

# hamradio today

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THE UK'S PREMIER HAM RADIO AND LISTENER MAGAZINE

APRIL 1999 £2.50

## First UK Review: Icom IC-706 MK II G



Radio  
and Electronics  
at the Boat Show

## Plus

- Getting Started in Scanning
- Optocom PC-controlled Receiver/Scanner
- Tracking Owls by Radio

Learn how you  
can help with  
auroral research





Making a cheap dual-bander wasn't difficult.

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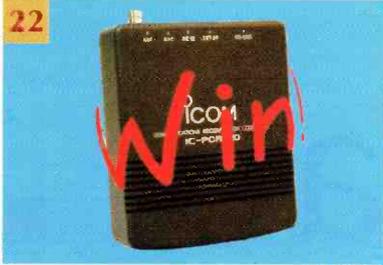
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- DTMF remote control
- Expandable frequency coverage

KENWOOD



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## who's

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■ As you will see from the news pages opposite, *Ham Radio Today* will become *Radio Today* from next month. Regular readers should not be concerned that their favourite magazine will no longer be an Amateur Radio magazine; all the regular columns will still be there and we will be keeping the same editorial policy as before.

When I wrote my first Editorial, in the March 1998 edition, having taken over as Editor from Sheila Lorek, G8IYA, I stressed then that I would continue with the same editorial policy. To me, this meant placing a high emphasis on being first with news of new products, being first with in-depth, technically-literate, reviews of those products, and with reports of exhibitions and shows. This policy has been very successful and I'm delighted to be able to report that we have more than doubled the number of subscribers to the magazine in the last year.

We are continuing in the same vein this month by being the first UK magazine with a full technical review of the Icom IC-706MkIIIG, Icom's long-awaited 'DC to light' (well, 160m - 70cm) transceiver, all in an amazingly small package.

In fact *Ham Radio Today* has been including a number of features that are not strictly about Amateur Radio (although we hope they are also of interest to Radio Amateurs!) for some time now, eg CB radio in the January edition, 'RSL' local community radio in February, and the Australian Flying Doctors last month. We call it 'broadening of the base' and - apart from the change of title - regular readers will see few changes from how the magazine has looked for the last few months.

With next month's issue we will also be introducing a new regular column covering broadcast radio in all its guises - shortwave, digital, local broadcasting, cable radio, radio over the Internet and so on - and this will be written by Martin Peters, G4EFE.

We hope that the change of title and somewhat broader contents will encourage more 'casual' radio enthusiasts to pick up the magazine at the newsagent and that these people will see what they have been missing - and then take up Amateur Radio themselves.

### meanwhile . . .

In the meantime this month we have yet another competition with a valuable Amateur Radio prize - the Icom IC-PCR100 computer-controlled receiver / scanner, which was reviewed in the March issue of the magazine. This really is tomorrow's technology today. Turn to page 22 to see how you can win one of these new radios.

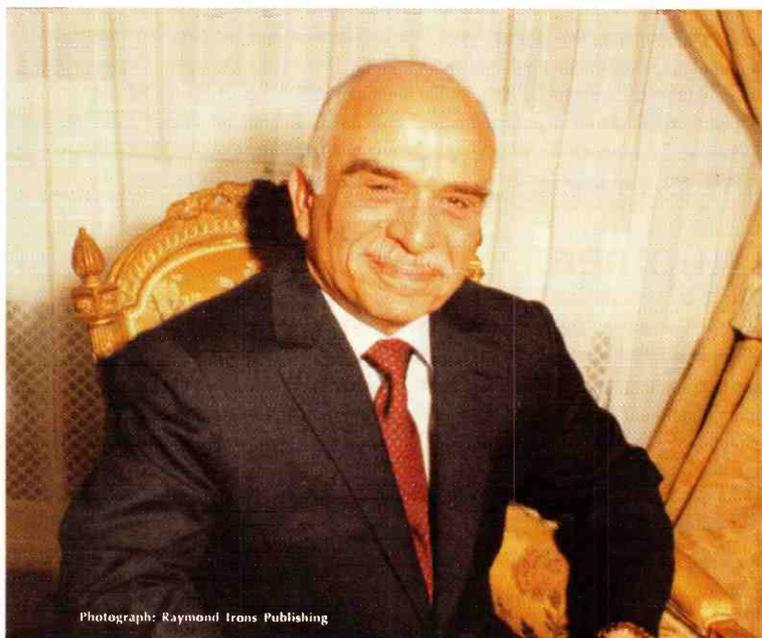
We are also pleased to bring you the article on tracking owls by radio, which had to be held over last month. One major feature in this month's issue is about the HAARP project. As this issue of the magazine appears in the newsagents, HAARP, an auroral research programme located in Alaska, will be about to carry out test transmissions from a high-power station on frequencies just outside the 40m and 80m amateur bands. They are requesting reception reports from Radio Amateurs and listeners throughout the world, which will help with their research into the ionosphere and to how solar radiation and auroras affect radio propagation on earth. Find out how you can help with this important scientific research project by turning to page 27.

*Steve G4JVG*

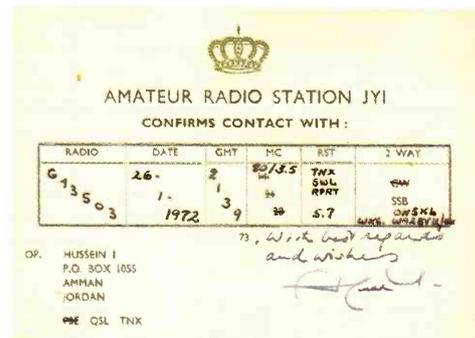
# RADIO TODAY

## farewell to JY1

HM King Hussein Ibn Talal of the Hashemite Kingdom of Jordan, better known to hundreds of thousands of Radio Amateurs simply as 'Hussein, JY1', died on Sunday 7 February 1999, after his long battle with cancer. He had been on the throne for 47 years and for well over half that



period had been an active Radio Amateur. Steve Telenius-Lowe, G4JVG, Editor of *Ham Radio Today*, remembers the first time he heard JY1 on the air, in 1972: "King Hussein had a QSL manager in the USA, but his address in Amman was also published, so I sent an SWL report direct to Jordan. My parents were mightily impressed when a heavy white envelope with gold-embossed crown from the Royal Palace in Amman appeared in their letterbox, addressed to their teenage son! I have kept the QSL, signed personally by Hussein, ever since. I didn't realise the significance at the time, but JY1 had been in contact with an American amateur in Israel - more than 20 years before contacts between Israel and Jordan became commonplace." There has been much in the national papers about Hussein's radio activities and to illustrate the esteem in which he was held by Radio Amateurs we can do no better than to quote from a letter published in *The Guardian* on 13 February, from Laurie Margolis, G3UML (who also wrote *Success for All on HF* in February's *Ham Radio Today*): "In September 1970 Jordan was engulfed in civil war. A 20-year-old Radio Amateur in Ilford was startled to hear JY1 on the airwaves late one evening. The amateur (me, as it happens) called and was given an eyewitness account of the battles around



Amman. All communications were severed by the war; for the best part of two weeks the only first-hand information coming out of Jordan was from its Arab king, talking directly to a young Jewish student in his living room in Essex. I had several radio conversations with Hussein, passing messages to his family and Jordan's embassy in London. Later in 1970 the king, laid low by exhaustion, was recovering in hospital in London. His radio activities continued, via a large aerial installed on the roof. My father and myself were invited to meet the king and we were presented with two engraved watches. I've worn mine most days since."

## operate from PJ2

According to an IARU Region 1 newsletter dated 4 November, the Netherlands Antilles in the Caribbean is the latest territory to sign up to the CEPT T/R 61-01 licence. This means that UK Class A and B amateurs will be able to operate from the Netherlands Antilles (and vice versa) without the necessity of applying for a reciprocal licence. The callsign to be used will be PJ2/ followed by your own callsign. No confirmation of this has been received from the RA yet.

## ham radio today to become radio today

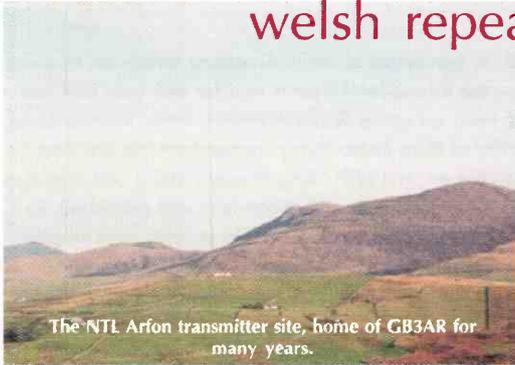
*Ham Radio Today* will look slightly different from next month. We are changing the title to *Radio Today* to reflect more accurately the content of the magazine, which has for a while already included a number of features which are not strictly about Amateur Radio. The change of title is intended to encourage more 'casual' radio enthusiasts and browsers to pick up the magazine at the newsagent. All the regular *Ham Radio Today* columns will remain and we will continue to feature Amateur Radio equipment, software and book reviews, exhibition and show reports, and plenty of Amateur Radio articles, in addition to the new radio features of a more general nature.

# radiotoday

Look out for *Radio Today* in your newsagents from 14 April!

# RA

## welsh repeater group feels the pinch



We reported in last month's *Ham Radio Today* that NTL and CTI are to increase their fees to repeater groups to reflect the true commercial cost of providing repeater sites. One of the first groups to feel the effects of this decision has been the Arfon Repeater

Group, which has decided to close down GB3AR, the 2m repeater located near Caernarfon, rather than pay the higher fees. The group says it is looking for alternative sites and has already located two possibilities. The Arfon Repeater Group provides an important service for this sparsely-populated area of North Wales, operating several repeaters and packet nodes, including GB3AN on 70cm, GB3TM (the first Amateur TV repeater in Wales), packet nodes GB7AR, GB7AN, GB7GW, GB7MS, and assisting in running the GB7ABB packet BBS.

## stolen equipment

A reward is being offered for the recovery of Craig Kelly's, G4KPP, Icom IC-2710H dualband VHF / UHF transceiver. It has the basic scanning microphone and not the keypad microphone. If it is offered for sale it would be without the manual, as that is still in Craig's possession. The rig was stolen from the Dawlish area of Devon on Sunday 30 January 1999. Any information to Craig Kelly, G4KPP, e-mail: craig@g4kpp.freemove.co.uk Craig also warns readers that it is important to insure Amateur Radio equipment separately to their ordinary insurance, as his insurer did not recognise his transceiver as radio or audio equipment, even though he has 'fully comprehensive cover'.



## shuttle launch postponed

The only Space Amateur Radio EXperiment (SAREX) flight scheduled for 1999 (see *Satellite Rendezvous* on pages 50 / 51) has been delayed yet again. NASA says the STS-93 shuttle *Discovery* mission - originally set for January and subsequently delayed until March, then April, then May - has now been rescheduled to 9 July. [ARRL Letter]

## aberdeen vhf / uhf activity day

The Aberdeen ARS is organising a VHF / UHF activity day from 1400UTC Saturday **29 May** until 1400UTC Sunday **30 May**. The object of the event is to encourage as many club stations to come on the air on the VHF / UHF bands. Clubs that have registered can submit a log to the registration address and receive a certificate showing their club name with the number of clubs worked during the 24hr period. Two trophies have been sponsored: one for Scotland and the other for England. An information pack including a registration form will be made available to all interested parties, please contact Duncan Gerrie, MM1BUO, tel: 01358 701796, e-mail: mm1buo@aol.com or packet: mm1buo@ab7abn

## palestine is new dxcc entity

The ARRL DXCC desk issued a press release on 3 February to say that "The International Telecommunication Union . . . has allocated the callsign prefix E4 for use by Palestine . . . Palestine will be added to the DXCC List effective 1 October 1999. Contacts made with E4 stations after 1 February 1999 will count for this new entity. . . Contacts with the deleted entity of Palestine made prior to 30 June 1968 do not count for this entity. There is no commonality of territory or administration." Several E4 stations, including E44A and E44B, came on the air in mid-February.

## ugly bug novice contest

The Norfolk Amateur Radio Club, which meets every Wednesday evening at the Ugly Bug Inn in Colton, is to hold a 6m / 70cm activity contest on Sunday 12 September. The event is exclusively for Novices in Norfolk and those outside the county with an NR postcode. The organiser, Peter Ives, G3ASQ, has written to all Novices whose addresses are listed in the 1999 *Yearbook*, but asks those whose details are withheld from the callbook, plus those who have received their licences since publication of the book, to contact him at 21 Riverside Close, Lower Hellesdon, Norwich NR6 5AU, tel: 01603 415992, for further details. The winners of the event will be entertained at a dinner hosted by the club prior to the presentation of trophies and awards.

John Wadman, G0VZD, chairman of Norfolk ARC (left), with *Ham Radio Today* editor Steve Telenius-Lowe, G4JVC, and his wife Eva, 2E1FHJ, after a talk at the 'Ugly Bug' recently.



Photograph: Victor Brand, G3JNB

# DIO TODAY

## secret reunion

A reunion is to take place of Radio Amateurs who served in the Radio Security Service during WWII. Some 2000 amateurs were employed by the highly-secret body to intercept German messages. RSS amateurs who would like to attend the reunion, which will be held at Bletchley Park on **16 May**, should call Bob King, G3ASE, tel: 01480 463129.

The Bletchley Park mansion ('Station X'), where the reunion will take place.



Photograph: Steve Blayer, G4UKR

## amateur radio forum

The RA has distributed audio cassettes of the Amateur Radio Forum which they hosted in July last year to all club station licensees. The forum was reported in detail in the October issue of *Ham Radio Today*. In an accompanying letter, the RA say that the cassettes were sent out "due to popular demand" and that further copies were available on request.

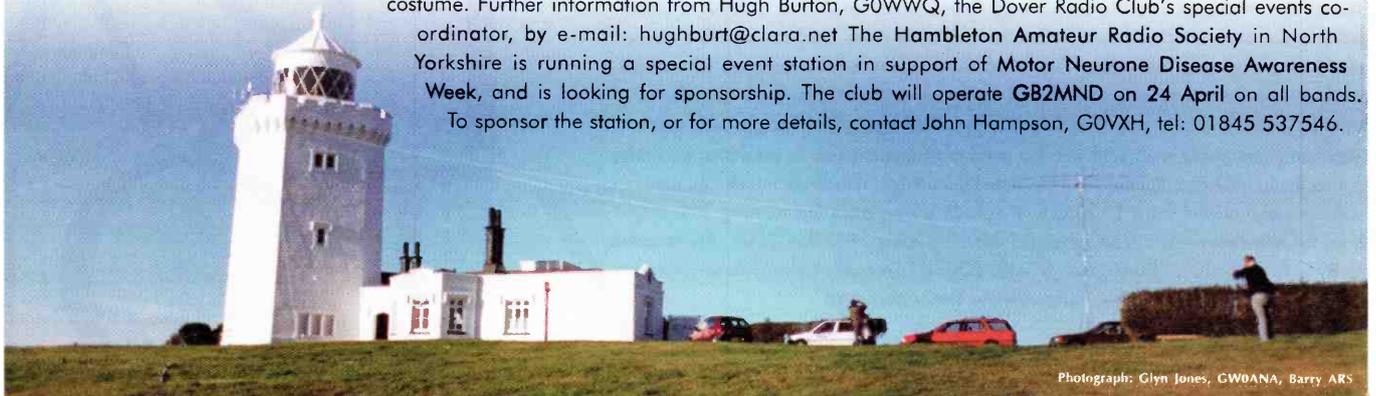
## in the pipeline?

The quest continues for high speed data transmission and Internet access using existing infrastructure. The latest proposal which could suffer EMC problems in the presence of amateur HF transmissions is called WMT or Water Main Telecommunications. The polyethylene material used for modern water mains and service pipes to houses is a good electrical insulator with relatively good RF dielectric properties. As the column of water in the pipe is slightly conductive, it can be used as the inner conductor of a coaxial transmission line with earth as the outer conductor.

Due to the high attenuation, standing waves do not form as they are well damped. Nevertheless, it is claimed that HF signals up to about 10MHz can be transmitted by this means. Where the service pipe enters the customer's house, a device called an Aqueous Filter (AF) is fitted. This contains a number of ferrite rings threaded on to the pipe, forming an RF choke to prevent the RF signals from leaking away to earth via copper piping in the house. It also taps off the RF signals which are fed to a special type of modem on a PC plug-in card. A length of hose pipe connects the PC to the AF (or April Fool).

## special event stations

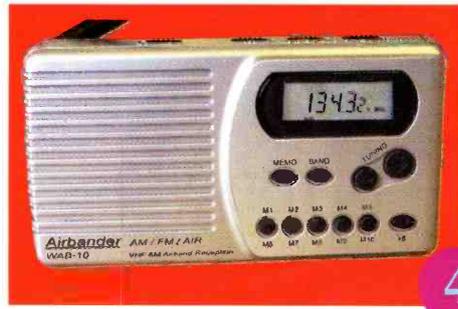
The Dover Radio Club, East Kent Radio Society, Hilderstone Radio Club, East Kent Amateur Television Group, Barry ARS, and the Wimereux radio club in France, are organising a series of events to celebrate the centenary of Marconi's cross-channel radio transmissions in 1899. On **27 March GB100SFL** will be on the air from South Foreland Lighthouse, whilst from **22 - 25 April** the clubs will be transmitting from South Foreland and from the **White Cliffs Experience**, from where they hope to use the special call GB100MAR. The photo below shows the Barry ARS transmitting from South Foreland in December, when they commemorated the centenary of Marconi's first ship to shore transmissions and of the first marine distress signal, 'CQD'. In April, the White Cliffs Experience will house displays of original Marconi equipment and Dr Ken Smith, G3JIX, will recreate early radio experiments. Amateur TV will link Wimereux and Kent and displays of modern communications equipment will be provided by the Royal Signals, Territorial Army and Coastguard Agency. Mme Marconi, local dignitaries and the RSGB will be sending greetings to their French counterparts during a re-enactment of the sending of the original messages, with operators in period costume. Further information from Hugh Burton, G0WWQ, the Dover Radio Club's special events co-ordinator, by e-mail: [hughburt@clara.net](mailto:hughburt@clara.net) The Hambleton Amateur Radio Society in North Yorkshire is running a special event station in support of **Motor Neurone Disease Awareness Week**, and is looking for sponsorship. The club will operate **GB2MND** on **24 April** on all bands. To sponsor the station, or for more details, contact John Hampson, G0VXH, tel: 01845 537546.



Photograph: Glyn Jones, CW0ANA, Barry ARS



2



4



# 1 cable fault DETECTOR

The **AEA Cablemate** is a true **Time Domain Reflectometer** available from **Nevada** that allows the detection and location of cable faults in real time of cables from 5 to 600 metres in length. The unit locates cable damage and tells you how far down the line the damage is.

It can resolve two faults less than 10ft apart. Cablemate will also measure a length of unknown cable - even when wound on a spool! It costs £399 inc VAT. Nevada, 189 London Road, North End, Portsmouth, Hants PO2 9AE; tel: 01705 662145; fax: 01705 690626.

# a shure THING 2

**ML&S, Martin Lynch & Sons**, have been appointed retail distributors for the American company **Shure** microphones. The **Shure 526T series 11** provides excellent quality audio from a base station microphone. If you prefer to use a headset, the **Shure 'SM'** professional headset and boom microphone is available at £269 - not cheap, but then quality never does come cheap! Martin Lynch & Sons, 140 - 142 Northfield Ave, Ealing, London W13 9SB; tel: 0181 566 1120; fax: 0181 566 1207; e-mail: sales@MLandS.co.uk; Internet: www.MLandS.co.uk

# 4 latest products FROM WATERS & STANTON

**Waters & Stanton's** new **WAB-10** is an economical new multiband receiver covering the **VHF airband**, 108 - 140MHz, as well as the **VHF / FM broadcast band** and medium wave. It offers true **AM** reception on the **VHF airband** with digital readout in 25kHz steps, 10 programmable memory channels, band scanning and stereo reception in the **VHF / FM broadcast band** when using optional headphones. The receiver is complete with a telescopic antenna and operates from two **AA** cells. It costs just £39.95 inc VAT. Waters & Stanton have been appointed distributors of the top-quality range of products from **SSB Electronics** which includes transverters and pre-amplifiers. These products are handmade in Germany and the pre-amps won the 'lowest noise pre-amp' contest at the Dayton 98 hamfest. There are four **transverters** available, the 6m, 2m and 70cm models have a 28MHz IF and 20W power output, whilst the 23cm model employs a 144MHz IF and has 10W output. On receive, they all offer unsurpassed strong signal handling with very low noise figures (1.0dB on 144 / 432MHz). The **LT-6S** and **LT-230S** cost £519, the **LT-70S** is £539 and the **LT-230S** for 23cm costs £849. There are three **SSB Electronics pre-amps** available: the **Super-Amp SP-6** for 6m, the **SP-2000** for 2m and the **SP-7000** for 70cm. All provide 20dB gain and have noise figures better than 1.0dB. They cost £139.95 (6m) or £149.95 (2m / 70cm). Waters & Stanton plc, 22 Main Rd, Hockley, Essex SS5 4QS; tel: 01702 206835; fax: 01702 205843; e-mail: info@wsplc.demon.co.uk; Internet: www.waters-and-stanton.co.uk

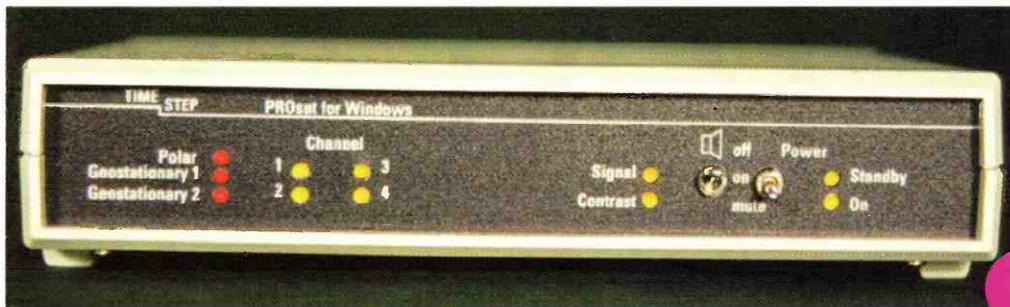
# weather sat INTERFACE / SOFTWARE

**PROsat for Windows i** is the latest and most powerful **APT / WEFAX** weather satellite reception interface and software available from weather satellite equipment manufacturers, **Timestep**. The 'i' products are new versions of Timestep's popular Windows interface and 32-bit software and contain every conceivable feature to provide totally stunning live images. The new **i** interface, which connects to the computer serial port and can be used with a notebook or desktop, can take up to three different receivers. The new **PROsat for Windows Interfaces and i** software are priced from £120.00; 'i' software upgrades for existing **Timestep PROsat for Windows** users start at about £50. Timestep, PO Box 2001, Newmarket, CB8 8XB; tel: 01440 820040; fax: 01440 820181; e-mail: Sales@Time-step.com; Internet: http://www.Time-step.com

# TRAI TOP



6



7

## yaesu's LATEST

Latest news on the long-awaited **Yaesu FT-100** 160m - 70cm mobile transceiver is that they are expected to arrive in the country by mid or late March. We'll keep you informed and will of course carry a review of this new rig as soon as possible. The **VX-5R** is a new **triple-band handheld** which is expected to make its debut at the Picketts Lock exhibition in March. It covers 6m, 2m and 70cm with 5W output (4.5W on 70cm) and with general coverage receive from 500kHz - 16MHz, 48 - 729MHz and 800 - 999MHz. On receive it covers narrow band FM of course, but also AM for the aircraft and shortwave / mediumwave broadcast bands, and wide FM for VHF broadcast reception. CTCSS encode is fitted as standard. We hope to bring you full details of this interesting new handheld and a review shortly. Yaesu UK, Unit 12, Sun Valley Business Park, Winnall Close, Winchester Hants SO23 0LB; tel: 01962 866667; fax: 01962 856801; e-mail: sales@yaesu.co.uk

## global radio GUIDE

The **Global Radio Guide** is a new publication from the **Association for International Broadcasting**. It is a 36-page A5 booklet which lists English-language broadcasts from all over the world. Under each country, the name, address, phone number, fax number, Internet URL and e-mail address of the broadcaster is given, followed by a listing of broadcasts by time, target area and frequency. Best of all, this handy publications costs only £3.95, or £4.25 post-paid to anywhere in the world. Order from: Association for International Broadcasting, PO Box 4440, Walton CO14 8BX; tel / fax: 01255 676996; e-mail: tomw@aibcast.demon.co.uk; Internet: www.aibcast.demon.co.uk

## new triodes FROM SVETLANA

Well-known Russian valve manufacturer, **Svetlana Electron Devices** has introduced two new triodes: the **3CX800A7** and **8874/3CX400A7**. Svetlana's valves are exact drop-in replacements for 3CX800s or 8874s from other manufacturers. You can take a 'cyber-tour' of Svetlana's manufacturing plant in St Petersburg, Russia, at [www.svetlana.com](http://www.svetlana.com) and click on 'What's New' to view a series of photographs taken recently at the Svetlana factory.

## high-spec DMM

A new high-performance bench **digital multimeter**, the **Grundig DM 100**, is now available from **Vann Draper**. It is microprocessor controlled with a comprehensive range of features, yet remaining user-friendly and easy to operate. Its main functions include AC and DC voltage (five ranges from 200mV to 1000 volts), resistance (220 ohm to 20 megohm), and AC and DC current (six ranges from 200uA to 10A). An RS232C interface enables the instrument to be controlled individually from a PC using optional software. The DM 100 costs £349. Vann Draper, Unit 5, Premier Works, Canal Street, South Wigston, Leicester LE18 2PL; tel: 0116 277 1400; fax: 0116 277 3945; e-mail: sales@vanndraper.co.uk; Internet: www.vanndraper.co.uk

This information is based upon submissions by suppliers, and is not necessarily endorsed by *Ham Radio Today*. We cannot be responsible for false or misleading claims by suppliers.

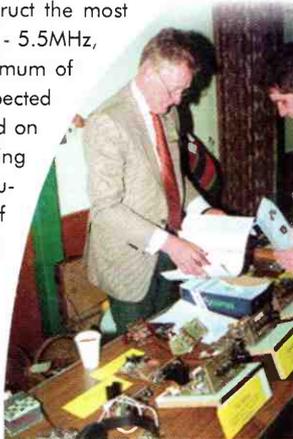
# RALLY OF THE MONTH

18 APRIL 18 APRIL 18 APRIL 18 APRIL 18 APRIL 18 APRIL

## The 15th annual Yeovil QRP Convention

■ The 15th annual Yeovil QRP Convention is at Digby Hall, Hound Street, Sherborne. This event is a 'must' for all enthusiasts of low-power operation and construction, and always attracts a large crowd from all over the country and indeed from overseas. The convention includes trade stands and component sales in a large hall, a 'constructors' challenge', RSGB Morse code tests on demand, and a series of lectures of interest to all Radio Amateurs, but with the emphasis on matters QRP. Refreshments are available. Doors open at 9.00am, with the Convention officially beginning at 10.00am.

The Yeovil QRP Convention Constructors' Challenge will be run during the day. The challenge is to construct the most stable free-running VFO to tune from 5 - 5.5MHz, calibrated in 1kHz steps, using a maximum of 15 components. Each entry will be expected to hold the test frequency (to be decided on the day) for a five-minute period starting 30 seconds after initial switch-on. A regulated 12V DC PSU and a load resistor of 10kΩ, one side of which will be connected to the 12V DC negative supply, will be provided. The unit having the lowest drift will be the winner. In the event of a tie, the unit with the lowest component count will be the winner. A circuit diagram of your entry should be supplied. A prize and certificate will be awarded to the winner.



Walford Electronics kits on sale at last year's convention.

### The lecture stream is as follows:

- 10.45 - 11.45am Daytime Signal Absorption on 160 and 80m, Rob Micklewright, G3MYM.
- 12.00 - 1.00pm QRP Operation on VHF, John Beech, G8SEQ.
- 2.45 - 3.45pm Near Vertical Incidence Skywave, Gerald Stancey, G3MCK.

Full details of the QRP Convention can be obtained from Mike Smith, G7SDD. Please note Mike has moved house recently, his new phone number is: 01935 814612.



The large hall is well stocked with trade stands offering components, antennas and ready-made equipment.

## Events Diary

- |   |   |
|---|---|
| <p>13 / 14 Mar RSGB Commonwealth Contest ( 80 - 10m CW).<br/>14 Mar WAB VHF / UHF CW Contest 0900 - 1500UTC.<br/>Details at <a href="http://www.users.zetnet.co.uk/g1ntw/wab.htm">www.users.zetnet.co.uk/g1ntw/wab.htm</a><br/>20 / 21 Mar Bermuda Contest, CW / SSB, 24 out of 48 hours.<br/>Overall winner collects prize in Bermuda in October - flights and accommodation paid!<br/>24 - 26 Mar 8th CEPT Radio Conference, Venice.<br/>27 / 28 Mar CQ WPX SSB Contest (0000 - 2400UTC, 160 - 10m).<br/>31 Mar - IEE Conference on Antennas and Propagation, University of York. Details tel: 0171 344 5473.<br/>1 Apr 'Scientific Approach to Global Communication' residential course, Bridgwater, Somerset. Details: Adrian Dening, G4JBH, tel: 01288 341454.</p> | <p>14 Apr <i>Radio Today</i> May publication date.<br/>23 - 25 Apr 1999 IOTA Convention, Alicante, Spain. Includes activation of Tabarca Island (EU-093). Full information from e-mail: <a href="mailto:ure@ure.es">ure@ure.es</a> or see <a href="http://www.ure.es/iota99/">http://www.ure.es/iota99/</a><br/>24 Apr International Marconi Day, organised by Cornish Radio Amateur Club. Details at <a href="http://www.users.globalnet.co.uk/~straff">www.users.globalnet.co.uk/~straff</a> or tel: 01209 212314.<br/>24 Apr Marconi Day Exhibition at Wireless Museum, Puckpool Park, Seaview, Isle of Wight, 11.00am - 5.00pm, GB3WM on air plus working model of Marconi's first spark transmitter. Free entry.<br/>25 Apr RSGB 50MHz Fixed Station Contest (0900 - 1300UTC).</p> |
|---|---|



# rallies

## 13 March

West Wales Amateur Radio and Computer Rally, Penparcau School, Aberystwyth. The rally features Amateur Radio and computer hardware and software trade stands, special interest groups (inc RAFARS, RSARS, WAB), electronic components, a bring and buy stall, HF and VHF stations on the air, a packet radio station, refreshments etc. There are good parking facilities with easy access for disabled visitors. Doors open 10.30am (disabled visitors from 10.00am) until 4.00pm. Admission just £1. For further details please contact Katy, GW0SFO, tel: 01545 580675.

## 13 / 14 March

London Amateur Radio and Computer Show, Lee Valley Leisure Centre, Picketts Lock Lane, Edmonton, north London. One of the year's biggest shows. Details from Radiosport Ltd, tel: 01923893929; fax: 01923 678770, e-mail: bookings@radiosport.co.uk, or see Picketts Lock Preview in March *Ham Radio Today*.

## 20 March

The Lagan Valley Amateur Radio Society annual rally at the Lagan Valley Hospital conference centre. Doors open at 12 noon. Further details can be obtained from Reid Campbell, M10BOT, tel: 01232 258403, by e-mailing gi4gty@qsl.net or checking the web site: www.qsl.net/gi4gty

## 21 March

Bournemouth Radio Society's 12th annual sale and rally at Kinson Community Centre, Pelhams Park, Millhams Road, Kinson, Bournemouth. Doors open 10.30am - 4.30pm. Amateur Radio and computer traders, bring and buy stall, clubs and specialised groups, excellent refreshments. Talk-in by G1BRS on 145.550MHz FM and admission is £1. Details from Olive or Frank, G0GOX, Goodger, 66 Selkirk Close, Merley, Wimborne, Dorset BH21 1TP, tel: 01202 887721.

Mid-Devon Rally, sponsored and organised by the Tiverton South West Amateur Radio Club, at the Pannier Market in Tiverton, Devon. This event is now a permanent fixture for the third Sunday in March each year, and with its wide range of traders, catering for all aspects of the hobby, is becoming a more and more popular event. There are excellent food and catering facilities in and around the Pannier Market. Doors open 10.00am and for further details please call Alan Sedgbeer, G0MAS, on tel: 01884 252259.

Norbreck Amateur Radio, Electronics and Computing Exhibition, Norbreck Castle Exhibition Centre, Blackpool. Organised by the Norbreck Amateur Radio Societies (NARSA), this is the biggest single-day exhibition in the country. Details from Peter Denton, G6CGF, tel: 0151 630 5790.

## 28 March

Magnum Radio and Computer Rally, Magnum Leisure Centre, Harbourside, Irvine, Scotland. Usual traders etc. The event is open 11.00am - 4.00pm (disabled visitors from 10.30am). For further details contact Eddie Barclay, GM0KVI, tel: 01563 524665.

## 11 April

The Red Rose Rally, organised by the West Manchester Radio Club, at Horwich Leisure Centre, Horwich, Bolton, off junction 6 of the M61. In addition to the usual traders, there is a bring and buy stall which costs £2 to enter for any one item, and there are no sales fees. Refreshments are available. Admission is £1.50 (or £1 for OAPs) and doors open at 11.00am (10.30am for disabled visitors). For more details, contact Bob Lowe, G0FRL, tel: 01204 494308.

## 11 April

The Swansea Amateur Radio Society Amateur Radio and Computer Show, at the Swansea Leisure Centre, on the A4067 Swansea - Mumbles coast road. Trade stands, bring and buy, HF / VHF demo station, special interest groups, licensed bar and full catering. Doors open 10.30am - 5.00pm. Talk-in is on 145.550MHz. Full details from Roger Williams, GW4HSH, tel: 01792 404422.

## 11 April

The Lough Erne Amateur Radio Club rally at the Killyhevlin Hotel, Enniskillen. Usual traders plus *no charge* bring and buy stand. Doors open 12 noon and for further details please contact Kieran, G17NET, on tel: 01365 348063 (day), or 01365 327133 (evening).

## 18 April

The Cambridgeshire Repeater Group annual rally takes place at Bottisham Village College, Bottisham, 6 miles east of Cambridge (access via A14 and A1303). Large hall, car boot sale, bring and buy and 'renowned' auction of radio and electronic equipment. Doors open 10.30am, admission £1. Refreshments available and talk-in is on 145.550MHz. Further details from Paul Dyke, G0LUC, tel: 01462 683574.

## 18 April

The 13th Rainham Radio Rally takes place on a new day and date this year, but at the usual venue: the Rainham School for Girls, Derwent Way, Rainham, Kent. Easy access from junction 4 of the M2 or from the A2. (just follow the 'RRR' arrows). All the regular traders and many special interest groups including RNARS, BARTG, TCP/IP, Kent ATV Group, G-QRP Club, Tango Echo, KRG. Talk-in by GB4RRR will be on 145.550MHz. Doors open at 10.00am, or 9.30am for disabled visitors and for those bringing items for the bring and buy sale. Admission is £2 and further details are available from Martin Pearson, tel: 01634 365980.

## 25 April

The British Amateur Television Club (BATC) rally, at the Sports Connexion, Leamington Road, Ryton-on-Dunsmore, near Coventry. Very large hall with over 200 trading tables, specialist ATV displays, Outside Broadcast units, large boot fair. Restaurant and bar. Doors open 10.00am (9.30am for disabled visitors) and admission is just £1 (50p concessions). Details from Mike Wooding, G6IQM, tel: 01788 890365 / 0468 925351; fax: 01788 891883; e-mail: rally99@batc.org.uk

To include your rally in this section, please make sure you send us details of your event in time: the deadline for the June issue is 12 April; for July, 17 May, and for the August issue it's 14 June. The address for submissions is: The Editor, Ham Radio Today (Rallies), RSGB Publications, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE; fax: 01707 645105. We would be grateful if Ham Radio Today readers would ask their local rally organiser to send information on their rally to this address. If you're travelling a long distance to attend rallies, we recommend you contact the organisers of the events first, to check if there has been any changes since this magazine went to press.



■ Many years ago, newcomers to Amateur Radio became aware of the hobby through listening on the air and overhearing amateurs chatting away, often on 'topband' (160m) AM. I personally discovered Amateur Radio this way as a teenager. Nowadays, this does still occur but usually on VHF / UHF, when a scanner user 'happens across' amateurs using FM on 2m or 70cm.

### what is a scanner?

A scanner differs from a manually-tuned receiver in that it can automatically scan across a number of pre-programmed frequencies looking for activity, halting when the receiver finds a signal. Most scanners also have a 'search' facility, where you can enter lower and upper limits and the set automatically hunts for signals between those frequencies, pausing when it finds one so that you can listen to it or store it into a memory channel for subsequent monitoring.

You can now buy a 'basic' handheld VHF / UHF scanner for less than £60 in the high street, giving coverage of typically 68 - 88, 137 - 174 and 405 - 512MHz on FM. Add an extra ten or twenty pounds and you get extra bands such as VHF airband on AM. Further up the price range and you get extended continuous coverage to 1300MHz or 2000MHz as well as HF. 'Up-market' models even add SSB and CW reception capabilities with programmable tuning steps down to 50Hz for these modes.

### what can I listen to?

Many people wrongly believe you can tune into and intentionally listen to anything you want, providing that you don't disclose what you've heard. Wrong. The Radiocommunications Agency (RA) has an information sheet, *Receive Only Radio - Scanners Etc* (RA169) [1], which you obtain from them free of charge. My thanks to the RA for permission to reproduce extracts of information from RA169.

It says: "Although it is not illegal to sell, buy or own a scanning or other receiver in the UK, it must only be used to listen to transmissions meant for general reception. The services that you can listen to include Amateur and Citizens' Band transmissions, licensed broadcast radio and at sea you may listen to weather and navigation information. It is an offence to listen to any other radio services unless you are authorised by the Secretary of State to do so."

Here are some common questions answered, also from RA169:

"Q. Can I get a licence to use a scanner?

A. No, there is no scanner licence.

Q. Could I get authority from the Secretary of State to listen to emergency service transmissions, for example? I am interested and might be able to help.

A. No, the Secretary of State's authority is usually reserved for people acting at his request and on his behalf. If you wish to listen in to messages, you should obtain the permission of the person sending them.

Q. Isn't it all right to listen as long as I don't pass on what I hear?

A. No, using radio equipment to listen in, except as provided by section 5(b) of the WT Act, is an offence, regardless of whether the information is passed on.

Q. Isn't this all a bit heavy?

A. No. No-one likes their private or business conversations to be listened to. Parliament has passed these laws to protect the privacy of radio users."

Realistically, this means that you're rather limited, although you can still use your scanner to listen to a number of services. For example, if you've a business radio licence you can listen on your licensed frequencies, and if you're at sea you can tune into the coastguard and other users transmitting safety and distress information, and weatherfax etc.

### airband

Many amateurs are specifically interested in airband reception and buy a scanner for this very purpose. Usually, airband listening isn't considered as a serious offence, and some authorities turn a blind eye. Indeed at one air show, the organisers had posted a list of frequencies used by the control tower on a board in the public viewing area. It would be hard not to believe that this was the organisers, ie those who control the show and thus radio transmissions, specifically giving spectators in the viewing area permission (even encouraging them!) to listen. On the other hand, the father of a young scanner owner I know was recently asked by a policeman to "accompany me down to the station" for an interview simply because he admitted that he used the scanner at his local airport to listen to the pilots whilst plane-spotting with his youngster.

I personally think the law is stupid in this respect, and I know many listeners will agree with me, but the law's the law. Now that we've got that out of the way, let's look at what's available and what can be tuned into, maybe to check you're not interfering with various services by radiating spurious, as our amateur licence formally tells us we must periodically test for.

### what's the best scanner?

There's no easy answer to this, as it depends entirely on what you want. First, take a look at your listening interests. If you'd like a wide-coverage VHF / UHF scanner and aren't particularly interested in HF (maybe

# Starting o Scanner

Chris Lorek,

# out in scanning



## G4HCL, gives an introduction to scanning and what you can listen to

because you already have general coverage receive on your HF transceiver), don't waste your money on one with this. If you're just starting out, take a look at a low cost type, you can always trade up later without losing too much. But if you're already an experienced listener and you'd like an 'all-rounder' capable of receiving virtually everything, consider something like the AOR AR-8200 (reviewed in last month's issue).

If you own a dualband 2m / 70cm transceiver, you may find you've already got a ready-made scanner, eg the Yaesu VX-1R already covers mediumwave and VHF / UHF with AM, narrow FM, and wide FM reception modes available, as well as being a feature-packed dualband transceiver. Many others can be modified very simply, for example the Kenwood TH-D7E, reviewed in the February issue, can be modified by a simple snip of an internal wire, others by a power-up key-press function, or by changing one or two internal links. Check with the dealer you bought your radio from for more information.

Should you get a handheld or a base scanner? In my experience, I've found the technical performance and operational facilities, price for price, of most sub-£500 scanners to be the same, whether they're base or portable types. A portable set has the advantage of being self-contained, usually powered by nicads, so you can take it with you on holiday or business trips. But if you're after a semi-professional monitoring station, then do look at equipment such as the AR-3000A, AR-5000 and ICR-9000; you won't get the performance of these in a handheld.

## antennas

No receiver is better than the antenna that's connected to it. If you're using your scanner with a set-top helical, or telescopic whip in the case of a base scanner, you're missing out on a lot of activity.

One the best investments you'll make here is a roof or loft-mounted vertical multiband collinear antenna. My advice is to stay clear of amplified types unless you really do live in the wilderness, tens of miles away from any transmitter. This is because many scanners, by their very nature, do suffer from unwanted signal reception to some degree. Connect a rooftop mounted amplified antenna and your wanted signals could be drowned by noise and interference - this can even happen in busy areas with a non-amplified type.

If you already have a 2m / 70cm collinear, try using that. A discone is another choice for true wideband coverage without any 'holes' in its frequency response, although many people find them physically unat-

tractive and I've always found the cheaper types suffer from bent or broken elements over the years when mounted outdoors.

## finding frequencies

All this is of little use without knowing where to tune with your receiver. The 'search' function on scanners is very useful, and some up-market scanners have the facility of automatically storing active signals into the set's memory channels for you. But it's a wide frequency spectrum, and knowing which frequency range to search across is half the battle won.

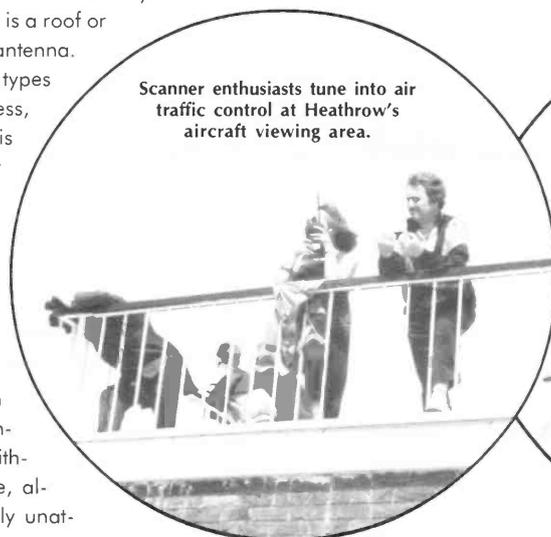
The RA has freely-downloadable spectrum allocation listings on their web site at [www.open.gov.uk/radiocom/](http://www.open.gov.uk/radiocom/) which give a general guide to what services operate where. For greater detail including spot frequencies of various users, the *VHF / UHF Scanning Frequency Guide* [2] is a popular choice. If you'd like a guide on getting started, frequency allocation listings and mini-reviews of scanners, *Scanning Secrets* [3] is worth a look. With that, I wish you happy listening!

## further reading

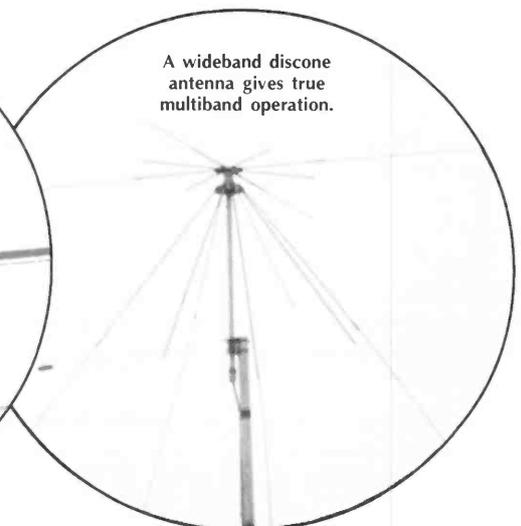
[1] *Receive Only Radio - Scanners Etc* (RA169) is available free of charge from the Radiocommunications Agency, New King's Beam House, 22 Upper Ground, London SE1 9SA.

[2] *VHF / UHF Scanning Frequency Guide* by Bill Laver, £12.95, and:

[3] *Scanning Secrets* by Mark Francis and Bill Laver, £16.50, are available from *Ham Radio Today* sales, see *Book Browser* on pages 60 / 61.



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<b>SBB-4</b>	Tri band Mobile 144/432 60W length 0.92 mtrs .....	£29.95 p&p £4.75
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<b>MG-4M</b>	Heavy duty mag mount c/w 4mtrs 3.5D low loss coax/PL259 .....	£19.95 p&p £4.75
<b>RS-700</b>	Gutter Mount fully adjustable .....	£17.95 p&p £4.75
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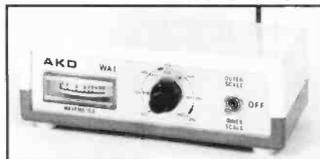


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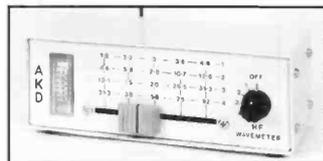
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# letters

Dear Ham Radio Today,

What total misrepresentation of the truth *The Future of Amateur Radio* was. At first glance Fig 1 and 2 give the blatant impression this is the opinion of RSGB members. On reading the last paragraph of this two-page article, this is "a small sample" 1% of RSGB - 0.6% of UK amateurs.

What a load of 'old cobblers' - shades of the ace propagandist Göbbels, "tell a lie often enough and they will believe it."

Let's have a referendum of all members - surely we had one not so long ago - obviously it didn't produce the result *Ham Radio Today* (and presumably) RSGB wanted.

**Jim Davis, G0OWS**

**Editorial comment:**

All members of the RSGB knew about the survey through RadCom and were invited to comment on the proposals, as were non-members. However, unlike the days of Göbbels, there was no obligation to respond, and it could even be argued that the 99% of RSGB members who chose not to either didn't care one way or the other or were reasonably happy with what was being proposed. Although the make-up of the sample was not necessarily statistically 'average', a 1% sample is typical of that used in national opinion polls, which usually produce remarkably accurate results. Far from being a misrepresentation of the truth, the author was very careful to cover both sides of the arguments in the report and to explain that the extent to which the results were applicable to all RSGB members, and to all UK radio amateurs, was open to debate. Of course, it could just be that this survey didn't produce the result that G0OWS wanted!

Dear Ham Radio Today,

G4KZH has gone QRT after 18 years and will not be heard on any band until my son or a member of my family gets a Class A ticket and takes it over. I have been honoured by being bequeathed a 60-year old callsign, G4FP, first issued to Ted (Edward) Price in 1938.

Ted Price was first licensed as a young army officer in the Royal Signals. He served on active duty in WWII and was promoted to colonel in the 1950s. In the 60s he was awarded the CBE for his work with the Intelligence Services in the cold war period. Ted's responsibility was to set up command headquarters and communication links in enemy occupied territory, which in this case would have been East Germany and the Soviet bloc, had the third world war started. Thankfully, this never happened and Ted retired to operate his favourite mode, CW, on Amateur Radio.

I met Ted in the 80s and we soon found out we had a lot of common interests, as my father was also a signals officer in the British Army. Ted once asked why I did not operate CW and was always trying to encourage me to use the mode. I told him the only time I used CW seriously was when I was paralysed and on a life support machine for nine months in 1981 / 82. This was the only way I could communicate with my father at the time. I did this by gently tapping on my dad's hand with one finger - even this took some time and was very frustrating for us both, but we managed OK. This was a great relief, as when my wife came to see me I could not always communicate with her. I would cry with frustration when she left, as I was unable to tell her anything and had to wait until the next visit when hopefully I was better and stronger.

I was in hospital for two years at that particular time with a progressive muscular disease and at one stage CW was the only way I could communicate. I was not inclined to use CW afterwards as this always reminded me of the terrible time I had plugged into a life support machine, paralysed but fully conscious most of the time, trapped in my own lifeless body. I was not expected to survive, but through a miracle, I slowly got better by being determined to do so and with the help of Britain's best specialists and my dear wife and family.

As I slowly recovered I started a ham radio business and always kept in touch with Ted. Sometimes, we used to have in-depth conversations while he was listening to a CW QSO at the same time - an amazing skill.

A few months ago, his son Michael, whom I also know very well, called and told he had some good and bad news. The bad news was that Ted had become a silent key, the other news was that shortly before he passed away, Ted said to his son that he wanted me to continue his callsign, as it was coming up to 60 years old. Ted also left me a box of Morse keys - I was shocked and speechless! I told Michael I would think about it: this was a clear message.

After giving the issue some serious thought (after recovering from the shock), I thought this a great honour. The least I can do is to carry out Ted's wishes and keep the callsign and CW tradition going. It is now time to brush up on my CW and use it, and at least have a few QSOs using Ted's old keys, why not?

I was declared in full remission of the illness, called Myasthenia Gravis, in 1991. This is the same illness that Aristotle Onassis died of (he was one of the wealthiest men in the world and his money did not save him). My illness was first diagnosed in 1974, and for over 10 years I underwent plasma exchange every fortnight over three days. This treatment is similar to dialysis and was very unpleasant. Now, most would not realise I had suffered this normally progressive illness - I recovered very slowly and I am very lucky to be alive!

G4FP also lives - in the true spirit of Amateur Radio. God Bless Ted Price, CBE - Rest In Peace. I'll do my best to preserve the tradition and hope you all will understand why my callsign is changing.

**Ray Withers, G4FP, ex-G8KZH and G4KZH**

letter  
of the  
month

Dear Ham Radio Today,

I have just read the January 1999 issue of *Ham Radio Today* and would like to make comments on your editorial which addresses the issue of the Internet and Amateur Radio. Firstly let me say that this is the first time I have read the magazine, and I found it a well-balanced read with something for everybody. It also has useful sections on explaining the meaning of the terms employed. The layout is clean and effective throughout.

Last year I did a three-month course to obtain the Novice B licence, giving access to the 70cm and 6m bands. This probably involved about 50 hours of time and study. This year I am studying the full B licence at a local adult evening centre. The cost of this is over £100, and with 30 sessions, this amounts to 60 hours, plus travelling time. Then there is additional study, and costs for photocopies, books and examination fees, so this could total up to, say, 150 hours and around £150.

If I pass the course I may also want to take the Morse for the full A licence. Further time, study and cost. Thus there is a lot of commitment to getting to a stage where you are licensed to use the full range of equipment.

In comparison, getting on the Internet is now a 'doddle'. The hard work has been taken away by sophisticated packages, and the Internet can deliver a higher quality of text, sound and vision than Amateur Radio. It is also available to everyone who owns a computer: with Amateur Radio you can only talk to someone who is also a licensee.

Although the cost of a computer, say £600 to £1600, is perhaps comparable with that of amateur transceivers, it is a much more flexible device. With a computer you can create software, use a large variety of applications like word processor, database, games etc. All the family can use it. A radio is a much more committed device.

The problem for Amateur Radio is that in the last three to five years a new rival has emerged that is more accessible. The recent popularity of Freeserve with a million new users in only four to six months proves which is easier to access.

The problem for Amateur Radio is that the age profile is increasing. Recruitment from the 10 to 25 age group is getting more difficult, as the Internet / portable phone competition presents less of a barrier in access.

Of course, most sensible amateurs will be using both radio and the Internet. Each has their own strengths and weaknesses. I see no problem with this. Yet the survival of Amateur Radio is down to how many practitioners it can muster in the next 10 to 15 years, not just what is happening now. The Internet is still young, it will grow and evolve in ever more sophisticated ways - in fact the concepts for Internet 2 are already in the planning stage.

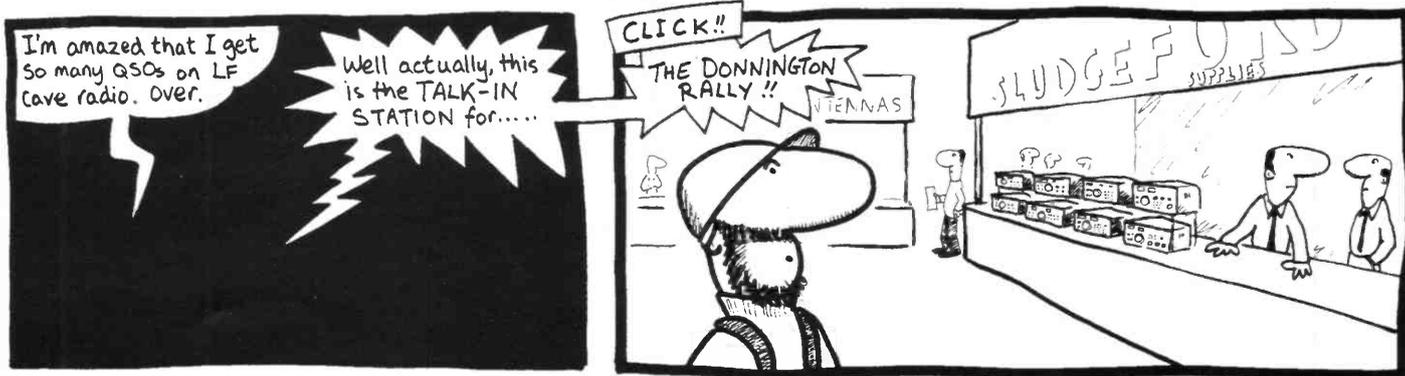
Amateur Radio needs to respond to this challenge by making itself more accessible to the general user. I think the solution is to have a much simpler requirement to get initial use of radio equipment, with a progressive scale as experience or interest develops. The way in which this is covered needs to be looked at entirely afresh, with a firm reliance on the practical use of equipment in a safe way, rather than by covering complicated theory that most amateurs are unlikely to use in the initial stages. Advancement would be available for those who required to operate more complex equipment, where detailed knowledge is important.

I suspect some amateurs would not like this to happen, as the 'exclusivity' of the current position would be under attack. Yet it seems to me that there must be progress, otherwise it will just decline.

Malcolm Cadman, 2E1GEQ

# "TONE" BURST

by GMBMEN



Dear Ham Radio Today,

As quite a long-standing reader of *Ham Radio Today* I felt I would like to add my congratulations to the new layout and excellent articles. I look forward to the familiar good quality reusable brown envelope which arrives through my letterbox now on subscription.

The article *The Future of Amateur Radio* by Derek Thom, G3NKS [*Ham Radio Today* February 1999], was of particular interest and was better set out than that in *RadCom*. I was particularly interested in the Novice section and I just hope that a decision will be made on letting Novices have the additional use of 2m and 4m. That would be absolutely marvelous and I just hope that very soon there will be an announcement, as this would make such a world of difference to our allocation.

On our club net on a Wednesday we have to do some cross-band working, which is quite tricky, as most amateurs have 2m but not 70cm. Four metres also sounds an exciting idea and I hope I do not get too old to enjoy these possible extras, as things seem to take so long to get any action.

My very best wishes for 1999 and I look forward to more goodies like the most useful *Propagation Predictor*.

Mrs Anne Reed, 2E1GKY

Do you have something constructive to say on the state of Amateur Radio today? Perhaps you'd like to put your viewpoint to the readers, get some discussion going, or give an answer to one of the issues raised? We'll pay £10 for the best letter we publish each month (paid 6-8 weeks following the publication date). So write in with your views to; Letters Column, *Ham Radio Today*, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE or send an e-mail to [hrt@rsgb.org.uk](mailto:hrt@rsgb.org.uk). We reserve the right to edit letters for length, grammar and clarity for publication. Letters must be original and not have been sent to any other magazines, and must include name and address plus callsign if held (name and callsign will be withheld from publication if requested). Reader's views published here are not necessarily those of the magazine.

# Optocom PC-Controlled

■ If you've been following equipment adverts over the last year or so, as well as recent *Ham Radio Today* equipment reviews of course, you'll have noticed the emergence of PC-controlled receivers and even transceivers. These are not simply 'PC controllable' units, instead those that use your PC as the sole means of control and operation, obviating the need for most front panel equipment controls.

The Optoelectronics 'Optocom' receiver falls into this category, with its frequencies being remotely controlled via rear panel connections. But it also has user controls of an on / off switch, rotary volume and squelch knobs, plus a manual 10dB attenuator switch on the rear panel. The volume and squelch levels can also be software controlled for remote operation. Besides an RS-232 port for PC control, it also has several 'CI-5' ports which Optoelectronics tell us are Icom CI-V compatible, for control from other devices such as the Opto 'Scout'. The Optocom usefully also has a built-in memory which is capable of storing up to 28 frequencies, and after uploading these to the receiver it can be used in 'stand alone' scanning operation this way, ie without the need to have your PC connected and powered up all the time.

The receiver measures 170W x 166D x 48Hmm. It's powered from an external 13.8V DC source, and comes supplied with a suitable plug-in AC wall adapter, RS-232 lead, software, and user instruction booklet.

## coverage and software

The Optocom receives over the range 25 - 550MHz and 760 - 1300MHz (US versions have their UHF cellular ranges at 824 - 849 and 867 - 894MHz locked out), on AM, FM, and wide FM.

Apart from its built-in 28 memories, under remote control the available memory channels, tuning steps etc are only limited by the PC control program you use, and the Optocom comes ready-supplied with two programs for this.

The first is Optocom, which is a basic DOS program and which provides a good 'start' in letting you use the receiver for monitoring purposes. The second supplied program is TrakkStar, which runs under Windows 3.1, 3.11 and 95 / 98, and this is quite versatile operating software. It allows you to enter, store, select and scan banks of frequencies, memory lists etc, as well as allowing you to view the frequency banks and simultaneously scan between them. The software comes with plenty

X	MHz	RX	MODE	NAME	MODE	MT	LO	DELAY	INFO	MIN	MAX	SNDS	TIME
0	156.0500	OMIT	FM	Marine CH01A	FM	OH	Scan		2500 Port Operations and C	-137	-10	OH	OH
1	156.2500	OMIT	FM	Marine CH05A	FM	OH	Scan		2500 Port Operations, VTS	-137	-10	OH	OH
2	156.3000	OMIT	FM	Marine CH05	FM	OH	Scan		2500 Intership Safety	-137	-10	OH	OH
3	156.3500	OMIT	FM	Marine CH07A	FM	OH	Scan		2500 Commercial	-137	-10	OH	OH
4	156.4000	OMIT	FM	Marine CH08	FM	OH	Scan		2500 Commercial (Intership)	-137	-10	OH	OH
5	156.4500	OMIT	FM	Marine CH09	FM	OH	Scan		2500 Boat Calling, Comm	-137	-10	OH	OH
6	156.5000	OMIT	FM	Marine CH10	FM	OH	Scan		2500 Commercial	-137	-10	OH	OH
7	156.5500	OMIT	FM	Marine CH11	FM	OH	Scan		2500 Commercial, VTS In s	-137	-10	OH	OH
8	156.6000	OMIT	FM	Marine CH12	FM	OH	Scan		2500 Port Operations, VTS	-137	-10	OH	OH
9	156.6500	OMIT	FM	Marine CH13	FM	OH	Scan		2500 Intership Navigation	-137	-10	OH	OH
10	156.7000	OMIT	FM	Marine CH14	FM	OH	Scan		2500 Port Operations, VTS	-137	-10	OH	OH
11	156.7500	OMIT	FM	Marine CH15	FM	OH	Scan		2500 Environmental (Recel)	-137	-10	OH	OH
12	156.8000	OMIT	FM	Marine CH16	FM	OH	Scan		2500 International Distress	-137	-10	OH	OH
13	156.8500	OMIT	FM	Marine CH17	FM	OH	Scan		2500 State Control	-137	-10	OH	OH
14	156.9000	OMIT	FM	Marine CH18A	FM	OH	Scan		2500 Commercial	-137	-10	OH	OH
15	156.9500	OMIT	FM	Marine CH19A	FM	OH	Scan		2500 Commercial	-137	-10	OH	OH
16	161.6000	OMIT	FM	Marine CH20	FM	OH	Scan		2500 Port Operations (dupl)	-137	-10	OH	OH
17	157.0000	OMIT	FM	Marine CH20A	FM	OH	Scan		2500 Port Operations	-137	-10	OH	OH
18	157.0500	OMIT	FM	Marine CH21A	FM	OH	Scan		2500 U.S. Government onk	-137	-10	OH	OH
19	157.1000	OMIT	FM	Marine CH22A	FM	OH	Scan		2500 Coast Guard Liaison	-137	-10	OH	OH
20	157.1500	OMIT	FM	Marine CH23A	FM	OH	Scan		2500 U.S. Government onk	-137	-10	OH	OH
21	157.2000	OMIT	FM	Marine CH24	FM	OH	Scan		2500 Marine Operator	-137	-10	OH	OH
22	161.8000	OMIT	FM	Marine CH24	FM	OH	Scan		2500 Marine Operator shi	-137	-10	OH	OH
23	157.2500	OMIT	FM	Marine CH25	FM	OH	Scan		2500 Marine Operator	-137	-10	OH	OH
24	161.8500	OMIT	FM	Marine CH25	FM	OH	Scan		2500 Marine Operator shi	-137	-10	OH	OH
25	157.3000	OMIT	FM	Marine CH25	FM	OH	Scan		2500 Marine Operator	-137	-10	OH	OH
26	161.9000	OMIT	FM	Marine CH25	FM	OH	Scan		2500 Marine Operator shi	-137	-10	OH	OH

Using one of the pre-stored banks of frequencies supplied with the TrakkStar software.

of pre-stored banks. A unique facility of this software is its capability to monitor some US-based radio trunking systems such as Motorola and LTR types. Unlike MPT1327 trunking (which the software doesn't support) these aren't commonly used in the UK, although one reported user is the Metropolitan Police who use a Motorola trunked system in the 152.0 - 152.9875MHz band. Optoelectronics make their operating protocol freely available, so third party software is also available. One such is Radio Manager by Ben Saladino, KC5IRJ, which is a Windows program that's capable of controlling a number of PC-controllable receivers. A demo version of the software is included on one of the supplied software disks, and I downloaded the latest version from [www.interplaza.com/bensware](http://www.interplaza.com/bensware) which I used to good effect.

As well as being able to decode Motorola talk group IDs and LTR tones for trunk tracking, the Optocom also has the capability of decoding CTCSS and DTMF (touch-tone) tones off-air. For external decoders, there's a 'data slicer' output on the RS-232 DSR line which gives an FSK output for ACARS, pager etc decoding using other appropriate software. There's also a discriminator output on the rear panel for external decoder use.

## on the air

My main shack PC has two USB (Universal Serial Bus) ports and an RS-232 port on COM5, however both the supplied Optoelectronics programs were only capable of using COM ports 1 to 4. So I used my alternative PC for this - although the Radio Manager software coped with higher COM ports quite nicely. The TrakkStar software writers also offer more comprehensive software versions, you can for example buy upgraded versions with a graphical band scope, digital audio logger and so on, so there's plenty available to keep you going.

Although I didn't find any supported trunk systems receivable in my area, I used the Optocom to tune into many other VHF / UHF signals. As a comparison, I usually found it to be a little less sensitive on VHF / UHF amateur bands than a typical transceiver, also the adjacent channel selectivity wasn't quite up to rejecting very strong signals 12.5kHz away.

What I found excellent, though, was the very fast scanning and searching rate, of at least 50 or 60 channels per second, which meant that I didn't miss on-air activity. The scan banks could also usefully be 'linked' for sequential



# ed VHF/UHF Receiver

Reviewed by Chris Lorek, G4HCL

scanning, so that I could, for example, scan the 6m, 4m, 2m, 70cm and 23cm FM simplex and repeater sections of each band, with a total cycle from start to finish of just a few seconds.

I found no problems with pager breakthrough on the amateur bands, although if I tuned to within 1MHz or so of VHF pager transmissions, ie those on the 138MHz and 153MHz bands, the receiver did somewhat suffer from these with wanted signals being overridden by interference.

## lab results

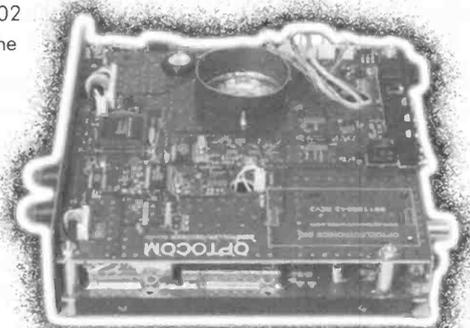
The measured results showed the receiver to have the RF performance of a typical VHF / UHF scanner type receiver, with reasonable sensitivity across the covered frequency range and with no great problems from unwanted out-of-band signals. But as found on air, the 12.5kHz adjacent channel rejection could be limiting in busy RF areas. The indicated strength of received signals using the provided Optocom software was

very inaccurate, although this facility might typically only be used for professional monitoring requirements.

The Optocom has the facility of providing a very powerful monitoring tool. Its fast scan rate, combined with both the supplied software and the availability of software offerings from third parties, makes its versatility as a VHF / UHF monitor even greater.

With its US-based trunking system monitoring capabilities and optimised FM IF bandwidth for 20 / 25 / 30kHz spacing I feel it's primarily aimed at the American market, although the versatile control facilities set it well above other European equipment offerings.

The Optocom has a recommended retail price of £499.95, and our thanks go to Waters & Stanton PLC, tel: 01702 206835, for the loan of the review sample.



## laboratory results

All measurements taken with receiver on 145.000MHz NFM unless otherwise stated.

### sensitivity

Input signal level in  $\mu$ V pd required to give 12dB SINAD:

Freq	AM	NFM	WFM
25MHz	0.80	0.27	0.93
50MHz	0.38	0.21	0.66
100MHz	0.57	0.39	1.09
145MHz	0.59	0.40	1.08
200MHz	0.44	0.35	0.80
250MHz	0.85	0.50	1.52
300MHz	0.36	0.23	0.67
435MHz	0.36	0.23	0.65
500MHz	0.55	0.34	0.96
800MHz	0.34	0.21	0.67
1000MHz	0.71	0.50	1.25
1300MHz	1.21	0.78	2.31

### adjacent channel selectivity

Measured on FM as increase in level of interfering signal, modulated with 400Hz at 1.5kHz deviation above 12dB SINAD ref level to cause 6dB degradation in 12dB on-channel signal:

+12.5kHz:	12.5dB
-12.5kHz:	8.4dB
+25kHz:	49.4dB
-25kHz:	48.9dB

### intermodulation rejection

Measured as increase over 12dB SINAD level of two interfering signals giving identical 12dB SINAD on-channel 3rd order intermodulation product:

25 & 50kHz spaced sigs:	Blocking limited
50 & 100kHz spaced sigs:	57.5dB

### maximum audio output

Measured at ext spkr socket with 1kHz audio at the onset of 10% distortion, 8 $\Omega$  resistive load:

1.90W RMS

The measurement results contained in this review were not made in an Accredited Test Laboratory, and therefore should not be construed as indicating compliance or otherwise with any requirement for type approval or for compliance with any Directive.

### image rejection

Difference in level between unwanted and wanted signal levels, each giving 12dB SINAD on-channel signals:

	70MHz	145MHz	435MHz
1st Image:	>90dB	>90dB	>90dB
2nd Image:	>90dB	>90dB	77.6dB
Half 2nd IF:	53.2dB	49.6dB	54.7dB
3rd Image:	52.8dB	52.3dB	51.6dB

### s-meter linearity

Actual Level	Indicated Level
-120dBm	-137dBm
-110dBm	-137dBm
-100dBm	-137dBm
-90dBm	-125dBm
-80dBm	-117dBm
-70dBm	-115dBm
-60dBm	-115dBm
-50dBm	-114dBm
-40dBm	-114dBm
-30dBm	-113dBm
-20dBm	-113dBm

### blocking

Measured as increase over 12dB SINAD level of interfering signal modulated with 400Hz at 1.5kHz deviation to cause 6dB degradation in 12dB SINAD on-channel signal:

+100kHz:	59.1dB
+1MHz:	77.8dB
+10MHz:	79.2dB

# Win an Icom IC-PCR100

## Competition Rules

Look at the three multiple choice questions below. Write your answers on a postcard or the back of a sealed envelope (no letters accepted) and send them to: Icom IC-PCR100 Competition, Ham Radio Today, RSGB Publications, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE. Don't forget to include your own name and address! The closing date is first post on **Friday 30 April 1999**.

Competition Rules

Competition Rules

## Computer Controlled Receiver/Scanner

Icom's new IC-PCR100 is a budget-priced receiver which - when coupled up to your 486DX4 or Pentium processor PC - gives you a wide-band (500kHz - 1300MHz) receiver - with all the features of a top-flight radio scanner.

The 'PCR100 was reviewed by Chris Lorek, G4HCL, in the March 1999 edition of *Ham Radio Today* (back issues are available for £3.20 inc P&P - see page 66 for details).

Now, an Icom IC-PCR100 is available to a lucky *Ham Radio Today* reader in our free competition, run in association with Waters & Stanton PLC. If you read the review by Chris Lorek, G4HCL, last month you will see what an independent reviewer thought of this brand new piece of equipment. To test your memory, there are three multiple choice questions below.

Answer them all correctly, and you can be the lucky winner of a 'PCR100!

## Questions

- 1) What is the frequency range of the IC-PCR100?
  - a) 1.8MHz - 30MHz
  - b) 500kHz - 146MHz
  - c) 500kHz - 1300MHz
- 2) What is the minimum specification PC required?
  - a) No minimum
  - b) 486DX4 / 100MHz / 16Mb RAM
  - c) Pentium / 133MHz / 32Mb RAM
- 3) What is the recommended retail price of the Icom IC-PCR100?
  - a) Approx £200
  - b) Approx £300
  - c) Approx £400

HINT: if you are unsure of any of the answers, re-reading Chris Lorek's review of the IC-PCR100 in the March 1999 edition of *Ham Radio Today* will help!

We would be grateful if you answer the following optional question (you will not be excluded from the prize draw if it is not answered).

- 4) What is your age?



Only one entry per reader (multiple entries will be disqualified). No other correspondence can be entered into. All entries will become the property of RSGB Publications. Employees of the RSGB are not eligible to enter. The winner will be the first correct entry drawn at random. The draw will take place on 30 April 1999.

The Burrowing Owl is an endangered species which migrates from central Canada to find its winter home in southern Texas. Last autumn 41 of them were radio-tagged and biologists sought help from VHF DF and scanner enthusiasts to track the migration, as Joe Moell, K0OV, reports

■ We've all seen wildlife films on TV that feature biologists locating radio-tagged animals with portable direction-finding (DF) gear. Migrating birds are amongst the most difficult to study, because they travel long distances in short periods, even in weather that is bad enough to prevent following them by aircraft. Researchers in North America are beginning to discover that the hundreds of thousands of Radio Amateurs there can aid their efforts. For instance, the Wildlife Conservation Corps has sought volunteers to help study the movements of endangered Whooping Cranes and a biologist from the ornithology laboratory at Cornell University has contacted me about the possibility of ham operators and scanner enthusiasts participating as 'citizen volunteers' in his institution's long-term wildlife research projects. These studies take place all over North America.

### the burrowing owl

Another important species being studied is the Burrowing Owl. In winter months, these unusual creatures can be found in southern USA, from

California's Imperial Valley to Texas. They also make homes in Florida from Orlando to the Florida Keys. However, their habitat is diminishing. As a result, they are considered endangered in some places and 'of special concern' in others.

Unlike other owls, it's unusual to see a Burrowing Owl in a tree. They prefer to roost in cavities on the ground in treeless grasslands. By day, they stand at a burrow entrance, ready to duck inside when necessary to avoid predators such as hawks. At night, they take flight to feed on small snakes, lizards, and rodents. They fly in an undulating pattern and sometimes hover in the air to catch grasshoppers, beetles and other insects.

### ham help

Early in March 1998, I received an e-mail from Helen Trefry, a Wildlife Technician with the Canadian Wildlife Service, who was working on a project about Burrowing Owls. "We know so little about their movement," she wrote. "We have no idea how long they take to migrate or if they make long stops along the way. It may be that weather is a large

# Bio-Tracking

## Radio Direction Finders Help Wildlife Project



factor in determining the rate of movement."

Owls banded during the summer in Saskatchewan had previously been recovered in south-eastern Colorado and the panhandle of Texas, lending support to the theory that they migrate south through the plains east of the Rockies to spend winter months in southern Texas and nearby regions of northern Mexico. To get more data, twelve Saskatchewan Burrowing Owls had been fitted with necklace-style VHF transmitters before their southward migration in the autumn of 1997.

Helen Trefry and her associates used the tags to learn that the birds travelled from 68 to 202 miles nightly during the hours of darkness. In the daytime, they used badger burrows as avian motels. Bad weather grounded the researchers' small plane (but not the owls!) after a few days and the tag signals were lost in south-western North Dakota. They were not heard again until December 1997, when one was picked up by another aircraft, 56 miles south-west of San Antonio, Texas. The remains of a banded Saskatchewan owl were discovered by a southern Texas wildlife refuge manager in December 1997.

I agreed to attempt to find some hams along the flight path to monitor for tag signals during the anticipated northwards flight period.

Dozens of amateurs responded, representing most of the states in the

expected migration path. Hundreds viewed the Burrowing Owl page on my web site, which gave the tag frequencies and monitoring tips. I have no way of knowing how many 'ham-hours' of monitoring were done, but I know that the response was heart-warming to me and the researchers.

Somehow, the surviving owls returned to Saskatchewan in late April and early May without being detected either by hams or researchers along the way. Perhaps if more advance notice had been available and more hams had been monitoring, some valuable insights about migration rates and patterns could have been obtained.

### south again

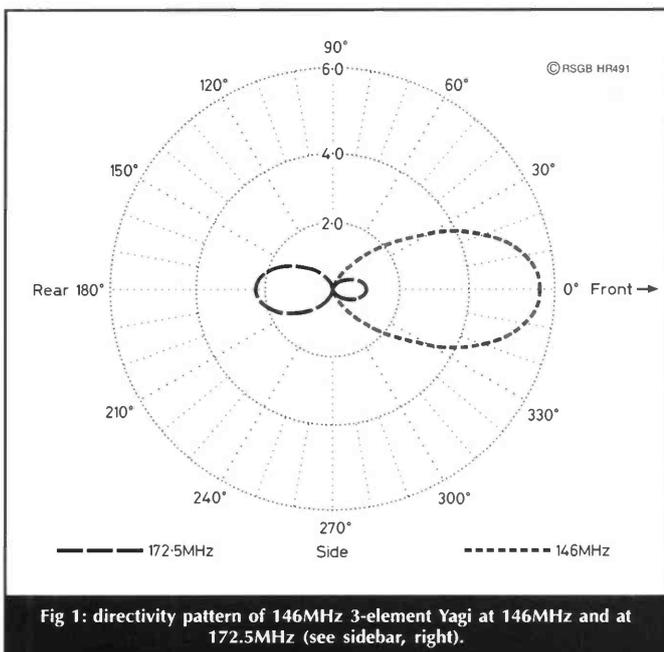
Helen wanted to try again during the owls' southward flights during the autumn of 1998. In August, she wrote: "A banded Saskatchewan burrowing owl was located in southern Texas during our winter field work last January, giving us our first hard evidence of where at least some of the Canadian owls must overwinter. Jason Duxbury, a graduate student, also flew by fixed-wing aircraft in Texas last December [1997] and was able to locate one signal, but could not confirm it on the ground. He will be returning in December to repeat the effort out of Rockport, Texas. He will again cover southern Texas and we are hoping that if a signal is picked up from the air, others will assist in a ground search. Ham operators could be an important part of a volunteer network we are hoping will assist in trying to locate the owls."

Between June and September 1998 41 Burrowing Owls were tagged with transmitters each operating on a different frequency between 172.021 and 172.975MHz. They were tagged in the Regina Plains area, Saskatchewan, and southern Alberta areas of Canada. The transmitters have battery lives of between six and eight months.

On 21 September, Danielle Todd of the Saskatchewan Burrowing Owl Project reported from the field site that the owls had started to leave. Just over two weeks later, Helen Trefry wrote, "Unfortunately, the aircraft tracking project



Amateur direction finders out on exercise and trying to locate a radio-tagged burrowing owl (top right).



that Saskatchewan had planned fell through for this fall, due to lack of sufficient funding (it is not cheap to follow these birds by plane). They are certainly not an easy bird to find, let alone a banded one, and we appreciate [the radio enthusiasts'] continuing efforts to assist us."

By 17 October Danielle Todd reported from Saskatchewan that all the owls had now left the study area. "When the signals were lost from the ground, we made several attempts at finding the owls from the air. Unfortunately, none of the aerial tracking flights were successful, as none of the signals were ever relocated either in the study area or as far south as the Big Muddy Valley, near the US border. It seems as though once the owls make up their minds to migrate south, they do so in a big way! . . . I look forward to continuing and expanding this research next year, when some improvements to transmitter design and possibly blood-testing of the young to determine sex differences will add another dimension to the post-fledging ecology of these charming little owls."

On 26 October, Helen Trefry reported that an Idaho owl had been picked up in California. "I am going to write to a few contacts from the Owl Symposium that may have transmitters on Burrowing Owls in the west, so that eager ham operators in that direction will have something to look for also", she said.

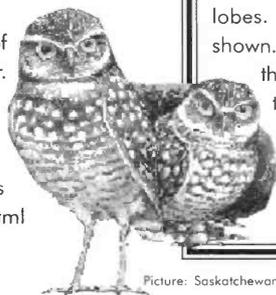
## success at last

On 22 November Grier Garrick, KC5FJZ, of Rockport, Texas, reported that he heard a pulsed signal on 172.370MHz with all the characteristics of an owl tag. Unfortunately, Grier did not hear the signal again. A radio tag on that frequency had been attached to a juvenile Burrowing Owl at a farm about five miles east of Moose Jaw, Saskatchewan, last summer. This tag has an expected battery life of only six months, so it may go off the air early in 1999.

Jason Duxbury, the graduate student researcher who picked up a burrowing owl signal from an aircraft in December 1997, again heard an owl signal on 172.321MHz from the air west of Kingsville, Texas, twice in early December 1998. The tag on that frequency is from a summer location close to the 172.370MHz tag, and it has the same expected battery life.

Both of these signals were heard during the hours of darkness, when the owls are most likely to be in the air. Volunteers in the Rockport and Corpus Christi area of Texas were asked to pay special attention to those frequencies and to continue regular monitoring.

For the latest information on this project, visit KOOV's web sites at <http://members.aol.com/joemoell/owl.html> and <http://members.aol.com/homingin/>



Picture: Saskatchewan Operation Burrowing Owl web site.

Two burrowing owls

## faqs

Many radio enthusiasts wishing to help with the project contacted me. The following is a summary of the some of the questions most frequently asked.

**Q:** Why are so many frequencies required?

**A:** So that the owls can be identified and tracked individually. Biologists assign a separate frequency to each owl because it eliminates the need to put special coding on the pulsed signals. That would add cost to receivers and transmitters, and would reduce battery life. Researchers use special narrowband receivers such as the LA12-Q by AVM Instrument Company Ltd. Its frequency readout (to 1kHz resolution) shows which tag is being received.

**Q:** What can be used instead of professional tracking receivers?

**A:** A sensitive multimode (FM / AM / CW / SSB) receiver in the CW or SSB mode provides performance nearly equal to that of a professional 'bio-receiver'. Current models that are ideal for indoor monitoring posts include the AOR AR-5000 and Icom R-8500. These sets can also be operated from 12V DC for use in a vehicle. Handheld multimode receivers such as the AOR AR-8000, AR-8200, and Icom R10 are well suited for field use. The new radio add-ons for personal computers appear to be ideal for wildlife monitoring from a base station. Check into the WinRadio WR-1000 or Icom PCR1000 computer receivers. For less than the cost of a multimode handheld receiver (plus the cost of your PC, of course), you get wide-frequency multimode coverage, computerised scan and search functions, plus extras such as a spectrum display.

**Q:** My 2m handheld tunes up to 172MHz, and so does my scanner. Can I use them?

**A:** Give it a try. You may find that your extended range handheld does not have good sensitivity at 172MHz, but maybe it does. Your scanner may work well there, or it may be plagued by 'birdies' and images from nearby strong VHF base stations and mobiles. Expect best results in rural areas. Radio tag frequencies are very close together, which may be a problem with the 5kHz channel spacing typical of FM scanners and ham sets. The passband of your set may include more than one tag frequency. That doesn't mean you can't copy the tag, it just means that it will be difficult to identify exactly which tag is being heard. Signal pulses from tags are very short, to conserve battery life. They occur only about once per second, so you can't just use the SCAN mode in a typical scanner to search for them. You must slowly step through the frequencies with the squelch open, listening through the noise for the 'blip . . . blip . . . blip' (momentary quieting) of the pulses.

**Q:** Can I use my 2m DF beam to track the tag transmitters?

**A:** Do not expect a Yagi or cubical quad for the 144 - 146MHz ham band to give proper directional indications on 172MHz 'bio-tags'. Such beams are optimised for a frequency range of only a few MHz. For example, Fig 1 shows the azimuthal directivity pattern of a 3-element Yagi typical of lightweight handheld antennas used for 2m DFing. Forward gain is 7.8dBi, giving excellent sensitivity. The 3dB beamwidth is  $\pm 32$  degrees, so bearings will be sharp. Response at angles over  $\pm 75$  degrees from the main lobe is at least 20dB down, so there are no ambiguous lobes. However, the same antenna used at 172.5MHz is also shown. Note that the forward lobe has only about 0dBi gain and there is a much larger backlobe. If you try to use this beam to track an owl, you will probably be led away from it instead of towards it! So you'll need a beam that is designed for optimum response at the tag frequency range. As a bonus, a 172MHz beam is somewhat smaller and lighter than an equivalent 2m antenna.

# SHACKLOG

## Version 5.00

If you have a PC in the shack but still keep a paper logbook, you're missing out on powerful facilities which a computer can provide. Scott Earle, G0SWG, looks at one of the most popular British logging programs

■ SHACKLOG is a fully-featured DOS-based logging program for the PC that has been developed over nine years, version 5 having just been released. It is intended to be used as a replacement for a paper log, and so provides the facility to log CQ calls and station shutdown information as well as all the facilities one would expect from a logging program. The bands covered are 1.8MHz - 2.3GHz plus 10GHz. For 50MHz and above, locator information is used to show a beam heading and distance for the remote station.

An optional IOTA (RSGB Islands on the Air) database, and an optional IOTA awards tracking program are available to keep track of which IOTA groups the user has worked and confirmed, as well as which groups have been 'accepted' for any IOTA awards that have been applied for.

Listeners are catered for, and the program can save an extra callsign for each QSO when SWL logging mode is enabled.

A good thing about SHACKLOG is that it does not require the latest PC in order to run. Any PC will suffice, as long as it has 640kB RAM, a hard disk and DOS v3.30 or later. SHACKLOG runs in full-screen and windowed mode under Windows 3.1, 3.11, 95 or 98.

### program configuration

Unlike most logging programs, SHACKLOG does not come with a list of countries and prefixes. Instead, when a callsign is typed into the 'callsign' field, SHACKLOG searches for previous QSOs with the same prefix, and enters that country into the 'country' field. If no contact has previously been logged with the prefix, the user must enter the country manually. While this sounds like a pain, it works well in practice. Obviously the first time the program is used, the user must type country names in for most QSOs. However, the program rapidly builds up its database and the user only needs to enter country names for countries they have not worked before.

One problem I have had is that the log is stored on the hard disk in multiple

files, instead of in one file. If one file is lost for any reason, the program refuses to start, and it can be difficult to recover information in this case. As with any important data, regular backups are strongly recommended!

### features

SHACKLOG's search facilities are excellent and can easily be used to track awards, or see how many DXCC countries you worked in a given year. It is useful to display (for example) all stations worked in a particular country from which no QSL card has been received. The bottom picture shows a search for countries worked and confirmed.

The radio (CAT) interface allows frequency and mode information to be requested directly from the transceiver while logging a QSO (top picture).

The program can use the 'Flying Horse' Radio Amateur Callbook CD-ROM, and can enter name and address information on the screen for a station in the callbook. This information can also be used to print address labels: most useful if you want to send a batch of direct QSL cards.

In DX Cluster mode, an alarm can sound when a country you haven't worked is 'spotted'.

### conclusion

There are many features of SHACKLOG that I could not begin to mention, due to space considerations. Its best features are the CAT and PacketCluster interfaces, and excellent search facilities. The main disadvantage of it being a DOS program is that configuring such things as COM ports is not as straightforward as with Windows programs. However, once configured the program is as easy to use as, and much better than, a paper log. Extensive documentation, covering all aspects of program operation and configuration and totalling 83 A4 pages, is supplied with the program.

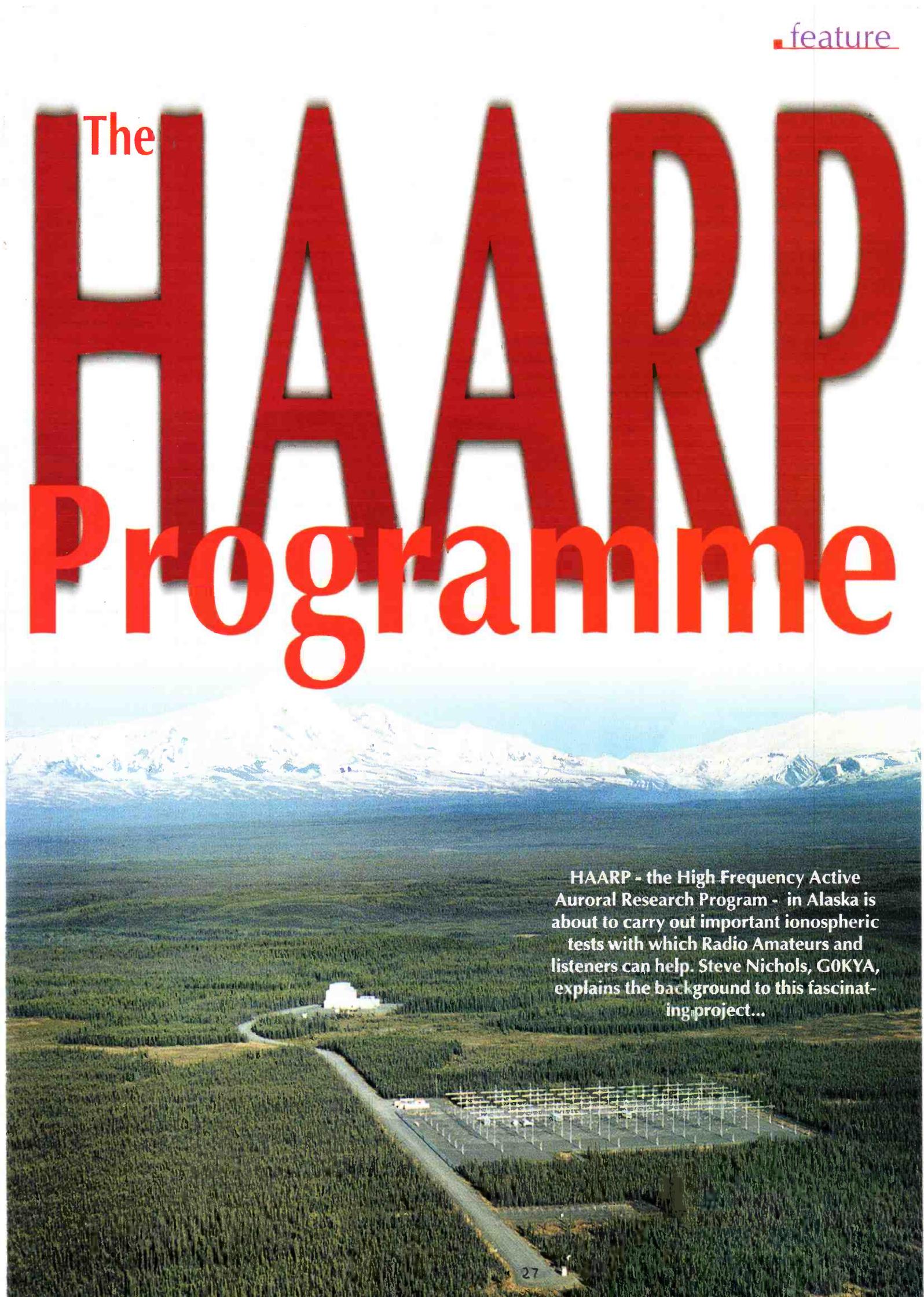
SHACKLOG is supported by its author, Alan Jubb, G3PMR. I have

found Alan very quick to respond to support questions about SHACKLOG.

SHACKLOG v5.00 costs £32. The IOTA directory is £8.00 and the SAM-IOTA awards manager £5.00, or all three can be purchased together for £42.50. It is available from Alan Jubb, G3PMR, 30 West Street, Great Gransden, Sandy, Beds SG19 3AU; e-mail: shacklog@aol.com, who is thanked for providing the review software.



# The HAARP Programme



HAARP - the High Frequency Active Auroral Research Program - in Alaska is about to carry out important ionospheric tests with which Radio Amateurs and listeners can help. Steve Nichols, G0KYA, explains the background to this fascinating project...

■ Ever since Kennelly in the US and Heaviside in Great Britain theorised that there was an electrified region in what we now call the ionosphere, research has been going on to find out exactly how it behaves. Edward Appleton verified the existence of what has become known as the E-layer in 1924, while Breit and Tuve used a form of radar to send short pulses vertically into the ionosphere a year later. This was the forerunner of what we now call ionospheric sounding.

But the High Frequency Active Auroral Research Program (HAARP) in Alaska is fast becoming the grand-daddy of all ionospheric sounders. Based at 62.39 degrees north, 145.15 degrees west, more than 200 miles north-northeast of Anchorage, HAARP promises to push our current understanding of the ionosphere to its limit.

### ionospheric stimulation

As well as the UK's Rutherford Appleton research laboratory, there are several HF research stations around the world, including sites in Puerto Rico, Tromsø (Norway), Peru and several in the Soviet Union. But the HAARP project is the most complex yet in a series of experiments aimed at 'stimulating' the ionosphere.

The ionosphere contains both neutral gas and a small number of charged particles known as ions and electrons. Solar emissions increase the level of this ionisation which can then distort, reflect or absorb radio signals, as any Radio Amateur active on HF or VHF will testify. But the ionosphere can also affect civilian and military communications, navigation, surveillance and remote sensing systems, which is why the American Department of Defence is backing HAARP.

The sun's radiation creates and maintains the ionosphere, but sudden variations in this radiation, such as those caused by solar flares, can affect the performance of radio systems. Lightning is also known to cause substantial heating and ionisation density enhancement in the lower ionosphere, and there are indications that ground-based HF transmitters, including radars and strong radio stations, also modify the ionosphere and influence radio waves travelling through the modified region.

Perhaps the most famous example of the latter is the 'Luxembourg' effect, first observed in 1933. In this case a weak Swiss radio station appeared to be modulated with signals from the powerful Luxembourg station, which was transmitting on a completely different frequency. Music from Radio Luxembourg was heard on the Swiss station's frequency.

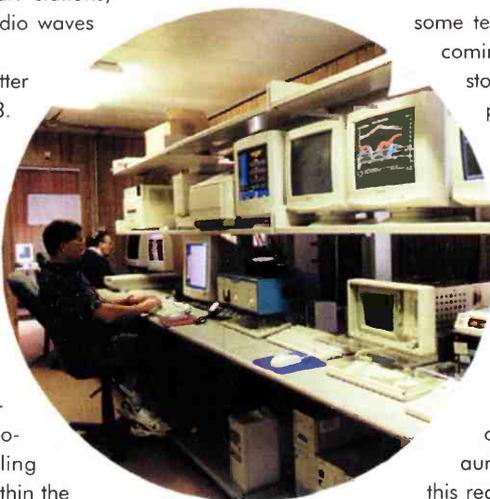
The HAARP project applies real science to this effect in an effort to see how the ionosphere can be 'manipulated'. In their words: "The HAARP facility is expected to provide significant advancements in understanding ionospheric science by stimulating and controlling plasma processes in a tiny localised region within the ionosphere, it also has the potential for significantly affecting the planning for future satellite communication and navigation systems through improvements in reliability and economics."

### big guns and water pistols

But what's so special about HAARP anyway? Many hams dream of being able to put up a tower. But what would you give to be able to put up two, or three, or even four? The HAARP site near Gakona beats this hands down with a phased array (or Ionospheric Research Instrument, IRI, as they prefer to call it) with a total of 48 70ft high towers arranged in eight columns of six rows. Each carries crossed dipoles for both the 2.8 - 8.3MHz and 7 - 10MHz bands. When completed, hopefully by 2002, the station will consist of 180 towers.

It will ultimately be fed by a pair of 10kW transmitters per tower giving a total of 360 transmitters and 3600kW output, but it is currently running at QRP levels of just 960kW!

By adjusting the phasing on each antenna a narrow beam can be produced which illuminates an area of the ionosphere 10 miles in diameter and up to a few kilometres thick. The beam is steerable up to 30 degrees off the vertical with a beam width of between 9 - 30 degrees. By way of comparison, the energy hitting the ionosphere from HAARP is still



some tens of thousands times less than that naturally coming from the sun. When there are ionospheric storms HAARP's IRI is about as effective as a water pistol!

### auroral regions

The site in Alaska was chosen very carefully. First, it is very remote yet accessible by highway. Secondly, and more importantly, it is directly underneath an area of the ionosphere which shows very varied characteristics. At times it behaves just like the mid-latitude layers, while at others it is truly auroral. If you have ever heard the strange 'hissing steam' CW or 'whispering' SSB signals associated with VHF auroral propagation you will know how important this region is.

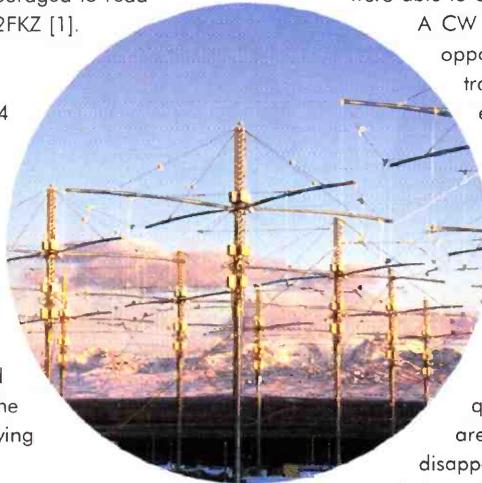
The auroral regions are traditionally defined as the polar areas where particulate solar matter is deflected by the earth's magnetic field where it causes intense ionisation and sometimes visible

aurora. We now know that this is an over simplistic view and if you feel a better explanation is warranted you are encouraged to read the book *Radio Auroras* by Charlie Newton, G2FKZ [1].

### listen to the haarp

HAARP's initial tests began in December 1994 but the first comprehensive research campaign was conducted in March 1997. The 48 element system should now be ready for full-blown research by the time you read this article.

Transmission modes include amplitude, frequency and phase modulation - SSB is not required although tests with the stations' amplifiers and a TS-440 as a prime mover showed that it would work with good linearity. If only the beam could be turned sideways instead of spraying



amateur bands, and listeners sending in a report of logged signal strength were able to claim a QSL card.

A CW message was broadcast to give listeners the opportunity to verify their reception of the HAARP transmission. This proved to be invaluable, as several listeners in New Zealand reported hearing HAARP, but not one of them correctly decoded the CW message, which makes you wonder if they were actually listening to the station at all. Another ZL reported hearing HAARP on totally the wrong frequency - the 'Luxembourg effect' again, or just wishful thinking?

The test was conducted just after sunset local time in Alaska. This time was chosen because the HAARP transmitter is limited to frequencies below 10MHz. Frequencies in this range are affected by absorption in the D layer which disappears at night.

And yes, HAARP was audible from the UK, although not at the '59' levels you might have expected. The web site contains a recording of HAARP's 6.99MHz signals as heard by Alan Gale, G4TMV, in Lancashire on 8 March 1997 as well as many more from hams across the USA. Other UK hams sent in written reports too.

The good news is that further tests are planned for mid-March this year, beginning on **Sunday 14 March**. The frequencies in use will once again be on or near **3.4MHz and 6.99MHz**. Exact transmission times were not known at the time of writing, but will be posted on the web site <http://w3.nrl.navy.mil/projects/haarp/hh2.html> when confirmed.

HAARP has attracted a lot of attention, including some from environmentalists who feel that this is an irresponsible way to conduct ionospheric research. Others suspect that HAARP is a US government-funded scheme to either a) modify the weather or b) brainwash the American public!

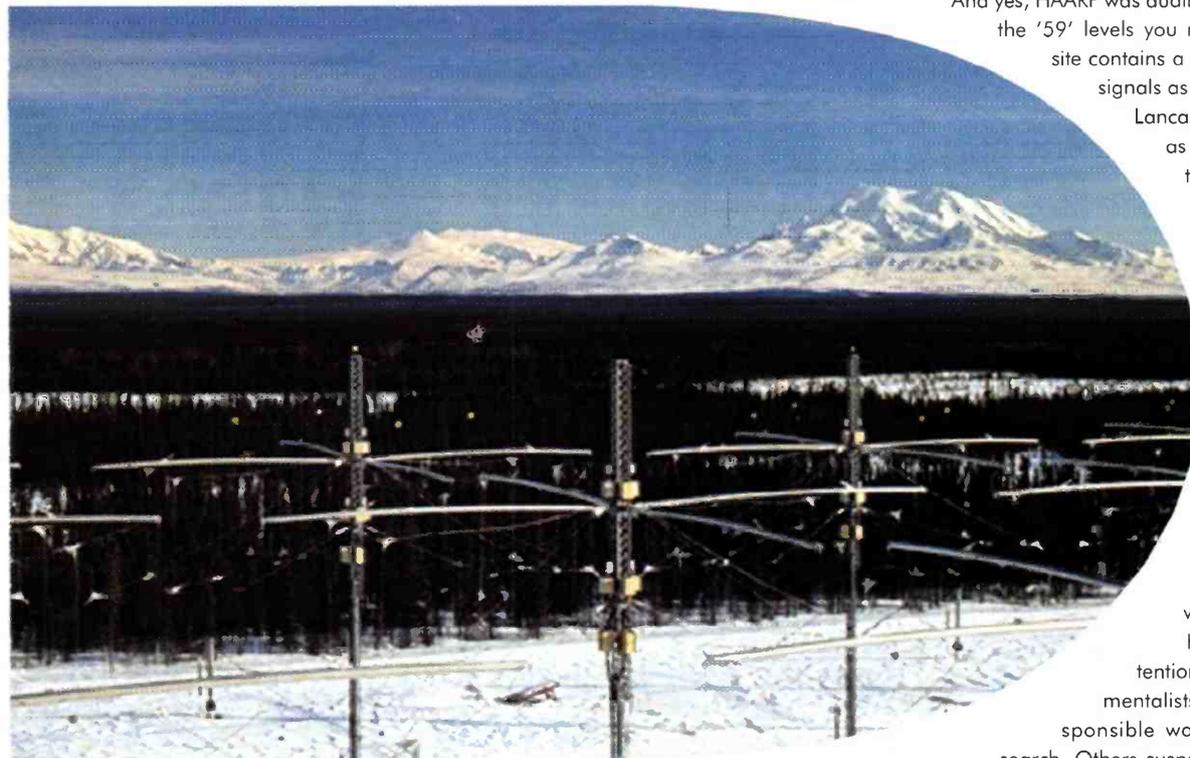
Nevertheless, HAARP offers listeners an opportunity to better understand the physics behind radio propagation - and a great opportunity to obtain a rare QSL card.

The HAARP web site at <http://w3.nrl.navy.mil/haarp.html> contains just about everything you could ever need to know about the project.

### further reading

- [1] *Radio Auroras* by Charlie Newton, G2FKZ, £4.95. Probably the most comprehensive guide to auroras, how they are formed and how to use them for radio contacts, ever published.
- [2] *Your Guide to Propagation* by Ian Poole, G3YWX, £6.99. An RSGB 'pocket guide' which explains all aspects of HF and VHF / UHF propagation, including auroras, in easy-to-understand language.
- [3] *The New Shortwave Propagation Handbook* by George Jacobs, W3ASK; Theodore Cohen, N4XX; and Robert Rose, K6GKU, £14.34. An excellent American book on all aspects of ionospheric propagation written in an easy-to-read style.

All these books are available from *Ham Radio Today* sales, see *Book Browser* on pages 60 / 61.



the RF straight up!

There have been concerns about the safety aspects of delivering such a large amount of RF into the sky, but local ground-based tests have shown that levels are within safety limits and the system is programmed to automatically shut down if radar detects aircraft in the region. TVI filters are built into the system and spurious signals are reputed to be lower than those obtained from commercial ham equipment.

The HAARP project is supported by a host of research equipment including UHF radars, magnetometers, ionosondes, spectrum monitors and a weather station. A riometer (relative ionospheric opacity meter) is also in use to sense ionospheric absorption of the celestial background electromagnetic radiation. Real-time data from all of these is available from the HAARP web site at <http://www.haarp.alaska.edu/haarp/data.html>

But if you want to hear HAARP doing what it does best - probing the ionosphere with HF signals - you can do that too. A listening test was set up in March 1997 and the co-ordinators were amazed at the level of participation from listeners around the world. More than 200 e-mailed reports were received as well as many more by 'snail mail'. HAARP transmitted on 3.4MHz and 6.99MHz, just outside the 80 and 40m



# Radio and Electronics a

The increasing importance of radio and electronics for those who take to the sea was evident from a visit to the Boat Show, which took place at Earl's Court, London, in January, as Steve Telenius-Lowe, G4JVG, reports

■ High above the massive display of boats on the ground floor, much of Earl's Court's first floor was devoted to marine radio and electronics, along with diesel engines, chandlers, book stalls and so on.

The large Icom (UK) stand displayed a wide range of VHF handhelds for the 156MHz band marine channels, along with VHF marine transceivers for use in yachts (the equivalent of 'mobiles' in the amateur market) and Icom's MF / HF transceiver, the IC-M710. This is a 150W PEP SSB unit with 976 pre-programmed ITU channels and wide coverage receiver which has been especially designed for operation in harsh marine environments. The optional AT-130E automatic ATU allows a vertical 'whip' aerial, or the back stay of the yacht's mast, to be used as an antenna.

The IC-PCR100 computer-controlled receiver was on display and this and the PCR-1000 are finding favour with boat owners who can use software to automatically tune-in the appropriate weather fax broadcast for their area, without even needing to know which frequency it is on. A small display of Amateur Radio equipment, including the new IC-706 MkIIIG, was also on show, as Icom realise that many sailors take out an Amateur Radio licence in addition to their marine radio licences.

Stephen Hand, Head of Aeronautical and Maritime Services at the Radiocommunications Agency (RA), was on hand to advise would-be radio users at sea of the licensing requirements. It would appear that unlicensed use of radio equipment is quite a problem in the marine sector, as the RA display included large TV screens carrying the stark message that they would prosecute the unlicensed use of radio equipment.

## weather bulletins

Another manufacturer displaying a weather fax receiver was NASA Marine Instruments of Stevenage. Their Target HF3 receiver is well known to short wave listeners as the AKD HF3, but

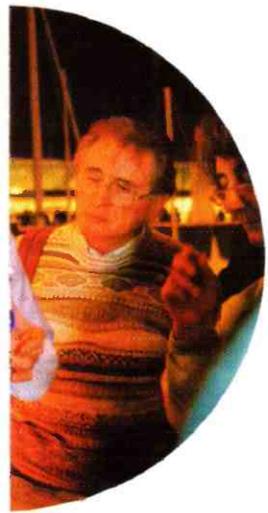
the marine version, the HF3/M (at £209.95) comes with software enabling mariners to receive both weather fax and RTTY transmissions. Also on display was the NASA Target Navtex receiver, which receives low frequency shipping forecast bulletins from coastal stations and displays the text on a high-contrast LCD. It can store over 8000 characters in memory and receives and retains messages even when the operator is not present.

Whilst Icom and NASA / AKD are well known to Radio Amateurs and listeners through their products intended for the amateur market, the UK firm ICS Electronics Ltd may be less well known. Nevertheless, they are a major manufacturer of quality marine radio and electronics equipment. The ICS stand featured their VHF3 DSC3 GMDSS-compatible VHF digital selective calling transceivers. If the shore or another vessel needs to communicate with you, an audible alarm sounds on VHF channel 16 (156.800MHz), meaning that there is no longer the need to maintain a listening watch for voice calls.

## satellite phones

Satellite communications were 'big' this year at the Boat Show, with several dealers displaying their wares. The Iridium phone allows users to connect to the international phone network from anywhere in the

# Boat



(From left to right): Andrew Bush, director Marine Sales with Burmarc of Liphook, Hants, demonstrates the amazing Iridium satellite phone; VHF handhelds, marine VHF transceivers, and the HF automatic ATU make up the Icom (UK) display; The Yeoman paper chart plotter demonstration always attracted lot of attention; The Royal Navy display included a mock-up of the control centre on board a destroyer; The central pool with its display of luxury yachts.

# at the...

world, from a handheld unit no bigger than many 'ordinary' mobile phones. If close enough in to shore, it will connect to the GSM network, but out at sea it connects directly to the Iridium world satellite service, a constellation of 66 satellites operating in the  $K_A$  band between 19.4 and 29.3GHz. The cost is around £2500 plus up to \$11 per minute for call charges.

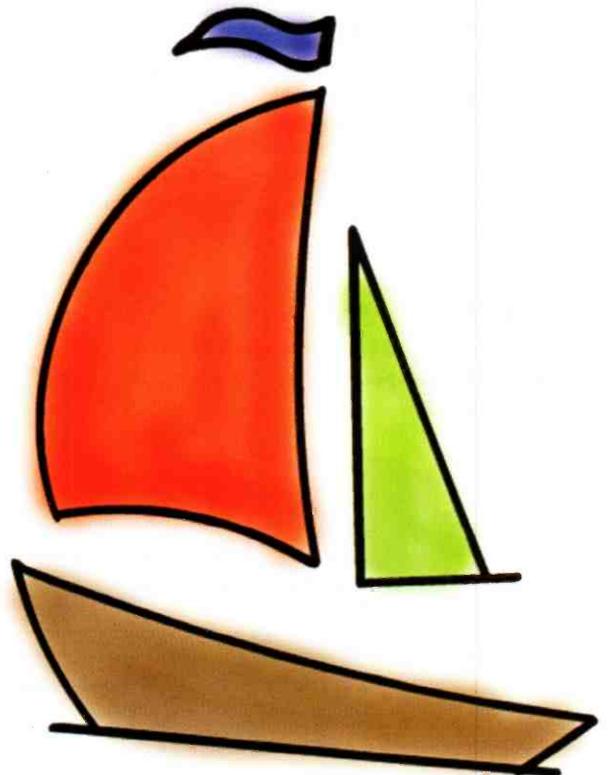
## navigation aids

One 'live' demonstration which was attracting a lot of attention was that of the Yeoman paper chart plotter, 'the mouse for maps'. The Yeoman 'mouse' makes navigation using charts easier. The Admiralty's new folio charts show Yeoman plotter positions which, at the click of a button, recognise pre-loaded reference points in the mouse. Once a chart is referenced to the base unit it's ready for use and the vessel's position can always be found by following the indicator lights on the mouse.

GPS is of course used by mariners as an aid to navigation, and two major manufacturers of GPS units, Garmin and Magellan, both had large stands at the show. The Japanese firm Koden also displayed their GPS units, including a differential GPS navigator, which receives beacons as well as satellites and using triangulation gives an even more accurate position indication than that possible using GPS alone.

There were numerous other manufacturers offering electronic equipment such as 'fishfinders', radar, electronic charts, autopilots, and satellite TV receivers. More and more software is becoming available for mariners, with numerous uses, including training in the use of radar and tidal navigation, there's a 'FogMaster' simulator to practice sailing and navigating in fog, and even 'learn how to sail' tutorials on CD-ROM.

# Show



# The Icom IC

**This long-awaited HF / VHF / UHF mobile has just arrived and we are pleased to bring you the UK's first full technical review, by Chris Lorek, G4HCL**

■ The original Icom IC-706 became available a few years ago, a tiny all-mode 100W HF and 6m transceiver with 10W on 2m, including a wideband receiver covering up to 200MHz. It was a marvel of a rig, one which hundreds of amateurs in the UK (together with 4000 more in the US!) had 'put their name down' on the waiting list for. They weren't disappointed, and if you read the review of this rig in the December 1995 issue of *Ham Radio Today* you'll have seen why.

It's hard to improve something that had already set the 'standard' for a tiny HF / VHF rig, one that many amateurs either have, or would love to have, beneath the dashboard of the car. But a couple of years later the IC-706MkII became available, with improved operating facilities together with a higher power of 20W on 2m.

A little later, an optional UT-106 DSP unit could be internally fitted, and soon this was supplied as standard with all IC-706MkIIs in the UK. The MkII certainly tempted even more amateurs to 'take the plunge' with their chequebook or credit card!

Now comes the IC-706MkIIG, having not just a higher power on 2m of 50W, but an extra transceive band as well! Inside an already packed interior, Icom have somehow managed to squeeze in 70cm as well, with a transmit output power of 20W.

That's not all, because as well as the DSP unit being included as standard there's a few extra niceties as well. There's an increase in the number of scan edge channels from two to six, and separate call channels for 2m and 70cm, together with other facilities which are especially useful with the set's increased appeal to the VHF / UHF operator. The often-used front-panel function keys are now back-lit for night-time operation, and there's still room to fit up to two optional narrow filters for SSB and CW as well as an optional speech synthesiser board with no increase on the original '706 outer case size.

In this review I've deliberately not covered all the set's facilities again, these have been well documented in the past. Instead I've concentrated on what's new in the 'G' model, as well as a complete set of technical measurements to see whether the performance has been compromised at all.

## tone squelch & packet

With many 2m and 70cm repeaters becoming equipped for CTCSS (sub-au-

dible tone) access as an alternative to a 1750Hz toneburst, and every 6m repeater in the UK using this as the sole means of access, Icom have included FM sub-tone encode and decode as standard.

This could previously be added as an optional plug-in unit, now it's built in as part of the main PCB circuitry. There's now also a CTCSS 'tone scan' facility, where the set can rapidly cycle through all the available CTCSS frequencies to find which, if any, is being used on the frequency you're tuned to.

There's a new socket on the rear panel. This is the now-standard 6-pin mini-DIN type for a packet TNC, with connections for data in, data out, audio out, squelch, PTT and ground. The transceiver can be used for both 1200 baud and 9600 baud packet, a front panel controlled set-up menu function selecting between the two speeds. When set to 9600 baud, the transmit audio from your TNC is applied directly to the internal limiter circuitry to automatically maintain the transmit bandwidth, too much input level and the set's TX indicator either flashes or doesn't light at all to warn you.

## swr measurement

Mobile whips have a rather narrow bandwidth on HF, especially on the lower bands of 160m, 80m and 40m. My 80m G-Whip for example works very well, but only over about 20 - 30kHz before I need to get out of the car and re-adjust it to a new frequency I might want to use. Most recent base-station HF transceivers have a switchable SWR readout on the meter, the IC-706MkIIG now has this also on its bar-graph meter display, together with transmit power output and SSB ALC.

But what about the SWR on either side of your tuned frequency - how far can you QSY while you're on the move before an antenna re-adjustment is needed? Here, Icom have added an extra facility which operates on the HF / 6m antenna port - with a simple 'SWR bargraph' display which appears along the bottom section of the LCD panel. You can pre-set the frequency spread of the display in intervals from 10kHz upwards from the centre operating frequency you're tuned to.

To use this, you first need to make sure the power output is at least 30W and the mode is either CW or RTTY.

After a front-panel button push, and after checking the frequency is clear, a press of the PTT measures the SWR and stores this on the first small vertical bargraph sec-



# IC-706MKIIG

tion. The transceiver then automatically changes frequency to the next frequency interval, a further PTT press measures and stores the SWR here on the next LCD section along, repeating this until the display is completed, when the transceiver automatically returns to the centre frequency. The manual shows that five separate measurement increments are used, although on the review model I tested I found three were used, ie the centre frequency plus one frequency increment either side of this. The SWR graph is usefully saved even when you switch bands - handy for multi-band mobile use.

## results

I gave the transceiver an initial air test, finding it to be very similar on receive to the performance of the IC-706MkII. Although my early review model wasn't fitted with a DSP unit (all those sold will be), I'd already tested this in an earlier set, finding it to be a very useful facility and a remarkable inclusion in such a physically small transceiver. You can read the review of this DSP unit in the July 1998 issue of *Ham Radio Today*.

On transmit my audio was described as nice and clear, although I was suffering from an illness during one of the on-air review evenings and my QSO partner probably still remembers me sounding rather peculiar that day! I had a few misgivings about the SWR graph facility on HF though - hopefully there won't be too many 'phantom carriers' appearing on the bands from amateurs misusing this!

On the newly-added 70cm range the receiver was nicely sensitive, and I had a number of contacts with local and not-so-local stations using this. Besides the useful tone squelch, which I also used to good effect on my local 6m repeater, I found the 'tone scan' worked well. This quickly showed me that 71.9Hz was needed to access this repeater, and this facility is very handy if you're travelling in different areas around the UK. The increased 2m power didn't cause any temperature problems at all,

thanks to the automatic forced-air cooling, it is of course a 100W HF and 6m transmitter as well.

The measured lab results confirm the on-air results, showing that Icom apparently haven't 'taken anything out' on receive to fit the extra circuitry in. The SSB linearity was still very good for such a physically small power amplifier, it was particular good on 70cm SSB. I did, however, find the lower-order harmonics on some HF bands a little high, those falling in the 36 - 42MHz range from the 14MHz, 18MHz and 21MHz bands being only around 40dB down on the transmitter's 100W output.

If you're wondering about 4m possibilities with a simple modification - no, the IC-706 series can't cover 70MHz on transmit, due to the first IF being 69.0115MHz, but you can of course easily use a transverter for this band.

## conclusions

Icom certainly had a winner when they launched the original IC-706, they have an even better winner with the IC-706MkIIIG. If you're looking for a multi-band multimode 'do everything' HF, 6m, 2m and 70cm mobile rig, you won't be disappointed.

My thanks go to Icom UK for the loan of the set for review. The recommended retail price is £1195 and the IC-706MkIIIG is available from a number of Amateur Radio dealers - see the advertisements in this issue of *Ham Radio Today*.

Please see page 39 for the Laboratory Results table.

Turn to page 39



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- 20 Memories
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- AA Cell Operation
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**2m Handheld**  
**£99.95**

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Includes DSP & CTCSS Encode



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Yes, it's your final chance to purchase this great transceiver. Uttering 100 watts on all bands from 1.8MHz to 54MHz plus 20 Watts on 144MHz.

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Dual Band Performance  
 2m & 70cms Handheld



- Includes**
- Wideband Receive
  - AM Airband
  - 5W from 12V
  - Full Duplex
  - Alphanumeric Display
  - 200 Memories
  - CTCSS & 1750Hz Torie
  - Ni-cads & Charger



### AR-146 2M 50W Mobile

Includes Full CTCSS  
 Complete with Microphone and mobile mount



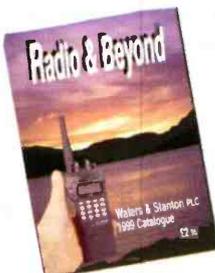
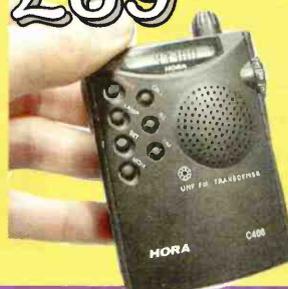
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**£89**

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Includes 70MHz Transceive

Yaesu's great new base station design lets you operate on all bands from 160m to 70cms. One small package - but what a package! Give us a call for the FREE leaflet.

**YAESU FT-920 1.8 - 54MHz** ~~£1229~~



Phone for "Near Trade" Price

\* 1.8 - 54MHz 100W \* DSP filter \* MOSFET PA \* Internal ATU \* Auto notch \* Twin VFOs \* Auto glow display \* Shuttle jog \* Digital memory memory \* Electronic keyer \* RS-232C converter \* Quick memory bank + lots more phone or e-mail for colour leaflet

**NEW YAESU FT-100 1.8 - 430MHz** ~~£1199~~

All modes - All Bands - One Box



It's been a long time coming - first shown at Dayton 9 months ago - we really are promised it for March. As usual we will have the first stocks and the best prices.

**ICOM IC-746 1.8 - 144MHz** ~~£649~~



Phone for "Near Trade" Price

The IC-746 has proved to be one of the best value base station transceivers around. All bands from 1.8 - 144MHz and a straight 100W makes this great value. Give us a call for the latest brochure and the best price around!

**YAESU FT-840 1.8 - 30MHz** ~~£649~~



Phone for "Near Trade" Price

If you are looking for a good, reliable 100W transceiver, then this is just the job. Supplied with FREE Base Mic.

**YAESU FT-8100 Dual Bander Mobile** ~~£399.95~~



Phone for "Near Trade" Price

Yaesu's top selling dual band mobile transceiver. very thing you could wish for including wideband receiver

**ICOM New IC-2100 2M Mobile** ~~£269~~

With Switched 12.5kHz & 25kHz Filters



Phone for "Near Trade" Price

The IC-2100 Mobile transceiver from ICOM features switched filtering, 55 Watts with 113 memories. And all this at a very competitive price. In stock NOW

email: sales@wspc.demon.co.uk

**ICOM IC-706 MKIIG** 1.8 - 432MHz

**NEW**



The new IC-706 MK IIG offers you all modes from 160m to 70cms in a mobile package. Using the optional remote head mounting kit it will fit in any car and give you 100W on all bands to 54MHz (jus 50W on 2m and 20W on 70cms. It also makes a great base station.

**YAESU FT-1000MPDC (AC £2199) £1899**



Phone for "Near Trade" Price

\* 1.8 - 30MHz 100W \* SSB - CW - FM - AM \* Rx 100kHz - 30MHz \* Message memory \* Dual in-band rx \* EDSF filter \* RF processor \* RF pre-amp \* Electronic keyer \* IF shift width \* Collins filters \* omprehensive menu system \* RS-232 interface and more - send for details

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TMG-707	£349	£295
THG-71E	£279	£235



**SGC-2020 QRP HF Transceiver** 1.8 - 30MHz ~~£599~~



0 - 20 Watts SSB and CW with CW break-in. Runs from 12V DC and has very nice SCAF audio filtering. Very low current requirements.

**YAESU VX-1R Dual Bander** 2m / 70cms ~~£199~~



500mW Output  
290 Memories  
Alphanumeric display  
Full CTCSS  
Dual Watch  
Smart Search

A smart little handheld that has been one of our best sellers for many months. Ideal for the brief case - give us a call for a really super deal!

**YAESU Special FT-41R 70cms Handheld** ~~£119.95~~

Includes **FREE** Hod Charger



430 - 450MHz  
12.5 & 25kHz Steps  
3.5 Watts (12V)  
151 Memories  
1750Hz Tone  
Keypad Entry  
Ni-cad Pack & Charger  
BNC Antenna  
Yaesu 2 Year Warranty

A chance to make a huge saving - but hurry as we have purchased the lot!

**KENWOOD New TH-D7E** £319

Dual bander VHF / UHF  
Built-in TNC Data Display

Now enjoy the benefit of a built-in TNC and APRS (Automatic GPS Packet Reporting System). The handheld that takes you into the Year 2000!

Features: \* 144/430MHz \* Wide / Narrow Deviation \* 1200/9600bps TNC \* DX Cluster Monitor \* Dual Rx Data/Voice on VHF \* 12 digit 3-line display plus scroll function \* 200 Memories \* CTCSS plus 1750Hz tone \* AIP (VHF) \* APRS \* Built-in 13.8V DC charger \* 6W on 13.8V DC \* AC charger & Ni-cad pack



**YAESU FT-50R 2m/70cms Handy** ~~£279~~



Phone for "Near Trade" Price

- \* Wideband Rx (AM Airband)
- \* FM Broadcast receive
- \* CTCSS & 1750Hz
- \* 112 Alphanumeric Memories
- \* Dual Watch - Military rated
- \* 5W from 12v DC input
- \* Ni-cads and AC Charger

This is a very solid rig that is proving one of the most popular dual band handhelds

**ICOM IC-T8E Triple Band Handy** ~~£319~~

All in one small package.



6m  
2m  
70cms

- \* 5W output (13V)
- \* 25 / 12.5kHz ready
- \* Wideband Rx
- \* Nickel Hydride batt
- \* Wide FM broadcast
- \* AM for airband
- \* Rapid scanning
- \* Alphanumeric

**ICOM Dual Bander New IC-Q7E** £215

2m & 70cms FM & AM Rx  
In Stock NOW



This pocket handheld provides 300mW of FM on 2m & 70cms plus wideband receive FM AM WFM from 30MHz - 1300MHz - no gaps. Runs from 2 x AA cells

**ICOM £369 IC-207H 2m/70cm Mobile**

- \* 2m & 70cm
- \* 50W / 30W
- \* Detachable head

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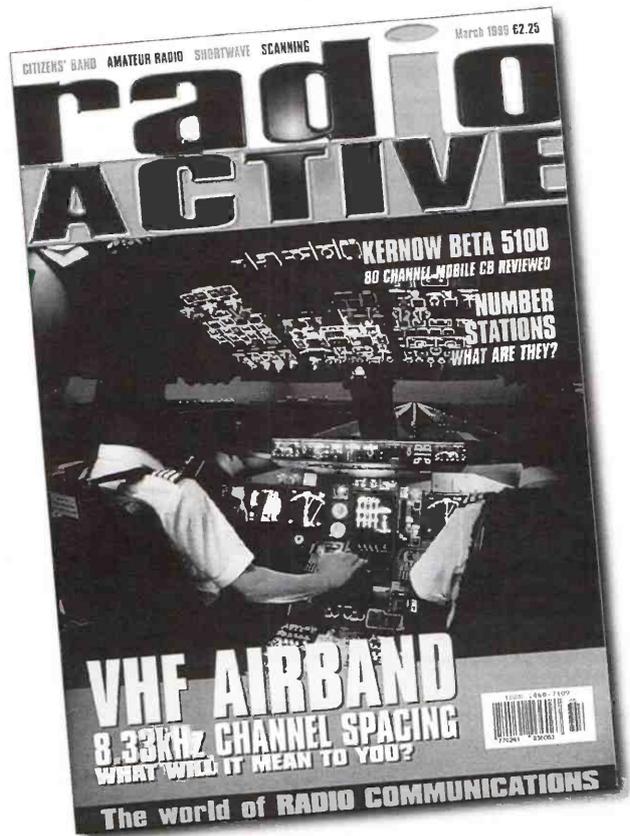
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# The Icom IC-706MKIIG

See the Chris Lorek review on pages 32 / 33

# laboratory results

All measurements carried out in standard bandwidth SSB mode on 21.4MHz, with attenuator / preamp off, unless stated.

## sensitivity

Input level in  $\mu\text{V}$  pd required to give 12dB SINAD, figures in brackets with preamp on:

Freq MHz	SSB / CW	AM	FM
1.8	0.23 (0.14)	0.60 (0.42)	-
3.5	0.24 (0.14)	0.51 (0.35)	-
7.0	0.18 (0.11)	0.47 (0.34)	-
10.1	0.18 (0.11)	0.54 (0.38)	-
14.0	0.18 (0.10)	0.57 (0.35)	-
18.1	0.16 (0.10)	0.47 (0.38)	-
21.0	0.17 (0.09)	0.48 (0.40)	-
24.9	0.15 (0.10)	0.47 (0.39)	-
29.0	0.16 (0.10)	-	0.33 (0.16)
50.1	0.12 (0.09)	-	0.20 (0.14)
145.0	0.12 (0.09)	-	0.18 (0.13)
433.0	0.15 (0.09)	-	0.27 (0.13)

## s-meter linearity

Measured at 14MHz:

Indication	Sig Level	Rel Level
S1	2.55 $\mu\text{V}$ pd	-24.8dB
S2	2.66 $\mu\text{V}$ pd	-24.4dB
S3	2.81 $\mu\text{V}$ pd	-23.9dB
S4	3.10 $\mu\text{V}$ pd	-23.0dB
S5	3.78 $\mu\text{V}$ pd	-21.3dB
S6	6.29 $\mu\text{V}$ pd	-16.9dB
S7	12.5 $\mu\text{V}$ pd	-10.9dB
S8	25.5 $\mu\text{V}$ pd	-4.8dB
S9	33.9 $\mu\text{V}$ pd	0dB ref
S9+20dB	138 $\mu\text{V}$ pd	+10.0dB
S9+40dB	419 $\mu\text{V}$ pd	+19.6dB
S9+60dB	871 $\mu\text{V}$ pd	+25.9dB

## image rejection

Increase in level of signal at the first IF image frequency over level of on-channel signal, giving identical 12dB SINAD signal:

Freq MHz	Image Rej
1.8	>110dB
3.5	>110dB
7.0	>110dB
10.1	>110dB
14.0	>110dB
18.1	>110dB
21.0	>110dB
24.9	>110dB
29.5	>110dB
50.1	>110dB
145.0	72.2dB
433.0	86.3dB

## s-meter s9 level

Freq MHz	Sig Level
1.8	33.8 $\mu\text{V}$ pd
29.0	33.2 $\mu\text{V}$ pd
50.1	23.7 $\mu\text{V}$ pd
145.0	24.0 $\mu\text{V}$ pd
433.0	22.5 $\mu\text{V}$ pd

## 3rd order intermodulation rejection

Increase over 12dB SINAD level of two interfering signals giving identical 12dB SINAD on-channel 3rd order intermodulation product:

	Preamp Off	Preamp On
10 / 20kHz spacing:	78.7dB	75.1dB
100 / 200kHz spacing:	79.1dB	75.8dB

## blocking

Measured as increase over 12dB SINAD level of interfering signal, unmodulated carrier, causing 6dB degradation in 12dB SINAD on-channel signal:

	Preamp Off	Preamp On
$\pm 50\text{kHz}$ :	95.7dB	96.1dB
$\pm 200\text{kHz}$ :	103.8dB	100.9dB

## selectivity

	SSB / CW	AM	FM
-3dB	2.52kHz	8.85kHz	13.55kHz
-6dB	2.68kHz	12.05kHz	15.65kHz
-20dB	3.06kHz	20.13kHz	19.43kHz
-60dB	5.98kHz	38.77kHz	25.76kHz

## harmonics

Freq	2nd	3rd	5th	7th
1.8	-63dBc	-52dBc	< -80dBc	< -80dBc
3.5	-65dBc	-54dBc	-53dBc	-57dBc
7.0	-73dBc	-59dBc	-48dBc	-62dBc
10.1	-50dBc	-61dBc	-47dBc	< -80dBc
14.0	-72dBc	-39dBc	-71dBc	< -80dBc
18.1	-41dBc	-55dBc	-58dBc	-66dBc
21.0	-38dBc	-62dBc	-77dBc	-64dBc
24.9	-61dBc	-62dBc	-60dBc	-68dBc
29.0	-68dBc	-78dBc	-80dBc	-65dBc
50.1	< -80dBc	-76dBc	< -80dBc	< -80dBc
145	-63dBc	-71dBc	< -80dBc	< -80dBc
433	-68dBc	-67dBc	< -80dBc	< -80dBc

## ssb imd performance

Measured with a two-tone AF signal, results given as dB below PEP level:

	3rd Order	5th Order	7th Order	9th Order	11th Order
<b>14MHz:</b>					
Proc Off	-41dB/	-38dB/	-41dB/	-47dB/	-52dB/
(ALC Onset)	-33dB	-35dB	-40dB	-44dB	-48dB
Proc On	-22dB/	-36dB/	-35dB/	-37dB/	-43dB/
(Mid ALC)	-29dB	-37dB	-38dB	-43dB	-47dB
<b>50MHz:</b>					
Proc Off	-28dB/	-40dB/	-42dB/	-43dB/	-49dB/
(ALC Onset)	-24dB	-37dB	-39dB	-42dB	-47dB
Proc On	-22dB/	-40dB/	-42dB/	-43dB/	-44dB/
(Mid ALC)	-26dB	-33dB	-42dB	-43dB	-44dB
<b>145MHz:</b>					
Proc Off	-25dB/	-40dB/	-51dB/	-56dB/	-58dB/
(ALC Onset)	-23dB	-38dB	-50dB	-54dB	-58dB
Proc On	-19dB/	-31dB/	-41dB/	-50dB/	-56dB/
(Mid ALC)	-26dB	-35dB	-47dB	-59dB	-61dB
<b>432MHz:</b>					
Proc Off	-31dB/	-50dB/	-52dB/	-60dB/	-68dB/
(ALC Onset)	-31dB	-49dB	-50dB	-61dB	-68dB
Proc On	-22dB/	-39dB/	-49dB/	-52dB/	-60dB/
(Mid ALC)	-34dB	-48dB	-51dB	-53dB	-63dB

# transmitter

The measurement results contained in this review were not made in an Accredited Test Laboratory, and therefore should not be construed as indicating compliance or otherwise with any requirement for type approval or for compliance with any Directive.

# receiver

## tx power / current consumption

Connected to stabilised 13.8V DC using supplied DC lead:

Freq MHz	Max Power	Min Power
1.8	105W (14.6A)	2.9W (5.3A)
3.5	107W (14.8A)	3.2W (5.4A)
7.0	108W (17.2A)	3.2W (5.5A)
10.1	109W (14.3A)	3.2W (5.3A)
14.0	106W (16.8A)	3.2W (5.4A)
18.1	104W (14.9A)	3.2W (5.2A)
21.0	103W (17.6A)	3.3W (5.5A)
24.9	102W (18.4A)	3.3W (5.5A)
29.0	102W (17.6A)	3.2W (5.3A)
50.1	104W (16.7A)	2.8W (5.4A)
145.0	54.9W (11.5A)	2.6W (5.2A)
433.0	20.1W (8.8A)	0.3W (5.1A)

■ Our association as Radio Amateurs with space and satellite communications goes back further than perhaps you imagined. Not just for the experts, although it does take some expertise, satellite communications can add that extra dash of interest to our hobby.

What does the word 'space' conjure up for you? Do you remember those flickering images of the first moon landings? Or perhaps if you are older you remember Sputnik and the various dogs and monkeys that went into space, or perhaps Telstar. It's certainly something that fires the imagination. Satellites are out there to map, to spy, to communicate, to send you Sky TV, to relay the news, and - even - to carry your QSO at HF, VHF, UHF or even microwave frequencies.

### telegraph lane and the shuttle

The first time I put Amateur Radio with space was when visiting the radio club in Norwich years ago where the guest speaker demonstrated with very simple equipment how you could access one of the satellites. Before then, I had seen these hideously complicated charts with moving bits of plastic and talk of apogees and orbits and complex antennas with all-directional controls, which I had decided was not for me. Since then, the only thing I really tried hard to do (and failed) was to try to speak to the manned space flights. I really would have liked *that* QSL card.

I learned a bit more about geo-stationary satellites when I played about with parabolic antennas some years ago for broadcast reception, otherwise I confess I have not done anything more about Mir or Oscar and their myriad friends.

So my knowledge, like yours perhaps, is sketchy. No excuse of course for this. You need look no further than Richard Limebear's articles on AMSAT happenings, only a page or so away from you now in this very magazine. Read his articles for the real McCoy, but I invite you now to accompany me to see what the Internet can show us on this subject. Who knows, this could be the start of a new opening of interest for you. The sites are not all ham radio based.

### amsat-uk and others

The first port of call had to be the AMSAT-UK pages. You won't be disappointed with this as a starter page. Apart from signing up, you will find a very useful links page as well as Oscar News and a list of other countries' AMSAT organisations and Internet pages. The AMSAT Colloquium sounds great: ". . . Buy them a beer and AMSAT-DL or U(niversity) o(f) S(urrey) staff will design you a spacecraft on the back of a beer-mat. Talk satellites or other Amateur Radio subjects all through the weekend . . ."

What more could you ask for? Seems to me these AMSAT people know how to enjoy their hobby. There are other AMSAT sites, which are listed in Table 1. I didn't visit them all - they are there for the reading - but the Australian site I did visit. I learnt what 'keps' (Keplerian Elements) were, and read about Oscar 5.

### nasa

You'd expect the NASA pages to be pretty good, and they are. Here we step out of Amateur Radio in the strictest sense. Some flights will touch upon it though. I used their search engine for 'ham radio' and under 'Letters to my Son' the astronaut Jerry Linenger writes, "Just talked to Ellen Baker on the ham radio. She talked to Mommy in Russia on the phone earlier, and passed along Kathryn's love to me as I was zooming over the US".

There is a whole set of questions from earthlings to the Shuttle crew and these are worth a read. An extensive library of images and movies and data enough to satisfy the hungriest space fan.

Answering the question: "Can I see the Space Station from my back yard?" a daily update tells you that you can. I extracted this one entry for London: 06:03 pm / 50 degrees ABOVE S; 22 degrees ABOVE SE.

ARISS (Amateur Radio on the International Space Station) has some interesting facts for Radio Amateurs. Factual rather than visual, but

useful nevertheless. This is part of the NASA site, so visit it before you move on.

### sedsat and pansat

I confess my total ignorance of these until I read Richard's article in the February 1999 *Ham Radio Today*, so I thought I'd look it up on the Internet. Here is the low down: "The SEDSAT 1 project has grown from a simple project begun by two students and their mentors, to an international project with volunteers world-wide, making a significant impact on the development and utilisation of advanced technology for the general space programme. The Amateur Radio communications and the educational opportunities that will be afforded by SedSat 1 will be used to educate students of all ages in technological pursuits for the advancement and betterment of all mankind."

They have a super website which is as attractive as it is informative. It's based at the University of Alabama in Huntsville. No trouble finding out the working frequencies (2m and 10m), and times and details are all there. This clever project will provide the Amateur Radio community with digital packet store-and-forward and analogue repeater systems.

The Petite Amateur Navy Satellite (PanSat) is a small satellite designed and built by officer students, faculty, and staff at the Naval Postgraduate School (NPS) to support the Space Systems Engineering and Space Systems Operations Curricula by providing a 'hands-on' hardware project, where exposure to the many facets of a space system development and life cycle can be experienced. The site has some very nice photos too.

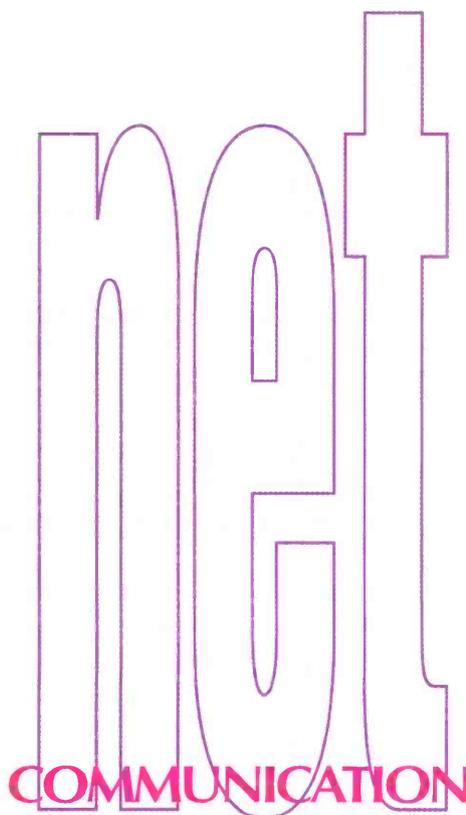
### satellite predictions

This is where I came unstuck in the past. Amateur satellites pass over, they are not geo-stationary (like Astra satellites) and so you need to know where they are and at what times. Fortunately there is the Satellite Predictions for UK Cities page by David Johnson of Badgersoft. Not over-elaborate, the pages nevertheless provide accurate and useful location by city. I looked up mine (Nottingham) and there they all were. All I need now is a suitable station.

Enter again our old friends, Azimuth, Elevation and Pass and their cousins, AOS (Acquisition of Signal), MEL (Maximum Elevation) and LOS (Loss of Signal).

### various and amateur

Ashley's Space World (WB50TD Reaching for the Stars) has an enthusiastic feel. You can hear recordings of Space Shuttle flights, and follow some of his links. One of which was Listen to the Satellites, suitable hardware and software to work out those awkward passes. I thought at



Space - the 'Final Frontier' for Radio Amateurs? Jeremy Boot, G4NJH, looks at what the Internet can show us on satellites and Amateur Radio in space

first this was a demo page, but in fact it is a clear well-organised set of equipment you could use and which the author recommends. There are good links here too. Jump then to Space Online to see "Planet Earth's best source for space news on the World Wide Web."

On to other amateur pages. I reviewed Peter's, G3PHO, microwave pages in a previous issue. See also G3CWV Home Page, which gives some uncluttered and useful information, including orbit details which are downloadable. Viktor Kudielka's, OE1VKW, Home Page similarly is more for the expert than the novice.

Chris, G4ZCT, is heavily into all things spatial. He lovingly displays various images and gives details of air to ground communications. Joe Kasser's, W3/G3ZCZ, page mainly details articles and books he has written. There are some very technical articles here too and details of software available.

When I looked at the NORAD page, which shows Santa Claus and his sleigh (I write this in January), I had to look twice. In fact the official missions of NORAD are: Aerospace Warning: the monitoring of man-made objects in space; and detection, validation and warning of attack against North America . . . and Aerospace Control: providing surveillance and control (air sovereignty) of Canadian and America airspace. It does give some interesting details of how it tracks Santa or anyone else.

I liked the European Space Agency's Pages with all sorts of detail. One is a break-neck speed presentation of what they do. Also interesting is their video library; they get such a

good view from up there.

### amateur satellites

Back to Amateur satellites. See the Sputnik Page: history of the project and current situation; Techsat Israel's Pages can exercise your computer's 3D powers. Details of flight, payload, orbit and so on. It was launched last July from Kazakhstan. The Amateur Radio interest is "a digital store and forward multi-user system to be used by the international Amateur Radio electronic community, compatible with existing store and forward facilities already in use on microsattellites." Three uplinks in the 145MHz (2m) VHF band, three uplinks in the 1270MHz (23cm) L-band, and one downlink in the 435MHz (70cm) UHF band. It transmits data.

### conclusion

A fair bit this month to keep you happy. Many of the sites will provide you with beautiful images. I didn't find many 'how to' pages as such, although 'Listening to the Satellites' touches on equipment. That will have to be for another article. A good starting point for interested UK readers would certainly be to contact AMSAT-UK, and you can also apply for membership through their pages.

Happy Surfing until next month and Happy Easter.

Jeremy Boot, G4NJH, asperges@innotts.co.uk



#### General

G7KPF UK Amateur Radio Quick Links page: [kama/hamlinks.htm](http://kama/hamlinks.htm)  
G4NJH Amateur Radio Pages in the UK: <http://www.innotts.co.uk/~asperges/>

#### Space sites

AMSAT-UK: <http://www.uk.amsat.org/>  
AMSAT Australia: <http://www.physics.usyd.edu.au/~ptitze/amsatvk/index2.html>  
AMSAT-I : [http://www.aec2000.it/amsat-i/welc\\_ing.htm](http://www.aec2000.it/amsat-i/welc_ing.htm)  
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AMSAT-LU: <http://www.amsat-lu.org>  
SedSat: <http://www.seds.org/sedsat>  
PanSat: <http://www.sp.nps.navy.mil/pansat>  
Space - Amateur Radio: <http://ham.shineline.it/c:/SITI/Space.htm>  
G0NXR Space Links Text Page: <http://www.g0nxr.demon.co.uk/spacet.html>  
NASA Pages: <http://shuttle.nasa.gov/index-n.html>

ARISS Page: <http://garc.gsfc.nasa.gov/~ariss/ariss.html>  
Satellite Predictions for UK Cities: <http://www.badgersoft.com/predict/>  
Ashley's Space World: <http://www.sirinet.net/~acagle/>  
Listen to the Satellites: <http://www.asahi-net.or.jp/~vq3h-nkmr/satellite/index-e.html>  
Space Online: <http://www.flatoday.com/space/>  
G3CWV Home Page: <http://www.users.zetnet.co.uk/clivew/index.htm>  
Viktor Kudielka: <http://asterix.nt.tuwien.ac.at/~oe1vkw/>  
G3ZCZ: <http://www.umuc.edu/~jkasser/>  
Chris's, G4ZCT, Page: <http://hometown.aol.com/g4zct/index.html>  
NORAD Tracks Santa: <http://www.noradsanta.org/english/>  
Joe Kasser's Page: <http://www.umuc.edu/~jkasser/>  
European Space Agency: <http://www.esrin.esa.it/>  
Sputnik-41: <http://www.ccr.jussieu.fr/physio/Satedu/sputnik41.html>  
EUROCKOT: <http://www.eurockot.com/main.html>  
TechSat (Israel): <http://techsat.internet-zahav.net/>

Table 1: URLs used in this article.

# hf happenings

■ April should produce some of the best DX conditions of the year. The days are getting longer, the solar ultra-violet radiation is hitting the northern hemisphere more square-on, and summer thunderstorms are still infrequent. Topband enthusiasts will already have been looking out for the ZLs around dawn and dusk as late March is one of the best times of the year for this path. For those needing Pacific DX we should be getting good openings into Fiji and Samoa mid-morning on 21MHz and above.

## z19ci qrt

As I write this piece, the ZL9CI team has finally gone QRT after a fantastic operation in which

they made 96,000 QSOs - easily beating the world DXpedition record. On all the bands from 3.5MHz to 24MHz they were very easy to work from the UK. This shouldn't have been too surprising as their location was almost exactly at the antipodal point (directly opposite London on the other side of the globe). From their QTH all directions led to us and even an omnidirectional antenna would have put in a good signal as a result of this freak of geometry. In practice of course they used beams - not only because other parts of the world like the USA were not as favourably positioned, but also because the ionosphere is never uniform and thus it pays to concentrate your signal in the direction that works best.

28MHz was a little more diffi-

cult than the lower bands given that the solar flux levels dipped below 120 during the operation, but even that band produced a few openings around 1000UTC and again around 1800UTC. The only problem band was 1.8MHz where there was no real darkness path for most Europeans. As far as I know, the only European station to work them on 160m was Clive Penna, GM3POI, in the Orkney Islands, who benefited from a north-westerly location which gave him an extra hour of darkness in the morning and just overlapped with the ZL9 sunset.

The propagation conditions to ZL9 were interesting as the majority of HF openings, both morning and afternoon, were via South America. The ionosphere over northern Siberia was rarely sufficiently intense to support propagation from ZL even though the VKs on a more southerly track were coming through well.

## vp8crb

Jan, KQ4D, was QRV in January from a small cabin by an abandoned Loran station on the top of a hill overlooking Port Stanley. There were two 150ft towers, 250ft apart, and the an-

A collage of HF Happenings people. Top: HF Happenings columnist Martin Atherton, G3ZAY, and Nasser, A41KG, at the HF Convention last year. Centre left: Jarda, OK1RD, Jarda's wife, and Slavek, OK1TN. Jarda and Slavek are two of the Czech operators scheduled to operate from Kiribati in March. Centre right: Andrew Williamson, G10NWG; one of the ZL9CI Campbell Island team. Bottom: Wayne Mills, N7NG, recently appointed DXAC Chairman, deep in conversation with Roger Western, G3SXW, who's planning a CW operation from Nauru in the central Pacific.



## Martin Atherton, G3ZAY, looks back on the record-breaking Campbell Island DXpedition, and looks forward to more expeditions in late March and April.

tennas were suspended between them. He was using three wire antennas, a 135ft vertical with elevated radials for 160m, a Radio Works Superloop at 140ft and tuner for all bands, and a home brew 17m delta loop vertically polarised below it at about 90ft. Antennas were orientated to slightly favour EU off one side and Asia off the other. At the half-way stage he had made 5600 contacts, of which 31% were with Europe.

The effort was made possible by Bob Valler, VP8BFH, and Mario Zuciv, VP8ALJ, who now owns the decommissioned Loran site and helped install the antennas. By the end of the operation Jan had made 140 QSOs on 1.8MHz and over 10,000 in total. He is now looking at an operation from South Georgia.

### dxcc

The ARRL has announced that Wayne Mills, N7NG, will be the DXAC Chairman and that John Kanode, N4MM, will be the ARRL Board DXCC Liaison for 1999. Wayne is a regular visitor to the RSGB's annual HF Convention, which takes place in Windsor in October.

### other expeditions

PS7KM has announced that the DXpedition to St Peter and St Paul Rocks, PY0S, Brazil, scheduled for the first week of March 1999 was cancelled because of budget problems. All donations received were due to be returned to sponsors as soon as possible. According to the 425 DX News, a second Brazilian group was now planning an operation from here between 15 and 22 March.

Philippe, FT5YG, is now in Adelie Land for one year. QSL via Gerard Karpe, F5LBL, 629 Route de Montpellier, F-30800 Saint Gilles, France.

Derek, F5VCR, and Ken, G3OCA, will be in Gabon between 11 and 19 March. They hope to operate from Banie Island (IOTA AF-043) possibly on 12 - 14 March.

Around 10 March, Jarda, OK1RD; Jiri, OK1RI; and Slavek, OK1TN, were due to head for either Canton Island in Central Kiribati as T31RD or Banaba as T33RD. They will be active until 28 March and will return to Tarawa, Western Kiribati, in early April. They will operate on all bands 10 - 160 metres, with two HF stations and amplifiers. QSL via the OK DX Foundation, PO Box 73, 29306 Mlada Boleslav, Bradlec, Czech Republic. Both these planned

island destinations are extremely difficult to reach. Canton Island is the home of an abandoned US military base and only has a dozen or so inhabitants today. Banaba, also known as Ocean Island, is an environmental disaster area abandoned by most of its original inhabitants following the extraction of phosphate fertiliser which has left bare rock across much of its interior. DL1VU was very active from Banaba in January and worked a lot of Europeans. QSL T33VU via DL2MDZ.

I was very pleased to work YC8TXW/P from the Obi Islands in late January on 21260kHz around 1000UTC on the long path. Ronny, and Benny, YC9YZ, spent about seven days on this rare IOTA (OC-222). QSL via Ronny, YC8TXW, PO Box 166, Tahuna 95800, Indonesia. Look for some more expeditions from this team soon.

Hillar, N6HR, reports that the Western Washington DX Club and the Island County ARC will be operating from the rare Tatoosh Island (IOTA NA-169) in the RSGB IOTA Contest in July. Tatoosh Island belongs to the Makah Indian Nation and is located off Cape Flaherty at the western tip of the Olympic Peninsula, Washington. For more information, contact N6HR at: hraamat@whidbey.net. This will be only the second operation from this rare IOTA location - the island is very difficult to land on from the sea and unless you fly by helicopter direct to the lighthouse you need permission from the Makah Nation to cross their territory. Let's hope the gang have some good weather to get ashore.

Gilles, F5AGL is now active as FT5WH from Crozet Island (AF-008) with a ground plane antenna on 10, 15, 20 and 40 metres. He is looking for an amplifier, which is hidden somewhere on the island [! - Ed]. Gilles is expected to operate RTTY as well and to be on Crozet for one year. QSL via F6KDF.

Look for Oki Island (Shimane-Ken IOTA AS-041) to be activated by Yuji, JA3CMY; Fumio, JE4CIL; and Takeshi, JI3DST, between 20 March and 21 December. Activity will be on 80 - 10m CW, SSB and SSTV.

A CW operation from the Republic of Nauru in the Central Pacific was due to take place from 27 February until 7 March. Bob, G3ZEM, planned to sign C21ZM and Roger, G3SXW, planned to sign C21SX. Priority was going to be given to Europe, where C21 is most needed and to the WARC bands, so I trust you got them. QSL to their home calls.

### dxcc assisted!

A controversial suggestion was made on the DX reflector recently. Why not, someone said, have a 'DXCC Assisted' award on the same basis as some contests have 'assisted' sections? The idea of an assisted section in contests is to segregate people who use the DX Cluster system, or other spotting networks, so that they are not competing directly against others who have no such aids.

This whole approach strikes me as pretty crazy! I find it very hard to see that a contact made after a tip-off is somehow inferior to one made by accidentally stumbling across a rare station on the band. It is even crazier to treat DX Clusters differently from a phone call from a friend telling you to check a particular frequency. This approach pretty soon leads to a call for a section for people operating with one hand tied behind their back!

The 'unassisted' purists also get into the argument about lists and nets. The argument runs that if you make a QSO on a DX net it is somehow less good than a QSO made in a massive pile-up. Never mind that in the pile-up you may not have copied your report, you may not be certain that the DX station copied your call, and you may not be certain the station even worked you! The level of information exchange may be far higher in a net situation and the QSO may be far more satisfactory.

To my mind the only real objection to DX nets is that they tie up a number of possibly rare DX stations in a situation where only one of them can make a QSO at a time. If they all worked on separate channels more DX QSOs would be made. [Another objection is that some net controllers give so much assistance to those trying to make DX QSOs that it's debatable whether the two stations really have had a two-way contact by themselves, or if the information was relayed by the net controller - Ed.]

### vip corner

January's *Ham Radio Today* reported that Emile Lahoud, OD5LE, had been elected as the new President of Lebanon. Other famous heads of state include: Prime Minister of Japan, Keizo Obuchi, JI1KIT; King Juan Carlos of Spain, EA0JC; President of Argentina Carlos Menem, LU1SM; Sultan Qaboos Bin Said of Oman, A41AA; King Bhumipol Adulyadej of Thailand, HS1A, and the most well-known was of course the late King Hussein Ibn Talal of Jordan, JY1.

This month Chris Lorek, G4HCL, puts the spotlight on some active UK datacomms groups

# data

## connection connection connection connection connection

■ JVCOMM32, which is often described as 'JVFX for Windows', is a 32-bit Windows program for sending and receiving SSTV and FAX using your PC linked to your transceiver. JVFX7.1a is an earlier DOS program from the same author, Eberhard Backeshoff, DK8JV, and this can use a simple plug-in op-amp interface between your PC and your receiver or transceiver. I recently received a query from Paul Gardner in Oakley near Basingstoke, saying that he'd bought a 'Multidata' unit (which is such an interface), but he's not having any success in making it work using JVCOMM32. Paul says he would like to use it for receiving weather fax pictures, adding that he can successfully use the program if he connects the headphone socket of his receiver to the sound card line input on his PC, which JVComm32 recognises, but if he tries using his external op-amp interface with any other configuration he gets no signal.

My answer to this is that the Multidata interface in question is a JVFX / Hamcomm type, and is a very universal type which can be used by a large number of available programs, such as RadioRaft, Embaycom, PD and so on - but not JVCOMM32.

Another reason for no weather satellite reception is that in common with virtually all such interfaces it's an 'FM' type, ie it'll work fine for SSTV and HF fax with JVFX, and CW, RTTY etc with HamComm, but weather satellites require an AM demodulator which is a rather more complex interface. This is probably why the considerably more powerful JVCOMM32 needs a more comprehensive interface. However, it very usefully supports a PC sound card as an interface for transmit and receive, and if your PC is fitted with one of these (as most Windows 95 / 98 capable PCs are) then by all means use that.

Alternatively, the program also supports the connection of PTC-II PACTOR modem, plus a HariFax IV modem, and for downloading an EasyDSP modem also. These can be selected using the 'configuration' screen within JVCOMM32. It can also support an alternative modem, under the 'Other' setting on the interface selection within the program, but this requires the use of a suitable external program which can perform the required translation, including the required mode switching on the connected interface, so to use this you'll need

to ensure you have the correct drivers.

My advice is to stick with using the sound card: if it works, don't try to fix it!

### kenwood th-d7 packet transceiver

You may have read the first UK review on this handheld in the February 99 issue of *Ham Radio Today*, which I know interested a large number of amateurs. As well as being able to control Kenwood's Visual Communicator (reviewed in the January 99 issue - another UK first!) there's now some Windows 95 / 98 software, MCP-D7, that's freely available from Kenwood for the radio for frequency / band upload / download and control. It allows editing of memory channels, APRS, Sky Command and various other settings of the transceiver. You'll need the optional PG-4W cable (or make your own) to write or read from the TH-D7E.

The current software version at the time of writing is a Beta test version, so be careful to back up your data first, but the final version may well be available by the time you read this. You'll find it's downloadable from Kenwood USA's web site, you can get it by pointing your browser at <http://208.197.91.81/SOFTWARE/THD7A/> The program is MD7001.EXE which is a 351k self-extracting file which expands to 800k. Alternatively if you'd like a copy on disk, ask your local Kenwood retailer or if you get stuck, just drop me a packet or e-mail (my contact details are on page 66).

### north-west packet group

I've given a mention to this active group in the north-west of England in the past in this column, and a number of readers have requested further information. The North West Packet Users Group (NWPUG) is a large group of amateurs, mainly active on packet radio and mainly located in the north-west of England. Formed in 1988, the group has grown to be one of the largest packet user groups in the country. Through its committee of volunteers and with the aid and funding from its large user base and sales of kits and PCBs, the group does as much as is possible to supply ideas and, in many cases, actual equipment to help BBSs and nodes set up good, well-planned links throughout their coverage area and into neighbouring regions. I'm told that BBSs and nodes are using about £13,500-worth of NWPUG

equipment to support the inter-district forwarding network, mostly on 23 / 24cm.

The latest news is that NWPUG now has its own web page with details of the group's activities: <http://www.merseyworld.com/nwpug/> Links to other packet sites are available, including access to the Flexnet web site in Darmstadt, Germany. NWPUG tells me they support the development of Flexnet in the UK, and the only two RMNC Flexnet nodes in the UK are in the north-west area, with support from NWPUG.

Those who'd like more details via AX25 packet should drop a message to Phil Jones, G6IIM: G6IIM@GB7OAR. If you're not already active but you'd like to get going on packet with a BayCom modem or USCC card, NWPUG can supply BayCom PCBs and kits. These PCBs are imported direct from the BayCom team, as well as BSX2 TNC kits. Further information including detailed leaflets can be obtained by post (remember to enclose an SASE) from Phil Jones, G6IIM, 12 Coronation Drive, Bromborough, Wirral, Merseyside L62 3LF. Or you can call Phil on tel: 0151 334 2452 between

(Top): MCP-D7, the freely available software for Kenwood's TH-D7

(Middle): JVCOMM32 typical PC screen display under Win98

(Bottom): North West Packet Users Group's web page



7.00pm and 9.00pm. The group says that all proceeds from the sale of BSX2 kits and PCBs directly benefit the packet network in north-west England.

If you're a packet user, every time you send a message to your mate 'down south' or 'up north', it's likely that links

funded by NWPUG members are transporting your mail! In the true spirit of Amateur Radio, as a licensed Radio Amateur in the north-west you're more than welcome to use the facilities of the UK's packet radio network as much as you like, totally free of any charge or obligation. It's simply a moral issue if you want to help the network you're using to

improve and expand. If you feel you want to help fund the system, please consider joining your local group.

### maxpak news

MaxPak, the Midland AX25 Packet users group, is another active organisation I've mentioned in these pages in the past. The group publishes a very readable and informative bi-monthly newsletter, and a while ago *Ham Radio Today* featured a review of their easy-to-build MAX-01 BayCom modem kit. Joe Jacobs, G3VYA, sent me a message to say the group has now been hard at work on their latest project, which is going to be called the MAX-02. This will be a revised

version of the dual 1200 / 9600 baud YAM modem for packet.

Joe says that if you've ever tried to build one of the other PCBs available and then attempted to gather the necessary software to make it work, you'll appreciate what an almost impossible task that can be! It appears that software for 9600 baud is available but not for 1200 baud, also that the usual double-sided PCB is of excellent quality but doesn't have the provision for a standard five-pin DIN socket on the board, as commonly used by many TNCs. Another hardware offering does have one of these, but doesn't follow the usual pin-connection

standard that's evolved from its initial use by all PacComm TNCs.

With all this in mind, MaxPak set out to produce a product which would be totally compatible with what is the accepted PacComm international standard for five-pin DIN cable connections. Added to this, the group wanted to provide a really good instruction manual to accompany the kit, as no such manual is available from any source at present. To be included in the manual are details of a menu program which after switching on the PC will give the user the opportunity to select YAM1k2 or YAM9k6 or Windows95 without loading TSRs (Terminate and Stay Resident) programs. It's also the group's intention to include with the kit a 3.5in floppy disk which will have the manual saved in both Word7.doc and .txt formats as well as all the necessary software and batch files.

MaxPak has kindly offered me a review sample to build and test for *Ham Radio Today* readers, which I hope to receive as soon as the final testing is complete: watch this space! If you can't wait, you can get more information from Joe, G4VYA, with a message to G4VYA@GB7MAX, or for information on the group, membership, and other equipment sales, from Richard G1NZZ@GB7MAX or tel: (Vodafone) 0374 826085 evenings / weekends.

### bartg

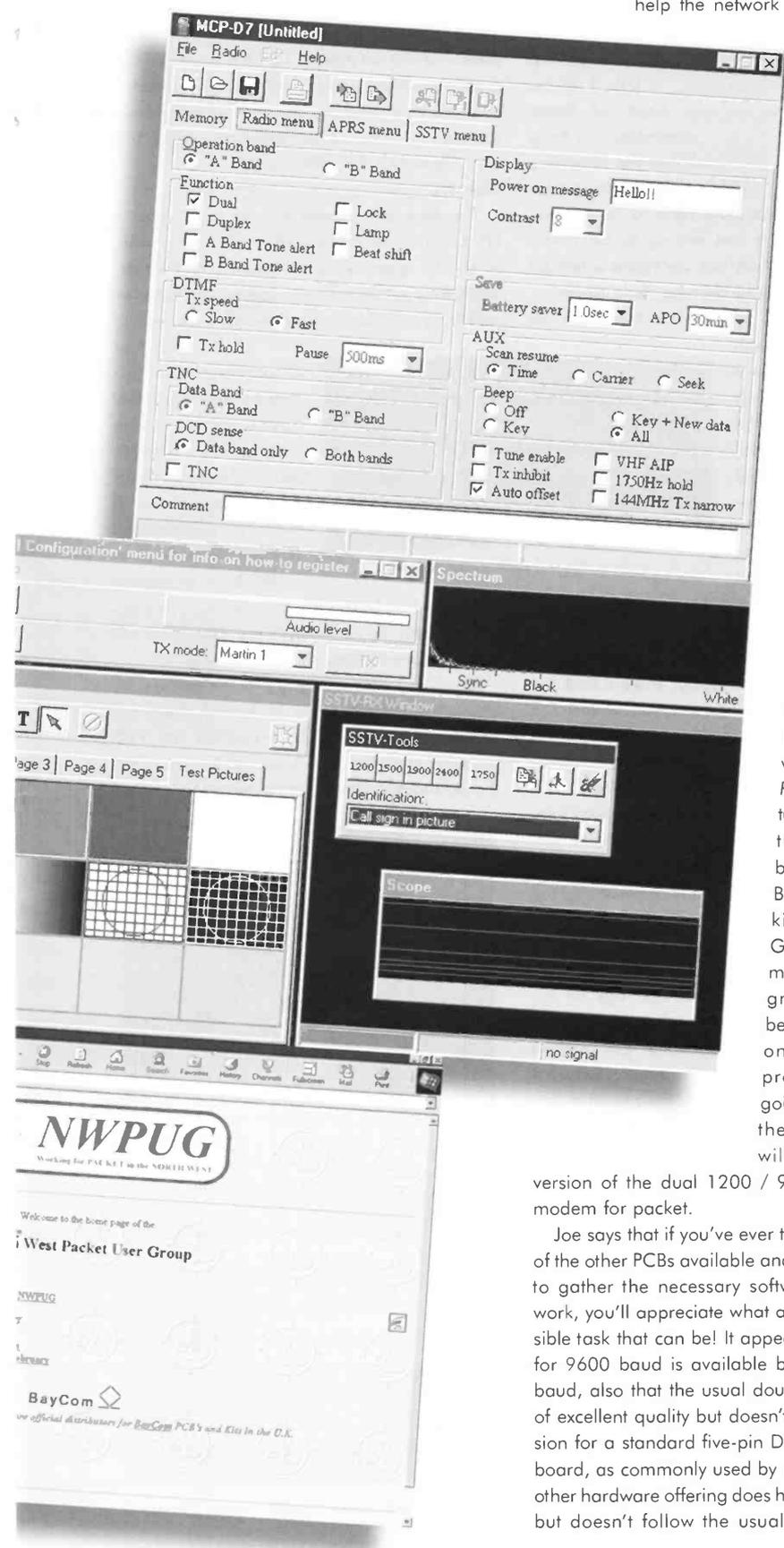
The British Amateur Radio Teledata Group (BARTG) is, as its name suggests, a national group, best known not only for its excellent and award-winning quarterly newsletter *DataCom*, but also for the very popular annual rally at Sandown Park. In the past couple of years this has included a comprehensive lecture stream on data modes.

Unfortunately it looks like there won't be a BARTG rally at Sandown in 1999, mainly due to the cost of the venue, which seems to be rising each year. BARTG would welcome suggestions for an alternative venue, especially if this also gives details of cost, floor area and the amount of car parking available.

It's quite possible the next BARTG rally will be in 2000: at least this would give the hard-working committee a well-deserved rest! If you'd like to offer suggestions or get more information on the group, its secretary is Ian, G4EAN@GB7NOT or by e-mail: secretary@bartg.demon.co.uk or by post to 56 Arnot Hill Road, Arnold, Nottingham NG5 6LQ. BARTG also has a web site at <http://www.bartg.demon.co.uk>

### ctrl-z, end of message

That's it for this month. Please do get in touch to let me know what's happening radio data-wise in your area. Maybe you've a question that you feel I or others can help with, or if you've successfully tried a new mode or system, don't keep quiet about it! My contact details are given every month in the Regular Contributors section on page 66.



Dick Pascoe, G0BPS, looks at some new QRP transceivers on the market soon,

and reports on a way of making a popular HF transceiver run at low power levels

# qrp

corner

corner

Spring approaches and with it the rally season once more. The club will

have a presence at the Rainham Rally (BRATS) under the auspices of Tony, G4WIF, and perhaps at Brighton, and will also be

at the Yeovil QRP Convention to be held at Sherborne on 18 April 1999. This is the premier QRP event in the south of the UK and the ambience is similar to the Rochdale event.

The normal rally traders will be found along with a stand of G-QRP Club products and other interesting items manned by Bob, G4JFN. Dedicated QRP traders such as the QRP Component Centre will be there with their selection of used equipment and generally useful stuff.

The list of speakers is quite interesting with the small lecture room usually packed out. The food is excellent with a local restaurant taking over the kitchen for the day. There is even space to sit and chew the cud whilst enjoying a cup of tea. For more information on the Yeovil rally call Mike Smith, G7SDD, on tel: 01935 814612.

## qro qrk for qrp rig

Readers will remember my recent comments about the unbuilt HW9. I managed to auction it over the Internet to the benefit of a young lady and after it was sold I put out a message to all on the two QRP Internet reflectors to thank all that had shown an interest and put in a bid. I had several messages back from those who read my note. I was amazed to be told that this wasn't the last unbuilt Heathkit HW9. Far from it, one US ham told me he had two and a friend of his had another.

Imagine my amazement when over the next week I heard of two more, one in the USA and

know of, there must be a few more. There must also be a few unbuilt HW7s and HW8s too. I wonder how many are tucked away in lofts or cupboards with the owners forgetting that they are there? If you are

an owner of any of these rigs perhaps you could let me know so that I can share the information with readers.

I cannot reveal the actual price I sold the HW9 for, that would be unethical, what I can reveal is that it almost doubled the previous highest offer and made me wonder where will it all end? What will an unbuilt HW7 sell for if one appears? I would suspect that it would be much more than I would be willing to pay. But, remember, some people just *must* have one, if only to get one up on their friends who may not have one.

## new qrp rigs

With the advent of two new QRP rigs on the scene there has been much talk of the difficulties of building a multiband rig with modern technologies. The old ideas of having separate boards to provide the VFO, the crystal mixer, the RF board etc have become almost extinct.

### The GQ-Plus

The arrival some years ago of the homebrew synthesiser was seen as a leap forward. The availability of modern components has made another leap forward possible. This possibility has been taken by two well-known US amateurs and another equally well-known British company.

The GQ series of rigs from Hands Electronics have been popular since their appearance a couple of years ago. The latest version, the GQ-Plus, is a multiband HF rig that uses just two main PCBs and a postcard-sized DDS board.

The old idea of running dozens of different

coloured wires around the case has also gone. No more bundling of these wires with string to make the whole affair look neat!

Sheldon Hands tells me that the connections in this rig are no more complex than in a simple monobander, with just one multi ribbon tape to the band select control. He says, "The 9850 DDS LO has radically changed the complexity of the multiband rig. No more VCOs, crystal oscillators, or PLLs to set up. You don't even have to wind the VFO coil! The only adjustment to make are two trimmers in each BPF and the BFO / CIO trimmers."

### The K2

The American version is from a well known US designer and builder, Wayne Burdick, N6KR, and his 'partner in crime' Eric Swartz, WA6HHQ, of Elecraft, who are putting together an HF rig in kit form called the K2. I saw one of



The K2, a dedicated HF QRP transceiver kit.

the prototypes at Dayton last year, which looked very nice. They have spent a long time getting this rig right. Even though there have been rumours of them not appearing, I am assured by Eric that at the time of writing

there are 100 boxed K2s almost ready to ship. They should be in the builders' hands by the time you are reading this.

The K2 is also made up of three boards, which include the main RF board, the front panel and control CPU. All controls are PCB mounted and there is no wiring harness. This should make building the K2 very easy.



Columnist Dick Pascoe, G0BPS, on the rally stand.

This ham-band only rig will be available in the UK direct from Elecraft. For more information contact them via [Eric@s@elecraft.com](mailto:Eric@s@elecraft.com) or check their Internet pages at <http://www.elecraft.com>

**strike!**

During the long winter month we have had several horrendous storms on the south coast of the UK. My own antenna system suffered some damage, causing me to drop the tower just before the G-QRP Club 'winter sports' contests started. During a couple of storms we also had some spectacular lightning along the coast.

This caused me to e-mail a friend in the USA to ask about their methods of lightning protection. The mid-west of the USA suffers from really frightening lightning storms. I have stopped on the freeway (motorway) during a storm when the rain was so heavy we couldn't see properly. What we could see was the sheet lightning crossing the sky. Quite a usual occurrence we were told.

Almost all buildings in that area have lightning rods on the roofs, providing a ground for this stray electricity. For those without the rods there are several ways of protecting the shack against the hit. One way is to use the simple car spark plug. Screw them into a small copper plate which is connected to a good earth. The insulated top of the plug can be used to mount your open wire feeder. Any lightning hit will hopefully go through the spark plug to earth before causing too much damage.

Setting up is quite easy, the gap on the plug should be set so that it will not leak at the highest power to be used. Yes, I know there are commercial anti-strike units available, but isn't it more fun to make your own?

**component analyser**

Frank, G3YCC, wrote to say he had found a great little gadget called the Peak Electronics

Component Analyser (model DCA 50). Based on a small PIC IC, the unit has three colour-coded leads. These may be attached to components such as a transistor, FET, diode etc and it tells you what the component is, including the pin out of transistors. It apparently tests for PNP or NPN as well.

The tester costs £59.95 and is available from Peak Electronics: see their web site at <http://www.peakelec.co.uk> It is pleasing to see another UK firm putting quality equipment on the market!.

**icelandic news**

Villi Sigurjónsson, TF3VS, wrote to me with a copy of the Icelandic Radio Amateurs (IRA) newsletter, CQ TF. It is an A4 magazine published four times a year. The number of pages depends on the material available to be published. Now members will be able to receive it via e-mail in Adobe Acrobat format. This should save a lot of costs in copying and postage. By doing it all 'on line' more colour can be used and the paper quality is of no consequence.

This all sounds so good that I grabbed the magazine as I headed for my normal study area (the bathroom!) Unfortunately I do not read or speak Icelandic, but the pictures looked nice and a circuit is a circuit in any language! For those who do speak the language you can contact Villi via [vilhj@vortex.is](mailto:vilhj@vortex.is)

**the ft-840qrp**

Martin Peters, G4EFE, has modified his Yaesu FT-840 for QRP use on all bands. He e-mailed his results on his modifications. He tells us that there are several adjustments that affect the RF power output. If the rig is set at 100 watts the internal control is set by VR1010. If the external power control is turned to minimum, this variable control VR1010 can be used to set the power level to that required. If the maximum output power switch is set at 50 watts (S1001),



The Icelandic magazine CQ TF.

the internal control is VR1016. These are found on the front right edge of the main board unit. The main board is the top board and reached through the top cover.

In practice Martin says he switched S1001 to the 50-watt position and then tweaked both pots until the required range is obtained. His rig now covers 300mW to 20 watts. As Martin says - great!

**qrp on the internet**

The G-QRP Club Internet reflector found on the 'blacksheep' site is where all the club members gather to swap ideas and news. It is not a busy site compared with its American cousin. On the UK site there are often ten to fifteen messages a day, whilst on the US site you will find up to one hundred a day! I know I have mentioned it before, but if you are on the Internet and wish to join our discussion group, send a message to [majordomo@blacksheep.org](mailto:majordomo@blacksheep.org) and put in the body of the message 'subscribe gqrp-l', ie GQRP-L in lower case. For the US group send a message to [listserv@lehigh.edu](mailto:listserv@lehigh.edu) with a 'subscribe qrp-l' in the body.



The Yaesu FT-840 which can be modified for QRP operation.

■ Before purchasing second-hand equipment do check that it does not seem to have had any extensive modifications carried out, and that a full manual is either supplied, or is at least available. When starting to repair or overhaul equipment, even experienced engineers give up quickly if they cannot obtain technical information, or when they find a load of unknown modifications have been incorporated.

That FM unit Joe fitted, together with the alterations to the mixer stages, and hi-tech noise blanker may have vastly improved the FT-101, but neither myself or most other engineers will want to try and carry out any repairs at all, if they are not fully documented together with a circuit diagram.

Modifications are not absolutely taboo, to be fair I have marketed quite a few over the years myself, but they *must* be clearly indicated and explained.

### overhauling equipment yourself

You will, of course, need some basic test equipment, but this need not be too elaborate. A good multi-range test meter is the main item you will need, and whilst a signal generator is desirable, in most cases it will be possible to make do with a crystal calibrator, or even with the rig's own marker oscillator.

The first rule before trying to carry out any repair work is to have a good idea as to how the equipment functions. Most items at the bottom end of the price range make extensive use of valves, items which have been largely left out in courses of technical training in recent years. Probably the best sources of relevant information on these are older copies of the RSGB or ARRL handbooks, which can usually be borrowed from radio club members, or sometimes obtained from second-hand book shops. (Quite a lot of public libraries will still have them on the shelves also).

### safety first

It is most important to remember that valve equipment normally operates directly from the

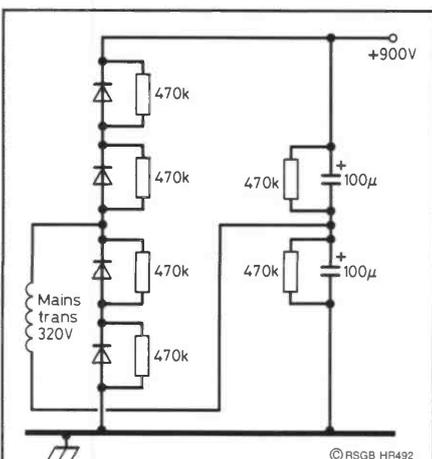


Fig 1: typical valve transceiver 900V power supply circuit.

mains supply, and carries high voltages so that it is doubly dangerous. One recommendation frequently given is to always work on this kind of equipment with one hand in your pocket. OK, this would greatly increase safety, but often it is not terribly practical. The main things to ensure are:

1) That you never, never, grip two items which are electrical conductors tightly at the same time if there is power connected.

2) That you do not stand on, lean against, or hold on to anything which is likely to be a conductor while working on equipment which is connected to the mains.

One really good way of hitching a quick trip back to your manufacturer, is to turn over heavy equipment when it is plugged into the mains supply. This entails grabbing it tightly, and if you touch something live you will not be able to let go, as your fingers will be totally paralysed. I know a TV engineer who got himself into this situation, he lived only because he managed to stagger backwards with the TV chassis and drop it on the floor. This dragged the plug out of the wall socket, it didn't do the TV much good though!

### cleaning controls

It is most important that you do not go ahead haphazardly, swapping doubtful parts left, right and centre, or you will probably end up with a non-functioning rig and no idea where you went wrong. Before you commence any work, test your newly-acquired equipment and note any obvious faults. At this stage set about curing definite faults, such as noisy controls, non operation on particular bands, dead receiver or dead transmitter, before looking for the more vague troubles such as reduced output, or shortage of receive gain.

When cleaning controls, don't just squirt anything in, switches can be made worse if loads of oily sticky 'goo' is left on them after 'cleaning' operations. Rotary switches and relays should be cleaned first with a propriety electronic cleaning fluid which does not contain a lubricant.

Relays must not have lubricant applied, but be left to dry, and only the rotary and sliding switches should then be given a very small dose of cleaner which incorporates a lubricant to prevent excessive wear. Be very careful not to leave large quantities of lubricant on switches carrying high voltages, as this attracts dust and may cause arc-over and insulation break down.

Volume and other rotary resistive controls should be cleaned with lubricant, or with switch cleaner with lubricant. Whilst it is not really intended for this kind of use, WD40 does also seem to work quite well on volume controls and sliding switches. In fact some push-button switches seem to respond better to this than specialised electronic switch cleaning fluid!

# A

## IN A DAY

So you've bought your third-hand old some tips on how to restor



Your FT-101E (and other valve rigs) can be re



# 'S WORK

valve rig. Harry Leeming, G3LLL, gives it to its original '70s state



## making equipment 'as new'

Once equipment is in reasonable working order and free from major faults it is time to attend to the gradual deterioration that has crept in over the years. Here it can't be too strongly emphasised that you must only tackle one stage at a time. Having overhauled one stage you must then re-test the rig before proceeding to the next. If things do go wrong (and they will) you can then easily backtrack and correct your mistakes, or even trace a faulty new part that you have fitted.

Perhaps the first thing to check is that the correct fuse is fitted. I have had to consign many rigs to scrap which would have only needed a minor repair if the right type of fuse had been fitted. For the average 200W input mains operated rig a maximum rating of 3 amp quick blow should be used. 5 amps is nearly 100% too big and will probably burn out the mains transformer should a short occur.

## the power supply

The obvious place to start when checking over equipment is the power supply. Measure the output voltages and see if they match those listed in the maker's list of voltages. Don't be deceived by such terms as '160 volt rail' on the circuit diagram, often the voltages used as 'names' on the circuit are not accurate, look for a list of voltages at designated test points, or find a friend with a similar rig and make some comparison tests.

When looking at the PSU, check the electrolytic capacitors for signs of 'weeping' or bulging, and look out for burnt resistors. If you want to ensure future reliability, check the equalising resistors across the rectifiers - see Fig 1.

These are fitted to ensure that the reverse voltage is evenly spread between the series diodes, and often one or two of them will go high in value or open circuit. This can mean that all the reverse voltage is across one diode, much increasing its chance of breaking down and going short circuit. If the values differ by more than, say, 15% replace all the resistors, or at least remove all of them. Resistors in this position are so unreliable that many people now consider it better to have no equalising resistors, than to risk having unequal ones. If you do consider taking the last course make sure the type and make of all the diodes are identical, and fit a 'bleeder' resistor of about 1M $\Omega$  to discharge the HT after the set is switched off.

Incidentally, if you should have to repair a rig that instantly blows its fuse, the very first thing to check is the condition of the rectifier diodes, as by far the most common cause of this trouble is that one or two of these are short. Don't save pennies, be sure to replace the lot.

Whilst checking the PSU, do make sure that the rig is set to the correct mains voltage, I

frequently get rigs in for service that are set for 220 volts, which can't do them much good especially if the local voltage is on the high side.

## receive audio stages

Voltage checks and valve substitution should help to find most cases of low gain or distortion on older equipment, but there are a couple of points worth noting.

Low audio gain may sometimes result due to the cathode bypass capacitors having dried out. This is a particularly common fault with the capacitor from the cathode of the audio output valve to chassis. An open circuit capacitor here causes negative feedback, resulting in slightly low audio gain, leaving one wondering whether there is or isn't a fault.

The simplest way to test cathode decoupling capacitors is to shunt them with a known good capacitor, and see if the audio gain is improved.

Distortion in valve audio amplifiers is frequently caused by a slight leak in the insulation of the capacitor which couples signals from the anode of one valve to the grid of the next. In this position a capacitor has to have an insulation resistance of several hundred megohms, or it will cause distortion, so it is no use trying to test it on the resistance range of a low voltage test meter. If in doubt, unhook the end that goes to the grid of the valve, connect the test meter to the end of the capacitor and measure the voltage with the rig switched on. After the initial charge current, there should be zero voltage reading on the meter if the capacitor is good. The circuit of a typical audio amplifier as used in valve receivers and transceivers is shown in Fig 2, with the capacitors in question clearly shown.

Transistorised audio amplifiers can be fault traced using normal voltage checks. A tip worth noting in this direction is that when a stage using silicon transistors is operating correctly, there should be between 0.5 and 0.6 volts between the base and the emitter. Do note that this should be measured with a high sensitivity voltmeter, such as a modern digital unit.

Next month we look at more ways to bring old transceivers back to life.

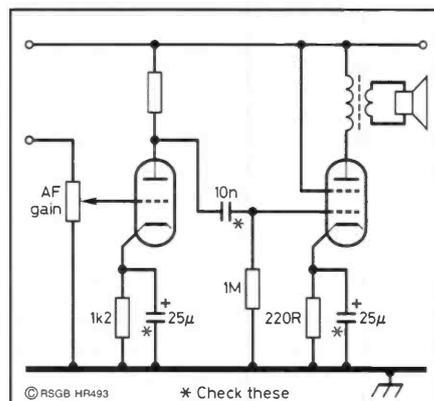


Fig 2: circuit of a typical valve receiver / transceiver audio amplifier. The capacitors to be checked are marked with asterisks.

stored back to their original 1970s condition.

# satellite

## rendezvous

Our regular round-up of  
AMSAT-UK and Amateur  
Radio space news  
compiled by Richard  
Limebear, G3RWL

■ Oscar 10 has been working well, with the exception of the periodic deep QSB, which can be partially eliminated by switching antenna polarisation. Strong signals have been heard even at apogee but there was a report of the transponder FMing recently. It therefore seems possible that another period of 'sleep' will start shortly. More information about the satellite can be found at: <http://www.cstone.net/~w4sm/AO-10.html>

### russian satellites

At the time of writing, RS-13 seems to be switched on, with RS-12 in beacon-only mode. Of course, this could change at any time so operators should be prepared to try either of the transponders aboard.

In January AP and CNN both reported that Russia would use private funding to keep the Mir space station going for three more years - instead of just until mid-1999. Then another report on 22 January said that the Russian Prime Minister had signed a decree to keep Mir in orbit for another three years. I guess we'll have to wait and see.

Meanwhile, as reported last month, the SSTV transmissions are still coming down on 145.985MHz. This frequency is apparently shared with the packet radio equipment. A collection of recent SSTV images may be found at IK1SLD's web site at [http://www.ik1sld.org/sstv\\_mir.htm](http://www.ik1sld.org/sstv_mir.htm)

### digital satellites

Amateur Radio's first Microsats celebrated their ninth birthday on 22 January. AMSAT Oscar 16, DOVE Oscar 17, WEBERSAT Oscar 18, and LUSAT Oscar 19 were all launched together on 22 January 1990 from Kourou, French Guiana.

AMSAT Oscar 16 is the only satellite of the group that continues to perform well. Functioning as a digital store-and-forward communications satellite, AO-16 has been operating for over 1590 days since its last on-board computer re-load.

The remaining satellites are not in full operation. DOVE Oscar 17 experienced a hard-

ware malfunction after launch that has made it nearly impossible for controllers to upload operating software to the satellite. WEBERSAT Oscar 18's primary function was to take digital colour images of the earth, but it also contains all the electronics necessary to function as a store-and-forward digital communications transponder; unfortunately it has been beset by problems for the past year or so. LUSAT Oscar 19 also contains a digital transponder. However, it has not been active since the satellite experienced an OBC software crash last year.

EA1BCU has a complete collection of Oscar 16 whole orbit telemetry data for 1998 at his web site: <http://www.ctv.es/USERS/ea1bcu/wod1998.zip>

KO-23 has been 'up and down' even more. The Korean command station says that, since last August, TX0 has tripped out frequently. They have solved the problem by turning it on again but it keeps going off. They have noticed that one of the battery cells is very unstable, apparently this started when KO-23 was in its maximum eclipse period. They also report that its not just the transmitter but most of the onboard systems which get powered down. They are analysing the relation between the life cycle of battery cells and the current problem.

### phase-3d

I have no news of Phase-3D or its launch, but I see from a European Space Agency (ESA) press release that there are to be three Ariane-5 flights this year, in April, June and November. Fingers crossed. For more information on P3D, see the Phase 3D Spacecraft Integration Laboratory web site at: <http://www.magicnet.net/~phase3d/>

### tm-sat

Since launch, TM-Sat has been running on its 80186 processor. The University of Surrey (UoS) recently uploaded software for the secondary processor, an 80386. They will be testing this software over the next few weeks and once they are happy that it is performing correctly, the OBC186 will be switched off and the

OBC386 will be made the primary OBC.

The OBC386 has a number of advantages over the 186 apart from processing power. It has 128MB of data storage available for storing images compared to the 186's 16MB. Also, two uplinks are available on the 386 and this should help reduce uplink congestion; the second uplink is on 145.975MHz.

Stations are asked not to transmit to TM-Sat when the secondary OBC is operating on the downlink. This processor uses the callsign TMSATS (rather than TMSAT) and users should not program this callsign into WiSP or other ground station software, as this may slow down the software testing.

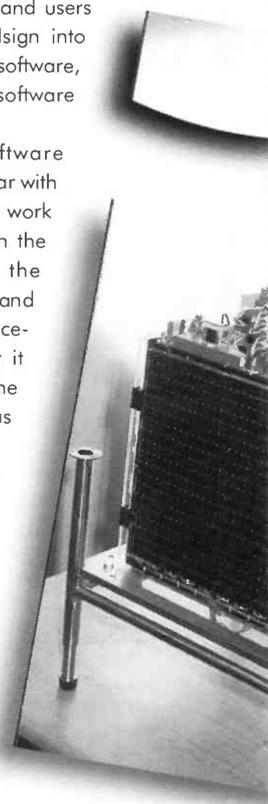
Also the '186 flight software crashed recently, so please bear with the command stations as they work through their problems. When the software crashed one of the magnetorquers remained on, and this severely disturbed the spacecraft attitude; after they got it working again they saw that the maximum libration angle was about 45 degrees!

On a positive note, this abnormal attitude gave an opportunity to use the imaging system to see the earth's rim. If anyone doubted that TM-Sat is a long way up, the images showing the full curvature of the earth really should convince them.

### sunsat

South Africa's first satellite, SunSat, has been sitting on the launch pad for over two weeks now: all dressed up and nowhere to go. It is on the flight carrying the USAF's Advanced Research and Global Observation Satellite (ARGOS), and the Danish Oersted satellite from Vandenberg, California.

The earlier problems were due to adverse high altitude winds which, should it have been



necessary to destroy the launch vehicle, would have taken debris into populated areas. There were also problems with unintended incursions into the flight safety area (in the event of destruction, debris would have hit someone who should not have been there). The most recent launch attempt counted down to zero and the motors lit up, only to be extinguished; this problem is being investigated. There is a web site with launch information: <http://www.boeing.com/defense-space/space/delta/delta2/argoskit.htm>

SunSat carries a digital store-and-forward payload as well as a stereo three-colour, high resolution imager. The push broom imager operates like a fax, returning 3456 pixel wide images with pixel spacing of 15 metres from an 800km altitude. The images will be useful for agricultural and en-

vironmental monitoring.

SunSat also carries a NASA GPS receiver and laser retro-reflectors.

The basic Amateur Radio payload includes a 2m FM parrot repeater on 145.825MHz NBFM and a 1200 and 9600 Baud store and forward system. Downlinks are said to be 436.300 and 436.250MHz with uplinks on 145.825, 145.850, 145.900, 145.950, 436.300, and 436.250MHz. I'm not yet sure which uplinks are for which system. SunSat's web page is at: <http://sunsat.ee.sun.ac.za>

A 'Parrot' repeater usually uses a single frequency to transmit and receive; it listens for a set period of time, probably about 10 seconds, then plays back whatever it heard. SunSat's parrot will not be turned on for a number of weeks after successfully achieving orbit.

## short bursts

The next SAREX mission, in fact the only SAREX mission in 1999, will be the STS-93 flight which is currently scheduled for launch on 8 April. This flight will include 2 metre FM and packet radio but I'm not sure if this flight will be visible from the UK. For more information on the SAREX program, check out the following web site: <http://www.gsfc.nasa.gov/sarex/>

Last month I mentioned that AMSAT-LU is preparing the final phase of its next satellite before launch. VOXSAT I will fly inside a Russian satellite, like AO-21, in 1999. The module was picked up in Buenos Aires by RV3DR during the last week in December. The orbit will be polar, altitude about 1000km. VOXSAT carries two transmitters; one for telemetry, 'broadcast' and the parrot repeater and another for a repeater, but it is unclear whether this is the parrot or another. Downlinks are: 145.990MHz FM (voice and telemetry) and 145.910MHz FM (cross band repeater UHF / VHF) with a common uplink on 435.990MHz FM. Telemetry is apparently CW at 25WPM. Please note that AMSAT-LU's web address has now changed to <http://www.amsat-lu.org>

## international space station

The ARRL reports that the first set of Amateur Radio gear to be used on the International Space Station has moved a bit closer to flight readiness. The Phase-1 gear was due to reach Kennedy Space Center by 20 January. The interim ISS amateur package will consist of Ericsson 2m and 70cm handheld transceivers set up for FM voice and packet operation, plus power supplies, cables, and accessories. Ericsson donated the commercial transceivers for the project, while the Italian ARISS team is providing the external antennas.

Amateur Radio has been manifested aboard the ISS as necessary crew equipment. The cost of providing just the interim Phase-1 amateur station for use aboard ISS is expected to exceed \$60,000 US. The total cost of putting Amateur Radio aboard the ISS is expected to approach \$700,000 US, with funds coming from AMSAT, the ARRL and NASA.

Still unclear at this point are the actual frequencies and the callsigns the crew will use aboard the ISS. The ultimate ISS ham radio complement - Phase-3 - will include equipment to operate from HF through to the microwave bands, with SSB, CW, FM, packet, ATV, compressed ATV, and SSTV capabilities. The German team on ARISS will supplement that station with a digitalker and a full duplex repeater.

Once aboard the ISS, Amateur Radio will serve as an educational tool through worldwide school contacts and as an outreach to the general public.



(Left): The South African SunSat satellite.

(Middle): This is the latest photo on the Phase 3D web site, uploaded on 2 February: the in house vacuum testing bell.

(Top): The two parts of the international space station joined together.

M  
E  
S  
S  
A  
G  
E

## VHF/UHF

Geoff Brown, GJ4ICD, with more news of low-cost Russian valves of interest to all constructors of VHF amplifiers, plus the 2m DX records



The largest of the family of triodes, the GS35b.

■ Fred Olte, C31HK, sent in a report of his VHF happenings. He has been rather busy on HF, but hopes to be putting up a new tower for the VHF bands. Andorra is very rare these days on VHF, so this will be very welcome, as permits for visitors are extremely difficult to get hold of. Fred has an e-mail address if you would like to set up a 'sked' with him, it is [fredo@andorra.ad](mailto:fredo@andorra.ad)

I am including the list of 144MHz distance records by each propagation mode this month (Table 1). Something to aim for during forthcoming tropo openings and during the Sporadic E season which is likely to start up once again next month!

### new beacons

PT9FH in Brazil on 50.032MHz has been reported heard in the Caribbean. Another new beacon has been reported on 50MHz, this time from the USA. It is on 50.070MHz with the callsign N3LEL and it's in grid FN00. It runs 1W to a dipole.

### those russian tubes again!

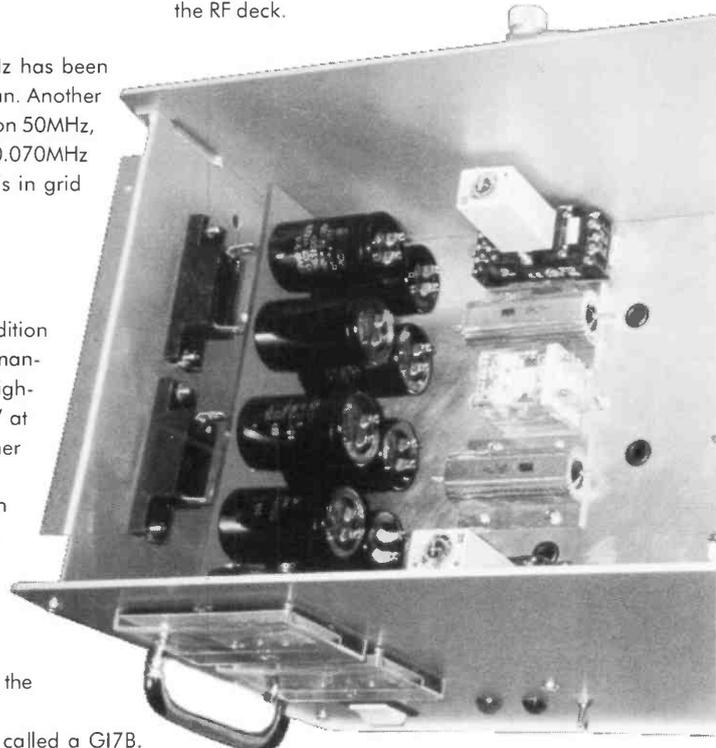
As mentioned in the February edition of *VHF / UHF Message*, I have managed to obtain a supply of high-power Russian valves or 'tubes' at 'silly' prices, compared with other manufactured tubes.

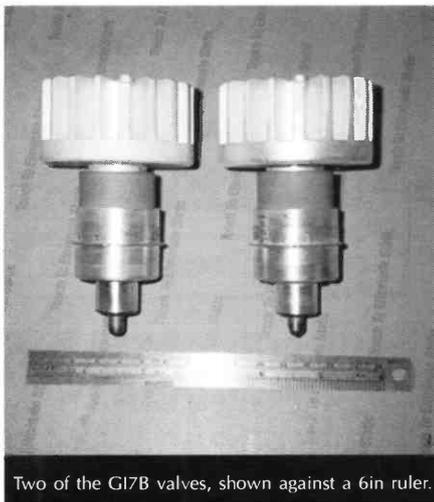
To recall, the tubes vary in power and frequency, but are ideal for many 'home-brew' amplifiers from 50MHz to 1296MHz (and they are also good for HF use). I had a flood of e-mails arrive after mentioning the tubes, so here is the full data.

The smallest of the tubes is called a G17B. This can deliver 500 watts PEP up to 23cm. It is

a triode, therefore eliminating complex power supply building. It is not possible to obtain the bases, however, a simple 'collet' made of strip brass can be made to fit around the heater / filament connections. The filament voltage is 12.6 volts AC at 2 amps, and the maximum EHT is 2.5kV with a maximum anode current of 600mA.

I have started to build a compact low cost 50MHz amplifier using the bigger tube called a GS31b or GS1b (see photo below). The power supply is constructed on the left-hand side and the toroidal transformer is mounted underneath the internal shelf. A partition is fitted (not shown in the photo) to separate the supply from the RF deck.





Two of the 617B valves, shown against a 6in ruler.

Timers (found at the London Amateur Radio and Computer Show at Picketts Lock back in November) are fitted to provide slow start / soft start and warm-up time for the tube and also to protect the power supply components.

The bank of smoothing capacitors is fitted to the left-hand wall along with the two main voltage doubler diodes.

The data on this tube is as follows: filament 12.6V AC at 3.2 amps max, anode volts are 3kV at 1.4 amp maximum anode current.

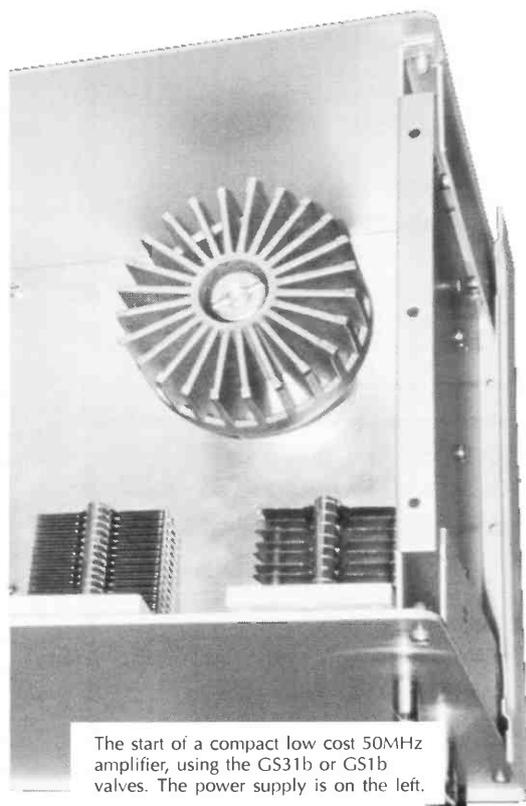
The GS31b or GS1b is bolted to the chassis using small angle clips, this earths the grid connection to provide a 'grounded grid' amplifier, again collets are made of strip brass to connect to the filament / cathode connections.

The largest of the family of triodes is the GS35b. This tube can provide a very clean 400 watts on all VHF and

UHF bands, but is rated at 1.6kW anode dissipation. It weighs in at a mere 3kg despite having a 4in diameter cooling head which is some 4in tall!

Data on this rather large tube is as follows: filament volts 12.6V AC at 3 amps max, anode volts max is 3kV, however, I know of a European 144MHz design using one of these tubes and the owner is using 4.2kV! The maximum anode current is 1.4 amps. Ian White, G3SEK, is currently building a 432MHz amplifier using this tube and I hope to receive some feedback from him in the near future.

The cost of the tubes makes home-brewing of your own amplifier a reasonable financial possibility. What you can see so far in the photograph has been constructed purely by using standard hand tools. Once the prototype amplifier is operational I intend to construct a 144MHz unit. More about this in future columns.



The start of a compact low cost 50MHz amplifier, using the GS31b or GS1b valves. The power supply is on the left.

Station A	Locator	Station B	Locator	Mode	Date (YY-MM-DD)	km
<b>TROPO</b>						
GM0KAE	IO86CD	EA8BML	IL27GX	SSB	88-09-09	3264
GM4COX	IO85JX	EA8BML	IL27GX	SSB	88-09-09	3260
GM8COX	IO85BS	EA8BML	IL27GX	SSB	88-09-09	3223
G0EHV	IO94FW	EA8BML	IL27GX	SSB	88-09-10	3198
GM0BQM/P	IO85CE	EA8BML	IL27GX	SSB	88-09-09	3165
<b>AURORA</b>						
PA3EKK	JO32HA	UA4ANV	LO44	CW	92-05-10	2724
GM4BYF	IO85JV	RB5CCO	KN59XG	CW	89-12-01	2465
G4VBG	IO94FV	UA3IFI	KO76WT	CW	86-02-07	2324
OH2TI	KP20KE	UZ9CC	MO06RT	CW	88-10-10	2137
LY2WR	KO24OQ	F6DBI	IN88JU	CW	89-11-17	2080
<b>SPORADIC E</b>						
OE1XLU	JN88FF	R18TA	MM37TE	SSB	89-07-21	4281
OE1SBB	JN88FF	R18TA	MM37TE	SSB	89-07-21	4281
EA8XS	IL28GA	HG0HO	KN07RU	SSB	83-07-16	3865
OZ1ELF	JO45TL	EA8BEX	IL27GX	?	86-07-12	3656
PA3CEE	JO33KC	UD6DE	LN40VK	SSB	89-07-21	3502
<b>METEOR SCATTER</b>						
GW4CQT	IO81LP	UW6MA	KN97VE	CW	77-08-12	3101
JX7DFA	IQ50OV	DK8ZJ	JO30IX	CW	97-01-04	2356
OZ1IUK	JO66GB	UA4CDT	LO41BV	?	84-08-11	2354
OZ1FDH	JO65EQ	UA6YB	KN93XW	?	84-08-12	2353
GM4CXM	IO75TV	UA1MC	KP59CW	CW	84-06-08	2293
<b>EME</b>						
ZS6ALE	KG46RC	K6MYC/KH6	BK29AO	CW	84-07-18	19287
DK9ZY	JO40BE	ZL1PE	RF74DG	CW	93-06-24	18054
PA2CHR	JO22XA	ZL1BVU	RF74DG	CW	92-09-23	17975
OZ4MM	JO55GH	ZL1BVU	RF74EG	?	91-03-23	17506
F/G8MBI	JN04FT	VK2FLR	QF56OD	CW	96-12-16	17241
<b>TEP</b>						
I4EAT	JN54VG	ZS3B	JG73	CW	79-03-30	7784
<b>IONO</b>						
G4SWX	JO02PB	SM2CEW	KP15CR	CW	91-06-11	1923
PE1OGF	JO21QJ	SM2CEW	KP15CR	CW	98-06-07	1860
SM2CEW	KP15CR	PA0JMV	JO21PL	CW	95-07-16	1854
JX7DFA	IQ50OV	SM5MIX	JO78JG	CW	96-07-18	1780
SM5BSZ	JO89IJ	I4XCC	JN63GV	CW	95-06-25	1748
<b>AURORAL ES</b>						
JX7DFA	IQ50OV	SM1BSA	JO97IO	CW	96-08-05	1959
G4SWX	JO02PB	SM2EKM	KP05UW	CW	90-07-28	1922
PA2CHR	JO22XA	SM2CEW	KP15CR	CW	91-06-11	1780
JX7DFA	IQ50OV	SM5BSZ	JO89IJ	CW	96-08-05	1728
JX7DFA	IQ50OV	SM0FMT	JO89	CW	96-08-05	1649
<b>FAI</b>						
YU7EW	KN05HP	EB4TT	IN70XJ	CW	95-06-02	2084
5B4/DL5MAE	KM65FA	I4LCK	JN54RK	CW	96-06-10	2073
YU7EW	KN05HP	EB5IJA	IM88WV	SSB	95-07-19	2012
YU7EW	KN05HP	EA1CYE	IN83CJ	CW	85-08-06	1948
YU7EW	KN05HP	EB5IFI	IM99WU	SSB	95-06-06	1810

Table 1: 144MHz distance records by propagation mode.



# AERIAL

Trading As

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DTR10-5 (10.1 / 10.2 MHz)

These little rigs can run at any output power from less than 25mW to around 8W. They all have a very effective 7 pole low-pass filter resulting in a harmonic level of better than 50dB.

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Postage (UK) GBP 4.00

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## Page 27: The HAARP Programme.

■ **HAARP**, the **High Frequency Active Auroral Research Program**, was set up to investigate how the **aurora** affects radio propagation on earth. Auroras (the *aurora borealis* in the northern hemisphere and *aurora australis* in the southern hemisphere) are caused by electrons emitted from the sun being attracted towards the two magnetic poles. The size and shape of the auroral 'circle' varies depending on the intensity of the radiation from the sun. Auroras cause the displays of 'northern lights' which most people will have heard of, if not actually witnessed. What is perhaps less well known is that auroras also affect radio propagation, especially when the level of radiation is particularly intense.

On the VHF and UHF bands (in fact all amateur bands between 28 and 1296MHz) signals can be reflected from the auroral curtain, making possible contacts over a much longer distance than would normally be the case. In order to achieve this, Radio Amateurs who wish to make a contact via the aurora need to beam their antennas towards where the auroral activity is occurring, rather than towards each other. Most European auroral contacts are made between amateurs in Scandinavia, but amateurs in Scotland can also take advantage of this unusual propagation mode from time to time, and - during particularly intense auroras - even amateurs in southern England or France. An amateur in England or Scotland would need to beam their antenna typically somewhere between north-west and north-east, whereas an amateur in northern Scandinavia may need to beam his antenna in any direction in order to 'find' the auroral curtain.

Most amateur auroral contacts are made on Morse code, which, when received via the aurora, sounds like 'hissing steam' rather than the pure note normally associated with Morse code signals. It is possible to make auroral contacts using voice modes, and the aurora also affects the sound of a voice signal to such an extent that an SSB signal sounds like the operator is whispering or has a bad case of laryngitis! It is necessary to speak slowly and very precisely, enunciating each word clearly, when attempting to make auroral contacts on SSB.

But auroras don't just bring good news for Radio Amateurs who wish to increase the distances

contacted on the VHF and UHF bands. For their HF cousins, auroras are a bad thing. HF signals which must travel through the auroral zone are attenuated to a great extent by the aurora. This is what makes contacts between the UK and Alaska, Hawaii or Japan relatively difficult. New Zealand is further than any of these places, but is relatively easy to contact because signals do not pass through the auroral zone.

Long distance HF radio communication from areas of the world located beneath the auroral circles, eg Alaska, parts of northern Canada, northern Scandinavia and Antarctica, can be very difficult; severe auroras can attenuate signals to such an extent that radio contact from these areas can be lost for several days at a time.

The HAARP project has been established in Alaska because of its location in the northern auroral circle. Research such as that carried out by HAARP can lead to a better understanding of how solar radiation and auroras affect radio communications on earth and it is to be welcomed that professional researchers request input to their research programme from Radio Amateurs and listeners. Incidentally, HAARP's eventual power output of 3600kW will be equivalent to 36,000 100-watt amateur transceivers transmitting simultaneously!

## Page 50: Satellite Rendezvous.

■ Amateur Radio on board the **International Space Station (ISS)**. It is planned that there will be a permanent Amateur Radio presence in space for the first time when the International Space Station becomes operational.

The initial Amateur Radio station hardware, primarily consisting of 2m and 70cm handheld transceivers, will get to the ISS on a NASA space shuttle flight and eventually the ISS's Amateur Radio station will include equipment to operate on all modes and all bands from HF to microwave.

NASA's Frank Bauer, KA3HDO, recently said the ISS Amateur Radio station, "will be a great recreational outlet for the on-orbit crews, an exciting DXpedition station for hams on the ground, and an outstanding educational outreach tool for students."

The eventual design of the International Space Station's Amateur Radio station was agreed at an ARISS meeting at the University of Surrey in Guildford in July 1998.

## Page 52: VHF / UHF Message.

■ **Valves** (or 'tubes') are considered rather 'old hat' by some Radio Amateurs, many preferring the use of semi-conductor devices such as transistors and FETs (Field Effect Transistors). Yet valves are still the easiest way of generating medium to high output power for Amateur Radio PAs (power amplifiers) - both at HF and VHF / UHF. Unfortunately, most new high-power transmitting valves have been very expensive in the past. Many Radio Amateurs therefore used second-hand 4CX250B and 4CX350R ceramic tetrode valves to make homemade VHF / UHF amplifiers. These valves often found their way on to the surplus market, after being routinely changed having clocked up their requisite number of hours use in professional equipment. Although 'used', some were nearly as good as new (depending on the use to which they had been put) and went on to provide hundreds of hours further use in amateur amplifiers. However, a source of really economical new high-power transmitting valves is to be welcomed, and our *VHF / UHF Message* columnist, Geoff Brown, GJ4ICD, has already started construction of a 50MHz amplifier using the Russian triodes which he has recently sourced.

The table showing **144MHz distance records** is divided into different categories for **tropo**, **aurora**, **Sporadic E**, **meteor scatter**, **EME**, **TEP**, **iono**, **Auroral Es** and **FAI**. Each of these is a different **mode of propagation**. It is beyond the scope of this article to go into the differences between these modes of propagation. However, **tropo** was covered briefly in the January and March 1999 *Help Files* columns and **aurora** is covered briefly above. If you are interested in learning more about propagation from HF to UHF, *Your Guide to Propagation*, by Ian Poole, G3YWX, is an excellent start (it is available from *Ham Radio Today* sales for £6.99).

It is important to distinguish between each mode of propagation when looking at distance records, because of the difference in the 'normal' distance which can be worked by each propagation mode. For example, **EME** (earth-moon-earth) or 'moonbounce' enables two-way contacts to be made by amateurs on opposite sides of the world (over 19,000km apart), by 'bouncing' signals off the moon. The maximum distance worked via aurora, however, is just over 2700km, between amateurs in the Netherlands and Russia.

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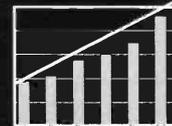
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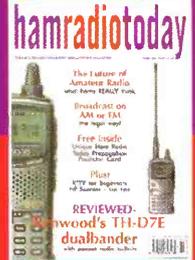


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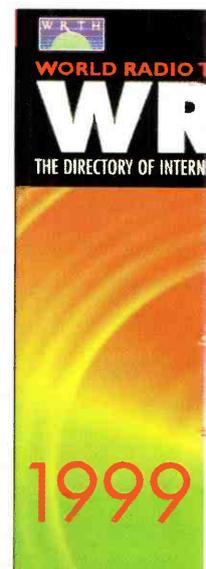
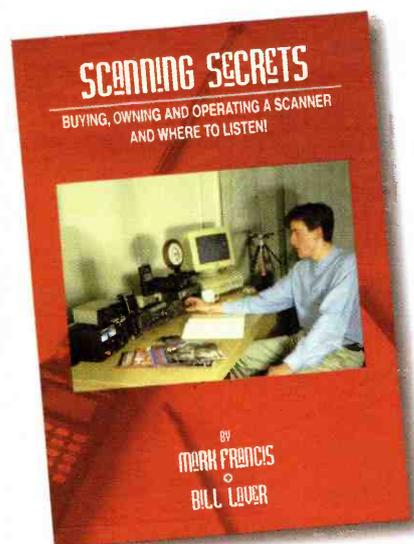
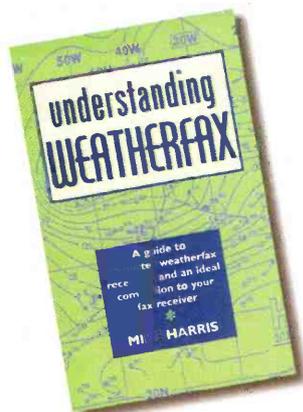
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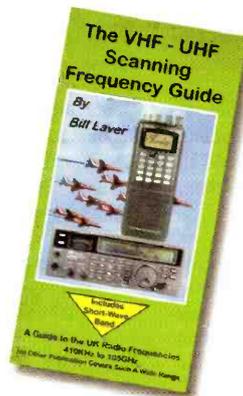
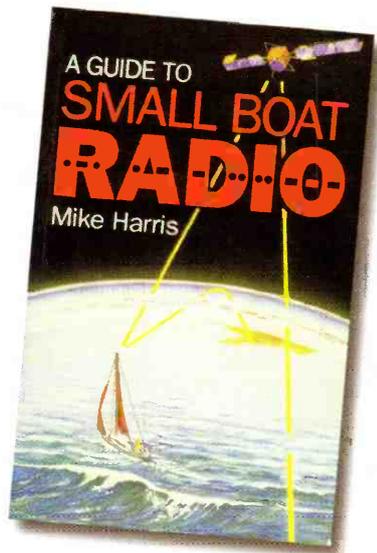
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## Your First Amateur Station

by Colin Redwood, **G6MXL**

How to set up a station and get on the air as cheaply and effectively as possible. It covers all bands, with special emphasis on VHF / UHF. A 'must' for everyone who has just passed the RAE or NRAE. (See the review in *Ham Radio Today* December 1997!)

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## Practical Wire Antennas

by John Heys, **G3BDQ**

A 'down to earth' guide to the construction of many different types of wire antennas, ranging from simple dipoles to ingenious multi-wire systems. Boring and unnecessary theory is kept to a minimum - instead the author shares his years of experience, offering advice for beginners and enthusiasts alike.

1st Edn, 96 pages

£8.92 (plus P&P)

## CQ-GTQM Diary of a Maritime Radio Officer

by Ross Bradshaw

This book provides a wealth of detail on the activities of maritime radio officers, the equipment that was used during the 1970s, and detailed technical information about the equipment. It is also a record of a way of life that was quite unique. See review in October 1998 issue.

240 pages

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## Ferrell's Confidential Frequency List - 1999 Edn

Compiled by Geoff Halligey

Including full reverse callsign list: aero; CW; coast; fax; fixed; embassy; military; Navtex; time; Volmet. Published by PW Publishing. See review in July 1998 issue.

10th Edn, 450 pages

£19.95 (plus P&P)

## Your First Packet Station

by Steve Jelly, **G0WSJ**

How to set up a basic packet radio station and enter the world of data communications from your shack. Explanations are kept as simple and non-technical as possible, making this book an ideal choice for the beginner.

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## Radio Amateurs Examination Manual

by John Case, **GW4HWR**, and Hilary Claytonsmith, **G4JKS**

This edition has been completely revised to take account of the changes in the RAE. In addition, it now incorporates many sample questions originally published in *How to Pass the RAE*. See review in August issue.

16th Edn, 172 pages

£12.93 (plus P&P)

## Practical Receivers for Beginners

by John Case, **GW4HWR**

Contains a selection of easy-to-build receiver designs suitable for amateur bands, together with simple 'fun' projects and test equipment. The theory and practice of receiving techniques is outlined to help of understand the circuits presented. This book is of value to anyone who is building receivers for the first time, or who is considering moving up to microwaves.

1st Edn, 165 pages

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 post - Ham Radio Today, RSGB Sales, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE

**Aberdeen ARS**

Meets Fris. 12 Mar 'how to write an article for a radio magazine, Graham Knight, GM8FFX. 19 Mar Amateur Radio vs the Internet. 26 Mar antique phonograph. 2 Apr junk sale. 9 Apr homemade masts & antennas, Stan Sutherland, GM4BKV. 16 Apr Easter bunny hunt (prizes), Ian Fraser, GM8MHU. 23 Apr action night. 30 Apr on air. Jim McCall, GM3HGA, 01224 313838, gm3hga@btinternet.com

**Aylesbury Vale RS**

8.00pm on 1st & 3rd Wed of month at Hardwick Village Hall, 3 miles north of Aylesbury on A413. 17 March AGM. Secretary Gerry Somers, G7VfV: 01296 432234.

**Ayr ARG**

7.30pm fortnightly Fris. 19 Mar 'the higher reaches', GM4CXM. 2 Apr military comms history, MMOAUB. 16 Apr international matters, GM4AUP. 30 Apr operating portable & mobile. Peter Sturgeon, MMOBQP, 01292 282597, petersturg@aol.com

**Bangor & DARS**

8.00pm, usually on 1st Wed of month, at Clondeboye Lodge Hotel, Bangor, Co Down. 7 Apr PSUs & constructors' contest. Roy Finlay, G10WVN: 01247 460716.

**Barnsley & DARC**

The club is now a registered exam centre for the RAE and Novice RAE and holds courses for both exams. 15 Mar Novice course starts for Jun 99 exam. Ernie Bailey, G4LUE, 01226 716339, mobile 0836 748958 (between 6.00 and 8.00pm please) or e-mail: badarc@cwcom.net

**Barry ARS**

Tues at Sully Sports & Leisure Club, South Road, Sully CF64 5SP. 23 Mar GB100SFL / GB100EGL on big screen video, Rich, GW4BVJ. 30 Mar on air, Morse practice. Richard Montimore, GW4BVJ, 01656 658600.

**Blackmore Vale ARS**

13 Apr AGM. Tony, G0GFL, 01258 860741.

**Bracknell ARC**

2nd Wed of month at Coopers Hill Youth & Community Centre, Crowthorne Road North, Bracknell. 10 Mar bring & buy. Details: Baugh@compuserve.com

**Braintree & DARS**

7.30 for 8.00pm 1st & 3rd Mons. 15 Mar sausage & mash supper. Details from Keith Farthing, 2E0ARS, 01376 347736.

**Bristol RSGB Group**

7.15 for 7.30pm last Mon of the month at Avon Combined Services Club, St Pauls Rd, Clifton, Bristol. 29 Mar ATUs & SWR, Peter Chadwick, G3RZP. Martyn Phillips, G3RFX, 0117 973 6419, g3rfx@compuserve.com

**Bromley & DARS**

7.30 for 8.00pm on 3rd Tue of month, at Victory Social Club, Kechill Gardens, Hayes, Kent. 16 Mar 'short talks', series of 10 min talks by club

members, Graham, G4NPD. 20 Apr TBA. Alan Messinger, G0TLK: 0181 777 0420; e-mail: aalangm@clara.net

**Bromsgrove ARS**

8.00pm 2nd & 4th Tue of month at Lickey End Social Club, Alcester Rd, Burscot, Bromsgrove. 23 Mar talk. 13 Apr propagation & your latest contacts. 27 Apr mobile DF hunt. Gus Malcolm, G8DEC: 01527 875573.

**Buxton Radio Amateurs**

2nd & 4th Tue of month at Lee Wood Hotel, Park Rd, Buxton. 23 Mar Goyt Valley challenge discussion. 13 Apr QSL night. 27 Apr loft antennas. J Watmough, 01298 79500.

**Chelmsford ARS**

1st Tue of month. 6 Apr weather forecasting satellites, Harry Heap, G5HF. Charles Shelton, G0GJS, 01245 256654.

**Cheltenham ARA**

7.45 for 8.00pm 1st Fri & 2nd Wed of month at Prestbury Library, The Burgage, Prestbury, Cheltenham. 9 Apr ATV, Severnside TV Group. 14 Apr 'back to basics: choosing an aerial'. Mrs Patricia Thom, G1NKS: 01242 241099 (9.00am - 9.00pm); e-mail: g1nks@g3nks.demon.co.uk

**Chesham & DARS**

8.15pm Wed at The White Hill Centre, Chesham. 17 Mar members' memoirs, Steve, M1BFL. 24 Mar RAE talk, G4HES. 31 Mar construction project. P Blakeney, G8BLB, 01494 784811.

**Cheshunt & DARC**

8.00pm Weds at the Church Room, Church Lane, Wormley, Herts. 17 Mar on air team contest. 24 Mar VSWR & measurement by sweeper, Jim, G0JXN. 31 Mar tuning & pruning aerials, Jim, G0JXN. 7 Apr members' forum. 14 Apr computer basics & millennium bug, Dennis, G3TIK. 21 Apr on air. 28 Apr constructors' contest. 5 May members' forum. Jim Brightman, G0JXN, 01992 468204.

**Colchester Radio Amateurs**

7.30pm Main Building, Colchester Institute, Sheepen Road. 18 Mar RF power measurement, Dave, G3PEN. Brian, G0GGM, 01206 822547.

**Coleraine ARS**

New secretary Jonathan Bell, G1TMQ, 72 Coleraine Rd, Portrush BT56 8HN.

**Cornish RAC**

7.30pm on 1st Thu of month at Perranwell Village Hall, near Truro. 1 Apr AGM. Robin Worsley, G0MYR: 01209 820118.

**Coventry ARS**

8.00pm Fris at Binley Church Hall, Brinklow Road, Coventry. 12 Mar on air. 19 Mar portable evening (venue TBA). 26 Mar on air. 2 Apr DXCluster demo. 9 Apr on air. 16 Apr visit to brewery. 23 Apr on air. 30 Apr how to use an oscilloscope. Robin Tew, G4JDO, 01203 673999.

**Cray Valley RS**

8.00pm 1st & 3rd Thu of month at Progress Hall, Admiral Seymore Road, Eltham, London SE9. 18 Mar construction contest. 1 Apr VHF contesting and DXing, Chris Whitmarsh, G0FDZ. 15 Apr AGM. Tony Fishpool, G4WIF: 0171 739 5057 (office hours).

**Crystal Palace & DRC**

20 Mar electronic warfare. 7 Apr basic electronics: circuits. 17 Apr inside 10 Downing St. V H Johnston, G1PKS; tel: 0181 653 2946; e-mail: vjohns653@aol.com

**Denby Dale (Pie Hall) ARS**

8.00pm Weds at the Pie Hall, Denby Dale. 14 Apr surplus sale. Tony, G4LLZ, 01484 664360.

**Dragon ARC**

(Clwb Radio Amatur y Ddraig, Ynys Môn) 7.30pm 1st & 3rd Mons of month at Ebenezer Hall, Foel y Graig Lane, Higher Village, Llanfairpwll, Anglesey. 15 Mar discussion. Stewart Rolfe, GW0ETF, 01248 362229.

**Droitwich Spa ARC**

8.00pm on 1st Thu of month at Cotton's Corner, 17 Ombersley Street West, Droitwich Spa. New secretary: Hector Wragg, M1BUV, tel: 01905 794399.

**East Cleveland ARC**

7.00pm Fris at Jubilee Hall, Gurney St, New Marske. 12 Mar transformers, Robert, M0BJX. 19 Mar invisible antennas, Alistair, G4OLK. 26 Mar mobile telephone experiences, Malcolm, G4YMB. 2 Apr no meeting. 9 Apr EMC. 16 Apr bring & tell. 23 Apr the VK licence. 30 Apr GPS demo. Alistair Mackay, G4OLK, 01642 475671.

**Echelford ARS**

7.00 for 7.30pm 2nd & 4th Thu at The Hall, St Martins Court, Kingston Crescent, Ashford, Middx. 11 Mar bring & buy. 25 Mar AGM. 1 Apr what's new in Avionics, Duncan Tribute, G1OEQ. 22 Apr WAB, Robert Snary, G4OBE. Robin Hewes, G3TDR, 01784 456513.

**Exeter ARS**

7.45pm 2nd Mon of month at Moose International Centre, Spinning Path, Blackboy Rd, Exeter. 3rd Mon is committee / open meeting. 15 Mar on air. 12 Apr inter club quiz. 19 Apr on air. G0WHJ, 01392 434078.

To include your club in this section, send your club event details to: The Editor, *Radio Today* (Club News), RSGB Publications, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE; fax: 01707 645105. The deadline for the June issue is 12 April; for July, 17 May, and for the August issue it's 14 June.

### Fareham & DARC

7.30pm Weds at Portchester Community Centre. 17 Mar Alexander Graham Bell video. 24 Mar 10 minute talks. 31 Mar introduction to modern personal computer, Steve, G7HEP. 7 or 14 Apr (TBA) programming PICs, Brian, G0UKB. 21 Apr video. 28 Apr R1155 night. Andrew Sinclair, G0AMS, 01329 235397.

### Felixstowe & DARS

8.00pm at Orwell Park School, Nacton, Ipswich. 22 Mar AGM. 19 Apr 'eclipses & other wonders of the solar system', Paul, G4YQC. Paul, G4YQC: 01394 273507.

### Gloucester AR&ES

Mons. 15 Mar Morse practice. 22 Mar on air. 29 Mar Morse practice. Tony Martin, 01452 618930 (office hours).

### Goole R&ES

7.30pm Fris at West Park Pavilion, Goole. 12 Mar talk. 19 Mar treasure hunt. 26 Mar fund raiser. 2 Apr contest planning. 9 Apr talk. 16 Apr visit. 23 Apr construction competition. 30 Apr fund raiser. Richard, G0GLZ, 01405 769894.

### Halifax & DARS

7.30pm on 3rd Tue of month at Tap & Spile Pub, Wards End, Halifax, for committee & Morse tuition. 16 Mar 'memories of G8OK, A Benn, G8AFV. 20 Apr component sale, Martin Stokes, G3ZXZ. Ray Nolson, 01274 600297.

### Hambleton ARS

7.30pm at Allertonshire School, Northallerton. 18 Mar talk. 15 Apr body shocks, Dr T Wilson, G3MAE. 29 Apr on air. John Hampson, G0VXH: 01845 537547, e-mail: jonham@breathe.mail.net, or packet: G0VXH @ GB7CYM.

### Hereford ARS

Fris. 19 Mar informal. 2 Apr no meeting. Steve, M1BYN, 01432 760226, new e-mail: hars@hereford-ars.freemove.co.uk New web site: <http://www.hereford-ars.freemove.co.uk>

### Hoddesdon Radio Club

8.00pm alternate Tues at Conservative Club, Rye Road, Hoddesdon, Herts. 16 Mar open forum. 30 Mar RadCom, editor Steve White, G3ZVW. 13 Apr natter night. Don Platt, G3JNJ, 0181 292 3678.

### Horndean & DARC

7.30pm 1st & 4th Tue of month at Lovedean Village Hall, 160 Lovedean Lane, Lovedean, Hants. The 1st Tue is usually a social evening. 23 Mar Red Army communications equipment, John Lines, G6XBG, Military Wire-less ARS. 27 Apr 30-line TV, Peter Smith, G4JNU. Stuart Swain, G0FYX: 01705 472846.

### Hornsea ARC

17 Mar talk, Peter Sheppard, G4EJP. 24 Mar contest antennas, Peter Rodmell, G3ZRS. 31

Mar activity. 7 Apr quiz, Peter Sheppard, G4EJP. No details of venue given, tel: J R Thompson, G0TPS, 01964 562258.

### Horsham ARC

8.00pm on 1st Thu of month at Guide Hall, Denne Road, Horsham, West Sussex. 1 Apr digital microwave networks, Bryn Tinton, G3SWC. Details from David Miller, G4JHI, tel: 01403 252101, e-mail: g4jhi@dmler2.force9.co.uk Internet: <http://www2.prestel.co.uk/jelley/harc>

### Ipswich Radio Club

Meets Weds. 17 Mar test equipment evening. 24 Mar Morse evening. 7 Apr AGM. 21 Apr on air. 28 Apr Morse evening. Keith Gaunt, G7CIY, 01394 385431, e-mail: keith.gaunt@bt.com

### Isle of Man ARS

8.30pm Mons at Woodbourne Hotel, Douglas except irregular meetings on 1st Mon of month at Transport House, Fort St, Douglas.

### Itchen Valley ARC

2nd & 4th Fri. 12 Mar AGM. 26 Mar junk sale. D C Symonds, G0PRZ, 01703 813827.

### Kidderminster & DARS

8.00pm first Tue of month at Sutton Arms, Sutton Park Road, Kidderminster, Worcs. 13 Apr first aid talk & hands-on demo, Geoff, G0PMF, & Robin, G0PMG. Robin Dellbridge, G0PMG, 01299 828136.

### Leicester Repeater Group

8.00pm at East Midlands Electricity Sports & Social Club, Aylestone Rd, Leicester. 22 Apr AGM. John Senior, G7RXS, 0116 284 1517, e-mail: SeniorJA@aol.com

### Leiston ARC

7.45pm 1st Tue on month at Leiston Town Athletic Association, Victory Rd, Leiston. 6 Apr police communications in the new millennium. John Rabson, G3PAL: 01394 460298; fax: 01394 420795; e-mail: word.factory@zetnet.co.uk

### Lincoln Short Wave Club

7.45pm Weds at Railway Sports & Social Club, Ropewalk, Lincoln. 17 Mar open forum. 24 Mar computer programming. 7, 21 April computer programming. 28 Apr surplus equipment sale. John Riddoch, G1TSL, 01522 793751.

### Liverpool & DARS

8.30pm Tues at Churchill Club, Church Road, Wavertree, Liverpool. 30 Mar surplus sale. 6 Apr visit by RSGB representative. 13 Apr on air. 27 Apr surplus sale. Publicity Officer, Ian Mant, G4WWX: 0151 722 1178.

### Lothians Radio Society

7.30pm on 2nd & 4th Weds of month at Orwell Lodge Hotel, Colinton Road, Edinburgh. 14 Apr Lothians Challenge 1999, N Stewart, GM1CNH. 28 Apr outside visit. Tommy Main, GM4DCL, 0131 663 8501.

### Loughborough & DARC

7.30pm Mons at Science Lab, Hind Leys Community College, Forest St, Shepshed (when college open) for general meetings & Tues as follows: 16 Mar open forum 'aerials a-gain'. 23 Mar interclub quiz. 30 Mar on air - try out club's linear. Alan, G0PHT, 01509 550420.

### Loughton & DARS

Alternate Fridays. 12 Mar BY China, Bob, RS178098, John, G0VEH. 26 Mar TBA. 9 Apr AGM. Marc Litchman, G0TOC, 0181 281 0886 (evenings), marc.litchman@brewin.co.uk

### Maxpack

Midlands AX25 Packet Radio Users Group. No details of venue given. 12 Apr AGM. Ed Loach, G4ZXS, 01902 741877 (evenings), g4zxs@gb7max.#28.gbr.eu

### Mid-Warwickshire ARS

23 Mar aerial basics, Terry Downing, G3MXH. 13 Apr the future of Amateur Radio, Brian Slatter, G4DF. 27 Apr operating procedures, Tony Blackburn, G0REP. Don Darkes, G4CYG, 01926 424465.

### Newbury & DARS

7.30pm on 4th Wed at Memorial Hall, Upper Bucklebury, nr Newbury. 24 Mar amateur TV, Graham Hanks, G8EMX. 28 Apr AGM. Ian Trusson, G3RVM, 01635 826019, g3rvm@compuserve.com

### Newquay & DARS

7.30pm 1st & 3rd Fri at Treviglas School. 26 Mar packet file downloading, Roger, G4OCO. 9 Apr slow scan demo. 23 Apr 'fox hunt'. Clive, M0BGA, 01637 875848.

### Norfolk ARC

7.00 for 8.00pm Weds at Ugly Bug Public House, Colton. Informal evenings, including night on air, construction QRP, & Morse practice, on 1st, 3rd & 5th Weds, plus: 17 Mar data modes, Phil Bridges, SMC / Siskin. 24 Mar HF NFD briefing. 7 Apr AGM. 21 Apr using & constructing ATUs, Stuart, G3XYO. 28 Apr on air. John, G0VZD, 01953 604769.

### North Wakefield RC

8.00pm Thus at East Ardsley Cricket Club, Wakefield. 11 Mar police drugs squad. 25 Mar bus preservation. 1 Apr on air. Wed 7 Apr visit to Lax and Shaw, glass bottle makers. 15 Apr police underwater team. Details: 0113 253 9087.

### Nunsfield House ARG

7.30pm Fris at Nunsfield House Community Association, 31 Boulton Lane, Alvaston, Derby. 12 Mar alternative technologies, John Beardmore. 19 Mar Les Jackson talks!, G3OZ. 26 Mar surplus sale. 30 Apr on air. Ann Wolverson, 2E1GNP, 01332 752997.

### Poldhu ARC

7.30pm 2nd Tue of month. 13 Apr on air. David Barlow, G3PLE: 01326 240738.

### Powys ARC

7.15pm for 8.00pm Thus at Newtown Royal British Legion Club, Broad Street, Newtown. Formal meetings 3rd Thu as follows: Mar 'Gordon's choice', GW0RJV. Apr talk by Glyn, GW0JAI. Paul Essery, GW3KFE, QTHR.



### Radio Society of Harrow

8.00pm Fris at Harrow Arts Centre, Uxbridge Rd, Hatch End, Middx. 19 Mar AGM & Irish theme evening: food & drink, work EI stations. 16 Apr Amateur Radio software, David Talabar. Jim Ballard, G0AOT, 01895 476933 (evenings/weekends), 0171 278 6421 (day).

### Reading & DARC

8.00pm 2nd & 4th Thurs at the Pavilion, Woodford Park, Woodley, Reading. 8 Apr HF broadcast-ing. P W Milton, 0118 969 5697.

### Salop ARS

18 Mar talk, G3IDY. 1 Apr expeditions video, G8VZT. 14 Apr construction evening. Fred Hall, G3NSY, 01743 790457.

### Silverthorn Radio Club

7.30pm Fris at Adult Education & Community Centre, Friday Hill House, Simmons Lane, Chingford, London E4 6JH. The club offers Morse code tuition & Morse tests. 12 Mar Rob Mannion, G3XFD, PW editor. 9 Apr junk sale. Dave, G0KHC: 0181 505 1871; packet: G1NPT@GB7TUT, e-mail: andrew@acolaid.demon.co.uk

### South Birmingham RS

8.00pm 1st Wed of month at West Heath Community Centre, Hampstead House, Fairfax Rd, West Heath, Birmingham. The club is "generally" open Mons, Thus & Fris from 8.00pm. 7 Apr rig test night: bring your gear for checking. Don Keeling, 0121 458 1603 (evenings).

### South Bristol ARC

7.30pm Weds at Whitchurch Folkhouse Association, Bridge Farm House, East Dundry Road, Whitchurch, Bristol. 17 Mar radio books, buy, sell, exchange, Doug, G3KUL. 24 Mar quiz & rally planning, Muriel, G4YZR. 31 Mar 10GHz activity, Bill, G6PJS. 7 Apr Amateur Radio software demo, Len, G4RZY. 14 Apr cheese & wine tasting, Muriel & Bill. 21 Apr 'oscilloscopes are fun', Len, G4RZY. 28 Apr computer parts bring & buy, Bob, M1BOB. Len Baker, G4RZY, 01275 834282 (24 hr answerphone).

### Southdown ARS

7.30pm first Mon of month at Chaseley Home, Bolsover Road, and each Friday at the Hailsham Lagoon. 12 Apr coastguard service talk. Brian Gauntlett, 01323 840530.

### Southgate ARC

7.30pm on 2nd & 4th Thu of month at Winchmore Hill Cricket Club, The Paulin Ground, Firs Lane, Winchmore Hill, London N21. 11 Mar amateur satellites, by Ham Radio Today columnist Richard Limebear, G3RWL. Brian Shelton, G0MEE, 01707 257534.

### South Manchester RC

Fris. 12 Mar table top DF. 19 Mar NARSA preparation. 26 Mar surplus equipment sale. G E Spark, G7FQY, 0161 969 1964.

### South Normanton & Alfreton DARC

7.30pm Mons (exc Bank Holidays) at New Street Community Centre, South Normanton, Derbyshire. 15 Mar natter night. 22 Mar magnetic loops, Martyn Moss, G4WBK. 29 Mar Practical Wireless, Rob Mannion. 5 Apr no meeting. 12 Apr Tanzania, Ken Frankcom. 19 Apr junk sale.

26 Apr Highordish night on air. Russell Bradley, G0OKD, 01773 863892.

### South Notts ARC

7.00pm Weds at Fairham Community College, Farnborough Rd, Clifton, Nottingham. 17 Mar open forum, members only. 24 Mar on air. 31 Mar design your own QSL card on computer, Julie, G0SOU. 7 Apr meeting at Sun Inn, Gotham. 14 Apr on air. 21 Apr open forum, members only. 24 Apr on air. Vice Chairman tel: 01509 672846.

### Stevenage & DARS

7.30pm Tues at the Day Centre, Chells Way, Stevenage. 16 Mar AGM, 23 Mar 20m on air. 30 Mar video. John Churchill, M0ARQ, 01462 684962.

### Stourbridge & DARS

8.00pm on 1st & 3rd Mon at the Radio Shack, Oldswinford Hospital, Heath Lane, Stourbridge. 15 Mar AGM. Gordon Bryant, G0TZV: 01384 395206.

### Stratford upon Avon & DRS

7.30 for 8.00pm on 2nd & 4th Mon of month at Home Guard Club, Main Road, Tiddington, Stratford upon Avon. 22 Mar junk sale. 12 Apr point to point microwave, G6FEO. 26 Apr AGM. Bob, M0AIZ, 01789 765912.

### Sudbury & DRA

7.30pm for 8.00pm 1st Tue of month at Wells Hall Old School, junction of Head Lane, Wells Hall Rd, Great Cornard. 6 Apr RF power measurement, Dave, G3PEN. Mark Bean, G7UTC, 01787 377493.

### Surrey Radio Contact Club

1st Mon (usually) of month at Terra Nova meeting hall, The Waldrons, Waddon, Croydon, Surrey. 5 Apr AGM. Bernie Wynn, G8TB, 0181 660 7517.

### Swindon & DARC

7.00 for 8.00pm Thus at Eastcott Community Centre, Savernake Street, Old Town, Swindon. 18 Mar 'In Practice - Live', Dr Ian White, G3SEK. Den Forrest, M0ACM, tel / fax: 01793 822705, e-mail: DenForrest@aol.com

### Telford & DARS

8.00pm Weds at Community Centre, Bank Road, Dawley, Telford. 17 Mar pre-AGM and contest planning. 24 Mar AGM. 31 Mar junk sale. 7 Apr on air. 14 Apr 10 minute topics. 21 Apr an old timer talks: G4LU. 28 Apr welding, G1DMJ. Mike Street, G3JKX, 01952 299677.

### Thornton Cleveleys ARS

Meets Mons. 15 Mar rally preparation. 29 Mar tuning valve transmitters. Jack Duddington,

G4BFH, duddington@wavenet.co.uk or 8 The Grove, Thornton Cleveleys, Lancs FY5 2JD.

### Torbay ARS

7.30pm Fris at ECC Social Club, Highweek, Newton Abbot. Informal meetings most Fris & talk / event once a month. 19 Mar West African antics, Roger Western, G3SXW. 23 Apr construction quiz, G4FCN. Peter Tanner, G4VTO: 01803 864528 (working hours).

### Trowbridge & DARC

8.00pm 1st & 3rd Wed of month (3rd Weds usually 'natter nights') at Southwick Village Hall, Southwick, on A361 Trowbridge / Frome road.

17 Mar open meeting. 7 Apr operating from Gibraltar, Martyn Phillips, G3RFX / ZB2FX. Ian Carter, G0GRI: 01225 864698 (evenings / weekends).

### Verulam ARC

7.30 for 8.00pm at RAF Association HQ, New Kent Rd, St Albans. 23 Mar Verulam ARC annual memorial lecture: airborne interception radar, Walter Craine, G3PMF. Walter Craine, G3PMF, 01923 262180.

### Wakefield & DRS

8.00pm Tues at Community Centre, Prospect Rd, Ossett, West Yorks. Novice & RAE tuition provided. 16 Mar computer evening. 23 Mar first aid. 30 Mar TBA. 6 Apr on air. 13, 20 Apr construction. 27 Apr AGM. Ian Roberts, M0BFO, 01924 216502.

### Warrington ARC

8.00pm Tues (Morse classes Weds) at Grappenhall Youth & Community Association, Bell House Lane, Grappenhall, Cheshire. 16 Mar Norbreck Rally preparations. 23 Mar Norbreck Rally post mortem. 30 Mar 'search for the ultimate DX', Ian Morrison, G0DMU. 6 Apr nuclear generation of electricity, John Riley, G0RPG. 27 Apr 'radar then & now', Ron Davies, G0WJX. John Riley, G0RPG, 01925 762722.

### Wimbledon & DARS

2nd & last Fri of month at St Andrews Church Hall, Herbert Rd, Wimbledon SW19. 12 Mar surplus equipment sale. 26 Mar Morse code techniques. 9 Apr ATC Radio, George, G3DWW. 30 Apr on air. J Gale, G4WYJ: 01737 356745.

### Wirral & DARC

8.00pm Weds at Irby Cricket Club. 17 Mar D & W ring of bells. Andy, G7HUD, 0151 677 4448; g7hud@qsl.net; G7HUD @ GB7OAR; www.merseyworld.com/wadarc

### Wolverhampton ARS

8.15pm Tues at Wolverhampton Electricity Sports and Social Club, St Mark's Road, Chapel Ash, Wolverhampton. 16 Mar junk sale. 23 Mar social. 30 Mar G4WAS. 6 Apr committee meet-



ing. 13 Apr natter night. 20 Apr talk by Mike Street, RAF Cosford. 27 Apr IOTA, Bill, G3CAQ. Joy Smith: 01902 751936.

### Worthing & DARC

Weds. 17 Mar oscilloscopes, G0ECW. 24 Mar auxiliary fire service, G1HIM. 31 Mar natter night. G4GPX, 01903 753893.

### Wrexham ARS

Mon 6m FM sessions, details: Patrick, GW0VMR, 01978 759617.

### Yarmouth RC

7.30 for 8.00pm Fris exc no meeting 1st Fri of month, at Bradwell Community Centre, Church Lane, Bradwell. 12 Mar open forum - all welcome. 26 Mar on air. 9, 23 Apr antenna construction. Tony Besford, G3NHU, 01493 721173.

## NATIONAL AND INTERNATIONAL GROUPS

### Amateur Radio Caravan and Camping Club (ARCC)

For further details please contact the Hon Sec, Mrs Norma Jackson, 41 Creswell Farm Drive, Stafford ST16 1PG.

### British Amateur Radio Teledata Group (BARTG)

has a quarterly magazine, *Datacom*, and holds an HF RTTY contest each year. There will be no BARTG rally in 1999, but it will return at a new venue in 2000. For more details about the group contact Membership Secretary Bill McGill, G0DXB, 14 Farquahar Road, Maltby, Rotherham, S66 7PD, Yorks S66 7PD, tel: 01709 814010 (Tue, Thu & Fri, 7.00pm to 9.00pm. Sat/Sun before 9.00pm), or via GB7WRG. Internet: <http://www.bartg.demon.co.uk>

### British Amateur Television Club (BATC)

produces a quarterly magazine, *CQ-TV*, and holds its own rally each year. BATC has an Internet site at <http://www.batc.org.uk> For details contact: Dave Lawton, G0ANO, Grenehurst, Pinewood Road, High Wycombe, Bucks HP12 4DD.

### CDXC (Chiltern DX Club) - the UK DX Foundation

membership is open to all amateurs and SWLs who have worked (or heard) more than 100 DXCC entities. It is the UK's first and largest grouping of amateurs interested in HF DX / contesting. It produces an excellent quarterly magazine, *CDXC Digest*, and holds occasional social events. Internet site: <http://www.cdxco.org.uk>

[www.cdxco.org.uk](http://www.cdxco.org.uk) For prospectus and further details please contact the Secretary, Barry Cooper, G4RKO, 1 Strouds Meadow, Cold Ash, Newbury RG16 9PQ; e-mail: [cooperb@g4rko.demon.co.uk](mailto:cooperb@g4rko.demon.co.uk)

### G-QRP Club

publishes a quarterly journal, *SPRAT*, devoted to low power communication, and holds regular get-togethers at their rally stands throughout the country. For membership details, contact their Secretary, Rev G Dobbs, St Aiden's Vicarage, 498 Manchester Road, Rochdale, Lancs OL11 3HE; tel: 01706 31812 or see their web site at <http://www.btinternet.com/~g4wif/gqrp.htm>

### International Short Wave League (ISWL)

who, as well as running an international QSL bureau for amateurs and SWLs, has a monthly magazine (*Monitor*) and regular get-togethers at their rally stands plus on-air nets on HF and VHF. For more details send an A4 sized SAE to: ISWL HQ, 267 Pelham Road, Immingham DN40 1JU. Internet: <http://www.aber.ac.uk/~srj5/iswl.htm>

### Irish Radio Transmitters Society (IRTS)

publishes regular newsletters giving details of local activities, and the yearly IRTS Callbook. They also have a video library. For further details of IRTS, contact Joe Ryan, EI7GY; tel: (Eire) 01 2854250 or by e-mail: [jryan@iol.ie](mailto:jryan@iol.ie) Book Sales: Dave Moore, EI4BZ, 12 Castle Ave, Carrigtwohill, Co Cork; tel: (Eire) 021 883555.

### Radio Amateurs' Emergency Network

National Registered Charity No. 1047725, can be contacted at Hunters Moon, Newton-le-Willows, Bedale, N Yorks DL8 1SX. 24hr emergency national contact line: 0141 621 2121; Raynet supplies: 01369 708760 or [raynetsupplies@latheron.demon.co.uk](mailto:raynetsupplies@latheron.demon.co.uk); Internet web site: <http://www.sgi.leeds.ac.uk/raynet/>

packet BBS: GB7NRC; phone BBS: +44 (0) 1296 393737; HF news net: Sun 8.30am local 3663kHz.

### Radio Amateur Invalid and Blind Club (RAIBC)

is a registered charity which raises money for radio / computer equipment, and audio cassette courses for home study, for blind, deaf and disabled amateurs. The club attends rallies throughout the year, and collects surplus equipment for resale. Please contact Honorary Treasurer / Membership Secretary Mrs Shelagh Chambers, 78 Durlay Ave, Pinner, Middx HA5 1JH. Web site address: <http://www.gurney.co.uk/raibc>

### Radio Amateur Relief Expeditions (RARE)

is a registered charity made up of radio amateurs and friends who take aid to Eastern Europe and organise summer camps for young people to learn about amateur radio, English language and life in the UK. New members are required to support this work both at home and by taking part in expeditions. Please contact: The Secretary, RARE, 1 Allfield Cottages, Condover, Shrewsbury SY5 7AP; tel: 01743 873815; fax: 01743 874729.

### Radiocommunications Agency (RA)

is the licensing authority for all UK radio amateurs. They have a large number of free publications, including the booklet *How to Become a Radio Amateur*, and their *Novice Licence Information* sheet and can offer advice on many aspects of licensing. New Kings Beam House, 22 Upper Ground, London SE1 9SA. Amateur Radio line, tel: 0171 211 0160. General enquiries, tel: 0171 211 0211.

### Radio Society of Great Britain (RSGB)

is the internationally-recognised national society, which has been representing UK Radio Amateurs and short wave listeners for 85 years. Members of the RSGB receive *RadCom*, a 100-page colour magazine sent to their home each month, have the advantage of free QSLing, can enter RSGB contests, and get help in obtaining planning permission for antennas, as well as much other technical support. A network of over 2000 volunteers is on hand to help the Radio Amateur and short wave listener with any enquiry. Address is: Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE; tel: 01707 659015; Internet site: <http://www.rsgb.org> and e-mail: [info@rsgb.org.uk](mailto:info@rsgb.org.uk)

### Royal Air Force ARS (RAFARS)

RAFARS is an international society for Amateur Radio enthusiasts who are, or have been, serving members of the Royal Air Force, inc RAF Reserves and Commonwealth or Allied Forces. Civilians whose work associated them with the RAF, or anyone with an interest in the RAF can also be members. RAFARS publishes its own callbook and magazine, *QRV*, twice a year, and runs its own QSL bureau. Contact address is Peter Lewin, G0JKW, 24 Brookfields Rd, Wyke, Bradford BD12 9LU; tel: 01274 677194.

### Subscription Services Ltd (SSL)

handles the issuing of amateur licences in the UK on behalf of the Radiocommunications Agency. SSL can help regarding enquiries concerning individual licences (rather than general licensing matters, which the RA handles, see above). Contact details: The Radio Licensing Centre, SSL, PO Box 884, Bristol BS99 5LF; tel: 0117 925 8333.

### United Kingdom Radio Society (UKRS)

is a new society for UK Radio Amateurs. They can be contacted at Box 100, Meadow Street, Northwich, Cheshire, CW8 1FA. tel: 01606 783270, or 0115 925 6597, packet: UKRS@GB7OAR, or e-mail: [admin@ukrs.org](mailto:admin@ukrs.org); Internet: <http://www.ukrs.org>



# contact info

## contributions to:

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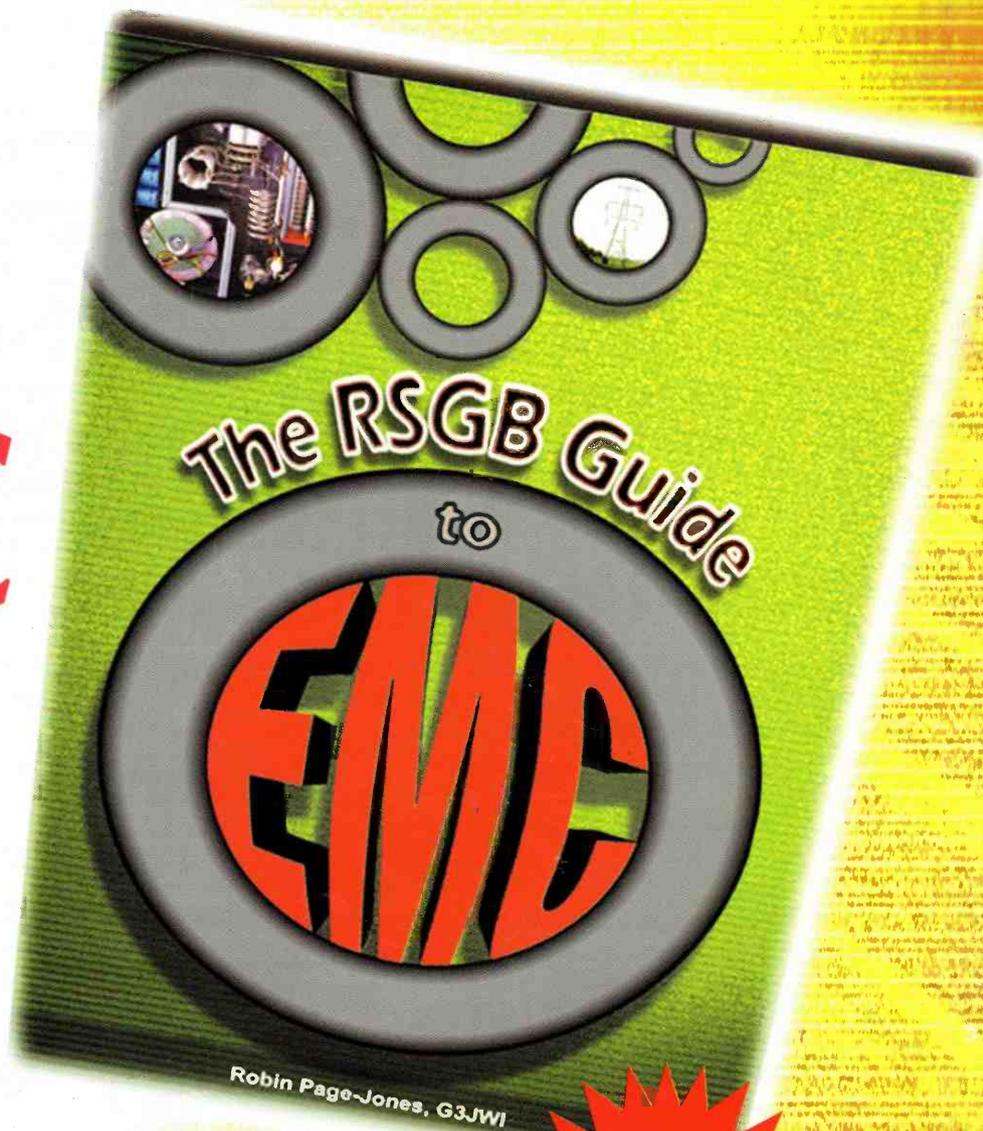
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