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editorial

who's

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■ This month's edition of *Ham Radio Today* is something of a 'VHF / UHF Special'. I make no apologies for that: around 50% of UK Radio Amateurs are class B licensees, and the ratio is moving towards the class B all the time. When I first became interested in Amateur Radio, the VHF / UHF bands were seen as being somehow rather 'exotic', and something to work towards after you had cut your teeth on the 'easy' HF bands. These days it is true to say that most beginners start on VHF / UHF, either by listening with a scanner or, after they have passed the RAE or Novice RAE, by using a 2m or 70cm FM handheld. Activity on the VHF / UHF bands, rightly or wrongly, is seen as a stepping stone towards gaining the confidence to 'go HF'.

However, the prime interest of even many class A amateurs is VHF / UHF, yet if you look at most Amateur Radio magazines, there seems to be a preponderance of HF-orientated articles. As the editor of such a magazine, I can understand the reason for this. It would appear that - with some honourable exceptions - those interested in HF are far more likely to write about their exploits than VHF / UHF types. I receive far more HF-orientated articles than VHF ones and would request that VHF operators send in more material. In that way we will be able to keep the magazine of interest to everyone who finds radio fascinating.

This month's free cover-mounted CD-ROM, the fourth since last March, contains hundreds of programs of interest to VHF types, including a utility to calculate the distance and angle between you and beacons; a bearing, distance and grid square calculator; several VHF / UHF / SHF contest logging programs; sporadic E propagation analysis; DSP program demo to detect very weak signals; meteor scatter CW receive and transmit program; moon tracking program for EME, and lots more. As if that wasn't enough, our very own VHF / UHF Message columnist, Geoff Brown, GJ4ICD, has compiled some audio files of actual spectacular 50MHz DX contacts which appear on the CD-ROM.

Geoff has been very busy, also contributing a review of the new Q-Tek range of VHF / UHF antennas and an article on how you can improve your VHF / UHF station to in order to 'compete' with the likes of him! Continuing with the VHF theme, there is also an article on 'tropo' propagation from Ian Poole, G3YWX.

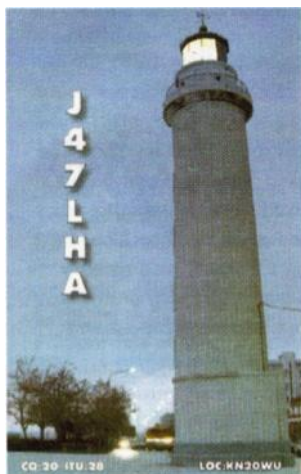
We welcome back Steve Ireland, VK6VZ, who has written a feature on the Flying Doctors, to the pages of *Ham Radio Today*. He's better known to many *Ham Radio Today* readers as G3ZZD, and was one of the early editors of this magazine back in the 1980s before he emigrated to Australia. In fact, I gained my first Amateur Radio writing experience by writing an article for Steve when he was editor, so now we have come well and truly full circle.

This month is the big London Amateur Radio and Computer Show, known to one and all as 'Picketts Lock'. As usual, *Ham Radio Today* has a stand there, and we look forward to having a chat with very many readers.

Finally, I would like to welcome the several hundred new people who have recently taken out a subscription to *Ham Radio Today*. I hope you enjoy the mix of Amateur Radio with the other radio-related features. If you like what you see, please tell others. If you don't, please tell me!

Steve G4JVG

RADIO TODAY



international lighthouse / lightship weekend

Now's the time to start planning for this year's **International Lighthouse / Lightship Weekend**, which takes place over the weekend of **21 / 22 August**. Last year, Radio Amateurs established stations at 151 lighthouses, lightships or maritime lights in 38 countries. The event runs over the full 48 hours of the weekend, and coincides with the Northern Lighthouse Weekend, when lighthouse stations will be set up in Scotland and the Isle of Man. Look for activity around: 3721, 7051, 14221, 21221 and 28351kHz on SSB, and 3521, 7021, 14021, 21021 and 28021kHz on CW. All Radio Amateurs are invited to join in the fun and establish a station at a lighthouse or lightship. However, operating permission must be obtained by groups before the event. Further information about the weekend can be obtained from Mike Dalrymple, GM4SUC, by e-mail: gm4suc@compuserve.com or by packet: GM4SUC@GB7AYR.#78.GBR.EU

J47LHA from Alexandroupolis, Greece, was one of the stations on the air last year. The lighthouse, 18m high, was built in 1880 and still guides ships in the North Aegean.

rae changes afoot

Ham Radio Today has long campaigned to make the Radio Amateurs Examination (RAE) more accessible - in the December 1998 Editorial, for example - so it is good to be able to report positive movement in that direction. City & Guilds (C&G) has said that it is prepared to hold the RAE more-or-less on demand, subject to it being able to generate a large enough bank of questions to make a suitably wide selection. To that end,

C&G is looking for new question writers and was planning to hold a question-writing seminar in February. If they are able to achieve a sufficiently large bank of questions, C&G will consider publishing the whole bank. They will also release past RAE papers for the first time from September this year, providing the bank of questions is sufficiently expanded. C&G has also agreed to make it easier and less costly for Amateur Radio clubs to become RAE test centres, by allowing clubs to become 'satellite venues' of the RSGB HQ Examination Centre. Any club wishing to take advantage of this would need suitable premises and a responsible person to act as local exam secretary.

amateur radio plays key role in earthquake aftermath

As we are going to press, news is emerging of the devastating earthquake in Colombia. According to the ARRL, Amateur Radio appears to be one of the major sources of information out of the earthquake area. HK3SA and HK3RQA are running a net on 14347kHz and local co-ordination is taking place between 7085 - 7090kHz.

ra on the move

The Radiocommunications Agency will shortly be moving back to South Quay Three, their office block in Docklands which was destroyed by an IRA bomb on 9 February 1996. The address will be 189 Marsh Wall, London E14 9SX, and the move should be completed by the end of May. Telephone, fax numbers and e-mail addresses remain the same.

first rsl tv station

Following on from the feature article on Restricted Service Licence (RSL) radio broadcasting in last month's *Ham Radio Today*, comes news that the UK's first RSL TV station went on the air at the end of October last year. The station, called TV 12 Limited, broadcast from Newport, Isle of Wight, on channel 54. Like RSL radio, all programmes were locally produced and included news and weather forecasts with local advertising.

yet another free ham radio today cd-rom!

This month's free cover-mount CD-ROM has a VHF / UHF theme. It contains over 400 shareware, freeware and public domain programs and files of interest to VHF and UHF enthusiasts, including a collation from *Ham Radio Today* VHF / UHF Message columnist Geoff Brown, GJ4ICD, of many audio files of actual 6m DX QSOs. All the programs and files are stored in both standard format with on-disk program information documentation, and in compressed Zip format with both DOS and Windows extraction programs also included on the CD for easy installation on to your PC's hard disk if you wish. The CD may be read on any DOS or Windows compatible IBM PC clone, the individual programs having differing hardware and operating requirements. To use the CD, simply place it into your PC's CD drive, log on to that drive and run the 'GO' program in either DOS or Windows for full program and file information.



RA



Photograph used with permission of Channel 4
The German Enigma coding machine.

the station x files

Those of you who followed the excellent Channel 4 TV series *Station X*, about the WWII codebreakers at Bletchley Park, will be interested to visit a couple of fascinating web sites about Bletchley. The Bletchley Park Trust (registered charity no. 1012743) website, at www.bletchleypark.org.uk/, gives the history and tells you how you can help Bletchley Park. The trust is aiming to raise £1.5 million during 1999. Secondly, a site called Bletchley Park: Britain's Best Kept Secret, at www.cranfield.ac.uk/cc/bpark/, has lots of information about what to do at Bletchley, information on WWII codebreaking, and details of the famous Enigma machine and Colossus computer. Tommy Flowers, the man who helped to design Colossus, died recently aged 92. Tommy was a key member of the wartime intelligence team at Bletchley and was often a guest at Amateur Radio clubs, where he spoke about his remarkable achievements.

If atlantic tests

On 16 / 17 January, amateurs attempted to span the Atlantic on 136kHz. Members of the Amateur Radio Research and Development Corporation set up a listening station in North Carolina to log LF broadcast stations from Europe and Africa. They also listened on the 136kHz band for amateurs and made a number of recordings for later computer analysis. About a dozen stations, running between 0.5 and 1W ERP, participated from the UK, Finland, Belgium, Italy, Ireland and Switzerland. Some used normal CW, whilst others used extremely slow Morse, with dots several seconds long, for DSP-aided reception. Although European broadcasters were heard, no amateur transmissions were received. More tests will be made later in the year.

GI and EI operators in on record-breaking operation

The ZL9CI DXpedition to Campbell Island, located several hundred kilometres south of New Zealand, set a new record number of contacts for a single DXpedition operation. The group, which numbered Andrew Williamson, G10NWG, and Declan Craig, EI6FR, among its 11 members from seven countries, made over 96,000 QSOs during the operation between 6 and 24 January. A message from Lee Jennings, ZL2AL, on the island and posted to the expedition's Internet site (www.qsl.net/zl9ci) on 25 January said, "We're going home! The team closed down ZL9CI today after achieving all its objectives. It took just nine hours to dismantle the antenna system and the eight stations, perhaps a measure of how much we want to get home. The barometer has been dropping for the past 30 hours and the weather for the trip home does not look all that promising. We sail in another few hours and the team is heavily into seasick pills at present."

constructors challenged

The Yeovil QRP Convention, which takes place on 18 April, this year has a Constructors' Challenge. 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 10k ohms, 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.

data bandplans - correction

The article *RTTY for Beginners!* in the February 1999 *Ham Radio Today* included some errors. In an attempt to give readers an idea of where to find RTTY signals, some frequencies outside the digimodes sections of the bandplans were given. RTTY operation should be confined to the data sections of the bands, which are: 1838 - 1842, 3580 - 3620, 7035 - 7045, 10140 - 10150, 14070 - 14099, 14101 - 14112, 18100 - 18109, 21080 - 21120, 24920 - 24929 and 28050 - 28150kHz. For details refer to the bandplans, published in the 1999 RSGB Yearbook.

this is not a wind-up!

Vivian Blick, Managing Director of Baygen Power Europe, has been named Young Businessperson of the Year 1998. The award was made to Vivian in recognition of his success in 'winding up' sales of the innovative Freeplay products by over 1000% in one year. The Baygen Freeplay radio was featured in the *Ham Radio Today Trade Topics* pages in December 1998.

Vivian Blick (right) accepting his Young Businessperson of the Year award.





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1 waters & stanton AT THE LONDON SHOW

As usual **Waters & Stanton** will be manning their large stand in the **Blue Hall at Picketts Lock** on **13 / 14 March**. Their new catalogue, **Radio and Beyond 1999** will be on sale, together with the latest products from **ADI**, **Cushcraft**, **Diamond**, **MFJ**, **Optoelectronics** and **Watson**. The new **Watson WMM-2 multimode modem with filters** and the **Optoelectronics Optocom wideband computer-controlled receiver / multimode decoder** will be on display. The **FC-36A** (pictured) is a new 36 amp portable power supply, manufactured in Spain for W&S. It has front and rear terminals, digital readout, carrying handle and even a 2W built-in 8 ohm loudspeaker and costs £169.95. W&S have been appointed distributors for the new range of **NEXcell Ni-MH rechargeable batteries** (pictured). Available in AA and AAA sizes, they are cadmium free and comply with EU regulations. Ni-MH batteries have a higher capacity than nicads and do not suffer from memory problems. They are capable of large current discharges, so are idea for digital cameras and handheld radios. A pack of four AA or AAA size cells will cost £9.95, but the first 100 applicants can buy a pack for just £8 inc P&P. **Yaesu** have announced a new **triple-band handheld**, the **VX-5R**. It covers 50, 144, and 430MHz and offers wide receiver coverage including the short wave bands and 48 - 999MHz. Full CTCSS, switched deviation (2.5 / 5kHz), optional barometer with altitude indicator, 5W capability with the supplied lithium cell and many other features. Delivery is expected at the end of February and the price is £299. The new **Icom R-75 receiver** should also arrive around February and will be a radical update of the IC-R72 for around £600. **Waters & Stanton** say that they are expecting stocks of the new **Icom IC-706 MkII** very soon and that they will be discounting the price right from the start. **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

martin lynch AT PICKETTS LOCK

Once again **Martin Lynch & Sons** will have a huge stand at the **London Amateur Radio and Computer Show** on **13 / 14 March**, with all the latest products from 'the big three': **Kenwood**, **Icom** and **Yaesu**. Of particular interest will be the new **Icom ICR-75E receiver**. This new addition to the Icom range includes DSP as a plug-in module (UT-106) covers 30kHz - 60MHz and includes Synchronous AM mode for enhanced audio quality of AM broadcast stations, and twin pass band tuning. Also new from Icom is the **IC-2800 base / mobile dualband transceiver** - with a difference. The front panel sports an enormous TFT colour screen which can be used to display slow scan TV pictures [not to be recommended when actually mobile! - Ed]. See it on demonstration on the ML&S stand. Another newcomer is the **Yaesu VX-5R 'handie'**. With three bands (6 / 2 / 70) in a tiny package, this rig uses a lithium ion battery which can produce a full 5 watts of transmit power. Add HF receive to 16MHz, airband, and even a barometric pressure and altitude readout, and you have a true 'outdoor' radio! For many years the American company **International Radio**, or '**Inrad**', have produced a superb range of replacement filters for Yaesu, Icom and **Kenwood** transceivers. Their full range will be available at the show, including the very popular 400Hz CW filter and SSB replacement filters for both IFs of the FT-1000MP. Inrad also makes a small module that fits inside the '1000MP and reduces IF noise and hiss, lowering the receiver noise floor by as much as 3 or 4dB. **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

vhf

COMMUNICATIONS

VHF Communications is an English-language European technical publication of interest to VHF, UHF and microwave enthusiasts. It is A5 in size and published quarterly. UK subscriptions cost £19.00 inc P&P (£20 by credit card) from **KM Publications**, 5 Ware Orchard, Barby, Nr Rugby CV23 8UF; tel: 01788 890365; fax: 01788 891883; e-mail: vhfsubs@vhfcomm.co.uk; Internet: www.vhfcomm.co.uk

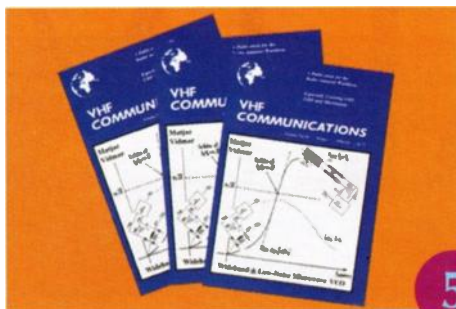
shacklog 5 RELEASED

SHACKLOG, probably the most popular UK-written and UK-supported logging software, receives its first major face-lift for nearly four years, with **SHACKLOG version 5**. New features include an SWL mode; unique **PacketCluster 'SNOOP'** mode and fully-configurable **PacketCluster** audio / video alarms. There are more data fields and **SHACKLOG 5** now supports many of the new radios introduced in the last four years, as well as dual radio control. Multiple COM ports are now supported. Like all previous versions, **SHACKLOG5** is Y2K compliant. It costs £32.00, the **IOTA Database** is £8.00 and **IOTA Awards Manager** £5.00, or the full set of three costs £42.50. If you wish to upgrade from an earlier version or order from overseas, please ask. We will be reviewing **SHACKLOG 5** in **Ham Radio Today** next month. It is available from **Alan Jubb**, G3PMR, 30 West Street, Gt Gransden, Sandy SG19 3AU; tel: 01767 677 913; e-mail: SHACKLOG@aol.com

TRAIP
TOP



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8

nevada NEWS

K6STI goes out OF SOFTWARE BUSINESS

Ham radio software developer Brian Beezley, K6STI, has gone out of business as a result of the piracy of his RITTY radioteletype program.

He says an overseas ham broke the copy protection on a demo version of his program and posted the pirated version on the Internet.

That prompted him to discontinue selling software altogether and he has no plans to offer support or further program enhancements. He also had developed five antenna programs, including the Yagi-optimising program YO.

Nevada has been appointed UK distributor for Patcomm Corporation USA and their first product to be released is the PC-16000 HF transceiver (pictured). This transceiver is unique as it has built-in CW and RTTY encode and decode facilities, with a keyboard supplied as standard. The receive side has a Collins mechanical filter and advanced DSP facilities, making the PC-16000 an ideal choice for the serious HF DXer. It costs £1595. Nevada is also the UK distributor for the Dutch Ropex company. Ropex has released the first commercially available transmitter for the new 136kHz LF band. 'The First' is a 30 / 130 watt CW transmitter crystal controlled on 136.5kHz. It operates from 12V DC and costs £179. Also new from Nevada is the Scanmaster HF-2 masthead co-ax switch. Despite its name, the HF-2 is good for frequencies up to 440MHz, and has an insertion loss of less than 0.2dB at 144MHz. It will handle up to 1000 watts PER. The HF-2 is available in two versions, with SO-239 sockets at £39.95, and with N-type sockets at £42. Nevada, 189 London Road, North End, Portsmouth, Hants PO2 9AE; tel: 01705 662145; fax: 01705 690626.

news from ICOM

You've heard of the single band handheld, the dualbander and even the triple-band handheld; now Icom has launched the first ever **quad-band handheld**. Covering 6m, 2m, 70cm and 23cm, the Icom IC-T81E boasts 5W output on the three lower bands and 1W out on 23cm. Narrow FM is included on 2m, as well as CTCSS (tone squelch) and a 1750Hz tone burst for UK repeater access. Unusually for a handheld, the IC-T81E includes an

RIT control for 23cm, to compensate for other operators' frequency errors. The rig is due to be on sale in February for around £399.99 inc VAT.

Wendy Dagnall has been appointed Ham Sales Assistant at Icom UK and will no doubt become a familiar face on the Icom stand at rallies and exhibitions around the country. Wendy is studying for her Chartered Institute of Marketing Advanced Certificate in Marketing at Canterbury College and goes to Icom with retail sector experience gained at Total Marketing Concepts. Icom has been awarded ISO9001 accreditation, one of the few radio manufacturers to carry this certification offering a high level of quality assurance. As a result, Icom will be allowed to carry out self-certification of products when the appropriate legislation has been adopted in Europe, improving the 'time to market' for many products. Finally, we're hearing rumours that Icom is to launch an updated version of the IC-756 as their flagship HF transceiver. Expected later in the year, it will sell for around the £2000 mark. Icom (UK) Ltd, Sea Street, Herne Bay, Kent CT6 8LD; tel: 01227 741741; e-mail: icomsales@icomuk.co.uk; Internet: www.icomuk.co.uk

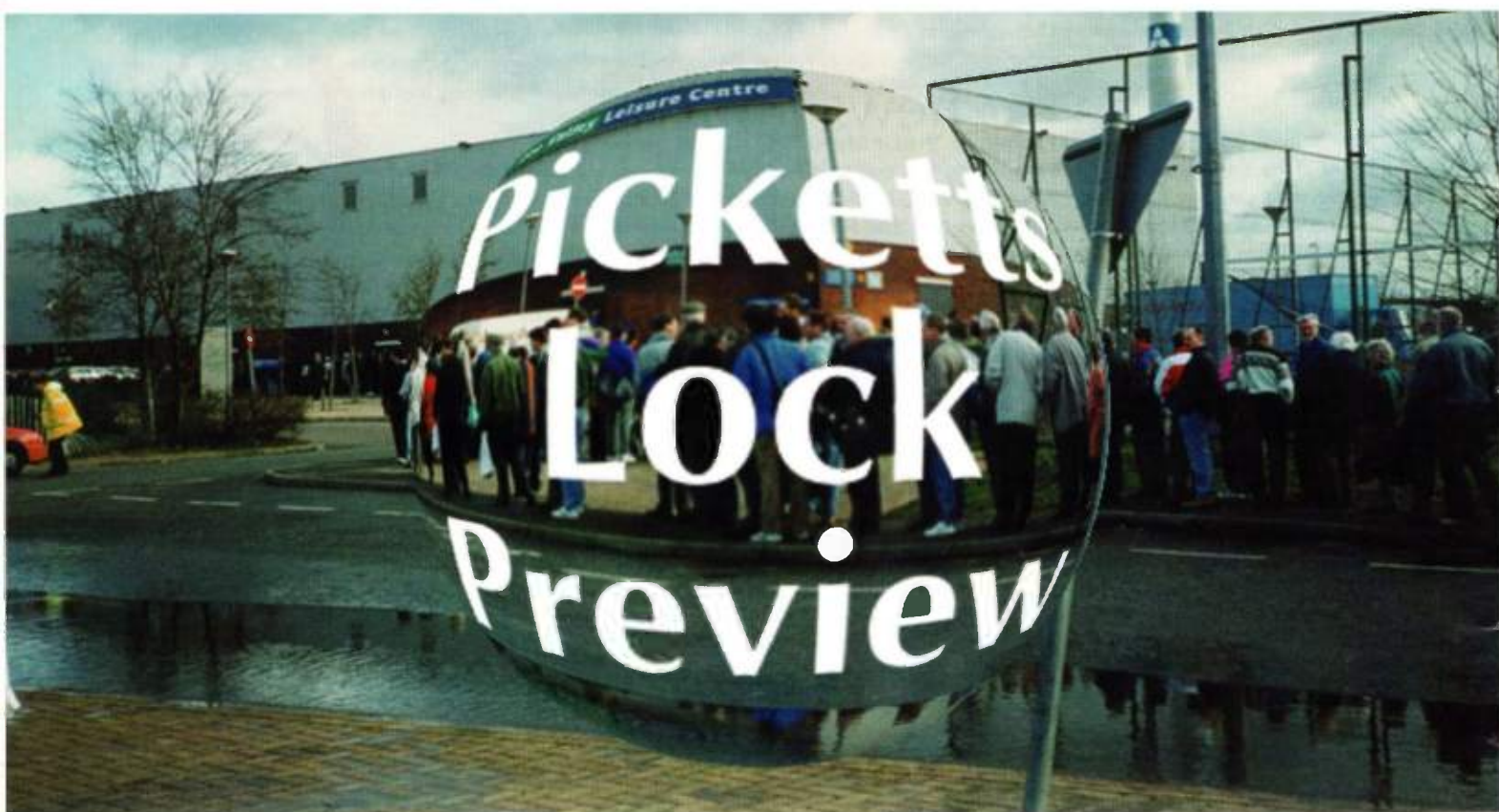
radio CABIN

Not enough room for a radio shack in your house? Accomodex Ltd of Coventry has an answer. They have recently introduced a new fully insulated garden building, designed especially as accommodation for radio hams. Known as the Radio Cabin, the new building comes complete with a single light and electrical socket. Additional sockets, or a full electrical rail all around, is available as an option. The building is 8ft wide and comes in any length from 8ft up, in increments of 2ft. The Radio Cabin is delivered in flatpack form, ready for self assembly. *Planning permission is not normally required, but check first with your local authority.* Prices start at £2295 plus VAT. Accomodex Ltd, Leofric House, Ryton-on-Dunsmore, Coventry CV8 3ED; tel: 01203 301301; fax: 01203 301148.

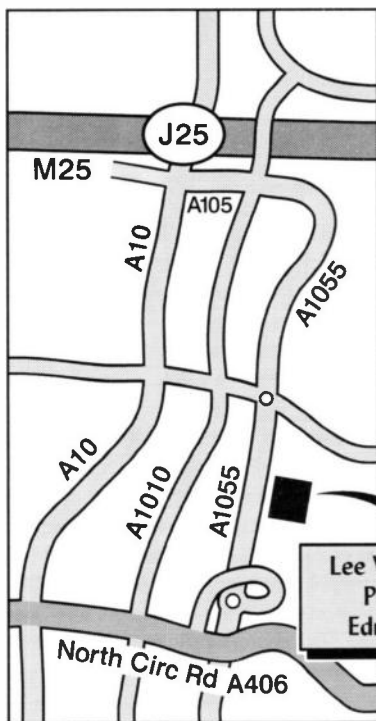
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RALLY OF THE MONTH

13/14 MARCH 13/14 MARCH 13/14 MARCH 13/14 MARCH 13/14 MARCH 13/14 MARCH



The London Amateur Radio and Computer Show takes place at the usual venue, the Lee Valley Leisure Centre in Picketts Lock Lane, Edmonton, north London, over the weekend of 13 and 14 March.



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This is one of the county's largest radio exhibitions and, with well over 100 exhibitors, definitely one not to be missed for anyone with an interest in Amateur Radio, computing, electronics and associated hobbies.

This year, the organisers, Radiosport Ltd, have arranged for some of the exhibitors to be housed in two large rooms in addition to two of the halls. A series of lectures take place at 12 noon and 2.00pm on both days in a smart conference room upstairs.

Of course, *Ham Radio Today* will be there, in our usual spot next to the refreshments and seated rest area in the Red

Hall, so please come along and say hello when you take a break for a cup of tea: we'd be delighted to see you.

The Lee Valley Leisure Centre is situated on the A1055, about five miles from junction 25 of the M25 (see map). Parking is extensive and free. By public transport, the W8 bus from Edmonton Green station will drop you right by the door. There's plenty on site of interest to others members of

the family, including a 12-screen cinema complex, golf, swimming, children's playground, restaurants and licensed bars.

The show is open from 10.00am to 5.00pm on both days and admission is £3.00 (concessions £2.50). Further details can be obtained from Radiosport Ltd, 126 Mount Pleasant Lane, Bricket Wood, Herts AL2 3XD; tel: 01923 893929; fax: 01923 678770; e-mail: bookings@radiosport.co.uk



Lecture Stream at Picketts Lock '99

PC Workshop for Radio Amateurs by Bob Fuller, G6PWS - Saturday 13 March, 12.00 noon

Do you have problems running DOS applications under Windows 95? Considering upgrading your PC, but don't want to spend too much? If so, here's your opportunity to discuss these and other PC matters. There'll be plenty of time for questions and answers, and you can help the expert to help you by bringing along copies of your AUTOEXEC.BAT and CONFIG.SYS files!

Planning Permission - Are You 59 With The Council? by Geoff Bond, G4GJB - Saturday 13 March, 2.00pm

Chairman of the RSGB Planning Advisory Committee, Geoff Bond, G4GJB, will provide details of what kind of antennas and satellite dishes you do and don't need planning permission for, plus Planning Appeals, the 'Four Year' rule, and how to deal with Enforcement Orders and Breach of Condition notices.

From Top Band to 10GHz - ATV in Focus by John Douglas, G4DVG - Sunday 14 March, 12.00 noon

Come and hear the Secretary of the North London ATV Repeater Group detail the history of ATV, describe present day Amateur TV practice, and present an update on the proposed London ATV repeater GB3EN.

QRP - Past, Present and Future by Dick Pascoe, G0BPS - Sunday 14 March, 2.00pm

Ham Radio Today QRP columnist Dick Pascoe will provide a potted history of low power operation, which will include a few surprises and revelations, then take a look at how and why QRP operation has become so popular. Thirdly he will look at what developments might shape the future. The talk will conclude with a discussion entitled "Where do we go from here?"

■ During the past month or two I have been snow-balled with requests for help by newly-licensed amateurs on what antenna to use and how to work all the exotic DX on VHF / UHF that has been mentioned in recent VHF / UHF Message columns in *Ham Radio Today*. Several readers thought the reports had got mixed up with *HF Happenings* and could not believe just what is possible on the VHF bands!

There are many tips that may help you to 'break the line of sight' rule on the VHF / UHF bands. For those who have the space to put up a beam and rotator I strongly recommend this, rather than using a vertical. There are many reasons for this, the main one being that a beam has much more 'gain' than a vertical, ie a vertical is omni-directional and does not exhibit any forward power gain in any particular direction. Whilst a vertical is fine for local FM working on 50, 144 or 433MHz, to work DX and 'compete' against fellow amateurs, maximum forward power is needed. This can only be achieved with a directional antenna, and the bigger the better - but make sure that when choosing a beam you do not get confused by manufacturers' gain measurement figures of dBi and dBd, as there is over 2dB difference [see also *The Help Files* in *Ham Radio Today* October issue, page 49 - Ed]. Use a sturdy rotator, not one intended for turning a small TV antenna.

vhf a different ball game

As the solar cycle progresses, conditions on 50MHz will produce openings into other continents that may well be worked on a vertical. However, there are other considerations to take into account if you are really serious in trying to better your best DX and add new countries (or DXCC 'entities') and grid squares to your scores.

It is not just a question of installing the biggest beam and biggest amplifier in order to work DX, operating skills play a key part, especially on VHF. Meteor scatter and moonbounce (EME) play key roles in working DX 'beyond the horizon' on 2m. Many HF operators have never explored these modes, as they are quite simply never used on HF. This type of VHF DXing can only be achieved with large antenna systems.

On 432MHz it can be harder to break the 'barrier' of the horizon, but luckily 432MHz directional antenna systems are much smaller in size, and consequently higher gain arrays can be installed that will not break the bank balance.

feeders and connectors

Serious thought must go to using the correct and best feeder possible for the frequency being used on VHF / UHF. It is a total waste of time installing a high-gain directional antenna or array and then using a feed line that cancels out the antenna gain because of its losses. Even on 50MHz losses occur over long feed lines and my advice is always to use the best quality coax you can afford.

There are several low-loss feeders available on the market, one of them being (if you can afford it!) Heliax. This is a semi-rigid cable and difficult to bend around the rotator. I use this type of feeder on all my VHF / UHF installations and terminate it just below the rotator. A high-quality 0.5in feeder is then used for the final few feet around the rotator to the antenna.

Other types of low-loss feeders are available, including the famous Westflex and Nevada's Japanese coax, but beware, as some feeders



If you work Kaliningrad on 2m, the chances are it will be this station: UZ2FWA.

Breaking of Silence on VHF

Geoff Brown, GJ4ICD, with a guide to work

require specialised connectors that cost that little extra.

Many of today's VHF radios are fitted with what I call sub-standard connectors, ie the dreaded SO-239 socket, requiring a PL-259 plug. These connectors are very poor when VHF / UHF power is applied to them, in fact they actually change their 50Ω impedance when used at over 100MHz. They are lossy and offer poor conductivity unless you manage to find the 'bolt up' types that have a water-resistant seal type grommet. The best advice is to use 'N' type connectors for any VHF / UHF application, especially at high power, as these connectors offer the minimum of losses and retain their 50Ω characteristic at high power / frequency levels. Now, I know you are going to say that they are an absolute pain to fit, but the more you use them, the easier they get!

BNC connectors are also useful at VHF / UHF frequencies, but they are somewhat restricted in the power level they can handle. [For more on coax connectors see the August 1998 issue of *Ham Radio Today* - Ed.]

what modes?

If you have followed the above tips you should have an optimum antenna system and be well on the way to working some real DX on the VHF / UHF bands. We are talking about working *real* DX and the only



the Line ght F/UHF

ing the ultimate DX on the VHF/UHF bands

modes you will do this on are SSB and CW. "Hold on", I hear! "VK6 has been worked in the UK on 50MHz FM!" Yes, I know that, but it was only on one occasion; it's certainly possible that other modes will provide DX, but the majority of real DX will be on SSB or CW.

SSB contacts will probably produce 75% of the DX, whilst CW will provide the furthest DX and break the barriers. This was proved at the peak of the last sunspot cycle in 1989 when Class 'A' operators out-classed Class 'B' operators (and please don't take this the wrong way!) by using CW. Several Class 'B' operators have worked 100 countries on 50MHz and achieved the prestigious DXCC award. However, Class 'A' operators notched up some 50 more countries using CW. This does prove that to work the ultimate DX, CW is required - although whether it is needed for a Class 'A' licence is another thing!

what power level?

We all know that we should use the minimum power required to make the contact, but this depends on what the station at the other end is using. If a German station is running 500W on 144MHz and has an antenna system that produces 12dBd gain, it is unlikely that your FT-290 with its 2.5 watts into a vertical will be heard by him.

High power is a problem in built-up areas, it can be anti-social due to the poor electromagnetic compatibility (EMC) of many domestic appliances. Most stations can usually run 100 watts on any of the VHF / UHF bands without creating any problems, but if there are TVI / BCI problems, most can be overcome by inserting filters in the offending apparatus or (if you're an RSGB member) with help from your local RSGB EMC Co-ordinator.

Here are a few tips that will help you with most of the more common openings found on the VHF / UHF bands.

50MHz

There are many modes of propagation on this band, such as F2, Sporadic E, tropospheric ('tropo') openings, MS, EME.

In the northern hemisphere, summer produces Sporadic E. The tell-tale sign of an impending Sporadic E opening is to watch the 27MHz CB band or listen to the 28MHz beacon band (28,190 - 28,300kHz), where there are many European beacons to be found. If you have a television that is capable of monitoring 48 / 49MHz, this is another good indicator - identifying a picture from another country on the television will usually indicate where the opening will occur.

F2 openings occur at the peak of the sunspot cycle and can continue for up to five years. The main openings happen between September and April, and will provide the best DX on the band, with distances of up to 17,000km being possible. The solar peak is expected in late 1999 or early 2000. Openings via this mode are a little harder to predict, but the general trend of 28MHz propagation will give you an idea as to where the openings will be. Check 28,885kHz, which is used world-wide as a VHF liaison frequency.

Finally, there are tropospheric openings, usually caused by anti-cyclones in the autumn months [more information on 'tropo' is in the article on pages 20 / 21 - Ed].

70 / 144MHz and up

4 and 2 metres have two main modes of propagation, 'tropo' and Sporadic E. Tropo is the everyday 'workhorse' of these bands and vast distances can be worked when high-pressure weather systems establish themselves over the UK. All sorts of effects take place like ducting and curving of the signals on a direct path.

Sporadic E is also possible during the summer months. The tell-tale sign here is to follow the rule of thumb for 50MHz, then check out VHF Band II at 88 - 108MHz for foreign broadcasts. There are also aircraft beacons from 112 - 115MHz to monitor, if you have a scanner that covers those frequencies. When the Sporadic E affects those frequencies, it's time to check 144MHz.

On 432 and 1296MHz, more tropo openings occur than on 144MHz. Follow the general rule as on 144MHz. However, Sporadic E is not possible due to the higher frequency of these bands.

Listening and monitoring will give you the knowledge needed to improve your operating skills, techniques and predict when the openings are going to occur. Unlike a transceiver, this cannot be bought - it comes with years of experience of knowing where and when things will happen.

Good luck and good DX.

You don't really need a dish antenna like this to work VHF / UHF DX, but it sure does no harm! John, 9H5EE; Phil, 9H1PA; and Paul, 9H1BT, three of Malta's top VHF / UHF operators.



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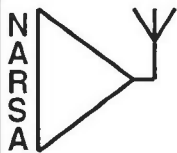
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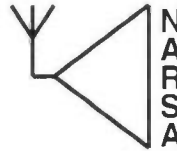
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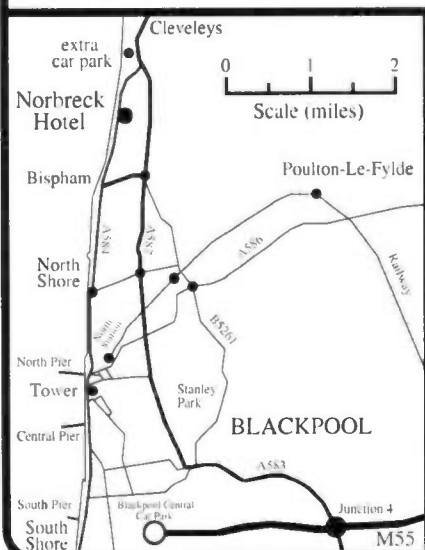
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21 February

The **RSGB National VHF Convention**, Sandown Exhibition Centre, Esher, Surrey. For full details see February's *Ham Radio Today*, or contact Marcia Brimson, 2E1DAY, at RSGB HQ, tel: 01707 659015.

21 February

The **Barry Amateur Radio Society Radio and Computer Fair** takes place at a new and improved venue: the Holmview Leisure Centre, Skomer Road, Barry, in the Vale of Glamorgan, South Wales. Bring and buy stall, talk-in, free parking, catering and bar. The admission is £1.50 and doors open at 10.30am (10.00am for disabled visitors). For further details please contact Brian Brown, GW0PUP, tel / fax: 01222 832253.

27 February

Tyneside Amateur Radio Society annual rally at the Temple Park Centre, John Reid Road, South Shields, Tyne and Wear. Usual traders plus a bring and buy sale from 12 noon (check-ins from 11.00am). RSGB Morse code tests on demand, with the usual formalities. Other visitors' facilities include restaurant, bar, heated indoor swimming pool, leisure centre. Please note that this rally is indeed on a Saturday! Doors open 11.00am (or 10.30am for disabled visitors) and the admission is £1. Talk-in on 2m and 70cm FM from 7.30am. Further information from Jack, G0DZG, tel: 0191 276 6279.

7 March

Wythall Radio Club Radio and Computer Rally, Wythall Park, Silver Street, Wythall, near Birmingham (two miles from junction 3 on the M42). Trade show in three halls and a large marquee with big bring and buy stand. Bar and refreshment facilities are on site. There's a unique free 'park and ride' service for easy and comfortable parking. Doors open 10.00am - 4.00pm and admission is £1.50. Talk-in is on 145.550MHz. Further details from rally organiser Chris Pettitt, G0EYO, tel: 0121 246 7267 (evenings / weekends); fax: 0121 246 7268; e-mail: g0eyo@compuserve.com

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

rallies

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. See *Picketts Lock Preview* on pages 10 / 11.

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. 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.

To include your rally in this section, please make sure you send us details of your event in time: the deadline for the May issue is 15 March; for the June issue it's 12 April and for July, 17 May. 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.

Events Diary

| | |
|-------------|--|
| 17 Feb | <i>Ham Radio Today</i> March publication date. |
| 6 / 7 Mar | RSGB 144 / 432MHz Contest (1400 - 1400UTC). |
| 10 Mar | <i>Ham Radio Today</i> April publication date. |
| 13 / 14 Mar | RSGB Commonwealth Contest (1200 - 1200UTC, 80 - 10m CW). |
| 14 Mar | WAB VHF / UHF CW Contest 0900 - 1500UTC. Details at www.users.zetnet.co.uk/g1ntw/wab.htm |
| 20 / 21 Mar | Bermuda Contest, CW / SSB, 24 out of 48 hours. Overall world-wide winner collects prize in Bermuda in |

| | |
|--------------|---|
| 27 / 28 Mar | October - flights and accommodation paid! |
| 29 Mar | CQ WPX SSB Contest (0000 - 2400UTC, 160 - 10m). |
| 30 Mar | RSGB Slow Speed CW Cumulative Contest (1900 - 2030UTC, 3540 - 3580kHz). |
| 31 Mar-1 Apr | RSGB 144MHz SSB Fixed Station Cumulative Contest (1900 - 2100UTC). |
| | IEE Conference on Antennas and Propagation, University of York. Details from IEE Conference Services, Savoy Place, London WC2R 0BL; tel: 0171 344 5473. |

letters

Dear Ham Radio Today,

When the B class licence was introduced, it was intended for those people who wished only to experiment on VHF and above, and was never intended as a junior licence, or one of a lesser status from the A. It was only as time went on, and people tended, by and large, to study *first* for the RAE and *later* for the 12WPM Morse test, that the B licence came to be perceived as a first stage towards a 'full' licence. This perception, wrong though it demonstrably was, took hold of both classes of licensee, and has now become one of those 'everyone knows . . .' matters. The addition of the Novice licence ran the risk of creating the perception of a 'third' class of amateur.

In the 1980s, Amateur Radio seemed to undergo a boom. It was then, and still is the case, that on most HF bands on which propagation is open, there is hardly a spare frequency. I only have to turn on my receiver to observe this. By default, then, the 12WPM Morse test has become a handy filter, through which amateurs emerge on to HF, rather than their all coming on at once.

Despite vehement arguments otherwise, this was the only thing which could be said in its favour, as technology left CW behind. People's differing aptitudes make the argument of 'demonstrating dedication' etc a weak one; neither has it been true to say that passing the Morse test makes one a better operator, and that doing away with it would somehow lower the standard of operation. If taking a test made good drivers, there would be no bad drivers - enough said!

The question is whether there is a need for a filter at all. Opinions differ. I say there still is a need, as HF bands are still crowded. If we must do away with the Morse test, the most obvious alternative filter would be *time*; let us all take the RAE, after which we may use VHF, and gain access to one HF band per year.

This would also do away with the need to change our callsigns as we went along, and a bureaucratic burden would be lessened.

Paul Thompson, GM6MEN

Editorial comment:

One HF band per year? Who would police whether someone had been licensed for, say, three years or six years, and therefore entitled to operate on 10, 12 and 15m (but not 17m), or 10, 12, 15, 17 and 20m (but not 30, 40, 80 or 160m) - it sounds like a bureaucratic nightmare to me, not a lessening of the burden!

Dear Ham Radio Today,

Two letters in the February 1999 issue of *Ham Radio Today* got my immediate attention! One from G7EXO, asking for an "argument that will hold water" concerning the Morse test requirement for HF. He also wants to know if those who hold A type callsigns regard others who don't as somehow "inferior"? What a strange question. What right-minded person could possibly think that because someone has a B type callsign he or she is inferior? No, the whole idea is crazy. And no, nor is it "one-upmanship" or an "ego trip" to want to obtain an A class callsign. An A type callsign is an alternative Amateur Radio transmitting licence - nothing more, nothing less. A person who holds an A class licence has made a free choice available to everyone else. He or she accepted that if one wanted to operate HF, a simple Morse test was the goal. The A class licence doesn't denote "superiority" (that's a chimera), on the contrary, it denotes a willingness to accept a personal challenge and win through.

For those unfortunate people unable to pass a Morse test because of physical problems, surely they knew that fact before they entertained the idea of wish to transmit on HF unsupervised? Besides, if they insist on wanting to communicate with other Radio Amateurs on the other side of the world, a B class licence is all you need to use amateur operated satellites. No Morse code required! And no, our common hobby won't "fall apart" if the Morse test requirement is dropped. Quite the reverse. And what would happen if the idiotic suggestion to have several classes of Amateur Radio licence were adopted? What price "superiority" then?

The second letter, from G3LLL, raises an interesting point about the current RAE. You see, today, most prospective hams are black box operators not black box builders. The reason why some cannot even wire up a key! For many, the RAE is merely a necessary hurdle to get over to get on the air and begin yakking. Nothing wrong in that of course. However, I believe the quintessential point of our hobby is lost on these people. The point being that an Amateur Radio licence is about self-training in the actual use of radio communication - meaning a hands-on approach, 'rolling your own'. Nowadays, our hobby is being held hostage by the plonk-your-money-down and just operate mentality. This is the greatest threat to the integrity of Amateur Radio, not the Internet.

G3LLL's tale of a newly-licensed Class A amateur not being able to wire up a Morse key is stark proof of the above. And being let loose with 400 watts with inadequate experience is a bit like being let loose with a 200MPH Ferrari immediately after passing a driving test. Whether a stiffer RAE would solve the problem is a moot point. The real problem we have is, in making Amateur Radio more popular, we unwittingly also sow the seed of our own eventual demise if we're not careful. The ongoing Morse test debacle is but one symptom of that.

Ray J Howes, G4OWY

Dear Ham Radio Today,

As you are probably aware, the CW sections of our bands are suffering a lot of QRM from data modes, I even hear RTTY operators complaining that they are being forced to work elsewhere. The main problem I find is that a very high number of data operators have never read, or are not aware of, bandplans. Operating procedures also leave a lot to be desired. It does not take much effort to listen on a frequency first or ask "QRL?", many data operators just do not do this or are not interested.

Perhaps Ham Radio Today and RadCom should have more articles on operating procedures and print the bandplans more often - not just the bandplan lists once a year but to also highlight the need for bandplans in the various sections of the magazines. I am not anti-data, I do use the PacketCluster and RTTY (all QRP!)

Thanks for the new look Ham Radio Today, now a very good read. Best regards,
Brian Waddell, GM4XQJ

Editorial comment:

Brian's comments apply to all modes: all operators should ensure the frequency they wish to use is not already in use before 'firing up' there. Likewise, bandplans - although only 'gentleman's agreements' - should always be adhered to, to avoid causing unintentional interference to other operators.

Dear Ham Radio Today,

Regarding the Kenwood TS-570DG [reviewed in Ham Radio Today Jan 99 - Ed] the transmitter equaliser was part of the original D version, the receiver equaliser is part of the new 'G' version. The upgrade is well worthwhile (I've had mine done) with one proviso: some models need a change to the backup battery circuit, or the lithium cell discharges in 24 hours. Readers should make sure they ask their dealer to check this at the time.

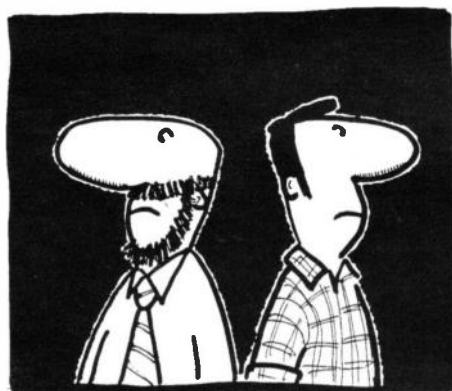
To assist more hesitant amateurs when it comes to technical matters, could those who are more experienced form a small publicised group to offer help in their local or regional area to those who are less so? I know this should be a primary function of clubs, but it's not happening. I have in mind those with access to test gear in particular.

Alan Messenger, G0TLK

"TONE" BURST



by GM6MEN, G



Dear Ham Radio Today,

It would seem that the cat is in amongst the pigeons in true fashion. There are many unanswered questions in this sad saga of 'Morse To Be or Not To Be', but rather it is a question of the uncompromising attitude adopted by RSGB senior management.

I'll elaborate! (a) Why were not members circularised individually with full details of what was envisaged or intended? What frequencies were being proposed for the 5WPM newcomers? What power were they being restricted to? What exam fees were being suggested? (b) What facilities were to be made available for Morse training at so slow a speed? Who was going to train them? Remember that this is a national hobby!

None of this or any other relevant information was supplied in draft form or otherwise and the whole concept was launched surrounded by an air of pure mystery and conjecture. Surely it was the duty of the Society to fully inform its members of its intentions - that it failed to do, resulting in the present hiatus. There has, for instance, been a long period of almost complete silence by its officials and virtually no attempt to fully inform its members of what is happening. They have not, for instance, told their members that some 150+ countries through three Regional Conferences have discussed and supported this position (of the IARU having voted not to support the 5WPM proposals by the RSGB). One wonders precisely why?

Is it all a 'storm in a teacup'? Modernise or update by all means, but let us have a simple, well thought-out, plan for the benefit of all radio enthusiasts submitted in advance for approval - there just wasn't any!

It seems to me that the Society has brought the present impasse upon its own head.

R Finlay, G10WVN

Editorial comment:

I can think of one very good reason why the RSGB did not send a circular to each of its members individually - it would have cost around £5500 just in postage (plus the not inconsiderable costs of paper, envelopes, printing and time). I suspect members may well have objected to their fees being spent in such a fashion, when the same information was sent to all members in RadCom, at no additional expense at all.

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 hr@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.

Tropospheric Propagation On the VHF/UHF Bands

"There seems to be a bit of a lift on." How often have you heard this on the VHF and UHF bands? Ian Poole, G3YWX, describes this phenomenon, and what causes it

■ Talk of radio propagation and most people think of the ionosphere - the D, E, and F layers - and of communication on the HF bands. However, there is more to radio propagation than the short wave bands. Those using the VHF and UHF bands sometimes experience unusual conditions that increase the distances over which signals travel. Whilst the distances that can be reached are much less than those that can be achieved on the short wave bands, the topic of propagation is every bit as important and just as interesting.

A little knowledge about propagation at VHF and above can be very useful: being able to predict when conditions might be improved can give a distinct advantage when it comes to DXing on these frequencies.

The ionosphere does affect frequencies above 30MHz. People who use 50MHz are able to make world-wide communication when the

conditions are good, by using reflections from the ionosphere. However, particularly as the frequencies increase, the possibility of ionosphere propagation reduces, and normal ionosphere propagation is not experienced on the 2 metre band.

Under 'flat' or normal conditions, signals can be heard over distances up to about 50km, although this is only a very rough guide and the actual distances achieved are very dependent upon the type of station at either end. The power levels, antenna, receiver and most of all the location will determine the distances achieved. In poor locations only relatively short distances will be achieved, whereas stations with much better equipment or in a good location can make contacts over considerable distances.

Other factors can also have an affect of the distances that are covered. Unlike the short wave bands, where the ionosphere enables enormous distances to be covered, for the VHF and UHF bands it is the troposphere that affects signals.

the troposphere

The troposphere is the layer of the atmosphere closest to the earth. It extends from ground level up to an altitude of around 10km. In this area the temperature of the air falls steadily until it reaches about -50°C. Here the temperature evens out at what is called the tropopause and then starts to rise in an area of the atmosphere known as the stratosphere.

It is within the troposphere that the changes which govern most of our weather take place. To give an idea of some of the altitudes involved, low clouds occur at up to about 2km whilst the highest clouds can be found at altitudes up to around 10km. As a further comparison, modern airlines fly at altitudes of up to 15km.

a 'normal' day

Under 'flat' or 'normal' conditions, the distances that are travelled by radio waves at VHF and above are beyond the normal line of sight distance. The reason for this is that radio waves are electromagnetic waves like light, and because of this they have the same basic characteristics. It is a well-known fact that light waves can be refracted when they pass from an area with one refractive index to an area with another. The same is true for radio waves, and like light waves they bend towards the areas of higher refractive index.

The refractive index of the air above the earth's surface falls very slightly with altitude. As a rough average the refractive index is 1.0003, and it falls by 0.0004 per kilometre. Even though this change appears to be minute, it is still enough to affect radio signals and they are refracted very slightly. As the area of the higher refractive index is nearer the earth it means that signals are refracted towards the earth's surface (see Fig 1). In fact the degree of refraction is sufficient to increase the range of signals by about one third.

At certain times, though, signals can be heard over distances that are considerably beyond what is normally experienced. This can result from



increased differences in the refractive index along the path of the signal. In turn this gives rise to increased levels of refraction, enabling the signals to travel over greater distances.

If the gradient rises above a certain figure, signals are refracted at a greater rate than the curvature of the earth, and they are returned to the ground where they are reflected back upwards again in much the same way as occurs on the HF bands. Under these conditions signals are easily heard over distances of a few hundred kilometres (see Fig 2).

Sometimes signals may become trapped in an area of higher refractive index above the ground in what is called an 'elevated duct'.

When this occurs, signals can travel over very considerable distances, often over a thousand kilometres. When

this happens signals are often not audible on the ground below the transmission path, similar to the 'dead', or 'skip' zone experienced with ionospheric propagation, as shown in Fig 3.

One of the features that is noticed about tropospheric propagation (or 'tropo') is the level of fading. When there is a 'lift', signals may be very strong one minute and almost inaudible the next. This occurs because conditions are continually changing. The air is always moving and this will cause the path over which the signals are travelling to change. It is also likely that the signal is reaching the receiver via several different paths.

As the paths vary, so the signals reaching the receiver fall in and out of phase with one another, causing the signal to be reinforced and then to cancel one another out.

why it occurs

As the signals are affected by the refractive index of the air in the troposphere, it is hardly surprising to find that there are many links to the weather conditions. Accordingly it is possible to gain a good idea of when there may be good radio conditions on the VHF and UHF bands by keeping a good eye on the weather map. In fact it has even been known for TV weathermen to comment about some weather conditions giving rise to interference on television signals as a result of them travelling over greater distances.

One of the main ways in which the rate at which the refractive index falls with height can occur when a temperature and / or a humidity inversion is present. Normally the temperature falls with height, but under some circumstances there may be an inversion, and the temperature increases with altitude. This gives rise to a sharp change in refractive index.

The most widely known example of this occurs when there is a high pressure system, and it may be particularly dramatic in summer when levels of humidity are higher. However, it should be noted that the presence of high pressure alone is not a guarantee of an improvement in conditions, although really high pressure levels are generally a safe bet. As high-pressure systems are generally stable and slow moving, the

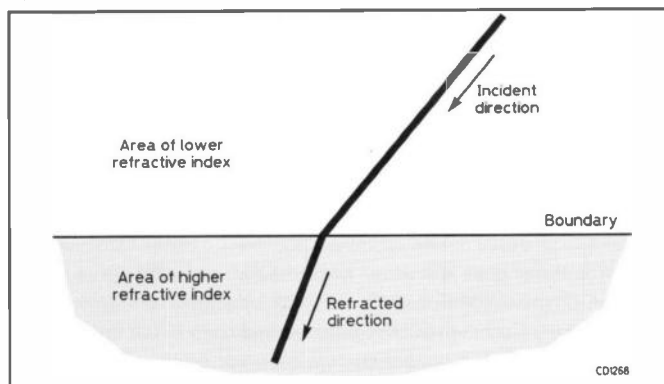


Fig 1: Refraction of an electromagnetic wave.

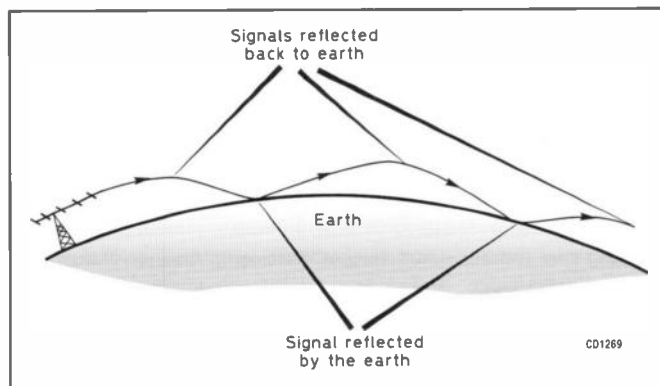


Fig 2: Signals are refracted back to earth.

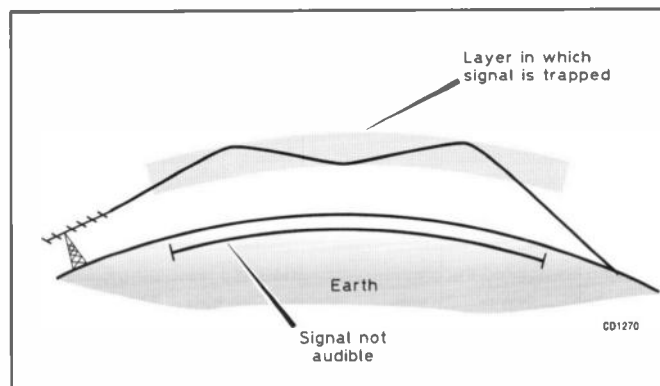


Fig 3: An elevated duct.

condition may persist for several days. It is generally true that the greatest improvements in conditions are often noted as the pressure level just begins to fall.

Another common form of temperature inversion occurs when a cold front approaches. Here the warmer air rises over the colder air beneath to create the temperature inversion. Cold fronts usually move fairly quickly and therefore any improvement in conditions will tend to be fairly short lived.

Several other conditions can cause temperature inversions. On a hot day the earth's surface may cool faster than the air higher up and a sunrise will give a short-lived effect as the air higher up is warmed before the earth's surface. Similarly, frosty mornings can give a lift, because the frosty earth is cooler than the air higher up.

interested? - find out more

If you want to find out more about tropo and all aspects of radio propagation, Ian's book, *Your Guide to Propagation*, published by the RSGB, is a great start. It was reviewed in the January 1999 issue of *Ham Radio Today* and can be ordered from *Ham Radio Today* sales - see Book Browser on pages 60 / 61.

Q-Tek - VHF / UHF

A look at some new Yagis for VHF / UHF

■ Towards the end of last year I moved QTH and although I had a collection of various VHF / UHF antennas I decided to try something different, as my Cushcraft 50MHz antenna had been in use for 10 years and developments and designs change over that length of time.

I had seen a new name in antennas advertised, Q-Tek. Who were they? Were they any good? And would they survive the Jersey climate of wind and salt air? Well the only way to find out was to contact the supplier, Mike Haydon of Haydon Communications, whom I knew very well.

Mike explained that the various VHF / UHF Q-Tek Yagis were very rugged and in comparison at least twice, if not three times, the strength of the competition from abroad.

A sample of the 5-element 50MHz version was promptly despatched and it arrived within a couple of days. On initial inspection I found that they were indeed very well built. The 5-element version is just under 12ft long and the 3-element version is 6ft long. Neither of the Yagis need a support brace, as their boom construction is far stronger than other antennas I have seen, without going 'overboard' on weight. The main boom is constructed from 1-inch square box-type aluminium which is around 1/8in thick.

According to the documentation the 5-element produces 9dBd gain and the 3-element version produces 7dBd gain (note that this is dBd and not dBi).

The main elements that connect to the boom consist of three pieces of quality thick-walled aluminium tube, two of which slide into the fixed boom element and are then fixed by screws, the holes of which are pre-drilled.

The whole assembly took only 30 minutes, including installing the pre-made Gamma match which, by the way, is fitted with an 'N' socket and will handle full legal power - and more! The single instruction sheet is very clear and concise and simple to follow.

Having completed the antenna I then mounted it on a 2in OD pole in the garden so that the Gamma match could be tuned. Now a good tip here is if you own an MFJ-259 or MFJ-259B antenna analyser (as re-

viewed in the January *Ham Radio Today* - Ed] use it and save yourself time. Several minutes with the MFJ-259 and a perfect match was made. The rear of the 'N' socket (where the feed for the Gamma match is) was then sealed with a small amount of silicon rubber compound to stop water seeping through into the connectors. I also recommend that the bush where the copper wire slides into the Gamma rod be sealed to stop water entering down the rod.

performance

Time for testing. I first looked around at various video carriers that I had stored in the memories of my transceiver and was quite amazed to hear the results - bear in mind that we are talking of a 2MHz difference between the video frequencies and 50MHz.

The German 48.239MHz transmitter is usually S2 - 3 in the mornings via troposcatter using my 5-element Cushcraft that has been wide-spaced and which has worked 164 countries on the band. The distance is around 750km. The Q-Tek produced a good 3db more on calibrated measuring equipment, although this was from a different location which interestingly is slightly lower above sea level. So the antenna was stripped down and transported to my old QTH for tests. The same feeder was used and the comparison was virtually identical. I put out several calls but the band was very dead and so I decided to run more receive tests. This was done using our local beacon GB3IOJ on 50.065MHz which is a very constant local source. The beacon was an identical signal on the S-meter on both the Q-Tek and the Cushcraft ('end stopping', even with in-line attenuators fitted), suggesting that the 3dB increase measured at my new QTH means that the site is better in the particular direction of the tests towards Germany.

However, on nulling the local beacon by turning the antenna sideways, the Q-Tek produced an amazing null compared with the other beam. The beacon could hardly be heard off the side of the beam, in fact at one point I thought it had gone QRT. Just to prove the point I tried

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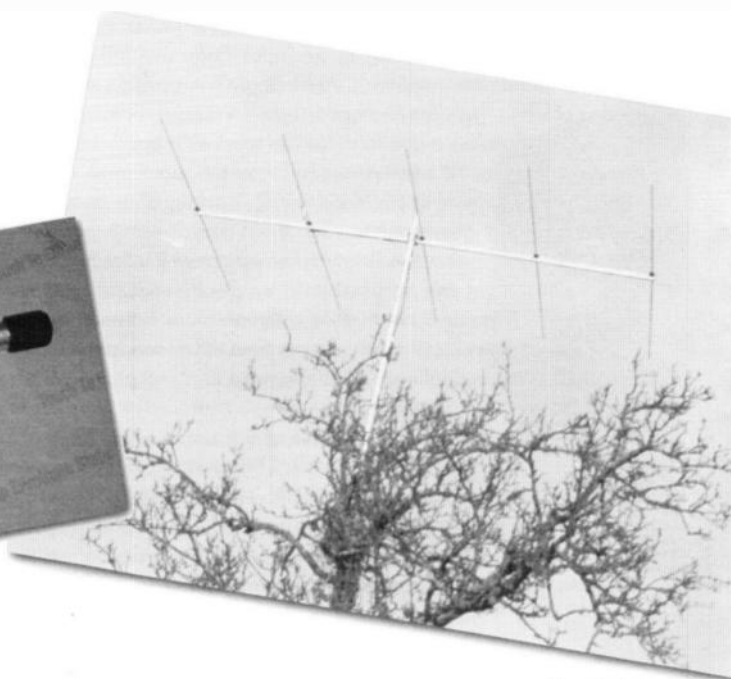
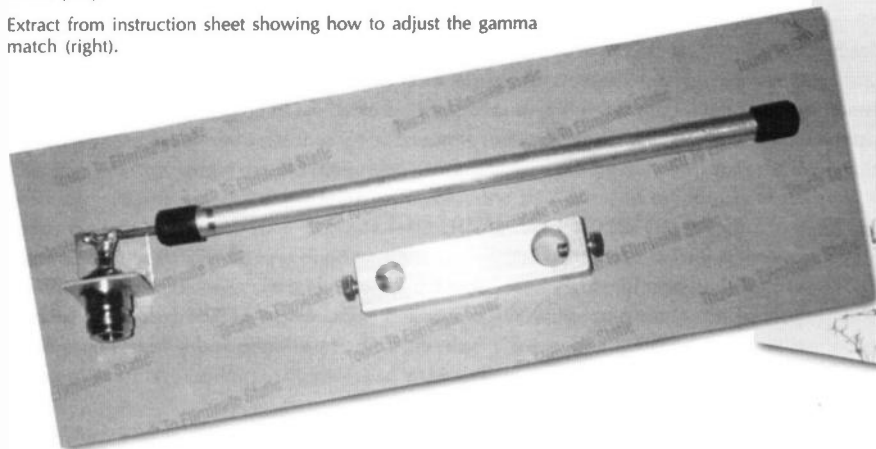
The gamma match fitted to all Q-Tek Yagis (left).

The 70MHz 5-element Yagi under test (right).

Opposite page:

Close-up of the feedpoint and gamma match on the Q-Tek 50MHz 5-element beam (left).

Extract from instruction sheet showing how to adjust the gamma match (right).



F Antennas that Really Work

HF, reviewed by Geoff Brown, GJ4ICD

the Yagis 180 degrees away from the beacon, and again the Q-Tek beat the other antenna hands down.

I repeated this experiment on GB3MBC in Cornwall and got the same results: superb nulling from the Q-Tek.

I'll explain why I was pleased with this result. The side lobes of an antenna are a very important part of its design and should you have a large side-lobe pattern this can cause you all sorts of problems, the main one being hearing things that you do not want to hear. Secondly, side lobes can cause EMC problems, as the lobes will radiate power in unwanted directions.

two new countries!

After the final tests I must say that I was quite impressed with the 12ft long Yagi. Some of the real DXers on 50MHz use Yagis up to 70ft long (W6JKV/5 is an example and he has four of them phased together!) and to get these results was rather impressive in comparison.

The antenna was dismantled and re-installed at my new QTH, that same day, and using just one call, I worked Larry, TZ6VV, in Mali for country number 165 using the new Q-Tek antenna, followed by Z21FO in Zimbabwe.

Several other tests were carried out, including power handing, as Mike Haydon was not sure of its maximum rating. As a holder of an SRP (special research permit) I ran 1000 watts into it without any problems whatsoever. The VSWR remained constant over a 10-minute test period at this power level, and there was no sign of arcing or flashover. It also survived force 8 gales gusting force 10 and dreadful storms in October last year.

On 19 October many stations in Argentina were worked using the Q-Tek antenna plus ZS6XJ, C56A, EH8/DJ3OS, V51KC and - real DX - E30GA in Eritrea for another new country!

the 4m beam

I also obtained a 70MHz 5-element Q-Tek Yagi. This antenna is identical to the 50MHz version apart from its physical size. The Gamma match was the same construction, as was the boom, and it will nicely complement the 70MHz Hands CW / SSB transceiver that I mention in VHF/ UHF Message this month.

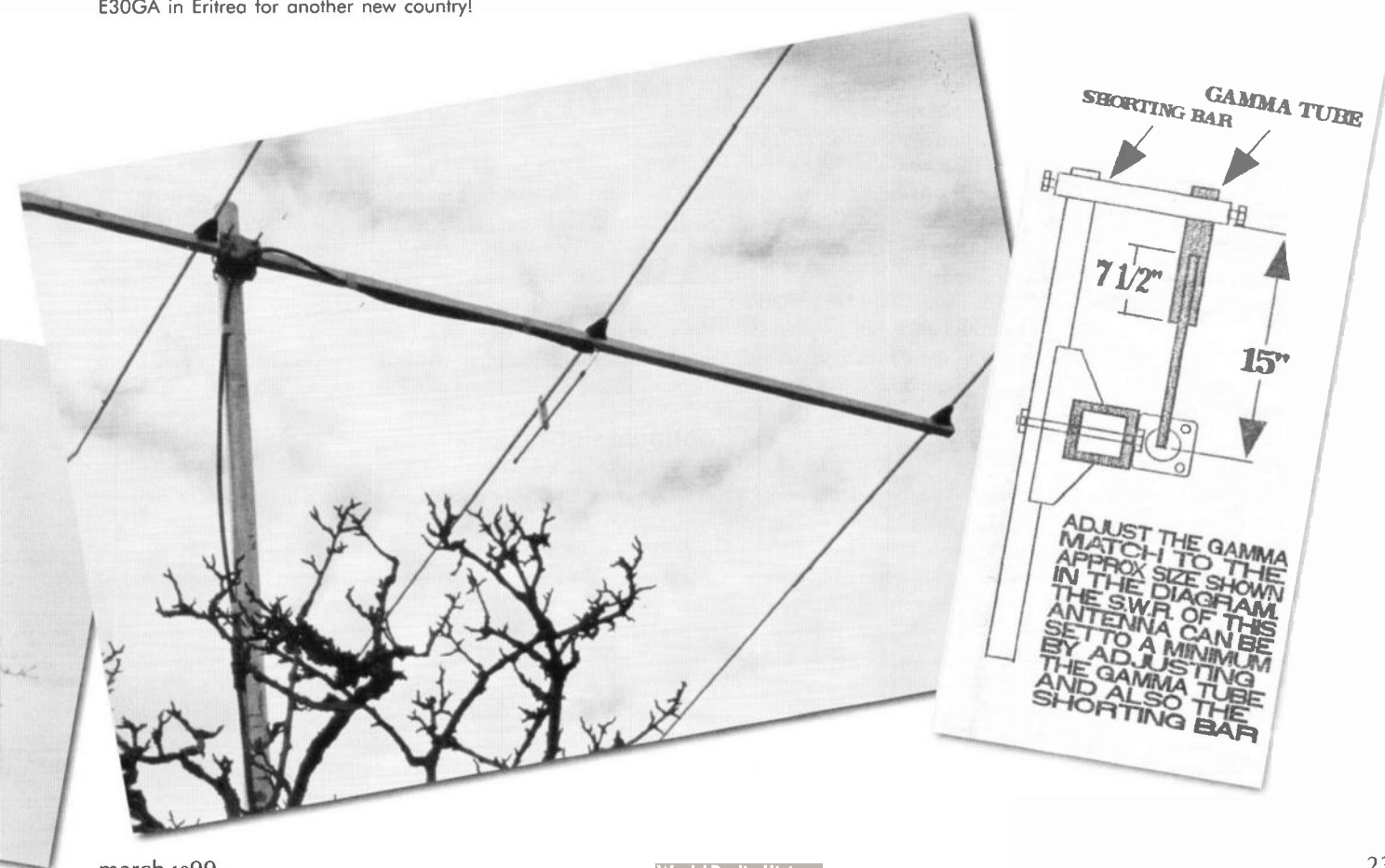
The estimated gain of the 70MHz 5-element is again 9dBd and the total length is around 10ft 6ins. There is also a 3-element version which is also quoted at 7dBd gain and is just under 4ft long. The antenna connection is again an 'N' type socket which is soldered to the Gamma match. Mast fixing is achieved by a heavy duty 2in universal mounting clamp.

range and cost

Q-Tek produces a variety of VHF / UHF beams in various formats. There are ZL Specials, standard Yagis and HB9CV-type beams for all bands from 50MHz to 1296MHz. These also include crossed Yagis for satellite work or for vertical / horizontal polarisation work.

I hope to be looking at the 144 / 432 / 1296MHz range of antennas later in the year. The largest of the beams is an 11-element for 144MHz that produces an estimated gain of 12.7dBd and is 15ft 6ins long.

Amazingly the cost of these very well-built Yagis is very low in my opinion; they do seem very good value for money. The Q-Tek 3- and 5-element 6m Yagis cost £49.95 and £69.95 respectively, whilst the 4m beams are £39.95 and £59.95. They are available from Haydon Communications, tel: 0181 951 5781, or call and see Mike Haydon at the RSGB VHF Convention at Sandown Park to see for yourself the quality of these antennas.





The five optional slot-in units.

The AOR

This is the one all the scanner enthusiasts have been waiting for - so much so that we're told there was quite a waiting list. Nevertheless, Chris Lorek, G4HCL, was able to obtain an AR-8200 for review

■ Many hobby radio enthusiasts start out with some form of receiver, often leading to the acquisition of a better receiver, or a more comprehensive antenna system (not necessarily in that order!), maybe eventually leading to becoming a licensed amateur. Occasionally, a wide-coverage receiver gets acquired after having been on the air on one or two bands with a transceiver, to see 'what else is out there' on the bands.

AOR has had a reputation of bringing us a number of good-quality wide-coverage receivers over many years, these typically being 'one step beyond' that which you'd usually find from 'mass market' scanner manufacturers and on high-street retailers' shelves. AOR describe their very latest handheld scanner, the AR-8200, as 'The Superior Concept', and after having used the receiver for a number of weeks I'm rather tempted to agree with them in many respects.

coverage & size

The AR-8200 receives over the frequency range of 530kHz to 2040MHz, with a tuning range down to 100kHz. It's equipped with reception modes of CW, LSB, USB, AM, Narrowband FM, and Wideband FM, with selectable filter widths for AM and NFM to cope with differing channel spacings, eg the 12.5kHz and 25kHz used on 2m. As well as all the usual world-wide AM and FM channel spacings, plus SSB / CW tuning steps down to 50Hz for accurate tuning, the forthcoming 8.33kHz civil airband channel spacing is also accommodated on the set.

The AR-8200 is a handy carry-around size, measuring 61W x 143H x 39Dmm. It's powered by four AA-sized nicads, which are supplied together with a plug-in AC wall charger. With the nicads and set-top antenna fitted, the set weighs 350g, and carrying aids of a belt clip and wrist strap are supplied.

facilities

If I tell you that the user handbook stretches to 140 pages, and is packed full of details of the various operating modes, you might get an idea of the versatility of the AR-8200's functions! I was, quite literally, overwhelmed at first because, even though I'm a self-confessed 'gadget freak', I found there was more than enough to keep me thoroughly satisfied.

The set's front panel sports a large dot-matrix LCD panel, which along with the usual frequency and mode indications also acts as an alphanumeric indication for setting the various operating modes.

As well as the front panel keypad, a side-mounted four-way rocker panel is used for scrolling through the various menu settings. A small

edge-mounted click-step rotary knob is also fitted as a 'channel' control. Because of the many operating modes, switching between, say, AM and FM, is performed by an initial press of the appropriate button on the front panel keypad, followed by use of the rocker panel to highlight the desired mode, with a press of the keypad 'Enter' button to confirm your selection. There's a very useful 'auto mode' facility which can, if you wish, automatically select all this for you depending on your tuned frequency.

There are also pre-stored search banks, such as '2m ham', 'Marine', 'Civil Airband', '70cm ham' etc, which again are useful when you're looking for new signals, although you can re-program these banks as you wish to suit your own preferences.

There's a switchable attenuator to help with strong local transmissions, a switchable AFC to pull-in off-frequency signals, and a noise limiter to help with AM and SSB / CW reception if you're suffering from ignition interference when you're out mobile with the scanner.

scanning & bandscope

Besides the two built-in manually-tuneable VFOs, 'A' and 'B', the receiver also has 1000 memory channels available, divided into 20 memory banks. Each memory channel can store the receive frequency, mode, tuning step, step-adjust, frequency offset (for 'receive on input' listening), attenuator setting, noise limiter status, AFC status, pass status, write protect, and a text comment of up to 12 characters. The memory banks are arranged in 'pairs' of 100 channels each, and you can change the split on each bank pair from 50 / 50 channels to another combination to suit your needs, such as 10 / 90, 20 / 80 etc. Besides the already useful 'alpha-tag' for memory channels, there's also a 'text search' available where you can use the AR-8200 to search for a given text string to find the stored memory channel you need.

The large display can be used as a graphical spectrum monitor 'bandscope' to give you an idea of the activity around your tuned frequency, although the receiver audio stays muted while it's sweeping. The bandscope can be set to sweep over several pre-set ranges of between 100kHz to 10MHz, it takes around three seconds for a 100kHz sweep, increasing to around 35 seconds for a 10MHz sweep, the LCD displaying a bar graph of signal activity it finds.

A 'peak hold' facility also lets you see what's been happening over several sweeps, and a very useful function is that you can use the tuning dial to move a small marker along the bargraph to tune the receiver to that frequency for monitoring. The bandscope results can be stored into memory, so you can retrieve it at a later date for searching and tuning.

optional slot-in units

AOR has also provided the AR-8200 with an internal slot at the bottom of the case for a number of optional plug-in modules. These currently include the:

- 1) EM8200, an add-on memory unit that can store four sets of entire memory data, including scan and search banks and bandscope memories;
- 2) VI8200, a voice inverter module, which lets you decode simple 'speech inversion' methods of audio transmissions. There's a variable audio inversion 'tuning' facility here for differing systems, but note this isn't a digital unscrambler - so it won't let you listen to digital cellphones or digitally-encrypted emergency services' transmissions;
- 3) CT8200, a CTCSS unit so that the receiver can search for a CTCSS

AOR AR-8200

tone used on a tuned channel, as well as acting as a 'tone squelch';

4) TE8200, a tone eliminator that causes the receiver to ignore certain continuous audio tone frequencies on a received signal when otherwise halting during a frequency search or memory scan; and

5) RU8200, a digital audio recorder, allowing you to record and replay 20 seconds of received audio.

pc control

If all of the above isn't enough, you can also control the AR-8200 from your PC's RS-232 COM port using an optional CC8200 PC connection lead. With this, AOR also provides very comprehensive software on CD-ROM which comes with on-disk documentation, but if you have Internet access, take a look at AOR-UK's web site at www.demon.co.uk/aor where you can freely download the latest software. At home, with the AR-8200 linked to the main PC in my shack, I found this to be superb. It gave me excellent logging and frequency management capabilities of active signals, as well as useful 'remote control' of the scanner's keypad facilities.

on the air

I used the AR-8200 in a variety of operational locations, including portable, mobile, home-based from my shack and 'temporary portable' operation from a number of alternative locations. The receiver comes with a short set-top antenna fitted with a BNC plug, useful when portable but which also allows external antennas to be connected.

With my chimney-mounted 6m / 2m / 70cm collinear I naturally found a vast improvement over the set-top whip, although living in a fairly RF-congested location I did occasionally find the odd problem from unwanted signals on adjacent channels. Fortunately there was no 'pager' transmission interference, which I often suffer from using typical dual-band amateur handhelds.

I often used the AR-8200 upstairs in my house with a Garex 'Nomad' antenna sited in a bedroom window, which gave me excellent results. I also used the same 'roll up in a suitcase' antenna with the AR-8200 from a hotel room overlooking Dublin Airport on a recent business trip - with so much to listen to I nearly forgot about a planned city centre outing

one night!

Using the set from a beginner's point of view, ie using the receiver without a knowledgeable session of pre-programming and being armed with an appropriate frequency guide, the pre-stored search ranges were extremely useful.

The 'auto store' facility, where the receiver would scan across a pre-set search range and automatically store active frequencies into memory, was equally useful. Using this I could scan across these active channels on subsequent occasions, rather than searching across both active and quiet frequencies and thus possibly missing interesting activity.

Besides the BNC-mounted set-top whip, the receiver also has a plastic shrouded plug-in ferrite bar antenna for medium wave reception, which slots in behind the volume and squelch knobs on the top panel. With this, I found the signal strength of medium wave stations improved vastly when using the set out portable. Even at home, the small MW antenna bar typically gave me better signal strength and readability on medium wave than an outdoor long wire.

(Below) AR-8200 with optional voice inverter unit fitted.

(Far right) The four-way rocker panel is used for scrolling through menu settings.



I found the AR-8200 to be quite adequate for general listening around on VHF / UHF, although switching between narrow and normal filters on FM made little difference in terms of rejection of signals 12.5kHz away. But on the HF broadcast bands, the 'narrow AM' was very useful in removing unwanted stations 5kHz away at the natural expense of a loss in audio fidelity on received signals.

Tuning around the HF amateur bands with the receiver was a novel experience, especially when I was away from home with just a short length of wire connected to the antenna socket. The fine tuning steps on SSB were a pleasure to use, and I found that I could nicely resolve both amateur and various utility stations with the set.

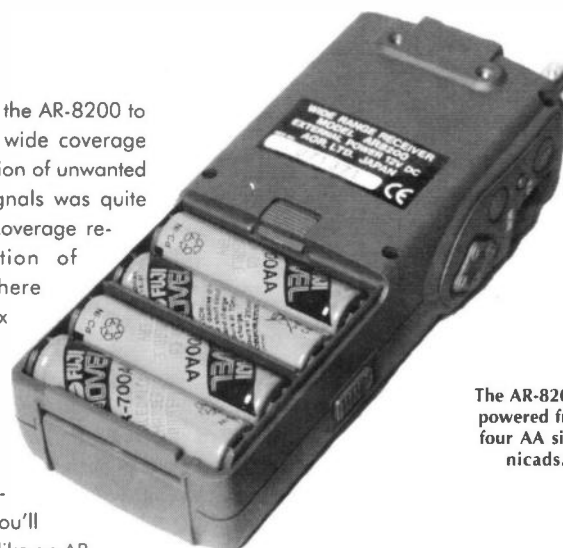
Connecting my albeit large outdoor HF antenna system from home did cause the AR-8200 to 'curl up' with the many strong signals on the bands, especially on the 7MHz amateur band and the 6MHz and 7MHz broadcast bands. Invariably I needed the attenuator switched in, which naturally is to be expected. For serious HF listening of course you really do need to use a dedicated HF base receiver.

lab tests

My measured lab results show the AR-8200 to be nicely sensitive across its wide coverage range on all modes. The rejection of unwanted widely-spaced off-channel signals was quite good for such a small wide-coverage receiver, likewise the rejection of intermodulation products where several off-channel signals mix together to cause problems was very good. The rejection of adjacent channel signals, ie 12.5kHz and 25kHz away, wasn't fantastic, although it was quite acceptable for typical portable use in handheld mode - you'll need to upgrade to something like an AR-3000A if you'd like better base station performance.

conclusions

The AR-8200 must be the most feature-packed handheld receiver I've ever used. It's the most comprehensive wideband handheld receiver I've ever come across in over two decades of testing radios. The optional PC control com-



The AR-8200 is powered from four AA sized nicads.

bined with superb software from AOR significantly extends its versatility when used as a monitoring tool. If you're after a very flexible handheld wideband portable receiver, my opinion is that you will not be disappointed with the AR-8200. I found it to be excellent.

My thanks go to AOR UK for the loan of the receiver and accessories for review.

laboratory results

All measurements taken with set powered using fully charged nicads, on 145.000MHz FM, attenuator off, unless otherwise stated.

s-meter linearity

| Indication | Sig Level | Rel Level |
|------------|-----------|-----------|
| 0.5 | 0.80µV pd | (-39.1dB) |
| 1 | 1.10µV pd | (-36.3dB) |
| 1.5 | 1.55µV pd | (-33.4dB) |
| 2 | 2.05µV pd | (-31.0dB) |
| 2.5 | 2.63µV pd | (-28.8dB) |
| 3 | 3.24µV pd | (-27.0dB) |
| 3.5 | 4.04µV pd | (-25.0dB) |
| 4 | 5.28µV pd | (-22.7dB) |
| 4.5 | 6.82µV pd | (-20.5dB) |
| 5 | 9.07µV pd | (-18.0dB) |
| 5.5 | 12.5µV pd | (-15.2dB) |
| 6 | 17.7µV pd | (-12.2dB) |
| 6.5 | 28.4µV pd | (-8.1dB) |
| 7 | 72.1µV pd | (0dB ref) |

image rejection

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

| | 70MHz | 145MHz | 435MHz |
|--------------|--------|--------|--------|
| 2nd Image: | 73.3dB | 76.2dB | 45.5dB |
| Half 2nd IF: | 65.1dB | 69.4dB | 67.9dB |
| 3rd Image: | 50.1dB | 53.8dB | 52.5dB |

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: | 53.7dB |
| 50 & 100kHz spaced sigs: | 52.7dB |

sensitivity

Input signal level in µV pd required to give 12dB SINAD:

| Freq | SSB | AM | NFM | WFM |
|---------|------|------|------|------|
| 500kHz | 0.47 | 2.69 | 1.76 | - |
| 1MHz | 0.17 | 0.83 | 0.52 | - |
| 4MHz | 0.14 | 0.52 | 0.36 | 3.12 |
| 10MHz | 0.13 | 0.52 | 0.35 | 2.58 |
| 20MHz | 0.13 | 0.53 | 0.37 | 2.56 |
| 50MHz | 0.12 | 0.27 | 0.16 | 0.92 |
| 100MHz | 0.11 | 0.31 | 0.19 | 1.08 |
| 145MHz | 0.13 | 0.32 | 0.18 | 1.33 |
| 200MHz | 0.12 | 0.30 | 0.18 | 1.47 |
| 300MHz | - | 0.27 | 0.17 | 1.64 |
| 435MHz | - | 0.36 | 0.22 | 1.74 |
| 600MHz | - | 0.61 | 0.29 | 2.67 |
| 800MHz | - | 0.60 | 0.47 | 2.88 |
| 1000MHz | - | 0.76 | 0.32 | 2.20 |
| 1300MHz | - | 0.83 | 0.30 | 2.61 |
| 1700MHz | - | 1.12 | 0.61 | 3.92 |
| 2000MHz | - | 1.93 | 0.82 | 5.03 |

adjacent channel selectivity

Measured as increase in level of interfering signal, modulated with 400Hz at 1.5kHz deviation (FM) / 30% modulation (AM), above 12dB SINAD ref level to cause 6dB degradation in 12dB on-channel signal:

| | AMN | SFM | FM |
|-----------|--------|--------|--------|
| +8.33kHz: | 12.7dB | - | - |
| -8.33kHz: | 18.2dB | - | - |
| +12.5kHz: | - | 31.6dB | 27.2dB |
| -12.5kHz: | - | 25.2dB | 25.7dB |
| +25kHz: | - | 44.8dB | 44.7dB |
| -25kHz: | - | 44.7dB | 44.4dB |

maximum audio output

Measured at earphone / ext spkr socket with 1kHz audio at the onset of 10% distortion, 8Ω resistive load:

65.5mW RMS

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:

| | SFM | FM |
|----------|--------|--------|
| +100kHz: | 65.3dB | 64.3dB |
| +1MHz: | 71.3dB | 68.6dB |
| +10MHz: | 86.1dB | 85.4dB |

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.

Icom IC-PCR100

You can turn your PC into a full-featured wideband receiver using Icom's latest unit, reviewed by Chris Lorek, G4HCL



■ The IC-PCR100 is a black box with just a selection of connectors on it. No knobs, no buttons - but it's a wide-coverage scanning receiver. That's if you couple it up to your PC, which transforms the otherwise insignificant-looking unit into a sophisticated receiver, with on-screen controls similar to that of a top-flight scanner.

coverage

The IC-PCR100 covers the frequency range of 500kHz to 1300MHz, with a tuning range down to 10kHz, offering reception modes of AM, FM, and wideband FM. For AM and FM you can select IF filter bandwidths of either 6kHz (for 12.5kHz channel spacing), 15kHz (for 25kHz channel spacing) or 50kHz (eg for weather satellites on FM or offset VHF airband transmissions on AM). On wideband FM, filter bandwidths of 50kHz and 230kHz are available. There's a switchable 20dB attenuator to help guard against strong signal overload problems, and a switchable AM noise limiter.

There's also a CTCSS (sub-tone) decoder built in, which will only allow audio to be transferred to the internal speaker if the transmission is accompanied with the correct sub-tone frequency you've programmed. You can select any of 51 sub-tone frequencies from 67Hz to 254.1Hz. The receiver can tune in pre-set steps of 1, 5, 6.25, 9, 10, 12.5, 15, 20, 25, 30, 50, 100, 500kHz, 1MHz or 10MHz.

The set is powered from 13.8V DC, and comes supplied with both a plug-in AC wall adapter and a DC lead, together with an RS-232 connection cable, a short wire antenna terminated in a BNC plug to mate with the receiver's antenna connector, an instruction book and operating software. It has a small built-in speaker, and an external audio output socket lets you plug in either an extension speaker, or link the

unit via a suitable lead to the audio input on your PC's sound card or indeed direct to a set of PC speakers.

The receiver comes in a dark grey plastic case covering a metal chassis. It measures a compact 131W x 33.5H x 154.5Dmm and weighs 500g.

pc

First of all, to use the receiver, the minimum specification PC you'll need is a 486DX4 or Pentium, 100MHz or faster is recommended, together with Windows 95 or 98 operating system, at least 16Mb of RAM and an RS-232 port capable of running at 38400bps or faster. Sorry, you can't use the second hand 486DX2/66 you picked up for a fiver at that rally.

The IC-PCR100 comes supplied with Icom's operating software on two 1.44Mb floppy disks, and installation takes just a minute or two. After this, you'll just need to select the appropriate COM port, and then you're off. The PC's mouse is used to 'press' the various on-screen buttons, including the numeric keypad for direct frequency entry, or you can use your PC's keyboard for the latter. The rotary knobs are 'turned' by moving the mouse pointer to the appropriate knob, and then using the left and right mouse buttons to 'rotate' the knobs anticlockwise or clockwise.

memories

Using the supplied software, the receiver has a memory storage capability of 1000 channels arranged into 20 banks of 50 channels each. Each of these can store a short alphanumeric channel name, the operating frequency, receive mode, IF filter selection, attenuator on / off setting, tuning step, scan 'select' mode and memory scan skip status,

The complete component parts of the IC-PCR100 package - you also need a PC, of course!



frequency, and a memory channel text comment. The memory channels can usefully be stored as a PC file, so you can if you wish have a number of these files to select from, using the file management capabilities of the software.

You can call up a memory list on the PC at any time, from where for each bank you can add or delete channels, enter information such as frequency, channel name, channel comment and so on using your PC's keyboard, and alter the reception mode, IF filter bandwidth and so on through 'pop-up' windows with a click on your mouse button. Each memory bank can also be given a name from the memory screen, which is then displayed on the main receiver screen when it's selected. You can also select the frequency, mode, bandwidth etc using the main receiver screen, and then click on the 'Bank' and 'MW' (Memory Write) buttons to store this information into your selected memory channel. A channel tag of 'NONAME' is automatically selected for you in this case. Retrieving a memory frequency from the main screen is similarly easy, with a click on the 'Mch' button to initially place the receiver into memory mode, with further clicks on the bank and memory channel up / down buttons.

screen displays

The 'main' receiver screen is a multi-function type, as shown in the screen shot. From this you can access many of the receiver functions, such as mode setting etc, as well as being offered a comprehensive display of what the receiver is doing at any time.

There's also a 'simple function receiver screen' which gives a limited sub-set such as the mode, S-meter, receive frequency, memory channel name, bank, quick access buttons to memory channels 1 - 5 (channels 6 - 50 can't be selected), up/down volume buttons, plus indicators for the ANL, tuning step, tone squelch, IF filter and attenuator settings. To change the settings on this simplified screen, you can bring up a 'function controller' screen from where you can select, via on-screen buttons using your mouse, the mode, squelch adjustment, tone squelch, IF filter, attenuator and ANL.

For general tuning around, a useful 'auto-mode' facility is available. Here, using the 'set' function you can program in up to 20 different frequency ranges, each having their own mode, filter bandwidth, and tuning step settings. Selecting 'auto mode' during tuning then uses your settings whenever you've tuned to any of the frequencies within the programmed ranges.

bandscope & scanning

The IC-PCR100 also features a 'bandscope'. With this you can get a visual display of channel activity around your tuned frequency, although the receiver audio is muted while it's in action. Using the main receiver screen, the bandscope is switched into action by a press of the 'Play / Pause' button, a further press pauses the display so that you can listen to the tuned frequency. By moving your mouse pointer to one of the vertical signal bar positions, you can monitor that frequency with a mouse button click. The 'Span+' and 'Span-' buttons can be used to vary the frequency span, in four steps from $\pm 100\text{kHz}$ to $\pm 2\text{MHz}$, and the sweep 'Stop' button disables the bandscope display.

Besides functioning as a manually-tuned receiver, a variety of scan and search modes are of course available, and it's these which most owners will probably use with the receiver. Firstly, a 'programmed scan' will automatically tune between a lower and upper programmed frequency limit, halting when it finds a signal. The 'memory scan' will scan through all the memory channels within your selected bank, and a 'memory skip scan' will do likewise but automatically ignore those channels you've programmed to be skipped. A variation to this is 'select memory scan', where the receiver will only scan through the memory channels you've selected with a 'select' tag in the memory bank. All these can be programmed in the memory list screen. Here there is also a 'mode select memory scan', which will only scan through channels with the reception mode you've set, eg AM, FM or WFM, within the memory bank. Finally, to find new active channels within a pre-set frequency range, an 'auto-write memory scan' can be used, which will continually scan between the lower and upper frequency limits and program all the channels it finds on which the receiver squelch raises into your chosen memory bank.

You can use up to 20 programmed scan ranges, and each scan can be set to halt either for a short period of a couple of seconds when a signal is found before resuming, or until the receive signal disappears with a selectable pause, or to halt the scan permanently as soon as an active frequency is found.

in use

After installing the software, it didn't take me too long to get the 'hang' of using the receiver - it was in fact quite simple and very similar indeed to using a 'real' piece of hardware complete with 'real' front panel controls sitting in the shack. The main difference was that I could still keep listening but 'minimise' the receiver whenever I wished, either by minimising the multi-function receiver screen (which I used the majority of the time) in Windows, or just by selecting the simple function screen and keeping this either at the top or bottom of my PC's display.

I tested the IC-PCR100 with a Pentium 120, 150, and 450MHz PII, finding it to work fine with any of these, none of the controls seemed 'sluggish' even with the P120. I did, however, find the scan rate to be somewhat slower than I'd have expected, at the rate of about four or five channels a second, on all the PCs. This meant that I sometimes lost the first few seconds of a conversation on a channel if the receiver had to 'cycle round' many other channels to find it.

I appreciated the switchable filter bandwidths, especially on

narrowband FM. This enabled me to select a 6kHz bandwidth on the 2m repeaters in my area which had already switched to 12.5kHz spacing, and 15kHz for the remainder plus 70cm etc.

The 50kHz bandwidth was useful for weather satellite monitoring because of the wider deviation transmitted by these, and I used the receiver together with sound card based software running on the same PC to receive some superb WXSAT pictures from the NOAA satellites. I did suffer from pager breakthrough here if I connected my rooftop 6m / 2m / 70cm collinear (which naturally isn't very useful at all for overhead satellite passes), but switching to my dedicated VHF WXSAT Jaybeam 137MHz crossed dipole and reflector reduced this somewhat.

On the other VHF and UHF bands, I found few problems from strong signal blocking. But trying to listen on the HF broadcast bands to AM stations was a virtual waste of time with my outdoor HF dipole connected: I always need the attenuator switched in. However, connecting a shorter length of wire instead, about 5m long and 'thrown out of the window', gave acceptable results.

There wasn't the usual 'priority scan' feature that's present on most other scanning receivers on the market (where a quick check is made on a pre-programmed frequency every few seconds for activity when the set is otherwise monitoring or scanning other frequencies). However, this should be possible given appropriate software, and Icom say that update information will be available on their US web site at <http://icomamerica.com/>

I found the metal base of the receiver became rather warm in use, although in a typical base station environment this shouldn't be any problem - in fact I sometimes inverted the unit and used it as a coffee

cup 'stay warm' base in the shack during extended listening sessions!

lab tests

The IC-PCR100 is a triple conversion superheterodyne (double conversion on WFM), with IFs of 266MHz, 10.7MHz, and (on AM and FM) 450kHz. I found the receiver sensitivity was very good across the coverage range, the image rejection and adjacent channel selectivity on all filter bandwidths likewise very good for such a receiver.

As I experienced on-air on HF, the intermodulation rejection, where off-channel signals mix together to cause an unwanted on-channel signal, wasn't that good, although adequate for use in non-congested VHF and UHF activity areas. It's naturally primarily intended as a dedicated 'base' scanner after all, to be typically used with a home-base antenna system, which is why I'm being a little critical here, although a number of handheld scanners I've tested are far worse.

conclusions

At under £200, this receiver offers a wide frequency coverage coupled with scanning facilities you'd typically only find on receivers costing rather a lot more. If you'd like SSB receive capability, the set's 'big brother', the IC-PCR1000, can be used, but Icom's latest PC-controllable 'baby' gives a good account for itself both on air and in terms of PC-based control. The selectable 50kHz IF bandwidth is a very welcome addition that isn't found on many other receivers.

My thanks go to South Midlands Communications Ltd for the loan of the review equipment, and to Icom UK for their help and information for this review.

laboratory results

All measurements taken with set on 145.000MHz FM, 15kHz bandwidth, unless otherwise stated.

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: | 71.9dB |
| +1MHz: | 82.2dB |
| +10MHz: | 78.4dB |

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:

| B/W: | 6kHz | 15kHz | 50kHz |
|-----------|--------|--------|--------|
| +12.5kHz: | 52.1dB | 30.4dB | |
| -12.5kHz: | 48.6dB | 16.5dB | |
| +25kHz: | 59.3dB | 52.7dB | |
| -25kHz: | 59.7dB | 52.9dB | |
| +100kHz: | - | - | 47.3dB |
| -100kHz: | - | - | 47.5dB |

maximum audio output

Measured at ext spkr socket with 1kHz audio at the onset of 10% distortion, 8Ω resistive load:
221mW RMS

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: | 47.2dB |
| 50 & 100kHz spaced sigs: | 55.9dB |

sensitivity

Input signal level in μV pd required to give 12dB SINAD:

| Freq | AM | NFM | WFM |
|----------|------|------|------|
| 500kHz: | 1.22 | 0.58 | 2.28 |
| 1MHz: | 0.90 | 0.37 | 2.30 |
| 2MHz: | 0.54 | 0.27 | 0.89 |
| 4MHz: | 0.39 | 0.18 | 0.65 |
| 10MHz: | 0.45 | 0.21 | 0.87 |
| 20MHz: | 0.77 | 0.32 | 1.58 |
| 50MHz: | 0.59 | 0.26 | 0.98 |
| 100MHz: | 0.45 | 0.21 | 0.70 |
| 145MHz: | 0.55 | 0.25 | 2.08 |
| 200MHz: | 0.46 | 0.24 | 0.87 |
| 300MHz: | 0.42 | 0.20 | 0.72 |
| 435MHz: | 0.46 | 0.23 | 0.84 |
| 600MHz: | 0.51 | 0.24 | 1.06 |
| 800MHz: | 0.59 | 0.25 | 0.95 |
| 1000MHz: | 0.67 | 0.31 | 0.96 |
| 1300MHz: | 0.74 | 0.35 | 1.10 |

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 | 74.5dB |
| 2nd Image: | >90dB | >90dB | 84.4dB |
| Half 2nd IF: | >90dB | 74.4dB | 71.1dB |
| 3rd Image: | 50.8dB | 51.8dB | 50.5dB |

s-meter linearity

| Indication | Sig Level | Rel Level |
|------------|-----------|-----------|
| 1 | 0.95μV pd | -37.0dB |
| 2 | 1.29μV pd | -34.4dB |
| 3 | 1.17μV pd | -31.9dB |
| 4 | 2.72μV pd | -27.9dB |
| 5 | 4.46μV pd | -23.6dB |
| 6 | 8.80μV pd | -17.7dB |
| 7 | 16.4μV pd | -12.3dB |
| 8 | 34.6μV pd | -5.8dB |
| 9 | 67.5μV pd | 0dB ref |
| + | 128μV pd | +5.6dB |
| +10dB | 248μV pd | +11.3dB |
| + | 588μV pd | +18.8dB |
| ++ | 784μV pd | +21.3dB |
| +20dB | 3.71mV pd | +34.8dB |

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.

Australia's Royal Fly

Steve Ireland, VK6VZ, the resident Ham
Radio Today expatriate Pom in Oz, brings us the true story
of the Australian Flying Doctors

■ About ten years ago, back in the days when I lived in London and was G3ZZD, my favourite TV programme was *Flying Doctors*. Every Saturday night, as I ate my dinner (or 'tea' as it is called in Oz) I used to watch the Australian-made drama on the BBC.

It had three of my favourite things in it - the wide brown Australian landscape, a couple of Australian character actors called Maurie Fields and Val Jellay, and the fact that the whole enterprise centred around long distance radio communications. Good grief, the radio operator at the Royal Flying Doctor Service hospital base at the fictional 'Coopers Creek' was actually one of the series' main characters . . .

When my migration papers to Australia came through in 1988, I decided I would visit outback Australia - and find out more about the Royal Flying Doctor Service, or 'RFDS' as every Australian knows it. This decision took me to the Alice Springs RFDS headquarters, the nearby 'School of the Air' premises, and introduced me to the work of a man called Alfred Hermann Traeger, professional engineer and Radio Amateur VK5AX.

Seventy years ago, Alf Traeger established an Australia-wide radio communications network which formed the backbone of the fledgling RFDS - and still exists today. Before talking about Traeger, let's introduce another character into our story, the RFDS's famous founder, Rev John Flynn. Without both Flynn and Traeger there would have been no RFDS.

flynn's 'mantle of safety'

Flynn was a Presbyterian clergyman working in the hot arid north of South Australia. Very soon, he recognised that the large distances and poor communications - by horse, camel or new-fangled car - meant that anyone who was seriously sick or injured in the outback could well die before they received suitable medical attention. Flynn set up the Australian Inland Mission (AIM), a far-flung network of bush hospitals and hostels, which went part of the way to addressing the problem. However, he was still anxious to solve the problem of how someone could summon aid from one of these hospitals.

Telephone

lines across the vast treeless expanses of much of the Australian bush were at that time impractical, but Flynn could see the possibilities of radio. He decided that he had to learn as much as possible about radio, so started to read books on 'wireless' and even joined the Wireless Institute of Australia, the Australian equivalent of the RSGB.

In 1925, with the assistance of George Towns, a retired army officer and radio enthusiast, Flynn set out on a 2500 mile trek down dirt tracks from Adelaide to Beltana and on to central Australia - Innamincka, Birdsville and, finally, Alice Springs to carry out radio trials. The trials were carried out from a Dodge Buckboard car on the 80m band, using a portable 100W transmitter and a single wire antenna.

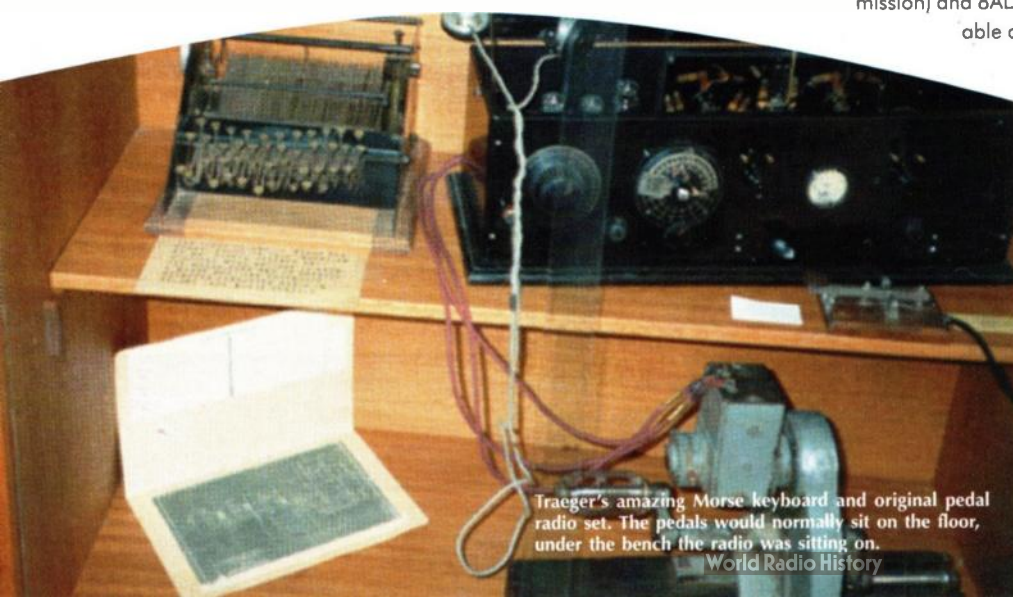
Power for the transmitter and receiver was derived from two generators which, after the back of the Dodge was jacked up, were driven from the car's rear wheel via a belt. Unfortunately, a few days before Flynn and Towns were due to depart, tests revealed that neither of the two generators worked properly. In desperation, Flynn mentioned his problems to Harry Kauper, technical manager of the 5CL broadcast station in Adelaide. A few minutes later, he was headed to a mechanical workshop where someone called Alfred Traeger worked - and who had recently built a 600V generator.

A breathless Flynn burst into the workshop and asked the surprised Traeger if the generator was for sale. The answer was "yes" and Traeger soon found himself £29/10/- richer - and the relationship with Flynn began.

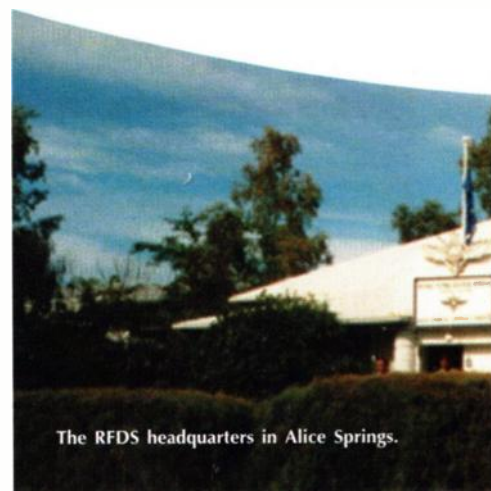
The trials went ahead with some success, with communications being established from a variety of bush sites back to Adelaide. However, there were two stumbling blocks - driving the generators from the car's back wheel meant a stable transmitted signal was virtually impossible and the only method of reliable communication was Morse code, a mode not readily accessible by 'ordinary' people.

getting 'on air'

Traeger, Flynn and Kauper soon put together three radio stations that were to form the first Australian Inland Mission radio network - the base station 8AB (Alice Springs), plus two satellite stations, 8AC (Hermannsburg mission) and 8AD (Arltunga mission). Sufficient power was available at the Alice Springs base station for it to transmit using AM telephony, but the satellites



Traeger's amazing Morse keyboard and original pedal radio set. The pedals would normally sit on the floor, under the bench the radio was sitting on.
 World Radio History



The RFDS headquarters in Alice Springs.

ving Doctor Service

were confined to Morse transmission, due to the limitations of their dry cell battery and generator power supplies.

In 1928, on behalf of the AIM, Flynn established the Aerial Medical Service - the forerunner of the RFDS - at Cloncurry in Queensland. A DeHavilland DH50A biplane was leased at 2/- a mile from a new air service that had started just down the road - the Queensland and Northern Territory Aerial Service, better known today as Qantas.

The DH50A has a covered-cabin forward of the pilot, where the doctor and patient could be carried. In contrast, the pilot's seat was totally open to the elements, in true pioneer aviation fashion.

With the launching of the service, Traeger found himself with a number of pressing technical challenges. First, there was the problem of how to power the portable miniaturised transmitters / receivers - batteries had a limited life, while conventional generators often lacked a suitable drive source.

Added to this, there was the problem of teaching Morse code to the pastors and sisters of the AIM, who staffed the growing number of remote missions / hostels, and to the farming families who lived on the remote cattle stations which formed the second line of communication for the fledgling AMS. While some of Traeger's students took to Morse like a duck to water, others suffered profound difficulties - a situation many present-day Radio Amateurs are all too familiar with.

pedal power

Hand generators offered something of a solution to the power problem, but made the second problem worse - imagine a novice radio operator trying to operate a Morse key, whilst turning a hand generator at the same time!

The story goes that Traeger was sitting on a box in his workshop eating lunch, when he suddenly put down the sandwich he was eating, told his brother Jack he was going to buy some bicycle pedals and rushed out the door.

On 17 November 1928, Traeger brought Flynn into his workshop to show him his first 'baby' - or miniaturised - transceiver. Underneath the table was a slim circular assembly, with a pair of shiny new pedals attached to it.

The generator had to be pedalled at a rate of

about one revolution per second, spinning the armature of the generator at about 1000RPM, using a 12:1 gearing / drive system. This provided about 180V DC, via a 26-segment commutator.

The actual 'Pedal Wireless' consisted of a two valve super-regenerative tunable receiver, using two Phillips A141 tetrodes, one as a detector and the other as an audio stage. The transmitter was a simple crystal controlled oscillator, using a Phillips B205 valve and operated on 3.4MHz.

The filament voltages of the valves were supplied by three 1.5 volt dry cell batteries, while the case of the original set was made from wood. An example of the original pedal wireless is shown in the photograph.

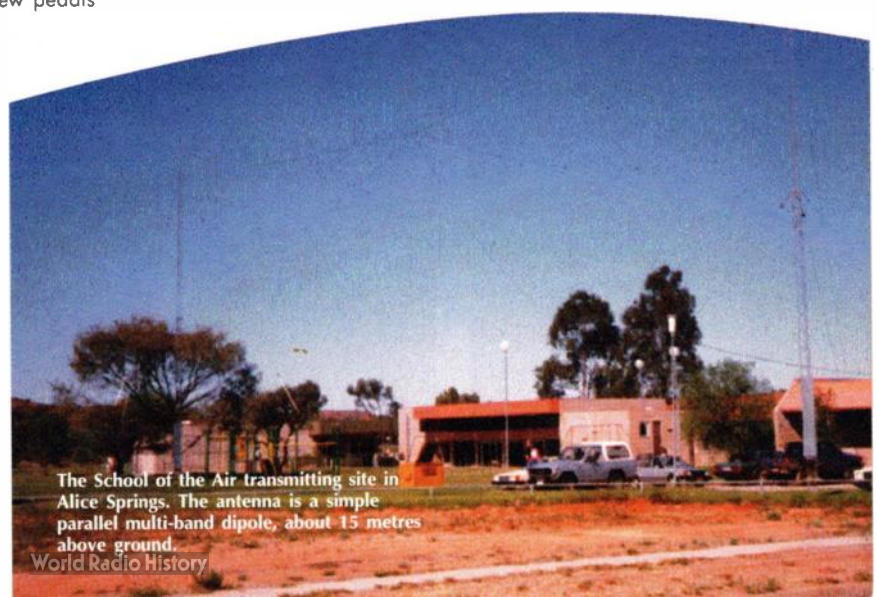
It took Traeger three more years to solve the Morse problem, again by some amazing mechanical ingenuity. He built an automatic Morse keyboard that resembled a standard 1930s four-gang typewriter - the keys were connected to pivoted steel bars with long arc-shaped indented ends, producing the dashes and dots of the code. The keyboard meant that no knowledge of Morse code was necessary, except by the operator at the central hub station, who received the Morse code transmissions from remote stations and replied to them using AM phone.

Traeger built around 50 of these keyboards, which became a part of every baby pedal wireless set-up in the AMS network until 1935, when he developed suitable telephony facilities for them.

school of the air

In 1932, the Aerial Medical Service network had grown to 25 stations. Three years later, this had doubled to 50. The arrival of widespread AM phone meant easier radio communication throughout the bush and led to the establishment of what became known as the 'galah session' on the network - an informal discussion at around 7.00am by its members of their lives and local happenings. 'Galahs' are the noisy pink and grey parrots that to this day delight on landing on aerial wires and screeching noisily. The idea of a daily organised chat on the radio was the idea of two nursing sisters, Amy Bishop and Edna McLean at the Birdsville AIM mission. The story goes that they approached Traeger for new supplies of aerial wire, after theirs was repeatedly broken by flocks of galahs. Traeger sent off the wire with an encouraging and lighthearted note, saying "what about making your chatter to one another, just like the galahs on your aerial?". The name stuck.

The idea of the 'galah session' contained



The School of the Air transmitting site in Alice Springs. The antenna is a simple parallel multi-band dipole, about 15 metres above ground.
World Radio History

the seed of an Australian institution to rival the Flying Doctor service - the famous 'School of the Air', in which the same Flying Doctor radios were used so that children living in remote missions and cattle stations in the outback could be taught by teachers living in Australian cities.

Incidentally, the three main radio frequencies used by the Flying Doctor pedal radios of the 1930s were lightheartedly known as long, medium and short wave, after the domestic broadcast bands - 148 metres (2020.5kHz), 85.7 metres (3110kHz) and 34.7 metres (8630kHz) - respectively.

rfds is born

Perhaps the defining moment of the Flying Doctor service came in 1934, when Traeger installed a transceiver into the DeHavilland DH50A, allowing Dr Jock Russell to carry out air-to-ground consultations for the first time.

In 1937, Traeger became an independent radio transceiver manufacturer, contracted to the Australian Aerial Medical Service. In 1942 the service was renamed the Flying Doctor Service and thirteen years later became the Royal Flying Doctor Service, after permission for the royal appellation was granted by Queen Elizabeth II.

Traeger's innovative involvement with the RFDS continued right through to 1974, through operational changes involving vibrator power supplies, the start of School of the Air and the introduction of single sideband (SSB) transmission. As he had always done, Alf Traeger led from the front.

the rfds today

Traditionally, radio has served as the backbone of the RFDS's 'mantle of safety' communications network. However, the penetration of telephones into households in even the remotest parts of the Australian bush has meant that its radio network is now used mainly by travellers and tourists in 4WD vehicles. If you are going to any remote area of Australia in a vehicle, the RFDS recommends all travellers to "investigate the possibility of obtaining and using an HF radio."

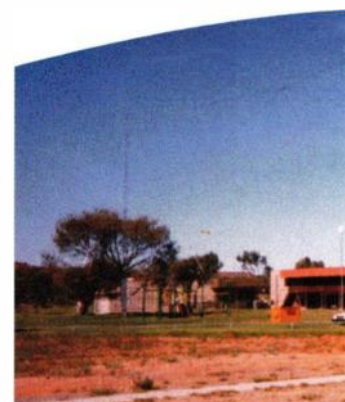
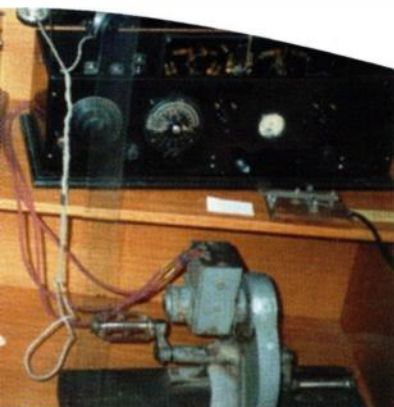
There are currently 12 HF radio RFDS bases around Australia - see Table 1 - and each one uses a different set of frequencies, although some are common to several bases.

HF radio equipment made by manufacturers such as Barrett and Codan suitable for RFDS purposes is commercially available in most regional and capital cities in Australia. Communications suppliers can configure RFDS transceivers so they contain the frequencies that are used in the area in which a traveller is going to be travelling and, if required, may provide training and support for the equipment.

Depending on the equipment and the services offered by the relevant RFDS base, the traveller will be able to make contact with the base itself, other Flying Doctor radio users - or



RFDS web site at <http://home.vicnet.net.au/~rfd/>





School of the Air studio in Alice Springs. On the left hand side, a self portrait by the artist and entertainer Rolf Harris can be seen on the studio wall.

with any telephone in the world! Radios contain an 'Emergency Call Button' which should allow the traveller to make contact with the nearest base station.

Operating hours vary from base-to-base, but the RFDS say a 24-hour emergency call watch is kept.

The only other thing travellers need - apart from a good antenna on their vehicles - is a licence from the Australian Communications Authority, the federal radio communications agency. Callsigns for RFDS purposes are issued in a similar manner to Amateur Radio ones.

One final note, the RFDS is heavily dependent on charitable donations for its operation. Every year, there is a national appeal on the ABC (the Aussie equivalent of the BBC). In addition, there is a fund-raising programme, known as the RFDS Community of the Year Awards. Since the RFDS CotY inception twelve years ago, country communities throughout Australia have raised over \$1.6 million for the organisation.

If you ever get to visit the real Australian outback in a 4WD, think about Flynn and Traeger and make sure you get a Flying Doctor radio. When you leave, make sure you send a few dollars to the RFDS - it might help to save a life.

references

Traeger - the Pedal Radio Man by Fred McKay, published in 1995, Boolarong Press, Australia.

Book Review of *Traeger - The Pedal Radio Man* by Graham Thornton, VK3IY, in *Amateur Radio*, the journal of the Wireless Institute of Australia, December 1995.

RFDS Internet web site at: <http://home.vicnet.net.au/~rdfs/>

| Callsign and Base Location | Organisation | Frequencies (kHz) |
|----------------------------|----------------------------|------------------------|
| VJY Darwin | St Johns Ambulance Service | 2360, 4010, 6840, 7975 |
| VJB Derby | RFDS Western Operations | 2792, 5300, 6945 |
| VKL Port Hedland | RFDS Western Operations | 2280, 4030, 6960 |
| VJT Carnarvon | RFDS Western Operations | 2280, 4045, 6890 |
| VKJ Meekathara | RFDS Western Operations | 2280, 4010, 6880 |
| VJQ Kalgoorlie | RFDS Western Operations | 2656, 5360, 6825 |
| VJD Alice Springs | RFDS Central Section | 2020, 5410, 6950 |
| VNZ Port Augusta | RFDS Central Section | 2020, 4010, 6890, 8165 |
| VJC Broken Hill | RFDS NSW Section | 2020, 4055, 6920 |
| VJN Charlesville | RFDS Queensland Section | 2020, 4980, 6845 |
| VJI Mt Isa | RFDS Queensland Section | 2020, 5110, 6965 |
| VJN Cairns | RFDS Queensland Section | 2020, 2260, 5145, 7465 |
| VZX Firefly | Penta Comstat | call 02 6559 1888 |
| Perth | Telstra Radphone | calls 1800 810 023 |

Table 1: List of frequencies of base stations, adapted from the RFDS web site. Note that frequencies and times of operation are subject to change without notice.



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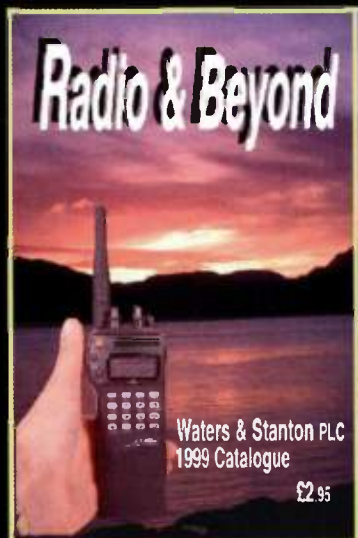
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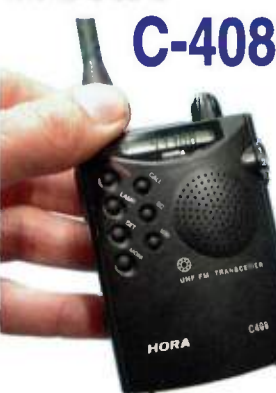
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|--|-----------------------|
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| VSWR minimum | 1.2:1 typical |
| 2:1 bandwidth, KHz | 6m >3000 |
| | 10m >1700 |
| | 12m >100 |
| | 15m >450 |
| | 17m >100 |
| | 20m 300 |
| Power, Watts out | 1500 |
| Radiation angle, deg. | 16 |
| Horizontal rad, deg | 360 |
| Height, ft (m) | 19 (5.8) |
| Mast size range, in | 1.5 - 1.75 |
| (cm) | (3.8-4.4) |
| Wind load, ft ² (m ²) | 1.5 (.14) |
| Weight, lb (kg) | 12.5 (5.6) |



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| GP-6 | 144/430MHz 6.5/9.0 3.07mtrs 200W | £89.95 p&p £8 |
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|---------|--|------------------|
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| HR-50 | 50MHz Centre loaded 2.15dBi 200W PEP, length 2.13 mtrs | £39.95 p&p £4.75 |
| SBB-2 | Tri band Mobile 144/432 100W length 0.46 mtrs | £19.95 p&p £4.75 |
| SBB-4 | Tri band Mobile 144/432 60W length 0.92 mtrs | £29.95 p&p £4.75 |
| SBB-14 | Tri band Mobile 50/144/432 120W length 1.08 mtrs | £39.95 p&p £4.75 |
| CX-702 | 50/144/430MHz High gain 120W, length 2.1 mtrs | £57.50 p&p £4.75 |

Comet HF Mobile Antenna

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|-------|---|---------------|
| CA-HV | HF/VHF, 7, 14, 21, 28, 50, 144MHz 120W 1.9 mtrs | £89.00 p&p £8 |
|-------|---|---------------|

Comet Handie Antennas

| | | |
|-------|--|------------------|
| SM-A3 | SMA connector 144/432/900MHz Ideal for VX1R | £19.95 p&p £3.75 |
| SH-95 | BNC connector 144/432/1200MHz 10W length 0.37 mtrs | £26.95 p&p £3.75 |

Comet Mobile Antenna Cables/Mounts

| | | |
|---------|---|------------------|
| 3D-4MB | SO239 Base w/4mtrs 3.5D low loss coax c/w PL259 plug | £15.50 p&p £4.75 |
| CK-3M4B | SO239 Base w/4mtrs 5D low loss coax c/w PL259 plug | £24.50 p&p £4.75 |
| MG-4M | Heavy duty mag mount c/w 4mtrs 3.5D low loss coax/PL259 | £19.95 p&p £4.75 |
| RS-700 | Gutter Mount fully adjustable | £17.95 p&p £4.75 |
| RS-730 | Hatch/Trunk Mount fully adjustable | £18.50 p&p £4.75 |
| TBR | Hatch/Trunk Mount standard model | £14.95 p&p £4.75 |

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|----------|---------------------|------------------|
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| CF-30S | 32MHz low pass filter, 150W CW | £19.95 p&p £4.75 |
| CF-30MR | 32MHz low pass, 1kw PEP | £37.50 p&p £4.75 |
| CF-50S | 50MHz low pass filter, 150W CW | £21.50 p&p £4.75 |
| CF-50MR | 50MHz low pass, 1kw PEP | £37.50 p&p £4.75 |

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| | | |
|---------|----------------------------------|------------------|
| CF-BPF6 | 50MHz band pass filter, 150W CW | £42.50 p&p £4.75 |
| CF-BPF2 | 144MHz band pass filter, 150W CW | £42.50 p&p £4.75 |

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| | | |
|---------|--|------------------|
| CF-416A | 144/430MHz SO239/PL/PL | £27.50 p&p £4.75 |
| CF-416B | 144/430MHz SO239/PL/'N' | £28.50 p&p £4.75 |
| CF-706 | For IC706 and CAHV 1.3-56MHz/75-320MHz | £39.00 p&p £4.75 |

Comet Triplexers

| | | |
|----------------|---|------------------|
| Comet CFX-431A | 144/430/1200MHz 'N' - 'N' - PL - 'N' socket | £46.00 p&p £4.75 |
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| | | |
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World Radio History

satellite

rendezvous

Richard Limebear,
G3RWL, with his regular
round-up of AMSAT-UK
and Amateur Radio space
news

■ Last month I reported that slow-scan television signals would soon be emitted from the Mir space station. This operation has started, but on 2m rather than on 70cm. The Robot 36 format SSTV signals have good picture quality with very little noise.

Neither of the cosmonauts aboard Mir during the current tour of duty is a licensed amateur. The SSTV equipment aboard the spacecraft was supplied to the Russians by WF1F, who says the system operates in automatic mode and can display a new image every two minutes. The SSTV system was likely to move to 70cm by 1 January 1999.

Further information on slow-scan television, including the various methods that can be used to receive SSTV images using a personal computer, is available at the following URL: <http://www.ultranet.com/~sstv>

tm-sat & techsat

TO-31 was opened up for general amateur use in November and, apart from the odd hiccup, seems to be working well.

A complication on this satellite is that the image files are big. This means that a) they take a long time to download, and b) they fill up the file system memory. A consequence of this is that once amateurs started uploading large files the image files were often deleted before folks had finished downloading them, so the command stations have recommended that users limit their uploading activities on this spacecraft. They pointed out that there are other satellites

(such as UO-22, KO-23 and KO-25) which do not have the features available on TO-31 and are therefore more suited to general messaging and distribution of other files.

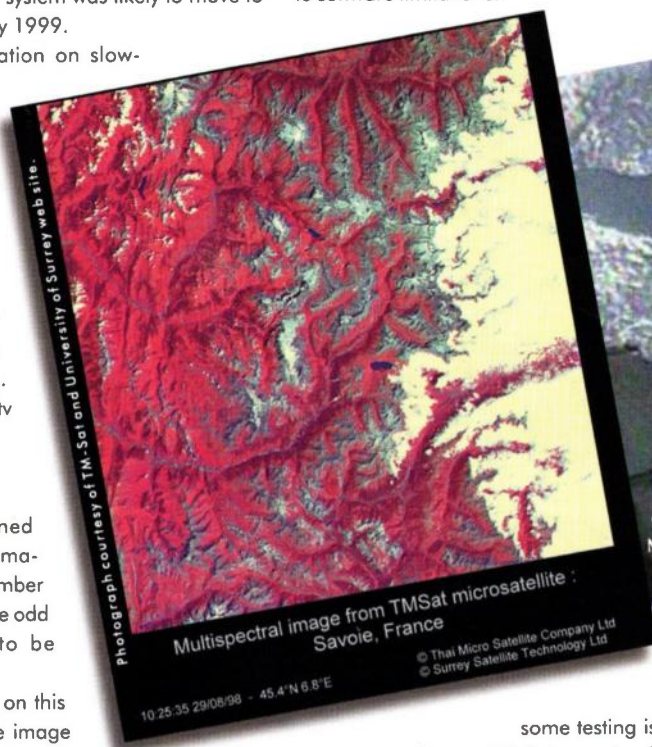
To aid the problem, TO-31 now zips the image files so they shrink down to about 800k.

Typical image files can be seen on the University of Surrey web site at: www.ee.surrey.ac.uk/EE/CSER/UOSAT/amateur/tmsat/index.html

The spacecraft has a second uplink receiver on 145.975MHz but cannot currently use it due to software limitations.

PanSat is PO-34.

The news about SedSat is not good: KD4ETA reports that they may be nearing the end of the efforts to recover the bird. He has determined that one of the two Mode L receivers on board the satellite was not working when it was launched. This was due to the removal of a part during final integration due to a fit problem. There is a strong possibility that this was the main receiver. The second receiver, even if it is working, may be useless because part of the initialisation



sequence was not implemented for the second receiver by the builders for unknown reasons.

Those who are copying data from the satellite are asked to please continue doing so. It is very important and controllers may be able to figure out a way to get around some of the uplink receiver problems.

The Petite Amateur Navy Satellite (PanSat) is a small satellite designed and built by officer students, faculty, and staff at the US Naval Postgraduate School (NPS). The main objective was to support the Space Systems Engineering and Space Systems Operations Curricula by providing a 'hands-on' hardware project where

Since some testing is still occurring on TM-Sat, you should expect the BBS to be unavailable occasionally. In addition, since they are still not 100% sure about a problem with the transmitter, they are gathering data and this may mean that the transmitter schedule will change from time to time.

sedsat & pansat

SedSat and PanSat have both received Oscar numbers: SedSat is now designated SO-33 and

exposure to the many facets of a space system development and life cycle could be experienced. The spacecraft itself provides digital, half-duplex, spread spectrum communications using the Amateur Radio 70cm band. The centre frequency (uplink and downlink) is the same as the KO-25 downlink, 436.500MHz; they did not co-ordinate this frequency with AMSAT or IARU before choosing it.

The satellite is approximately 19in in diameter and has no attitude control or propulsion. 18 square and eight triangular aluminium panels make up the outer surface of the satellite; 17 of the panels are equipped with solar panels and four dipole antennas are attached in a tangential turnstile configuration to the triangular plates. The spacecraft structure is composed of two equipment plates, solar panels, and a cylindrical support. The three main spacecraft subsystems are the electrical power subsystem (EPS), digital control subsystem (DCS), and the communications payload.

The amateur user will eventually be able to work PanSat's BBS in a 9842 bps, simplex, direct sequence spread spectrum mode. The BBS has

above the UK horizon. The other bad news is the use of spread-spectrum (SS) communications, which is currently not specifically permitted by UK transmitting licences. The situation is a little unclear but please note that SS operation may not be legal in the UK.

sunsat

South Africa's first satellite, SunSat, was due to take off on 8 January on the flight carrying the USAF's Advanced Research and Global Observation Satellite (ARGOS), and the Danish Oersted satellite from Vandenberg, California.

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 environmental monitoring.

SunSat also carries a NASA GPS receiver and

for cross-band repeater operation. Phase 3 will be a completely reconfigurable station through the use of plug-in modules. It is designed to operate on any band from HF through microwaves with the appropriate modules. It will also be able to operate any mode. It will be commandable from the ground and interfaced to ISS voice and video channels. The official web site for ISS Amateur Radio activities (ARISS) is located at <http://garc.gsfc.nasa.gov/~ariss>

DO-17 stopped transmitting in March last year. Since then they have not been able to get it to respond to any ground command. There are a couple of things which remain to be tried and they hope to attempt those in the next few weeks. Dove has gone to a 'no response' state before a couple of times and come out of it, so they are not yet at the point of declaring it lost. Fingers crossed - Dove provided the best-yet

2400MHz signals from space, and there are a lot of people who recently obtained one of the Drake converters just itching for a signal to try it out on!

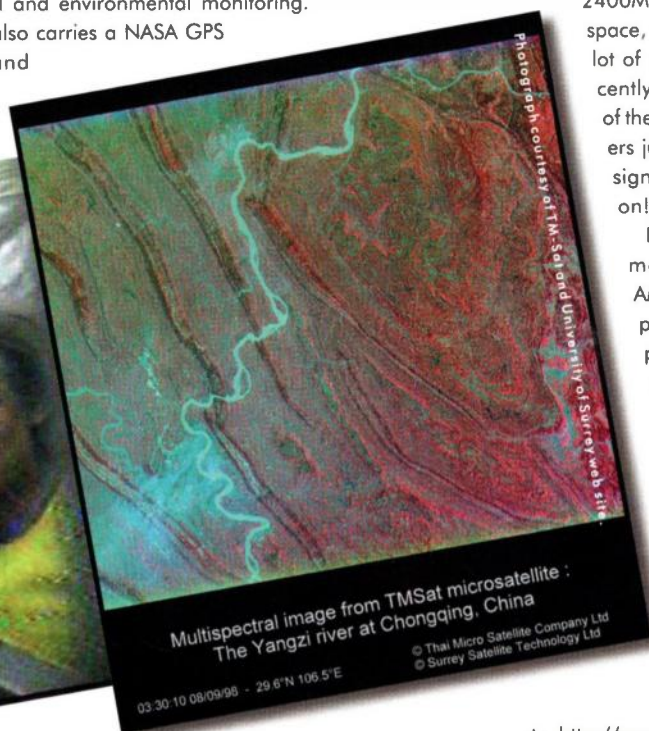
Last month I mentioned that AMSAT-LU is preparing the final phase of its next satellite before launch. VOXSAT I will fly inside a Russian satellite, like AO-21, in 1999. AMSAT-LU's web address has now changed

to <http://www.amsat-lu.org>

The AMSAT-France 'Spoutnik-41', known as RS-18, which was hand-launched on 10 November during a spacewalk, ceased functioning after being last heard over the United Kingdom on an evening pass on 10 December. RS-18 contained no recharging system (such as solar cells) and met its expected design life of 30 days.

amsat-uk news

Last month I announced that the 14th AMSAT-UK Colloquium, SpaceComm 99, will be held at Surrey University, Guildford, Surrey, from Friday 23 July to Sunday 25 July 1999 and asked if there would be a demand for sessions specifically for beginners to amateur satellite operating. I've had a few responses, but not many: anyone interested should let me know, because if not enough people express interest it won't happen. You don't have to be a member of AMSAT to come to this event.



9MB of message storage. Unlike other amateur satellites, PanSat does not have a beacon mode.

Like other packet radio satellites, before it can be made fully operational, PanSat requires additional software to be uploaded, including the operating system and software for AX.25 and file transfers. However, before that happens, they want to see how the spacecraft is operating on its own. There should be plenty of time for this because the satellite is expected to be operational for four to six years.

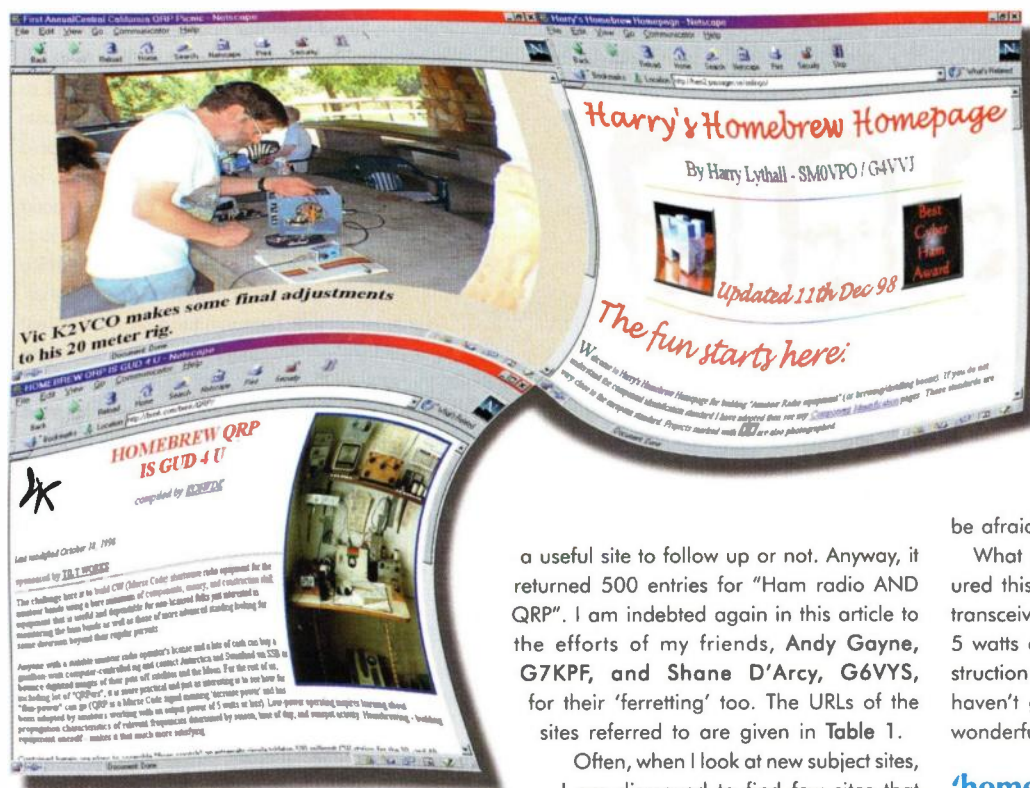
For more information about PanSat and the Space Systems Academic Group at NPS, visit the web page at <http://www.sp.nps.navy.mil/pansat/pansat.html>

The main bad news for UK amateurs is that, having been ejected from a 28.5 deg inclination shuttle flight, this spacecraft will never rise

laser retro-reflectors. SunSat's orbit will be at 450 - 520 x 850km altitude and 96 degrees inclination. Local time at northerly equatorial crossings will start off at about 1500, and drift an hour earlier every seventy days. The orbit is dictated by the orbital requirements of Oersted. Regrettably I have no frequency information.

short bursts

The permanent Amateur Radio station on board the International Space Station will be built in three phases. Phase 1 consists of two transceivers (2m and 70cm) as well as a packet TNC. The hardware is built and is currently undergoing qualification testing. The plan is to deliver it to ISS in May so that it will already be on-board when the first permanent crew arrives in December 1999 or January 2000. Phase 2 has two higher-power transceivers. It will have a digitalker and can also be configured



■ I have touched in the past on QRP. The last mention I made of it was a couple of months ago when we were considering contests, but I haven't yet delved into the world of QRP as such. Now I am going to invite you to join me, magnifying glass in hand, to look at Low Power Operation - just in case you had forgotten what QRP stood for.

"QRP?", you ask. "Yes, I've heard that before . . . now let me see." Well, yes, you see articles on QRP every month, if you're a regular reader of Ham Radio Today, written by my colleague Dick Pascoe, G0BPS. See also his Kanga pages. I am not going to stray into his territory - if you want good advice go to the experts - I am just going to take you on another quick tour of what the Internet can offer you, should you wish to explore another aspect of our limitless hobby.

webferret - a nifty animal

I wondered when I started this article whether it might be difficult to find links. With the aid of a nifty little program called **Web Ferret** which accepts your phrase or keyword and rushes off to three of the big search engines and neatly arranges the links to your enquiry, all clickable for you to surf. Another handy little item is that it will display the first few words of the text (which gives you an idea as to whether this was

a useful site to follow up or not. Anyway, it returned 500 entries for "Ham radio AND QRP". I am indebted again in this article to the efforts of my friends, Andy Gayne, G7KPF, and Shane D'Arcy, G6VYS, for their 'ferretting' too. The URLs of the sites referred to are given in Table 1.

Often, when I look at new subject sites, I am dismayed to find few sites that explain what such-and-such a subject is all about. Many sites expect you to be part of the subject and make no attempt to invite you in and explain what it's all about. Gratifying then to come across a nice friendly

site in Australia, **The Australian QRP Homepage**, ('Getting More for Less') run by Peter Parker, VK3YE, who writes clearly and in a businesslike way. He grabs your attention from the start. What is QRP? What can you expect? Peter gives us 10 golden rules. Read them for yourself, but here are some that struck me as good advice:

1. Use efficient antennas, 2. Know your capabilities, 3. Have frequency-agile equipment, 4. Use 'tail-ending' to advantage, 5. Have a quality signal, 10. Don't

be afraid to call CQ.

What strikes you, if you hadn't already figured this out, is that QRP is more than just a transceiver on low power (usually accepted as 5 watts or less output), but impinges on construction (heavily), operating skill (because you haven't got the clout of a big linear), and a wonderful sense of achievement.

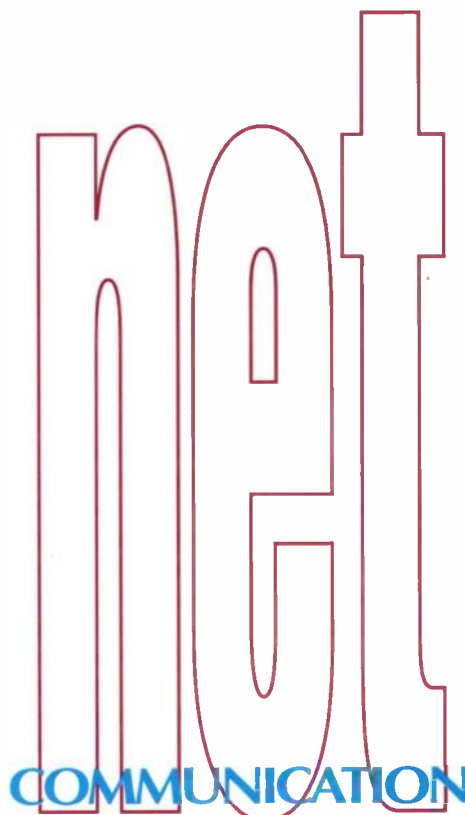
'homebrew qrp is gud 4U'

This is what KC6WDK would have you believe in his useful page. "The challenge here is to build CW (Morse code) shortwave radio equipment for the amateur bands using a bare minimum of components, money, and construction skill . . . it is more practical and just as interesting is to see how far 'flea-power' can go . . . Low-power operating inspires learning about propagation characteristics of relevant frequencies determined by season, time of day, and sunspot activity. Homebrewing - building equipment oneself - makes it that much more satisfying." Construction we already knew about, but here's another skill to add to those we've already chalked up: learning to use the propagation to its best effect.

I am sure I have quoted Frank's, G3YCC, page before, but a visit to it is bound to please. He has a series of pictures of QRP operators' shacks. One imagines (naively) they might be huddled over a matchbox with a tiny keyer. But no, a picture of Markus', HB9JNH, shack reveals one to drool over. Mind you, Frank's own shack looks pretty good to me.

backpackers' tales

I loved this section and I must quote from Neil's, WOYSE, tale: "I decided to go on my first backpacking QRP adventure into the mountains above Ogden, Utah . . . I found a good spot with a tall tree into which I threw up an end-fed half-wave antenna. It loaded up very



This month Jeremy Boot, G4NJH, looks into the world of Internet QRP sites - where size doesn't matter

well and I heard G3BTM loud and clear. I reached into my pack to find the key . . . No key. No paddle either! Since my MFJ-9020 has a speaker, I decided to use the earphone plug as a key to tune up the tuner. Then I tried calling G3BTM by moving the plug in and out of the key jack. It was slow and sloppy. I think he heard me, but since I sounded like a pre-novice, he was not about to entertain a QSO with that fist. So I decided to tune up to the QRP freqs and found SM4CAN/qrp calling a weak CQ. I answered him with my 'plug fist' he came back to me and gave me a 449. I about died! Kent was running only 5 watts to my 2 or so. It jus' shows-ta-go-ya that you should nevvva give up." Read more in a similar vein on the pages.

The **W3CV Homepage** promises us a QRP Heaven, but apparently it is still being built here on earth. As with many other smaller QRP pages, **Wilderness Radio of California** can at least deliver the goods with its various kits. What import duty you would pay on non-EU goods, however, might be worth calculating before ordering. The **NorCal Page**, also in California, has some nice pages to examine, with details of their Central California QRP Picnic: "Bill Jones was the first to meet us, he too was dressed in a NorCal T-shirt. Bill seemed to be everywhere, cooking, greeting and more. Bill used his famous wrist rocket line launcher to put the lines over the supports (trees). It was not long before 40m was at hand at the picnic." Every wrist should have one.

4S7NR will tell you that "QRP is not only home brewing, it is much more than that, namely: low power hamming, technical training, home-brewing, low cost and less QRM!". He will also give you a brief but useful low-down on rigs, antennas, receivers and accessories for QRP. A useful page.

Happy Harry's Homepage (Harry Lythall, SM0VPO / G4VWJ) is a very good page with extensive coverage of receivers, transmitters, circuit building blocks (amusingly misspelled on the pages), antennas, useful circuits, and should you be exhausted after all this work, an additional item on homebrew - with alcohol that is, drinking for the use of.

Internet QRP Club figures heavily in the original search I did for QRP. The club offers a QRP mailing list of the listserve variety; you can sign up on the pages. A 'Hints and Kinks' page includes a useful library of articles by various people on their experiences and reviews and 'mods' for various pieces of equipment. Many of these articles are downloadable by ftp. I can't say I particularly like this arrangement, it has its advantages, but the main disadvantage is that you download perhaps extensive info to your own machine you might not really want.

The **S5 QRP Club** of

Ferretting and links

Web Ferret: <http://www.ferretsoft.com>

Andy Gayne G7KPF: <http://www.users.zetnet.co.uk/kama/hamlinks.htm>

Shane-Anthony D'Arcy G6VYS: <http://www.g6vys.demon.co.uk>

G4NJH Amateur Radio Pages: <http://www.innotts.co.uk/~asperges/>

QRP Sites

The Australian QRP Homepage: <http://www.alphalink.com.au/~parkerp/qrp.htm>

KC6WDK: <http://brink.com/brink/georgebio.html>

K17MN's QRP Page: <http://www.dancris.com/~ki7mn/>

G-QRP Club: <http://www.btinternet.com/~g4wif/gqrp.htm>

G3YCC Pages: <http://www.homeusers.prestel.co.uk/g3ycc/>

Kanga Products: <http://www.kanga.demon.co.uk>

The W3CV Homepage: <http://www.erols.com/ke3nv/>

Wilderness Radio: <http://www.fix.net/~jparker/wild.html>

The NorCal Page: <http://www.fix.net/~jparker/norcal.html>

4S7NR's Site: <http://qsl.net/qrp/index.html>

Happy Harry's Homepage: <http://hem2.passagen.se/sm0vpo/>

Internet QRP Club: <http://qrp.cc.nd.edu/qrp-l/>

S5 QRP Club - Slovenia: <http://www.geocities.com/SiliconValley/Vista/6978/>

JARL QRP Club: <http://www.infoseed.co.jp/qrp/>

Colorado QRP Club, Inc: <http://www.mtechnologies.com/cqc/>

Table 1: Links referred to in the text.

Slovenia is fairly brief in content but does include details of international QRP Beacons, which I confess, I had never heard of. Useful information. I think beacons are under used in ham radio. I am ashamed to say that in my earliest days on HF, I once "worked" a beacon. Well, the CW was so nice and regular (blush). A list of various QRP known skeds is also published on the pages.

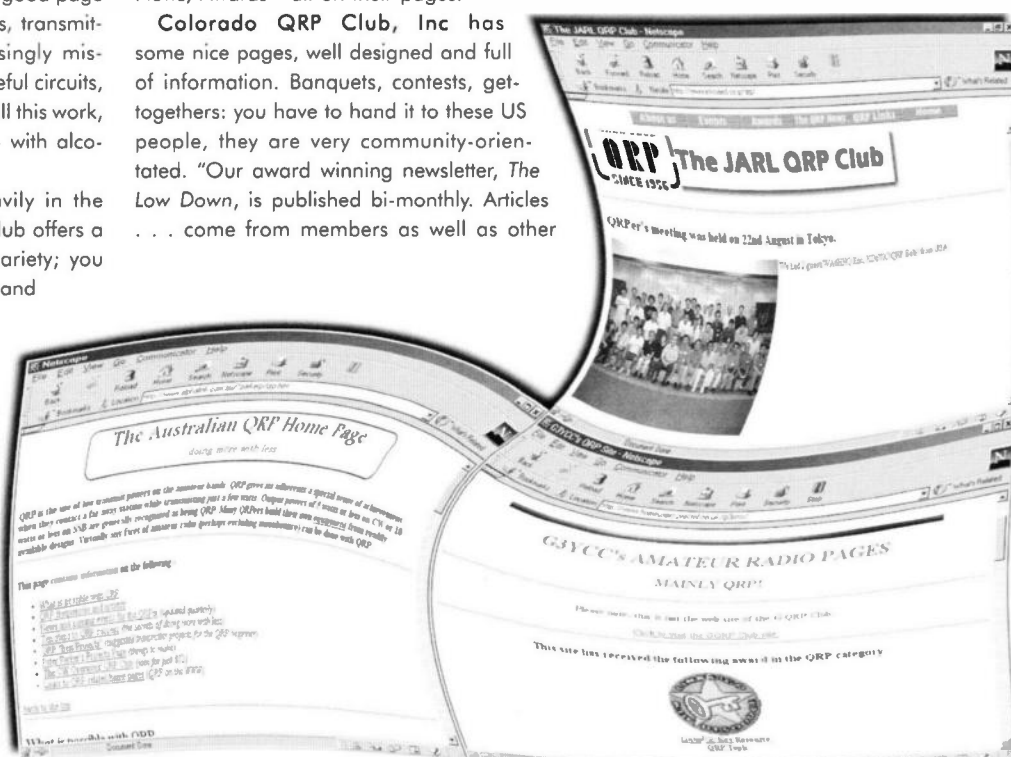
"Mr Shimizu (JA0AS SK) and seven amateurs found The JARL QRP Club in 1956. After 40 years we have about 200 QRPers and we enjoy QRPing much . . . All of the members can't gather because it is a nationwide club. So, directors decide the management of the club, and they carry it out." Bulletins, Links, News, Awards - all on their pages.

Colorado QRP Club, Inc has some nice pages, well designed and full of information. Banquets, contests, get-togethers: you have to hand it to these US people; they are very community-orientated. "Our award winning newsletter, The Low Down, is published bi-monthly. Articles . . . come from members as well as other

publications and Internet. It . . . is also used to disseminate information such as features of the various QRP kits, addresses of parts and kit suppliers, information and addresses of other QRP Clubs worldwide and e-mail and packet addresses of members, other QRP Clubs, amateur organizations and suppliers of equipment and parts."

Another month then of Internet exploring. With March comes the longer days of spring and, one hopes, longer operating hours on HF with the promise of better conditions as we climb higher up the sunspot cycle. All propitious for some QRP operation. So how about it? Give it a try.

Happy Surfing.



Chris Lorek, G4HCL, says "APRS is on the increase"

data

connection connection connection connection connection

■ If you've been fired up by the review of the Kenwood TH-D7E in last month's *Ham Radio Today*, you're not the only one! I know of a number of amateurs who've already gone out and bought one as soon as they were available (and I'm writing this before the review's even been published!) and are walking and driving around with APRS (Automatic Position Reporting System) beacons being sent over the air.

One dealer is already offering a 'package deal' of the TH-D7E, the VC-H1 Visual Communicator [reviewed in the December 1998 *Ham Radio Today* - Ed], and a complete Windows and DOS software package on CD-ROM for packet, SSTV and APRS for multimedia Amateur Radio communications. Using a program such as JVCOMM32 (a shareware program which now has no date expiry), this using your PC's sound card as the PC / transceiver interface at your shack-based station, can give you a low-cost colour SSTV transceive set-up. Coupled with WinAPRS you can even see on a map exactly where your QSO partner is.

For more information on UK APRS in the UK, as well as an introduction to what it's all about, take a look at Ciemon's, G0TRT, web site at <http://www.g0trt.freemove.co.uk>

winaprs map service

Ian, G3NRW, sent me an e-mail offering a valuable service to amateurs. He says he can now supply WinAPRS image files (for WinAPRS 2.2.2 or later), centred on any point in the UK. Separate images are available for (nominally) 4, 7, 15, 30, 60 and 120 mile radii north / south from the chosen point.

To obtain your set of images, just specify the

following:

1. Your callsign - eg 'G3NRW', or Grid Square at the centre of the images - eg 'IO91SX', or any other meaningful name (six-character max) - eg 'London'. The callsign / grid square / meaningful name will be used as the base name of the image files.

2. The lat / long co-ordinates of the centre point of the images (in deg min sec or deg and decimal minutes), eg 51 57 58N / 000 29 23W or 5157.96N / 00029.39W.

From this information Ian will create six .GIF files and the corresponding .GEO files. The file names will be of the form: G3NRW04.GIF and G3NRW04.GEO for four-mile radius, G3NRW07.GIF and G3NRW07.GEO for seven-mile radius etc. These will then be zipped up and e-mailed to you, the zip file will typically be about 450k in size. Unzip these into your 'Images' directory in WinAPRS, and away you go.

Ian kindly sent me a set of sample maps centred on his location, which show that they're certainly a lot better than the 'vector' line maps typically used in WinAPRS that are often imported from DOS-based APRS. Ian's e-mail address is: ian@dowmain.demon.co.uk

tcpip converse net

A regular TCP / IP net in southern England has been started using the linked converse servers at GB7BIP and GB7IPW. It takes place every Sunday night commencing at 8.00pm local time. AX25 users who want to find out more about TCP / IP, or who are just interested in joining in for a live keyboard conference, can join in by connecting to GB7BIP from GB7IW, POMPEY, or NEND nodes, and after answering sign-on questions if you are a new user, by

typing 'CONF 0'.

If you're interested, you can get more information from Lionel, G6HXW @ GB7VRB.

gb7pfd

At the time of writing, GB7PFD in Petersfield is currently off the air for essential maintenance. More significantly, the SysOp, Peter, G6HJP, says that he's having problems over planning permission, which is worrying as this will limit the available service to users.

If you'd like to help, a letter of support and / or appreciation for the BBS service he's providing would be beneficial to accompany Peter's efforts to resolve this problem. When he does return to service, the aerials will initially be lower than before, until the planning situation has been resolved. Peter's contact information via packet is G6HJP @ GB7PFD.

sunpac and maxpak

Chris, G0WYF, who's the licence holder for the planned SUNPAC hilltop node at Farleigh Wallop near Basingstoke, says that the RSGB's DCC has now issued the site clearance paperwork on behalf of the RA. The one exception is the proposed 70cm 9k6 user port which had been deferred following objections from a nearby area. At their recent meeting, the DCC agreed that the application for this port could now proceed, after reviewing technical submissions and undertakings made by SUNPAC's Network Co-ordinator, G8OQN.

As with all such major projects, this merely means that GB7FW is one step nearer coming into existence - there are still many man-hours of work to be completed, including site meetings with the owners to agree the details of how the equipment will be housed, aerials

Series of G3NRW's WinAPRS maps, at distances of four, seven, 15, 30 and 60 miles (see text)



rigged, etc. Also several hundreds of pounds of funds will now need to be spent!

For details of joining or supporting SUNPAC, contact John, G8OQN @ GB7SUN, or attend one of their bi-monthly meetings which are held in the Southampton area (details again from John, G8OQN).

The December / January issue of *Digicom*, the newsletter of the Midlands Packet User Group, MAXPAK, recently came through my letterbox. This issue is even better than ever, being packed with plenty of interesting reading for packet users. There are features on emergency boot disks to keep your PC running, a construction article for 2m / 70cm verticals, how to make up a lead for RS-232 use with a TNC or BayCom modem, obtaining free Internet access without a CD, and no less than four pages of the latest node maps for the South West and Channel Islands, the South East, London and the Thames Valley, and the Home Counties and East Anglia.

Operational news from MAXPAK tells us that the computer at the heavily-used GB7MAX packet BBS is currently due to be upgraded to a faster type for better performance, and that the link from the BBS to the WV node will be upgraded to 9600 baud. The 9600 baud user port on 144.825MHz at the WV22 node also recently failed, this was traced to a faulty crystal and it has now been replaced.

MAXPAK have regular meetings and can offer packet hardware kits and software at advantageous prices to members. For more information, contact Richard, G1NZZ @ GB7MAX or tel: 0374 826075 7.00pm - 10.00pm Mon - Fri or 10.00am - 10.00pm Sat / Sun.

new packet software

If you hate HTML in packet messages (although I've noticed that many users seem to have gone back to using plain text after an initial 'play') there's now an easy answer. Roger, G4IDE, has created *HTMStrip*, which is a WinPack viewer that removes HTML tags from packet messages. If you've already downloaded HTMSTRIP.ZIP, note that this is an updated version, released on 5 December 1998. You can download the program from Roger's web site at <http://www.peaksys.demon.co.uk/>

Also from Roger's site there's *WXAPR15.ZIP*, which is an updated (15 December 98) version

of the *WXAPRS* add-on for WinPack as featured in the May 1998 *Ham Radio Today*.

From Roger's site there's also the latest version of GM1JLP's *WINP_ACE 7plus* server for WinPack, *WINPE15R.ZIP*. Note that this version is only suitable for Win95.

From Ted, G8NPF, comes a new version, v201, of the 'Sally' packet program. This now has support for TNCs fitted with TF27 or WA8DED EPROMS, TFEMU (Flexnet) and the TFPCX range of TNC emulation software, as well as BPQ. You can download this from <http://www.cix.co.uk/~ntsx/sally.html>

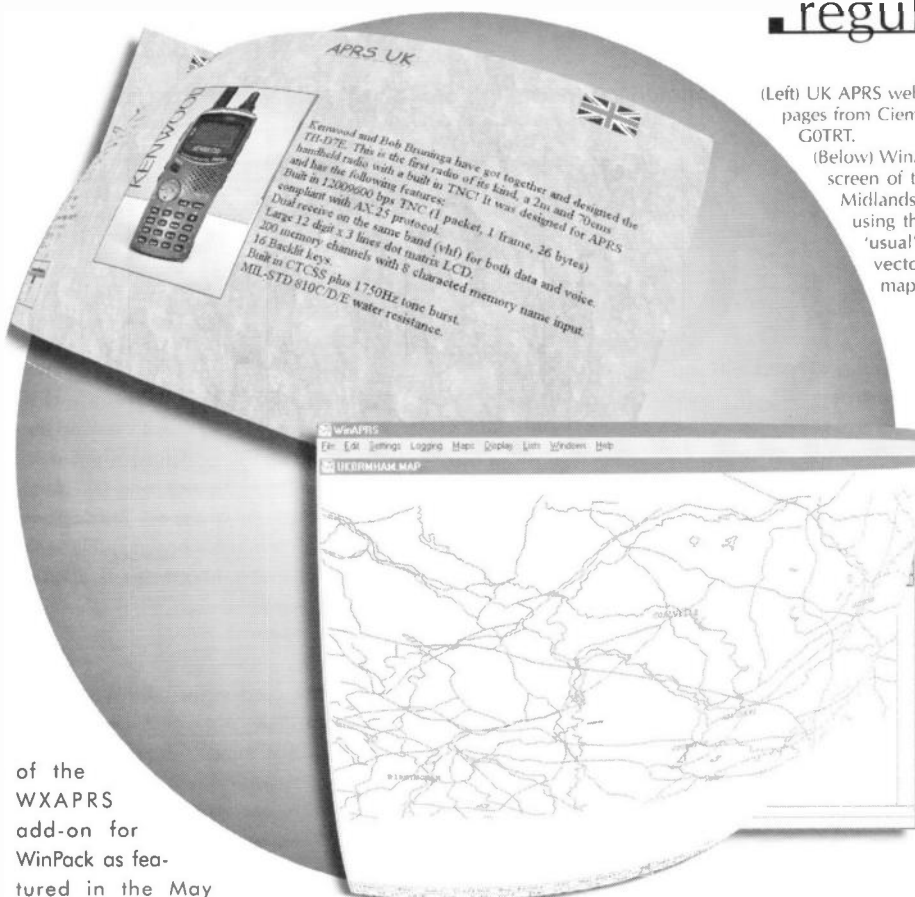
sb-1000 for hf data

Dave, G3RID, wrote to me following my recent mention in this column of using the Heathkit SB-1000 linear amplifier for HF data modes. Like myself, Dave has used the SB-1000 on both AmTOR and PacTOR and has found that it copes perfectly well with the faster transmit / receive switching requirements of these modes. He's regularly inspected the relay contacts and says there seems to be no evidence of any burning due to 'hot switching'.

Dave, however, brings us a useful tip. About

(Left) UK APRS web pages from Ciemon, G0TRT.

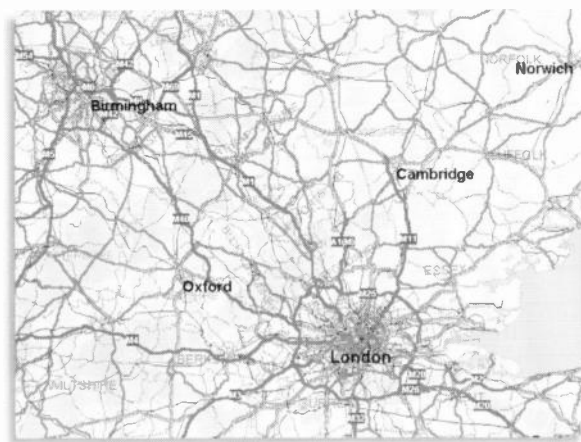
(Below) WinAPRS screen of the Midlands area, using the 'usual' vector maps.



four years ago he experienced problems when the mains transformer developed a short circuit to earth on its primary winding. Apparently, this is a common problem according to Ameritron, who manufacture the amplifier (it's the Ameritron AL-80 under a different name). Although they could supply a replacement from stock the cost including shipping from the US was prohibitive. Quotes received for re-wiring in the UK were likewise expensive.

Eventually Dave contacted Peter Rodmell, G3ZRS, of Linear Amp UK, who was able to supply a replacement toroidal transformer similar to the one used in their 'Hunter' amplifier, which just fitted into the space vacated by the former transformer. This also eradicated the effects of vibration and magnetic field experienced with the original transformer.

Dave has now been using it for over a year with no problems, saying that the replacement transformer's cost was just £112 at the time, including VAT and carriage. So, if you find a bargain SB-1000 at a junk sale with a damaged transformer, you now know what to do!



and asks "do computerised modelling programs really work?"

Dick Pascoe, G0BPS, looks at substituting components

qrp

corner

corner

A letter from Gordon Sadler arrived with comments on the November QRP Corner column in which I mentioned using shotgun cartridges as coil formers. Mr Sadler points out that the 410-gauge cartridge I mentioned is not 1/4in diameter (6mm), but 0.410in. Almost half an inch, or, for the metricated amongst you, 10.4mm. It was my intention to indicate that these cartridges could be used to make coil formers if nothing else was available.

To test out my theory I made up two coils, one on a standard former and the other on the 410. Much as I would expect, there was quite a difference in the inductance of the two formers. The 6mm with 50 turns of fine wire provided $7.33\mu\text{H}$ and the larger 10.4mm shotgun cartridge gave $17.15\mu\text{H}$. If we were looking for a set value it will be seen that the extra wire and extra diameter of the cartridge gives us less turns for the inductance required. This equals less work of course.

Those in the know and those with good eyesight will notice that this particular cartridge has not been fired, thus there is still some lead shot inside it. After it had been fired the 'brass' case on the bottom can be used to mount the case.

A hole cut into the top can be used to maintain the integrity of the coil. Please note that after the photo was taken the cartridge was

corner

re-turned to safety in my gun cabinet - unfired cartridges should be treated with the greatest of respect. Thanks to Mr Sadler for bringing this to my attention. I hope this clears it all up now.

aade

The instrument used in the above tests is a rather nice unit from Almost All Digital Electronics (AADE). It is supplied as either a kit of parts or ready built, and is a very useful unit that can measure accurately capacitance and inductance. When supplied as a kit it can be put together fairly quickly and easily. Mine burst into life straight away and has become one of my standard pieces of test equipment. In any tuned circuit, if the capacitance is known the inductance required can be calculated and then made up using this instrument.

When using dust iron or ferrite cores it is often easier to consult a simple computer program that I found some years ago. Called *Toroidal* by J Norton, G4TLS, it allows the user to find many parameters from the information entered. For example, if we are making a VFO on 5 - 5.5MHz using a variable capacitor of 100pF, we need to know the inductance required for a frequency swing of 500kHz. We just enter the required parameters and are given the answer, in this case $8.37\mu\text{H}$.

Using the

AADE meter we can wind our coil and measure it as we go. It does make life easier!

more from the qrp society

In the last column I referred to the now defunct QRP Society. The February 1952 issue of their magazine complains of the drying up of ex-service surplus equipment. The editor tells us that "there is still a lot of stuff about, but the variety is much less and the prices are starting to rise . . . 807 valves that were ten a penny some time ago are now getting scarce." Another interesting comment was "the amateur is well used to home construction and using substitutes". How many could find a substitute these days if a component died in their rig?

There was also a proposed VHF section. Apparently a number of members were interested and G2DHV made it clear that QRP was worthwhile, even at 145Mc/s (this is 1952) [1Mc/s = 1MHz - Ed]. Amateurs were not only using this VHF band but were also considering low power activity there.

The circuit shown in Fig 1 is also from their magazine and shows a receiver built on a plywood panel backed with tin plate. In this circuit the power used was 200 volts from a mains power pack and 76 volts from a battery. The two valves used were a 6J7 and a 6J5 and in this case the heater voltage was also battery powered. Consumption quoted was a measly 0.87W. This receiver was used to chase broadcast stations, with a lot of DX gathered. Heard at "QSA5 R9 plus" (to you and me that's a report of 59) were Brazzaville, Leopoldville,



If you want help, go to the experts: Ian Keyser, G3ROO, gives assistance to a prospective builder at a QRP rally.

Ankara, Damascus, India and the USA. The circuit shown is lifted from the society's newsletter in 1952: if it's wrong, please don't scream at me, I was only eight then and I know nothing about valves!

substituting components

I mentioned substitution of components above. Many builders have a bottomless junk box, where all manner of components are kept 'just in case'. Very often, if a component fails in one of our projects we will find a replacement in the box, but will they be right?

If we take something as simple as a resistor, is a 470Ω resistor always identical to another

ceramic disc above, the component has 20% tolerance this may pull a circuit a long way off its designed frequency. Yes, it is rare to see all the components going the same way, but it can and does happen, thankfully only occasionally.

rallies

The G-QRP Club will have a presence at several rallies again this year, both in the UK and abroad. Some members have offered to take tables at UK-based rallies. I know that BRATS in Rainham will have representation, as will Leicester, and Bob, G4JFN, covers the Yeovil QRP Convention. As far as I know that is all the UK ones but we still would like members to

take time out to cover a few more. As previously mentioned the club covers the table costs.

George, G3RJV, and I will be at Dayton again in May, both at the 'Four Days in May' symposium at the Days Inn Hotel over the HamVention weekend as well as at the show itself. An exhausting weekend!

Sheldon, GW8ELR, and I will be at

Friedrichshafen along with a few DL members. This is in a beautiful part of Germany, right next to Lake Constance.

Tony, G4WIF, and Graham, G3MFJ, will be in Texas for the annual HamCon event with some of our US cousins, and I shall be in California at Pacificon in October. Any members who wish to join us are very welcome. Just contact me for more details.

homebrewing

My earlier comments above about homebrewing makes me wonder how many amateurs actually build anything these days? I must admit to doing less building now than I used to. Time is my own worst enemy. I, like many others have a few projects on the go, various boxes with bags of parts in them waiting for me to complete them. I have an EPROM programmer, a voice recorder and

a couple of ATUs to complete. I also plan to try out the Cobweb antenna that several have raved about.

Like many I actually enjoy building things, often the act of construction is an end in itself and the finished product is often relegated to a shelf in the shack. I built my first kit like this about fifteen years ago. It looked great, and with the help of Ian Keyser, G3ROO, it actually worked well too. But after a couple of days it was relegated to the upper reaches of the shack and it vanished for years! I still love the smell (from a distance) of molten solder and the feel of making something that works.

One of the disadvantages of solder is that it is messy when experimenting with circuits. It is easy to build something 'ugly style' but much easier to use boards that enable us to plug in the components. We can switch them around and experiment, finding the best combination of values to obtain peak performance. It is not only easier but also much quicker to pull out a resistor and push in another.

There is an easier way of course, and that is to use a computerised modelling program. Now this is not something that I am very familiar with. I have dabbled with *Electronics Workbench* and must admit to finding it a little boring. Yes, it gives the results. Yes, you can 'plug in' a multimeter or 'scope, but how much better it is to use the real thing. Are there any readers out there that have used these programs with good results? Do they give accurate results and are they reliable? Please let me know what you think of them.

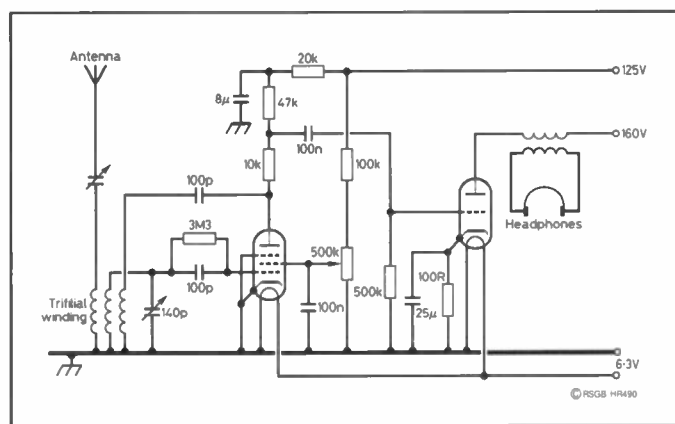


Fig 1: Two-valve receiver featured in a QRP Society magazine of 1952.

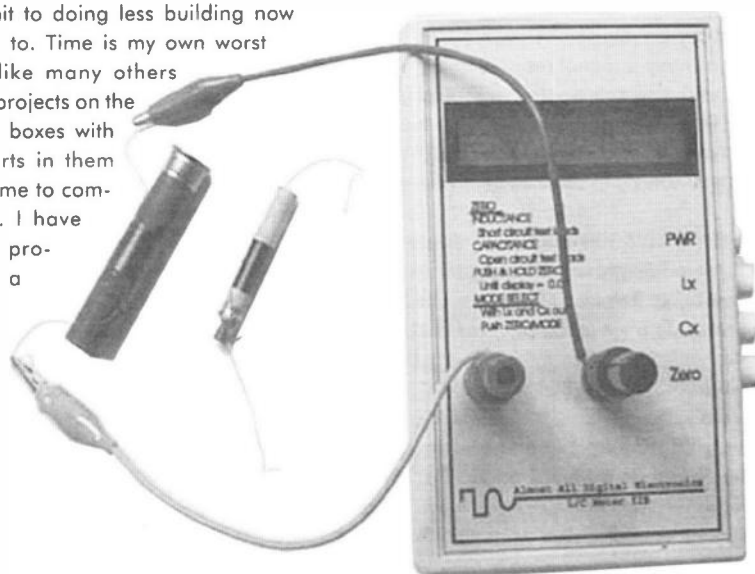
470Ω resistor? Of course not, but what makes the difference? Apart from, perhaps, a difference in size where a change in wattage is obvious, there could also be differences in construction.

A change in size with perhaps a larger wattage will change the inductance of the resistor, as inductance is also related to size. Metal film resistors made today, we are told, are quite low in inductance and may be comparable to carbon ones. But beware, because at VHF this slight difference may be important. Metal film resistors should not be confused with 'wire wound', which are inductive even at HF. When changing a resistor in a circuit the inductance of a resistor is often overlooked. Often it will not matter, or even change the way the circuit works, but if the circuit fails to work it might be worth considering.

A polystyrene capacitor is often preferred in a circuit, eg in oscillators, where the tolerance is important. If these are not available, NPO (zero) capacitors can be used. The typical 20% tolerance of normal ceramic disc capacitors means that often these are not suitable.

When building a circuit it should always be remembered to take the tolerance of components into consideration. I have had two units which appeared to be identical but after exhaustive testing it was found that in one case all the tolerances were high and in the second some were high and some low. In rare cases all the tolerances might be one way and if, like the ce-

The AADE L/C meter shown measuring coils made on a standard former and using a shotgun cartridge (see text).



■ If you want to learn something, and to spend very little, there are quite a lot of 'old and tired' rigs around for £50 - £100, and for under £200 some excellent pieces of equipment can be found. The following is by no means an extensive list, but just a few recommendations based on personal experience.

bargain basement

First, some rigs for £50 - £150 (depending on condition).

Trio TS-510 and TS-515. These rigs are mainly valve operated with separate, generously-rated, PSUs. Both give extremely good results on the lower frequencies, but the 510 is rather 'deaf' and short of drive on 10 metres.

The Yaesu FT-200. This is a pretty basic economy unit, has no provision for fitting a CW filter, and like the above models is mainly valve with an external PSU. It can, however, give extremely good results if it is in good condition.

Yaesu FT-401 / 560 (and Somerkamp equivalents). These rigs are almost identical, use mainly valves, with an input power of around 550 watts. They can produce over three-quarters of the legal maximum output power, if they are in mint condition. They are self-contained with a substantial PSU, but rather overrun the power output valves, which should be a pair of Toshiba or NEC 6KD6s. Used carefully the valves can last for ages, but they have absolutely no margin for error, and blow in seconds at any mistake in tuning. (I always recommend running at around 180 watts output by tapping the HT voltage down on the mains transformer to give a little more margin for error.) The correct Japanese 6KD6 PA valves are now somewhat difficult to obtain, so if possible buy the rig with a set of spares. (Please don't ask me, as I haven't got any!)

KW-2000 and separates. KW equipment was never mass-produced; is 99% valve, and (rather like the modern Ten-Tec equipment) gives the appearance of having a top class 'do it yourself engineer built' type of construction. This is extremely advantageous to the keen enthusiast, as what was hand-built in the first place can usually be rebuilt. The main fault with old KW equipment is that of resistors going high in value, and time spent going right through the entire set checking and replacing, where the value has drifted by more than say 20%, will pay big dividends in improvement of performance.

Heathkit HW-100 and 101. These were of course originally DIY kit units, so are ideal for rebuilding. The weak links seems to be the mains transformers in the separate PSU, some seemed rather small for the job and burnt out, and the VFO tuning dial mechanism, which stops working.

Yaesu FT-101 Mk1 (otherwise marketed as the Somerkamp FT-277 Mk1). The Mk1 is the early version that does not have 160m marked on the band change switch. This unit, believe it or not, was originally designed as a

portable / mobile unit for the USA market, and tends to overload on receive when used with a full-size antenna, but there are several modifications that can improve this. Much of the circuit is similar to later versions, but as it is now around 25 years old check condition carefully. See below.

a modest price to pay

In the £150 - £300 range one can hope to find equipment which will be in good working order, and which if purchased through a dealer might even carry some sort of guarantee.

Yaesu FT-101 Mk2, B, or E. These are units to be recommended. The Mk2 can be identified from the Mk1 in that it has the 160m band factory marked on the range switch, while the later B and E models are clearly stamped on the front panel. The thing to watch on all the older FT-101s is that the coupling capacitors C13 and C131 from the driver to PA stage tend to break down if a rig is put back into service after a long rest. Failure of this part can result in burnt out valves and mains transformer, and hence a rig that is not worth the cost of repair. Always replace these parts before putting any FT-101 prior to the ZD model back into service. Check this point and get confirmation that C13 and C131 have been replaced before purchasing from a dealer.

Trio TS-520S, are more or less Trio / Kenwood's equivalent to the FT-101, and these can also be a good buy. Like the 101, the series ran for many years and so age and condition should be considered.

Yaesu FT-101Z and ZD. Early samples of this may be obtainable below the £300 mark, along with the very good Trio TS-820. The only thing you will miss here are the WARC bands, but performance will certainly leave you nothing to complain about.

a world-beating transceiver?

In the £300 - £400 range comes equipment which, for performance on the amateur bands, is very difficult to appreciate better at any price. It seems to me that manufacturers have spent many years developing general-coverage synthesised equipment, and yet have only in the last few years managed to get back to a standard of receiver performance that they previously achieved in the late 1970s with ham band only equipment.

Yaesu FT-901 / 902. These are fine units usually fitted with AM and FM, and sometimes a memory and a keyer. They have an excellent receiver, and are all solid state except for the driver and PA stages. The main difference between the two models is that the 901 did not incorporate the new 10, 18, and 24MHz bands, and so it tends to sell for about £70 less than the FT-902. These models use the same type of 100pF capacitor between the anode of the driver valve and the grid of the PAs as did the FT-101, this must be replaced.

Yaesu FT-101ZD / Z. This model was brought out as an economy version of the FT-

A

IN A DAY

Over the next few months, Harry Le
buy a second-hand rig for next to n
sometimes to 'as

901. By and large, whilst it has a few less facilities (and was available without the digital display as the FT-101Z), the performance is not much behind the FT-901 / 2. Several modifications took place along the production run resulting in quite a few versions. These are not marked on the units, and so, as they considerably affect the value, they should be noted.

FT-101ZD Mk1. This has only SSB and CW capabilities, the mode switch being so marked, and is only fitted with the old 160 - 10m bands.

FT-101ZD Mk2. -This is the same as the Mk1 except that it has an AM position added to the mode switch. It may, or may not, be fitted with an AM unit, however.

FT-101ZD Mk2a. This is the same as the Mk2 except that it is fitted with the three additional bands 10, 18, and 24MHz and has an improved frequency counter.

FT-101ZD Mk3. This is the latest unit and can be identified in that it has the addition of a peak and notch filter, and that one position of the mode switch is marked 'AM / FM'. The unit may be fitted with an AM unit, an FM unit, or none at all.

Trio TS-830. This superseded the TS-820 and is fitted with all the current HF amateur bands. This was Trio's competitor for the FT-901 / 101ZD and likewise has a very good receiver section. As I was not an agent for Trio / Kenwood I am not as familiar with it as the Yaesu, but any going second-hand seem to be snapped up pretty quickly.

before parting with your money

Everything is relative, and so your expectations should line up with the price being asked, and the rea-



II 'S WORK

Leeming, G3LLL, looks at how you can
something, then how you can restore it -
-new' condition

son for sale. You can of course get extremely
good value in the right circumstances; we all
have heard stories of 'pirate' operators who,
having got wind that they are due for a 'visit',
unload their equipment for peanuts, but nor-
mally one should be wary of equipment that is
too cheap.

With nearly new equipment
bought privately one has the worry
of whether or not it still belongs to a
finance company, but at least in the age
group we are dealing with this is un-
likely. One must still remember that the
law states that however much you pay for
something, it isn't yours, if it was not the
property of the person you bought it from.
Only recently one of my customers had
his FT-101ZD stolen. He in-
formed me and a shortly
afterwards a local
CB opera-

tor brought in the bargain FT-101ZD he had
picked up at a car boot sale for repair, he ended
up answering some very awkward questions at
the police station, and minus cash and rig.

what to look for

Quite apart from the problem of right of own-
ership, one has to carefully consider the qual-
ity and condition of transceivers before parting
with hard-earned cash. Where a private sale is
involved it is pretty well essential to see the
equipment in operation before purchase. Even
then it can be hard to judge. How much ALC
action do you expect an FT-200 to have on
10m? Is it normal for the output to be down to
45 watts? By far the best way to buy is to take a
friend with you who is familiar with the rig you
are going to purchase. Together you can then
judge as to whether you are being expected to
pay top price for equipment which has only
50% performance.

the price is right, but can it be repaired?

Parts like resistors, transistors, valves
and capacitors that are li-
able to wear out
can usu-

ally be obtained. Damaged items such as slugs
broken and jammed in tuning coils, split coils,
switches which have sparked over, or been
damaged by unskilled hands, or faulty special-
ised items such as mechanical drives or dedi-
cated ICs are another story. Visual examina-
tion of the inside should also give you a rough
idea of the extent of any damage done due to
many years of exposure to cigarette smoke. If
the coils switches and pre-set tuning capacitors
are all solid with yellow 'goo', there is nothing
that can be done to restore 'as new' perform-
ance. If, however, the inside looks fairly clean,
and the wiring and parts seem to be original,
you are in with a chance.

We continue with this theme next month by
looking at how to overhaul old rigs yourself.



(Far left): A mint-condition FT-101EX is now extremely
rare, especially when it comes complete with one of
Harry Leeming's add-on FM discriminators!

hf happenings

■ March sees us heading back towards summer conditions with the HF bands opening until well into the evening and the LF bands still performing strongly from mid-afternoon to breakfast time. Conditions around the equinox of 21 March are often as good as they get all year if the solar numbers are reasonable.

At the time of writing in January the solar flux has regained its previous peak around 175 and daytime conditions on HF have been spectacularly good. The long path to the Far East has been opening shortly after sunrise, encompassing all bands up to 28MHz, with the short path taking over (or overlapping) an hour or so later. 10MHz has been yielding Pacific DX for much of the morning and afternoon.

expeditions

Many operators have been vacationing in the Pacific area in recent months and QSOs with Fiji (3D2), Tonga (A35), Tokelau (ZK3), and the various parts of Kiribati (T30 - T33) have been commonplace on almost all bands.

<rt>Bernhard, DL2GAC, should still be active as H44MS from Pigeon Island (IOTA reference OC-065), Temotu, until the end of April. He was expecting to be joined by DK9FN to operate CW during the first half of February only. QSL via DL2GAC.

Ronny, YC8TXW, and Benny, YC8YZ, are planning a number of IOTA expeditions for 1999. They expected to be active as YC8TXW/P and YC8YZ/P from the Obi Islands (OC-222) between 12 and 19 January and hope to be on from the Sula Islands (OC-076) in March. Plans for the future include the activation of two new ones, the Mapi

YC8VIP is reported to be trying to get a local amateur QRV from the Banda Islands (OC-157). All these operators are often to be found around the IOTA frequency of 21260kHz at 1300UTC.

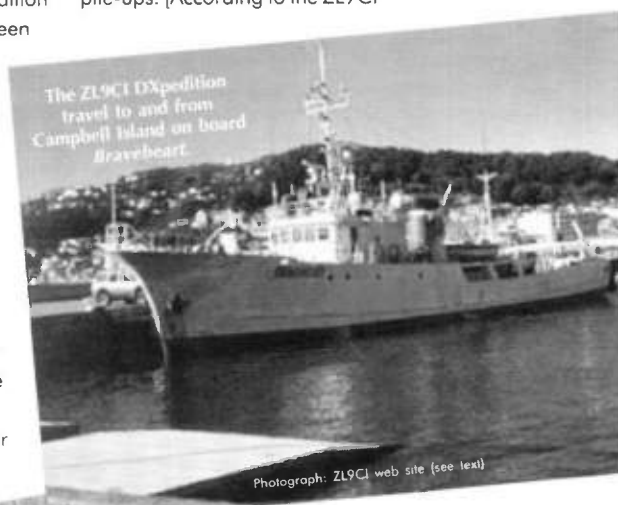
Frank Smith, AH0W, reports that the Midway Kure DX Foundation multi-national DXpedition to 3B9 Rodriguez Island (AF-017) has been postponed to April.

Cedric, HB9HFN, has received the call FW5FN for his operation from Wallis and Futuna (FW) from 23 February to 8 March. He promises to be QRV for Europe on all bands - mostly on CW.

HA9RE and HA8IC were reported to be planning a DXpedition to several islands in the Pacific Ocean. They hoped to be active (on 10 - 160 metres CW, SSB and RTTY) from West Kiribati (T30), East Kiribati (T32) and Banaba (T33) at some time between January and mid-March.

Pedro, PP5SZ, reports that the ten-year old Brazil DX Net will be held again on Saturdays and Sun-

night (to comply with ecological restrictions) unless the weather is bad enough to make this hazardous. Even though this decision has to be made by the biologist on the team I feel sure that there will be at least a few nights when they find they are able to continue with the pile-ups. [According to the ZL9CI]



Photograph: ZL9CI web site (see text)



web site at www.qsl.net/zl9ci/ the expedition made 30,000 QSOs in their first four days of operation and was scheduled to remain on the air for a further 12 days! - Ed]

island amsterdam

days, between 1200 and 1400UTC on 28430kHz. This is often a good place to pick up Brazilian or South American IOTA stations.

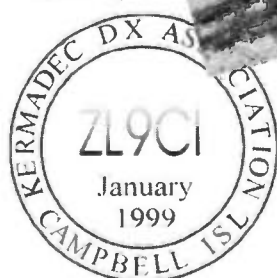
The FT5Z expedition wound up a few days before Christmas, having made around 32,000 QSOs with 14,000 different stations - a remarkable total with just two operators. As I expected it was a fairly easy shot from Europe, and EU QSOs were some 46% of the total. For the statistically minded, North American QSOs were 33% of the total and Asian QSOs 17%. Surprisingly 1.8MHz proved to be a real problem, with only 27 QSOs made - all CW and the majority with Japan. Only two or three Europeans made it through on this band.

There was the usual controversy on the Internet over the amount of the 14MHz band taken over by the expedition's pile-up, with most people supporting the use of up to 30kHz. To my mind this is a little too much - but it's better



Islands (YB8) and the Lucipara Islands (YB9). Meanwhile,

At the time of writing the ZL9 gang are en route to Campbell Island and DXers around the world are hoping they get some bad weather after they have arrived and set up the antennas. This is not some malicious streak that has just surfaced, but a response to the news that the team will have to return to their ship for at least a few hours each



March sees the return of the HF contest 'season' and the possibility of the best conditions of the year, as Martin Atherton, G3ZAY, reports



than excessive use of "Only stations with '1's in the call" for hours at a time or an operator trying to remember all the European countries as he takes each one in turn, out of phase with propagation changes - and then forgets England.

Although Eric and Mehdi are now QRT, Amsterdam Island remains available on the bands, as a young French soldier will be stationed there for a year. He was only licensed in December '98 so is unlikely to be running pile-ups for a while, but look out for him as FT5ZJ.

a new one? - not!

The Canadian authorities have announced a new prefix of YV0 for the Inuit (Eskimo) territory of Nunavut which was formed from the eastern portion of the North-West Territories (VE8) on 1 January. Unfortunately - and I write as an annual visitor to the area - this is unlikely to be sufficiently independent to qualify as a separate DXCC entity.

As an aside - I was amused to see that the second most popular candidate name for the remaining part of VE8 is 'Bob' [why?! - Ed]. Proponents argue that 'Bob' is dyslexic-friendly and will put an end to the government being 'Big Brother', since Bob's your uncle! Again, not a new DXCC entity, but we may get another new prefix to work there whatever it's finally called.

band plans

There have been some minor changes to the band plans recently with a new recommendation for SSTV operation on the three main HF

bands. 14230, 21340, and 28680kHz are now calling frequencies, and, after establishing contact on them, SSTV and fax operators should QSY to another slot in the telephony portion of the band. Hopefully this will put an end to the over-zealous policing by SSTV operators who used to ferociously QRM anyone who dared to have a regular SSB QSO in 'their' part of the band - even though the old SSTV allocation was supposed to be shared with normal telephony operation.

Another change is that 3570 - 3580kHz and 21120 - 21130kHz are recommended for slow Morse transmissions.

contests

March sees the return of the contest season with a vengeance, so you just have time to get your antennas tuned, earth systems watered, and armchair cushions plumped up!

RSGB Commonwealth Contest

The big domestic event in March is the RSGB's Commonwealth Contest (formerly known as 'BERU'). This is a CW-only event which takes place from 1200 Saturday 14 March to 1200 Sunday 15 March. Serious entrants should consult the rules in *RadCom*, but the general idea is as follows:

Entrants must be single-op, and unassisted by spotting nets, packet clusters etc. There are two sections; open (no limit on operating time) and restricted (12 hours operating time with at least four hours after 0000UTC). Contest frequencies are the lower 30kHz of each band (except when working Novices above 21030 and 28030) from 3.5 - 28MHz (but excluding

the WARC bands). UK stations can only work Commonwealth call areas outside the UK and score 5 points per contact with a bonus of 20 points for each of the first three contacts with each call area on each band. HQ stations (which will identify themselves by sending 'HQ' as part of their report) count as additional call areas for points and bonuses. Entrants are allowed to contact their own HQ station for points and bonuses. The contest exchange is RST and serial number and there is no multiplier system. Logs should be sent to: RSGB HF Contests Committee, c/o Steve Knowles, G3UFY, 77 Bensham Manor Road, Thornton Heath, Surrey CR7 7AF, and be postmarked no later than 7 April 1998.

There is an interesting collection of Commonwealth Contest info at the following web site maintained by Bob Whelan, G3PJT: http://ourworld.compuserve.com/homepages/Bob_G3PJT/

CQ WPX Contest

The SSB version of this contest runs for 48 hours from 0000 on 27 March to 2400 on 28 March. The full rules should be on the web at a number of places, including <http://www.sk3bg.se/contest/cqwwwpx.htm> and <http://ourworld.compuserve.com/homepages/N8BJQ/> but at the time of writing both these sites have only the 1998 rules.

The general idea is that you use all bands from 1.8 - 28MHz (again excluding the WARC bands), gaining 3 points per inter-continental QSO on 14 / 21 / 28MHz and 6 points per inter-continental QSO on the LF bands. Intra-continent QSOs count 1 and 2 points respectively. The multiplier is the number of different callsign prefixes worked (each prefix counting only once even if worked on different bands). There are numerous categories of entry from single-op single band to multi-op multi-band and including a category for 'rookie ops' licensed less than three years.

The contest is essentially a 'run' style contest where the aim is to make as many 6 and 3 point QSOs as possible. In practice this means that in order to do really well any multi-band entrant must have good LF capability to rack up the US QSOs on 3.5 and 7MHz. The US stations must be worked 'split' on 7MHz as they cannot transmit SSB below 7150 - EU stations must call CQ below 7100 and listen in clear spots above 7150kHz.

VHF/UHF

With the VHF/UHF bands generally quieter of late, Geoff Brown, GJ4ICD, takes up the soldering iron to put together a new UK-made 70MHz transceiver kit

■ Things have certainly been poor on the VHF/UHF bands, it seemed as though after the E30GA Eritrea HF / 50MHz expedition in October everybody just switched off their radios and stored them away for Christmas! So by way of a change this month I am including other information on some new VHF kits. But first, news of a VHF / UHF tropo opening.

Dave, G4RGK, reported that he worked into southern France and Switzerland on 17 December. Stations were active from JN37, 38, 24, 25, 26, 27, 14 - 19 etc on 2m and Dave also worked F1CYB (JN17) on 23cm.

50MHz snippets

Sergio, 5N9RGP, who is currently working in Nigeria is now active on 50MHz. He made his first QSO with CT1DYX on 20 December. QSL information is via IK7JTF.

Alan, 3C5I, in Equatorial Guinea has renewed his permit for 50MHz. He had thought that there were going to be problems with its renewal, but after consulting with the local PTT permission was granted for at least another year. Alan's log for December showed that several contacts were made into Europe. On 5 December yours truly made an S9+ QSO with him - on FM!

news from m0bcg

Ian Williams, M0BCG, from near Swindon sent in some interesting information about his VHF DX activities.

On 16 November last year he worked 20 countries on 50MHz via meteor scatter. His equipment is an Icom IC-706 and Alinco DX-70TH which drive a modified SB-200 linear into two 7-element homebrew Yagis, as shown in the photograph. Ian plans to install two 9-element Yagis in the near future.

microwave round table

The Martlesham Microwave Round Table, held on 8 November, was a huge success, with well over 80 microwavers in attendance from as far away as France, Belgium, Germany and USA.

You had to be there early to get the bargains at the bring and buy stand. Peter Day, G3PHO, arrived at 9.45am after a 200 mile drive, only to find he had left his money on the shack bench back home in Sheffield! By the time the cash machine at a nearby supermarket had provided some 'readies', a 250mW 10GHz PA had gone to a pal for only £5. Maybe an all-night camp on the doorstep is called for next year!

Overseas visitors included F4FAY and his wife; Freddie, ON6UG; Paul, N6TX; Dave, WW2R (also G4FRE); and Michael, DB6NT. Thanks to Peter, G3PHO, for this short report on 'Martlesham 98'.

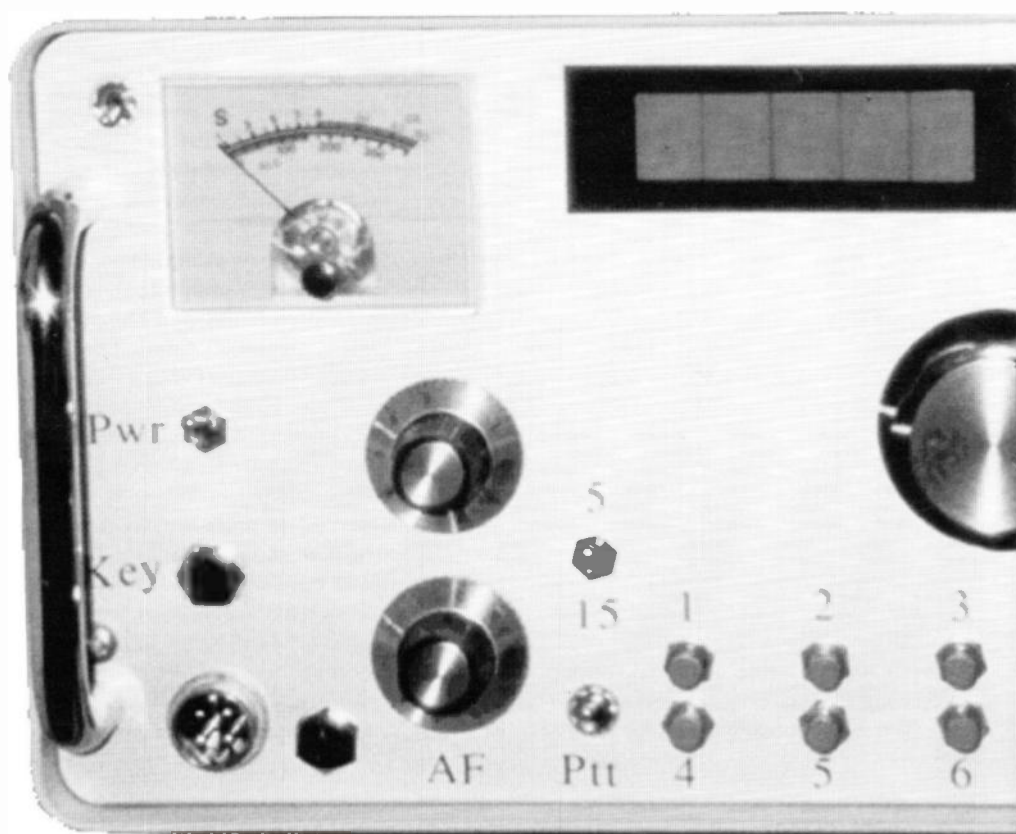
hands 70MHz transceiver kit

We have been waiting a long time to look at this British 'first' for 4 metres - the Hands RDX70 kit. It is an affordable, easy to build, complete kit for a CW / SSB transceiver, producing 5 watts out on the band.

The kit comprises an IF board, a VFO phase lock loop board, the power amplifier unit and the front end board. Options like AGC and digital display can be added if required.

Each double sided printed circuit board is silk screen printed and carries legends for all of the components. There is also a hardware kit available if needed that contains the main case and vernier slow motion drive, plus mounting tray for the boards and all the nuts and bolts. The documentation included with each kit even explains basic soldering techniques to help the newcomer to home construction.

Each board kit comes complete with its own



sub packs which contain the wire for the various inductors.

the IF board

This is the heart of the transceiver, it is the IF for both TX and RX and can either be fitted with a 9MHz or 10.7MHz crystal filter (supplied). Audio output uses an under run 20 watt IC and microphone input can be low or high impedance. The component count is around 175 resistors, capacitors, ICs and pots, plus the circuit pins for connecting up the other boards.

Step by step instructions are included and completion of this board took around six hours. Once built it is very easy to set up with no specialised test equipment needed. There are no adjustments to make on the board other than the trimmers for CW / USB and LSB and by using a simple HF receiver which is capable of receiving 9 or 10.7MHz the TX line can easily be checked out. The RX line is also very easy to set up. With step by step instructions, all that is needed is a standard multimeter.

the vfo pll board

The VFO unit is built into the supplied die-cast box for stability and includes a Jackson type main tuning capacitor. This board is quite heavily populated with components and takes a little more time to produce than the other boards.

The VFO output is 61.000 to 61.400MHz which gives a tuning range of 70.000 to 70.400MHz if using the 9MHz IF filter, which is an ample swing for SSB / CW use.

A few Radiospares PTFE or similar feedthroughs will be needed for the various feeds such as 12 volt, RIT and local oscillator output. A detailed stage by stage setting up sheet is included as the VFO is phase lock looped.

the pa

Three VMOS FETs form the backbone of the power amplifier board, which also contains the antenna changeover relay and pre-driver. Construction is very simple, and again, step by step instructions guide you through the setting up of the bias pots once the unit is built. The board must be fitted to the rear panel of the hardware case for heatsinking. On board low pass filtering is also included to suppress any unwanted harmonics.

the front end unit

This board contains many pre-made inductors in the shape of IF type cans. Legends on the board indicate which way round they are mounted, making life that little bit easier.

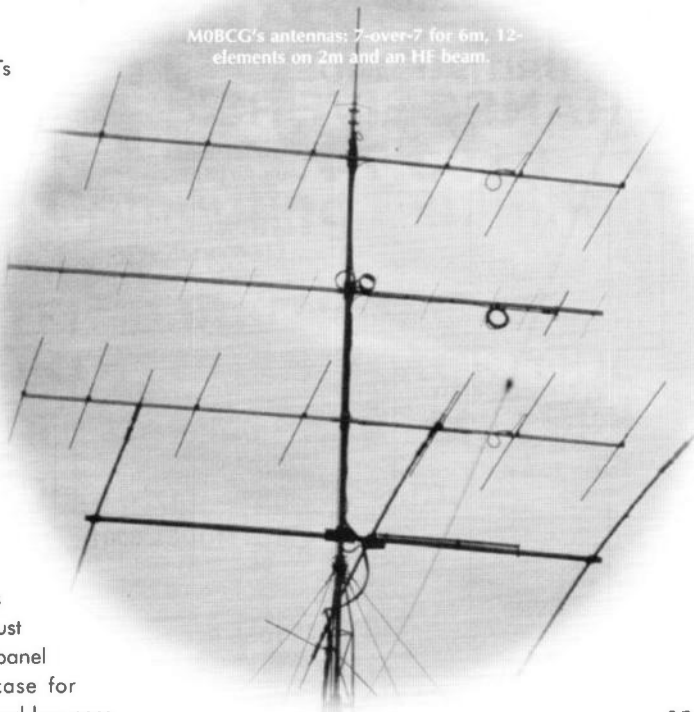
Gold plated header pins for connecting to the other boards are also supplied, a bit of 'over kill' here I think. The VFO output (local oscillator) along with IF in connects to this board to supply the mixer device. Front end signal to noise ratio is superb, due to the discrete device used.

final assembly

Once all four boards have been built and tested, it is a simple case of wiring them up with a reasonable quality mini coax. Note that this is not included with the kit and will have to be purchased separately. I used PTFE mini coax which is available from Westlake, it will withstand high temperatures whilst soldering and I thoroughly recommend this approach.

The kit manufacturer, Sheldon Hands, offers a 'tried and tested' layout with the power amplifier and RF front

M0BCG's antennas: 7-over-7 for 6m, 12-elements on 2m and an HF beam.



end mounted in the top half of the case, whilst the VFO and IF unit are mounted in the bottom of the case. I chose to use an RS case to match my previously built 50MHz version and made a shelf to support the boards.

conclusion

Sheldon Hands has certainly produced another winner for home constructors following on from the well known RDX50 50MHz transceiver (which looks identical). Full alignment and setting up instructions are included with each board, making things foolproof, and should you encounter any problems

Sheldon can be reached by e-mail, phone or 'snail mail' to provide help.

Having earlier built the 50MHz version I can confirm that so much was learnt in how the transceiver works, that should it go wrong I feel sure that I am capable of delving into the box and repairing it. If you're on a budget each board can be purchased separately as a 'go along' project, easing the financial burden.

The basic cost for all four boards is £175, plus the hardware kit and digital display if needed. Sheldon can also supply a memory keyer kit, but it is worth noting that if you intend to add on other boards a larger case may be required.

Full information can be found at www.rf-kits.demon.co.uk or from Hands Electronics, Tegryn, Llanfyrnach, Pembrokeshire SA35 0BL; tel: 01239 698427; fax: 01239 831652; e-mail: hands@rf-kits.demon.co.uk



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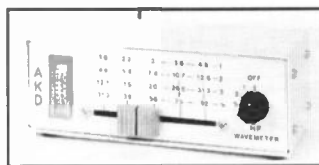
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| 6m | 25 | 375 459 | 70cm | 10 | 100 359 |
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THE HELP FILES

Page 12: Breaking the Line of Sight on VHF / UHF.

The title of this article alludes to the widely-held misconception that VHF and UHF communications are only good for short-distance ('line of sight') communications. It is true that, with very few exceptions, the VHF and UHF bands are used by professional radio users (broadcasters, the utility services such as gas and electricity boards, emergency services such as fire and ambulance, the military and so on) for local communications only. However, Radio Amateurs have proved that even under 'normal' propagation conditions, VHF and UHF signals reliably travel several hundred kilometres *further* than just the 'line of sight', providing that high-gain antennas are used at both the transmitting and receiving ends and reasonably high power (a few hundred watts) is used by the transmitter.

Under **anomalous propagation conditions** ('tropo', Sporadic E, etc) such high-power signals will travel even further, and even low-power stations can make two-way contacts over long distances. The purpose of the article is to encourage amateurs to upgrade their stations and thus increase the number of long-distance contacts being made on the VHF and UHF bands.

Page 20: Tropospheric Propagation on the VHF / UHF Bands.

Continuing our VHF / UHF theme, this article explains one of the **anomalous types of propagation** most frequently encountered on the VHF and UHF bands. **Tropospheric propagation**, usually referred to by Radio Amateurs as 'tropo', increases the signal strength of distant stations considerably, and can increase the distance covered by a particular transmission several fold.

When signals are stronger than usual, or more distant stations than usual are being heard on the VHF / UHF bands, Radio Amateurs say that there is a 'lift' taking place: it is usually tropospheric propagation which causes the 'lift'. Our article explains how and why tropo takes place, and gives some good pointers as to how to predict when tropo may occur.

Page 22: Q-Tek - VHF / UHF Antennas that Really Work.

The Q-Tek range of VHF / UHF antennas reviewed are **Yagis** (named after one of the two Japanese

inventors of this type of antenna, Yagi and Uda). A Yagi is a particular type of **beam antenna** (one with **gain** in a particular direction) based around a **half-wave dipole** (or sometimes a **folded dipole**) element, a **reflector** (usually just one) placed behind the dipole, and any number of **directors** in front of the dipole.

The Yagi radiates (and receives) in the direction of the 'front' of the antenna, ie from the reflector towards the radiator(s). A Yagi with one director is called a 3-element Yagi (one director, one reflector and one **driven element**); if there are three directors it would be a 5-element Yagi, etc. The dipole is referred to as the driven element because it is the one to which the power is directly fed, by having the coaxial cable connected to it in the centre of the element. All the other elements are called **parasitic elements** because in the Yagi design no power is fed directly to them: they radiate power **parasitically**.

The length of the director and reflector(s), and their spacing from the driven element, is critical and is dependent upon the frequency (and therefore the wavelength) for which it is designed. The lower the frequency, the larger the antenna, both in terms of element length and **boom length** (the distance between the director and the front director). So the Q-Tek 5-element Yagi for the 50MHz band (6 metres) which is reviewed is just under 12ft (about 3.6m) long (and its element lengths would be around 3m), whereas a 5-element Yagi for the 3.5MHz (80 metre) band, built to the same design, would be around 53m (170ft) long, with elements of around 40m (130ft); clearly an impractical solution for most back yards!

Page 24: AOR AR-8200 Wideband Handheld Scanner, and Page 27: The Icom IC-PCR100 Computer Controlled Receiver.

Reviewer Chris Lorek, G4HCL, states that "The AR-8200 receives over the frequency range of 530kHz to 2040MHz, with a tuning range down to 100kHz", whilst "The IC-PCR100 covers the frequency range of 500kHz to 1300MHz, with a tuning range down to 10kHz". In both cases, the receivers will tune down to a lower frequency than that given in the specifications. This is often the case with receivers and transceivers, and is because it is difficult to maintain high specifications over a very wide range of frequencies, particu-

larly at low frequencies. Therefore manufacturers often quote the sensitivity, selectivity, and other parameters, over a certain range (in these cases from 530 and 500kHz respectively) but **enable** the receiver over a wider range, even though the specifications are not guaranteed there.

Similarly, in some cases amateur VHF / UHF transceivers have wideband receivers fitted, but the specifications are only guaranteed within the amateur bands covered. With such sets, being able to tune outside the amateur bands must be seen as a free 'bonus' and any image breakthrough or other receive problems which occur outside the specified frequency range(s) must be accepted.

What is the difference between a 'scanner' and a 'receiver' or a 'communications receiver'? A receiver normally requires the operator to control it manually, eg by turning the tuning knob in order to set the frequency. There is no real definition of how a 'communications receiver' differs from an ordinary receiver, but it can be thought of as offering superior performance, perhaps be more sensitive, and to have 'tighter' filters, giving better selectivity. Generally a communications receiver will also have the ability to resolve single sideband (SSB) and Morse code (CW) transmissions, whereas an ordinary receiver may not be able to.

A scanner, whilst it will almost certainly also have a form of manual tuning control, in its most simple form is designed to tune across a whole range of frequencies automatically, stopping when a signal is found. In this way, the operator can quickly detect activity on what might otherwise be a 'dead' band.

Having said this, many modern receivers incorporate a scanning function which will also do this. Where a scanner really differs from a receiver is in just how comprehensive the scanning functions are. For example, most scanners can be programmed so that frequencies which are **normally** active are ignored, so that new or unusual signals can be discovered.

Please note it is illegal to listen to transmissions not intended for general reception, ie anything except radio and TV broadcasts, amateur and CB transmissions, standard time and frequency stations and - if at sea - marine radio. We plan to feature an introduction to scanning in the next edition of *Ham Radio Today*.

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March 1999

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❖ **FC-902 ATU**. Tel: 0181 300 0767 (Sidcup, Kent)

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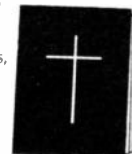


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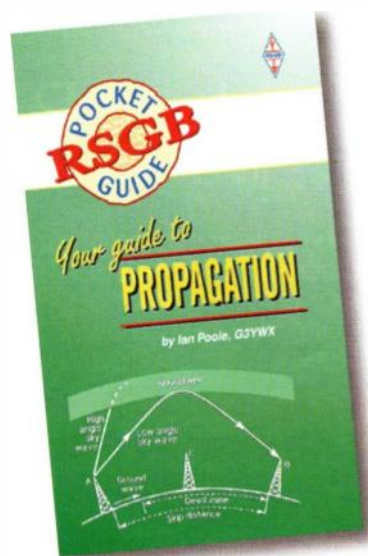
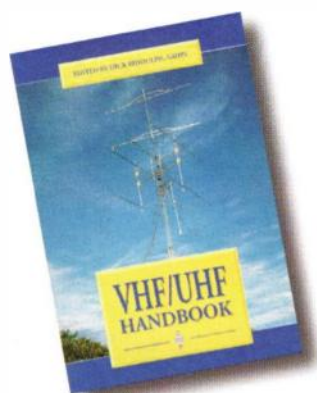
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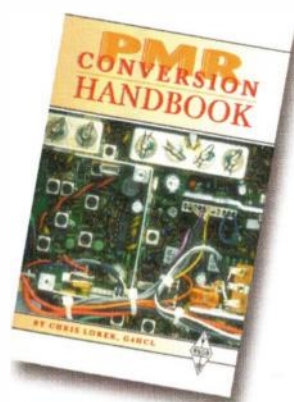
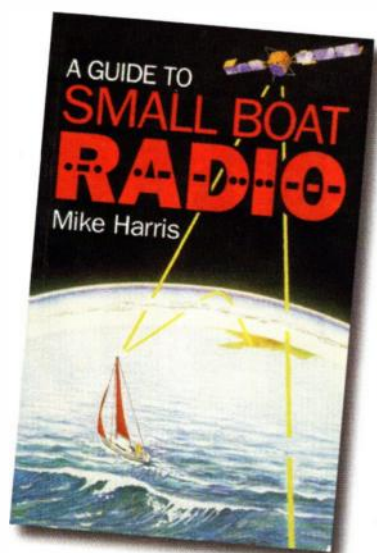
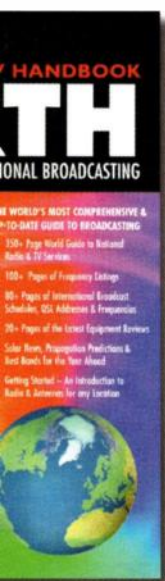
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Ayr ARG

7.30pm fortnightly Fris. 22 Jan foreign affairs, GM0JMO. 19 Feb California kW, GM4NFC. 5 Mar home constructors' evening. 19 Mar 'the higher reaches', GM4CXM. Peter Sturgeon, MM0BQP, 01292 282597, petersturg@aol.com

Bangor & DARS

8.00pm, usually on 1st Wed of month, at Clandeboye Lodge Hotel, Bangor, Co Down. 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 (6-8.00pm).

Bournemouth RS

5 Mar 'The RSGB Today & Tomorrow', Peter Kirby, G0TWW, RSGB General Manager. Mike Stevens, 01202 872692.

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. 1 Mar Essex Repeater Group, Mike, G4ZPE. 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. 22 Feb practical HF linears, Ross Clare, GW3NWS. 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 10min talks by club members, Graham, G4NPD. Alan Messenger, G0TLK: 0181 777 0420.

Bromsgrove ARS

8.00pm 2nd & 4th Tue of month at Lickey End Social Club, Alcester Rd, Burscot, Bromsgrove. 23 Feb antenna construction & MFJ-259. 9 Mar



Technical Topics discussion. 23 Mar talk. Gus Malcolm, G8DEC: 01527 875573.

Buxton Radio Amateurs

2nd & 4th Tue of month at Lee Wood Hotel, Park Rd, Buxton. 23 Feb watts to dB explained. 9 Mar border hike video. 23 Mar Goyt Valley challenge discussion. 13 Apr QSL night. J Watmough, 01298 79500.

Chelmsford ARS

1st Tue of month. 2 Mar QRP, Tom, G4INM, talk by Ken, G3PMW, Essex Repeater Group briefing. Charles Shelton, G0GJS, 01245 256654.

Cheltenham ARA

7.45 for 8.00pm on 1st Fri of month at Prestbury Library, The Burgage, Prestbury, Cheltenham. 5 Mar constructors' contest. Mrs Patricia Thom, G1NKS: 01242 241099 (9.00am - 9.00pm).

Chesham & DARS

8.15pm Wed at The White Hill Centre, Chesham. 17 Feb home construction. 24 Feb on air. P Blakeney, G8BLB, 01494 784811.

Cheshunt & DARC

8.00pm Weds at the Church Room, Church Lane, Wormley, Herts. 17 Feb on air. 24 Feb high power semiconductor motor controllers, Chas Bockling, G1YRK. 3 Mar members' forum. 10 Mar junk sale. 17 Mar on air team contest. 24 Mar VSWR & measurement by sweeper, Jim, G0JXN. 31 Mar tuning & pruning aerials, Jim, G0JXN. Jim Brightman, G0JXN, 01992 468204.

Coventry ARS

8.00pm Fris at Binley Church Hall, Brinklow Road, Coventry. 19 Feb annual dinner. 26 Feb on air. 5 Mar surplus equipment sale. 12 Mar

on air. 19 Mar portable evening (venue TBA). 26 Mar on air. Robin Tew, G4JDO, 01203 673999.

Cray Valley RS

8.00pm 1st & 3rd Thus of month at Progress Hall, Admiral Seymore Road, Eltham, London SE9. 4 Mar 'fox hunting' & Kanga Products, Dick Pascoe, G0BPS. 18 Mar construction contest. Tony Fishpool, G4WIF: 0171 739 5057 (office hours).

Crystal Palace & DRC

20 Feb AGM, construction contest. 3 Mar basic electronics, components, M1BJC. 20 Mar electronic warfare. 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. 17 Feb basic test equipment, Dennis Mott. 3 Mar RLO / funny cop, Derek Allen. 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. 1 Mar getting on air with ATV. 15 Mar discussion. Stewart Rolfe, GW0ETF, 01248 362229.

East Cleveland ARC

7.00pm Fris at Jubilee Hall, Gurney St, New Marske. 5 Mar rig check night. 12 Mar transformers, Robert, M0BJX. 19 Mar invisible antennas, Alistair, G4OLK. 26 Mar mobile telephone experiences, Malcolm, G4YMB. Alistair Mackay, G4OLK, 01642 475671.

East Yorkshire ARS

Thus at Northern Foods Sports & Social Club, Cottingham. 18 Feb way ahead meeting. 26 Feb annual dinner. David Boughton, G7PER, 01482 656324, dc.boughton@which.net

Echelford ARS

7.00 for 7.30pm 2nd & 4th Thu at The Hall, St Martins Court, Kingston Crescent, Ashford, Middx. 25 Feb 10GHz DX, G4ZXU. 11 Mar bring & buy. 25 Mar AGM. 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. 8

To include your club in this section, send your club event details to: The Editor, *Ham Radio Today* (Club News), RSGB Publications, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE; fax: 01707 645105. The deadline for the May issue is 15 March; for the June issue it's 12 April and for July, 17 May.

Mar construction competition. 15 Mar on air. G0WHJ, 01392 434078.

Felixstowe & DARS

8.00pm at Orwell Park School, Nacton, Ipswich. 22 Feb CQWW. 8 Mar Chinese cookery demo. 22 Mar AGM. Paul, G4YQC: 01394 273507.

Flight Refueling ARS

meets in / near Wimborne, Dorset. 21 Feb Mediterranean DX, John, G4POF. Tony White, G0IWZ, 01202 682438 (day).

Gloucester AR&ES

22 Feb Morse practice. 1 Mar 136kHz talk / project. 8 Mar the Outback radio story. 15, 29 Mar Morse practice. 22 Mar on air. Tony Martin, 01452 618930 (office hours).

Goole R&ES

7.30pm Fris at West Park Pavilion, Goole. 19 Feb visit to GEL. 5 Mar planning. 12 Mar talk. 19 Mar treasure hunt. 26 Mar fund raiser. Richard, G0GLZ, 01405 769894.

Guildford & DRS

7.30 for 8.00pm. 26 Feb QRP. Tim Dabbs, G7JYQ, 0181 399 5125.

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. D Moss, G0DLM: 01422 202306.

Hambleton ARS

7.30pm at Allertonshire School, Northallerton. 4 Mar SSTV. 18 Mar talk. John Hampson, G0VXH: 01845 537547.

Harlow & DARC

Tues at Mark Hall Barn, First Avenue, Harlow. Novice course Mons at same venue. 23 Feb NRAE course for Jun exam begins. 9 Mar 9MOC Spratly Islands DXpedition, Steve Telenius-Lowe, G4JVG. Len, G7UFF, 01279 832700.

Hereford ARS

Fris. 19 Feb informal. 5 Mar amateur communications at 470 Tera Hertz. 19 Mar informal. Steve, M1BYN, 01432 760226, new e-mail: hars@hereford-ars.freemove.co.uk

Hoddesdon Radio Club

8.00pm alternate Tues at Conservative Club, Rye Road, Hoddesdon, Herts. 2 Mar R5GB President Hilary Clayton-Smith, G4JKS. 16 Mar open forum. 23

Mar RadCom, editor Steve White, G3ZVW. 26 Mar first club dinner. 30 Mar guest speaker. 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 Feb bring and buy. 23 Mar Red Army communications equipment, John Lines, G6XBG, Military Wireless ARS. Stuart Swain, G0FYX: 01705 472846.

Hornsea ARC

17 Feb non-linear editing demo, G4YTV. 24 Feb slide show, G4IGY. 3 Mar activity. 10 Mar committee meeting. 17 Mar talk, Peter Sheppard, G4EJP. 24 Mar contest antennas, Peter Rodmell, G3ZRS. 31 Mar activity. 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. 4 Mar junk sale. Details from David Miller, G4JHI, tel: 01403 252101.

Ipswich Radio Club

Meets Weds. 21 Feb Morse evening. Keith Gaunt, G7CIY, 01394 385431.

Itchen Valley ARC

2nd & 4th Fri. 26 Feb studying the sun, Ken Medway. 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. 2 Mar open evening. Robin Dellbridge, G0PMG, 01299 828136.

Lagan Valley ARC

2nd Wed of month at Harmony Hill Arts Centre, Lisburn, Co Antrim. Details from Reid Campbell, M10BOT, 01232 258403 or gi4gty@qsl.net

Leiston ARC

7.45pm 1st Tue on month at Leiston Town Athletic Association, Victory Rd, Leiston. 2 Mar eclipses and other wonders of the solar system, Paul Whiting, G4YQC. 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. 24 Feb visit Micromet Techniques. 3 Mar computer programming. 17 Mar open

forum. 24 Mar computer programming. John Riddoch, G1TSL, 01522 793751.

Liverpool & DARS

8.30pm Tues at Churchill Club, Church Road, Wavertree, Liverpool. 23 Feb surplus sale. 2 Mar NARSA rally preparations. 9 Mar on air. 30 Mar surplus sale. Ian Mant, G4WWX: 0151 722 1178.

Lothians Radio Society

7.30pm on 2nd & 4th Weds of month at Orwell Lodge Hotel, Colinton Road, Edinburgh. 24 Feb laser communication, Jim Hatton, GM4RJX. 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: 23 Feb 'indoor DF', maps required, Alan, G7HZZ. 2 Mar vintage radio repair, Ian, G8SNF. 9 Mar the PIC microcontroller, John, G8JMG. 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. 26 Feb RAE revision. 12 Mar BY China, Bob, RS178098, John, G0VEH. 26 Mar TBA. Marc Litchman, G0TOC, 0181 281 0886 (evenings), marc.litchman@brewin.co.uk

Maxpack

Midlands AX25 Packet Radio Users Group. 1 Mar PC upgrades for 2000? Ed Loach, G4ZXS, 01902 741877 (evenings).

Mid-Warwickshire ARS

23 Feb microwave links, John Levett, G3VTL. 9 Mar AGM. 23 Mar aerial basics, Terry Downing, G3MXH. Don Darkes, G4CYG, 01926 424465.

Moray Firth ARS

The club is a registered C&G examination centre for both the RAE and Novice RAE. It intends to offer the exams regularly, the next being the mid-year RAE. Geoff Crowley, GM7SJC, 01542 882818; gcrowley@cwcom.net

Newbury & DARS

7.30pm on 4th Wed at Memorial Hall, Upper Bucklebury, nr Newbury. 24 Feb advanced driving talk, Alan Dunkerton. 24 Mar TBA. Ian Trusson, G3RVM, 01635 826019, g3rvn@compuserve.com

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 Feb video of NARC's 1998 events, Jack, G3NJQ. 3 Mar 'science for all', Arnold, G3PTB. 17 Mar data modes, Phil Bridges, SMC / Siskin. 24 Mar HF NFD briefing. John, G0VZD, 01953 604769.



North Wakefield RC

8.00pm Thus at East Ardsley Cricket Club, Wakefield. 25 Feb junk sale. 4 Mar on air. 11 Mar police drugs squad. 25 Mar bus preservation. Further details: 0113 253 9087.

Nunsfield House ARG

Fris at Nunsfield House Community Association, 31 Boulton Lane, Alvaston, Derby. 19 Feb Police dog handler PC Campion + dog. 26 Feb surplus sale. 5 Mar going for a song quiz, Kevin, M0BJT. 12 Mar alternative technologies, John Beardmore. 19 Mar Les Jackson talks!, G3OZ. 26 Mar surplus sale. Ann Wolverson, 2E1GNP, 01332 752997.

Radio Society of Harrow

8.00pm Fris at Harrow Arts Centre, Uxbridge Rd, Hatch End, Middx. 26 Feb on air: try out the new antenna. 5 Mar QSL techniques. 19 Mar AGM & Irish theme evening: food & drink, work EI stations. Jim Ballard, G0AOT, 01895 476933 (evenings / weekends), 0171 278 6421 (day).

Salop ARS

18 Feb collecting 'sheepskins', Fred Hall, G3NSY. 4 Mar repeaters, recent changes, G3UQH. 18 Mar talk, G3IDY. Fred Hall, G3NSY, 01743 790457.

Sheffield & DARS

8.00pm Thus at Church Hall, Amphill Rd, Sheffield, Beds. CW practice from 7.30pm. 23 Feb AGM. Derek Clarkson, G4JLP: 01462 851722.

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. 19 Feb general meeting. 12 Mar Rob Mannion, G3XFD, PW editor. Dave, G0KHC: 0181 505 1871.

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. 3 Mar Pacific crossing, John Layton, G4AAL. 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 Feb photographic bring & buy, Jean, G0AWX. 24 Feb history of large well-known local firm, Fred, G7LPP. 3 Mar 15m activity evening. 10 Mar simple home construction, Ken, G0TDS. 17 Mar radio books, buy, sell, exchange, Doug, G3KUL. 24 Mar quiz & rally planning, Muriel, G4YZR. 31 Mar 10GHz activity, Bill, G6PJS. Len Baker, G4RZY, 01275 834282 (24 hr answerphone).

THIS MONTH AT THE... THIS MONTH AT THE...



Southdown ARS

7.30pm first Mon of month at Chaseley Home, Bolsover Road, and each Friday at the Hailsham Lagoon. 1 Mar hearing and sound, Eddie Wilson, G0ECW. Peter Martin, G6GVM, 01323 731514.

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. Dave Green, G8BCQ, 0181 366 8680.

South Notts ARC

7.00pm Weds at Fairham Community College, Farnborough Rd, Clifton, Nottingham. 17 Feb meeting at the Sun Inn, Gotham. 24 Feb computer logging demo, on air. 3 Mar languages, Roy, G4NPT. 10 Mar on air. 17 Mar open forum, members only. 24 Mar on air. 31 Mar design your own QSL card on computer, Julie, G0SOU. Vice Chairman tel: 01509 672846.

Stockport RS

2nd & 4th Weds. 24 Feb 'Over the Oggins', Nigel Roscoe, G0RXA. David Simcock, 0161 285 0017.

Stourbridge & DARS

8.00pm on 1st & 3rd Mon at the Radio Shack, Oldswinford Hospital, Heath Lane, Stourbridge. 1 Mar on air. 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 Feb 9M0C Spratly DXpedition. 8 Mar packet live demo, G3ZFR. 22 Mar junk sale. 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. 2 Mar visit from Waters & Stanton (TBC). Mark Bean, G7UTC, 01787 377493.

Surrey Radio Contact Club

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

Swansea ARS

23 Feb '3D TV: a Virtual Reality'. Dave Williams, GW4BNJ, 01792 519046.

Swindon & DARC

7.00 for 8.00pm Thus at Eastcott Community Centre, Savernake Street, Old Town, Swindon. 18 Feb PC hardware, Mike Biddulph, G7CGB. 4 Mar radar & radio communications museum, HMS Collingwood, Lt Cmdr Bill Legge RN & Dave, G3VXM. 18 Mar 'In Practice - Live', Dr Ian White, G3SEK. Den Forrest, M0ACM, tel / fax: 01793 822705.

Telford & DARS

8.00pm Weds at Community Centre, Bank Road, Dawley, Telford. 24 Feb HF operating demo. 3 Mar committee meeting, on air. 10 Mar major construction competition (over £5). 17 Mar pre-AGM and contest planning. 24 Mar AGM. Mike Street, G3JKX, 01952 299677.

Thornton Cleveleys ARS

Meets Mons. 22 Feb technical talk. 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 Feb AGM. 19 Mar West African antics, Roger, G3SXW. Peter Tanner, G4VTO: 01803 864528 (day).

Trowbridge & DARC

8.00pm 1st & 3rd Wed of month (3rd Weds usually 'natter nights') at Southwick Village Hall, Southwick, on A361 Trowbridge / Frome road. 3 Mar surplus equipment sale. Ian Carter, G0GRI: 01225 864698 (evenings / weekends).

Verulam ARC

7.30 for 8.00pm at RAF Association HQ, New Kent Rd, St Albans. 23 Feb AGM. 23 Mar 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. 23 Feb construction contest judging. Ian Roberts, M0BFO, 01924 216502.

Warrington ARC

8.00pm Tues (Morse classes Weds) at Grappenhall Youth & Community Association, Bell House Lane, Grappenhall, Cheshire. 23 Feb cardiac arrest & resuscitation, Dave, G0RVW. 2 Mar 'Blue Peter evening', Mick, M0ACK. 9 Mar RSGB Zonal Council Member Peter Sheppard, G4EJP. 16 Mar rally preparations. 23 Mar rally post mortem. 30 Mar 'search for the ultimate DX', Ian, G0DMU. John Riley, G0RPG, 01925 762722.

Welland Valley ARS

7.15pm 1st Tue of month at Great Bowden Village Hall, The Green, Great Bowden, Market Harborough. 2 Mar construction competition judging. Simon Day, G8PAN, 01858 432109; e-mail: 106161.304@compuserve.com

Worthing & DARC

Weds. 24 Feb club photo competition. G4GPX, 01903 753893.

Yarmouth RC

7.30 for 8.00pm Fris exc no meeting 1st Fri of month, at Bradwell Community Centre, Church Lane, Bradwell. 26 Feb military radio equipment demo, G0VKM. 12 Mar open forum - all welcome. 26 Mar on air. Tony Besford, G3NHU, 01493 721173.

Yeovil ARC

7.00pm Thus at the Red Cross Centre, Grove Avenue, Yeovil. 18 Feb homebrew construction, Tim Walford, G3PCJ. 25 Feb on air. Mike Smith, G7SDD, 01935 814612.

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 a rally and HF RTTY contest each year. For more details about the group contact Membership Secretary Bill McGill, G0DXB, 14 Farquhar Road, Maltby, Rotherham, S.Yorks S66 7PD, tel: 01709 814010 (Tues, Thurs & 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.cdxc.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

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 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-Wilows, Bedale, N Yorks DL8 1SX. 24hr emergency national contact line: 0141 621 2121; Raynet supplies: 01369 708760 or 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 Durley 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; packet: G6FHM@GB7PMB; e-mail: rare@donsun.demon.co.uk

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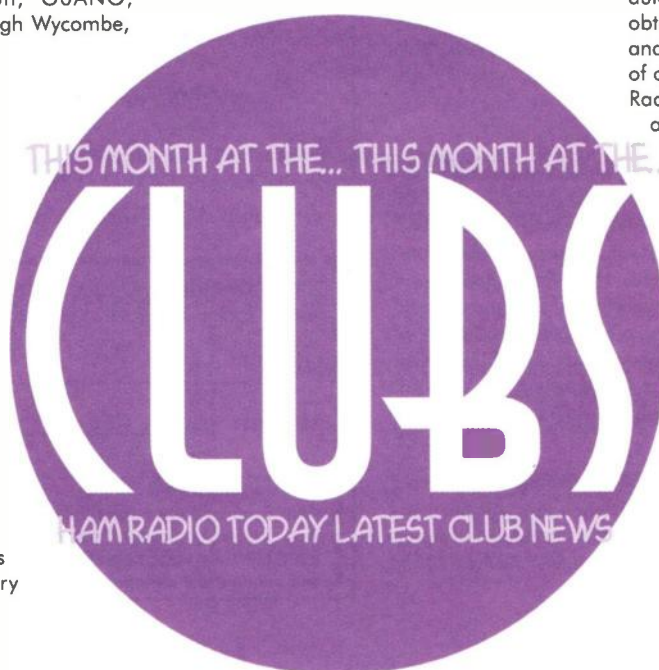
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Radio Society of Great Britain (RSGB)

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 a 100-page colour magazine sent to their home each month, and also have the advantage of free QSLing, automatic entry in RSGB contests, and help in obtaining planning permission for antennas, and 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

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Hardly the result of skimping.

In fact, the only way we could bring you the TH-G71E for so little money was through our continued investment in advanced manufacturing techniques.

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KENWOOD

"The VX-1R is smaller than most pagers!"

"Over 19 hours* of use from the rechargeable lithium ion battery!"



"Looks like Yaesu did it again!"

VX-1R

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Dual-Band Handheld

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Actual Size
Shown
1 7/8" x 3 3/16" x 1 5/16"

Features

- Frequency Coverage
Wide Multi-Band Receive
RX: 76~999 MHz**
TX: 144~146, 430~440 MHz
- AM/FM/TV Broadcast Receive
- AM Aircraft Receive
- CTCSS Encode/Decode
- DCS Encode/Decode
- CTCSS/DCS Tone Search
- Dual Watch
- SmartSearch™
- Auto Range Transpond System™ (ARTS™)
- Priority Channel Alarm
- ADMS-1D Windows™ Programmable
- 1 Watt External Power Supply
- 80 Minute Rapid Charger
- Flexible Antenna, Belt Clip, Hand Strap

**Cellular blocked

*Battery Life 5-5-90 duty cycle.

FT-50R
Compact
Dual Band
Handheld



FT-51R
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