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# HRT

## HAM RADIO TODAY

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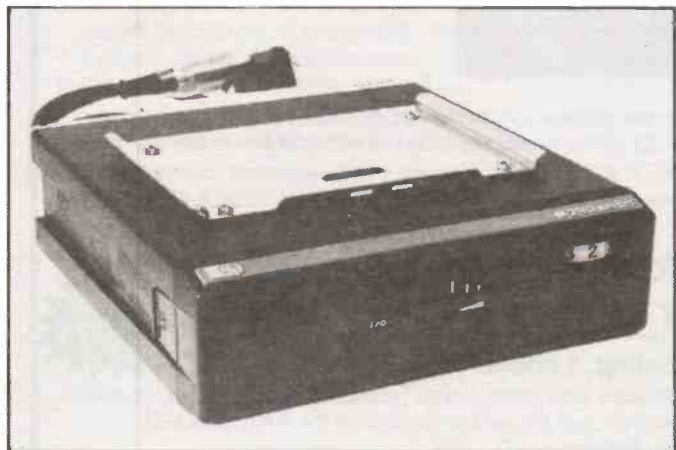
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Icom IC-2iE Reviewed

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# CQ de G8IYA

*HRT readers are awake, who else is?*



**Some of the happy HRT crew, alive and awake at the Leicester Show, ready to chat to readers**

This month I'm very pleased to report that, following a couple of 'pleas' in the HRT 'Letters' column from a reader in Grimsby who desperately wanted to join a Novice class but with none to be found, that a club has responded and is currently setting up such a course. Another is John Badger G4YZO who in response to our calls for RAE and Novice courses has set these up for amateurs in his home town. Also, the latest edition of 'Vital Spark', the newsletter of the Hastings and Electronics Radio Club which landed on my desk this morning, also shows they've started a club-run RAE course as well as an NRAE course. More power to your respective elbows lads!

A large number of amateurs take the trouble to give their time freely to help others, and in next month's issue you'll see a nomination form for our annual HRT 'Amateur of the Year' award. Last year I was most surprised to find that one or two amateurs, who I know have spent a significant amount of effort in voluntarily helping the hobby, hadn't been nominated. I bet you can think of one or two people right now. We're planning to offer a small transceiver as the prize this time, so get your thinking caps on, think about preparing a short written proposal of why you think such-and-such a person should win the award. Look out for the entry form in next month's issue, or if you can't wait then just drop me an SAE, to the HRT address (listed at the

rear of the magazine) and you'll have one in the post to you.

## Reflections

Looking back over the past year has shown it to have been a difficult time for many. Amateur radio dealers have also suffered, with several having gone 'down', and at the Leicester show yet another such dealer was evident by the lack of his very large and usually well noticed brightly lit stand. It isn't just the small dealers, it's the big ones as well. Fortunately HRT has been 'weathering' this with no decrease in circulation, so we must be doing something right!

We're not sitting around contented though, we're keeping our eyes very much open to make sure we present what you want us to. To this end it's very useful chatting to amateurs at rallies and exhibitions, and from these chats I sometimes receive the odd comment of 'I don't agree with such-and-such in HRT' or 'I fully agree with your magazine on so-and-so'. Taking the subject a little further more often than not reveals that it's the 'Letters' or 'Radio Today' news pages that are the topic of conversation. Alternatively it's the subject matter in the 'CQ de G8IYA' Editorials. If you read carefully, you'll see that, besides reader's personal views and opinions in the letters pages (we don't censor your views!), it's usually facts, not opinions, stated there with a few carefully-put 'suggestions' thrown in for good measure to get discussion going, to keep you on your toes as well as keeping you informed. In other words, we rattle the cage!

We support our national society but are not 'spoon fed' by them, if we disagree with something we make no bones about it. We need a national society, who runs it is up to you. Again we have a good relationship with the RA and we're happy to publicize the information they give us. But again, as you'll have seen, we may not agree with some of it. Through the 'independent voice' of HRT we're pleased to have been able to change a few things, or at least brought them to light so something could be done about them.

## Keep the Cage Rattling!

Yes, we could sit back and let things go as there are, being 'spoon fed' by all and sundry. But the Editorial team on HRT are alive, we're awake, we're not content to let the hobby go the way some other leisure interests have due to apathy combined with lack of available resources. We like to get a bit of controversy going! To get amateurs talking about things on the air. Not just 'you're 5 and 9 old man, name is Fred, QSL 100% sure' and then onto the next one, and the next, and the next. We like to get club activities going. Of course it's sometimes not worth going down to club, besides it's only the usual moaners waffling about who they worked the night before, no interesting talks or outings. Does this ring a bell? It's significant that a group of go-ahead amateurs have recently started up an active club, just down the road from the HRT head office!

We also report on new thing you may like to try out. No, I don't fancy trying packet, or the orbiting 2m/70cm FM repeater I can work Europeans with using my dual-band mobile rig, all this satellite stuff is too advanced for me, even if it is just pressing a button and talking. What about those funny noises we hear on S22, some packet stuff from a space station - I want to talk to my mate Fred down the road on FM, not U6MIR or whatever. So what if they're cosmonauts, shouldn't be allowed to cause QRM like that should they?

By prompting discussion, hopefully we're keeping you awake, alive to what's going on in the world of Amateur Radio. If you'd like to share your views with others, write to us! We'll be pleased to publish constructive letters, even if they are the moaning type, just remember to keep them constructive!

Finally, wherever you may be reading this, may I wish you a happy and peaceful Christmas, in our shared hobby where international and political barriers mean nothing to the goodwill we wish each other following our QSOs. 73 de G8IYA.

# LETTERS

## Letter of the month

Dear HRT,  
In your October issue you printed a letter from Ray Williams, regarding attending classes for the Novice exam. I like him am more or less confined to the house, and am only able to get around on a walking frame, but at 81 I was able, with the help of the Senior Instructor for the county of Powys, to take my instruction and also my exam at home. In the end I passed my exam and received my Novice Licence. I would like to suggest to Mr. Williams that he contacts his Senior Instructor for his area, and I feel sure he will be able to come to some arrangement to suit his needs. So come on Mr. Williams get cracking, I feel sure that you will get one hundred per cent cooperation from all concerned.  
Harry Brunning 2W1AVC.

**Editorial comment;**  
**As Novice instructors ourselves we can only echo your sentiments, Novice training can easily be done on a 'one-to-one' basis. Congratulations on making it Harry, and thank you to your instructor who we're sending a small 'something' in the post to.**

Dear HRT,  
As a new reader to your magazine I find it very helpful and informative to someone like myself starting out in amateur radio, but what seems to be missing is a 'problem page' as they seem to have in computer/video/photography magazines. I think this would be a great help, what do you think?  
Les Johnstone.

**Editorial comment;**  
**The Editorial staff and our contributors are very willing to help readers directly in terms of 'problems' with subjects covered in HRT articles, as well as many other 'general' problems. When we can't for some reason, our free 'Helplines'**

can be of use for a 'problem shared'. Due to the specialized nature of our hobby, a lower number of such 'problems' are shared by others, so we prefer to use the Editorial space for another review, construction article, ex-PMR conversion, and the like. If we add something, unfortunately we must take something away, so instead we just work harder into the night in replying to readers individually, which not many other magazine staff do!

Dear HRT,  
Thank you again for another excellent copy of your magazine. I see that in your August issue under the title of 'Abuse of the Airwaves', you state that "a radio amateur pleaded guilty to two charges of using radio apparatus and was fined £150 and ordered to pay £300 costs". I wonder why your and other publications have not named this person, when national as well as local papers quote names and addresses of persons who have been convicted of offenses like drink and drive, theft, rape, shoplift, etc. Surely, if we knew who this individual is then we have the opportunity to work or ignore as we deem fit. As things stand now this person stays anonymous and I could find myself chatting away to a 'radio amateur' who is a self-confessed jammer, this cannot be good for our hobby. We must have the right not to encourage people who set out to bring scorn and ridicule to our hobby. If there is some legal reason for not naming him, then OK, but I, and others, seem confused as to why no name and call sign (even a pirated one) has not been given. Your comments would be appreciated, thanks again.  
Malcolm Pemberton G6DAY.

**Editorial comment;**  
**This point was raised during one of our recent meetings with the RA, who normally provide us with such information. They tell us that the question of 'naming names' is a 'difficult' one. Rather than become a 'sensationalist' magazine, we prefer**

to report facts, and occasionally (and hopefully!) even stir people into discussion and activity for the progression of our hobby. The fact that the RIS can and do prosecute abusers of the radio spectrum should hopefully be enough to dissuade others, nationally, and we're glad to publicize this. But if local amateurs wish to ask the court in question exactly who it was who was convicted, then from the information provided they'd be able to find out. Otherwise, we simply respect the information we're given and put it into print as appropriate.

We've received a number of letters (see last month's Editorial) regarding the new proposed Morse exam, as follows;

Dear HRT,  
I am well aware that one of the objects of a letters column is to generate feedback or stir things up. This you have indeed achieved with me for the letter from Mr. Mansell (Nov 92 HRT).  
Does the extra material make the test harder for the Novice? Yes, students will have to learn more - the abbreviations, the Q codes and the procedure signs. It should be noted however that a student will not, or should not, sit down and learn them. If the student is taking advantage of the GB2CW broadcasts these new parts can be learnt in a 'passive' manner, i.e., through constant repetition. The abbreviations can be used and their mode of formation considered as general examples for use in other situations. Over the few weeks I have been using this altered format on my GB2CW transmissions I have found that the students quickly pick up the meaning of these new elements, especially the beginners who consider these 'funny' combinations of letters as being quite normal.

The advantages of the new style test are; a) It is shorter than the old style yet permits the same number of errors. It could be argued that this makes it easier. b) A thoughtful study

## £10 for the Letter of the Month

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. So write in with your views, to Letters Column, P.O. Box 73, Eastleigh, Hants SO5 5WG.

# "TONE" BURST



By G6MEN



of the information published by the RSGB would show that the receiving test is somewhat like a 'rubber stamp' QSO. This similarity of form should again make the test easier, though beware the dangers of anticipation! c) The new format is in line with real life CW QSOs and the student will be able to participate on air with confidence in that he has the required knowledge of what to do. This will make life more interesting as the student will be 'learning by doing'.

If you compare the Morse test with any other, it must be the easiest in the world as you only need to know 26 letters and 10 digits! As an evening class tutor, a GB2CW operator, and as an examiner, I trust you will publish this missive.  
R. Wilson G4NZU.

Dear HRT,

I was very interested when I read the comments of R. Mansell in his letter in the November 92 HRT, and I am in total agreement with them. I am also annoyed by the attitude of the RSGB, after all, they are supposed to look after the Radio Amateur. But do they? Or is it the 'old boy network' at it again? After all the years of a standard Morse test, the RSGB have now stated that they are going to alter the format of the test.

When I discussed this at my club, I found the reaction of some members very interesting. Yes they said, it is a good thing that the test is to include QSOs etc. It will help you get on the air on the CW bands much sooner. I may add these comments all came from A licence holders, not one B licence holder agreed at all. We all think the RSGB have taken a very high handed attitude towards B licence holders, in implementing the revised test without consultation with rank and file members. Also, not

everyone is a member of the RSGB. For an organisation like the RSGB to tell us what they consider is best for us comes very close to discrimination.

Finally, I fully endorse the comments you made at the end of Mr. Mansell's letter, only I would have worded it a little more strongly. I realise that for you this is not possible, however, keep up the great work. Perhaps now the RSGB are going to be hard pushed to deal with all those applications for the Morse test before next March!

V. Lowe G1IND

Dear HRT,

I am wondering what has come over the RSGB recently. I am referring to the changes to the format of the Morse test. I was under the impression that we were trying to get more people into amateur radio, not make it more difficult for them. Many people have commented on how difficult the new Novice Morse test is, and that it would be easier to obtain the full 12 wpm test. So instead of making it easier, they make the full test even more difficult. At least with plain text you can see the odd mistake, how can you do that with the Q code I wonder. The RSGB seem to believe very much in the carrot and the stick approach, the problem is the carrot isn't worth the effort.

Why is it that with a lot of people not having an interest in CW as a mode for regular use, we have some parties forcing it down our throats.  
J. Robertson G0KJU.

Dear HRT,

I am unable to resist what was obviously a provocative comment in your editorial after the letter from G00VK in Nov 92 HRT, when you suggested that the change of format

of the CW test was an unnecessary obstacle compared to its present form of plain language. It is necessary to know the QSO format symbols for the RAE anyway and, as they are all letters of the alphabet, that should present no additional difficulty should it? With the new format of the CW test people would be able to go straight on the air and have a QSO in CW which is more than many ops feel they can do having trained in plain language, with separate numbers. This is a positive step to make the test more useful and is likely to result in more CW QSOs after the test rather than use it by way as a means to an end.

Yours faithfully,  
R. G. Preston G0RAX.

Dear HRT,

\*!!\*\*!, what will the RSGB do next? Now we have to learn QSO symbols as well as plain Morse. Is this required as a regulation by the RA? The RSGB told me when I phoned them that the Chief Examiner had questioned his examiners, and then asked to do it to the RA.

Finally, as a reader of your mag from number 1, may I say I like it. Its the only one I don't have to look down the index first to see if I want to buy it, as I do with other radio mags.  
C. Parker-Larkin (Squibs), G8UVG.

**Editorial comment;**  
It's interesting to note that all the 'pro-new-exam' letters come from Class A's, and all the 'anti-new-exam' letters come from Class Bs. Rather than to HRT, you can address correspondence regarding this proposed change to;  
Radiocommunications Agency, Amateur Radio Licensing Division, Waterloo Bridge House, Waterloo Road, London, SE1 8UA.

# RADIO TODAY

## HRT at the Leicester Show

During the two days of October 22nd and 23rd, we joined over 7,600 other visitors to the Granby Halls in Leicester at the 1992 Leicester Amateur Radio and Electronics Exhibition. Our 'crew' at the exhibition included Editor Sheila, Tech. Ed. Chris, Claire, Amanda, Helen and Donna from Advertising, and Jason and Dave from Magazine Sales, plus several contributors who came along also to meet the many readers who visited us at the Argus Specialist Publications stand. We found that two amateurs had travelled all the way from Germany to attend the show, a 17 hour drive (that's dedication for you) plus a French trader who may even be exhibiting at next year's event.

As well as the many bargains on display, the Leicester show has traditionally been the place where new products are launched. This year, these included the IC2iE from Icom (reviewed in this issue - we got in there quick!), the PacComm Pactor controller by Siskin Electronics (sat here for review!), and the Friday evening brought about a trade presentation hosted by Graham Taylor of SMC. Here the new FRG-100 high-performance HF general coverage receiver, and the new FT-530 dual band FM handheld paging transceiver, complete with optional LCD speaker/mic controller, were revealed (reviews planned). The refreshments hosted by SMC provided a welcome 'break' after a long first exhibition day, this was followed by a celebration anniversary 'party' next door hosted by our friends PW Publishing, which we enjoyed together with many of the traders at the show (thanks for the invite Elaine). The unexpected (and unconnected) firework display hosted by one of our trader friends at around midnight made the evening even more memorable!

The following day saw a large number of subscriptions taken at the HRT stand, one even being taken out before the official opening to 'beat the rush'. We really must say a big 'thank you' to the many readers who came along to meet us on the stand, it's great to meet you face to face, and we certainly enjoyed chatting to you!



A large crowd in the Sales Hall



The new FRG-100 and FT-530 were launched at the show



The Friday evening trade presentation was well attended

## New Callbook

The RSGB have just published their latest Callbook and Information Directory. If you've ever heard the abbreviation QTHR, this means the licensee's details are correctly printed in the current RSGB callbook, hence this is the one you'll need! This year, as well as listing UK Class A/B and E1 licensees, it adds UK Novice licensees to its listings. As well as being a 'callsign directory', it also

provides over 100 pages of comprehensive reference information such as HF and VHF awards, beacons, contest rules, EMC advice, repeater lists and maps and Morse practice transmissions and test details. Available either direct from the RSGB (£7.00 members or £9.50 non-members inc p/p - see 'Club News' pages for address), or from amateur radio dealers and bookshops (ISBN 1 872309 13 5).

## RAE and NRAE Pass Rates

The City and Guilds of London Institute has now published its report on the June Novice Radio Amateurs Examination. This shows that a record number of candidates (369) sat the exam, with a pass rate of 74%. A further City and Guilds report on the May RAE gives a pass rate of over 81% which is the highest for several years.

## Stolen Equipment

Stolen in the Edinburgh area; Icom receiver IC-R9000 serial number 01060. It is a large receiver complete with spectrum display and 30kHz to 2GHz coverage, costing well over £4000, so it isn't one of the 'run of the mill' sets. If you have any information, contact P. C. M. Forsyth (PC3467) at Lothian and Borders police, Tel. 0506 31200 (24hrs).



### Award Presentation to Ken G5KW

Major Ken Ellis G5KW, whose name many regular HRT readers will be familiar with, received a silver salver when he visited Jersey in late October. This was presented for his pioneering work on 50MHz by the Chairman of the UK Six Metre Group, Geoff Brown GJ4ICD, and Jersey Amateur Radio Society President Mike Turner, GJ0PDJ. Congratulations Ken!



(L-R) Geoff Brown GJ4ICD, Ken Ellis G5KW, and Mike Turner GJ0PDJ.

### VLF Radio

David Gibson of the Cave Radio and Electronics Group of the British Cave Research Association tells us the ELF and VLF radio bands have been largely neglected by amateur radio and electronic enthusiasts. He adds that negotiations with the RA for an amateur VLF allocation ARE well under way, and that neglect of the bottom end of the radio spectrum could be coming to an end. Here, the evocatively named 'dawn chorus', with its 'tweaks' and 'whistlers', comprises a whole range of natural phenomena generated in the earth's atmosphere. More practical uses of frequencies below 150kHz include broadcasting standard frequency and standard time services, hyperbolic navigation and communication through sea water or solid rock to submarines, miners and pot-holers.

David's group is already active in this field, and are intent on improving techniques of VLF radio communication with a particular emphasis on its use in cave surveying and cave rescue. A journal containing a broad mix of practical and theoretical articles is published quarterly, with recent articles covering Although most of the groups members are actively involved in caving, there is much here to interest those with a more general interest in VLF radio communication and miscellaneous electronic applications. Recent articles have covered the principles of inductive communication, aerial design, modulation methods, and the like. Full membership of the group, including subscription to the journal is £7.50. For details contact David Gibson at 12 Well House Drive, Leeds LS8 4BX, Tel. 0532 481218



BCRA

He added "Unfortunately, in the past some magistrates have imposed what seem to be lenient penalties for pirate radio offences. These stations not only cause radio and TV interference for the ordinary viewer and listener, but can seriously endanger life by disrupting the radio communications of the emergency services and airport control towers. This is no joking matter - it could cost lives".

"Pirate radio is theft, threat and thoughtlessness - theft of spectrum, threat to life, and mindless disdain for ordinary viewers and listeners. In one instance a pirate radio station was raided after it had interfered with the communications of an airport, the police, a bus company, the local authority, a legitimate community radio station and spoilt reception for many law abiding people".

From 30th September 1992, the fine that can be imposed in a Magistrates Court was increased from £2,000 to £5,000, six months imprisonment, and forfeiture of equipment. In Crown Courts the fine continues to be unlimited, with a maximum two years imprisonment and forfeiture of equipment.

### EI Activity Day - Dec 27

Following the success of the EI Activity Day held on March 17th, the Irish Radio Transmitters Society have decided to promote a second EI Activity Day in 1992 to give amateurs and SWLs worldwide another chance to qualify for the IRTS Diamond Jubilee Award. The date set is Sunday December 27th and all EI counties should be active on that day.

The Diamond Jubilee Award is being issued to

mark the Diamond Jubilee of the IRTS which was founded 60 years ago in 1932. It is available to amateurs who work at least 20 of the 26 EI counties during 1992 (SWLs on a 'heard' basis), on any band, any mode, (no endorsements). QSL cards are not required, send a log extract verified by two amateurs together with IR£3.00 (or equivalent) to; Diamond Jubilee Award Manager, IRTS, P. O. Box 462, Dublin 9. The latest date for receipt of applications is 1st April 1993.

### Stiffer Penalties for Pirate Radio

The RA tell us that stiffer penalties for pirate radio stations came into force at the end of September 1992. These were welcomed by Trade and Technology Minister Edward Leigh, who said "Pirate radio creates anarchy on the airwaves".

# RADIO

# HAMSTORES

# CELEBRATE SHOP & SE

## EXTEND THE HANDHELD DUAL-BAND 2m/70cm TRANSCEIVERS

### KENWOOD TH-78E (Dual-band)

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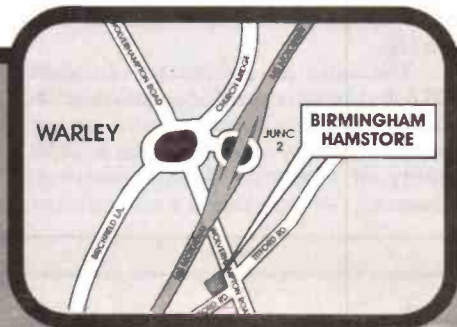
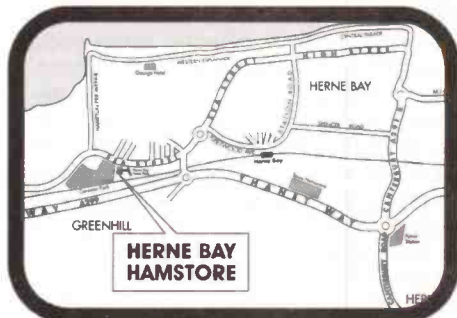
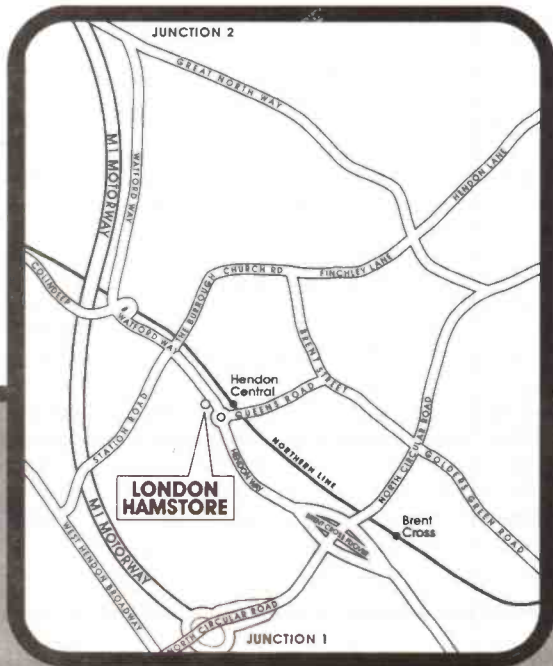
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# The 1992 HF and IOTA Convention

*Don Field G3XTT reports on the event*



**W9DC operates convention station GB1OTA while DK6NP looks on**



**The well-attended IOTA session**



**At the convention dinner F6AJA receives a plaque from G3KMA in recognition of his services to IOTA**

The RSGB HF and IOTA Convention was held at the end of September at the ICL Beaumont Training Centre near Windsor. The venue proved to be an excellent choice, offering very good conference facilities in a lovely setting. As the title suggests, this year the annual HF Convention was combined with an IOTA (Islands on the Air) event, reflecting the massive upsurge in interest in this, the most popular of the RSGB awards programmes. In fact, some 100 or so overseas visitors attended, most of them IOTA DXpeditioners and enthusiasts with no less than 27 DXCC countries represented, including most of Europe as well as Japan, Siberia, and the US.

The Saturday started with an open IOTA forum at which those involved in running the programme could be put on the spot by island chasers, with plenty of vigorous debate ensuing. However, perhaps this is a reflection of

how seriously the award is treated and the enthusiasm it engenders in its followers. After an excellent lunch the programme moved on to a series of presentations by IOTA expeditioners. That by Larry K5MK on organising a DXpedition was equally applicable to all expedition operations, as he spoke at length about the preparation which is required, the necessity of taking vital tools and spares, and much else of practical help.

Over 200 sat down to dinner on the Saturday evening. This was followed by a number of presentations as well as an address by the RSGB President and a short but amusing talk by Bob W9KNI, taking a light-hearted look at the DXing hobby. The formal proceedings ended with a presentation to a

packed audience by Terry Dubson W6MKB of the 1992 VP8SSI South Sandwich Islands DXpedition. The slides could only give a superficial idea of the cold and discomfort suffered by the team, but it was enough to leave the audience convinced that this was certainly one DXpedition where it was better to be at home in the warm shack than at the sharp end.

The Sunday programme, which attracted an attendance of over 350 from about 30 DXCC countries, consisted of three parallel lecture streams along with software demonstrations, RSGB committee stands, and a working station GB1OTA, organised by the Chiltern DX Club, which made almost 1000 QSOs in the course of the weekend.

Ross Clare GW3NWS gave hints and tips on homebrewing linear amplifiers followed by a 'clinic' in one of the smaller rooms where he attracted a constant succession of would-be constructors. Mike Grierson, G3TSO, also presented a fascinating constructional lecture on how he has gone about

putting together his superb HF transceivers. Strumech were there to talk about the use and abuse of towers, Peter G3RZP to take away the mythology surrounding SWR, Robin G3JWI to tackle the thorny issues of EMC and Peter G3SJX to explain that spending more on a transceiver may buy you more bells and whistles but is no guarantee of better HF performance. Ian G3TMA summarised the recent RadCom series on HF DXing. Myself and John G3WGV of the Reading Radio Club gave away some (but not all!) of our secrets of how to win NFD, while the contest forum addressed issues such as logging accuracy. The slide presentations included Hans DF5UG on his Malaysian IOTA operations, Doug G0LUH on Sri Lanka, Andy G4ZVJ on his most recent Pacific tour and Vincent G0LMX on the FO0CI Clipperton Island operation.

The HF Convention organisers have always ensured that the Convention is very much a social event as well as the lecture streams (which have an HF flavour but would undoubtedly be of interest to all amateurs). This year Martin Lynch acted as event sponsor, as well as showing some of the latest equipment, Martin kindly arranged for free tea and coffee to be available throughout the day. Peter G3RZP was pleased to find the bar served real ale!

To give you a flavour of who else you might have bumped into in the bar, some of the well-known overseas visitors were RA3AUU, SM0AGD, K5MK, DL2GAC, DK7PE, JI6KVR, F6EXV, ON5NT, DF5UG and DK6NP. It was also good to see the IARU HF managers for Italy and Germany, Mario I2MQP and Hans DJ6TJ.

Particular thanks are due to Bob Whelan G3PJT, Roger Balister, G3KMA, and other HF Committee members for their hard work in organising this most successful event, and to Don Beattie, G3OZF, for arranging the use of the excellent venue. Plans are already in hand for the 1993 Convention which will almost certainly take place over the weekend of 25/26th September. Put it in your diaries now! After all, if UA9OPA, UA9OBA and RZ9OA can travel for days by road and air to attend the Convention, what excuse is there for the G's!

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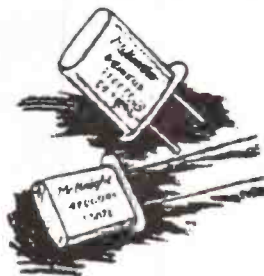
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# Icom IC-2iE Mini-review

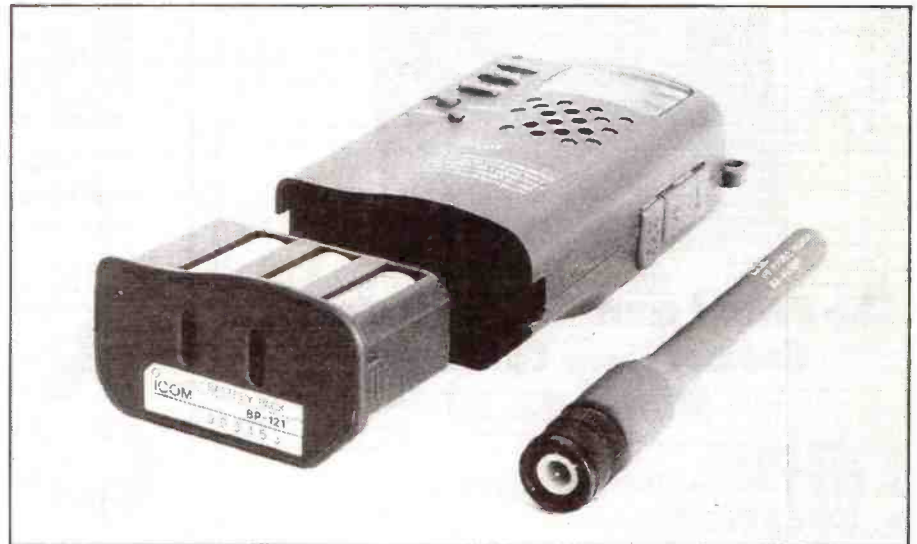
*Chris Lorek G4HCL with a mini-review of Icom's mini-portable*



Icom must like small things, as hot on the trail of their last mini-portable comes the new IC-2iE. As you can see from the photo, it's as small as ever, an internally-fitted battery pack giving it a 'designer image'. You'll also see it has a very limited layout of buttons and the like, and Icom (UK) tell me it's designed to appeal to those who long for simplicity in operating their rig rather than be confronted with keypads galore. The set tested here is the 2m version, the 70cm IC-4iE being identical apart from the operating band.

As a test of this, I started to program the ten memory channels, which I could easily do without even opening the manual. But try as I might I couldn't work out how to enter a repeater shift! This wasn't surprising, as a 'hidden' *multi-function mode* had to be programmed first, the shift programmed into the various memory channels, then the original *easy mode* restored. This is taking simplicity of use (no more accidentally transmitting on the wrong shift for example) to a new level!

With the supplied BP-121 7.2V 400mAh battery, the set gives around 1W output, plugging a 12V battery in gives higher power, and an external 13.8V supply puts this up to a hefty 5W for mobile use and the like. Three low



power levels are available, right down to 20mW nominal for ultra-local use. The rig comes with a plug-in wall charger with the correct UK three-pin plug moulded onto the case, a carrying strap, and a metal belt clip which you can attach to the back panel of the set.

## On The Air

The tiny size brings with it a tiny internal speaker, which not surprisingly I found rather 'toppy' and tending to distort badly if I cranked the volume up to maximum. But for normal handheld use it was fine, and I could plug in an optional external speaker-mic if needed for more demanding work. Although I had to program 8 of the 10 'normal' memory channels with R0-R7 repeater channels leaving two for other uses, two additional memories stored 'lower' and 'upper' scan limits for the VFO, which I found very useful for scanning the simplex channels. Switching between memories and VFO was a one-button press, likewise starting 'scan' mode of either, another button and an LCD backlight comes on, very easy indeed! Another 'nice' feature was the small digital clock display on the LCD along with the frequency, memory channel, and bar-graph S-meter.

On air I found the receiver was quite sensitive, although the S-meter often seemed to indicate full scale on

most signals. Living on the 'fringe' of portable coverage of two 2m repeaters, the 1W transmitter caused me a bit of frustration as I found I often couldn't get in, however the optional 12V 400mAh battery would no doubt have overcome this at the expense of increasing the overall size somewhat. Overall, I found the set as supplied was a very handy 'carry along' for my top pocket.

Icom (UK) also tell me the set is (quote) "designed to appeal to women", you can make from that what you like, but HRT Editor Sheila G8IYA thought it was very easy to use. That was, until she found she couldn't tune in 12.5kHz steps when needed. I found that neither could I, and nowhere in the manual did it tell me how to! Tut, tut Icom, what about the users in London eh? Although I worked out how to do it in 'multi-function' mode only, and an Icom 'Tech talk' document is reputedly available which describes this mode, this isn't supplied with the 'standard' set in the UK.

## Lab Tests

Suffice to say the set tested out fine, technical boffins can of course examine the accompanying lab results thoroughly. As a 'real test', with a fully charged nicad (this being above the 7.2V 'nominal' voltage) I measured 1.16W on transmit, but with the re-

ceiver volume fully up a rather awful 43.2% distortion confirming the on-air results - keeping the volume below 338mW gave less than 10% distortion.

## Conclusions

Icom's new set looks good, and it performed well although I'd personally

## LABORATORY RESULTS:

All measurements taken using fully charged BP-121 nicad, high power TX, otherwise stated.

### RECEIVER;

#### Sensitivity;

Input level required to give 12dB SINAD;

144MHz;	0.14µV pd
145MHz;	0.13µV pd
146MHz;	0.14µV pd

#### Squelch Sensitivity;

Threshold; 0.11µV pd (10dB SINAD)  
Maximum; 0.24µV pd (25dB SINAD)

#### Adjacent Channel Selectivity;

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

+12.5kHz;	20.0dB
-12.5kHz;	36.0dB
+25kHz;	63.5dB
-25kHz;	63.5dB

have liked more than 1W maximum output. However this would have shortened the life of the battery, making a bigger one necessary, making the set bigger, and so on, and as supplied it was a nice handy size. The set was also really easy to use which is an added 'plus point', but the lack of information on how to accomplish

#### Blocking;

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;	76.0dB
+1MHz;	90.0dB
+10MHz;	97.5dB

#### Intermodulation Rejection;

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

25/50kHz spacing;	65.0dB
50/100kHz spacing;	63.5dB

#### S-Meter Level

Reading	Sig. Level	Rel. Level
S1	sq. open	-
S3	0.35µV pd	-5.6dB
S5	0.42µV pd	-4.0dB
S7	0.53µV pd	-2.0dB
S9	0.67µV pd	0dB ref
S9+	0.79µV pd	+1.5dB
S9++	0.98µV pd	+3.4dB

12.5kHz step tuning may be a major shortcoming for some users. The current retail price is £255 including nicad and UK charger (but check the latest due to changes in exchange rates), and my thanks go to Icom (UK) for the loan of the review sample. Now lads, you don't really want it back, do you? Ah well, never mind!

#### Maximum Audio Output;

Measured at 1kHz on the onset of clipping, 8 ohm load;

338mW RMS

#### Image Rejection;

Increase in level of signal at first IF image frequency (-61.7MHz), over level of on-channel signal, to give identical 12dB SINAD signal;

76.0dB

#### Current Consumption

Standby, economizer off;	49.5mA
Receive, mid volume;	94mA
Receive, max. volume;	168mA

## TRANSMITTER

### TX Power and Current Consumption;

Freq.	Power	7.2V Supply	13.2V Supply
144MHz	High	720mW/580mA	5.30W/1.40A
	Low 3	720mW/580mA	2.83W/1.03A
	Low 2	560mW/540mA	560mW/540mA
	Low 1	15mW/70mA	15mW/70mA
145MHz	High	800mW/600mA	5.25W/1.38A
	Low 3	800mW/600mA	2.88W/1.04A
	Low 2	580mW/540mA	580mW/540mA
	Low 1	15mW/70mA	15mW/70mA
146MHz	High	900mW/650mA	5.30W/1.41A
	Low 3	900mW/650mA	2.93W/1.05A
	Low 2	580mW/540mA	580mW/540mA
	Low 1	15mW/70mA	15mW/70mA

#### Peak Deviation;

5.64kHz

#### Toneburst Deviation;

3.17kHz

#### Frequency Accuracy;

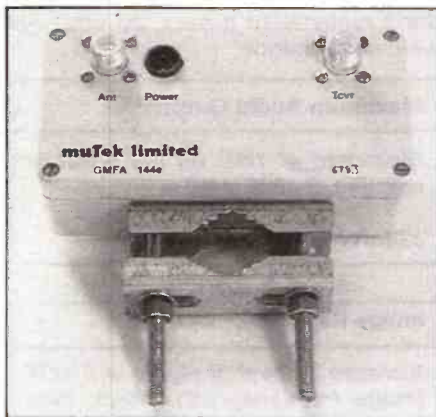
+185Hz

#### Harmonics;

2nd Harmonic;	-70dBc
3rd Harmonic;	-72dBc
4th Harmonic;	-78dBc
5th Harmonic;	-74dBc
6th Harmonic;	-73dBc
7th Harmonic;	-67dBc

# MuTek 2m Masthead Preamp Review

*Chirs lorek G4HCL improves his receive performance with muTek's masthead offering*



The tough masthead unit

The name of muTek is well known amongst dedicated VHF and UHF DXers. A 'muTek replacement front end' in your 2m multimode was virtually an essential for serious 2m contest working, and they've been producing high specification front ends and preamps longer than many amateurs have been active on the band. I quickly accepted

their offer to test the GMFA 144e 2m masthead preamp.

The tough weather-sealed polycarbonate case houses a well built two stage low noise amplifier with negative feedback applied to each stage, a muTek 'special' to keep the noise as low as possible. Two pairs of input/output TX/RX relays are used to provide plenty of preamp isolation along with the rated 1kW 50% duty cycle transmit handling power (250W continuous). As well as RF sensing with a half second hang time for 'quick installation', hard switching and a 50mS release time is of course available. The latter is preferred by most serious operators, typically using a sequence controller at the shack if high TX power is used. A three pin Dubilier socket is used for the 12-14V DC power and control lines, the unit going to 'through mode' when no DC is present.

I tested the unit over a period of time with my FT-736R multimode, and yes it certainly did improve things as expected over the 'barefoot' arrange-

ment fed with a feeder of a couple of dB loss. The benefits of a masthead preamp are gained when it's used to overcome such feeder loss, and I couldn't complain at all about the end result - superb. A super-low noise figure is a waste of time for most 2m terrestrial work, and muTek's claimed noise figure of less than 1dB was totally adequate, even when I had my beams pointed skywards towards OSCAR-13 for worldwide DX via satellite. Strong signal handling is another important factor. I sometimes suffer due to a local packet node (I can't complain as I run it!) and the signal gain of the preamp of course worsened this.

A test in the lab showed that the preamp's 1dB compression point was -0.9dBm measured at the input (better than the specified -5dBm), hence it was my transceiver limiting the performance, not the preamp. The signal gain was 12.1dB at 144MHz, 12.8dB at 145MHz and 12.5dB at 146MHz, with -3dB points at 142.5 and 147.7MHz, again confirming the unit's specifications.

The end result, another superb product from the firm, one which I'm sure a lot of dedicated 2m operators will be pleased to use. The GMFA 144e is currently priced at £185, and my thanks go to muTek Ltd. for the loan of the review sample.

## Mini Review - MFJ CW Keyer

*Dick Pascoe G0BPS tries the 'Deluxe' keyer from MFJ*



I've been using the MFJ 'Grandmaster Keyer' for some time now, finding the memories particularly useful, especially when operating with low power when I often have to repeat messages. However, keyers with memories are expensive and not everybody can afford one. One alternative, again from MFJ, is the 407B *Deluxe Electronic Keyer* which will fit the bill in cases where these fancy memories aren't required.

The keyer, which measures a quite large 185mm x 63mm x 150mm deep, runs either from an external 5-9V power

source or an internal 9V battery, and has outputs for both grid block for those valve sets and direct keying. I found the unit worked well, even at very high speeds, enough to satisfy the most ardent operator, although I very rarely change the weighting of my keyers and hence didn't adjust this. The pitch control allows adjustment of the sidetone, which can be set to match that from your transmitter or to any level you may prefer, a further control setting the volume of the tone.

The unit permits the use of either

type of lmbic operation, either producing a following alternate element when the paddles have been squeezed, or not, as required. For example with type 'A' selected on the rear panel, if the paddles are squeezed and then released during the 'dah' a letter 'A' will sound, with type 'B' selected there will be an added dot sounded giving an 'R'. A 'straight' key can also be used in this unit, if it is first switched into the 'semi-auto' mode.

I often wished that commercial keyers including this one would have the facility for changing the left to right paddle, to control the dot/dash sides of the keyer, as I know a few operators who differ from the rest of us and use dots on the right paddle. Oh, to be able to push in a switch and change them over.

### Conclusion

My overall impression is of a very nicely built keyer. The finish was good and it performed very well, doing the job required without any problems. I also appreciated the provided circuit diagram, which not many units come with these days.

My thanks go to Waters and Stanton Electronics for loaning the keyer for review, which currently retails at £79.95.



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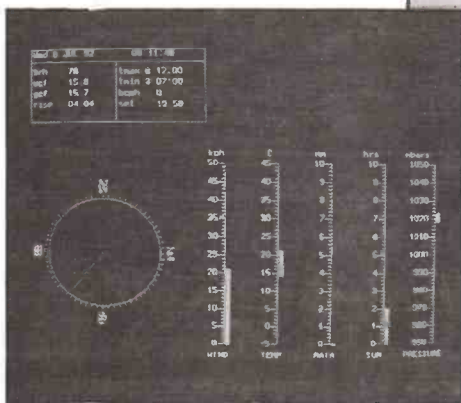
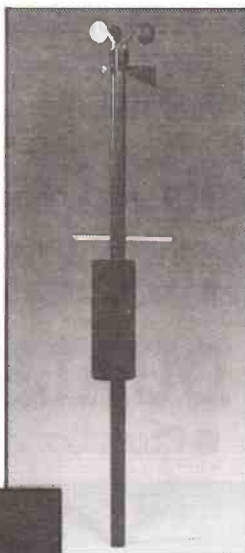
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experience, built of high grade materials  
and designed for performance.*

*They may cost a little more  
but look at the gains.*

- ◆ 5 year Warranty ◆ High gain, low noise and upgradeable ◆ High quality Mil Spec. feeder cable with 'N' termination and moulded connection to the driven element
- ◆ HE 9, 10 Gauge aluminium boom and stainless Steel fixings - STRONG and RESISTANT TO CORROSION ◆ Easily assembled and ready for immediate use - NO ADJUSTMENTS ◆ Unique Encapsulated matching system, protected from the atmosphere ◆

UK manufactured



Model	☆ 50/3	70/5	144/7	144/14	144/18	432/16	432/29	☆ 434/8V
No. of elements	3	5	7	14	18	16	29	8
Design Freq. - Mhz.	51	70.2	144.3	144.3	144.3	432.2	432.2	434
Gain - dBd.	6.1	7.5	10.3	14.2	16.4	15.8	17.8	11
VSWR at design Freq.	<-----< 1.2:1 ----->							
Boom Length - metres	2.4	2.8	2.8	6.9	9.7	2.9	5.9	1.6
Boom sections	1	1	1	3	3	1	2	1
Prices £	85	79	79	129	149	85	121	59

☆ New Products    Ⓞ Extended boom for vertical mounting

All prices include UK Vat and packing

Carriage £ 11.75 including Vat for overnight delivery - UK mainland only.

Other New Products include:- Vertical Colinears for 6m, 4m, 2m, & 70cms  
Active Receiving Antenna for 50 khz. to 30 Mhz.

Future Products Include :- 1296 Mhz. Antennas, HF Yagis and Verticals

## PHOENIX AERIALS ARE FOR THOSE WITH THE MOST TO GAIN

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For further details of these and other Phoenix products,  
contact the address above for a free catalogue.

# S.M.C.

# THREE WINNERS FOR 1993

Leeds (0532) 350606 Axminster (0297) 34918 Southampton (0703) 255111



## FRG100 HF RECEIVER

- 0.05-30MHz general coverage
- All mode AM, SSB, CW
- FM optional
- 50 memories
- Adjustable BFO for CW



## FT530 DUALBAND HANDIE

- Dual simultaneous receive on one band
- Optional remote mic with frequency display

## FT5100 DUALBAND MOBILE

- Dual receive
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# TRY A WINNER TODAY

# 'SHACK' ACCESSORIES

## ROTATORS



Suberb engineering standards combined with pin sharp setting accuracy means new technology from Yaesu create Kenbro Hygan.

G-250	Bell type twist/switch CTL	£79.75	C
G-400	Bell type meter controller	£152.00	C
G-400RC	Bell type round controller	£182.85	C
G-600RC	Bell type round controller	£240.00	C
G-800SDX	Bell type 450 deg. var. speed	£332.00	C
G-1000SDX	Bell type 450 deg. var. speed	£376.00	C
G-2000RC	Bell type round controller	£454.00	C
G-2700SDX	Bell type 450 deg. var. speed	£649.00	E
G-500A	Elevation meter controller	£203.00	C
G-54008	Azimuth/elev. dual control	£379.00	D
G-56008	Azimuth/elev. dual control	£444.00	D
RC5-1	Bell type round controller	£223.75	C
RC5-3	Bell type preset	£280.00	C
RC5A-3	Bell type var. speed & preset	£434.24	C
RC5B-3	Bell type var. speed & preset	£689.00	D

## ROTATOR HARDWARE

GS-050	Rotary bearing 1.5" mast	£20.39	B
GS-065	Rotary bearing 2" mast	£30.60	B
GC-038	Lower mast clamp G-400, 600 etc.	£17.35	B
9523	Channel master bearing	£19.95	B
CK46	Rotary bearing 1.5-2.5 mast	£35.75	B
MC1	Lower mast clamp RC5 series	£35.75	C

## COMPUTER INTERFACES FOR G-5400/G-56008

IF-100PC	1/F C/W lead & software IBMPC	£142.00	B
IF-100C4	1/F C/W lead & software CBM64/128	£148.00	B

## ROTATOR CONTROL CABLE

RC6W	6 way G-250, 400, 600, RC XRS50 per mtr.	£0.74	
RC8W	8 way G-2000 create series	£0.88	

## CARRIAGE

Rotator cable £3.50 up to over 20 mtrs. over 20 mtrs. £5.00

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VERSATOWER**

MAIN STOCKIST  
MOST POPULAR MODELS IN STOCK

## DAIWA POWER SUPPLIES

The Daiwa range of power supplies is proving very popular for all types of applications, both for the professional user and the hobbyist alike. From the smallest 9A continuous PS120MKII, via the extremely popular 24A PS304, to the top of the range 32A continuous RS40X. All the Daiwa range of PSU's feature variable voltage from at least 3-15V and switchable voltage 1 current

## Daiwa DLA80H Linear Amplifier

The latest linear amplifier from Daiwa, this DLA80H, is a new dual band linear which is ideal for low/medium power handhelds and mobiles.

With fully automatic input power selection from 0.5-2.5w, operation on 2m and 70cms and full duplex mode make the DLA80H one of the most versatile linear amplifiers on the market today.

See HRT August 1992 for Review.



### Brief Specifications:

Output Power: VHF 80w at 5w input  
UHF 60w at 5w input  
Input Power: VHF 15dB  
Preamp Gain: UHF 12dB  
Power Consumption: 15A at 13.8vDC  
Dimensions: 160W x 45H x 238D (mm)  
Weight: 1.5kg

**IN STOCK NOW £339**

A = £2; B = £5; C = £7.50;  
D = £12.50; E = £16.50



## END OF LINE/DISCONTINUED ITEMS

These are all items which are either end of line or are discontinued items which we have pleasure in offering at 'silly' prices. Some of the equipment may have slightly marked boxed but they are all unused.

### MORSE KEYS

HK703	Straight key	was <del>£50.75</del>	now £39.95
HK704	Straight key	was <del>£12.35</del>	now £16.95
HK710	Straight key	was <del>£40.65</del>	now £29.95
HK808	Straight key	was <del>£68.00</del>	now £53.95
HK711	Knee type key	was <del>£40.65</del>	now £29.95
MK701	Single lever paddle	was <del>£20.00</del>	now £29.95
MK705	Squeeze key	was <del>£33.49</del>	now £25.95

### FILTERS

XF10.7KC	800Hz CW filter	was <del>£25.54</del>	now £17.95
XF8.2HSN	Narrow SSB filter	was <del>£10.05</del>	now £12.75
XF8.9GA	6kHz AM filter		£10.22
XF8.9GF	12kHz FM filter	was <del>£10.44</del>	now £14.95
XF8.2HC	600Hz CW filter	was <del>£16.30</del>	now £9.95
TF30F12	12kHz 6 pole 3.18MHz	was <del>£16.00</del>	now £12.75
TF30H12	12kHz 8 pole 3.18MHz	was <del>£16.00</del>	now £12.75
YF90H12	12kHz 8 pole 9MHz	was <del>£16.00</del>	now £12.75
YF107H12	12kHz 8 pole 10.7MHz	was <del>£16.00</del>	now £12.75
YF107F2.4	2.4kHz 6 pole 10.7MHz	was <del>£16.00</del>	now £12.75

### POWER SUPPLIES

12/6A	6A BNOS	was <del>£60.00</del>	now £75.00
12/12A	12A BNOS	was <del>£161.50</del>	now £139.00
12/40A	40A BNOS	was <del>£665.00</del>	now £399.00
FP40C	10A cont 20A peak Yaesu	was <del>£200.00</del>	now £149.00

3 month warranty.

### ANTENNAS

268E	432MHz 6dB mobile	£19.99
358	432MHz 6.3dB mobile	£19.99
GP714	432MHz 10dB 14 step collinear base	£49.95
88F	144MHz 8/8 5.2dB mobile	£18.00
SQ144	Swiss quad 2m vert polarised	£39.95
50/5	6m 5 ele Yagi	£49.95

### VALVES

Valves for old Yaesu and other equipment.

12A07	£1.75	6CB6	£2.00
12AX7	£1.75	6EA8	£2.95
6AH6	£2.00	6EH7	£1.75
6AN8A	£3.00	6EJ7	£2.50
6AQB	£2.00	6GW8	£2.35
6AV6	£1.75	6NB8	£2.50
6AW8A	£2.95	6V8A	£17.5
6BE6	£1.75		
6BQ6	£2.00		
6BZ6	£5.25		

### MISCELLANEOUS

HX850E	Scanner 60-89, 118-136, 140-174, 406-495MHz AM/FM	was <del>£206</del>	now £99.95
430/726	70cms module FT726		£169.00
144TV	2m module FTV901, 707, 107		£49.00
CB90	1990 Callbook		£2.50
CB91	1991 Callbook		£3.50

### 3 month warranty.

### DELIVERY CHARGE

On all valves, filters and call books	£1.75
On all Morse keys	£2.75
On all PSU's (3 day del)	£10.00
On all Antennas (mobile)	£3.75
On all Antennas (Base)	£7.50
On all other items	£3.75

**Axminster (0297)**  
34918  
Reg Ward & Co. Ltd  
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West Street  
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Devon EX13 5NY  
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504 Alum Rock Road  
Alum Rock  
Birmingham B8 3HX  
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9am-4pm Sat



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SMC HQ, School Close  
Chandlers Ford Ind. Est  
Eastleigh  
Hants SO5 3BY  
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9am-1pm Sat

**Chesterfield (0246)**  
453340  
SMC Midlands  
102 High Street  
New Whittington  
Chesterfield  
9.30am-5.30pm  
Tues-Sat

**Leeds (0532) 350606**  
SMC Northern  
Nowell Lane Ind. Est.  
Nowell Lane  
Leeds LS9 6JE  
9am-5.30pm Mon-Fri  
9am-1pm Sat

- Same day despatch wherever possible.
- Yaesu Distributor Warranty, 12 months parts and labour.
- Carriage charged on all items as indicated or by quotation.
- Prices and availability subject to change without prior notice.
- Free Finance on selected items, subject to status. Details available on request.
- Up to £1000 instant credit, a quotation in writing is available on request, subject to status.

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# Review – MFJ Aerial Accessories

*Chris Lorek G4HCL tests three shack accessories to improve HF performance*

MFJ seems to have quite a collection of nice 'bits and pieces' in terms of shack accessories, from CW keys to TNCs. I chose a small collection of aerial accessories to test, my favourite being the 'Versa Tuner II' which I used for many purposes – but that's another story!

## 1020A Active Antenna

Currently retailing at £84.95, this is designed for SWLs who have difficulty in getting an outside aerial erected. It operates over the 300kHz to 30MHz HF range, powered from either a separate power supply or an internal 9V battery, a telescopic whip fitting onto the top panel for portability. It comes in a black metal case with a brushed silver facia, and as well as being simply an aerial preamp it adds a preselector to improve performance and reduce out-of-band signals. This can be very important on many of the lower-cost general coverage receivers, where strong signals can cause overload. Many 'old hands' will remember a manually tuned preselector on their receiver, the MFJ 1020A gives you this, which you can use with or without the built-in preamp.

You can use the unit either with its own telescopic whip, or a short external aerial sited away from local interference sources, a front panel gain control lets you set the level of signal amplification needed. In use, after tuning to the frequency on the receiver and the correct band on the unit, a quick 'tweak' of the preselector for maximum signal is all that I needed – very simple. My

only 'gripe' was the use of phono plugs for the coax connections, although a large 'ground' tag is provided for connection of an external RF ground.

## 1040B Deluxe RF Preselector

This could be called the 'luxury' model of the 1020A. At just under £100 it has all the features of the 1020A but with a number of 'extras', including the capability of being used with a transceiver system with its automatic RF sensed changeover. 'Hard' PTT TX/RX switching can also be connected to the unit if you're a 'purist'. On the rear panel are sockets for two receivers and two aerials, allowing a degree of flexibility without 'lead swapping', and although phono plugs are fitted these are paralleled with SO239 coax sockets. On the front, a four-way band switch and tune control lets you select the receive frequency, again with a variable gain control. Front panel buttons let you select which aerial and which receiver (or transceiver) you wish to use, and a 20dB attenuator can be switched in for when those strong on-air signals start to get the better of your receiver front end.

Inside, a 40673 dual gate MOSFET and 2N390 bipolar are used for the preamplifier, the circuitry being switched out when RF power appears. A variable delay controls the time the unit takes to go back to 'receive' mode, which you can set to suit the type of operating involved.

The 'vintage' of the circuit compo-

nents used, combined with the cream coloured facia and wood grain effect cabinet suggest to me that this product has been around for quite a while, the ultimate 'test' of lasting marketability of course.

## 949D Versa Tuner II

If you're using a long wire, or other kind of non-resonant aerial for your transmitter, you normally need some form of aerial matching unit and SWR meter. No two ways about it, otherwise you either don't get much power output or you blow your PA up, whichever comes first!

MFJ tell me their Versa Tuner II is designed to "match virtually any transmitter to virtually any antenna", and in practice I certainly found this to be true. For example, one day I had forgotten to connect my long wire to the unit, just having the ground lead connected to the rear of the tuner. Yes, it tuned that up quite nicely! A more 'practical' example was on 40m, where I had decided to, literally, throw a totally random length of insulated wire out of my shack window and secure the end to the garden fence. After a quick tune-up, I called into the Sunday afternoon ISWL net, with several reports from around the UK of being the 'strongest signal on the net' with my 100W. I've since had many, many other QSOs on that bit of wire matched with the MFJ-949D!

Back to hard facts, the tuner handles up to 300W, and has a built-in 300W dummy load for PA tune-up. A dual-range peak-reading SWR and Wattmeter comes in the case, a 'cross needle' type which saves the hassle of knob-twiddling to read the actual SWR for varying power levels, this combination was superb for SSB operation. A multi-position knob selects between two coax inputs, either direct or via the matcher, or a long wire aerial (a balanced line input can be connected instead of the long wire with a link made at the rear). The matching circuit is a 'T' arrangement of capacitor, inductor, capacitor, with a switched 4:1 balun for the balanced line. In use I found it did everything I wanted, and more, I was very pleased indeed with its performance.

The 949D retails at £149, and my thanks go to Waters and Stanton Electronics for the loan of these MFJ units.



## SANGEAN ATS 803A

(Direct key-in world receiver with quartz alarm clock timer)

unable BFO SSB/CW!

### Specifications and features

★ 150-29.999 continuous tuning with no gaps. Phase locked loop-double conversion Superheterodyne ★ Full shortwave/AM/SSB 150-29999kHz no gaps! + FM87.5-108 mono/stereo ★ Five tuning functions: Direct press button frequency input auto scanning, manual scanning memory recall and manual tuning knob



★ Built-in clock and alarm. Radio turns on automatically at preset time and frequency. ★ Large digital frequency display. ★ Fourteen memories - nine memory channels for your favourite station frequencies. Last setting of mode and waveband stored in five memories. ★ Direct press-button access to all 12 shortwave broadcast bands. ★ Two power sources - battery or AC mains adaptor. ★ General coverage of all AM bands in LW/MW/SW (dedicated broadcast band coverage on all versions), plus of course the FM band for quality sound broadcasts in headphone stereo. ★ SLEEP function turns the radio on or off after an adjustable time of 10-90 minutes. ★ Separate BASS and TREBLE controls for maximum listening pleasure. ★ External antenna jack for better reception. ★ Adjustable RF GAIN control to prevent overloading when listening close to other strong stations or if there is interference. ★ New improved wide/narrow filter (6/2.7kHz) ★ BFO control (Beat Frequency Oscillator) enables reception of SSB/USB/LSWB (single side band) and CW (Morse Code) transmissions. ★ Illuminated display to facilitate night-time use. ★ Designed for both portable and desk top use. ★ Five dot LED signal strength indicator.

DIMENSIONS: 29.2cmx16.0cm (11.5inx6.3inx2.36in). OUTPUT: 1200mW (10%THD) WEIGHT: 1.7kg (3.75lbs) without batteries. Wide/narrow filter switch.

£109.95 + £5 check, test and p&p.

## SKY SCAN

### Desk Top Antenna Model Desk 1300

Built and designed for use with scanners. Coverage: 25 to 1300MHz. Total height - 36ins - 9ins at widest point. Comes complete with 4 metres of RG58 coax cable and BNC connector fitted. Ideal indoor - high performance antenna and can also be used as a car antenna when your car is static. REMEMBER YOUR SCANNER IS ONLY AS GOOD AS YOUR ANTENNA SYSTEM!

£49.00 + £3.00 p&p



### SKY SCAN V1300 Antenna

Most discons only have horizontal elements and this is the reason that they are not ideal for use with a scanner. Most of the transmissions that you are likely to receive on your scanner are transmitted from vertically mounted antennas. The Sky Scan V1300 discone has both vertical and horizontal elements for maximum reception. The V1300 is constructed from best quality stainless steel and aluminium and comes complete with mounting pole. Designed and built for use with scanners.

£49.95 + £3.00 p&p

### SKY SCAN Magmount MKII

For improved performance, wide band reception, 25 to 1300MHz. Comes complete with protective rubber base, 4m RG.58 coax cable and BNC connector. Built and designed for use with scanners.

£24.95 + £3.00 p&p

### SANGEAN Portable SW Antenna ANT 60

- Greatly improve reception power of portable shortwave receiver
- Easy hookup to snap onto telescoping rod antenna or plug into radio's external AM antenna jack extends to 7 metres (23 feet).
- Portable for indoors and outdoors.
- Suitable for all kinds of shortwave radios.

£14.99 FREE POST & PACKING WITH THIS ISSUE ONLY



## YUPITERU

### MVT 7000 HANDHELD

PROBABLY THE UK'S MOST POPULAR HANDHELD SCANNER!

- ★ Receives 8 to 1300 MHz 100kHz-1300MHz (at reduced sensitivity)
  - ★ 200 Memory channels
  - ★ Rotary or keypad freq. control
  - ★ AM/FM/NFM
  - ★ Large display with signal strength ..mete
- EACH SET IS SUPPLIED COMPLETE WITH:- Full set of high power NiCads, AC charger, DC power lead and carry strap.....£289



### MVT 8000 MOBILE/BASE

This new model is the mobile version of the popular MVT 7000 Handheld above.

- ★ Receives 8 to 1300MHz, 100kHz to 1300MHz (at reduced sensitivity)
- THIS RADIO IS ESPECIALLY SENSITIVE AT UHF FREQS. Set is supplied with mains power unit.....£299

### MVT 6000 MOBILE/BASE

An economy version of the new MVT 8000 above housed in the same case.

- ★ Receives 25-550MHz, 800-1300MHz
  - ★ 100 Memory channels
- SPECIAL PRICE .....£199

## AIRBAND RADIOS

This month we are pleased to introduce THE WORLDS FIRST DEDICATED CIVIL/MILITARY AIRBAND RECEIVER, THE VT225.

A powerful pocket scanner that leaves the competition standing. A super sensitive set designed for optimum performance on the Civil/Military Airbands.

- ★ Receives 108-142 MHz Civil Airband 222-391MHz Military Airband 149.5-160MHz Marine Band
- ★ 100 Memory channels
- ★ AM/FM on VHF
- ★ Priority channel function



### EACH SET IS SUPPLIED COMPLETE WITH:-

NiCads, earphone, carrying strap and mains charger.....£229

### VT-125 UK CIVIL AIRBAND RECEIVER

Using the same technology as the VT-225, this set covers the full Civil Airband - hearing distant signals that are inaudible on some other scanners.

- ★ Covers 108-142MHz
- ★ 30 Direct entry memories
- ★ Search steps 25, 50, 100kHz SUPPLIED COMPLETE WITH NICADS AND UK CHARGER.....£149

## FAIRMATE

### HP2000

STILL ONE OF THE MOST POPULAR HANDHELD SCANNERS ON THE MARKET.

Over the last year the HP2000 has outsold almost all other models.

- ★ Continuous coverage from 500kHz to 1300MHz
- ★ 1000 channels of memory
- ★ Keypad or rotary control
- ★ AM, FM and WIDE FM modes
- ★ Search steps from 5 to 995kHz



### EVERY SET COMES COMPLETE WITH:-

Full set of high power NiCads, 2 antennas, carrying case, earphone, DC cable, belt clip and strap, UK charger.....£269

### MS1000 BASE/MOBILE SCANNER

MOBILE VERSION OF THE HP2000 HANDHELD BUT WITH SEVERAL ADDITIONS:-

- ★ Switchable audio squelch
- ★ Tape recorder output socket
- ★ Automatic - signal operated tape recorder switching
- ★ All metal case for improved EMC compatibility
- ★ Receives:- 500kHz - 600MHz, 805 - 1300MHz. Supplied with mains power supply.....£279



## AOR SCANNERS

### AR1500 HANDHELD

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

- ★ Charger
- ★ Dry cell battery case
- ★ 5 mtr LW antenna
- ★ Ear piece
- ★ Soft case

NOW IN STOCK .....£279



### AR2002 BASE/MOBILE

Receives 25 - 550MHz, 800 - 1300MHz, AM, FM, WFM. Supersensitive receiver.....£399

### AR2500 BASE/MOBILE

Receives 5-550MHz, 800-1300MHz AM, NBFM, WFM. 1984 Memory Channels, Fast 36 CH/SEC Scan. Resolves SSB with BFO control.....£399

### AR2800

★ Receives 500kHz - 600MHz, 800 - 1300MHz AM, FM, WFM. SSB capability with BFO. ★ 1000 Memory.....£395

## SCANNERS

### ALINCO DJ-X1 HANDHELD SCANNER

- ★ Covers 500kHz to 130MHz
- ★ AM/FM/WFM
- ★ 100 Memories
- ★ 3 Scanning speeds

PLEASE NOTE:- ALINCO DO NOT INCLUDE BATTERIES AND CHARGER AT THIS PRICE. ....£249



SRP Trading, Unit 20, Nash Works, Forge Lane, Belbroughton, Nr. Stourbridge, Worcs. Tel: (0562) 730672. Fax: (0562) 731002

# M294 Ex-PMR Conversion

*G4HCL converts a car-radio sized transceiver to 2m and 4m*



The M290 series

The last few rallies seem to have brought about a sudden 'surge' in M290 series mobiles. Likewise with requests for information on the packet network. Why? Maybe now is 'the time' for M290 series radio users to 'upgrade' to a newer generation of sets? But the fact remains that we've been getting calls asking 'have you got anything for the M290 in the pipeline?'. Here's the first.....

## The Series

The M290 series, as the label on the front of the case states, is a series of sets. There is *no such thing* as an M290, remember that, it's important! The series is split up into three basic types, the M293, M294, and M296. They're crystal controlled sets which come in either single channel or six channel versions, the six channel ones have a channel change switch on the front, the single ones don't. A later range, the MX290 series which are synthesized transceivers, look virtually identical from the outside apart from the channel change switch which has 16 positions instead of 6 or more rarely an electronic front panel with a digital display (not to be confused with some selective calling modules - check the channel switch). You'll see a conversion project on these synthesized rigs soon, it's here, waiting to be published. But this article deals with the crystallised version, by far the most commonly available at the time of

writing.

## Identification

As usual, look at the serial number plate on the rear panel. Here you'll see the equipment type number, M293 signifying VHF AM, M294 signifying VHF FM, and M296 UHF FM. This plate is riveted on, if it's missing then don't touch the set with a barge pole! I once saw such a number-less rig selling at £5 at a rally, with an attached label saying 'M296 70cm FM'. I looked inside the case before parting with my money and found an M293 VHF AM rig. Trust *only* the serial number plate! The M293, unless you want an AM set, frankly isn't worth trying to convert to FM, and this article deals with the M294 - the M296 will be covered in a forthcoming HRT conversion.

## Frequencies

The M294 is available in a number of frequency ranges, such as 68-88MHz

(E band) which is OK for 4m, plus 132-156MHz (B band) and 148-174MHz (A band) which are both OK for 2m. Two further bands are available, M band which covers 105-108MHz TX with 138-141MHz RX, and P band which covers 96-106MHz RX with 79-88MHz TX. These will require a large degree of modification work to get going, and although a conversion may be possible with an amount of work (this will be covered in the future if demand exists) I'd advise you obtain the correct type of set for the band you're interested in. To do this, simply look at the frequency label at the rear, if 'A', or 'B' is shown on the equipment code or the frequency engraved is something like 167MHz/172MHz then you're OK for 2m, likewise 'E' or 72MHz/85MHz and you've got a 4m set. You'll find most sets to be 12.5kHz channel spacing which is OK for packet and/or 4m. You'll probably find some distortion on receive on 2m FM speech, if this gets too much you can replace the standard 10.7MHz crystal filter and 455kHz ceramic filter directly with +/-7.5kHz types, these are available from firms such as Cirkit.

## Crystals

You'll need a pair of crystals for each channel, one for transmit, the other for receive. The crystal frequencies you'll need are given by;

A & B Bands	
RX xtal =	$\frac{\text{RX Freq} + 10.7\text{MHz}}{3}$
Tx xtal =	$\frac{\text{TX Freq}}{16}$
E Band;	
RX xtal =	$\frac{\text{RX Freq} + 10.7\text{MHz}}{2}$
TX xtal =	$\frac{\text{TX Freq}}{16}$

Look at the rear serial number plate for identification



The crystals are plug-in HC25u types, and when ordering state they're for the M294. It may be worth giving the crystal supplier the commercial specifications for these which are T71 for the receiver, and T93Rx for the transmitter, requesting 'amateur spec' versions to keep the cost down. Note that positive side receiver injection as shown should be used for 2m on both A and B bands, not negative side injection as indicated for A band sets in the 'official manual' as this applies only to frequencies above 148MHz.

## Opening Up

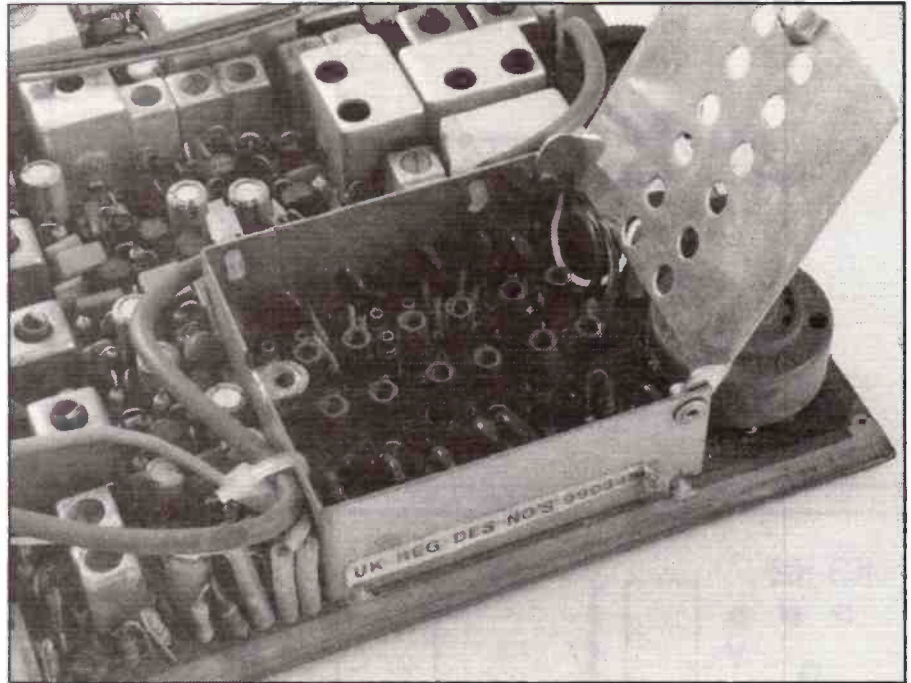
The transceiver is a single PCB which fits in an extruded alloy case. You may also find a built-in selective calling module, with buttons and/or LEDs built onto the front panel in addition to the transceiver controls shown in the photograph here, but don't worry about that at the moment. To remove the transceiver innards you don't need to take the front panel off, instead remove the four screws at each corner of the rear panel and slide the transceiver assembly out. This shouldn't leave any electronics inside - look into the case as a 'double check' for any selective call circuitry built onto the front panel.

## Receiver Alignment

You'll need a 13.8V supply, connected to the red and black power leads coming from the rear of the set (normally terminated in a black connector), and an external speaker of 3-8 ohms impedance connected to the blue and brown speaker leads (normally terminated in a smaller white connector). The aerial lead is the flying coax lead, and finally the five-way socket is the microphone plug, leave this plug disconnected for now. You'll need a multimeter and suitable non-metallic trimming tool to fit the ferrite cores for adjustment. Don't, ever, use a metallic tool like a jeweller's screwdriver, you'll break and thus jam the fragile cores very easily. Towards the end you'll also need an off-air signal on the receive frequency for the front end and crystal adjustments.

Plug your crystals into the compartment beneath the hinge-up lid (this is normally screwed down), the crystal positions for each channel are clearly marked. Switch on, and check smoke doesn't appear! If the set doesn't draw any current, check your connections and the plug-in fuse at the front of the set. With the volume control set midway, adjust the squelch preset RV4 to 'open' the squelch, then reset the volume control to a suitable level.

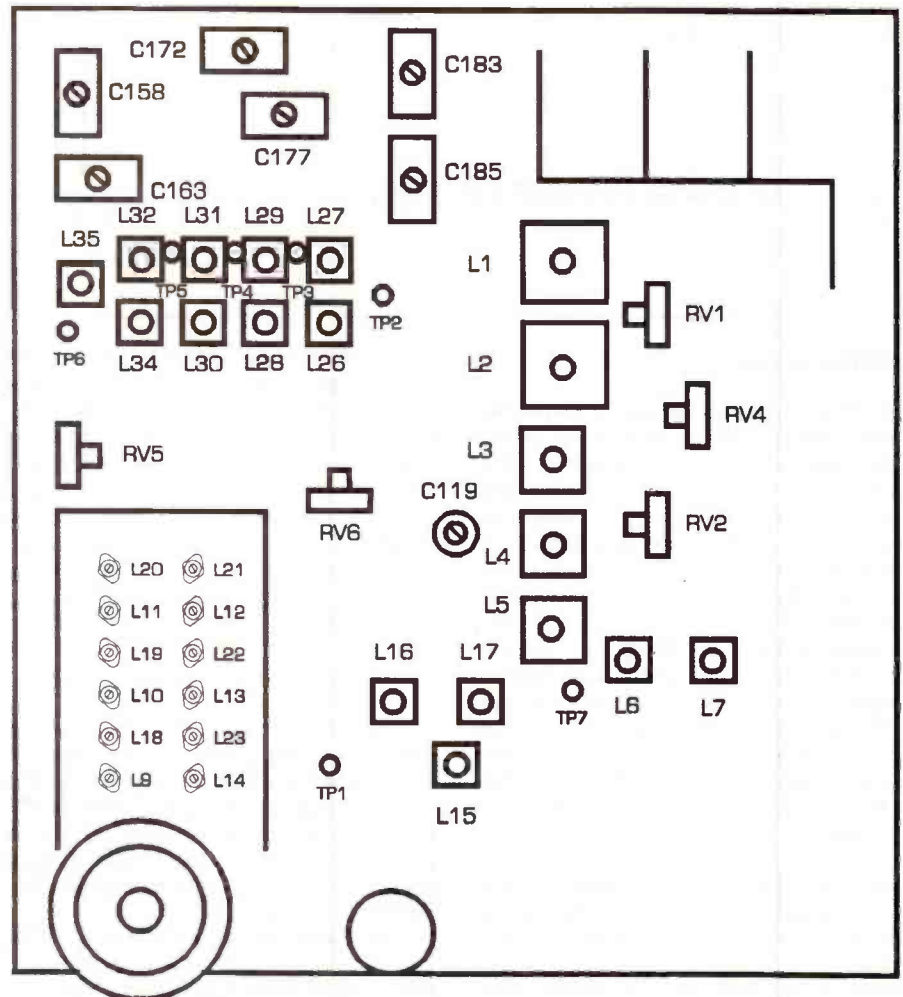
If you don't hear any squelch noise,

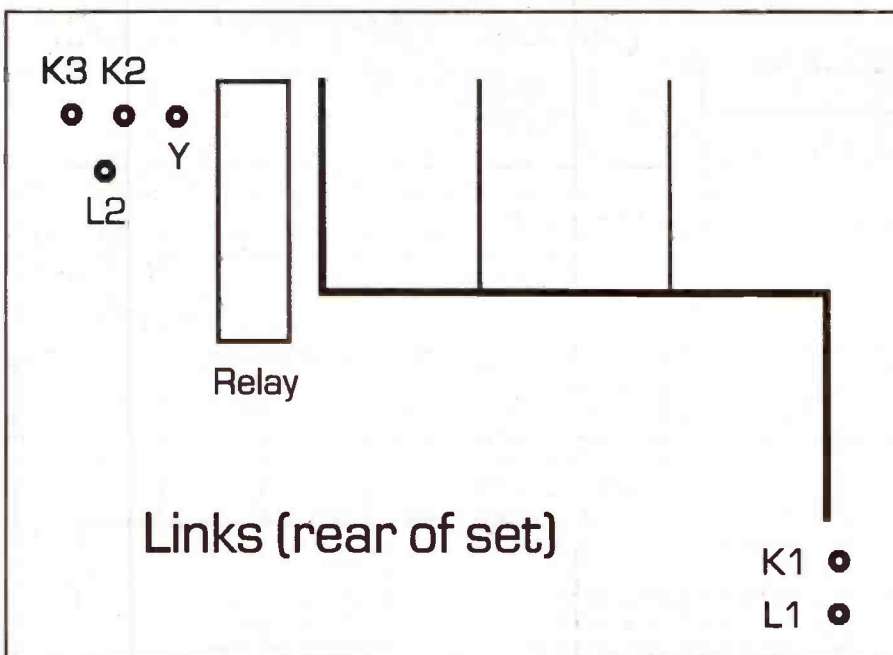
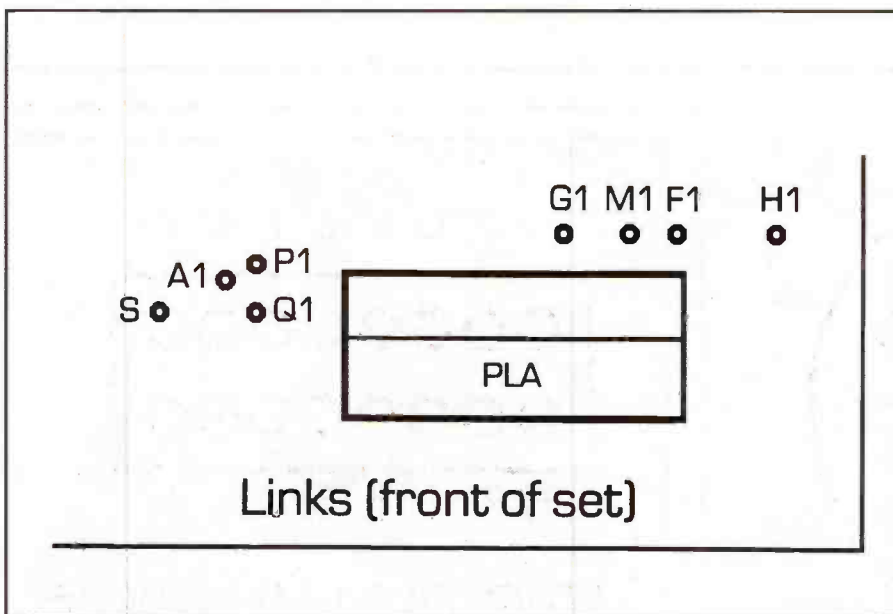


your set may have been 'linked' for receiver audio switching for use with a

selective calling module. Refer to the linking point diagrams, and check that

## Alignment Diagram





### Linking points

pin F1 is connected to pin G (some sets may have pin G1 connected to S, which disables the direct receive audio path). Start by connecting your multimeter negative lead to the supply negative, which is also the transceiver ground. With the meter set to the 2.5V DC range or thereabouts, connect the positive lead to TP1 and tune L15 with your adjusting tool for maximum voltage reading, then tune L16 for a 'dip' in voltage. Switch your multimeter to read 10V and transfer the positive lead to TP7. Tune L16 and then L17 for maximum, then L15, L16 and L17 in that order again for absolute maximum voltage.

Now connect your aerial (or signal generator if you're fortunate enough to have one). To get the front end 'somewhere near', start by tuning the cores of L1-L5 downwards about three full turns each. If you can hear a signal, then

adjust the core of the receiver crystal coil for best reception, i.e. least distortion of a modulated signal. Then tune L1, L2, L3, L4 and L5 in that order for best reception, readjusting the crystal trimmer if a signal eventually appears. You shouldn't need to touch the IF coils L6 and L7 if the set came out of service, these should be already correctly tuned. Reset the squelch preset, and that's it, now for the transmitter.

### Transmitter Alignment

For the transmitter tune-up you'll need a suitable 'dummy load' capable of dissipating 25W connected to the aerial socket, with some form of RF power level indicator in line such as a power/SWR meter. You'll also need a 13.8V power supply capable of providing 6A or more.

To keep the TX PTT keyed while you're tuning the set up, externally connect pins 3 and 5 together on the mic

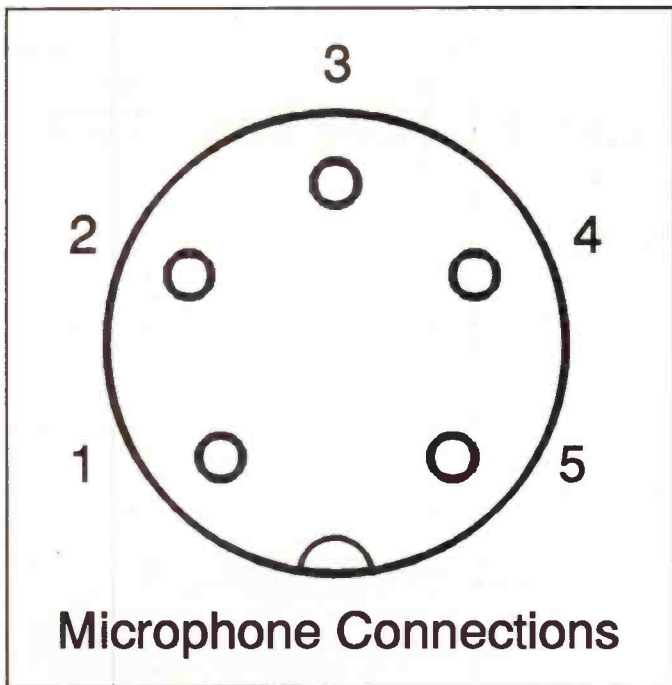
plug – refer to the connection diagram. This is a standard 270 degree DIN socket, plugs are readily available. Note that the PTT switching is 'positive voltage' rather than 'ground for transmit', so don't short the PTT line to 0V. During the final stages of tuning, when transmit power is produced, keep the PTT switched only for the time needed for each individual tuning step, to prevent damage to the PA.

Firstly, check that the large TX/RX relay clicks over when the PTT is keyed, if not then check the links as these may have been set to give external 'TX inhibit' under some selective calling arrangements if such a module was fitted. The lead from mic socket pin 3 should go to pin L2 for 'normal' operation (it's connected to pin K3 for 'transmit lock-out'), and links are needed from pin K1 to pin K2 and from pin L1 to pin L2.

Now for the alignment. First turn RV7, which is the transmitter power control adjustment, fully clockwise to give maximum power. Connect your multimeter negative lead to the negative voltage supply, and with the meter set to a 10V DC range or thereabouts connect the positive meter lead to TP2. With the set's PTT keyed, adjust C119 for a slight peak, then tune L26 for minimum voltage. Transfer your multimeter positive lead to TP3, adjust L27 for maximum and then L28 for minimum. Transfer to TP4 and adjust L29 for maximum, then L30 for minimum. On to TP5, adjusting L31 for maximum, then L32 for minimum, then L34 for maximum. By now you may be seeing a slight 'sniff' of RF power, or an increase in DC current drawn as you tune. Otherwise, connect a simple diode probe to your multimeter and detect the RF drive present on the metal adjuster of C163 (you may need to turn RV7 clockwise to take a reading), in either case retune L26-L32, L34 and L35, in that order, for maximum reading of power or current.

From now on, keep the PTT only for as long as needed to take a measurement. First adjust C185 to minimum capacity, i.e. plates fully apart, and then adjust C158 and C163 for maximum RF output (or initially for maximum supply current if there's no RF, then for maximum RF output). You'll probably need to use a different trimming tool for these capacitors, don't use a metal screwdriver – it may be tempting but some of the slots are 'hot' with RF, and you'll soon know about it! Now adjust C172 together with C177, then C183 together with C185, in 'pairs' (one hand on each trimming tool) for maximum power output. Retune the six capacitors, in pairs, until you can't get any more RF output, then de-key the PTT to give the PA a rest!



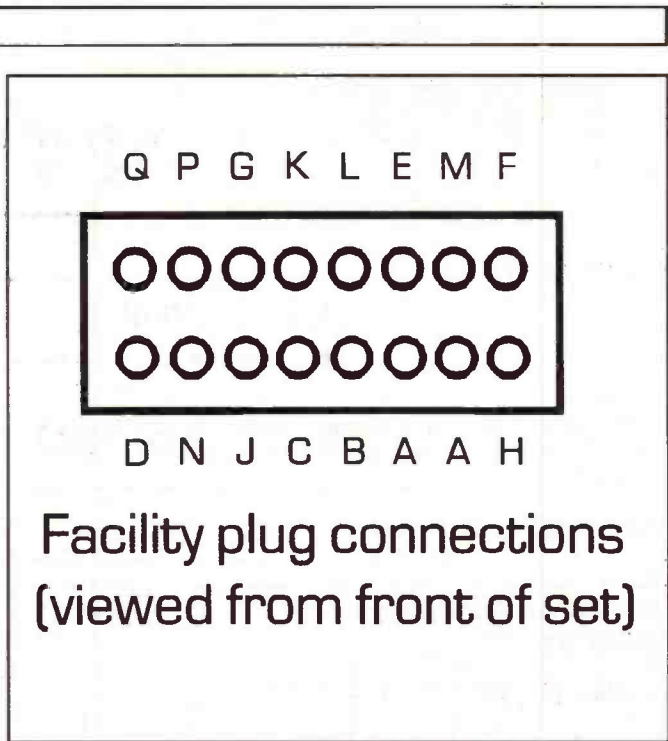


1	Mic live
2	Ground
3	10V PTT line
4	RX low level audio
5	10V output

You should get around 25W output, which you can reduce if you wish with RV7. Adjust your crystal trimmer to get you accurately on frequency, and RV6 is the peak deviation control which may need altering to give you 5kHz deviation. The mic gain preset is RV5 which should already be set to a suitable level for a normal 600 ohm dynamic microphone, but you can adjust this to suit your particular microphone or operating conditions after having set RV6 correctly. That's it, you now have a fully working rig!

### Selective Calling Module Fitted?

Before putting the set back in its case, if such a module is fitted then (unless you want to use it of course) I'd



A	-ve	H	Undedicated
B	-ve	J	TX 10V
C	Mic preamp gating	K	10V via TX PTT
D	In band TX encode	L	TX relay coil
E	Sub audio TX encode	M	Undedicated
F	RX audio for decoders	P	Undedicated
G	RX squelched audio	Q	Undedicated

recommend you remove the circuitry completely. The PCB(s) simply unscrew from the case front - you'll see two spigots next to the facility connector which partly secure the front PCB. The buttons stay as part of the case front, so you shouldn't be left with any unsightly holes.

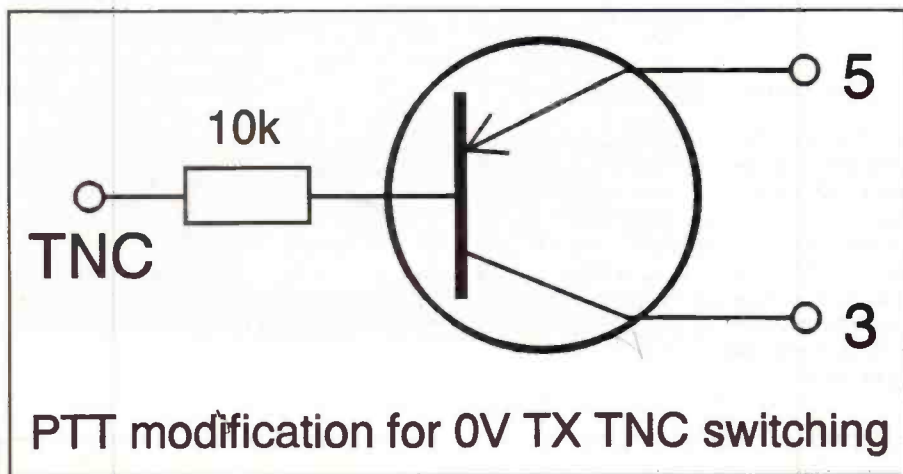
### External Interfacing

If you plan to use your rig for packet, remember the set needs +10V for PTT switching, and not a 0V ground line for TX keying which most TNCs give. The accompanying diagram gives a simple one-transistor switch interface which

you can use if needed. At the front of the set you'll see the multi-way connector used for interfacing the selective calling modules, this should enable you to add home-made options if you so wish. Table 2 shows the pin connections for these, note the non-sequential pin layout as shown in the diagram. If you'd like to connect a 'busy' LED, you'll find that pin P2 on the main PCB goes low when the receiver squelch raises, and this may already be linked to the interface connector pin M via board pin M1.

### Problems?

You'll find the most common fault giving poor operation is the crimped-on BNC aerial connector, sometimes having an open-circuit braid at the end of the crimp; it's worthwhile checking for this in any case. Otherwise the sets are very reliable, and most faults are caused through jammed ferrite cores by not following the instructions of 'no metallic trimming tools'. If you really get stuck and need a circuit or whatever, I can be reached with an SAE c/o the HRT Editorial Office, P. O. Box 73, Eastleigh, Hants, SO55WG. With that, have fun, and watch out for the forthcoming M296 UHF article in HRT.



# PMR Conversions in HRT

*Where to find those missed PMR Conversions*

Many readers contact us each week to ask for details of PMR conversions, and in many cases these have been published in HRT. You asked us for a 'roundup' index, so here it is!

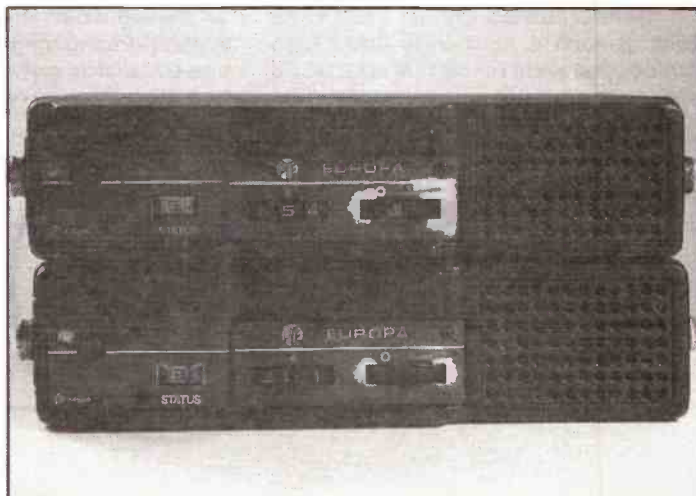
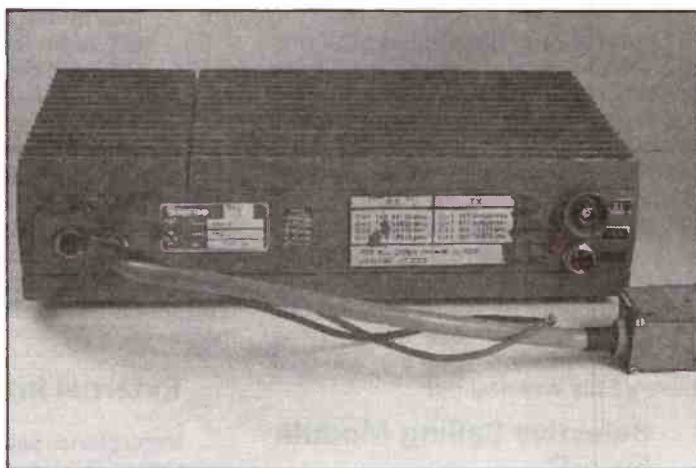
## PMR Radio Featured

Pye A200 Amplifier for 2m, 4m, and 6m	Sep 1986
A200 'M' band conversion to 2m	Apr 1987
Burndep't Ex-Police UHF portable to 70cm	Dec 1990
Burndep't BE448 to 2m	Jul 1990
Pye Europa MF5/MF25 to 2m and 70cm	Mar 1989
E band Europa to 4m	Sep 1987
P band Europa to 4m	Jan 1991
M band Europa to 2m	Aug 1991
VHF Pye Olympics, M202 range including M band, for 2m and 4m	Apr 1991
UHF Pye Olympics, M212 range to 70cm	May 1991
Pye PMR2 high power remote mount to 2m FM	Feb 1992
PF2/PF5 Pocketfones to 70cm	Feb 1986
PF2/PF3 Pocketfones to 4m	Sep 1987
Pye PF1 Pocketfones to 70cm	Jun 1986
Pye PF85 UHF portable to 70cm	Jan 1992
M294 to 2m and 4m	Jan 1993
MF6AM Reporter to 4m AM	Sep 1987
SR1 Pager to 2m monitor receiver	Jun 1987
Pye SSB 130 100W HF rig	Jan 1989
Storno CQM 644	
(Synthesised mid-band version) to 2m	Aug 1992
Storno CQM 713E conversion to 2m	Mar 1987
Storno 900 to 2m packet	May 1992
Pye Westminster to 2m and 4m FM	Mar 1986
Pye W15AM and W30AM Westminsters to 4m AM	Sep 1987
E band Westminster conversion to 6m	May 1989
P band Westminster to 4m and 6m	Nov 1990
M band Westminster to 2m	Mar 1991
W15U Westminster to 70cm	Apr 1986

## Add-on projects to use with your converted PMR rig

10-Channel Scanner	Apr 1992
Crystal controlled tone burst	Aug 1992
VFO for 4m and 6m ex-PMR rigs	Nov 1986

You may obtain back issues for the last 12 months from Argus Subscription Services, Ham Radio Today, Queensway House, 2 Queensway, Redhill, Surrey, Tel. 0737 768611. Please telephone first to ensure the availability and price of the issue you require, as copies of some magazines, and of earlier issues in particular, have run out due to popularity. For photocopies of earlier articles, and indeed of the ones sold out, fill in the photocopies coupon which periodically appears within the pages of HRT, if no coupon this time, send your requirements to ASP Photocopy Service, Argus House, Boundary Way, Hemel Hempstead, Herts HP2 7ST, at a charge of £2.00 each (cheques payable to ASP). State HRT magazine and the article and issue date you require.



# Last Month In HRT

## Reviews

Icom IC-3230H dual band mobile reviewed  
 Alinco DJ-X1D hand held scanner reviewed  
**Feature** – Packet Radio in Russia  
**Project** – BBC to PC Monitor Interface

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| Pye M212 "T" for 70cms 1ch with mic etc   | £30  |
| Pye MX294 "A" band synthesised for conversion to 2m. +mic   | £100 |
| Pye W15FM "A" band for 2m 6ch with mic etc  | £25  |
| Pye PCI controller with tuilip mic  | £25  |
| Pye MF6AM reporters midband can be modified for glider use  | £25  |
| Pye L9U wallmounting UHF base stations similar to MF5U  | £25  |
| Microwave modules MML144/100s linear amps these have been modified to work on 106mhz. But are easily modded back to 2m. use with full info and circuits | £35  |
| Linear amps as above but as new and boxed   | £45  |
| Nolton Nova 242 small dash mount 12v. 10ch. for 4m +info  | £35  |
| Pye PF2FMB "E" band h/held for 4m. Units only   | £12  |
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# AR1500E - Enhanced model

The **AR1500E** is a revised version of this already World beating receiver featuring an addition filter for better selectivity + micro buffer. Coverage is from 500 kHz all the way to 1300 MHz without any gaps in the range. Channel steps are programmable in multiples of 5 kHz and 12.5 kHz upto 995 kHz, the BFO will allow tuning between these steps for SSB operation. All popular modes are provided NFM, WFM, AM and SSB (USB, LSB and CW) with the BFO switched on.

The receiver is supplied with a comprehensive selection of accessories: DA900 wide band flexible aerial, NiCad pack, Dry battery case (for use with 4 x AAA alkaline cells), Charger, DC lead fitted with cigar lighter plug, Earphone, Soft case, Belt hook, 5 metres (approx) of aerial wire terminated in a BNC connector for shortwave reception and Operating manual.

Versatility is excellent. The AR1500 may be powered from it's internal NiCad pack, spare dry batteries may be carried for extended operation and used with the dry battery case, the set may also be plugged directly into the cigar lighter socket of a motor vehicle (external input range 11 - 18V DC).

Although offering a long list of facilities and operating modes, the receiver remains easy to operate. Many facilities have been carried across for the well proven AR2000 receiver. The AR1500 has a new 'automatic memory' feature which automatically stores busy channels from search bank 9 into the 100 memory channels of scan bank 9.

There are 1000 memories in total arranged in 100 memories x 10 banks, there are also 10 additional programmable search banks. Each memory will store frequency and mode (NFM, WFM or AM - not SSB) the search banks will also store the step increment. There is a massive EEPROM memory store for all memories and search banks so that no backup battery is required. The memories may be over-written time and time again.

The display often provides 'prompts' for selected operations such as a flashing "CH" to invite the user to key in a new memory channel number. All information such as frequency, mode (except SSB), channel etcetera is presented via an easy to see Liquid Crystal Display (LCD). The display is fitted with a switchable light to increase visibility in areas of low level lighting.

The AR1500 can meet a number of requirements to satisfy Airband or Marine enthusiasts, Professional off air monitoring and of course casual listening too. The World's shortwave and Amateur bands can be monitored, even the longer range Oceanic Airband and ship to shore. Of course the performance of this compact hand-held receiver can not be directly compared to that of the AR3000A or dedicated General Coverage Receiver.

Amazing value, all for an extremely attractive Recommended Retail Price of

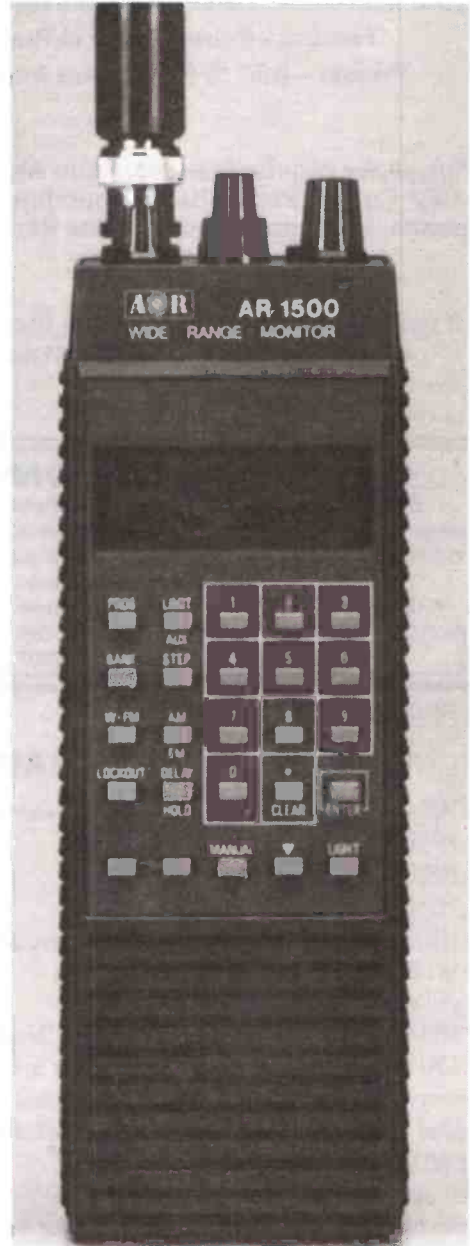
**£299.00 including VAT.**

The popular **AR2000** receiver continues. It has not been replaced by the new AR1500 receiver, the AR2000 remains a firm favourite with listeners and enthusiasts. Features include coverage from 500 kHz - 1300 MHz and reception of AM, NFM & WFM. Recommended Retail Price **£279.00 including VAT.**

The **AR3000A** base / mobile receiver is an evolutionary step forward from the highly acclaimed AR3000, many major improvements have been implemented at the requests of enthusiastic listeners and commercial organisations. Search and scan speed has been increased to an unprecedented maximum of 50 increments per second. Your listening horizons are truly extended with receive coverage from 100 kHz all the way up to 2036 MHz without any gaps in the range. The AR3000A offers the widest coverage on the market today with a high level of performance and versatility from long wave through shortwave, VHF and onward to the upper limits of UHF and SHF.

Not only will the AR3000A cover this extremely wide range it will allow listening on any mode: NFM, WFM, AM, USB, LSB AND CW.

The high level of performance is achieved by using 15 band pass filters before the GaAsFET RF amplifiers unlike other receivers which may rely largely on broad band amplifiers. This ensures high sensitivity through the entire coverage with outstanding dynamic range and freedom from intermodulation effects.



An RS232 port is provided enabling full remote control via most computers. A rear panel switch changes

control between the keypad and RS232 port. Two commercial IBM compatible software packages are available... ACEPAC3A & AOR Spectrum Coordinator.

The AR3000A is powered from 13.8V DC, a suitable mains power supply is provided with the receiver. Other accessories include a telescopic whip, DC lead and comprehensive operating manual.

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# SCANNERS

## From the Editor's Desk

## INTERNATIONAL

I write this having just returned from the Leicester Amateur Radio Exhibition, where the 'hottest' thing on sale scanner-wise was the 'UK Scanning Directory' as Bill Robertson reviewed in last month's *Scanners International*, at least one dealer completely sold out! On a sadder note, a face you'll have seen also in last month's issue wasn't able to attend this year. That well-known writer Peter Rouse (author of *Scanners* and *Scanners 2* published by our sister company Argus Books) who many readers will know had recently recovered from Leukaemia, was unfortunately re-admitted to hospital with the same condition a

couple of weeks ago. He's currently in fine spirits, and we wish him all the best for a successful recovery. We visit Peter regularly in hospital, and we'll be pleased to pass on any 'get well' cards sent c/o the Scanners International Editorial address; P. O. Box 73, Eastleigh, Hants, SO5 5WG.

### More 'Scanner' Ad Scandals?

Following the recent 'scandal' of the claimed interception of a certain royal cellular telephone conversation, it looks like the 'ripoff' merchants are taking full advantage of the public's

gullibility again. After the 'exposé' in our Aug 1991 issue, of a newspaper-advertised 'scanner' apparently priced at £19.95 to listen in into phone calls (but really costing you much more, not being a scanner at all, plus it's lack of coverage of frequencies used by cordless or cellular phones), it seems like more members of the UK public have been conned. After having helped one UK Trading Standards Office following this, another has just contacted us and sent us the very same type of 'scanner' for inspection and a statement. We hope they take the company to the cleaners in their forthcoming court case!

## Free Competition

With the long winter nights well upon us, we at *Scanners International* thought we'd give you the chance of adding a great book to your collection to make your hobby that little more interesting. We've teamed up with the Editor and Publisher of that very popular book, the *Aviation Enthusiasts Handbook* by Kevin Fox G4MDQ, and we've six books to give away, personally signed by the author, to be awarded to the first six correct entries drawn out of the editorial hat. All you need do is choose what you believe is the correct answer to each question below, and circle your choice in each case. All the answers are contained within the book. Send us your completed entry form to arrive no later than January 15th 1993, when the draw will be made. If you don't want to cut your magazine up, a photocopy of this form is acceptable, or if you wish you may fax your entry to us direct on 0703 263429, but only one entry per reader please! Remember to add your name and address, and telephone number if you wish, the lucky winners will be immediately informed by phone or otherwise by post. If less than six correct answers are received, the prizes will be awarded to the highest-scoring readers, so don't worry if you don't know all the answers!

Regular readers will have seen the book reviewed in the Dec 1991 issue (take a look for details). If you can't wait to find out if you've won one (you can always give it as a gift if you win one, we'll be pleased to send it a recipient at any address besides your own if you wish), then you can get a copy for only £9.95 plus £1.00 p/p from Bailey Distribution, Learoyd Road, Mountfield Road Industrial Estate, New Romney, Kent. TN28 8XU, Tel. 0679 66905, credit card orders are also accepted by phone. Your local bookshop can also obtain it for you, the ISBN is 1 85486 054 2

Send your completed form to; Book Competition, *Scanners International*, P. O. Box 73, Eastleigh, Hants, SO5 5WG.

1) What does ILS mean? Is it;

- a) The Instrument Landing System,
- b) The Instrument Lighting System,
- c) The Indicated Lunar Sphere

2) What does a Ground Movement Controller do?

- a) Control aircraft about to land

- b) Coordinate earthquake warnings
- c) Control activity around the airport manoeuvring area

3) What is controlled airspace?

- a) Sectioned-off parts of the sky where only authorized aircraft are permitted,
- b) Areas where no aircraft are permitted,
- c) Areas believed to be under war zone control

4) Are 'company messages';

- a) Personal chats on an intercom between pilot and navigator to relieve boredom,
- b) Communication between aircraft and their parent companies,
- c) Warnings to aircraft in the same airspace

5) What does VHF stand for?

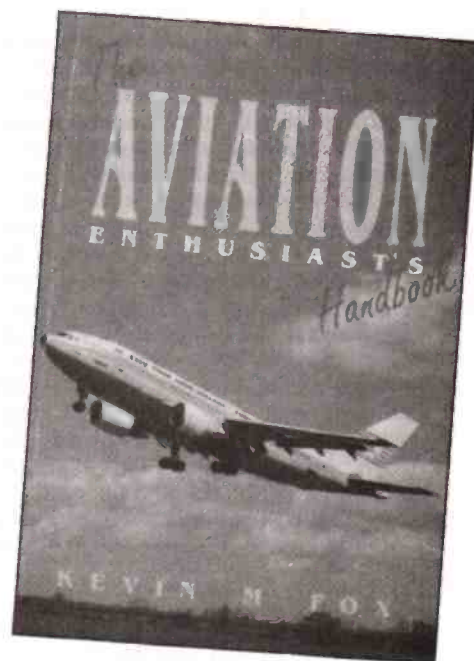
- a) Variable Heavy Fog
- b) Very High Frequency
- c) Very Heavy Flight

6) A 'cleared' flight is;

- a) Able to proceed under the conditions stated

- b) Cleared from further movement control instructions

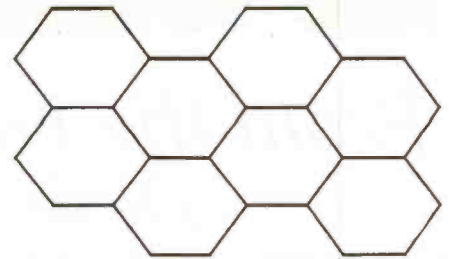
- c) Not subject to customs checks upon arrival



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# Trunking, what it's all about

**Bill Robertson discusses the ins and outs of trunked radio systems**



In the October 1992 issue of *Scanners International*, you'll have read about the differences between simplex, duplex, talkthrough and so on (if not, why not order a back issue!). From this, you'll know of what are termed 'simple' radio systems, i.e., 'press to talk and let go to listen', on a given radio channel or channels. Each radio user communicates on a given channel, and if you set the frequency on your receiver to that particular one then you'll hear that user.

But life isn't that simple all the time. There aren't enough frequencies for everyone to have their own. In London for example, every single VHF 'high band' PMR channel is full to capacity, with most users 'sharing' their channels with others. More people want radio communication channels, and one way to make the best available use of a given number of channels is a 'trunking' system.

## Trunk Calls

Trunked radio systems operate in a similar way to telephone trunking. Here, a given number of 'lines' are available, between two cities for example, with a much larger total number of 'users' who have access to these lines. Not all users wish to have communication at the same time, so the lines are allocated as and when needed, for the exclusive use of that call but only for as long as it's needed. Radio trunking is basically the same, where a given number of radio channels in each area are shared between a large number of radio users. To save frantic channel switching by each radio user, looking for a 'free' channel (like the UK System 3 radiophone system many years ago), the radio units have built-in circuitry to automatically change channel as and when needed. In other words, they're 'intelligent' radio units. A 'pool' of radio channels are available which are used as and when needed by each radio, after which the channel is returned to the common 'pool'.

One example of a trunked system is cel-

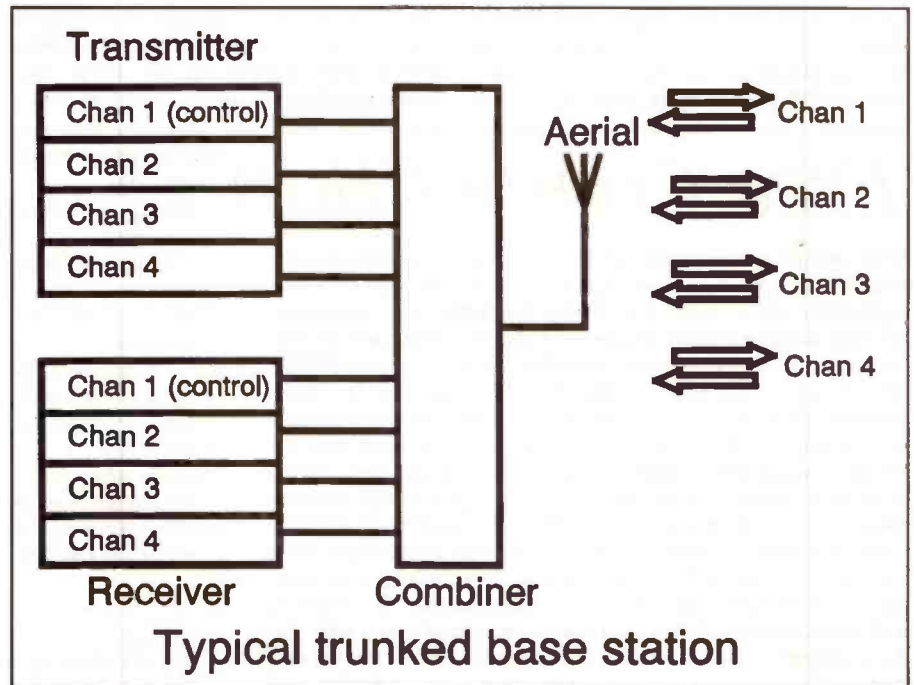
lular radio telephony, another is the UK Band III network, and some 'community repeater' systems are changing to multi-channel trunking. Here's how it works;

## Multi-Channel

For each base station, a number of radio channels are used, normally with the rack of transmitter/receivers combined into a common aerial system or systems. One of the channels for each coverage area is known as a 'control channel', this usually sends out a constant stream of data giving registration and

of a fixed control channel with a number of 'communication channels', as used on the UK TACS cellular telephone system and the national coverage Band III system.

When a mobile radio unit is switched on, it first hunts and 'locks on' to this control channel. It first checks that it is the correct system etc. that the mobile is registered for, if



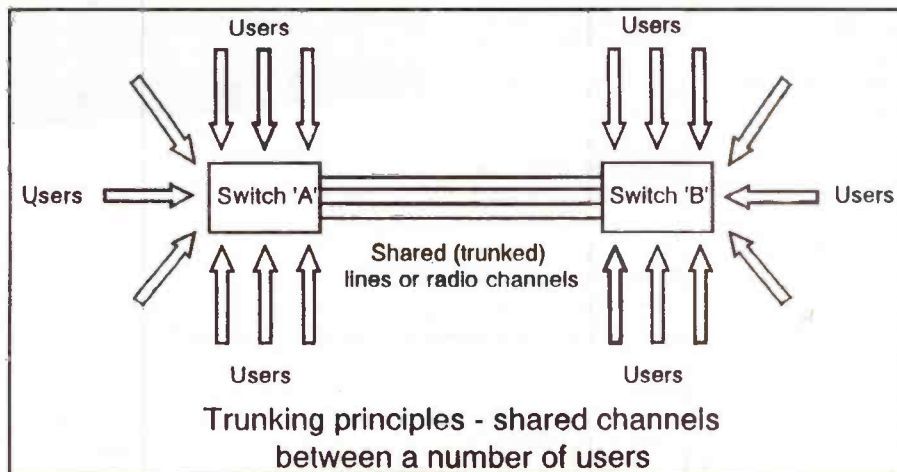
**Typical trunked base station**

call information. Some PMR systems may 'cycle' this channel between the other channels, or indeed 'time share' it with control channels at other base station sites in the same system. However the most common use is that

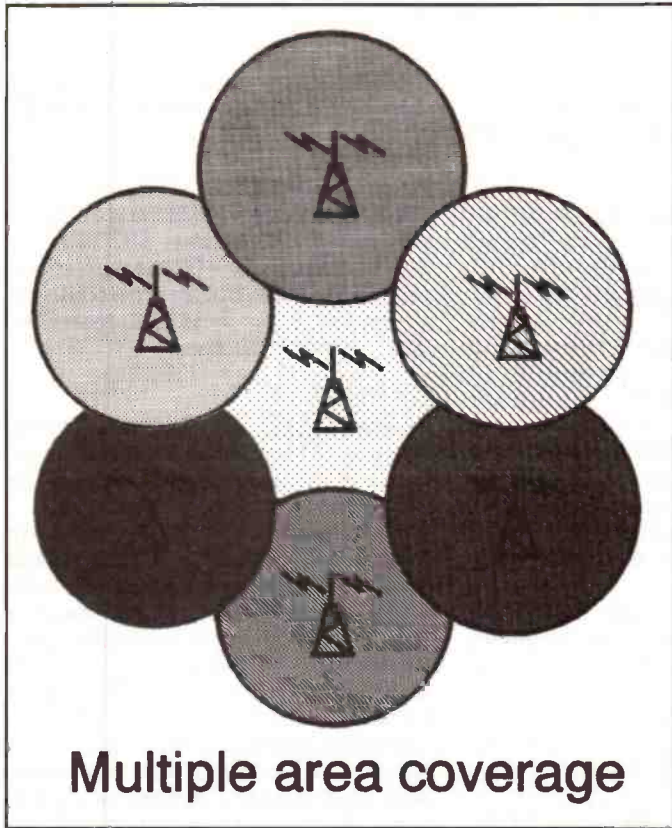
not then it hunts for another control channel from its pre-stored list of frequencies. Once it's confirmed this, it sends a short burst of 'registration' data to the system, to say 'I'm switched on and available for communication at this site'. This is done on the 'reverse' control channel, i.e., the split-frequency that the radio system is 'listening' on. The trunking system controller updates itself with that information, to the effect that such-and-such a mobile identity is 'logged on' to that base.

## Calling

When the radio user places a call, the mobile again transmits a short burst of data to the system, on the 'reverse' control channel. If a speech communication channel is available, the system, again via the control channel, instructs that mobile to automatically shift frequency to the allocated channel, which is



**Trunking principles - shared channels between a number of users**



**Multiple area coverage**

used until the end of that period of communication. During this on some systems, the mobile transmitter power can be controlled in stages (e.g. up to seven 4dB steps in the case of UK TACS cellular) so that it need only use the lowest power needed to achieve satisfactory communication with that particular base station. After the end of the communication, the mobile reverts back to silently monitoring the control channel, and the communication channel which was used is placed back into the 'pool' of available channels for all users.

**Cellular Coverage**

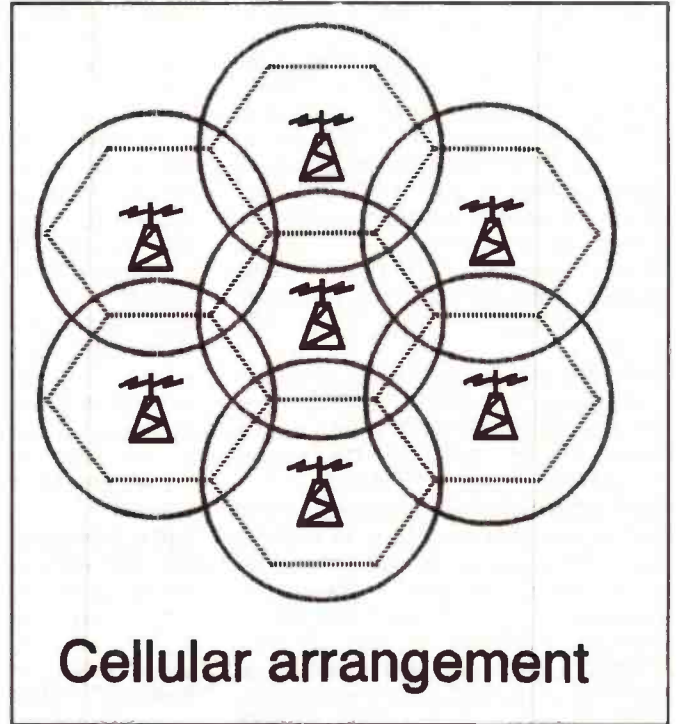
Because of the multi-frequency availability by both base stations and mobile radios, combined with carefully 'tailored' coverage areas for each base station transmitter site using VHF and UHF frequencies, the same frequencies can be re-used a given distance away. By adding coverage areas in this way, a 'network' based on 'cellular' coverage areas can be achieved, with overlaps between 'cells' to ensure that mobiles moving in between these cells can always achieve communication on one channel or another. Neighbouring cell sites must of course use different frequencies for the 'control channel', plus different frequencies for the communication channels, to avoid problems to mobile stations at overlapping signal areas. This means the mobiles need a bit 'more' intelligence in them, as we'll now see...

**Automatic Handoff**

When a mobile moves from one cell coverage area and into the next, the signal strength from the first control channel, which the mobile is silently monitoring, gets pro-

gressively weaker. At a given level, the set's 'brain' decides 'this is too weak, I'll try and find another' and commences to scan the frequencies in its internal

listen carefully you may hear slight changes, this being the data transmitted as calls are made and the like. A number of 'communication' channels are associated with each control channel, when these are in use at any given time you'll hear normal speech possibly combined with data bursts as the mobiles are instructed to change power and so on, and



**Cellular arrangement**

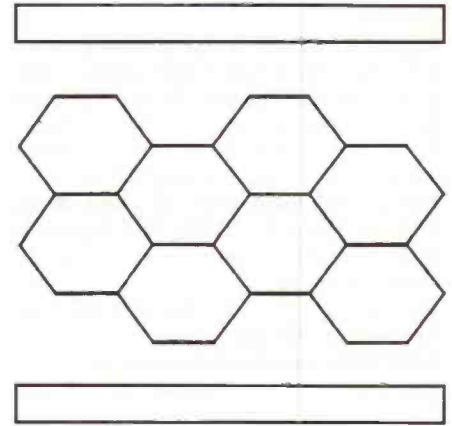
memory to try and find a stronger control channel. When it does, it again registers with a data burst on the reverse control channel to update the system as to its location. Any incoming calls to that mobile will then be routed to that site rather than the site it was last registered on.

When the mobile radio user is in the middle of a conversation, and starts running out of coverage of the first cell and into that of another, an automatic 'handoff' can occur. Before this happens, the mobile may be instructed to automatically increase its power as it gets further and further away, to keep it in communication, this being done again by short data 'bursts' on the communication channel. When it finally runs out of signal, but is capable of communication on another channel using an adjacent cell coverage area on the same system, another data burst automatically instructs the set to shift frequency to that of a given communication channel allocated for its use on the neighbouring site. Of course, if there are none available on the neighbouring site because they're all in use, the classic 'dropped call' happens and the mobile user is left with a forced disconnection, as rush-hour city cellular users well know!

**Monitoring**

When scanning across a given frequency range used by a trunked system in situations where you are allowed to monitor such things, you'll typically hear a channel constantly transmitting a high-pitched 'warble', 24 hours a day. This is the control channel, and if you

finally a burst followed by the signal dropping in mid-conversation when the mobile is either instructed to move frequency onto a channel on the next site or when the call has been completed. The channels used are invariably split-frequency, i.e., mobiles transmit on one frequency and receive on another. Some are half-duplex, i.e., 'push-to-talk' where only hear one side of the conversation is normally heard if communication is being made between different sites. On others, such as cellular telephony channels, both sides of the conversation are normally transmitted by the base station due to the 'sidetone' (the transmitted speech) which the radio user hears from his earphone when speaking.



# ScanAds

## CLUBS

**Scanner Enthusiast** would like to exchange ideas etc. with others in the luton area. Contact CB41, P. O. Box 401, Luton LU3 0J

## FOR SALE

**Ar-1000 hand scanner**, boxed as new, £125. Contact J. Jennings (Near Leicesters), Tel. 0455 209125

**Trio R1000 receiver**, AM, USB, LSB, excellent condition, 150kHz to 30MHz, digital/clock readout, manual included, £210. Please contact Trevor (Nr. Swansea), Tel. 0792 898961 for information.

**Realistic PRO-34 scanner**, nicads, rubber duck, boxed, excellent condition, £160 ono. Contact A. Hickey (Barnoldswick, Lancs), Tel. 0282 816860

**Realistic PRO-2021 scanner**, VGC, £75. Contact Howard (Enfield), Tel. 081 363 3093

**ERA MkII Microreader**, mint condition and boxed, £130. Will swap for scanner e.g. Fairmate 100E, WHY? Contact John Redmond, 38 Ochilview, Devonside, Tillicoultry, Scotland FK13 6JD

**AOR-2000 handheld scanner**, boxed and in excellent condition, 11 months old, with spare aerial and instruction book. Mr. D. Morgan, 4 Blaenwern, Newcastle Emllyn, Dyfed. SA38 9BE

**Realistic PRO2005 scanner**, 25MHz-1300MHz, professionally modified to 6400 channels, VGC, as new and boxed, £200. (Aldershot). Tel. 0252 332035 evenings

**AOR 2002 base mobile scanner**, 25-1300MHz with telescopic aerial and frequency book, £280. Also Uniden 2830 transceiver and WEP 666 aerial, £285, would consider exchange for Yaesu FT-757 or FT-767. (Lincoln). Tel. 0522 690732

**Signal R-535 aircraft band receiver**, boxed with manual, £180. (Hull, N. Humberside). Tel. 0482 813439

**AR 2000 handheld 0.5-1300MHz**, AM, FM, WFM, cost £269, four chargeable batteries, ear plug, lighter plug, strap, charger, sell £220 ono or part exchange for CBs and equipment. Gareth Wyn Davies, 15 Bron Y Berth, Penrhos, Pwllheli, Gwynedd, LL53 7HL, Tel. 0758 614446

**Realistic PRO-2005 scanner**, 400 channels, boxed, never been used, complete with manual and 'Scanners' book by Peter Rouse, £225 ono. Contact Miss. S. Phyll (Ashford, Kent), Tel. 0233 770391 evenings and weekends.

**Yaesu FRG-9600 VHF, HF, SW, ATU, ERA microreader**, £500. Will swap for Kenwood R2000 with VHF converter. Hallicrafter Sky Champion S-20, £80. Contact J. Thomas (Borehamwood, Herts), Tel. 081 207 0706

**AOR 2002 base/mobile scanner**, 25 to 1300MHz, with telescopic aerial and frequency book, £285. Would consider

exchange for Yaesu 757 or 767. Contact A. Lane (Lincoln), Tel. 0522 690732

**Yaesu FRG-9600 receiver**, VHF, UHF, SW, with Yaesu ATU, and ERA Microreader MkII for CW and RTTY, bargain, £500, cash no cheques. Will swap for AOR 3000A scanner receiver. Contact J. Thomas (Elstree), Tel. 081 207 0706

**Realistic PRO2006 scanner**, 400 channels, programable, two speed hyperscan, 26 channel fast mode, 13 channel slow mode, covers 25 to 520MHz, 760 to 1300MHz, plus 2 sec scan delay, frequency steps 5, 12.5, 50kHz, bands AM, NBFM, WBFM, 10 monitor channels to store frequencies, individual electronic lockout, plus stainless steel discone, £245. Contact J. Down (Clacton on Sea), Tel. 0255 431449

**Icom IC-R100 with SSB**, 100kHz to 1.8GHz, all mode, as new condition, boxed with manual, £390 ono. Standard C520/528 dual band handheld, multi function, with case and nicads, boxed as new, £290 ono. Contact Andy Smith G1JVVY (Beds), Tel. 0462 816610 after 5.30pm.

**Saiko Scanner**, 12V FM 16ch, 78-88, 455-168, 456-476Mhz, mobile brackets, teleaerial, brand new, boxed, unwanted gift, £60. Eric Page GU3HKV, Seacroft, Clos du Muerier, St Sampson, Guernsey. Tel. 0481 47278

**Realistic PRO41 handheld scanner**, covers 66-88, 137-174, 406-512MHz, 10 channels, programmable, boxed, only 6 months old, £65 ono, carriage extra. Steve (Edinburgh), Tel. 031 336 4430.

**Realistic PRO-35 scanner**, 100 memories, 66-88, 108-137, 137-144, 144-148, 148-174, 406-512MHz, VHF/AM, charger and instructions, 9 months old, £120. (Ferryhill). Tel. 0388 720442 evenings.

**Realistic PRO-35 100 channel handheld scanner**, mint condition, boxed, 66-88, 108-137 AM, 137-174, 406-512MHz,

£105 including postage. 128 Llanrwst Road, Colwyn Bay, Clwyd, LL28 5UT

## WANTED

**Realistic PRO-22 handheld crystal scanner**, or Signal R528 handheld crystal scanner. Also Lowe SRX30 HF receiver, or Eddystone EC10 Mk2 receiver, working or faulty but must be complete. Contact A. Blair (Tyne and Wear), Tel. 0207 544342 after 6pm.

## EXCHANGE

**Bearcat 950XLT base/mobile** and Realistic PRO-41 scanner, swap for Fairmate HP-100E or sell for cash (Margate). Tel. 0843 864511

**For scanner up to 1300MHz or HF receiver FRG 7700**, or anything considered, will exchange Yamaha MK-100 electric stereo keyboard, too much to list, instructions, cost over £500. John Redmond ISWL/GM-20450, 38 Ochilview, Devonside, Tillicoultry, Clacks. FK13 6JD, Scotland.

**AOR-2001 scanner** offered for sale or part exchange for 934MHz transceiver and good quality CB, base of mobile. Tom (Kettering), Tel. 0536 522007

**Yupiteru MVT-7000 scanner**, 100kHz to 1300MHz, box, manual etc. cost £280, exchange for FRG-7700 or WHY? (Fareham) Phone Gary after 7.00pm on Fareham 56 823459.

**Yupiteru MVT-7000 scanner**, 100kHz to 1300MHz, box, manual etc., cost £280. Exchange for FRG-7700 or WHY. Contact Gary Lebrun (Fareham, Hants), Tel. Fareham 56823459 after 7pm, thank you.


**Realistic PRO-37 hyperscan** and BBC Master system computer plus twin disc drive unit, for Icom IC-R1 scanner or Alinco DJ-580 twin bander, or any good coverage scanner, adjustment either way. Mark Richardson, 8 Tanhill Drive, Lancaster, Lancs. LA1 2JD.

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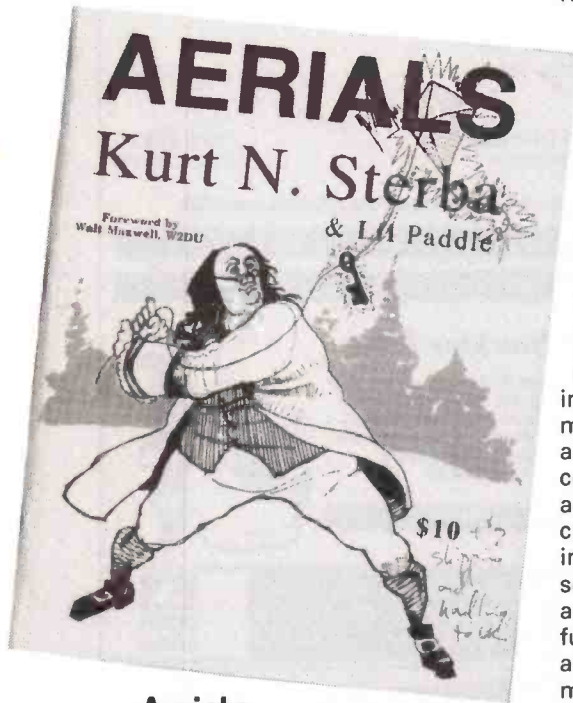
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# Book Reviews

*The HRT Editorial team's latest bookshelf additions*



## Aerials

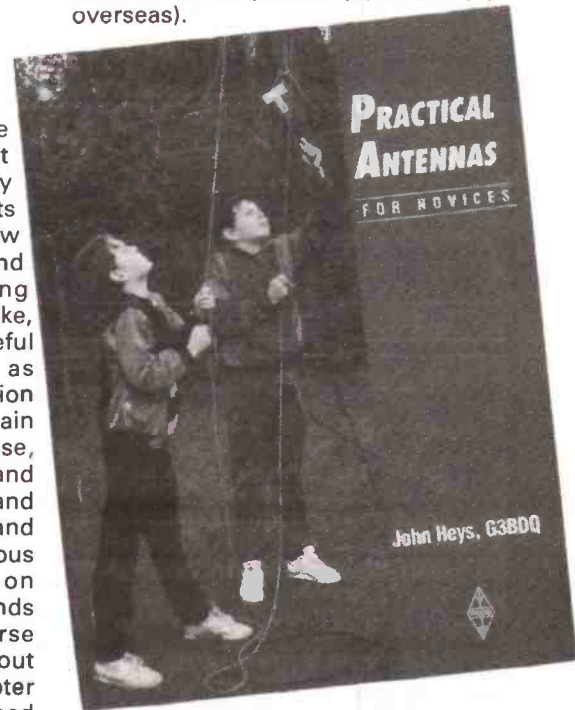
This is a 93 page American book, put together from articles written by the husband and wife 'nom de plume' team of Kurt N. Sterba and Lil Paddle (for the uninitiated, a Sterba curtain is a type of HF aerial). It's filled with mainly text (no diagrams whatsoever, surprising for a book on aerials), but even so I found it very enlightening reading. The two authors certainly don't hide their opinions, which does make the book lively reading. However much of the volume of the book appears to be just that, opinions. If you can stand the various 'quips', like "Kurt, who brings you good karma asks to be disguised in order to speak the truth and not to have to argue with yahoos who think the parasitic array was invented by Dr. Sushi" and "Then to the reprobates who have written in challenging what we've been saying in this column: you are full of soup! After you read next month's column by my alternate, you will realise what twits you are" you may, actually, find much of the content makes sense. Plenty of aerial 'myths' are exposed, and a good deal of solid advice is given within its pages. Maybe it was this combination that caused me to read it from cover to cover (eventually!), and I did enjoy reading

this more than several other books that come my way, probably learning a few things into the bargain. It's available from Worldradio, 2120 28th St., Sacramento, CA 95818, USA, (Tel. 916 457 3655) at \$10 plus \$2 shipping and handling to Europe.

## The Morse Code for Radio Amateurs

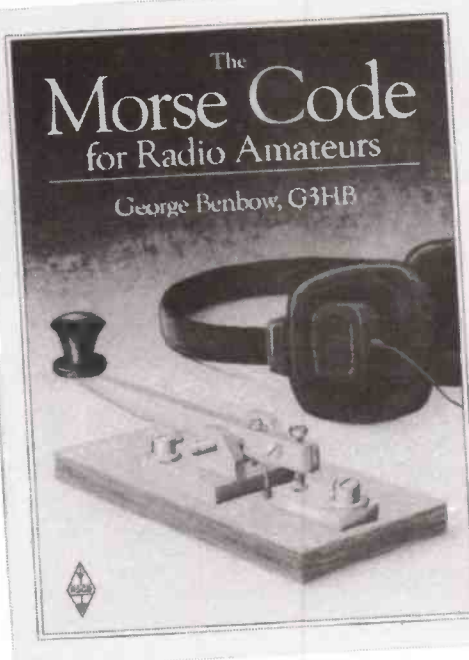
The original book of this title was written in 1947 by Margaret Mills, to show its value yours truly still has a copy of one of its reprints in my bookcase! George Benbow G3HB has now revised the book and extended it's scope, adding introductory paragraphs and the like, making the book that bit more useful and interesting as well as comprehensively fulfilling its intention as a teaching aid for Morse. The main content of the book is, of course, involved with the art of reading and sending CW with sample exercises and advice on the correct use of the key, and further text details the use of the various aids available, including hints on memorising the code, and reminds readers of the on-air slow Morse broadcasts by volunteers throughout the UK. A short but useful final chapter details 'what next' after you've passed the Morse test, introducing high-speed Morse together with semi-automatic and automatic bug keys, and automatic

code transmission and reception. It's also nice to see that the RSGB now use a capital 'M' for Morse (it is a man's name, after all) in their current books! The 28 page book is available from the RSGB (details every month in Club News) at £3.51 plus £1 p/p (£2.50 p/p overseas).



## Practical Antennas for Novices

John Heys G3BDQ, the author of the excellent (and complementary) book 'Wire Antennas', has put his talents towards a similarly excellent book aimed at Novices and other beginners to the hobby. The book details the basics of polarisation and the like in very easy-to-understand language, and overall it describes aerials which are easy to make, easy to erect, and possibly very importantly, aerials which won't cost a fortune to build. Construction of similarly easy-to-make ancillary equipment such as output indicators for end-fed and coax-fed aerials, and a dummy load, are also detailed. A 'Safety and Commonsense' chapter is devoted to the safety aspects of working with aerials, an important subject which may be new to many beginners. Although much of the content of the book is biased towards HF aerials, with



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## PACKET/DIGITAL RADIO

### Thinking about Packet Radio? read on....

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#### Tiny 2, MKII (Le Euro-Tiny?)

The Tiny 2 MK II is available NOW! The UK's best selling dedicated packet TNC now sports exciting new extras including: 64K eprom (including the famous PacCom FMS) plus an additional rom such as DED Host mode, TheNet/NetRom or we'll even give you a second language such as French, German or Spanish etc); Current firmware now implements TAPR 1.1.8 features; 6MHz CMOS CPU with 10MHz option; low power consumption for portable operation (<40 mA); 300 to 38,400 computer baud rate, optional 9600 add-on modem. What's more we'll supply the Tiny-2 MKII complete with free software, ready made radio cables and computer leads for YOUR setup.  
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#### PacComm FACTOR - (here at last!)

We finally have the PacComm PacTor units in stock. This is a licenced version of the original German design but with an optional packet upgrade option. Modes supported also include AMTOR ARQ (mode A), FEC (mode B) and FEC plus RTTY. For a full technical rundown of PacTor please call or write.  
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#### Kantronics PACTOR (!?)

Yes, Kantronics KAM owners will also be able to benefit from an exciting new Kantronics upgrade that sports PacTor. This should be available from Siskin (bugs permitting!) sometime in December. (phone us around Mid-December).

Our range of amateur data products has grown to such an extent over recent months we just can't cram it all into a tiny ad like this. We also have excellent support programs for not only the PC range but also the Amiga, ST, Archimedes, BBC B, Spectrum (all models), CBM 64 and the MAC to name but a few. Please feel free to call or write for more information. Our telephone support lines are generally manned from 8am to 8pm most days including weekends!

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examples for each band currently available to Novices, a couple of simple vertical aerials for 6m and 70cm are also included. The 58 page book is available from the RSGB (details in *Club News*) at £4.50 plus £1 p/p (£2.50 p/p overseas).

### Setting up an Amateur Station

Ian Poole G3YWX, a name you'll have seen in the pages of HRT, has put together his knowledge and experience in an easy-to-read book to help others in getting their first 'shack' up and running. This experience is often learned the 'hard way' over the years, often from one's mistakes, and I must say that I wish I'd have been able to read a book such as Ian's when I was beginning in my hobby! Topics covered include an introduction to amateur radio, the question of new or secondhand equipment, test gear, shack location, wiring, earthing and equipment layout, general electronic practices such as testing components and Veroboard construction, aerials, and even a chapter on preparing for obtaining your licence. Much of the content will be 'second nature' to the 'old hands' in our hobby, however this

book helps reduce the 'learning time' which could take many people (including myself) several years to acquire. Although of necessity it isn't substantially detailed, it should prove useful to any aspiring amateur or SWL setting up, or 'sorting out', their first station. A compact pocket-sized 86 page book, it's published by Bernard Babani and is available from many bookshops (ISBN 0 85934 245 X) at £3.95.



# Packet Radio

## —Roundup—



*HRT's SysOp G4HCL enthuses about a superb new packet guide*

Another year is nearly over, and if you're looking for a new TNC in your stocking I hope you're rewarded! I was hoping to add the new £99 TNC from AMDAT to the 'Review Special' this month, but unfortunately supplies hadn't reached the UK by the time this was being put together, but they may well be available now - look for the ads. 'Hot news' comes from Siskin Electronics in Hythe, in that their *Micropower-2* is currently 'on offer' at £99, complete with a battery-backed real-time clock, get one while you can! The Tiny-2 has also come down by £20 to £129, including ready-made leads for your computer and radio! The reason for this is that PacComm will sometime in the future be launching their 'Tiny-2 Mk2', which is now all CMOS and thus low power (in effect, like the *Micropower-2*). It has 6MHz CMOS parts with 10MHz optional, and a 64k EPROM with each 32k 'section' selected using a rear panel button for switchable 'software modes'. Siskin have also got their first PacComm Pactor units, watch out for a forthcoming review in HRT.

### New Book - Basic Packet Radio

If you saw the review of G3ZCZ's 'Lan-Link V2.00A' in the November 1992 HRT, well here's the book to go with it! Priced at £19.95 in the UK (\$29.95 in the US) it contains 364 fact-filled pages, and comes with a disk containing the program itself. The latter half of the book is dedicated to appendices covering the full Lan-Link manual together with a guide to the 'ELMER' program supplied with Lan-Link. The first half of the book is, however, the most readable introduction to packet radio that I have seen for a long time. Chapters cover getting started, connecting your PC to the TNC, how packet radio works, connecting to someone, using digipeaters and nodes, including BPO



Joe W3/G3ZCZ, Author of 'Basic Packet Radio' and 'Lan-Link'

nodes, using BBSs, a brief guide to PacketClusters, and other applications such as using a REQFIL server (who can say they know all the ins and outs of that?). It doesn't 'boggle' you with science, and presents the information in a very, very easy-to-understand way whilst not being simplistic. OK, it's relatively expensive, but I believe the quality of the book certainly justifies this, I recommend it very highly. Well done Joe, this one looks like a standard others will no doubt be compared with. My thanks to Readycrest Ltd. for the supply of the book for review.

### What is 7+ anyway?

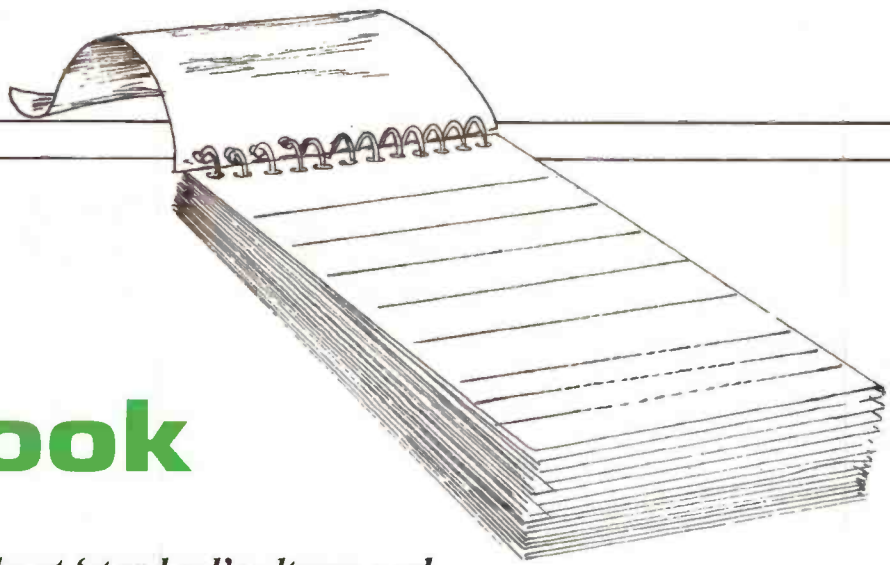
You've seen the files, you've read the discussions, but what is it anyway? 7+, written by Axel DG1BBQ is distributed as Public Domain for amateur radio use only (hamware?), and it's basically an intelligent ASCII to binary encoder (and the reverse). It allows files to be 'split up' into manageable 'chunks' for transmission over the packet network, adding further error-correcting capabilities by the use an encoding algorithm (RADIX216 to be precise). This program is one answer to a problem many amateurs have been waiting for - that of allowing complex circuit diagrams and the like to be sent

over the network (see *Packet Radio Roundup* July 92). Modifications to ex-PMR gear, 'black boxes', you name it; I've requested 7+ files of mod diagrams from distant file servers and reconstructed them with great success. We must of course be careful in the use of such a powerful facility, it's very easy to 'inundate' the network with many trivial (unwanted?) files sent as 'flood bulletins'. The idea is, of course, to ask yourself 'is the file I'm about to send really necessary as a 'flood bulletin', or would a message saying it's 'available for request on such-and-such a BBS' be better?'. One day we may all have high speed dedicated microwave packet node-node links (some of us have!), but until then we must remember the current limitations of our still-evolving network!

### CTRL-Z, End of Message

Where have all the ex-PMR rigs for 4m gone? Some time ago they were *everywhere*, now they seem to be *very scarce*! Have UK packet operators eventually found the advantages of the quieter 'greener pastures' of 4m? They must have been reading this column! Have a happy and peaceful Christmas, wherever you may be reading this, and thank you for all your messages over the past year. Until 1993, 73 from Chris G4HCL @ GB7XJZ (or post to P.O. Box 73, Eastleigh, Hants, SO5 5WG).

# From My Notebook



## Geoff Arnold G3GSR looks at 'standard' voltages and how they came to be used

If, like me, you have an enquiring mind (which is just a polite way of saying that we're nosy!) you will probably have wondered about many of the things in radio and electrical engineering which lesser souls take for granted. The sorts of thing I'm talking about are the 'standard' voltages for mains and battery power supplies, many of which are actually anything *but* standard. Then, too, there are 'standard' impedances for audio and RF distribution, and for computer networking.

An understanding of some of the reasons behind these standards can be a great help in understanding the 'nuts and bolts' of radio, and I shall be looking at a few of them this month.

### Mains Supplies

The question of why various standards of 220, 230 and 240V have found favour over the years for mains supplies in the UK and much of mainland Europe is an intriguing one. The reasons were discussed in a 'Brains Trust' feature on the adoption of 132,000 volts (132kV) for the main transmission lines of the original UK Electricity Grid System in the September 1943 issue of *Wireless World*, from which the following information is extracted.

Before the adoption of the volt, ampere, etc., as official units, EMF or PD was specified as due to so many cells of a given type. The chief use of electricity in early days was for line telegraphy, and the most common telegraph battery was composed of Daniell cells, which had a reasonably constant EMF. It became customary to specify electrical pressures as equivalent to so many Daniell cells, and in fact the *daniell* very nearly attained the position now officially occupied by the *volt*. In early literature on electricity, supplies are specified as having 'an EMF of 50 Daniells'. When dynamos began to be used for generating electricity (DC mains, of course), the engineers adopted a round number of 100 or 200

of the Daniell cells as their mains PD. When the volt arrived with the adoption of the 'Absolute c.g.s. system of electromagnetic units' in 1882, the EMF of the Daniell cell was found to be around 1.1 volts. The engineers kept the supply pressure from their generators the same, and just re-christened it as '110 volts' or '220 volts', as appropriate. Hence this mysterious factor of 1.1 which seems to feature in so many mains supply voltage values.

In about 1890 the Board of Trade made regulations among which was a ruling that no conductor in a private house might be more than 250 volts PD above or below earth. Apparently the belief was that a fatal electric shock could not occur on less than 250V! When AC supplies came into use, there was a tendency to go as close to this limit as possible, whilst leaving a safe margin for voltage variations due to changing loads, etc., leading to the adoption of 240V as a 'declared' value.

Around 1900, three-phase AC became more common. With the earthed neutral, the maximum legal line-to-neutral PD of 250V would give a line-to-line voltage of 433V (to obtain the line-to-line voltage in a 'star-connected' three-phase system, you multiply the line-to-neutral voltage by the square root of three (1.73)). Many supply companies preferred to have a good round number, choosing 400V for the line-to-line voltage - the line-to-neutral voltage supplied to houses then became 231V, usually rounded to 230V.

Much of continental Europe adopted 220V AC as a standard line-to-neutral voltage, giving a phase-to-phase pressure of 380V. Other countries adopted all manner of strange voltages, such as 120V, 125V and 150V.

In the early UK electricity Acts, the supply companies were required to maintain the supply to the customer's terminals within two per cent of the declared value. The penalty for greater variation was £5 per day, of which half

was to go to the consumer who complained. It appears that no action under this clause ever came before the courts. In the early 1920s, the clause was dropped, to be replaced by 'allowed' variations of five or six per cent, but with no penalty for any infringement.

### Why 13.8V?

Why is it that equipment designed to work on the nominal 12 volt DC supply in a motor car or small commercial vehicle is likely to be rated in the handbook at something in the range 13.2 or 13.8 volts, with similar variations in the outputs of AC mains power units designed to operate such rigs in base-station mode? For the answer to this one, we can turn to a far more modern reference, a British Standard Specification for the testing of radio equipment used in the mobile services.

First of all, that 12 volt figure is the 'nominal' voltage of a lead-acid accumulator, which is made up of six 2-volt cells in series. A fully-charged accumulator will settle down at between 2 and 2.2 volts per cell after being taken off charge.

However, mobile radio equipment, and that includes a lot of the transceivers designed for the amateur market, is generally used whilst the accumulator is being charged when the vehicle is on the move. Depending on the actual output from the dynamo or alternator, the terminal voltage of the nominal 12V accumulator can easily exceed 15 volts on charge. That British Standard lays down that the mobile radio equipment should operate correctly from a supply of up to 2.6V per cell, equivalent to 15.6 volts for a 12V accumulator. So that it can still function reliably when operated for long periods in a parked vehicle, it must also be tested down to 10.8V, equal to the usually accepted 'end-point' of 1.8V per cell for a lead acid accumulator.

It doesn't end there, though, due to our old friend the voltage drop on the

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cable connecting the rig to the vehicle supply. The drop will obviously depend on the length of the cable and thickness of its conductors, and also the current drawn by the rig. The British Standard lists different test voltages for rigs drawing various currents from a nominal 12V supply as follows:

- Less than 6 amps: 13.8V.
- 6 to 16 amps: 13.6V
- 16 to 36 amps: 13.4V 3
- 6 to 50 amps: 13.2V
- Greater than 50 amps: 13.0V.

So, using these figures as a guideline, we would expect to find that a small 10W VHF or UHF rig drawing around 5 amps is rated at 13.8V, whilst a beefier 100W HF rig drawing 20 to 25 amps should be rated at 13.4V. Often, amateur rigs of this power seem to be rated at 13.2V, which gives a slightly better margin for voltage drop. Regular readers of this feature will be able to work out for themselves the cable resistance and conductor size which must have been used to arrive at these figures, allowing for an average cable run of perhaps 2 to 3 metres in length.

Totally different figures apply to portable and personal radio equipment, which operates from primary (non-rechargeable) cells or from an accumulator which is not charged while the set is in operation.

### Constant Voltage Lines

These are used in public-address and other large audio systems to distribute the output from the amplifiers to the loudspeaker network. Feeding the output at low impedance directly to a single loudspeaker, or even a small group, as is done in radio receivers or domestic hi-fi, is simply not practicable for such a system.

For one thing, the voltage drop on the cables (yes, we're back to that again!) would waste much of the amplifier's power; this can happen even in domestic hi-fi systems if you use thin

cables to feed loudspeakers on the other side of the room. Secondly, although you could connect up, say, eight loudspeakers in a hall in series-parallel to present the correct load impedance to the amplifier, life gets complicated if someone decides that one more loudspeaker is required to get more sound into a 'dead' corner.

So, instead of arranging the amplifier to feed into the usual constant load impedance of 4, 8 or 15 ohms, at a fairly low voltage, the output voltage is transformed up and heavy negative feedback applied over the amplifier to provide a constant-voltage output (for a given level of audio signal) into any connected load from zero up to the maximum rated output of the amplifier. This arrangement is known as a constant-voltage or CV line.

Now, connecting loudspeakers to the distribution network is rather like plugging lamps or electric fires or whatever into a domestic ring-main supply, where you can add as many as you like up to the point where the 30 amp main fuse will blow. Lamps and fires are rated in watts or kilowatts, so you would have to do a calculation to convert these ratings to currents in amps to work how many you could safely add.

When adding loudspeakers to a constant-voltage audio distribution system, the sound engineer will know the impedance of the individual loudspeaker, and also the line voltage. He will decide how many watts are required at a particular loudspeaker position, and then select taps on the transformer fitted to each loudspeaker to give that power. The speaker transformers often have tag panels marked directly in watts for a given speaker impedance and line voltage, otherwise you have to calculate what transformer ratio is required using a table of ratios provided by the maker.

Say, for example, that we have a 4 ohm loudspeaker which we want to draw a maximum of 3 watts from a 70-volt constant-voltage line on sound

peaks. To dissipate 3 watts in 4 ohms, we need to apply about 3.5 volts (multiply watts and ohms together and take the square root to give voltage). The turns ratio of the transformer feeding the speaker must therefore be 20:1 (from dividing 70 by 3.5).

As usual with such calculations, you can approach it from another direction. We might have asked what impedance we need to connect across a 70V supply to draw 3 watts. In this case, we take the square of the line voltage and divide it by the wattage required, the answer being just over 1600 ohms. The transformer ratio needed to convert 1600 ohms to 4 ohms is 400:1 in impedance terms, we have to take the square root of that to give the turns ratio, which comes out at 20:1, as before.

If you've had anything to do with loudspeaker distribution systems in the past, you may well be saying 'That's a funny voltage - we always use 100V lines'. This is true, 100 volt lines are common, and you will also come across 50 volt lines in some applications. The reason for the 'funny figure' of 70V is that there are applications where specifications lay down that the working voltage shall not exceed 100 volts peak. For an AC voltage of 100V peak, the RMS equivalent is 70.7 volts, or 70 volts in round figures.

### 600 Ohm Lines

For audio distribution at lower signal levels, whether in audio systems or in telephones, an impedance of 600 ohms is widely adopted, although other values such as 150 and 300 ohms are also used. The reasons behind the choice of 600 ohms lead into the realms of higher mathematics, which I don't propose to venture into here, but basically it gives the best compromise between all the losses, resistive, inductive and capacitive, which are present in a twin-wire line.

That's it for this month. I plan to talk about RF lines another time.

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# QRP CORNER

*Dick Pascoe G0BPS looks at new QRP goodies for winter working*

Isn't it amazing how the year flashes past? It only seems a short while ago that we were looking forward to a nice summer. Now we only have the winter to contemplate, with the associated weather to help us on our way.

Still, Christmas will very shortly be upon us and perhaps now is the time for all the amateurs in the family to start considering the new piece of ham gear that is wanted. One obvious method of getting that new item of equipment is of course to ask outright, but there is much more fun in the discrete method of leaving various ham magazines laying open on the coffee table, showing the required gear, prices and of course where, and for how much, it can be obtained. In my own case this did work once, after that all I got was a sharp reminder to tidy up after myself or those 'awful' magazines would go in the bin. Well I do have about nine ham-orientated magazines a month so I suppose she can moan a little!

## New QRP Products

At the moment there are a couple of relative newcomers to the QRP commercial scene and both of these may be worth a closer look. Both are the subject of planned reviews in HRT.

The first is the *JIM* HF handheld transceiver, users of the Mizuho radio will recognise this one. It is available for several HF bands and is for both SSB and CW enthusiasts, only about 2W out but even this flea power can be put to good use at times.

The other is the MFJ 20m QRP transceiver seen at Dayton recently. Waters and Stanton import both these radios into the UK, so you can get more information from them. Another surprise from this company is the free leaflet that they offer, giving advice on various equipment both in the lower, and the higher price bracket available. An SAE to the company will get you a copy.

## VHF QRP

I'm certain that many of those that fancy a go at low power operating are put off by the thought that their Morse may not be good enough. By far the mainstream of avid QRPers are CW enthusiasts, but *not all*. Most also assume that low power operating is strictly for HF only, and that on the higher bands at least 25W as a minimum is

required. But many QRPers use solely VHF, some using only FM. Yes, there are drawbacks but.

Some amateurs find that they can't erect the size of aerial they think they need to succeed in this aspect of the hobby. But a huge array of beams, stacked and bayed is not a requirement. QRP is a state of mind, and only those chasing awards need stay away from the various repeaters available to amateurs. The satellites chasing each other around the sky are there to be used, so if you can't get a signal out of your valley on 2m, try a satellite. You will not only work around the world you will probably enjoy it too. Many very interesting articles abound on this subject, and one advantage is that aerial does not have to be so big either.

It always amazes me the distances people work on the UHF bands with milliwatts. OK, it is mostly line of sight working but it is still QRP! How many 2m operators only have an FT290? With just their 2.5W they often work long distances without a thought. Sporadic E can be a boon too in the season, I, and others, have managed Malta on 2m with just 3W of SSB.

5 watts of FM from a handheld is still a QRP signal, many operators tend

to forget this. Even these contacts, providing they were not through a repeater of any kind are very valid for the G-QRP club awards. In fact the only time I have ever had a chat with the club secretary George G3RJV has been on 2m with a handheld, but it counts!

## Disbeliever?

For those of you who still, after all my efforts, don't believe, may I offer the results of an American to you? Randy AA2U now has worked / confirmed 303 countries with 5W or less! He has made DXCC at levels of 100mW or less and presently has 85 countries at a power level of 50mW. Yes, Randy now has a tower and a beam aerial, but 180 countries were worked with just simple wire aerials before the tower arrived. Randy is an inspiration to all low power enthusiasts.

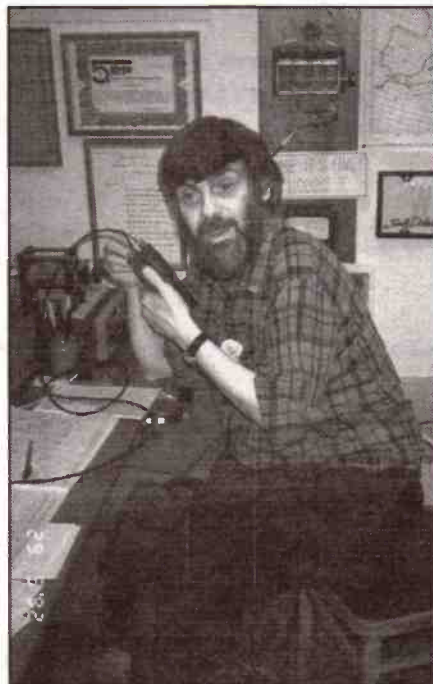
## QRP Winter Sports

Every year, between Christmas Day and New Year's Day, members of QRP clubs worldwide gather to chew the cud and have a chat about the world's ills, and all on low power too. This gathering has become known as the *Winter Sports*. It is *not* a contest, but every member taking part is invited to send in a log of their contacts to Gus G8PG, the G-QRP Club Awards Manager who 'runs' the sports. I must reiterate that it is not a contest. Each contact should be a brief chat, with the most *interesting* log winning, not the highest scoring one. Do join us and have some fun.

You might see elsewhere in this issue news about a contest. Not the normal type of contest, but a QRP one where anyone could win, on HF or VHF. Read the details and have a go. It takes place at the same time as the G-QRP club winter sports, so there should be a lot of QRP activity there for you to catch.

Finally, a letter arrived from Chris G0LWA regarding the audio filters in the November issue. He reminded me that the ERA filter is also a good one, recently reviewed by George Dobbs a couple of years ago. Chris uses one of these to good effect and comments "I find it incomparably better than others".

Well that's it for this month, News and views to me via the Editor, or packet at GB7SEK, or direct to 3, Limes Road, Folkestone CT19 4AU. 72, Dick G0BPS



George 'The Boss' G3RJV tries the new *JIM* handheld QRP transceiver at the QTH of Norman G4LOF

# QRP COMPETITION

Ham Radio Today is pleased to announce a QRP competition! Now, before you all switch off at the thought of *yet another* contest to cause havoc on our already heavily-used bands, wait, this competition is rather different. Note the word *competition*. This is not a contest in the normally accepted manner, as each operator is expected to pass a few moments with each contact.

Each year between the joyous session of Christmas Day and the 'end' (?) of the festivities on New Year's Day, members of various worldwide QRP clubs gather to have a 'sports week', and this coincides with the dates of our 'small tournament' to promote both low power operating and homebrew. To this end, Kanga Products (the kit people) have kindly donated a suitable trophy, and we'll be presenting a token prize, to the winner.

The rules have been designed to make it a fair competition for *all* amateurs, for those with 'A', 'B' or the Novice licence. Each will stand a chance of winning.

**Date/Time;** Any four two hour periods between 0700 Boxing Day until 2359 New Years Eve. Only count the best four, two hour periods for the competition. You may operate for any length of time, at any time during the week, but to score you must operate for (at least) four two hours periods. Any two hour period must be consecutive i.e., 0945-1145. Pick your entry times carefully!

**Equipment;** At least *two* of the items in the station used must be home made. This *must* include either or both the transmitter and/or receiver, a transceiver counts as one



item (a transverter counts as one too)

**Bands;** Any band the operator is licensed for (see below)  
**Power output;** Limited to QRP levels, i.e., for a 'non carrier' signal (SSB) 10W, and a 'carrier' signal (CW, FM, RTTY) 5W; repeater contacts don't count.

**Scoring;** 1 point for any contact within own country, 3 points for contact within your continent (e.g. Europe for UK amateurs), 5 points for contacts outside your continent. The difficult bit; Add together your total score and then *divide* by the number of bands used, this is to aid the VHF- only operators. *Don't* operate in 'contest' mode, contacts are supposed to be at least a brief QSO, a friendly chat. We will be listening!

Your entry form should follow the standard logbook format, but add the score claimed for each contact, the equipment used and your power output. Sign your entry to the effect that it was carried out in the spirit of the competition. If you'd like to add further details, such as any particularly interesting contacts or unusual operating conditions, please do so as these will be taken into account. The winner will not necessarily be the one with the highest score, as 'spirit' will also be judged! The decision of the judges will be final, the winner will be informed by post/telephone and will be subsequently announced in HRT.

Claims to; *HRT QRP Competition, P. O. Box 73, Eastleigh, Hants. SO5 5WG* to arrive no later than 14th January 1993.

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# The Silent Key

*Our traditional Christmas 'chiller'*



Bill had always been keen on 'automated' amateur radio. Even as an SWL he'd connected his all-mode terminal unit up to his receiver and computer, decoding off-air signals such as RTTY, AMTOR and CW. He often hunted round rallies and club junk sales for such gear, this week it was a plug-in computer card, next week another packet TNC and so on. When he passed the RAE, one of the first modes he became operational on was packet, even setting up a Bulletin Board System for the use of local amateurs. He became used to the automatic clicking of relays and the whirrs of the disk drive in his shack, although his XYL often complained about this while she was trying to get to sleep at night in their adjacent bedroom.

Bill eventually found that VHF communication through 'store and forward' modes was becoming routine, and longed to have direct, worldwide HF contacts, wishing he could answer the many AMTOR and CW signals his computer displayed. He had the gear there, his black box transceiver coupled up to his automated CW reader/sender, how he wished he could use that for the CW exam. Eventually he learned the Morse alphabet with the help of his computer's 'random CW generator' program, but this didn't give him the 'real' QSO style contacts he knew he might have to use for the new style test coming soon. So he listened to the RSGB Morse practice broadcasts transmitted each evening on 2m by Simon, a mature G3 in the same town, and soon became proficient. Indeed, he struck up a good relationship with Simon, and the two would often have long on-air CW QSOs as well as chatting down at the club. Bill began to realize that there was another pleasure to be gained in this amateur radio, that of skilled CW, very different to the 'impersonal' automated modes he'd become used to. He passed the subsequent Morse test with ease, and hand-sent CW became his favourite HF mode.

His rally-hunting trips continued, but now he added CW keys to his list, and soon acquired a small collection he

was quite proud of. One day at his local club's junk sale he came across a beauty, a magnificent early 1900's telegraph key. Although the brass was old and tarnished he knew he'd be able to clean it up a treat, and although he paid 'over the odds' for it he was justifiably proud of his purchase. The mechanics were still superb, the handling exquisite, and Bill eventually left this plugged into the rear of his HF rig as his 'permanent' key.

This of course was alongside all the other gear connected, like the VHF rig monitoring the local DX PacketCluster connected to his computer system together with the multimode terminal unit which was in turn plugged into the rear of his HF rig. He used the latest 'spotting' software which, as soon as a DX 'spot' appeared, would scan his 'needs' list, tell him if that country and band was needed for his 5 band DXCC, automatically switch his HF rig to the frequency through its data control port, enter the time and date in the electronic log, and after the QSO a ready-printed QSO would emerge from the printer. The computerized QSL manager database even retrieved the callsign worked and printed the correct address label for the envelope. All Bill needed to do was use his CW skill with the key in working the stations, which let him carry on doing what he liked best, that of working the DX and not being bogged down by paperwork. Each week he'd just stick the printed labels on the stack of blank QSLs, attach the address labels and drop the envelopes in the post.

However, after a few months he started having doubts about this. He knew computers were generally infallible, with any errors normally being caused by the operator, but sometimes he looked back and couldn't find records of a rare country he knew he'd worked many months ago, and hadn't got a QSL for. Of course he knew some of these could have been pirates, but one of his first rules was 'work them first, then worry'. But he also began receiving QSLs from a few stations he didn't remember working. This he put down to tiredness, as he sometimes had all-

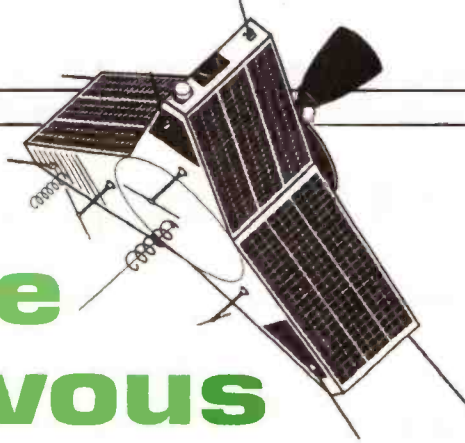
night 'DX hunting' sessions to try and snag that 'rare one'.

But one fortnight in mid-December, during which he'd treated his wife to a second honeymoon for their tenth wedding anniversary missing a major DXpedition going on at the time, he found some weeks later that he'd received a QSL card for working it. Bill knew his memory wasn't that bad, and together with the other events he was convinced that someone was pirating his callsign. During the next few weeks he carefully listened for his callsign on air, but to no avail. The QSLs still trickled through. One night he checked his archived electronic logbook for details of the 'pirate' QSOs in an effort to prove he wasn't on air at that time. But, for every single contact, there it was, stored on disk. 'This is getting beyond a joke' thought Bill. He knew someone on packet might have the facility of access to his computer system which also his station, and may have been playing a long joke on him. So Bill thought he'd carefully watch his computer to see what was happening. This he did for many evenings, but nothing. However one night whilst half-asleep in bed he heard the 'logging' drive whirring, and stumbled into the shack. There was the HF transceiver, switched on as usual. There was the computer, running as usual, logging what was coming in. But what he was to see next was almost beyond belief. The HF rig switched to TX, and quietly started working the station on CW. No sidetone, his multimode terminal unit wasn't set to CW, but a slight 'clicking' reached Bill's ears. There was the key, sending the best CW Bill had ever heard. This was too much, he threw the shack 'master switch' to remove all the power, switching the lot off, and a very tired Bill went back to bed. The following morning he was convinced it was all a bad dream, and switched the system back on knowing that his BBS was relied upon by many locals.

That evening at the club, amongst the complaints of 'why have I lost my mail on your BBS' Simon told Bill that he'd heard him on HF last night, but what had he done to his hand? Bill failed to understand. Simon explained that Bill's CW 'fist' was different last night, in fact just like Arthur's unique style. "Remember Arthur?" Simon replied, "The deceased chap who's equipment was sold at the last club junk sale. He was a keen CW DXer and loved working the rare DX, even had a knack of spotting the odd 'pirate' call on the bands using a rare prefix to 'snag' an unsuspecting pile-up and never bothered working or QSLing them".

Bill silently remembered where he'd bought his prized key.

# Satellite Rendezvous



*Richard Limebear G3RWL details two new satellites in this month's collation of AMSAT-UK news*

The launch of the new amateur satellite, RS-15, is planned for early 1993. The orbit of the spacecraft will be near circular and polar with a height 2300km and inclination of 67 degrees. The weight of the satellite is 70kg. The satellite will carry a radio-technical complex called "BRTK-11" which consists of a linear transponder with two beacons, a bulletin board with 2Mb of memory, and a command/telemetry system of 64 parameters. The transponder output power is 5W, while the beacons will run between 0.4W and 1.2W, the aeriels are 1/4 wave monopoles.

## UNAMSAT-1

There's another Microsat-style spacecraft going up about the first week of December. Its called *UNAMSAT-1*, the first Mexican amateur satellite, built at the Autonomous University of Mexico. As with the earlier Microsats it will have five modules, each about 20cm on a side. Four of the five modules are updated clones of existing Microsat hardware/software carrying dual 70cm PSK transmitters, a computer and power system, a 5-channel 2m FSK receiver, and running similar software to the other Microsats. The main differences from the earlier Microsat configuration are that the computer will have 4Mb of RAM instead of 8Mb and UNAMSAT-1 will be equipped with Gallium Arsenide solar panels.

The innovative new addition is a brand new on-board experiment in the 5th 'TSFR' (This Space For Rent) module.

UNAMSAT-1's primary mission is to act as meteor sounder. It will contain a 40.097MHz transmitter with 60W output, pulses from which can be varied from 1 to 10mS in duration and with a pulse repetition rate of 1 to 10 seconds, controlled by a computer subsystem. The meteor echoes will be detected on a receiver at the same frequency designed to detect the returned echo and measure its doppler shift. The use of

the meteor sounder is to obtain research data on the full-sky spatial and velocity distribution of meteors, with the focus on a search for high-velocity meteors originating outside our solar system. The 40MHz frequency for this transmitter is in accordance with the ITU frequency allocations table for scientific research and both the 40MHz and amateur frequencies have been licensed by Mexican authorities.

When UNAMSAT-1 is not involved in meteor research, it can be turned into a standard PACSAT message store-and-forward satellite and data will be sent using standard amateur AX.25 packet but the actual frequencies haven't been determined yet. The launch of this will also be the beginning of a new era. Along with a larger meteorological satellite, it will be launched by the Russians on a decommissioned SS-18 ICBM into an orbit about 1000km high. Details of the launch have not yet been finalised.

## Emergency Communication via AMSATs

UO-22 has been playing a major role in moving message traffic from the hurricane devastated areas in Hawaii around the world. Working in conjunction with the HF packet bulletin board systems around the world, the traffic is collected and sent to Honolulu via 15m packet and UO-22. From Honolulu, the traffic then goes directly to the devastated areas via ham radio or by a Navy MARS station. KI6QE says that out of a 1000 pieces of traffic handled, 20% has been delivered using UO-22's BBS.

AO-13 had its day too; with HF conditions poor AO-13 was able to provide a usable circuit for emergency and health-and-welfare traffic.

## Emergency 'First' for Space Shuttle

The latest in a series of Amateur

Radio Experiments flown in US Space Shuttle missions can only be described as a complete success. Not only did astronaut/hams Jay Apt (N5QWL), and Mamoru Mohri (7L2NJV) make many packet and voice contacts with ground stations on Earth, but the SAREX radio equipment also came to the rescue when a communications malfunction prevented normal Shuttle communications with Mission Control.

Communications were relayed to the ground using the SAREX portable 2m FM transceiver. Amateur Radio has always played an important role in providing communications in circumstances where regular communication links have failed, but this was the first time Amateur Radio emergency communications was used in space. This comes after emergency traffic was recently passed through OSCAR-13, LUSAT, and UoSAT-OSCAR-22 in the wake of hurricane Iniki, another Amateur Satellite 'first'.

During 'normal' SAREX operations involving packet radio communications, the 'Robot' firmware contained in the SAREX TNC performed flawlessly keeping a log of contacts, and transmitting short beacon messages generated by the astronauts.

During this SAREX mission, an uplink frequency of 144.700MHz was used for packet operations. This caused some interference in areas served by FM voice repeaters having input frequencies close to the 144.700MHz uplink in the USA. In one instance, emergency communications to a stranded motorist was interfered with by ground stations attempting a packet connection with SAREX. A solution to this problem is currently under investigation and hopefully they'll now take more notice of the comments from over here that the 144.700MHz part of the 2m band causes us problems too.

QSL cards are available for all who either heard the Shuttle or actually made two-way radio contact with the SAREX package. QSLs should be sent along with an SASE to; Jay Apt N5QWL, 806 Shorewood Drive, Seabrook, Texas. 77586 USA. Stations outside the US should include at least \$0.50 or equivalent IRCs for return postage.

## Oscar 21

AO-21's FM repeater mode has proven to be enormously popular with radio amateurs around the world. One factor which has made this mode so popular is the relative ease of use for the first-time satellite user. With 2m and 70cm FM equipment and a simple aerial arrangement, one can easily work stations through this 'repeater-in-the-sky'. This allows amateurs who have

never used an OSCAR to get a taste of satellite operation. It's possible that once they try AO-21's FM repeater mode, the first-time user might be inclined to try some of the other OSCARs. If you want to try AO-21, its uplink is on 435.016MHz and the downlink frequency is 145.987MHz.

## KitSat

The commissioning process is still going well. So far the team have deployed the gravity gradient boom, taken some fairly good images, and produced speech from the DSP experiment. Apart from a minor problem with the low-power transmitter, everything has been proceeding very smoothly. The BBS is not yet open for traffic but there is no reason for folks not to download the pictures if they want to.

As this is being written, they are still testing the KITSAT-1 payloads, currently they are working on the Digital Speech Processing Experiment to enhance the voice quality.

Previously when they tested the voice, it had a couple of stops which cut the middle of the voice because of the other operations on OBC. Now they are trying another DSPE program, but because they could not test it on the Engineering Model of KITSAT-1, they crashed OBC a few times.

## DOVE

The current status of DOVE is that three months ago the command team undertook to commit whatever time was necessary to determine what the hardware problem was, and if it could be got round in software. After some weeks they found out what the hardware problem was (failure of an AART handshake line from the DOVE module), and worked around it and got DOVE talking. This is in addition to the previ-

ously known failure of the S-band modulator.

The new AMSAT-Argentina authorities have added two new stations to the team, both are located near Buenos Aires and will share the work and responsibilities with the existing LO-19 Command Station from now on. The Command Team is now; LU7XAC, Nestor Pavan, Rio Gallegos, Santa Cruz; LU7DSU, Marcelino Garcia, Rafael Calzada, Buenos Aires; and LU8DYF, Norberto Penini, Olivos, Buenos Aires.

## AO-16

During a system outage starting in late July, command stations have been performing tests on several subsystems. The tests conducted to date have given the test team valuable information on the overall health of the spacecraft; subsystem degradation since launch; and have clarified some discrepancies noted in the telemetry channel assignments.

The performance of the straight PSK transmitter (437.025MHz) has degraded since launch. To provide better service the team decided to switch transmitters and use the raised cosine transmitter (437.050MHz) as AO-16's primary mission transmitter in future.

Six temperature channels in the telemetry have been mislabelled since launch. An update of the corrected telemetry decoding information will be published in the near future. Apart from that, all of the systems are in good health and continue to perform as expected.

The joint AO-16 test team has made significant progress since last month and several megabytes of performance data has been collected and analyzed. The team has now moved on to their next objective, to implement changes to the solar array power control algorithm.

## AMSAT-UK News

*The Proceedings* of the Colloquium have now been dispatched, if you ordered your's then you should have it by now. Also by the time you read this, there will be a new AMSAT-UK publication available; an addition to the technical manual, about simple operations of UO-22/23 by K16QE. On another note, sorry, but all the AO-10 books mentioned in an earlier issue have all gone now.

A new set of Trakboxes have been ordered following a 'sell-out' of the earlier batch, if you'd like one either now or sometime in the future then please contact Ron at AMSAT-UK to allow 'future planning'. New software from Amsat-UK; there is a new version of DTLM, completely updated, same price as before. Likewise a new version of the SPLOT program is in, same price as before. If you order SPLOT, Ron needs to know the configuration of your PC i.e., 286/386/486/co-processor, and it's only available on 3.5in disk.

For further information about AMSAT-UK contact: AMSAT-UK, c/o Ron Broadbent, G3AAJ, 94 Herongate Rd, London, E12 5EQ. Big SAE gets you membership info. SWLs are welcome.

### RS-15 frequencies

Uplink passband:	145.857-145.897MHz
Downlink passband:	29.357-29.397MHz
Beacon1:	29.398MHz
Beacon2:	29.353MHz

### KEPLERS

SAT:	OSCAR 10	UoSat 2	AO-13	PACSAT	DO-17	WO-18	LO-19
EPOC:	92227.67653450	92264.12710532	92261.74261212	92264.43990974	92259.97578800	92262.11157910	92256.11238670
INCL:	26.7268	97.8439	57.2722	98.6406	98.6411	98.6407	98.6412
RAAN:	68.9017	296.1114	1.0433	346.1178	341.8291	343.9890	338.1631
ECCN:	0.6028962	0.0012038	0.7290812	0.0010411	0.0010492	0.0010958	0.0011466
ARGP:	8.6060	135.0018	296.4390	258.7210	271.6567	264.9361	283.4466
MA:	358.5849	225.2165	8.4100	101.2805	88.3421	95.0574	76.5438
MM:	2.05882051	14.68662299	2.09721271	14.29735904	14.29862067	14.29852786	14.29935391
DECY:	-3.7E-07	4.52E-06	-1.42E-06	1.06E-06	1.02E-06	8.8E-07	7.7E-07
REVN:	4098	45707	114	13889	13826	13857	13772
SAT:	FO-20	AO-21	UO-22	KITSAT-A	RS-10/11	RS-12/13	Mir
EPOC:	92267.75719261	92269.07716910	92259.72145899	92268.19391306	92269.12479571	92266.65128500	92269.00771736
INCL:	99.0689	82.9400	98.5036	66.0712	82.9227	82.9257	51.6237
RAAN:	167.9457	248.9942	33.8562	162.4920	74.5264	120.5160	108.7177
ECCN:	0.0540797	0.0036740	0.0008553	0.0062983	0.0011574	0.0030371	0.0002798
ARGP:	329.9704	41.9990	39.2182	128.5291	340.7064	70.0010	200.6386
MA:	27.1373	318.3984	320.9263	232.1147	19.3637	290.4411	159.4473
MM:	12.83213944	13.74493970	14.36694318	12.77678945	13.72295000	13.74000391	15.54275539
DECY:	-3E-08	6.9E-07	1.31E-06	-2E-08	1.76E-06	3.5E-07	1.1805E-04
REVN:	12314	8302	6125	566	26349	8178	37780

# VHF/UHF Message

*HRT's well-known VHF/UHF DX columnist Geoff Brown GJ4ICD looks at the recent good conditions across Europe*

however no great openings had still materialised to the south via the T.E.P. mode on 50MHz by the 13th. The 15th livened up with 50MHz open to LU and PY early evening, and by the 16th things started to change. Very good tropo conditions were reported on all the VHF/UHF bands, and that day saw the first opening for some time to ZD8 on 50MHz. This was produced by T.E.P. and extended by Sporadic 'E' as, Neil G0JHC (Lancs) reported EA3VHF on 50MHz during the same period via 'ES'. More disturbed conditions followed with a large aurora taking place on the 17th, the quieter side of the sun then returned for the last week or so.

## Another Classic Chart

In Fig. 1 you can see another "classic Barograph chart" revealing the opening which occurred on Wed 16th September, pressure dips and then rises again, then falls, although this anticyclone was not very intense it still did produce some very nice contacts on all bands, please also note humidity was very, very high.

## On 'Six'

There were a few 'ES' openings in the early part of the month, Ela G6HKM

**The 'Three Generals', (L-R) Les W8KYP, Dave K8WKZ, and Dave jnr, N8NQS**



Pat N8PYO sent in this month's photo of three generations of radio operators pictured together. The three, who their family refer to as the 'Three Generals' (not 'Musketeers'!) have logged in a total of 72 years of combined operation. Les Bostedor, W8KYP (left) does his operations from Florida, he held a previous call that was K9KLV in Illinois. Dave Bostedor, K8WKZ (centre) was the very first to be awarded VUCC on 6m and the eighth in the world to achieve DXCC on 6m, he was also given recognition in the UK by being awarded the UK Six Metre Group DXCC plaque number two, Dave also had a previous call in Illinois that was K9KLU. Dave jnr, N8NQS (right) is the newest licensee of the gang, he entered the world of amateur radio as a codeless technician in April 1991, then the bug got him and within a year's time he upgraded to the general licence. If it were not for codeless licensing he most likely would not have ventured into amateur radio. Dave and Dave jnr both live in Michigan, USA where they are very active on 6m and 2m.

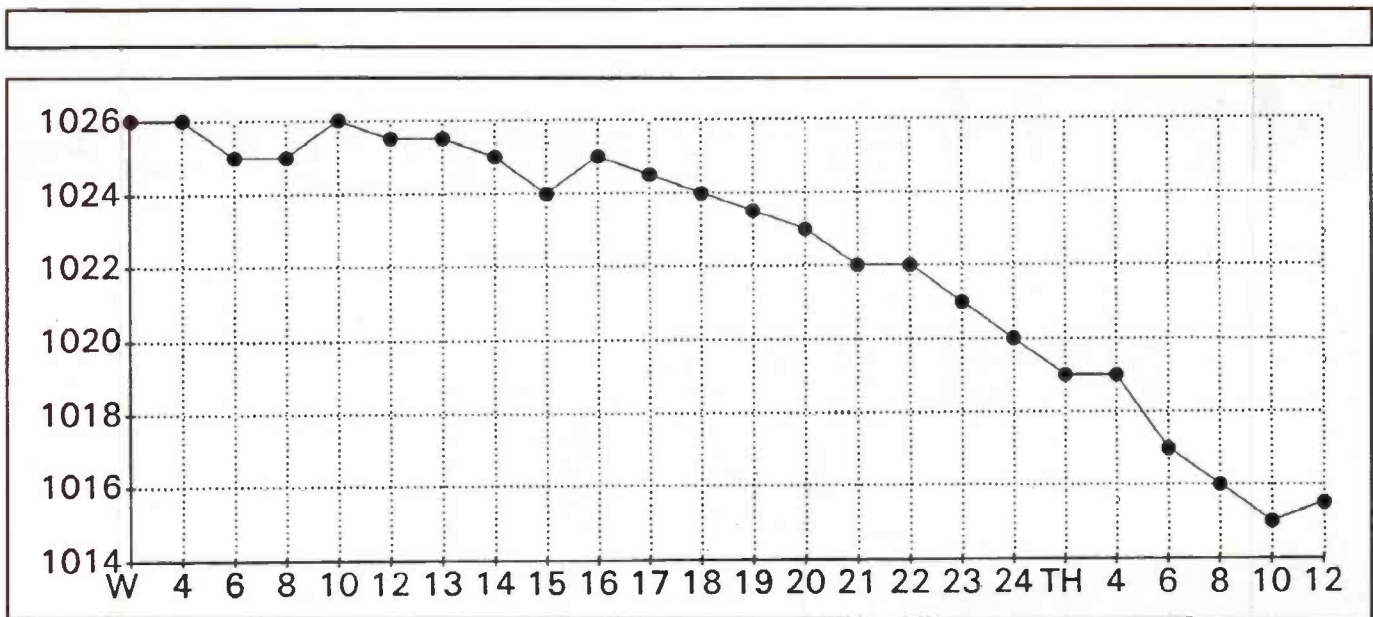
## A Bumpy Start to September.

Early September got off to a bumpy start with the solar figures. The 'A' in-

**The 'LU Gang' having a party after working GJ4ICD! (clockwise from left) LU2EID, 9DO, 8AJK, 3DCA, 8AHW, 9AEA, 3EX, 9AT, 4DGN, N4PZ/LU, and 2DSL.**

dex rose to a level of 50 on the 4th, and a couple of Auroras were reported,





worked OE and OK on the 7th, I5, I3, IT9 and LZ on the 9th, and GMs, DIs and Pas on the 10th via Aurora. Conditions mid-month started to pick up, a good opening to LU and PY materialised on the 15th, the main area of reports were from the south west of England. Early on the 16th (0930z) ZD8VHF on 50.0325MHz was S5 into the southern UK, and later that day several stations reported German video and audio carriers via tropo (average distance around 700km and not very common!) at around 1800z. The reported frequencies were 53.740MHz and 53.980MHz for audio, and 48.238MHz for video. I also noticed this, but there was no sign of any activity from DL! On the 17th, Neil G0JHC phoned to say 50MHz was 'Auroral' with a few SMs on the band, and on the 24th 3X0HNU (Guinea) was into the UK at S9+.

### On 'One Four Four'

The first weekend of the month of September is always the 144MHz 'Trophy' contest, and as always conditions were poor, with nothing spectacular was reported as being worked over the 24 hours. The mid-month anticyclone brought a selection of Europeans into the UK, and SP, OK, DL, OZ and OE were all reported on SSB at fantastic strengths on the 17th.

### On 'Four Three Two'

With the 1026 millibar anticyclone sitting on the top of the UK on the 15/16th conditions were quite good on this band, OE5VRL/5 was worked by many from central England to central France. During mid evening on the 16th, Charlie, EA4GR/P was S9+ into GJ and the south coast of the UK, and many French stations around the Spanish border were reported into the UK. G6HKM's catch

**Fig. 1 - Barograph chart for 16-17 Sept revealing the VHF/UHF opening**

on the 16/17th was only DK2GR (JN59), with no other contacts reported, showing the difference between Essex and the south coast mainland.

### On 'One Two Nine Six'

This band also produced some DX around the 16th, F6CTW (JN18, Paris) was heard working strings of Europeans, and Bernard, FC1CSU/IN93KP (Dax) close to the Spanish Border was quite happily working into the UK and northern France. Although Bernard was S9 into GJ, the beacons from southern France were very weak, showing that ducting was taking place at different height levels. At this time I heard GB3FM on 1297.050MHz at S5 churning its callsign out for over two hours down here in GJ. Again, Ela G6HKM reports very little on this band, favouring the southerners for a change! A reader's request came in which I cannot answer, does anybody know the UK distance record for 23cm? Also, has EA8 been worked on this band? Maybe we have a claimant, my best DX on 23cm is only 1338km, so I'm out of the big league. Can anybody help?

### Award News

Ian Cornes G4OUT, the RSGB awards manager, sent in the latest awards list for 50MHz for 100 countries, as follows; No. 1; GJ4ICD 14/05/91 (first 100 countries award issued to a British amateur ever on 50MHz)  
 No. 2; G4CCZ 22/02/92 (first 'G' award)  
 No. 3; G3WOS 6/03/92 (now upgraded to 120)  
 No. 4; G4UPS 6/04/92  
 No. 5; NL-213 (first ever SWL award, now upgraded to 110, how did he do it?).

### Snippets

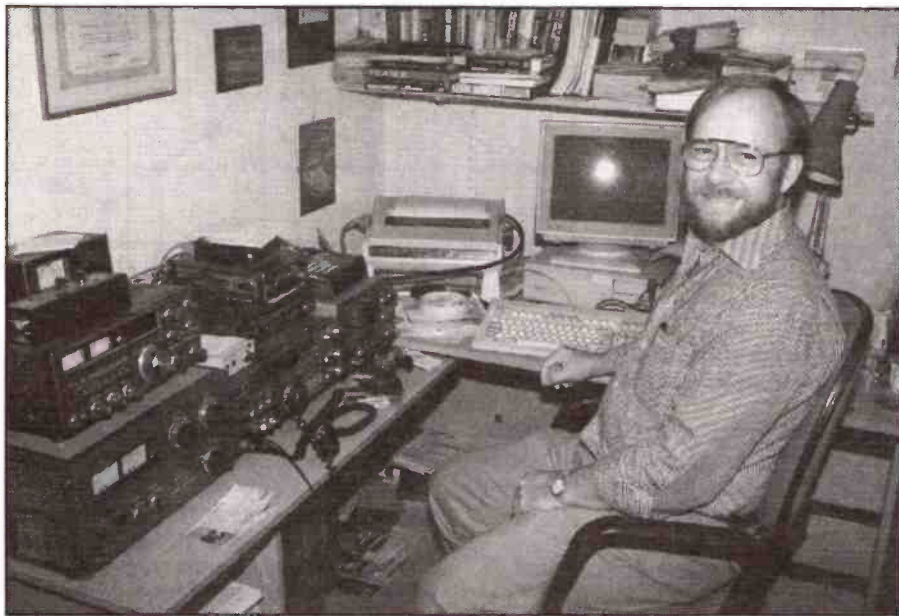
G0JHC has just passed on news that Hal ZS6WB is about to despatch a 50MHz radio to C9RDM in Mozambique. This will be a new one for everybody if we have propagation! Ivo, ZS6AXT reported poor 50MHz propagation, by the end of September Ivo had only worked into Italy and Spain. Compared with last year this was about 15 countries down! The UK Six Metre Group's journal *Six News* has just arrived through my letter box. In this issue, Chris G3WOS has produced a very interesting comparison on 50MHz aerials, and Henk PA2HJS has come up with modifications for Tonna aerials of which he claims an increase in gain of 3db (scale it down for 144/432/1296?). The journal also includes a full list of the 82 Spanish permit holders, results of the June sporadic 'E' contest, the JA to DL/YU summer sporadic 'E' opening on 50MHz, and numerous snippets for the 6m DXer, well worth trying to get your hands on a copy if you are QRV on this band. You can get membership details on the UKSMG from G3WOS.

### Final

Next month I'll take a special look at a visit by Ken, G5KW (your past columnist) to Jersey, what did he think of this exotic ground plain? and does Jersey have some magnetic propagation attractions? we ask Ken what he thinks, all will be revealed next month. All that is left for me to say is have a Merry Christmas and a Happy New Year, and my grateful thanks for your support in 1992. News and views can be sent to me by the 6th of the month, deadline is the 10th, to: Geoff Brown GJ4ICD, TV Shop, Belmont Rd, St Helier, Jersey. Or phone day 0534 77067 switched to fax after 1730 local.

# HF Happenings

*Don Field G3XTT looks at LF DXing possibilities for the coming year*



**Terry W6MKB visits the G3XTT shack (see text).**

1993 will soon be upon us, and will take us further down the slippery slope of the sunspot cycle, although my experience in the past has been that even at the sunspot minima it is possible to work over 100 countries in a year on 10m. The north-south path is very reliable, the summer brings Sporadic-E openings around Europe, and occasionally there will be openings to Central America and parts of Asia. This is where the international beacon chain can be invaluable. Often you will hear distant beacons on 10m even when there are no other signals on the band. Remember, too, that the 10m band plan includes a series of FM channels, not dissimilar to the way in which the VHF bands are divided up and complete with repeaters.

Of course, the lower bands will increasingly carry DX traffic and this is something you can turn to your advantage if you have only modest aeri- als. Whereas you may find it hard to compete on 20m, for example, against those with large beams, there are far fewer stations equipped for 40 or 80m with directional aerial systems, so these bands are a great leveller. What is most, at least around the dawn period, UK stations enjoy the great benefit on the lower bands of having DX propagation all to themselves for anything up to an

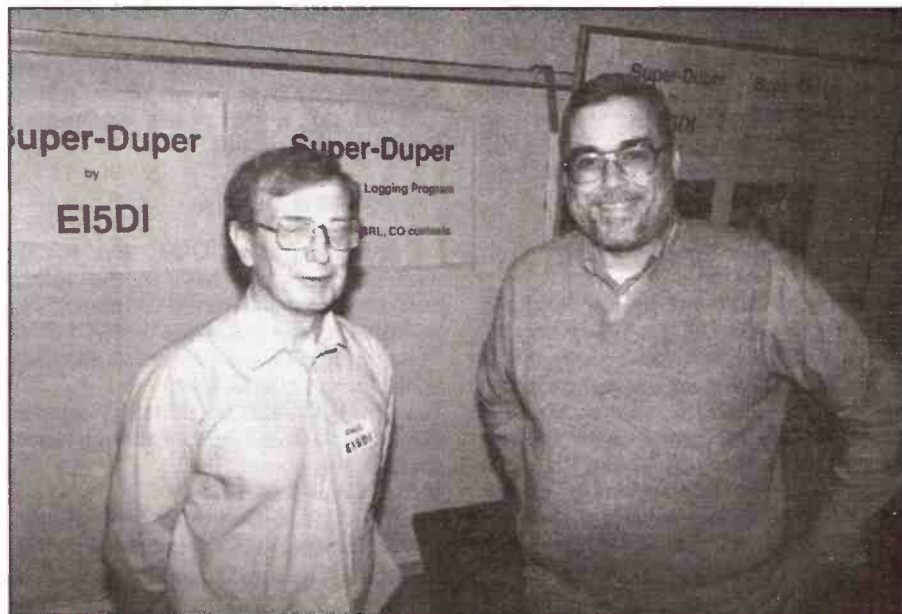
hour after the rest of Europe. Make the most of this during the Winter and Spring, you will be amazed at what you can hear and work. Bear in mind, though, that much DXing activity on 80 and 40m SSB takes place split-frequency. North American stations in particular have a band allocation which extends well above ours (to 7.3MHz on 40m and to 4MHz on 80m, or '75' as they call it), but will usually make a point of listening in our part of the band for European stations.

Talking about the LF bands, I was very interested to meet Rudi, DK7PE, at this year's HF Convention. Rudi has

many successful DXpeditions to his credit, and has always made a particular point of emphasising LF band activity. I was especially curious when Rudi told me he is able to take an all-band aerial system with him on his expeditions, wrapped into a small ball. It turns out he pre-cuts wire aeri- als for all nine HF bands, including reflectors. His technique is then to book a room near the top of a high-rise hotel and suspend the aeri- als from his hotel room using a fibreglass fishing pole! He often uses two element aeri- als, by cutting wires for both driven element and reflector, but also believes that the metal frame of the building acts as an effective reflector (therefore it is important to choose a room facing in the most important direction, e.g. towards Europe). The results speak for themselves. On Rudi's recent DXpedition to Bangladesh as S21ZC he was a consistently stronger signal than Jim Smith VK9NS, operating as S21ZA, despite the fact that Jim had the use of a linear amplifier whereas Rudi was running barefoot with an Icom 735.

Incidentally, Rudi gave me a useful piece of advice about expedition planning. He never announces an expedition until four essential aspects are in place; permission to operate, permission to enter the country and bring in equipment, somewhere to stay, and confirmed travel reservations. With these four in place the scope for last minute hiccoughs should be reduced to a minimum.

I was also very pleased to have Paul EI5DI of PC logbook fame compares notes with 'The Complete DXer' writer Bob W9KNI.





Terry Dubson, W6MKB, staying with me over the HF Convention weekend. Terry had been one of the operators on the VP8SSI South Sandwich Island DXpedition, and had flown in to show slides of the trip at the Convention. Terry is a veteran of many DXpeditions including a couple of the early joint US/USSR efforts - US0SU from Ayon Island and 4K2FJL Franz Josef Land. Terry has operated many times from warmer climates such as D44 (Cape Verde) and HC8 (Galapagos) and was due to be in Easter Island (CE0) for the October CQWW Phone Contest. He also showed me a photograph of himself and the other operators of JY7Z (Jordan) some years ago, rubbing shoulders with none other than JY1 (better known as King Hussein).

As well as being a keen operator, contesteer and DXpeditioner, Terry is a very competent engineer, and I was extremely impressed with photographs of his station. In true Californian style he has a 60m tower with a 'Christmas Tree' of monoband yagis, including a monster full-size 3-element beam for 80m, and a 10 element for 20m on a



## DX News

During September and October the bands started to pick up again with some reasonable DX available even on 24 and 28MHz. I particularly want to single out Nigel, G3TXF who operated from Brunei as V85XF during a business trip to the Far East. In four days Nigel made over 5,000 contacts, all on CW, and was worked in the UK on all HF bands except 160m. In fact, 360 of con-

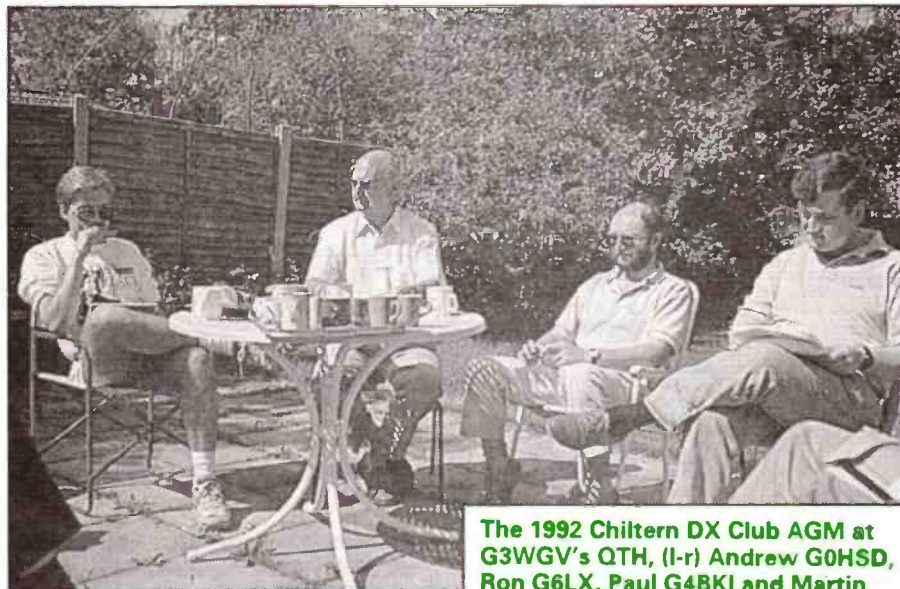
**A bevy of IOTA enthusiasts; (sitting l-r) NN2C, AI5O, K5MK, ON5KL, (standing l-r) DL8AAM, and DK6NP**

A35VG (Tonga) ZK2XG (Tuvalu) and other calls while returning to Papua New Guinea from a brief trip back to Europe, and there were plenty of other interesting ones to catch on the bands.

So far, very few DXpedition operations have been notified for the New Year, but I am sure that plenty will come along in due course. There does seem to be an increasing tendency to announce trips at very short notice, perhaps in order not to raise expectations among the DX chasers, only to have them dashed if there is a last-minute problem. The answer, of course, is to subscribe to a DX newsletter or to keep a close eye on the bands and on the PacketCluster system. The *Hambank* telephone line (0426 925240) is also very handy - I checked it while writing this and heard a message put on by G3NOM, currently living and working in Thailand, to the effect that he and JA1UT are due to show up tomorrow from Bangladesh for a short operation. This is the sort of information that comes in extremely handy if you want to catch some rare ones before the rest of the world discovers they are on.

Finally, the results of the 1991 CQ *Worldwide* Contests have now appeared (getting out the results of these major contests, with several thousand participants, usually takes the best part of a year). I am never sure whether it is worth taking up column space to publish them, but there are always some tens of UK participants, not all of whom actually subscribe to *CQ Magazine*. If any HRT readers took part and want to know how they did, please feel free to drop me a line and I will photocopy the relevant pages (the complete contest write-ups run to 10 or 12 pages in all).

That's it for another month. Good DXing, and do keep me informed of any snippets of HF news you may pick up in your wanderings around the bands.



**The 1992 Chiltern DX Club AGM at G3WGV's QTH, (l-r) Andrew G0HSD, Ron G6LX, Paul G4BKI and Martin G3ZAY**

30m boom! What I found most impressive of all, though, is that Terry designed and built the whole thing with no outside help, even building a remote controlled winch so that he can sit high on his tower and winch aerials up to where he is working! He and his twin brother, who is also licensed, have also almost completed the construction of a 15m Ketch with which they hope, in years to come, to activate rare spots around the Pacific. Whoever said radio amateurs were boring people?! Indeed, the great joy of the Convention, as always, was meeting with so many fascinating people who, previously, had just been disembodied voices over the airwaves.

tacts, or about 7%, were with Gs which is pretty good going. Soon afterwards Nigel joined Roger, G3SXW, and Crjs, G4FAM, for a DXpedition to Swaziland (3DA0). It's great to see British amateurs making such a splash on the bands.

As well as the above, CY0NSM was very active in early October from Sable Island and worked on most bands including 160m. A group of Americans made a big effort from Christmas Island (T32) and were worked here on 20, 17 and 15m. VK2DXI showed up from Nepal as 9N1DX and was worked on most bands. *HF Happenings* ex-columnist Steve G4JVJG appeared as

# Club News

**Aylesbury Vale RS** meet on Wednesday evenings in the Village Hall in Hardwick, located off the A413 between Aylesbury and Buckingham. Club events;  
Jan. 13th Annual dinner and presentations.  
Jan. 20th AVRS vs Chesham ARS quiz.  
Further details from Martin G4XZJ, Tel. 0296 81097

**Basingstoke ARC** meet on the first Monday of each month, 7.30pm, at the Forest Ring Community Centre, Sycamore Way, Winklebury, Basingstoke, Hants. Planned club diary;  
Dec. 7th Christmas social and quiz night.  
Dec. 27th 2m 'The Turkey Settler' foxhunt.  
For further details Tel. 0256 25517

**Barnsley and District ARC** was formed in 1913, and meets every Monday night in the radio shack at the rear of the Darton Hotel, Station Road, Darton, Barnsley. Anyone interested in radio or the Novice licence is most welcome to attend.  
Forthcoming club events/talks;  
Dec. 7th Christmas buffet.  
Dec. 14th Junk sale.  
Jan. 25th Rig check night.  
For further details contact Ernie G4LUE, Tel. 0226 716339 between 6pm and 8pm.

**Braintree and District ARS** meet on the first and third Monday of the month (except bank holidays), 8.00pm, at the Community Centre, Victoria St., Braintree. Club net on 145.375MHz on the second and fourth Mondays at 8.00pm. Planned club events/talks;  
Dec. 21st Cheese and wine party.  
Jan. 4th Work of the Trinity House Lighthouse tenders, talk/video by G7EIG.  
Jan. 18th PMR conversion theory, G3PEN and G0DEC.  
For further details please contact Derek Mayes G3MMA, Tel. 0787 474312

**Bridlington and District ARS** meet every other Thursday, 7.30pm, in the Combined Cadet Building, Bridlington Upper School, Yorkshire, all visitors welcome. Planned club events/talks;  
Dec. 10th Christmas dinner.  
Jan. 7th Low profile DX, John G3EZZ.  
Jan. 21st Packet nodes, Chris G6KIA.  
Further details can be obtained from Norman G4NJP, 44 Hilderthorpe Rd, Bridlington, Yorks YO15 3BG.

**Bristol ARC** meet at the 159th Scout Headquarters, Firtree Lane, St. George, Bristol. Planned diary of events/talks;  
Dec. 10th QRP/homebrew play and display night.  
Dec. 24th Computer evening, Barry G0CFM.  
Further details from Lance Whitelegg G0CCU, Tel. 0272 721744.

**Bristol (South) ARC** meet every Wednesday at the Whitchurch Folkhouse Association, Bridge Farm House, East Dundry Road, Whitchurch, Bristol. Club diary of events/talks;  
Dec. 9th HF activity evening.  
Dec. 23rd Let us see your photographic equipment.  
Dec. 30th Greetings to your friends.  
For more information telephone Whitchurch 832222 on a Wednesday evening.

**City of Bristol Group** meet on the last Monday in the month, 7.00pm for 7.30pm, at The Small Lecture Theatre, Queens Building, University of Bristol. Club diary of events/talks;  
Dec. 14th Christmas party.  
Further details can be obtained from Dave Coxon G0GHH, Tel. 0275 855123

**Bromley and District ARC** meet on the 3rd Tuesday of each month, 7.30pm for 8.00pm at the Victory Social Club, Kechill Gardens, Hayes, Kent. Club events/talks;  
Dec. 15th Christmas party.  
Jan. 19th AGM.  
Further details from Mr. Geoffrey Milne G3UMI, 142 Hayes Lane, Hayes, Kent, BR2 9EL, Tel. 081 462 2689.

**Bromsgrove ARC** meet on the 2nd and 4th Tuesday of the month at Lickey End Working Mens Club, Burcot, Bromsgrove. Club diary of events/talks;  
Dec. 8th Christmas dinner.  
Further details from Mr. D. Edwards G4TUI, Tel. 0527 546075

**Buxton ARC** meet at the Lee Wood Hotel, Buxton, at 8.00pm on the 2nd and 4th Tuesdays each month. Club diary of events/talks;  
Dec. 8th Quiz night.  
Dec. 22nd Social evening.  
For further information contact Derek Carson G4IHO, Tel. 0298 25506

**Coventry ARS** meet at 8.00pm at Baden Powell House, 121 St. Nicholas Street, Radford, Coventry. Visitors are always welcome. The club SSB net is on Mondays at 20.00 GMT on 144.240MHz. Planned club talks/events;  
Dec. 11th NOTA and Morse tuition/Novice Licence class.  
Dec. 18th Social night (Adam & Eve pub Eden St Paradise!).  
Further details can be obtained from David G1ORG, Tel. 0203 311468 or on packet @ GB7NUN.

**Crystal Palace and District RC** meet on the third Saturday of each month, 8.00pm, at the All Saints Parish Rooms, Beulah Hill, London SE19 (opposite junction with Grange Road). Club event;  
Dec. 19th Christmas social.  
Further details can be obtained from Marino Fiorentini G7HUC, Tel. 081 653 1090

**Dacorum AR and TS** meet on the first (informal) and third (formal) Tuesdays, 8.00pm, at the Heath Park, Cotterells, Hemel Hempstead. Club talk/event;  
Dec. 15th Christmas dinner at The Heath Park.  
For further details contact Dennis Boast G1AKX, Tel. 0442 259620

**Delyn Radio Club** meet every other Tuesday, 8.00pm, at the Gwernymynd Community Centre, near Mold, Clwyd. They welcome radio amateurs, CB operators, short wave listeners, and any other radio users. Club diary of events/talks;  
Dec. 15th Mince pie night.  
Further details can be obtained by writing to P. O. Box 150, Mold, Clwyd, North Wales CH7 1YL, or Tel. Steve Studdart GW7AAV on 0244 819618

**Dereham ARC** meet at the St. Johns Ambulance Hall, Yaxham Road, Dereham, at 8.00pm. Planned club talks/events;  
Dec. 10th Social evening and quiz night.  
For further details contact Mark Taylor G0LGJ, Tel. 0362 691099 or G0LGJ @ GB7TLH packet.

**Dragon ARC** meet on the first and third Mondays of each month at the Fourcrosses Hotel, Menai Bridge. Club diary of events/talks;  
Dec. 7th Ron Watson-Jones with more amazing pictures.  
Dec. 21st Christmas party.  
Further details from the Secretary Tony Rees GW0FMQ, Tel. 0248 600963

**Edgware and District RS** meet, at 8.00pm, at the Watling Community Centre, 145 Orange Hill Road, Burnt Oak. They have Morse practice sessions, and run club nets on Mondays and the last Sunday of each month. Visitors always welcome. Planned club talks/events;  
Dec. 10th Junk sale.  
Jan. 14th AGM.  
Further details can be obtained from Howard Drury G4HMD, Tel. 0923 822776, or Steve Slater G0PQB, Tel. 081 953 2164

**Fakenham ARC** meet on the first Tuesday of every month at the Trinity Church Room, Hempton, 7.30 for 8.00pm. All are welcome. Diary of events/talks;  
Dec. 24th GX4LSF Christmas Eve nets on 80m and 2m.  
For further details contact Dave Jarrett, Tel. 0485 528633

**Fylde ARS** meet on the 2nd and 4th Thursdays at South Shore Lawn Tennis Club, Midgeland Rd, Blackpool, at 7.30pm. The fourth Thursday is normally an informal meeting, other planned events/talks as follows;  
Dec. 10th Supper and social evening.  
Further details can be obtained from R. J. Bourn G7CUL, 7 Clitheroes Lane, Freckleton, Preston PR4 1SD

**Halifax and District ARS** meet 7.30pm, on the first and third Tuesdays each month at the Running Man Public House, Pellon Lane, Halifax. The first Tuesdays are informal 'Noggin and Natter' nights, other planned club events/talks;  
Dec. 15th Christmas social.  
Jan. 19th Jandek, Derek G3ZOM.  
Further details can be obtained from Mr. D. Moss G0DLM, Beechwood Lodge, Lightcliffe, Halifax HX3 8NU, Tel. 0422 202306

**Hastings Electronics and RC** meet every Friday, 7.30pm at Ashdown Farm C.C., Downey Close, Hastings, for a social evening, and every third Wednesday of each month for their main meeting. Planned club events/talks;



Dec. 18th Christmas dinner.  
For further details contact Reg Kemp G3YYF, Tel Crowhurst 83454

**Hesketh ARC** is a small but active club based in Southport, Lancashire. They tell us they ran a successful Novice course with nine students last year who all passed, and are currently running another course for Hesketh Bank ATC. They meet every other Tuesday in Birkdale, Southport. Planned club talks/events;  
Dec. 8th Live Packet/TCPIP demonstration.  
Jan. 5th Open evening, for everyone interested in communications.  
Jan. 19th AGM.  
For further details contact Bernie G7DEM, Tel. 0704 63344 or via packet @ GB7NWI.

**Hoddesdon Radio Club** meet alternate Thursdays at the Conservative Club, Rye Road, Hoddesdon from 8.00pm. Club diary of talks/events;  
Dec. 10th Christmas social.  
For more information contact Roy G4UNL, Tel. 081 804 5643.

**Hordean and District ARC** meet on the first Thursday of each month at Hordean Community School, Barton Cross (off Catherington Lane), Hordean, Hants. Club diary;  
Jan. 7th The Portsmouth repeater, John G3MYI.  
Further details can be obtained from Stuart Swain, Tel. 0705 472846

**Keighley ARS** meet at the Cricket Club, Ingrow, near Keighley every Thursday at 8.00pm. Most club meetings are 'Natter nights', other events/talks include;  
Dec. 17th Christmas buffet.  
Further details from Kathy Conlon G1IGH on 0274 496222

**South East Kent (YMCA) ARC** meet at the Dover YMCA in Leyburne Road, Dover, every Wednesday at 7.30pm. The club is actively involved with manning the permanent special event station at the South Foreland Lighthouse, and also runs Morse and Novice classes. Planned club talks/events;  
Dec. 9th Other members' shacks.  
Dec. 16th Christmas social.  
For further details about the club and courses contact Eileen G7HXJ, Tel. 0304 372656.

**Kettering ARS** meet every Tuesday at 7.30pm at The Electricity Sports and Social Club, Eksdale St, Kettering. Club diary of events/talks;  
Dec. 8th Christmas social.  
Jan. 26th Radio communication, by F/O Rose from RAF Wyton.  
Further details from Len G0RDV (was G7EHM), Tel. 0536 514544

**Loughton and District ARS** meet 7.45pm, in room 12, Loughton Hall, Rectory Lane, Loughton. Planned club events/talks;  
Dec. 18th Directional Aerials for 2m, Ray G0LWF.  
Dec. 31st Seeing the old year out at the Victoria Tavern, Smarts Lane.  
Further details can be obtained from Ray Pedley G0LWF, Tel. 081 500 2811

**Maidenhead and District ARC** meet, 7.30pm, at The Red Cross Hall, The Crescent, Maidenhead. Planned club events/talks;  
Dec. 15th Christmas quiz.  
Jan. 19th Moonbounce (EME), Ian G3SEK.  
For further details contact Neil G8XYN, Tel. 0628 25952

**Maidstone YMCA ARS** meet every Friday at 8.00pm, at the YMCA Sports Centre, Melrose Close, Maidstone, Kent ME15 6BD. RAE classes are held every other week, lectures and events in alternate weeks. Planned club events/talks;  
Dec. 11th Christmas special.  
Jan. 17th RSGB Morse tests.  
For further details contact club Secretary Colin Roberts, Tel. 0622 670936.

**Mansfield ARC** meet on the first Thursday every month, 7.30pm, at The Polish Catholic Club, Off Windmill Lane, Woodhouse Road, Mansfield. Planned club diary of events/talks;  
Jan. 7th Chairman's evening, G8EHX on Ecuador.  
For further details contact Mary G0NZA, Tel. 0623 755288

**Norfolk ARC** meet every Wednesday at 'The Norfolk Dumpling', The Livestock Market, Harford, Norwich, 7.30 for 8.00pm start. Club diary of events/talks;  
Dec. 9th CW quiz, all can take part!  
Dec. 16th Christmas party.  
Dec. 23rd No meeting.  
Dec. 30th NARC film archives - Jack G3NJQ.  
Jan. 10th 80m AFS.  
Jan. 13th 'Real radio' evening.  
Further details can be obtained from Jack Simpson G3NJQ, Tel. 0603 747992



**Northern Heights ARS** meet on the first and third Wednesdays every month, 8.00pm, at the Broadshaw Tavern, near Queensbury, between Bradford and Halifax. Forthcoming club events/talks;

Dec. 16th Social evening.  
Jan. 6th Videos.  
Jan. 20th Annual dinner.  
Further details can be obtained from Stan Catton G1HYR/G0IYR, Tel. 0274 673116.

**Nottingham ARC** meet every Thursday, 7.30pm, in the Sherwood Community Centre, Mansfield Road, Nottingham. Visitors interested in amateur radio, whether as a transmitting amateur or SWL, are most welcome. Forthcoming events/talks include;

Dec. 10th Tuning club HF equipment - G0IXR  
Dec. 17th Christmas social.  
Jan. 7th How to deal with electrical emergencies.  
Jan. 14th Morse and the Morse test.  
Further details from Ian Miller G4JAE, Tel. 0602 232604



**South Notts ARC** meet every Friday, 7.00pm, at Highbank Community Centre, Farnborough Road, Clifton Estate, Nottingham, or Fairham Community College, Farnborough Road, Clifton Estate, Nottingham. Planned club events/talks;

Dec. 11th Construction at Fairham College.  
Dec. 18th On air.  
Dec. 20th Christmas dinner.  
Jan. 8th AGM.  
Jan. 15th Junk sale.  
Jan. 22nd Construction at Fairham College.  
For further details contact Julian G0LXX, Tel. 0602 211069, or Ray G7ENK, Tel. 0602 841940.



**Oxford and District ARS** meet every 2nd and 4th Thursday, 7.45pm, at the British Legion Club, Haddow Road, Crotch Crescent, Marston Road, Oxford. Club diary of events/talks;  
Dec. 10th Christmas mince pie party.  
For more information about the club contact Terry Hastings G0CFN, Tel. 0865 863526 (24hr answering machine).

**Preston ARS** have a full and varied calendar for 1993, they meet at the Lonsdale Club, off Fulwood Hall Lane, Preston, fortnightly at 8.00pm. For more details contact Eric Eastwood G1WCQ, Tel. 0772 686708. Planned club talks/events for the near future;  
Dec. 10th Christmas buffet for members, wives, and friends.  
Jan. 7th Paddle keys - international, by G4ZPY.  
Jan. 21st AGM.

**Reading and District ARC** meet on the 2nd and 4th Thursdays, 8.00pm, at The Woodley Pavilion, Woodford Park, Haddon Drive, Woodley, Reading, Berks. The club Christmas dinner will be in December, contact Nick for details. The club diary of events/talks;  
Dec. 10th AGM with wine and cheese.  
Further details can be obtained from Nick Challacombe, Tel. 0734 722489

**Silverthorn RC** meet every Friday, 7.30pm, at the Adult Education and Community Centre, Friday Hill House, Simmons Lane, Chingford, London E4 6JH. Planned club diary of events/talks;  
Dec. 18th Christmas party.  
For further details contact Andrew Mowbray G0LWS/G1NPT, Tel. 081 529 4489 (evenings and weekends only).

**Southgate ARC** meet on the second and last Thursdays of each month at the Winchmore Hill Cricket Club Pavilion, Firs Lane, Winchmore Hill, London N21. Forthcoming club events/talks;  
Dec. 10th AGM - election of new 1993 committee.  
For further details contact Brian Shelton G0MEE, Tel. 081 360 2453.

**Stockport ARS** meet on the second and fourth Wednesdays each month, for details of their meeting place contact Club Secretary Jim G3KAF, Tel. 061 439 4952. Planned club events/talks;  
Dec. 9th AGM.  
Dec. 16th Christmas party.

**Stratford upon Avon & District RS** meet at the Home Guard Club, Main Road, Tiddington, Stratford upon Avon, at 7.30pm. Club events/talks include;  
Dec. 14th Aeronautic electronics - G0NKY.  
Dec. 25th Christmas greetings on the air, 11.00am, 145.275MHz.  
Jan. 11th New year social.  
Jan. 25th Contesting and IOTA.  
Details from A. Beasley G0CXJ, Tel. 060 882 495.



**Surrey Radio Contact Club** meet on the first Monday of each month at TS 'Terra Nova', The Waldrons, Waddon, Croydon, Surrey. Planned club talks;  
 Dec. 7th Workshop Practicalities.  
 Jan. 4th 'I followed Rommel'  
 For further details contact Bernard Wynn G8TB, Tel. 081 660 7517

**Sutton and Cheam RS** meet on the 3rd Thursdays each month, 7.30pm for 8.00pm at Sutton United Football Club, The Borough Sports Ground, Gander Green Lane, Sutton, Surrey. Natter nights are on the first Thursday of each month, and they have a club net on Monday at 20.30 on 70.3875MHz, and Tuesday at 10.30 on 3.760MHz. Club talks;  
 Dec. 17th Christmas buffet.  
 Jan. 10th 3.5MHz AFS contest (CW).  
 Jan. 16th 3.5MHz AFS contest (SSB).  
 For further details, Tel. 081 644 9945



**Three Counties ARC** meet every other Wednesday, 8.00pm, at the Railway Hotel, Liphook. Club diary of events/talks;  
 Dec. 16th Christmas quiz night.  
 Further details can be obtained from Kevin Roche G8GOS, Tel. 0420 83091



**Torbay ARS** meet every Friday at the ECC Social Club, Highweek, Newton Abbot at 7.30pm. They have informal meetings most Fridays with a talk/event once a month, details as follows;  
 Dec. 18th Christmas party.  
 Jan. 22nd Contest and construction night.  
 Further details can be obtained from Walt G3HTX, Tel. 0803 526762 or Andy G4VPM, Tel. 0803 329055



**Verulam ARC** meet on the second and fourth Tuesdays each month, 7.30 for 8.00pm, at the RAF Association Headquarters, New Kent Road (off Marlborough Road), St. Albans. Club diary of events/talks;  
 Dec. 13th Club Christmas rally.  
 Dec. 15th Club AGM.  
 For further details contact Walter Craine G3PMF, Tel. 0923 262180

**Wakefield and District ARS** meet every Tuesday at 8.00pm, in the first floor rooms, Ossett Community Centre, Prospect Road, Ossett, W. Yorkshire. Club events;  
 Dec. Christmas social (contact Dave for details)  
 Further details from Dave Ackrill G0DJA, Tel. 0924 240577

**Winchester ARC** meet on the third Friday of the month, 7.30pm, at the British Red Cross Centre, Durgate House, Winchester (adjacent to North Walls Police Station). Club diary;  
 Dec. 18th Christmas party.  
 Jan. 15th AGM.  
 For further details contact Malcolm Butler G0LMD, Tel. 0962 89550.

**Wirral and District ARC** meet 8pm, at the Irby Cricket Club, Mill Hill Road, Irby, Wirral. Planned club events/talks;  
 Dec. 9th Chairmans night.  
 Dec. 16th D&W The Anchor, Irby.  
 Jan. 6th D&W The Greave Dunning, Greasby.  
 Jan. 13th AGM - make your feelings known.  
 For further details contact Paul G0JZP, Tel. 051 648 5892

**Wrexham ARS** meet at Maesgwyn Road Community Centre, Wrexham. Forthcoming events/talks;  
 Dec. 15th Christmas buffet.  
 For further details contact D. Ian Wright GW1MVL, Tel. 0978 845858

**Yeovil ARC** meet every Thursday, at the Red Cross Centre, Grove Avenue, Yeovil, Somerset. Club events/talks;  
 Dec. 10th This is packet radio, G7KBE.  
 Dec. 17th Mince pies and RF.  
 Dec. 29th Quiz and operating club station.  
 Jan. 7th Club's 2m linear, G3FOO.  
 Jan. 14th Club project transmitter board, G3MYM.  
 Further details can be obtained from Mike Woodford G0JVG, Holm Wood, 5 Orchard Close, South Petherton, Somerset TA13 5DX.

**National and International British Amateur Radio Teledata Group (BARTG)** have a quarterly magazine, hold two contests and a rally each year. The membership officer is Peter Adams, G6LZB, Tel. 0923 220774 for details of joining the BARTG. For other information, the group's Secretary and Publications Manager is Ian Brothwell G4EAN, 56 Annot Hill Road, Arnold, Nottingham NG5 6LQ, Tel. 0602 262360, or via packet G4EAN @ GB7BAD.



**G-QRP Club** publish a quarterly magazine devoted to low power communication, and hold regular get-togethers. Their secretary is Rev. G. Dobbs, St. Aiden's Vicarage, 498 Manchester Road, Rochdale. Lancs. OL11 3HE. Tel. 0706 31812.



**International Short Wave League** who as well as running an International QSL bureau for amateurs and SWLs, have a monthly journal and regular get-togethers at their rally stands. See their feature in the June 92 issue of HRT. For more details send an A4 sized SAE to; ISWL HQ, 10 Clyde Crescent, Wharton, Winsford, Cheshire. CW7 3LA



**The Irish Radio Transmitters Society** send out regular newsletters giving details of local activities, Sunday 27th December is their EI Activity Day. The contact man for this is Dave Moore EI4BZ, 12 Castle Ave, Carrigtwohill, Co Cork. Tel. (Eire) 021 883555



**Radio Society of Great Britain** are based at Lambda House, Cranbourne Road, Potters Bar, Herts. EN6 3JE, Tel. 0707 59015. They have a unique blend of full-time staff at Potters Bar coupled with many volunteer officials around the country. See their 'open day' feature in the July 92 issue of HRT.



**Royal Naval Amateur Radio Society** have a large number of on-air nets, and meet together at rallies and events throughout the UK. They publish a regular newsletter, and offer a wide variety of member's supplies. Information from their Secretary Mick Puttick G3LIK, 21 Sandfield Cres, Cowplain, Waterlooille PO8 8SQ, Tel. 0705 255880.

*To include your club, or rally, in this feature, make sure you send us your events details early. We only list active clubs, i.e. those who send us their diary of planned talks/events, so if they're not listed here they're obviously not very dynamic! Is your club listed - if not then either give your Secretary a boot or get some activities going! Dates to be included in the issue published on the first Friday in February must reach us by the 15th December, addressed to 'HRT Club News', P. O. Box 73, Eastleigh, Hants SO5 5WG.*

## Rallies

### December 13th

**Centre of England Christmas Radio, Computer, Electronics and Communications Rally** will be at the National Motorcycle Museum, near the NEC, Birmingham. Doors open at 11.00am (10.30am for disabled visitors), admission £1 with a reduction for RAIBC members. We're told there will be over 60 traders, bar and restaurant, ample parking, and also a Christmas special 'spot the cracker' which will be on many of the trade stands to win a free prize. Further details may be obtained from Frank Martin G4UMF, Tel. 0952-598173.

**Leeds and District ARS annual rally**, will be at Pudsey Civic Centre, Dawsons Corner, Pudsey, Leeds. All the usual attractions and facilities, doors open at 10.30am. Further details may be obtained from John G0FWP, Tel. 0532 589652  
**Verulam ARC Christmas Rally** will be held at The University of Hertfordshire (formerly Hatfield Polytechnic), doors open at 11.00am. Also a bar, refreshments, and grand raffle. Free parking with talk-in on S22. For further details contact Walter Craine G3PMF, Tel. 0923 262180.

### January 24th 1993

**The Lancastrian Rally**, is to be held at the University of Lancaster, admission £1. Doors open at 10.30am for disabled visitors. For further details contact Sue G10HH, Tel. 0524 64239.

### February 7th

**South Essex ARS Radio Rally**, will be held at The Paddocks, Long Road (A130), Canvey Island, Essex. Doors open at 10.00am, with trade stands, bring and buy, home made refreshments, free parking plus parking outside the main door for disabled visitors. 2m talk-in on S22 (G4RSE). Further details contact Ken Hendry G0BBN, Tel. 0268 755350.

### February 14th

**2nd Northern Cross Rally**, will be held at Rodillian School, near the junction of M1/M62. For further details contact Dave Gray, Tel. 0532 827883.

### February 21st

**East Coast Amateur Radio and Computer Rally** will be held at the Clacton Leisure Centre. For further details, Tel. 0255 474292

### February 27th

**Tyneside ARS 5th Annual Rally** will take place at the Temple Park Leisure Centre, South Shields. Doors open at 11am (10.30am for disabled visitors). We are told all their usual visiting trade stands will be in attendance, and those visitors not wishing to partake in the rally have all the amenities of the leisure centre available. For further details contact Jack Pickersgill G0DZG, Tel. 091 265 1718

# Free Readers Ads!

## HELPLINES

**Do you need local help getting that PMR rig going, or with the repair of your rig, do you need a circuit diagram, or do you have time on your hands and you'd like to offer help? Maybe you have some old gear or even radio books and magazines going spare that you'd like to offer 'free to a good home' rather than throw away. Do you need that elusive small part for your radio repair? Then be our guest, advertise free in this new section of 'Free Readers Ads' (Amateur Radio related ads only please). Post your coupon, marked 'Helplines' to us, or Fax it direct to 0703 263429.**

**Has anyone had any success in using a Trio 2200GX on packet? I use a Tiny 2 but with no joy, any help would be appreciated. Write to; Alan Little G4PSO, 20 Vicarage Close, Shillington, Hitchin, Herts SG5 3LS or Tel. 0462 711364 or packet @ GB7ZPU.**

**Manual or info wanted on Collins TCS/10/12 transceiver, all expenses paid. Contact John G3DOP (Helston, Cornwall), Tel. 0326 290711**

**I wonder if anyone out there could please help me get into amateur radio. There is one problem that is in my mind which may put people off and that is that I am a skinhead. I've been to one or two houses to ask about RAE exams etc., and received the cold shoulder. All I want is to learn about a hobby I'm interested in, and to pass my RAE. So if there is anyone in Whitley Bay, North Shields, or Newcastle who would like to help, I would be very grateful, we're not all bad you know. Please contact Mr. D. Barr, 11 Cambo Place, Preston Gardens, North Shield, Tyne and Wear NE30 3RJ, Tel. 091 259 5239**

**Any help or info required to re-program ex-PMR Storno COM 6114S to 2m band, this one's not been in HRT yet! I believe this rig covers 134 to 174MHz with 12.5kHz spacing and 25W output. Please contact Ray Griffiths G7MTH (Sanderstead, S. Croydon), Tel. 081 651 1581**

**Users guide or any information wanted on how to operate the Uniden Bearcat BC200LXT scanner. All costs refunded. Please write to; Mr. W. Byers, 29 Newton, Frizington, Cumbria CA26 3QQ, or Tel. 0946 813406**

**Are there any class A amateurs, who would be willing to give some time to help me through the Morse test, in or around the North West Surrey area. Contact Martin Clarke G7DUK, Tel. 0932 228565**

**Any modifications for the Icom IC-402 70cm SSB portable, particularly those from Dubus 1/83, and anything concerning the replacement of the aerial socket, all costs refunded. Please contact P. Lawrence (Warwick), Tel. 0926 498388**

**Heathkit DX40 (not DX40V) transmitter restoration, could anyone help me by sending me the manual and circuit diagram (or photocopy)? Costs reimbursed. Thank you. John Wilkinson, 2 Parkgate Drive, Leyland, Lancs. PR5 1BU. Tel. 0772 421336**

## FOR SALE

**FT-290R Mk1 muTek front end, two sets of nicads, charger, soft case, speaker mic, box and instructions, £225. Tono 100W 2m linear amp, £85. 14 ele 2m MET beam, good condition, in bag with instructions, £25. Contact Mr. S. Hawkins G4TVR (Solihull), Tel. 021 745 8222**

**Tokyo Hi-Power HT-1066m SSB/CW transceiver, 10W, boxed, excellent condition. Also 5A 13.8V power supply to suit, £170. Contact Darren Hudson (Norwich, Norfolk), Tel. 0603 629024**

**Ten Tec Century 22 with crystal marker, built-in electronic keyer, circuit breaker, PSU, twin paddle key, and manual, in superb as new condition, complete HF station, £250. Contact Geoff Saxton (Huddersfield), Tel. 0484 645923**

**Diamond CP6 HF vertical with radials, 6, 10, 15, 20, 40, and 80m, only been used outside for 3 weeks, excellent condition, as new and boxed, cost £220 asking for £145 ono. Nowhere to site it at new QTH, thus for sale. Contact S. Tucker (Altrincham, Cheshire), Tel. 061 980 5506 evenings or weekends.**

**KW 2000A, with PSU, VGC, £180 ono. Would exchange for 2m FM mobile, FDK or other etc. Contact Mr. A. Humphreys, 45 Cwmlace, Llandudno, Gwynedd, N. Wales LL30 1LP, or Tel. 0492 623672**

**Yaesu FT-290 MkII, nicads,**

**charger, new power supply, colinear and coax, all as brand new, £300. Contact Andrew Bevan (Stourbridge area, W. Midlands), Tel. 0384 423571**

**Howes, Kanga, Cirkit, QRP kits, some made up, plus multimeter, valves, components of value, all less than half price. Contact A. Beglin (Petherton, Somerset), Tel. 0278 662592 for details.**

**Realistic DX-160 short wave receiver, 0 to 30MHz, matching speaker and instruction manual, £75 ovno. Marc NR-52F1 communications receiver, 12 bands, 145kHz to 30MHz, 60MHz to 470MHz, FM, AM, SSB, CW, handbook, £60 ovno. Racal digital frequency meter, £8. Hewlett Packard computer terminal, £5. Buyer collects. Contact T. Gill (Burton-on-Trent), Tel. 0283 223497**

**Realistic PRO-2005 scanner, 400 channels, boxed, never been used, complete with manual and 'Scanners' book by Peter Rouse, £225 ono. Contact Miss. S. Phyll (Ashford, Kent), Tel. 0233 770391 evenings and weekends.**

**FRG-7700, FRV-7700, and FRT-7700, near mint condition, with manual, £250 ono, buyer collects. Contact Brian Forster (Sheffield), Tel. 0742 887052 anytime.**

**Yaesu FRG-9600 VHF, HF, SW, ATU, ERA microreader, £500. Will swap for Kenwood R2000 with VHF converter. Hallicrafter Sky Champion S-20, £80. Contact J. Thomas (Borehamwood, Herts), Tel. 081 207 0706**

**Standard C520 2m/70cm dual bander transceiver with case, same as C528, very good condition, receive 130 to 172, 350 to 470, 890 to 910MHz, £260. Contact Joe Chan GM0PLH (Cumbernauld, Glasgow), Tel. 0236 457989 daytime.**

**Sanyo MBC 1200 computer, twin drives, excellent monitor, software, gift at £25. Radio spares LSG-17 signal generator, £90. AR-1000 hand scanner, boxed as new, £125. Racal 9024 counter, needs work, £10. Contact J. Jennings (Lutterworth, Leics), Tel. 0455 209125**

**KW2000B with PSU, ATU, and SWR meters, £200 including carriage. Vibroplex champion bug key, £35. Contact Mathew McKee (Antrim, Co. Antrim), Tel. 08494 60409**

**Racal 117E and RA63, SSB adaptor, manuals, £225. MA1350 decade frequency counter and manual, £35. Solarton wide band**

**oscilloscope CD1212/CT484 with CX1251 and manual, £25. Buyers collect, cash only. Wanted - R4C receiver. Contact Mr. N. Walker, 35/37 Brighthouse and Denholme Road, Opposite Raggalds Inn, Queensbury, Bradford BD13 1NA**

**Yaesu FT-757GXMk2, Yaesu FC-902 aerial tuner, Daiwa PS304 30A power supply, £1000. Contact R. Mansell G0OVK (West Midlands), Tel. 0902 633774**

**Drake R7 updated R7A, 5 filters, N/B, mint condition, £700. Sony CRF-330K world zone receiver with built-in cassette, was £1000 sell for £450. Sony CRF-320 32 band digital, 1.6-30MHz, FM, MW, LW, excellent receiver, was £800 sell for £350. Grundig 650 Internation, like new, £230. Zenith 3000, VGC, original, £60. Contact R. Rai (Southall, Middx), Tel. 081 813 9193**

**Pye A200 linear M1, converts 2, 4, and 6m, £12 plus carriage. Contact Geoff G3AOS (Macclesfield), Tel. 02605 252287**

**Amiga 500 including external disk drive, half Meg Exp., workbench 1.3, mouse, PSU, joystick, modulator, and manual, boxed as new with games and Amiga Shopper magazines 1 - 18, £230 ono. ERA Microreader, boxed as new, £100 no offers. Contact Ken Cole (York), Tel. 0904 794969 evenings only.**

**AOR 2002 base/mobile scanner, 25 to 1300MHz, with telescopic aerial and frequency book, £285. Would consider exchange for Yaesu 757 or 767. Contact A. Lane (Lincoln), Tel. 0522 690732**

**TS-440S, mint and boxed. Z match coupler 80/10, long wire ATU, pluggable series parallel with reflectometer, 0.5A and 3A RF ammeters, offers. Contact J. Lee-Rand (Worthing), Tel. 0903 242927**

**Icom 490E 70cm multimode mobile transceiver in box with all fittings, handbook etc., excellent working order, £325 ovno. Will swop for any 2m multimode mobile transceiver with 25W output, must also be in good overall condition. Contact Bob Taylor (Stourbridge), Tel. 0384 395328**

**National Panasonic RF-B600LBS/LBE communications receiver, with manual, and memory circuit, nice condition, £200 ono. Hammerlund HG one-eighty communications receiver, GWO with manual, £100. Contact W. Billington (London area), Tel. 081 699 4413 after 6pm.**

**Yaesu FRG-9600** receiver, VHF, UHF, SW, with Yaesu ATU, and ERA Microreader MkII for CW and RTTY, bargain, £500, cash no cheques. Will swop for AOR 3000A scanner receiver. Contact J. Thomas (Elstree), Tel. 081 207 0706

**Dragon 32k** computer with PSU, tape deck, leads, software, numerous books, magazines etc., £50. Contact Steve Beal (Surrey), Tel. 0689 842650

**Sommerkamp FTDX150**, £150. FRG7, £120. Transmitting key type 365B, antique! Also brass key used on the Cape to Cairo line, both £50. All offers invited. Contact Mark Large (Hastings), Tel. 0424 441966 answer phone. **FT-101ZD** transceiver, £400. FV-101DM extension VFO, £95. FC902 ATU, £95. SSM Europa 50MHz transverter, suits FT-101, £30. Kemprow squeeze key, £35. SP102 speaker, £30. HQ2 triband beam, 6, 10, and 15m, £50. Buyer collects, inspects. Contact Norman Lilley (New Milton, Hants), Tel. 0425 621230

**Realistic PRO2006** scanner, 400 channels, programable, two speed hyperscan, 26 channel fast mode, 13 channel slow mode, covers 25 to 520MHz, 760 to 1300MHz, plus 2 sec scan delay, frequency steps 5, 12.5, 50kHz, bands AM, NBFM, WBFM, 10 monitor channels to store frequencies, individual electronic lockout, plus stainless steel disc, £245. Contact J. Down (Clacton on Sea), Tel. 0255 431449

**1992 USA** and International callbooks, £27 the pair post paid. Contact M. Faulkner (Farnborough, Hants), Tel. 0252 548561

**KW2000** power supply and speaker, best offers. Wanted DG5 digital frequency display for TS-520SE transceiver. Contact Reg Hargreaves (Leicester), Tel. 0355 889903

**FT-23R 2m** FM handheld transceiver, £170 cash only. Contact J. Thomas (Borehamwood, Herts), Tel. 081 207 0706

**ZX Spectrum** software etc. for receiving weather fax, still boxed, £20 post paid. Datassette unit for Commodore CBM64/128, never been used, still boxed, £25 post paid. Contact M. Marsden (Ormskirk, Lancs), Tel. 0704 892088

**FT-239R, MMB11**, nicads, charger, case, boxed, with 5 element yagi, £210 ono. Datong D70 with Himound HK707 key, £40. Maplin (XG92A) RF power meter, 1.8 to 500MHz, 0.5 to 120W, requires calibration, £45. Wanted - PRE66 Halda, swop any of above with cash adjustment either way. Contact Graham Campbell (Alloa, Scotland), Tel. 0259 219091

**Icom IC-R72** receiver, plus Real-

istic PRO2004 scanner, both for £550. Contact W. Bannister (Liverpool), Tel. 051 207 2602

**Grundig satellite** transceiver, hardly used, transistorised, 35 years old, offers. Wanted - amplifier for scanner, or any equipment of interest to obtain good reception. Contact J. Johnston (Derbyshire), Tel. 0283 221870

**Kenwood TS-140S** HF transceiver, mint condition, complete with manual, box, and mobile mounting bracket, £600. Contact R. Caton (Bristol), Tel. 0275 851501

**Yaesu FT-221 2m** multimode with 5 repeater crystals, excellent working order, £285 ono. Will swop for 2m mobile multimode. Contact Dave G1NYN (W. Yorks), Tel. 0924 405274

**Swan 500CX 'Special'**, covers 80, 40, 20, 15, and 10m, includes Swan 117XC PSU, Swan DD76 frequency counter 240V to 110V converter, and Shure base mike, complete with manual, £225 ono or WHY? Contact Alan on Tel. 0924 453853

**High speed** Morse sender AN/ GRA-17 comprising of keyer, coder, and two tape cassettes, £25. including postage. Contact A. Grime (Rochdale, Lancs), Tel. 0706 356003

**Icom IC-R100** with SSB, 100kHz to 1.8GHz, all mode, as new condition, boxed with manual, £390 ono. Standard C520/528 dual band handheld, multi function, with case and nicads, boxed as new, £290 ono. Contact Andy Smith G1JVV (Beds), Tel. 0462 816610 after 5.30pm.

**Radio magazines** for sale, HRT, RadCom, SWM (new style), PW, PT, Pop Elec, Prac Elec, plus a few Australian and USA mags, mostly under 40p each, send SAE for list. Wanted - PP2 WB radio 1987/88, have 'super box loop' (MW), £25, SAE for details. Any books on the history of radio. Q-multiplier required, WHY? Write to; Mike Evans, 120 Loughton Way, Buckhurst Hill, Essex IG9 6AR

**Kenwood TM-231 2m** transceiver, 50W, extended receive, 136 to 174MHz, £175. Diamond dual band mobile mag mount aerial, £35. Both as new. Wanted - 80Mb plus 1DE hard drive. Contact Rex G0MWH (Norwich), Tel. 0603 627389

**Butternut HF5B** butterfly compact beam for 20 to 10m including WARC, entire element active on all bands, light, only 18 months old, VGC, £145. Contact Chris Knowlson (Cheshire), Tel. 0625 531154

**Tiny-2 TNC** with latest PMS, £95. Contact Chris Reeves (Criccieth, Gwynedd), Tel. 0766 522744 anytime.

**CTE 1600 2m** handheld (as IC-2E), 4W out, high power nicad pack fitted, complete with speaker/mike HM46, and charger, £115. MML144/30LS amp 1/3W in 30W out, £60. Nicad pack BP4 700mA batteries fitted, £10. Nicad pack BP5, £20. Weller PS2D temp controlled soldering station (new type), £25. Contact Terry G4OXD (Hitchin), Tel. 0462 435248 after 6pm.

**Sommerkamp FT-277ZD**, FV-101DM VFO, and SP-901 speaker, £550. Kenwood AT-230 ATU, £120. Kenwood TM-241E 2m FM transceiver, £195. Tono 2m 150W linear amplifier, £70. Contact Iain Muir GM0OQV (Wishaw, Scotland), Tel. 0698 384948 after 6pm.

**Standard C528 2m/70cm** dual band hand held, extended coverage to 980MHz, 5W output, dual receive, comes with CTCSS tone board, speaker/mike, base charger, base plate, all boxed and in excellent condition, cost over £620 new, will accept £375 ono. Contact Steve Powell (Bracknell), Tel. 0344 486281

**Icom IC-32E**, soft case, speaker/mike, charger, nicad, case for 6 AA cells, VGC, £230. Contact R. Prew G8EPQ (Milton Keynes), Tel. 0908 678778

**Yaesu FT-4700** dual band mobile, 5/50W on both bands, remote head, excellent condition, as new, never been used mobile, was £650 new, sell for £350 ono. Buyer collects, first to see will buy. Contact S. Tucker (South Manchester), Tel. 061 980 5506 after 7pm or weekends.

**Yaesu FTV-107R** transverter with 2m module, instruction manual, and boxed, £120. Contact Alan G1NRM (London area), Tel. 081 959 3380

**Tono 9100E** multimode communications terminal, AMTOR, RTTY, ASCII, CW, stand alone unit, full autotrack on CW RX, just hook up to audio, TTL or RS232, comes with screened monitor, all leads and comprehensive instruction and service manuals, cost £1000+, will accept £375 ono. Contact Steve Powell (Bracknell), Tel. 0344 486281

**Kenwood 531E** 23cm mobile transceiver, absolutely mint condition, boxed, cables etc., must clear, £260. Tandon PCA 12/40 286 computer, 40MB hard disk, VGA card (no monitor), to clear, £300. Contact Paul G4XHF (Crawley), Tel. 0293 515201

**Yaesu FT-102** HF all mode transceiver, including FM board, CW and SSB filters, manual and technical supplement, good condition, £475. Sommerkamp FTV-901R transverter, 2m fitted, £125. Contact P. Cox G7MGT

(Steyning, W. Sussex), Tel. 0903 815412

**Morse oscillator** advanced MM2 programable speaking tutor, variable speeds 6 to 32 WPM, manual, boxed, GWO, £65. Welz SP15 SWR/PWR meter, 1.8 to 200MHz, 2, 20, 200W switching, boxed, GWO, £29. Tonna 144MHz 4 element portable/base beam, light, very compact, £15. Contact Chris Knowlson (Cheshire), Tel. 0625 531154

**Kenwood SM220** including panadapter, £250. ELE keyer, £40. Amstrad PPC640 including DOS 3.3, Baycom packet modem, £175. Capco 80 to 30 and 20 to 10 mag loops, £150. All plus postage and packing. Contact Phil Lawson (Kent), Tel. 0303 278978 ext 3354 daytime, or 0304 381420 evenings.

**Waveguide No.16**, flexible 6ft long with round flanges, £20. Vibroplex J36 bug, £40. RAF key D7373, £25. 70cm PF3 with charger, £40. Yaesu FP-8 PSU, £50. SPC300 ATU, £75. Microwave power meter, £50. All plus postage. Contact A. Williams (Ryde, IoW), Tel. 0983 565551

**Lowe SRX30** 0.5 to 30MHz receiver, with circuit and handbook, VGC, no mods, £65. Also VHF 2m converter to suit, £15. Wanted - parts or complete 2m 'talkbox' featured in Feb/Mar 1984 HRT, or WHY 2m gear, or swop SRX30. Contact E. Edwards (Birkenhead), Tel. 051 647 5156

**FT-7B** transceiver, 80 to 10m, SSB/CW, 50W output, mike, manual, good condition, £245. Contact G. Grieveon G4GXU, 95 Sedgemoor Road, Coventry CV3 4EA, Tel. Coventry 307272

**Samlex 15** to 20 amp, 13.8V regulated power supply, still boxed, never used, £40. Rotator Kenpro KR400 RC complete with cable, good condition, £40. Contact Jason Eccles (Colchester, Essex), Tel. 0206 768360

**Pye A200** linear amplifiers, M band, modify 2, 4, and 6m, £12 each plus carriage. Contact G. Barnes G3AOS, 14 Coalpit Lane, Langley, Macclesfield, Cheshire SK11 0DO, Tel. 0260 252287

**Standard C500E** dual band handheld, extended transmit and receive, 130MHz to 169MHz, and 400MHz to 470MHz, with speaker mic, and nicads, £195, will exchange for three high power UHF ex-PMR mobiles. Also Pye PFX UHF handheld on 70cm, with nicads and manual, £95. Contact Tony Cox (Camberley), Tel. 0276 452868

**New stabilized** power supply, 13.8V, 12A, 15A surge, short circuit protected, £55. Jaybeam 2m colinear, as new, £25. Contact T. Hartshorn (Chesterfield), Tel. 0246 236496

**PK232MBX** mint, latest ROM, complete with Packrat 5.1 software, optional TAPR mod if required. Boxed, manuals etc. £240. Paul (Abergele), Tel. 0745 833847

**HF Mobile** linear 80-10m, 150W+, variable output, preamp new PAs, exchange for linear 2/70/6m? WHY, or sell £90. Also AD370 aerial, £40. Ian (Eccles-on-Sea), Tel. 0692 580201.

**Calling budding** radio hams, 'RAE Manual' and 'How to pass the RAE' book, both as new, £10 for pair. (Boston). Tel. 0205 350179 after 6.00pm please.

**Saiko Scanner**, 12V FM 16ch, 78-88, 155-168, 456-476Mhz, mobile brackets, tele aerial, brand new, boxed, unwanted gift, £60. Eric Page GU3HKV, Seacroft, Clos du Muerier, St Sampson, Guernsey. Tel. 0481 47278

**Aerial Tuning** units for VHF and UHF, broadband for RX and TX to 150W, used for base or portable VHF 118 to 157MHz, UHF 370 to 480MHz, with instructions, £25 each. Ring anytime 9.00am to 9.00pm (Witnesham, Suffolk), Tel. 0473 785203

**Matsui MR4099 RX**, vgc, £45. KW speaker, £15. Yaesu clock, £10. Howard (Enfield), Tel. 081 363 3093

FT-736R, mint, boxed, as new, with fitted wideband VHF coverage, and Yaesu internal CTCSS encoder/decoder for 2m/70cm repeater use, complete with owner's manual and full technical manual, very reluctant sale, £995. Chris G4HCL (Southampton), Tel. 0703 262105, Fax. 0703 263429.

#### EXCHANGE

Icom IC-R1 scanner, 0.1 to 1300MHz, FM, AM, WFM, with charger. Exchange for FT-690R. Contact J. Brown (Tamworth), Tel. 0827 58605

**Amstrad 640PPC**, twin disk drives, modem and Epson LX86 printer. Exchange for 2m mobile or handheld rig. Also exchange Sinclair QL (needs attention but complete), for Sinclair Spectrum (working or not). Will deliver and collect. Contact Peter Smith (Wakefield), Tel. 0924 828361 after 6pm or 0836 344652 anytime.

**For oscilloscope** with at least 40MHz bandwidth, and dual trace I will exchange my Technics SX-K700 professional keyboard, all usual features plus many more not usually available; programmable voices and foot switch, sound effects, midi compatible, with manual, and in good condition. Contact M. Tonks (Burton on Trent), Tel. 0283 814374

**Yupiter MVT-7000** scanner, 100kHz to 1300MHz, box, manual etc., cost £280. Exchange for FRG-7700 or WHY. Contact Gary Lebrun (Fareham, Hants), Tel. Fareham 56823459 after 7pm, thank you.

**Multiband V dipole** aerial, 730V, HF, 40 to 10m, 1kW PEP, hardly used, now dismantled and packed with manual, cost £150. Exchange for a reasonably good short wave receiver, 30kHz to 30MHz, AM, SSB, CW. Contact Mike G0JHK (Hastings), Tel. 0424 64847

**For FRG-8800**, computer, WHY?, I'll exchange G-reg Jawa motorcycle, 5,000 miles. A. Altree, 1 Brid Close, Bridestowe, Devon. EX20 4EJ

**Realistic PRO-37** hyperscan and BBC Master system computer plus twin disc drive unit, for Icom IC-R1 scanner or Alinco DJ-580 twin bander, or any good coverage scanner, adjustment either way. Mark Richardson, 8 Tanhill Drive, Lancaster, Lancs. LA12JD. **Anyone interested** in swap, I have a Yamaha MK-100 multi menu

electronic stereo keyboard, cost over £500, mint condition, want a Yaesu FRG-7700 plus converter or handheld scanner 1300MHz, consider offers of all receivers. John GM-20450, 38 Ochilview, Devonside, Tillicoultry, Clacks. FK13 6JD

#### WANTED

**Pye or Storno** ex-PMR equipment suitable for beginners' club conversion projects, base, mobile, portable, AM or FM, VHF and UHF, transceivers, linears etc. Write stating age, condition, and price to; Hon. Sec. DARS, Peter Grant EI8CZB, 36 Cherryvale, Dundalk, Co. Louth, Ireland.

**KW or SEM E-Z Match**, or KW super match types KW107, br KW207, or KW109. Also wanted Heathkit GDO type GD-1U. Cash waiting. Contact Richard (Tiverton, Devon), Tel. 03986 215 anytime.

**Cheap 2m FM** transceiver, must be suitable for packet, crystal set maybe? Prefer not ex-PMR. I have several ex-PMR radios if you want to part exchange, mostly AM but some FM. Cash waiting. Contact Ian G1LSK (Lincoln), Tel. 0522 546145

**FL-2025 clip-on** 25W linear amplifier for FT-290 R2 multimode, only GWO please. Contact Chris Knowlson (Cheshire), Tel. 0625 531154

**Kenwood MC50** desk microphone. Contact Philip GW6IVO (Ebbw Vale, Gwent), Tel. 0495 302430

**Realistic PRO-22** handheld crystal scanner, or Signal R528 handheld crystal scanner. Also Lowe SRX30 HF receiver, or Eddystone EC10 Mk2 receiver, working or faulty but must be complete. Contact A. Blair (Tyne and Wear), Tel. 0207 544342 af-

ter 6pm.

**RAF type 'D'** Morse key, 'GW' type Morse key. Contact D. Davies, Pen-y-Maes, Halcog, Brymbo, Clwyd LL11 5DR, Tel. 0978 756330

**Belcom LS102L** 10m transceiver with continuous tuning, or similar rig wanted. Please write stating condition and price to; Mr. R. Northwood, P.O. Box 17, Lowestoft, Suffolk NR32 7DF

**Daiwa 3.5** to 54MHz ATU, model CNW 319II, aerial tuner for cash or will swap Sony PRO-80 scanner. Contact A. Florence (Royston), Tel. 0763 262443

**Eddystone models 40A** (for GPO), 870, 870A, cabin receivers, EB35, EC10 and 688, 697, 698, round speakers for cash, possibly able to collect. Please contact Peter Lepino (Surrey), Tel. 037 245 4381 anytime, thank you.

**ERA** or similar Morse reader, Dis/OAP, good price, good condition. Contact R. Williams (Grantham, Lincs), Tel. 0476 66047

**BNOS 70cm** linear amplifier, 432-3-50. Also Daiwa U66VN, 140 to 525MHz coupler for NS660P power meter. Contact P. Lawrence (Warwick), Tel. 0926 498388

**Workshop Service** manual for Trio TS700 (digital readout). Loan or purchase, your price paid (Grimsby). Tel. 0472 71215

**SMC Monitorscope**, must be in VGC. Chris Quarrron (York), Tel. 0904 635771

**Speech Processor**, Datong if possible, other makes will also be considered, also RCI2950. J. Johnson (Derbys) Tel. 0283 221870

**QRO Linear**, HF or VHF, base or mobile, anything out of the ordinary in dead or alive condition. All letters answered. De Cadenet, 22 Beeching Close, Harpenden. AL5 4LZ

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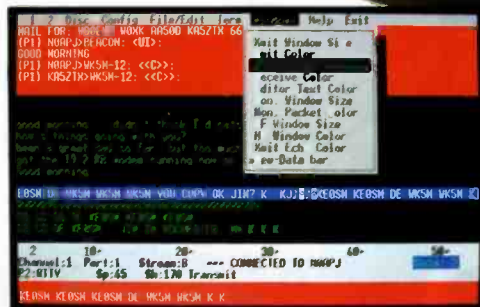
Simultaneous multi-mode terminal hardware & software for the PC, Mac and Commodore-64.

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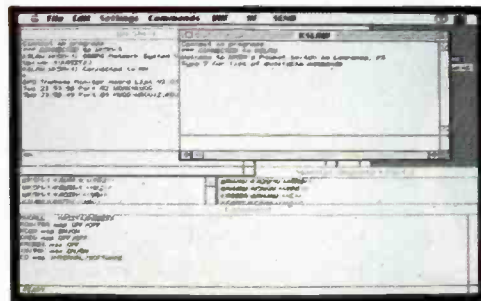
Operate CW, RTTY, ASCII, FEC, ARQ, packet or copy NAVTEX on HF and packet on VHF/UHF simultaneously! Toggle back and forth between any HF mode and packet for sending, while viewing monitored and connected packets and HF data at the same time.

New firmware features (terminal program independent) include AMTOR access to your personal mailbox, remote access for sysops and SEND PRIVATE, SEND BULLETIN, SEND TRAFFIC and enhanced mailbox commands. Blinking mail-waiting LED also provided, independent of software. Hostmaster features include:

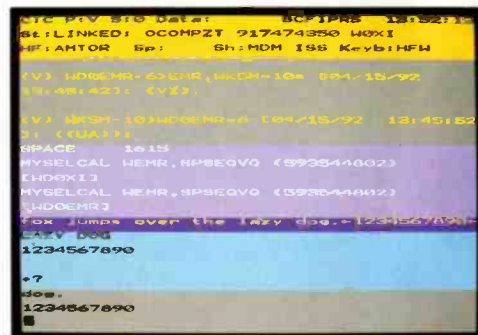
- split screen operation: receive and transmit
- menu display line
- packet monitor window
- separate packet connect window per channel
- xmit echo display line
- non-packet window (for KAM only)
- status display lines
- xmit buffer per channel
- file buffer per channel
- file transfers and file captures
- compatible with all Kantronics 5.0 firmware: KAM, KPCs and DataEngine 2.0.



Hostmaster on the PC



Hostmaster on the Mac

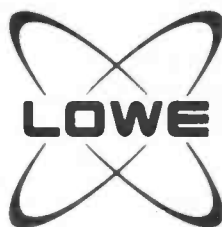


Hostmaster on the Commodore 64

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