Radio Communication

The Journal of the Radio Society of Great Britain

March 1994

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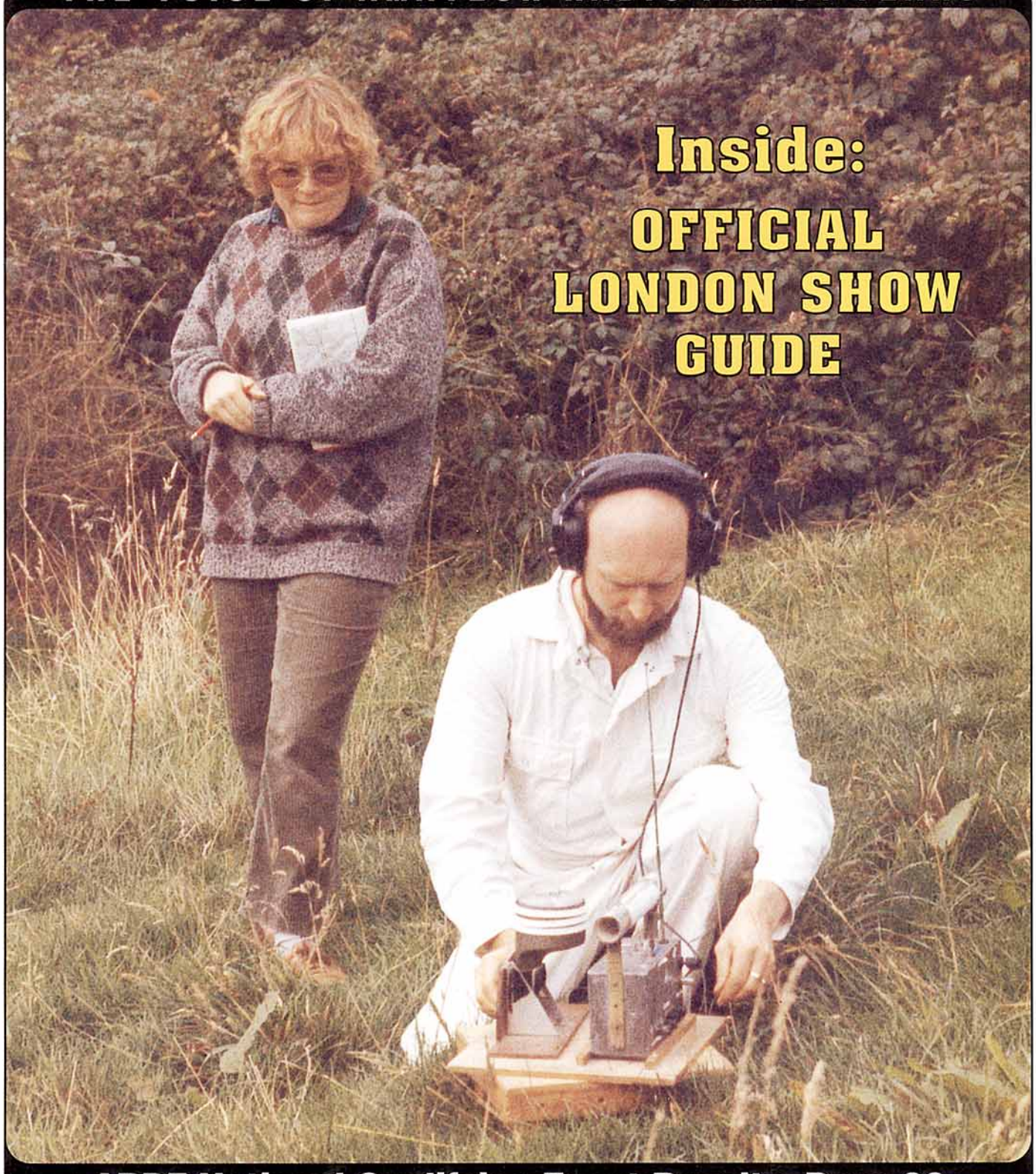
THE VOICE OF AMATEUR RADIO FOR 81 YEARS



Inside:
OFFICIAL LONDON SHOW GUIDE

ARDF National Qualifying Event Results: Page 93

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

HATS OFF!

TH-22E/42E
FM HANDHELD TRANSCEIVERS

The news is out. And it's too exciting to keep under your hat.

Kenwood's new TH-22E (144MHz) and TH-42E (430 MHz) redefine hand-held communications, with a palm-size format and impressive performance.

They're small and light enough to carry anywhere, but offer over 5 watts output (with a 9.6V battery) and long hours between charges. The secret's in the FET power module, a world first in this class for sophisticated power management.

Other features? From the user friendly menu system to the 40 EEPROM memory channels, Kenwood's new handheld FM transceivers offer numerous category-leading features and first-class performance. So it's hats off to Kenwood – the transceivers that cap the rest.

KENWOOD

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Radio Communication

COVER PICTURE:
Top Band ARDF is becoming increasingly popular. Each year, eight regional qualifying events are used to select the entrants for the RSGB National Final. See this month's *Contest Classified* for the latest qualifying event results. Next month we'll be reporting on the National Final.
PHOTOGRAPH: G4KBB

NEWS AND REPORTS

TECHNICAL FEATURES

REGULARS

REVIEWS

SHOW GUIDE

RADIO SOCIETY OF GREAT BRITAIN

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

PATRON: HRH PRINCE PHILIP, DUKE OF EDINBURGH, KG

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

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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:
0707-659015

The RadCom Leader

Out and About

IT IS AT THIS time of year that one starts to think about Spring and Summer, daffodils, tulips and long sunny days, field days and work on the antennas. I am sure you all know the score.

Here at HQ, Spring means that Derek Lund (the Rally Manager) and myself sit down to decide the rally and events programme for the coming year.

The Society's rally programme traditionally runs from February through to November and, with over 200 amateur radio events taking place annually nationwide, it is no easy task. Obviously we would like to accept every invitation we receive but this is not possible. We do not have the staff or the financial resources to achieve this aim. I hope event organisers understand this.

The Society makes a conscious effort not to concentrate solely on large events. These are obviously more financially viable, however we feel that the smaller events also need our support and we try to even out the balance between large and small, and with as large a geographical spread as possible.

The RSGB events in the calendar - the VHF Convention, the National Rally at Woburn and the HF Convention - are organised and run by the Society's volunteer committees with logistical support from HQ.

HQ Rally Team

THE OTHER EVENTS we attend are staffed by the four-strong HQ rallies team, who take on this task as an additional commitment outside their normal duties. The staff derive great pleasure from attending these events, especially meeting you, the members.

Members are the most important factor in Society life, so it is important that we present a friendly and efficient image to you when we are in your part of the country. From the large amount of complimentary correspondence I receive on the performance of the rally team, I think we do.

This year our events calendar starts on 20 February when our teams are at both the VHF Convention and the Trafford Amateur Radio Club Rally in Manchester. We then move on to the RSGB London Amateur Radio and Computer Show at Picketts Lock on 12 and 13 March.

There is no RSGB event at the NEC so we will have our large book stall and information point at the London Show this year. In addition, there will be a large open plan stand where representatives of the Society's Membership Liaison Committee, Licensing Advisory Committee, EMC Committee and Planning Advisory Board will be on hand to deal with your enquiries.

The event calendar for 1994 is not yet complete so I cannot inform you of our other movements. Please keep your eye on the *Rallies and Events* page which appears in *RadCom* every month.

If we are at a rally or exhibition near you this year, please come along and say hello. We will be more than pleased to see you.

Peter Kirby, G0TWW
General Manager

NEWS & REPORTS

● GX0CRW/P WILL celebrate the 250th anniversary of the founding of Sir Henry Fermor School in Crowborough, East Sussex. Operational dates are expected to be: 21 May, 24 June and 2 July. Anyone associated with the school in the past is invited to contact Mick Smith, G6UUO (QTHR).

● THE ALL INDIA Amateur Radio Convention will be held 9/10 April in Bangalore. For free brochure and registration forms, write to: Nagesh Upadhyaya, VU2NUD, General Convenor, P Box 1129, Bangalore-560 011, India.

● ON PAGE 74 can be found the Minutes of the 1993 RSGB Annual General Meeting and the Extraordinary General Meeting. The Society is indebted to Dave Johnson, G1GNS, and other local members for locating the venue and providing talk-in.

● RADIO AMATEUR Relief Expeditions is an organisation dedicated to using the skills learnt through amateur radio for overseas relief work. Details can be obtained from Don Sunderland, G6FHM, QTHR.

● THE SIX and Ten Reporting Club provides regular propagation reports in a newsletter. A year's subscription is available for £6 (UK price) from Ian Brotherton, G2BDV (QTHR).

● KENT IP GROUP has just been formed to help develop the TCP/IP packet network and encourage its use in Kent. Details from Stuart Dixon, G4IYK, QTHR.

● KENWOOD HAVE appointed top VHF DXer Geoff Brown, GJ4ICD, as their official amateur radio dealer in the Channel Islands. His shop is in Belmont Road, St Helier, Jersey.

● STOLEN from D Hooper, G0CYU: TS-930S (S/N 370150). Any information to PC2487 Craig on 0924 375831.

● MIKE SHREAD, GM6TAN, reads the RSGB's *GB2RS* News Bulletin each week at 1800UTC on 145.525MHz FM.

● 4Z85TA CELEBRATES the 85th anniversary of the founding of Tel-Aviv. Operation will be all modes, all bands until 30 April.

● THE LATEST callsigns issued by SSL at 9 February were in the G*0UL*, G*7RP* 2*0AH* and 2*1CP* series.

● THERE ARE 1,500 licensed amateurs in Paraguay.

Indian Amateurs Receive Recognition for Humanitarian Work

Relief Team Awarded Golden Antenna

EVERY YEAR since 1982, on the occasion of the German-Dutch Radio Amateur Festival, the town of Bad Bentheim in Germany has presented the Golden Antenna to a deserving amateur. This is an attractive trophy, awarded for an exceptional humanitarian deed in the field of amateur radio.

Winners in the last decade have included amateurs doing work as diverse as supporting a jungle doctor, coordinating rescue operations in an Italian earthquake and helping the people of Romania. These have come from many countries including Brazil, Italy, Belgium, the Netherlands, Romania and the former USSR.

The Mayor of Bad Bentheim presents the Golden Antenna award for public service to Surrender Arora of India's National Institute of Amateur Radio.

1993 Winner

THIS TIME the jury awarded the Golden Antenna (the 12th such award) to the Civil Emergency Services Wing of the National Institute of Amateur Radio, Hyderabad, India. NIAR volunteers have selflessly relieved suffering during floods, earthquakes and other catastrophes in India over the past ten years.

At a special ceremony, Surrender Arora accepted the award on behalf of NIAR from the Mayor of Bad Bentheim.

Nominations

NOMINATIONS FOR the 1994 award are welcomed from groups or individuals. Detailed nominations, supported by all relevant supporting documents, should be sent by 15 June to: Stadt Bad Bentheim, PO Box 14 52, D 48445, Bad Bentheim, Germany.

The presentation is to take place on 26 August at the 26th German-Dutch Radio Amateur Festival.

UK Amateurs Provide Flood Relief

THE EXCEPTIONALLY heavy rains caused much flooding early this year. The city of Chichester in West Sussex was particularly badly affected when the River Lavant overflowed into the town centre and surrounding countryside, causing considerable disruption of services and communications.

The A27 and A259 main roads became impassable and the only vehicles seen on the A27 for some time were sailboards!

The Raynet Group of the Chichester and District ARC was called out to assist the emergency services. They provided 24-hour communications between the County Hall emergency centre and outside observers checking on the state of roads and water courses.

Hampshire RLO

THE NEW RSGB Liaison Officer for Hampshire is: Kenneth Fisher, 102 Fairfield Avenue, Fareham, Hants PO14 1EL; telephone 0329 311724. A list of the other RLOs appeared in the January and February issues of *RadCom*.

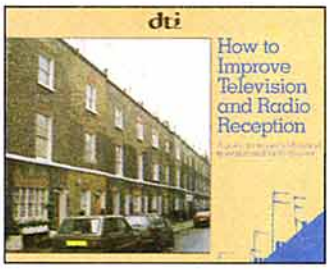
RSGB Regional Meeting

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

Free EMC Booklet

MANY MEMBERS will remember the 28-page colourful, glossy booklet *How to Improve Television and Radio Reception* which was published by the Radiocommunications Agency a few years ago. It was most useful in helping to diagnose and cure EMC problems. It has now been superseded by a six-page leaflet *Advice on TV and Radio Reception* which contains the latest payment details and forms to report a source of interference and request an RIS visit.

The RA has a stock of the old 'glossies' left over and the RIS has agreed to let the Society have these surplus copies with the proviso that all of the out of date forms are removed before they are issued. This has now been done and copies are available by sending an A4 SAE with two First Class stamps to: Hilary Claytonsmith, G4JKS, 115 Marshalswick Lane, St Albans, Herts AL1 4UU.



Up the Pole

LAURENCE HOWELL, GM4DMA, who provided communications for Fiennes and Stroud's record-breaking Antarctic expedition, is supporting another trek, this time to the North Pole.

Three men will sledge unsupported across the Arctic Ocean from Siberia to the North Pole and thence to Canada. Laurence will communicate from Aberdeen direct to the expedition which will use a Yaesu FT70G and a dipole supported by ski stick extensions from the roof of the tent. Coax cables and aerial wire use materials which can stay flexible down to the forecast –60°C.

At GM4DMA the equipment, supplied by SMC, will consist of a commercial grade FT-990 and linear amp feeding a rhombic at 100ft. The enviable aerial system covers seven acres of farm land!

Dragons Breathe Life into Marconi's Station

MEMBERS OF the Dragon Amateur Radio Club took to the hills last September to mark the 75th anniversary of the first direct wireless message from the UK to Australia. They operated from the site of Marconi's Transatlantic station which was built in 1914 on the slopes of Cefn-du, near Waunfawr, Caernarfon.

On 22 September 1918, the Marconi Company transmitted a message from the Rt Hon W M Hughes, the Australian Prime Minister who was visiting the European battlefields. The message which reported that "the glorious valour and dash of the Australian troops saved Amiens" was received at Wahroonga, 20km North of Sydney. It was probably sent on a wavelength of 14,000 metres (approximately 21kHz) using the Timed Disc spark transmission system. The aerial current was some 220A!

Huge Halls

ALTHOUGH THE masts have long since been dismantled, dotted along the mountainside are the concrete mast bases and guy rope anchorages. The huge transmitter halls have survived, some being used now for sports and leisure purposes. It was in one of these cavernous buildings that exactly seventy-five years later, Welsh amateurs recreated the historic contact.

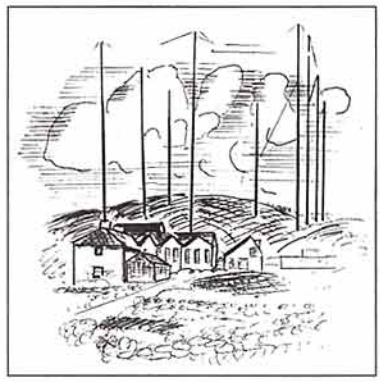
An FT-1 and an FT-520 fed a G5RV, a long-wire and an indoor 2-element beam to keep GB2VK on the air on HF CW and SSB for 24 hours.

There was a near disaster on the evening of the 21st when water caused the building's lighting circuit to fail. Undaunted by this, the group brought in table lamps and opened the station on time. Despite poor propagation 300 contacts were made. The high spot was when, at 0716 on 22 September, operator GW3VVC managed a 14MHz CW contact with VK2WAH, a station put on by the Wahroonga Amateur Historical Radio Association.

Memorial

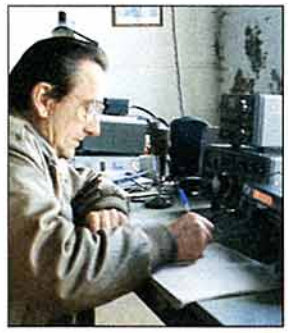
GB2VK ATTRACTED considerable media interest with the club chairman speaking on several Welsh and English radio programmes. Two BBC reporters stayed on site for several hours and a television recording was made, too. Local MP, Dafydd Wigley visited GB2VK and showed great interest. He has called for local interests to erect a memorial to the original event.

Operating GB2VK from one of the equipment halls at the former Marconi Long Wave Wireless Station are (left) Harold, GW0PRX, and Hywel, GW4CNM.

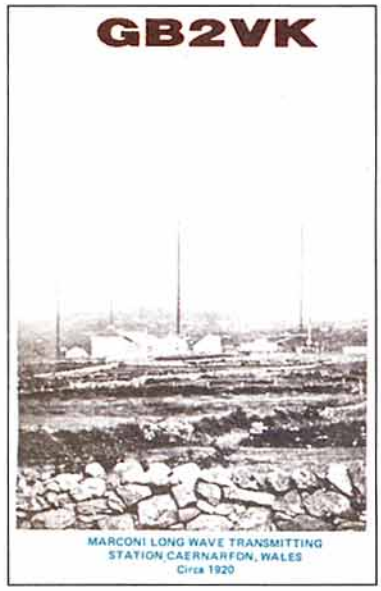


Above: Marconi's Trans-Ocean Wireless Station near Caernarfon.

Left: The Experimental Long Wave Station at Wahroonga, near Sydney.



John Parry, GW3VVC, used GB2VK to recreate the 1918 first radio contact with Australia when he worked VK2WAH at Wahroonga.



The GB2VK QSL card shows the Marconi transmitting site as it was nearly seventy-five years ago. The masts were 400ft high and carried 4,500 feet of wire. Frequencies from 21kHz to 60kHz were in use.

FEAST of Radio

THE NORFOLK Amateur Radio Club is contributing to FEAST, the Norwich Festival of Art, Science and Technology which will take place 18 to 26 March. FEAST is part of a national week of science, engineering and technology for the general public, called SET'. It promises to be the biggest ever attempt to make these subjects more accessible and enjoyable to non-scientists.

The Norwich ARC is organising a workshop on building a receiver, helping children to find out all about amateur radio. The callsign GB2NCM (Norwich Castle Museum) will be activated.

The Castle Museum is celebrating its 100th anniversary this year so it is appropriate that it should host such an up to date project. Free admission to the museum for one child and one adult is available on presentation of the special GB2NCM QSL.

RSGB Planning Advice Bulletin

THIS IS the first of a series of occasional notes from the Planning Advisory Committee regarding the vexed subject of obtaining planning permission for an aerial and/or mast. Most members will be aware that the Society publishes a booklet (free of charge to members) giving practical guidance to those wishing to make an application for a mast.

The main point about this note is to remind members that they must expect some local objection to their proposal to erect even a modest 40ft mast in their back garden. Only very rarely does this not happen. Experience shows that there is always one person, who may not be an immediate neighbour, who regards such a mast and aerial as an eyesore and who will make life as difficult for you as possible.

As the booklet says, there is a clear difference between erecting a mast in a large garden of an acre or more, and the same mast in the back garden of a semi-detached or small detached house. Planning authorities usually look at such proposals to see whether the mast will fit into either the street scene or the surrounding area as a whole, or whether it will be unsightly and give an overpowering feeling to adjoining houses. Clearly where bungalows are involved, the effect is greater.

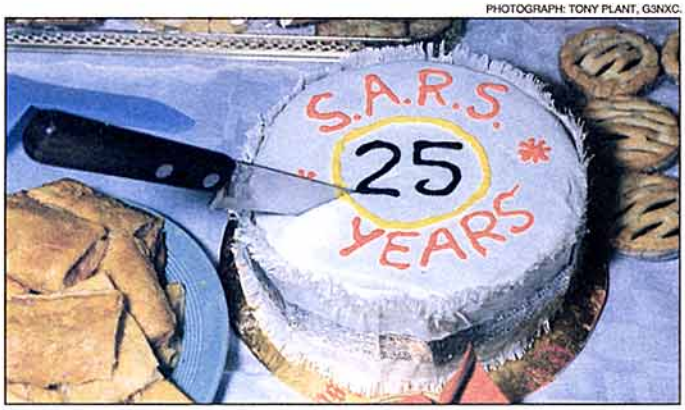
Don't think that "no-one will notice", or "It'll be alright"; people *do* notice and the council has 'big guns' to make you tow the line if they feel so inclined. This is particularly so if the mast has been erected and there has been a stream of complaints to the council. There is also the additional matter of being at loggerheads with your neighbours, and many amateurs do not wish to be in that situation.

The Planning Leaflet is available free to members only from the Amateur Radio Dept at RSGB Headquarters.

PHOTOGRAPH: TONY PLANT, G3NXC.

The Solihull Amateur Radio Society celebrated its 25th anniversary last December. The society's Christmas social evening was attended by the Deputy Mayor and Mayoress of Solihull, Councillor and Mrs Brian Chapple, who used the special call GB8SR to pass greetings messages to amateurs in the UK and overseas, supervised by Dr Roger Hancock, G4BBT, (right) and watched by Club Chairman G8VXQ.

PHOTOGRAPH: TONY PLANT, G3NXC.



The centrepiece of the Solihull ARS Christmas social was this anniversary cake made by Thelma, XYL of Bob Cox, G3PLP.

VHF Round Table

THE MARTLESHAM Radio Society is holding its fifth VHF Round Table at the BT Laboratories, Martlesham Heath, Ipswich, Suffolk on 10 April. Comprehensive measuring and test equipment will be available and there will be technical workshops and talks. Refreshments and free car parking are available.

Because of the BT security requirements, admission is by ticket only; send an SASE with the names of all in your party to Darren Hatcher, G7BKO, BT Computer Centre, Bibb Way, Ipswich, Suffolk, or contact Darren on 0473 227332, office hours.

● MORAG HOWELL, GM0MUV, is supporting a British Polar expedition (a different one from husband Laurence – see opposite) from her base high in the Canadian Arctic (80°N 80°W). She is signing GM0MUV/VE8.

Former HQ staff member Tim Charles, G4EZA, who died in January, aged 34. He was mainly interested in CW, both HF and VHF, and was until recently a member of the Colchester Radio Amateurs.

Joint US and Russian Space Missions

IN AN AGREEMENT signed in Moscow last December, NASA and the Russian Space Agency agreed to up to ten shuttle flights to the Mir Space Station with a total of 24 months on board Mir for US astronauts. The agreement covering the period 1995 – 1997 also caters for joint scientific and technological research programmes and an upgrade to Mir, extending its lifetime.

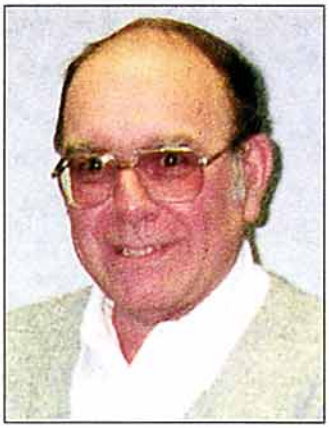
NASA Administrator Daniel S Goldin said: "This is a very significant step in expanding our human spaceflight cooperation with our Russian friends. These activities will provide valuable experience for the construction and operation of the international space station."

Amateur radio has played an important part in the Mir and Shuttle operations, both for space science studies in schools and to help astronauts and cosmonauts to relax during their long flights. This bilateral agreement will no doubt lead to more amateur radio activity from space during the next three years.

SSL Appeals

A NUMBER OF members have asked us what to do if something goes wrong when applying for, or renewing, licences.

The licensing company, Subscription Services Ltd work as agents of the Radiocommunications Agency so it is to the RA that any complaints must be addressed. In order that the RA may properly look into your query, members are advised to communicate with SSL by letter, not by telephone, and to keep copies of all correspondence.



A recent visitor to RSGB HQ, was Bill Burden, WB1BRE, of the ARRL. He is New England Divisional Director and a member of the Administration and Finance Committee.

Man Tower

ENTHUSIASTIC VISITORS to the Isle of Man, intending to activate GD for contests etc, need not bring heavy antennas and masts with them. The IOM Radio Society (GT3GLH) offers "assistance to individuals and groups who visit our beautiful island" and subject to availability they offer the loan of HF antennas and a 40ft mobile tower.

The IOMRS has 106 members; not bad for an island with only about 150 licensees. Meetings are held in Peel and Douglas every week and visitors are welcome [a fact I can confirm, having been very well looked after by IOM amateurs some years ago – *Ed*]. Further details of the club can be obtained from the Secretary Chris Wood, GD6TWF (QTHR), tel: 0624 611507.

Transistor History

SEVERAL MEMBERS have taken us to task for omitting to mention the work of other transistor experimenters in our article on the Yeovil anniversary ('The Transistor Transmitter is Forty', *News & Reports*, February). We were covering the celebrations of the Yeovil ARC of their claimed 'first sky-wave' transistor contact, rather than giving an overview on the transistor experimentation carried out by amateurs in 1954. Nevertheless, the article has generated so much interest that more on this subject is scheduled to appear in *RadCom* later this year.

● A NOVICE COURSE is being run by the Widnes & Runcorn ARC. The Club's students had a 100% pass rate in last June's exam. Contact Mr K Brooks, G0SPH, QTHR.

YARIA Links African Youth

YOUTH FOR Amateur Radio in Africa (YARIA) is a quarterly event arranged by an IARU Region 1 working group known as STARS (Support for the Amateur Radio Service). The main objective of YARIA is to set up amateur radio stations at schools, colleges, universities and youth clubs and to allow young people under the supervision of licensed amateurs to talk to their peer groups in other African countries.

During 1993 YARIA provided valuable interaction between young people in Swaziland, Lesotho, Zimbabwe, South Africa and Kenya. On dates in February, May, August and November this year, nets will be run on the 40, 20 and 15 metre bands, with a "listening only" station transmitting on 10.125MHz CAM (an AM or SSB receiver will work). Net controller is ZS6SRL.

Andy Watts, G4VIW, who received the MBE in the New Year Honours List for his services to plumbing (that's taps and heating, not waveguides!).

GB2RS Line

LAST YEAR, the Society made the *GB2RS* Main News Bulletin available on a premium rate telephone line for those who are unable to listen to the various transmissions, or who want to hear the news a day or two earlier than the Sunday broadcast. This has proved popular and the Society derives a small income from it. British Telecom has informed us that from 31 March their premium rate call charges will go up to 39 pence per minute cheap rate, 49 pence per minute at all other times.

The GB2RS Hot Line is available on **0336 40 73 94** and is updated on Thursdays.

● PERMANENT SPECIAL Event callsign GB2AIR has been issued to the South Yorkshire Aircraft Museum near Worksop.

Training and Education

Licence Conditions Made Simple

The Society's Training and Education Committee has produced *A Simple Guide to the Licence Conditions*. This free leaflet covering the terms and conditions of the Full Licence has been approved by the RA and complements a similar leaflet about the Novice Licence. To obtain your copy, send an A5 SASE to W G Turner, GW6MNC, QTHR.

Visual Aids

The Training and Education Committee has prepared overhead projector transparencies of topics related to the RAE and NRAE, which it is hoped will ease the problems of producing such diagrams in class. Two groups of diagrams have been targeted: those which are difficult to draw, such as frequency modulation waveforms; and those which are very time-consuming, eg a moving coil loudspeaker.

The cost of each transparency, plus an A4 paper diagram which can be used to produce further copies, is 50p. A post and packing charge of £1 must be added to each order. Details are available by sending an SASE to W G Turner, GW6MNC, QTHR.

Alternative Exam?

The Training and Education Committee is looking for alternatives to the present system of examinations for amateur radio licences and is currently exploring the possible advantages of moving towards a competence-based assessment and awards structure.

Constructive comments and observations are invited from interested parties and should be sent to: David Garrity, G4TPA, 27 Grosvenor Street, Liscard, Wallasey, Merseyside L44 1AW.

RAE/NRAE Reports

The City and Guilds reports on the December RAE and NRAE have been published. In general the standard is reported as similar to previous examinations.

In the **RAE**, subjects which needed further work by candidates included EMC, tuned circuits, balanced modulators, oscillators, VHF propagation and PSU efficiency.

NRAE candidates were "generally well prepared" but needed to brush up on a receiver's detector stage, PA input power calculation, logging, and the relationship between frequency and wavelength. Several questions were "very well answered".

Copies of the reports are available by sending an SASE to the Amateur Radio Dept at RSGB HQ, stating which report is required: RAE Part One, RAE Part Two or NRAE.

RAE/NRAE Centres

Two centres have been registered as City and Guilds examination centres and both will accept external candidates:

Sawston Village College, c/o Mr D W Cupit, Community Education Office, Sawston, Cambridge CB2 4BP, and

Cambridge Regional College, Newmarket Road, Cambridge CB5 8EG.

PHOTOGRAPH: HILARY CLAYTONSMITH, G4JKS

Linda Everitt, G0TIB, explains how to become a radio amateur to Chinese delegates at the Association for Science Education annual meeting at Birmingham University in January.

NEWS FLASH! NEWS FLASH!

MOSLEY

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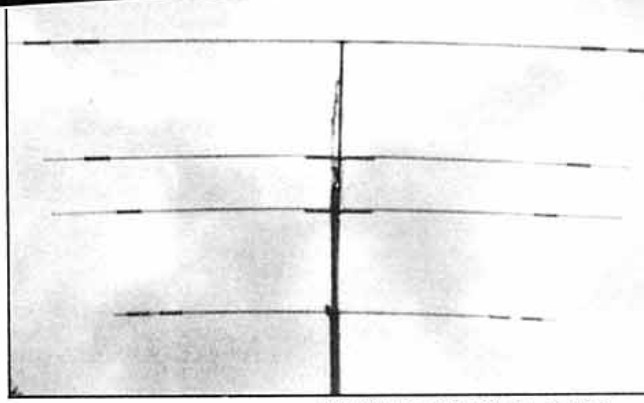

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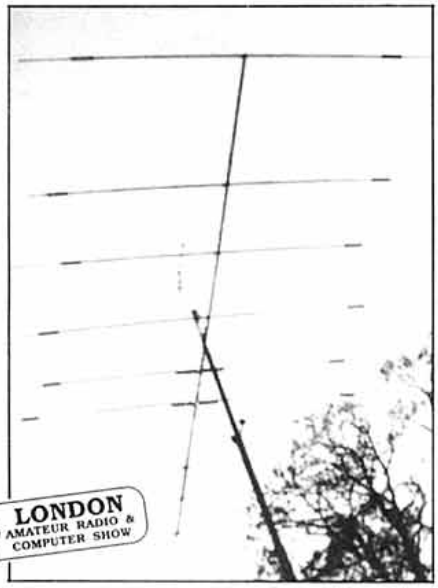

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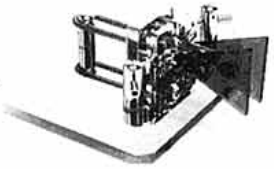

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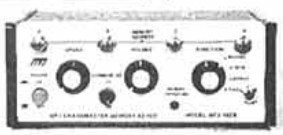

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Display	LCD 7 dec. places
Gate Times	0.01/0.1/1/10 secs.
Size	115 x 175 x 60mm

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Counter Input	BNC
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THIS MONTH'S LEADING PROJECT

Portable 30-Element 2m Antenna

First of a two-part project by Jean-Pierre Morizet, F5OAU

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

THE ELECTRICAL DESIGN of this antenna is not new. In 1970, M Cousin, F8DO, published the design of his EME beam using six groups of four elements backed by a common reflector screen [1]. Its principal claims to fame were a gain of 18 or 19 dBd, front to back ratio of 30dB, and, very important, a relatively generous –3dB main-lobe width of 22° and height of 26°.

In 1984, D and A Quivy, F1AUQ and F6HVK, having failed to get clean patterns and a low SWR with four long Yagis, reported outstanding results from a stack of three F8DO bays in which the reflector screen had been replaced by an individual reflector element behind each radiator [2]. The antenna described here uses this electrical design.

DESCRIPTION OF THE ANTENNA

THERE ARE FIVE half-wavelength spaced stacked bays phased by open wire lines.

Each bay consists of two collinear half-wave dipoles fed at their adjacent ends, ie at high-impedance. At 0.15λ behind each dipole there is a reflector. Two directors are placed at 0.1 and 0.2λ respectively in front of the feed point, for a total of six elements per bay, see **Fig 1**.

Of the total of 30 elements, only ten are driven. The assembly is coax fed at the centre bay by means of a quarter-wave stub and a 4:1 balun.

THE CONSTRUCTION

THE MECHANICS ARE the main feature of this article. Half-elements consisting of 5mm dural rod, perhaps salvaged from VHF TV antennas, are spliced end-to-end with 'choc-blocks' (see note below) inside booms made of 25mm PVC electrical conduit, which are joined with straight couplers and tees.

A fibreglass mast was salvaged from a windsurfer casualty; because of a break at its lower end, the usable length was only 4.2m, but that is enough. The phasing harness and the stub are of 4mm aluminium rod. The balun is an electrical half-wave of RG213 coax.

FIXING ELEMENTS TO THE BOOMS

HOLES TO FIT the element rods are drilled through the booms; it is not easy to do that precisely at right angles to the boom axes! The following trick (**Fig 2**), may help: Wind a strip of paper around the boom and mark points A and B on the paper; A-B is one boom circumference. Unwind the paper and fold A to B. The crease gives point M, exactly halfway between A and B. If the paper is now

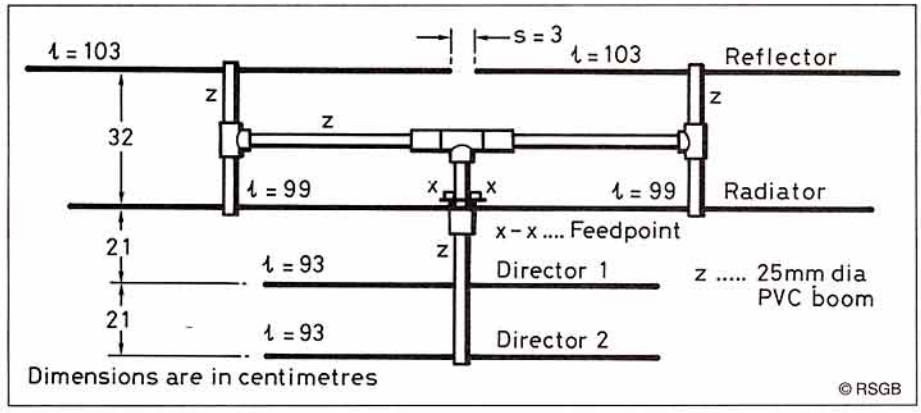


Fig 1: One bay of six elements.

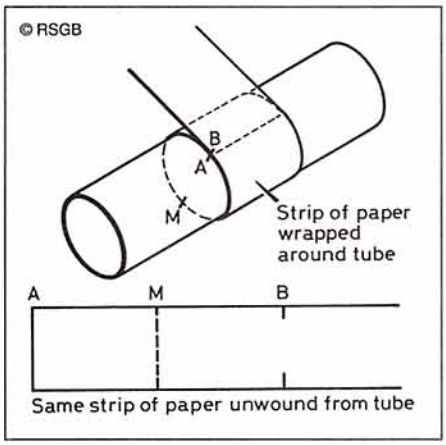


Fig 2: Marking two holes exactly opposite one another

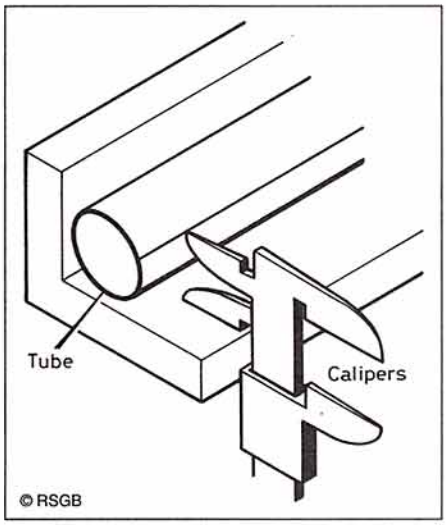
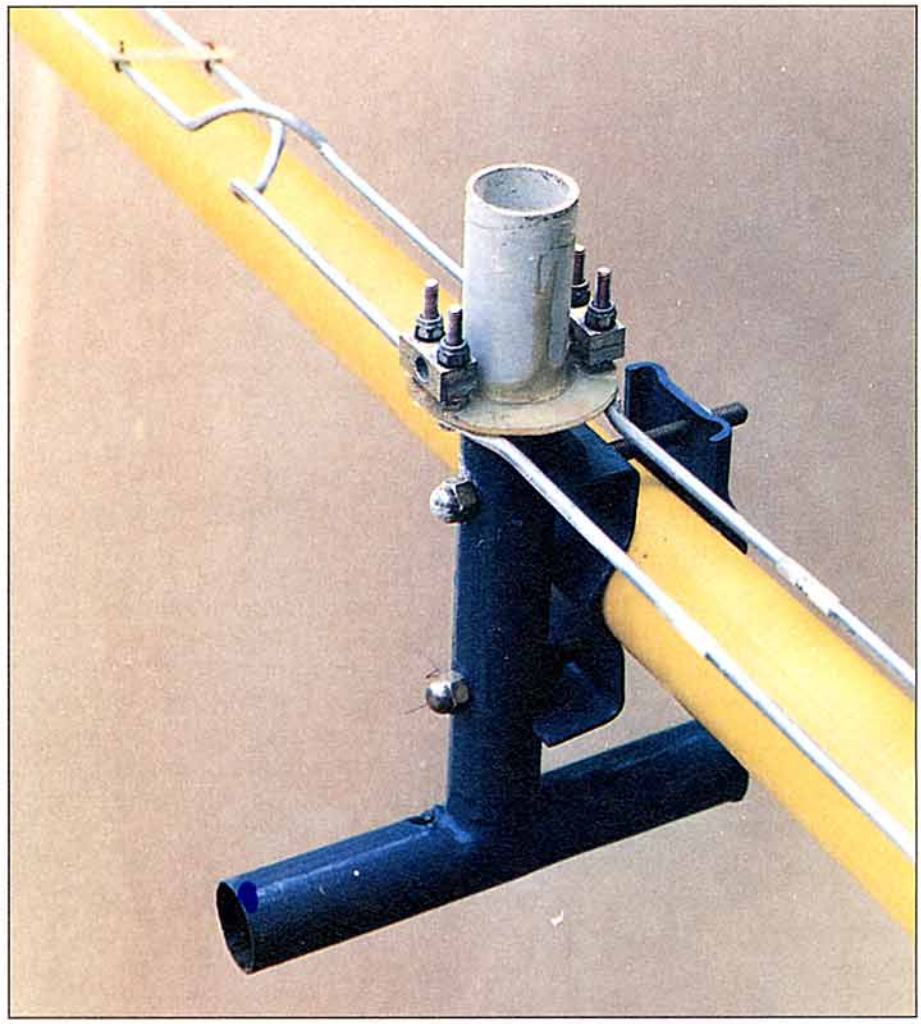


Fig 3: Scribing a reference line on a tube.



The clamps for the driven elements are mounted on PCB-material disks cemented to their booms. The phasing lines are transposed between bays.

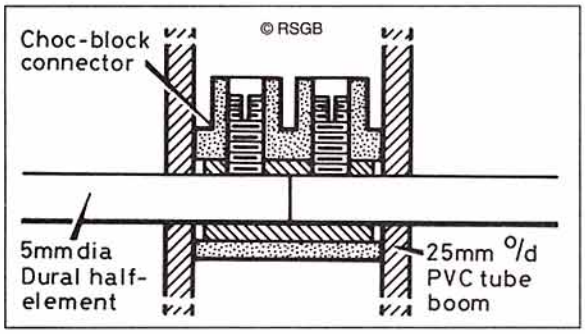


Fig 4: Attaching a dural rod element to a PVC boom with a choc-block.

wound back onto the boom, point M is exactly opposite point A.

To make sure that the elements will be in the same plane, scribe a reference line on the booms before drilling (**Fig 3**). **Fig 4** shows how a 'choc-block' is slipped into the end of a boom and aligned with the holes. The two half elements are inserted through the holes in the boom; once the set screws are tightened there is a good connection between the element halves (see note below) and lateral movement is prevented.

ASSEMBLING THE BOOMS

THE PVC PIECES supporting the six elements of each bay are made up in four sections which can be easily separated and reassembled on site (**Fig 5**).

Buy best-quality couplers and tees; use a round file to remove the stops in each tee so the boom can be slid through it.

Before glueing the tees with PVC cement, make sure that all elements and PVC pieces are in one plane. The straight couplers are glued on one side only, the side with the tightest fit around the tubing. To lock the removable boom ends into the couplers, 5cm-wide adhesive tape, as used for lagging work, was found adequate.

CONNECTING THE PHASING HARNESSES

A SQUARE OF PCB material without copper, with a 25mm central hole, is slipped onto the central boom of each bay and epoxy-glued in position against the straight coupling. Four more holes are drilled in the PCB square for the bolts which connect the ends of the phasing lines to the clamps for the radiators (**Fig 6**).

These clamps are made of 8mm square dural bar. To make the half-holes in which the

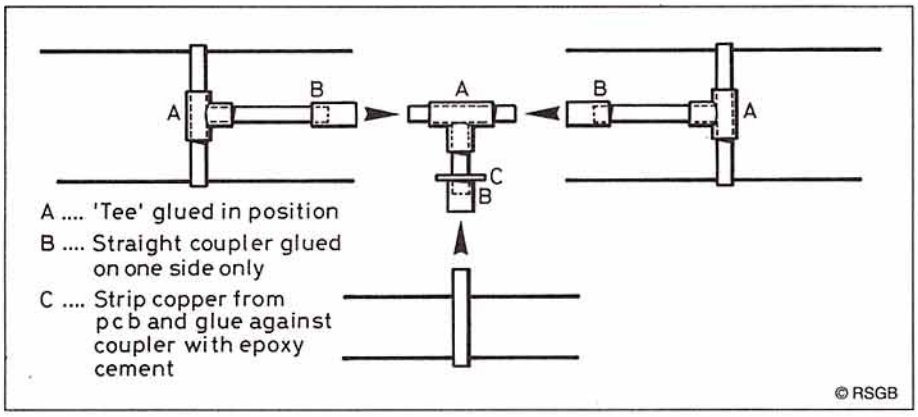


Fig 5: How the booms are assembled

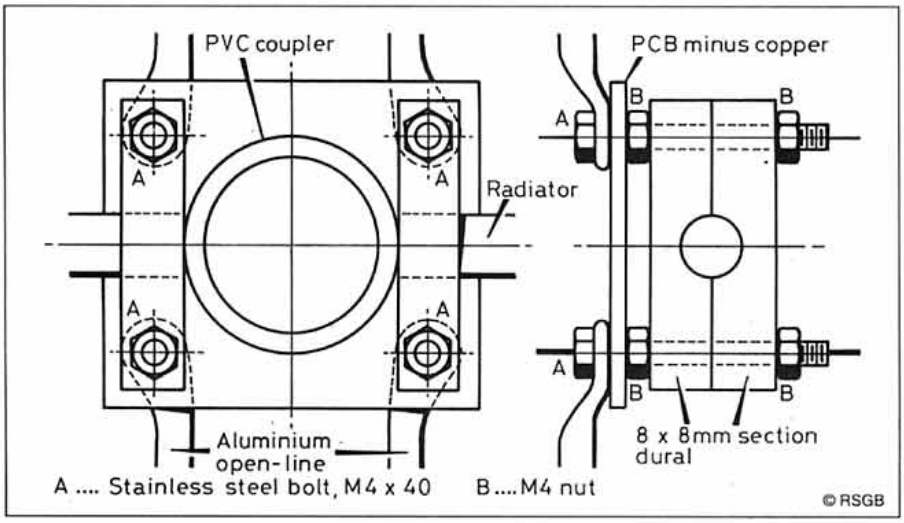


Fig 6: Connecting the phasing line to the radiators.

5mm radiator rods are to be squeezed, bolt the two halves together with a 1mm thick washer between them, hold this assembly in a vice and drill with a 5mm bit.

The phasing lines should be made of 1m lengths of 4mm aluminium wire; not of dural, which is brittle and cannot be formed. The ends are hammered flat and drilled for 4mm bolts.

To establish the correct phase relationship between bays, each phasing section must be twisted 180° as shown in **Fig 7**. Spreaders of stripped PCB material keep the distance between wires close to 30mm and guard against shorts in strong winds.

MOUNTING THE BAYS ON THE MAST

ONLY THE T-SHAPED central boom sections are permanently fixed to the mast, using boom-to-mast clamps salvaged from VHF TV antennas. These had to be enlarged to take the 25mm boom tubing. It may be wise to use 25mm steel conduit for this boom section as PVC has been somewhat fragile.

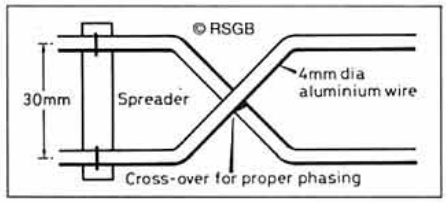


Fig 7: The phasing lines must be transposed between bays.

REFERENCES:

[1] L'antenne 'Radar', M Cousin, F8DO, *Ondes Courtes Information*, Nov/Dec 1970.

[2] Antennes Colinéaires à Eléments Directeurs sur 144MHz by D and A Quivy, F1AUQ and F6HVK, *Radio-REF* May 1984.

Note: Splicing dural rods in brass choc-block inserts with steel set screws is adequate for occasional field service, but for long-term use dissimilar-metal corrosion would ruin the connection. To avoid this, use full-length elements and epoxy glue to hold them in place. *G4LQI.*

. . . to be continued

NEXT MONTH

In the concluding part, Jean-Pierre Morizet deals with phasing, matching, and tuning the antenna.

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HF NEWS

JOHN ALLAWAY G3FKM
10 Knightlow Road, Birmingham
B17 8QB

A VERY SAD note to begin the column with this month – news of the passing of Lloyd Colvin, W6KG, one of the greatest DXpeditioners of all time. He died on 14 December last in Istanbul, Turkey, where he and Iris, W6QL, were just beginning yet another YASME expedition. He sustained a massive stroke on 12 December and died two days later. The Colvins had arrived in Turkey about two weeks earlier and Iris had made a few QSOs as TA3/W6QL. Lloyd was first licensed when he was 12 years old and over the years travelled to more than 223 different countries, operating from more than 100 of them. Earlier in his career he had served for 30 years in the US Army reaching the rank of Lt Colonel. Lloyd is survived by Iris and his daughter Joy and two grand daughters. His remains were scattered at sea. He will be sadly missed.

The design of the programme of the RSGB International HF Convention and 30th Anniversary of IOTA is well under way. It is being emphasised that this is a *two day event* and should appeal to all interested in HF communications. There will be three programme streams during the whole of the two days – two devoted to HF and the third to IOTA. The programme will be a broad one including DXpeditions, equipment, antennas, computers in the shack, contesting and datacomms. Full details are available from Neville, G3NUG (QTHR).

CONTESTS

ARRL INTERNATIONAL DX CONTEST (PHONE)

0000 5 March – 2400 6 March

Rules the same as for the CW section – see last month. I have copies of rules available – SASE please.

BERMUDA AMATEUR RADIO CONTEST

0001 19 March – 2400 20 March

Single-operator only and operating time must not exceed 24 hours. Off periods must be clearly logged and each has to be of at least two hours duration. 3.5 to 28MHz, SSB and CW but no cross mode contacts. A second contact on the same band with a station on the other mode counts for QSO points only and not as a multiplier. Exchange RS/T plus serial number. Each QSO counts five points and the final score is total QSO points from all bands multiplied by the number of DXCC/WAE countries on each band times the number of VP9 contacts on each band. I have copies of the rules (SASE please) which are completely different from those in effect a few years ago.

LZ DX CONTEST

In the 1993 **LZ DX Contest** G3ESF scored 9,735 points in the multi-band category and G4OKN 1,111. On 14MHz GM3CFS scored 2,750 and G3PHW 2,270.

SP DX CONTEST

1500 2 April – 1500 3 April

SSB this year on 1.8 to 28MHz bands (no WARC). Single-operator single and multiband and multi-operator multi-band categories. Send RS plus serial number (from 01). Polish stations will also give two letters which denote their *wojewodztwo* (province). There are 49 of these and they count as multipliers *once only*. Each QSO counts three points. Listeners may enter and must log SP stations only. Each may only be logged once per band and counts three points. Logs have to reach the organisers no later than 30 April 1994 – PZK SPDX Contest Committee, PO Box 320, 00-950 Warsaw, Poland. I can supply copies of the rules (SASE please).

HOLYLAND CONTEST

1800 2 April – 1800 3 April

1.8 to 28MHz (no WARC) *following IARU recommended band plans*. SSB and CW. Single and multi-operator all bands and listener categories. Send RS/T and serial number (from 001). Israeli stations will give their area. Same station may be worked on both modes on each band. QSOs on 1.8, 3.5, and 7MHz count two points, on 14, 21, and 28MHz one. Multiplier is one for each area worked on each band. Entries must be postmarked no later than 31 May 1994 and sent to IARC Contest Manager, 4Z4UT, Box 3003, Beer-sheva 84130, Israel. I have photocopies of rules (SASE please). The **Holyland Award** may be obtained using contest QSOs.

BAND REPORTS

A RATHER BETTER resonse this month with input from G2s AFV, HKU, G3s GVV, IYM, IZD, KKJ, G4DJC, GW4KGR, G4s MUW, OBK, G0MHC, and from the UK DX Packet Cluster via G4PDQ. Stations in italics were using CW:-

1.8MHz
0000 *A71CW, D2EYE, JW5MN, XE1CCB,* 5N0MVE
0300 *OX3BV, PY0FF, 4K1F, 5B4OG*
0700 *C6AGN, FM5BG, N6SS (Az), TI4CF, VE7SU, XE2XA*
1800 *UA9KAA, 4S7RO*
2100 *RW9NA, S21ZG, VK6HD, VQ9QM, YB6ABE, Z21HS*
2200 *JA, V85PB, ZD8VJ, ZD8Z*
2300 *RAEM, UM8GGK, 4K2MAL, 9N1UZ*

10MHz
0800 *H44/DK7PE, JR5XPH, ZD8M*
1000 *S21ZZ*
1600 *J6/KU0J, OY2H, VK9XO, YJ0AXX, 4U1ITU, 9K2MU*
2000 *TR8XX*
2200 *S92SS, VI9XN*

14MHz
0700 JA, NH2G, T30EB, *5X1B, 9G1MS*
0800 BV2FG, CE0ZIS, FK8CP, JD1BIE, P29DX, S0IMZ, *ST0K,* VP8LP
0900 FK8GT, JT1BV, YJ8RN, VK9NI, ZD8VJ, ZK1AT, 9M2/G3NUG
1100 CE0YLM, SV2ASP/P, *T30RT, V73C*
1500 AP2JZB, J28GG, VK6RU, VK9XO, XF4CI, ZL3BUJ, 5X1F, 9N1AA
1600 ET3SID, *FH/F5NCU,* KL7XD, *VQ9QM,* ZK1AT, 3B8AD, *5R8DG,* 5Z4FM
1800 FH4EP, FR5FR, T32BB, 5H3JB, 8J1RL
2200 C91AI, *ET3YU,* ZD8M, ZV0ASN, 5T5SV

18MHz
0900 BZ3BLB, *FK8GJ,* P29WK, ZD9BV
1000 *S21ZZ, T30RT,* VP8BZL, XU7VK, *ZP6DN, 7Q7LA,* 9G1SD
1100 C53HG, TU2ZR, YI1AL
1200 HK0CTN, VK9XO, 8R1AK, 9X5DX
1300 PJ8AD, *8Q7BX*
1500 *HV3SJ, J37XC, TL8NG, 5R8DG*
1600 *FG5/F2PI,* I2RAO/HK0, W6, XF4CI

21MHz
0800 A61AF, BZ4CHC, HZ1TA, VR2BH, 5R8DM (L.P)
0900 A71BY, BV7GA, ET3SID, HL, JA, XX9GD, YI1HS, ZD8Z
1000 S21AM, VK9ND, VK, VP8CMT, 9N1IZ
1100 D44BC, ET3RA, *HS0/G3NOM,* P29DX, S21B, *ST0K,* YK1AO
1200 A71AN, C53HG, FH5CB, *S21YD,* 5R8DA, 9N1JA
1500 D2EGH, HC8KU, I2RAO/HK0, TU2DX, ZF2SQ/ZF8
1700 FH5CB, OA9G, W1-W4, W6, W7, W0, ZS8MI

28MHz
1000 C91J, FR5DX, OD50MM, VK6ZB, 5Z4FO, 9G1SD
1300 FH5CB, FY5GJ, HH2LQ, ZD7WIG, ZS9A
1500 HP2CTM, NP2EE, TL8MS, *VP5P,* XQ8ABF

QTH CORNER

A71CW	K Darbrowski, P O Box 22061, Doha, Qatar.
A92FV/A92C	UKNDA, RAF Thatcham, Station Rd, Thatcham Brooks, Berks RG13 4LY.
TA1/W6QL	YASME , P O Box 2025, Castro Valley, CA 94546, USA.
UL7IDB/UN7ID	Andy Komarov, Box 130, 463000 Aktyubinsk, Kazakhstan.
VP8BZL	(see 3Y Expedition)
VP8BZL/MM	(see 3Y Expedition)
VU7API/VU7SF	direct only to P O Box 4250, Bangalore 560042, India.
3Y Expedition	AA6BB, 93787 Dorsey Lane, Junction City, Oregon 97448, USA.
9N1HA	P O Box 4292, Kathmandu, Nepal.
9N1KY	Kiyoko Yamakami, Box 3, Tokaimura 319-11, Japan.

CQ WW WPX CONTEST

0000 26 March – 2400 27 March

Unfortunately, since the death of W1WY, *CQ Magazine* no longer sends me the rules or results of its contests. I am therefore dependant on the arrival of my personal copy of the magazine which is usually received too late for inclusion of rules in this column. I suggest writing to *CQ* Magazine, 76 North Broadway, Hicksville, NY 11801, USA, for copies of rules.

DX NEWS

IN A *DXCC NEWS Release* dated 2 December 1993 ARRL said that there were 146 unprocessed DXCC applications in hand (16,153 QSLs). 484 applications (46,942 QSLs) for endorsements and new awards had been received in the month, and applications being sent out at the end of November were received eight days earlier. In a further release dated 14 December the ARRL announced that an RTTY 'Honor Roll' has now been created. Qualification for this is the same as for Mixed Honor Roll – with effect from 1 January 1994, 319 current (not deleted) countries. The RTTY DXCC accepts contacts made using BAUDOT, ASCII, AMTOR, and other non-CW digital protocols. Persons who qualify for this new listing will be recognised based on their records – there will be no need to apply.

Steve, P29DX, finishes his period in **Papua New Guinea**

NINE BAND TABLE NO 9

Call	1.8	3.5	7	10	14	18	21	24	28	Total
G3KMA	180	**277**	**322**	**259**	**328**	**299**	**328**	**288**	**321**	**2602**
G4BWP	147	272	308	241	327	291	323	263	311	2483
G4GIR	134	264	305	235	**328**	281	324	249	311	2431
G3XTT	**183**	243	296	209	325	268	319	242	295	2380
G3GIQ	76	219	284	133	**328**	257	**328**	225	313	2163
G3TXF	92	192	252	160	307	183	304	133	273	1896
G4OBK	128	175	226	156	293	218	271	183	246	1896
GM3PPE	68	163	209	192	278	233	255	181	222	1801
G3WGV	77	150	203	207	251	232	254	186	226	1786
G3SXW	79	175	215	172	286	170	277	132	238	1744 (CW)
G3JXN	49	125	192	126	275	201	280	183	280	1711
G3IGW	122	179	298	170	274	211	227	19	198	1698
G3NOF	5	104	108	–	325	215	327	212	295	1591
G3JJG	52	105	201	169	235	189	260	148	206	1565 (CW)
G4ODV	87	156	303	142	247	108	239	68	196	1546
G3VJP	17	135	212	80	311	114	289	43	238	1439
G3IAR	69	102	130	133	244	166	217	122	147	1330
GW3JXN	48	125	170	114	217	174	219	106	146	1319
G4XRX	3	48	91	105	260	147	283	149	228	1314
G4NXG/M	6	42	96	–	237	128	256	137	238	1140

Please note that scores for the next table should be sent to G3GIQ to reach him no later than **8 April 1994.** (The entry level for the table is 600 countries but there is no need to work all bands).

1993 WARC BANDS TABLE

	10MHz	18MHz	24MHz	Total
G3KKJ	**156**	**210**	**173**	**539**
G3IZD	130	185	161	476
G3IAR	122	145	100	367
G3SXW	125	127	73	325
G4XRV	117	119	56	292 (CW)
G0MHC	60	125	63	248
G2AFV	100	94	51	245
G4OBK	84	115	35	234
GJ4GG	37	63	41	141
G4MUW	2	73	46	121
G3IQF	45	41	17	103
G0KDS	2	80	2	86
G4CMZ	21	–	–	21

this month and will be returning to the UK. 4Z85TA is a special **Israel** call commemorating the 85th anniversary of the city of Tel Aviv. It will be in use until 30 April.

G3WDK reports that during a QSO with G0RKJ he learned that the latter will be on Palma Is, in **Antarctica**, from 16 March until about September 1994. He will be active as work permits, on SSB and PACTOR, using the call N7CXB/KC4. FT5XJ is now on from **Kerguelen Is** and should be found on 14 and 21MHz until he leaves in July. 3B9FR, on **Rodriguez Is**, is now to be found on the WARC bands. He is said by *Long Island DX Bulletin* to frequent 18.125MHz at about 1730.

Mike, V85KX/G3JKX, tells me that Jeff Bill, G0MCF, is now in **Brunei** for a two year spell. Mike himself remains there until this autumn but says that conditions have been very poor but in spite of that he has worked one or two UK stations on 1.8 and 3.5MHz. A71CW, in **Qatar**, is reported to appear in the area between 1.830 and 1.840MHz between 2230 and 0230UTC. David, ex-ZC4DG, is now in **Bahrain** and licensed as A92FV. He should be found on all bands and may also operate from the club station A92C. According to *Lynx DX Bulletin* 9N1KY, 9N1HA, and 9N1HP, are new licensees in **Nepal.** The first mentioned is NH6RT who is likely to be there for two years.

There are four special stations from **Norway** using the LI prefix. These are LI1OWG, LI2OWG, LI3OWG, and LI4OWG. LA5EBA is now on **Svalbard** as JW5EBA. He is active on all bands on CW and SSB and is expected to be there until July.

Peter Hopwood, G3UKH, would like readers to know that he does *not* hold any logs for UL7IDB/UN7ID. He used to act as QSL manager but suggests that cards should be sent direct to the address in *QTH Corner*.

EXPEDITIONS

THE SAGA of the long awaited visit to **Pratas Island** continues. There was a two hour operation on 5 January by BV9P. This was said to be a public relations exercise carried out to show the Taiwanese authorities that such an operation would not be harmful. BV9P made 630 contacts – some with Europe, Asia, and Australasia, but unfortunately none with Western Europe. The latest dates for a full expedition seem to be either 6 to 14 March or 16 to 24 March, but according to *RSGB DX News Sheet* the actual schedule will be decided by the Defence Department and the Army.

DL5XAT and DL9XAT are planning to be on **St Lucia** between 5 and 18 March. They intend to operate on all bands from 1.8 to 50MHz with SSB and CW using a TS690S feeding Fritzel FB33 and FD4 antennas.

DL2GAC should now be in the Western Pacific area. He was scheduled to go to the **Solomon Is** in mid-March and return to Europe in late April via Singapore and India. He is an IOTA enthusiast and asks for only one QSO to be made with him from each IOTA island.

IV3HUL should be finishing his operation from **Cook Is** about now and departing to **French Polynesia**. His favourite frequencies are said to be 3.505, 3.760, 7.005, 7.095, 14.005, 14.260, 21.005, and 21.260MHz.

SUDAN

IN THE January column I reported on recent news received from ST2/G4OJW. Now Ali has sent me an update in the shape of 'Report No 1'. This says "Radio amateur enthusiasts in Sudan have been struggling to obtain official recognition and formal licensing arrangements for many decades. As a result 'ST-land' became one of the rarest DX countries in the world with Dr 'Sid' Ahmed, ST2SA, for many years providing the only signals of '73 from ST'.

"Now there is reason to be optimistic. The new administration has showed an interest in the Amateur Radio Service and the needs of radio amateurs and with the support and assistance of the Radio Licensing Authority an amateur radio station was operated from the Sudan Telecom Public Corporation in Khartoum laying the foundation for the Telecom Workers Amateur Radio Club 'ST0K'.

"ST0K was operated in the final quarter of 1993 by 'OM Ali' (ex G4OJW) who aired the station mostly in CW operating pile ups on the 14, 18, 21, and 24MHz bands in order to give as many as possible the chance of a QSO. The set up was simple – 100W to a dipole – so working DX was not easy.

"Unfortunately there were initial problems receiving QSL cards via the antiquated postal service, however, it seems that the problems with respect to PO Box 617 have been ironed out with the help of the General Post Master himself who took charge of the mail for 'ST0K'. However, anyone who sent QSLs for ST2/G4OJW via P O Box 4016, included return postage and did not yet receive his QSL should inform Ali c/o Box 617 and include at least a self addressed envelope once again.

"The QSL cards for ST0K are being prepared for print and in the next report we shall inform with respect to the situation. Please QRX for ST0K cards!

"A big thank you to the many radio amateurs who contacted ST0K and for the many lovely QSL cards received. We expect you to receive your cards from ST0K in February at the latest.

"We would be very grateful to anyone who can send us copies or details of *any* reports or mention of amateur radio operation in Sudan, ST2/G4OJW operations or ST0K operations from any of the DX news publications or columns. This will help us to see what information is needed or needs to be corrected, for publication in our Report Nr 2".

Iris (W6QL) and the late Lloyd (W6KQ) Colvin at Dayton Hamvention 1993.

DXCC HONOUR ROLL

THE LIST of DXCC members in February *QST* contained the following British stations. The list

was in order of all time countries confirmed – including many that have now been deleted. In the **Mixed** category details were as follows :

G3AAE, GW3AHN (370), G3FKM, G3FXB, G4CP (367), G2FSP (360), G3ITN (358), G3HCT, GI3IVJ (351), G3KMA (353), G3IOR (351), G3GIQ (349), G3UML, GM3BQA (348), G3JEC (344), G3HTA (343), G3LQP (341), G3ALI, G3MXJ (340), G3RUX (339), G3KDB, G3NSY (338), G3COJ, G3JAG (337), G3MCS (336), G3SJH (333), G3VIE, G3ZAY (332), G3YJI (330), G3RCA, G3TXF (329), G4DYO (328), G3KLL, GW4BLE (327), G4CNY (325), G4BUE, G4BWP (324), G3WPF, G4FEU, GW3ARS (323), G3RTE, G3XTT (321), G4ADD, G4GIR (320), G4DDS (319), G4EDG (318), G4IUF, GM3WIL (317), G4GOR (315).

In the **Phone** list are:– GW3AHN (366), G3FKM (361),, GM3BQA (348), G3UML (347), G3NLY (3460, G3JEC (344), G3KMA (340), G3TJW, G3ZBA (339), G3MCS (336), G3SJH (333), G3YJI (329), G3RCA, G3ZAY, G4DYO (328), G3KLL (326), GW3CDP (325), G4BWP (323), GW3ARS (322), G3VOF (321), G4GIR (320), G4ADD (319), G4GED (315), and G4WFZ (314). UK stations with DXCC on 1.8MHz were listed as G3XTT (160), G3RFS (136), GM3ITN (118), G4BWP (105), G3SDL (103), and G4GIR (100). Finally GW0ANA has 104 countries on RTTY and G6WZR 105 via satellites.

AWARDS

SP-DX AWARD

THIS IS AN attractive certificate of honorary membership of the SP-DX-Club. It is available to licensed amateurs and listeners who have worked (or who have confirmed reports from) 15 members since 1 October 1959. Send a certified list of contacts plus 10 IRCs to: Award Manager SPDXC Zenon Pietrzak, SP6FER, skr.poczt 2156, 50-985 Wroclaw 47, Poland. I can supply a photocopy of the list of members (SASE please).

POLSKA AWARD

Three Classes – Class I for contacts with 49 Wojewodztwos (Polish provinces), Class II for contacts with 35, and Class III for 20. QSLs are required except when all contacts are made during the SPDX Contest. In this case send an application form with a list of SP stations worked during the contest together with 10 IRCs. Abbreviations used for the provinces are: SP1: KO, SL, SZ. SP2: BY, GD, EL, TO, WL. SP3: GO, KL, KN, LE, PI, PO, ZG. SP4: BK, LO, OL, SU. SP5: CI, OS, PL, SE, WA. SP6: JG, LG, OP, WB, WR. SP7: KI, LD, PT, RA, SI, SK, TG. SP8: BP, CH, KS, LU, PR, RZ, ZA. SP9: BB, CZ, KA, KR, NS, TA.

PROPAGATION

G8KG REMARKS that it nice to be able to say something a little more cheerful in his first report in 1994 but warns that it doesn't herald anything dramatic in the way of improvement as yet! It goes as follows:– "The rather disappointing conditions on the HF bands reported last month continued almost but not quite to the end of 1993. Things changed in the last week of the year when a sudden surge in solar activity took the daily solar flux values to a peak of 148 sfu on the first day of the new year, a value not seen since last March. At the time of writing (18 January) the 27-day average solar flux had risen steadily to reach 120 sfu, a value last seen back in April 1993 and the approximate level at which the cycle ended its long steep fall in the first half of 1992.

"During much of the period under review the geomagnetic field was in a quiet to unsettled state with the Boulder A index being reported as zero on several days and this combined with the surge in solar activity to cause MUFs to rise so that even 28MHz was open to all continents on a number of days around the turn of the year. By the middle of January, however, the magnetic field had become rather disturbed and the solar flux peak looked to be over, at least for the time being.

"The annual mean sunspot number for 1993 was 54 as compared with 94 in 1992 and 145 in 1991 – the corresponding solar flux means were 110, 151, and 208 sfu. For the last minimum year (1986) they were 13.5 and 74 sfu respectively so it would seem that the next one is still some way off."

THANKS

TO ALL WHO have provided input for this month's column and specially to the authors of the *Long Island DX Bulletin* (W2IYX), *RSGB DX News Sheet* (G4DYO), *DXPRESS* (PA3FQA), and the *Lynx DX Bulletin* (EA2KL).

For the **May** issue I need your input no later than **23 March** please.

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

THE POOR tropospheric conditions continued in January. Mother nature seems to have thrown the book at Britain with gales, floods, ice and blizzards. Some antenna systems will have suffered damage, so contributing to the lack of general activity on the bands. On the positive side, there is news of a 50MHz DXpedition to Jordan in the summer.

TABULAR MATTERS

CONGRATULATIONS to those stalwarts who participated in the 1993 Annual Table and made it to the leading four in each band. This table is a useful indicator of activity over the years. Based upon average points per entrant in the 1990s, last year was the poorest at 122 compared with 136 in 1991.

Most disappointing was the dramatic decline in entries for the 1.3GHz band – only four compared with 11 in 1992. Nevertheless, no changes have been made for this year's table. The counties are the 77 listed on page 81 in the January *RadCom* and the countries are the current DXCC ones plus Sicily, IT9. If you need a copy of the rules, send me an SASE.

ACTIVITY – AGAIN

IN THE last few years, the pattern of activity in the DX sections of the VHF and UHF bands has changed. The more keen and experienced operators watched the daily weather maps for signs that tropo propagation might be enhanced; they listened to WWV bulletins in the HF spectrum for forecasts of geomagnetic disturbances. These supplement the solar factual data broadcast by *GB2RS* on Sundays. No doubt they still use this strategy.

With the mass use of packet radio, it now seems that many VHF/UHF operators monitor messages from others to alert them to possible openings. While this may be more efficient, it may not lead to a proper appreciation of propagation. It can also result in long periods of low, if any, activity. Yet as soon as there is a whiff of an aurora or Sporadic-E opening, two metres in particular becomes quite busy. It is a pity that people seem less inclined to conduct longer distance QSOs in non-lift conditions.

DXPEDITION

THE KINGDOM of Jordan has never been activated on 50MHz but that is to be rectified this summer. Members of the UK Six Metre Group (UKSMG) have permission to operate from Amman. A fax message was received on 1 December 1993, from the private office of His Majesty King Hussein, stating that permission had been granted to operate a 6m station by the Royal Jordanian Amateur Radio Society. This operation is scheduled for the last week in May, through most of June, the peak of the summer Es season. Committed operators include G0JHC, G3KOX, G3WOS, G4CCZ, GJ4ICD and DL7AV. More would be welcome, so contact Chris Gare, G3WOS, at 183 Sycamore Road, Farnborough, Hants, England GU14 6RF if you would like to go.

One of the main reasons for the trip is to equip the RJARS in Amman with a complete 6m station. The UKSMG has set up 'The JY Equipment Fund' to collect donations and/or equipment. Ideally it would like to supply a monoband transceiver, 100W PA, PSU and beam antenna. Cheques, payable to The UK Six Metre Group, should be sent to Byron Fletcher, G6HCV, at 2 Slade Gardens, Codsall, Wolverhampton, England WV8 1BJ.

REPEATERS

REPEATER GB3BA, located 16km WNW of Stonehaven, near Aberdeen (GRN), is now back in service after a rebuild by the Grampian Repeater Group. It operates on channel RB1. For details and/or to submit reports, contact keeper Mr F Baxter, GM3VEY, who is QTHR (ie address correct in the current RSGB *Call Book*).

The Aylesbury Vale Repeater Group's January *Newsletter* includes reports on the organization's three repeaters. VHF relay GB3VA on R4, has been operating faultlessly since last June. It received a birthday card on its 12th anniversary on 21 November 1993! UHF repeater GB3BV on RB1 has also been 100% reliable and seems more used since

the new A41 dual carriageway was opened.

GB3AV on RB2 was equipped with a new set of Sinclair filters on 26 June 1993 and now uses a single antenna. This comprises a stack of four vertical dipoles 30m AGL and 76m ASL. The Tx is a modified Pye T462, giving 14dBW power and the Rx is a modified Pye R470 with low noise preamp. There were a number of failures last summer and odd noises have been noted on the transmission, probably caused by another transmitter on the same site. The AVRG has 186 members. For details contact Mike Marsden, G8BQH (QTHR).

PUBLICATIONS

THE ENGLISH edition of the German publication *UKV Berichte* first appeared in February 1969 as *VHF Communications.* It is now printed in England, the editors being Mike, G6IQM, and Krystyna Wooding, whose company, KM Publications, publishes and distributes it. The magazine is devoted to technical matter – no who worked what columns – and issue 4/1993 includes articles on measurement aids for UHF amateurs; EMC; a 28/144MHz transverter; antennas and further details of DB1NV's spectrum analyzer. PCBs and kits are available for many of the designs. For subscription details contact the publisher at 5 Ware Orchard, Barby, Rugby, CV23 8UF.

The January issue of the UKSMG's journal *Six News* includes the announcement of the Jordan DXpedition; a description of I0XGR's comprehensive logging program for PCs called Fastlog; modifications to the IC-575 transceiver by VK3ALM to achieve passband tuning; audio mods to the TS-690; an antenna switch/triplexer by G3ZYY; DX news and lots more. For details of the UKSMG send an SASE to secretary Chris Gare, G3WOS (QTHR).

CONTESTS

THE UKSMG is running a Winter Contest for all 6m operators. The first session was on 13 February and the two remaining legs are on 13 March and 10 April, 1000-1300GMT. There are four UK sections; Single-op fixed, SWL, Novice and All-others, such as Portable and Multi-op. The other two sections are Rest of Europe and Rest of the World. For a set of rules and log sheets, send a large SASE to The UKSMG Contest Manager at The Corner House, Church Road, Mortimer Westend, Reading, England RG7 2HY.

FIRSTS

THIS MONTH'S list is devoted to 144MHz 'firsts' from The Channel Islands, Isle of Man and Ulster. Data are given as calls, time, date and mode. GC2TR – EA1AB 11/6/64; GC3EBK – G3WW 2100 2/3/53; GB2GC – GM3RUF/P 27?/8/65; GC2FCZ – OK3KDX 4/7/65; GC3EBK – OZ2FR 3/53; GC2TR – SM6CYZ/7 18/9/65.

GD8EXI – EA8XS no other data; GD3UMW/A-DM 6?/9/74; GD3DA/P – G 15/5/52; GD3DA/P – GI 15/5/52; GD3DA/P – GM 15/5/52; GD8EXI – HG5AIR 9/7/74 (Es); GD2HDZ – I6ZAU 24/5/71 (Es);GD3UMW/A – LA 6?/9/74 (A); GD3UMW/A – OH 6?/9/74 (A); GD8EXI – OK 9/7/74 (Es); GD3UMW/A – UR2 6?/9/74 (A); GD2CZM/P – YU2HB 7/65 (Es).

GI3OFT – DL1RX 28/10/61 (A); GI2FHN – G3BW 29/6/49; GI? – GD3DA/P 15/5/52; GI2FHN – GM3BDA 1/7/49; GI3GXP – HB9RG 6/10/60 (A); GI3SLI – LX1CW 3/2/65;GI3GXP – OK1VR/P 27/10/58;GI3OFT – OZ5CE 3/12/62.

Obviously, some of these data are incomplete and were taken from *The RSGB Bulletin.* I have complete copies of *The Short Wave Magazine* from 1947 up to the time the title was bought by PW Publishing Ltd. When I have some spare time, I will retrieve these early volumes and try to fill in the gaps. Next month, the GM and GW firsts on 2m.

SOFTWARE

LAST MONTH I mentioned having received Karl Lamford's, G6ODT (NHM), LOGBOOK program for VHF/UHF bands. The 'demo' version allows up to 50 entries so that prospective buyers can explore its merits. The opening menu comprises; Display logs, Check a locator, Edit log entries, Main logbook, Activity between two dates, Counties in a year, Squares in a year, Back-up files and Quit.

Minimum hardware requirements are a 286 PC and a 3.5in drive. Installation is simple – just pop the disk into the drive, type INSTALL [ENTER] and it will create the required directories. The main .EXE file is 141k in size. Karl has tidied up the original version and fixed a few bugs I found in it. For further details, send him an SASE; he is QTHR.

FASTLOG is written by I0XGR and was favourably reviewed in *Six News No.40.* Its features sound impressive. It needs a PC running MS-DOS 3.0 or later and at least 500k of convenional and 512k of expanded memory. A 386 33MHz system is recommended. Alberto has offered this program free to UKSMG members. Copies are available from Neil Carr, G0JHC, who is QTHR. Send him a formatted 3.5in 1.44MHz or 5.25in 1.2MHz disk, two first class stamps (UK) or two IRCs (Europe) and SAE *and quote your UKSMG membership number.*

METEOR SCATTER

THE FEW reports on the January Quadrantids stream suggests it was disappointing. John Hoban, G0EVT (YSW), found reflections quite strong but of short duration on 2m. He suggests the peak was around 1730 on the 3rd, much as predicted. Activity seemed low compared to previous years, but improved after midnight. He completed on random with 9A1CCY, but lost OH1LSQ through poor operating by another G station.

John Hunter, G3IMV (BUX), agrees the shower was disappointing this year. He reported that Mike Ray, G4XBF, thought it a wash-out as none of his schedules were completed. There is much less enthusiasm for MS

1993 ANNUAL TABLE-BREAKDOWN

50MHz Annual Table – 1993 Final Placings – Top Four

Callsign	Counties	Countries	Pts
GW6VZW	65	57	122
G6HKM	57	56	113
G0TRB	60	43	103
G3FDW	31	32	63

70MHz Annual Table – 1993 Final Placings – Top Five

G3FDW	47	6	53
G4OUT	42	7	49
G1SWH	39	6	45
G0TRB	37	5	42

144MHz Annual Table – 1993 Final Placings – Top Four

GW0PZT	72	32	104
G6HKM	72	29	101
G1AWF	70	22	92
G1SWH	74	16	90

430MHz Annual Table – 1993 Final Placings – Top Four

G0TRB	55	15	70
G6HKM	41	17	58
G0TRB	42	13	55
G1OGY	31	11	42

1.3GHz Annual Table – 1993 Final Placings – Top Four

G6HKM	20	10	30
G1SWH	9	4	13
G8LHT	6	3	9
G3FIJ	3	1	4

ANNUAL VHF/UHF TABLE FINAL PLACINGS AT 31 DECEMBER 1993

	50MHz		70MHz		144MHz		430MHz		1.3GHz		Total
Callsign	Cty	Ctr	Cty	Ctr	Cty	Ctr	Cty	Ctr	Cty	Ctr	Points
G6HKM	57	56	–	–	72	29	41	17	20	10	302
G0TRB	60	43	37	5	58	16	55	15	–	–	289
G1SWH	12	16	39	6	74	16	28	5	9	4	209
G3FDW	31	32	47	6	45	6	12	2	–	–	181
G1OGY	32	23	–	–	54	16	31	11	–	–	167
G3FIJ	1	17	30	4	54	12	25	8	3	1	155
G8XTJ	27	33	–	–	65	12	–	–	–	–	137
G0EHV	–	–	30	4	54	14	25	8	–	–	135
GI4OWA	18	34	–	–	48	25	–	–	–	–	125
G1AWF	22	8	–	–	70	22	–	–	–	–	122
GW6VZW	65	57	–	–	–	–	–	–	–	–	122
G7EWL	27	21	3	1	46	9	8	4	–	–	119
G4OUT	–	–	42	7	55	14	–	–	–	–	118
G0EVT	8	21	16	1	33	32	–	–	–	–	111
GW0PZT	–	–	–	–	72	32	–	–	–	–	104
G8LHT	3	17	26	3	7	20	9	9	6	3	103
G1UGH	13	32	–	–	44	14	–	–	–	–	103
G3UOL	2	1	–	–	63	13	–	–	–	–	79
G6ODT	–	–	–	–	10	6	27	10	–	–	53
G7CLY	11	18	–	–	14	5	1	2	–	–	51
GU4HUY	–	–	–	–	38	11	–	–	–	–	49
G3FPK	–	–	–	–	32	12	–	–	–	–	44
G3YHF	–	–	–	–	–	–	30	8	–	–	38
G1JDU	1	18	–	–	–	–	–	–	–	–	19

British counties were those listed on page 65 in the January 1993 *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 1994 scores is 31 March.

mode now and John points out that most of the devotees of the past are now on EME; listen to the 20m EME nets and you must agree. There are no significant showers in March. Data for the April Lyrids will be given next month.

MOONBOUNCE

144MHZ

The sked period on the last weekend of January came after the copy deadline. G3IMV reported that SM5MIX was very loud at 1845 on the 28th and that SM5BSZ was also giving good reflections. All his Saturday morning skeds failed, though. Conditions may have been upset somewhat by an aurora on the 27th. John mentioned *The 2m EME News Sheet* edited and published monthly by John M Carter, K0IFL. Annual subscription is US $18 and his QTH is: PO Box 554, Union, MO 63084 USA.

G0EVT has been using four 9-ele Tonna Yagis with which he has worked 26 initials. John has heard many more stations, including JA and VK, plus many Ws. He has all the aluminium to make four 10-ele DL6WU-type Yagis, which he hopes will give more gain than the theoretical 1dB improvement over the present group.

Tony Read, G0GMS (SXW), was very active on EME last year but has now given up; ". . . . due to the high number of incomplete QSOs versus received QSL cards for complete QSOs." I assume he means some partners have confirmed contacts which he does not claim to have properly completed. This phenomenon has been reported on other modes, but I would be surprised if it is widespread on EME. Have other readers encountered this problem?

430MHZ

The February edition of Al Katz's, K2UYH, *432 and Above EME News* confirms alterations to previously announced sked weekends. The new dates are 19/20 March, 16/17 April and 2/3 July. This will move the Moon closer to apogee but will increase the northern declination and move Moon times earlier in the evening. Data for a London QTH for the March weekend from the VK3UM program are: Declination +21° max; sky temperature 44° K max; degradation –1.62dB to –1.27dB. Al has a new E-mail address, a.katz@ieee.org.

The EME BBS is on 704 2844854; precede that by 0101 from the UK.

50MHZ

NEWS

Jon Eastment, GW4LXO (GNS), is now up to 125 countries worked. New ones last year, mostly via Es, were C31HK, EH8ACW, EV8A, RU1A, SV5TS, T97M and 9K2MU. He would like to see more technical data in *VHF/UHF News*, such as details of equipment used. His 6m station comprises an FT-101E, home-built transverter and PA, BF960 preamp and 5-ele NBS Yagi fed with LDF4-50A cable.

Ted Collins, G4UPS (DVN), forwarded details of the Italian Six Metre Group's 1994 Activity Contest. The first session runs from 1 January to 31 March, the second from 1 October to 31 December. For MS, they suggest Sundays and Mondays 0500-0700GMT, QRGs 50.1515 to 50.1637MHz. Exchange callsigns, reports and locator. MS QSOs over 500km are worth 1,200pts, all other QSOs are scored at one point per kilometre. Logs should list the 30 best QSOs with different stations each month. Entries to: Giovanni Zangara, IW0BET, at Casella Postale 36, I-00100 Roma Centro, Italy.

G4UPS lists the following Cyprus stations worked, all in KM64. In the Republic, P30YX, 5B4s AZ, JE, OG and YX, 5B4/DK9IP and 5B4/G3KOX. In the British Sovereign Bases, ZC4s AB, AD, ESB, JJ, KS, MK and ST. David Court, G3SDL, plans operation as 5B4/G3SDL from 29 June to 12 July from KM65. Using his Danish call, OZ3SDL, he will be QRV from Bornholm Island (JO74) during the August Bank Holiday; more details later.

From Ascension Island, Mike Wadsworth, G3UOF, is QRV from Two Boats village as ZD8M using a TS-690S and 3-ele Yagi. He has worked to KP4, YV4, PY and CT3FQ. Beacon EA8SIX has been heard regularly in the evenings. He has also heard EH7AH at S9+ but failed to make contact. Mike maintains the ZD8VHF beacon on 50.0325MHz. QSLs should go to his home QTH as per the *Call Book*. Other beacon news is that VE1MQ/B on 50.073MHz is now signing VE1BTT/B, keeper Mike Smith's previous callsign. Its CW message is "de VE1BTT/B FN65 5W es quad loop." H44HIR on 50.005MHz on the Solomon Islands is no longer operating, according to P29CW.

ACTIVITY

G4UPS lists Quadrantids MS QSOs on 3 January, after which the only activity was the morning skeds with G3CCH and SM7AED. The first winter Es appeared on 23 January when Ted worked SM3EQY (JP81) at 0843. The SM reported Es to GB3NGI and to France on the 21st, but no QSOs were made. Nobody else reported anything on the band.

70MHZ

A TALE OF woe from Gerry Schoof, G1SWH (LNH), who wrote: "I've had an accident with my tower and lost the lot – 2m, 70cm and 4m." Roger Betts, G0TRB (SFD), operated in the Christmas Contest but found things very quiet; he worked one new county on the band. He asked if crossband 4/6m contacts count for the Squares Table. Sorry, no. It would be rather confusing.

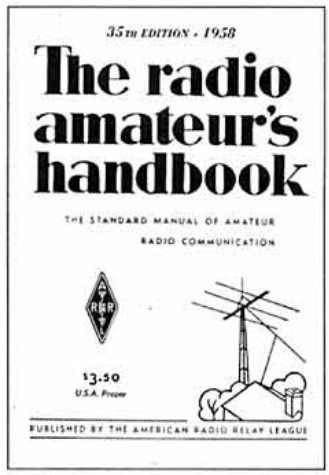
Ken Eastty, G3LVP (GLR), wrote at length about the history of the band. He mentions the 1958 edition of the *Radio Amateur Operator's Handbook* which included useful information. Commenting on today's situation, he notes the high proportion of homebrew or converted equipment in use – ". . . . not a band for the black box brigade!" Using a Pye 'Westminster' bought at a rally a couple of years ago for £7, he worked ZB on Es with an indoor vertical. In his area, illegal cordless telephones on 70.362MHz are a problem as they have ranges of several miles.

GW3MHW (DFD) is another reader whose interest in the band goes back many years in which time he has worked 1,070 different calls. John compiled a list of firsts years ago when many African and European countries had an amateur allocation around 70MHz. I'm sure that GW3KJW would like a copy of it. He has permission to operate unattended beacons from both of his sites. The one at IO72XG is on 70.147MHz. There are two at IO82IP, one on 70.071MHz the other on 70.052MHz. All run 5W ERP from a pair of crossed dipoles giving omni-directional horizontal polarization and are QRV 0830-2400.

GW4LXO is looking for AK, WJ, XJ, XN, YQ and ZP squares – in the original E-QTL system. He runs an FT-101E, home-built transverter and PA using a pair of MRF150s, BF981 preamp and 5-ele NBS Yagi.

144MHZ

VERY LITTLE news this month with no significant auroras or tropo to report. Welcome to Andy Wyspianski, G1AWF (LDN), who made an eleventh hour entry into the Annual Table. He runs an IC-275E, 70W PA and 17-ele Tonna Yagi atop a Versatower. His QTH is 60ft ASL. David Hilton-Jones, G4YTL (BUX), was QRT most of last year and is presently running a 3CX800 PA to a single five-wavelength Yagi. He hopes to have four antennas soon.



G3LVP found this book useful for researching the history of 70MHz.

Jim Barr, GI1CET, from Belfast has a new antenna, a 12-ele Yagi on a 20ft boom with T-match from the Eagle range by SAS. He also has a new, single 4CX250B PA giving about 250W output, but plans to change to a 4CX350 with 2.5kV on the anode. GW4LXO reckons 2m is a lost cause these days due to computer and commercial electronic QRM. Jon's station consists of an IC-202, 4CX250B driver, 7213 PA, MGF1402 preamp and 9-ele Tonna Yagi fed with LDF4-50A cable.

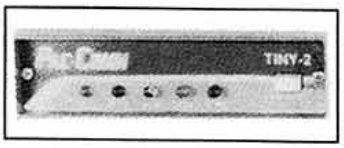
Joe Ludlow, GW3ZTH (GNM), has analyzed Es occurrences from 1975 onwards. He has devised an algorithm, taking into account the K and A indices, Band 1 TV channel received, 28MHz and 50MHz skip factors, Band 2 VHF FM DX factor and an Alpine thunderstorm factor. From all these data he uses a formula to derive a figure of merit. I have passed these data to Jim Bacon, G3YLA, for comment but none was received up to 30 January.

FINALE

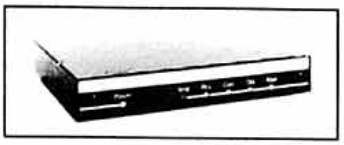
THERE WERE no activity reports for the higher bands, so that's all for this month. The deadline for **May** is **31 March** and for **June, 28 April**. The fax machine is on 081 763 9457; the BT Gold mailbox is 76:MSX021; my CompuServe ID is 70630,603 and the Internet address is 70630.603@compuserve.com.

ARE YOU THINKING OF PICKING UP PACKET AT PICKETT'S LOCK? ...

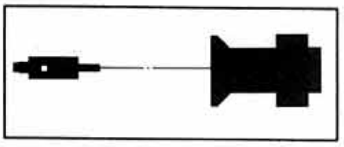
If you are visiting Pickets Lock you will be pleased to learn there has never been a better time to explore new avenues of Amateur Radio such as PacTor, Amtor, RTTY, Packet and Fax to name but a few. Whether you own the latest 486 PC or the trusty old BBC Siskin can help get you going. Prices start from just £69.95 and in most cases we supply a COMPETE package including ready made computer and transceiver cables plus software generally at NO EXTRA CHARGE. Here's just a small selection of our best sellers which of course will be available at the Exhibition:



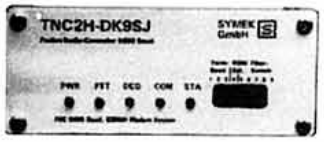
TINY II MK2 VHF/UHF Packet TNC (Suitable for MOST popular computers and Dumb Terminals)
The Tiny sports a powerful Personal Message System, battery backed ram and a wide range of accessories such as a G3RUH 9600 baud add-on modems for high speed and Satellite working. If you ever wondered why you don't see too many on the second-hand market the reason is that many mailboxes and nodes also run on TINY 2s using special software for backbone network operations so the Tiny 2's is still very much hot property to the beginner and expert Packet user alike! Tiny 2 is supplied by Siskin with ready-made cables for YOUR computer, transceiver and software. **£139.00**



Kantronics KPC-3 VHF/UHF Packet TNC (Suitable for MOST popular computers and Dumb Terminals)
A relative new comer to the scene KPC-3 sales with Siskin have been rising rapidly over the past few months. All KPC-3's sold by Siskin now include 128K ram as standard (previously an optional extra). The KPC-3 will also support WeFax with appropriate software (supplied by Siskin) for the PC, BBC, CBM 64 and BBC. Supplied by Siskin complete with ready-made cables, 128K ram, software and 5.1 firmware. **£149**
(Existing KPC-3 owners who purchased form Siskin may update to 128K ram for just £9.95 incl. P&P!)

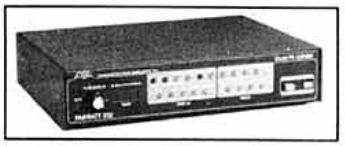


The Mini-Pak System (IBM PC and 100% PC Compatibles)
This popular little VHF/UHF Packet Radio modem is actually built INSIDE a conventional 9 way D shell using advanced surface mount construction. The Mini-Pak offers many of the features of it's standalone cousins (Tiny 2 . KPC-3 etc.) at a very affordable price. Supplied by Siskin complete with ready-mode radio cable, the world famous BayCom software and a free evaluation copy of G7JJF's superb Personal Message System software! **£69.95**

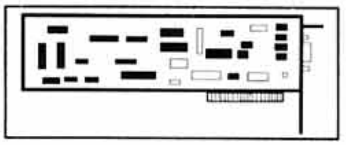


SYMEK TNC2-H 9600 baud VHF/UHF TNC (Suitable for MOST popular computers and Dumb Terminals)
This superbly manufactured German TNC offers unrivalled performance with 9600 baud operation for all G3RUH compatible systems such as OSCAR 22 and high speed linking. Clocking at 9.8MHz this is the fastest TNC we stock offering effortless 9600 baud operation. Standard features include 64K selectable eprom (so you can switch between regular TNC-2 code and TheNet, WA8DED etc.,) plus front panel selectable filter switches for optimising specific transceivers. **£179**

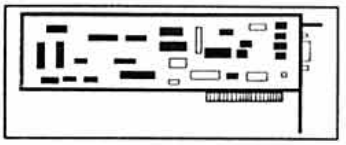
The KAM PLUS 128K (Suitable for MOST popular computers and Dumb Terminals)
We've almost lost count of KAM sales over the past few months. So many features in such a compact unit! Facilities include HF/VHF Packet, Amtor, PacTor, RTTY, CW, ASCII, Navtex, Fax plus true dual port operation, up to a 100K battery backed Personal Message System and real time clock now as standard! Once again KAM PLUS's supplied by Siskin include ready-made cables for your transceivers and computer plus software (including Fax and Windows programs.) **£395**



The PK-232MBX (Suitable for MOST popular computers and Dumb Terminals)
With over 70,000 units sold the PK-232MBX remains a firm favourite with features including HF/VHF Packet, Amtor, PacTor, RTTY, CW, ASCII, Navtex, Fax (Receive AND Transmit). Recent additions include AEA's "Gateway" node system (please note, NOT cross mode) plus enhanced Amtor/PacTor operation including automatic mode selection for Amtor/PacTor and PacTor round table and a new "EXPERT" command dramatically reducing the usual long list of commands. Supplied by Siskin complete with ready-made cables and software! **£385**



SPECIALIST PC CARDS - THOR RLC100 series
The RLC-100 offers great savings over conventional standalone TNCs with reduced cabling and savings in space and power consumption. Already in use by hundreds of BBSs and nodes throughout Europe this British designed and manufactured product may be run with the "industry standard!" G8BPQ networking package plus most popular multi-use BBS programs such as NNA, FBB, WORLI and the excellent G7JJF multi-user PMS. All ports are 1200 baud but may be upgraded at a later date to the G3RUH 9600 baud standard. Two port version **£165** Four port version **£285**



BayCom 4 Port - this card offers VHF 1200 on port 1, VHF/HF on port 2, G3RUH licensed 9600 baud on port 3 with a high speed modem disconnect header on port 4! Once again this card can be used with the excellent G8BPQ package (supplied) and BayCom's own super terminal driver software plus regular BBS program such as NNA, FBB, WORLI and the excellent G7JJF multi-user PMS program (evaluation copy included). **£269**

PLUS LOTS LOTS MORE.....

Siskin holds an extensive range of ready-made computer & transceiver cables at modest prices which we are happy to supply even if you bought your TNC elsewhere! We also stock update eproms for ALL the units we stock although these seem to change weekly so please phone for the latest update info for YOUR TNC or Multimode. Please write or phone for a catalogue and pricelist (no SAE or stamps required!). You can generally telephone Siskin from 8am to 8pm Monday Saturday for both sales information and technical support and of course personal callers are most welcome Monday - Friday in our Southampton office.

QSL

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

WE HAVE received notification of a new address to send V3 cards to which is Derek Griffin, V31DE, P O Box 273, Belmopan, Belize C A.

We also have a new address for UH (Turkmenistan) cards. This is P O Box 555, Ashkhabad 20, Turkmenistan 744020.

HISTORY

READERS WILL be aware of the sad death of Arthur Milne, G2MI in October 1993.

He was so helpful to me when compiling the history of the RSGB Bureau (Dec 93, Jan/Feb 94) and I am eternally grateful for his kindness and patience during my seemingly naive questions. I am glad I got his observations on the bureau before he left us. He really was Mr QSL and amateurs all over the world owe him a debt of gratitude that is impossible to quantify.

QSL

WYNNE EVANS, GW3WWN, has sent me a copy of the QSL card used for GB2SDD which is run from the Port Talbot ARS every 1 March. It is reproduced on this page and features a picture of the Saint David's Day Award. If you work GB2SDD send cards via the Bureau!

Mike Wadsworth, G3UOF (ZD8M), has written to tell me *inter alia* that I got his name wrong in the December issue and I apologies for that. He also says he has had the QSL cards printed for the ZD8 operation printed in 12 different colours to cover different bands and modes, so watch out for them.

Reg Lyddon, G4ETJ, worked 1A0KM on 5 January 1994 CW (what else is there!) but has had the card returned from I0IJ (given as the route) telling Reg that the operator was a pirate. Reg is none too happy about that because it would have been a new country for him. I have a feeling I may be a victim too so be warned!

The Bureau has recently received another letter from P O Box 88 saying that all is well out there although we still get letters from individual operators saying it isn't! In fairness, we are getting cards through from Box 88 so I am not quite sure what to think.

We have also received a letter from OH3MHT saying that he will not be the route for UN8PYL after 15 January 1994. He says that Alex, UN8PYL, will try and send QSL cards out in response to those already received but the postal service in Kazakh is in a bit of a state.

Ted Allen, G3DRN, (a long-suffering QSL Sub Manager) tells me that he had a call recently from a G3 asking why he had not received any cards of late. Ted said there were no envelopes lodged with him and, after some questioning, the caller revealed that he had sent them to an RLO! Now doing that sort of thing makes the RLOs feel wanted but one is not likely to receive many QSL cards via that route!

Don McLean, G3NOF, says that one IRC can be exchanged for airmail postage to anywhere in the world. The system was changed about two years ago. If you look at the back of a recent IRC and compare the words there with those printed on one dated two or three years ago you will see what I mean. I didn't know that so I guess one learns something new every day!

Jim Johnston, GM3LYY, (QSL Sub Manager) tells me that his address is printed incorrectly in all sorts of places and would I try and rectify it. His house number is 2c and not 20 as shown in various lists and the *RSGB Call Book*. Please take note.

Tim Hughes, G3GVV, tells me he has received notification from CTARL that the address of their QSL bureau remains the same namely: P O Box 93 Taipel, Taiwan, R O C. The only reason Tim can think of for the notification is that the CTARL has gone through a number of changes recently although the Bureau seems to be unaffected.

John Ridd, G8BQX, tells me that he has at last managed to get a QSL card from CN8CC using F6FNU as a route. However the address to use for the latter is M Antoine Baldeck, Box 14, F91291 Arpajon Cedex, France. Don't use the address listed for F6FNU in the *International Callbook* because if you do you will not get a response.

The new post code for DARC is D-34216 Baunatal and not any other you might have.

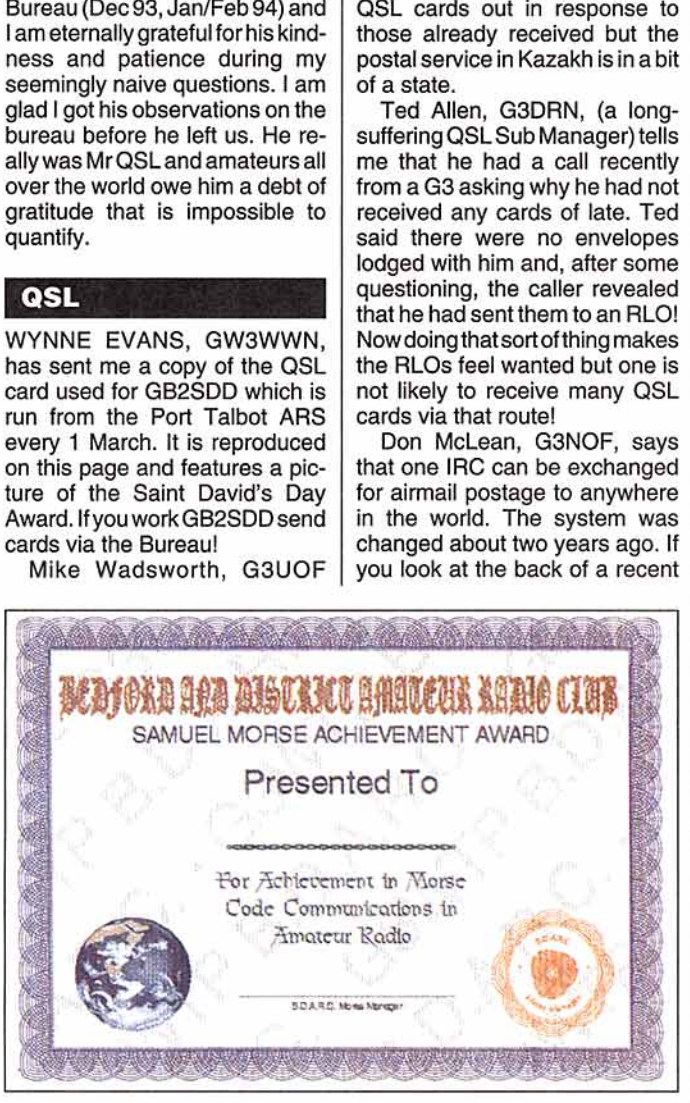
I wrote recently about cards for the island of Gozo and reported that they went to Arthur Cross. I have now learnt that Arthur has sadly become without sight and cannot continue the work he has performed so ably in the past. I wish him well in the future. Cards for the island can go by two routes:

a) To MARL Club, PO Box 575, Valletta, Malta GC, Zip CMR 01, or

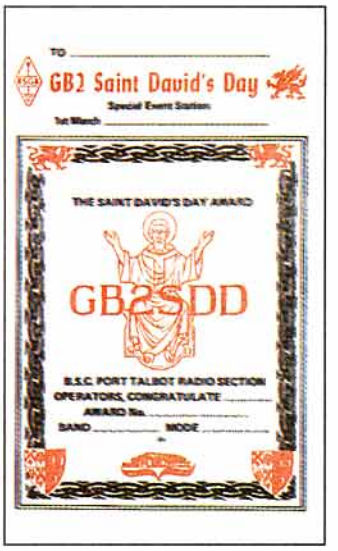
b) To John Cussar, 168 Main Street, San Sannat, Malta GC, Zip VCT 112.

As most readers will know, Czechoslovakia ceased to exist on 1 January 1993. As a consequence there are now two QSL Bureaux in that area. The first is the Czech Republic Bureau at PO Box 69, 11327, Prahal, Czech Republic and the second is the new Slovak Republic Bureau at SARA, PO Box 1, 852 99, Bratislava, Slovak Republic. This means that all OM QSL cards will be sent to the second address. Anyone sending a card for an OK3 direct to a bureau out there would be advised to send it to the SARA address.

Mr K Plumridge, GW4BYY (the G0AAA–AZZ sub-manager), has contacted us to say that amateurs who want to receive cards should send their SASEs to Gwn-1-Gwent, High Street, Llanberis, Gwynedd LL55 4EN.



The Samuel Morse Achievement Award (see last month's *QSL*).



Look out on 1 March (St David's Day) for GB2SDD.

AWARDS

MORE LETTERS on the Empire DX Award have been received from Arthur Biddell, GM3GNM; Norman Fitch, G3FPK; Doug Manson, G8PW and John Wightman, ZL1AH (ex G3AH). Arthur tells me that he got his in 1968 along with a personalised lapel badge. Norman got his certificate in 1962 signed by John Clarricoats, and says, unlike the early certificates his does not have the oceans coloured blue, and the words 'The Incorporated' are missing. Norman goes on to say a more difficult award to achieve was the Worked All Pacific Award sponsored by NZART which he did not manage to obtain until 1966. The requirement was to work 30 different countries in the Pacific. If anyone has a colour photograph of one of those I would dearly like to share it with column readers. Doug Manson kindly sent me the original conditions for the award and says his is numbered 130 issued in 1956. John Wightman tells me that he left England in 1950 being half a dozen QSOs short of the award so he started again from ZL! He was awarded certificate number 127 – still has it and the lapel badge. He says certificates 1, 2 and 3 were obtained by G6RH, G2PL and G6ZO respectively and the award was so difficult to obtain that by 1957, ten years since its inception, only 133 had been issued. John says be obtained his DXCC with 90 watts to 'a piece of wire'! All those with towers, 5 element beams and linears please note!

"Our Keys Unlock the World"

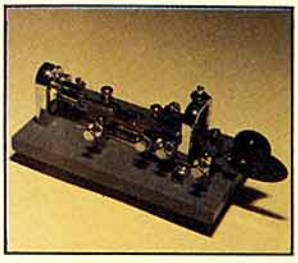
VIBROPLEX®

"the oldest name in amateur radio"

ADVERTISING from the early 1900s shows the early establishment of the Vibroplex patented keys.

In 1890 Horace Martin searched for relief from the "glass arm" telegraph operators were getting from pounding the straight keys. His answer, the Vibroplex Original, was an instant success. This was the first significant improvement in code transmission since the birth of telegraphy and the straight-key that was invented in the 1840's by Samuel F. B. Morse.

ORIGINAL



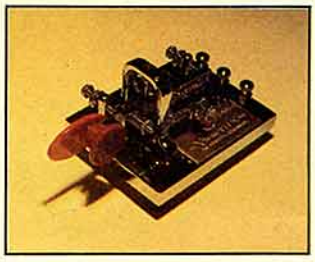
The **Vibroplex "Original"** design, with little modification, is made today using the same tools and dies as the early models. Modern day operators can put their fist to the same equipment as the Western Union and railroad operators of old. The feeling of quality and pride from owning a piece of history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

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

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

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

VIBROKEYER



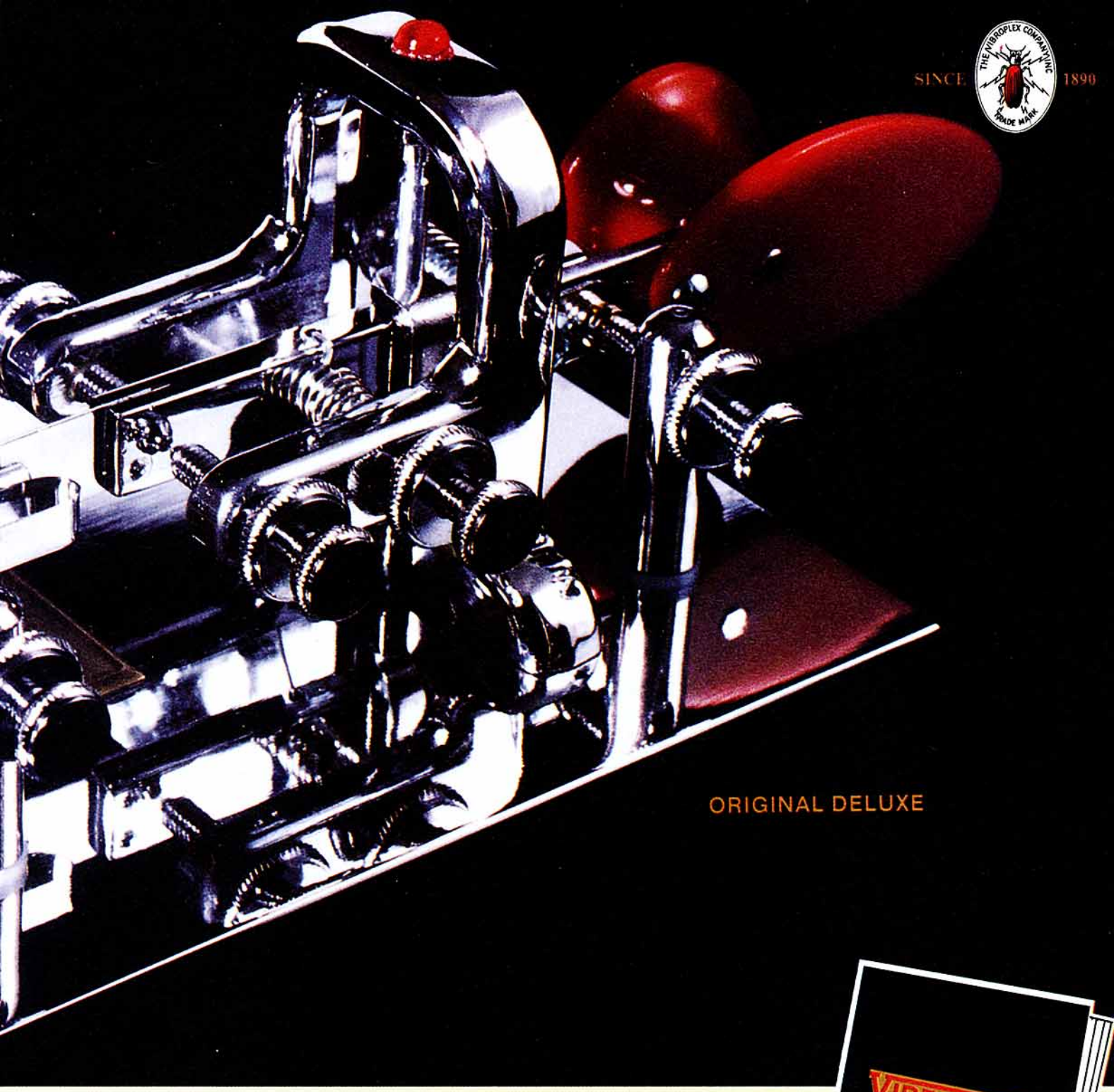
The **Vibroplex Vibrokeyer** is designed for "Bug" operators who want to move to electronic keyers without relearning keying. The single lever paddle initiates the automatic dots and dashes of the electronic keyer with the same motion used to operate the "Bug".

Vibrokeyer Deluxe – Highly polished chrome base with bright chrome top parts. Silky smooth movements are jewelled as in a fine Swiss watch.

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

VIBROPLEX SERVICING: Full parts and refurbishment service for all models. Call EastComm.

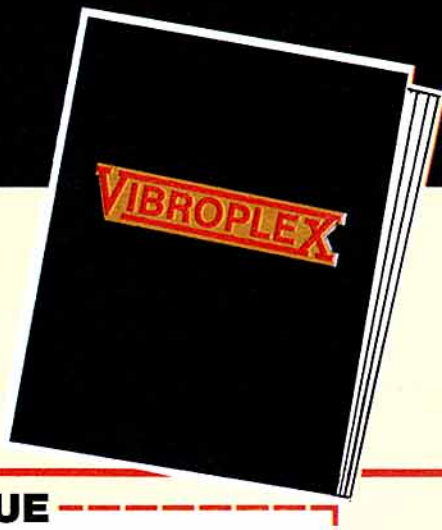
SEE VIBROPLEX ON EASTCOMM'S STAND

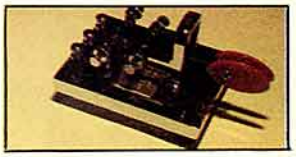


The Vibroplex "Bug" became the standard with telegraphers to amateur radio operators ... and became a legend in its own time. The Vibroplex key is still unmatched for quality, feel, simplicity, performance, and satisfaction. It has come to represent the one piece of equipment in the ham shack that symbolizes the interest, camaraderie, and *esprit de corps* of the world-wide ham radio community. Even in this age of electronics, the heritage of Vibroplex has been passed down from generation to generation in the service of professional and amateur radio operators who demand quality. *Discover why!*

100 YEARS ANNIVERSARY BOOK

Vibroplex 1890-1990. A "Must" for collectors. The history of the company. William Holly <1BH has done exhaustive research over 20 years to produce this excellent collectors piece. Features all known models. Also available signed by author.





IAMBIC

Iambic Presentation – 24K gold plated brass plate on a highly polished chrome base with bright chrome top parts. Silky smooth movements are jewelled as in a fine Swiss watch.
Iambic Deluxe – Same as Presentation but without the gold plated brass plate.
Iambic Standard – A neat, crisp textured finish grey base with bright chrome top parts.

BRASS RACER

The **Vibroplex Brass Race – EK** – Concealed in the base is a fully Iambic dot-dash insertion, and adjustable speed control keyer using the Curtis 8044 chip. The perfect unit for mobile, DXpedition, or just plain economical fun.
Brass Racer Iambic – Solid lacquered brass mounted on a hardwood base.

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AT THE LONDON AMATEUR RADIO SHOW

HF F-LAYER PROPAGATION PREDICTIONS FOR MARCH 1994

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

Time / / GMT	28MHz 000001111122 024680246802	24MHz 000001111122 024680246802	21MHz 000001111122 024680246802	18MHz 000001111122 024680246802	14MHz 000001111122 024680246802	10MHz 000001111122 024680246802	7MHz 000001111122 024680246802	3.5MHz 000001111122 024680246802
** EUROPE								
MOSCOW	.....111....	....12332...	....456651..	...167887 4..	...577778 82.	32265545 6885	875322223689	+53.....3++
MALTA	.....1111...	....233331..	....566664..	...178888 61.	...587778 951	653755556897	998532224689	+++2....3++
GIBRALTAR	.....11111..	....144443..	....467676 1.	....777789 5.	331576556895	898743223689	+++42....3++
ICELAND	..........1.	.....1221..	.....2443..	....167777 3.	1..166666883	763553334578	+++42....24+
** ASIA								
OSAKA	.....1.....	....241.....	...1463.....	...265422 2..	...132123 551	....1...1462	.....3.	
HONGKONG	....112.....	....2341....	...156631...	...267652 2..	...145445 61.	1...121247 63	1.....1475	42
BANGKOK	....2233....	...1355 51...	...257774 1..	...357676 3..	...125456 71.	2...212477 5	2.....1477	44
SINGAPORE	....2333 1...	...1455 53...	...257776 1..	...357677 3..	...124456 72.	2...112477 5	2.....1477	44
NEW DELHI	....2333....	...14555....	...367772...	...456674...	..122345 6221	511..112467 6	62.....1478	3.....4+
TEHERAN	....3444 1...	...256663...	...466776 1..	...655677 4..	1.142244 67 32	7441..113787	862.....1478	+3.....4+
COLOMBO	....3444 2...	...156664...	...356777 2..	...345678 5..	...112446 832	52....113788	61.....1478	3.....4+
BAHRAIN	....4444 2...	...266674...	...466787 1..	...555678 4..	312422446 753	8531..113788	861.....1478	+3.....4+
CYPRUS	....4545 4...	...167776 2..	...488888 5..	...788888 82.	422765667 974	976433335 799	9852...12588	++2....25+
ADEN	....5556 4...	...267776 2..	...466788 5..	...544578 721	522311246 875	974....13689	872.....1478	+4.....4+
** OCEANIA								
SUVA/S	.....1.....	.....122....	.....244 21..	.....244 4551.	...332123 62.	...21...13..	.....	
SUVA/L	.....1.....	....1....2.	....411...51	11.16321.262	111564322 652	..153111 362.	...21...13..	.....
WELLINGTON/S	.....11....	.....233 1...	....245531..	...255445 5..	...432123 62.	...21...141.	.....	
WELLINGTON/L	.....1.....	....1.....21	11..3.....42	222352...263	.12432..153 1	...21...31.	.....	
SYDNEY/S	....12.....	....2421....	...256432...	...477554 2..	...465446 61.	...232124 741	....1...143.	.....
SYDNEY/L	..........1.	.....1.....1	....42....31	111.6421..74	...242113 52	....1...33.	.....	
PERTH	....343.....	...15651....	...477742...	...467654 2..	1..244446 631	2...111137 85	1.....1474	42
HONOLULU	..........1.	.....1.....	.....13....	.....211352.	...132113 3..	..141...11..	.....	
** AFRICA								
SEYCHELLES	....24564...	...246776 2..	...456788 5..	1..444678 721	521211346 875	962....13689	85.....1478	+2.....4+
MAURITIUS	....56664 1..	...267787 2..	...466788 61.	1..445678 831	621212346 886	962...113689	84.....1478	+.....4+
NAIROBI	....5567 52..	...167787 4..	...466688 72.	1..544478 842	641411146 887	9841...13689	883.....1478	+5.....45
HARARE	....4677 63..	...167888 51.	...366688 831	21.554478 963	751521146 898	9952...13689	884.....1478	++.....45
CAPETOWN	....3578 74..	....568887 1.	...176789 951	2..365568 974	741632236 898	9964 1..13689	8851....1378	++2....4+
LAGOS	....4678 751.	....678887 2.	....766689 51	32.275457 984	772642125 898	9976 1...2689	7873....378	5+5.....4+
ASCENSION Is	....2644 661.	....5755 772.	....776678 61	22..864458 83	674363112 698	99863....389	8884....168	5+5.....3+
DAKAR	....1566 761.	....3777 883.	....676678 6.	12..765468 83	574263213 697	99863 1..379	8884....158	+55.....2+
LAS PALMAS	....1444 44..	....2676 661.	....688888 4.	....888889 71	342386666 896	898754334 689	99863111379	+++3.....4+
** S. AMERICA								
5th SHETLAND	.....4666 1.	.....1678 73.	.....3778 86.	12..156677 72	574244345 566	788632112 235	57841....13	245.....
FALKLAND Is	.....1666 51.	.....3877 73.	....157778 6.	.1..266667 72	464255333 466	898632 11.136	78841....13	4+5.....
R DE JANEIRO	.....5423 51.	.....7645 73.	.....8756 76.	.1..175446 72	464235311 367	99863 2....48	88841....16	++5.....3
BUENOS AIRES	.....2555 51.	.....3777 73.	.....6776 75.	.1..176555 72	354145422 256	898542 1...26	78841....3	5+52.....
LIMA	.....3334 1.	.....5555 2.	.....7656 4.	.....6544 51	222.314311 24	687442 1...3	58841....1	2+52.....
BOGOTA	.....3223 1.	.....5445 2.	.....7655 4.	.....1654 451	121.234211 35	77732 1....4	68841....1	4+52.....
** N. AMERICA								
BARBADOS	.....3334 1.	.....2545 62.	.....5766 65.	.....6654 562	222.154212 56	787432 1...26	88741....3	++52.....
JAMAICA	.....2223..	.....4344 2.	.....6655 4.	.....6644 51	11..124322 34	676232 1....4	68841....1	3+52.....
BERMUDA	.....1122..	.....3344 1.	.....1655 64.	.....3655 561	11...443235 5	675222 1...25	78841....3	4+52.....
NEW YORK	.....111..	.....1233 1.	.....3555 3.	.....5656 51	1....244335 4	653112 11...24	68741....2	3+52.....
MEXICO	.....111..	.....2331.	.....5552.	.....1654 31	1....1.343222	353131 111...1	27741.....	.452.....
MONTREAL	.....11....	.....1223 1.	.....3445 3.	.....4656 51	1....244345 4	553121 11.125	68741....2	3+52.....
DENVER	..........1.	.....1331.	.....2443.	.....3533 2.	341111.112..2	267311.....	.352.....	
LOS ANGELES	.....11....	.....331.	.....542.	.....2532 1.	231112..13...	146311.....	..52.....	
VANCOUVER	.....1.....	.....122.	.....1343 1.	.....1123 3.	221111..13211	135311...1...	..4.....	
FAIRBANKS	.....1.....	.....1123 3.	11.2221134 32	122411...111.	.....	

The provisional mean sunspot number for January 1994 issued by the Sunspot Data Centre, Brussels was 58.8. The maximum daily sunspot number was 104 on 5 January and the minimum was 25 on 7 January. The predicted smoothed sunspot numbers for March, April and May, are respectively: (classical method) 38, 36, 34 (±9); (SIDC adjusted values) 21, 19, 16 (±4).

Lowe Electronics

Chesterfield Road, Matlock, Derbyshire, DE4 5LE
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MULTIPLE HETERODYNES WHITE / PINK NOISE POWER LINE NOISE AND MORE...

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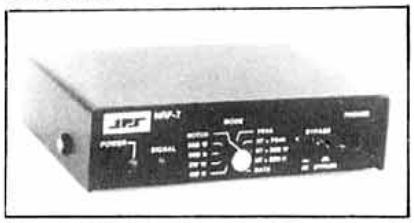
DSP NOISE REDUCTION PRODUCTS FROM JPS COMMUNICATIONS!

A lot of people today are still making do with old radios. Our second-hand stock sells faster than our workshop can check it over, proving the point there is a lot of mileage in some old kit. If you're one of these users you probably dream of owning the latest transceiver with all sorts of new gizmos to enhance operation. A good front end is a good thing but other goodies like a tunable notch filter, IF shift, really pushes the price up. If you want to add Digital Signal Processing, you need a unit like Kenwood's TS450S plus the DSP100 or Yaesu's FT990 with digital audio filtering, and you're going to need written permission from both spouse and bank manager! Not any more. JPS Communications specialises in low cost digital signal processors and what's more, they'll work with anything from your home-brewed AM top bander up to the latest all-singing all-dancing transceivers on any band you care to mention! JPS make a whole family of DSP filters so there's something for everyone.

NRF7

General purpose noise remover and filter



The NRF7 reduces atmospheric noise through dynamic peaking and removes multiple tones from voice signals. High performance voice filters and CW filters with selectable centre frequency

Just £279.00.....*Carriage £10.00*

All JPS DSP filters work off receiver audio so there's no mods to be done to your rig - just plug into the speaker socket, hook up your headphones or an extension speaker and you are in business.

NIR10

Noise / Interference reduction unit

The NIR10 allows reception of difficult to read signals. NIR mode helps to reduce or even eliminate heterodynes, white or ignition noise, RTTY interference and power line noise. PEAK function reduces white noise interference. NOTCH FILTER mode removes multiple heterodynes and acts in 3 milliseconds! BANDPASS mode has a continuously adjustable centre frequency

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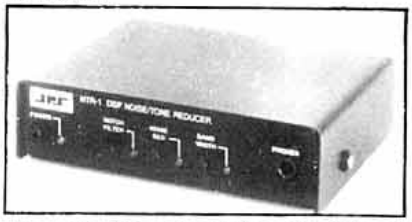
NTR1

Wide band noise and tone remover



The NTR1 provides wideband operation for AM or FM reception and narrow band operation for SSB, CW or Data reception. State-of-the-art DSP rapidly removes multiple tones.

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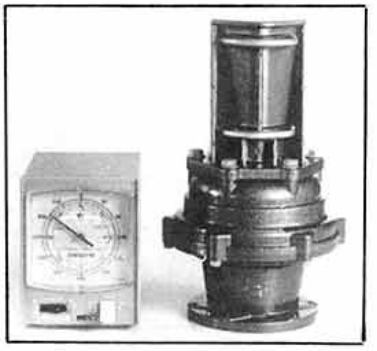
All JPS DSP filters require a 12V power supply to run from the mains but it needs to be fairly beefy. Run it from your shack supply or from our dedicated 1 Amp PSU available at £29.95

To mis-quote Max Bygraves.....

"WHEN IT'S SPRING AGAIN, I'LL BRING AGAIN ROTATORS FROM JAPAN....."



Yes, Spring is with us once more - the weather's turning nice again and it's time to climb that tower and see what damage that Winter has done to your rotator and antenna system. If you've got an Emotator rotator, you'll have little to worry about. They're made in Japan to a very high standard, proven by the number of professional customers we have using these products, but certain mechanical parts do wear out after prolonged use and that's where Mark in our spares department come in - we are one of the few companies to actually keep rotator spares on the shelf. Something to bear in mind if you need to replace your rotator this spring! Emotator have a rotator to suit everyone - from modest VHF beams to the larger HF beams, there's an Emotator to suit you. Don't forget, we also give the same service and backup to Hygain rotators from the USA. If you want to compare specifications, give us a call and we'll pop some excellent brochures in the post to you.

To quote dear old Max again....."You need hands....."
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Jack Hollingworth's articles in RadCom from Nov'93 to Jan'94 gave you a good insight into CLOVER - now you can try it for yourself! Re-read Jack's articles or give us a call for a more detailed information pack on CLOVER and other data products.

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Contest Exchange

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

I HAD BETTER START this month's column with a correction to the February issue. The May 2m contest rules remain as last year, and will have only counties plus countries as the multiplier – the rules as published on p83 of February 1994 *RadCom* are correct. My thanks to Richard, G4WKN, for pointing out this discrepancy.

HF CONTESTS

QUITE A FEW interesting contests take place during March. A popular event is the RSGB Commonwealth Contest (also known by its old name of BERU – British Empire Radio Union), which is CW on 80 to 10m. It involves working people in the countries of the British Commonwealth. This is one of those contests where being loud, and calling CQ for the whole event will not gain you a top position. This is partly because of the relatively small number of Commonwealth countries when compared to the DXCC list. If you are going to do well it is very important to catch the openings to these diverse parts of the world. A lot of patient searching, combined with a good knowledge of propagation is vital. The full rules are on p81 of the October 1993 *RadCom*.

There are two big international HF contests which present superb opportunities for clubs to enter. During the first weekend in March, the SSB leg of the ARRL contest takes place. From Europe, this contest means working US and Canadian stations on 160m through 10m. I always find it fun working 'stateside' stations in contests – the pile-ups can be huge, and last-10 QSO rates can peak over 500/hour. For details of the contest see this month's *HF News* column, or check out the CONTESTS file area on your local PacketCluster node. The rules are very straightforward, and having only one area of the world to look at makes the tactics relatively simple, and also gives some interesting opportunities for fixed wire arrays for the low bands. You don't necessarily need that big yagi for 40m to do well if you use your imagination. Dealing with the pile-ups from the US is an excellent basis for operator training since the accents are relatively easy for native English speakers to understand, and signals are usually good – much easier to handle than a 50 deep pile of 10 watt JAs where they are all about S2 (ESP level)!

The big contest of the month is SSB WPX (Worked all Prefixes). Next to CQWW this is the biggest contest of the year – it has many sections, uses prefixes as the multiplier, and takes place on the last weekend of March. Again there will be an enormous level of activity, although you may not be able to figure out where some of it is coming from – there will be a few very weird and wonderful prefixes out! Tactically, this is an easier contest than many since to a large extent, multipliers tend to come automatically to you, and getting a good QSO total is a good start, although the scoring system means that intercontinental QSOs on the low bands are important.

VHF CONTESTS

FOR VHF, THE MAIN March contest is the 2m and 70cm event on the first weekend – unfortunately clashing with the ARRL SSB. This traditionally marks the start of the year's portable contest season, although, since it is not uncommon to see snow on the hills over this weekend, it tends not to be the most comfortable of portable events. In spite of this, there is usually good activity, and this year a six hour section has been introduced for single operator fixed stations who are unable to operate for the full duration. Full rules are on p83 of January *RadCom*. With this event sounding the starting pistol for the portable contest season, it seems an appropriate time to talk about generators which form a key and much neglected component of any significant portable entry. My thanks to Chris Parry, G8JFJ, who has sent me some very useful thoughts on this subject, focusing some of the problems which can occur!

PORTABLE POWER

THE BASIC CHOICE IS diesel or petrol, though gas is also feasible. All the options are expensive to buy or hire! Most sets produce 220VAC or 240VAC, although battery charging 12VDC or 24VDC sets produce an attractive alternative solution for modest power stations. Petrol or gas engines can both stop in driving rain, and have been known to lose regulation upwards, which is potentially dangerous. I used one petrol generator which suffered from major overshoot on its throttle control loop – as you went back to receive, it would shoot up to 350V – this destroyed a rig and bits of an amplifier very quickly! Put a box in line between the generator and equipment which will cut the load if voltage outside the limits 200-270V is detected.

Bring the generator up to governed speed before connecting the load, and isolate the load before stopping the generator. 10% voltage regulation is an everyday problem for /P contest groups, and all reservoir capacitors need to be rated to cope with the volts on receive. An alternative is to switch-in a fan heater on receive (a popular winter-time solution).

Both petrol and gas engines use spark-ignition which can cause potential EMC problems, and the storage and transport of petrol needs to be considered. 'Hot' filling of petrol generators can be very hazardous, especially in windy weather.

Diesel sets can be difficult or impossible to start after long periods of storage, and summer fuel can freeze in March. Diesel sets are bigger and heavier than similarly-rated petrol sets, but are far more economical, and as an extra bonus, fuel may be tax-exempt 'red' diesel, available from boatyards, etc. Anything bigger than 5kVA is best trailer-mounted in order to reduce the man-handling hazards in rain or snow. Generators of all types need to be sited away from the main antenna lobe, downwind, and where cables do not cross footpaths.

The big issue is, how big a generator do you need? In general, a much bigger one than you might expect! This is because most transmitters have capacitor-input power supplies which draw current only on waveform peaks, causing high copper-losses in the alternator. As a 'sizing' guide, aim for a generator with a VA rating fourfold greater than the required transmitter output PEP. Even with a generator significantly bigger than this, with most valve amplifiers you should not expect to see the same power output on the generator as you do at home, mainly because the HT will be down. The only real solution is either to have much bigger amplifiers than you need, or to use those with choke-input supplies which take current over the whole mains cycle. A good example of an amplifier with a choke input supply is the old Tempo 2002 which is almost as effective on a generator as it is on the mains – I don't know what the newer 2002A is like however. Switched mode supplies can also be a good option.

Alan Goodacre, VE3HX, topped the 28MHz single-band entries to the 1993 RSGB Commonwealth Contest.

Cable size may be less significant than expected, because of the high source impedance of the generator as compared with domestic mains. Ex building-site alternators are often 220VAC brushless types and produce a squarewave EMF. Posher types with proper sinewave output exist, but these have brushes, and may therefore be less reliable, and present possible EMC problems. Beware oil consumption – smoky generators could seize if run continuously for 24 hours. Also beware vibration. Avoid the temptation to get 240VAC out of a 220VAC mechanically governed set by raising the governed speed by 10%. The engine mountings etc. may be ineffective (or worse) at anything other than the intended mechanical frequency.

Many alternators have the Neutral connected to the frame, but others have the L-N output fully insulated. Chalk hilltops in summer present earth conductivity problems, even assuming it is possible to drive in an earth stake, and in all cases it is necessary to think carefully about safety in terms of fusing and RCCB/ELCB performance, especially if using multiple generators as part of a single installation. If, like me, you don't fully understand this side of the system, get good advice from someone who really does!

One final point is that of physical safety – when using a crank handle, fingers and thumb must go on the same side to avoid risk of injury in event of kickback, and all belts, chains and shafts must have guards.

SWL NEWS

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

THOSE WHO monitored the LF bands, particularly 3.5MHz, during late December and early January will not have been disappointed at the DX which was on offer. A number of listeners commented on the particularly fine conditions during our afternoon 'grey-line' period on 3.5MHz.

Stations logged included: VE7CC, VE7SZ, VE7ON, W7EKM, VE7DX, JA6XMM, W6RJ, W7XR, W6RR, W7RM, N7UA, VE3DZM, 9N1WU, JA0JHA, VK3AJJ, FK8CP, ZL1CCR, JA4DND, VK4HF and VS6WV. The signals from W7XR and N7UA in the north west US were especially strong.

At other times on 3.5MHz the best DX reported was undoubtedly VK9NS and T32BB from the Pacific.

The 7MHz band seemed poor, but forty always seems to peak during late January and February.

1.8MHz was incredibly noisy, even on my very long sloping wire. The band suffered from a poor quality commercial signal on 1.900MHz, which also affected the top end of 3.5MHz, and listening was sometimes impossible. However, conditions to the West on the evening of 10 January were very good, when East coast Ws were 5 9 as early as 2230, and HH7PV was also audible, although not Q5.

SUNSPOT NUMBERS, SOLAR FLUX, ETC

I REFERRED to sunspot numbers for the *CQ* World-Wide DX contest at the end of October but the figures quoted were actually the 'solar flux'. I am grateful to G8KG for drawing this to my attention and for providing more information.

The provisional sunspot numbers for the CQWW weekend were 24 on the Saturday and 25 on the Sunday. The figure of 91 on both days was what is referred to as solar flux. This is the 2800MHz solar flux, a measure of the power radiated by the sun at that frequency and measured daily at local noon in British Columbia.

Solar flux is in fact measured at various frequencies for different purposes but the 2800MHz value is the one which correlates most closely with the sunspot activity, though the correlation between daily values is not very strong. With heavy averaging a sunspot number of 100 equates to a solar flux of 145 solar flux units (sfu); 150 with 195 sfu and 0 sunspots with 65 sfu.

It was pure luck that the sudden improvement in conditions coincided with the contest and some of that improvement was due to considerable help from Sporadic E propagation on 14, 21 and 28MHz.

G8KG considers that the origin of the improvement may have been events at the beginning of October. Sunspot numbers then were between 87 and 100 between 2 and 5 October, and note that this is about 27 days before CQWW. It sometimes happens that the remnants of a very active solar region give rise to a peak in HF conditions during the next rotation although the indices by that time have fallen away. This is a good example of how the daily sunspot or solar flux figures are not always a good guide to band conditions.

GB2MSR – JOTA STATION

AS READERS will know, the 36th Jamboree on the Air took place in October. Many special event stations were active and Scouts were able to pass greetings messages over the air. One such station was GB2MSR from the Isle of Man. Scouts and Guides passed greetings messages to 37 other JOTA stations around the world. All those who contacted GB2MSR have received a special Manx Railway QSL card donated to the station by the Isle of Man Post Office and Manx Passenger Transport. GB2MSR would like reports, via GD4OEL, from SWLs (especially Scout SWLs) from around the world as well as from the British Isles. One of the special QSL cards is reproduced on this page.

Philip Davies, RS95258, reports his 'QSO of the month' to have been PA3GAT working VO1FG on 80m. The amazing thing about that was the Dutch station using only 10W to a bit of wire strung to a lamp post.

It might be helpful to point out that CQWW saw the Canadians using the CH prefix, HK0HEU was on San Andres Island, CX0CW was in Uruguay, the '4L' prefix was used by stations in Georgia, while TO5MM was a special callsign from Martinique. Other 'funnies' were ZX0F from Fernando da Noronha, the UN prefix from UL7, P39 from Cyprus, while 4U1VIC counts as Austria.

HEARD ALL BRITAIN NEWS

THE HAB/WAB awards continue to attract new listeners. Nine SWLs had applied for HAB Record Books in the period under review. Once again this year, there will be a wide range of contests, where the object will be to log as many stations in as many different WAB squares as possible.

Liam O'Hara, RS95272, who was the lucky recipient of a DR48 communications receiver. It had been donated by Malcolm, A92EV, for presenting by the RSGB to a deserving SWL.

QSL card used for the Isle of Man JOTA station GB2MSR.

Further information about HAB can be obtained by writing to Dennis Sartin, GW6JNE, at 7 Penrhos Crescent, Rumney, Cardiff CF3 9PB.

WORLD WIDE NAVAL CONTEST

BILL McCONACHIE, BRS88921, provided a very full report on his efforts during the International Naval World Wide CW Contest. This is the second event that Bill has taken part in recently. Once again it is a lesser-known event, but he prefers these to full-blown Society contests.

The stations logged showed that amongst naval personnel, this event was quite popular and it attracted a very interesting level of support from all around the World.

HF NEWS

THE ARRL 28MHz contest in early December provided hardly any Stateside stations to log, but the DX trying for USA contacts made the weekend worthwhile for Philip Davies, RS95258.

The 18 and 24MHz bands were interesting at times, but little real DX was heard.

Some of the better DX on 18MHz included ZD8VJ and 9X5DX. On 24MHz 9G1SD, 9X5DX, I2RAO/HK0 (Malpelo Is) were the pick of the bunch.

BARTG GUIDE TO PACKET RADIO

THE BRITISH Amateur Radio Teledata Group has recently published its new guide to packet. It provides a friendly and clear guide for any one who is thinking about getting into packet. It is reasonably priced at £1, including postage and packing, and is available from Mark Ashby, G6WRB, 47 Ryton Close, Luton, Bedfordshire LU1 5SR.

FINALE

NEWS AND contributions for the **May** issue must be received at the address shown at the top of this page by **16 March**.

NOVICE NEWS

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

A YEAR ago, I reported that two fourteen-year-old pupils at the Mary Hare School for the Deaf were studying for the NRAE, with others following their example possibly this year.

Merton, G4JAL, was the course tutor for James, 2E1BKE, and Jamie, 2E1BXM. He reported that no sign language was used in teaching, maximum use being made of residual hearing so that normal oral/aural means plus data and Morse may be used in the future.

Talk is the magazine of the National Deaf Children's Society and the story was featured in there, so many thanks to Ryk Royall, G8ESB, for sending me a copy of the report.

Congratulations to all concerned in achieving their Novice Licences – which proves once more that there are no barriers too great given enough determination and practical help.

INTERNATIONAL MARCONI DAY

IN 1988, ten years after a week-long event to commemorate Marconi's achievement Norman, G4USB, and Monty, G4ZKH, decided to mount a Marconi related special event and 'Marconi Day' has been recognised several times since then with the Cornish Amateur Radio Club playing a leading role.

1994 will be no exception and there will be stations in the many countries taking part. There will be an award for working these stations and also an SWL award for those who cannot yet make a direct contact. Over a period of six years more than 500 certificates have been issued and with more stations participating, it should make a very interesting exercise.

The IMD special event will take place from 0000 to 2359UTC on Saturday 23 April (which is the nearest Saturday to Marconi's birth date). Next month, I hope to give a little more information – callsigns to look for and where to look for them.

SCHOOL LINKS

AT A RECENT rally I was buttonholed by an amateur who wondered just how many schools are 'radio active' on a regular basis so that they can make regular contacts with one another. This is a plea to all such schools.

It would be so satisfying for pupils to speak to other youngsters in the same position as themselves – and perhaps learn a little about other areas of the country. A first radio link could be continued by letter – maybe leading to lasting friendships. This extra activity could be continued out of school hours.

If you are involved with a school which is active by any means (phone, packet, etc) could you spare a moment to drop me a line? If a suitable time and place can be decided and several schools are available, some interesting contacts could be made.

Any suggestions? If schools or other establishments are interested and let me have the relevant information, then I will send it to all interested parties who write. This will also help when the 'Kidlink' set-up is being planned as I assume this will be activated again this year.

YAGIS

THIS STANDS for The Young Amateurs Group in Scotland. The group has reason to be proud of its record. A 100% success rate in both RAE and NRAE exams means that there are now seven more full licencees and 24 more Novices in the area. Four of those Novices were taking the December RAE so, if the past trend is maintained, success will soon be in double figures for both licences.

Hughie, GM0HCS, not only sent this information, but also sent a list of YAGIS students which shows their progress from Novice B through to Full Class A.

There should be five candidates for the March NRAE from St Aloysius College (including the school technician) and an NRAE course is planned with the June exam in mind at Glasgow Caledonian University. This will probably start in February but Hughie tailors courses to meet demand. If you live in Glasgow and know anyone who is keen to become a Novice, they should get in touch with Hughie, QTHR, or ring 041 6366656 – if out, his answering machine will take your message.

One of his students was Phylis, 2M1CHC, and Hughie wondered if she could be Scotland's first girl Novice. Does anyone know of an earlier one?

FRANK'S 800 LICENCES

WHEN TWELVE-year-old Keith started following in his father's footsteps, a train of thought followed that led to this item.

Alan (Keith's father), G0EGX, had enrolled in an RAE course run by Frank, G3FIJ, seven years earlier, so he knew his son was in capable hands.

Frank started teaching the classes in 1956. Up to 1979 when the exam became multi-choice, he had achieved considerable success with some 300 new local amateurs. But it didn't end there. Since the introduction of the multi-choice exam, 764 candidates have sat the papers, with 539 full passes and 174 referrals – that is, one paper passed. Of these, most passed the failed paper at the second attempt. The age range of these new amateurs was from twelve to seventy five.

Over a period of 35 years more than 800 amateur licences have been gained in North East Essex – and beyond – due to Frank and his colleagues at the Colchester Radio Club.

Congratulations to Frank, and thanks to Alan for the information. And Keith? Of course, he passed. On his fourteenth birthday he took Alan's old callsign and is now G1NTY. Welcome aboard, Keith!

Pictured are (L to R) Don, G3HZL; Alf, G3UNM; Brian, G7LIE, and in front of them four happy novices who had just completed their Morse test. The successful candidates are (L to R) Steven, 2E1AGN; Paul, 2E1AHO; Matthew, 2E1AIA, and Guy, 2E1AGK. All four should now have their new callsigns.

SUCCESSFUL AT LAST

ALWAYS INTERESTED in amateur radio, John joined the Ribble Valley Amateur Radio Society, and some thirty-five years ago, at a very tender age, took – and failed – the RAE. End of amateur radio interest for many years as other things took over his life – and he lost touch with the hobby.

However, last year, he heard of the Novice scheme and his interest was re-kindled. He joined a Novice class with about seven others which was run at the Hesketh ARC, Southport, by Bernie, G7DEM, and his colleagues. As is usual, the students were of widely differing ages – from twelve to seventy-plus.

Work still took up far too much of his time so his efforts into amateur radio and his ambition marked time until February. Vernon, G0KSH, ran a Morse class at the Central Lancashire ARC and John joined it.

He acquired some textbooks, studied hard and took the RAE in May, two days after taking his Morse test. Successful in both, he became G0SDY at the end of July. He expresses his gratitude to Bernie, Vernon and all others who gave their time and encouragement. He also thanks those who conceived the Novice approach and spent so much time and effort in promoting it.

The spirit of Robert the Bruce lives on. Congratulations on joining us in the end, John, and thanks for telling of your experience. He asks if 36 years between failing and passing the RAE is a record. Well, is it?

AND FINALLY

DUE TO LACK of space, some items sent to me in the past have not appeared. We are trying to catch up with some of them but obviously some are now out of date.

I have heard of many Novices and ex Novices who are now registered Instructors who are keen to pass on their knowledge to a new generation of beginners. This shows the true spirit of the hobby, and in a future column I will tell you about some of them. Please tell me of *your* progress so that I can tell your story and maybe inspire someone else to copy your example!

Novice Note Book

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

THIS MORSE OSCILLATOR is just the item required to improve your, or your novice students, Morse code speed. It is designed by Dave, G4DDW, and is based on the 555 timer chip. The oscillator has two controls, one for audio pitch or frequency and the other for speaker volume.

The oscillator can be used as a straight Morse practice oscillator. Several operators can use it, each operator's Morse key can be connected in parallel at the oscillator keying point so that simulated QSOs can be made.

This unit has other uses. It can be used to provide a CW facility to an SSB or FM transceiver not designed for CW. Additionally it can be used to provide sidetone for a transmitter or transceiver not provided with sidetone.

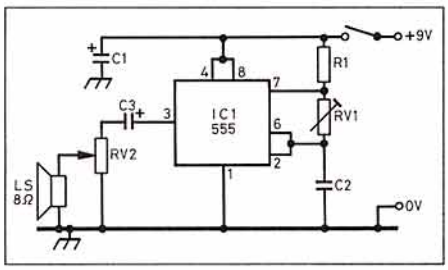


Fig 1: Circuit diagram of Morse oscillator.

When used in this application the oscillator is keyed from a contact of a relay, operated via the transmit/receive system in the transmitter.

The light weight key shown in the photo should be fixed to the bench or table where it is to be used or mounted on a heavy base. In this case the heavy base option has been used becuase it allows it to be portable. The oscillator and speaker are also fixed to the base making it a very practical, self contained, unit.

The circuit comprises a 555 timer with a short time-constant resistance/capacitor (RV1 and C2). This causes the timer to switch on and off at an audio frequency. When the output of the timer is connected to a speaker, as shown in **Fig 1**, it produces an audible note. The pitch of this note is set by adjusting RV1.

The values of the various components are not critical and are itemised in the components list. These are mounted on Veroboard as shown in **Fig 2**.

MORSE TRAINING SOFTWARE

WHILE ON THE same subject, I use a Morse tutor program on my PC from G4UXD. I use it for teaching Morse but it would be very good for the person learning Morse from scratch. It will teach you the Morse characters, then go on to sent sample text to you finally give you up to 100 sample Morse tests, 70 of which are in the new style. A further 30 memories can be added and accessed to help training even further.

It is also possible to key text into the keyboard and the computer will send Morse, this saves a lot of wrist work for an instructor sending to a group! If the computer is used to key Morse direct it can provide sidetone. A very useful program indeed and all for £9.50.

The software can be obtained from: Mr D. Brandon, G4UXD, 1 Woodland Road, Chester, CH4 8LB. Telephone: 0244 683363.

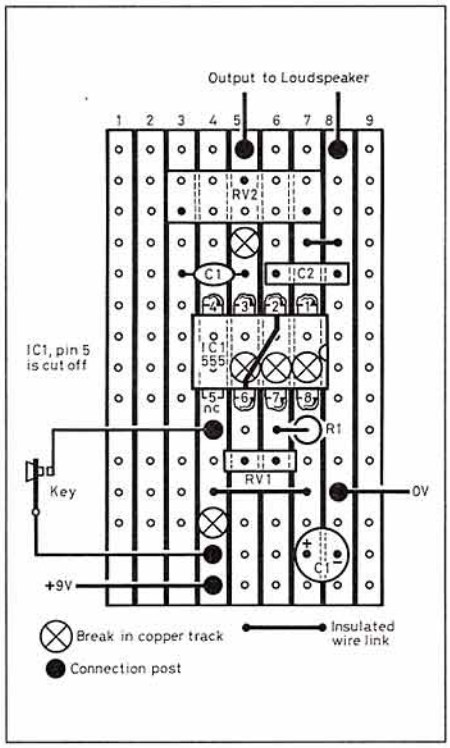
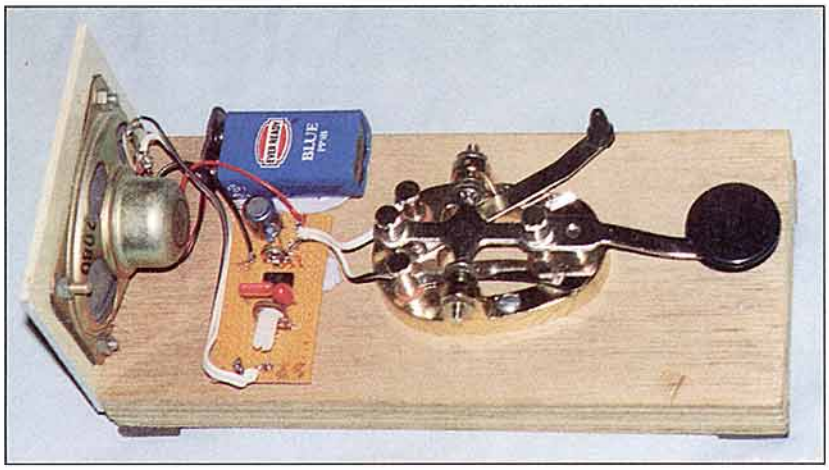


Fig 2: Component layout of Morse oscillator.

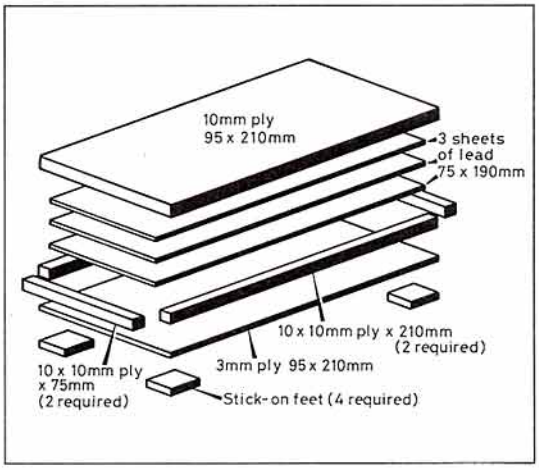
COMPONENTS

R1	4k7	1/4 watt
RV1	47k	potentiometer Tone Control
RV2	10k	potentiometer Volume Control
C1	100µF	25 volt electrolytic
C2	22nF	ceramic disk
C3	47µF	25 volt electrolytic
IC1	555	timer

Small loudspeaker, 8Ω or more
Morse key from; MARCO trading, Wem, Shropshire



Base with Morse key oscillator board and speaker.



Construction details of base.

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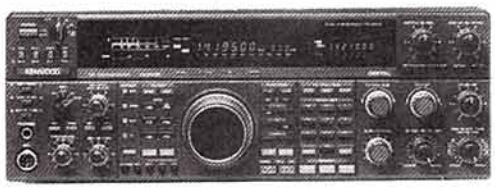

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RADCOM TECHNICAL FEATURE

Five-Band Lazy-H Antenna

by Fred Brown, W6HPH

THIS ANTENNA provides more bands at a lower cost than a tri-bander. Essentially the Lazy-H (**Fig 1**) consists of two horizontal doublets or dipoles stacked vertically and fed in phase - an idea that dates backs to the thirties. A plot of free-space gain versus spacing of two half-wave dipoles is shown in **Fig 2**.

If the spacing is made 31 feet (9.45 metres) the frequencies indicated will fall on the curve at the points shown. Note that the gain will be more than 3dB on five amateur bands: 20, 17, 15, 12 and 10 metres, and more than 4dB on 17, 15 and 12 metres. However, this is the free-space gain. The actual gain when compared to a dipole at the same height above ground as the top of the Lazy-H can be more than 6dB, as shown by W8JK in his classic work *Antennas* [1]. The additional gain results from the lower angle of radiation of the Lazy-H; a typical vertical radiation pattern is shown in **Fig 3**.

If the dipoles are made a half-wave long on 20 metres, they will be full-wave dipoles on 10 metres, which will result in about 1.9dB more gain on that band than indicated in Fig 2, since the curve is for half-wave dipoles. There will also be slightly more gain on 12 and 15 metres.

So the Lazy-H can be a very effective DX antenna, as has been known for many years.

When compared to a 3 element full-size tri-bander, the Lazy-H has the advantage of providing more bands, five instead of three; and about the same gain, since the tri-bander has optimum element spacing on only one band (where the gain is about 6.5dB) and is a compromise on the other two bands.

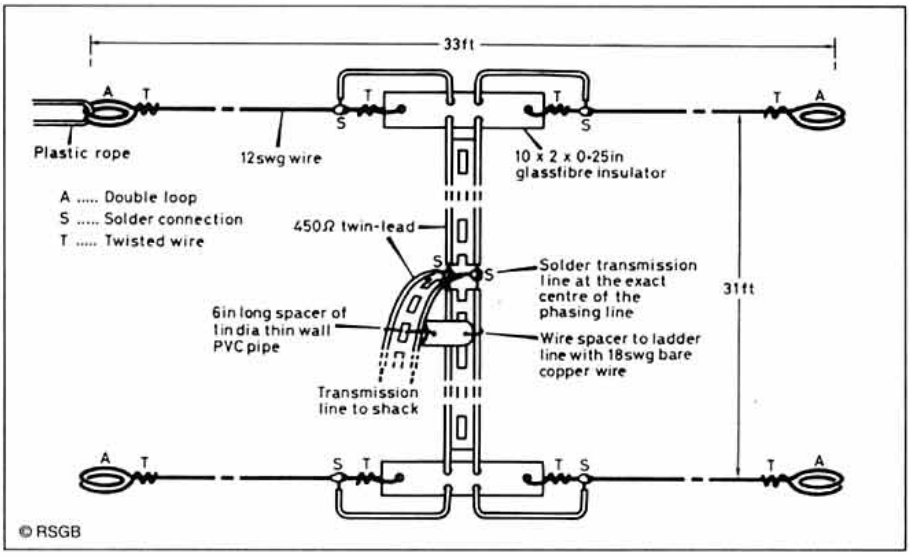


Fig 1: Construction details of the author's Lazy-H antenna.

The Lazy-H also provides constant gain across each band, whereas a tri-bander's gain will fall off at the band edges, especially on 10 metres. A further advantage of the Lazy-H is that it is easier and cheaper to construct than a tri-bander.

The bi-directional pattern of the Lazy-H can be both an advantage and disadvantage. The zero-dB front-to-back ratio does not discriminate against QRM off the back, but on the other hand it is sometimes nice to be able to work in opposite directions simultaneously.

FEEDING

THE FEED-POINT impedance of the Lazy-H will vary over a wide range as the frequency is changed. The problem of impedance matching at the antenna can be avoided with tuned feeders.

A match to 50Ω coax can then be accomplished in the shack with an antenna tuning unit. The SWR on the feeders will be high but transmission line losses will be low if a good low-loss line is used for the feeders.

In the old days amateurs used 600Ω open-wire line with six-inch spreaders spaced three to four feet apart. Such an arrangement will give you the ultimate in all-weather low-loss performance especially if Teflon or glazed porcelain spreaders are used. In my case I

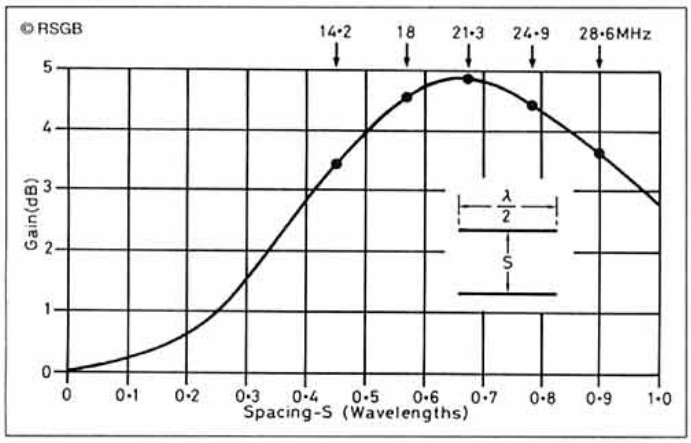


Fig 2: Gain over a dipole of two half-wave elements fed in phase. If the spacing S is made 31 feet the frequencies shown will fall on the curve at the points indicated.

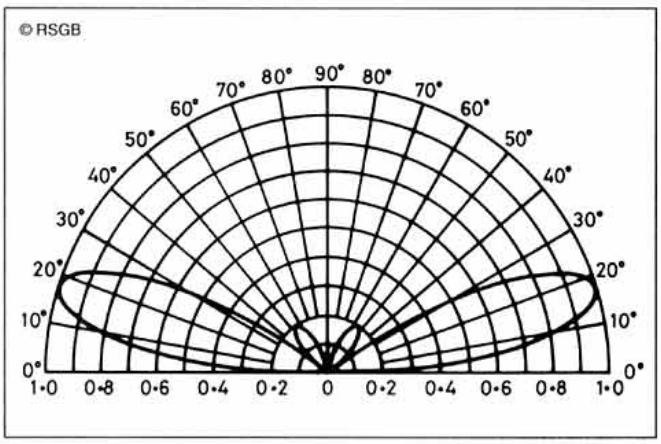


Fig 3: Vertical-plane radiation pattern of a Lazy-H where the lower element is .5 wavelength above ground and the upper element is at a height of one wavelength.

simply used 450Ω ladder-line twin-lead [2] for both the transmission line and phasing line. This stuff is easy to work with and sufficiently low-loss for line lengths up to 75 feet or so, at least when dry. Construction details are shown in Fig 1.

THE ASTU

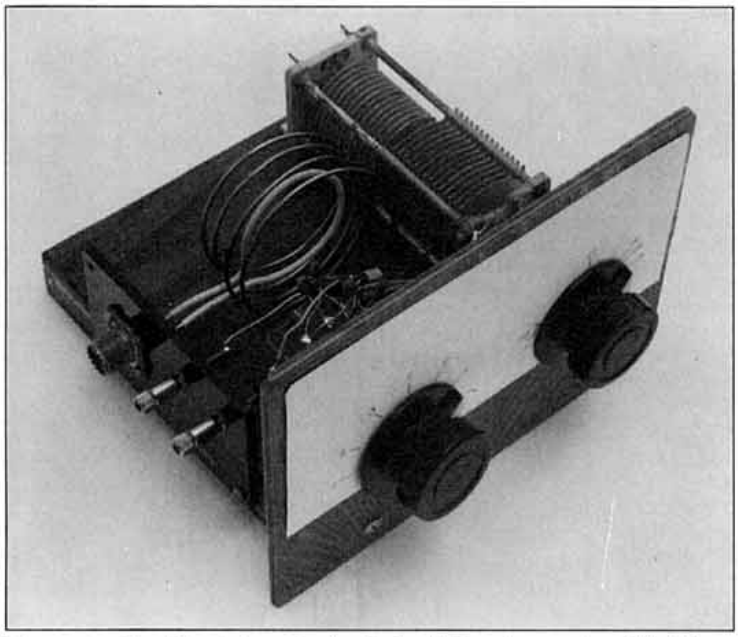
I WANTED THE Antenna System Tuning Unit to serve also as a balun and so the configuration shown in **Fig 4** was adopted. This ASTU will match the antenna on all 5 bands to 50Ω coax and the SWR will be less than 1.5. Most of the construction details should be apparent from Fig 4 and the photo.

If you run any amount of power it is important that the fixed capacitors be high-voltage types (3kV or higher). After I cremated several 500V units, W6MMU suggested that I make the capacitors of double-sided circuit board. Since one side of the capacitors are a common connection, only one side of the board need be etched. Dimensions are shown in Fig 4(b) for common 60mm fibreglass board. This type of board has a capacity of 25pF per square inch.

The dimensions of the smaller capacitors in Fig 4(b) do not calculate out proportionately, and this is because of fringing. If you work out the dimensions on the basis of area alone, and neglect fringing, the smaller capacitors will come out too large. However, the values are not particularly critical. The 50pF capacitor I did not include on the board because 50pF high-voltage capacitors are a standard television receiver replacement part and readily obtainable.

If an eight position switch is used for S1, the extra position can be used for connection to a separate six metre ASTU.

The one turn link is centred in the inductance and it is impormtant that the link be the diameter given. A full-size link will not work unless it is pulled out of the coil a little.



The construction of the Antenna System Tuning Unit can be seen from this picture.

WIRE VERSIONS

MY LAZY-H IS stretched between two fir trees which happen to be conveniently located near the shack. I reinforced the smaller tree at the top with one inch steel pipe, which I strapped to the trunk with steel tape. I also stretched a stout rope between the trees to prevent them from snapping the antenna by separating in a high wind.

A disadvantage of the Lazy-H is that you need at least 50 feet of height. Fifty feet will put the lower doublet only 19 feet above the ground, which is the minimum height I would recommend. If you don't have two 50 foot masts separated by more than 34 feet, or trees that will serve the same purpose, you might consider the inverted-V form shown in **Fig 5**.

This version uses only one mast to support two Lazy-Hs at right angles for 360 degree coverage. The doublets also serve as guy wires. Two separate transmission lines are brought into the shack for switch selection of the desired array.

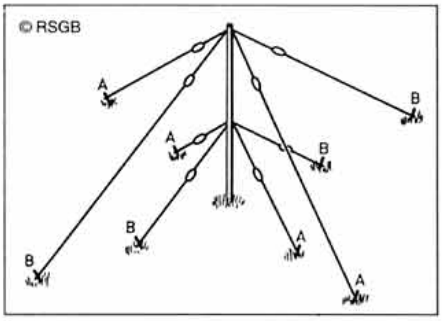


Fig 5: Two Lazy-Hs at right angles in inverted-V form can be placed on one mast for 360 degrees coverage. In this view one Lazy-H is marked A-A-A-A and the other B-B-B-B. Separate transmission lines are brought into the shack for switching between arrays.

DIPOLE VERSION

THE LAZY-H CAN also be made with tubing dipoles mounted on a mast, as shown in **Fig 6**, and this will permit rotation. Since the antenna is bi-directional, only 180 degrees of rotation will be needed. The rotating mast can be guyed through slipping guy rings, and if guyed near the upper dipole, the guys will have to make an angle of at least 29 degrees from the mast in order to clear the lower dipole.

The guy 'wires' should be non-metallic such as plastic rope. This version has the advantage of requiring much less real estate than that shown in Fig 5. It also permits exact placement of the pattern nulls for QRM reduction.

PATTERNS

ON 20 METRES the azimuth pattern will be the same as a half-wave dipole and on 10 metres the pattern will be the same as a full-wave dipole. Both of these patterns have been published in the *ARRL Antenna Book* [3] as well as many other publications.

On 17, 15 and 12 metres the radiation

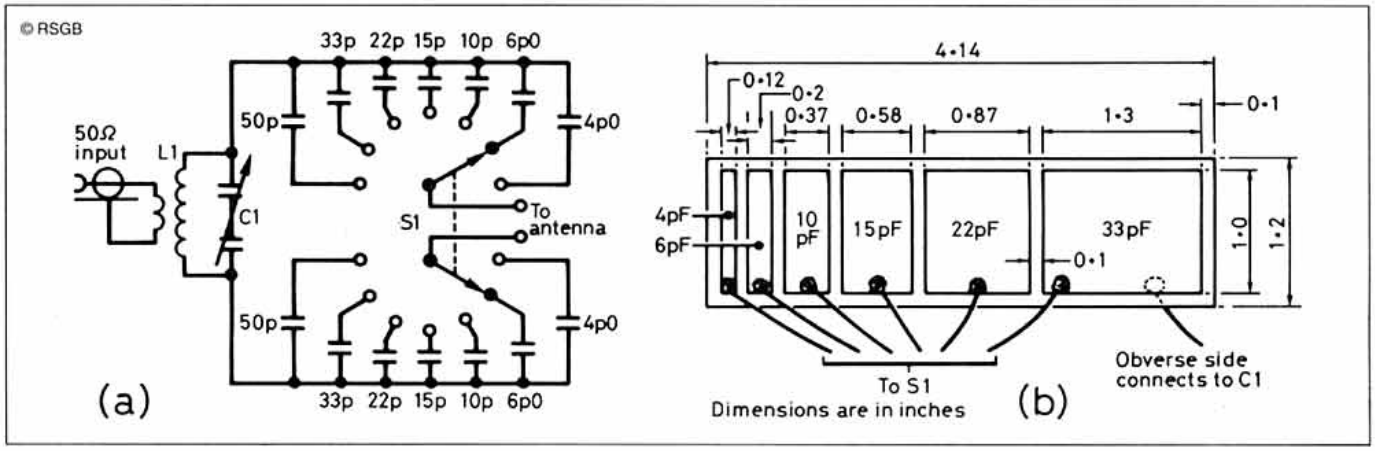


Fig 4(a): This Antenna System Tuning Unit will match 50Ω coax to the tuned feeders on all 5 bands. C1 is a 175pF per-section split-stator variable. L1 is 4.25 turns of #10 (12 SWG), 3 inches diameter, 1 inch long, air wound. The link is one turn, 1.9inch diameter, centred between the turns of L1. S1 is a two-wafer, 7 position ceramic rotary switch. For power levels above 100 watts all fixed capacitors should be 3kV or higher. Fig 3(b) shows dimensions for construction of high voltage capacitors from double-sided circuit board. The capacitors can be made with the above dimensions from 25pF-per-square-inch circuit board. Two such boards will be needed.

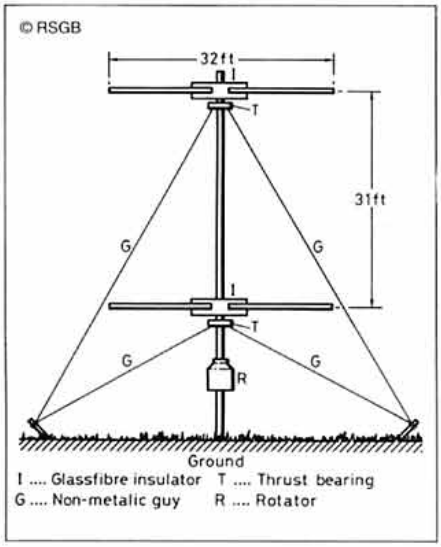


Fig 6: A Lazy-H made with tubing dipoles can be made into a fully rotatable array.

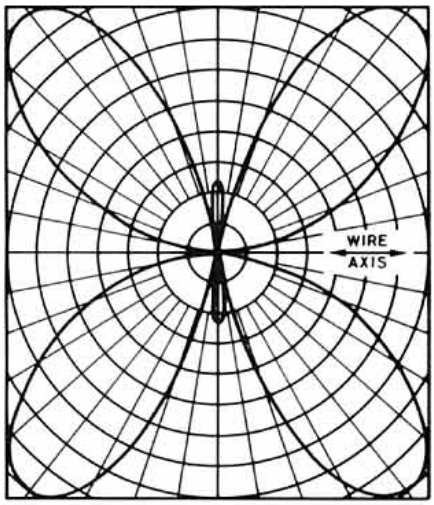


Fig 7: On six metres the azimuth radiation pattern has 4 main lobes with maxima at 49° with respect to the wire axes. At this frequency the broadside lobes are insignificant.

pattern will be something between the half-wave and full-wave dipole patterns. On all five bands the pattern consists of two lobes broadside to the wire axes, the only difference being that, as the frequency increases, the lobes become narrower.

At frequencies above 30MHz, the broadside lobe continues to narrow but minor lobes begin to appear on either side of the main lobe. As the frequency is raised further these minor lobes grow in amplitude until at 50MHz they are much stronger than the broadside lobes, as can be seen in the diagram above (**Fig 7**).

OTHER BANDS

EIGHTY AND FORTY metre operation can be achieved by tying the feeders together and using the antenna - transmission line combination as a top-loaded vertical in conjunction with an RF ground or counterpoise.

On six metres the Lazy-H will give about 6dB of gain, but not in the broadside direction. The radiation pattern will be as shown in Fig 7 [4]. A separate ASTU will be needed for six metres. The free-space vertical-plane pattern of the Lazy-H on 6 metres shows a null at an elevation angle of 18.4° which may limit its performance on short-range sporadic-E contacts.

RESULTS

MY LAZY-H IS oriented towards Europe, which puts the back lobe on New Zealand. Signal reports from both directions have been truly gratifying and it easily surpasses a very good dipole [5] at 75ft.

REFERENCES

[1] *Antennas, First Edition,* J D Kraus, McGraw-Hill Book Company, Fig 11-32, page 313.

[2] Available from Amateur Electronic Supply in the US, or from W. H. Westlake (Tel 0409 2537590) in the UK.

[3] *The ARRL Antenna Book, 15th and 16th Editions,* pp 3-11, Fig 17 and pp 8-32 Fig 40. [16th Edition available from RSGB Sales, see this month's *RSGB Book Case* on pages 104/105 – *Ed*].

[4] Thanks are due to W6MMU for calculating this pattern on his computer.

[5] 'A Five-Band Dipole', *Ham Radio, September 1988;* page 76, Fred Brown, W6HPH.

Simply Silicon

by Paul Lovell, G3YMP

MAXIM MAX 294 LOW-PASS FILTER

- 8th-order low pass elliptic filter
- Clock-tuneable corner frequency range of 0.1Hz to 25kHz
- Clock to corner frequency ratio 100:1
- Operates with a single +5V or dual ±5V supply
- Uncommitted op amp for anti-aliasing or clock-noise filtering
- 8-pin DIP or surface mount packages

HERE'S A USEFUL little chip which provides sharp low-pass filtering for audio applications. The Maxim MAX294CPA is easy to use as it doesn't need critical external components to set the operating conditions. Setting the clock frequency to approx 220kHz with a single 150pF capacitor from pin 1 to ground gives a high performance filter with a corner (or cut-off) frequency of 2.2kHz and a response which is nearly –60dB for frequencies above 2.6kHz. An external clock can also be used to set the corner frequency, if required.

Switched capacitor filters such as this need a reasonably large signal input of at least 500mV RMS to achieve a good signal to noise ratio, with supply decoupling capacitors (eg 100nF) close to the IC. This filter is a little unusual in that it emulates a passive elliptic ladder configuration. Most switched capacitor ICs are designed with bi-quadratic sections which often require high tolerance external resistors and capacitors for good results. **Fig 1** shows pin connections for the 8-pin DIP version, and connections in the other diagrams refer to this package. Electrical characteristics are given in **Table 1**.

MANUFACTURER'S DATA

THE MAX294 has a 1.2:1 transition ratio (f_s/f_o) with steep rolloff and –58dB of stopband rejection. The filter has a fixed response so that the design task is limited to selecting the clock frequency which controls the filter's corner frequency.

An external capacitor may be used to generate a clock using the internal oscillator, or an external clock signal can be used. An uncommitted op amp (non-inverting input grounded) is provided for building a continuous-time low-pass filter for post-filtering or anti-aliasing. Steep roll off and high order make these filters ideal for communication applications that require filtering of signals in close proximity within the frequency domain.

MAX294 operates with a 100:1 clock to corner frequency ratio and a maximum corner frequency (f_o) of 25kHz. Corner frequency is defined as the point where the filter output attenuation falls just below the passband ripple, which in this case is typically 0.27dB. **Fig 2** shows the frequency response of the filter with a 100kHz clock.

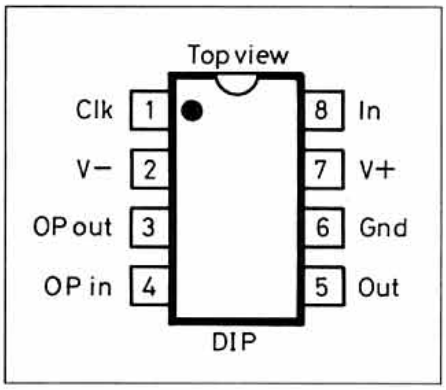


Fig 1: Pin connections for the MAX294CPA.

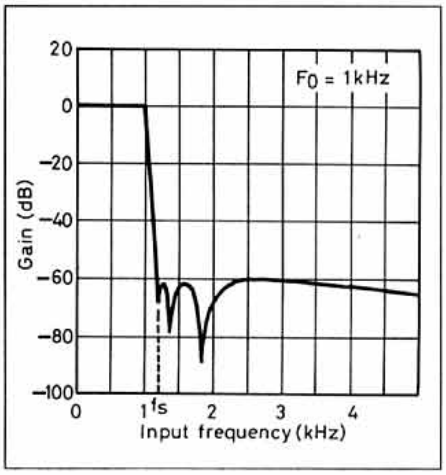


Fig 2: Frequency response with 100kHz clock.

CLOCK SIGNAL REQUIREMENTS

MAXIMUM RECOMMENDED clock frequency is 2.5MHz, producing a cutoff frequency of 25kHz. The CLK pin can be driven by an external clock or by the internal oscillator with an external capacitor. For external clock applications, the clock circuitry has been designed to interface with +5V CMOS logic. Drive the CLK pin with a CMOS gate powered from 0V and +5V when using either a dual ±5V supply (**Fig 3**) or a single supply (**Fig 4**).

Varying the rate of an external clock will dynamically adjust the filter's corner frequency. When using the internal oscillator, the capacitor value on the CLK pin determines the oscillator frequency as follows:

$$f_{osc}(kHz) = \frac{100{,}000}{3 * C_{osc}}$$

where C_{osc} is the value of the capacitor in pF.

Stray capacitance at CLK should be minimized since it will affect the internal oscillator frequency.

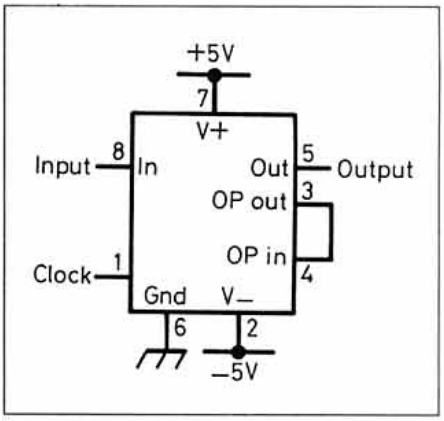


Fig 3: Operation from a dual supply.

UNCOMMITTED OP AMP

THE MAX294 has an uncommitted op amp with it's non-inverting input connected to the GND pin internally, and this can be used to build a first or second order continuous-time lowpass filter. Although this is primarily intended for anti-aliasing applications preceding the switched-capacitor filter, it can be used as a post-filter to reduce clock noise. **Fig 5** shows one of many filters that can be built with this op amp – a second order Butterworth filter with a 10kHz corner frequency and an input impedance greater than 22kΩ.

When using the uncommitted op amp as a post-filter to reduce clock noise, it is important to keep the filter's input impedance above 20kΩ in order to avoid excessive loading of the switched capacitor filter. Note that the op amp experiences some clock feedthrough, so it is generally more useful for anti-aliasing than for clock-noise attenuation.

DAC POST FILTERING

DIGITAL TO ANALOGUE converters (DACs) can use the MAX294 for post-filtering and in this case the DAC and filter clocks should be synchronized. If this is not done, beat frequencies are liable to alias into the desired passband. The DAC's clock should be generated by dividing down the switch capacitor filter's clock.

Harmonic distortion arises from non-

Electrical Characteristics

V+ = +5V, V– = –5V, 20k load resistor to ground at output, f_{CLK} = 100kHz unless otherwise stated.

Parameter	Conditions	Min	Typ	Max
Supply Voltage	(Dual)	±2.375V		±5.5V
Supply Voltage	(Single)	4.75V		11.0V
Supply current	±5V		15.0mA	22.0mA
Internal clock	C_{OSC} = 1000pF	29kHz	35kHz	43kHz
Output DC swing		±4V		
Output offset voltage	IN = GND		±150mV	±400mV
Clock feedthrough	T_A = 25°C		5.0mV p-p	

linearities within the filter, which generate harmonics when a pure sine wave is applied to the filter input. With a 1kHz 5V peak-to-peak sine wave input signal, 1MHz clock frequency and 20kΩ load the typical levels are as follows:

2nd harmonic	–67dB
3rd harmonic	–90dB
4th harmonic	–92dB
5th harmonic	–94dB

AVAILABILITY

THE MAX294CPA MAY be obtained from Maxim distributors such as HB Electronics (tel: 0204 25544 for delivery time). The price is £4.66 each plus £0.30 P&P and £0.87 VAT, total £5.83.

NOTE: Device characteristics and application notes in *Simply Silicon* are compiled from manufacturers' published data. Circuit diagrams are included for experimental purposes only, and have not been proven by *Radio Communication*. Transmitting equipment must be operated in accordance with national regulations. All data is copyright of the device manufacturer.

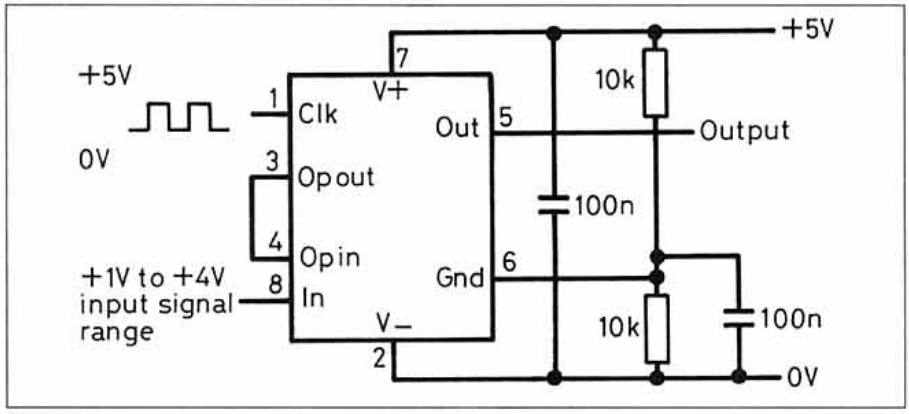


Fig 4: Single supply operation.

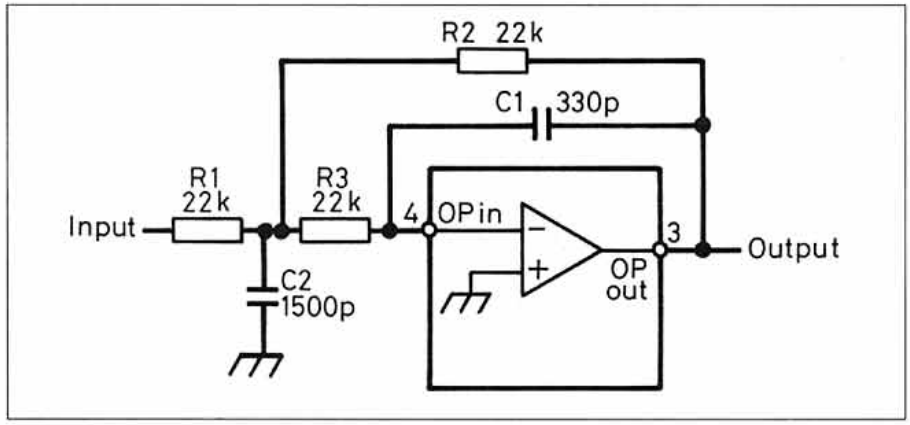


Fig 5: Uncommitted op amp connected as a 10kHz lowpass filter.

Pat Hawker's

Technical Topics

MAINS PRACTICES IN THE UK & OVERSEAS

THE DECEMBER 1993 *TT* item 'Mains adapters are not fused', pointed out the need for international travellers to be more aware of the differences in mains practice in different countries. This has resulted in a number of letters underlining the need for amateurs to be aware of the mains practices in all countries – including the UK. We need to be aware, for example, of the increasing use in the UK of "protective multiple earthing (PME)" – as described in *TT*, April 1987 (*Technical Topics Scrapbook, 1985-89, pp161-2)* and in more depth in *'Killing Ground, Earth Your Station Safely'* by Peter Chadwick, G3RZP, *RadCom*, June 1987. An additional problem is that mains practices are currently undergoing changes aimed at more standardization, at least in Europe. It is also clear that this whole question is rather more complex than suggested in the December notes.

George Benbow, G3HB, draws attention to the fact that, with effect from January 1995, the nominal UK 50Hz mains voltage will be 230V with a permitted tolerance of –6%, +10%. The change from 240V to 230V is apparently in line with European Community plans to standardize at 230V instead of the mixture of 240V and 220V.

Paul Coxwell (RS39369) writes: "I am sure that many UK amateurs are aware that US supplies are 120V, 60Hz, but other variations from the British practice are less widely known."

"In all but smaller, older homes in the USA, power is derived from a 240V centre-tapped transformer, and three conductors are brought into the service entrance panel. The centre-tap connects to the neutral bus bar, which is also connected to a ground rod and bonded to the panel's outer casing. Two 'hot' bus bars are provided, each being connected to one of the remaining incoming conductors. This arrangement allows most general circuits to run at 120V, the load being distributed evenly between 'hot' phases, while heavy loads such as electric ranges, clothes driers, air conditioners [and often linear amplifiers, etc – *G3VA*] are run on 240V, power being taken from the two hot bus bars.

"Colour coding on 120V circuits is black for 'hot', white for neutral, and green for ground. Receptacles are arranged as shown in **Fig 1**, although some older wiring may have ungrounded 2-pin outlets. Unlike British connectors, an American three-pin outlet will accept a two-pin plug. Note that the neutral slot is slightly larger than the 'hot' one; this is because some 2-pin plugs are polarized, having a widened end on the neutral pin. When line cords have only a single layer of insulation, the conductors themselves may be different colours: silver is the neutral and the bare-copper wire is the 'hot' wire. Circuits for 240V appliances each have their own special type of connectors, with pins set at various angles to avoid accidental connection to the wrong outlet, and two 'hot' wires are usually colour-coded black and red.

"Other differences that do not directly affect the connection and use of radio equipment, but which may be of interest are as follows. The peculiarly British 'ring' circuit is unknown; most outlets are on 15A branches that feed several receptacles and lights. Indeed, it is common practice to have a wall-switch control one or more outlets in a bedroom or living room, allowing free-standing lamps to be controlled from the doorway. Most plugs are not fused, although a few types are designed to take a fuse, thereby obviating the need for one in the equipment itself. A minor point is the standard practice for switches to be 'up' for 'on' and 'down' for 'off', ie the opposite of current British practice.

"I hope these comments may provide background information for British amateurs who use American equipment or who visit America with their own equipment. In these days of international travel with amateur equipment, it might be useful to provide details on the arrangements used in other countries such as earthing systems, colour codes etc."

Jan-Martin Noeding, LA8AK comments similarly from a Norwegian viewpoint. He writes: "I am rather uncertain whether 220V is still a 'defined mains voltage' for Western Europe [see above – *G3VA*]. In Norway most of the supply network is triangular 230V connection, maximum 242V per phase, with 140V star connected transformers. Some rural circuits use centre earth connection while others do not (the case for Kristiansand). There are several different requirements as to whether earth-failure indicator breakers are necessary for new installations in houses. Because of the system used any earth failure for the Kristiansand urban/suburban network is limited to 140V, see **Fig 2**. There are two fuses per single-phase circuit in a house.

"I phoned the local electricity board and was told that the nominal standard used is 230V ±0%, but that since some equipment could be damaged, mains voltage at the transformer is limited to 242V. This corresponds to 230V +6% –10% with lower than 212V to be avoided rather than the absolute minimum of 207V.

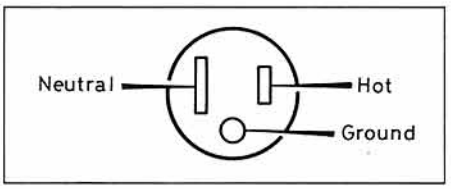


Fig 1: Standard American 3-pin, 120VAC (60Hz) receptacle (socket).

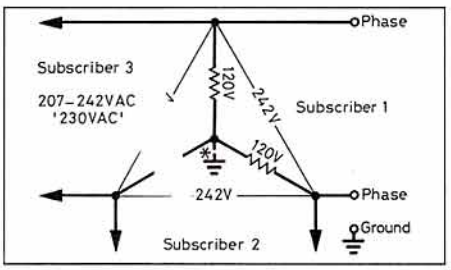


Fig 2: '230Vac' distribution system used in some parts of Norway, in which a failure of the supply earthing limits the voltage to a domestic earth to half the full supply voltage. Both 'phase' lines are fused.

"A local electrician told me that the distribution system shown in Fig 2 is used only in Norway and Albania, although there is some use of the more normal three-phase 380V (418V) system in Stavanger with only one main fuse per phase.

"The term '220V mains' was used in Norway 30-40 years ago, but not more recently. Mains voltages measured in my shacks at several different QTHs have varied between 225 to 233V with little or no variation between summer and winter. However at some of the Norwegian telecommunication and broadcast stations with which I have been concerned, where the station is the only customer, the line voltage has been as high as 250V, resulting in problems until changed. At supply transformers (22kV or 9kV to 240V) it is possible to choose between different secondary taps on the transformer, but there is no automatic voltage regulation."

In the UK, high-power TV broadcast stations normally incorporate automatic voltage regulation since it is necessary to keep the power supplies to the transmitters within much closer limits of voltage variation than can be expected from the public mains supply. The usual voltage specification is ±0.5% of the phase voltage as compared with the statutory voltage limits of ±6% of the Electricity Supply Regulations 1937.

This means that automatic voltage regulators are installed in the feeds to each of the main transmitters, for example with a rating of 150kVA 3-phase for a 25kW transmitter and capable of correcting over a range of ±10% with a minimum speed of response of 1V per second.

The regulators tend to be of the electro-mechanical type and are air-cooled. Control is achieved on each phase by a transistorised sensor unit and reversing drive system to move the variable transformer brushgear to give the required voltage output. Fortunately amateur equipment can usually cope with normal mains variations although, as noted in the past in *TT*, the life of high-power directly or indirectly heater-filament valves is highly dependent upon reasonably close-tolerances (see *TT*, June 1982). The use of a Variac or similar adjustable system in conjunction with checking the voltage of the mains supply can contribute significantly to equipment longevity.

Dr Geoffrey Manning, G4GLM takes up the original question of mains adapters, and whether or not these should be fused. He writes:

"There are still too many deaths by electrocution and many fires in buildings caused by 'electrical faults' (*sic*). Yet there is still too lax an approach to electrical safety on the part of the public [including amateurs].

"My mother asked my advice when buying hair-curling tongs. The manufacturer states these may safely operate from a shaver isolating-transformer. So I fitted a suitable two-way round-pin plug for this purpose. Double insulation means that there is no earth connection. For occasional use in hotels, I bought her a Data adapter (marked '87' underneath,

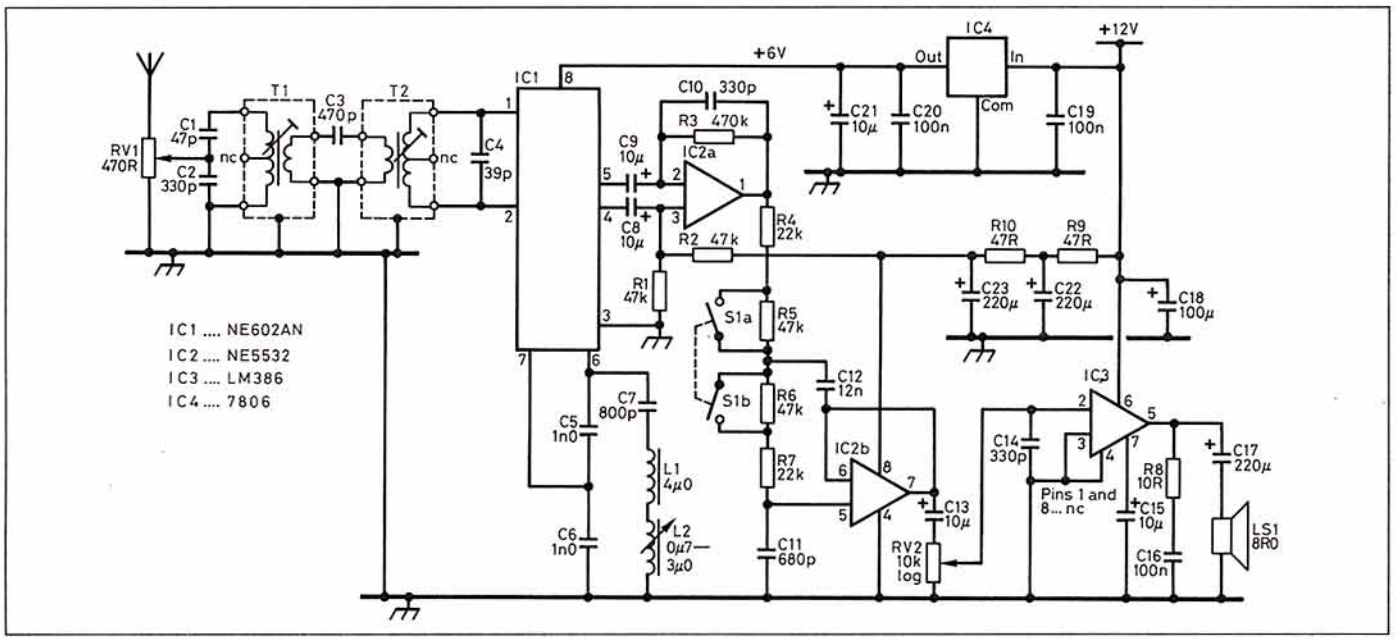
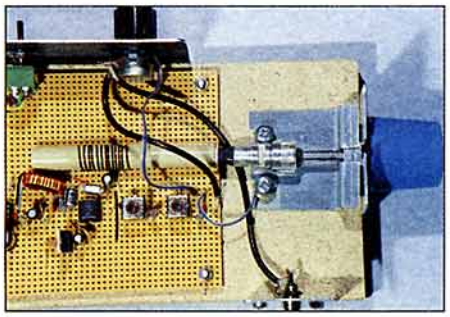


Fig 3: G4BWE's 3.5MHz 'Newbury' direct-conversion receiver featuring permeability tuning. L1 consists of 29 turns of 24SWG enamel copper wire wound onto a T68-6 dust-iron toroid (about 4µH). L2 consists of 13 turns of 22SWG enamel copper wire wound over a length of 25mm (1-inch) on a cylindrical plastic former (eg barrel of felt-tip pen) providing an inductance of about 0.7-3µH. T1 and T2 are Toko KANK3333R. S1 is open for CW, closed for SSB.



Permeability-tuning as implemented in the G4BWE 'Newbury' receiver.

possibly year of manufacture). This accepts shaver and continental two-way round-pins and enables them to connect to a standard 13A mains socket. But yes [unlike the adapter described in the December *TT*] it is fused! There is a miniature BS646 cartridge fuse, the type found in clock-point plugs. Low ratings (1A and 2A) are available. I would not let my mother use it without a fuse; if the fuse blows she would be unable to replace it on site – an effective form of 'fail-safe'.

"Next year, all Europe is due to change to nominal 230V RMS and, providing this actually happens as scheduled, it means that equipment made anywhere in the EC can also be sold and operated anywhere in Europe – although for many years there seem likely to remain a need for international adapters – preferably fused!"

THE 'NEWBURY' 3.5MHZ DC RECEIVER

DESPITE THE RECOGNIZED limited dynamic range of the popular NE602 chip (or the slightly better NE602A), the device continues to gain support as a means of building simple, but reasonably effective HF receivers, both superhet and direct-conversion.

Steve Price, G4BWE, noted the extremely simple direct-conversion receiver originally described in 'Circuit & Design Ideas', *Electronics Australia* and given in *TT*, July 1993, page 52, but felt that some additional features would be desirable. He writes:

"Panic set in when I realised that I had no new projects to demonstrate at the annual 'home construction evening' of my local club, the Newbury and District Amateur Radio Society. As such events present a good opportunity to promote home-brewing to an audience not consisting entirely of 'converts' to this aspect of the hobby, I was eager to present a design which offered a range of features and yet was inexpensive and straightforward to construct.

"The NE602N and NE602AN mixer/oscillator chips have rightly proved popular with home-brewers, and I was inspired by the minimalist 3.5MHz receiver featured in *TT* – such simplicity is very difficult to resist! However I realised that it would be prudent to include pre-mixer selectivity in the form of a bandpass filter and this certainly helps reduce breakthrough of strong AM broadcast signals caused by envelope detection in less than perfect mixers. As this form of interference is level dependant and will normally disappear if the signal level is below a certain threshold, an RF gain control was added to provide variable input attenuation.

"In the arrangement shown in **Fig 3**, IC2a (one half of a low-noise dual op-amp type NE5532) provides some 55dB AF pre-amplification. IC2b is a low-pass filter which provides switch-selected cut-off frequencies of approximately 2.4kHz (SSB) and 800Hz. The 800Hz setting is used mainly for CW but can also be used to enhance SSB in the presence of fierce QRM. As a simple D-C receiver it lacks single-sideband selectivity and the 800Hz filter can help to compensate for this. Following the AF gain control is an LM386 audio power amplifier capable of delivering 250mW to an 8Ω loudspeaker.

"With some 100dB of voltage gain available, careful decoupling is mandatory – hence C22, C23 plus R9, R10 for IC2 and the use of 'active decoupling' courtesy of the 7806 voltage regulator IC4, which provides 6V for IC1.

"The provision of an effective tuning arrangement was the thorniest problem to overcome. Variable capacitors of reasonable quality are becoming rarer and increasingly expensive. But even when a capacitor can be obtained at a price which does not double the cost of a simple design, there is still a requirement for a smooth-acting reduction drive. Epicyclic types are popular, but the typical 6:1 reduction still leaves a decidedly coarse tuning rate of 100kHz per revolution; this assumes that the coverage is limited to the 300kHz of the European 3.5MHz band, with the shaft of a variable capacitor turning through only 180° between unmeshed and fulled meshed states. Another solution is to replace the traditional variable capacitor with a varicap diode and use a ten-turn potentiometer to develop the tuning voltage. This is fine for projects of intermediate complexity, but the cost of a suitable potentiometer (usually between £3 and £6) is still rather high for a no-frills DC receiver.

"For many years, high-class manufacturers such as Collins favoured permeability tuning in high-performance receivers and transmitters, and it has been used in upmarket car-radios by Radiomobile and others. The American company, Ten-Tec still favours this approach (see the review of the Ten-Tec 'Scout 555 transceiver' in *RadCom*, November 1993, p66).

"A permeability-tuned VFO uses a fixed tank capacitor working in conjunction with a variable inductor. The most practical way of altering the inductance of a small, cylindrically wound coil is to vary the position of a suitable core (normally ferrite) within its former. As the core is pushed further into the windings, the inductance rises quite considerably. [With a brass core, inductance decreases – *G3VA*].

"Variable inductances are available in the form of 'slug-tuned' coils and RF transformers (eg the Toko types used in the bandpass filter of this design) but the variation in induct-

ance is generally restricted to about plus or minus 20% and the small, threaded ferrite cores are too brittle to withstand continuous or even frequent adjustment.

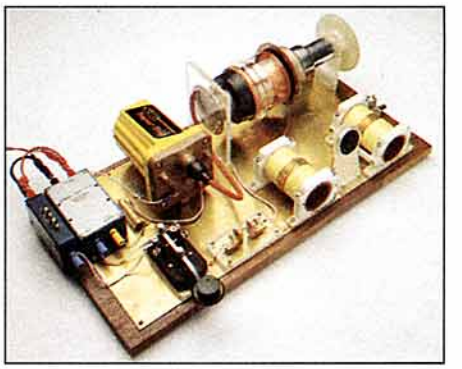
"Luckily, a far more robust variable inductor offering a much greater range of adjustment can be made quite easily using a standard ferrite rod of the type used for the MW/LW antenna in portable radios: see **Fig 4**. For this design, the ferrite rod is a Maplin type 810 of 8mm (0.3-inch) diameter which is fixed to an 80mm (3-inch) long M6 bolt using a standard 'Belling & Lee' TV antenna plug. The centre pin of the plug is cut off to allow the end of the rod to be inserted into the bottom of the plug and glued with Araldite.

"The M6 bolt is inserted into the top of the plug exactly as though it were a coaxial cable (the end of the bolt should self-tap into the plastic insert which formerly supported the centre pin). Although the braid grip will tighten quite effectively around the bolt as the plug's end-cap is screwed home, it is a good idea to coat the end of the bolt with Araldite before final assembly. The bolt is supported by make-shift brackets which contain two M6 bolts (square-shaped 'roofing' types were used as these are easier to clamp). It will be evident from Fig 4 that each revolution of the make-shift tuning knob will move the ferrite rod over only a small distance, thus providing the equivalent of a reduction drive. In my project, the barrel from a Berol Notewriter felt-tip pen was used as the former for the tuning coil (L2).

"Calculations showed that in order to tune the VFO from 3.5 to 3.8MHz, the tank inductance needed to be decreased from 7 to 6μH. This implied that the bulk of the inductance could remain fixed. In the interests of stability and a low tuning rate, a standard 4μH toroid inductor (L1) is wired in series with L2. The frequency coverage of the prototype receiver considerably exceeds the 300kHz of the European band, although the tuning rate is an acceptable 50kHz per revolution. This could be reduced by lowering the inductance of L2 and increasing L1 to compensate."

Home-constructed permeability tuning of VFOs has applications well beyond this specific receiver and can offer advantages not mentioned by G4BWE including a more constant-Q over a wide tuning range. G4BWE does not seem to have made any provision for a multi-turn tuning dial mechanism which can be one of the complications of this approach.

The scarcity of high-voltage variable capacitors at reasonable prices is encouraging a return to 1920s practice when variable capacitors were often home-brew. P J Behrtel, PA3AYP in the Dutch *Electron* (January 1994, pp11-13) provides detailed drawings for the construction of a 1-62pF low-loss split-stator capacitor suitable for the demanding application of a motor-driven capacitor for a 'magnetic-loop' transmitting antenna. One of PA3AYP's drawings is reproduced as Fig 24. The appearance of the assembled component is sufficiently attractive for it to feature as the cover photograph of the journal!



Laboratory version of a Braun-type spark-gap transmitter as used by Dr John Belrose, VE2CV to make demonstration tapes of "the sound of spark". (Photo by Janice Lang, courtesy of the Canadian Communications Research Centre).

The form of construction shown might well be adaptable to the construction of a differential capacitor in which the overall capacitance

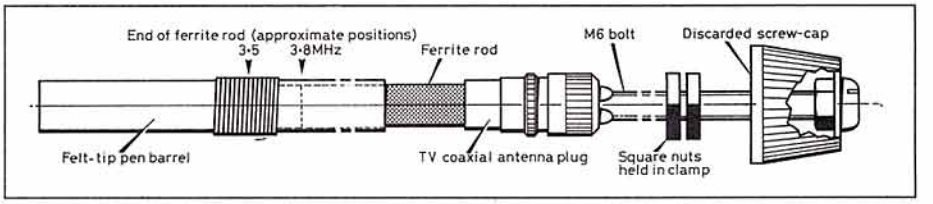


Fig 4: Constructional details of the permeability-tuned L2 inductance.

KISS MEASUREMENT OF INDUCTANCE

RON KAYE, G6RO, was prompted by the article by Laura Scott, G4HUV, on inductance measurement (*RadCom*, November 1993 p40) to write a short piece on his long-used method of measuring inductances by making the unknown inductance the basis of the tuned circuit of a simple two-terminal oscillator and then measuring the frequency using a calibrated general-coverage receiver. He used an AR88D for frequencies above about 550kHz and a B28 receiver for lower frequencies. He writes:

"The oscillator circuit must be of a type that requires no taps to the inductor and no capacitance network feedback to maintain oscillation, yet oscillates readily with sufficient output over a very wide frequency range. Originally I used a double-triode valve as a cathode-coupled oscillator but this was abandoned some years ago in favour of a source-coupled FET oscillator: **Fig 5**. This has proved ideal for the purpose with more than sufficient stability when built into a die-cast metal box, the base of which serves as the top panel carrying two terminals, one of which must be insulated from the box, and the on-off switch. A small 9V battery is inside the box. Output is taken to a co-ax socket on the back of the box. It oscillates well from at least 150kHz up to 30MHz, enabling inductance values from less than 1μH to a few mH to be determined. Toroids present no problem.

"In practice, the unknown inductor is connected to the terminals and the oscillator switched 'on'. The fundamental signal is then located on the receiver, using the BFO to tune to zero beat using a short pick-up wire on the receiver and about two inches of wire from the oscillator output socket will usually provide sufficient signal. The unknown inductance value can then be calculated from the formula:

$$Lx = 25330/(f^2 \times C)$$

with C the inbuilt capacitance across the coil in pF (200pF in Fig 5). Lx is unknown inductance in μH f is fundamental frequency in MHz.

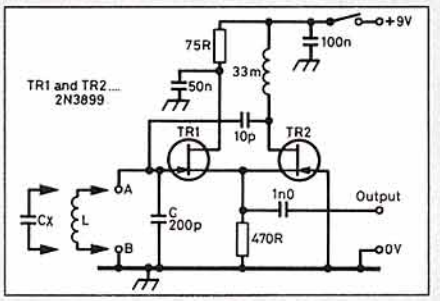


Fig 5: The source-coupled FET 'universal' oscillator used by G6RO for KISS inductance and capacitance measurement in conjunction with a calibrated, general-coverage receiver. L is the unknown inductance (without Cx for inductance measurement. Cx is unknown capacitance, in parallel with an L of about 0.75μH for capacitance measurement.

"This 'universal' oscillator can also be used to measure capacitors, especially those in the lower pF range. An inductor of about 0.75μH (exact value need not be known) is connected to the terminals, the oscillator switched on and the frequency determined. The unknown capacitor is then connected in parallel with the inductor and the new frequency measured. The value of the unknown capacitance can then be calculated (simply with the aid of a scientific calculator) from:

$$Cx = (C \times f^2/f_1^2) - C$$

where f is the frequency without the added capacitor (ie the higher of the two measurements), f_1 is the frequency with the added capacitor and Cx is the capacitor whose value is required.

"The technique is slower than with my capacitance bridge but is more accurate for very small capacitance values. A big advantage is that it requires no ancillary equipment such as signal generators or output meters. It could probably be used directly with a digital frequency meter in the absence of a general-coverage receiver. Finally, a 'universal' wide range oscillator is a useful device to have around."

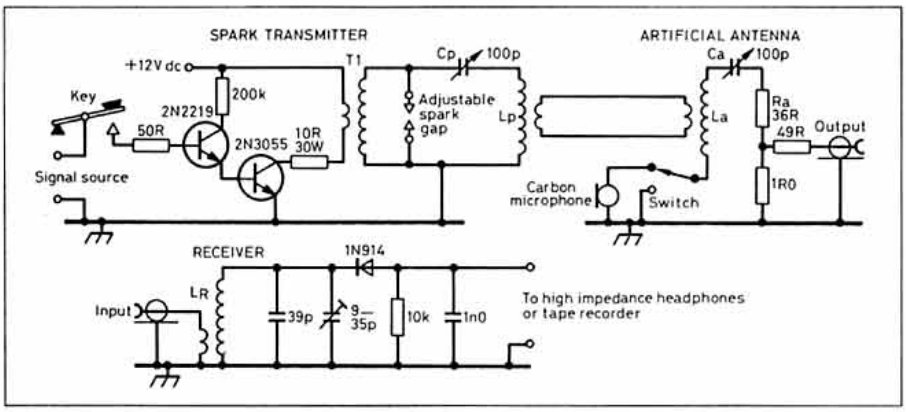


Fig 6: VE2CV's 5MHz spark transmitter and crystal receiver used to make recordings of "the sound of spark" including speech transmission as it must have sounded during Fessenden's historic 'first' speech transmissions in December 1900. Ca 100pF, Cp 100pF high-voltage vacuum capacitor. Lp, La, LR 22μH. T1 high performance automotive ignition coil. SW SPDT phone/CW switch. Signal source RC oscillator 60Hz, 120Hz, 800Hz and 10kHz. Power supply 12VDC Gel-Cell battery.

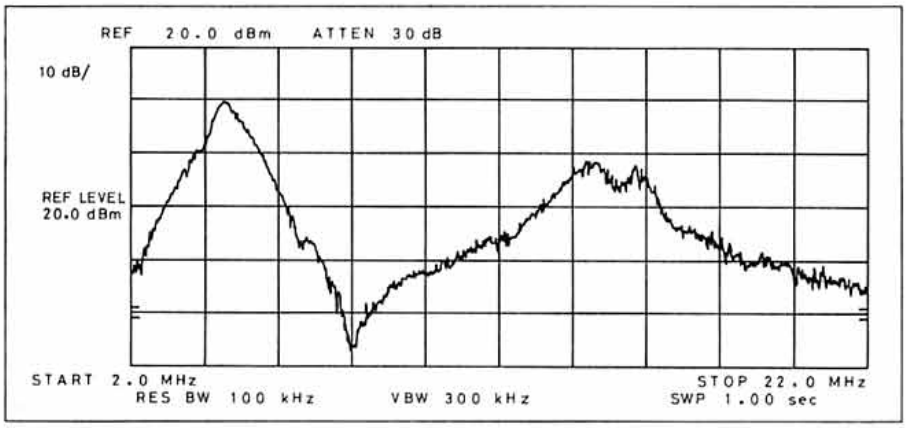


Fig 7: Output spectrum of the spark transmitter extending over many megahertz, and above the reference level of 20dBm for roughly 3MHz around 5MHz. Note significant third-harmonic output around 15MHz.

remains the same but shifts from one set of fixed vanes to the other, a type of variable capacitor that seems to have long disappeared from the market.

THE SOUND OF SPARK

I RECALL IN 1940 listening on 500kHz (600-metres) to distress messages being sent by an Egyptian ship that was still equipped with a spark transmitter.

Had it not been for the war, spark would have been completely phased out in the maritime service except for emergency (lifeboat) purposes by the end of 1939. The distinctive sound of spark is not easily forgotten, yet I suppose the vast majority of readers have no knowledge of how the spark transmitters used by experimental amateurs from about 1905 to about 1925 sounded when received on the simple crystal receivers of the day. Or what the first crude attempts of Fessenden to transmit voice on a spark transmitter must have sounded like.

Dr John S Belrose, VE2CV, was surprised to read my comments on his 1992 Alexander Graham Bell Lecture 'Fessenden and the Early History of Radio Science' in *TT*, November 1993. As a result Dr Belrose kindly sent along the full text of his interesting lecture as printed in the *Proceedings of the Radio Club of America* (November 1993, pp6-23). For this lecture, he devised and implemented a means of recording a demonstration tape of the sounds of spark transmission, including speech, as received on a crystal receiver.

He writes: "So far as I know, no one has recorded for posterity the sound of spark signals heard on a simple receiver. Because of the tremendous variety of gap speeds, for synchronous and non-synchronous rotary gaps, electrode shape and spacing, and operating high voltage, every spark station had its own characteristic sound. This was an advantage when there were a number of stations on the air. Spark signals were broad, and within the broad bandwidth of the simple receivers, there could be several stations operating . . . . communications would have been more difficult if all the signals had sounded the same.

"Some will have seen, heard and smelt (ozone) an operating spark transmitter in museums in Canada and the USA [there is or was a rather crude demonstration in the London Science Museum – *G3VA*] but few will have heard how the received signals sounded – and particularly the sound of speech over spark. Fessenden said of his first voice transmission: "Words were perfectly clear except accompanied by an extremely loud disagreeable noise.' Anyone who has thought about this experiment will agree on the comment about disagreeable noise, but could the words have been 'perfectly clear' – with a spark transmitter and a microphone connected in series with the antenna lead?

"So we constructed a 5MHz spark transmitter, using an automotive ignition coil for the induction coil, and circuitry to simulate a Braun type transmitter with a 5MHz quarter-wave antenna. This was like the Braun transmitter, excepting that Ls (the secondary winding wound over primary Lp) was not directly connected to the antenna, but link coupled through a short length of transmission line (see **Fig 6**). The frequency and output spectrum is determined by the frequency response of the antenna system; a spectrum very broad, megahertz wide (**Fig 7**). Somewhat surprising is the magnitude of the third harmonic in spite of the fact that our simulated antenna, unlike a real monopole, was not resonant at the third harmonic.

"The output of the transmitter, attenuated by 120-140dB, was coupled directly to the receiver which comprised a simple tuned circuit, detector (admittedly a modern germanium diode), and tape recorder (high-impedance headphones are hard to come by nowadays). For speech, we used a carbon microphone from an old telephone hand set.

"To make recordings we had to relearn how to set up and 'tune' a spark transmitter. The primary and secondary circuits, the 'tank' and 'antenna' circuits, must not be overcoupled, since this results in a double peaked extremely broad amplitude-frequency response. The spark should take place between polished, hemisphere-shaped electrodes, not between pointed electrodes. And the widest gap possible consistent with regular sparking when the key is held down must be used, since otherwise the signal becomes all 'mushy' In effect, we 'optimized' our transmitter by gradually narrowing the gap for the best received sound before making a recording at a particular spark rate.

"Hence the sounds on our demonstration tape probably represent the best quality of sound that could have been achieved with Braun-type spark transmitters."

VE2CV sent along a copy of his demonstration tape (about 7 minutes of recording and commentary on a C60 audio cassette) containing brief examples of transmissions with about 60, 125 and 750 sparks per second and finally speech with about the 10kHz spark rate used by Fessenden on 23 December, 1900 to transmit over a distance of about one mile. Yes you can distinguish the words but "perfectly clearly" is perhaps "inventor's licence" of what one could call "spitch".

Readers who would like to hear this themselves can obtain a copy of the recording by writing to Dr John Belrose, VE2CV, 17 Tadoussac Drive, Aylmer QC J9J1G1, Canada enclosing $US10 to cover the cost of the tape, handling and mailing.

It was Fessenden who later invented the HF alternator and with difficulty persuaded General Electric to make one at his expense! Fessenden was later to comment: "No organization engaged in any specific field of work ever invents any important development in that field, or adopts any important development in that field until forced to do so by outside competition."

A profound statement (although one can think of exceptions such as the practical development of the transistor by Bell Laboratories) that underlines the importance of the independent inventor and the amateur experimenter!

A description of a 1914 rotary spark trans-

mitter used in South Africa by the late W E Dixon-Bennett, A3V/ZS4W/ZS5EG, appeared in *Radio-ZS* (September, 1993): "My transmitter in 1914 employed a 1kW transformer, which stepped up the mains supply to about 10kV. The transformer embodied a magnetic shunt which was adjustable .... for controlling the primary input. The main condenser in the closed energy storage and oscillating circuit was of the glass dielectric type in a 1in by 10in by 6in container. The spark discharger was of the high speed rotary type, with twelve electrodes revolving between two stationary electrodes .... the rig put about 3A into a long Marconi antenna and could be loaded up to the then standard wavelength of 600m .... the operating range was normally 50-100 miles."

Even with the coming of valves, the practice of using MCW (modulated continuous wave) meant that coast stations and ship transmitters could often be immediately identified by their distinctive "note" and copied on crystal sets or broadcast sets without a beat frequency oscillator.

Dr Brian Austin, G0GSF, while not disputing Fessenden's role as the pioneer of radiotelephony, reminds us that 1994 is the centenary of the world's first public demonstrations of radio transmission by Sir Oliver Lodge. As a distinguished scientist, Lodge was President of the RSGB in 1925; in 1894 he was Professor of Physics at the University of Liverpool where he made his first radio experiments, based on the work of his friend Heinrich Hertz who had died on 1 January, 1894 at the tragically young age of 36 years. Professor Lodge accordingly delivered a memorial lecture on Hertz in London on 1 June, 1894 and in August, at Oxford, publicly demonstrated that Hertzian waves could be used for telegraphic signalling in the Morse code.

As noted in *Precinct*, the newsletter of Liverpool University, some of Lodge's first experimental transmissions were made in Liverpool between Lewis's department store to the clock tower of the University's Victoria Building. His original work was in pursuit of scientific knowledge rather than to develop a practical system of signalling without wires. Although he did not use an elevated antenna, the key to long distance communications, his demonstrations preceded those of Marconi. And he soon teamed up with Muirhead so that by 1898 he was able to demonstrate both manual Morse and machine transmission using a Muirhead punched tape automatic keyer with a siphon recorder as the receiving instrument.

Even earlier, in 1890, Lodge had evolved his resonance-jar experiment, the key to 'tuning'. In 1897 he took out a patent for selective tuning in advance of Marconi's more famous 7777 patent – the resulting patent struggle was settled in 1911 in favour of Lodge; his patent was extended for eight more years on the condition that he sold it to the Marconi Company.

An IEE History of Technology Weekend is being held at Liverpool University July 8-10 and there will be a conference organised by the Liverpool Physical Society on July 11, both marking the "development of radio" by Lodge.

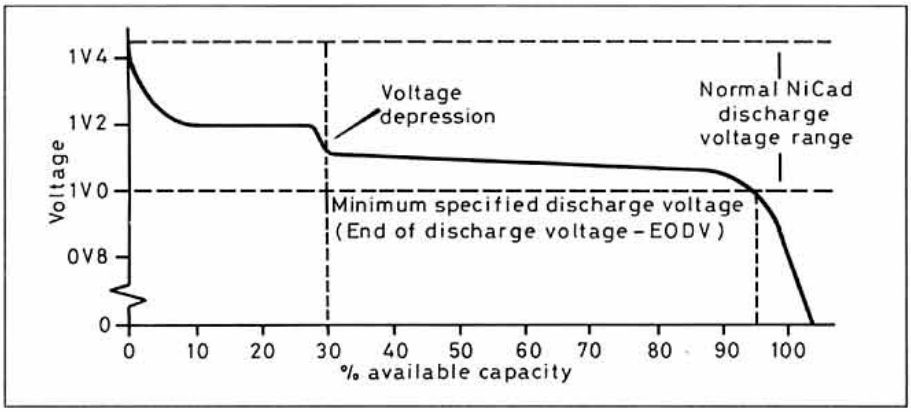


Fig 8: Discharge curve of a nicad cell showing a pronounced 'voltage depression' at about one-third discharge. Usual cause is overlong trickle charging although the effect is often attributed to the so-called 'memory' of nicad cells. Genuine cases of nicad 'memory' due to repeated partial discharges to exactly the same point are rarely met in practice.

MAINTENANCE-FREE BATTERIES

AT THE BRITISH LIBRARY (Science Reference and Information Service), I recently found among the recent additions by Dr Dietrich Berndt (Varta) published 1993 by Research Studies Press Ltd of Taunton and marketed by John Wiley & Sons. It runs to 362 + xxii pages, hard covers, but at a price of £65 it is clearly not targeted at amateurs. However there are some useful introductory statements that bear repetition.

For example: "Maintenance-free lead-acid and nickel/cadmium batteries are distinguished from their conventional counterparts mainly by the fact that topping-up with water at regular intervals is not required. Although this periodic direct work is no longer necessary, the generally applied term 'maintenance-free' should not mislead the user to abandon all kinds of supervision. To ensure its proper function, the maintenance-free battery has to be observed and checked regularly unless it is monitored automatically."

Dr Berndt makes it clear that although the term "sealed" can be applied to this category of nickel/cadmium and nickel/hydride batteries, it should not be applied to lead-acid batteries which are more correctly termed 'valve-regulated lead-acid batteries': "In the lead-acid battery, complete sealing can never be achieved because the generation of hydrogen can never be avoided completely. The valve has to open periodically to let small amounts of gas, mainly hydrogen, escape from the cell. Otherwise the internal pressure would exceed tolerable limits.

"Gradual water loss is connected with this gas evolution, and thus water loss causes slight changes in cell parameters during service life. But the rate of water loss can be kept so low that the initial amount of electrolyte is sufficient for a service life of ten years or more .... Besides these maintenance-free batteries, a wide spectrum of low-maintenance lead-acid batteries is on the market.

"The maintenance-free starter battery is beyond the scope of this book, when it is a flooded lead-acid battery, but with special constructional features, designed to outlast the usual service life in a car without refilling, although the principles are described briefly."

Dr Berndt notes that the history of the lead-acid battery stretches back to 1854 (Sinsteden) with practical implementation discovered independently in 1859 by Plante. Fundamental inventions in the field of nickel-iron and nickel-cadmium batteries were made around 1900, with the principles of the seal nickel/cadmium battery described in German patents by G Neumann (1948).

An item 'Nicad memory – fact or fiction?' *TT*, June 1989, p34 (also *Technical Topics Scrapbook*, 1985-89, p308) showed that the common problem of loss of capacity of nicad cells, commonly ascribed to "memory" was more generally a voltage depression occurring at about one-third discharge due to overlong trickle charging: **Fig 8.** Genuine "memory" is only rarely encountered in practice. Dr Berndt puts this as follows: "The memory effect in nickel/cadmium batteries is a vague description of a temporary loss of capacity after:

- Subjecting the battery to a large number of unvarying partial discharge-charge cycles (the 'genuine' memory effect).
- Extended storage periods without recharge or periods with insufficient charge.
- Prolonged constant-current charging (float charging) eg in emergency-lighting applications.

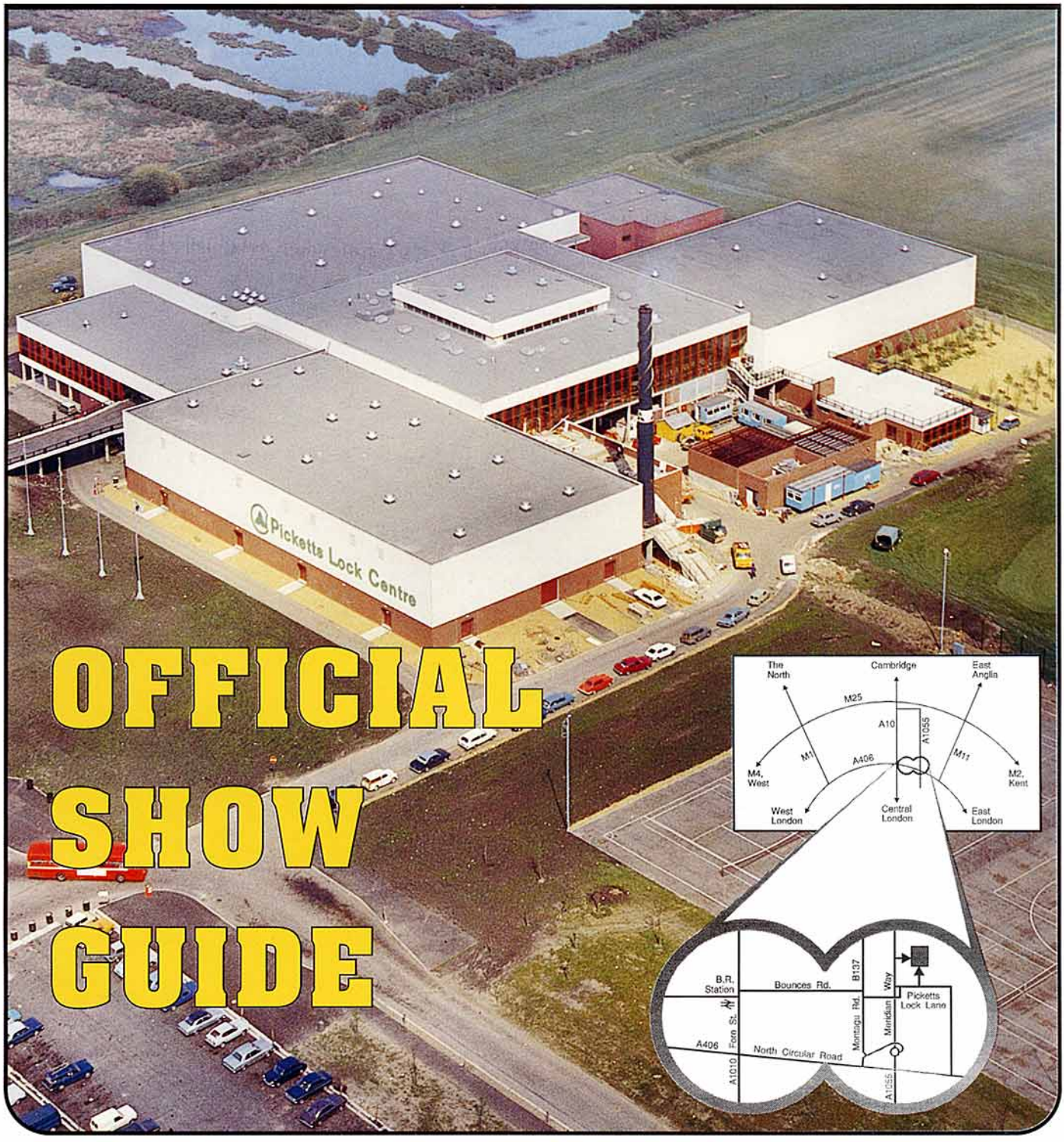
As emphasised in the 1989 *TT* item, which was based on articles by Anton Wilson in *International Broadcast Engineer*: "The most prevalent cause of memory phenomena turns out to be long-term trickle charging .... in this case the continuous current can cause a metamorphosis to occur within a fully charged nicad cell ....

"Over a period of time the charged nicad compounds are transformed into a secondary alloy called Ni_5Cd_{21} which exhibits a lower voltage potential than a normal nicad cell."

It was pointed out that long-term trickle charging can also result in the even more serious problem of 'accelerated ageing' which can reduce the useful life of a battery, in terms of charge/discharge cycles, to only one-eighth of normal.

Roy Mander, GW4DYY found the battery for his hedge-trimmer did not charge overnight in his unheated garage. He found his charger had a thermostat that prevented charging below 5°C. A belated look at the instructions stated this was to prevent damage to nicad cells. As he has not seen this mentioned elsewhere he wonders how important is this precaution? ***G3VA***

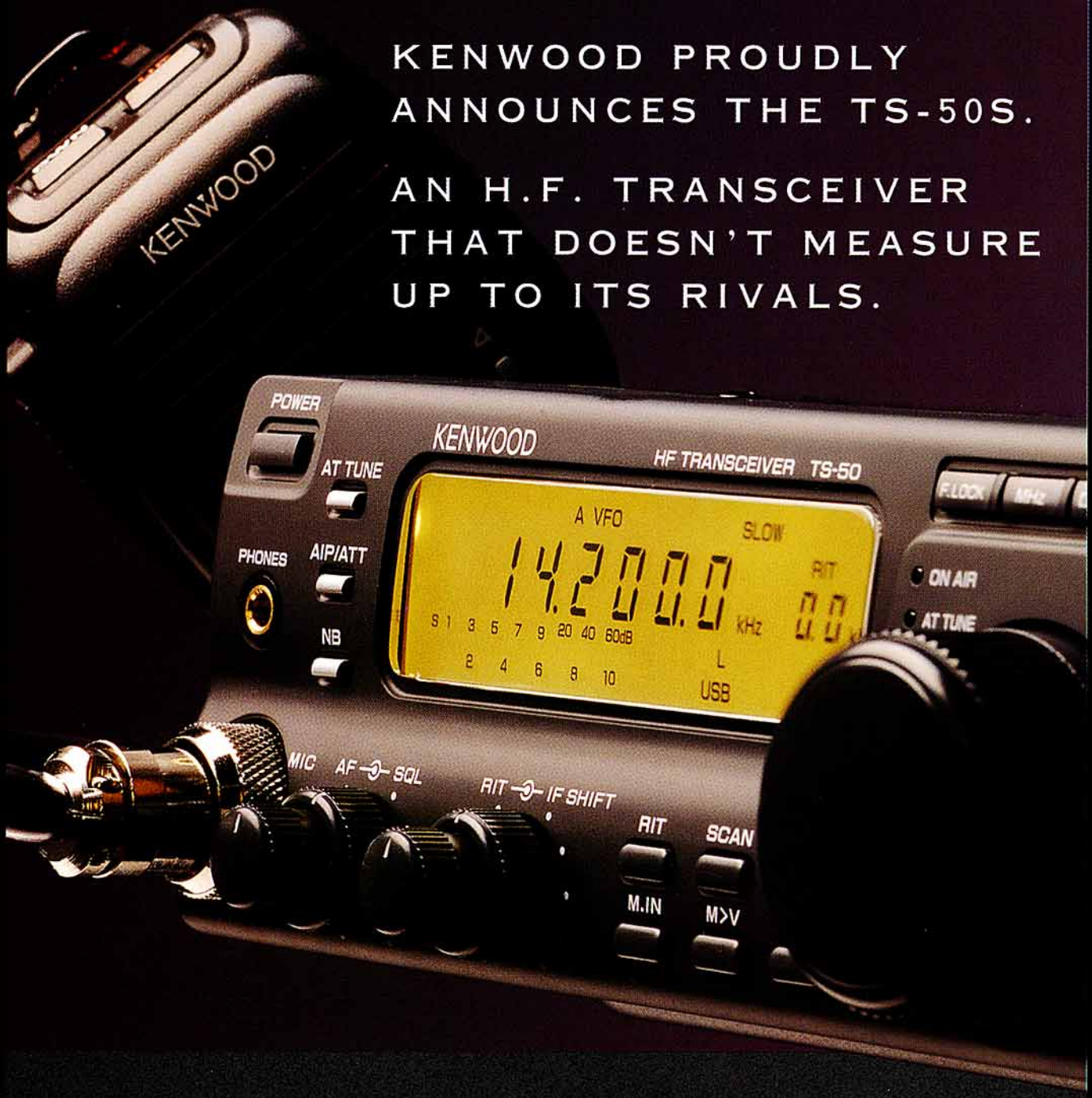
LONDON
AMATEUR RADIO & COMPUTER SHOW



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

KENWOOD PROUDLY ANNOUNCES THE TS-50S.

AN H.F. TRANSCEIVER THAT DOESN'T MEASURE UP TO ITS RIVALS.



If Kenwood's TS-50S wasn't the world's smallest H.F. transceiver, it would still be a mighty impressive piece of equipment.

Its maximum output of 100W, combined with 100 memory channels, gives its operators a versatility that other, bulkier H.F. transceivers struggle to match.

The multi-function microphone, menu system and user-friendly "fuzzy logic" Direct Digital Synthesiser makes it simple to operate on the move. And a host of features, from Advanced Intercept Point to switchable AGC circuit, means that although the TS-50S is small, its performance is a big talking point.

Your local Kenwood specialist dealer has the full technical story. So all that remains to add is the price: around £1000.

After all, the Kenwood TS-50S may be the world's smallest H.F. transceiver. But you don't need the world's biggest bank account to own one.

KENWOOD

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

Welcome to the London Amateur Radio & Computer Show

THE LONDON AMATEUR RADIO & COMPUTER SHOW celebrates its fifth year this year, a milestone in the progress of this most successful event. This year however, this most popular Show, conceived by RadioSport Ltd, is presented in cooperation with the RSGB.

Since its introduction in 1990, The London Amateur Radio & Computer Show has increased in size and attendance by both trade and visitors to the extent that it is now Britain's number one event for the Radio Amateur, SWL and Computer enthusiast. This year there are over 120 trade stands, including a presence by the major Japanese manufacturers, plus special interest groups, lectures and Morse testing, all showing across three large halls.

RadioSport and the RSGB aim to make this Show one of the largest in the European Amateur Radio Calendar.

B Godfrey, G4AOG
Radiosport Ltd

I D Suart, GM4AUP,
RSGB President

S White, G3ZVW
Southgate ARC

Lecture Programme

Saturday 12 March

12.00 - 2.00pm

***Understanding Propagation Reports and Predictions*, by Ray Flavell, G3LTP.**

Based around the *RadCom* Propagation Prediction page and *GB2RS* News Broadcasts, Ray Flavell, Tropospheric Coordinator of the IARU and former Chairman of the RSGB Propagation Studies Committee will endeavour to dispel the myths surrounding the predictions in *RadCom* and the mysteries of K indices, Sunspot Numbers, different types of Solar Flares, etc.

2.00pm - 4.00pm

***Don't Panic (dealing with EMC problems)*, by Robin Page-Jones, G3JWI and Dave Lauder, G0SNO.**

Co-presented by the Chairman and the Alarm and Filter Specialist of the EMC Committee, good housekeeping will be the focus of this talk, and in particular how to avoid EMC problems. However, if EMC problems do arise, the use of ferrites and filters will be covered in detail.

Sunday 13 March

12.00 - 2.00pm

***LONNY, The London to New York Packet Radio Wormhole*, by Julian Prictoe, G4NQO.**

The history of LONNY, the people behind it, where it goes, and the installations at London, New York and Burbank will be examined. The World-wide Conference Circuit, what it is, how it works will also be covered. A live demo will finish the talk, showing where in the world can be reached. There will also be an opportunity for questions to be answered.

2.00 - 4.00pm

***Features and use of the KAMPlus, Kantronics' state-of-the-art multi-mode datacomms interface*, by Ken Ashcroft, G3MSW.**

Interfacing of several different software packages to the KAMplus will be studied, the presentation concluding with a Question and Answer session where you will be welcome to ask questions about your Packet Radio problems in general. There will also be a practical demonstration of *PACTOR*.

The London Show Product News

We asked exhibitors to tell us what products would be launched or featured at Picketts Lock. 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.

Trio-Kenwood (UK) Stand Red N

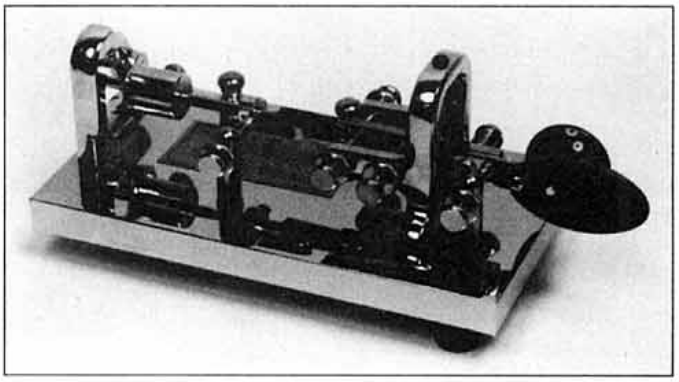
GOOD TO SEE the 50MHz continuing to find new converts, especially for mobile operation. Readers wishing to join them might do well to visit the Kenwood stand at the Show. Their popular little TS50S now has a 6 metre brother! It's the **Kenwood TS60S** all-mode 50MHz transceiver for mobile or DX use.

Performance is impressive. The TS60S is capable of giving a full 90 watts RF on CW, SSB or FM. AM operation is also possible at up to 23W output. Two VFOs and 100 memory channels give the operator versatile split-channel operation, and a dual-menu system gives control of all functions.

Mobile operators will appreciate the comprehensive interference reduction facilities, with Kenwood's own AIP (Advanced Intercept Point) giving a total dynamic range of 105dB. There is also an IF Shift control, 20dB attenuator and a pulse noise blanker. Most functions are accessible from buttons on the microphone – four of which are programmable.

Like most modern rigs this one has a Direct Digital Synthesizer which tunes smoothly in selectable steps from 5Hz upwards. Incidentally, the tuning knob has adjustable torque to suit the operator's individual preference. CW facilities include full or semi break-in, and an optional 500Hz filter is available for this mode. Despite being such a compact set, the LCD readout gives a wealth of information and dims for night-time use.

This year's Show will herald the first showing of the TS60S in the UK. Demand is expected to be high, so readers are advised to check availability with their local Kenwood dealer.



Eastern Communications Stand Blue P

TWO OF THE most famous names in amateur radio will be featured on the Eastcomm stand. The full range of **Vibroplex keys** will be on display including the very latest gold-plated presentation versions. Also (and for the first time) a full range of accessories will be available, together with a fascinating collectors book which describes the history of Vibroplex keys from 1890 to the present day. If that's not enough, there will also be special show offers on all models!

Eastcomm are also the sole UK distributors for the **Mosley Antenna** range from the USA. Mosley beams range from single element two-banders, through seven element seven-banders, to nine element six-banders. These include WARC and traditional bands. But did you know that Mosley also manufacture six, seven, and eight-band verticals together with VHF and UHF beams and wire antennas? It's time to beat a path to the Eastcomm stand.

And talking of time, Eastcomm have a very nice **12/24 hr clock** for the shack wall. Its 9in diameter face has a three-colour global map which gives true bearings in degrees from London.

ICS Electronics Stand Red V

TURN ANY standard PC compatible 101-key keyboard into an easy-to-use feature packed morse machine. All you need is the **AEA KK-1 Keyboard Keyer** from ICS. This terrific little device shares the keyboard with your computer (cable provided) saving valuable operating space. Unique features such as code practice mode, short term memory, message repeat and nestable message buffers make the KK-1 versatile and easy to use.

The **PK-96 9600 baud** packet controller has 1200 AFSK, as well as 9600 baud K9NG and G3RUH compatibility direct frequency modulation. 14k and 100k memory versions will be available, as well as a 100k upgrade.

Automatic tracking of satellites is made possible with the new **AEA ST-1 System**. This has hardware and software control to give hands-off operation of both antennas and transceiver. The ST-1 provides both initial tuning and Doppler correction during satellite pass.

AEA Log Windows is a fully integrated and easy-to-use Windows program. It combines the functions of logging, rig control and DX Cluster monitoring with award tracking and reporting. The program also has a comprehensive database for storage of QSO information.

Another impressive Windows program is the **WEFAX software** for the DSP-2232/1232. This displays (in real time) true grey-scale images from either the NOAA HF WeFax service or the NOAA APT Satellite Service.

ICOM (UK)

Stand Red S

THE NEW **ICOM IC-736** SSB/CW transceiver for HF and 50MHz will be on display at the Show. It has an AC power supply unit *and* a fully automatic antenna tuner built in. Just add an antenna and microphone and you're away. If you don't need to use the internal antenna tuner, it can be set so as to only switch in when the SWR is greater than 1.5:1 – so protecting the PA MOSFETs.

Icom have incorporated a pair of powerful MRF174 semiconductors for smooth and stable transmissions throughout the HF and 50MHz ranges. The aluminium diecast frame and two large cooling fans help stabilize the PA circuit and allow full 100% duty cycle operation. An automatic antenna selector, as used on the IC-737, is another handy feature of this rig.

The big, clear analogue meter works as an S-meter on receive and either an SWR, power or ALC meter in the transmit mode. Very fine tuning resolution is possible, down to just 1Hz - equivalent to 200Hz for each rotation of the tuning dial - made possible by Icom's exclusive new DDS (Direct Digital Synthesizer). 101 memory channels are available, of which ten may be used for split frequency working.

Many facilities which other rigs offer as extras have been included! How about a built-in adjustable electronic keyer with full or semi break-in? Or passband tuning and a notch filter to pull the DX out of the noise? SSB operators have a speech compressor and noise blanker to help them, and the radio has a manually variable RF gain control for optimum receive signal handling capability. A hand microphone is supplied as standard, but desktop microphones are also available from Icom. Other optional accessories include 250Hz and 500Hz CW filters and solid-state linear amplifiers which are fully controllable from the IC-736.

Icom's new VHF and UHF handhelds have advanced features to suit everyone from the beginner to the old-timer. The 2 metre **IC-2GXE** and **IC-2GXET** types boast a useful 7W RF output, and the **IC-T21A/E (2m)** and **IC-T41A/E (70cm)** have crossband receive capabilities, plus an ultra high speed scan function.

● STOP PRESS: Just in is news of more new models expected to be at the show.

The IC-28IH is a 50W 2m FM mobile with CTCSS, UHF receive and 9600Bd data.

The IC-820H is a 2m/70cm multimode base station with 1Hz DDS.

Another dual-bander is the IC-2700 2m/70cm 50/35W FM mobile with detachable front panel, remote operation and much more.

R & D Electronics

Stand Green A

THIS YEAR'S Show will mark the first UK showing for **Met-Log** – a computer interfaced weather monitoring and logging system, which may be used as a comprehensive stand-alone PC package, or in conjunction with R&D's electronic **Weather Station**. If you haven't seen this before, come to the show and take a look. Visual information on wind speed, gusts, direction, external temperatures, sunshine hours, rainfall, humidity and barometric pressure are all available at a glance.

AOR UK LTD

Stand Red X

ONE OF THE most exciting HF receivers announced in recent months has to be the **AOR AR3030** general coverage model.

AOR have their own stand to demonstrate this high specification radio at the Show. We're sure many readers will be eager to find out more about this set, with its multi-mode (AM/SSB/CW/FM/FAX) capabilities and famous Collins filters. DDS digital tuning and a temperature compensated crystal oscillator are included as standard. AOR call this "The New Classic"

Yaesu UK Stand Red Q

THE OUTSTANDING **Yaesu FT840** transceiver is likely to be a major attraction at the Show. But wait, there's more.

A couple of smart little handhelds have just been launched onto the amateur market. The FT-11R measures just 102(H) x 57(W) x 25.5(D)mm, but has an output of up to 5W on 2 metres when used with a 9.6V supply. Even the 4.8V battery pack produces 1.5W of RF and a CTCSS decode unit is available as an optional extra if required.

The 432MHz version of this transceiver is available as the **FT-41R** with a similar spec. Incidentally, these little rigs have 150 memory channels and all the facilities to compete comfortably with their bigger compatriots.

The battery saving and Automatic Power Off (APO) features are standard on both radios. Ask for more information about these versatile little transceivers at the Show.

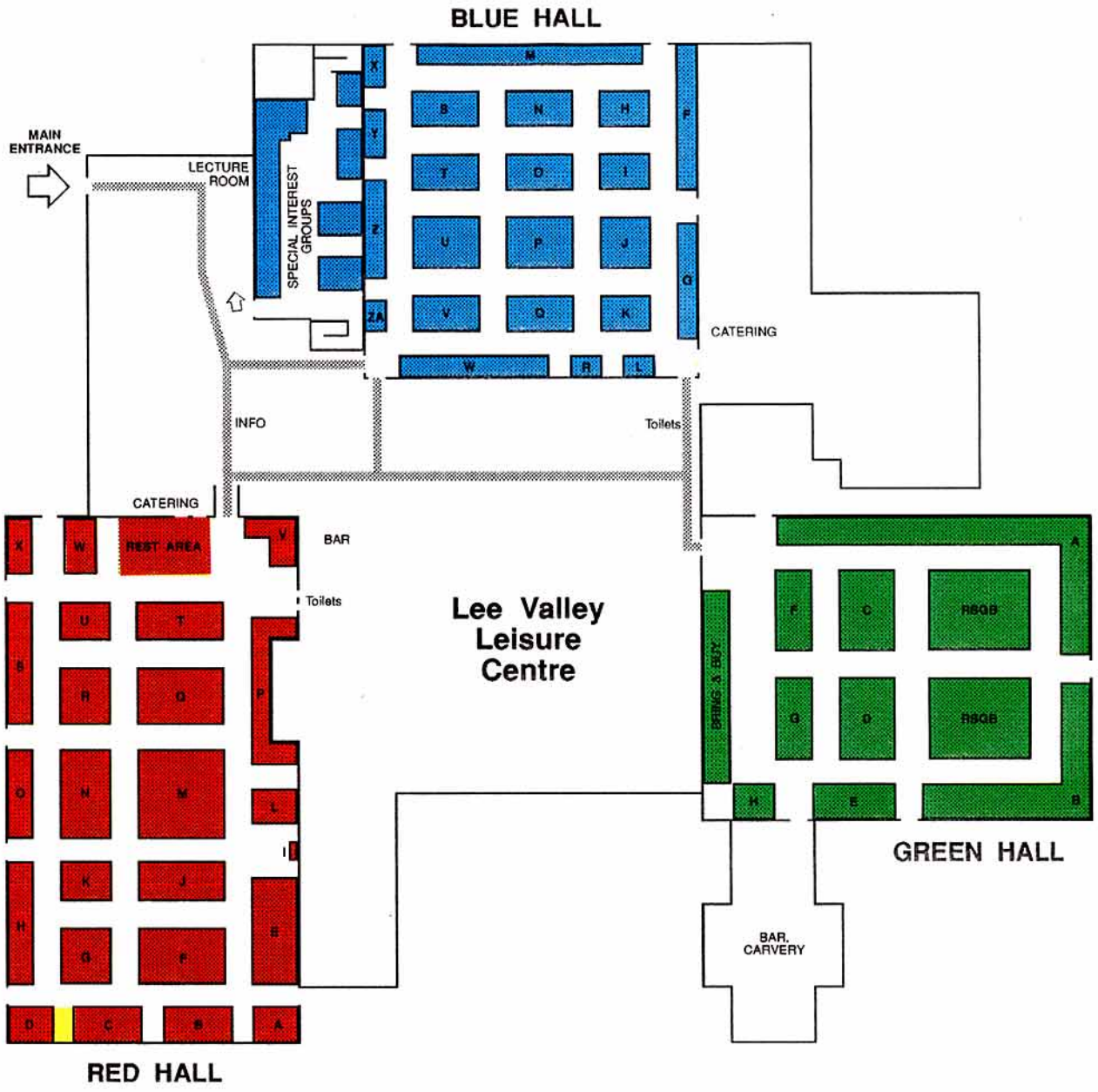
RN Electronics Stand Blue U

ALL THE BANDS from 10m to 2m are within your reach from a range of **Receive Converters** which (by popular demand) have just been relaunched by RN Electronics of Mountnessing, Essex. They have 2m, 4m and 6m converters for use with 10m radios, and 10m, 6m and 4m converters for 2 metre receivers. The show will also feature RN's new **137MHz weather satellite unit** and, naturally, the latest versions of their famous transceivers.

xiv

RSGB Amateur Radi

Floor Plan



LIST OF EXHIBITORS ON NEXT PAGE

The London Show Guide To 'Safe DX'

MARTIN LYNCH
G4HKS
THE AMATEUR RADIO EXCHANGE CENTRE

Your Seven Essentials Fo

If your'e visiting the London show at Pickets Lock this year, I'll guarantee you the best package price. Over the last three years I've prov
THE CUSTOMER IS ALWAYS NUMBER ONE. For the London show, if you have decided what you want and your'e ready to buy, come ove
the best possible deal on your chosen rig or accessory, (nobody beats my part-exchange deals either!). If, on the other hand, you would

1 Yaesu Musen

Yaesu Musen of Japan was formed the same time that I was born - That's right, a long time ago! I've been tracking their product range since I was a kid and in my opinion, they continue to be the leaders in Ham Radio manufacturers. Now that Yaesu are distributing direct to the U.K. dealers, prices have come down further and delivery is even quicker. Here's their latest range of products.

FT1000

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

FT990

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

FT890

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

FT840

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

FRG100

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

FT736R

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

FT260R mk11

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

FT5200

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

FT2200/7200

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

FT530R

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

FT11R/41R

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

2 Trio-Kenwood

For those of you who have visited their HQ in Watford, you couldn't help but be impressed at the size of the company behind the product. Investing in Kenwood has always been sound and with their market leading range there has never been a better time to look more closely at their individual products.

TS950SDX

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

TS850S

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

TS450/690S

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

TS50S

Apparently there are people out there that still think the ever so small TS50S is an April Fools ploy

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

R5000

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

TR751E/851E

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

TS790E

For those of you that like TS850 style looks but want it on VHF, then take a look at the new

TS790E. Comes fitted with 45 watts on 2 & 70, you can add a 10w 23cm module and have a triple band base all in one box! They are good, I used one at home for a while, until Chris, G1FMH sold my own machine to a customer. What ever next.

For Safety's Sake, Buy From Martin Lynch!

THE FULL RANGE OF MFJ PRODUCTS ARE NOW IN STOCK

Here are just a few examples of their unbeatable range:

MFJ-249 Digital SWR Analyser	£229.00
MFJ-1786 Super Mag. Loop	£299.00
MFJ-949E Antenna Tuner with load	£169.00
MFJ-948 Antenna Tuner	£149.00
MFJ-1278BX All mode Packet Controller	£339.95

Antenna, Cables and Accessories

Moving to a bigger premises means loads more hardware. the full range of Yaesu Rotators, coax from all the best manufacturers, antenna mounting hardware, including Chimney lashings, poles, clamps, rawlbolts, we've got it all. Include antennas from: Diamond, Comet, Create, Tonna, KLM, CushCraft, Capco, Outbacker, DeeComm, Sandpiper, Panorama, the list is endless. Mail Order no problem.

VARGARDA ANTENNAS

Recently appointed the only London retailer for theis excellent range of Sweedish antennas, the full Vargarda range is now aailable from stock.

In addition to the antenna range, the range of stacking kits can be obtained. Call for free catalogue.

3 ele	6m beam	£85.55
3 ele	2m beam	£38.35
6 ele	2m beam	£47.00
9 ele	2m beam	£61.10
6 ele	70cm beam	£39.00
13 ele	70cm beam	£54.10
19 ele	70cm beam	£76.00

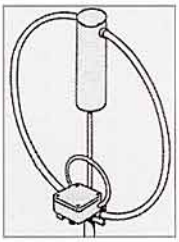
PACKET & DECODERS

Moving to a larger premises has also enabled us to show off our massive range of new & used datacomms equipment. Here is just some of the range stocked:

AEA PK-900	£549.95 Free Finance!!
AEA PK-232MBX	£385.00 Free Finance!!
AEA PK-88	£169.95
Tiny 2 TNC	£139.00

KAM	PHONE!!
KPC-3	£139.00
MFJ 1278	£339.95
Universal M400	£399.95
M900	£529.00
M1200	£399.95
M8000	£1279.00
Momentum	
MCL 1200	£229.00
ERA Microreader	£189.00

I can supply the full range of Tony G4OGP's AA&A 'CAPCO LOOPS'.



For years my customers have been telling me how good they are. I've recently visited many owners who've been using them and the results are staggering. Whether you're using a FT747 or a top flight FT1000, if the space is limited, try the new range of CAPCO LOOPS for yourself. For a limited period I'm offering them on interest free, it couldn't be easier!

Magnetic Loops

AMA-3 200W 13.9 - 30 Mhz ...£249.95
AMA-4 100W 1.8 - 4.2Mhz £399.50
AMA-5 150W 3.5 - 11Mhz £299.95
AMA-6 150W 6.9 - 24Mhz £279.95

Antenna Tuning Units

SPC-300D Roller Coaster, 300W RMS, 1kW pep.....£299.95
SPC-3000D Roller coaster 1kW RMS, 3Kw pep.....£399.95

VFA

Variable frequency antenna

And don't forget the high power range of baluns, all ratio's.

THE UNIVERSAL RANGE OF DECODERS

M-400
£399.95 incl. VAT.
PSU extra at £19.95

M-900
£529.95 incl. VAT.
PSU extra At £19.95

M-1200
£399.95 incl. VAT

M-8000
£1279 incl. VAT. A 12" VGA HIGH RES COLOUR Monitor is available for £179.95 incl. VAT

THE NEW 'TS' RANGE OF MOBILE AND BASE ANTENNAS

MyDEL

The new exclusive range of MyDEL VHF/UHF antennas are now avalable from stock. Costing some 20% less than other well known brands, compare the quality and prices yourself!

MyDEL MOBILE RANGE

TSM-1005	2m 7/8th	5.2dbi	1.89m long	£39.95
TSM-1320	2m/70cms	2.1/3.8dbi	0.44m long	£21.95
TSM-1310	2m/70cms	2.1/5.0dbi	0.80m long	£29.95
TSM-1326	2m/70cms	2.1/5.0dbi	0.77m long	£29.95
TSM-1332	2m/70cms	4.5/7.2dbi	1.50m long	£44.95
TSM-1607	2m/70cm/23cms	2.8/6.0/8.4dbi	0.78m long	£49.95

MyDEL BASE RANGE

TSB-3002	2m (2 section)	6.5dbi	2.87m long	£44.95
TSB-3003	2m (3 section)	7.8dbi	4.50m long	£69.95
TSB-3303	2m/70cms	3.0/6.0dbi	1.15m long	£49.95
TSB-3302	2m/70cms	4.5/7.2dbi	1.79m long	£69.95
TSB-3304	2m/70cms	6.0/8.4dbi	2.15m long	£69.95

CELLULAR TELEPHONES!

Great News!

From February 1994, you can now buy your Cellular Hand Telephone from Martin Lynch all competitively priced and with the security of buying from the largest Amateur Radio Retailer in the country. If youv'e been thinking of buying a phone, (either for yourself, your business or your husband or wife), then call the sales team today for free information and colour brochure.

Second Hand Equipment...

with Guarantees and SUPER LOW FINANCE

KENWOOD		YAESU		ICOM	
TS140S	£649	FT101ZD Mk3	£449	IC735	£699
TS680S	£749	FT102	£499	IC725	£599
TS440S	£649	FT290R Mk2	£349	IC761	£1599
TS950SD	£2295	FT790R Mk1	£269	IC737	£1349
TR751E	£595	FT736R	£1295	ICW2E	£299
TS711E	£749	FT1000	£2395	IC275E	£699
TS811E	£749	FT23R	£149	IC781	£3695
TL922	£1150	FT480R	£299	IC751A	£849
TH28E	£249	FT780R	£379	IC745	£595
TH78E	£379	FT690R Mk2	£369	ICR1E	£299
TS530S	£529	FT726R+6m	£795	ICSM8	£75
TS780	£795	FRG100	£469	ICAT150	£299
AT230	£185	FC102	£195	ICAT100	£299
AT250	£269	FC902	£185		
AT440S	£179				

MARTIN LYNCH

G4HKS

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...r 'Safe DX'!

...ed to you (and sixteen thousand other customers), that in my book, ...r to the Lynch stand. Using my "Price Match" coupon overleaf, I'll guarantee you ... rather gamble your money elsewhere, the risk is yours! 73 Martin G4HKS

ICOM

Probably the most advanced of all the Japanese manufacturers, Icom introduced a synthesised transceiver years before anyone else. 1994 is the year that this great company brings you a world first - The NEW IC-736!

THE NEW ICOM IC-736
100 watts on HF + 100 watts on SIX!

Due in March 1994, the IC-736 is a worlds first all mode all band 100w transceiver including the brilliant SIX METRE BAND. No other manufacturer has given you so much in one package. Based on the already best selling IC-737 introduced last year, just look at the additional features:

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

No other radio offers you so much - for so less. Have Icom got it right? I should say so! The price is right and so is our special opening offer. Call now.

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

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

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

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

TM241E/441E
Simple to use high power 2 or 70 FM mobiles. No more to say. We love 'em. Get your money out and lets haggle.

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

TH22/42E
The latest in slim-line single band FM handies. If you're fed up with the bits you'll never use, but just want a good 2 or 70 radio then look no further. They are sensibly priced too!

muTek

The full range of muTek advanced RF engineering modules are always available, including the NEW RDX replacement front end boards for the Yaesu FT736R. Give me a call for the latest price list and catalogue.

Alinco

It was Alinco that woke the "big three" up only a couple of years ago with their fantastic range of Handies. I gather there are some exciting shortwave goodies on the horizon, watch with interest.

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

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

Yupiteru

A relatively new name to the scanning equipment scene, "YOO-PIT-EH-ROO" may not be the catchiest of names, but they have certainly carved a nice slice out of the market in a very short period of time.

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

AOR

AOR are probably the oldest of the scanner/receiver manufacturers. Their new products are class leaders and their U.K. support, thanks to Richard & Tak at AOR U.K. is second to none.

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

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

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

You'll feel safer buying from Martin Lynch!

io & Computer Show

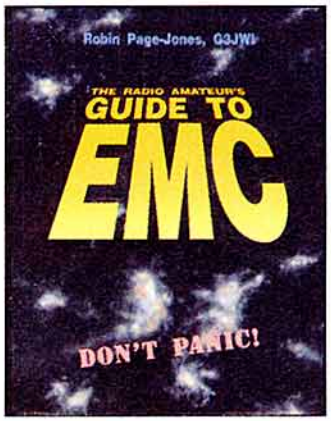
List of Exhibitors

Company	Hall	Stand
A A A Ltd	Red	U
A C R Ltd	Blue	I
A J P Communications	Blue	X
A K D	Blue	T
A O R (UK) Ltd	Red	X
A R E Communications Ltd	Red	K
Agile Sales	Red	L
Air Training Corps	SP/INT	10/11
Aladdin Computers Ltd	Blue	O
Alan Hooker	Blue	P
Algebra Computers	Green	A
AMSAT UK	SP/INT	15/17
Arnold GC & Partners	SP/INT	33/34
Audio Exchange	Green	A
Badger Boards	Red	B
Bajan Computers	Red	G
BARTG	SP/INT	4/5
Bill MacDonald	Red	L
Bonex Ltd	Red	C
Bring and Buy	Green	
British Amateur TV Club	SP/INT	27/28
Castle Electronics	Blue	T
Cheshunt & District ARC	Red	J
Compelec	Red	P
Computer Junk Shop	Blue	Y
Damson Computing	Blue	V
Deecom	Blue	F
Display Electronics	Red	F
Dosher J	Red	P
Eastern Communications	Blue	P
Electrocomp	Green	A
Eskan Electronics	Green	F
Expo-Drills and Tools	Blue	K
Field Electrics	Green	E
Gadget Computer Services	Red	P
Garex Electronics	Red	D
Giacomelli	Blue	H
G QRP Club	Green	A
Grafton A R Society	SP/INT	9
Grosvenor Software	Blue	ZA
Guide Dogs for the Blind	SP/INT	20-22
Ham Radio Products	Red	W
Haydon Communications	Blue	Z
Hesing Technology	Red	W
Hoddesdon Radio Club	SP/INT	7
Holderness R J	Red	J
House of CD Rom	Blue	O
Howes Communications	Blue	L
Icom UK Ltd	Red	S
ICS Electronics Ltd	Red	V
Kanga Products	Green	A
Kent R A	Blue	V
Lee Electronics	Green	B
Len Cooke Enterprises	Green	F
Loutronics	Blue	J
Lowe Electronics Ltd	Green	D
Mainline Electronics	Blue	Q
Martin Lynch	Red	R
Mauritron Technical Svcs	Blue	S
Micro Solution Computers	Green	F
Microgenesis Ltd	Green	F
Mirage Designs	Blue	Q
Morgan Smith H J	Blue	N
Nevada	Red	H
Oasis Computer Systems	Red	E
Personal Comp Solutions	Red	J
Peter Rodmell Comms	Red	G
Poole Logic	Blue	S
Proops	Blue	K
PTV Electrical Services	Blue	N
PW Publishing Co Ltd	Red	T
Quill Marketing	Green	F
R&D Electronics	Green	A
Radio Research	Red	I
Radio Shack Ltd	Blue	G
RAIBC	Red	L
RAOTA	SP/INT	24
Raynet	Red	W
RBL Satellite	Green	G
Remote Imaging Group	SP/INT	1-3
Rich Electronics	Green	G
Ripmax PLC	Green	A
RN Electronics	Blue	U
RNARS	SP/INT	29/30
Robert Keyes	Green	A
Rowland AP	Blue	V
RSARS	SP/INT	12-14
RSGB	Green	C D F
Sandpiper	Red	M
Satellite Surplus	Blue	R
SEM	Red	P
SGS	Green	A
Shacklog	Red	L
Silverthorn Radio Club	Blue	M
Simon Baker	Green	G
Siskin Electronics	Blue	V
SMC	Red	M
Software City	Blue	U
Specialist Antenna System	Red	O
Squire V	Green	B
SRP Trading	Blue	S
Strikalite	Blue	M
Sudbury Electronics	Blue	O
Suredata	Blue	M
SW Shareware	Green	G
Syon Trading	Red	B
Taurus	Blue	I
Telford Electronics	Blue	M
Tennamast Scotland	Blue	N
Trade Centre PMR	Blue	S
Trident Systems	Red	E
Trio Kenwood UK Ltd	Red	N
UBM	Red	A
Vector Computing	Green	B
Venus Electronics	Red	U
Waters & Stanton	Blue	W
WE Software	Green	H
Westlake WH	Red	P
Wilson Valves	Blue	T
Woodpecker	Blue	V
Worked All Britain	SP/INT	6
Wraith TW	Blue	U
Y&J Enterprises	Blue	V
Yaesu UK Ltd	Red	Q

FLOOR PLAN ON THE PREVIOUS PAGE

Visit the R
in the G

Special Show Offers for RSGB Members only



Radio Amateur's Guide to EMC (RSGB)

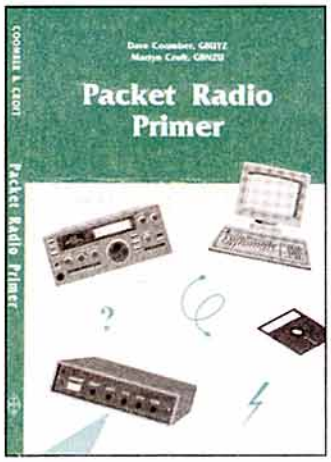
Robin Page-Jones, G3JWI

AN ESSENTIAL GUIDE, normal RRP (£6.50). This weekend, only:

£4.50

RF Byrne's Unpublished Masterpieces

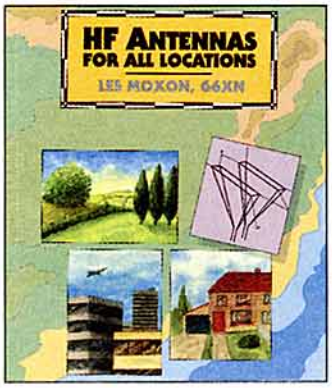
FREE with all sales over £40 – while stocks last.



Packet Radio Primer (RSGB)

A LIGHT-HEARTED introduction to packet radio with detailed practical advice, an operating guide plus much reference information. Normal RRP (£7.50). This weekend only:

£5.50



HF Antennas for all Locations (RSGB)

A WEALTH OF practical information. Normal RRP (£13.99). This weekend only:

£10

Log Books — essential for all amateurs

Buy any log book and get a Log Book Cover for **only £2.25.**
(normal RRP (4.50)

Log Book Transmitting

(£2.50) £2.12

Log Book Receiving

(£3.50) £2.97

Plus a small selection of slightly damaged books all at half price!

(proof of RSGB membership is required)

SGB Stand
reen Hall

AT THIS YEAR'S SHOW we have increased our stand space to cater for all your requirements. As well as our large book stand and information point, (where my staff will be happy to advise you on all the RSGB publications and special offers available), at this year's show for the first time we have a large membership liaison stand. On this stand will be volunteers from the Society's Membership Liaison Committee, Licensing Advisory Committee, EMC Committee and Planning Advisory Board to advise you on any concerns you may have with respect to amateur radio matters.

I hope you enjoy this show, thank you for your support.

Peter Kirby, G0TWW
General Manager

We Have the Answers to Your Questions . . .

EMC Problems

INTERFERENCE IS A common problem that can often be easily overcome.

Equipment Insurance

THIS ESSENTIAL SAFEGUARD has been arranged especially for members. Speak to representatives from Amateur Radio Insurance Services for details of their advantageous rates and terms.

Planning Permission

Membership Queries

Licensing Advice

QSL

SAVE POSTAGE, drop off your QSL cards at the RSGB Stand and we will transport them back to our central QSL sorting office on your behalf.

Credit

APPLY AT THE show for an RSGB Bank of Scotland credit card.

. . . and are Here to Help!

Martin Lynch
Stand Red R

VHF AND UHF antennas are featured in the exclusive range of new products. The **TM Antenna Range** includes triple band antennas covering the 2m, 70cm and 23cm bands.

The full range of data decoders will be at the show – in particular the **Universal M8000** which makes sense of most of those strange warbling noises you hear on the bands and "decodes them into screens full of text and pictures you can understand."

The **M1200** has all the features of the M8000 on a card that fits into a standard PC. Among the codes supported are: Morse, RTTY, ASCII, SITOR Mode A (ARQ), Mode B (FEC), collective and selective autor, ARQ-E, ARQ-E3, ARQ-M2, ARQ-M4, SWED-ARQ, ARQ-S, FEC-A, FEC-S, Packet (AX25), VFT, Three Shift (Russian Cyrillic on video), FAX, GOLAY, POCSAG and PICCOLO.

VGA video and serial/parallel printer outputs are also available, on the M8000 together with an EIA level computer connection.

By the way, make sure you don't miss the company's huge spread of new and used equipment for amateur radio enthusiasts of all ages and interests. Get in the know . . . . visit the show!

NEVADA Stand Red H

DIGITAL SIGNAL processing is a technique which could well have far reaching implications for the future of radio communication. This is bound to include amateur radio, and the first signs are starting to appear! Timewave Technology Inc. (USA) have introduced two advanced Audio Digital Signal Processors which dramatically reduce noise, interference and eliminate heterodynes. Advanced 16-bit technology gives "unmatched performance".

Two models are currently available – the **DSP-9 CW/SSB** filter, and the **DSP-59 Multi-Mode** filter. The DSP-9 is designed for the amateur who wants CW and SSB, and it features selectable switching between 1.8, 2.4, 3.1kHz SSB filters and between 100, 200 and 500Hz for CW filters. Also available is the DSP-59 – this is one for the real enthusiast. 320 filter variations cater for virtually all operational modes including RTTY, SSTV, AMTOR, PACTOR, HF, Satellite, EME, SSB, CW, AM and weak signal VHF.

Right, so you've finished doing battle with the DX. Time to sit down and watch a good video. Nevada have just the thing. It's called **'Getting Started in Contesting'** and is the latest in the successful series from CQ Communications. Packed with hints and tips from the most successful contesters in the USA, it contains helpful operating secrets for HF, VHF and UHF operators.

All these products will be available for the first time from Nevada at the show, so make sure you're where the action is!

Waters and Stanton
Stand Blue W

MFJ HAVE JUST announced the **MFJ-259**, an SWR analyzer which also measures radiation resistance, This sounds ideal for the avid experimenter. A frequency counter is included, so it really is a comprehensive test instrument for the amateur shack.

Waters and Stanton tell us that the **MFJ-249** SWR analyzer, which also has the 170MHz frequency counter, has now sold in thousands around the world. Either is available with a custom carrying pouch – just the thing for field days!

Peter Rodmell Communications
Stand Red G

IT'S THE 10TH anniversary of the all-British **Explorer Linears**. The new 1000 watt (variable) output model now in production has many applications in both amateur and professional circles, and is capable of generating peak power which comfortably meets the UK legal limit.

Visit their stand and see it for yourself!

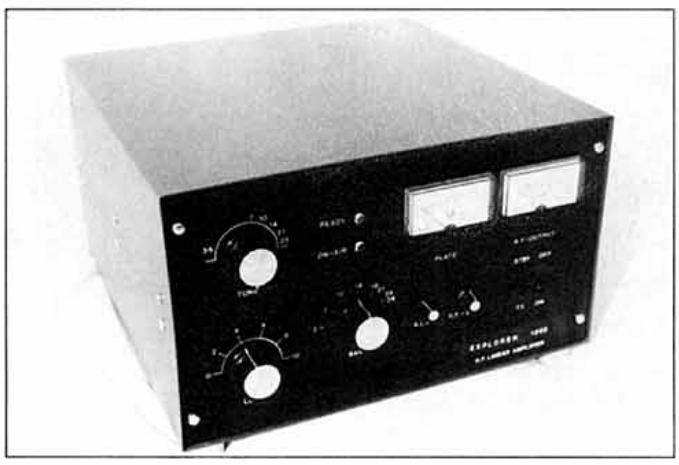
South Midlands Communications
Stand Red M

DON'T MISS the new **Serene range of antennas** and accessories from Taiwan. You'll find them all on the SMC stand, including base station dual and tri-band colinears. Single and dual band mobile antenna mounts etc, will also be available together with mobile power/SWR meters and antenna diplexers and triplexers. Taiwan (via SMC) is also the source for high quality low-loss coaxial cable.

Unfortunately, Yaesu in Japan has ceased supplying the popular **G-400 and G-400RC antenna rotators**, but the good news is that SMC have secured a quantity of these which they're offering at competitive prices. Just a sample of the many interesting items on offer at the SMC stand.

Dee Comm
Stand Blue F

DEE COMM HAVE a new range of **end fed half-wave antennas**. Pre-tuned and ready for use, they can be used either vertically or horizontally. Available for bands from 4m to 80m these aerials are ideal for either portable or base station use.



Siskin Electronics Stand Blue V

NEW TECHNOLOGY will be much in evidence on the Siskin stand, with the emphasis on 9600 baud Packet Radio. Pride of place this year must surely go to the **SYSMEK TNC2H**, a revolutionary high-speed TNC incorporating the G3RUH 9600 system which is fast becoming the world standard.

Siskin will also be offering a range of 9600 baud products including the British-built Wood and Douglas 144PK-D high speed Data Radio.

ICOM'S NEW IC-
HAS ALL THIS AND MO

The IC-736 has many features that make it superior to other transceivers, here are just a few to prove it:

- Built-in power supply and high-speed automatic antenna tuner on all bands, to save shack space.
- Power MOS FET's (Motorola MRF174 x 2) to guarantee stable transmission.
- 100 watt output power for both HF and 50MHz bands.
- Quick-split function with one-touch offset.
- Newly developed DDS system to provide 1Hz tuning steps.
- Double band stacking registers.
- Memo pad function.
- XFC function.
- Split lock function.
- Built-in electronic keyer
- Full Break-in.
- Bright and large LCD shows modes, receive and transmit frequencies.
- Push ANT to select antenna (two connections are available).
- Push FULL to activate full break-in (QSK) function.
- Push TUNER to instantly activate the internal 160-6m automatic antenna tuner.
- DDS (Direct Digital Synthesis) provides crystal clear reception and transmission.

ICOM

For more information and your local Icom dealer contact:
Icom (UK) Ltd. Sea Street Herne Bay Kent CT6 8LD
Telephone: 0227 741741 (24hr). Fax: 0227 741742

736 HF/50MHz
ORE FOR ONLY £1849!

Radio shown actual size

- Adjust KEY SPEED to vary the speed of the internal electronic keyer.
- Press SSB, CW/N, AM, or FM to select desired operating mode.
- Press MP-R to recall memo pad memories for intermediate use.
- Press MP-W to automatically write the present operating frequency and mode to memo pad memory.
- Using the KEYPAD, select a desired band or directly enter frequencies.
- Retain your last selected frequency and modes with DBSR (Double Band Stacking Registers - Two frequencies per band), use one for CW and one for SSB.
- Hold SPLIT down for one second to start the split mode function and initiate QUICK SPLIT feature, equalizing both VFOs to the same frequency.
- Press NOTCH and adjust to eliminate annoying beat signals.
- Rotate MEMORY CHANNEL SELECTOR to select a channel from 101 available memories (memories store frequency, mode, antenna selection and tuner on/off condition).
- Adjust PBT to reduce interference.
- Push RIT and/or ΔTX to change the transmit or receive frequency +/- 9.999 KHz.

ICOM manufacture a full range of base-stations, mobiles and handheld transceivers and receivers to cover all popular Ham frequencies... and beyond. No matter what your requirements, ICOM have the radio for you.

DON'T YOU WISH YOUR TRANSCEIVER HAD ALL THESE...

- BUILT-IN POWER SUPPLY
- 2 PAIRS OF CW JACKS
- OPTIONAL CW NARROW MODE
- BUILT-IN ATU
- NOTCH FILTER
- 2 ANTENNA CONNECTORS
- MULTI-FUNCTION METER
- 'SET' MODE FUNCTION
- 101 MEMORY CHANNELS
- AF TYPE SPEECH PROCESSOR
- NOISE BLANKER
- KEYPAD OPERATION
- PASSBAND TUNING
- LARGE FUNCTION DISPLAY
- DOUBLE COOLING FAN SYSTEM
- CONTROL CIRCUIT FOR AH-3 OPTION
- RF GAIN CONTROL
- CONVENIENT VOX FUNCTION

IF SO, WHAT YOU NEED IS ABOUT TO UNFOLD BEFORE YOUR VERY EYES!

NEW!

"Look, alphanumeric display and a 4.8V battery. Terrific!"

"Small and thin – with a full sized keypad! How'd they do that?"

"Yaesu did it again!"

FT-11R/41R
2m/70cm Handhelds

- **Frequency Coverage:**
  FT-11: 144-146 MHz
  FT-41: 430-440 MHz
- Selectable Alpha Numeric Display
- New Compact Battery Design
  4.8V produces 1.5 Watts
- (FT-41: 1.0W)
  9.6V produces Full 5 Watts
- 150 Memory Channels
- (75 when Alpha Numeric)
  AM "Aircraft" Receive
- (110-136 MHz)
  Small Compact Size w/ Easy
- Operation (measures only:
  102(H) × 57(W) × 25.5(D)mm)
  Rx/Tx Battery Savers
- High-efficiency MOS FET Power
- Module
  Large Back-Lit Keypad and
- Display
  Up/Down Volume/Squelch
- Controls
  Built-in DTMF Paging/Coded
- Squelch
  Automatic Power Off (APO)
-
-

RSGB **LONDON** AMATEUR RADIO & COMPUTER SHOW

SEE US AT THE SHOW!

NEW Alphanumeric Display
First time for Yaesu HT Full function LCD combines letters and numbers.

NEW Up/Down Thumb Control
with Volume and Squelch Bar Graph. No other radio has this. Back lit, too!

NEW Compact Battery Design
4.8V gets you 1.5 Watts. A first for amateur radio. (FT-41: 1.0W)

Get a grip on this!

World's smallest size HT with a full sized keypad
Measures only: 102(H) × 57(W) × 25.5(D)mm

"Small" is relative, isn't it? It could mean size – which in this case it does. And, it could mean "reduced", which it doesn't! Nothing missing from the hot new FT-11R HT from Yaesu except bulk! You're going to wonder just how all the features of this full-function radio fit in. Until you remember Yaesu pioneered 2-way radio micro technology.

To see what this really means to you, check out all the new features. Like the alphanumeric display. This Yaesu HT first, lets you tag your favorite frequency by name, call sign or number. Or, the new "voltage stingy" battery. It's an industry first for amateur radio. Smaller and compact, the 4.8V battery gives you 1.5 watts on TX (FT-41: 1.0W). And, if that's not enough, there's an optional drop in, dash mount battery charger.

You see it's not a small time performer. Just small sized. The FT-11R. Another small example of Yaesu superiority. See your dealer today!

YAESU

Performance without compromise.℠

YAESU UK, Unit 2 Maple Grove, Business Centre, Lawrence Rd. Hounslow Middlesex TW4 6DR.

RADCOM TECHNICAL FEATURE

A Low Power Transmitter Dummy Load

by P C Cole, DA1PE

A Simple Design suitable for use with Novice Transmitters on the High Frequency Bands.

A DUMMY LOAD is a resistor, equal in value to the output impedance of a transmitter; it is used to convert the output power to heat instead of feeding it to an antenna. This has the advantage that transmitter testing and tuning can be carried out without radiating a signal which causes interference to other band users. Also, with the addition of a simple diode detector circuit, quite accurate power output measurements can be made.

Normally transmitter dummy loads use special low inductance resistors designed to have a constant impedance over their operating range. These are expensive and often difficult to obtain so it is fortunate that, for low power working, perfectly suitable loads can be built with standard low-wattage carbon resistors.

Fig 1 gives the circuit of a 50Ω load designed for use with Novice (or any QRP) transmitters on the high frequency bands. Ten 1W carbon resistors (nine of 470Ω and one of 1.2kΩ) are connected in parallel to make a load of 50Ω with a nominal power rating of 10 watts. Any other combination of resistors to make 50Ω could just as easily be used, but note that with the suggested values the power handling capacity of the load is much higher than necessary for Novice use. This intentional under-rating is a good practice to follow with components which dissipate enough power to make them get hot. Long term reliability is improved and there is no danger of overheating during lengthy tests.

POWER MEASUREMENT

D1, C1 IN FIG 1 FORM a half wave rectifier which is used with a high impedance voltmeter to determine the peak radio frequency voltage (Vpk) across the load. The voltmeter actually reads Vpk minus the diode forward voltage drop, so a correction factor of approximately 0.7V (the approximate forward voltage drop of the silicon diode specified in the parts list) must be added to the meter reading to obtain Vpk. Power may then be calculated by using the following expression:

$$\text{Power (in 50}\Omega\text{ load)} = \frac{(Vpk)^2}{2 \times 50} \text{ Watts}$$

(see also the Appendix)

For ease of reference a table of voltages for different power levels calculated as above is given in **Table 1**, but do note that this method is valid *only* if the meter used is a very high impedance one such as a modern digital type that does not load (ie take a lot of current from) the rectifier output. Most analogue meters will affect the voltage across C1 to varying degrees and the only way to deal with this is to calibrate the meter against accurate test equipment. However, even if this can't be done it doesn't detract from the value of the metering circuit as an indicator of relative power for testing and tuning.

CONSTRUCTION

A VERY SIMPLE method of construction is used to make it easy for beginners to build the circuit at minimum cost. Savings result from not using an expensive box to house the project and by using a separate meter, such as the station multi-meter, to read power. Overall cost should not exceed about £2.50.

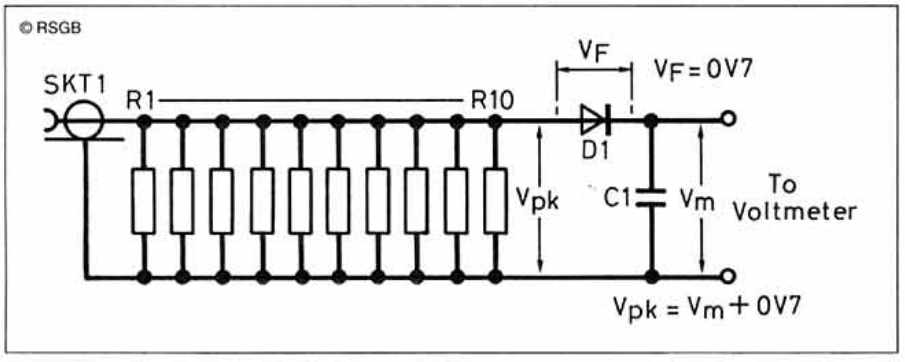


Fig 1: The Circuit of the inexpensive low power dummy load.

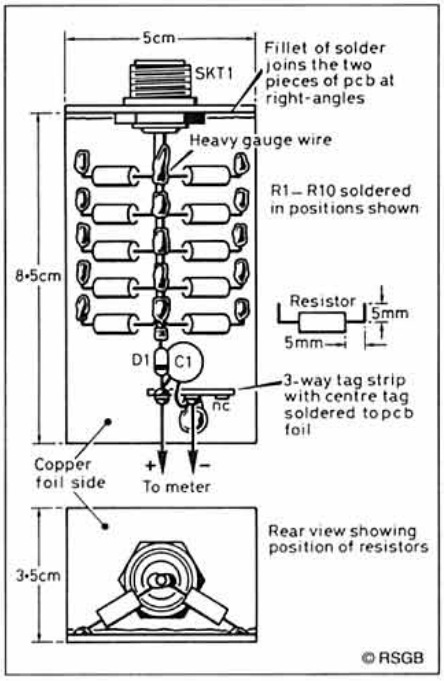


Fig 2: Construction using two pieces of PCB.

As shown in **Fig 2** the components are assembled on an L-shaped frame made from off-cuts of printed circuit board. Construction should proceed as follows:

1. Collect components together and cut/bend resistor leads as shown.
2. Cut circuit boards to size and make a hole in the end plate to take the chosen type of coaxial socket.
3. Solder end and base plates together,

APPENDIX

POWER MEASUREMENT

Power in the load is calculated using the formula:

Power (Watts) = $\frac{V^2}{R}$ where V=RMS volts and R=Load Resistance

The metering circuit reads peak voltage (Vpk).

$$Vrms = \frac{Vpk}{\sqrt{2}} \quad \text{therefore}$$

$$\text{Power} = \frac{Vpk}{\sqrt{2}} \times \frac{Vpk}{\sqrt{2}} \times \frac{1}{R}$$

$$= \frac{(Vpk)2}{2 \times R} \text{ Watts}$$

(Remember Vpk = Vm + 0.7V)

mount SK1 and solder the heavy gauge wire to the centre pin.
4. Solder the resistors into place.
5. Finally mount the tag strip and solder C1 and D1 into position.

TESTING

AFTER A FINAL CHECK of soldered joints, connect an ohm-meter between centre and outer of the coaxial socket. The reading should be 50Ω ±5%. If this is in order connect the load to the transmitter output (if possible via an SWR meter) using 50Ω coaxial cable. With the output from a transmitter of up to 3W the load resistors should only be warm to the touch, but take care at higher power levels as the resistors get very hot when running at their maximum rating. A voltmeter connected to the metering terminals should give readings as shown in Table 1 and an SWR reading should be close to 1:1 over the high frequency range with perhaps a slight increase at 29MHz.

FINAL COMMENTS

ON-AIR TESTING of transmitters, and that includes low power ones, is an anti-social practice which causes unnecessary interference to other stations. Quite apart from this, it is better to use a resistive load for the initial setting up of a transmitter than to use an antenna of perhaps unknown impedance. When the transmitter is working correctly, the antenna can be connected and quickly tuned if necessary ready for the next contact.

COMPONENTS LIST

Resistors
R1-R9 470Ω +/- 5%, 1 Watt carbon
R10 1.2kΩ +/- 5%, 1 Watt carbon
Maplin Carbon Film 1W or similar

Capacitor
C1 0.1ΩF 50 volt disc ceramic

Diode
D1 Silicon signal diode
Type 1N4148 or similar

Miscellaneous
SKT1 Coaxial socket to suit station cables

Small 2 or 3 way tag strip

10cm of heavy gauge tinned copper wire eg 1.6mm/16SWG or thicker

PC board approx 35mm x 50mm

PC board approx 85mm x 50mm

Power Watts	Vpk Volts	Meter Reading Vm (Volts)
5.0	22.4	21.7
4.0	20.0	19.3
3.0	17.3	16.6
2.0	14.1	13.4
1.0	10.0	9.3

Table 1: Power output versus voltage readings.

● Paul Pique, G8KDQ, wants to exchange information on using an **STC TX 3000 Telex Terminal** (NOT ITT 3000) for RTTY. He also has some queries on the **Spectrum+ Computer with a Wafadrive**. Any information appreciated, send to Paul, QTHR or tel: 081 645 0714.

● Mike Shepherd, G0SEB, needs a circuit diagram for an **Eagle VOM Model K-1200 Multimeter**. All expenses paid. Contact Mike at: 25 Station Road, St Helens, Ryde, Isle of Wight, PO33 1YF. Or phone 0983 873306, evenings only please.

● Jose Ponce, EA7BFW, wants a manual and/or circuit diagrams for a **Transceiver type FM-208-S**, marketed by Hudson Electronics Ltd, Croydon. All costs reimbursed. Please send any information to Jose at: Box 175, Huelva 21080, Spain.

● Andrew Marshall, G8BUR, would like oscillator circuit for some **Marconi and STC VLF, B7G crystals**, which have four seperate connections to the crystal (visible through the envelope). The first crystal is marked:- MARCONI, QO.1650 B, 1000Hz, 50/20/128; the second MARCONI, 48Kc/s, XLC24C; the third STC, 10Kc/s, 4652, MAY-67, 200/B/429. Any information would be much appreciated. Please ring 0438 814295 (Answerphone).

● Bill RS49308 wants a user/service manual for a **Solartron CD 1014.3** Scope, to borrow or copy. All expenses paid. Contact Bill by tel: 0207 592007.

● Ron Uphill, G2HKW wants any information of a possible source of supply for a **TDA 4441B IC** for a Thomson TV TS2503. Contact Ron, QTHR or tel: 0703 265566.

RADCOM Helplines FOR MEMBERS

● Bill Vann, GM3TBV, would be grateful for any circuit diagrams, manuals or magazine articles for the original **KW2000** transceiver (single 6146) to complete the refurbishing and modifying of one. Expenses will be refunded. Write to Bill, QTHR or tel: 0250 872520.

● Alun Hughes, GW6KVA, wants for a book, any information on the **use of radio in the Spanish Civil War**, 1936 – 1939. QSL cards, contemporary accounts and logbook entries are needed especially. All material will be copied and returned with a refund of postage. Alternatively, send photocopies. Any information please to Alun who is QTHR.

● Malcolm Gregg, G0KNN, wants to know of any amateur radio **programs for an Amstrad PCW 9256**. He also needs information on interface connections and set-ups that are used. Contact him on 0388 817325, any reasonable time.

● Malcolm Richards, G4APF, is after any hints and tips on **fitting Mobile VHF gear to a Volvo 340** fitted with electronic ignition. What problems are there, particularity with interference to the car? All costs refunded. Write to G4APF, QTHR or tel: 0384 258504.

● Wanted: Servicing/operating manuals for an **Advance VHF Square Wave Generator SG21**. Any information to Ken Atack, G4WAS. Please telephone at the weekend on 0922 475057.

● Manuals or circuit diagrams for **Hitachi** V-302 Oscilloscope and Leader LSG 16 Signal Generator. Any information to Chris, G3RSE, QTHR or tel: 0223 356385 after 7pm.

● Rob, G0HJR, is looking for a manual for a **Racal** SA33 Frequency Converter and for a Type 78M Wobbulator, made by Samwell & Hutton Ltd, Army reference Z4/00000-01835. Any information to Rob on 0526 378685.

● A handbook/circuit diagram of the **Trio** 530S is required by Brian, G4SDL. Also Programming information and a circuit diagram of the interface between PC and handset for the PYE PFX highband pocketset, for modification to 2 metres and a circuit diagram of this and the **Motorola** HT600E UHF handportable. All reasoable costs reimbursed for information. Contact Brian tel: 0831 127011(day) or 0617 484010(evening).

● Pierre, ON4IV, requires information on a program to control the Synthesizer NJ88C30 (an IC by Plessey) that works up to 200MHz through the Serial Port of a IBM-compatible PC. Please send information to P Dehez, 10 Chaussee de Wavre, 1370 Jodoigne, Belgium or tel: 32-10-81.38.82

● Syd Fenwick, G3AIO is looking for a circuit diagram and/or Handbook for an **AMF VENNER Frequency Counter** No 1000F Mk2. All expenses reimbursed. Please tel: 0892 822836 or write QTHR.

RADCOM TECHNICAL FEATURE

An Experimenter's CW Transceiver

Concluding a two part article by Steve Price, G4BWE

THE DESIGN OF THE RF power amplifier will, to a large extent, be dependent on the required transmit power. For output powers greater than 10W, a push-pull output stage using a pair of bipolar or, perhaps, VMOS power transistors would be a good choice. Suitable circuits have appeared in the application notes published by the manufacturers of RF power devices – Motorola and Siliconix, for example – and variants of these standard designs have found their way into constructional articles. There are also quite a few kits available, and these normally offer the advantage of a prepared PCB.

For output powers in the region of 1 to 5 Watts, a simple single ended output stage using just one transistor is quite adequate. The transistor does not have to be expensive, although in practice it is a good idea to employ a medium power type so as to avoid the need for protection circuitry. The reasoning here is partly financial: The price difference between a 5 Watt transistor and one capable of 20W is less than the cost of the protection circuitry that would be required to 'save' the smaller device in the event of a high VSWR or excessive power dissipation. Needless to say, even a more rugged transistor is likely to fail under extreme conditions, but such an event can normally be avoided by carefully checking antenna connections, etc before going on the air.

Fig 3 shows the complete circuit of a 14MHz PA which is capable of 5W output and can be fully driven from the output of the transceiver's mixer (IC1, in Fig 2). TR6 is a tuned amplifier used to raise the input voltage from approximately 300mV peak to around 3V peak. T3 and T4 provide impedance matching and selectivity. The latter is required in order to suppress the unwanted mixer product at around 5MHz (VFO minus 4.43MHz).

TR7 is a unity gain buffer which provides a low impedance drive for the VN88AF, VMOS (Vertical Metal Oxide Semiconductor) output transistor, TR8. Although a small amount of forward bias is developed by R60 and R61, this does little more than overcome TR7's base/emitter voltage drop. As TR8 requires a gate voltage of about 1.5V in order to initiate current flow between its source and drain, the output stage will not pass any quiescent current, and so effectively operates in class C; which is fine for a CW only rig.

In order to simplify the output matching and to enable TR8 to run at a lower drain current, the output stage is powered from a 25 to 28V rail. However, for portable operation a supply of 12 to 13.5V could be used, which should still give an output of between 1 and 2 watts. The VN88AF (available from Bonex) is rated for a maximum drain voltage of 80V and so should be able to withstand a VSWR of at least 2.5:1 when operating at 28V.

Although the prototype PA has been constructed on Veroboard, it is advisable to consider producing a double sided PCB. The topside of the PCB should be left largely unetched and used to provide a low impedance ground plane – this will promote stability. TR8 requires a small heatsink, but remember to use an insulated mounting here as the cooling tab of the VN88AF is connected internally to the drain.

L2 to L4 and C81 to C84 form a 50Ω, low pass harmonic filter. The ferrite tuning slugs of T3 and T4 must be tuned for maximum output at 14.03MHz. The slug of T4 may have to be screwed some way out of the former in order to obtain resonance – consider fixing it in place afterwards using a drop of glue or varnish.

OTHER BANDS

THE BASIC DESIGN can be adapted for operation on other bands by altering certain frequency dependant component values – see **Table 1**. Note that on 3.5, 7 and 10MHz the VFO tunes 4.434MHz higher than the operating frequency. To ensure correct netting on these bands the carrier oscillator frequency should be set slightly above the IF filter passband – ie at around 4.43366MHz. This can be achieved by removing RFC3 so that C62 is connected directly to Xtal 7.

TUNING METER

FINDING A PRACTICAL method of adding a tuning scale to a homebrew rig is a perennial problem for the home constructor. Indeed, it is often the adoption of a Heath-Robinson solution here, such as the ubiquitous but now rather antiquated looking vernier drive – sometimes accompanied by a hand written calibration table stuck alongside – which mars the appearance of the finished project. One solution is to incorporate digital read-out of frequency. However, whereas this facility is provided on commercial transceivers as an inevitable by-product of frequency synthesis (the display is simply driven from the synthesizers programmable divider), adding digital read-out to a VFO-based rig involves the use of an independent frequency counter. Furthermore, if the transceiver is a superhet, the VFO frequency will not necessarily correspond in any obvious way to the operating frequency.

In the case of our 14MHz transceiver, the VFO tunes from 9.57 to 9.67MHz in order to provide coverage of 14 to 14.1MHz. Clearly, if a straightforward digital frequency meter is simply coupled to the VFO output the resulting display will bear little resemblance to the tuned frequency. One way round this problem is to take an output from the carrier oscillator and add this to the VFO frequency

in a mixer. The output from the mixer can then be filtered to select the 14MHz product (9.57 + 4.43 = 14) which is then presented to the frequency counter. Indeed, this is exactly what happens on transmit, but as the 14MHz product generated by the rig is only present on key-down, and not at all on receive, it cannot easily be used to provide an input for the counter. Another, and generally more elegant, solution is to employ a frequency counter with programmable offset. As the term implies, this is a counter that can be set-up (usually by an arrangement of hard wired links) to display the counted frequency plus or minus a pre-determined value. So, we can arrange for the counter to measure the VFO frequency, and then add, say, 4432 to this before displaying the result.

Programmable frequency counter chips are available from a number of sources, and the larger suppliers should be able to provide data sheets. An important parameter to bear in mind is the maximum frequency of operation – some counters are only guaranteed to function up to 5MHz and so may have to be driven via a higher speed frequency divider chip, known as a prescaler. The counter will require a clock crystal, which provides an accurate reference frequency, and also a display module. As the task of connecting the counter chip to a suitable display can be somewhat complex, many constructors will wish to consider purchasing the counter complete, or perhaps in kit form (for instance from Cirkit or C M Howes).

As a digital frequency display will add considerably to the complexity, and cost, of a homebrew transceiver, it is worthwhile looking at the alternatives. One possibility is a mechanical tuning scale having a pointer which is arranged to traverse an aperture cut into the transceiver's front panel. Where tuning is provided by a ten-turn potentiometer, it will be necessary to link the pointer via some form of reduction drive; comprising either a set of toothed gears or, perhaps, an arrangement of pulleys linked with tensioned string. This latter option is similar to that once used in domestic broadcast receivers.

We can, however, avoid the physical complexity of mechanical systems by exploiting the fact that where the VFO employs a variable capacitance diode for tuning, there is a control voltage present which is closely related to the VFO frequency. This means that a voltmeter attached to the wiper of the ten-turn potentiometer (RV4, Fig 2) will provide a convenient indication of the tuned frequency. A sensitive moving coil meter with a modern looking edgewise scale might appear the best choice, but this is not necessarily the case. Although high quality meter movements of contemporary appearance can sometimes be obtained at rallies, the edgewise variety sold as new items by the larger component stockists frequently fall short of expectations: The scale length tends to be too short for applications other than 'battery indication', the movement will frequently be non-linear and, finally, they are often expensive.

Fortunately, a most attractive tuning meter can be realised using the LM3914 linear bargraph driver IC. This device contains ten separate voltage comparators, each of which can be used to drive an LED (Light Emitting Diode). **Fig 4** shows a tuning meter for the 14MHz transceiver based on the LM3914. The wiper of RV4 is coupled to IC11's input via R55. R55 is positioned close to RV4 and serves to attenuate any noise picked up by the connecting lead, which might otherwise modulate the tuning voltage. The ten LEDs are arranged in a horizontal line above the tuning knob and will light in turn as the knob is rotated.

The scale end-points must be set so that LED1 is illuminated between 14.00 and 14.01MHz, and LED10 between 14.09 and 14.10MHz (approximately). This is achieved by arranging for the correct voltages to be present on pins 4 and 6 of IC11. R64 and R65 effectively replicate the function of R28 and R29 in Fig 2 – this takes care of LED1 – whereas R63 provides a voltage drop of approximately 10% of scale, thus ensuring that LED10 illuminates before RV4s wiper reaches the top end of its track. The LEDs are mounted on a small strip of Veroboard along with IC11 and the rest of the circuitry.

Band (MHz)	3.5	7	10	18	21
VFO lower band edge freq (MHz)	7.934	11.434	14.434	13.634	16.566
L1 (T68-6 / 24SWG)	4.9µH / 32t	3.4µH / 27t	2.7µH / 24t	2.8µH / 25t	2.3µH / 22t
C48	91p	56p	33p	39p	27p
C50, 51	470p	330p	270p	270p	220p
C1	330p	1.2n	680p	1n	680p
C2, 77	47p	100p	56p	68p	56p
C3	470p	100p	39p	39p	39p
C4, 73	68p	100p	56p	68p	56p
C5, 72	100p	470p	220p	330p	220p
T1 - T4 (Toko KANK)	3333R	3334R	3334R	3335R	3335R
RFC4 (Toko 8RBS)	22µH	10µH	8.2µH	4.7µH	4.7µH
L2 - L4 (T50-2 / 22SWG)	2.1µH / 20t	1.1µH / 15t	0.75µH / 12t	0.4µH / 9t	0.35µH / 8t
C81, 84	820p	390p	330p	180p	150p
C82, 83	1.5n	820p	680p	390p	330p

Table 1: Component values for other bands. Capacitors that prove difficult to obtain may be made up with series or parallel combinations of more common values (eg two 47pF in parallel will substitute for 91pF). (t = number of turns).

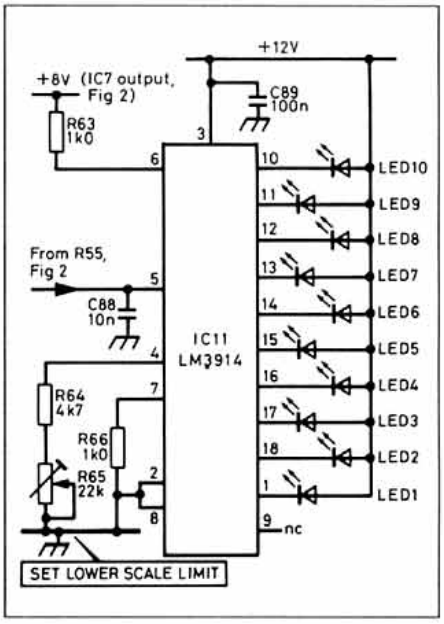


Fig 4: Circuit of the bargraph tuning meter.

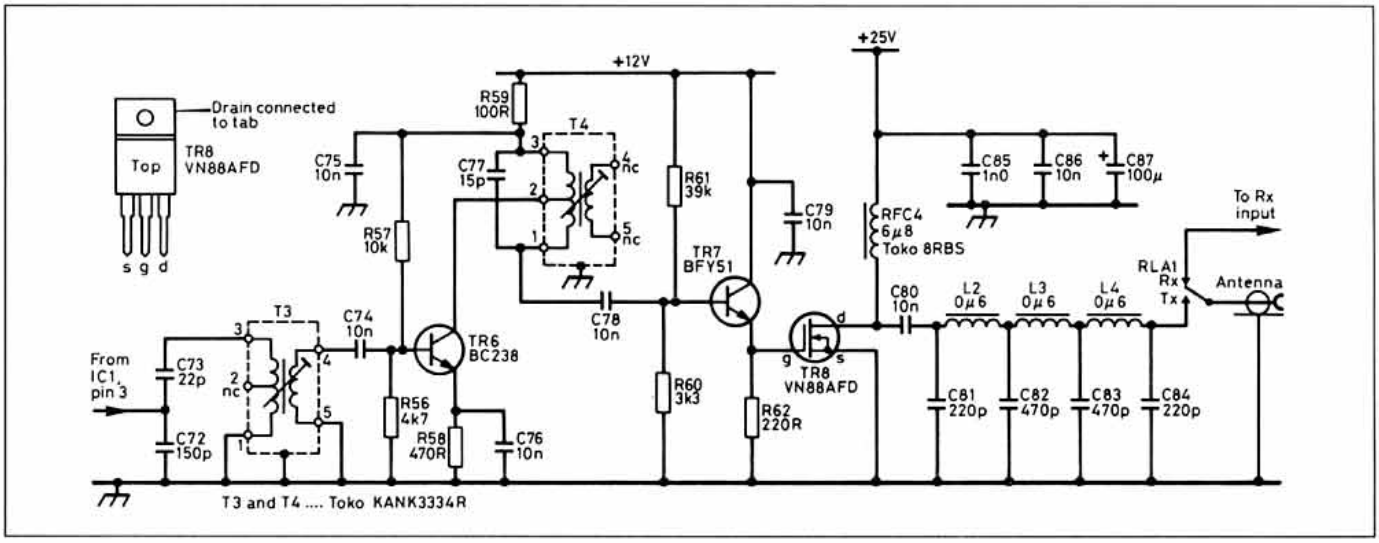
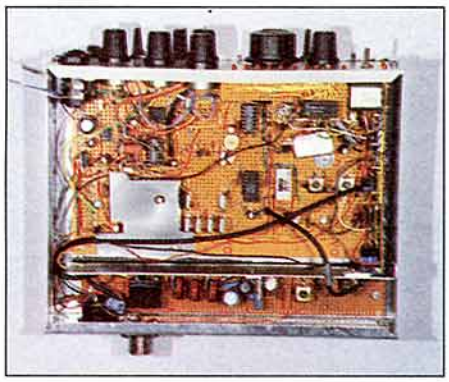


Fig 3: A 14MHz CW power amplifier. L2, L3 and L4 are all 11 turns of 22SWG enam on T50-2 powdered iron toroids.



When used in conjunction with a reasonably large tuning knob having a pointer or white dot, the bargraph tuning meter will give a frequency resolution of around ±5kHz, but this can be improved considerably by adding a crystal calibrator.

CRYSTAL CALIBRATOR

FIGS 5 AND 6 SHOW the block and circuit diagrams of a crystal calibrator system which provides easily identifiable markers at intervals of 10, 50 and 500kHz. The circuitry which generates the 500kHz input for IC12 is not shown, as this will depend on the resonant frequency of the quartz crystal. For example, if a 4MHz crystal is chosen it will first be necessary to divide the oscillator output by eight (see [3] for further details).

IC12 divides the 500kHz input by ten to produce 50kHz markers. IC14 (OSC1) interrupts IC12 for a short period approximately once per second. This gives the 50kHz marker a regular 'long dash' rhythm that is easily recognisable. IC13 divides the 50kHz pulse train by five, giving 10kHz markers. IC13 is enabled by IC15 (OSC2), but in this case the timing components (R71, R72 and C93) are chosen to give a more rapid interruption, thus imparting a faster, 'dot' rhythm. LEDs 11 and 12 provide front panel indication and may be labelled '50' and '10' accordingly. LED13, the ON/OFF indicator, is entirely optional.

A potential flaw is that during the periods when IC12 is interrupted, there is no 50kHz input to IC13, and so the 10kHz marker also disappears. However, as IC12 is enabled for over 80% of the time, this has only a minimal effect (the dot rhythm of the 10kHz marker suffers a slightly irregular 'hiccup').

The 10 and 50kHz marker signals are fed to the receiver input (junction of C1 and C2, Fig 2) via C96 and C97. The continuous 500kHz marker is much stronger and so a length of insulated wire wrapped once around the body of C3 provides adequate coupling. The circuit must be run from a 5V supply rail and this is generated by IC16.

The calibrator is a very useful addition to the 14MHz transceiver. The 500kHz marker is used to locate the lower band edge (14.000MHz), the dashed 50kHz markers appear at 14.050 and 14.100MHz, and the dotted 10kHz markers indicate 14.010, .020, .030 etc, up to 14.090MHz. Furthermore, as the tuning rate is very close to 10kHz per revolution, it is easy to gauge the correct settings for intermediate frequencies. It is likely that a small number of low level 'ghost' markers may also be heard due to intermodulation (the precise effect is dependant on the level of coupling into the receiver). However, ghosts are much weaker than the intended markers and are easily ignored.

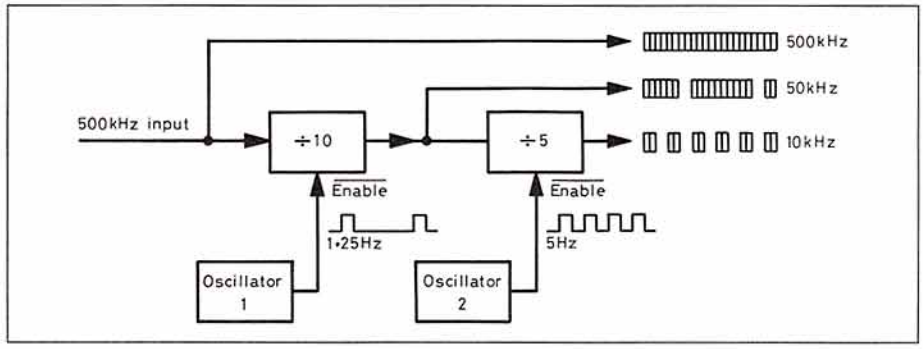


Fig 5: An arrangement to produce easily recognisable calibration markers at 10, 50 and 500kHz intervals.

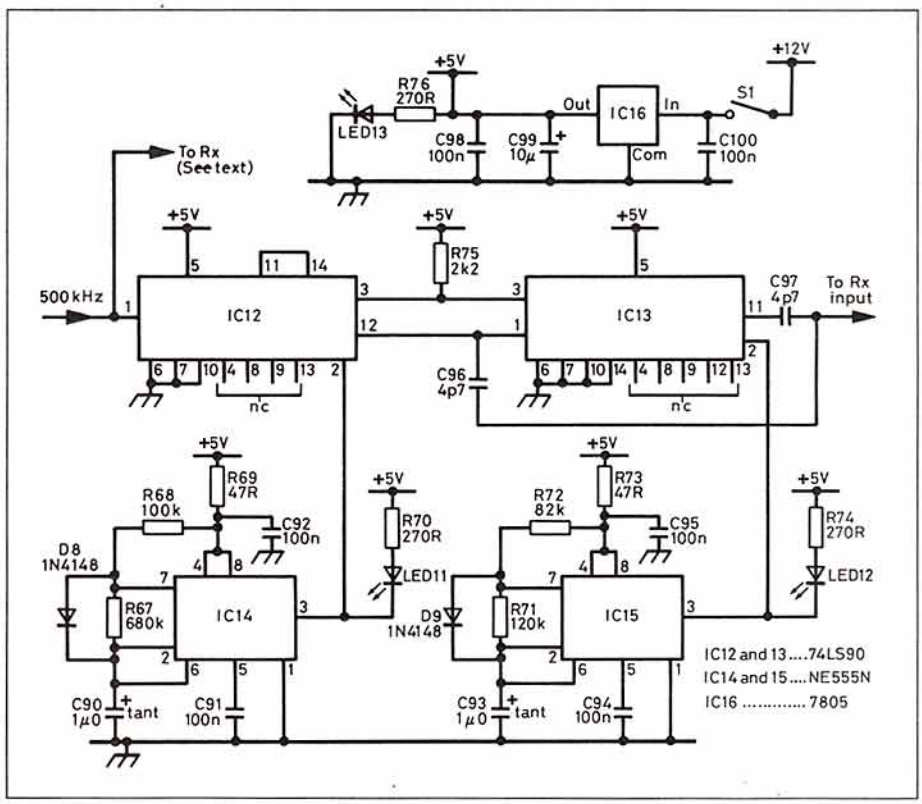


Fig 6: Circuit of the marker generator.

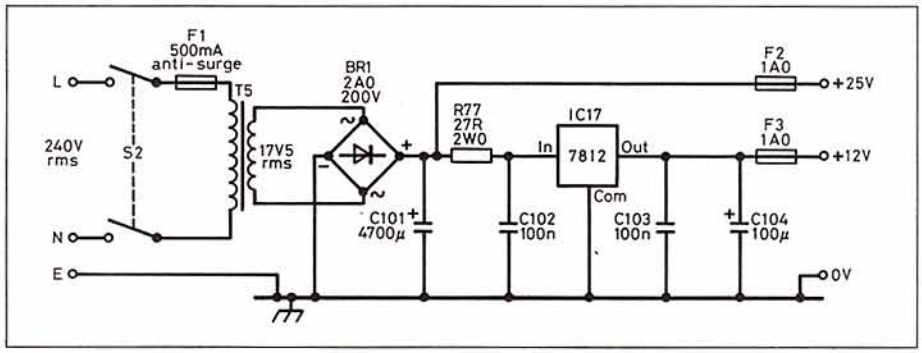


Fig 7: A suitable mains power supply unit.

POWER SUPPLY UNIT

THE MAINS PSU (Fig 7 overleaf), which is built into a separate case, is particularly straightforward. A 50VA transformer with two 17.5V, 1.4A secondaries (Cirkit type C5017) was used for the prototype, the secondaries being wired in parallel to provide the equivalent of a single 17.5V, 2.8A winding. Although the rig draws far less current than this, the use of a transformer which is larger than strictly necessary helps ensure that the unregulated 25V supply used to feed the RF output stage does not suffer a significant voltage drop on load (it also helps to minimise ripple).

IC17 provides a 12V rail for the rest of the transceiver. R77 introduces a voltage drop to reduce the regulator power dissipation. However, IC17 still requires a heatsink consisting of at least four

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This Month's Book Choice

Reviewed by Pat Hawker, G3VA

LEE DE FOREST AND THE FATHERHOOD OF RADIO

by James A Hijiya.

Published by Associated University Presses, 1992. 182 pages. Hard Covers. £27.50.

ISBN O.934223.23.8

IN 1907 BY PUTTING a grid into a derivative of the British Fleming 'Oscillating Valve' (actually a two-electrode RF detector diode), Lee de Forest stumbled into one of this century's most important inventions – the 'Audion' triode – with its potential not only as an RF detector but also for amplification, oscillation and electronic switching. The question of whether de Forest actually understood the importance of his grid or was merely trying to circumvent Fleming's patent led to some of the most protracted patent proceedings to reach the US courts in an era when almost every major invention was hotly disputed.

De Forest claimed that the Audion was a logical development from his diode-type detector using the ionisation in a gas flame and claimed (falsely) that he had never heard of or seen a Fleming diode. This led him to discount the value (noted by Fleming) of a hard vacuum. Until other workers had modified the Audion, de Forest was not able to achieve amplification or oscillation. This did not deter him from challenging Howard Armstrong's 1913 claim for the discovery of the value of regeneration in receivers – claims that occupied the US courts from 1920-34 and led to Armstrong's suicide and a Phyrrhic victory for Fleming, with the major professional institutions pointedly awarding honours to Armstrong rather than de Forest.

One is tempted to compare de Forest with our own John Logie Baird who genuinely believed that he 'invented' television and allowed himself to be manipulated by unscrupulous financial interests. De Forest, intent on greatness, desperate for fame, altogether "organised over 26 different companies, many of them associated with malodorous stock-selling schemes, most of them badly managed, all of them finally bankrupt. He had no talent for business or associates, some of whom went to jail for fraud. All told he made and lost three fortunes in a frantic series of ups and downs. He also was married three times and divorced twice." (quoted from *Man of High Fidelity: Edwin Howard Armstrong* by Lawrence Lessing). De Forest was also less fortunate than Baird in his choice of a mistress who in 1931 sued him for breach of contract in regard to the lease of her apartment.

Yet he, like Baird, was ahead of his contemporaries in foreseeing the importance of radiotelephony and broadcasting. In 1913 he was tried on a charge of fraudulently using the US mail to sell public stock in his Radio Telephone Company. The District Attorney charged that "de Forest has said it would be possible to transmit the human voice across the Atlantic before many years. Based on these absurd and deliberately misleading statements, the misguided public has been persuaded to purchase stock in his company." Two years later, in 1915, speech was transmitted (although not by de Forest but by AT & T) from Arlington, USA to Paris.

De Forest was one of the earliest to appreciate how radiotelephony could be used to broadcast information and entertainment. Experimental broadcasts were made by his company in New York between 1907 and 1911 (presumably using RF alternators) and again in 1916, and he had a loyal following among the early American radio operators and pioneering amateurs.

This new book is not so much an analysis of de Forest's contribution to technology (from 1920 mainly in the field of talking pictures) as an attempt to explain what moved him to become an important, if frustrated, inventor credited with some 300 patents. Hijiya writes: "He drove (automobiles) the same way that he walked: at full speed, with eyes straight ahead, looking neither to left nor right, proving a menace to motorists or pedestrians who sought to cross his path."

Hijiya shows that Lee de Forest had an immense curiosity that extended beyond science and engineering to politics, literature and religion. It is an interesting, well-written, well-researched book although *RadCom* readers might have wished for more information on de Forest's technology rather than his philosophy and personal life.

WE REGRET that *Eurotek* has had to be held over until next month for space reasons.

square inches of 18SWG aluminium. Note that R77 should have a rating of 2W – otherwise it is likely to overheat (It is, of course, possible to make R77 from a series, or parallel, combination of smaller resistors eg ten 0.25W 270W types in parallel).

The PSU is coupled to the transceiver using a three-core cable terminated with a non-reversible connector of the constructor's choice.

KIT OF PARTS

A kit of parts, excluding mains transformer, case and PCB can be obtained for £84.70 from: JAB Electronic Components, The Industrial Estate, 1180 Aldridge Road, Great Barr, Birmingham B44 8PE.

TECHNICAL UPDATE

The G3TDZ Phasing Transceiver Radcom July 1993.

The three ganged tuning capacitors shown in Fig 1 and Fig 6 are shown as 50pF. G3HGM has pointed out that the circuits will not cover the whole band or track correctly using 50pF capacitors. This is confirmed by the author, John Hey, G3TDZ, who says that 75pF capacitors were actually used and these are shown on the photograph on the front cover, although shown incorrectly in the text. The RF and mixer stage 75pF tuning capacitors should have series capacitors of 27pF and 22pF respectively to improve tracking. Provision has been made for these on the PCB and the capacitors are shown in dotted lines in Fig 2.

John Hey has also provided the following additional information: There is no C49 as shown in Fig 1 parts list.

Inductors L1 and L2 in Fig 1 should have 28 turns of 32-36 SWG enamelled wire close wound on 4.8mm formers.

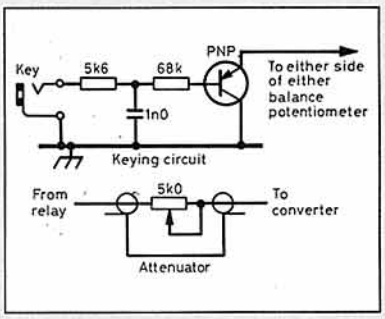
The commercial inductors suggested for low-pass filter L1, L2 and L3 in Fig 3 are rather lossy. The alternative circuit, shown in Fig 5 and described in the accompanying text, should be used.

Fig 9. C41 should be 10n, not 470n. The ferrite tubes used in transformers T4 and T5 are FairRite 26-43006301, Cirkit catalogue number 55-06301.

The new NEC 2SC1969 transistors used in the PA (TR3 and TR4 of Fig 9) do not give as much power as the older Mitsubishi and Toshiba ones used in the prototype. If the output is lower than specified try MFR475s.

A simple keying circuit is shown in the diagram below. It can be connected to either side of either RV2 or RV4 in Fig 3.

The 40 metre receiver performance can be improved with a variable attenuator. It is wired in series with the coax feed to the converter housing connector as shown in the diagram below.



Above: Simple keying circuit.
Below: Receiver attenuator.

RADCOM TECHNICAL FEATURE

Understanding HF F2 Propagation Predictions

By Charlie Newton G2FKX, Chairman Propagation Studies Committee

EVERY PROPAGATION prediction must be regarded as a *probability*. You should think of it as the percentage chance that a route will be open but nothing is certain. The percentage chance can be broken down further for example a particular time, day, number of days per month, or possible frequency band when a particular path will be open. In fact, the odds of getting it completely correct are very small. The only way is to reduce these odds as much as possible which is what the system of the *RadCom* published predictions does. Let us look at how this is done, because if you understand the logic behind the predictions you can make better use of them.

First, we do not say the band will be open to, say, South America as a whole, this could mean the north, south or middle part, Pacific or Atlantic side. Take a look at the big difference in the predictions between Buenos Aires and Lima and you can see the problem. So we reduce the odds by giving specific places, which means only that particular path has been computed and forecast. Propagation to a location near to one of these places will be rather similar.

Second, the monthly, cyclic and seasonal changes throughout any cycle are different because the sunspot and solar activity is either increasing or decreasing (as at present). Not all cycles are the same. Some are very active, like cycle 19 with peak yearly sunspot indices in 1957 of 190.2 and some are very quiet like cycle 20, with a peak in 1968 of 105.9. The present Cycle 22 is in between and peaked in 1989 at 157.6.

The odds are reduced by forecasting for the shortest possible time ahead, on the basis that it is more likely to be nearer the factual data. This lead time is governed primarily by the publication shedule of *RadCom*. Sunspot indices vary considerably from day to day. For example, from 109 on the 7 December 1993 down to 23 by 12 December. However 12-month smoothed predictions of the monthly average index figures are used in preparing the predictions, and these smooth out the wider variations in the index values which are given.

There are several monthly indices available: the number itself prepared by the Sunspot Index Centre in Belgium; the 10.7cm (2,800MHz) solar radio noise flux measurements (ϕ) measured in Canada; and a number of indices derived from ionospheric conditions, including two – IF2 and IG – which are prepared at the Rutherford Appleton Laboratory.

THE SEASONAL CHANGES

SEASONAL CHANGES MUST be considered, because the higher HF bands are best during the winter months and poorest during the summer. The prediction must account for the expected background noise level and absorption in the D region to ascertain if the weak signals will exceed the background noise.

PATH DIRECTION EFFECTS

THE HIGHER HF BANDS are open during daylight hours, and the lower bands during darkness hours. If we operate in the north/south direction then the ionosphere over the whole path is illuminated in a similar way by the sun so that there will be a consistent variation on foF2 along the path.

If we go east/west, foF2 frequencies vary widely due to the different sunlight/darkness effects. To see this, note the difference between Lagos and Montreal which are a similar distance. These variations are taken into account in the computation and thus help to reduce the odds. Careful study and plotting the daily time pattern of a few paths on graph paper will show how they change over the year with frequency and season.

LOCATION

THE PREDICTIONS AS published are based on London, if you live further north the ionosphere is not so intensely ionised, and the effect of magnetic activity on the ionosphere progressively increases. **Fig 1** shows the weekly averages of typical *Critical Frequency Difference* between Slough and South Uist; it makes little difference whether it is sunspot maximum or minimum, summer or winter, the difference remains. Unfortunately both these ionosondes have now been closed down.

If you live in the north of Scotland the daylight critical frequencies will be at least 500KHz and very often 1MHz lower than in

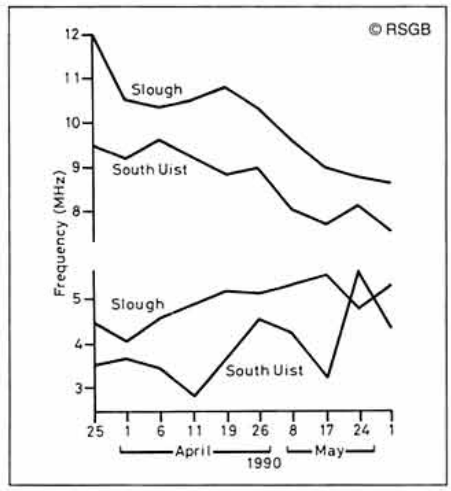


Fig 1: The F2 critical frequencies for the daily highs and darkness hour lows averaged for the weekly periods. 95% of the time the figures for South Uist are lower than those for Slough.

London, the same applies to the darkness hour lows. As the maximum usable frequency (MUF) for a path may be about three times the critical frequency for that path, then the north is penalised by a reduction of between 2 and 3MHz.

HOW TO GET THE BEST FROM THE PREDICTIONS

READ THE INSTRUCTIONS at the top of the forecast, note it is a *probability*. Where do you fit in? If you run full licence power, have a wind-up 120ft mast with a big beam which can propagate signals at a very low angle, say 5°, and are blessed with DX ears, then you have considerably reduced the odds. However, the 100-watter with a 5RV in town with a noisy location and a take-off angle of say 30°, can only use personal working experience established over time, to determine the smallest possible number which is generally usable.

Of course, there will be exceptional days. Remember we are talking about *probabilities*, and there will be the odd day when the number '1' comes up. One of the best ways to reduce your odds for DX contacts is to raise your antenna as high as you can, this gives a lower take-off angle.

The published predictions are probabilities for the month as a whole and there are many shorter term variations which cannot be included. The sun rotates once approximately every 27 days; a solar rotation base map of this is published in the *RSGB Call Book*. If you plot the daily data, solar flux, Ap indices, IF2 critical frequency etc, activity patterns can be noted.

For example, there are solar active and quiet longitudes, plus magnetically active and quiet longitudes, and they do not necessarily go in step. Magnetic activity, apart from the equinox changes cannot be forecast months ahead and included in the predictions, so the computation assumes that magnetic activity is relatively low, that is quiet. If changes occur then the predictions must be degraded and **Fig 2** shows how to adjust to the changing circumstances.

Note that it is a *guide* only. Accurate results would require re-computing the predictions. If the geomagnetic activity increases or the solar flux takes a sudden dive, then depending on your location, and your station set up etc, downgrade the predictions accordingly.

THE ROTATING SUN

FOR THE PAST few years we have had one solar active side, and one very quiet, each lasting about a week, with the rest being in between. There is usually one week per rotation when conditions can be expected to be up to, or slightly exceeding, the predictions.

Magnetic changes occur all the time and are related to many different solar features, like the passage of coronal holes, solar flares, disintegrating filaments, speed of the solar wind etc. Some events, whether active or quiet, can last four or five rotations, coming round when that part of the sun is looking our way again, others are transitory.

Any increase in magnetic activity degrades the predictions for that period, and in the vast majority of cases the farther north you are the worse it will be, because you will be nearer the source of the magnetic disturbance; the bigger the event the worse it is for all parts of the ionosphere.

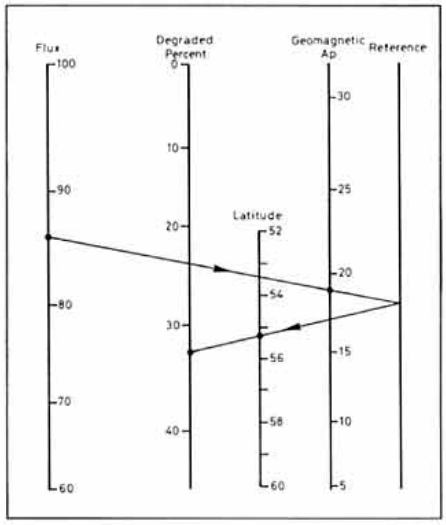


Fig 2: This chart should be useful during the next five or six years during the sunspot minimum period. Place a ruler across the current solar flux and Ap indices, and mark the point on the reference line where it crosses. From that point, a line through your latitude to the degraded percentage will give an *idea* of how the predictions are degraded in your case.

It sometimes happens that solar flux levels suddenly increase with low magnetic activity, it does not necessarily mean conditions will shoot up, because a by-product of this is that D region absorption increases immediately but it takes some days before the F2 layer catches up.

In the vast majority of cases rapid decreases in solar flux and/or increases in magnetic activity affect the northern stations more. Spread F, which means there are holes in the layer causing QSB, is more prevalent the farther north you go.

WHAT IS GOING ON?

THE *GB2RS* NEWS BULLETIN gives you the factual data averaged for the week to which it applies. If you plot it on your solar base map you will, in time, see patterns, which can be related to your operating and prediction numbers.

Some solar and magnetic data are available daily on the packet radio network, and will be broadcast by GAM1 when the licence is granted, so it will keep you up to date with events.

The *GB2RS* forecast for that week gives what activity is expected and includes the solar flux levels. This is the best clue as to what activity is expected.

For example, "the active side of the sun will be looking our way", "solar flux is expected to be about the 100s" "magnetic activity is expected to be unsettled [this means an Ap between about 11 to 20 see *RSGB Call Book* explanations], but the 15th and 16th could be disturbed [at least Ap 21] due to the passage of a coronal hole". "The radio quality indices based on past history are expected to be normal, improving towards the end of the week".

These are the clues you require to modify the propagation predictions for your own use.

DEFINITIONS

F2 layer	The highest layer in the ionosphere (approx 500km). Propagates HF band signals.
D region	50 to 70km high, it is only operative during daylight. Causes absorption, attenuates lower frequencies.
foF2	Frequency of F2 layer at critical incidence, ie measured vertically (see below).
Ap index	Planetary geomagnetic A index, from a global network of magnetometers.
Ionisation	Affect of the sun's radiation on the ionospheric layers.
Ionosonde	Equipment that measures ionospheric parameters.
GAM1	Proposed RSGB solar data broadcasting station on 3.821MHz (awaiting licence).

SOLAR FLUX

This is the 2,800MHz radio noise output from the sun at midday. The level varies from (at the cycle's minimum) about 67 units to a maximum of around 300 units. The higher the level, the more intense is the sun's ionising radiation, and the higher the frequency that can be reflected from the ionosphere.

CRITICAL FREQUENCY

A measure of the highest frequency that can be reflected from the ionosphere from a signal sent vertically upwards. In practice, the maximum frequency that can be used for normal communication is about three times the critical at 'equal latitudes' but if you work south, then higher levels are possible, and to the north, lower. The actual level depends on prevailing conditions and the time of the day.

SPREAD F

During darkness hours, the normally smooth layers can break up, during magnetically disturbed times. The break-up can be vertically, or horizontally, or both at once. These holes give rise to deep fading (QSB). In practice the more northern circuits are more prone to this effect, and it is also more likely to occur during the early morning periods. The *GB2RS* bulletin usually refers to the numbers of hours the spread F has been present, or if very bad, on any particular day.

FURTHER INFORMATION

IF YOU REQUIRE further information on understading propagation data, contact the RSGB Propagation Studies Committee, c/o 83 Hollingthorpe Road, Hall Green, Wakefield, W Yorks. WF4 3NW.

RSGB Annual Meeting

Saturday 4 December 1993

RENOLD BUILDING, UNIVERSITY OF MANCHESTER INSTITUTE OF SCIENCE AND TECHNOLOGY, MANCHESTER

THE MEETING WAS IN THREE PARTS: The Annual General Meeting as required by the Companies Act; an Extraordinary General Meeting and an Open Meeting comprising the President's speech, presentation of awards and a question and answer session. The minutes of the first two meetings are reproduced below. A report of the Open Meeting will be published in a future edition.

MINUTES OF THE 67TH ANNUAL GENERAL MEETING OF THE RADIO SOCIETY OF GREAT BRITAIN.

THE PRESIDENT P E Chadwick, G3RZP, introduced the rostrum party as Ray Antieul, the Society's Auditor; R P Horton, G4AOJ, Honorary Treasurer; I D Suart, GM4AUP, Executive Vice President of the Society; J C Hall, G3KVA, Company Secretary and P E Kirby, G0TWW, General Manager.

Council Members present were: J Allen, G3DOT; J T Barnes, GI3USS; J Bazley, G3HCT; M H Claytonsmith, G4JKS; J D Forward, G3HTA; J D Gannaway, G3YGF; I J Kyle, GI8AYZ; N Lasher, G6HIU; T I Lundegard, G3GJW; N Roberts, G4IJF; P E Sheppard, G4EJP and C N Trotman, GW4YKL.

Apologies were recorded from: Council members J Greenwell, G3AEZ; G L Benbow, G3HB and J Allaway, G3FKM, and the following members: G8DPS; GW3KFE; G3NCL; G3MCX; G3GVV; G6JJ; G7NRO; G4DWZ; G3COJ; G4LWA; GW4HWR and G3MVV.

The President announced that more than 50 members were present (the total attendance recorded was 105).

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

MINUTES

The President drew members' attention to the first item on the agenda which was to receive and, if approved, confirm the minutes of the 66th Annual General Meeting circulated with the March 1993 edition of *Radio Communication*.

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

ACCOUNTS

The President then moved to Item 2 on the agenda which was to receive and consider the accounts for the year ending 30 June 1993 and reports to Council and auditors thereon.

The Society's auditor then read the report which had previously been circulated to all members with the November 1993 edition of *Radio Communication*.

The Honorary Treasurer then presented the accounts and highlighted a number of key issues contained within them, namely that while the Society had made a small surplus it was vital that the decline in membership be arrested.

H Bellfield, G3SBV, asked for full details concerning an out-of-court settlement made by the Society. The Company Secretary read a statement prepared by the Society's legal advisers which had previously been broadcast on *GB2RS*.

I McLuskie, G8ORG, then asked for an explanation of the costs involved in maintaining Council and its Committees. The Honorary Treasurer stated that he would provide a considered reply in writing to the questioner in due course. *[Company Secretary's Note: written explanation provided].*

The questioner then raised the issue of Committee Reports and the Company Secretary replied that a number of Chairmen of Committees were lax in this area. However the Society relied on an enormous amount of work put in by unpaid volunteers and the sanctions it could impose for non compliance with requests for information were limited. The position was unsatisfactory but almost impossible to remedy.

1994 COUNCIL

The President then moved on to Item 3 and announced the names of those members to serve on Council for 1994 and to call for volunteer scrutineers for the 1994 Council Elections.

The results were as follows:

Election for one Ordinary Member:

J D Forward	G3HTA	606 votes
D W McQue	G4NJU	266 votes
G R Morris	GW1ATZ	184 votes
D A Evans	G3OUF	882 votes
D J Young	G8ZQJ	164 votes

D A Evans was declared elected as an Ordinary Member

Election for Zone B:

D Gourley, G0MJY was elected unopposed

Election for Zone E:

C N Trotman, GW4YKL was elected unopposed

Election for Zone G:

F D Hall, GM8BZX was elected unopposed

There were 146 votes disallowed comprising:

Received Late	30
Unidentified	89
Subscriptions in arrears	12
Invalid Category	8
Spoilt Ballot Papers	7

THE 1994 COUNCIL WOULD BE AS FOLLOWS:

ORDINARY MEMBERS

I D Suart	GM4AUP	President
E J Allaway	G3FKM	

The top table: (l to r) Peter Kirby, John Hall, Ian Suart, Peter Chadwick, Richard Horton and Ray Antieul.

J Bazley	G3HCT	
G L Benbow	G3HB	
P E Chadwick	G3RZP	Immediate Past President
M H Claytonsmsith	G4JKS	
D A Evans	G3OUF	
J E Greenwell	G3AEZ	
T I Lundegard	G3GJW	
N Roberts	G4IJF	
R P Horton	G4AOJ	Honorary Treasurer

ZONE MEMBERS

P R Sheppard	G4EJP	Zone A
D Gourley	G0MJY	Zone B
N Lasher	G6HIU	Zone C
J N Gannaway	G3YGF	Zone D
C N Trotman	GW4YKL	Zone E
I J Kyle	GI8AYZ	Zone F
F D Hall	GM8BZX	Zone G

The scrutineers were thanked for their work. They were: A C Butcher, G3FSN; A H B Bower, G3COJ; A E N Gard, G4LWA; I R Brothwell, G4EAN; J Crabbe, G3WFM; G P Stancey, G3MCK. Special thanks were accorded to Alan Butcher for acting as chief scrutineer.

Harry Bellfield, G3SBV, asks a question.

The following member put himself forward as a scrutineer: H L W Bellfield, G3SBV.

AUDITORS

The last item on the agenda was to reappoint the Auditors Peter Goddard and Co for the financial year 1994/95 and to authorise Council to fix their remuneration. This was proposed by the President, seconded by T I Lundegard, G3GJW, and carried unanimously on a show of hands.

The President then closed the Annual General Meeting.

EXTRAORDINARY GENERAL MEETING

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

SPECIAL RESOLUTION 1

The President drew members' attention to the first item on the agenda which was:

1(a) That the objects set forth in paragraphs 3(b), 3(b)(2), 3(b)(8) and 3(f) of the printed document produced to this meeting and for the purpose of identification signed by the Chairman hereof and reproduced in the Society's journal of June 1993 be approved and adopted as the objects of the Company, in substitution for, and to the exclusion of, all the existing objects thereof, and that the Memorandum of Association be altered accordingly.

1(b) That the objects of the Company set forth in the Memorandum of Association of the Company be altered by the addition of paragraphs 3(b)(9), 3(b)(10) and 3(b)(11) as included in the printed document produced to this meeting and for the purpose of identification signed by the Chairman hereof and reproduced in the Society's journal of June 1993 and that the Memorandum of Association be altered accordingly.

1(c) That the wording of paragraph 6 be amended by the substitution of one pound for one guinea.

The special resolution was carried unanimously on a show of hands.

SPECIAL RESOLUTION 2

The second item on the agenda was:

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

(a) Amending Article 6 by deleting the words 'and elected in that behalf'.

(b) The deletion of Article 7 and replacement with a new Article 7 to read 'Corporate Members must be 18 years of age or over'.

(c) The deletion of Article 9 and replacement with a new Article 9 to read 'Associate members must be under 18 years of age. Associates shall have no vote. On attaining the age of 18 years an Associate must transfer to Corporate membership in order to remain a member of the Society'.

(d) The deletion of Article 15 and replacement with a new Article 15 reading 'Any person wishing to become a member of the Society shall apply to the Society on a form which shall be provided for that purpose'.

(e) The deletion of Article 16 and replacement with a new Article 16 reading 'The Council may reject any application for membership without giving any reason therefor. No entry other than the name, address and the date on which his or her application was considered by the Council shall be made or kept in the records of the Society relating to any person whose application is rejected'.

(f) In Article 17 the replacement of the word 'election' by the word 'membership'.

(g) The deletion of Article 18 and replacement with a new Article 18 reading 'An applicant for membership of the Society shall not become a member until such time as his subscription payment shall have been received by the Society'

(h) The deletion of Article 20 and replacement with a new Article 20 to read 'Subscriptions shall be payable in advance and may be paid in one or more instalments as shall be determined by the Council from time to time. The first subscription shall be due (subject to any instalment arrangements) on joining and subsequent annual subscriptions shall be due (subject to any instalment arrangements) either on the first day of the month in which the member joined in each year or on such common renewal date as shall be determined by the Council from time to time.

(i) In Article 22 the deletion of the words 'election to'.

The special resolution was carried unanimously on a show of hands.

SPECIAL RESOLUTION 3

Item three on the agenda was that:

3 In Article 56 the deletion of the words 'The ballot paper shall state the date of birth of any candidate who will have attained the age of seventy years before the end of the term of office he would normally serve if elected'.

The special resolution was carried unanimously on a show of hands.

The President declared the Extraordinary General Meeting closed.

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A SECOND BATTERY

WHEN OPERATING FROM my caravan, I use a car battery which I charged before leaving home. Can I mount this battery in the boot or in the caravan, and charge it while driving along? Can I simply connect the second battery via a diode?

IN PRACTICE

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

YES, BUT NOT WITH a diode. I didn't have all the details myself, but fortunately knew a man who did! Thanks for this information to Chris Kelland, G0JEK, formerly a Training Officer with you-know-who, and himself an active caravanner.

Auxiliary batteries mounted in the car boot or in a caravan can be connected so that they charge in parallel with the car battery when the engine is running. But it isn't quite that simple. To avoid overloading the wiring, the auxiliary battery must be disconnected while the main battery is starting the engine, and it is not a good idea to run auxiliary equipment from the main battery for a long period. With early alternator systems, it was possible to separate the two batteries by connecting a diode in series with each (**Fig 1**, from the *Radio Communication Handbook* (RSGB), chapter 14), and then perhaps to increase the alternator output to compensate for the voltage drop through the diodes. This is no longer possible with modern car electrical systems, and the reasons why not are quite interesting.

Modern car electrical systems are designed to draw essentially no current from the battery when the engine is running. Starting-up a cold engine considerably discharges the battery, so its terminal voltage falls to about 8V. The alternator then delivers full charging current into the battery until its terminal voltage rises. When the battery is re-charged and its terminal voltage has risen to a certain value, the regulator reduces the charging current to a trickle. The regulator set-point voltage is typically 13.8V, but with some makes of car and battery it can be as high as 15.0V. If extra current is drawn from the system, it doesn't really come from the battery at all, but from the alternator, which increases its output to maintain the battery voltage at its set-point. Thus when the engine is running the main functions of the battery are to smooth-out the rectified waveform from the alternator and to act as an element in the feedback system to the regulator.

Fig 2 shows a typical circuit for an alternator with built-in electronic regulator. The alternator itself is a three-phase device with full-wave rectification (diodes D1-D6); this provides a quite smooth output waveform in its own right. Many alternators have three more rectifying diodes (D6-D9) to provide excitation current to the field coil when the engine is running. The basic electronics of the regulator are very simple. TR3 is a power transistor which controls the current through the field coil, and hence the output from the alternator. The output voltage is sensed by transistor TR1 via the voltage-divider network R1-R2 and the zener diode ZD1. If the alternator is supplying too much current, the battery voltage will rise and so too with the base voltage of TR1. This causes TR1 to draw more current through R3, decreasing the base voltage on the emitter-follower TR2 and thus the base voltage on TR3. As TR3 turns off, the current through the field coil decreases so that the alternator supplies less current and the battery voltage returns to where it should be. If the battery voltage falls, the opposite chain of events takes place and the field-coil current increases until the correct voltage has been restored. In other words, this is a nice simple feedback system.

Returning to the question of fitting diodes to steer the charging current into the main and auxiliary batteries, you might imagine that nothing could be easier than to sense the terminal voltage on the main battery, and let the regulator increase its output to compensate for the extra 0.6-0.7V drop through the diode. Unfortunately it's not. For a start, most modern regulators are closely integrated with the alternator, and as shown in Fig 2 they actually sense and regulate the voltage at their own output terminals rather than at the battery. Inserting an external series diode (Fig 1) will prevent the system from charging the battery adequately. That's why the standard method of charging auxiliary batteries is now to wire them directly in parallel with the main battery, via a relay which does not connect the auxiliary batteries until the engine has been started (**Fig 3**).

The relay coil is energized from a point such 'IND' in Fig 2, which only supplies sufficient current when the alternator is running. Suitable relays are obtainable from car and caravan accessory dealers, and often have extra contacts for switching two separate loads (eg an auxiliary battery and the caravan refrigerator).

The second problem with charging auxiliary batteries is more difficult to solve, because it arises from the unavoidable run of cable from the engine compartment to the rear of the car. Even with thick wire, the voltage drop prevents the auxiliary batteries from receiving as much charge as the main battery. When the main battery is fully charged and the regulator reverts to trickle-charge, batteries in the car boot or even further away in the caravan may not even be half-charged. While this may be sufficient for many caravanning uses, eg an evening's lighting and casual chatting on the local repeater, it isn't totally satisfactory.

Yes, you could disconnect the main battery when the engine is running, but if the auxiliary battery also became disconnected (eg if fuse F1 were to blow) the resulting unregulated high voltage would probably damage the car's electrical and electronic systems – not recommended! The only safe and effective way to charge fully a remote 12V battery is to find some extra volts, over and above what the car can provide. For example, you could use a 12V powered AC mains inverter connected to an ordinary battery charger.

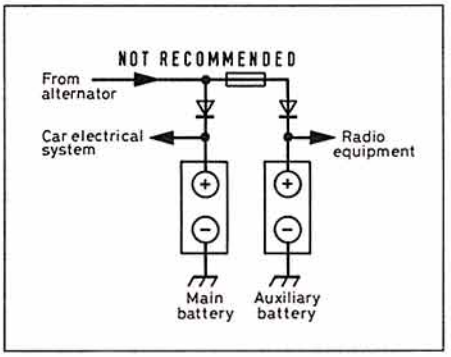

Fig 1: With early alternators, diodes could be used to charge the main and auxiliary batteries simultaneously. This is no longer possible with most modern integrated alternator-regulator systems.

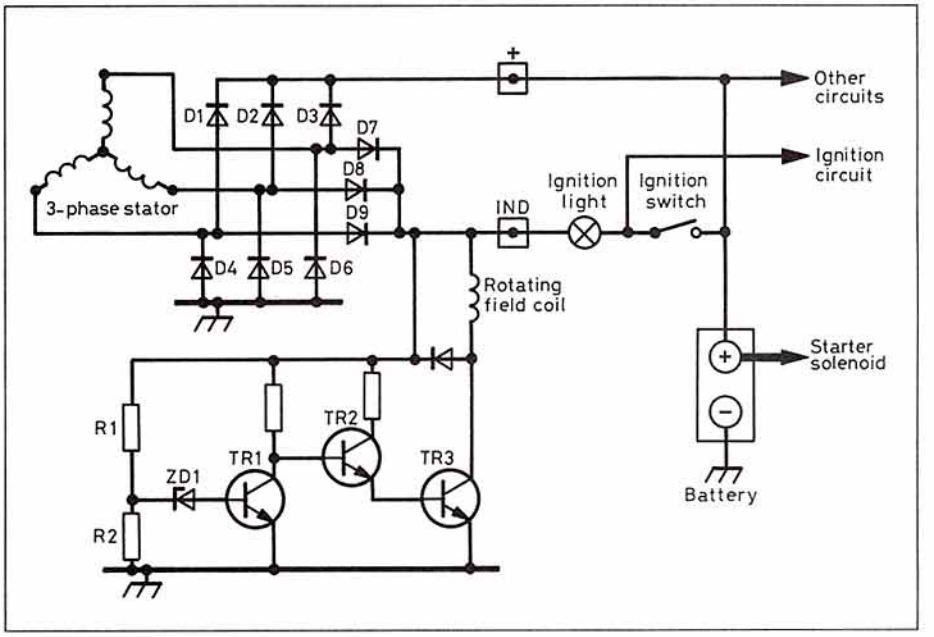

Fig 2: Simplified circuit of an alternator and regulator. The regulator actually senses the alternator voltage, with no true feedback from the battery itself.

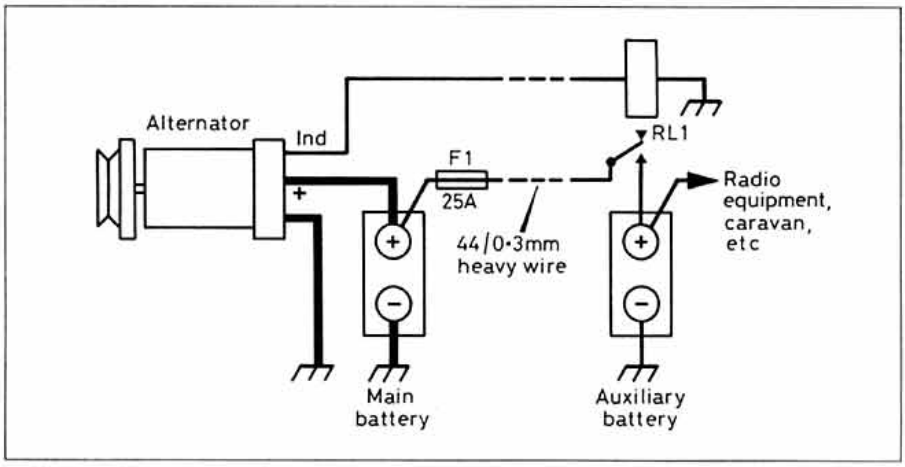

Fig 3: A relay is used to disconnect the auxiliary battery unless the alternator is running.

WHAT KIND OF BATTERY?

WHAT KIND OF BATTERY should I use?

THIS QUESTION ALSO RELATES to January's suggestion about using a trickle-charged battery as an alternative to a fully-electronic regulated power supply. Most ordinary car batteries are not really suitable for this kind of usage, which is quite different from their normal operating regime involving regular deep discharge at very high currents followed by fast recharging. Slow discharge followed by slow and incomplete recharging will quite rapidly damage the plates of most car batteries. As most occasional users of hand-held transceivers are aware, nickel-cadmium batteries hate this kind of operation too. Some types of car batteries will survive, but there is no way to tell in advance.

Look instead for a so-called 'leisure' battery, a fully sealed lead-acid unit which will probably be available from the usual car battery dealers but is specifically designed for use in caravans, mowers and 12V electrical systems other than cars. They hold their charge for long periods, eg from autumn to spring, and are suitable for slow recharging. Best of all would be a large gel-cell battery of the kind used in standby power supplies for computers. These are designed for continuous trickle-charging, and although they cost a small fortune when new, they sometimes appear as surplus bargains.

REMOVING AN IC

HOW DO I REMOVE a dual in-line IC from a printed circuit board without destroying everything?

IF YOU'RE A PROFESSIONAL, it's not too difficult using a special soldering iron with a hollow tip and a suction pump. You place the tip over each pin in turn, melt the solder and the pump sucks it away from around the pin. In many cases you can then just lift the IC out of the board. Unfortunately these devices are too expensive for occasional use by amateurs, so as usual we have to make do.

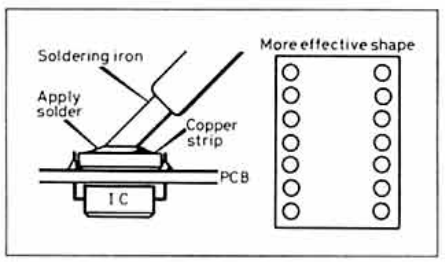

Fig 4: Using a piece of copper to unsolder all IC pins at once. The shape with the holes fitting over the pins is more effective.

If you don't have access to the most effective techniques and equipment, you may have to decide whether you wish to salvage the IC or the board. In the latter case, for example when making a repair, the safest method is to snip off each leg of the IC above the board and then remove the pins individually. This applies particularly to boards with plated-through holes, which can be very difficult to desolder. If you want to save the PC board, be very careful not to wiggle the whole IC around in an effort to loosen it - you'll almost certainly tear the copper tracks off the board.

To remove ICs without damage, you need either to melt all the solder at once or remove the solder from around all the individual pins. With packages up to about eight pins on each side you can often melt the solder around all the pins at once, and the professional method is to use a large, specially shaped soldering-iron bit. You can do almost the same by using a piece of copper of the right size to transfer the heat from the soldering iron. **Fig 4** shows the simplest version that fits between the rows of pins, and a more effective version that drops over the pins themselves. Take care not to damage any PC tracks running between the rows of pins or through the gaps between the pads.

A spring-loaded solder-sucker is probably the best approach for removing larger ICs. Ideally you should have the nozzle poised over the end of the pin while you apply the point of the soldering iron bit to the surrounding pad. The trick is then to place the nozzle squarely over the board to avoid losing suction, and press the button before the solder solidifies. Unfortunately this requires more coordination than most of us possess! Above all, be patient: don't attempt to lever the IC off the board until there is clear space around every single pin, as seen under a magnifying glass.

DXCLUSTER AND VHF/UHF/ MICROWAVES

I AM A KEEN VHF operator and have just started to use the local DX Cluster. I know how to type in SHOW/DX 6 or SHOW/DX 50 for 50MHz spots, and SHOW/DX 2 or SHOW/DX 144 for 144MHz spots, but what about 70MHz, 432MHz, 1296MHz and above?

THE DXCLUSTER SOFTWARE as delivered to sysops is able to accept spots on the following VHF/UHF bands: 50MHz, 144MHz, 220MHz and 432MHz. Most UK DXcluster sysops have amended the US 220MHz band to cater for 1296MHz instead. When entering a DX spot, frequencies have to be given in kilohertz, eg 1296200.0 and not 1296.200. On any band, the command *SHow/DX <kHz>-<kHz>* will retrieve any DX spots that the system has accepted.

However, that still leaves out 70MHz and the microwave bands above 1296MHz. The situation may change in future software upgrades, but as a temporary work-around the UK DXcluster sysops are discussing the possibility of making the '50MHz band' include 70MHz by accepting DX spots on any frequency from 50000.0kHz to 70500.0kHz. *SHow/DX 6* would thus retrieve spots for both bands together. By setting the CW/SSB changeover frequency at say 52000.0kHz, the software could be persuaded to store 50MHz spots on all modes as '6m CW' and to store 70MHz spots on all modes separately as '6m SSB'. For the microwave bands a similar work-around could be employed. Unfortunately it is not possible to handle 10GHz spots in the same way because the numbers involved are longer than the software presently allows, and this can sometimes cause problems on any frequency above 1GHz. Admittedly these are not elegant solutions, but they would open up the facilities of the DXcluster to DXers on the higher bands.

While on the subject, most UK DXcluster sysops have already set up a separate distribution list for VHF/UHF *ANNounce* messages. To send an announcement, the syntax is *ANNounce/UKW <text>*. 'UKW' is the German abbreviation for 'VHF' and indeed your *ANNounce/UKW* message will go to members of the list on all connected DXcluster nodes across Europe. To join the list yourself, just send a message to your local DXcluster sysop and ask to be added.

The vast majority of DXcluster sysops and users welcome traffic related to serious VHF, UHF and microwave DX, and some sysops have already implemented the related modifications. The remainder are just waiting for someone to show an interest, so please don't be shy! If you are a VHF/UHF/microwave DXer and want the DXcluster software to meet your needs even better in the future, join in now and show interest in what's already there.

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

RADIO SOCIETY OF GREAT BRITAIN

Unaudited Income and Expenditure Account
For the 6 months ended 31 December 1993

	Notes	6 Months Ended 31/12/93 £	6 Months Ended 31/12/92 £
INCOME			
Subscriptions	1	652,821	655,004
Newsletters		22,542	14,749
Advertising		137,200	117,144
Book Sales		180,775	185,669
Other Income		23,705	38,249
Total Income		**£ 1,017,043**	**£ 1,010,815**
EXPENDITURE			
Cost of sales			
Cost of printing & distrib (books)		85,582	73,851
Cost of publishing & despatch staff		34,802	36,943
Cost of printing & distrib (newsletters)		24,899	20,260
Sundry		19,605	18,161
		164,888	**149,215**
Headquarters			
Rates, lighting, heating & cleaning		17,172	23,238
Repairs and maintenance		5,045	7,822
		22,217	**31,060**
Administration Costs		**251,061**	**240,145**
Finance		**21,169**	**16,765**
Membership Services			
Radio Communication		253,185	223,644
QSL Bureau		12,782	11,522
Beacons, repeaters, satellites & Int Watch		7,833	13,833
Cost of committees, regnl & Ccl mtgs		33,101	24,754
Novice Licence		8,214	5,424
Other services		50,644	30,052
		365,759	309,229
Exceptional expenses	2	7,821	0
TOTAL EXPENDITURE		**£ 832,915**	**£ 746,414**
SURPLUS/(DEFICIT) FOR THE HALF YEAR		**£ 184,128**	**£ 264,401**

NOTES TO THE HALF-YEAR ACCOUNTS

1 Subscription income has been accounted for on a cash basis for all renewals or subscriptions commencing in the period. The 1992 figures have been restated on this basis to facilitate comparison.

2 The exceptional expenses are in respect of an underpayment of VAT relating to prior years.

RADIO SOCIETY OF GREAT BRITAIN

BALANCE SHEET AS AT 31 DECEMBER 1993

	At 31 December 1993 £	At 31 December 1992 £
FIXED ASSETS		
Tangible assets	644,432	688,845
CURRENT ASSETS		
Stocks, at lower of cost and net realisable value	130,749	122,237
Trade and other debtors	126,078	124,479
Prepayments and accrued income	46,084	8,118
Cash at bank and in hand	382,362	336,852
	685,273	**591,686**
CREDITORS: AMOUNTS FALLING DUE WITHIN ONE YEAR		
Obligations under finance leases	20,604	19,874
Trade creditors	87,362	17,008
Corporation tax	1,000	17,500
Other taxation and social security	8,189	9,357
Other creditors	6,458	3,419
Accruals and deferred income	92,877	67,701
	216,490	134,859
NET CURRENT ASSETS	**468,783**	**456,827**
CREDITORS: AMOUNTS FALLING DUE AFTER MORE THAN ONE YEAR		
Obligations under finance leases (2-5 years)	0	(17,734)
	£ 1,113,215	**£ 1,127,938**
ACCUMULATED FUNDS		
Income and expenditure account		
Balance at 31 December	385,364	(20)
Result for period ended 30 June, 1993	(198,851)	120,983
Result for period ended 31 December, 1993	184,128	264,401
	370,641	385,364
Revaluation reserve	207,288	207,288
Special reserve	317,946	317,946
General reserve	217,340	217,340
	£ 1,113,215	**£ 1,127,938**

Commentary on the Half-Year Accounts

THE UNAUDITED income and expenditure account shows a surplus of £184,128 compared to £264,401 for the comparable period in 1992/93. Because the majority of the Society's subscription income is received in the first half of the financial year, the surplus cannot be seen as indicative of the result for the year as a whole. We anticipate an overall result for the year of roughly breakeven. The results for the first half are broadly in line with expectations.

The Society has not been immune from the effects of recession and cautious financial management has been and will continue to be required. There are some encouraging signs – subscription income is holding steady and, after a slow start, book sales are beginning to pick up.

The increase in costs reflects a conscious decision to invest in particular areas of Headquarters to improve the Society's image and the services provided to members. It is somewhat discouraging, if not unexpected, that this has not yet resulted in increased membership and, therefore, subscription income.

Richard Horton, G4AOJ
Honorary Treasurer.

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Satellites

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

IN *OSCAR NEWS*, AMSAT-UK's Journal for December last, there appears an article entitled 'An Amateur Satellite Operation Upgrade Path', by G Gould Smith, WA4SXM. The opening paragraph of this reads: "The summer of 1992 found thirteen active amateur satellites plus the MIR space station orbiting the earth. These satellites operate using many different modes and modulating methods. With so many choices available it can be somewhat overwhelming to determine how and where to begin or where to go". He continues: "One of the most common questions I am asked is 'What does it take to get on the satellites?' Since most newcomers don't know about the multitude of modes in use, they assume it requires a single set-up like getting on CW, packet, SSTV or RTTY."

These words so exactly express my feelings on this topic that I have taken the liberty of quoting them extensively this month.

WHAT YOU NEED

WA4SXM GOES ON TO GRADE the satellites, and the requirements for using them, into levels, from the simplest to the most complex. Each level is defined by the amount of equipment and the knowledge required to operate. Level 1 is the starting point. If you are not sure whether you are going to be really interested in satellites and don't feel justified in spending a lot of money on trying the mode, then the satellites in Level 1 are the Russian ones, viz RS 10/11/12/13, Mode A and K. For this level you can use the gear likely to be found in most amateur radio shacks these days. A 10-20W Tx with the usual multiband transmitting aerial is adequate. A separate 10m receiver and a 2m transmitter SSB or CW for mode A; a 15m Tx for Mode K.

Level 2 is when you've decided you'd like to keep to satellites and go on further, as your interest and experience grows, so you can add to your station gradually. You can tackle the FO-20, AO-13 and so on. This will be quite a big step forward but you can tackle it slowly as you gain experience.

Level 3 brings in microsats, requiring higher frequencies and more elaborate aerial systems. Finally Level 4 takes in the S band, which may well be the band of the future.

This is a very sketchy summary indeed of WA4SXM's article. He finishes it off by a detailed account of each of the current satellites' characteristics and the equipment needed to use them. If you can, get a copy of this *OSCAR NEWS* and read the whole article. If it interests you then send off your application to join AMSAT-UK. AMSAT-UK's address is 94 Herongate Road, Wanstead Park, London E12 5EQ.

USING YOUR COMPUTER

ONCE YOU HAVE started amateur radio satellite communication, you'll want to progress to more sophisticated satellites and this will lead you to wanting to use a computer for orbital predictions and other advanced satellite methods. Getting used to a computer does present its problems unless you are already 'computer-wise'. If you are not, you'll have to seek the help of numerous manuals and booklets to help you along the way. These vary enormously, from the completely unintelligible to those which have managed to make a very complex topic understandable.

One of those which has just come out is *Packet BBS Survival for the Beginner*. While written primarily for the packet user, much of it is applicable for the satellite user. Its author says: "Packet radio has been around now for some nine years or so and still confuses the beginner. There are several good books covering the theory and operation of packet, including installation and set-up of equipment . . . . but this is not the intention of this manual to cover that ground. However, having set up the equipment successfully, and with the increasing sophistication of BBS software, the user is left to his own devices when connecting for the first time."

It is a very comprehensive manual. There are 73 pages of really appropriate and useful information, nicely soft-bound and produced and I defy anyone to say that they hadn't learnt a lot after reading it. It is available from Roger Cooke, G3LDI, The Old Nursery, The Drift, Swardeston, Norwich, Norfolk NR14 8LQ, priced at £4.50 by post in the UK. £1 of this will be devoted to the Phase 3D fund.

One must also mention the *New Guide to Amateur Satellite Operation*, now on sale from AMSAT-UK. It is a continuation of the series compiled by Richard Limebear, G3RWL. This comprehensive guide to amateur satellites was first published in 1975 and revised in 1977, 1979, 1980, 1984, 1990 and now updated in September 1993. This latest edition is a much enlarged version (11.5" x 8"), is very well printed and easily readable. It covers all you want to know about amateur radio satellites and how to use them. One very useful section is a 'Glossary of Frequently Used Terms and Abbreviations' – a great help for those taking up 'Satellites' for the first time. Available from AMSAT-UK, London E12 5EQ, price £4.50.

Colour fax transmissions sent by G6HMS and received via the FO-20 satellite.

FIRST FO-20 COLOUR-FAX

LAST DECEMBER, G6HMS and G0NKA, taking advantage of the Japanese satellite being in the analog mode for the week 1 – 8 December, experimented with passing FAX pictures through the 'JA' mode transponder. Once the technique of holding the picture by following the Doppler movement on the downlink was overcome, the methodology worked well. (Unlike voice transmissions where the ear can compensate for tonal frequency shift, computers decoding FAX signals are far more critical).

By Monday 6 December they had the best yet black and white picture throughput. They then followed this with a full colour transmission that produced a 50% success rate. On Thursday 7 December, using JV-FAX 6.0 transmission and receiving on the Shareware version of Microfax, they succeeded in producing full colour throughput with a better than 90% resolution. On all experiments the LSB uplink used was 145.980MHz. The downlink USB frequency was 435.820MHz +/– Doppler. The uplink frequency was maintained throughout the pass and the downlink was tuned to compensate for the change of Doppler Shift. Their results are shown on this page.

CHINESE AMATEUR SATELLITE PLANS

THE TSINGHUA UNIVERSITY Amateur Radio Club of Beijing, has received from the Chinese Radio Sports Association, some OSCAR satellite ground station equipment which they may use for a period of six months in an effort to encourage activity on amateur satellites. This consists of a Yaesu FT-726 dual-band transceiver, a crossed Yagi antenna, a 70cm amplifier, a receiver preamplifier and an elevator/azimuth rotor system.

ISRAEL'S SATELLITE PROGRESS

THE ISRAELI AMATEUR radio satellite project, TECHSAT, continues full steam ahead at the Technion University in Haifa and the launch is scheduled for 1995. Its BBS software has been written and is being operated terrestrially on VHF Packet as a PACSAT simulator from the radio club 4X4HF at Bet Miller. To connect with the grounded satellite, the uplink frequency is 145.550 and the downlink is 432.650MHz, as in Mode J. Standard VM 1200 baud packet is being used. At present, encouragement is being made to club members to 'connect' with the satellite which is using 4X4F1-11 or 4X4HF1-12 as callsigns. They are requested to keep the Techsat staff informed of problems and malfunctions, while at the same time familiarizing themselves with the operation of the PB and PG software. Arrangements have been made with the Russian Space Agency to launch the satellite.

Data Stream

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

THE WRITING OF THIS COLUMN is only part of my task; a major part is dealing with the resulting technical correspondence. In order to make sure that the advice or information I pass on is relevant, correct and up to date, I would appreciate feedback on the subsequent success (or otherwise) of those who have contacted me. This will benefit anyone making similar queries at a later date. Thanks!

PACTOR GOSSIP

NEW PACTOR-PLUS CONTROLLER

The Existing PTC PacTOR controller from SCS is being replaced by the PacTOR-Plus controller, based around the 68000 series microprocessor, instead of the original Z80. Although this has been done mainly because one of the original Z80 support chips is no longer manufactured, it has enabled the designers to add some useful features. On-air performance is much the same as before, but the new unit is rather more user-friendly.

New features include: RAM expansion up to 256k without reconfiguration; additional RFI filtering on the RS232 interface; a facility whereby serial baud rate and other alterations can be made from the rear panel or in software without the need to move internal links; wider range of serial baud rates supported; better filtering of receive and especially transmitted tones; high and low tones supported without realignment; the option to route the DC supply via the power connector or via the rig; automatic synchronization of received CW speed; software squelch in RTTY mode to prevent random characters being generated by noise when there is no signal; built-in online help on all commands; enhanced personal mailbox facilities and so on.

Many of the components in the new unit are surface-mounting, and for this reason it will not be available as a kit. Superficially, the new unit closely resembles the existing one, with the main visual differences being confined to the rear panel. It is expected to be available from March 1994.

It sounds to me as if the designers have made some big improvements on the existing unit, which I always felt was let down by being rather user-unfriendly both in terms of hardware and firmware, despite its good on-air performance.

PACTOR-II PROTOCOL

The PacTOR-Plus unit should not be confused with the PacTOR-II protocol, which is still under development. This will be a major advance over the existing protocol, and will require DSP (Digital Signal Processing) to handle the PSK (Phase Shift Keying) modulation to be used.

PACTOR LICENSING

Certain controller and software suppliers have licensing agreements with SCS, which means that their products are developed with the co-operation and approval of the original design team. These are PacComm, Kantronics, Grosvenor Software (BMK-Multy), Universal Radio, and DRSI (Digital Radio Systems Inc). The surprise news is that HAL (the Clover people) may sign up with SCS; HAL are especially interested in PacTOR-II.

On the subject of BMK-Multy PacTOR; initial versions were said to be not so good, but the current software apparently works very well, and SCS are pleased with its performance. An advantage in later versions, is that it will now run at 200 baud even on an original 4·77MHz PC XT. This is still a very cheap way of becoming QRV on PacTOR, as the only hardware required, apart from the PC and the rig, is a straightforward 'dumb' RTTY/AmTOR terminal unit.

UK DX CLUSTER NETWORK

FIG 1 SHOWS THE LINKING of the UK DX cluster network, plus links within EI and the near continent. To remind those of you not on packet radio, DX clusters are a specialised type of packet radio mailbox, designed to provide rapid alerts of interesting DX, as well as other useful services.

The links shown are the ones normally used, though the actual links used will vary as circumstances dictate. Note that GB7SMC uses either of two links, but not both simultaneously. I have not shown the proposed new GB7ADX cluster, which was originally to be located near Aberdeen, but which is now to be located on the Isle of Anglesey.

By the time you read this, some minor changes may have taken place, but it should still give you an impression of how all the clusters are linked.

COMMERCIAL PACKET RADIO

SOME TIME AGO, I DESCRIBED in *RadCom* how I came across an interesting and unexpected use of packet radio at a car-hire depot near Los Angeles airport.

Coming right up to date, I recently had the use of a commercial handheld packet radio terminal for a few weeks. The terminal is made by Cognito Ltd, based in Newbury, Berkshire, and operates at 9600 baud in the 900MHz region, as far as I know. Within seconds of a colleague in the office, or in the field, sending a message, it arrived on my terminal and a bleeper sounded. If I was in a 'dead spot' the mail was held until the terminal could 'find' the network again, and indicate that it was ready to receive mail.

When I sent a message, a status line told me when the message was queued for sending, when it was in the network, when it arrived at the far terminal, and when it was viewed by the recipient. I could of course store all incoming and outgoing messages. Recipients could be selected by name from a list, without the need to remember any terminal ID numbers.

It did all sorts of other tricks, and worked very well on the whole. I was rather sad to have to return it to Cognito! [So why does amateur packet have to be so complicated for the end user? – *Ed*]

NEW PACKET TNC BOARD

THERE'S A NEW TNC PCB available, in addition to the existing BSX2, KFN2 and TNC2-DL boards. It is called the TNC-Plus board, and was designed by John, G8STW, as an enhanced version of the BSX2. Additional features include: ON/OFF switch; RAM reset switch (good idea!); baud rates selectable from the front-panel with LED indication; supply polarity protection; DC power socket on board; re-positioned power regulator for easier heat sinking; and on-board 'true' (state-machine) DCD for squelch-less operation.

The board is produced by Badger Boards, price £17·00, plus £4·50 for the comprehensive manual. These prices include postage, and are not subject to VAT. Incidentally, John Badger tells me that he's got some very interesting datacomms projects up his sleeve, so I'll bring you news of them as soon as it's available. Badger boards are at 87 Blackberry Lane, Four Oaks, Sutton Coldfield, West

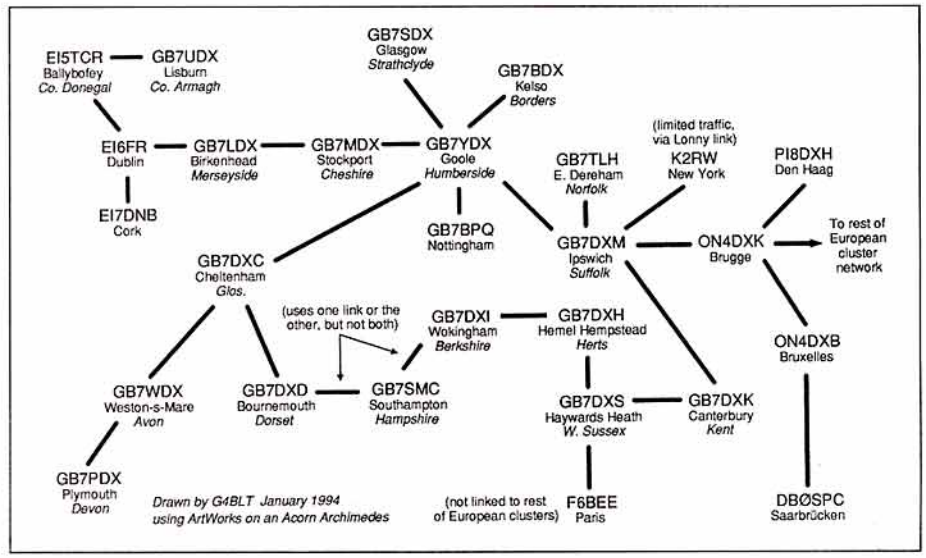

Fig 1: UK DX Cluster Network, January 1994 (not to scale).

A small handheld commercial packet radio terminal.

Midlands B74 3JF. You can also find John Badger at some rallies, and Syon Trading act as agents for Badger at other rallies.

BSX2 TNC RS232 CONNECTIONS

THAT REMINDS ME TO WARN YOU of a potential problem with the BSX2 board, and indeed also with the TNC-Plus board. Most TNCs and controllers use CTS and RTS for hardware handshaking between the TNC and the computer/terminal. However, these boards use DSR (pin 20) on the 25-way connector as the handshake input to the TNC, rather than the more usual RTS (pin 4). This can result in 'lost' received characters from the TNC under some circumstances, though transmitted text to the TNC should be OK. I'm not saying the boards are wired 'wrongly', they are just wired 'differently'.

The solution is quite simple: Wire up the RS232 lead with pins 4 and 20 linked inside the TNC-end connector, or better still link them on the TNC board itself.

UU, 7+ AND GIF FILES

ON PACKET, YOU MAY HAVE been puzzled by references to strange things called UU files, 7+ files, and GIF files. What on earth they are all for, and why do they seem to stir up such passions?

UU CODE

Well, UU and 7+ files are basically the same sort of thing. UU stands for 'Unix-to-Unix', and as this suggests it has its origins in mainframe computers. It is a means of overcoming the problem of sending non-text files via packet, particularly where the files need to be sent as mail from one BBS to another. You cannot easily send a file such as a picture, executable program, ROM image, over a medium that was intended for text messages using only 7 binary bits. These non-text files contain all sorts of control codes and characters using all 8 binary bits, and what you need is some way of 'wrapping them up' in a textual coat, so that they can be sent like any other message.

This is done by encoding the original file using only normal printable characters, complete with a start and end sequence, and some sort of checksum. This enables the decoder to ignore headers, footers etc, and decode only the file itself, with a check for corruptions. Files can be split into a number of smaller sections so as to conform to the five kilobyte forwarding limit imposed by some BBSs, and the decoder can splice them all together again.

There are two problems with UU code, as currently used. First, because the range of characters used is limited compared to the full 256 of the ASCII character set, the encoded file is appreciably longer than the source file, typically 30% longer. Secondly, if a section is corrupted en route, then the entire section will have to be re-sent.

7+ CODE

7+ was developed to overcome these two drawbacks. It uses a much wider range of ASCII characters, including those 8-bit characters which are not universally defined, and tend to appear on screen as strange foreign accented characters, symbols and so forth (this is the reason for the name 7+, meaning more than 7-bit characters). Control codes are still avoided, as these would soon tie your TNC in knots! Because a much wider range of characters is used, 7+ encoded files are only slightly larger than the source file, typically 10%. Also, if parts are corrupted, it is possible to generate a request file to get a correction file, rather than send entire sections again.

7+ is a little harder to use than UU encoding, in that you have to be more careful about your TNC and driver program settings, in order that you don't 'lose' the vital eighth binary bit. The TNC parameter '8bitconv' must be ON, and the TNC and driver program must be set up to use 8-bit protocol on the RS232 serial link; typically 8 bits, No Parity, 1 Stop bit. Even so, you might find that the program is still stripping the 8th bit before dumping to disc, and you can check this by reading the saved file in a text editor. Also, some PMS firmware such as that for the Tiny-2 etc. strips the 8th bit of messages sent to the PMS. There is nothing you can do about this, except download the appropriate messages 'live' from the other station or BBS, rather than from your PMS.

Thus, users are able to send virtually any type of file via packet, of any size (split into sections). The question is, what should people send? Well, some like to send useful utility programs for computers, some like to send games, and some like to send anything they can lay hands on just to try 7+ out! The CLIVE and GOPHER databases at GB7KLY and GB7NWI respectively, contain lots of 7+ encoded material. Before encoding, files are usually 'archived', that is compressed into the smallest possible length and bundled together.

PRETTY PICTURES

The tempers start to flare when users send out pictures, since they tend to be very large in terms of file size, and since they are frequently of thatched cottages, cartoon characters, scenic views, and things like that, as well as more technical things such as circuit diagrams and images from spacecraft and satellites. The available pool of images is infinite, so there is a real danger of overloading the packet network at the bottlenecks!

Pictures can be stored, and encoded, as a variety of types of file. One of the most common types is the GIF file (Graphics Interchange Format). These are frequently sent encoded as 7+ files, so you could be forgiven for thinking that they were one and the same thing! GIF files are highly 'compressed' compared to simple file formats, since there are often areas of solid colour in a picture which occupy large amounts of file space needlessly. Other common file types are TIFF, PCX and JPEG, but there are many more. Specialist art packages and CAD packages tend to have their own peculiar formats. I am lucky enough to be able to 'translate' many different formats on my Acorn Archimedes, and similar 'translators' are available for IBM-compatibles and other machines.

Some SysOps have become so annoyed at what they see as inconsiderate users sending huge numbers of 7+ files, that they kill them (the files I mean) on sight! Others impose strict limits on the quantity passing through their BBSs. This is a shame, but unless users show restraint, then it is perhaps inevitable.

DCC GUIDELINES FOR 7+

THE RSGB DCC (Data Communications Committee) has issued guidelines for the use of 7+.

1 The files should be relevant to amateur radio.
2 Local tests should be carried out to prove successful sending, and dealing with error requests.
3 The total file content should be no longer than 10 parts of 5k each, (unless absolutely necessary).
4 All parts should *not* be sent out at the same time, but sent out over a period of a few days. SysOps should consider holding all locally-generated mail for validation.
5 An introductory message should be sent containing the details of the file contents.
6 Offer to make files available on disk.
7 It would be better to offer the distribution of files to other countries by post, for example EU/WWW.
8 Be careful not to breach copyright regulations when sending programs by 7+.
9 Try to include '7+' in the subject line, as this helps automatic servers, eg Subject: 7+ DCC.Zip P01/2

PROBLEM WITH [PMS CMD ERR]

SOME USERS OF THE PACCOMM PMS software, as found on TNC2 clones such as the Tiny-2, have experienced problems. Sometimes, another station connecting to the PMS finds that only the very first command typed works; the following ones all result in the error message [PMS CMD ERR].

There is nothing the owner of the PMS can do, unfortunately, but it can be prevented by setting the parameter 'LFadd OFF' on the connecting station's TNC; this is in fact the factory default setting on all TNCs I have come across, which is why this problem is relatively rare. If 'LFadd' is set ON, then unwanted LineFeeds are effectively 'tagged' on to the beginning of commands, resulting in the error.

AR SK

'Rick' G4BLT @ GB7WRG.#19.GBR.EU or GB7PLY (PacTOR).

Microwaves

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

IN THE MAY 1993 column I briefly featured the G3WDG005 general purpose 10GHz GaAsFET amplifier and the G3WDG006 250mW linear power amplifier designed by Charlie Suckling. At the same time I mentioned the G3WDG004 HEMT low-noise receive preamplifier which was, at that time, undergoing final development trials. Since then, both this amplifier and the G3WDG007 1W output linear transmit power amplifier have been successfully tested, proved and launched by the RSGB Microwave Committee Components Service [1].

G3WDG004 LNA

TWO VERSIONS OF THE –004 amplifier have been built and proved: one with SMA input and one with WG16 input. All prototypes have averaged 1dB or slightly under. Where the noise figure has been fractionally above 1dB there has been some evidence of degradation during construction, possibly by static.

The circuit for either is identical and is shown in **Fig 1**. The short kit contains both the HEMT and unusually detailed construction sheets. In this case much of the detail concerns the anti-static precautions which *must* be taken when using HEMT devices: static damage may not be total, hence the remarks above!

The advantage of the WG-input version is that a probe inputs signal directly from the waveguide to the HEMT. The SMA version will almost certainly require a least one more SMA connector and a short length of semi-rigid 'cable' to the amplifier input, thus degrading the noise figure by a few tenths of a dB - it is vital to win that little loss back if you are searching for the ultimate performance, for instance for moonbounce!

Again the Components Service [1] supplies details of the order of construction, although it is stressed that this version requires even more careful work than the SMA version: the layout details of the board of either version is given in **Fig 2**, to give you some idea of the work involved. What we're saying is that building an amplifier to reach this level of performance is not as easy as building Charlie's earlier designs!

The other good news is that the 1W solid-state amplifier prototypes and a beta-test version are proving reliable, reproducible and are giving, in many cases, a generous 1W output. Don't expect the design to be cheap to build (the GaAsFET is expensive) but, in the long run, it will probably be worth the cost and effort for the ease of operation from a single low-voltage supply!

There are circuit and layout similarities which have led to a need for a 'universal' regulated power supply and for common handling techniques to avoid electrostatic damage (ESD) to the devices when the designs are built 'on the kitchen table'.

Dealing with the last point (ESD) first, HEMT devices are more easily damaged by static than 'ordinary' GaAsFETs whilst the power FET (Misubishi MGF2430A) used in the '007 PA is expensive enough to make the constructor want to take special precautions to avoid damage whilst handling! The Microwave Committee Components Service cannot supply free replacements for devices which are damaged by careless handling and it is therefore appropriate to take similar precautions in handling either device!

The following precautions are recommended by the designer, G3WDG, and should be applicable not only to these latest designs but also to forthcoming designs, for other bands, which use high-performance GaAsFETs or, indeed, any other sensitive microwave device. ESD is best avoided by never allowing the device to have a different potential to *any* object it touches – including yourself!

A simple static-free workstation should be made and used. This can be as simple as a sheet of metal, such as thin aluminium, to which a few flexible 'fly-leads' are attached. One fly-lead should be connected preferably to a proprietary antistatic wristband (these are available from, for instance, Tandy) or to a thin, flexible wire attached to a finger-ring. If using the latter, put a high resistance (say 100k) in series between the wire and the

This 4m diameter dish is certain to give the Three Spires Contest Group (G4IEV/P) a good position in the October 1993 1.3GHz Trophy event. The dish knocks down into eight pieces for transporting and can be assembled on site by G4IEV in under two hours. The feed and pivot/steering mechanism is the work of G4HRY.

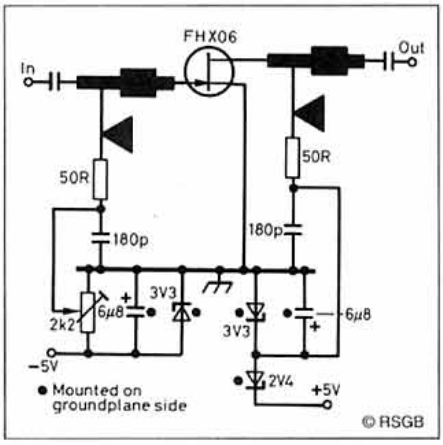

Fig 1: Circuit of the G3WDG004 10GHz HEMT LNA. Component values shown on the diagram.

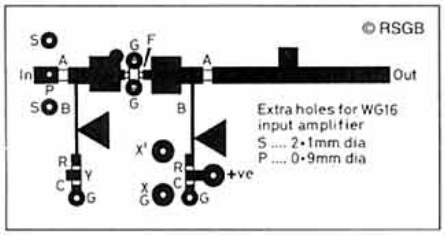

Fig 2: Layout of the G3WDG004 10GHz HEMT LNA (not to scale). Key to components: A 2p2 ATC capacitor, B bias wires, C 180p chip capacitors, F HEMT, G grounding Veropins, R 47R chip resistors, X,Y position of connections to bias pot 'X' is –ve input).

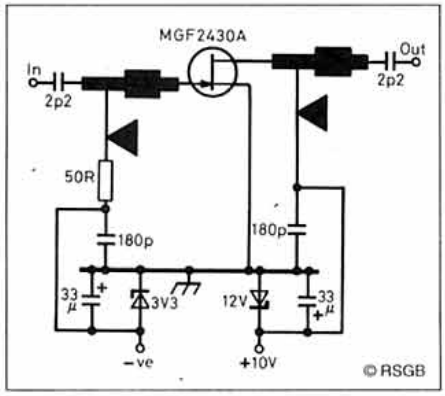

Fig 3: Circuit of the G3WDG007 10GHz 1W output linear PA. Component values shown on the diagram.

metal work plate. The body-earthing device should be worn all the time whilst working on the FETs.

The device may now be unpackaged and placed on the work surface. FET leads may be safely cut to length using un-insulated tools which, when not in use, are kept on the work surface. If you use insulated side-cutters, touch the metal of the cutters to the work surface *before* allowing them to touch the FET leads.

Once these operations have been completed then the equipment into which the device is to be soldered should be placed on the work surface and another fly-lead (possibly using a small crocodile clip) should be connected between the box in which the PCB is housed (or the groundplane of the PCB, if that is more convenient) and the work surface.

Next, arrange another fly-lead between the work surface and the soldering-iron bit, separate from the mains earth. Check that even when hot there is a low resistance path from the soldering-iron tip to the work surface. It is also worth checking that there is no leakage in the iron by measuring the resistance between the tip and the heater connections when both hot and cold – but disconnect the mains first!

Solder the source leads first, making certain that the iron tip does not touch either the gate or drain lead during the soldering operation. Before soldering the gate or drain, disconnect the mains supply from the iron whilst maintaining the tip to work surface connection. Once in place, the device is safe! If at any time you have to do any further soldering operations, make sure you take the same precautions again.

Quoting G3WDG directly, "Some irons claim to have an ESD connection – I would not trust this! Sometimes after zapping, devices do not fail catastrophically – the noise figure rises by a few tenths of a dB but otherwise the amplifier seems to behave normally. Poor final performance may therefore be related to device damage". Whilst these remarks apply primarily to HEMT devices, they are equally applicable to the more expensive power devices, but for a different reason!

The preamplifier gives a gain of about 10dB with a noise figure of 1dB or a little less. Fig 2 shows the layout of this design. The additional holes shown on the layout will be explained in the next column: these are for a version of the amplifier which mounts directly on a WG16 to board transition.

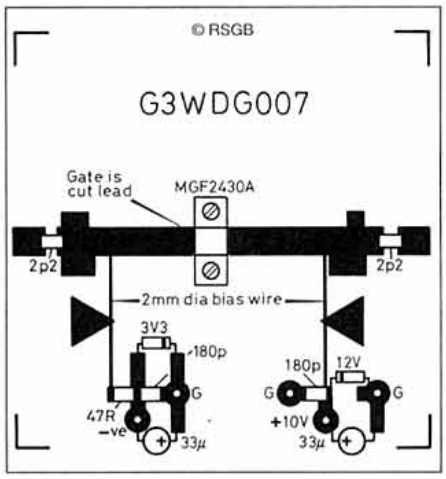

Fig 4: Layout of the G3WDG007 10GHz 1W PA (not to scale). Heat sink arrangements are not shown but are described in detail in the booklet which accompanies the kit.

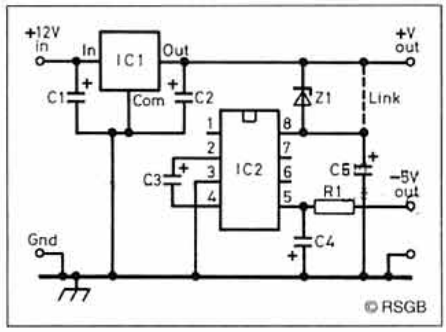

Fig 5: Basic circuit of the G4FRE023 dual output power regulator module. Components IC1, Z1/link and R1 are selected, according to the application, from Table 1. Remaining components: IC2 ICL7660SCPA; C1, C2 1µF; C3, C4, 22µF; C5, 10µF, all SMD tantalum.

G3WDG007 PA

FIG 3 IS THE CIRCUIT DIAGRAM of the G3WDG007 1W PA which gives a power gain of about 6-7dB and **Fig 4** is the layout.

Although the layouts are not to scale, both units use PCBs of similar size and are based on similar design principles, as the circuit diagrams reveal. Both amplifiers are mounted in the usual way, soldered into tin-plate boxes of the appropriate size. The main differences are the need for an efficient (large) heat-sink in the case of the PA module and the provision of different gate and drain bias voltages to suit the devices used in the two amplifiers. 'Short' kits for both designs are, of course, available from [1].

The original G4FRE023 regulator board has now appeared in so many different circuit configurations that it is time to present a brief review of the 'theme and variations'.

Fig 5 shows the 'common' circuit whilst **Table 1** summarises the circuit variations as used to date, referred to the various G3WDG 10GHz designs and their required supplies.

REFERENCE

MICROWAVE COMMITTEE Components Service, c/o Mrs P Suckling, G4KGC, 314A, Newton Road, Rushden, Northants NN10 0SY (Tel. 0933 411446).

Module G3WDG–	IC1	Z1/link	R1	Output (+)	Output (–)
001	7808	3V3	3k3	8V	2.5V
002	7805	link	680R	5V	2.5V
003	7808	3V3	1k5	8V	2.5V
004	78L05	link	2k2	5V	5.0V
005	7805	link	4k7	5V	2.5V
006	7808	3V3	2k2	8V	2.5V
007	L4710CV	5V1	100R	10V	5.0V

Table 1: Component variations for the G3WDG boards (see Fig 5 and text).

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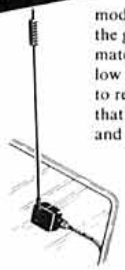

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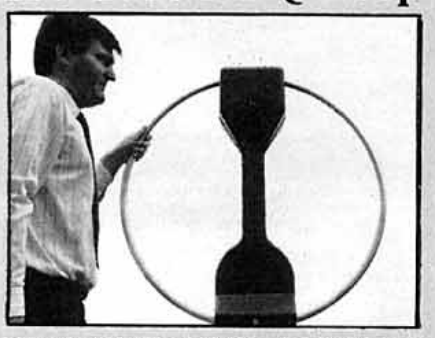

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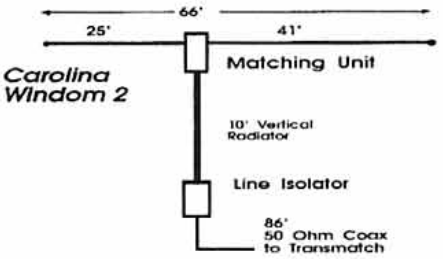

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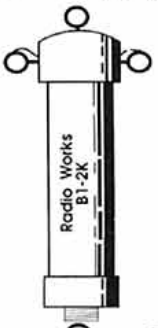

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1:1 SO-239

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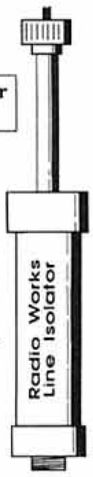
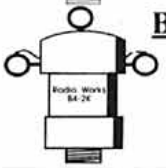


B4-2K £32



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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

IOTA CONTEST

Following the great success of the first IOTA Contest in 1993, the rules have been reviewed in the light of entrants' comments. The major changes are the inclusion of CW, points credit for contact with one's own country, and a limited (12 hour) category.

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 1994 *RadCom*.

Note: mainland G/GM/GW = EU005, mainland GI/EI = EU115.

2. When: 1200UTC Saturday 30 July to 1200UTC Sunday 31 July 1994.

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 for QSO points. 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. The winner of the IOTA Trophy will not be eligible for this award.

(c) 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.

HF RESULTS

LF CUMULATIVES 1993

The HF Contests Committee organises a calendar of twenty competitive events over the year, each with its own discrete way of testing operating skill and knowledge of propagation. The LF Cumulatives are no exception to this and comprise 15 individual mini-contests held over a five-week period on 1.8, 3.5 and 7MHz. As well as demonstrating contesting expertise, leading stations show a commitment to the event itself. The overall winner of the 1993 event was Jan Fisher, G0IVZ, who entered 13 sessions with a full house of nine making up his overall score. In adjudicating terms, this contest has been the property of John Kennedy, G3MCX, who has spent much of his free time meticulously cross-checking every possible contact, in addition he has encouraged less-experienced entrants by corresponding with them to point out areas of improvement in logging and transcribing after the event. John has been suffering ill-health during the past few months and I am sure contesters would wish him a full recovery, in addition I add my own thanks to John's unstinting dedication. *G3SJJ*

		160					80					40					
Posn	Call	4/1	12/1	20/1	28/1	5/2	3/1	9/1	24/1	30/1	7/2	27/12	2/1	17/1	23/1	31/1	Total
+*1	G0IVZ	264	ck	215	252	ck	297	–	285	276	–	ck	273	ck	281	326	2474
2	G3HEJ	230	ck	ck	195	222	259	–	264	266	ck	210	–	228	272	–	2146
3	G3RSD	–	ck	178	192	201	255	–	261	249	ck	216	ck	234	230	–	2016
4	G4OGB	207	ck	198	201	ck	ck	ck	250	249	230	ck	ck	216	208	203	1962
5	GM4SID	147	128	–	210	–	236	–	216	228	–	216	–	217	ck	231	1829
6	G3YAJ	185	ck	195	ck	165	213	–	222	231	–	ck	211	ck	201	204	1827
7	G2HLU	ck	171	ck	179	174	234	ck	227	224	ck	ck	189	182	ck	233	1813
8	G0JQN	171	ck	178	170	ck	–	225	226	201	ck	ck	ck	201	184	254	1810
+9	G5LP						–	–	277	297	277	288	–	315	ck	355	1809
10	G3GLL	98	–	–	186	150	289	–	275	ck	231	222	–	156	–	123	1730
11	G3LIK	128	ck	130	119	ck	ck	221	204	222	–	ck	ck	201	244	249	1718
12	GM0MYV	207	ck	162	ck	164	ck	ck	215	195	209	165	ck	213	vk	177	1703
13	G3KNU	168	ck	153	174	ck	240	197	207	ck	ck	ck	177	–	173	201	1690
14	G0ORY	81	ck	135	ck	138	215	ck	248	222	ck	204	228	–	216	–	1687
15	G3USR	ck	ck	141	91	127	200	ck	204	239	ck	ck	217	ck	202	241	1662
16	G3ZGC	158	ck	168	ck	153	204	ck	225	210	ck	ck	177	186	ck	177	1658
17	G0ADH	ck	ck	117	117	134	210	210	228	ck	ck	ck	ck	186	202	245	1649
18	G0LZL	117	–	–	114	152	–	228	211	–	207	–	–	171	192	201	1593
19	G3HQH	159	ck	156	121	ck	213	185	205	ck	ck	ck	ck	153	185	201	1578
20	G4OFR						260	267	238	ck	ck	–	248	254	245	–	1507
21	G3BPM	179	129	–	169	–	154	181	147	–	–	ck	172	177	197	ck	1505
22	G3AWR	ck	ck	141	147	138	192	ck	180	180	ck	ck	ck	158	162	161	1459
23	G4ARI	95	–	–	–	–	231	ck	ck	242	222	216	–	191	–	251	1448
24	GW3JI	ck	ck	128	129	138	ck	168	141	ck	162	ck	ck	144	159	170	1339
25	G3GMS	ck	–	126	102	105	183	ck	162	ck	140	165	174	168	–	–	1325
26	G4KGK						225	ck	–	213	210	ck	–	209	213	237	1307
27	GW3WWN						ck	218	188	204	–	ck	212	218	ck	233	1273
28	G0IDE						204	–	198	ck	219	–	209	222	ck	219	1269
29	G4BUO	144	ck	66	120	ck	213	207	ck	191	–	123	ck	81	–	78	1243
30	G0LKX	ck	67	98	–	105	ck	ck	156	163	147	ck	ck	151	164	175	1226
31	GW3SB	108	–	–	119	98	138	–	165	138	–	141	140	150	ck	ck	1197
32	GM3UM	105	ck	–	111	116	163	162	ck	ck	160	ck	111	–	111	153	1192
33	G0AIZ	76	74	–	94	ck	ck	ck	176	179	170	ck	134	ck	141	147	1191
34	G3VNG	33	–	130	–	120	–	–	104	141	180	–	ck	132	152	141	1133
35	G4XPE						180	–	204	–	189	141	–	168	–	146	1028
36	G0OGN						154	ck	173	153	ck	165	ck	ck	184	180	1009
37	G6QQ	1	12	28	–	–	–	156	–	179	194	–	–	78	189	147	984
38	G3YEC						248	–	244	222	ck	–	216	–	171	244	958
39	G3DPX	–	–	–	87	112	–	–	168	170	161	–	–	114	111	174	898
40	G4EBK						ck	ck	257	233	221	167	–	–	–	–	878
41	G0KKG						ck	ck	163	134	134	–	ck	134	166	141	872
42	G3SQX	–	–	120	–	–	–	–	168	102	108	153	87	–	–	111	849
43	GW0KZW	ck	70	77	ck	70	106	ck	103	ck	113	–	90	93	74	ck	796
44	G0HZG	ck	–	31	89	88	107	–	ck	109	77	90	ck	–	95	108	794
45	GM4WLN						ck	ck	129	150	131	112	119	114	–	ck	755
46	G3JJG											ck	237	234	ck	245	716
47	G0JNZ									ck	229	251	228	–			708
48	G3GMM	101	ck	127	ck	83	ck	72	122	–	99	84	–	–	–	–	688
49	G3VYI						215	254	218	–	–						687
50	G3NKC	–	–	218	261	207											686
51	G4BLI						190	ck	216	212	ck						618
52	G0NID	–	–	19	21	37	87	ck	113	90	–	47	ck	99	ck	89	602
53	GW3JSV	ck	ck	194	200	191											585
–	LA1IE	75	ck	57	88	–	30	85	96	–	–	–	–	66	–	69	566
54	G0MRH						88	ck	113	128	ck	ck	ck	76	82	60	547
55	G4ENA	208	ck	184	141	–											533
56	G0IBN											–	–	153	140	180	473
57	G4RCG	ck	ck	159	157	143											459
58	G4EIX						ck	ck	129	156	165						450
59	GW4HBK	149	–	143	156	–											448
60	G3NEO	125	–	ck	137	156											418
61	G3ZBU	ck	ck	137	126	119											382
62	G4PTE						60	48	78	–	–	–	90	45	54	–	375
63	G4JSN						–	–	122	120	118						360
64	G0AMY	130	103	–	ck	112											345
65	G3KDP											135	107	–	ck	109	351
66	G4ZYF											92	96	102	ck	–	290
67	G4UXG						–	–	–	–	157						157
–	F6EQV						–	–	–	–	105						105
68	GI4SRQ	–	–	29	–	–	–	–	57	–	–						86

Checklogs gratefully acknowledged from G0KZO, G3MCK, G3MCX, G4IQM and PA3BTH.
* = Certificate of Merit
+ = Band Leader

ROPOCO CONTESTS

1. The General Rules for RSGB HF Contests (January 1994 *RadCom*) apply to these events.

2. Dates & Times:

ROPOCO-1: 0700 - 0900UTC, Sunday 10 April 1994.

ROPOCO-2: 0700 - 0900UTC, Sunday 7 August 1994.

3. Band & Mode: 3520kHz - 3570kHz, CW only.

4. Exchange: RST only, do *not* send Serial Number. **Other Data:** For the first QSO, the entrant's own postcode. For each subsequent QSO, the postcode received from the previous contact.

5. Scoring: Ten points per QSO. Contacts with UK stations only.

6. Address and Closing Date for logs as per General Rules.

7. Awards: Certificates to the leading three entrants in both contests. Trophies to the highest-scoring entrant with a perfect (or the most accurate) log; in ROPOCO1 the Verulam Silver Jubilee Trophy, in ROPOCO2 the G3XTJ Memorial Trophy. The G5MY Trophy to the entrant with the highest aggregate score from both events.

HF CONTESTS CALENDAR - 1994.

5/6 Mar	*ARRL SSB* (Mar 94, p18)
12/13 Mar	Commonwealth (Oct 93)
19/20 Mar	*Bermuda* (Mar 94, p18)
19/21 Mar	BARTG Spring RTTY (Rules de G4SKA)
26/27 Mar	*WPX SSB* (Mar 94, p18)
2/3 Apr	*SP-DX SSB* (Mar 94, p18)
5 Apr	QRS Cumulative (Jan 94)
10 Apr	ROPOCO-1 (Mar 94)
13 Apr	QRS Cumulative
17 Apr	Low Power (Feb 94)
21 Apr	QRS Cumulative
23/24 Apr	*Helvetia (Mixed Mode)*
29 Apr	QRS Cumulative
7/8 May	*ARI DX (Mixed Mode)*
9 May	QRS Cumulative
14/15 May	*CQ-M (RSF [Russia] Mixed Mode)*

RSGB 1994 VHF/UHF CONTESTS CALENDAR

13/27 Feb	70MHz Cums (Dec 93)
5/6 Mar	144/432MHz (Jan 94, Feb 94)
13 Mar	70MHz Cums (Dec 93)
27 Mar	70MHz Fixed/SWL (Feb 94)
10 Apr	1st 23cm & 13cm Fixed/SWL (Feb 94)
7 May	70cm Trophy (Feb 94)
7/8 May	432MHz to 24GHz (Feb 94)
21/22 May	144MHz/SWL/Single/All Others (Feb 94)
22 May	1st Back Packers 144MHz (Jan 94)
4 Jun	50MHz Trophy (Feb 94)
4/5 Jun	IARU 50MHz (Feb 94)
12 Jun	70MHz CW (Feb 94)
18 Jun	432MHz FM Fixed & Open
2/3 Jul	VHF NFD
3/4 Jul	VHF Field Day
4 Jul	3rd Back Packers 144MHz
23 Jul	144MHz Low Power/SWL
24 Jul	432MHz Low Power/SWL
21 Aug	432MHz Fixed/SWL
30 Aug	144MHz CW Cums
3/4 Sep	144MHz Trophy/SWL
4 Sep	4th Back Packers 144MHz
14/29 Sep	144MHz CW Cums
25 Sep	70MHz Trophy/SWL
1/2 Oct	RSGB 432MHz-24Ghz
2 Oct	1.3GHz Trophy/SWL
2 Oct	2.3GHz Trophy/SWL
1/2 Oct	IARU 432MHz-24Ghz
4/19 Oct	1.3 & 2.3GHz Cum

For details of rules for European contests, contact G4PIQ, QTHR.

CORRECTION

FEB RADCOM

Page 83; VHF Results:

"Trophy 1993" should of course have read "70MHz Trophy 1993".

VHF RESULTS

VHF CHAMPIONSHIP 1993

This is the first time that an overall championship has been run by the VHF Contests Committee to find the top Club/Group (multi- operator fixed or portable stations) and Home station (single operator, fixed station as defined in the General Rules). Entry in this competition was automatic if you participated in one or more of the individual contests that were part of the VHF Championship. These contests were: March 144/432MHz, 50MHz Trophy, 70MHz Trophy, 144MHz Trophy, 432MHz Trophy, 1.3GHz Trophy, 2.3GHz Trophy, May 144MHz, 144MHz QRP and the 432MHz QRP. The normalised results for these contests were added together to produce the final Championship table shown below.

Over the year, almost 170 different clubs/groups and single operators entered the two sections of the Championship. The Open section ended up as a three way battle between the Northern Lights, Spalding and District Amateur Radio Society and the Victory Contest Group. Eventually the final blow was delivered by the Northern Lights when they won both the 144MHz and 432MHz QRP contests. The single operator section was equally close for a long time until G4PIQ won three contests late in the year to pip G6HKM at the post.

Congratulations to the Northern Lights for winning the Open section. They will receive the Racal Radio Cup for this achievement. Congratulations to Andy Cook, G4PIQ for winning the Single Operator section. He will receive the John Pilags Memorial Trophy for this achievement. The winners and runners-up will also receive certificates.

Ian Pawson, G0FCT

OPEN SECTION

	Group	Pts	No Ctsts Entd
1	Northern Lights	6331	9
2	Spalding & DARS	4778	10
3	Victory CG	4647	7
4	Warrington CG	3198	5
5	Three Spires CG	1694	3
6	Bracknell ARC	1674	6
7	11th Hour CG	1662	6
8	Windbreakers CG	1643	2
9	Wirral & Distrct ARC	1620	2
10	I R Dixon	1600	3
11	A1 CG	1570	2
12	Flowerpot Men	1520	2
13	Swale ARC CG	1455	3
14	South Devon RC	1192	6
15	Andrew Kissack	1000	1
16	Windbreakers & Hadrabs CG	1000	2
17	Colchester R A	933	2
18	Northumberland CG	891	2
19	M J Pemberton	821	3
20	Allen Duncan	806	2
21	Three Legs VHF CG	767	1
22	Parallel Lines CG	757	1
23	Trowbridge & DARC	718	1
24	West London ARS	666	1
25	Chris Partington	610	2
26	Peter Tribe	606	2
27	Kintyre Window Cleaners CG	597	1
28	Two Counties VHF CG	564	2
29	Atherstone ARC	533	2
30	Crawley ARC	530	2
31	Gwent UHF Group	475	1
32	West Kent ARS	470	2
33	Mid Cheshire CG	467	7
34	Scunthorpe VHF CG	453	1
35	Rob Briggs	447	1
36	Bryan Bourne	441	1
37	Tiverton (SW) ARC	393	2
38	East London Exiles	384	2
39	Stroud & DARS	379	2
40	Chepstow Wireless Society	378	1
41	UNIBOL CG	335	1
42	T S Day	322	1
43	Sam Powis	319	1
44	Caversham Contest Club	315	1
45	Wakefield & DRS	313	1
46	Radio Society of Harrow	293	1
47	Southampton University ARC	286	1
48	A D Jay	274	1
49	Horndean & DARC	266	1
50	Hereford VHF CG	258	1
51	Chesham & DARS	258	2
52	Wyre VHF Group	253	1
53	Ochil Hills CG	246	1
54	John Smith	221	2
55	David Wood	219	1
56	Far Canal CG	218	1
57	I McLuskie	212	3
58	Telford & DARS	209	1
59	Colin Redwood	200	1
60	Cambridge & DARC	199	1
61	South Birmingham RS	196	2
62	Queen Mary ARCG	167	2
63	Abingdon CG	166	1
64	R K Smith	158	1
65	Ipswich RC	157	1
66	Welwyn & Hatfield ARC	154	1
67	P J Davenport	145	1
68	Paul Bradbeer	143	1
69	Guildford & DRS	140	1
70	Peter Croucher / Mick Worsfold	136	2
71	Torbay ARS	123	1
72	South Manchester RC	119	1
73	Guernsey ARS	104	1
74	GW8AWM/P	104	1
75	D C W Hewitt	101	1
76	King's Lynn ARC	74	1
77	North Kent RS	72	2
78	Coulsdon & Wimbledon RS	66	1
79	Reading & DARC	60	1
80	Tony Crake	57	1
81	Reigate ATS	53	1
82	Great Lumley ARES	50	1
83	Martin Coles	49	2
84	Swansea ARS	38	1
85	GM4VVX/P	29	1
86	A Seago	21	1
87	Wood & Douglas CG	21	1
88	Plymouth Univ	18	1
89	P Cordrey	7	1

SINGLE OP FIXED STATION SECTION

	Callsign	Pts	No Ctsts Entd
1	G4PIQ	3000	3
2	G6HKM	2028	4
3	G0TDF	1000	1
4	G3SXR	1000	1
5	G4EQD	1000	2
6	G4KUX	1000	1
7	G4WKN	1000	1
8	G4LRT	987	2
9	G3XDY	951	2
10	G4DEZ	918	4
11	G3NAQ	789	1
12	G1GEY	766	2
13	G3FDW	709	1
14	G0NYL	684	2
15	G3BPM	617	1
16	G0NFH	577	1
17	G8FBG	531	1
18	G8ZRE	518	3
19	G3MEH	475	3
20	G3NKS	466	1
21	G6SPS	445	2
22	G0EHV	418	1
23	G3JYP	410	1
24	G4AFJ	389	1
25	GM3POI	346	1
26	G0ODQ	336	1
27	G1GHA	330	1
28	G4ZDA	321	1
29	GW3JXN	315	1
30	G0AEV	303	1
31	G1GCT	302	1
32	G4FOH	301	1
33	G4LDR	294	1
34	G3APY	283	1
35	G4OUT	280	1
36	G0ADH	261	3
37	G0RRC	247	2
38	G0SYK	247	2
39	G8ZOB	246	1
40	G7MLB	237	1
41	G4KLX	209	1
42	GM8ORG	187	1
43	G1FYC	177	1
44	G6WOI	169	1
45	G3OIL	164	1
46	G0MYE	149	1
47	G5UM	136	3
48	G6FQZ	127	1
49	G0CDA	122	1
50	G8IFU	117	4
51	GM4JJJ	115	1
52	G3JDM	112	1
53	G3RHH	100	1
54	G1TWS	99	1
55	G0TCD	97	2
56	G7OWD	93	1
57	G1OGY	87	1
58	G3YSX	76	2
59	G7OZE	73	1
60	G0SWG	72	1
61	G1KFB	66	1
62	G7AZP	64	1
63	G8JXV	63	1
64	G7GAB	59	1
65	G0HVQ	59	1
66	G7JHZ	56	2
67	G6HXU	51	1
68	G4TJE	47	1
69	G3YHF	45	1
70	G3FLI	45	1
71	GM0NXP	44	1
72	G0HDZ	44	1
73	G8CDW	28	1
74	G4DDK	25	2
75	G0LJD	17	1
76	GU4HUY	17	2
77	GM7LVJ	14	1
78	G7LSH	4	1

VHF RESULTS

10GHZ SUMMER CUM 1994

Dates: 24 April, 29 May, 26 June, 31 July, 28 August, 25 September, 30 October 1994.

Times: 0900 - 2100UTC

Rules: as 1993 with the following changes/clarifications:

1) Contest exchange is RS(T), Serial number, QTH locator (6 or 8 character IARU standard), exceptionally NGR may be sent. No QTH location is required.

2) An entrant may submit /P and home station logs, to be aggregated as one entry. For the purposes of the awards this would be counted as a /P entrant.

3) There is no restriction on the number of locations used. Where contact is made with another station more than once then only the highest scoring contact counts, even if the other station has moved and changed country prefix.

4) All logs should be submitted and the best four adjudicated scores to count.

5) Logs may be optionally submitted on computer disk to either the G4JNT or VHF Committee formats. An SAE will ensure return of the disk, if required.

24GHZ SUMMER CUM 1994

Dates: 10 April, 8 May, 12 June, 10 July, 14 August, 11 September, 9 October 1994.

Times: 0900 - 2100UTC

Rules: as 10GHz, except: 1) All logs to be submitted, the best 3 adjudicated scores to count.

DIRECTION FINDING

RESULTS OF COVENTRY HF QUALIFYING EVENT

This year's event was in fact a joint venture between Coventry and Northampton, in memory of Derrick Newman, G4AKL, and we found that we had the largest number of teams of the year competing.

It was held on the Northampton map, the start being in the NW corner of the map at Daventry Country Park. This venue provided all the facilities required by teams travelling from various parts of the country - toilets, picnic area and plenty of space for taking bearings. A few panic-stricken competitors descended on the organiser's car when he arrived at the start ten minutes before the first transmissions, but transmitter callsigns and frequencies were quickly distributed and everyone was tuned in for the start.

Transmitter A (Norman, G4KZU) was located in a small copse 12.5km from the start. The aerial ran round the trees and through every bush, bramble and swamp that could be found - however, this did not keep competitors out for very long. (Permission to locate the Tx off the footpath was given by the Althorp Estate).

Phil, G4CFG, and Bill Mays (Northampton) operated station B hidden in Hazelborough Wood approximately 23km SE of the start. We had the space here to run a very long aerial over a wide area and this proved to be very effective. Thanks to Yardley Gobion WI for an excellent tea.

Pos	Name	Club	Time of Arrival at Transmitters A	(UTC) B
1	D Holland	South Manchester	1421	1525
2	G Blomeley	South Manchester	1428	1527
3	J Hall	Ripon	1421	1529
4	B Bristow	Mid Thames	1420	1530
5	P Clark	Torbay	1447	1532
6	C Plummer	South Manchester	1421	1536
7	C Wells	Mid Thames	1420	1537
8	A Simmons	Mid Thames	1457	1547
9	B Gray	Mid Thames	1446	1554
10	M Standen	Mid Thames	1511	1557
11	G Foster	Mid Thames	1447	1603
12	A Mead	Colchester	1613	1447
13	M Hawkins	Colchester	1504	1615
14	M Mallinson	Banbury	1527	1617
15	G Nicholls	Banbury	1525	1618
16	P Tyler	Mid Thames	1524	1622
17	C Merry	Dartford Heath	1519	1623
18	R Titterington	De Montfort University	1532	1625

THE B SIMMONDS MEMORIAL ROSEBOWL

The Bert Simmonds Memorial Rosebowl is awarded to the person accumulating most points during the qualifying events for the RSGB Top Band ARDF National Final. Points are awarded on a 'grand prix' basis to the first six finishers, with nine points for the winner, six points for second and four points for third down to one point for sixth.

Name	Club	Points
B Bristow	Mid Thames	43
G Blomeley	South Manchester	18
D Holland	South Manchester	15
C Boyce	Mid Thames	13
G Whenham	Coventry	12
C Wells	Mid Thames	12
G Foster	Mid Thames	11
A Mead	Colchester	9
D Brocks	Colchester	9
M Hawkins	Colchester	8
C Plummer	South Manchester	7
A Simmons	Mid Thames	6
A Collett	Colchester	6
J Hall	Ripon	5
R Goodearl	Mid Thames	4
C Merry	Dartford Heath	4
M Standen	Mid Thames	4
B Gray	Mid Thames	4
P Clark	Colchester	4
P Cunningham	Colchester	3
G Nicholls	Banbury	2
W Pechey	Mid Thames	1

SOUTH MANCHESTER QUAD NIGHT

Date: 5 March 1994

Map: 109 (Manchester)

Assembly: 1900UTC for start at 1920UTC

Location

tre, Norris Road, Sale. NGR 798909

Competitors requiring supper should notify Dave Holland, tel: 061 973 1837, no later than 26 February.

ARDF CONTESTS CALENDAR - 1994

13 March	G Peck Memorial Trophy
27 March	1 Qualifying Event
24 April	2 Qualifying Event
27 May	3 Qualifying Event
12 June	4 Qualifying Event
3 July	5 Qualifying Event
24 July	6 Qualifying Event
14 August	7 Qualifying Event
4 September	8 Qualifying Event
25 September	National Final
29 October	E Mollart Memorial Trophy

Members' Advertisements

RSGB Members wishing to place an advertisement in this section must use the official form incorporated on the label carrier of Radio Communication. This will prove membership and must be for the current month. No acknowledgment will be sent. Ads not clearly worded, or which do not comply with these conditions will be returned. If an ad is cancelled no refund will be due. An advertisement longer than 60 words will be charged pro rata. Trade or business ads, even from members, will not be accepted. Traders who wish to use this facility must send a signed declaration that the items for sale are part of, or intended for, their own personal amateur station. The RSGB reserves the right to refuse ads, and accepts no responsibility for errors or omissions, or for the quality of goods for sale or exchange. Ads for CB equipment will not be accepted. Each advertisement must be accompanied by the correct remittance, as a credit card payment, cheque or postal order made payable to the Radio Society of Great Britain. Please note that because this is a subsidised service to members, no correspondence can be entered into. Licensed members are asked to use their callsign and QTHR, provided their address in the current edition of the RSGB Amateur Callbook is correct. RS members will have to provide their name and address or telephone number. Please include your town and phone number in the free boxes provided to assist readers. Advertisements will be placed in the first available edition of *RadCom*.

Warning: *Members are advised to ensure that the equipment they intend to purchase is not subject to a current hire purchase agreement. The 'purchase' of goods legally owned by a finance company could result in the 'purchaser' losing both the goods and the cash paid.*

FOR SALE

EXC QTH in Devon for working DX!. Unique Semi. Lounge, dining, 2 b/rooms, all mod cons. 1/3 acre, masts, antennas. Price: £85,000. Contact G3TJW, QTHR for full details and photo. (Exeter) 0392 75051.

ICOM IC720A HF Tcvr and Gen Cov Rx: £350, includes PSU and ATU, orig pkg and manuals. All gd condx. G4ZKY. (Faversham, Kent) 0795 535186.

JRC HF STATION comprising JST125 Tcvr (WARC Bands): £650. NBD500 PSU: £125. NFG97 ATU: £140. OR sell complete: £850. TenTec Argosy 525D HF Tcvr with PSU: £395. AR 900 H/held Scanner: £110. ETM8C Iambic Memory Keyer: £60. MM1000Kb ASCII to Morse Converter with RCA Keyboard: £70. Spectrum +3 Computer: £40. Buyer collects or split carriage. G0MHQ, QTHR. (Peterborough) 0733 230088.

KENWOOD R2000 Communication Rx 150KHz-30MHz all mode, virtually unused, cost £600 asking: £399. (Gillingham, Kent) 0634 379140.

KENWOOD TN241E 2M Tcvr, mint condx, never used Mobile, boxed with manual: £250. Tel: Mark, QTHR. (Belfast) 0232 795783.

MIDI OSCILLOSCOPE model CO-50C two, size 130 x 150 x 230, 3.5kg H & V gain, 30dB. Freq 20Hz - 200KHz, gd condx, 117/200v, circuit and instructions, bargain: £47. 2 Metre H/held 2W self charging, stand 144MHz to 148MHz Covers 2-4-5.6 and two Simplex, model Kenpro KP202, exc condx: £60. Phone G3AIU. (Swindon) 0473 814280.

MOVING! Must sell AR88, SX100 Scanner, Sony Cameras AVC 3250CE, Wiper 60ft Versatower, Avo Oscillator and Electronic Voltmeter, bit Fax/phone switch, free Fans. G3BGA. (Huddersfield) phone evenings, 0484 604546. daytime 0484 450982.

NAG-144XL 2M Lin Amp, 4CX350F valve, 250W o/p, fine example, full history: £300. Cushcraft AV-3 Triband Trap Vertical, excel: £40 ono. (Holsworthy) 0288 81289.

RACAL RA179Z HF Rx. Backlit with bite. 2.7 USB LSB plus full Filter compliment, as new: £1750. Signal One Milspec 1030 Professional Tcvr, 200W option. Full filter compliment: £2750. Watkins Johnson AEA Professional VLF Rx 1KHz - 600KHz, all mode, full factory service, excl condx: £750. All items in first class condx with h/books, etc. Carriage extra or collection prefered. Contact Peter, evenings. (Cleveland) 0642 816608.

SOMMERKAMP FR100B: £55. FL200B: £40. Both ono. Prefer buyer inspects. G4CMZ, QTHR. (Derby) 0332 271470.

STRUMECH Triangular lattice Tripod, especially manufactured for ground or flat roof mount of large Disc, UHF/VHF/HF Arrays, heavy duty, 5ft base footprint, H2R Rotor Head Unit, KSO65 Bearing, 12ft hight, free standing, galvanised, drawings available, as new, OFFERS. (Notts) 0602 609345.

TS50S plus AT50 Avco ATU unused: £1000. TS430 with PSU430 LS430 FM gd condx: £500. ICR7000 VHF/UHF Rx Base: £550. DJ560 D/band Handie 2 batteries, case: £250. Nevada TM1000 ATU: £75. KW1000 Linear, still going!!: £200. 486 SX25 Computer SVGA 180Mb HD, 8Mb Ram, 6X RS232, 2 FD: £900. Cobra 7.5m Yacht full electronics, gd condx, 1980, lying S/Wales: £8000 ono. Nick, G4FAT. (Malvern, Worcs) 0684 564854..

TRIO TS120S with DFC-230 external VFO, both boxed, VGC, used as standby Tx/Rx: £345 ono. Prefer buyer collects. G0KRL, QTHR. (Bury St Edmunds) 0359 70527.

70CM HIGAIN Antenna 48 ele J-Beam. 4CX250 in cavity, 19inch rack mount. Converters 4-6MHz, 28-30MHz. Offers, bits or all. G3OWB, QTHR. (Cambridge) 0223 358601.

AKD 4 Metre 25w Tcvr, new: £120. AKD 4m Base Antenna by Wallen, high quality, new: £30. Dee-Comm 5ele 4m Beam, new: £20. All the above bought one week ago and are unsuitable for this location. Ring for details. Bob. (Uxbridge) 0895 234126.

ALINCO DJ500T/E D/band H/held, Extended Rec, 20 mem, 2 Nicads, charger, Mobile charger cord, case, all boxed, manual, as new: £195. Wavecom W4010 Data Decoder, manual: £450 ono. Audio Filter W9GR/DSP, new, manual, boxed: £225. G7JAI, QTHR. (Kenilworth) 0926 54556.

ALINCO DJ580D/band Handie, c/w battery, charger: £350. Zetagi B300 300W HF Linear: £70. Kenwood PS20 PSU suit TS120V, etc: £25. Yaesu PMR Handies 2m and 70cms versions, 16ch c/w Programming S/ware and IBM RS232 Interface, batteries and charger included: £175. (Won't split) Telephone after 6pm please. GM0BRJ, QTHR. (Kilsyth) 0236 824167.

ALINCO DR590 D/band Mobile 45/35W 2m/70cm, separation kit, boxed: £425. Atari ST 4Mb, SM124 Hi Res Mon, External 1Mb Drive, many extras, H/ware, S/ware including Clockcard, Digitiser PD DTP Finance and games. All boxed: £225. Colour Monitor for Atari: £100. Mike, G7NCK anytime. (Aintree) 051 523 4140.

AMATEUR'S, we all are paying hundred's of Pounds for radio's, grudgingly buying poor cable and bent coat hangers. Lets be like the professionals and buy quality cable. For sale. Andrews LDF 4-50, please state your requirements at £1 per yard. Commercial Band-Pass Filters: £25. Azden Mobile Spkr: £20. SSB Electronics 70cm masthead Pre-Amp: £25. 1.8 Metre Satellite Dish, Offers! Please phone after 6pm. (N. Norfolk) 0328 710641).

AMSTRAD NC100 Notebook, hardly used, c/w H/book and external power supply, Word Processor, Diary/Alarm and address/data: £80. (Catterick) 0748 833073.

AMSTRAD PCW 8256 c/w S/Interface for Packet. Printer 25 way Lead and Packet S/ware included: £120. (Catterick) 0748 833073.

AMSTRAD PPC 640 Personal Computer with Modem, complete package as originally purchased. Sharp MZ80K S/ware includes Morse Tutor. Ideal for beginner. Offers GM8YUM, QTHR. (Kirkcaldy) 0592 262873.

AR2002 25-1300MHz Scanner: £150. Kenpro KR400RC Rotator and Controller, unused, 29 metres cable: £110. MET 144/6X crossed Yagis: £20. G6ZH, QTHR. (Wallingford) 0491 651259.

ATARI 4Mb Designer Programme Paged catalogue system. Recall any page and sprite to develope complex pictures. Usefull for PCB design where components, overlays and track data can be manipulated. Other uses are grapic, stock control where edit and data logging are possible: £20. Also RTTY and Morse transceive: £10 each. Mr V McClure, 43 Roman Way, Seaton Devon, EX12 2NT. Exchange Radio gdies. Phone. (Seaton) 0297 23421.

ATARI 520STFM Expanded Ram, Mono Monitor, Mouse, Joystick, Wordproc package, Amateur radio S/ware. Assorted other S/ware: £250 ono. G4TXK, QTHR. (Leeds) 0532 873628.

BAYCOM SYSTEM S/ware, H/ware and Leda 2-way Data switch +leads also Packet users guide by G6AWD, Mike Mansfield etc: £50 ono. G7ARB, QTHR. (Melton Mowbray) 0664 500814(eve).

BEAM HF 3 Element Mini Beam Amitron 20m + 10m : £80. You collect. (Bedford) 711538. (weekends).

CLARK Pneumatic Mast, Seals, Guide Pads, "O" Rings. (Medway) 0634 379140.

COLLINS KWM380 with workshop manual, Mic: £1200 ono. Kenwood TR751 2m Multi Mode 25W: £480 ono. FTV107R Transverter fitted 2m/70cm Modules: £225 ono. FC757AT Auto/manual Antenna tuner: £225 ono. Wanted 40way extender Board and 6m Module for FT107M, consider PX. Harry, G4FEQ, QTHR. (Castleford) 0977 552862.

COMMODORE 64 Computer, cassette: £40. Disc Drive: £50. Graphics Printer: £60. Various Books & Guides: £3 each. Various Discs on Ham, Wordproccessing, Data Base, Flight simulators, Mini-Office, few games, Joysticks & Mouse, mint condx: £180 the Lot, or Exchange for General Cov Rx or 2 Metre H/held, must be in gd condx. Also Kenwood 2m ATU, very small: £25. Mutek (in shack) Pre-Amp: £25. Altai Dip Meter: £25. (Pontypool) 0495 757221.

COMPLETE AERIAL Assembly. 16ft Steel Pole, Rotator, 8XY for 2 metre, 18 ele for 70cm, UR67 feeders, Control Unit: £30. Buyer collects. (Bexley, Kent) 0322 523729.

COMPONENTS for Marchwood PSU. TS120S PSU. FT75 with PSU's, AC & DC, VFO. 6ft X 1ft Triangular Mast sections. RadioVision Commander BC221 complete, AVO8, Heathkit V7A Valvevolt Meter, FT200 Tcvr, Cheetah Teleprinter. SAE for list. G3KJX, QTHR. (Northhallerton) 0609 772702.

COUNTY HUNTERS Hammond World Atlas. New 520 pages Specially USA Counties clearly coloured by State. Ideal DXing: £35 plus post. (Leamington Spa) 0926 313534.

CUSHCRAFT R5 HF Vertical Antenna, almost new, excl for DX. Neighbours force sale! Prefer buyer collects: £180. G0KYA. (Norwich) 0603 503076.

CUSHCRAFT R5 HF Vertical, Sept 1991. Neighbours don't like it in addition to my Versatower: £100. Buyer collects. G5DS, QTHR. (Surbiton) 081 390 1566.

DRAGON 64K Computer with twin 5.25 Disc drives, OS9 Operating system, books, games, Joystick, I/O interface: £100. Dragon 32K Computer with cassette player, books, Joystick, I/O Interface: £30. Eddystone 940 Rx, 0.5 - 30MHz very gd condx, offers. Ring Nick. (Birmingham) 021 559 6233.

DRAKE L4 Linear Amplifier, vgc, contains two new Eimac 3-400Z: £650 ono. Also two new boxed Eimac 3-400Z valves, offers. DX33 Tri Band 3 ele Yagi, new, boxed, surplus: £225. Chris. (Anglesey) 0248 852420.

DRAKE MN2000 2KW ATU, ex cond: £225. Datong ANF Filter: £35. Cushcraft DW3 WARC Dipole: £60. Mobile Mount for Atlas: £20. G3GGK. (Cambridge) 0954 210374.

DRAKE R4C, T4XC, MS4PSU, 3 Filters, WARCS, MN200, new PA's, all perfect, no mods: £750. TenTec 263 Corsair Remote VFO. (Leamington Spa) 0926 313534.

DRAKE TR7, PS7, RV7, service manuals, extender Boards, 250Hz, 500Hz AM filters fitted: £600. G3HVX, QTHR. (Nr Hereford) 0544 318412.

DUE TO EMIGRATION must sell complete contents of Electronic Workshop:- 21 Multi-Draw cabinets full of every kind of components, resistors, capacitors and many thousands of semiconductors. Catalogue value of components alone is around: £11,500. Would accept a bargain price for all 21 Cabinets plus their contents of: £2,500. Might negotiate a Px or loan/finance deal. View by appointment only. (Birmingham) 021 472 3688.

DXPEDITION. Have one of your own in paradisiac comfort at Great Harbour Cay, Berry Islands, Bahamas (IOTA NA54) as a guest of "The Burmuda Triangle Club". Rent: £400 per week. G4AML, QTHR. (Milton Keynes) 0908 668169. (+) (44) 908 668169.

EDDYSTONE 940: £80 ono. Cossor Melody Master model 523A. GER Mighty Midget with orig pkg. Offers! Buyer collects. (Cambridge) 0223 263994.

ERA BP34 Audio Filter: £65. Samson ETM SQ Dual Paddle Key: £30. Kenwood IF Xtal Filters; YG455C1 500Hz: £90, YK88CN1 270Hz: £40, YK88S1 2.4kHz: £40. Kenwood DC Power lead P62X: £10. Service manual TS850S: £30. Service manual DSP100: £8. Alan. (Bridgewater) 0278 456292.

FAIRMATE HP2000 Scanning Receiver 0.5 - 1300MHz, no gaps, AM/FM/WBFM: £170 or Swop for HF equipment. G3RVX, QTHR. (Bath) 0225 859195.

FILTERS. Kenwood YG-455-CN1 (250Hz, 455kHz): £90. Ten-Tec 217 CW (500Hz, 9MHz) 216 RTTY (500Hz, 9MHz) 218 SSB (1.8kHz, 9MHz): £55 each. Datong FL2: £75. (Oswestry) 0691 831111.

FREE 50FT MAST with QTH and Business. General Store on Norfolk coast. No competition, gd potential, two bed house attached, overall plot 0.8 Acre, serves 200 homes, nearest town 4 miles, schools nearby with bus pick up at shop. Aerials for 2m, 70cm and 6m, gd takeoff: £25,000 ono. Leasehold, Freehold available. Tel: Ian. (Stalham) 0692 580201.

FRG7700, FRT700, FRV7700, 140 - 170Mhz, crack in Receiver facia surround hence: £230, otherwise VGC, manuals. AKD WA3 HF Wavemeter: £25. Hi-Mound BK100 Paddle Key: £25 as new. G3OPL, 83 St James Avenue, Ramsgate, Kent (Ramsgate) 0843 597916.

FT101B original box with operating instructions: £250. KW Supamatch: £100. Or £300 for both. (Heathfield) 0435 862283 after 6pm.

FT102 c/w SP102 Spkr and Desk Mic, all VGC: £500 ono. Creed 7ERP Teleprinter + Tape Reader, Offers?. G4ASH, QTHR. (Leighton Buzzard) 0525 378580.

FT690 C/w Mic, Nicads, case, charger, handbook, in boxed mint condx: £265. WANTED Non-working FL6020/2025 for spares. G3TVU, QTHR. (Ashbourne, Derbys) 0335 343201.

FT747GX : £550. FT290 R11 M/mode: £350. PK232 MBX: £250. MFJ Versa-tuner: £100. Ham International Linear LA120: £100. Skiptech 15-20A PSU: £65. AR3000A Scanner: £650. ABIS GaAs FET Pre-amp 25-2300mHz: £30. Cushcraft A144-7 Beam: £30. Dummy Load 15-100W: £15. Boxed. Mint. Manuals. Phone Tom. (Kettering) 0536 522007.

FT901DE TRANCEIVER with Synthesized Scanning VFO FV-901 and two Metre Transverter FTV901R also Antenna Tuner FC902 with Spkr, all instructions, manuals: £850. Will not split. (Coventry) 0203 471829.

FT901DM very little used, exc condx new Band modification kit: £395. G4YMS, QTHR. (York) 0904 768686.

FTONE 0-30MHz Tx/Rx fitted all Filters, overhauled by SMC, Jan-93, mint condx, plus Yaesu ATU fitted, SEM%% Ezitune, mint: £900. SWR Power Bridge: £25. Dummy Load 300W: £50. Pye converted PMRS Olympic 70cms: £40. Europa 2m: £40. G3XSZ. (Alton) 0420 85956.

G2DAF LINEAR 80-15m 2x 813, internal PSU, c/w spare valves: £250. Buyer must collect. Alan, G3XAQ. (Canterbury) 0227 738520.

GAP CHALLENGER DX6 Antenna: £95. Gap Eagle Antenna: £100. Makita Generator 1300K, 900W 240V RMS: £175. (Dorking) 0306 883098.

GEM QUAD Antenna 10, 15 and 20 Metres: £100. Tonna 2X 19 435MHz, brand new: £30 carrage extra or by arrangement. Gerry. (Hesketh Bank) 0772 814200.

GEMQUAD Third element Kit. Four, fibre glass arms, aluminium spider etc. Covers 10, 15 and 20 Metre bands: £25. (Cardiff) 0222 757556.

HEATHKIT HW9, WARC, no Mods, c/w handbook: £230. Yaesu FT480R, c/w H/book: £240. Or £420 for both!. All in gd condx. G0LCQ, QTHR. (Devizes) 0380 723839.

HEATHKIT SB220 2Kw Linear: £350. Also 2 off 3-500s, brand new: £50 each. Drake "L" Match ATU MN2000 Incorporates SWR/Power Meter: £100. All items to be collected. G3JBU. (Northampton) 0604 401800.

HEATHKIT SB220 Linear Amp, vgc, manual: £450 ono. 2KW Hygain TB2 HF 2 ele Antenna, vgc: £80 ono. Readvertised due to timewasters. (Southampton) 0703 666133.

HF MOBILE? G-Whip (GPL259) for 15, 20, 40 plus one spare whip: £40. Amstrad 1640,

Mono Screen, twin 5.25 D/drives: £140 ono. BBC Master, Green screen, 40/80 5.25 D/drive, spreadsheet and View built in, manuals: £90 ono. G0NRO, QTHR. (Aldershot) 0252 373257.

HOWES 20 Metre Receiver, headphones, power supply, completly cased, all first class: £90. Now giving up transmitting. Write to : G4KFW, 87 Dyas Avenue, Birmingham, B42 1HQ.

ICOM 505 exc condx, boxed, manual, c/w 6 Metre 4 ele Jaybeam: £300. Tom, G7APX. (Longton) 0782 311386.

ICOM AT100 Auto Antenna Tuner: £210. Capco SPC300 ATU: £120. Capco 4:1 Balun for twin feeders: £15. Carriage Extra. G0MDZ. (Nottingham) 0636 830005.

ICOM IC251E, MuTek front-end, service manual: £350. W1SL 2x 4CX250B H/brew Amp for 144MHz with PSU: £250. Pye/Philips T414/R414 UHF Tx/Rx Units: £20 each. Pye Westminster W15FM High-band on 144MHz with Xtals: £50. Pye Westminster W15FM low-band on 70MHz with Xtals for Packet: £50. Pye F496 with manual (ideal UHF repeater): £50. Storno CQM662 with manual (ideal UHF repeater): £40. Yaesu Desk Mic: £10. 1.2 Metre IRTE Satellite Dish, polar mount, actuator, polorisor etc: £175. Band 4, valve TV Amp (YD1300) will tune 70cm for 300W o/p: £75. 1.5KVA petrol Gen: £200. BBC model B, D/drive and Monitor: £100. Qume Sprint-9 daisy wheel Printer: £40. Dowty Quattro V.21/23/22/22bis Modem: £75. Part built 4CX1000 Amp for 144MHz includes chassis with valve base, valve, transformer 2500V at 700Ma and capacitors for PSU: £200. 4CX1500 valve (under 100 hours use): £75. Buyer collects. Mike. (Worcester) 0905 619144.

ICOM IC260E 2m M/mode complete in orig pkg: £240. Pye PMR2 ideal dedicated 2m Packet Tcvr, complete: £50. WS46: £30. (Birmingham) 021 357 6139.

ICOM IC551 Base station very gd, all extras inc FM: £400. Yaesu FT650 6/10/12 Base Station, mint: £810. Bird 43 PEP Module fitted: £165. Various Scopes. 4CX250 Linear bits, transformers, EHT elects. Control Units as RadCom Dec 1987. Single 4CX250 Amp 4m: £35. Various Meters and Transformers. Other odd bits. (Kettering) 0933 318493.

ICOM IC725 HF All Mode, HM12 Mic: £575. Himound Key: £18. Solid state HF All-Mode Linear's, 300W PEP: £150, 80W: £50, 35W: £30, 2m FM 50W: £50. Regulated 5A PSU: £25. AEA 2m Telescopic Hand Portable Antenna: £20. 10M FM Tcvr: £30. Welz SWR Power Meter 1.8-150MHz: £45. G-Whip 1 Metre extension: £10. Ferguson Videostar Camera 3VO4 AC/adaptor 3VO5: £85. Avo 8 : £50. USA made Multi Meter: £20. 1.8 Metre Satellite Dish, Offers!. Please phone after 6pm. (N. Norfolk) 0328 710641).

ICOM IC726 HF + 6M, GC. Rx 5-33MHz, boxed: £750. IC2400 D/band 35/45W, boxed: £425. KW2000: £65. Hammarlund HQ-170A SSB Rx, vgc: £100. Consider Part Exch IC735, TS50. G4AFY. (Kidderminster) 0562 747480.

ICOM IC735 C/w Mobile Bracket, never used: £650. Icom ATV500: £275. Icom IC255E 2m: £125. Kenwood H/held 2m TR2500: £110. Ron, G4YRR, QTHR. (Stoke on Trent) 0782 395017.

ICOM IC735 HF Tcvr as new, manual, hardly used, as log book shows, non smoker: £650. (Dartford) 0322 370733.

ICOM ICR71E HF (Short Wave) Communications Receiver 0-30MHz, PBT, Notch filter, switchable AGC, DC-kit fitted. Exc condx: £525. IC2E Handie 2m with handbook and charger: £95. 4 Metre Module for Yaesu FTV707 Transverter: £45. Ham 5A Electronic Keyer with Bencher Key: £55. Yaesu YO-301 Monitor-Scope, exc condx, handbook: £95. Wanted D/band Handie or Moblie, also 70cms Handie. (Abingdon) 0235 532653.

JAPAN Radio Company JST-125 HF Tcvr, 9 bands 1.8-28MHz, c/w matching NBD-500 PSU and JRC CHG-43 Desk Mic, all mint condx, boxed, manual: £750. G4GTR, QTHR. (Bakewell) 0629 640475.

KENWOOD R1000 Rx: £200. KW204 Tx: £80 ono. Both exc condx. G3UKE, QTHR. (Lightwater, Surrey) 0276 472098.

KENWOOD TH26E 2m FM H/held + SMC-33 Remote Control Spkr/Mic: £140. Microset R50 2m FM/SSB 50W Linear + GaAs FET Pre-Amp: £60. Diamond DP-EL2E 7/8th 2m Vertical: £20. All boxed as new. The LOT for £200!. Complete System makes a V. Gd Base/Mobile station. Lawrence, G7LQO. (Sheffield) 0742 630793.

KENWOOD TH77E D/band H/held plus Charger, mint: £300 ovno. Also Microwave Modules 144MHz Linear MML144/100: £100. G0IBW, QTHR. (Guisborough) 0287 633816.

KENWOOD TL922 Linear, 14 months old, two hours use, orig pkg: £1,400. Perfect. G4FKR. (Winchester) 0962 880411.

KENWOOD TM78-E, D/Band, H/held, CTCSS fitted, Spkr Mic Headset with Vox: £395. (New Milton) 0425 617592.

KENWOOD TS440S fitted ATU, filters, mint, little used, with PS50 PSU and MC60 Mic: £900. PK232 MBX, mint, little used, incl S/ware: £200. G4HBD, QTHR. (Poole) 0202 767583.

KENWOOD TS450SAT c/w PSU and Mic, mint condx, one year old: £1100 ono. G0HPJ, QTHR. (Peterborough) 0733 245031.

KENWOOD TS690SAT, Auto ATU, Mic, manual, boxed as new: £1300. Contact Michael, G0SMG, NOT QTHR. (Sleaford, Lincs) 0529 304842.

KENWOOD TS950SD Tcvr: £1,900 ono. VG condx. Buyer collects. Bob Treacher, BRS32525. (London) 081 850 1386.

KLM KT34A, new sealed orig pkg: £325. AMT-3 incl S/ware, leads: £55. Bencher BY-1 Black base: £25. Global CX-401 Antenna Coax Switch: £30. Epson Printer MX80: £30. Dewsbury Supa-Key A: £25. Phone Pete, G4BUV. (Norfolk) 0953 488267.

KW1000 Linear, gd working order with H/book: £480. G4AKG, QTHR. (Croydon) 081 651 5147.

KW2000B Matching PSU, KW Q-multiplier, speech compressor, Shure 201 Mic, H/books, set spare valves, working order: £120. G3ZYQ, QTHR.

KW2000E with Power Unit, one owner: £200, plus carriage. G2FFN, QTHR. (Nr Alford, Lincs) 0507 450571.

KW2000E, PSU, Mic: £195. Hi-Gain ATU: £75 carriage extra or purchaser collects. University Student, gone QRP, insufficient room. G4RBP, QTHR. (Oxford) 0865 242888.

LINEAR AMP LK550, lot of Bottle with 3X 3-500Z tubes, 1500w PEP, QSK, QRO "for the big time", three years old, little used, cost £2132. Serious offers only. (Bristol) 0272 656783.

LINEAR AMPLIFIER MML 144/100-S 100W: £120. Daiwa infrared Mobile Mic System RM940: £25. Both units as new. (Newcastle) 091 266 6829.

LOWE HF225 Rx, very gd condx with mains Power supply: £300. Phone G3SPE. (Nr Bude) 0566 781493.

METEOSAT 95CM Spun Aluminium Dish, plus silver plated Dipole feed, mounting plate, tripod arms. Includes intrgral tubular steel patio ring: £95. Prefer buyer to collect or plus £10 delivery. Meteosat 37 ele Loop Yagi Kit by TH2 Imaging, c/w "N" Type connector and instructions: £45 plus £5 post. G0KTN, QTHR. (Melksham, Wilts) 0225 703726.

OFFERS Short Wave Mag, 59-70. Ham Radio, 83-87. Amateur Radio, 83-87. RadCom, 77-80. G3SYG. (Bangor Regis, Sussex) 0243 822000.

ONE EACH. Tonna 6 metre Five ele Beam: £10, 2 metre nine ele Beam: £20, 2m four ele Beam: £5., GG144B Colinear: £20. Commander 400 Rotator: £100. SU4000 Rotator: £50. Drae 4A Power supply: £10. Phillips Reel Tape Recorder: £10. Two, National HRO Rx, plus coils: £100. Datong Filter FL3: £75. Yaesu FRG7700: £300. Yaesu FR50B: £50. Yaesu FRT7700 Ant Tuner: £25. Three various bands Yaesu FRV7700 VHF Converters: £75. Welz SP200 Meter: £50. Datong D70 Morse Tutor: £25. ICOM IC271E 2m Tcvr, Hand and Desk Mics: £250. Manuals for all items. Buyer dismantles Antennas. Will sell as job lot for: £800 or Split. Gary, G0ENW, QTHR. (West Horsley) 0483 282808.

PC Printer Port CDROM Drive as new: £60. Also various Microsoft CD's and Computer Books. G3NPT, QTHR. (Hull) 0482 640964.

QRP STATION. Lake DTR7 ATU2, PM20: £200. Butternut HF6V: £75. G4MPK. (Surrey) 0372 375514.

RACAL RA17L Rx with steel Cabinet, GWO, maintenance manual, discriminator and L/F Units included. Buyer collects: £75. (Central Scotland) 0506 844001.

RANK WOW and Flutter Meter type 1741(valve): Sugden Distortion Analyser type SI452. Both gd order, with instruction books: £35 each. Sid, G0HTP, QTHR. (Ellesmere Port) 051 355 2833.

REALISTIC Scanner 2022, box and manual: £110. Amiga A1200 with 85Mb H/Disc fitted, boxed, manuals: £210. Amiga 500 plus external Drive, manuals: £110. Buyer inspects and collects. Peter, G0SWU. (Sutton) 081 661 1466.

REVOX PROFESSIONAL Reel Recorder model B77 Stero Amps 4-track. Needs replacement Replay heads hence only: £25, including accessories. Gd otherwise. (Cardiff) 0222 757556.

ROBOT 400 The Rolls-Royce of Slow Scan TV. Converters, central control/ storage without Computer of Rx, Tx, tape, Mic, frame grab etc. Very low hours. With Sanyo Camera with gd zoom and 6 inch National Monitor. Ready to go on air, originally £800 yours for: £400. G3RDG. (NW London) 081 346 5841.

ROTATOR DR7500R plus DC7011 Locator, over 60ft cable. Jaybeam 8X 8 ele 2m, 60ft 50 ohm Coax, new. QTH no permit. Lot: £100. (Scunthorpe) 0427 733900.

SALE. Due to loss of hearing. Icom IC761 HF Tcvr, exc condx, bargain price: £800. Trio TS711/A/E All Mode 2metre Tcvr: £200. Many extras with purchase. G4MFF, QTHR. (Brighton) 0273 303626.

SHACK CLEARANCE. Caps, Pots, Resistors, Vanguard Tcvr + spares, 2M TR7020. Send for lists. Bill, G6DJE, QTHR. (London) 081 451 1611.

SHACK CLEARANCE. Smaller QTH forces reluctant sale. FT101ZD, fan, FM, LS FC902 ATU, VGC, manuals, boxes, Homebrew Ext VFO: £575. Robot 400 Slow Scan Converter, manual, box, security Cameras, mint: £450. Pyramid 400W Linear: £75. SM202 Labatory Grade Timer/Counter, manual: £85. (Leominster) 0568 84327.

SONY ICF-SW7600 150KHz-30MHz AM/SSB, 88-108MHz FM Rx, mains adaptor, boxed as new: £95. Sem Tranzmatch with Ezitune: £50. Raycomm 13.8v/12A PS: £30. Yaesu YD148 Desk Mic: £25. (Sunderland) 091 528 2882.

SWISS QUAD for Ten metres. Compact two element design by HB9CV. Professional construction, bosses slide on 1.5 inch mast: £20. (Cardiff) 0222 757556.

TAIT T500 70cm 2ch Synth Mobile 25w: £80. Pye MX294 2m 32ch synth Mobile 30W: £80. Both tuned and working. Sharp Stereo Cassette Deck metal Tape Dolby B/C, perfect: £40. G4BAO, QTHR. (Cambridge) 0223 862480.

TEN TEC Complete Station. Corsair 2, 960 Power supply/Spkr, 229B 2KW ATU, 263G Remote VFO, all mint condx: £950 ono. No Splits. Buyer collects. AL84 Linear, mint: £250. Alinco DR112 2m 25W FM rig: £150. EP-925 PSU: £70. (Holyhead) 0407 762330.

TEN-TEC OMNI 5 Tcvr, 3 years old, Club rig, only little use: £900 ono. Details from Steve, G3OAG. (Manchester) 061 881 1850, 9am-6pm.

THIRD SECTION for 60ft Tower, plus Head Unit: £100. Tel: (Hamilton) 0698 284580 8am - 2pm.

TRIO 201A 2m Tx/Rx 25W Mobile, instructions, boxed, mint condx: £130 ono. (Weston Super Mare) 0934 510897.

TRIO 9000 2m M/mode 10+watts, boxed, manual, etc. C/w PS10 PSU, all gd condx: £265. Also available Microwave Modules 2m 50W Linear: £70. Mike, G8MMN. (Nr Warrington) 0928 787061.

TRIO TR2600E 2m H/held, c/w nicad, base, stand, PSU/charger ST2, Spkr, Mic, soft case, boxed, exc condx: £185. G0KPH. (Leamington Spa) 0926 888022.

TRIO TR751E All mode 2M Tcvr, very little used, boxed: £500 ono. G1LUC. (Oxon) 0844 281714 after 6pm.

TRIO TR9000 2m M/mode, GWO, worked LA, SM, UC2, RA3, I, and YT, old but gd: £240. G4XEN, QTHR. (Wellingborough) 0933 677573.

TRIO TS430, FM board, immaculate: £575. Kenwood TM231E 2M FM, never used mobile: £195. Versatower P60 HD Winches, buyer dismantles and collects: £375. 4-Way Co-ax Switch: £45. Stay Bearing: £18. Carriage extra. G3VOW. (Newbury) 0635 43048.

TRIO TS520S manual, spares: £350. Icom IC240 2M Mobile Tcvr: £100. Z Match Aerial tuner, RF power Meter, SWR Bridge, 12v PSU!. G4HFR, QTHR evenings. (Bishop Stortford) 0279 507480.

TRIO TS830S CW filter, VGC: £550. Kenwood TS520E, CW filter, VGC: £275. 6-Way Antenna Switch: £20. TTL Logic Probe RS(423-942): £15. Kanga Freq Marker kit: £8. Prefer buyer test and collect. Peter, G4LWF, QTHR. (Halesowen, W Mids) 021 550 5759.

TRIO TS830S with CW Filter, Mic, orig packing, manual: £525. GW0MSW, QTHR. (Monmouth) 0600 712498.

TRIO TS940S, A ATU, SP940 Ext Spkr, narrow CW filter, IF-232C /IF10B Computer Interfaces, all exc condx, original boxes: £1275. (Crawley, Sussex) 0293 520424.

TS140S, A1 condx, boxed, delivered: £650. Cash - collect (cheaper) Haggle if you like!. G3DYY, QTHR. (Nr Huntingdon) 0487 841558.

TS520S, Mic, manuals: £300. Trio AT230 ATU, boxed: £130. Yaesu FT290 Mk1, boxed: £200. MM Linear 30W: £50. Datong Speech Processor: £50. Yaesu FRG7700, FRT7700, boxed, manuals: £250. FT290 Mobile mount: £20. Adonis Mobile Mic/Headset: £15. Kenwood HS5 H/Phones: £20. ST5MC CW/RTTY Modem: £40. 2m 5ele beam: £15. Commodore C64 Datassete, PSU: £50. Commodore 1541 D/drive: £50. (Croydon) 081 689 7432.

TS530SP, CW filter: £450. KW1000C 1KW 80-10m Linear Amp, plus pair new 572B valves: £280. Both as new. (Derby) 0332 662818.

TS830S with CW filter, mint condx: £495 ono. Kenwood H/phones HS-5: £25. ERA Microreader Mk2: £100. Daiwa 1.8-150MHz SWR: £35. G3LEQ Morse Tution Tapes: £20. SEM wide band Pre-Amp: £25. SEM Rx ATU: £40. Tony, G7NZR. (Ilkley) 0943 607506.

USE IT or Loose it! Not enough 50MHz activity here, hence AKD 6001 mint and boxed: £125 ono + Whip IF collected. May consider "Two rigs for One" swap. (above rig + Yaesu FT227R) for Kenwood TR9130, vgc and un-modded. April 92 RadCom Wanted. (Stockport) 061 477 5303.

WELZ SP825 SWR and Power Meter 1.8 - 1300Mhz, gd working order, boxed, manual, can post: £130 ono. Roger, GW0UDH. (Crickhowell) 0873 811323.

WIRELESS WORLD Bound Volumes, 68/81. Bundles; PW, PE, R/Constructor, Hi-Fi, News, 60s/70s. Linsley-Hood 75w Stereo Amp, Audio Master valve Pre-Amp, Goldring GL75 Turntable/plinth, Jason Tuner, 50 x 7inch Reels Audio tapes, Kef Bass Drivers X2 (Active enclosure) Homebrew. Offers! G0AHC, QTHR. (Birmingham) 021 458 2946.

YAESU 2m H/held, charger, spare battery, soft cover, instruction book, all gd condx: £140. BNOS Linear Amp LPM 144, 10W in, 100W out, boxed, instruction, manual, little used: £110. Bell Sonic PSU 13.8v at 3A: £15. 2m Power Amp, 10W in, 40W out, circuit, all details included: £35. (Nelson, Lancs) 0282 618548.

YAESU 902DM perfect order: £575. Hi-Mound Bug Key, new: £25. Kent Paddle Key: £30. KW Ant Switch: £10. New Pair 7MHz Traps: £15. 3 ele Tri-Band HF Beam: £150. SWR/PWR Meter: £15. Misc Desk Mics: £20 each. 7 ele Cushcraft VHF Yagi with Rotator and cable, one month since bought new: £60 complete. Mostly all boxed, prefer buyer collects or carriage extra. Jack. (Barry) 0446 747223.

YAESU FT101ZD HF Tcvr, 9 band, FM fitted, gd condx: £330. G0DGB, QTHR. (Durham) 091 384 7306.

YAESU FT101ZD HF Tcvr, fitted FM board, fan, Mic and manual: £375. Matched pair 6146B General Electric tubes, unused: £40. (Ipswich) 0473 612657.

YAESU FT101ZDFM, fan, etc, FTV901R Transverter with 144MHz, FV901DM Ext VFO, SP901 Spkr, FC902 ATU, T-200 Dummy Load: £950 ono. Will split. IC2E with charger, Boom Mic, mag mount and two Mobile antennas: £100. Encased 28MHz Cobra 148GTLDX c/w 100 watt Amp and Spkr: £120 ono. Microwave Modules 144MHz 10/100watt Amp: £100. Owner emigrating. Call Mike. (Evesham) 0386 831508.

YAESU FT200 HF Tcvr 80 - 10m, 100W, exc condx, new valves, in regular use, Mic, handbook: £200. Prefer buyer collects. G3TZO. (Malpas) 0948 770429.

YAESU FT200 HF Tcvr with PSU, ATU, SWR Bridge, Manual, Mic: £210 ono. Steve G4ZUL, QTHR. (Basildon) 0268 541251.

YAESU FT290R, BNOS Electronics 8A PSU, Micro/Mods 30W Linear, Zegati mod 430 PWR/SWR Meter, ATU 100W H/B: £325. (Rye) 0797 222011.

YAESU FT401DX Tcvr with pair new 6KD6's c/w matching Yaesu Desk Mic: £170. Europa 2m Transverter 10m IF: £70. Martelec Weather Satellite Rx for both orbiting and stationary reception c/w Satellite dish LNB and timestep PC5AT 2 Program and PC Card: £400 or Swap for D/band Storno. 4m FM Rig 2 chan Xtalled: £25. All VGC inspect/ collect. Dave, G0MJK, QTHR. (Northampton) 0604 711647.

YAESU FTDX401 plus spare O/P valves: £125. Kenwood TR2400 plus Base and Mobile chargers: £75. Kenwood TH21BT (U.S. Spec), Tx OK, Rx bad: £15. Tandy model 100 Portable Computer with datacorder, splitscreen, W/processor and Rom based S/sheet. Great for Packet: £100. G4HIY, QTHR. (Huntingdon) 0487 823451.

WANTED

ANEMOMETER with Remote Read-out. Condx immaterial if in gd working condx. (Gillingham, Kent) 0634 379140.

BOOKS Conference Proceedings Agard/dsir reports etc on VLF/HF/VHF to SHF Propagation, Antennas, Systems and telecomms. Rang before? Please ring again! Answerphone erased messages from ? Cardigan and John? in Crawley! The next time I know how to save your messages! Bob, G3REP. (Steyning) 0903 879083.

REGULATORS MC1469R, MC1569R. Intergrated Circuits MJ1445, L120AB, UA726H, UA727H, UA78HGASC and MJ2812, Wanted Urgently. Phone Peter. (London) 081 694 0330 daytime or 081 857 4084 evening.

MEMBERS' ADS

SHIMIZU SS105 Transceiver, c/w FM Board, in gd working order. Harry, G4ZJB. Evenings only. (Sheffield) 0742 746464.

2 METRE H/held Tcvr for £40 or Under. G3LYV. (Coventry) 0203 413438.

40M BEAM Antenna 2 or 3 elements. Would consider a Tri-Bander with 40M add-on. (Glasgow) 041 639 7700.

60FT TELESCOPIC Tiltover Tower, any make considered. Must be in gd condx. Cash waiting. Please ring anytime. Luis, G0KJV. (Blackpool) 0253 22987.

ADMIRALTY PATTERN 1942 Tuner Amplifier B13 1309K 1942 Tx/Rx Unit 4S. Any information or parts write: Oaklands, Avenue Road, Brockenhurst, Hants SO43 7RT. (Bournemouth) 0202 434346.

ATLAS 215X 180 any Atlas bits, Mobile mount, Base Console, Xstal box, anything Atlas. Contact Dave, G3RCQ, QTHR. (Romford) 0708 374043.

AUTO ATU (Remote) Type, must be able to handle 1KW. Would help to be able to tune open wire feeders, but this not essential. (Edinburgh) 031 447 9979.

BBC B Amateur Radio Programs Discs. Copy - buy, will pay postage. Please contact GW1TDX anytime. Tel (Treorchy) 0443 772271.

COLLINS 51-S-1, 51-J-1-2-3-4, 32-S-1, 75A1, KWS-1, KWM380 65-1S-1 Rx gd condx. Also wanted 390A first class condx. (Heathrow) 081 813 9193.

COLLINS KWM2 a late model required with 230v power supply. Would consider S-Line. Contact Gerry, G0AQH. (Brighton) 0273 454108.

COLLINS MECH Filter F455 FA05 also Collins 51S1 75S3 B/C must be in gd condx. All gd condx Collins gear considered. G3GBB. (Suffolk) Home 0379 783657, office 0284 753049.

DRAKE MS4 to power TR4C or T4X needed urgently. G4KME. Phone (Stoke) 0782 503444 or (Wakefield) 0924 255937.

DRAKE W-4 Wattmeter 1.8 - 54MHz. Will pay £30 plus postage for one in gd condx. G3TKR, QTHR. (Keighley) 0535 645574.

EDDYSTONE MF/HF Receiver such as 940, 730 or similar, non working, damaged or incomplete for chassis and tuning mechanism. Also Heathkit RG1 Rx. Tony Woodward. (Worcester) 0905 641759.

EDDYSTONE RADIO'S EC10, EC10 Mk2, EB35, 820, 960. £10 each offered for scrap receivers. Will pay cash. Collection possible. Fax 0372 454381. (Surrey) 0374 128170.

FV102DM YAESU External VFO, in gd condx. Price including postage to NZ to ZL1NZ. John Blyde, R.D.2 Waihi, New Zealand.

HANSEN FS710H Peak Reading Power Meter, Auto SWR or similar Meter. Also Dummy Load 600W or greater. (Wrexham) 0244 570738.

HEATHKIT MOHICAN Radio construction manual and circuit. Loan or buy. All costs met. (Hemel Hempstead) 0442 253792.

HRO w/all Coil Sets, 50kHz - 30MHz in exc condx. WW2 German ex-service Equipment. For Sale. Collins 51JY Rcvr w/3 Mech Filters: £350. OZ8RO. RAE Otterstad, Hosterkobvej 10, DK-3460, Denmark. (Birkerod) 010 45 4281 5205.

HW7-8-9 Unfinished Kit or Non-working but complete Ten Tec 22. G3KJX, QTHR. (Northhallerton) 0609 772702.

IC202 SSB/CW Tcvr must be VGC, cash waiting. Also FC902 Aerial Coupler required. Telephone, eves and weekends, G4IDF. (Worcester) 0905 351568.

IC725/6 with CW Filter. Azden or Similar 2m FM Tcvr with Airband Rx. Eureka and S-phone for private collection. WHY? G4NCE. (Birmingham) 021 357 6139.

KANTRONICS DATA Engine wanted. Smith, G4AJJ, QTHR. (Scarborough) 0723 371509.

LF/HF SIGNAL GENERATOR. Prefer Digital Readout. Reliable 50 Ohm Attenuator necessary. Also Marconi TF2000 Audio Oscillator, dead or alive. Collection possible. (Crawley) 0293 885701.

MULLARD Audio Amp and Tape Deck Manual, circa 1955-59. Buy or borrow or photo copy. G3AGZ, QTHR. (Chesham) 0494 782604.

PRO2001 SCANNER GWO must cover 30 - 50Mhz Band. (Colchester) 562430.

PYE, EMI, Marconi TV product Catalogues , 1950 - 1980 for research. Also circuit for Tektronics "ITS" Gen model 148. Phone Brian, G8GQS. (Uxbridge) 0895 810144.

QUAD LEAK Radford etc Valve Hi-Fi Equipment. Working or not. Will Pay cash and collect. (Chelmsford) 0245 260027.

RACAL MA79 Drive Unit. Racal MA90, 91 + 92 Units. TS174 20-250MHz Hetrodyne freq Meter. Manuals for Type 78M Wobbulator, made by Samwell & Hutton Ltd. (Timberland, Lincs) 0526 378685.

RACAL RA1779 Handbooks (3 Vols). Your price paid for originals. Also Ext Interface input Board DA78271. Racal Active Antenna AE3002. (Shrewsbury) 0743 884858.

SGC SMARTTUNER SG-230. Information and user experience required for this unit. All expenses will be refunded. GM4LBE, QTHR. (Lerwick) 0595 4270.

SM-220 Kenwood Station Monitor, if possible with BS8. Also Microwave Modules Transverter for 50MHz, 144MHz, 432MHz, and 1296MHz. Write to Tiago J Frederico, CT1WW Nagoselo Do Douro, 5130 S Joao Pesqueira, Portugal. (Portugal) 54 44102.

STUMECH VERSATOWER P60 wanted, Preferably complete, rotator and Head Unit. Cash waiting. Graham, G0SUB, QTHR. (Stroud) 0453 757467 or FAX 757414.

T AND R BULLETINS prior to July 1935. Condx immaterial as long as text is complete. G8BQX, QTHR. (Hastings) 0424 429965.

TRIO TX599 Transmitter. Also Trio Matching Spkr for JR599. Please phone after 6pm. GI4RYP. (Armagh) 0861 524267.

VALVE LINEAR Amplifier 2m 50W, 70cm 100W or WHY. Working or in need of repair. Contact Bob, G8ATE, QTHR. (Leicester) 0533 392842.

YAESU FC902 ATU and YAESU FL2100Z Linear; Sale, P/ex FL2000B TS120S AT130 also need 13 ele Tonna and SW2100 Modules. G0HAS. (Trowbridge) 0225 763923.

EXCHANGE

DENTRON Kilowatt ATU 160-10m Balanced/Unbalanced. Offers? G3TPW Cobweb B Antenna, unstable this location, offers? (Salford) 0529 413547.

INFORMATION by Telephone Bulletin board System. No charges! Extensive choice of files. 'The Wizard' (0704) 821420 (24hr). 'Amateur Advert' 051 524 3407 (10pm - 8am). Both BBS located in the North West. Sysops G7EVY and G0LZX.

EVENTS DIARY

CLUB NEWS

DEADLINE - Items for inclusion in the May 1994 issue must be sent to HQ marked "Club News - DIARY", to be received by 28 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

NORTH BRISTOL ARC - 18, Setting up a Packet station; 25, How to use a Wave Meter. Tuition for RAE and Morse is available at every meeting. Club meets every Friday at 7 Braemar Crescent, Northville at 7pm. Details 0272 513573.

RSGB CITY OF BRISTOL GROUP - 28, talk 'Cosmic Horizon' by John Meacham. Details G4NKT 0272 672124.

SHIREHAMPTON ARC - 4, Wonderful World of Weather Satellites by G4NAQ; 18, VHF Test Equipment(check your rigs emissions) by G4DPJ; Apr 1 & 8 (Easter), Club Closed. Details 0272 770504.

SOUTH BRISTOL ARC - 2, 15m Activity evening; 9, Aviation Video evening; 16, First Aid in Home & Resuscitation; 23, Display of Members Morse Keys!; 30, "How to build your own P.C" by Len, G4YZR. Details 0275 834282.

WESTON-SUPER-MARE - 7, Bring & buy Sale; 16, Workshop night; Apr 4, talk 'Incidents not Accidents-Radio operating on a commercial airliner' by John, G0JQN. Details 0934 415700

BEDFORDSHIRE

SHEFFORD & DARS - 3 & 17, Members activity night; 24, Junk Sale; 31, Members activity night. Details 0462 700618.

BERKSHIRE

MAIDENHEAD & DARC - 3, Quiz - against Reading DARC at home; 15, Annual General Meeting. Details 0628 25952.

NEWBURY & DARS - 23, Talk by Rob Mannion, G3XFD, Editor of Practical Wireless. Details 0635 863310.

BUCKINGHAMSHIRE

AYLESBURY VALE RS - 2, Quiz with Chesham & DARS at Chesham; 16, Annual General Meeting. Details 0296 81097.

CHESHAM & DARS - 2, Quiz with Aylesbury Vale RC; 9, General meeting; 16, Talk 'VHF Weather Satellite Reception' by Terry, G8AHS; 23, talk 'Computers in Amateur radio (Pt 1) by Alan, G6CDV; 30, Video evening. Details Ian, G0RTF 0494 676391.

CAMBRIDGESHIRE

CAMBRIDGE & DARC - 4, Talk by Mark Francis of Waters & Stanton; 11, Great Egg Race event; 18, Constructors and Radio Bygones evening; 25, Annual General Meeting at 7.45pm. Details 0763 243570.

CENTRAL

DOLLAR ACAEMY ARC - Meets most afternoons at the Academy after 5.15pm. Details GM0LOD 0259 742126.

STIRLING & DARS - Meets every Thursday at 7.30pm in the Clubrooms, Bandeath Industrial Estate, Throsk, Nr Stirling. Morse instruction available when requested. Details 0324 636235.

CHESHIRE

MID-CHESHIRE ARS - 2, Construction/On-Air night; 9, Talk by Bob, G4UJS of the Northern Lights Contest group; 16, "Cairo" night; 23, Quiz night; 30, Video night. Details 0606 331210.

STOCKPORT RS - 9, talk 'Amateur Satellites' by Neville, G3AUB. Details 061 439 4952.

STOCKPORT RS COMPUTER GROUP - 4, Q & A on Radio and Computers; 11, Multi Media by G0HJQ; 18, Computer set-up procedures by G0HAL; 25, AmTOR/PacTOR demonstration by G3KAF. Details 061 439 4952.

CLEVELAND

EAST CLEVELAND ARC - 4, Project - making a Slim Jim Antenna; 11, VHF/UHF NoA; 18, Talk 'Maps, Navigation and the Locator System; 25, A CW evening. Details 0642 475671.

CLWYD

RHYL & DARC - Club meets every 1st and 3rd Monday of each month, WRVS Centre 116, Vale Road, Rhyl at 8pm. Details 0745 351362.

CO DOWN

BANGOR & DARS - 4, Presentation on "Basic Computing" by Gordon, GI6FZI. Bangor Tech College, room A13 at 8pm. Details Keith, GI0SSA 0247 883315.

CORNWALL

CORNISH RAC - 3, Packet Radio by Mike, G4WQL. Details 0209 820118.

NEWQUAY & DARS - **Change** Meeting day to be changed from alternate Wednesdays to alternate Friday. Anyone intersted in Amateur Radio is welcome to attend. Details G0KEM 0726 882752.

PENZANCE RAC - Hold regular meeting on Monday. Details Brian, 0736 61427.

POLDHU ARC GB2GM, GX0PZE - Regular Meetings Tuesdays and Fridays 7.30pm. Visitors welcome. HF net Wednesdays 7.30pm around 3.75MHz. All welcome. Details 0326 290638.

SALTASH & DARC - 4, Visit to the local Airport ATC (Subject to confirmation and numbers); 18, Pre-Planning the Spring Field Day. Details 0752 844321.

CUMBRIA

EDEN VALLEY RS - 31, Annual General Meeting, followed by presentation of Constructors Trophy. Club meets, odd months at BBC Club, Penrith. Details 07683 52106.

DERBYSHIRE

BUXTON RA - 8, Construction night; 22, Why is CW (Morse code) better than Phone. Details Derek, G4IHO on 0298 25506.

DERBY & DARS - 2, Surplus Sale; 16, The Crich Tramway Museum - illustrated talk by Bob Hall; 23, Annual General Meeting; 30, Illustrated talk 'Designing Receivers' by John Wilson of Lowe Production Ltd. Details Hayley, G7PXA 0773 856904.

DEVON

AXE VALE ARC - 4, 'Ballistic Missile development' by Doug Hall, G5JJ. Details Pat 0297 33756.

EXETER ARS - 14, Construction Competition. ***NEW VENUE** Club now meets in the Moose International Centre, Blackboy Road, Exeter. Details from Ray, G3YBK 0392 78710.

EXMOUTH ARC - ***The Club's meeting place HAS NOT changed.*** (contrary to February's RadCom) it is still "The Scout Hut, Marpool Hill". - 2, Talk on 'QRA Locators' by G4BQH; 16, A Video evening; 30, A 'What is it?' evening. Details 0395 279574.

PLYMOUTH RC - 1, Agony night; 8, Table Top Sale; 17, Visit to Brixham Coastguard Ops Room; 22, talk by Lifeboat Crew Member(standby talk on 'pressures of the CW exam by the examiner'); 23, Visit to Crownhill Police Station Comms Room; 29, Talk on the pressurers of the CW exam by the Examiner(Standby talk by Lifeboat Crew member). Details Frank, G7LUL, 0752 563222.

TORBAY ARS - 5, Annual Dinner & Dance; 18, Talk by Peter Thornhill. Details Walt, G3HTX on 0803 526762.

DORSET

FLIGHT REFUELLING ARS - 6, Vintage Radio evening; 13, DX Packet Cluster by G0OFE; 20, Island Chasing by G4WFZ; 27, Guest Speaker - TBA. Details G4POF 0425 653404.

SOUTH DORSET RS - 1, Annual Bring, Buy & Barter event. Meets 1st Tuesday of every month. New members and visitors welcome. Details from Mike, G7HNY 0305 773860.

DYFED

ABERYSTWYTH & DARS - 10, Video "Skywatching" and Discussion evening; 12, Bring & buy Sale of Surplus Radi Equipment at Aberaeron Youth Club. (Talk-in S22); Club meets 2nd Thursday each month at 8pm, Scout Hut, Plascrug Avenue, Aberystwyth. Details 0545 580675.

EAST SUSSEX

CROWBOROUGH & DARS - 24, The biggest "Aspidistra in the World BBC' overseas broadcasting by Les, G3FET. Details Mike, G6UUO 0892 661807.

HASTINGS E&RC - 16, Annual General Meeting. *** Main meeting now held at the West Hill Community Centre, 3rd Wednesday of each month***. Details G3YYF 0424 830454.

SOUTHDOWN ARS - 7, Talk 'Communications in the Fire Service' by G4KAR. Details 0323 484282.

WORTHING & DARC - 2, Computers by G7OBD & G7OBE; 9, Club Dinner; 16, Video "DX-pedition to Jarvis Island"; 23, Alignment by G3UFS. Details 0903 753893.

ESSEX

CHELMSFORD ARS - 1, Telemetry at Anglian Water by Alan Sargeant; Details G0GJS 0245 260831.

COLCHESTER RA - 10, Contest and Why by Alan, G0EGX and Dave, G1OGY; 12, Morse Test in the Committee room, 10am, Booking in advance to RSGB HQ; 24, Travel in China by Adrian, G4HPU. Details 0206 764034.

LOUGHTON & DARS - 4, Packet Radio update by John, G8DZH; 18, Voice procedures on Aeronautical Airwaves by Tony G0LWM. Allvisitors are welcome. Details 081 508 3434.

VANGE ARS - 3, Junk Sale; 31, Easter Buffet (Members & Guests ONLY). Details 0268 552606.

GRAMPIAN

ABERDEEN ARS - 4, Junk Sale; 11, Talk 'Measurements and Test Instruments'; Apr 1, Junk Sale. Details GM7PXW 0224 780591.

MORAY FIRTH ARS - Club meets every Thursday at 7.30pm. Details 0343 86395.

GLOUCESTERSHIRE

CHELTENHAM ARA - 4, Constructors Contest. Meets 1st Friday of each month at Charlton Kings Library. Details 0242 242336.

GREATER LONDON

ACTON, BRENTFORD & CHISWICK RC - 15, General Awards and discussion evening. Details 081 749 9972.

BROMLEY & DARS - 15, Minature Antenna Demonstration by Ian Daniels and Jim Burr. Details 081 777 0420.

CLIFTON ARS - **NEW VENUE**, Kidbrooke House Community Centre, Room 9, 90 Mycense Road, Blackheath, SE3 7SE. (between Blackheath and Greenwich). Details 081 859 7630.

COULSDON ATS - 14, The History of Cameras by Chris, G0KEB. Details 081 684 0610.

CRAY VALLEY RS - 3, Annual Construction Contest; 17, RSGB Video(tba); Apr 7, Talk 'Test Equipment' by G0FDZ. Details 081 850 1386.

CRYSTAL PALACE & DRC - 19, Lecture 'Computers in Amateur Radio' by Tony, G0IAT. Details 081 699 5732.

EDGWARE & DARS - 10, Amtor by Hank, G0FAB; 24, Morse Training/NoA. Details 081 204 1868.

GRAFTON RS - 9, Talk & Demonstration by Keith, G3MCD 'Weather Satellites'; 23, Evening on the HF bands, first half hour is Morse tuition; 25, Annual Dinner at Middlesex University. Details 071 272 2328.

SILVERTHORN RC - 4, Preparations for RSGB London Amateur Radio & Computer Exhibition; 11 & 18, NoA; 25, Junk Sale. Club meets every Friday at 7.30pm. Details Dave, G0KHC 081 505 1871.

SOUTHGATE ARC - 10, Talk 'The Training of WW2 Bomber Air Crews' by Tom, G4PSY; 11, Show set-up day; 12/13, London AR & C Show - Pickets Lock; 24, Club visit & lecture at Kings College, London. Details 081 360 2453.

SURREY RCC - 7, Surplus Sale. Details 081 660 7517.

SUTTON & CHEAM RS - 17, Talk entitled 'The 7th Cavalry, The Pogo-Stick and guide to personal Communications' by Brian, G8DIU; 19, Annual Dinner at Sutton United Fc. Details John, G0BWV 081 644 9945.

WIMBLEDON & DARS - 25, Top Band DF. Details 081 540 2180.

GREATER MANCHESTER

ECCLES & DARS - 1, Lecture 'Wordprocessing using Wordperfect' by G8KRG; Apr 5, Discussion 'HF NFD Contest'. Details 061 773 7899.

SOUTH MANCHESTER RC - 4, Talk 'Wizard of Menlo Park' by G4IRB; 11, TRF Receiver part 2, by G0KJK; 18, Pulsars - the Timekeepers of the Universe' by Ian Morrison; 25, Surplus Equipment Sale. Details 061 969 1964.

TAMESIDE ARS - Club now meets on Wednesday nights at 7.30pm at the ATC Hut, Moorcroft Street, Droylsden, Tameside. Details from: A N Laughlan, 8 Kempton Close, Droylsden, Tameside, M43 7JL.

GWYNEDD

DRAGON ARC - 7, A technical Demonstration by Geoff, GW4DRR; 21, Videos on Electricity Distribution arranged by Norman, GW0MKP; Apr 4, Surplus Equipment Sale. Details 0248 600963.

PORTHMADOG & DARS - 17, Ffestiniog Railway Signals by Alan, GW0SAU. Details 0766 770546.

HAMPSHIRE

ANDOVER RAC - 1, Global Positioning Systems by Brian, G4NNS; 15, Natter night; Apr 5, Surplus Equipment Sale. 1st and 3rd Tuesdays of each month. Details 0264 773547.

FARNBOROUGH & DRS - 9, Open evening for

RAE students; 23, How I started on Packet Radio by Neville, G4SPD. Details 0252 715765.
HORNDEAN & DARC - A talk by Keith Ridley, Deputy Editor of 'The News', a Portsmouth area newspaper; Apr 7, Ordance Survey by Ray Tarling. Details 0705 472846.
ITCHEN VALLEY ARC - 12, Annual General Meeting; 26, Annual Surplus (junk!) Sale, with small gen items Bring & buy. Details 0703 732997.
WATERSIDE ARS - 22, Talk 'Digital Radio Techniques' by Phil, G6DLJ. Details 0703 843491.

HEREFORD AND WORCESTER

BROMSGROVE & DARC - 11, Annual General Meeting. Details 0562 710010.
BROMSGROVE ARS - 8, Talk 'Radio Amateur Relief Expeditions' by G0PMF; 22, Night on Air - Invitation to Scouts/Novices. Details 0527 542266.
HEREFORD ARS - Club meets on first and third Friday of each month. Details G4MET, QTHR.
VALE OF EVESHAM RAC - 3, talk 'Radio Amateur Relief Expeditions' by G0PMF. Details 0386 41508.
HEREFORD WOODPECKER ARC - . Details 0432 277591.
REDDITCH RC - 10, 'Sounds of Yesterday' Exhibition. Club meets 2nd Thursday each month. WRVS Centre, Ludlow Road at 8pm. Details 0789 762041.

HERTFORDSHIRE

CHESHUNT & DARC - 2, natter night; 9, Junk Sale; 16, Mem forum & natter night; 23, UFO's - What & Why? by G0TEO; 30, natter night. Details 0992 464795.
HODDESDON RC - 3, Preparation for London AR Show; 17, Visit to Martin Lynch's Shop in Ealing; 18, Annual Dinner; 31, Talk & demo 'Fast Scan TV' by Adrian, G0OJY. Details John, G7OCI 0920 466639.
STEVENAGE & DARS - 1, General get together to discuss projects and events; 8, Junk Sale; 15, Quiz night; 22, Video evening; 29, Radio Experiences (Stories from the past). Details 0438 350882.
VERULAM ARC - 22, Memorial Lecture, SAREX manned operations from space by Doug Loughmiller, G0SYX. 7.30 for 8pm. Visitors welcome. RAFA HQ, NewKent Road, St Albans. Details 0727 859318.

HUMBERSIDE

GOOLE R & ES - 4, On Air - UHF hosted by G6YYN; 11, Annual Junk Sale, start 8pm; 18, Contest Planning, by G8ZCS; 25, social evening. Details 0405 769130.
GRIMSBY ARS - 3, Barry's Construction evening(follow on); 17, RSGB Video evening; 31, Chairmans talk, construction of a club transmitter. Details 0472 825899.
HORNSEA ARC - 16, Lecture 'Simple Antenna at restricted site' by G0DEB; 23, A DIY PC by G3RMX. Details 0964 534283.

KENT

DARENTH VALLEY RS - 16, Talk by G3DCC; 30, Annual General Meeting. Details 0474 703322.
DOVER RC - 2, Novice evening; 9, ATV by G8ZYZ; 16, natter night; 23, Construction Contest; 30, NO MEETING. Club meets Wednesday evenings 18.30 - 22.00 during term time. Novice, full RAE and Morse classes. All ages (over 8) welcome. Details 0304 825030.
EAST KENT RS - 3, Annual Junk Sale at Parkside (No Novice class); 17, (At Icom, 8pm) Talk 'How I became a Radio Amateur' by Alf, G3NNK. Details 0227 364606.
HILDERSTONE RS - 4, What brought me into amateur radio; 11, Equipment Sale; 18, Practical evening - Power Supply 0-20volts; 25, Quiz. Details 0843 869812.
MEDWAY AR & TS - 4, 'Boxing Contest' by Gloria, G7OVI; 18, 'Morse, for better or worse? by "Smudge", G3GJW. Details 0634 710023.
SEVENOAKS & DARS - 21, Desk-top Publishing by Ray Petri. Details 0634 710023.
WEST KENT ARS - 4, informal; 18, Bring & buy; Apr 1, NO MEETING. Details 0892 664960.

LANCASHIRE

BURY RS - 8, Presentation by the ISWL; 15, 22, discussion & Operating; 29, RSGB video. Details 0204 883212.
FYLDE ARS - 8, Preparations for NARSA Rally; 22, informal. Details 0772 635464.
NORTH SEFTON ARC - Meets 2nd Wednesday of each month. Details G1DFT on 0704 579017.
ROCHDALE & DARS - 21, talk 'Lego Bricks PC' by G3RIK. Details 0706 376204.
THORNTON CLEVELEYS ARS - 7, Crime Prevention; 14, Final preparations for Norbreck Rally; 21, Talk by Mike, GD0HYM; 28, informal evening. Details from G4BFH, QTHR.

LEICESTERSHIRE

LOUGHBOROUGH & DARC - 1, Computers & Things; 8, Junk Sale; 15, Talk 'Speakers' by Ian, G8SNF; 22, Slide show 'Kenya' by Val Williams. All welcome; 29, HF and Club Aerials meeting. Details Loughborough 218259.

LINCOLNSHIRE

GRANTHAM RC - 1, Club Quiz; 15, Sine Waves, Decibals and falling off 'logs' by Mike, G3PJR; Apr 19, Visit to Lincolnshire Police HQ - name to Secretary now!. Details 0476 65743.
LOUTH & DARS - meet on 3rd Tuesday in month at The Wellington, Louth.. Details G1XWD, QTHR.
SPALDING & DARS - 13, Junk Sale and auction. Held at the Community Hall, Spalding Common. Details 0775 750382.

MERSEYSIDE

LIVERPOOL & DARS - 1, Astronomy; 8, Club on the Air; 15, History of Computers; 22, The Mark 123 Spy Set by G3XSN; 29, Surplus Sale. Details 051 722 1178.

MID GLAMORGAN

RHONDDA ARS - 3, Amateur Radio films evening at the NUM Club, Tonypandy at 7.45pm. Details 0443 440680.

NORFOLK

DEREHAM ARC - 10, Talk 'Fax machines, how they work' by G0FVG. Meets at the St Johns Ambulance Station, Yaxham Road, nr new Tesco in Dereham. Details 0362 691099
ARC FAKENHAM - 1, ATV Demonstration by Mark, G0LGJ. Details 0485 528633.
NORFOLK ARC - 2, Safety in the Shack by Arnold, G3PTB; 9, Construction QRP, Morse practice; 13, Coach trip to Picketts Lock; 16, First HF NFD briefing; 23, The making of 'Anglia at War' by Richard Kennan. Special, Numbers are restricted, names to Sheila ASAP; 30, Annual General Meeting - Please support your club. Details 0603 618810.
YARMOUTH RC- 3, informal; 10, Early Detection systems; 17, informal; 24, Pulling signals out of the noise; 31, informal. Details Yarmouth 721173.

NOTTINGHAMSHIRE

ARC OF NOTTINGHAM - 3, Forum & NoA; 10, Talk "Tuning the Club's HF rig and Amplifier" by Trevor, G0IXR; 17, tba; 24, Construction/activity night; 31, The Annual Construction Exhibition and Competition night. Details 0602 501733.
MANSFIELD ARS - 14, Junk Sale. The Polish Catholic Club, Off Windmill Lane, Woodhouse Road, Mansfield at 7.30pm. Details 0623 755288.
SOUTH NOTTS ARC - 4, Construction + On Air(HF, VHF); 11, Anatomy of an IBM PC by Gary, 2E1BKB; 18, Construction +; 25, Open Forum - Mem only. Details 0602 216342.

NORTH YORKSHIRE

HAMBLETON ARS - 3, RAE Course; 10, Talk 'Elements of Aircraft Gyroscopic Control & Navigation Systems' by Gordon, G3DJE; 17, RAE course; 24, Practical/ Ops night. Details 0609 776608.

OXFORDSHIRE

OXFORD & DARS - Meets 2nd and 4th Wednesdays of the month. Details 0865 863526.
VALE OF WHITE HORSE ARS - 1, Meeting. Meets 1st Tuesday of every month, 8pm, the Fox, Steventon. Visitors Welcome. Details 0235 531559.

SHROPSHIRE

SALOP ARS - 10, A discussion on Construction Projects by Terry, G8DIQ and Paul, G7LRB; 24, Final talk on construction Projects by Paul and Terry; 31, A talk 'Packet' by Don, G3UQH. Details 0743 361935.
TELFORD & DARS - 2, Club equipment available; 9, Construction competition; 16, talk/demo by JANDEK; 23, Pre-AGM meeting; 30, 25 Anniversary Annual General Meeting; Apr 6, Morse and equipment evening. Details 0952 588878.

SOMERSET

TAUNTON & DARC - 4, Brains Trust; 18, Discussion - Safety in the Shack. Details 0823 680778.
WINCANTON ARC - 7, CR100 and CR150 Receivers - by George, G5GZ (the designer of these Rx); 21, Open evening. Details 0963 34360 or 0747 51381.
YEOVIL ARC - 3, Radio Astronomy by G1PZK; 10, Entries for Construction Contest and a 2 Metre Antenna Matching Unit by G3GC; 17, 2m Historic AM-Tx, G3ICO and G3GC; 24, Adjudication of Constructors entries by G3DSS; 31, Committee meeting and Club station on Air. Details 0258 473845.

SOUTH GLAMORGAN

CARDIFF RSGB G - 14, Loud Speaker enclosures by Bill, GW6MNC. Details 0222 810368.

SOUTH YORKSHIRE

BARNSLEY & DARC - 21, Annual General Meeting at Three Horseshoes, Brierley, Nr Barnsley. Details 0226 203448 between 6-7pm Mondays, 6-8pm other days.
SHEFFIELD ARC - 1, Raynet meeting at Sheffield 197 Club; 7, Round 2 for the inter Club quiz; 21, Operation of Club's HF and Construction night; 22, Ten pin bowling; 28, Talk 'Christians in Amateur Radio' by Dick. Details 0742 446282.

STRATHCLYDE

WEST OF SCOTLAND ARS - 4, Club night GM7BOW; 11, Lecture 'Personal Emergency Communications' by Jack, GM3COX; 25, Talk 'Log Periodic Antennas' by Dennis, GM3NOZ. Details 0698 350926.

SUFFOLK

FELIXSTOWE & DARS - 7, talk "Weather & Propagation" by Jim, G3YLA (Open Meeting: Remember Names to Sec); 14, Novice RAE Examination; 21, Annual General Meeting; Apr 4, Easter Monday - NO MEETING. Detail 0394 273507(evenings).
FELIXSTOWE & DARS - 7, talk 'Weather & Propagation' by Jim, G3YLA(Anglia TV Weather) **Open Meeting - All Welcome***; 14, Novice RAE examination; 21, Annual General Meeting; Apr 4, Easter Monday - NO MEETING. Detail 0394 273507(evenings).
IPSWICH RC - 2, Construction contest; 16, Talk 'Navigation' by Michael Sabine; 30, CW evening. Details 0473 742072.
SUDBURY & DRA - 1, Talk and demonstration 'PCB computer aid design' (CAD) by Colin, G0PAO. Details 0787 313212.

SURREY

DORKING & DRS - 22, Talk 'Digital Communications' by Neil Lasher, G6HIU, Zone "C" Council Member. Details 0306 631236.
THREE COUNTIES ARC - 2, Talk 'Integrated emergency planning' by Bob, G4VWP; 16, 'A non-mathemtical look at how antennas and feeders work' by Nigel, G7CAW; 30, talk 'SAREX - the Shuttle Amateur Radio Experiment' by Doug Loughmillar, K/G0SYX. Details 0428 642930.

TAYSIDE

DUNDEE ARC - 1, lecture "Viewing the bands - DIY panoramic reception' by Bill Wilson, Aberdeen ARS; 8, Construction night; 15, Lecture - 'Acorn valves to CD Roms' by Grahan, GM8FFX; 22, Construction night; 29, Lecture. Details from GM4FSB, QTHR.

WARWICKSHIRE

COVENTRY ARS - 4, NoA & Morse code tuition; 11, Club Project Starts; 18, NoA & Morse code tuition; 25, Cheese and wine Supper. Usually meets every Friday, 8pm at Baden Powell House, 121 St Nicholas Street, Radford. Details 0203 311468.
STRATFORD U AVON & DARS - 14, 'Something in the Sky' by Ken, G4NIJ; 28, Annual General Meeting, followed by @Down memory lane'. Club meets the Home Guard Club, Main Street, Tiddington, Stratford u Avon, at 7.30pm. Details 0608 82495.

WEST GLAMORGAN

SWANSEA ARS - 20, Coach to Picketts Lock Rally. Details GW4HSH (0792) 404422.

WEST MIDLANDS

ALDRIDGE & BARR BEACON ARC - ***NEW NAME & NEW MEETING PLACE*** (Was the Bar Beacon ARC). New venue Aldridge Central Community Association Hall, Middlemore Lane, Aldridge, Walsall WS9 8AN. Meets 1st & 3rd Mondays in the month. Details G0NOL 0922 36162.

RS of BLOXWICH - 14, Construction Project; 28, Easter social; Apr 11, VHF/UHF Locator Systems by G0TDF. All meetings and events are Non-Smoking. Details 0922 683877.
SOLIHULL ARS - ***New Secretary*** Paul Gaskin, G8AYY, QTHR. Details 021 783 2996.(Nov 10th notified)
STOURBRIDGE & DARS - 7, On Air and discussion; 21, Annual General Meeting. Details 0384 374354.

WEST SUSSEX

HORSHAM ARC - 3, Surplus Equipment Sale. Details 0737 842150.

WEST YORKSHIRE

DENBY DALE ARS - 2, A talk on Astronomy by Malcolm, G8RWN; 9, Surplus Sale; 16, Video Editing by G0ISX. Details 0484 429238.
HALIFAX & DARS - 15, Talk 'Receiver Construction' by George Dobbs. Details 0422 202306.
KEIGHLEY ARS - 3, Natter night; 10, Talk 'Local Life between the Wars' by Ian Dewhirst; 17, Packet on the Air by G0KRS & G7KRC; 24, Junk Sale; 31, natter night. Details 0274 496222.
NORTH WAKEFIELD RC - 3, Talk 'Yorkshire Water'; 10, Open meeting; 17, Talk 'Wakefield Repeater Group' by Phill, G0COA and Rick, G4BLT; 22, Visit to Yorkshire TV; 24, RSGB video night. Details 0924 362144.
SPEN VALLEY ARS - 3, Visit to British Gas (Maximum of 12 persons only); 17, Annual General Meeting; Apr 7, Contest Operating by John, G4RCG. Details 0924 497767.

WILTSHIRE

SALISBURY R & ES - 8, Construction evening and Advice Clinic; 15, Members Bring and Buy Sale; 22, Talk 'Contests'; 29, HF Operating - "B" Lincencees under supervision. Details 0722 330971.
TROWBRIDGE & DARC - 2, Worked All Britain Awards, talk by G3GKC. Details 0225 864698(evenings).

RALLIES AND EVENTS

This is a list of all rallies, hamfests, exhibitions and conventions notified to HQ (as at press date). Items are given in detail for the next three months inclusive and in brief thereafter. Please send detailed information, including contact callsign and telephone numbers direct to HQ and marked 'Rally News - DIARY'.

12/13 MARCH

RSGB LONDON AR & Computer Show - Lee Vally Leisure Centre (Same venue - new name), Picketts Lock Lane, Edmonton, London, N9. Doors open 10am on both days. Disabled facilities. Large trade presence. Lectures, Special Interest Group sections. Plus a bring & buy stall. Talk-in on 2m and 70cm. Details 0923 893929.

13 MARCH

9th WYTHALL Radio Club Rally - Wythall Park, Silver Street, Wythall, (Near Birmingham, on the A435, just 2 miles from Jn 3 on the M42). Event occupies three hall and a marquee. Doors open 10.30am. Features the usual traders, bring and buy stall, run by the club. Refreshments available. Talk-in on S22. Admission £1. Details Chris, G0EYO on 021 430 7267.

19 MARCH

LAGAN VALLEY ARS Rally - Lagan Valley Hospital Recreation Hall. Doors open 11.00am. Features trade stands, bring and buy and refreshments available. Talk-in on S22. Please park carefully. Details Ron, GI4NTO 0846 601941.

20 MARCH

NORBRECK AR Electronics & Computing Exhibition - Norbreck Castle Exhibition Centre, Blackpool. Details G6CGF on 051 630 5790.
TIVERTON SOUTH WEST ARC Mid Devon Rally - Pannier Market, in the middle of Tiverton. Easy access, only minutes from Jn 27, M5. Doors open 10am. Features two halls of trade stands, bring & buy and a mobile snack bar. Further displays and full refreshments facilities in the Club room bar, open through. Talk-in on S22 by G4TSW. Trader details G6SMG 0884 257009 or G4TSW, Mid Devon Rally, PO Box 3, Tiverton, Devon.

27 MARCH

BOURNEMOUTH RS 7th Annual Sale - Kinson Community Centre, Pelhams Park, Millhams Road, Kinson, Bournemouth. Doors open 10am. Amateur radio and computer traders, Club and specialized groups. Refreshment available. Admission £1, including free raffle ticket. Talk-in on S22 via G1BRS. Details Ian, G2BDV, QTHR or 0202 886887.
MAGNUM Rally - Magnum Leisure Centre, Irvine, organised by Cunninghame & DARC. Follow signs for "Harbourside". Doors open 10.30am, 10.00 for disabled. Features the usual trade stands and a bring and buy. For those requiring accommodation the organizers have negotiated preferential room rates at the Hospitality Inn. Further details from GM0DEO 0563 40048.
PONTEFRACT & DISTRICT ARS 14th Annual Components Fair and Spring Rally - The Carleton Community Centre, Carleton, nr Pontefract. Doors open 11am, 10.30 for disabled visitors. Trade stands, bookstall, Morse Tests (Usual requirement, two passport size photographs), a bring & buy stall at ground level. Refreshments. Admission by Prize programme. Details Colin, G0NQE 0977 677006

3 APRIL

LAUNCESTON 8th AR Rally - Launceston College. Doors open 10.30am. Features trade stands, bring and buy and hot snacks. Talk-in on S22. Details Roy, G0IKC 0409 221624 or Rodney on 0566 775167.
28th WHITE ROSE ARS Rally - Allerton High School, Links Lane, Leeds. Submit Morse Test applications to RSGB HQ. Details G7ELS on 0850 690189.

4 APRIL

CENTRE OF ENGLAND Rally. Satellite Computer & Electronics Show - Sports Connection Centre, Leamington Road, Ryton. On Dunsmore, Coventry A45/A423. Doors open 10.30am. Admission £1.50, Senior Citizens £1. Held in two large halls. Over 80 traders, bring & buy. Talk-in on S22. Bar & hot food all day. Ample parking. Details Frank, G4UMF 0952 598173.

10 APRIL

SWANSEA ARS Rally - Swansea Leisure Centre, situated on the Swansea/Mumbles coast road, the A4067. Doors open 10.30am to 17.00pm. Usual attractions, trade stands, bring and buy, repeater groups, operational HF/VHF multimode stations and Talk-in on S22 using GB2SWR. Full catering and bar. Details Roger, GW4HSH 0792 404422.

16 APRIL

SPRING ALL MICRO Show, Radio Rally and Electronics Fair - Bingly Hall, Staffordshire Showground, Weston Road, Stafford. (A518 Stafford/Uttoxeter Road) Signposted from Jn 14 on M6. Doors open 10am. Features many trade stands covering the computer spectrum. Also accessories, S/ware, books, components, shareware, media, hardware. Radio & satallite and a bring & buy stall. Refreshments, free parking. RSGB Members half price, one pound off. Details 0473 272002 or Fax 0473 272008.

17 APRIL

BURY RS Radio Rally - Castle Leisure Centre, Bolton Street, Bury, Lancs. Doors open 11am, 10.30 disabled visitors. Bring and buy, hot food available and bar. Talk-in on S22. For booking forms and more details Laurence, G4KLT 061 762 9308.
CAMBRIDGE Repeater Group Amateur Radio Rally - Philips Telecom - Catering Centre, St Andrews Road, Chesterton, Cambridge. Doors open 10.30am. Trade stalls, bring and buy and the usual Auction. Details Darren Salter 0223 358985 ext 3265 work hours.
MARSKE-BY-THE-SEA Radio Rally - Marske Leisure Centre, High Street, Masrske-by-the-Sea. Doors open 11am. Usual traders, bring and buy and refreshments. Talk-in on S22. Details Alister, G4OLK 0642 475671.

23 APRIL

INTERNATIONAL MARCONI Day - Special exhibition station at the Wireless Museum in Puckpool Park, Seaview, IOW. Details G3KPO, QTHR or 0983 567665.

23/24 APRIL

IRISH R & T Society Annual Radio Rally -

CABLES & CONNECTORS

Westflex 103, low loss air spaced 50 ohm	95p/m
RG213U, (UR67), Mil spec, 50 ohm low loss	70p/m
UR43, 5mm dia, 50 ohm, single centre	30p/m
RG58CU, 5mm dia, 50 ohm, stranded centre	30p/m
RG174U, 2.3mm, 50 ohm, miniature coax	30p/m
UR95, 2.3mm, 50 ohm, mini nylon coax	30p/m
UR111, 2.3mm, 75 ohm PTFE mini coax	40p/m
UR57, 10.3mm, 75 ohm low loss coax	70p/m
UR70, 6mm dia, 75 ohm transmitting coax	30p/m
Double screened, 75 ohm coax, 8mm dia	40p/m
UHF low loss TV downlead, 75 ohm	25p/m
75 ohm twin balanced feeder, 400 w PEP	20p/m
300 ohm standard ribbon	20p/m
RG62AU, 6mm dia, 95 ohm coax	50p/m
Single core screened cable, 2.3mm dia	12p/m
Two core screened cable, 5mm	30p/m
3 core mains, 5 amp, cable	25p/m
6 core rotator cable, heavy duty	45p/m
8 core rotator cable, heavy duty	65p/m
14 SWG HD copper 25p/m	16 SWG HD copper 20p/m
PVC coated AE wire, light duty	8p/m
Red/black DC power cable, 8 amp	30p/m
Red/black DC power cable, 15 amp	45p/m
PVC coated AE wire, heavy duty	12p/m
NEW UR67 50 ohm HD with robust outer sheath	90p/m
NEW 75 ohm HEAVY DUTY TWIN Balanced feeder	60p/m
NEW 300 ohm HEAVY DUTY SLOTTED Feeder	60p/m
NEW 16swg stranded copper aerial wire	30p/m
NEW 450 ohm ladder ribbon feeder	65p/m

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N4 hole sq chassis socket	£2.00		
BNC plug, GREENPAR 5mm	£1.20	ditto 10.3mm	£4.00
N SKT to N SKT line adaptor	£3.00	ditto N plug to N plug	£3.50
N socket to BNC plug adtr	£3.00	BNC plug to N socket	£3.00
PL259 plug, GREENPAR, PTFE/silver	£1.20	(P/P on connectors	75p)
Special N plugs for W103	£5.80	Polyprop egg insulators	70p
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EVENTS DIARY

Jacksons Hotel, Ballybofey, Co Donegal. Large trade presence expected, bring and buy, leisure facilities on site, special accommodation rates available in Jacksons Hotel. Hosts to the Irish Radio Transmitters Society Dinner/AGM on 23/24 April. Details Ken, EI4DW, QTHR or Tel: 074 31109.(UK 010 353 74 31109)

1 MAY

11th ANGLO-SCOTTISH Rally - Tait Hall, Kelso. Doors open 11am. Features the usual traders, bring and buy, catering and many other attractions in historic Kelso. Entrance still one pound. Talk-in S22 via GM4KHS. Details GM4UFP, 0750 20006 after 6pm.

BRITISH AMATEUR TELEVISION CLUB (BATC) Rally. ***NEW VENUE*** The Sports Connextion, Learnington Road, Ryton-on-Dunsmore, Coventry. Details Tel: 0788 890365 or Fax 0788 891883.

2 MAY(MONDAY)

DARTMOOR Radio Rally - Yelverton Memorial Village Hall, Meavy Lane, Yelverton, Devon. Doors open 10.30am. Parking for 600 cars, access for disabled. Trade stands, bring and buy, etc. Refreshments and playground for children. Talk-in on S22. Details Ron on 0822 852586.

MID-CHESHIRE ARS Rally - Civic Hall, Winsford, Cheshire. Doors open 11am, 10.30 for disabled visitors. Full catering facilities. Entry fee one pound. Ample car parking. Details Dave, G4XUV on 0606 77787.

8 MAY

MARS/DRAYTON Mobile Radio Rally - Drayton Manor Park, Tamworth, Staffs on the A4091. Doors open 10.30am. Usual traders, club stands, flea market, car boot area. 'The family rally'. Details G6DRN on 021 443 1189.Trade stands G8BHE 021 422 9787.

10th YEOVIL QRP Convention - Preston Centre, Yeovil. Doors open 9am to 5pm. Traders orientated to QRP kits, components etc. Club bring and buy, Bob's QRP Club stand(bring your QSL's), on Air QRP stations. Talks on propagation, construction, oscillators, RSGB matters. Displays of DIY Rigs, vintage Ham radio and communication equipment. Admission one pound and fifty pence, free car park. Talk-in on S22 by GB2LOW. Details G3CQR, QTHR. Tel: 0935 813054.

15 MAY

DUNSTABLE DOWNS RC 11th Annual National AR Car Boot Sale - Stockwood County Park, Luton. Near Jun 10 M1. 10am to 5pm. Talk-in on 2m. Attractions include admission to the Environmental Open Day, free entry to The Mossman Collection of Horse Drawn Vehicles, Craft Museum and carriage rides. Plot details on 0582 451057 (6-8pm only). Pre booking for plots available until May 8th. Plots can be purchased on the day.

21/22 MAY

INTERNATIONAL KITE Festival - with kite aerials flown from the Wireless Museum at Puckpool Park, Seaview, Isle of Wight. Details Douglas, G3KPO 0983 567665.

22 MAY

The 37th NORTHERN Mobile Rally - Details G0MKK. Tel: 0423 507653 eve.

22/23 MAY

INTERNATIONAL KITE FESTIVAL - Details G3KPO, QTHR or 0983 567665.

29 MAY

EAST ANGLIAN Radio & Computer Rally (ESWR) - The Maidenhall Sports Centre, Ipswich, Suffolk. Details 0394 271257.

PLYMOUTH RC Annual Radio Electronics Fair - Plymstock Secondary School, Church Road, Plymstock, Plymouth. Doors open 10.30am. Over 25 stalls selling electronic, computer and radio components, a large bring & buy stall. Bookstall. Grand raffle. Refreshments available through the day. Admission one pound. Talk-in on S22. Details Derek, G7ESZ 0752 364150.

5 JUNE

SPALDING Amateur Radio Exhibition & Rally - Springfields Exhibition Centre, Spalding. Details G4TWR 0775 722940 or G7CWM 0775 680447.

6 JUNE

D-DAY EXHIBITION - Details G3KPO, QTHR or 0983 567665.

12 JUNE

The 25th ELVASTON CASTLE National Radio Rally - Elvaston Castle Country Park, nr Derby. Details Ken, G3OCA, 0332 662818. Trader enquiries to Keith, G1ZLQ, 0332 662896.

ROYAL NAVAL ARS Annual Mobile Rally - HMS Collingwood, Fareham. Details Clive, G3YTQ 0705 3327621(daytime) 0329 234143(eve).

19 JUNE

DENBY DALE & DARS Annual Mobile Rally - Details 0484 644827.

NEWBURY Car Boot Sale - Details Richard, G3ZGC on 0635 46241.

26 JUNE

37th LONGLEAT Amateur Radio Rally - Prices to both visitors & trade will be frozen at 1993 levels.

Details Shaun, G8VPG on 0272 860422 (office hours), 0225 873098 (eve & weekends), FAX 0272 869387.

NORFOLK RAYNET BARFORD Rally - Book your pitch now, contact G4TWT, 0603 427008.

2/3 JULY

HAMFEST-UK - The County Showground, Weston Road, Stafford. Details 0923 893929.

3 JULY

YORK Radio Rally - Tattersall Building, York Racecourse, Knavesmire, York. Details 0904 790079.

9 JULY

CORNISH RAC Rally - Details from Ted. Tel: 0872 222605 or Ken on 0209 821073.

10 JULY

HORNCASTLE AR Electronics and Computer Fair - Details from G6CZV 0507 522482.

SUSSEX AR and Computer Fair - Brighton Racecourse, Sussex. Details G8VEH, QTHR Tel: 0903 763978 or 0273 417756 office hours.

24 JULY

COLCHESTER Radio & Computer Rally - St Helena School, Sheepen Road. Details Richard, G7BIV, QTHR.

1st HUMBER BRIDGE AR Rally - Details & booking contact Roly, G0UKS on 0482 837042.

28/31 JULY(THURSDAY-SUNDAY)

AMSAT-UK Colloquium - The University of Surrey, Guildford. Details from Ron, G3AAJ 081 989 6741.

31 JULY

RUGBY ATS 6th Annual Amateur Radio Rally - Details Peter on 0455 552449 or Steve (for bookings) on 0788 824214.

7 AUGUST

RSGB WOBURN Rally - Details from Norman Miller, G3MVV, 0277 225563.

14 AUGUST

DERBY & DARS Annual Radio Rally - Littleover Community School, Pastures Hill, Littleover, Derby. Details Martin, G3SEJ 0332 556875.

FLIGHT REFUELLING ARS HAMFEST'94 - Flight Refuelling Sports Ground, Merley, Wimborne. Details Richard, G4VCQ 0202 691021.

21 AUGUST

5th GREAT EASTERN Rally - ***NEW DATE*** (organised by the Kings Lynn ARC) - Cattle Market, Hardwick Narrows, Kings Lynn. Details 0553 765614.

WEST MANCHESTER Radio Clubs "RED ROSE RALLY" - Details Dave, G1IOO 0204 24104(evenings only).

29 AUGUST(MONDAY)

SCARBOROUGH Radio Electronics and Computer Fair - The Spa, South Foreshore, Scarborough. Details Ross, G4NZ, 0723 514767.

3 SEPTEMBER

ANNUAL WIGHT WIRELESS RALLY - Details G3KPO, QTHR or 0983 567665.

4 SEPTEMBER

BRISTOL Radio Rally (Incorporting Bristol Computer & Electronics Market) - Details G4YZR 0275 834282.

PRESTON Amateur Radio Society 26th Annual Rally - Details George 0772 718175 or Godfrey on 0772 253810.

TELFORD Radio Rally - Details 0743 249943.

VANGE Amateur Radio Society Rally - Details Doris 0268 552606.

11 SEPTEMBER

BARTG Rally - Details Peter, G8VXY 021 453 2676.

13th LINCOLN Hamfest - Details Sue, (XYL G8VGF) 0522 525760.

25 SEPTEMBER

HARLOW Amateur Radio Rally - Details Mike, 0850 487863 or Ken 0279 426647(home).

THE THREE COUNTIES Rally - Details G4PQZ 0905 773181.

NORTH WAKEFIELD Radio Club Rally - Details G4RCG 0924 362144 or G0EVT 0924 825443.

PETERBOROUGH Radio & Electronics Society East of England Rally - Bookings and further details contact Ted, G0REM 0733 66471.

7/9 OCTOBER(FRIDAY/SUNDAY)

RSGB INTERNATIONAL HF & IOTA CONVENTION. Details, G3OUF, QTHR.

12 NOVEMBER(SATURDAY)

THE ALL MICRO Show - Details 0473 272002.

20 NOVEMBER

BISHOP AUCKLAND Radio & Computer Annual Rally - (**NEW VENUE**). Details G0PRQ 0388 766264.

27 NOVEMBER

WEST MANCHESTER Radio Clubs "WINTER RALLY" - Details G1IOO 0204 24104(evenings only).

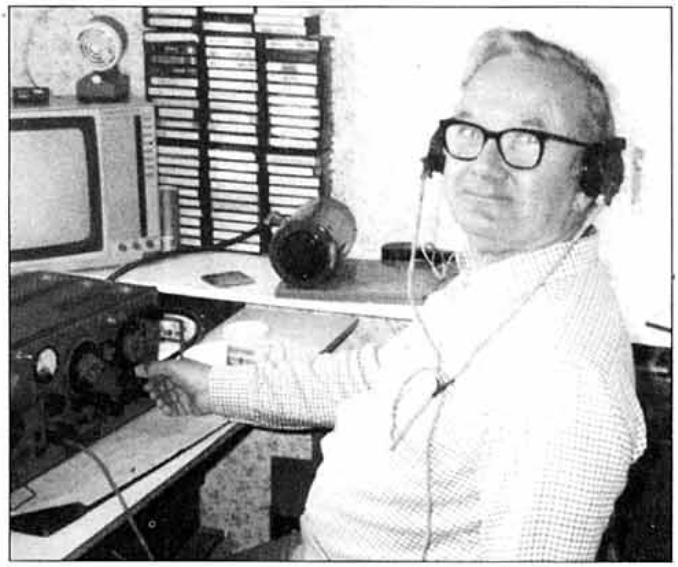
11 DECEMBER

VERULAM CHRISTMAS Rally - (**NEW VENUE**). Details G3PMF 0923 262180

SILENT KEYS

WE HAVE BEEN advised of the deaths of the following radio amateurs:

3DA0AR	Mr P G Jupp	July 93
G0EPW	Mr P Walker	11.11.93
G0NEX	Mr Wagland	31.10.93
G2AIQ	Mr H C L Barnett	18.01.94
G2AK	Mr C Young	04.12.93
G2ATT	Mr J W Tourtel	26.11.93
G2CWY	Mr R McMillan	29.12.9
G3BW	Mr W H Hodgson	02.11.93
G3DJM	Mr D Hales	
G3EHU	Mr F J Wallace	21.12.93
G3FVN	Mr R Machin	14.11.93
G3TPN	Mr W Knox	06.06.93
G3WJ	Mr L Phillips	12.01.94
G3YBW	Mr D A Watson	04.01.94
G4EYD	Mr J O Bailey	07.11.93
G4EZA	Mr T Charles	10.01.94
G4WDE	Mr D M Edge	07.05.93
G4ZA	Mr E W Anderson	19.01.94
G6OOX	Mr G Blakeman	31.12.93
G7DDT	Mr K M Rosebury	25.08.93
G7FBH	Mr P G Turner	23.11.93
G8ADJ	Mr P J Parker	17.01.94
G8DG	Mr K Howell	
G8ENC	Mr T W Cannell	27.11.93
GM3RFR	Mr S S S Polson	09.11.93
GM4TKK	Mr A B W Wales	13.12.93
GW4REP	Mr C O Webb	19.12.93
GW8QI	Mr W T J Cox	Mar 93
GM4IHW	Mr P V McCulloch	06.12.93
PA0CRH	Mr C H Rutgers	23.10.93
RS51780	Mr J P Pearce	01.01.94
RS93443	Mr R Bass	23.12.93
VK1RH	Mr R Henderson	26.04.93



Alan Sydney Chester, G3CCB.

ALAN CHESTER, G3CCB, died on the 13 January 1994. He was first licenced in 1948 and was a member of the Fareham & DARC. He reviewed technical articles for *RadCom* on behalf of the Technical and Publications Advisory Committee, and had supported the Novice Licence by assisting with the questions for the Novice Exam. Alan was also a tutor for the RAE and Morse courses.

He was also a prolific author and contributed articles to *RadCom* and other technical journals over the years.

Later in life his enthusiasm for amateur radio led to a sharing of his skills and knowledge with others through teaching and furthering the interest of people of all ages. His contacts were world-wide and he was acknowledged as one of the finest exponents of the art.

Alan leaves a wife, Gina, daughter Gillian and son, Philip.

GB CALLS

The list below shows all special event stations licensed for operation during this month and up to 25 March. It was taken from the HQ computer on 8 February. These callsigns are valid for use from the date given but the period of operation may vary from 1-28 days.

1 MARCH

GB2SDD	Saint David's Day

2 MARCH

GB2RNX	Royal Naval Auxiliary Service

4 MARCH

GB4CNS	Central Notts Scouts
GB4STD	St Dunstan's
GB2DX	'DX'

6 MARCH

GB0DWS	Dorneywood Scouts

7 MARCH

GB0THS	Thomas Hardye School

9 MARCH

GB2RNX	Royal Naval Auxiliary Service

10 MARCH

GB4LON	London Amateur Radio Show

11 MARCH

GB0HMS	Hendon Museum Society

12 MARCH

GB2NCM	Norwich Castle Museum
GB6RS	Royal Signals

16 MARCH

GB2RNX	Royal Naval Auxiliary Service
GB4SPD	St Patrick's Day

18 MARCH

GB2UOL	University of Leicester

19 MARCH

GB2IEE	Institute of Electrical Engs

25 MARCH

GB4NCP	Northfield County Primary Sch

The LAST WORD

CONSPIRACY?

I have viewed with concern and downright anger the combined efforts of G4PIQ in *Contest Exchange* and the hand-in-glove conspiracy of his contest committee to further the fortunes of the semi-professional contest participants with long purses who dominate VHF/UHF contests in the Home Counties.

I refer to the support for bully boy tactics which are so common on our VHF/UHF bands these days (*Contest Exchange*, July, August and September 1993). The slant of this column's message is that you need to be loud, loud or louder! The photographs show single band aerials with costs between £2,000 and £3,500 (at a rough estimate). I dread to think what linears are in use with the aerials shown.

I do not know how you, the Editor, could encourage the presentation of this laughable stuff to the vast majority of this country's amateurs who are not rich, don't live on farms (and have to take their neighbours into consideration) and who try and get aerials for 3 VHF/UHF bands on the *one* 30ft mast!

My beef with G4PIQ and his contest committee? They have now introduced county and country multipliers for VHF contests, with the one aim of making it possible for the bully boys to more easily win contests from the London area!

I cannot believe that the Contest Committees are not aware of the laws of radio physics which shows that a station's performance is given by a formula with a distance squared in it. Is their geography so poor that they don't know that the majority of counties and countries workable from the UK are nearer London than Glasgow or Belfast?? Maybe they don't care?

It makes my task as an RLO in a remote area very difficult when I try and counter the argument that the RSGB is still a thinly disguised London Wireless Society!

Mike Gibbings G3FDW

[A careful reading of last year's Contest Exchange *columns will reveal considerable useful advice for those of us who enjoy contests but do not have the resources to become 'big guns'. Indeed it is part of Andy Cook's brief from me to do this. The multipliers apply only to a proportion of VHF events but do they really discriminate in favour of the Home Counties? Taking a couple of results at random, the sections of the 50MHz Trophy were won by a GW and GD respectively, and the single operator sections of the 144MHz Contest were won by a GM and a GW - Ed]*

MOBILE MIC OPTION?

Why are all new HF and VHF mobile transceivers sold with hand-held microphones as standard equipment?

Since the use of a fist mic while driving is not only frowned upon could not the RSGB which has long condemned this practice, encourage vendors to include a proper mobile microphone in their advertisements? Even if this were an optional extra, it would be an improvement on the current situation!

I noticed with some surprise, that the User Review of the AKD 6001 6m Transceiver (*RadCom*, February) actually contained the wording "It comes with a mobile Push-to-Talk (PTT) mic...." and shows the fist mic atop the transceiver in the photograph accompanying the article.

Perhaps if every manufacturer of mobile equipment offered a proper mobile microphone as standard equipment, the price of such microphones would fall to a level nearer to that at which fist microphones can be purchased.

A G Hargrave G0AXA

REVIEW REVIEW

Just a brief communication to say how much the review of 1993 was appreciated in the RSGB's *GB2RS* news broadcast last Sunday. I felt it summarised the year well, drew out and focussed on the important events, and illustrated how much there is to celebrate in our chosen hobby. Surely such a worthy summary is worth publicity in *RadCom* as a permanent record.

Tom Gladwin G3UFA

I'm pleased you like the summary. It was written for the second year running by Vic Kusin, GM4HCO, to whom we are most grateful.

ANOTHER FOR FM+CW

Mark Davis, G0KHB, asks (*The Last Word*, February): "Why haven't the radio manufacturers tempted us CW-ers by building FM rigs with CW capabilities. I'd be tempted to rush out and buy one of those", and so would I! Or CW-only would do.

Fred Barrell G3DCN

CLASSIC VALUE

On second-hand transceivers of ten years ago, G4OWY (*The Last Word*, February) may have a point but for twenty-year-old rigs, sorry chum but you're wrong!

A KW2000A valve transceiver cost about 15 weeks gross salary for the ordinary skilled working man in the late '60s. Call it £4500 in today's money. They sell now for about £120. Like most valve rigs, be they from KW, the USA or Japan (with the possible exception of the block Xtal filters that fortunately don't usually give trouble) all parts are just a 'phone call away and most can be bought over the hobby shop counter. The circuitry is straightforward, understandable and repairable in the shack with 'ham grade' test gear and there is lots of room for adaptations and experiments. This is everything a factory made ham rig should be. Everything the latest wonder box from Yaescomkenwood is not!

The thing about valves is they are standard parts and were made in zillions for years and years and specialist suppliers like Langrex, Raedek etc have enough to keep the few of us still needing them going for a long time yet. The same is *not* true of the large scale integrated circuit DDS chips made as a small quantity run to special order in that fancy box you just shelled our £2000+ for! So in ten years time when a big EMP from a nearby thunderstorm turns these (by then) totally obsolete devices to coke and the company that made it now only makes hand-held video telephones and sat nav aids .... never mind, you can buy my Heath SB401, it'll probably only fetch £50 by then but I wager you'll still find 6146s and it will hear anything on the ham bands the other rig did without the need for 20dB attenuators up front on 40m at night either!

I honestly believe the late-sixties/early-seventies HF transceiver, selling at £120 and adaptable to 9-band operation for about £50 more, is the cheapest way available today to raise 100W+ on all HF bands. Does anyone disagree?

Stephen Dyke G3ROZ

FM CW

With reference to Mark Davis's letter, CW on FM rigs (*The Last Word* February), a number of stations use Morse on FM, including *GB2CW* Slow Morse Service stations, using F2A. This can be obtained by using a separate oscillator and modulating the rig via the microphone , or feeding the oscillator directly into the mic socket of the rig. If this mode were to become popular it may encourage more operators to get involved, including Class B licence holders who want to practice to get up to the test speed.

M J Jenkinson G0RGE

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.

QSLING GONE MAD?

For many of us the collecting of QSL cards is, or has been, an enjoyable aspect of the hobby. However, once the initial novelty of 'being on the air' has passed this usually amounts to seeking to confirm 'new' countries, zones, states, locator squares, etc. As such it might be expected that the soliciting of QSL exchanges would diminish with time.

As an occasional contest operator I now respond to a relatively large number of incoming cards and am only too pleased to do so if mine are really wanted. However, I do get irked when the same person's QSLs turn up time and time again for same band QSOs. I do wonder if senders of cards containing grossly inaccurate or illegible information really wish for a reply. and the ease of producing computer generated stick-on labels seems to have fuelled some people's urge to QSL. The consequent cost in time and money to individuals and national bureaux must be considerable.

You may well say, "I've heard all this before. Why again?" Well, among the 184 cards I have replied to in recent days was one from a JH1. On the back it said: "Please send me your QSL for an award. I must get 10,000 for it. Now 21,000 QSOs and 5850 QSLs received." and he still writes them by hand (and yes, I did send him one).

Roger Smethers G3NLY

MORSE, NOT CW

I am a 73-year-old who built his first short-wave receiver at the age of 12 but who has been actively engaged in radio ever since. It is only in recent years that I have had the opportunity to take the RAE and obtain a B licence. I am trying to progress to an A licence and am therefore trying to learn Morse to the required standard.

I am rather annoyed to hear remarks like "you will soon get the CW under your belt." CW! I am trying to learn Morse for heaven's sake. Morse was originally invented for telegraphic communication by landline. It was only with the advent of the spark gap transmitter that it became CW or more correctly ICW (interrupted carrier wave). When the valve transmitter was introduced with a modulating tone on the carrier it became MCW with the tone being keyed instead of the carrier.

Why cannot we amateurs refer to Morse as Morse and not the technically incorrect term CW? Perhaps there are other people out there who share my view.

H G Odd G7JYG

[That's one of my pet hates, too - Ed]

PREFIX FIX?

An increasing problem on our bands is that of rapidly altering country callsign prefixes. How often I've heard stations comment "I just can't keep up with all the new prefixes".

The solution is simple. If *RadCom* could find a way to publish a list of the new prefixes quarterly or even give away a pull-out poster every six months listing the current DXCC list and other bits and pieces, could this be paid for by border adverts? One other possibility is to publish a complete list each month on the reverse side of the Propagation Prediction page, even make it a pull-out page?

John Edwards GM7NVA

[Yes I find this a problem, too, but changes are usually flagged up in one or more of the HF News, VHF/UHF News *and* SWL News *columns. A complete list of prefixes can be found in the* RSGB Call Book, *and since all of the ITU callsign blocks (eg MAA - MZZ = UK) are listed many of the more unusual calls can be traced. More immediate information is available in the* RSGB DX News Sheet *and on the DX Packet Cluster network - Ed]*

SECRET JACKSON

On the cover of the January *Radcom* I noted that one of our Past Presidents was Admiral Sir Henry Jackson.

Now down these parts there has been a story circulating for years of a certain Commander Jackson who carried out successful radio communication experiments at *HMS Defiance* in the river Tamar long before Marconi, but was denied publicity because of the Official Secrets Act. It would be interesting to find out if he was the gentleman concerned. Is there anyone out there who could enlighten me.

Sandy Pimlott G8IDE

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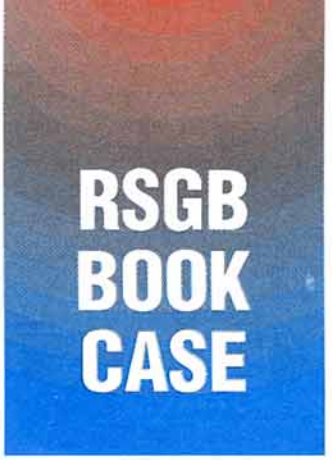

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