80ch FM mobile. Details from R A Woodley, G1HKT, 1 Melton Drive, Didcot, Oxon OX11 7JP.

SILENT KEY SALE, G3EFC. TS830S, KW2000A, Century 21, FL400DX, JR500S, TR2200GX, MML144/50 2m Linear, Capco SP300D, Bencher BY1, Kent straight Key, Eddystone Bug Key, Peki Keyer, Kent Twin Paddle, Shure 444, Shure Stick Mic, Datong FL1, Datong Up Converter, Codar Q Multiplier, Codar T28, Advance 10A PSU, Global GDO, MFJ 203 Dip Meter, KW Dummy Load, Magnetic Choke Balun, RC Bridge, SEM Eztune, 6:1 Balun, Elonex Traps, Sentinal 2m Converter, MET 144-7T 2m Yagi, RCA 813 valve, various other valves, 6BA6's etc. Sensible offers please to G3ZFZ, QTHR. (Barrow in Furness) 01229 474147.

TA33 Tri-band Yagi, good condition: £65. Buyer collects. G3FYF. (Ashburton) 01364 631319.

TEN TEC Century 22 Tx/Rx, exc condx, built in Keyer, calibration + PSU: £235. Hi-Mound HK706 Key, excellent: £20 plus carriage. (Whetstone) 0181 368 8674.

TENNAMAST 30ft Wall Mounted, complete with winch, Head unit and 8ft stub mast: £230. GW4EAI. (Blackwood) 01495 225226.

TM251E two metre Tcvr, 50w, extended coverage with 70cm receive, almost new: £295. G4FMO. (Abbots Bromley) 01283 840667.

TR751E pristine condx, never used mobile, Vargarda 6 ele 2 used in loft: £500. Yupiteru MVT8000 excl condx: £280. All original packing. Wanted SM230, must be in excellent condition. Best price paid or part exch for right model. Phone evenings after 8pm. (Stakeford) 01670 811950.

TRIO 9130 25 Watt 2m m/mode bxd C/W, all accessories: £275. Also 2m-6m RN trnsvrtr 25W, mint: £125. (Coalville) 01530 813953 (after 6pm).

TRIO R-600: £150. Trio TR-7500: £90. Hammerlund HQ180: £80. Archimedes 310 with monitor: £250. BBC-B computer with monitor, 5.25 disk drive, SSTV/FAX RTTY: £100. TAXAN printer: £50. (Bognor Regis) 01243 266659.

TRIO R1000 Rx C/W ATU and handbk, all mint condx - Bangor Co Down) 01247 460251.

TRIO TR9000 2m M/mode Tcvr: £175. Hewlett Packard HP8660 Sig Gen 0-110MHz AM/FM: £250. Philips PM3243 50MHz Storage Oscilloscope: £225. Evenings only. G8NXB, QTHR. (Cheam) 0181 642 1359.

TRIO TS120V 10W 500Hz CW Filter, ideal QRP rig, good condx: £280. Starmaster Keyer: £30. FRA7700 Yaesu Active Antenna: £35. Howes QRP ATU: £15. (Nr Leicester) 0455 273042.

TRIO TS120V 10W HF tcvr: £250. VFO120 matching remote VFO: £45. Both bxd with manuals. Prefer buyer collects. GW8JLY QTHR (Cardiff) 01222 553842.

TRIO TS520 Tcvr with Mic and manual, vgc, used as standby only, clean condition: £295. Prefer buyer inspect and collect. G0DAY. (Burntwood) 01543 685810.

TRIO TS520S tcvr plus 520 external VFO + MC50 mic, two spare PA valves. Not been used on transmit: £375ono (Brough, Hull) 01482 667630.

TS530S, excl condx, with 270Hz, 1.8 and 2.4kHz Filters. Shure 201 Mic, spare driver/PA valves, SP-230 Spkr, VFO-120, Electronic Keyer, ATU SWR bridge, H/phones QY4-400 with base. Dumb terminal plus other bits!: £500. Please phone for details. G3KKJ. (Ulverston) 01229 832164.

TS530S, narrow CW Filter, 2 pairs spare tubes, MC50 Desk Mic: £450. SEM ORM Eliminators, new: £55. Katsumi Electronic Key: £50. HF Pre-amp1.8-60MHz, new: £40. HF Wavemeter, new: £35. MFJ 2kW Dummy Load: £25. SB220 2kW Linear: £550. Tokyo HC 2000 Antenna coupler: £275. All items immaculate. Cobwebb Antenna 5 bands: £100. (Bristol) 0117 964 2867.

TS930S OWNERS! Bought unused YK88C-1 in error for YK88C. Exchange for S/hand MC60 Desk Mic or similar value cash offer. General Radio + computer upgrade clearout. eg. BBC/ RTTY set-up. Send SAE for lists, G0OZK, QTHR.

TS940S Inbuilt auto ATU, perfect order, bxd, manual, mic MC80; QRT sale: £1000ono. (Sutton-in-Ashfield) 01623 552319.

TWO METRE Pocket Receiver, Xtal controlled, with 6 xtals pre-installed model MR-2G Nicads: £25 each ono. Laffayette HE-40 NOT well!: £50. Ethernet Tcvr i/p AUI, o/p BNC 10Base2: £15. 250 Re-cycled blank 1.44Mb Disks: £70. Buyer collects. (NW London) 01956 544202.

VALVES, new 6146B: £10 each, include Post/packing. Phone quick after 6.30pm any day. Ask for Charles. (Swindon) 01793 849896.

WATKINS AND JOHNSON VHF Pro Rx with Spectrum Display: £400. FT470R with DC adaptor, boxed as new: £250. Mini circuits balanced mixers, same as SBL 1X, up to 1500MHz: £2.50 ea. Quantity available. Various quality HF Rx for sale. Wanted IC202S. (Rugby) 01788 815506.

WIRELESS WORLD and *Radio Review* vols 12 and 17 1923-1925: £30 ea. Other radio books back to 1915. Stamp for lists. Two BSR 78 RPM sound on disc recorders: £300 ea. G3OEP QHTR (Gt Yarmouth) 01493 662323.

WW2 RECEIVER R103A 1.7-7.5MHz. Works very well. Probably dev model with 230V AC input, black panel, grey case, and signwritten legends. Some handbook info. Buyer collects. Offers Please. G3AJD. (Barnet) 0181 449 0877.

YAESU 736R: £1075. 736R 23cm cnvrtr: £275. Tokyo 70cm 120W amp HL130U: £325. Alinco DJ580E dualbander, spare nicad pak: £320. (Portsmouth) 01705 786773.

YAESU FL/FR50B Tx/Rx 50w SSB, FV50C VFO, fitted VOX all manuals. Get onto HF for just : £120. G4ZWX, QTHR. (Windsor) 01753 671331.

YAESU FP-757HD 20A PSU w/Spkr: £180. Cushcraft A3S Tribander (new): £250. JPS NF-60 Auto notch filter: £90. Tandy Rotator w/cable: £25. MFJ Artificial ground: £45. Carl. (Northants) 01280 705676.

YAESU FRG7700 HF Rx plus 2m Datong Converter: £250. Or exchange for HF Tcvr, eg. FT101. Call Dave, after 6pm. (Barnsley) 01226 759909.

YAESU FRG9600 VHF/UHF Rx with mod for 0.2 to 30MHz HF coverage: £300ono. Discone stainless steel antenna: £30ono. Stabilised 13.8V DC 7amp pwr supply: £30ono. GW4TPG (Mid Glamorgan) 01269 870076.

YAESU FT101ZD, with manual: £400. ATU FC102: £100. Taylor Valve Tester, with manual: Offers. MFJ HQ Loop as new, manual: £200 ono. Belcom LS102h 10m, + manual: £150. (Chelmsford) 01245 360037.

YAESU FT102 C/W mic manual, vgc: £400. Himound Morse key: £15. Lodestar signal generator SG-4160B 100Kc/s - 150MHz: £80. Purchaser pays postage if required. (Tewkesbury) 01684 299420.

YAESU FT102, FC102 ATU with Trio SP100 Spkr. All in good order: £500. Prefer buyer inspects and collects. IC211E 2m Tx/Rx with Mutek frontend: £300. FT790R Mk1, soft case, Nicads and charger: £180. Dave, G8KBH, QTHR. (Blackpool) 01253 890114.

YAESU FT107 line up Tcvr, Ext VFO, ATU. All good or vgc with manuals: £550 ono. Mike, evenings. (Epsom) 0181 393 7271.

YAESU FT290 Mk1, Mutek, case, charger, vgc: £195. Jay Beam half size MiniMax Tribander: £225. Must collect. ICS M/mode TNC: £50. (Gravesend) 01474 823797.

YAESU FT5200 VHF/UHF, FM, 50/35W, CTCSS, new June 1994, but never installed, absolutely mint, original packing. Genuine reason for sale: £455. Buyer collect or £5 PPI. G4LWA, QTHR. (High Wycombe) 01494 531755.

YAESU FT767GX tcvr C/W 2m and 70cm modules gd condx: £1050. Citizen Swift 24-pin dot matrix printer C/W automatic sheet feeder, tatty but working: £100. Ferguson 3V20A colour video camera, believed working but untested: £30. G0MBL QTHR (Ramsgate) 01843 581340.

YAESU FT815 70cms H/held, only two months old, ideal Novice rig, new £350 sell for: £200. John, G6SVJ. (Uttoxeter) 01889 565836.

YAESU FT990 DC model, built in ATU, boxed with manuals: £1,200. Yaesu FT707 HF Tcvr 10-80m, inc WARC Bands: £325. ERA Micro reader: £90. MFJ De-Luxe Versa Tuner 2: £75. All above items in exc condx. Marconi Sig Gen TF2015A 10-520MHz: £80. Mobile radio Test Set Marconi TF2950: £50. Pye 294 fully Syntherised on 2m, 25w, exc: £85. (Washington) 0191 4173006.

YAESU FTDX401 HF Tcvr 80-10m, sn 2130055. Just professionally overhauled, with Mic, hand book, some valves. G3XOI, QTHR. (Shoreham) 01273 594570.

YAESU FTV 901R trnsvrtr, complete with 50MHz 144MHz 430MHz modules, vgc: £325. G4EOW (Romsey) 01794 512475.

WANTED

ALL EARLY WIRELESS and Television items, Crystal Sets, Receivers, Transmitters, Horn Speakers, pre-1925 Valves, early Hi-Fi, pre-war television, Spy sets, any Clandestine equipment, early radio, television Books. Pay cash and collect. G4ERU, 5 Luther Road, Winton, Bournemouth BH9 1LH. (Bournemouth) 01202 510400.

AP1086 ISSUE 1 (RAF Radio Stores Ref No's) Also AP1186 -A, -B, -C, -D, -E. All sections and AP's releating to Radio, Radar Equipment. Would purchase Post-War to current Magnetrons, Klystrons, T/R cells, Ignitrons, Thyratrons, Microwave Planar Tubes, TWT's and special CV types. Required R1355 10D/13032, IFF Rx's R3002, R3067, R3121, Control Unit Type 17. All unmodified. Excellent price offered. Please phone (or FAX) anytime. (London) 0171 511 4786.

FOR YAESU FT290R Mk 1. Front panel push buttons Pt No KEF10901. Wd consider junked unit for stripping. Can travel 20km. Malcolm, G4APF QTHR (Dudley) 01384 258504.

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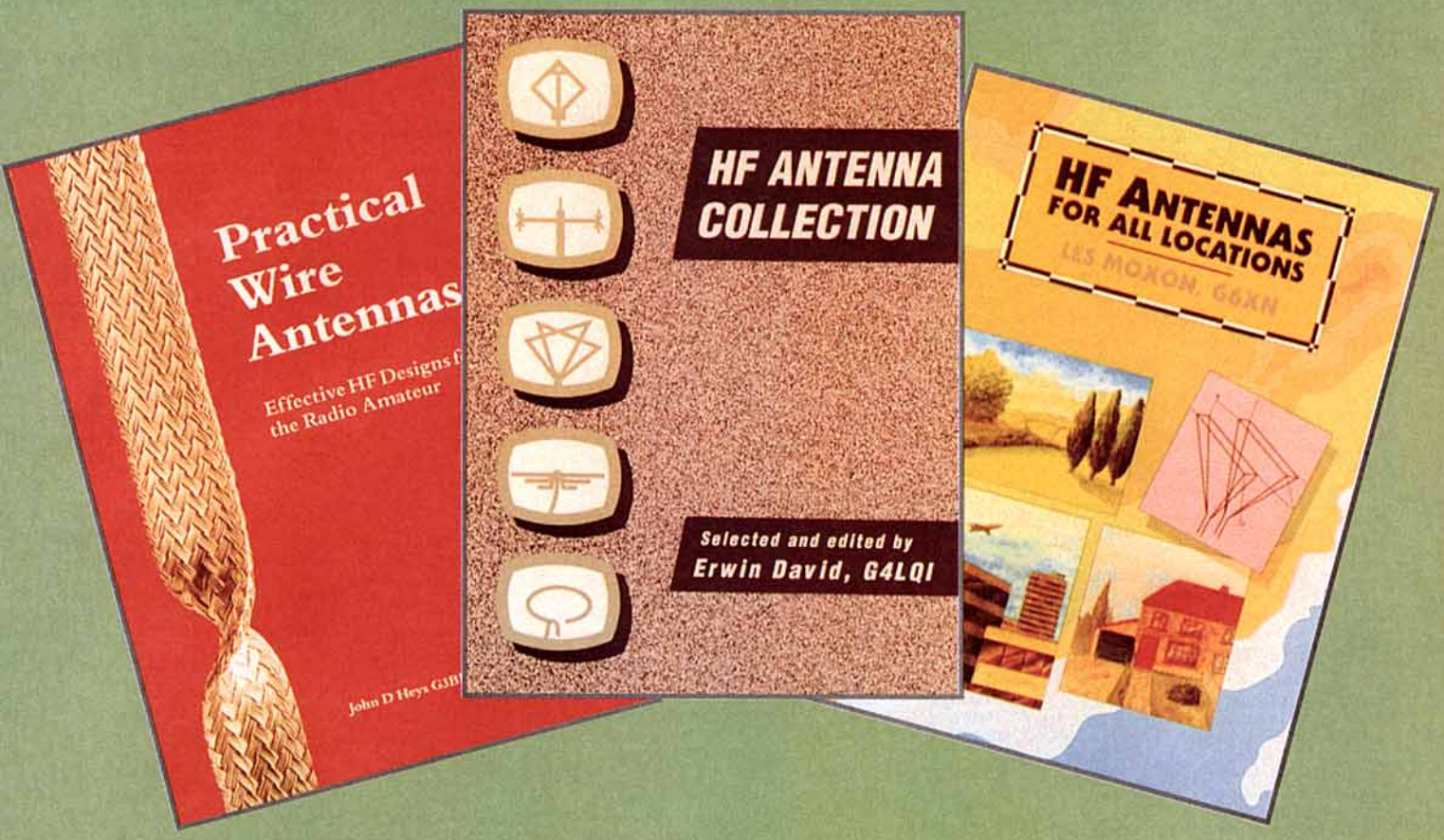

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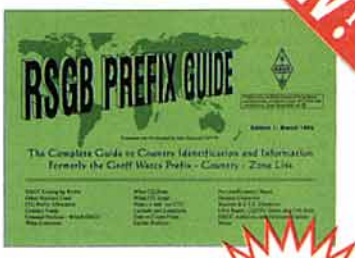

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G2LP	Mr E Knight	10.12.94
G3ATF	Mr C B S Seaman	09.12.94
G3BQS	Mr K Chorley	06.11.94
G3HXS	Mr P L Jeffery	14.12.94
G3JLX	Mr R W Dawson	04.12.94
G3MSU	Mr B E R Street	11.12.94
G3TVG	Mr F Pearce	11.12.94
G4GI	Mr S M Gambles	26.12.94
G4NWD	Mr M J Bardill	22.11.94
G4YEM	Mr C R Browning	31.12.94
G6GPK	Mr G J Obree	15.10.94
G6ZWP	Mr C I Williams	27.11.94
G8ATX	Mr T Allen	02.12.94
G8SCC	Mr R Latham	02.11.94
GM3GQH	Mr P Elliot	31.07.94
GM3PGO	Mr P Roux	23.11.94
F/G8PJ	Mr W R Worden	04.12.94

Sir Richard Harries Davies, KCVO, CBE, CEng, FIEE, G2XM.

SIR RICHARD ('DICK') DAVIES, G2XM, died on 30 January 1995 at the age of 78. He was born in Ystrad, Glamorgan, on 28 June 1916 and was first licensed in the early 1930s. He was an outstanding student and built his first amateur receiver, almost from scratch, while still at school.

After graduating with a first from London University, he worked for the Air Ministry on the development of radar at the Bawdsey Research Station. During the war he was assigned to the British Air Commission in Washington DC, one of his tasks being to persuade the Americans to adopt the British radar system. After the war he remained in the USA for many years, working as vice-president of Ferranti Electric Inc in New York between 1948 and 1963. He also served as president of the British-American Chamber of Commerce in New York for several years.

Sir Richard Davies, G2XM, 1916 - 1995.

Richard Davies was director of Ferranti Ltd from 1970 to 1976 and the following year entered the Duke of Edinburgh's household, serving as assistant private secretary from 1977 - 82 and later as treasurer and the head of household. Upon his retirement in 1984 he was created Knight Commander of the Royal Victorian Order and appointed an Extra Equerry to the Duke of Edinburgh.

Sir Richard, or Dick as he was known on the air, lived in Thorpeness, Suffolk and was an active member of the Leiston ARC, attending as many meetings as his many other commitments and interests allowed. He had varied interests in the hobby and was active on all bands from 160m to 10m, maintaining regular contacts with America. Whatever he pursued he did with a quiet dignity and thoroughness which earned him the respect of all with whom he associated. Dick gave the club several talks and on each occasion his intellect and intelligence were evidenced in abundance by his ability to communicate. Those talks will long be remembered by all who had the privilege to hear them.

G2XM was RSGB President in 1988, the Society's 75th anniversary year; he later wrote that "the highlight of the year for me was the 75th anniversary convention". He was instrumental in launching 'Project YEAR' ('Youth into Electronics via Amateur Radio') and made the formal Novice licence presentation at the RSGB / DTI Industry conference.

He is succeeded by his second wife, Patricia, and by two sons and two daughters from his first marriage. He will be missed by all who had the good fortune to enjoy his company.

John Harold Ballard Hum, G5UM.

JACK HUM, G5UM, died on 11 January 1995 at the age of 84. First licensed in October 1927 shortly before his seventeenth birthday, he was a member of the RSGB for 66 years, being elected a Vice-President in 1974.

While he is best known now for his work on the VHF bands, Jack's earliest interest was at the other end of the spectrum, and as early as 1929 he was writing in the *T&R Bulletin* on 1.8MHz matters.

After wartime service in the RAF as a Squadron Leader in Coastal Command, Jack was employed by Murphy Radio in Welwyn Garden City as publicity officer. By now, Jack's main interest had turned to VHF, and especially to the then 58 - 60MHz band. In 1952 he was elected to the RSGB Council and was Honorary Editor of the *RSGB Bulletin* between 1952 and 1955. During this period he was prominent in raising awareness of the VHF bands, founding, with others, VHF National Field Day , the VHF Committee and the concept of VHF beacons.

In 1966 Jack moved to Houghton-on-the-Hill in Leicestershire to take up a new position as Technical Journalist with the Rank organisation. It is no coincidence that the house he moved to was on top of a 600ft hill in what was probably the best VHF location in the county! The same year G5UM took over the *Four Metres and Down* column in the *RSGB Bulletin* and later became the Society's VHF Awards Manager, a position he held throughout the 70s and most of the 80s. In the early 1970s Jack was instrumental in the development of the concept of VHF amateur repeaters and, in recognition of this work, was later elected Honorary Life President of the Leicestershire Repeater Group.

Even when well into his eighties, Jack continued to write regular articles on VHF operating, most recently in *Ham Radio Today* magazine. He was one of the original 50MHz permit holders in 1984 and remained active on that band, as well as on 4m, 2m and 70cm, until the day before his death.

There can be few people who have contributed as much to amateur radio over such a period of time as Jack Hum. He set the highest possible operating standards for others to follow, and was widely known as the 'great gentleman of the airwaves'.

Jack leaves a wife, Grace.

PHOTOGRAPH: G3XKX

Jack Hum, G5UM, 1911 - 1995.

CLUB NEWS

DEADLINE - Items for inclusion in the May 1995 issue must be sent to HQ marked "Club News - DIARY", to be received by 24 March latest. If news is received by the published deadline, it should appear in the listing. It is your responsibility to ensure that items are sent DIRECT to HQ in good time. News items should be sent in writing, preferably typed or written legibly, and be signed by the club secretary or the person responsible for publicity.

NOTE: This is primarily a service for clubs affiliated to the RSGB, to whom priority will be given.

AVON

BRISTOL ARC - 2, Wine and Cheese; 9, Talk 'WX Satellites' by Shaun, G8PVG; 16, QRP Equipment; 23, Club Computer/s; 30, Club Management Meeting. Details 0117 965 4886.

RSGB CITY OF BRISTOL GROUP - 28, Talk 'Cellular Radio'. Details 0117 967 2124.

SOUTH BRISTOL ARC - 1, 15m activity evening; 8, Handheld rigs, Rally and Bring & Buy; 15, Model railway magazine evening; 22, 10GHz activity evening; 29, demonstration 'Making a "Fox Hunt" antenna'; Details 0275 834282, 24 hr answerphone.

WESTON-SUPER-MARE ARS - ***New Secretary*** L A Berridge, 33 Wesley Drive, Worle, Weston-Super-Mare BS22 0TJ, tel: 01934 512609.

BEDFORDSHIRE

SHEFFORD & DARS - 2, Members' activity night; 30, Members' activity night. Details 01462 700618.

BERKSHIRE

BRACKNELL ARC - 8, 'RACE III' Daptive HF; Apr 12, Amateur radio software. Details 01344 420577.

MAIDENHEAD & DARC - 2, talk 'Repeater Management' by Fergus, G8URB; 21, Annual General Meeting. Details Roy, G4XYN, 01628 25952.

NEWBURY & DARS -22, Weather Fax with Philip Mitchell. Details 01635 863310.

READING & DARC - 9, Talk 'CW - it goes on and on' by Dave Waterworth, G4HNF. Details 01734 698274 (evenings).

BUCKINGHAMSHIRE

AYLESBURY VALE RS - 1, Annual General Meeting; 15, Discussion evening; Apr 5, Surplus equipment sale. Details Martyn Jones, G4XZJ, 01296 81097.

CHESHAM & DARS - 1, Contest planning meeting; 8, General meeting; 15, Technical topic; 22, Inter-club quiz challenge; 29, Guest speaker TBA. Details 01494 676391.

CAMBRIDGESHIRE

CAMBRIDGE & DARC - 3, Club project discussion; 10, Use shack; 17, Meet your Committee; 31, Annual General Meeting. Details 01954 200 072.

CHESHIRE

MID-CHESHIRE ARS - 1, Construction; 6, Committee meeting - Cabbage Hall; 8, On air & Pancakes; 15, Talk 'HF Propagation' by David, G4XUV; 22, NFD planning & 'NFD the Video'; 29, Talk 'The Club's latest HF transceiver' by Roland, G0GZI; Apr 3, Committee meeting - Cabbage Hall; 5, Construction. Details 01606 592207.

CORNWALL

CORNISH RAC - 2, Talk 'Power Engineering' by Keith. Details 01209 820118.

SALTASH & DARC - 3, Maritime tales by Dave, G0RUP; 17, Visit to Widegates.

DERBYSHIRE

BUXTON RA - 14, talk 'Live Morse' by Derek, G4IHO. Details 01298 25506.

DERBY & DARS - 1, Junk sale; 8, Illustrated talk 'Railway signalling - then and now' by John Jameson; 15, illustrated talk about Hospital Radio 'Radio Link'; 22, Annual General Meeting; 29, illustrated talk 'Energy for the 21st Century' by Mr J Layne of the Institute of Physics; Apr 5, Junk sale. Details 01773 856904.

DEVON

APPLEDORE & DARC - 20, Annual General Meeting. Details 01237 477301.

AXE VALE ARC - 3, talk 'Op Amps' by G3HAL. Details 01297 445518.

TORBAY ARS - 24, Talk 'Operating Contests' by Derrick, G3LHJ. Details 01803 526762.

DORSET

BLACKMORE VALE ARS - 14, talk 'Smith Charts' by Rob, G3MYM; 28, Junk sale. Details 01935 814055.

FLIGHT REFUELLING ARS - 5, talk 'A Simple Modular 80m Transceiver for Home Construction' by G3PFM; 12, Contest strategy 1995, 19, talk 'UFOs - The Evidence' by S Gerrard; 26, Video 'Salisbury Cathedral Workshops'. Details 01425 653404.

POOLE RS - 10, talk 'Tessla Coils' by Phil Mason. Details 01202 762110.

EAST SUSSEX

HASTINGS ER&C - 15, Annual General Meeting. Details 01424 830454.

SOUTHDOWN ARS - 6, Talk 'Foxhunts' by Brian, G4BCO; Apr 3, Bring your own thing (made or bought). Let's see it! Details 01323 484282 or G0UOI @ GB7HAS.

ESSEX

BRAINTREE & DARS - 6, talk 'Propagation' by Mike, G4GGC; 20, Table-top sale; Apr 3, Construction contest. Details 01376 327431.

CHELMSFORD ARS - 7, talk 'The Vodaphone Digital Experience' by Colin, G4IIK; Apr 4, talk 'A Gallimaufry of Amateur Radio Devices and Experiences' by Geoff, G3EDM. Details 01245 256654.

COLCHESTER RA - 9, Interclub Quiz; 23, talk 'Essex County & Rescue Service' by Andy Taylor; Apr 6, talk 'Harnessing Solar Energy' by Mike, G4GGC. Details 01206 383510.

DENGIE HUNDRED ARS - 6, Talk 'Two years in Antartica' by G3HTF; Apr 4, Talk 'RNLI'. Details 01621 776237.

ESSEX

VANGE ARS - 2, Junk sale, 9, talk 'Electric Generators' by G4BQF; 23, Steam engines; 30, talk by G7JRK. Details 01268 552606.

GLOUCESTERSHIRE

GLOUCESTER ARS - 1, talk and demonstration 'QRP' by G4CIB; 8/15/22/29, Construction, Novice Licence, Morse Group. Details 01452 421510.

GREATER LONDON

BROMLEY & DARS - 21, Construction evening & Contest. Details 0181 777 0420.

COULSDON ATS - 13, talk 'Back Yard Antennas' by George Cripps, G3DWW. Details 0181 684 0610.

CRYSTAL PALACE & DARC - 18, talk 'Oscilloscopes for the Amateur' by Peter, G3ZPB and Paul, G0OHI. Details 0181 699 5732.

GRAFTON RS - 22, Talk 'My Work as a Professional Photographer' by Rod, G0JUZ. Details 0171 272 2328.

RS OF HARROW - 3, Annual General Meeting; 17, Construction contest (postponed from November); 31, Video evening showing Police Car Chases starring Tom, G0NSY. Details 0171 251 2700 (daytime).

SOUTHGATE ARC - 9, talk 'D-Day in Bletchley Park' by Mr Tom Flowers; 10, Southgate ARS Show setting up; 11/12, AR&C Show with RSGB; 23, LAR&C Show debrief; Apr 13, Grand surplus equipment sale. Details 0181 360 2453.

SURREY RCC - 6, Surplus Sale; Apr 3, AGM. Details 0181 660 7517.

SUTTON & CHEAM RS - 16, talk 'Early Television' by Ray Herbert, G2KU. Details 0181 644 9945.

WIMBLEDON & DARS - 31, talk 'Basics of Packet Radio' by G4WYJ. Details 01737 351313.

GREATER MANCHESTER

ECCLES & DARS - 7, Talk 'The Pentium FDIV Fault' by G8KRG; Apr 4, Discussion 'HF NFD contest'. Details 0161 773 7899.

GWYNEDD

DRAGON ARC - 6, talk 'A Home-brew Spectrum Analyser' by Stewart Rolfe, GW0ETF; 20, talk 'Memories of Radio Anglesey' by Gareth Llewelyn, GW3RXD. Details 01248 600963.

HAMPSHIRE

BASINGSTOKE ARC - 6, Talk 'Global Positioning Systems' by J B Cornwall of Trimble Navigation; 26, 2m Direction Finding Competition - Fox Dave, G4WIZ; Apr 3, Constructors' competition. Details 01256 25517.

HORNDEAN & DARC - ***NEW VENUE*** Now meets at Lovedean Village Hall, Lovedean Lane, Lovedean, Hants on 1st & 4th Tuesday each month at 7.30pm. 28, Talk 'Early History of Telecommunications' by Dr M Pope. Details 01705 472846.

ITCHEN VALLEY ARC - 10, Annual General Meeting; 24, Annual surplus equipment (junk) sale. Details 01703 732997.

HEREFORD AND WORCESTER

BROMSGROVE ARS - 14, In Practice - question and answer session; 28, talk 'Propagation' by Ray Cracknell, G2AHU/Kurt Feldmesser, RS87676. Details 01527 542266.

BROMSGROVE & DARC - 10, Annual General Meeting. Details G3VGG.

DROITWICH ARC - 7, talk and slides 'The Air Ambulance Service' by Chris Leybourne; Apr 4, talk 'Aerials - Baluns & SWR' by Dave Yates (BBC). Details 01905 778794.

MALVERN HILLS RAC - 14, Members' hints and kinks. Details 01684 560490.

VALE OF EVESHAM RAC - 2, talk 'Ocean Challenge' by Richard Palmer, crew member on the Group 4 Yacht in the Round The World Yacht Race. Details 01386 41508.

HERTFORDSHIRE

DACORUM ARTS - 21, Talk 'Novice Licence' by John, G4JOV; Apr 4, Dacorum ARC AGM. Details Nick, G7KFQ.

HARPENDEN ARC - 2, Construction evening by David, 2E1BZP; Apr 6, Packet radio organised by Ken, G3MSW. Details 2E1BDB.

STEVENAGE & DARS - 7, Talk 'Latest in DF Equipment' by Tony, G0OVO; 14, Annual General Meeting; 21, General Get-Together - HF/VHF on Air, CW practice - Beginners & Improvers; 28, Video evening - video TBA, see Ralph, G7HFD for the video directory. Details 01438 724509.

VERULAM ARC - 28, talk 'The Radio Spectrum and the CAA' by Mr Tim Doncaster, G4PJD. Visitors welcome at all club meetings. Details 0923 262180.

HIGHLAND

INVERNESS ARC - **NEW VENUE** Now meets at the Cameron Youth Centre, Planefield Road, Inverness on the 1st & 3rd Thursdays of each month at 7.30pm. Details Ian, GM4JAE, QTHR or @ GB7INV.

HUMBERSIDE

GOOLE R&ES - 24, ARDF planning; 31, Social evening; Apr 7, Discussion on Contests Antennas. Details 01405 769968.

GRIMSBY ARS - 2, talk 'Packet Logic' by Brian, G4DXB; 9, Committee meeting; 16, talk 'Royal Naval and Merchant Navy Communication Systems, before Satellites' by G3DOT; 30, talk 'Prefixes and Locators' by Brian, G4KAL; Apr 6, Packet Radio club, AGM. Details 01472 825899.

HORNSEA ARC - 1, Archive of G4YTV; 8, Committee meeting; 15, Talk 'Single Tube Colour Imaging' by G8EQZ; 22, talk 'Modern Trawlers' by G7NNT; Apr 5, Talk 'Truck Driving Abroad' by G1IKT. Details 01964 562258.

KENT

EAST KENT RS - 3, Annual used equipment sale; 9, Novice class at Icom; 17, talk 'How I Got Started in Ham Radio and What Happened Then' by Paul, G3VJF; 23/30, Novice class at Icom. Details01227 743070.

MEDWAY AR&TS - 10, talk 'Magnetism' by Lars Harstad; 25, (Saturday) MARTS annual dinner. Details 01634 685585 or 201462.

SEVENOAKS & DARS - 20, talk 'The Radio control of Models' by Alistair Dunlop. Details The Secretary, Sevenoaks & DARS, c/o Sevenoaks Dist Council, Argyle Rd, Sevenoaks TN13 1HG.

LEICESTERSHIRE

LOUGHBOROUGH & DARC - 14, Junk sale; 21, talk 'Early TV' by B Senior; 28, talk by G3KWY. Details 01509 218259.

LOTHIAN

LOTHIANS RS - 8 Junk sale; 22, Visit to Radio Forth, Forth Street - members only; Apr 12, talk 'TVI and how to cure it'. Details 0131 343 5423 (daytime).

MERSEYSIDE

LIVERPOOL & DARS - 7, Question & answer night; 21, Contest planning; 28, Surplus sale. Details 0151 722 1178.

WIRRAL & DARC - 29, Quiz night; Apr 5, Ten-pin bowling. Names to Ron, G3HFA. Details 0151 606 8989.

MID-GLAMORGAN

MID-GLAMORGAN ARG - 2, talk 'The RSGB' by Clive Trotman, GW4YKL, RSGB President. Details 01656 733729 or 0656 736954.

NORFOLK

NORFOLK ARC - 1, talk 'Use of Test Equipment' by Mike, G4UUB; 8, Construction QRP; 12, Trip to Picketts Lock Rally; 15, CW National Field Day, Briefing; 22, talk 'Science for All' by Arnold Tomalin, G3PTB; 29, Construction QRP. Details 01603 789792.

YARMOUTH RC - 9, Red Cross First Aid Talk; 12, Visit to London Radio Show; 23, Tech Books members bring; 30, 'Herring Story' by C Lewis. Details 01493 721173.

NOTTINGHAMSHIRE

ARC of NOTTINGHAM - 2, talk 'Operating the club's packet station' by Ed, G0INA; 9, Forum and talk 'Introduction to Foxhunting'; 16, ARCON's famous surplus equipment sale; 23, Talk 'Fast Scan TV'; 30, Construction/activity; Apr 6, AGM. Details 0115 950 1733.

SOUTH NOTTINGHAM ARC - 3, Construction at Fairham College; 10, Open forum - members only; 17, Construction at Fairham College; 24, talk 'LF Propagation' by Chris Burbanks, G3SJJ; 31, Construction at Fairham College; Apr 7, Junk auction with Julian, G0LXX. Details 0509 672734.

SHROPSHIRE

SALOP ARS - 9, Eagle Antennas with Mike, G4UDE; 16, Workshop evening; 23, Open night; Apr 6, Construction competition. Details G7SBD QTHR or @ GB7PMB.

TELFORD & DARS - 1, Club equipment night; 8, Visit to BT Oswestry - details G4EIX; 15, Main construction competition; 22, Pre-AGM meeting; 29, Annual General Meeting. Details 01952 588878.

SOMERSET

TAUNTON & DARC - 3, talk 'Work of the NRA' by Mr Chris Moore of The NRA; 17, talk 'Kites' by Paul Foulds. Details 01823 680778.

SOUTH GLAMORGAN

CARDIFF RSGB G - 13, talk 'March Satellites' by Bill, GW2GHM. Details 01222 810368.

SUFFOLK

FELIXSTOWE & DARS - 6, talk 'PC Networks' by Steve Thomas, 2E1CRV; 13, Novice RAE examination; 20, Annual General Meeting. Details 01394 273507.

SUDBURY & DRA - 7, Junk sale at Wells Hall Old School (10% takings to Club funds); Apr 4, talk and demonstration 'Antennas' by Frank, G3FIJ. Details 01787 313212 (before 10pm).

SURREY

ECHELFORD ARS - 9, Classic Wireless Competition. Details 01344 843472.

TAYSIDE

DUNDEE ARC - 7, Construction; 14, Talk 'Power Communications' by Ron Payne, GM4AWA; 21, Construction; 28, talk 'Cellular Phones' by Pinnacle Cellular Ltd. Details Allan, GM7ONJ, QTHR.

WARWICKSHIRE

COVENTRY ARS - 3, NOTA - Theme: 50MHz; 10, Mini lectures; 17, NOTA - Theme: RTTY & Construction; 24, Secretary's birthday cheese & wine party; 31, NOTA - 70MHz. Details 01203 617367.

MID-WARWICKSHIRE ARS - 14, talk and slides 'Living Without Electricity' by Bill Ford; 28, Surplus sale. Details 01926 424465.

STRATFORD UPON AVON & DARS - 13, talk - speaker TBA; 27, Surplus sale; Apr 10, AGM. Details 01789 740073.

WEST GLAMORGAN

SWANSEA ARS - 2, talk 'The sharp end of a BBS' by GW8TVX; 11, Coach to Picketts Lock Rally. Details 01792 404422.

WEST MIDLANDS

RS of BLOXWICH - 7, Video evening; 21, talk and demonstration 'Amateur Television'; Apr 4, Easter social at the GT Leisure Bowl, Bloxwich. Details 01922 683877.

STOURBRIDGE & DARS - 6, Constructors' competition; 20, Annual General Meeting. Details G7HEZ @ GB7PZT or 01384 374354.

WEST SUSSEX

HORSHAM ARC - 2, Surplus equipment sale. Details 0173 784 2150.

WEST YORKSHIRE

DENBY DALE & DARS - 1, talk 'Aspects of sky wave propagation' by David, G0EVA; 15, talk 'Digital electronics and repeater controls' by John, G0PRF; Apr 5, talk 'Diving' by Barry, G4TML and Frank, G1FBC. Details 01484 547553.

HALIFAX & DARS - 21, talk 'Hudds 70cm repeater'. Details 01422 202306.

KEIGHLEY ARS - 16, Visit by Crime Prevention Officer; 30, talk 'Desert Island Disk Drive' by G6WHL. Details 01274 496222.

PONTEFRACT & DARS - 9, talk 'Top Band TX' by Brian, G3SYC; 16, Rally preview and arrangements; 26, Components Fair & Spring Rally; Apr 6, Rally windup. Details 01977 677006.

WILTSHIRE

TROWBRIDGE & DARC - 1, The Somerset range of kit, Walford Electronics; 15, Social. Details 01225 864698 (evenings).

RALLIES AND EVENTS

This is a list of 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'.

4 MARCH (SATURDAY)

ABERYSTWYTH & DARS Annual Amateur Radio Rally - Aberaeron School, Aberaeron, Dyfed. Event features trade stands, special interest stalls, Amateur Radio demonstrations and a bring and buy. Plenty of room, easy parking. All welcome. Town and craft centre near by. Details from Katy, GW0SFO, 01545 580675.

11-12 MARCH (SATURDAY-SUNDAY)

RSGB LONDON Amateur Radio & Computer Show - Lee Valley Leisure Centre, Picketts Lock Lane, Edmonton, London N9. Doors open 10am, with priority admission for the disabled. Event features trade stands, lectures, special interest groups and a bring & buy. RSGB Morse Test available on demand (two photos needed). Refreshments available. Ample free parking. Talk-in on 2m and 70cm. See this month's *Show Guide*.

12 MARCH

10th ANNUAL WYTHALL Radio Club Rally -

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Send 5 - 1st class stamps for specifications and price list of Towers and Antennas to:

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It is now possible to use the above computers to run Packet Radio with an outlay of much less than £100!!
Commodore, PC and Spectrum systems allow HF and VHF working, while the Atari system only offers VHF. PMS facilities are available on the Commodore, and the Spectrum if a microdrive is fitted. Digipeating facilities are offered on all versions. The Spectrum modem can also be supplied with a centronics printer port. We supply a fully tested modem, with a free copy of suitable software.

Commodore 64, Atari ST and PC Modems **£55.00**
Baycom Agency
Spectrum Modem **£75.00**
Spectrum Modem with printer port **£85.00**
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VISA
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Wythall Park, Silver Street, Wythall, near Birmingham. On the A435, 2 miles from M42, junction 3. Features the usual traders in three halls and a marquee. A bring and buy stall. Bar and refreshments facilities will be available. Talk-in on S22. Admission £1. Details Chris, G0EYO, 0121 430 7267.

19 MARCH

NORBRECK Amateur Radio Electronic and Computing Exhibition - Norbreck Castle Exhibition Centre, Blackpool. Organised by the Northern Amateur Radio Societies Association (NARSA). Details Peter, G6CGF 0151 630 5790.

TIVERTON MID-DEVON Rally - Pannier Market, Tiverton, Devon. Only minutes from M5, Jn 27. Doors open 10am. Features in two halls, trade stands, a bring and buy stall and refreshments. Further displays and full refreshment facilities in the club room bar. Talk-in on S22. Details G4TSW, Mid-Devon Rally, PO Box 3, Tiverton, Devon.

26 MARCH

BOURNEMOUTH Radio Society Annual Sale - Kinson Community Centre, Pelhams Park, Millhams Road, Kinson, Bournemouth. Doors open 10.30am until 4.30pm. Features Amateur radio and computer traders, clubs and specialised groups. Refreshment available. Admission £1 including free raffle. Talk-in on 2 metres on S22 by G1BRS. Details from Malcolm, G0UCX QTHR or 01202 747745.

THE MAGNUM Radio & Computer Rally - Magnum Leisure Centre, Irvine - follow the signs for 'Harbourside'. Doors open 11am (10.30 for disabled visitors). All usual traders, interest groups and large Bring & Buy stand. **NEW** Morse tests available on demand. Two passport photos & ID needed. Full catering facilities with licensed bar. Details Bob, GM0DEQ, **NEW TELEPHONE NO** 01563 574660.

PONTEFRACT & DARS, 15th Annual Components Fair & Spring Rally - The Carleton Community Centre, Carleton, nr Pontefract. Doors open 11am, 10.30 for disabled visitors. Features trade stands, bookstall and a bring and buy stall. Morse tests on demand, the usual two passport size photos required. Refreshments available. Admission by prize programme. Details Colin, G0NQE on 01977 677006.

2 APRIL

FELTHAM AND HOUNSLOW SEA CADETS Computer and Radio Rally - Feltham & Hounslow Sea Cadet Corps, 2 Poplar Way, Feltham, Middlesex TW13 7AB. Doors open 10am. Entrance fee £1, children under 14 years accompanied by an adult, free. Stall bookings and enquiries talk in on S22 and 1933MHs Allan, G49JU. Tel: 01784 456486.

9 APRIL

LAUNCESTON 9th Amateur Radio Rally - Launceston College. Doors open 10.30am. Event features trade stands, RSGB bookstall and a bring and buy stand. RSGB Morse tests available on demand, remember to bring two passport size photos and the relevant fee. Hot snacks from 7am. Talk-in on S22. Ample parking. Details Roy, G0IKC on 01409 22164 or Rodney, G8HDW on 01566 775167.

WHITE ROSE Rally - ***NEW VENUE*** Leeds University. Morse test available on demand, subject to two passport size photos and the necessary fee. Details Allen, G7ELS PO Box 73, Leeds LS1 5AR or tel 0973 189276.

16 APRIL

CAMBRIDGESHIRE Repeater Group Amateur Radio Rally - Philips Telecom - Catering Centre, St Andrews Road, Chesterton, Cambridge. Doors open 10.30am. Event features trade stalls and a bring and buy. Ample parking space. Details Darren, G1ERM on 01223 60601 evenings.

22 APRIL (SATURDAY)

INTERNATIONAL MARCONI DAY Special Exhibition Station at the Wireless Museum, Puckpool Park, Seaview, Isle of Wight. Details Douglas, G3KPO 01983 567665.

INTERNATIONAL MARCONI DAY H/Q - Details Norman, G4USB 01209 212314.

23 APRIL

BURY RS Annual Rally - the Castle Leisure Centre, Bolton Street, Bury. Doors open 11am, 10.30 for disabled visitors. Bring and buy. Bar and refreshments available. Talk-in on S22. Details G4KLT, 0161 762 9308.

SWANSEA ARS Amateur Radio and Computer Show - Swansea Leisure Centre, on the A4067 Swansea to Mumbles road. Doors open from 10.30am to 5pm. Event features trade stands, a bring and buy stall and special interest groups. Operational HF and VHF Station. Talk-in on S22. Details Roger, GW4HSH 01792 404422.

30 APRIL

BRITISH ATV CLUB (BATC) Rally - The Sports Connexion, Coventry. Doors open 10am, 9.30 for disabled visitors. Rally features many radio trade stands, special interest groups and a bring and buy. Refreshments available all day. Entrance £1, 50p under 14 and OAP. Talk-in on S22 and GB3CV. Details & trade enquiries Mike, G6IQM 01788 890365 or Fax 01788 891883.

EAST CLEVELAND ARC Annual Rally - the Leisure Centre, Marske by the Sea. Doors open 11am. Event features the usual trader stands and a bring and buy stall. Refreshments available. Details Malcolm, G4YMB 01287 638119.

12th ANGLO-SCOTTISH Rally - Tait Hall, Kelso. Doors open 11am. Features the usual traders and a bring and buy. Refreshments available. Talk-in on S22 via GM4KHS. Entrance still £1. Details Colin, GM4UFP 01750 20006 after 6pm.

CONGRATULATIONS

To the following who our records show as having reached fifty years continuous RSGB membership this month:

Mr M A Chatfield, RS18624

6 MAY (SATURDAY)

DARTMOOR Radio Rally - Yelverton Memorial Village Hall, Meavy Lane, Yelverton, Devon. Doors open 10.30am. Parking for 600 cars. Access for disabled. Playground for children. Trade stands, bring & buy etc. Refreshments. Talk-in on S22. Details Ron on 01822 852586.

8 MAY (MONDAY)

EXHIBITION OF WARTIME equipment from all three services and Special Event Station at Puckpool Park Wireless Museum, Seaview, Ryde, IOW. Details Douglas, G3KPO 01983 567665.

MID CHESHIRE ARS Rally - Civic Hall, Winsford. *****THIS RALLY HAS BEEN CANCELLED*****

14 MAY

DUNSTABLE DOWNS Radio Club 12th Annual National Amateur Radio Car Boot Sale - Stockwood Country Park, Luton. Nr jnct 10 M1. 10am - 5pm. Talk-in on 2m. Attractions include Open Day, environmental exhibits, side stalls, free entry to The Mossman Collection of Horse Drawn Vehicles, Craft Museum, train and carriage rides plus much more. Plot details on 01582 451057. Pre-booking for plots until 11th May. Plots can be purchased on the day.

MARS/DRAYTON MANOR Radio and Computer Rally - Drayton Manor Park near Tamworth, Staffs - on A4091. Doors open 10am. Usual traders, bring & buy. Details Norman, G8BHE 0121 422 9787(evenings).

MARTLESHAM Radio Society VHF Roundtable 1995 - BT Laboratories, Martlesham Heath, Ipswich, Suffolk. The event commences 10am and will include round table sessions, test facilities and bring and buy facilities. For BT Labs security requirements, all access is by advance booking only - please give the names and details of all persons attending in a group, if multiple tickets requested. For tickets send an SASE to Roy Smith, G0RRC, Lykkeboo, The Street, Burstall, Ipswich, Suffolk IP8 3DN.

21 MAY

11th YEOVIL QRP & Construction Convention - Preston School/Centre, off Preston Road, Yeovil. Details and map G3CQR QTHR tel: 01935/813054.

28 MAY

EAST SUFFOLK Wireless Revival - Ipswich Rally - Maidenhall Sports Centre, Ipswich. Doors open 10am - 4pm (open to car boots from 8.30am). Admission £1.50. Trade stands, car boot sale, bring & buy, drive-in antenna test facility, radio check facility, RNARS RAFARS RAOTA ISWL; local Club stands, Novice Licence - City & Guilds Entry, vintage wireless show, non-radio traders, large traders' hall, improved disabled access, refreshments & bar available, ample free parking. Talk-in on S22 GB4SWR. Details 01473 645885.

MAIDSTONE YMCA Mobile Rally - YMCA Sportscentre, Melrose Close, Maidstone, Kent ME15 6BD. Route - M2 jnct 3, or M20 jncts 4,5,6 or 7, then A229 to Loose Village 2 miles south of Maidstone. QSX GX8TRF (S22) and GX3YSC (10FM and SU22). Exhibition HF Station GX3TRF. Opens 10.30am (free 10am admission for severely disabled). Entry £1.50 per adult. All day videos and free sweeties and sickly drinks for juniors. Snack bar available. *Do Your Own* bring & buy outdoor tables for hire. YMCA desk 01622 743317 for free pre-rally camping caravan facilites. Free brunch and afternoon tea for all traders . Trade bookings before 9.30pm. Ian, 01622 630000.

PLYMOUTH Radio Club Radio Electronics Fair - Plymstock Secondary School, Church Road, Plymstock, Plymouth. Doors open 10.30am. Over 25 stalls with electronic, computer and radio components, bring & buy stall, bookstall, grand raffle. Refreshments available. Talk-in on S22. Details Frank, G7LUL, 63 Fleet Street, Keyham, Plymouth PL2 2BU, tel: 01752 563222.

TRAFFORD Rally (The Great Northern Rally) at G-Mex - The Greater Manchester Exhibition and Events Centre, City Centre, Manchester. All usual traders and attractions, RSGB stand, bring & buy and new traders. Free cash draw, licensed bar, refreshments and hot & cold food. Ample car parking (both free and paid for). Doors open 10.30am for all classes (with disabled persons' priority queue) and close at 5pm. Admission £1.50. Talk-in on S22 2m via GB1GMX. Trade and further enquiries Graham, G1IJK on 0161 748 9804.

4 JUNE

SPALDING Amateur Radio and Computer Rally - Details G4TWR, 01775 722940.

11 JUNE

THE 26th ELVASTON CASTLE National Radio Rally - Details from Ken, G3OCA, 01332 662818. Trade enquiries, Keith, G1ZLQ 01332 662896 after 7pm,please.

ROYAL NAVAL Amateur Radio Society (RNARS) Annual Mobile Rally - Details Clive, G3YTQ on 01329 234143.

17/18 JUNE

BLETCHLEY PARK Amateur Radio & Computer Rally - Details 0923 893929.

18 JUNE

NEWBURY Boot Sale - Details George 01488 682814.

THE GORDON Rally (North of Scotland AR Convention) - Huntly, Aberdeenshire. Details GM6TAN 01466 780739.

25 JUNE

38th LONGLEAT Amateur Radio Rally - Details Gordon, G0KGL 0117 940 2950.

2 JULY

The 6th YORK Radio Rally - Details Dave, G7FGA 01904 790079.

8 JULY (SATURDAY)

CORNISH Radio Rally and Computer Fair - Information & booking Ken, G0FIC 01209 821073.

9 JULY

SUSSEX Amateur Radio & Computer Fair - Information and booking Ron, G8VEH 01903 763978 or 0273 417756 office hours.

16 JULY

RAIBC Romsey Picnic - Details John Compton, G4COM, 01703 693017.

THE 12TH McMICHAEL Rally and Car Boot Sale - Trade bookings Chris, G0MZN 01734 874870. General details Dave, G3SET 01628 486554.

22 JULY (SATURDAY)

AIR FORMATION Open Day - Colerne Airfield. (RSARS) Stall applications etc to RSm G Baldry on 01225 743240 ext 5256.

23 JULY

COLCHESTER Radio & Computer Rally - Details Richard, G7BIV, 01376 571239.

2nd HUMBER BRIDGE Amateur Radio Rally - Details or bookings Roly, G0UKS 01482 837042.

30 JULY

SCARBOROUGH ARS Radio Electronics and Computer Fair - Details Ross, G4ZNZ 01723 514767.

6 AUGUST

RSGB WOBURN Rally - Woburn Abbey, Bedfordshire. Details from Norman Miller, G3MVV, 01277 225563.

13 AUGUST

38th ANNUAL DERBY Mobile Rally - Details 0332 556875.

FLIGHT REFUELLING ARS Hamfest'95 - Dorset. Overnight camping facilities available for Saturday 12th. Details Richard Hogan, G4VCQ 01202 691021.

18 AUGUST (FRIDAY)

COCKENZIE & PORT SETON ARC Radio Junk Night - Details Bob, GM4UYZ on 01875 811723 or via GB7EDN.

19/20 AUGUST

STAFFORD Amateur Radio & Computer Show (incorporating RSGB National Convention)) - Details 01923 893929.

20 AUGUST

6th GREAT EASTERN Rally - Details Ian, G0BMS 01553 765614 or at GB7OPC.

WEST MANCHESTER Radio Clubs "RED ROSE" Rally - Details Dave, G1IOO 01204 24104 evenings only.

27 AUGUST

TORBAY ARS ANNUAL Mobile Rally - Details John, G3YCH, QTHR; 01803 842178.

2 SEPTEMBER (SATURDAY)

ANNUAL WIGHT WIRELESS Rally - National Wireless Museum, Arreton Manor, Newport, IOW. Details Douglas, G3KPO 01983 567665.

3 SEPTEMBER

BRISTOL RADIO RALLY - Details Muriel, G4YZR 01275 834282 (24 hour answerphone.)

18th TELFORD Rally - Details 01952 588878 or 01743 249943. Traders only contact Jim on 01952 684173.

VANGE ARS Rally - Details Stuart, G1VWB 01375 859632.

10 SEPTEMBER

BARTG Rally - Details Peter Nichol, 38 Mitten Ave., Rubery, Rednal, Birmingham. B45 0JB. Tel: 0121 680 5963.

SOUTHEND & DRS 75th Anniversary Radio & Computer Rally - ***NEW VENUE***Cliffs Pavilion, Southend-on-Sea. Details Ron, G0UAW on 01702 353676 or Fax Martin, G0OQR on 01702 602271.

24 SEPTEMBER

THREE COUNTIES RADIO RALLY - Details G4PQZ tel: 01905 773181.

NORTH WAKEFIELD Radio Club Rally - Details John, G4RCG on 01924 362144 or John, G0EVT 01924 825443.

THE THREE COUNTIES Radio Rally - Details & bookings Eddie, G4PQZ on 01905 773181.

8 OCTOBER

KIDDERMINSTER & DARS Rally - Details G8JTL on 01384 894019.

20/21 OCTOBER (FRIDAY/SATURDAY)

LEICESTER AR Exhibition - Details Frank, G4PDZ on 0116 287 1086.

29 OCTOBER

HORNSEA ARC Rally - Details Duncan, G3TLI on 01964 532588.

12 NOVEMBER

MARS-STOCKLAND Radio/Computer Rally - Details Norman, G8BHE on 0121 422 9787.

26 NOVEMBER

BRIDGEND & DARC Radio Rally - Details Mike, GW7NIS on 01656 722199.

WEST MANCHESTER Radio Clubs "WINTER" Rally - Details Dave, G1IOO on 01204 24104 evenings only.

3 DECEMBER

VERULAM ARC Rally - Details Ian, G0PAU on 01923 222284.

GB CALLS

The list below shows special event stations licensed for operation during this month. It was taken from the HQ computer on 6 February. These callsigns are valid for use from the date given but the period of operation may vary from 1-28 days.

MARCH

1	GB2SDD	Saint David's Day
	GB2TAM	Tangmere Air Museum
	GB5CC	Commonwealth Contest
3	GB2RNC	Royal Naval College
4	GB2SR	Stelar Radio
8	GB2RNX	Royal Naval Auxiliary Service
10	GB0CDU	Coastal Defence 'U'
	GB4LON	Lee Valley Leisure Centre
	GB6RS	Royal Signals
11	GB4OM	Oldham Museum
14	GB4YAC	York Air Cadets
18	GB0MEP	Maplin Electronics Preston
	GB2NRS	Northern Radio Societies
	GB5SR	Stellar Radio Net
24	GB13FRI	Friday The Thirteenth
25	GB2SED	Spring Exhibition Day
27	GB2DAY	Old Anniversary Year ♦

The LAST WORD

ATROCIOUS DIN

Do any *RadCom* readers share my loathing of DIN plugs? These devices seem to have been ill-conceived, atrociously manufactured, yet are plugged into just about every piece of amateur radio equipment. I have tolerated these plugs for many years, with their shells that fall apart, and do not hold the pin-section rigidly; with their strain reliefs and cylindrical covers which fit very easily but usually refuse to come off.

Matters have been brought to a head with the increasing use of 13-pin plugs and (dare I say it?) mini-DIN plugs. The drive for miniaturisation has gone too far! It is time we, as users, took a firm stand. I, as a committed Kenwood user, find at least one of these 13-pin plugs on the back of my Kenwood equipment. Thanks to sensible circuit design, most of the pins have the same functions on each transceiver; no doubt the design engineer wanted the user to be able to plug the same ancillary equipment into each of his products simply by interchanging a single plug.

Thanks to the inept design of the plug, I have a 13-pin fully-wired plug that will physically fit the TS-950 and the TS-690 but not the TS-790; another plug will fit the TS-790 and the TS-690 but not the TS-950! Quite simply, the engineering tolerances on these 13-pin plugs are not tight enough to ensure consistent mating when the plug is loaded with its full complement of cables.

I offer you a simple challenge: wire up a 9-pin mini-DIN plug or a 13-pin standard DIN plug with screened multi-way cable *first time!* I am not saying it is impossible, but if you try you will know why these plugs are more trouble than they are worth, and why some manufacturers charge up to £50 for a cable with a fitted mini-DIN plug!

Dr G Brown, G1VCY

GREETINGS FROM JAPAN

I just read *Radio Communication* for December 1994 and found that my picture is brought to the public on its cover page. It is a great honour for me and I must thank you and members of the RSGB for their kind consideration.

As your journal said, I retired from the secretaryship of IARU Region 3 after having served in that post for twelve years. When I recollect things experienced during that period, all are happy ones remaining in my memory. Those include vivid memories of my attendance at five Region 1 Conferences from Brighton in 1981 to De Haan in 1993, which has deepened my friendship with RSGB people in particular.

I am pleased to say here that even after my retirement I will remain at the Secretariat of Region 3 to assist my successor, Mr Komuro, JA1KAB, in editing the *Region 3 News* and with other services for the time being. So, I am expecting to see your people again somewhere in Region 1 or in Region 3.

It would be very much appreciated if you could convey my sincere thanks to RSGB members. Best wishes to you all!

Masayoshi Fujioka, JM1UXU
Assistant to the Secretary, IARU Region 3

ANTARCTIC INFO

Sincere thanks to G4XZJ, G0FQE, G7NCU, G3VPO, GM4VDA and G4WOE who wrote or 'phoned to give useful leads resulting in establishing that PO A J Williams, RN was the CW operator seconded to *RRS Discovery* on the British, Australian and New Zealand Antarctic Expedition in 1929, led by Sir Douglas Mawson, Australian explorer and geologist. To date we have failed to find any relatives but will be mounting his picture on the bulkhead of the recently reinstated wireless room during the refit of this historic vessel. Members of Dundee Amateur Radio Club are presently searching for large dials and knife switches to reconstruct the cabin.

Donald Black, GM0PIV

ALL'S WELL THAT ENDS WELL

In *News and Reports* (*RadCom* Oct 94) a short information was published about my Alinco hand-held which was stolen in Manchester. *[See also The Last Word in recent months - Ed]*

A few months later, I didn't believe my eyes, after the postman had delivered a parcel from the UK which contained a brand new Yaesu FT-415 2m handheld.

I wish to express my warm thanks to all the British radio amateurs who have helped me in my unpleasant situation that happened during my holiday bike trip to G-land, and who contributed to the collection for this new piece of gear. I would especially like to thank Dave, G0HXN, who managed all the necessary steps to pass the gear on to me in such a short time.

It is very good that the ham-spirit still works and is able to help in such difficulties. Once again G-boys, my thanks for helping me. I look forward to many QSOs with G-Land.

Mirek Holik, OK2VZE

KEEP IT SIMPLE?

You requested comments on the new-look *Radio Communication* (January, page 9):

1. Issue guide number - top left cover. Why make things complicated? All that is required is a narrow white strip with the month and year in plain English.
2. Heading. Prefer old heading with *white* spaces to write on significant contents with felt pen for quick reference.
3. General contents - good though with decreasing mental capability some articles require concentration! Exception - waste of paper with non-informative picture of cave-man - never complain about articles "left over due to lack of space".
4. Nice to have article of depth on noise from compact and other fluorescent lamps.
5. Overall - spelling has improved.
6. May we be spared over-laboured descriptions of outdoor operations? It is of no interest to me to know if GXYZ and company went to the wrong site or to know how many pints of petrol were used... This is the stuff for 80m natters. Let's have a bit of hefty editing here.
7. Overall you're 'doing a good job'.

Rowland Dunn, G4VGH

[We felt the 'cave-man' picture on page 17 of the January RadCom *was a dramatic illustration for what was an important technical article - Ed]*

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.

THANKS TO SSL...

I wish to convey heartfelt thanks to Subscription Services Ltd, and to Jason Pearce in particular, for their recent help.

I shall be flying out to Romania for Easter week to initiate the training of teacher-carers of children who have learning and physical disabilities. My husband, Robin, will be driving a truck in a convoy for the Biggin Hill Romania Relief Group.

If I have the time and working conditions are favourable, I should like to transmit back from my base - an area west of Bacau, Eastern Transylvania. I am trying to overcome problems both technical and non-technical, not least the realisation that my licence would need renewing. I envisaged a miracle was needed if I was to beat this particular deadline on which other deadlines depended.

Subscription Services Ltd at the Radio Licensing Centre came to the rescue. On the Monday, Jason Pearce listened courteously to my problem. On the Tuesday he received written confirmation of my trip and my cheque. On the Saturday my new licence arrived. This was an exceptional case, I know, but keep up the good work, SSL, and may your efficiency on this occasion pervade your execution of other licence renewals for radio amateurs nationwide.

I should like to hear from anyone who is interested in hearing more about my fact-finding mission and its consequences, anyone who has transmitted from Romania or who has contacts near where I am going. An SASE would be much appreciated.

Gloria Ackerley, G3VUN
Secretary Medway Amateur Transmitting and Receiving Society

POLISH SPONSORSHIP REQUESTED

Please explain to me the conditions for continuing to receive *Radio Communication* magazine every month. For several years I sent series of Polish stamps as payment to my friend Alan Taylor, G3DME. Alan was also my sponsor for *DX News Sheet*. Since he died the present situation is not clear for me. Sending any currency abroad from Poland as before is impossible. Besides, I'm a pensioner and my latest pension is very low - about $100.

Wlodzimierz Kuligowski, SP3AGE
ul Zeromskiego 6/1
78-600 Walcz
Poland

[SP3AGE has been a member since 1977 but his membership is due to lapse this month. If any member or club would care to sponsor him, perhaps in return for Polish stamps, please write directly to Wlodzimierz at the address above - Ed]

WHY DID YOU TAKE THE RAE?

I have just spent a full hour on 2m SSB (1240 - 1340 UTC) calling CQ till blue in the face, putting the beam in all directions, operating VOX so as not to miss anything, without a single reply. What has become of 2m SSB? Has it been taken from us without my knowledge? You would think that at least one person would reply after that length of time, or am I dreaming? I seem to recall that the RAE contains questions on operating procedure, but why, if nobody is going to operate?

Maybe these questions should be changed to questions about operating a TNC. If people only watch for DX news via packet then no DX will ever be worked as we will all be too busy watching computer screens rather than being there to find out if a DX QSO can be made. Your signal can travel as far as it wants, but if nobody is listening, the whole exercise is nothing other than pointless.

Let's get back to 'real radio' and try to work other *people* rather than their computers via a network. If you want to do that get on the Internet!

Why did *you* take the RAE?

Keith Sharples, G7LPW

CLASSIFIED ADVERTISEMENTS

Classified advertisements 55p per word (VAT incl) minimum 14 words (£7.70). Please write clearly. No responsibility accepted for errors. Latest date for acceptance — 5 weeks before 1st of issue month.

All classified advertisements MUST be prepaid.

NB: CHEQUES SHOULD BE MADE PAYABLE TO RSGB.

Copy and remittance to: **Victor Brand Associates, 'West Barn', Low Common, Bunwell, Norwich, Norfolk, NR16 1SY.**

NB. Members' Ads must be sent to "Members' Ads," RSGB Hq.

FOR SALE

SAMSON TOP QUALITY GERMAN EL-KEYERS. ETM-5C, £90.00. ETM-9COG super memory model, (logikey specification) £108.00. S.A.E. Details G5BM QTHR. (0531-820960).

AOR 8000 £375 improved S.W. Performance version special buy. G3LLL — see below...

FT990 BARGAINS. We bought at old prices, few left £1,919 & DC version £1,660 — hurry! G3LLL — see below...

CLEARANCE LINES. IC728 very quiet RX super on C.W. AS NEW (swopped for later ICOM) (list £995) £665 inc Free CW filter or FM unit — Icom IC2KL 500w s.s. linear & p.s.u. (list £2,040) in good order £990, matching 500w auto ATU (list £595) £295 Both £1,150, — IC707 new (Icoms FT840! + pre amp) (list £895) £599 with 2 year guarantee. G3LLL — see below...

P.A. VALVE OFFER pair 6JS6C for FT101E etc. + JAP 12BY7A (normally £78) £48 Pair 6146B + JAP 12BY7A (normally £74) £48 — ONLY if you cut out this ad. Cash/cheque p&p £1.50. Holdings Amateur Electronics (G3LLL), 45 Johnston St., Blackburn BB2 1EF. Open Tues, Wed, Fri & Sat, but phone first 0254 59595.

G4TJB QSL CARDS, CARDS printed to your specifications, send large S.A.E. for samples and full product list. Unit 6, Worle Industrial Centre, Coker Road, Worle, Weston-super-Mare, BS22 0BX. Tel: (0934) 512757, (0850) 707257, Fax (0934) 512757.

"RAYNET" YELLOW REFLECTIVE TABARDS with "RAYNET". Medium £10.50, Large £11.00, XLarge £11.50. "RAYNET CONTROLLER" 50p extra.- EPSON PX4+ lap top computer, built-in printer, charger Eprom for packet £46.50 inc pp. Nonreversible battery connectors line/panel mounting (10 pairs/pack) £6.50. Mike Watson G8CPH, Ipswich (0473) 831448.

MOSLEY ANTENNAE — All the famous British Manufactured Antennae, direct from us including spares/replacements. Mustang, Elan, TA-33Jnr etc. Full details shown in our Handbook, price £1.25 refunded upon purchase of Antennae, Mosley Electronics, 196 Norwich Road, New Costessey, Norwich NR5 0EX (Administrative address only).

ANTI-T.V.I. CUSTOM BUILT HF/VHF AERIALS, Trap-dipoles, multibanders, traps, baluns, parts. Reconditioned TX/RX's, Linears ATU's. Data 38p SAE, Aerial Guide £1.50. G2DYM, Uplowman, Devon EX16 7PH. Tel: 013986-215 any time.

QSL CARDS. Gloss or tinted cards. SAE for samples to Twrog Press, Penybont, Gellilydan, Blaenau Ffestiniog, Gwynedd LL41 4EP.

ALUMINIUM TUBE. Heavy-duty (scaffold) tube approx. dimensions 20' long, 2" dia, $^{11}/_{64}$" (4.5mm) wall thickness. 20' and 10' lengths available @ £1.80 + VAT per ft. C.W.O. Rusper Hire (Crawley) 01293 87 1621 office hours only.

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LANDWEHR VHF/UHF MASTHEAD PREAMPLIFIERS 2 metre 145mas £147 and 70cm 435ma £152. Post & packing £4. Write or phone for leaflet. Qualitas Radio, 23 Dark Lane, Hollywood, Birmingham B47 5BS, Tel: 021-430 7267.

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GW3COI — sketches for QSLs etc from your photos or ideas. Penrhynbach, Abersoch, Gwynedd 0758 712675.

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THE WINTER 1994 G0LOV/G04LUE. UK Amateur Callbook for IBM compatibles. The Callsign Data is supplied by the Radiocommunications Agency October 1994. Specially written database, easy to install and use. Fast searching, by callsign, address, postcode, surname or wildcard, shows WAB book numbers. Facilities also includes UK repeaters, mailboxes, nodes, European repeaters £12.50. Now available Hamfax, transmit and receive fax, slowscan pictures ritty and Morse code, all on one pcb, available in kit form £21.00 or ready built £25.00 both excluding box. New product CTCSS transmit on your radio a small pcb which when fitted in to your transceiver will transmit CTCSS tone one frequency, (see Radcom December page 66), kit £9.95 ready (built on your CTCSS code) £12.75. Please enclose £1.50 PPI and are available from J. Bailey, 8 Hild Avenue, Cudworth, Barnsley, South Yorkshire S72 8RN.

JVfax/SSTV, HamComm, PktMon. 9FD or 25FD PC Transceive Interface, Programs, Manuals, Pictures. £25.50. G8SLB (QTHR). 0181-595 0823.

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ADVERTISERS INDEX

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The display advertisement copy date for our May 1995 issue will be **6th March 1995**

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ICOM's new IC-2000H delivers a hefty 50 watts of output power to provide the talk power you need to reach even the most distant repeaters, lower power levels of 10 and 5 watts are also available. Die-cast aluminium construction combined with a large heat sink ensure that operation is stable even at high duty cycles. Now look at the IC-2000H's list of features:

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For sheer high-performance, anywhere, the FT-900AT is incomparable and ranks with the FT-1000 to further underline Yaesu as the choice of the world's top DX'ers.

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- Programmable CTCSS Encode w/Repeater Offset
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- 100 Memory Channels
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  RX: 100 kHz-30 MHz
  TX: 160-10 meters
- CW Full Break-in Keying w/ Adjustable Speed
- Fast/Slow AGC Circuit
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- Duct Flow Cooling System
- Twin Band Stacking VFOs
- Built-in Noise Blanker
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MMB-62 Controller Bracket
MMB-20 Mobile Mtg. Bracket
SP-7 Mobile External Spkr.
SP-6 Base Station External Spkr.
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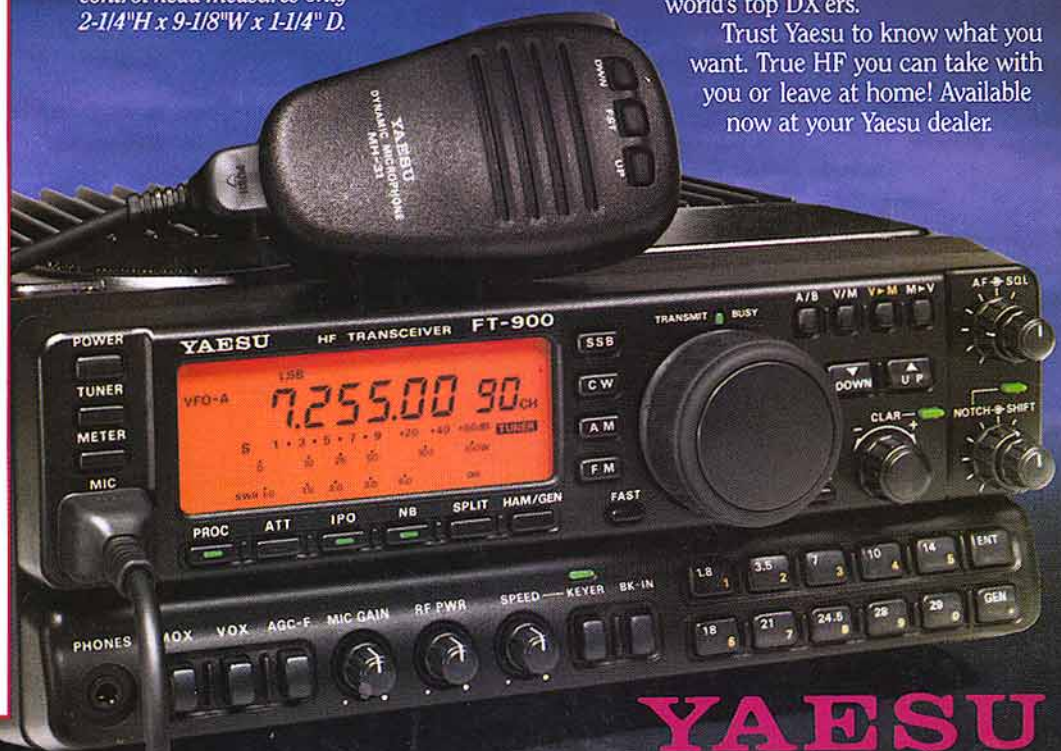
YH-77ST Headphone



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