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## HAM RADIO TODAY

SEPTEMBER 1992 £1.70

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Friedrichshafen  
1992  
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review  
HF-150  
receiver



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# ICOM

# HRT

## HAM RADIO TODAY

VOLUME 11 NO8 SEPT 1992

### REGULAR COLUMNS

<b>PACKET RADIO ROUNDUP</b> .....	36
Chris Lorek G4HCL goes 'down under' with VK packet software	
<b>FROM MY NOTEBOOK</b> .....	38
Geoff Arnold G3GSR takes us through the basics of receivers	
<b>SATELLITE RENDEZVOUS</b> .....	40
AMSAT-UK news collated by Richard Limebear G3RWL together with an introduction to KITSAT	
<b>QRP CORNER</b> .....	42
Dick Pascoe G0BPS looks at the international side of QRP	
<b>VHF/UHF MESSAGE</b> .....	44
Geoff Brown GJ4ICD says 'What Come May!'	
<b>HF HAPPENINGS</b> .....	46
Don Field G3XTT reports on DX and planned updates to the International Beacons	
<b>FREE READERS ADS</b> .....	52
Helplines, For Sale, Exchange and Wanted, published free	

### NEWS AND VIEWS

<b>CQ de G8IYA EDITORIAL</b> .....	5
What do amateurs want to spend their money on?	
<b>LETTERS</b> .....	6
Are new rigs becoming fashion-conscious like trainer shoes?	
<b>RADIO TODAY</b> .....	8
No more 'Sparks' on the Seas? – the formal end of mandatory CW	
<b>CLUB NEWS</b> .....	49
Active clubs with active members, those who aren't don't get in here!	
<b>RALLIES</b> .....	51
It's summer – go out and meet with like minded people!	
<b>HRT SUBSCRIPTIONS</b> .....	43
Make sure of your copy each month	
<b>ADVERTISERS INDEX</b> .....	48
<b>CLASSIFIED ADVERTISEMENTS</b> .....	57
Your local dealers, component and kit suppliers, and RAE courses	

### PROJECTS

<b>A SHIELDED ANTI-NOISE 40M AERIAL</b> .....	22
Richard Marris G2BZQ constructs a QRN-rejecting loop aerial for 40m	
<b>AN EFFECTIVE MULTIBAND HF AERIAL SYSTEM</b> .....	26
Maurice Healey G3TNO describes the construction and his on-air results of a compact multiband system	

### REVIEWS

<b>KENWOOD TH-78E REVIEW</b> .....	16
Chris G4HCL reviews Kenwood's fully-featured 'designer' portable	

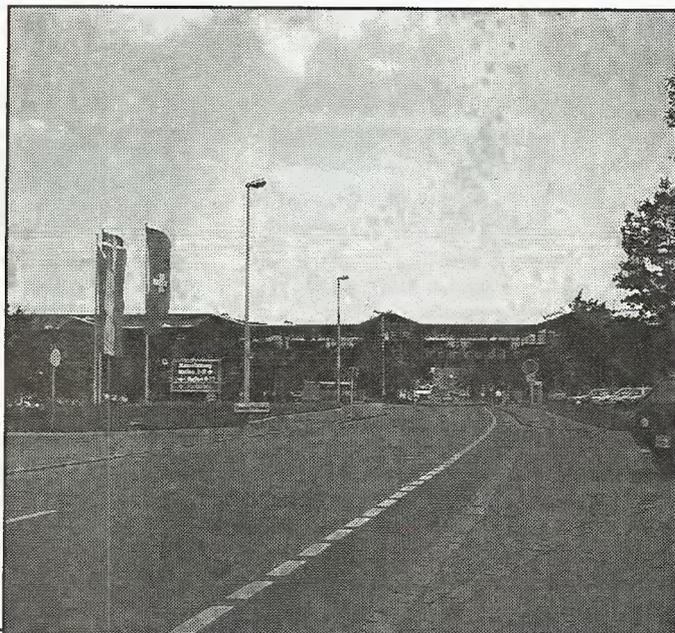


Above; Lowe HF-150 reviewed

Right; Friedrichshaffen 'Ham Radio 92' Show report

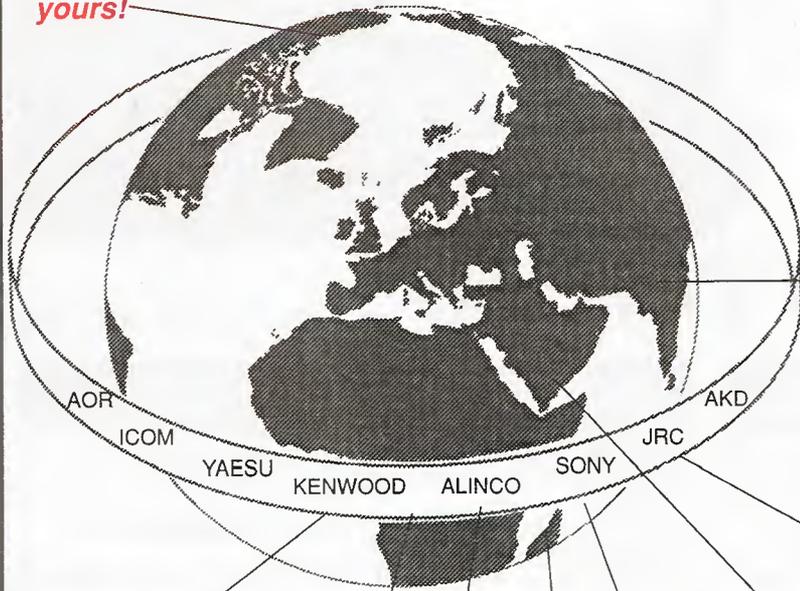
### FEATURES

<b>FRIEDRICHSHAFEN SHOW REPORT</b> .....	12
The HRT team joined over 20,000 like-minded visitors at 'Ham Radio 92' in southern Germany	
<b>CHOOSING YOUR AERIAL FOR MINIMUM TVI</b> .....	24
Ian Poole G3YWX gives advice on choosing the right HF aerial for the best EMC	
<b>SCANNERS INTERNATIONAL</b> .....	29
Lowe HF-150 receiver reviewed	
<b>DO I NEED A BALUN?</b> .....	34
Harry G3LLL answers the question "should I use coax or twin feed for my multiband HF aerial system, and do I need a balun?"	



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# ARE COMMUNICATIONS '92



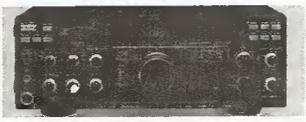
2m and 70cms hand-holds from the Kenpro KT22E thumbwheel to the sophisticated Kenwood TH28E.

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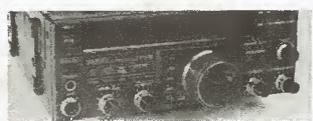
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# CQ de G8IYA

*'What do amateurs want to spend their money on?' is this month's Editorial discussion topic*

As I write this, the last few weeks have been a busy time with rallies and exhibitions. First off was *RSGB '92* at the NEC Exhibition Centre near Birmingham. Unfortunately it was nowhere near the success that many traders and visitors expected, with poor attendance (reportedly around 4,000), large empty spaces in the hall, coupled with a relatively high admission price. Two weeks later, in complete contrast, was the Elvaston Castle Rally, also held in the Midlands. This had a reported number of 23,000 visitors through the gates, over 200 trade stands in marquees plus over 100 further outdoor trade stalls, and a far, far lower admission price.

Then there was the Friedrichshafen *Ham Radio 92* show in southern Germany. What an event! Have a look elsewhere in this month's issue for a report on this. And don't think it's a new thing in HRT, there were also Friedrichshafen Show reports back in the October 1985 and October 1987 issues of HRT.

## Recession?

At this year's NEC, it was well publicised that a visitor was caught stealing rigs from a trader's stand, coordinating with another person on 2m. At the 1990 Leicester Show weekend, an amateur's car was stolen just for the purpose of stripping the valuable amateur radio gear out, other equipment being left (it took 'inside knowledge' to know what to steal). A sign of hard times you may say, and it's easy to blame the recession for many things. Recession is also happening in the USA, but it doesn't seem to stop the same vast number of amateurs attending the Dayton Hamfest, often travelling great distances to do so. There was a record attendance at this year's Friedrichshafen show, with visitors attending from many, many countries, which also doesn't come cheap. Another record attendance at Elvaston, one trader here told us he'd never done better at any show in the past, another in the same marquee sold his entire pile of new 2m portables.

Don't think I'm deliberately 'knocking' or 'promoting' any organisation. I believe this is simply a sign of the changing times, where amateurs are voting with their feet. The 'power of the press' may be one thing, but the reality of what amateurs want to see, pay for, and do, at radio rallies is a fact of human

nature. One thing some 'popular' shows have in common are a large, relatively outdoor location (i.e., where you can glimpse daylight occasionally) and venues where amateurs feel free to socialise. But this doesn't explain why the Leicester Show for example is so popular each year, maybe it's rooted a little deeper? Comments from amateur radio traders, visitors, even the 'writing on the wall' on the packet network, has left me in no uncertain terms on how traders and visitors intend to 'vote with their feet' next year.

## Not everyone wants your money!

One thing I was absolutely sick and fed up with at one UK amateur radio event was the *continual* 'begging for more money', this starting the minute visitors had paid their entrance fee and walked through the door. This was in support of a non-radio related charity, and within a few hours I'd been approached (yes, *approached*) over 20 times for money as I walked around, a tin was repeatedly rattled under my nose, again and again. Now charity is all well and good, especially for those who have money to spare as there are many worthy causes around, but there are limits! From feedback, I know the type of memory of this event that some visiting overseas amateurs unfortunately left with.

Anyway, here's a bit of 'fighting back' for an amateur-radio related charity, and no, it's not an appeal for money, nor hours of time, you don't even the price of a stamp.

## RAIBC 'no cost, no time' help

David Caldwell, who is the Northern Ireland MLO/Appeals Officer of the RAIBC (Radio Amateur Invalid and Blind Club), was recently and quite independently in touch with us. He tells us his group *do not* ask the public for money, as there are so many organisations asking for cash. Here's the interesting part. Since BP withdrew their Lifestyle tokens from circulation late in 1991, replacing these with the new Options vouchers, they are no longer valid to exchange for goods by the general public. However within the new charitable option recently launched by BP, it allows charitable organisations



Amateurs often like to socialise at rallies, spot the happy HRT Editor here in the midst of an international gathering

such as the RAIBC to surrender these old vouchers for the next few months. David tells us his group can use these old vouchers together with those from all other companies including Air Miles, to purchase radio equipment and to provide study courses on audio tape, for the blind and disabled in the community.

To date, using this method of fund raising, David's group have purchased and distributed more than £25,000 of equipment in the province. They ask that, if you have any tokens, no matter what brand they are, and if you do not wish to use them yourself, to please consider the group and to post them, *free of charge*, to; RAIBC (NI), FREE-POST BE1769, Belfast, BT12 5BR. If you would like to go one further and are interested in membership or feel you may be able to help in other ways, then you can contact the group at; MLO RAIBC (NI Area), Belfast, BT12 5PU.

## Readers Around the World

I was recently asked by a reader 'Who is your furthest subscriber?'. HRT is certainly read all around the world, including Australia and New Zealand which must be about as far as you can get, and recent additional subscribers include 'remote' locations such as Papua New Guinea and Fiji. Where do you read HRT? Let us know, we'll be pleased to publicise unusual or remote locations, and we'll even air mail you a suitable small prize for a novel letter if we publish it. For those closer to 'home', HRT is published on the first Friday of each month, in the month preceding the cover date. If your newsagent doesn't have it, ask them. If they're still unhelpful, then let us know and we'll 'send the boys round' there while you take advantage of our mail order subscription!

# LETTERS

## Letter of the Month

Dear HRT,

Your Editorial in the July issue regarding new rigs made interesting reading. One of the main attractions of your magazine for me is your equipment reviews. It seems to me that in recent years a plethora of rigs has adorned the shelves of amateur emporia, enough to confuse any newcomer, of which they're virtually all the same! Manufacturers bring out new models every year in the same way as car manufacturers, and yet the rig is little different to its predecessor, except perhaps for minor improvements such as extra memory channels, and a redesigned box making it more trendy looking. Only rarely does a rig hit the market with a real difference such as, for example, the Standard scanner incorporating a panoramic display. Hand portables, of course, get smaller but still feature similar facilities to their predecessors and now sport flashy exteriors, rather like the ever-changing breed of trainer shoes. Occasionally a manufacturer decides to go back to its roots and launch a rig without any bells and whistles that fades into oblivion.

Bob Mersh, G8JNZ

### Editorial comment;

This month's lead review feature certainly does show the 'fashion-conscious' exterior given to portable rigs. Could 'It's smart to be seen with' be the next advertising ploy? Regarding 'basic' rigs, well if you take a look at this month's 'Scanners International' section, you'll see a very basic-looking HF receiver, without all the 'bells and whistles' (it hasn't even got an S-meter), but we've evidence that the UK manufacturers can't make them fast enough to cope with the European export orders!

Dear HRT,

In reply to Steve G7CGN (July 92 HRT), I was somewhat shocked at his thought of a Novice licensee having the use of 50W output power. Has he never considered the EMC problems that could arise, has he no consideration for other users of amateur radio? He or she who uses the lowest possible power to make contact, has achieved their goal, not those who are power minded. I do agree with his idea of a four tier system, and to go into it further, not everyone has a Novice course within their area. This is something which is going to need looking into very seriously, as one can study for the amateur licence at home or at an evening class, which is ideal, but not so with the present situation for the Novice course. This is a far more important matter, so that everyone who wishes to take up the hobby of amateur radio, has the opportunity to do so.

M. B. Marsden

### Editorial comment;

The lack of Novice courses in many areas is certainly a cause for concern, we know of many potential Novices who just can't afford to travel to their semi-local volunteer, let alone pay the fees required by some groups who run the course. A 'home study' course won't provide the 'practical' element which is a part of the current course, so it's down to getting more volunteers as Novice instructors, unless of course someone comes up with an alternative.....

Dear HRT,

After reading the July issue of HRT, I had to write to forward my views about two different letters you had published. Firstly in response to Nigel Parr's letter, I found it most alarming that he can boast about being an amateur for so many years, not realising that the benefits, i.e., QSL bureau etc. which are available to all members. After the value of periodicals have been deducted from

the annual cost of joining the RSGB, any member cannot complain about the high cost of membership. If Nigel is to approach a dealer or any other person with the intent to purchase any item of merchandise, does he ask them if he can pay in ten instalments, you and I know the reply.

J. D. Burrow, G0NYD

### Editorial comment;

We would say that many, if not most, amateurs buy their equipment from dealers by instalments nowadays, whether this be a credit card or HP. But there is, of course, a limit as to the sensible and indeed financially worthwhile level of the lowest payment to warrant the required additional paperwork etc. Direct debit does however seem to be popular with many organisations.

Dear HRT,

As a member of the RSGB I was really taken back at said RSGB official, who literally snubbed Nigel Parr's query. Why when RSGB's membership is falling, can officials come out with the standoffish statement he made, that amateurs can pay all at once. Paying by standing order or direct debit is now the in thing to those on low incomes, so let's see what the top RSGB officials think. J. D. Bolton G4XPP's statement was also correct, what's wrong with giving one's callsign correctly, maybe those who gabble after the letter 'G' have something to hide, or are they frightened of being reported like those who misuse the band plans. Some are Class A operators, who should be giving the lead, especially to the up and coming Novice.

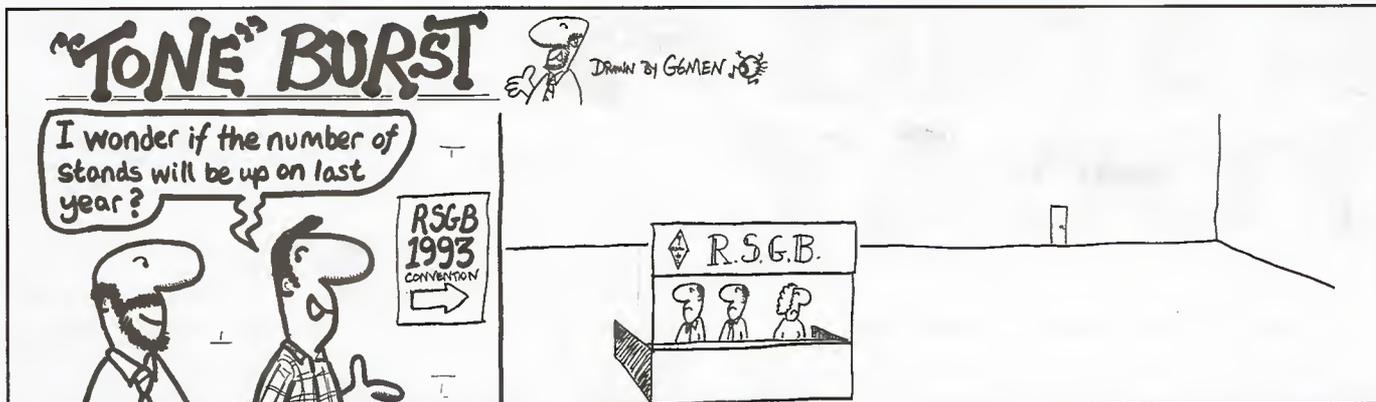
J. H. Clifton, G7IOU.

### Editorial comment;

Not everyone can pay all at once, maybe that's one reason why amateurs are

## £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



cutting back on what they believe, rightly or wrongly to be 'non-essentials' in their hobby.

Dear HRT,

With regards to the 'Letter of the Month' for July, I, like Nigel Parr, suggested alternative methods of payments to an RSGB official on the subject of the annual fees, and got the same reply. However last year I wrote directly to the chairman on this subject and he told me to watch the notices in RadCom, as there were to be new payment schedules coming out shortly. I 'aint seen nothing yet, have you? One of the most annoying types of letters that I often read, is the one from the chap who states that anyone who has passed the RAE can learn and pass the Morse test. I'd suggest that licences start with a Novice B (all above 50MHz at 25W max) upgraded by written test to a Novice A after one full working year (all bands at 50W max). Then take the RAE (again after one full working year) for amateur class B (all bands at 100W max). After a further year working for one's amateur 'A' licence, one must show that one has met all the minimum working hours on the bands and can prove to have a working knowledge of those modes that he or she has selected to use, this of course includes CW if the operator is interested, and not because he or she is required by law to do so. J. D. Bolton, G4XPP.

**Editorial comment;**

**We read lots of annoying letters too, but we try to publish the constructive ones (or the constructive parts of them) to stimulate discussion. 'Moaning' letters get filed very quickly!**

Dear HRT,

I am pleased to read that the Radiocommunications Agency are 'open', this scarcely applied to their predecessors, from whom I eventually gained the impression that one without official standing in the RSGB was 'almost persona non grata'. A matter I

would now like to see raised is the increase in permitted CW power from 100W to 400W without anything more for the 'phone man. In earlier days of my interest in these things, the restriction was 150W DC input to the PA which, with Class C operation enabling circa 66% efficiency, gave about 100W RF carrier which could be Morse coded or amplitude modulated. 100% modulation (impractical in practice) of a 100W carrier gives 400W peak envelope power and this was deemed the appropriate limit when SSB came in, the average power of course being roughly as before but without wasting most of it in a carrier. It follows that when CW was uprated there should have been some sort of uprating of speech carrier and SSB PEP. 1600W PEP might have been a bit much given the levels of processing now available, but 1000W with 250W or even 200W carrier for FM would have been very reasonable. It would be most interesting to know, not even so much why no improvement was granted to the 'phone man, but were representations ever made on his behalf of equal weight to these for CW man?

Sandy, GM0IRZ

**Editorial comment;**

**1000W is allowed to amateurs in some countries, and in the UK this is sometimes allowed by special licensing for defined experimental purposes. The RA have told us they would actively consider ideas on 'incentive' licensing, once their Novice licence review has been accomplished (i.e. right about now). Maybe by proving one's capability to handle power levels like these, we can gain such privileges in the future. Now, where's that pair of 3-500Z's I had lying around?**

Dear HRT,

In the May 92 issue of HRT my letter was under the callsign of G4BYU, it should have been G4BYV hi. The point I was trying to make was that all members of RSGB pay towards the

paper work and licensing of the repeaters, which are also used by non RSGB members.

John Tye, G4BYV.

**Editorial Comment;**

**Thank's for the correction John - it's very easy to interpret a hand-written 'V' as a 'U'!**

Dear HRT,

Having passed the RAE with honours, I would willingly take a further test of my proficiency on technical matters, to operate radio equipment in the HF spectrum. I personally think it is far more important for an operator to know what he is doing in terms of product knowledge, i.e., if I do this what will happen!!, and to be able to operate his/her equipment so as not to cause emission out of band or on any frequency where that type of transmission is not internationally allowed. How many times have I heard, 'oh sorry mate, didn't realise this was the slow scan portion of the band'. Even worse the disgusting and selfish methods of operating. There again once one has passed the Morse at 12WPM it is OK to key up anywhere on any band. I am sure I have trod on many toes, I am not trying to stir up a hornet's nest, but to say this in 1992 the age of satellites, packet and data comms, voice, SSB, moonbounce, television, and SSTV, all have their allocated space on most bands.

Nigel R. Parr, G1OTJ

**Editorial Comment;**

**A better tested knowledge of 'operational matters' and EMC would undoubtedly go towards better operating to some degree. The Novice licence ensures this to some extent, which of course is 'one way' to go in achieving limited access to HF. We'll see what happens following the RA licence revision.**

# RADIO TODAY

## EI Adopts CEPT Licensing Agreement

Following representations by the IRTS (Irish Radio Transmitters Society), EI is now included in the list of countries that have signed the CEPT T/R 61-01 agreement. This means that as well as EI amateurs being able to operate in CEPT countries by simply using the country's prefix followed by their own callsign, Class I/II amateurs in CEPT countries, including full Class A and B licensees from Great Britain, can similarly operate in EI without a reciprocal licence. The IRTS however ask that EI amateurs 'hold back' from requesting their 'new' licence unless they genuinely need it for imminent operation in other countries, as a licensing backlog could easily occur.

The IRTS have also announced that the minimum age for Experimenter Licence applications has now been reduced from 16 to 14 years. This again brings Ireland into line with most European countries, and they thank their Department of Communications for the work involved in bringing these changes into effect.

## Ham or Amateur in VK?

The Wireless Institute of Australia (WIA), acknowledged as the oldest amateur radio society in the world, have since 1959 had the policy to actively discourage the use of Ham to describe an amateur radio operator. After taking into consideration;

1) The increased use, public understanding and acceptance of the word *Ham* to denote a radio amateur within Australia, without any derogatory intent,

2) The meaning of *Ham* and *Amateur* in the Australian Macquarie dictionary, and

3) The need to explain amateur radio in terms easily understood by the public and so raise their awareness of our hobby; the WIA Federal Council has repealed that

policy. It looks like even the most established organisation in the world is moving with today's times!

## No more 'Sparks' on the Seas?

At this year's WARC (World Administrative Radio Conference), the Radio Regulations relating to qualifications for ships operators were revised to align them with the *Safety of Life At Sea* (SOLAS) Convention. This means ships will be changing over to *Global Maritime Distress and Safety System* (GMDSS), a satellite based reporting system in the near future replacing the redundancy of ship borne equipment and the technically qualified maintainer-operator. The International Maritime Organisation (IMO) believes that when GMDSS is fully implemented in 1999, the use of Morse radio telegraphy by ships will cease. It looks like radio amateurs may then be the only ones carrying on the Morse tradition for everyday use.

## GB8TS - Tall Ships

The Wirral and District Amateur Radio Club will be operating a special event station during part of August, from Perch Rock Lighthouse, New Brighton in Merseyside. Using the callsign GB8TS, the station will be operating as part of the Grand Regatta *Columbus '92* celebrations.

Tall ships, sailing ships of all shapes and sizes, from all over the world, will visit Port for nearly a week. They will have recreated Christopher Columbus' historic voyage of 500 years ago, during which he was credited with discovering America. The lighthouse will be the closest point to land that the ships have been since they set sail, and it will be the last piece of land to sail past on their next voyage.

GB8TS will be operational from Thursday August 13, when all the ships should be in Port, until they depart in a grand parade of sail on Sunday August 16. Popular HF bands and some VHF operation will take place. While HF coverage should be good, the expected VHF/UHF coverage is likely to be limited to the north west and North Wales, as well as Ireland and south west Scotland, although an RF corridor does exist across the Midlands to London and the south east. At this time of the year the chances of a 'lift' of a spot of ducting may be good, so some long distance VHF work into EU countries may be possible. As an added point of interest, for those who like to work lighthouses or clumps of rock in the sea, Perch Rock is in SJ39 for the purpose of WAB awards.

A rather unusual QSL card, befitting of the event and

## G7HOT and G0MCP win Friedrichshafen Trip

At this year's Elvaston Castle Rally, the South Notts ARC held a raffle for a pair of tickets on their club's trip to the Friedrichshafen *Ham Radio 92* show, with B/B in a first class hotel on the shores of Lake Constance and luxury travel. The winner was Mrs. J. Scott G7HOT with green ticket No. 13 (lucky for some, obviously!), who took husband G0MCP along with her. Unfortunately the couple weren't at the rally to collect their tickets in person, how-

ever HRT were offered the exclusive privilege of being the first to inform the lucky pair by phone. Congratulations, we hope the couple as well as the club enjoyed the event!

**RSGB President Terry Barnes G3USS draws the winning ticket for the South Notts ARC trip for two to Friedrichshafen**



location, has been designed to send to those who send in their confirmation of working the station and well as for short wave listeners. All QSLs to be sent via the bureau, and we're told all QSLs will be acknowledged. Further details of the station or the Wirral Club may be obtained from Gerry Scott G8TRY, with an SAE to 19 Penkett Road, Wallasey, Merseyside, L45 7QF, or Tel. 051 630 1393 evenings.

### New Initiative Catches NEC Thieves

During the past year, amateur retailers in the UK have not only been hit by the recession, but have been subject to a number of high value thefts at rallies and shows. A new initiative put into operation at the NEC provided dramatic results within half an hour of the show opening to the public.

Paul Martin G0AFF, working on the Nevada Communications Stand, initiated a sequence of events that enabled Nevada's Managing Director, Mike Devereux G3SED, to challenge a suspect within minutes of an alleged theft, with the help of a member of the NEC security staff.

The alleged suspect was then arrested and taken away for interview by the police. At the same time, as part of the new initiative, NEC security staff put into plan an undercover operation that enabled the detention of an accomplice who had been using 2m to keep in contact with the suspect. Two handheld transceivers, a Standard C528 and a Kenpro KT-220, collectively valued at over £600, were recovered from a bag carried by the first suspect.

Mike Devereux G3SED commented that the dealers are determined to crack down on the increasing number of thefts from stands at shows and rallies. "Ultimately it is the customers who have to bear the cost of such thefts" he said. "Paul Martin's action, combined with that of the NEC security staff, proved that the new initiative worked well. I was particularly impressed with the undercover operation carried out by the NEC security staff, that trapped a further suspect within ten minutes of the operation beginning. I have just one word for potential thieves at shows – beware!"

### Charnwood 'Beer Can' Aerial Station

On August 30, the Charnwood Amateur Radio Contest Club (G0OCE) will be holding a barbecue and running various stations, with the object of constructing a HF vertical aerial made out of beer cans. They will of course use the aerial as part of the HF station. Any local amateurs and SWLs who would like to donate a can (this of course may be consumed on site, as we're sure many will be!) may contact the Club Chairman Phil Southwart G4RVW, Tel. 0509 232927.

### White Rose Silver Jubilee

The White Rose Amateur Radio Society celebrates its silver jubilee with a barbecue, family fun and open day, on Sunday August 30. Listen for

the special event station GB0WRR (White Rose Radio) which will be active from August 16. Details from the club's Secretary Mrs. Betty Capelluto, 7 Rycroft Place, Leeds, LS13 4PF, Tel. 0533 555488

### Talkthrough Permits for all Groups

From 1st July, Talkthrough Permits (e.g. to operate talkthrough repeater stations) will be available to all organised groups of radio amateurs who participate in Emergency Radio Communications for recognised User Services. This follows the 'independence' of RAYNET. Permits will be administered on behalf of the Radiocommunications Agency by the RSGB Emergency Communications Officer, who is



### New Brighton Lighthouse, Perch Rock, site of the GB8TS station.

temporarily the Membership Liaison Officer, Clive Trotman GW4YKL. For details you can contact Clive direct at 19 Parkview, Dolau, Llanharan, Mid Glam. CF7 9RZ.

### NEC RAIBC Competition

At this year's RSGB NEC exhibition, RNElectronics had a 'guess the number of fuses in the jar' competition, with a voluntary 10p donation to the Radio Amateur Invalid and Blind Club (RAIBC) for each guess. The prize was an RN Electronics 2m power amplifier. The actual number of fuses was 907, and the winner was Simon Miller of Cirkit, who guessed the nearest at 910. Simon kindly donated the prize to the RAIBC, who also received the sum of £17.92 from the voluntary donations.

The winner of the RN Electronics 'guess the number of fuses in the jar' competition



### RA Info Sheet – Abuse of Amateur Radio

The Radiocommunications Agency have just published a new information sheet concerned with abuse on amateur radio. This includes what to do, how to collate information, information on the Amateur Radio Observation Service (AROS), and what the RA can do. If you'd like a copy of the sheet, contact the RA directly asking for publication RA 198, by post to; Radio-communications Agency Library, Waterloo Bridge House, Waterloo Road, London SE1 8UA.

### G-QRP Club Raffle

Also at this year's RSGB NEC exhibition, Waters and Stanton donated a JIM QRP HF transceiver to the G-QRP club for raffle towards the club's funds (see this month's QRP Corner). Shown here are Jeff Stanton and George Dobbs G3RJV, drawing the lucky winner.



Jeff Stanton draws the winning ticket for the G-QRP Club draw at the NEC, accompanied by Rev. George Dobbs G3RJV.

### New RSGB QSL Bureau Sub-Manager

A new RSGB QSL manager for the G4Sxx series has been announced, this is J. M. Payne RS93150, 1 Huberts Drive, Skegness, Lincs. PE25 2LS

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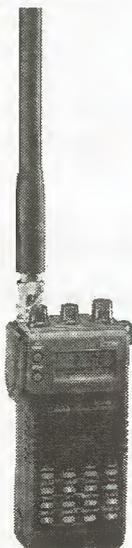
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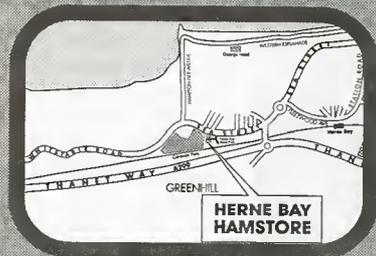
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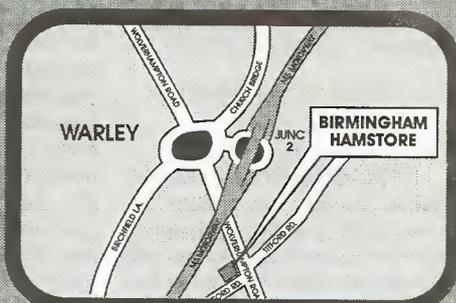
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# Friedrichshafen '92 Show Report

The HRT team joined over 20,000 like-minded visitors at 'Ham Radio 92' in southern Germany



In the weeks before the event, there was so much 'talk' amongst UK amateurs about 'Friedrichshafen' that we were wondering whether there would be more UK visitors over *there* than at a typical UK rally! It seemed that scores of clubs all over the UK were organising visits, some even having raffles for all-inclusive trips (see this month's *Radio Today*).

## Friedrichwhat?

If you don't know of it, the annual Friedrichshafen 'Ham Radio' show, which is acknowledged as Europe's largest amateur radio show, takes place each year at the *Messe* exhibition centre at Friedrichshafen in southern Germany. It's a superb location, the town

being right on the shores of the tourist area of *Bodensee* (Lake Constance, forming the Swiss/German border) with plenty of attractions for other members of the family.

At this year's show we counted 165 'major' trade stands in three large halls plus outdoor displays, a vast number of 'flea market' stands in a massive separate hall, and no less than 38 large club stands also in a hall to themselves. Plus of course the extra stands selling food and drink, including the traditional beer-garden style barbecued chickens, to be accompanied of course by an (optional!) glass or two of Bavarian beer - lovely!

This year was a 'double event', as the annual *Seehasenfest* (a large festival on the shores of the lake) this time also happened to take place over the same weekend in Friedrichshafen. This provided plenty of evening entertainment, including fairground rides, stalls, fireworks and (more) beer-gardens to quench one's hunger and thirst. All to the tunes of traditional Bavarian foot-stamping music (although the HRT Editor refused to be photographed dancing on the tables, glass in hand!).

## An International Event

Over 20,000 visitors attended the radio show, which was held over three days on the last Friday/Saturday/Sunday weekend this June. They came from far and wide, for example the club stands included groups from Germany, Austria, Switzerland, France, England

(the RSGB were there!), Spain, Italy, Hungary, Finland, Sweden, and even Israel. In the trade halls, an enterprising stand staffed by UA amateurs were selling marvellously-built gear, such as an 800W HF linear for DM600 (around £210), and plenty of 'surplus' goodies including high-power valves and even coins. "How much?" a visitor asked, "I don't know, please tell me what it's worth to you?" the chap behind the stall replied. On the Saturday evening, the annual 'HamFest' took place where visitors could enjoy food, drink, and convivial company by the lakeside, with coaches laid on to and from the halls.

## Flea Market

The vast 'flea market' with its huge variety of gear on offer could occupy many visitors for an entire day. Indeed over half a dozen stands were devoted purely to vintage radio and gramophone gear - a collector's delight! Ex-PMR gear was also in evidence, even with Pye Europas for sale - and yes, they do read HRT! You name it, you could buy it there. I even saw a Marconi 2017 cavity-tuned signal generator for sale (which RF engineers may recognise as a current high-performance signal generator worth many thousands of pounds), perched on a trestle table with heaps of other test gear on top, like the odd spectrum analyzer or two - they didn't have prices on them!

## A small corner of the vast flea market





**Small Traders**

**Five large halls plus an outdoor area formed the venue**

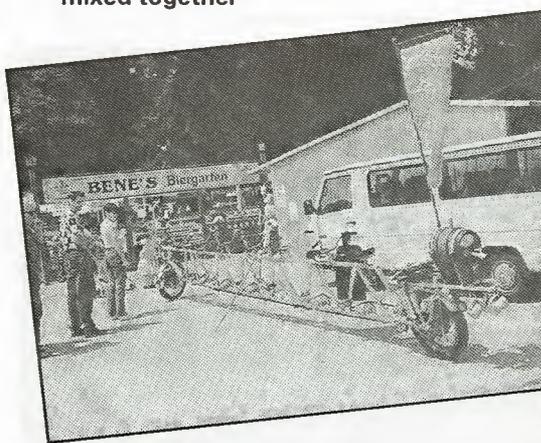
**Large Traders**



**Visitors from around the world mixed together**



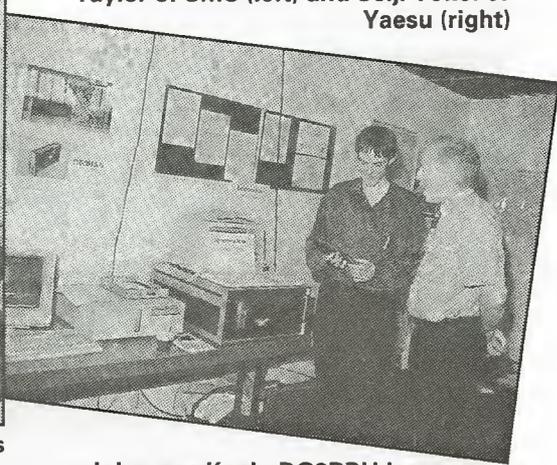
**Two well-known traders, Graham Taylor of SMC (left) and Seiji Yokoi of Yaesu (right)**



**Some took the economy means of transport to Friedrichshafen**



**Tom Crosbie of Lowe Electronics proudly displays the HF-150, reviewed in this issue**



**Johannes Kneip DG3RBU leaves a message for DL/G4HCL on the 433.775MHz speech mailbox, watched by the DARC VHF/UHF Manager Dr. Walter Schlink DL3OAP**



**Ex-PMR gear including Pye Europas!**

**Vintage equipment in the flea market**





The UA stand with bargains galore

## Big Names, Small Names

All the 'major' names were there, such as Icom, Kenwood and Yaesu, as well as scores of 'smaller' names. The British contingent included R. A. Kent, Marco Trading, T.A.R. Communications, Bricom, R & D Electronics, Lowe Electronics and our friends from P. W. Publishing. Most of the traders spoke English of course, and a bank and foreign change bureau were at the venue for those who found a bargain they must have! A post office was on site, with special collector's Ham Radio 92 franks for letters posted from there. Outside the halls in the sunshine were dealers with larger aerial and tower arrays on show, and all around the



RSGB President Terry GI3USS at the RSGB stand

halls were multitudes of caravans, motor homes and tents, many of these also sporting rather large aerial arrays!

On the local UHF airwaves, as well as operating simplex and through local repeaters for communication, the DARC (Deutscher Amateur Radio Club) had set up an FM 'speech mailbox' repeater on site. This allowed you to leave digitally recorded speech messages, for your friends to retrieve off-air if you couldn't raise them at the time. Utterances from DL/G4HCL/P arranging a meeting with DG3RBU/P were thus immortalised on hard disk!

## Getting There

No, it *isn't* as cheap as going to your local rally. Return air fares to Zurich are commonly advertised at around

£125 (Air Miles also come in handy for a totally free flight!), and hotels seem remarkably cheap, a superb hotel right on the lakeside cost us £40 a night for two (i.e., £20 each) including breakfast. Then it's either a hire car (£55 for two nights), or the airport train and the ferry across the lake, or you can even fly onto Friedrichshafen itself. So a 'luxury' three day visit to the show, travelling Friday morning and returning Sunday evening (the flight time is just over an hour, food and drink included!), would be around £200 each including accommodation. This of course would be *considerably* cheaper if you either didn't fly, used a town hotel, went as a group with a club, or even drove a motor home/caravan/family-sized tent across. We can't finish without expressing our thanks to the Baycom team for their wonderful hospitality, and to the two ladies at the Press Centre for their marvellous help and assistance, including the aerial photography forming the background to this month's front cover.

Next year's show is on the 25-27th June weekend, for details you can phone the Messe Organisation office direct on INT+49 (0) 7541 7080, for accommodation the Friedrichshafen tourist office is on INT+49 (0) 7541 21729). See you in the beer-garden there?

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# Kenwood TH-78E Review

*Chris Lorek G4HCL looks at Kenwood's fully-featured 'designer' portable*

Well, I'm just about recovering from reading the instruction book! This portable seems to be a personal do-everything communicator, pager, message centre, the works. I'm told that you can even play a game of space invaders on it, which doesn't surprise me! All this in a fashion-conscious 'designer' case, the looks of which give a foretaste of what lurks within.

## Packed to Burst

A while ago, I saw one of Kenwood's first 'designer' style portables, the 70cm TH-K47. This was a Japanese home-market rig only and wasn't launched in the UK (it didn't stop me trying one out!), but I wondered when Kenwood would start to bring rigs of this styling into the European market. Well the new TH-78E has answered this. It's a dual-bander operating on 2m and 70cm, and a slide-up cover over the keypad 'converts' it between a fully controllable set and one which uses pre-stored configurations of memory channels and the like to use on the air.

With the keypad closed off, an array of buttons on the front and side of the set control the often-used features, such as 2m/70cm band switching, memory/VFO, PTT (of course), toneburst, LCD backlight, a 'Message' button (more of this later!), squelch defeat and so on. Two pairs of concentric knobs at the top of the set control volume and frequency change, and the squelch setting on each band.

When you're initially programming the set up with your memories and the like, and indeed for those who like complete control of virtually everything all the time, the multi-function keypad comes into use. This includes the 'usual' direct frequency and memory channel entry, programmable scan limits and the like.

## Memory Joggers

In memory channel mode, as well as indicating your operational frequency plus a small memory channel number, a handy facility of the set is that of an alphanumeric readout to accompany this display. This reduces the number of available normal memory channels from 50 (as standard) to 25, but it could be handy as a 'memory jogger' to indicate your local club net or Raynet channel, calling channel and local repeater call signs and the like. If you need more memories and don't mind the cost, then an optional internally fitted memory expansion module expands the set up to 250 standard or 125 alphanumeric memory channels, this costing an additional £109.95.

## Listen to Everything

Being a fully featured twin bander, the set can naturally receive on both bands simultaneously, the transmitter being operational on either 2m or 70cm depending on which one you (or the set!) selects - an 'automatic band change' can be set to automatically transfer PTT control to the band which last received a signal. As well as this, the set can instead be switched to receive two frequencies on the same band, for example S20 and your local 2m repeater.

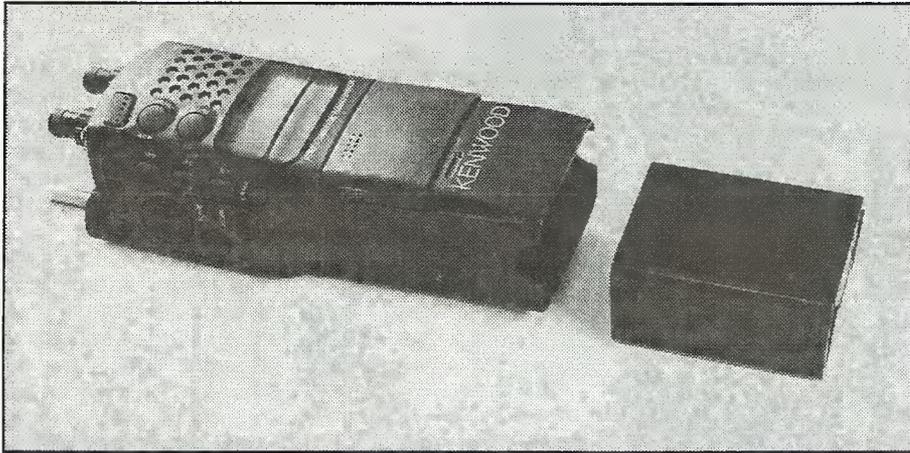
You can choose no less than eight different types of scanning systems on each band. Two types of scan 'stop' modes are available, carrier operated (which stops on a busy channel for as long as the signal is present) and time operated (which resumes five seconds after the scan stops).

## Selective Calling

Many amateurs are now aware of some of the 'selective calling' methods



used on amateur radio, to let you quietly monitor a channel until a signal with the required pre-set tones or whatever appears. CTCSS (sub-audible tone signalling) and DTMF ('touch-tone') are two common types used on amateur radio. An optional module (costing £33.95) may be fitted in the set to encode and decode CTCSS, this could be handy as 2m repeaters throughout the UK are beginning to use this in a well-planned and documented manner as a 'selective' access system. For one-to-one use, either simplex or via repeaters, the set provides as standard a variety of selective calling methods using multiple



DTMF digits. This includes individual and group calls, together with a 'pager' mode which displays the three-digit number of the caller. As well as for 'quiet' monitoring, this can also be used when you're listening normally, to sound an alert and display the calling ID when the correct digits are decoded on the channel you're listening to.

### Message Transmission

And I thought that portable packet was the only way to send text messages using a carry-about rig, not any more! As well as 'numerical' paging, the TH-78E can also send and receive alpha-numeric paging messages. Short texts of up to six characters can be sent and received between suitably-equipped sets, and the TH-78E keeps the last ten messages received in its memory. This means you can leave the set unattended, or indeed have the volume turned down when needed, knowing that when you've been called by your friend using a similar transceiver a message can be left for you. Four 'quick access' messages are available, these being CALLME, FONEME (phone me), ROGER and ATHOME. You can also key in and store up to ten additional messages of your choice for subsequent transmission, giving you quite a wide choice of options. Well well, whatever next!

### On The Air

It did take me quite a while to read and fully digest the contents of the instruction book, all 71 pages of it, indeed 18 pages of this was purely devoted to the various tone and message signalling systems! I must say that, before I'd read it, I couldn't even manage to store frequencies into the set's memory channels, despite being used to reviewing rigs left, right, and centre each month. However, once I'd got the hang of using the many features of the

set, I found these to be relatively straightforward, even though I did find I had to push buttons galore for some functions.

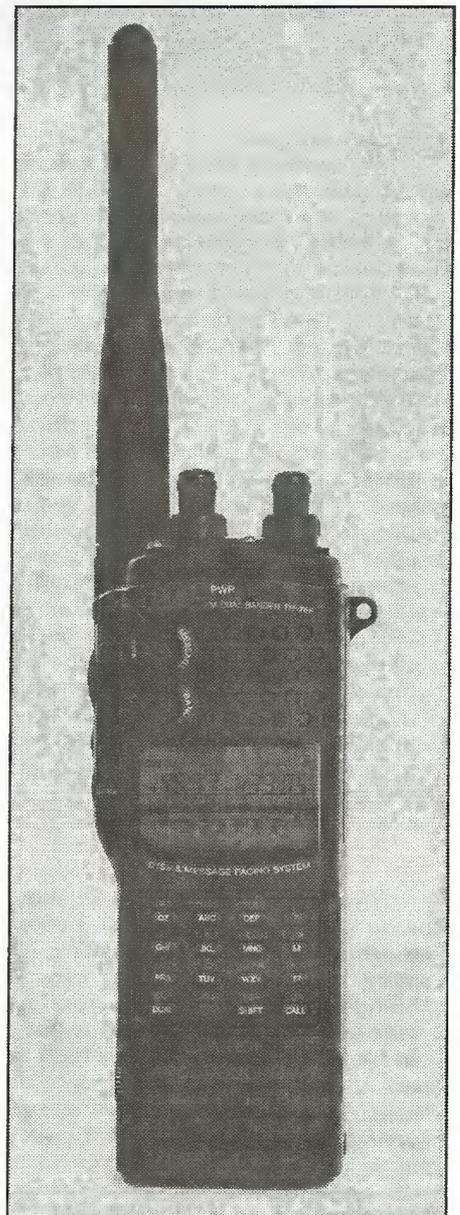
Although I found the tiny buttons on the keypad rather fiddly to use, after I'd programmed up the various functions of the set I rarely needed to use this. When I needed it, the keypad backlight system was extremely good, letting me control the various functions in the dead of night - I'd have got rather lost otherwise!

The various scanning, searching, paging and selective calling options I found could be used to virtually limitless ends. I missed the facility of having at least CTCSS encode fitted, this is becoming widely used on 2m and I always use this on my local 70cm 'chat channel' when out and about - I'd have added this option if I were to use the set permanently. Although I couldn't (yet) find another amateur with a similar rig to evaluate the novel message system, I could think of a number of uses for this between my licensed XYL and I. We're often in different locations and sometimes not able to answer immediately, so LUNCH, MEETME, and YOUPAY I believe could be typical messages during one exchange!

I found the set fitted comfortably in my hand, the large 'Band', 'VFO' and 'Mem' buttons being easy to use. The two innermost rotary controls on the top panel are digital click-steps types, one normally controlling the selected band receiver volume in 20 steps, the other controlling the frequency or channel, although the functions of these can be changed at will. The numerical volume setting for each band is indicated on the LCD as you turn the control, this I found quite handy as it allowed me to set the volume easily without needing to defeat the squelch on each band (as I usually have to do).

Although there was ample receive volume, the audio was rather on the 'boxy' side for my liking, this probably

being due to the small internal speaker. A nice touch however was a 'quiet' volume function for earpiece use, which gave a lower level output but still variable over 20 steps - this was useful as I often listen at night and with other sets I always accidentally deafen myself





## Conclusions

The TH-78E certainly packs a lot into a small case, the amount of facilities offered are virtually limitless by today's standards.

The 'message' facility is a novel concept and I wonder how well this will catch on - I'd certainly use it.

The performance of the set I found wasn't quite up to that of a typical dedicated single-band portable rig, but then you 'pay your money and take your choice', I'd also allow for the fitment of a CTCSS unit for serious future use on UK 2m repeaters at least. All in all, a very versatile set, it was with a degree of sadness that I returned it following the review.

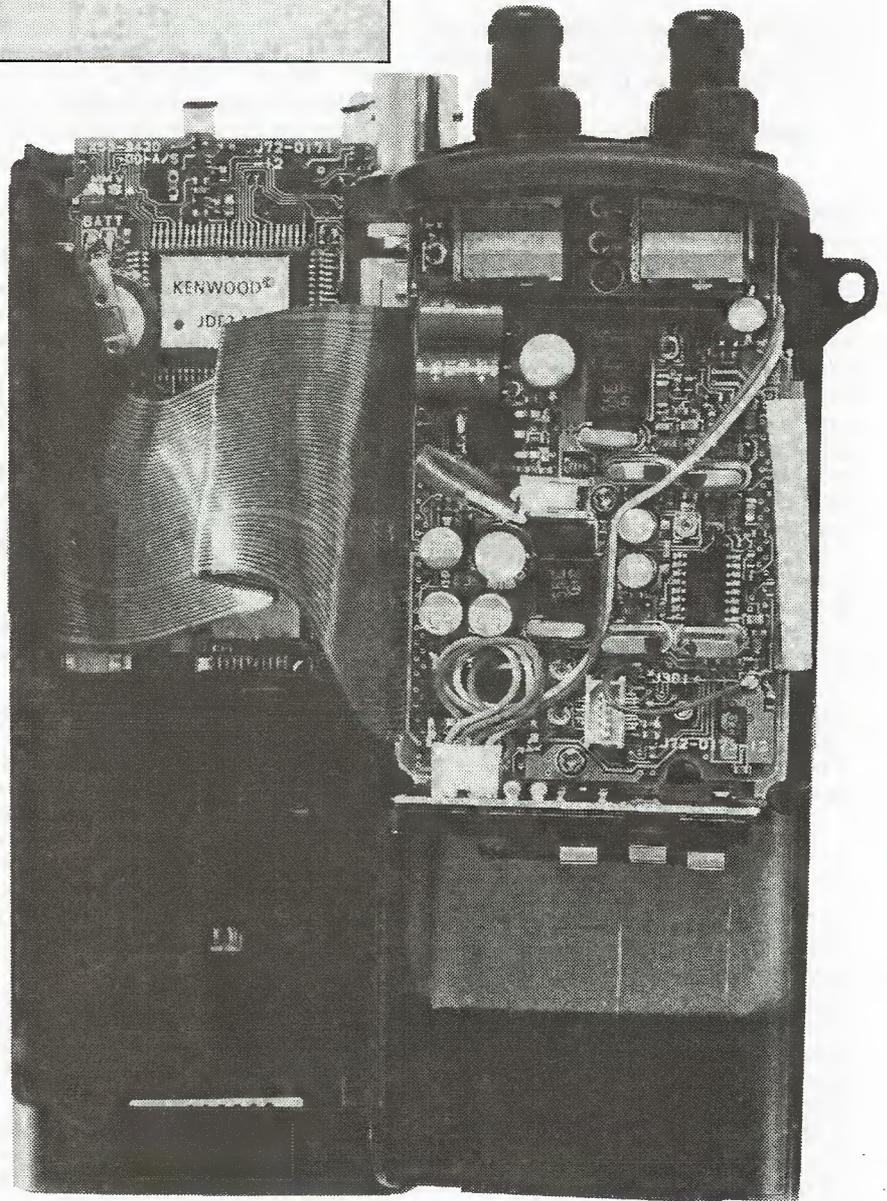
The TH-78E currently retails at £425 including nicad and charger, and my thanks go to Lowe Electronics for kindly loaning me the first ever model to land in the UK.

using an earphone!

The receiver sensitivity on both bands was quite good, although the supplied dual-band aerial did limit the range a little - plugging in a larger set-top aerial certainly showed the rig itself was capable of good results. The supplied 7.2V nicad gave a transmitter output of around 1.5W-2W on each band, and for mobile use I found I could plug a 13.8V supply in to get around 5W out. As long as I didn't 'ragchew' too much using high power, the set's case (which is used as the transmitter heatsink) stayed reasonably cool, but during one journey on an already-hot day I found I needed to switch to low power to save burning my hand. The instruction manual says the rig is only rated for 1:4 TX:RX ratio, which seemed to be borne out in practice on high power. The set has an internal 10 minute timeout-timer, disabling the transmitter after this time, which would be handy for 'mobile mic' users who insist on having a 'hard' toggle-switch PTT control.

## Laboratory Tests

The accompanying results show the rig had a fairly reasonable overall performance, although the 12.5kHz rejection might possibly have proved limiting in areas where this is used. The image rejection, however, was so good that I couldn't measure it - the high ifs used in the set (45.05MHz on 2m, 58.525MHz on 70cm) were working well. Opening up the set shows that a very compact internal arrangement is used with miniature components galore, there's plenty of circuitry in there!



## LABORATORY RESULTS:

All measurements taken using fully charged PB-13 nicad, high power TX, unless otherwise stated.

### RECEIVER;

Squelch Sensitivity;	
145MHz	435MHz
Threshold; <0.05uV pd (<2dB SINAD)	0.08uV pd (1.5dB SINAD)
Maximum; 0.19uV pd (19dB SINAD)	0.19uV pd (19dB SINAD)

Adjacent Channel Selectivity;		
	145MHz	435MHz
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;	14.5dB	22.0dB
-12.5kHz;	22.5dB	22.0dB
+25kHz;	62.0dB	61.0dB
-25kHz;	62.5dB	62.0dB

### 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;

	145MHz	435MHz
+100kHz;	74.0dB	75.0dB
+1MHz;	88.5dB	90.5dB
+10MHz;	94.5dB	95.0dB

### Intermodulation Rejection;

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

	145MHz	435MHz
25/50kHz spacing;	57.0dB	68.5dB
50/100kHz spacing;	57.0dB	67.0dB

### Current Consumption

Standby, economizer off;	106mA
Receive, mid volume;	152mA
Receive, max. volume;	234mA

Maximum Audio Output;	
145MHz	435MHz
Measured at 1kHz on the onset of clipping, 8 ohm load;	
215mW RMS	175mW RMS

Sensitivity;	
Input level required to give 12dB SINAD;	
144MHz;	0.13uV pd
145MHz;	0.14uV pd
146MHz;	0.14uV pd
430MHz;	0.15uV pd
435MHz;	0.14uV pd
440MHz;	0.14uV pd

Image Rejection;		
	145MHz	435MHz
Increase in level of signal at first IF image frequency, over level of on-channel signal, to give identical 12dB SINAD signal;		
	<100dB	<100dB

## TRANSMITTER;

TX Power and Current Consumption;			
Freq.	Power	7.2V Supply	13.2V Supply
144MHz	High	1.68W/900mA	5.25W/1.35A
	Low	410mW/520mA	340mW/500mA
	E-Low	25mW/130mA	25mW/130mA
145MHz	High	1.67W/890mA	5.20W/1.35A
	Low	410mW/510mA	350mW/500mA
	E-Low	25mW/130mA	25mW/130mA
146MHz	High	1.71W/950mA	5.20W/1.35A
	Low	410mW/520mA	350mW/500mA
	E-Low	25mW/130mA	25mW/130mA
430MHz	High	1.62W/1.09A	4.98W/1.45A
	Low	290mW/500mA	320mW/510mA
	E-Low	10mW/120mA	10mW/120mA
435MHz	High	1.66W/1.07A	4.85W/1.45A
	Low	280mW/500mA	300mW/510mA
	E-Low	10mW/120mA	10mW/120mA
440MHz	High	1.65W/1.06A	4.59W/1.44A
	Low	270mW/500mA	290mW/510mA
	E-Low	10mW/120mA	10mW/120mA

Toneburst Deviation;		
	145MHz	435MHz
	3.16kHz	3.13kHz

Peak Deviation;		
	145MHz	435MHz
	4.68kHz	4.57kHz

Harmonics;		
	145MHz	435MHz
2nd Harmonic;	-61dBc	-68dBc
3rd Harmonic;	-69dBc	-77dBc
4th Harmonic;	-85dBc	<-90dBc
5th Harmonic;	<-90dBc	-
6th Harmonic;	-72dBc	-
7th Harmonic;	<-90dBc	-

Frequency Accuracy;		
	145MHz	435MHz
	+40Hz	-50Hz

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CH1200WS	23cm BNC 5.6dB 2x $\frac{1}{2}$ wave	£14.50	A
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CA-285	6m/2m dualbander 0dB/3.5dB	1.32m	£20.75	B
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CA2x4MB	2m/70cm 4.5dB/7.5dB	1.99m	£38.50	C
CA2x4KG	2m/70cm 6.0dB/8.4dB	2.06m	£40.75	C
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CD-270D	140-525MHz 15/60/200W	£79.65	B

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CSW-20	2 way DC-1GHz 50239	£26.50	B
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# A Shielded Anti-noise 40m Aerial

*Richard Marris G2BZQ constructs a QRN-rejecting loop aerial for 40m*

These days, when many of us live in suburban, somewhat congested, areas, we are subjected to all manner of noise and interference on the HF bands. This is known as QRN, as apart from QRM which covers interference from other stations.

QRN means 'being troubled by static'. However, in amateur circles it has come to mean static and manmade electrical noise. Apart from atmospheric and electric storms, this is generated by TVs, computers, domestic electrical appliances, dimmer switches, street lamps, car ignition, thermostats, model electric trains, and even the cheap and cheerful electronic calculator. Some of this noise enters the receiver via the AC mains, and can be eliminated with filters. However, the bulk of this noise is 'airborne', entering via the receive aerial, and is usually directional. At my location, this QRN situation is worst on the 40m band. Maybe something in house construction, or wiring, has a resonance which makes it worse on this band.

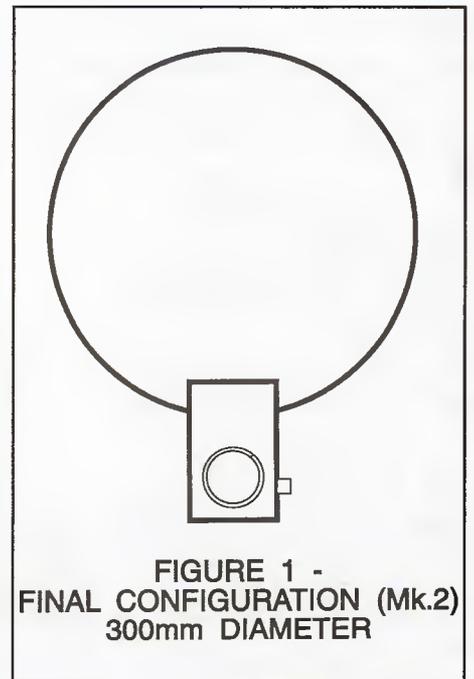
If you suffer from QRN on Top Band (160m), a common solution is to build an electrostatically shielded loop aerial, and a similar aerial is sometimes also used on 80m. Functionally these are excellent, but they suffer from being usually bulky, and domestically a nuisance. I decided to project this idea to 40m, and, if successful, try and produce a scaled down version of about 300mm diameter.

Fig. 2 shows a conventional shielded loop aerial, consisting of a round loop of coax cable, with the inner conductor (L1) resonated to frequency by a variable capacitor. A single turn (L2) couples the aerial to your receiver aerial input, and at the top of the loop there is a small gap in the coaxial outer braid screening.

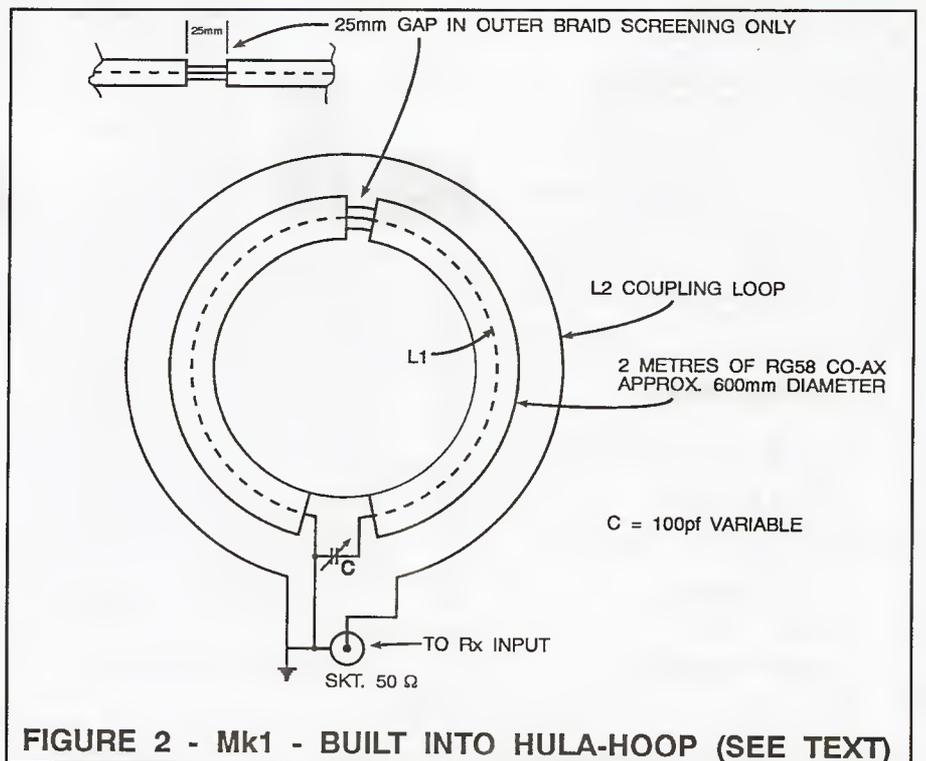
In effect, this type of construction provides an electrostatically shielded aerial eliminating or reducing much of the QRN. A further bonus is that the aerial is directional, having a sharp null, so it can be rotated for maximum signal. It can also be rotated a little either side of this point for reduction of QRM and particularly bad airborne QRN.

A loop built to the dimensions shown in Fig. 2, with a 100pF variable capacitor, covered the frequency range 6.400MHz to 9.990MHz. The coaxial loop consists of a 2m length of RG58 feedline, with a 25mm gap in the middle. For convenience and support, it was inserted into the plastic tubing of a 610mm diameter hula-hoop. L2 was secured to the outer circumference of the hoop.

The signal sensitivity was excellent, as was QRN reduction and nulling. However the tuning was sharp and required a slow motion drive, and the 610mm diameter was domestically somewhat large. Also I only required coverage of the 7.000MHz-7.300MHz



**FIGURE 1 - FINAL CONFIGURATION (Mk.2) 300mm DIAMETER**

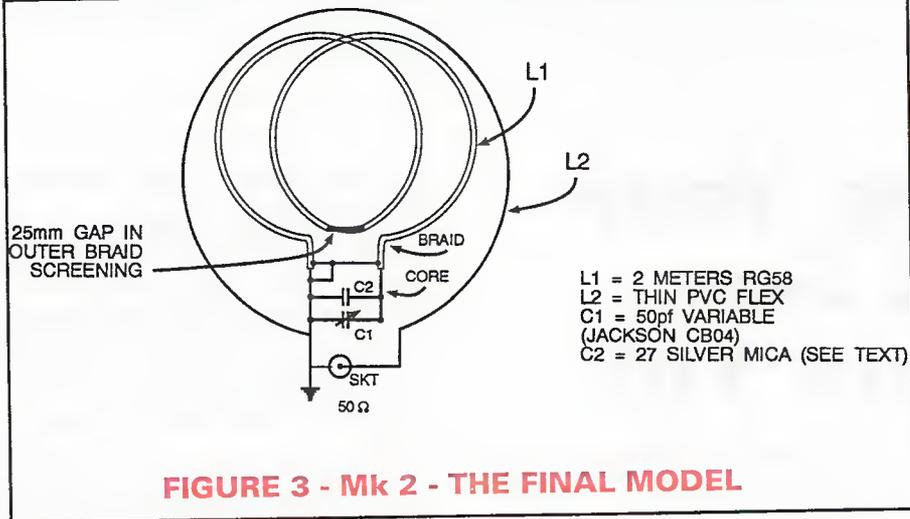


**FIGURE 2 - Mk1 - BUILT INTO HULA-HOOP (SEE TEXT)**

band, with a small overlap at the ends. The point had been simply proved that a 40m shielded loop would do the required job. Possibly some readers may like to make this version?

Mk1 was then built, reduced to 305mm diameter with a frequency coverage of approximately 6.600MHz-7.600MHz. This was built as shown in

the neat configuration in Fig. 1. Once again, 2m of RG58 coaxial feedline was used, with the braid removed for 25mm at the centre, as with Mk1 shown in the Fig. 4 inset. The circuit is shown in Fig. 3. The 2m of RG58 was wound on a simple plastic coil former in two complete close-wound turns, with the 25mm gap in the braid now being at the bot-



semblies may vary a little, and C2 should be made a little larger, or smaller, if necessary, to achieve 7.000MHz at 50% enmeshment of C1 plates.

I found this 305mm outside diameter MkII loop to be more sensitive than my MkI, with QRN rejection, due to the shielding, equal to the MkI. The nulling, on rotation, was sharper with excellent QRN reduction. I found a preamplifier wasn't needed with the high gain receiver I used, but one of 20dB or so gain may be added for use with less sensitive receivers.

Checking a small loop for nulling efficiency can be difficult indoors using incoming signals, due to possible reflections from surrounding structures. If a captive signal (an oscillator) is not available for these tests, then a simple electronic calculator can be used. The loop and calculator should be set up a convenient distance apart on a table, the calculator will produce radiated noise which will increase, or decrease as the loop is rotated. This is a very simple, cheap, and effective test method for any small loop.

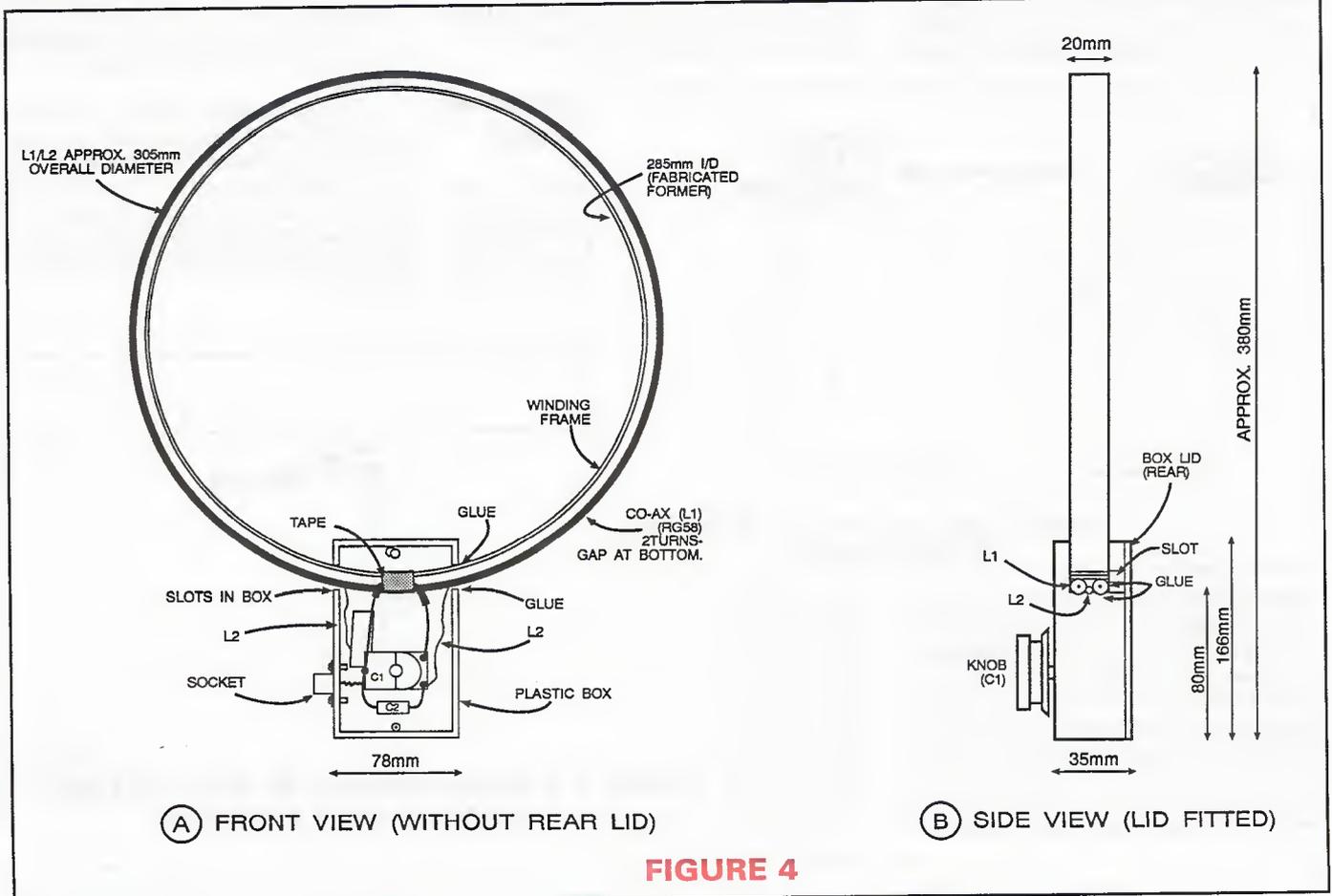
Finally, you may find that the loop will provide greater sensitivity if placed on a metal tray, the tray connected to the earth on the loop. This all depending upon the surrounding objects and may be worth experimenting with, but it will have no noticeable effect on QRN rejection.

tom. The plastic coil former was made of a 1.955m strip of trent white plastic 20mm wide 1mm thickness flat edging, obtainable from most DIY stores. The strip was tightly coiled into a double turn circle, with an overlap at the end of 25mm, the two ends being secured with superglue. This gave a coil former of about 285mm inside diameter by 20mm wide.

The two turns of RG58 (L1) are close-wound around the outside, and taped to the former with PVC at the ends, as shown in Fig. 4a. Spots of superglue may be applied around the circumference to hold the turns in position. L2 consists of a length of thin PVC covered flex, wound so that it lies snugly between the two coaxial turns (Fig. 4b), held in place with spots of superglue. The finished loop is then mounted towards the top of a white

plastic ABS box, I used one of 166mm x 78mm x 35mm, available from several components suppliers. Cut a slot into either side of the box to accommodate the loop as shown in Figs. 4a and 4b, and hold it firmly in position with a liberal application of Araldite. The base of the box can be mounted on a small wooden base.

C1 (Jackson 50pF type C804 variable) is mounted in the box immediately under the ends of the loop. C2 (27pF silver mica) is soldered across C1. All connections should be kept as short as possible. A suitable co-axial socket (SKT) is mounted on one side of the box as shown. C1 acts as a bandspread capacitor, and this doesn't need a slow motion drive. C2 is a 'bandset' capacitor, and, in the prototype, was 27pF. 7.000MHz is resonated with C1 plates about 50% enmeshed. Individual as-



# Choosing Your Aerial For Minimum TVI

*Ian Poole G3YWX gives advice on choosing the right HF aerial for the best EMC, both to and from your station*

TVI (breakthrough of RF onto domestic receiving equipment) is the bane of every radio amateur's life. There is always the possibility of it occurring, even with low power transmitters. It is usually possible to cure it with some filters and ferrites but this is not always easy. The neighbour might not like you installing some filters behind his new TV and video especially if the filters are home made.

The best approach is to expect the worst and to think about TVI when the station and aerials are being set up. Certain types of aerial are far more likely to cause TVI and a little forethought in the positioning the aerial can save a lot of hassle later.

## Positioning

Saying that the position of the aerial can have a lot of bearing on TVI might seem obvious, but the extent to which it plays a part may not be well known. In

10dB or more. Another advantage is that the screening effect of the house is reduced so that significant gains can sometimes be made here.

Being realistic, not everyone can put all their aerials at the bottom of the garden. Often a beam (especially for VHF/UHF) has to be mounted somewhere on or near the house, but the choice of exactly where can make a big difference. Beams in particular can cause problems because they vastly increase the power levels in the direction of maximum radiation. This makes even low power transmitters more susceptible to being the source of breakthrough. The best solution is to mount the transmitting aerial as far away from any television aerials as possible. It might even be a good idea to carry out some tests to choose the best place. By doing a few experiments it may be found that even raising or lowering the aerial may take the offending TV aerial out of the line of the signal.

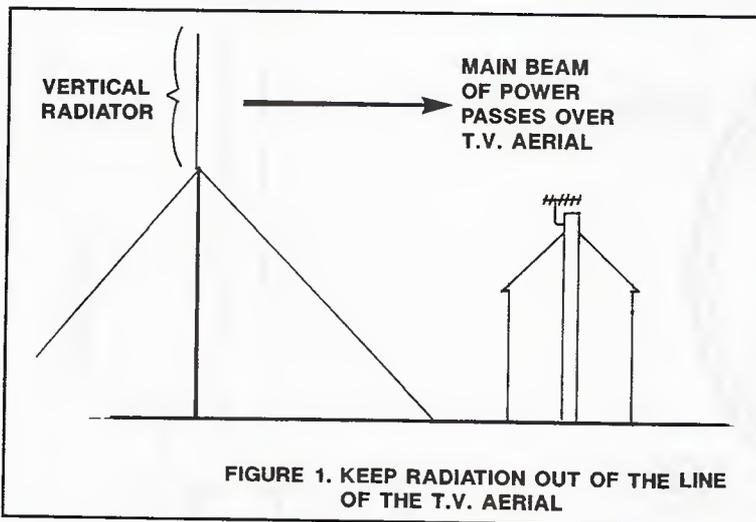
where the variety of aerial designs is much greater.

The first type of aerial to avoid is the long wire (or more correctly an end-fed wire), this aerial can be particularly bad. Firstly it starts radiating as soon as the wire leaves the ATU. As this is usually in the shack, there will be comparatively high levels of RF here and around the house.

Another problem is that a long wire relies heavily on its earth connection to function properly. If the earth is not ideal then RF will tend to travel along the mains wiring, entering all the equipment in the house with the possibility of causing havoc not only with televisions but also hi-fi systems and radios as well.

Verticals can also cause problems although they are not usually anywhere near as bad. Whilst they are ideal in many circumstances because they are easy to erect and do not require much space, they do have a reputation of giving trouble at HF. The reason is simple. They have a low angle of radiation, and especially if they are ground mounted they direct a lot of power into the local houses! In addition to this, by their very nature television downleads have the same polarization as the aerial and this means that they are susceptible to pick up radiation from the vertical. To get round these problems, it is best to mount the vertical high enough so that the majority of the signal passes over the television aerials and leads.

The aerial which seems to give the least amount of problems is the simple dipole. It is balanced and does not rely on an earth connection. Accordingly it is less prone to bringing RF back into the house. However be warned, a balun is required if the coax is not to act as a radiator.

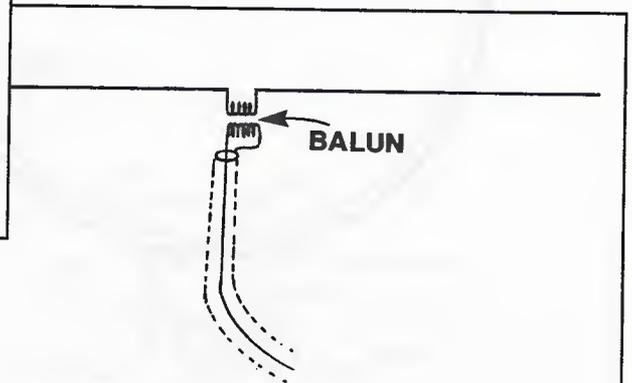


## Types of Aerial

Apart from the position, the design of the aerial can

fact placing an aerial away from a house will not only reduce the possibility of TVI but it also brings other advantages. The level of interference which is received will also fall. Television time base signals, hash from computers, and even the radiation from fluorescent lights all contribute to a high level of noise. By moving the aerial away from the house this noise can easily be reduced by

often have a large bearing on the level of interference which may be caused. This is more applicable to the HF bands



**FIGURE 2. A BALUN SHOULD BE USED TO FEED A DIPOLE IF CO-AX IS USED.**

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Lynn reports that they also perport to offer the best support around. Well, did you know that **RADIO SHOPPER** does give great pricing AND after sales second to none - and just for the measure we even know what we're talking about - Our guarantee is also in fact superior to **ANYONE** in this country.

Lynn also reports that Ken (you know who!) has spotted other info for next month - and we all know how he can sniff out the scandal.....

See you soon  
Lynn Ear

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# An Effective Multiband HF Aerial System

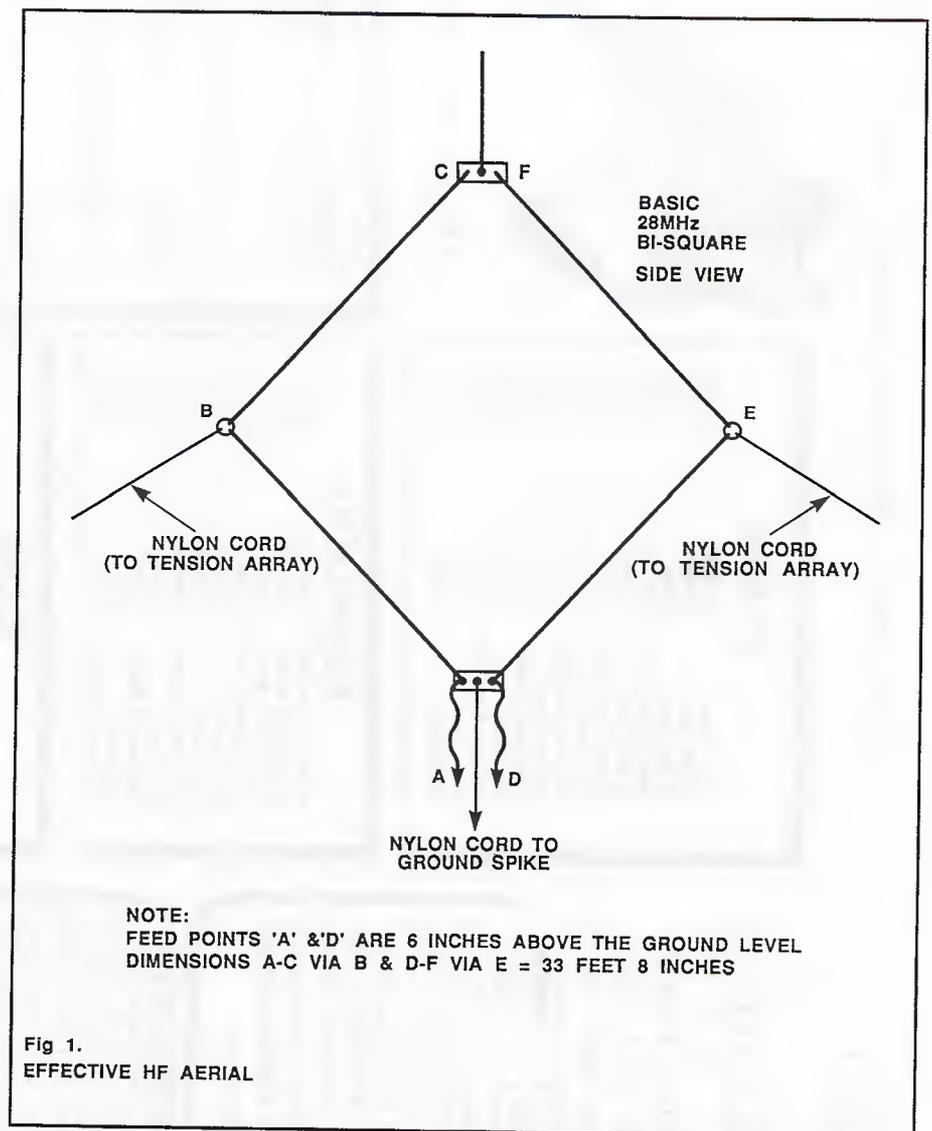
*Maurice Healey G3TNO describes the construction and his on-air results of a compact multiband system*

Over many years I've operated on the DX bands using a variety of simple aerials such as dipoles, verticals, quad loops etc. Whilst I found these performed reasonably well, I never felt that I was achieving optimum use of the available space. As a full size beam was out of the question, I hence sought an alternative.

Firstly, I drew up a list of my requirements. This included items such as minimum visual impact, (the neighbours are very aware of any unsightly intrusion upon the sky-line). The aerial also needed to cover as many bands as possible, be simple to construct, and have at least some control, where practical, of its directional properties. With these points in mind, I made a search of various books and other publications. During this, one of the aerials I came across was the 'Bi-Square' (see Fig. 1).

It appeared that one cut for 28MHz would have useful resonances on the lower frequency bands (*Ed's note - one electrical wavelength at 28.5MHz equates to a length of 1.00m*). My first prototype, the elements made from wire with non-conductive insulators for support, was cut for 28.10MHz and fed via a 4:1 balun as in Fig. 2, with the feed point almost at ground level. An earth mat, consisting of a number of buried radials adjacent to the feed point of the aerial, could also be connected when needed (although I found that a few radials of an electrical quarter wave length seemed to be as good as the earth mat on the higher bands. A change to a link coupled tuned circuit as in Fig. 3 improved matching and kept losses on 28MHz to a minimum.

I compared the performance of this aerial with a centre fed doublet 20m long and mounted about 10m above ground level. The Bi-square performed surprisingly well in comparison to the doublet, and within the space of an hour or so on 28MHz CW, I managed some nice DX contacts, including KH6, VS6, HL, JA, VK and ZL. I found that for the longer haul contacts, the Bi-square had a considerable advantage over the



doublet, with the advantage swinging to the doublet for shorter haul contacts, i.e., Europe and the East coast of North America.

I then made an examination of the possible ways to use the elements of the 28MHz Bi-square on the lower frequency bands, the results of which can be seen in Table 1.

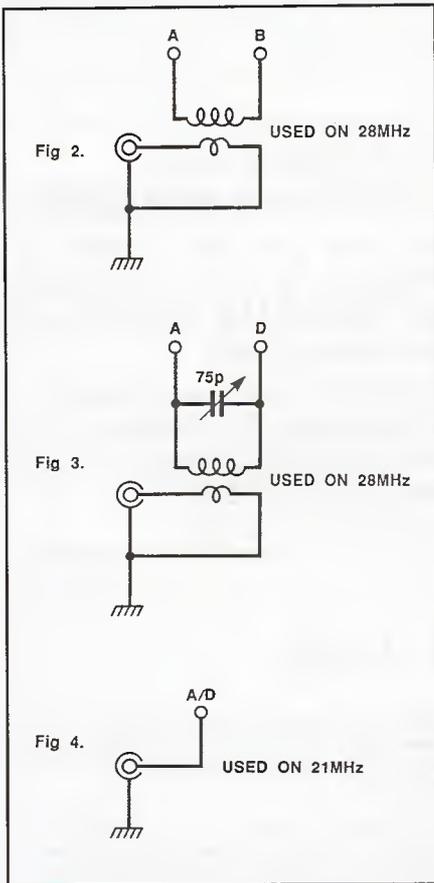
## 21MHz

After such a promising start on 28MHz I tested the aerial on 21MHz. As the feed impedance here is very different from that on 28MHz, I connected one leg of the aerial to the inner of the 50 ohm coax feeder with the coax outer connected to the earth mat (Fig 4). The

**Table 1**

Freq	Length	Approx impedance	Performing as
28MHz	1 wavelength	High (> 200 ohms)	Bi-square
21MHz	3/4 wavelength	Low (60 ohms)	2 ele vertical
14MHz	1/2 wavelength	High (> 2000 ohms)	2 ele vertical
10MHz	1/3 wavelength	Reactive (> 250 ohms)	Extended G/Plane
7MHz	1/4 wavelength	Low (50 ohms or less)	Ground plane
3.5MHz	1/8 wavelength	Low (12 ohms or less)	Loaded vertical
1.8MHz	1/16 wavelength	Low (12 ohms or less)	Loaded vertical

**Note:** The values of length in this table relate to the length of each element of the array.



I immediately found the 'new' aerial performance was considerably better than the doublet for DX, in fact I was getting 'pile ups' to the Pacific and the West coast of W, and VE from my CQ calls.

Changing over the connections to the elements, so that the other leg was the driven element instead, swung the polar diagram through 180 degrees. I found this made a great difference, when previously signals from Africa were almost inaudible, with the changed arrangement stations in ZS, 5H3 and ZD8 became good workable signals.

### 7MHz

On 7MHz the feed impedance is low, similar to that on 21MHz. The only change to the set-up used on 21MHz was that the two elements of the aerial on 7MHz are fed in parallel with each other (this helps to reduce resistive losses to a minimum), see Fig. 5. This arrangement turns the aerial into a 'fat' ground plane with a low angle omnidirectional polar diagram, which performed much as expected. Inter-G working for example was much worse than the doublet. However, it was considerably better than the doublet for contacts outside Europe.

### 10.1MHz

I spent a considerable time on 10MHz trying to produce a directional polar diagram, but to no avail. I decided to treat both elements in a similar way to that used on 7MHz, except that to obtain a reasonable match a capacitor had to be used as a series tuning capacitor at the feed point to tune out the inductive reactance due to the elements being too long for quarter wavelength resonance (see Fig. 6).

I selected the capacitor first by fitting a variable 500pF capacitor in series with the feed point, and by using low power adjusted this for optimum VSWR reading on the coax feeder. I then removed and measured the value of the capacitor, replacing this with a 500V working fixed mica capacitor of the

same value.

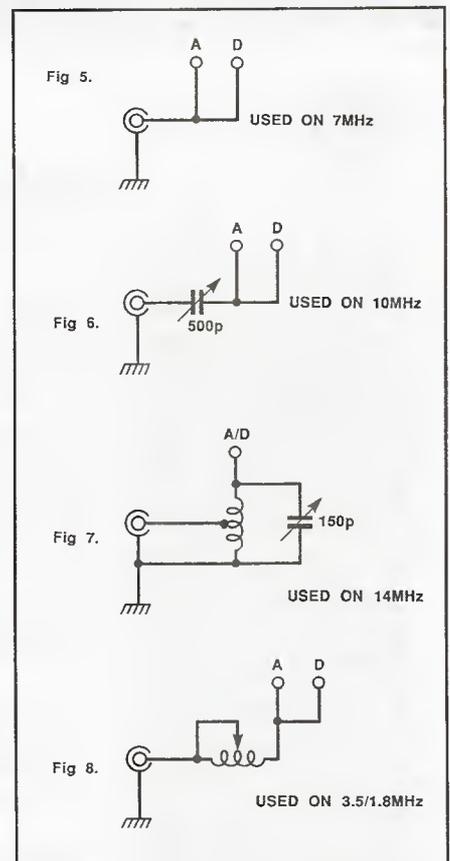
The performance on 10.1MHz was very similar to that on 7MHz, and I managed to work a fair amount of DX on both bands. Again the vertical elements favoured DX, contacts with European or inter-G stations being much better on the doublet.

### 14MHz

The feed impedance on 14MHz is high, so some form of matching is needed, such as a tuned circuit coupled to the feeder (see Fig. 7). My results on 14MHz were good, particularly in the favoured directions of due north or due south (depending on which is the driven element), and I obtained a good many long haul DX QSOs. Again the polar diagram produced was at a low angle, hence providing good performance for DX contacts.

### 3.5 and 1.8MHz bands

'Base Loading' the array is possible, so that operation on 3.5MHz and 1.8MHz bands as a 'low' height loaded vertical, is feasible. The array being 'fat' helps to capacitively load the array so that less 'lossy' inductive loading is required to achieve resonance on 3.5MHz and 1.8MHz (see Fig. 8).



I compared the performance on these two bands to an end fed wire,

other leg of the aerial is left unconnected. As there is considerable coupling between the driven and undriven elements, also some phase shift due to the physical spacing of the elements, it was reasonable therefore to expect a degree of directivity, from the array.

From my local field strength measurements, a roughly cardioid polar diagram was produced, with a null in the direction of the undriven element together with a low angle of radiation, just right for DX working. The VSWR I obtained was surprisingly good, with a reading of between 1:3 and 1:5 at the HF and LF ends of 21MHz respectively.

My next step was to have a few QSOs using the new setup. A CQ/WW, CW Contest weekend was coming up, which gave me a good chance to judge the aerial under competitive conditions.

using the earth mat with the Bi-square feed point at the far end of my garden. My results on 3.5MHz were better than I expected, and I worked a number of W, and VE stations, at greater strength on the loaded vertical than was possible with the end fed wire. Due to the end fed wire having a higher angle of radiation, signals from Europe were better using the end fed wire aerial.

On 1.8MHz I managed to work European stations, I also obtained inter-G QSOs, but the end fed wire was the better of the two. However, I often found that due to a lower noise floor from the loaded vertical, it was better for the

reception of DX stations and some mobiles, as the signal to noise ratio was better.

### Constructional Hints

The various interconnections, capacitors, and loading coils need to be kept dry. For the inter-connections, I found a 35mm film canister was ideal. For the larger items I found that a 1 litre ice cream container with a snap-on lid was perfect.

### In Conclusion

The resulting aerial seems to be a

winner with the neighbours, because of its small physical size they are unable to see it! It lets me work several HF bands effectively from the minimum of space, with small outlay in time and materials. However, for those with more land area, a further pair of similar elements could be erected at right angles to the first, to provide a choice of directivity on the three higher frequency bands, and with all of the elements connected together on 1.8, 3.5, 7, and 10.1MHz bands. Finally, I would like to thank the very many amateurs who assisted me with on-air reports during the trial stages.

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## AOR - ALL IN ONE

The **AR1500** is the World's first true compact hand-held wide range receiver offering SSB as standard. 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 its 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 **£279.00 including VAT**.

The popular **AR2000** receiver continues. The AR2000 remains a firm favourite with listeners and enthusiasts. Features include coverage from 500 kHz - 1300 MHz and reception of AM, NFM & WFM.

There are many other units and products available: AR2002, AR2800, AR3000A, WX2000, WA5000, DA3000 etc. For a complete set of leaflets and price list please send a large S.A.E. (34p).

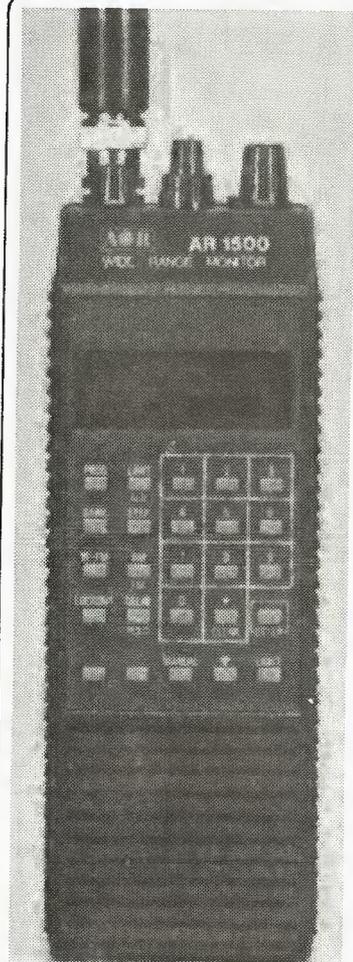


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# SCANNERS

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## HF-150 Receiver Review

*Chris Lorek reviews a 'Wolf in Sheep's Clothing', the latest British-made HF communications receiver*

We're living in an age of information awareness, where being able to scour the short wave bands for the latest news and events is now commonplace amongst members of the public as well as dedicated HF enthusiasts. This is very obvious amongst ex-patriots, who like to retain contact with news, goings-on, and of course entertainment, from their 'home' country.

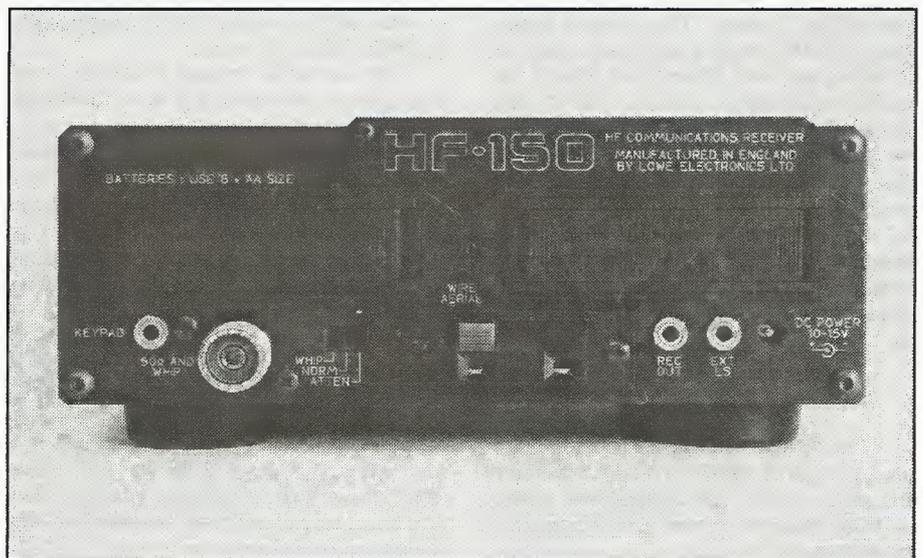
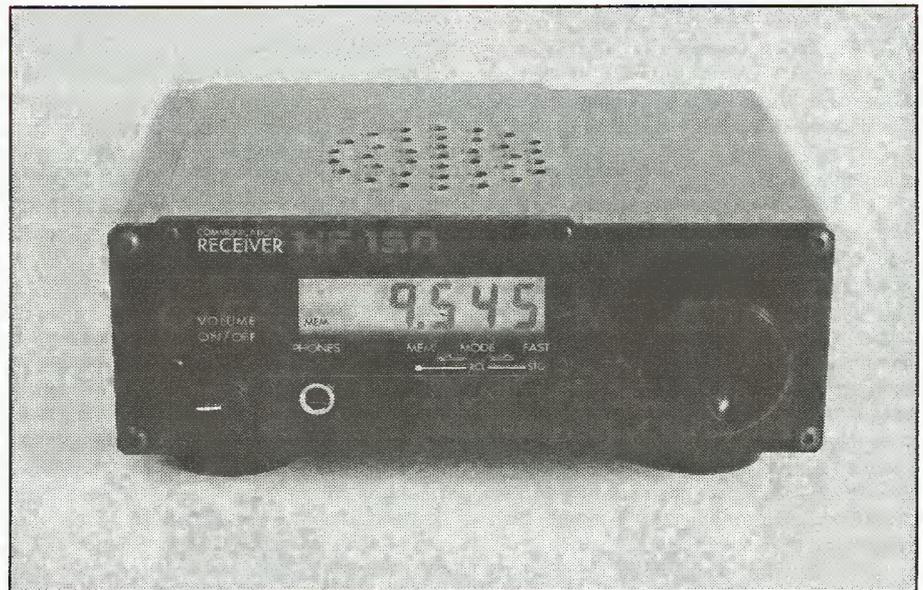
Very often, the strive to be able to receive overseas radio stations leads the interested person to buy one of the many impressive-looking 'global' receivers, typically selling at around £50-£100 from a mail order catalogue or from non-specialist 'high street' dealers. These sets certainly 'look the business', but unfortunately their on-air performance doesn't always match their impressive appearance. Eventually after 'cutting his teeth', the dedicated 'world band' listener then goes and looks for something better. But multiple knobs and buttons aren't always a guide to good performance.

Simplicity of use' is the keynote to the HF-150, a British-made offering from the Derbyshire firm of Lowe Electronics. They've had a record of designing high-performance HF receivers, and they've now extended their 'own design' range with the HF-150, aimed at the 'man in the street' who wants 'something better' as well as the devoted radio globetrotter enthusiast.

### Fully Featured

Think of the features you'd like for HF broadcast reception such as various forms of synchronous AM, as well as selectable USB/LSB for amateur and utility band monitoring, and the HF-150 has got them.

For AM, as well as wide (7kHz) and narrow (2.5kHz) AM demodulation, the HF-150 has quite a variety of synchronous AM reception modes. If you've listened to, and got rather fed up with, all the fading and resultant distortion from signals on the HF broadcast bands, then you need to try synchronous reception on a suitably-equipped receiver. Here, the set's circuitry 'locks-on' to the fading carrier, and re-inserts an internal carrier signal in its place. When locked in this way, during



carrier and selective sideband fades the result is often still a clear distortion-free signal.

Together with the 'usual' USB and LSB synchronous modes found on such receivers (where you can manually choose between listening to the USB or LSB component of the

wanted signal, depending on which suffers the least interference), for use on 'clearer' signals the HF-150 also allows you to use double-sideband reception in synchronous mode for better resistance to fading when there's no interference around. A further refinement is a

'Hi-Fi' mode for double-sideband synchronous reception of clear signals, which as well as giving low distortion also provides a wider frequency response with more treble to the loudspeaker audio. This uses a clever technique of shifting the response of the wider IF filters, giving around 5kHz of audio bandwidth rather than the usual +/- 3.5kHz.

## Interfaces

The dark-brown and black front panel is very uncluttered, a light brown coloured extruded alloy case matching this in appearance. What readers may not appreciate is the receiver's small size, measuring just 185mm x 80mm x 175mm, I was rather surprised when I first saw it!

A built-in speaker comes fitted to the set, and a rear panel 3.5mm jack socket lets you plug in an external speaker for higher quality reproduction. A 'record' output gives around 200mV at an impedance of 5kohms for tape recorder 'line in' connection, and a front panel socket lets you plug in either mono or stereo headphones, either giving mono reproduction.

An SO-239 coax socket is used for a 50 ohm aerial input, and you can also connect a short wire or whip aerial to this, using the switchable internal preamp to boost the signal when needed. Sprung connections are also fitted for a long wire aerial and earth, an internal matching transformer giving a better impedance match with the wire. If you're using a 'monster' aerial, you can also switch in an internal attenuator to reduce problems from strong-signal overload, and I'm told an optional external preselector will soon be available to give even better front-end selectivity if you ever need this.

The set can operate from a variety of power supplies, including AC mains with the supplied AC adaptor. The nominal supply voltage is 12V through a rear panel socket, the set taking between 130mA and 300mA depending on the volume setting. A pair of slide-in battery holders are also fitted, which let you use the receiver from 8 AA size batteries, either alkaline or nicad. With the receiver switched off, plugging in an external 12V DC supply or the mains adapter charges the internal nicads if you've fitted these. An accessory kit including nicads, carrying aids and a telescopic whip is also available for portable use.

## Tuning

The receiver covers the wide HF frequency range of 30kHz to 30MHz, tuning in 8Hz steps on SSB and synchronous modes, and 60Hz steps on 'normal' AM. A large LCD shows the tuned frequency to the nearest kHz, and this provides mode information and the like when you're using the front panel buttons. You can use the spin-wheel VFO knob on the front panel for tuning, and turning this quickly speeds up the tuning rate to let you get from one part of the band to the other more rapidly. A press of the front panel 'fast' button changes



the knob to tune in 100kHz steps for larger frequency changes. Dedicated listeners will be pleased to know that an optional desk-mounting keypad can be plugged in, to give direct frequency entry.

## On The Air

A very well-written 32 page instruction book comes with the HF-150, this gives details on aerials, tuning, reception modes and so on for the 'beginner' as well as progressing onto technical information and several pages of internal circuit diagrams for the more technically-minded amongst us. After having a read, plugging in and switching on couldn't be easier, and within a few seconds I was listening to the 41m broadcast band with double sideband synchronous reception, retuning a minute or so later and I was listening to amateurs on 14.2MHz USB, and so on.

The set has 60 internal memories, each storing mode and frequency in an EEPROM which needs no power to retain its memory. There are three memory functions on the front panel push-buttons, 'preview', 'recall', and 'store'. Pressing the left hand button allowed me, while still listening to my original frequency, to cycle through the frequencies of the channels I'd stored, a press of the 'recall' button transferring me to that channel. As well as for storing the frequencies of broadcast stations, I also found this handy to use as a 'personalised bandswitch' control, as I could then tune away from each memory channel with a twist of the main knob.

But the highlight of the set was, in my mind, its excellent performance when tested in very trying on-air conditions. As I tuned around, stations came and went very cleanly indeed, and listening to extremely congested bands was a sheer pleasure when compared with what I usually 'suffer'. I really did appreciate the synchronous AM facilities, I found the double sideband modes (both 'normal' and 'Hi-Fi') gave me a quality of HF reception I'd rarely come across before. Superb.

## Technicalities

The receiver circuitry is based on the HF-225 receiver (a higher priced set from the same manufacturer), and although the number of filter bandwidths and the like is 'cut down' I found the RF performance hasn't been cut at all. Indeed from the operational point of view, the HF-150 has more synchronous reception facilities, with matching performance to boot, than any other set I've come across below a price tag of several thousand pounds. Multiple IF filters are fitted to give the 2.5kHz and 7kHz bandwidths, these filters being cascaded where needed to give better selectivity. Examination of the circuit diagram even shows crystal and ceramic filters in line with the 45MHz and 455kHz carrier oscillator feeds to the mixers, to 'clean up' these signals, showing attention has been paid in design to getting the utmost performance. I normally have to use such techniques in the laboratory to 'clean up' my high performance cavity-tuned signal generator needed to measure such high-performance receivers! The accompanying lab results confirm the good performance, some of these (e.g. image at 12MHz) were beyond the limits of already sophisticated measurement techniques

## Conclusions

I understand the HF-150 is being sold around Europe virtually as fast as it can be made, which doesn't surprise me. I found the set performed impeccably on air, finding no case of limitations through other strong signals even though I used a wide variety of aerials in the on-air tests. Amateur and utility band devotees however may prefer a receiver with a greater choice of filters to get the best out of narrowband modes. In conclusion I can happily say that, to devotees of quality HF broadcast band reception, the set is superb.

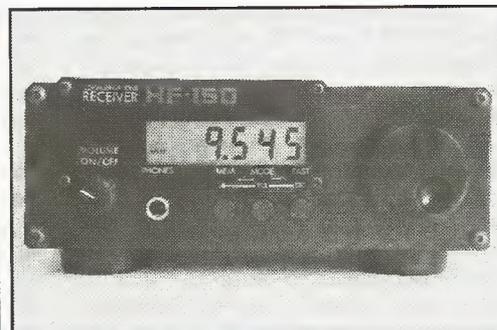
*The HF-150 is currently priced at £325, and my thanks go to Lowe Electronics, who are the manufacturers of the HF-150, for the loan of the review set.*

## LABORATORY RESULTS:

### Sensitivity;

Input level required to give 12dB SINAD (bracketed figures measured with whip amplifier switched in);

Freq. MHz	SSB/CW	AM
0.1	0.49uV pd	1.14uV pd
0.5	0.31uV pd	0.76uV pd
1.0	0.32uV pd (0.14uV pd)	0.73uV pd (0.39uV pd)
1.5	0.30uV pd	0.74uV pd
2.0	0.31uV pd	0.74uV pd
4.0	0.29uV pd	0.79uV pd
6.0	0.25uV pd	0.71uV pd
8.0	0.31uV pd	0.77uV pd
10.0	0.31uV pd (0.13uV pd)	0.73uV pd (0.35uV pd)
12.0	0.30uV pd	0.76uV pd
15.0	0.32uV pd	0.77uV pd
20.0	0.32uV pd (0.11uV pd)	0.81uV pd (0.26uV pd)
25.0	0.36uV pd	0.85uV pd
30.0	0.42uV pd	0.99uV pd



### 3rd Order Intermodulation Rejection;

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

	SSB 2.4kHz	AM 7.0kHz
50/100kHz spacing;	87.0dB	82.0dB
100/200kHz spacing;	87.0dB	85.5dB

### Image Rejection;

Increase in level of signals at the first IF image frequency, and the IF frequency itself, over level of on-channel signal to give identical 12dB SINAD signals, measured on AM, 7.0kHz bandwidth;

Freq. MHz	Image	IF
0.1	85.5dB	80.5dB
0.5	90.5dB	84.5dB
1.0	91.5dB	84.5dB
1.5	90.5dB	84.5dB
2.0	90.5dB	84.5dB
4.0	91.5dB	90.0dB
6.0	96.0dB	85.0dB
8.0	98.5dB	85.0dB
10.0	105.5dB	85.5dB
12.0	>110dB	85.5dB
15.0	>110dB	86.0dB
20.0	103.0dB	85.5dB
25.0	95.0dB	84.5dB
30.0	91.0dB	84.0dB

### Blocking;

Measured as increase over 12dB SINAD level of interfering signal, unmodulated carrier, causing 6dB degradation in 12dB SINAD on-channel signal, measured at 10.7MHz;

	SSB 2.4kHz	AM 7.0kHz
+/-100kHz;	95.5dB	84.5dB
+/-200kHz;	100.0dB	90.0dB
+/-1MHz;	106.5dB	95.5dB

### Selectivity;

Single-signal selectivity, measured at 10.7MHz;

	2.5kHz Filter	7.0kHz Filter
-3dB	1.65kHz	4.83kHz
-6dB	1.97kHz	6.52kHz
-20dB	2.27kHz	8.15kHz
-40dB	2.40kHz	8.16kHz
-60dB	2.52kHz	12.81kHz
-80dB	2.58kHz	16.28kHz

## Nevada Scanmaster

# New Products

The Nevada Scanmaster is a wideband receiving aerial, covering the frequency range 25-1500MHz although we're told it will operate down to 500kHz at reduced sensitivity. It's constructed of fibreglass, stainless steel and chromed brass, so it should stand up to the elements quite well together with being fairly unobtrusive. A 'N' connector is used, which reduces

losses at the higher end of its frequency coverage, and a multitrapped vertical system is used to provide the wide frequency range. The aerial itself is 1100mm long excluding the mounting tube, with four horizontal radials at the base each 200mm long. The Scanmaster aerial is supplied with a stainless steel mounting tube and mast clamps, and is currently priced at £39.95. Further details from Nevada Communications, Tel. 0705 662145, remember to state *Scanners International* when enquiring.

# ScanAds

Want a scanner or receiver, or have you got one to sell? Do you need some accessories, or simply want to advertise your local scanner/airband club? Then advertise **free** in our 'ScanAds' page! This is a free service for reader's privately-owned scanner related products and for non-profit enthusiast groups. Traders please contact our commercial ads division on 0442 66551, they'll be pleased to help. Send your reader's ad to; ScanAds, Scanners International, P. O. Box 73, Eastleigh. SO5 5WG, or you can fax your ad to us directly on 0703 263429. There's no limit as to the length, just continue on a separate sheet if required, but please note that the coupon below, or a photocopy of this, must accompany each submitted advertisement as proof of readership. Your name/address as requested on the coupon will not normally be published, this is just for us to get in touch with you if we there are any problems, so please include the contact details you require, together with your area or town, within the advert text itself. Your ad will appear in the first available issue.

## CLUBS

I'm interested in setting up a scanner enthusiast's club, if you're interested please contact me, Carl Morphett, 70 Alexandra Crescent, Flat 4, Birkdale Road, Dewsbury, West Yorkshire, WF13 4HL. or Tel. 0929 459279

## FOR SALE

Yaesu FRG-7700 receiver and FRV-

7700 VHF converter, with manual, £220 ono. Daiwa heavy duty rotator with new round indicator controller, £60 ono. Contact Tony G1JHX (Manchester), Tel. 061 865 7896

**AR1000**, nine months old, all items £175 plus p/p. New Realistic PRO-2022 desktop scanner, in shop £200, will take £150 plus p/p. Microreader with leads to printer, £75. Alf Brimming BRS36662, 43 Atwood Drive, Lawrence weston, Bristol. BS11 0SR, Tel. 0272 828586 anytime

**Uniden Bearcat** 200 channel scanner for sale, £120. Also, wanted any ham radio equipment frequency charts including many frequencies from 1MHz to 5GHz. (Wirral, Merseyside). Tel. 051 637 0751

**Realistic PRO-2022** desktop programmable scanner, with instruction manual, 12 months old, hardly used, £180. (Boston). tel. 0205 354812

**Realistic PRO-34** scanner, 200 channels; 68-88, 108-136, 136-174, 380-512, 806-960MHz. Nicads, rubber duck and telescopic aerials, £170. (Huddersfield). Contact Mark, Tel. 0484 682951

**Yupiteru MVT-6000** home base or mobile scanner for sale. Six months old, boxed and guaranteed, with adaptor. £200 ono. (Nottingham). Tel. 0602 630838

**JIL HF/VHF/UHF** scanning monitor, type BGL9DMSX-400, 26-520MHz with wideband aerial, unused, mint condition, £250 ono (Warwickshire). Tel. 0295 680256 any time

**AOR AR2001** base or mobile scanner, 25 to 550MHz cont. In as-new condi-

tion, boxed with manual, buyer to collect, £175 (Kettering). Tel. 0536 522007

**Realistic PRO-2005**, 400 channels VHF/UHF scanner, boxed, as new, £225 ono (Gravesend). Tel. 0474 357795

**Yupiteru MVT-7000** with M-100 preamp, PSU-101 discone, boxed, as new, £250. (Southampton). Tel. 0703 639342

**Sony ICF2001D** Air/FM/SW, 32 memories, LED display, clock, alarms, sleep, two tuning modes etc. VGC, with freq. books, maps, £160 ono. (Doncaster). Tel. Steve, 0302 328662 any time.

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## WANTED

Fellow scanner enthusiasts wishing to exchange frequencies, literature, and any other related info. All letters answered, but particularly Yorkshire listeners wanted. Please write to Carl Morphett, 70 Alexandra Crescent, Flat 4, Birkdale Road, Dewsbury, West Yorkshire. WF13 4HL, or telephone 0929 459279



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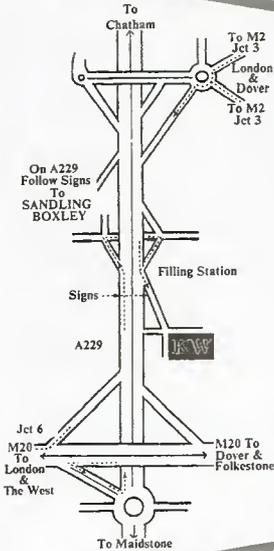
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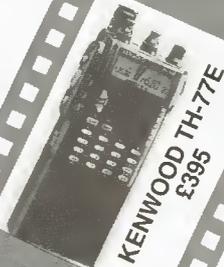


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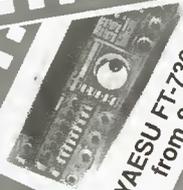
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**We look forward to serving you. 73's Tom G6PZZ**

# Do I Need a Balun?

Harry Lemming, G3LLL answers the question "Should I use coax or twin feeder for my multiband HF aerial system, and do I need a balun?"

Multiband aerial systems such as trap dipoles or G5RVs are very popular with amateurs who, like me, don't have room for separate dipoles for every band. Typical examples are shown in Fig. 1.

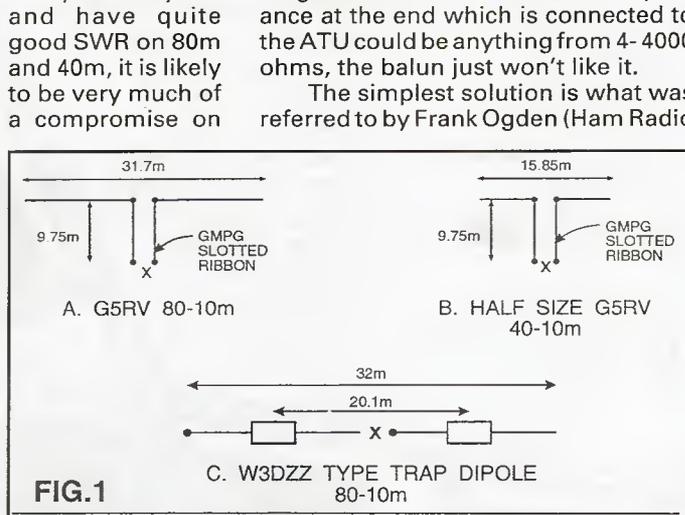
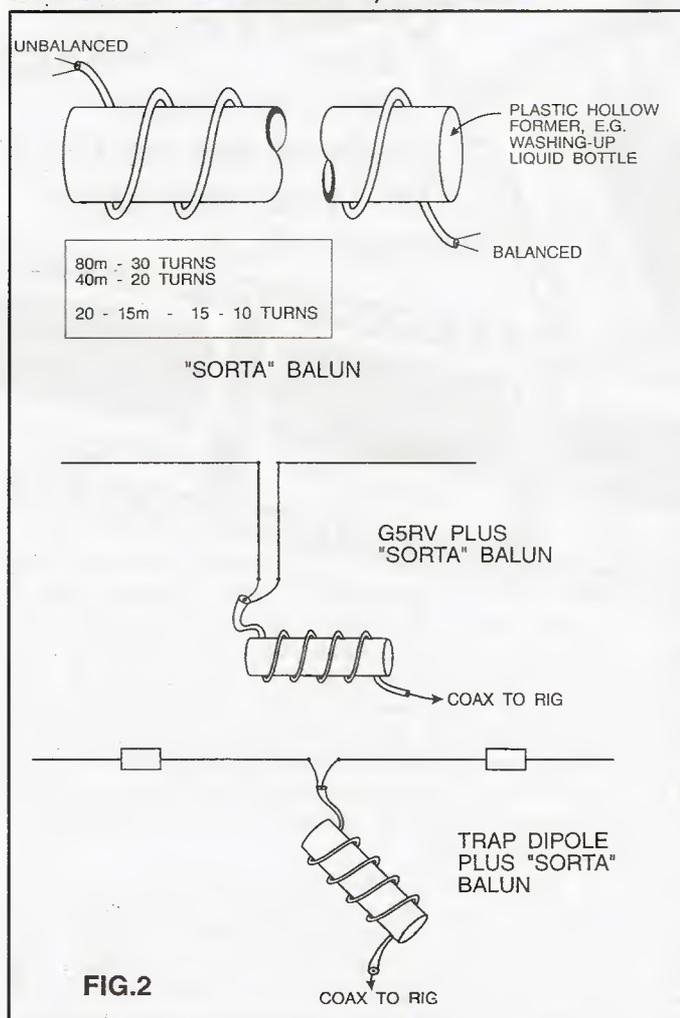
As with any dipole, these aerials are basically balanced devices, and they only give textbook radiation patterns if they are balanced in every way. To ensure this, both halves must be equal in length, height, and distance from nearby conductors. In practice this is very unlikely to be possible in average urban surroundings. So quite a case can be made for not worrying about causing further imbalance, by connecting 50 or 80 ohm coax at points X, in place of the recommended 75 ohm twin feeder. I do not have any loss

figures for commonly available 75 ohm twin, but it certainly looks very 'lossy', and as I cannot find anything better I don't feel like pushing it! Why not forget it and use coax then?

The big thing against coax, is that it does make aerial balance even worse, which promotes extra feeder radiation. Most amateurs have more than enough worries with TVI and BCI, and extra feeder radiation is something they can well do without. So why not fit a balun at point X and then use coax? 1/1 balun transformers are often intended to be used at 50 ohm, and whilst most would be happy at 70 or 80 ohms resistive load, they don't like high SWR with high or low impedances, especially if the load is reactive. Whilst a carefully constructed W3DZZ may be fairly flat and have quite good SWR on 80m and 40m, it is likely to be very much of a compromise on

feeder have to be rated at 75 ohm? In practice on most bands the impedance of the aerials shown in Fig.1 is likely to be anything but 75 ohms, and one way to get the RF down is to use open wire feeders or the relatively new very low loss GMP ladder-type air spaced feeder. It is important that this feeder is kept well clear of objects that might be slightly conductive such as walls, hence it can be somewhat untidy by comparison with coax or 75 ohm twin. But it is efficient and makes an ideal HF band low-loss feeder, but how does one couple it to the ATU? If you have a KW or SEM Z-match, no problem, but most other ATUs have an unbalanced output. Use a 4/1 balun? No, the feeder may be 400 ohm but as it will be running as a resonant feeder, the impedance at the end which is connected to the ATU could be anything from 4-4000 ohms, the balun just won't like it.

The simplest solution is what was referred to by Frank Ogden (Ham Radio



the other bands. Likewise the G5RV owner will be lucky if the aerial itself is fully resonant on more than one band. Under these conditions a balun transformer is likely to be much more 'lossy' than our twin feeder and may well burn out if it is run at more than a fraction of its rated power. Back to twin feeder?

Does the twin

Today's first Editor) as a 'Sorta Balun'. This consists of a washing-up bottle (dry and empty!) or other similar insulated former wound with about 20 turns of coax, as shown in Fig. 2.

The coil of the coax acts as an RF choke and prevents the earthy side of the coax pulling one side of the aerial down to ground. As well as being used between the ends of the twin feeder and coax, it can also be used as a normal balun in the centre of the trap dipole shown in Fig. 1c. The 'Sorta Balun' has the virtue of being much cheaper than a normal commercial item, as well as introducing less loss when used under conditions of mismatch.

For once you pay less and get better results, which can't be bad!

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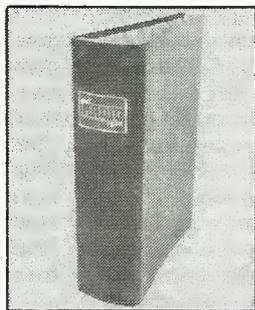
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## PACKET...

*MORE new products from Siskin!*

### KANTRONICS KPC 3

By the time you read this stocks of the new KPC 3 should just be arriving. This cigarette packet size TNC is not only ideal for portable use but also boasts a unique simplified command set for those just starting out. Additional features include full blown Kantronics PBBS (personal mailbox) and open squelch DCD detection as standard. Available NOW. **£149**

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At last there is no need to rip your transceiver to pieces to use 9600 packet. Wood & Douglas (already a highly respected name in the world of commercial broadcasting) have produced this excellent 2M transceiver purely for hi-speed data applications. All connections for 1200 & 9600 baud packet are located where one might normally expect to find a mic socket. Power output is 8-10 watts anywhere in the 2M band (Synthesised) coupled with a commercial grade receiver (no, you will not get airband breakthrough with this radio!) Available NOW. **£225**

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Our Turbo 9600 TNC is obviously ideal for OSCAR 22 but how about the other birds that use 1200 baud PSK? For two years now we've been selling the PacComm PSK-1 which has almost become a standard in it's right. The PSK-1 simply connects to a TNC modem disconnect header to provide switchable PSK/AFSK (for regular terrestrial packet operations). The PSK-1 also sports an RS-232 socket allowing it be controlled by a computer using any simple terminal program and also decodes OSCAR 13 telemetry transmissions. Available now **£189**

### AND NOT FORGETTING...

Although we don't always mention it ads these days we still boast the largest range of packet radio products in the UK including the best selling Mini-Pak, Tiny 2, PK-88, KPC 2, KPC 4, PK-232, KAM and a complete range of plug in PC packet cards. This is further backed up by a wide range of PD/shareware software and ready made leads for just about any combination.

### UR..WHAT DOES ALL THIS MEAN?

We appreciate that everyone has to start somewhere and that the packet world must be one of the most confusing aspects of the hobby. We have a team of trained people who will not think you are daft when you phone up and pick our brains, so if you need help in deciding CALL US, we are here to help you, not baffle you with Science! To that end we also run a telephone help line from 8am to 8pm most days.

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# Packet Radio

## Roundup

*Our packet SysOp G4HCL goes 'down under' and reviews a superb VK program – paKet V5.1*



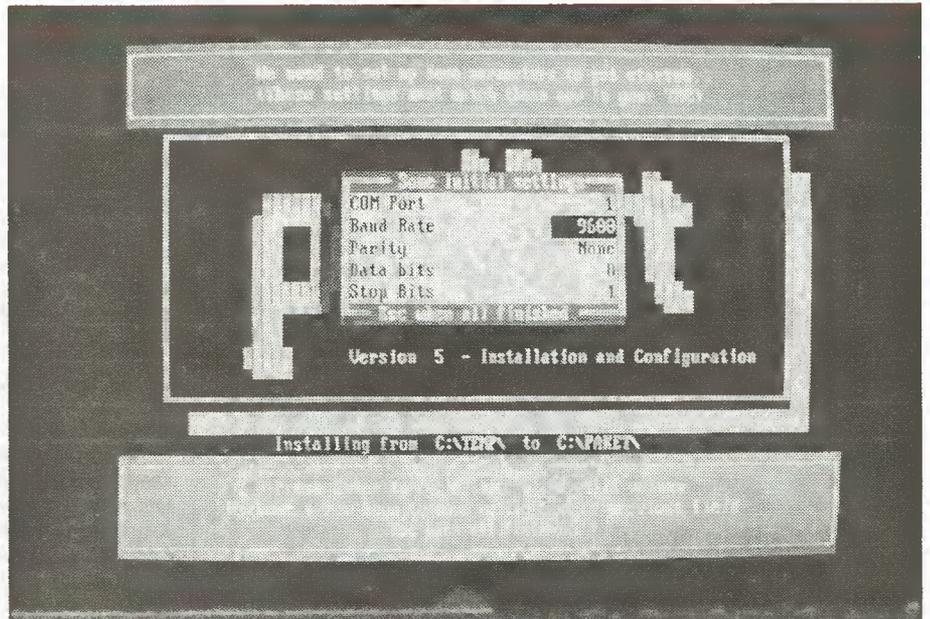
I've just received the latest newsletter of *Digipeat*, the quarterly newsletter of the Australian Amateur Packet Radio Association (AAPRA). Even though I receive the two 'national' Aussie amateur radio magazines each month, it's interesting to see exactly what 'goes on behind the scenes' there on packet (would any VK HRT readers like to drop me some info?).

Although based in Australia, the AAPRA have members in New Zealand, UK, USA, Germany, France, Philippines and Netherlands as well as in all Australian states. The society have been raising funds since their inception over six years ago, through the sale of packet related items such as TNCs. These funds are utilised in assisting clubs to establish digipeaters, either in strategic areas for the long-distance networks, or in areas to enable remote operators to access the more highly populated areas. They've recently been concentrating on upgrading equipment throughout the country to accommodate ROSE (Rats Open System Environment), and the instigation of a UHF 'highway'. They invite clubs to ask them for support, and a glance at their newsletter list shows they've supplied at least 40 clubs with gear! With equipment for a single typical node costing up to £1000 or so, maybe we should have an AAPRA in the UK! Unfortunately, NetRom type nodes aren't allowed in VK due to licensing conditions, hence the widespread use of ROSE for networking. Through the use of this they seem to be having their fair share of 'political' problems with users - nothing changes around the world does it?

### PaKet Version 5.1

Although it's written by Tony Lonsdale VK2DHU, I recently received the latest copy of his program *paKet*, this being version 5.1, from the UK. Many packet users will know of earlier versions of this, such as V4.0 and V5.0, this latest upgrade mainly being a 'bug fix' (V5.0 for example needed a program 'XTFIX' to be loaded prior to it running correctly on some XTs).

As I indicated last month, this I



### Easy configuration through the use of pop-up menus

believe is currently one of the best programs around for packet that isn't dedicated to a particular make or model of TNC. It's a 'shareware' product, i.e., you can freely copy it and try it out first, but if you'd like to use it you're asked to register it with the author. PaKet V5.1 registration costs you A\$25 (25 Australian dollars) in cash or by credit card, this gives you registration support for life, plus all future updates at A\$5 a time to cover diskette, postage etc.

Installing the system is fairly straightforward, it 'expands' itself to run either from a floppy disk (although smaller capacity disks won't fit some of the files such as all the documentation) or from your computer's hard disk with 'everything included'. The installation leads you through step-by-step, asking you to select your TNC type and the various communications parameters from a given menu with explanations. In use, the program offers such a wide variety of functions that the on-disk 'document' file, which I printed out for reference, amounts to almost 200 pages - I think I'll soon need a new printer toner cartridge!

A number of on-screen 'windows' are provided, for example several

'Connect' and 'Type Ahead' windows (you can use up to 10 streams), plus further windows for 'Messages', 'Help' for a pop-up on-line manual, 'Status', 'Disk Directory' and a very useful on-line 'TNC Help' window which pops up when you need it to remind you of what all your TNC commands do. Your computer's 'Function' and 'Alt' keys give commonly-used TNC commands as well as acting as quick-access command keys for file transfer and the like. The program can handle ASCII, YAPP, BayCom and its own paKet protocol file transfers, has a personal message system which doesn't rely on your TNC's PMS, and even a 'remote' mode for unattended access.

I did find the odd minor 'bug' in use, such as stream switching when using my KAM rather than a TNC-2 clone, but to be fair the manual did make note of this and the program even provided a two-key command to initialise each communications window when needed. But overall, I was extremely impressed with the program, and I make no hesitation in recommending it. I received my copy from Venus Electronics (Tel. 0252 837860) which came on two disks - these I had to 'merge' onto a single larger capacity disk to allow it to install correctly, - it will fit on a single 720k or 1.2M disk.

```

> 4 GB0QN-9 100 14!
> 5 GB1UM-1 150 23!
Z GB7MI 100 1!
c bbshjp
CFORD:G4SMC} Connected to BBSHJP:GB7HJP
[RLI 13 7-MS]
Hello Chris, Welcome to the GB7HJP MailBox, part of the SUNFAC network
This system is Owned and Operated by Peter in Waterlooville.

You last connected at 1938 on 920620, your Home BBS is GB7XJZ.

Type H for Help.
Type I for Information about this system.

Look for messages to SUNFAC, the Local Packet Group.
Use the command LC for Topics.

64HCL de GB7HJP: at 1444z on 920622 B,D,H,T,I,J,K,L,N,R,S,T,U,V,W

```

The main communications window, with a type-ahead area at the bottom

```

F1 - Help
F2 - Turn Log File OFF
F3 - Turn REPORT mode ON
F4 - Load Drop/Single Line
F5 - Send an ASCII text file
F6 - Receive ASCII text file
F7 - Send Binary File using AT
F8 - Recv Binary File using AT
F9 - BBS Gateway
F10 - Help with TNC Commands
Alt-F1 - Display Online Manual
Alt-F5 - Send New Binary File
Alt-F6 - Recv New Binary File
Alt-F7 - Send File to LogDir
Alt-F8 - Recv File from LogDir
Page Up - Flashback
Scroll Lock - Toggle
Shift-Right - Next Comm Window
Shift-Left - Prev Comm Window
Up/Ar Arrow - Recall Type Ahead

```

The on-screen menu of commands

```

14:46:27 AUTO RTS CTS DSR DCD BTR
COMMAND      ON/OFF  DEF/ALT  DESCRIPTION
Delete        ON/OFF  OFF       Delete character (BACKSPACE) or (DEL)
DIGipeat      ON/OFF  ON        Enable/disable digipeating through you.
Disconn       none    none     Teardown connection path.
Display       A,C,H,I,L,N,T (all Async, Char, Health, Id, Mon, Timing)
Mail          0-250  16       Delay for digipeaters (n*10 msec).
Echo          ON/OFF  OFF       Echo typed characters to screen.
EScape        ON/OFF  OFF       Display character for (ESCAPE)
Flow          ON/OFF  ON        Inhibit output from TNC while typing.
FRack         1-15   3        Time in secs to wait for ACK.
FullDup       ON/OFF  OFF       Select simplex or duplex mode.
HeaderIn      ON/OFF  OFF       Header and text on separate/same line.
HEdit         ON/OFF  OFF       Normal/software won by STA and COM leds.
Hid           ON/OFF  OFF       Enable/disable ID every 9 mins.
Id            none    none     Force an ID packet.
K             Immediate Cmd
K            a       none     Enter CONVERSE mode.
Kill          a       none     Kill a PMS message number.
KISS         ON/OFF  OFF       Select KISS mode for TCP-IP.
LCalls       Call 1-8 blank
LCok         ON/OFF  ON        List of calls to allow (Badlist).
LCok         Lower to upper case conversion.
LCStream     ON/OFF  ON        Allow stream ID to be

```

The TNC 'help' file pops up on your command

## Packet over Inmarsat

Phill G7JRV dropped me a message beseeching me to publish a little more about the 9600 baud packet system used over Inmarsat using the Camel Trophy event this year (see HRT June 92). It's nothing clever really, we amateurs have been doing it all the time, it was just a commercial application of error-correcting packet techniques to get messages across. It was mainly used for press releases from Guyana and Brazil (as well as from France to the USA during the preselections), to report on progress of the 32 teams from around the world as they make their way along the 1000 mile trek. These were prepared on a PC, then subsequently packetised and sent using a normal voice channel over the satellite, i.e., just like a 23cm duplex packet channel, to the end distribution point. Here another terminal picked up the text and then subsequently electronically distributed this, often to over 100 destinations around the world. In past years, each document had to be typed and printed out, then faxed individually to each destination - something a little difficult to do when the convoy moves so quickly, to say nothing of the extra costs involved (with calls at over £6 a minute, a single data transmission of less than a minute works out a lot cheaper than lots of faxes every day!).

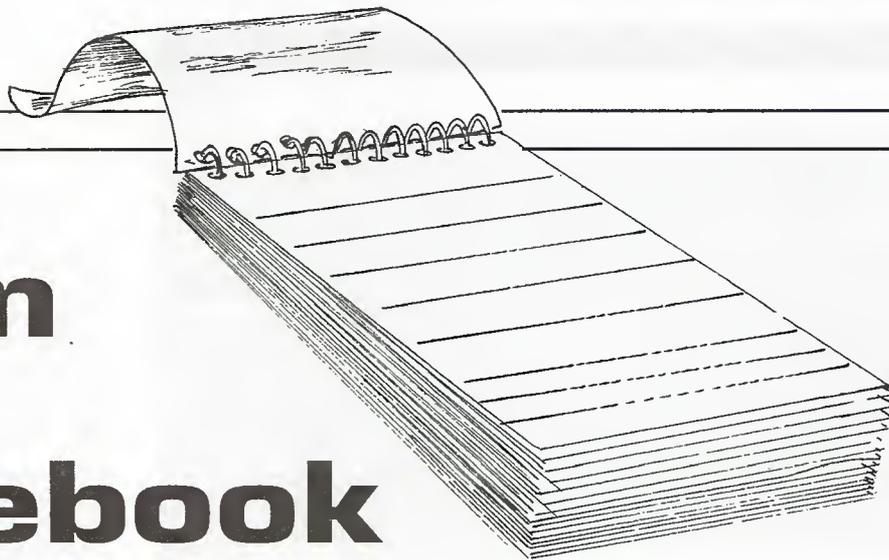
## CTRL-Z, End of Message

Paul G0NDV, who's also the DigiProm copier for UK North, has been in touch to say that, following the mention of the Commodore Club 64/128 in *Packet Radio Roundup*, he's had an overwhelming response, and feels the club should soon reach 200 members. Paul is the club's organiser, and if you'd like information on this then drop a message to G0NDV @ GB7BSX. He also mentions DigiProm's new MB.XA software, watch out for more info on this in HRT soon.

My local BBS, run by David G6XJZ, has been off air for a short while lately due to computer problems - the effect locally has been very noticeable! I also find the same when the node system I run has a 'hiccup'. It's surprising how many amateurs take the network for granted - a word of encouragement or offer of help to your local SysOp is always appreciated, remember it's *their* gear you're using!

I'm off now to the Bavarian rally-by-the-lake (Johannes DG3RGU of Baycom last month finally twisted my arm!) to look at the latest on the European scene, watch out for photos and a report from this elsewhere in this issue of HRT. Until next month, 73 from Chris G4HCL @ GB7XJZ.

# From My Notebook



*Geoff Arnold G3GSR takes us through the basics of receivers*

Most newcomers to the radio hobby learn quite early on, the basic difference between a 'straight' receiver (also known as a 'tuned radio frequency', or TRF for short) and a superhet, which in its turn is short for supersonic heterodyne. The heterodyne process is one where two signals of different frequencies are mixed together so that other signals at frequencies equal to their sum and difference are generated. Those sum and difference signals may be at audio frequencies, in which case they can be heard on headphones or a loudspeaker. These audible outputs are often referred to as 'beat-notes'. Alternatively, the sum and difference may be at radio frequencies, in other words above sound frequencies, or supersonic.

## The TRF

In a TRF, all the circuits providing amplification and selectivity ahead of the detector are operating at the frequency of the incoming radio signal. To receive just one station, without interference from other stations on neighbouring frequencies, more than one tuned circuit is needed. The only exception to this might be if you happen to live close to the radio transmitter handling the programme that you want to listen to. In that case the sheer strength of that local signal will overwhelm any potential interference, which is all very well unless you sometimes want to listen to a different station. If you have a TRF with several tuned circuits, each adjusted to the appropriate frequency by means of a variable capacitor, every time that you want to listen to a different station, you have to retune each and every one of those circuits to the appropriate frequency.

In the earliest radio receivers, each tuned circuit had its adjustment brought out to a separate control knob, so that there were a whole row of them on the front panel, and each one had to be 'peaked' carefully for optimum results - maximum strength of the wanted signal and minimum interference. With a

small number of tuned circuits, it is quite possible to turn all the variable capacitors from one control knob, or even to use a 'ganged' capacitor, one in which two, three or even four variable capacitors are combined onto one shaft. For ganged tuning to work, the coils in every RF circuit must be identical in inductance, and the 'law' of every one of the variable capacitors, in other words the relationship between the angle of the control shaft and the capacitance value, must also be closely matched. Making all the tuned circuits 'track' correctly - keeping them all tuned to the same frequency no matter what the setting of the ganged variable capacitors - gets more and more difficult as you add more tuned circuits. The requirement is complicated by the fact that the first tuned circuit in the receiver will be influenced to some extent by the natural capacitance, the so-called 'throw-in' capacitance, of the antenna which is connected to it.

The modern equivalent of the ganged variable capacitor is, of course, a series of varicap diodes all biased from a single tuning potentiometer. In this case it is the capacitance versus bias voltage relationship, rather than capacitance versus shaft angle relationship which is important. Regardless of whether it is variable capacitors or diodes, the tuning elements must be electrically matched so that the different circuits are tuned in step with one another. If you have a situation where you only want to receive one particular station, or to monitor signals on just one frequency, the TRF can give you all you require, for you never need to adjust the tuning again once it has been set up. Examples might be a receiver intended for listening exclusively to a single broadcasting station, or to keep watch on a recognised calling channel. This assumes that the frequency involved is one at which a string of tuned amplifying stages can provide the necessary selectivity, and be operated reliably without bursting into self-oscillation.

## The Superheterodyne Principle

If the receiver is required to be tuneable over a range of frequencies, the classic solution is the superhet circuit. In this, a first 'rough' selection of the signal we want to listen to is done, using just one or two tuned circuits rather than a whole string of them, and then that signal is mixed (heterodyned) with a second signal which we generate locally in the receiver. This second signal is produced by a circuit appropriately called a local oscillator, abbreviated LO (also sometimes called the first oscillator, abbreviated O1) which runs at a frequency chosen to give the appropriate 'difference' frequency.

The stage in which the heterodyning process takes place is known under a variety of names. These range from the plainly descriptive 'frequency changer' (abbreviated FC), to 'mixer' and even the somewhat enigmatic 'first detector'. The output at the designed sum or difference frequency, called the intermediate frequency (abbreviated to IF), is fed to a series of fixed-tuned amplifier stages called IF amplifiers. Because the tuning of these stages is fixed, they can be carefully set up when the receiver is made, in order to give the desired bandwidth and selectivity shape to select just the wanted signal, whilst rejecting all the interference from neighbouring channels - in an ideal world, at least. In fact, of course, this perfect 'barn-door' shape as it is sometimes called, is impossible to achieve, although modern filter technology can come very close.

## The Basic Superhet

Perhaps an example will make the process clearer. Say that we want to listen to BBC Radio 3 on the medium wave broadcast band, transmitting on 1215kHz. The intermediate frequency is 455kHz - now more or less standard for this application - so we need to choose a frequency for the local oscillator which is 455kHz away from 1215kHz.

There are two possibilities; the first would be to run the LO at 760kHz, which would produce an output at  $1215 - 760 = 455\text{kHz}$ . The second possibility would be to run the LO at 1670kHz, producing an output at  $1670 - 1215 = 455\text{kHz}$ .

The second arrangement, where the local oscillator frequency is above the signal frequency (sometimes called 'oscillator high'), is the most common. For the medium wave broadcast band, covering 531 - 1620kHz, the reason is not difficult to see. With the oscillator running above signal frequency, the span of coverage required from the local oscillator is 986 - 2075kHz, a range of just over 2:1 in frequency, easy to achieve with a standard inductor plus variable capacitor combination. Running the oscillator below the signal frequency ('oscillator low') would require it to be tuneable from 76 - 1165kHz in one sweep of the control, a frequency span of 15:1 and a very different engineering proposition. On low frequencies, such as the long-wave broadcast band, it is clearly impossible to run with the oscillator below the signal frequency if using a 455kHz IF. For example, Radio 4 on 198kHz would require the oscillator to be on -257kHz, a negative frequency!

On higher frequencies, the 'oscillator high' arrangement is still generally favoured, although there have been communications receiver designs where the 'oscillator low' arrangement was used for the 10m band, 28 - 29.7MHz, presumably because of difficulties in making the local oscillator run at frequencies in excess of 30MHz using the technology of the day. Although 455kHz has been almost universally used for many years as the IF in long, medium and short wave broadcast receivers, and in some inexpensive communications receivers too, it is by no means the only frequency used. In the earliest days of superhet manufacture, the IF was chosen seemingly at the designer's whim. Frequencies like 110 or 127kHz were used, on the grounds that sharp selectivity was easier to achieve at low frequencies. It brought other problems, though, of which more later. Then, a broad standardisation gradually took place for broadcast receivers, with the favourite in UK designs being 465kHz, and in Europe 455kHz.

## Images

As already mentioned, any mixer stage will produce at its output both the sum and difference of the two input frequencies. In the example I gave above, as well as the difference at 455kHz, the sum of 1215 and 1670kHz (2885kHz) will also appear at the output. This should be no problem, as the

chain of tuned 455kHz amplifiers would reject this frequency without difficulty.

What is a problem, however, is another mixing product which is known as the image or second-channel response. It stems from the fact that the mixer stage will happily produce an output at our chosen IF from a signal which is 455kHz above the LO frequency as well as one at 455kHz below it. In this example, with the LO running at 1670kHz, the image will be at  $1670 + 455 = 2125\text{kHz}$ . So far as the IF amplifier chain is concerned, this unwanted translation of a signal from 2125kHz is no different from the wanted one. They are both on 455kHz and that's that. To prevent image interference, as it is called, there must be sufficient RF (signal frequency) selectivity to reduce the strength of the interfering signal to negligible proportions before it arrives at the mixer. Selectivity after the mixer can do nothing about it.

The image frequency always differs from the wanted signal frequency by an amount equal to twice the IF. If the LO runs at a frequency above the signal frequency (oscillator high), the image is 2 x IF above the signal frequency, but if running 'oscillator low' the image is 2 x IF below the signal frequency. This fact leads to a conclusion that achieving sufficient RF selectivity to get rid of the image response, or at least reduce it to acceptable proportions, becomes easier if a higher intermediate frequency is used, because the frequency separation between wanted and image signals becomes greater. Suppose we have a short-wave receiver with an IF of 455kHz, tuned to the amateur 15m band at 21400kHz. The image will be at  $21400 + (2 \times 455) = 22310\text{kHz}$ , right in the middle of the 22MHz shipping band. The image frequency is only 4 per cent different to the wanted frequency, and the RF tuned circuits are going to do a pretty poor job of rejecting it.

If a higher IF was used, say 9MHz, a common figure in amateur equipment, the image for that 21400kHz signal would be at  $21400 + 18000 = 39400\text{kHz}$ , or 39.4MHz. That's a difference of 84 per cent, and the RF tuned circuits should provide a very good rejection of the image. So, high intermediate frequencies are the answer to our problems - or are they?

The snag is that we have won ease of rejecting the image frequency, but landed ourselves in difficulty over achieving a nicely defined IF passband, because of exactly that same percentage-difference problem affecting the IF tuned circuits. Say we want a 3kHz passband to listen to an SSB signal, with steep sides to reject other signals on adjacent channels. At 455kHz, that

3kHz represents a percentage bandwidth of around 0.7 per cent, but at 9MHz it becomes 0.03 per cent, requiring rather more exotic and expensive filtering. Selecting a suitable intermediate frequency for a basic superhet is therefore something of a compromise between good image rejection and good adjacent channel rejection.

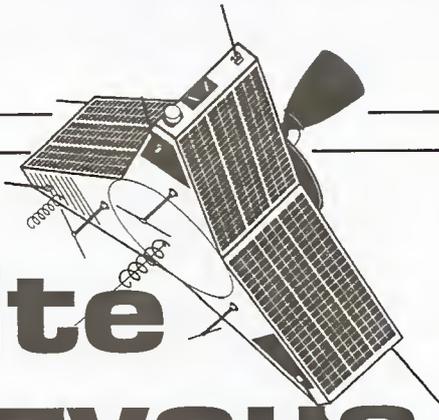
There is one other consideration, which is breakthrough or leakage into the intermediate amplifier stages of signals at the IF. The ability of a receiver design to keep out IF interference depends on the value of the IF, the characteristics of the RF tuned circuits, and the efficiency of the screening of the IF stages and filtering of leads and PCB tracks carrying power supplies, AGC, etc., to those stages. If you have a broadcast receiver tuned to the bottom end of the medium wave broadcast band, the rejection of signals at 455kHz provided by the RF stage tuned circuits is going to be rather poor.

The recognised broadcast receiver IFs of 455kHz for medium and long waves and 10.7MHz for VHF Band II receivers, are supposed to be protected frequencies, free from interfering transmitters. In the past, this has certainly not been true where the 450 - 470kHz range of IFs was concerned, as these all suffered interference in coastal areas from ships and maritime coast radio stations, which were allocated several working frequencies in this range, transmitting anything up to 10kW of tone-modulated Morse. Some years ago, when I lived in Hampshire, there was regular breakthrough from the coast station at Niton on the Isle of Wight, transmitting on 464kHz, on a radiogram which I had. I cured it by putting a trap circuit, tuned to 464kHz, in series with the antenna lead-in. With the recent introduction of maritime satellite communications, use of these frequencies is now much less, and this is one problem that has to a large extent disappeared.

## Advanced Receivers

Having come to terms with the basic superheterodyne principle, many a newcomer has been totally baffled by receivers called multiple superhets. These are commonly double superhets, but even the use of a triple superhet circuit is not uncommon on some emission modes in modern amateur radio equipment. So, what are these multiple superhets, and what benefits can they offer?

Why do some superhets use different intermediate frequencies on different bands. What are 'up-conversion' superhets. I shall be looking at all these questions, and more, in the next issue.



# Satellite Rendezvous

*Richard Limebear G3RWL collates AMSAT-UK news together with an introduction to KITSAT, to be launched this month*

In 1990, the University of Surrey started a collaborative program with the Korean Advanced Institute of Technology (KAIST). KAIST student engineers have now constructed the KITSAT-A satellite at Surrey, under the guidance of the UoSAT team. KITSAT-A will be launched as a secondary payload on board the Ariane V-52 mission, the primary passenger for this mission being the oceanographic satellite TOPEX/POSEIDON. The target orbit is nearly circular, with semi-major axis 7700km and inclination 66 degrees. Currently the launch date is set at 10th August. KITSAT-A is based on the same satellite bus used by UO-14 and UO-22, and will operate as a Mode-J satellite with user uplinks on 145.850MHz and 145.900MHz, and a single 435.175MHz downlink. The KITSAT-A payloads are as follows;

## **PACSAT Communications System (PCS)**

The PCS will provide open access store-and-forward digital communications for stations in the Amateur Satellite service. This system will use the standard protocols of the PACSAT Protocol Suite for message forwarding. The PCS will have 13Mb of CMOS SRAM for message storage, and will use data links of 9.6kbps or higher. This will be the second 9.6kbps PACSAT available in the amateur satellite service. Stations equipped for UO-22 will be able to use KITSAT as soon as it is put into service.

## **Earth Imaging System (EIS)**

This will be an upgraded version of the UO-22 EIS, which has demonstrated that amateur satellites can produce interesting meteorological-scale images.

Equally important, the images can be downloaded and displayed by fairly simple groundstations. The UO-22 images have been directly received by many radio amateurs and are available indirectly to a very wide audience. There are many educational uses for these images which are now being investigated.

The KITSAT-A EIS will consist of two charge-coupled device (CCD) imagers, two lenses, and a Transputer Image Processing Experiment. One of the imagers will provide a wide field of view with approximately 4km ground resolution similar to the UO-22 camera but covering a larger area of the Earth. The second imager will provide telephoto facility giving approximately 400 meters ground resolution. The use of the wide-angle camera as a spotting camera for detailed images from the narrow-field camera will greatly enhance the Amateur Satellite Services imaging capabilities.

## **Digital Signal Processing Experiment (DSPE)**

This will be used for speech synthesis, store-and-forward speech relay, and high-speed modulation experiments. The KITSAT-A DSPEs primary mission will be similar to DOVE's, transmitting multi-lingual greeting messages. These will periodically replace data transmissions on the downlink.

The DSPE will also be used for experimentation in digital voice relay and high-speed modulation. These experiments have not been completely defined, but are likely to include real-time conversion of a digital uplink signal to an FM voice downlink signal for 'repeater' type operations. As a platform for voice coding experiments, the KITSAT DSPE may provide useful data for future amateur satellite missions.

## **Cosmic Ray Experiment (CRE)**

In its low-altitude, high-inclination orbit, KITSAT-A will measure the total radiation dose and the occurrence of highly energetic cosmic rays. In parallel with this environment data, effects of the radiation on microcomputers, power systems, memories and solar panels will be monitored.

This information, which will be freely available to amateur satellite designers, may be of great importance for future amateur satellite missions such as Phase-3D (AO-10 and FO-12 have both been crippled by radiation damage).

## **Operation**

With so many onboard experiments, it is perhaps difficult to imagine how KITSAT-A will appear to the Amateur Radio operator. It is most useful to imagine a cross between UO-14 and UO-22. Like UO-14, KITSAT will transmit and receive 9600 bit/second FSK signals using the AX.25 protocol. Telemetry, experimental data, camera images and store-and-forward communications will be interleaved on this downlink using the techniques developed on UO-14 and UO-22. Radiation data and images will be stored in files that users will download using the standard PACSAT Protocol Suite. Current plans call for KITSAT-A to operate in this standard mode for about 95% of the time, with the remaining 5% taken up with digital voice broadcasts and/or high-speed modulation experiments. KITSAT-A operations will be managed by KAIST from their groundstation (HLOENJ) which is already active in Korea. KAIST and KARL will work together to insure that the KITSAT-A 'service' will be useful for radio amateurs and remains within the ITU regulations. Although UoS will have no formal control over KITSAT-A operations, they will advise KAIST when necessary.

## **Oscar 13**

Mode L of AO-13 will be off until Aug 17. An attitude change to 150/0 is planned to have occurred on Jul 20, until Sep 21. Up to date information about AO-13 operations is always available on the beacons, 145.812MHz or 435.658MHz in CW, RTTY and 400 bps PSK. A calendar of events for Oscar-13 to the end of 1992 is shown in Table 1.

## **AO-21/RUDAK**

The 'reset' procedure performed by the Ground Command station in

Table 1.

OSCAR-13 Calender of Events

Date	Event	Modes	Sun Angle	SEL/SAZ
1992 Jul 20 [Mon]	Move to 150/0*	B ---	3 to 44	-34/176
1992 Aug 17 [Mon]	L ON	B JL S	28	-26/208
1992 Sep 21 [Mon]	Move to 180/0	B JL S	-1 to 29	-2/241
1992 Nov 23 [Mon]	Move to 210/0	B JL S	-29 to -4	33/305
1992 Dec 14 [Mon]	L OFF	B ---	-27	33/333
1992 Dec 28 [Mon]	t.b.a.		43	29/351

Notes:

- \* via Alon/Alat 180/15; expect poor performance for a few days.
- Illumination = 100\*cos(Sun\_Angle) % and needs to be better than 70%, i.e. Sun angle within +/- 45 deg.
- SEL/SAZ is the Sun's position in orbit plane (like ALAT/ALON). The move on Jul 20 to 150/0 was because the Sun was at SAZ=176, i.e., apogee direction, so the aerials cannot point there as the solar panels would not be illuminated. The Sun then gradually moves to SAZ around 208 so we cannot use attitude 210/0 as has been customary.

coordination with AMSAT-U in May was successful and the AO-21/RUDAK Beacon returned again to operation. Testing and operation of AO-21's transponders and RUDAK experiment continue with success. Here's a list of AO-21's operating frequencies;

Transponder 1:

Mode B Up; 435.102-435.022MHz, Mode B Down; 145.852-145.932MHz. Beacons; 145.822MHz CW, 145.952MHz 1100 bps PSK.

Transponder 2:

Mode B Up; 435.123-435.043MHz, Mode B Down; 145.866-145.946MHz. Beacons; 145.948MHz CW, 145.838MHz 1100 bps PSK

RUDAK Transponder:

Uplink 1: 435.016 MHz 1200 bps Manchester FSK

Uplink 2: 435.155 MHz 2400 bps BPSK

Uplink 3A: 435.193 MHz 4800 bps RSM NRZI

Uplink 3B: 435.193 MHz 9600 bps RSM NRZI

Uplink 4: 435.041 MHz Digital Signal Processor Input

Downlink: 145.983 MHz

Mode 1: Pacsat/FO-20 Compatible

Mode 2: AO-13 400 bps BPSK Compatible

Mode 3: AO-13 RUDAK I Compatible

Mode 4: 4800 bps

Mode 5: 9600 bps

Mode 6: CW

Mode 7: FSK (F1 or F2B) RTTY, FAX, SSTV, etc.

Mode 8: FM using D/A converter and DSP output

The frequency list should not be taken as an open invitation to use the spacecraft's transponders, but rather as a guide for monitoring the status and operation of the satellite. When AO-21 is fully commissioned, announcements will be made by the

spacecraft controllers.

DOVE back on 2m

N4HY returned DOVE (DO-17) to 2m in May, reloading it using its S-Band link. Since 24th May DOVE has been running a

small engineering test of the speech module, this is DOVE's first voice from space. The purpose of the test is to exercise the control and data lines of the speech module. The actual speech was kept as simple as possible, it is uninflected speech from the 'phoneme' generator; "You are listening to DOVE Microsat". Three minutes of 1200 bps telemetry alternates with one minute of voice. *Much better speech is expected once the final check-outs are completed.* This test is just part of a recent intensive period of engineering activity on DOVE, designed to find the cause of the control difficulties and to formulate a viable work-around.

New Patch for InstantTrack V1.00

Patch #2 to InstantTrack V1.00 is now available. This patch cures a bug in Patch #1 to InstantTrack that could cause system crashes or causes other unpredictable behaviour when reading an ill-formatted NASA 2-line element sets. Users who have installed Patch #1 are advised to install Patch #2 as soon as possible to avoid any problems. Patch #2, like Patch #1 is designed to solve the problem created by the recent change in NASA's computation of the checksum in its 2-line element sets. NASA changed the value of the '+' sign from a '2' to a '0'. Users can work around this prob-

lem by replacing each '+' sign in the element set files with a space. However, with Patch #2, this manual operation is not necessary. The 'patched' InstantTrack V1.00b will accept NASA format element sets that use either checksum formula. Patch #2 is available as ITPATCH2.ZIP or ITPAT2.ZIP on CompuServe's HamNet forum and several landline BBS systems. Also, it is available for download on AO-16 and LO-19. It can also be obtained from the AMSAT-UK office.

AMSAT-UK News

Ron, Fred, Jenny, Max, Dennis and I were all at the RSGB show at the NEC in Birmingham (the HRT Tech Ed and I enjoyed a superb curry with Richard and Ron on the Friday night - thanks guys - Ed). If you came along to the AMSAT Colloquium last week we hope you enjoyed it and found much of interest - see you next year?

Ron, as Honorary Secretary of AMSAT-UK, will by now have visited Spain as a guest of AMSAT-URE to present them with an AMSAT-UK affiliation certificate, welcome them to AMSAT-UK, and explain our constitution. AMSAT-URE are recently formed and are making use of almost all of AMSAT-UK's constitution in their own articles of association.

The Amsat-UK Phase 3D fund has now been opened under a separate bank account to which members and non-members of the amateur radio fraternity may donate. The target is £2,000,000. For further information about AMSAT-UK contact: AMSAT-UK, c/o Ron Broadbent, G3AAJ, 94 Herongate Rd, London, E125EQ. A large SAE gets you membership info, SWLs as well as licensed amateurs are welcome.

KEPLERS							
SAT:	OSCAR 10	UoSat 2	AO-13	UO-14	PACSAT	DO-17	WO-18
EPOC:	92132.48216704	92144.62254734	92140.16301853	92148.25037007	92142.73847690	92144.51309071	92143.70913145
INCL:	26.4317	97.8541	56.8894	98.6412	98.6454	98.6457	98.6449
RAAN:	84.3076	181.4281	24.6549	230.2581	225.3641	227.2385	226.4842
ECCN:	0.6052516	0.0012051	0.7300937	0.0010367	0.0010783	0.0010602	0.0011183
ARGP:	342.8623	155.8850	286.1379	235.4622	256.6477	249.4355	252.4668
MA:	3.3043	204.2922	10.2003	124.5584	103.3503	110.5637	107.5292
MM:	2.05883898	14.68557546	2.09721487	14.29641110	14.29704212	14.29830335	14.29823074
DECY:	-9.1E-07	8.01E-06	-1.93E-06	2.62E-06	2.56E-06	2.63E-06	2.42E-06
REVN:	3902	43953	3012	12228	12150	12176	12165
SAT:	LO-19	FO-20	AO-21 RS-14	UO-22	RS-10/11	RS-12/13	Mir
EPOC:	92142.26507611	92147.21871041	92147.87299051	92148.63741168	92148.38269823	92144.67552077	92148.43666706
INCL:	98.6454	99.0746	82.9444	98.5095	82.9255	82.9262	51.6020
RAAN:	225.1598	69.8385	338.7007	224.1445	163.7576	210.9285	350.8073
ECCN:	0.0011722	0.0539939	0.0036278	0.0008317	0.0010659	0.0031158	0.0032221
ARGP:	256.8703	242.6251	20.3493	14.1552	315.1371	49.0642	102.2912
MA:	103.1170	111.8931	339.9101	345.9866	44.8899	311.3203	258.0788
MM:	14.29905245	12.83210974	13.74485180	14.36657977	13.72286237	13.73993038	15.58296023
DECY:	2.61E-06	1.3E-07	7.8E-07	3.17E-06	1.75E-06	6.4E-07	1.8282E-04
REVN:	12145	10768	6637	4530	24693	6503	35904

# QRP CORNER

*Dick Pascoe, G0BPS, looks at the international side of QRP*

It is marvellous to hear that the 'word' about QRP operating has spread through the different countries throughout the world. Low power operating as a means to an end has always been around, but not as an international happening. The American club, the QRP ARCI (Amateur Radio Club International) has gone from strength to strength in the past few years. The German QRP club has now also gained recognition within the German amateur field and is growing very quickly, and reports from Czechoslovakia tell us that their club is growing rapidly as well.

I mention the QRP ARCI for several reasons, I was their UK representative for a few years and now seem to have become the European rep. So a message to all, membership is £7 and £6 per year after. I have application forms if you wish to join (*OK, we don't mind giving them a free plug - Ed*). Existing members may renew through myself, cheques payable to me, not the ARCI as I do not have an account in that name.

## QRP at Dayton

Another reason for mentioning the club is that we met many of their members during our visit to the Dayton Hamvention. During the Saturday evening in the hospitality suite, just

**Michigan QRP group members Lowell KD8FK and his wife Robin N18R met up with yours truly at Dayton**



**L-R George G3RJV, Roy W7EL, Randy AA2U, and Doug W1FB**

after the pizza, it was announced that after several years of disagreement the organisers of the club had at last managed to agree on the requirements for a members name to be added to the 'QRP ARCI Honor Roll'. As no-one had ever been entered before, this was quite a surprise! It appeared that six names had been put forward, but only four could be agreed upon by all. The names were not read out in any order, but I would say that Doug DeMaw W1FB was everyone's choice. He gave a delightful speech, typical of Doug, belittling his work in amateur radio.

Many amateurs will have heard of the *ELNEC* computer program for defining the usefulness of aerials, what many will not have known is that its author has been involved in computer analysis of aerials for many years, many of his offerings being in shareware. Roy Lewellen W7EL was amazed to be added to this 'hall of fame'.

One of the leaders in the field of QRP operating in the USA is Randy Rand AA2U, anyone who is active in long haul DXing with low power will have heard of Randy's work. He is the one who broke the Bouvet Island pileup on CW using milliwatts, and to cap it all he lives on a small plot using only wire aerials. Randy is the shining example of the QRPers motto; *Power is no substitute for skill*.

For the seven or eight Englishmen there, the highlight of the evening was to hear that the ARCI Board of Directors had also agreed unanimously to add the name of the Rev George Dobbs G3RJV to the list. George has been involved in QRP operating for many years, it was through his efforts that the G-QRP was formed almost 20 years ago. It was agreed by those English folk attending that the award was indeed truly earned by George and that the whole of the G-QRP club was honoured by this recognition of his work for the club.

During these evenings at the hotel, everyone who's brought some homebrew gear shows it off and in many cases permits other enthusiasts to 'have a play'. Peter G3PDL (the treasurer of the G-QRP Club) jumped at the

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chance to try out a miniature 20m transceiver brought in by one happy builder. This combination of a superhet receiver and simple transmitter delighted Peter.

At the other end of the room, Randy AA2U was showing how it was done. MFJ had donated one of their new single band transceivers to the club (ARCI) who got it on the air very quickly.

Not only do visitors and from the UK turn out, but other QRP clubs from the US also attend this hay making! There is quite a strong QRP group up in Michigan who tend to take things a little more seriously, meeting for breakfast on a regular basis! Seen in the picture is Lowell KD8FK with his wife Robin NI8R with yours truly. As can be seen from the smiles great fun was had by all, a truly memorable QRP gathering at Dayton.

### NEC 1992

Several G-QRP club members attended the annual gathering put on by the RSGB at the NEC in Birmingham. The club stand was about 3m square giving us plenty of room to sit and chat. The club had good exposure to the visitors with many new members being signed up, and several lapsed members renewing. Lots of the club

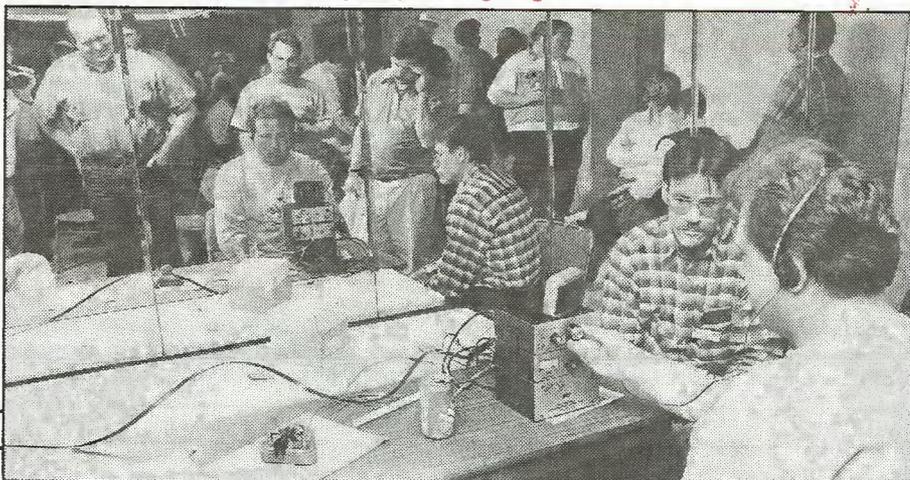
goodies were on sale including the HW7 modification boards, the White Rose PCBs and several others. Jeff Stanton of Waters and Stanton was very generous by offering a JIM 20m handheld SSB & CW radio to be raffled for club funds. The JIM is a direct replacement to the well known tiny Mizuho handheld that many QRP operators fell in love with.

Many club members that stayed over spent the night at Norman's G4LQF, of course we had to try out this radio and an aerial was quickly attached. George G3RJV soon worked into UA with 1W of SSB with Peter G3PDL having a ragchew later with the same station. The best though was Lewis, G4SDI working into VU land with, again just

1W of SSB. It's amazing what can be done with such low power! This little radio is available in 20m, 40m and 80m band versions, and is priced at £199.00, many thanks to Waters & Stanton for the donation.

Other than the fun had by the club members, the RSGB show was a rather uneventful affair. Less than half the projected visitors attended, with a lot of empty space in the hall. I understand also that the date of next year's show will clash with the Swindon Rally as well as the Dunstable Downs National Boot Fair at Luton. I know where I will be!

**Randy AA2U helps Mike K4ZTS plus onlookers get the new MFJ QRP rig going**



# VHF/UHF Message

Geoff Brown, GJ4ICD says 'What Come May!'

As the title suggests, *it did!*

May must go down as the best month so far this year for DX on the VHF/UHF/SHF bands. 144MHz was actually open for the May contest (most unusual), 432MHz was also very good, some real cream was worked on 1296MHz, and even I got in on the act. 50MHz had its fair share of real DX, just as everybody thought propagation was going down, T.E.P. enhanced by 'ES' at the top end brought some very rare DX such as 8R1, FR/G (Glorioso Isle north of Madagascar), yes – that is a separate country. The Dxpediton then moved without warning to D68BR, Estonia via 'ES', and, the USA on double hop 'ES', plus hours upon hours of Sporadic 'E' and Auroras. Then a large double hop 'E' into 4X4/5B4/ZC4 and Turkey at the end of the month. Wow! 'What have I missed?' I hear in the distance.

## Sun Bathing?

Those of you who were tanning themselves in the sun during the hot May missed some choice dx, it's not very often that we see an anticyclone bring such superb conditions on all bands from 50MHz to 10GHz in May, plus, one of the finest aurora's we have had for some years occurred on the 10th with SM1LPU using 150mW on 50MHz who was 59A into 'GJ'!, that's a distance of 1630km. As you can see by the Barograph chart a typical 'tropo' opening took place on Sunday the 17th and some shattering qso's took place, plus tropo on 'six' was fantastic.

The first major news was that G4FUF in Essex heard SM6HYG in JO58 on 10GHz, the path must be around the 1000km, it is not known at this time whether Keith G4FUF eventually made it a two way.

## Starting High

This month, let's start with 23cm. Activity seems to be growing on this band (in certain countries!), and during the 17th I copied no less than ten beacons. However, *hearing* beacons is one thing, and finding stations to *work* in the area of the beacons can be another. This I found with LA1UHG on 1296.8600MHz and LA3UHG on 1296.8778MHz (my readout), which were audible for nearly ten hours but with no signs of an LA. Ela G6HKM

reports working her first GJ ever on the band on the 16th, a distance of around 350km with very low power.

Sunday the 17th was the 'highlight' day. In the early morning, barometric pressure started to fall (Fig 1), and on looking at the UK beacons I was amazed to find the Emley Moor beacon at S9+, with stations in the Lancashire area very loud. Later in the day things really got going, GB3MHL (1296.832MHz) was end-stopping into GJ, as was the PA beacon and DB0OS (JO40) but activity was rather low.

Ela G6HKM also reports working DC6UW (JO44) for square number 55, and as dusk fell things really got into the swing, SM6HYG (JO58) was S9 into GJ as were a few Ozs. On the 27th, GB3IOW on 1296.905MHz was reported as being off the air by Graham, G8HVY, in Southampton, but by the 30th the beacon was active once again.

just a sample of real DX worked by a 'Class B' licensee on SSB; IW4BAI (JN45), JO22, 30, 31, 32, 33, 40, 41, 42, 43, 50, 53, 69, 61; JN04, 05, 18, 19, 25, 27, 37, 39, 45, 48, 49, 87; plus IN87. Now that's impressive stuff for SSB Ela! Stations on the DX PacketCluster network reported the following; HA5JC (JN97) 54A, OH3NQW (KP21) 51A, and SM0CCM (JO89), others included OE3UP, HG1YA, 4N2CCY, OK3YCM, plus lots more.

The 17th and 18th were the big 'Tropo' days, again Ela G6HKM had a very good path to Eire and worked EI4EY, EI5FK, EI2DNB, EI6GP, EI6GL and EI2GK. Stations in Central England worked into Poland, and in the Southern UK stations were worked in OK, OE, SP and HA via Tropo.

The 30th saw the first major 'ES' opening of the year on 2m, when SV1EN reported an opening to France on

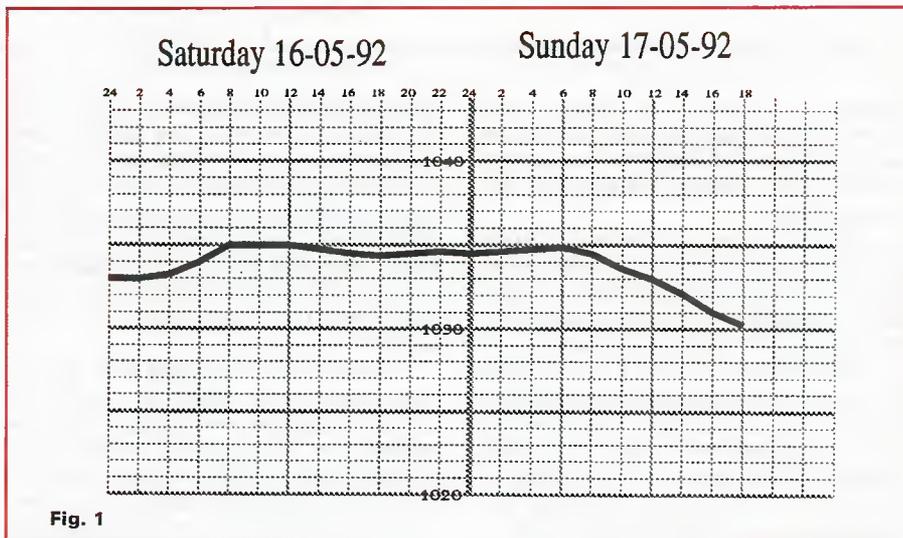


Fig. 1

## Lower Activity on 70cm

My reports for 432MHz indicate that conditions were better on the higher and lower bands on the 17th/18th, i.e., 144MHz and 1296MHz, which is a little unusual. G6HKM's log lists May 3rd with DF1VW/P (JN39), 17th with EI2GK (IO63) and the 18th with DC6UW (JO44).

## Long Hauls on 144MHz

May produced an equal bag of Tropo and Aurora, the 10th was extremely good with an Aurora. This is

50.110MHz, (so you 2m guys, there is a use for 50MHz!). Also, after this opening, stations in Spain and France had a very good F.A.I. opening to HG, YO, and YU.

## Six Still Brings Surprises

Sporadic 'E' was well under way by the beginning of May, and so many individual logs arrived that it's impossible to list all the contacts, but here is a brief resume;

On the 4th 4X4IF to PA/SM, 5th GI to G, GJ, G to SM, G to I8, FR5/B in, G to

# UL7GCC/P



Mike Chirkov  
3-D Microraiion, House 31, Flat 14  
Alma Ata  
Kazakstan  
480073 Kazakstan Republic  
C.I.S.

Grid: MN83 OBL 190 Zone 17

Verified by G3WOS

STATION	MO	DAY	YR	UTC	FREQ	REPORT	MODE
GJ4ICD	1	29	92	1044	50	559	TWO WAY CW

QSL card provided by the UK Six Metre Group

For information on the UKSMG write to: The Secretary, Old White Lodge, 183 Sycamore Road, Farnborough, Hants GU14 6RF, UK

9H1, the 6th brought IT9 to G, Z23JO to G, 7Q7CM and 7Q7RM at S9 into the UK, 9J2MK to GJ, A22BW to G looking for Novices on 51.260MHz, but nobody was answering him!, (LAs and SMs have also told me that nobody seems to monitor 51.260). The 'ES' continued on the 7th with Neil G0JHC in Lancashire working strings of DIs and Oks at lunch time. Further south, stations were working into SM in the north east, crisscrossing the ionised cloud.

Later that day came the *real* DX, possibly enhanced by the 'ES' in the northern latitudes. At 1800z TU2EW (Ivory Coast) was into the British Isles, just fifteen minutes later the FY7 beacon in French Guiana on 50.039MHz was S3 into GJ. Quick thinking made me phone Chris G3WOS who had the contact phone number of the G4SMC/8R1 expedition in Guyana, South America (expense is never spared to work real DX!).

Paul G4CCZ answered the phone and quickly came up on 28.885MHz, after getting Richard, G4CVI out of bed (sorry mate). Eventually a loud voice appeared on 50.110MHz and off we all went, both Richard and Paul had a nice little pile-up going into G, F, I, 9H, etc. (It is hoped that a full report will be published in a future HRT). Others worked that day from the UK were, CX4HS (GF06), LU1DMA (GF05), LU2EIO (GF05) and a few PYs.

Carrying onto the 8th, Neil G0JHC reported an Aurora, and would you believe it the 9th brought VK4 into PAO and ON, and VK5 into SM!

Again, Ela G6HKM had a ball on this favourite band. The 10th produced no less than 38 squares in 15 Countries via Aurora on SSB, on the 18th she finally got FR/DJ3OS (LH38) for a new

one, and the 22nd brought another Aurora with G, GI, GM, and OZ being worked. Ela must now be very close to claiming the first and only UKSMG Class 'B' 100 countries plaque award.

On the 13th Neil, G0JHC caught the first double hop 'ES' 'VE' opening across the pond, this was in mid evening when Neil was suddenly called by Bob VE1YX just after working CX4HS, several stations were worked on the Canadian coastline.

News from Ken G4IGO in Somerset tells us of the 17th when he copied E2 video from Germany via tropo, Ken reports that this was the first time he has seen video via this mode of propagation, also here in GJ stations in Belgium and The Netherlands were S9+ via tropo ducting, this was very unusual. Back up North, and Neil, G0JHC caught D68BR on Comoros Isle for what he thinks was a 'G' first, Bernd (DJ3OS) operating D68BR also made it into the London area.

Later on in the month, Brian G3SYC in Yorkshire got the warning net into action on the 29th, as at 1800z there was a large 'ES' opening to YU and Italy, this then linked up to another 'ionised cloud' with propagation extended to the Middle East, my telephones were going mad with many reporting this massive opening. Brian worked TA5ZA (KM77FA), as did Neil G0JHC in Lancashire, we in the south had to wait. Trevor G3ZYY (Saltash) phoned me to say that Eric TA5ZA was at last audible on the South coast and GJ. TA5ZA is of course our friend Eric F1JKK who appeared in this column in a previous HRT, his QSL route is via F6FNU.

Others stations reported in the opening were; ZC4KS, 4Z70IF (Ralph

4X11F), and a DL/5B4 was also heard, lots of 'SV's' were heard along with what could be three separate Countries as from late May, YT3, 4N2, and YU7, this will be confirmed at a later date.

## Which Type of 'ES'?

It seems apparent that there is more than one type of 'ES' mode on 50MHz, some events seem to happen straight after geomagnetic activity, some a few hours later, some 48 hours after the aurora, and also the large flare disturbances sometimes seem to enhance the long haul F2 openings like what happened on the 8th/9th.

Many people comment on their thoughts of causes of 'ES' but yet nobody has come up with a possible prediction idea as yet, how about it guys? (and gals).

The 30th continued with massive 'ES' openings again, Byron G6HCV (Midlands) was heard working 5B4/G3KOX in Larnaka (KM64), and 4Z70IF (Ralph 4X11F) was pounding into the UK just before 1900z. Chris GM3WOJ reported working Alberto CX4HS at 1950z which was a great surprise. The 31st brought Chris G3WOS (Hants) a new one in the shape of TA5ZA, and the band was full of 5B4s, ZC4s, and 4Z70IF and 7Q7 was also heard.

June started off with a bang, on the 1st TA5ZA was heard working Alan GW3LDH, others heard were 5B4, 4Z70IF, ZC4, OZ, DL, F, ON, SV, and SM0-7, all which were worked in the UK.

The 2nd continued, later in the day I discovered Secam video on 49.739MHz from the Middle East, just after this George GD3AHV heard 9K2WR in qso with a ZC4 station via multi-hop 'ES'.

## Late News

Poland was activated during 5th-15th June on 50MHz as an experiment, the callsign used was 3Z4PAR, QSL info is SP4KM. DK9IP/5B4 was also heard on 50MHz, it is thought that his grid locator was KM64. Ralph 4X11F has been heard using the special callsign of 4Z70IF just recently on 50MHz and 144MHz. Lots of DX news has just arrived from Eric, VK5LP but space is very limited, so more next month from the 'Down-Under Scene'.

Don't forget to send me your news before the end of each month relating to any topics of VHF/UHF/ and SHF to; Geoff Brown, TV Shop, Belmont Road, St. Helier, Jersey, or Phone/Fax on 0534-77067 anytime.

# HF Happenings

*Don Field G3XTT reports on DX and planned updates to the International Beacons*

As I look back over the past month, either propagation has been unseasonably bad or we really are starting to see the decline of the present sunspot cycle. I was in the USA for the weekend of the CQ WPX CW contest, staying with W4BAA (the US checkpoint for the RSGB's *Islands On The Air* awards programme) in northern Michigan, and the bands were in absolutely appalling shape. I had hoped to give lots of points to the UK participants, but heard only the loudest signals out of G.

## HF NFD

The HF National Field Day contest took place the following weekend and, once again, conditions were relatively poor. However most Field Day contacts are usually with UK and European portable stations, and not with DX. My local club was out in force for Field Day, this year we made a determined effort to put on both an 'A' station and a 'B' station. The 'A' station was home for the club's most experienced operators, the 'B' station gave the less experienced operators a chance to gain some contest experience with a better station than many of them are able to put together at home. This kind of two-tier approach is very valuable, helping to form the next generation of experienced operators. What was even better was that one of our club members is a Novice instructor and several of his young Novice trainees came along. The whole experience brought to life the things they had been hearing about in the classroom, and their enthusiasm was a tonic to the rest of us.

Apart from the various contest operations the bands were relatively quiet in May, with the exception of a surprise operation from Glorioso Island (FR/G) by Baldur, DJ6SI, along with DJ8CR and DJ3OS. It is many years since there was a significant DXpedition from there, due, I believe, to difficulties in getting landing permission unless one has a legitimate business reason to be on the island. How the Germans cracked this one remains to be seen, but they certainly did a good job and were worked in the UK on 40m through 10m, including the WARC bands. After leaving Glorioso the group reappeared briefly from the Comoro Islands (D68). KH6JEB/KH7 also put in an appearance on the

bands from Kure Island. Apparently the various installations are currently being removed from the island, so activity from there may become very rare in future.

## DX News

Ray, G3NOM, is currently active as HS0AC from Thailand, and was also hoping to sign XU1NOM from Kampuchea between 29th July and 8th August. However, this operation is dependent on the political situation in Kampuchea at the time.

Spanish stations have been very active of late with special prefixes (and some special event callsigns) in connection with Expo 92 and the Olympic Games. Although I have yet to see anything, I wouldn't be surprised if the Spanish radio society also sponsors some awards in connection with these activities. I suggest you make a point of chasing those stations you hear with AM, AN AO and EH prefixes.

The Heard Island DX Association (run by Jim Smith, VK9NS) is talking about the possibility of running two major DXpeditions, one to Mellish Reef and Willis Island and one to Heard Island. The Mellish/Willis operation could

take place in late August or early September, and the hope is to assemble a team of six experienced operators who will spend 7 days on Mellish Reef (possibly signing VK9MM) and 3 days on Willis Island (signing VK9WW and concentrating on CW operation). If the DXpedition comes off, operation will be on all HF bands and modes.

Plans for the Heard Island operation are based on the possibility of getting a 3, 6, or 9-man team to the island around the turn of the year for a 5-week operation (this is to fit in with the schedule of the ship which would take them there and then undertake other work in the area before collecting them).

Both of these proposed operations will prove very costly, especially that to Heard Island (which is very remote, off the coast of Antarctica) and donations are being solicited by HIDXA. As plans progress, the latest news will be put out on the HIDXA net on 14.222MHz.

## Chiltern DX Club

The Chiltern DX Club held its Annual Meeting in May and elected a new Committee for 1992/93. The officers are *President* - Martin G3ZAY; *Chairman* - John G3WGV; *Vice-Chairman* - Keith



**John G3WGV, newly appointed Chairman of the CDXC operates G3ULT/P on HF NFD. The NFD Trophy won last year's contest is there for encouragement!**

**G3VKW; Treasurer - Ron G6LX; Secretary - Alan G3PMR; Newsletter - Andrew G0HSD.**

The CDXC started back in the 1970s, and has now grown to be a national

group with well over 100 members, a regular newsletter, and a range of activities related to HF DXing. In the past year CDXC members have been the driving force behind various DXpeditions and contest operations, have provided financial and other support to major DXpeditions, have hosted overseas DXers visiting the UK, donated DXpedition videos to the RSGB Tape and Slide library, and much more.

The new Committee is tasked with extending the reach of CDXC to the many up-and-coming HF enthusiasts in the UK, and spreading the word about HF DXing through talks to radio clubs and a variety of other means. If you want to know more about CDXC membership (the membership requirement is that you have 100 countries worked and are currently active as an HF DXer), or want to know about how CDXC can help you or your club to find out more about DXing, then drop a line to the Secretary - Alan Jubb, G3PMR, 30 West St, Great Gransden, Sandy, Beds, SG19 3AT.

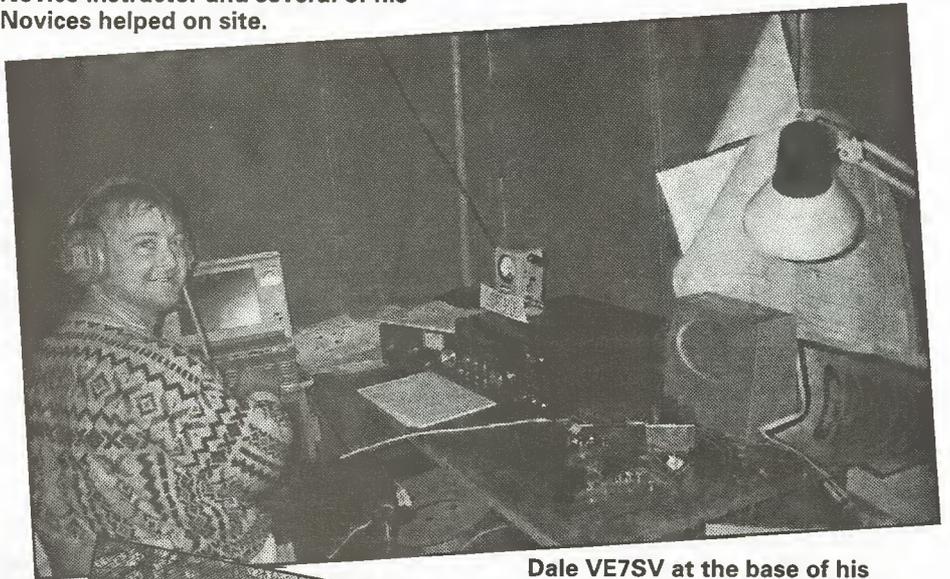
## DXCC News

The ARRL is now accepting cards for the recent S2/HA5BUS operation from Bangladesh (note the group were not able to operate from Bhutan, although there were some reports of activity, presumably by a pirate). YA5MM QSLs are also acceptable for DXCC credit. Unfortunately, the DXCC desk appears to be falling behind again with checking of QSLs. As I write this the backlog seems to be about six months, so don't expect a quick turnaround of your cards. The longest wait will be for those whose DXCC record has not yet been computerised (you will know if it has, because you will have been sent a computer print-out after your last application or update). The ARRL DX Bulletin reported that JA1ACB is the first station to achieve DXCC Honor Roll status on RTTY with 315 current countries credited, a very remarkable achievement. Also, talking about DXing achievements, DX News Sheet reports that Tom GW3AHN has now worked 299 countries on 12m.

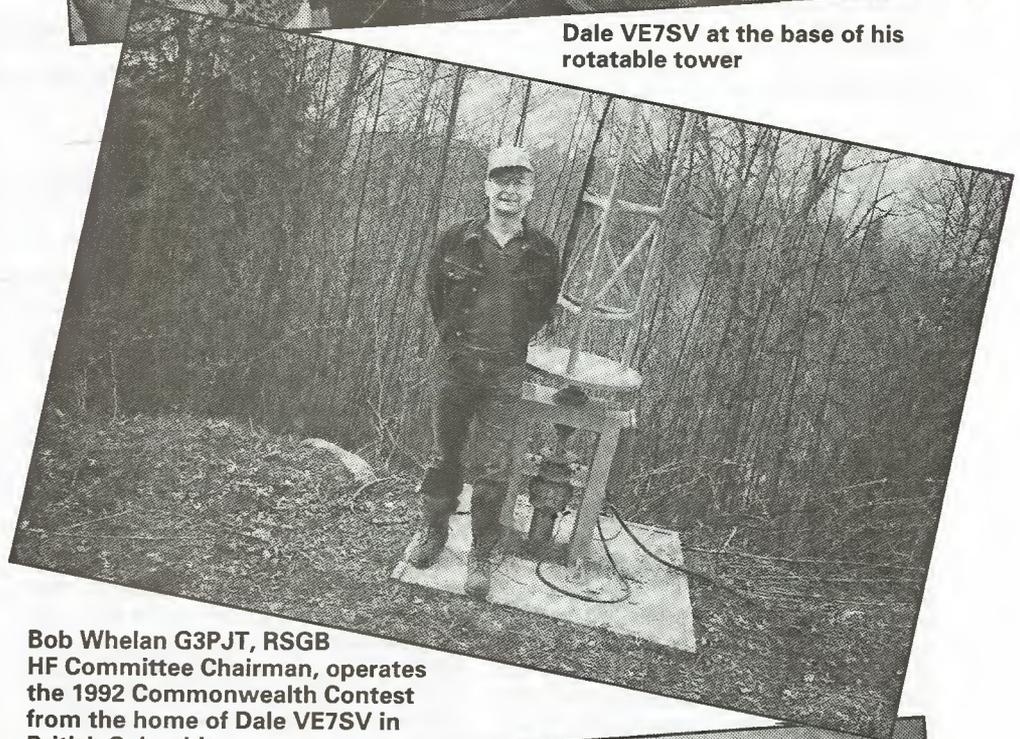
## SP IOTA Convention

SP6TPM has written to me with details of the first Polish IOTA (Islands On The Air) Convention, to be held in Petrowice between 21st and 23rd August. The programme will include presentations of island DXpeditions, discussions, a DX dinner, etc. The special callsign SP0IOTA will also be aired from the Convention site. Cost of the event (covering accommodation and food) is \$40. Further details are available from

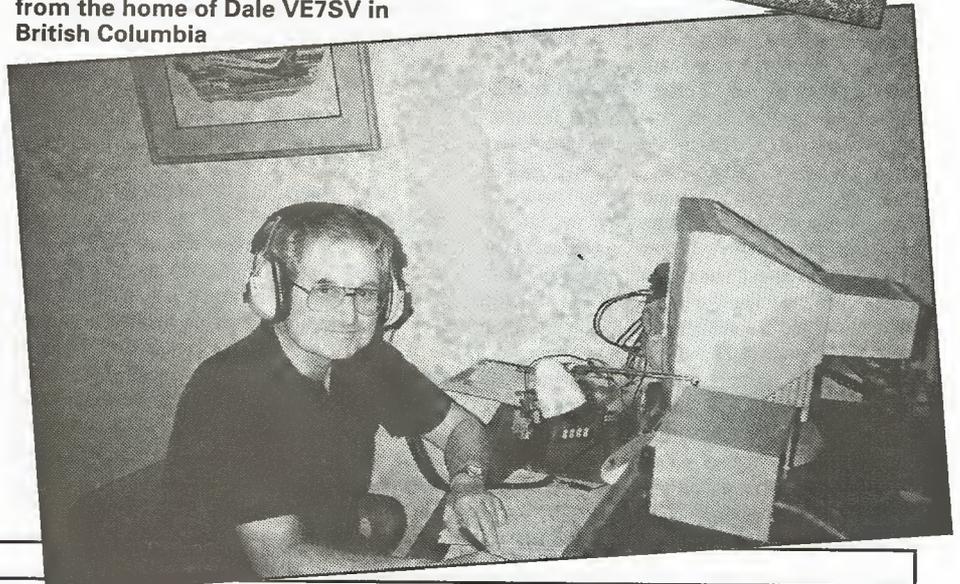
**Pete, G0PUB operates the G0RSR/P HF NFD 'B' station. Pete is also a Novice instructor and several of his Novices helped on site.**



**Dale VE7SV at the base of his rotatable tower**



**Bob Whelan G3PJT, RSGB HF Committee Chairman, operates the 1992 Commonwealth Contest from the home of Dale VE7SV in British Columbia**



## HRT PHOTOCOPIES

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HRT Subscriptions .....	43
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KW Communications .....	33
Phoenix .....	15
President .....	IBC
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Rafal Krawiec, SP6TPM, Box 22, 48100 Glubczyce, Poland (Tel: +48 7945 2004).

### Beacons

The Northern California DX Foundation who support many DXpedition operations also run the worldwide chain of beacons which operate on 14.100MHz. This chain has now been in operation for 10 years, and the most recent NCDXF newsletter reports on plans to make some enhancements to the service. Firstly, it's planned to take timing data from the GPS (Global Positioning System) satellite system to ensure better timing accuracy and facilitate automatic monitoring (to spot band openings, etc). More frequencies are also planned, after experiments with the W6WX/B beacon which, for the past year, has been operational on three bands. The following frequencies have been earmarked, though it may be some time before they all come into use; 28.200MHz, 24.930MHz, 21.150MHz, 18.110MHz and 14.100MHz.

Another proposal is to change the time sequence of the transmissions. Each of the beacons current transmit for one minute in every ten. As ten minutes can be a long time to wait to see if a particular propagation path is

open, the proposal is to move to ten second transmissions every two minutes. Ten seconds may be too short to get an idea of signal strength (because each transmission is at several stepped power levels, which would be only about one second each) so the W6WX/B beacon is currently operating on this basis to gauge reaction from users. At some stage, additional beacons may be added to the chain, there are nine operational now; 4U1UN/B (New York), W6WX/B (California), KH6O/B (Hawaii), JA2IGY (Japan), 4X6TU (Israel), OH2B (Finland), CT3B (Madeira), ZS6DN/B (South Africa) and LU4AA/B (Argentina).

### No More QSLs?

Last month I waxed whimsical about how in the future we might expect contests to be handled by the shack computer, with little or no operator intervention. This may be far-fetched, but I read a suggestion recently which would appear to be practicable right now, and would make life easier for all DX chasers. The idea was based on the fact that most major DXpeditions keep their log on computer disk, so why not pass a copy of the log direct to the ARRL so that the contacts can be credited

automatically to their computerised DXCC database? This would save the effort and expense of handling the tens of thousands of QSL cards that a big DXpedition involves nowadays. Obviously there are a number of problems which would have to be overcome, but surely it is worth looking into? QSLing would then be limited to casual operations or to, say, one card per DXpedition purely as a keepsake.

Of course, it has always been, and probably always will be, interesting to look at QSL cards. While visiting W4BAA I had the opportunity to look at some of Dewitt's early QSLs. He was first licensed in 1932 and over the years has worked most of the major DXpeditions and lots of exotic DX. Many of the cards were from countries that no longer exist, and are a fascinating commentary on political changes around the world. Mind you, some things never change. I was also looking at some 1932 issues of QST, the ARRL's monthly magazine. The editorials are little different from many that we read nowadays. DXing wasn't what it used to be. QRM on the bands was reaching intolerable proportions and operating standards were judged to have declined to an all time low. And so on. Some things never change! Happy DXing, and see you all in the pile-ups!

# Club News

**Acton, Brentford & Chiswick RC** meet at 7.30pm on the 3rd Tuesday of each month at the Chiswick Town Hall, Turnham Green, Chiswick, London W4. New members welcome. Club talk;  
Aug. 18th Open discussion on radio.  
Further details from Paul Truitt G4WQO, Tel. 071 938 2561

**Aylesbury Vale RS** meet on Wednesday evenings in the Village Hall in Hardwick, located off the A413 between Aylesbury and Buckingham. Club events;  
Sep. 2nd RSGB video evening.  
Sep. 16th EMC and its cure - Peter G1OSC.  
Further details from Martin G4XZJ, Tel. 0296 81097

**Bangor and District ARS** meet on the first Friday of the month at the Winston Hotel, Queens Parade, Bangor, starting at 8pm. New members very welcome. Club date;  
Sep. 4th Annual General Meeting.  
Further details from club Chairman Stewart G1AOCK, Tel. 0247 454049

**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;  
Aug. 10th Open talk on the 1992 Barnsley rally.  
Aug. 30th Moonbounce - G6ZTU.  
Sep. 14th Junk sale.  
For further details contact Ernie G4LUE, Tel. 0226 716339 between 6pm and 8pm.

**Basingstoke ARC** meet on the first Monday of each month, 7.30 for 8.00pm, at the Forest Ring Community Centre, Sycamore Way, Winklebury, Basingstoke, Hants. Planned club talks/events;  
Sep. 5/6th HF Field Day.  
For further details, Tel. 0256 25517

**Bristol (South) ARC** meet every Wednesday at the Whitchurch Folkhouse Association, Bridge Farm House, East Dundry Road, Whitchurch, Bristol. Club diary of events/talks;  
Aug. 12th DX Broadcast TV - SWL Ron.  
Aug. 19th Bring your Morse keys.  
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;  
Aug. 24th Video evening.  
Aug. 30th Picnic at Almondsbury Scout Camp.  
Sep. 28th First aid with ref. to electric shock.  
Further details can be obtained from Dave Coxon G0GDM, 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;  
Aug. 18th Operating evening and BBQ.  
Sep. 15th Junk sale.  
Oct. 20th /mobile to Turkey - Tony Swainsbury.  
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 Men's Club, Burcot, Bromsgrove. Club diary of events/talks;  
Aug. 25th Aerial construction.  
Sep. 8th PME earthing.  
Sep. 22nd Technical topics. 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;  
Aug. 11th Test equipment.  
Aug. 25th Nicad battery charging.  
Sep. 8th Club visit to a local company.  
Sep. 22nd Discussion night - JOTA/foxhunt.  
For further information contact Derek Carson G4IHO, Tel. 0298 25506

**Charnwood AR Contest Club** meet every first and third Sunday in the month, at The Albion, Loughborough. Club events;  
Aug. 30th All day station open day with BBQ.  
Sep. 5th Sked with P2O club with BBQ.  
Further details from Phil G4RVW, 2 Alan Moss Road, Loughborough, Leics LE11 0LX

**Delyn Radio Club** meet every other Tuesday, 8pm, at the Gwernynydd Community Centre, near Mold, Clwyd. They would like to welcome Radio Amateurs, CB operators, Short Wave listeners, and any other radio users. Club diary of events/talks;  
Sep. 8th Open night.  
Sep. 22nd UFOs - by Steve G1HAW.  
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

**Dragon ARC** meet on the first and third Mondays of each month at the Fourcrosses Hotel, Menai Bridge. Club diary of events/talks;  
Aug. 17th Construction evening - show your latest project.  
Sep. 7th Vintage radio, bring along the oldest thing in radio you possess.  
Sep. 19/20th Special event - GB2NTC National Trust event.  
Sep. 21st VHF pick and mix - Tony Jones GW4VEQ.  
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;  
Aug. 13th No meeting.  
Aug. 27th SSB Field Day briefing.  
Sep. 5/6th SSB Field Day - Cophthall Stadium.  
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 8pm, all are welcome. Club diary of events/talks;  
Aug. 17-21st GB2 Fakenham Splash Week, Fakenham High School, Wells Road.  
Further details can be obtained from Dave Jarrett G4DCJ, Tel. 0485 528633

**Fylde ARS** meet on the 2nd and 4th Thursdays at South Shore Lawn Tennis Club, Midgeland Rd, Blackpool starting at 7.30pm. The fourth Thursday is normally an informal meeting, other planned events/talks as follows;  
Aug. 13th DF Foxhunt.  
Oct. 8th Equipment sale.  
Further details can be obtained from R. J. Bourn G7CUL, 7 Clitheroes Lane, Freckleton, Preston PR4 1SD

**Halifax and District ARS** meet on the first and third Tuesdays in the month at 'The Running Man' public house, Pellon Lane, Halifax, 7.30pm prompt. The first Tuesday is an informal 'Noggin and Natter' night, third Tuesday events as follows;  
Aug. 18th Old and New Equipment - J. Fish G4MH.  
Sep. 15th AGM.  
Further details can be obtained from David Moss, Tel. Halifax 202306

**Hastings Electronics and RC** meet on the third Wednesday of every month, 7.45pm, at West Hill Community Centre, Croft Road, Hastings, also every Friday evening, 7.30 - 10.00pm, for a social evening and mini mart at Ashdown Farm, C.C. Downey Close, Hastings. Club events/talks;  
Aug. 19th 'Bring Your Thingy' competition - bring your thingy, and let everyone gaze upon it in wonderment!  
For further details contact the club Secretary Reg Kemp G3YYF, 7 Forewood Rise, Crowhurst, Tel. Crowhurst 83454

**Hoddesdon Radio Club** meet alternate Thursdays at the Conservative Club, Rye Road, Hoddesdon from 8.00pm. Club diary of talks/events;  
Aug. 20th Video and Friedrichshafen - Roy G4UNL.  
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;  
Sep. 3rd Surplus two-way radio conversions - Chris Lorek.  
Oct. 1st AGM.  
Further details from S. W. 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;  
Aug. 27th Sounds on the air - G4ZVD.



Sep. 10th Visit to Royal Mail Bradford, 6.30pm.  
Sep. 16th Quiz evening at Northern Heights RC.  
Sep. 19/20th Special Event - East Riddlesden Hall.  
Sep. 24th White Rose TX fame - Talk by G3TDZ.  
Further details from Kathy Conlon G1IGH on 0274 496222

**Kettering ARS** meet every Tuesday at 7.30pm at The Electricity Sports and Social Club, Eksdale St, Kettering. Club diary of events/talks;  
September HF Field Day at Loddington.  
Sep. 15th Visit from Radiocommunications Agency, bring along your equipment for a check out.  
Further details from Len G0RDV (was G7EHM), Tel. 0536 514544

**Maidenhead and District ARC** meet at The Red Cross Hall, The Crescent, Maidenhead, at 7.30pm. Forthcoming events/talks;  
Aug. 18th 2m foxhunt.  
For further details contact Neil Savin G8XYN, Tel. 0628 25952.

**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;  
Aug. 12th 'Real Radio' evening.  
Aug. 19th Sea, salt and satellites - Pat G3IOR.  
Aug. 26th Science for all - Arnold Tomalin G3PTB.  
Sep. 2nd Town and Country show final briefing.  
Sep. 7th Kite flying /P radio day at East Tuddenham NFD site  
Sep. 9th Flying radio controlled models - Geoff G4ODC.  
Sep. 13th Club station at T&C show, Costessey.  
Sep. 16th Make a rig night - Jim Bacon G3YLA.  
Sep. 30th AC op-amp circuit design - Mike G3YIA.  
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;  
Aug. 19th Rescue Romania - slides and video.  
Sep. 2nd Mini talks, home brew test gear.  
Sep. 16th Quiz night, entertain KARS.  
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;  
Aug. 13th Balun construction - Stewart G3WQW.  
Aug. 20th Activity/fox hunt 4.  
Aug. 27th Repeater construction and logic - Barry G0LCU.  
Sep. 3rd Forum.  
Sep. 10th Foreign language QSOs - Walter G0OMO.  
Sep. 17th Activity/fox hunt 5.  
Sep. 24th Oscilloscopes - Dave G3YUT.  
Further details from Ian Miller G4JAE, Tel. 0602 232604



**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;  
Aug. 27th Video night.  
Sep. 24th Computer viruses - Dr. R. Ford.  
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 1992, for details of their meeting venue and time you'll need to contact Eric Eastwood G1WCQ, Tel. 0772 686708. Planned club talks/events for the near future;  
Aug. 20th A Preston Kaleidoscope - talk.  
Sep. 3rd Test equipment - by Mr. Grimes.  
Sep. 17th Novice licence - Mr. Williamson, Senior Instructor.

**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 diary of events/talks;  
Aug. 13th Standing Wave Ratios - Peter G3RZP.  
Aug. 27th History of GB2SM - Geoff G3JUL.  
Sep. 10th Autumn junk sale.  
Further details can be obtained from Nick Challacombe, Tel. 0734 722489



**Rhyl and District ARC** meet on the first and third Mondays of each month, in the Committee Room of Bodelwyddan Castle. Club events/talks;

Aug. 28th Annual dinner.  
Sep. 21st Annual General Meeting.  
For further details contact Ken Padley GW7IAR, Tel. 0745 338276

**Salisbury R&ES** normally meet at Grovesnor House, Churchfields Road, Salisbury at 7.30pm, and hold Morse and RAE classes every week. Visitors are welcome, but note that, for this month;  
August Club room closed.  
For further details contact David Kennedy, Tel. 0256 342321 daytime and 0722 33097 evenings and weekends.



**Silverthorn ARC** meet every Friday, 7.30pm, at The Chingford Community and Adult Centre, Friday Hill House, Simmons Lane, Chingford, London E4 6JH. Club events;  
Aug. 14th 2m direction finding contest, 7pm. Non members welcome to take part.  
Aug. 21&28th Informal meetings at The Royal Oak, Kings Head Hill - Friday Hill House closed for maintenance.  
Further details from Andrew Mowbray G0LWS, Tel. 081 529 4489 between 5.30 and 6.30pm weekdays only.

**Southgate ARC** meet on the second and last Thursdays each month at the Winchmore Hill Cricket Club Pavilion, Firs Lane, Winchmore Hill, London N21. Forthcoming club events/talks;  
Aug. 13th WAB hunting - Keith G8UKT.  
Aug. 27th Club DF equipment check.  
Aug. 31st Bank holiday DF hunt and BBQ - White Webbs Park, Enfield.  
Sep. 10th Lecture and show on model aircraft - G0MEO.  
Sep. 24th RadCom - Mike Dennison G3XDV.  
For further details contact Brian Shelton G0MEE, Tel. 081 360 2453.

**Stratford upon Avon & District RS** meet at the Home Guard Club, Main Road, Tiddington, Stratford upon Avon, at 7.30pm. Club events/talks include;  
Sep. 14th Open evening.  
Sep. 28th Visit from Castle Electronics.  
Details from A. Beasley G0CXJ, Tel. 060 882 495.



**Sudbury and District RA (SAnDRA)** meet on the first Tuesday of each month, 8pm, at The Five Bells Inn, Great Cornard, Sudbury, Suffolk. Forthcoming talk;  
Oct. 6th Electrical wiring and safety in the shack.  
Further details can be obtained from Colin Muddimer G0PAO, Tel. 0787 77004.

**Mid Sussex ARS** meet every Thursday in term time, 7.45pm, at Marle Place Further Education Centre, Leylands Road, Burgess Hill, West Sussex. Club event;  
Nov. 12th Autumn junk sale.  
Further details from John Fuller G0OIO, Tel. 0444 450957

**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 (note the new venue). Natter nights are on the first Thursday of each month, and they have a club net on Mon at 20.30 on 70.3875MHz, and Tues at 10.30 on 3.760MHz. Club talk;  
Sep. 5/6th SSB Field Day.  
Sep. 13th BARTG Rally, Sandown Park.  
Sep. 17th Aerial Forum - by Geoff Plucknett G4FKA.  
Oct. 15th Junk sale.  
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;  
Aug. 12th Video night.  
Aug. 26th Junk sale.  
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;  
Aug. 21st Steam nostalgia - talk/slides.  
Aug. 30th Torbay mobile rally - STC Paington Social Club.  
Sep. 18th CQ World Wide '89 - video.  
Further details can be obtained from Walt G3HTX, Tel. 0803 526762 or Andy G4VPM, Tel. 0803 329055



**Wakefield and District ARS** meet every Tuesday at 8pm, in the first floor rooms, Ossett Community Centre, Prospect Road, Ossett, W. Yorkshire. Club events;  
Aug. 18th 2m DF/fox hunt.  
Sep. 1st 2m CW cumulative contest.  
Sep. 22nd Electricity in animals - John G0MVA.

Sep. 29th From the power station to your door - David G0DJA.  
Further details from John G0MVA, Tel. 0924 260048

**Winchester ARC** meet on the third Friday of the month, 7.30pm, at the British Red Cross Centre, Durngate House, Winchester (adjacent to North Walls Police Station). Club diary;

Aug. 21st No meeting.

Sep. 18th Talk - by Peter Chadwick G3RZP.

For further details contact Malcolm Butler G0LMD, Tel. 0962 89550.

**Wirral ARS** meet every first and third Wednesdays, 7.45pm, at Ivy Farm, Arrowe Park Road, Birkenhead, Wirral L49 5LW. Informal meetings take place every Tuesday night at 7.30pm, new members and visitors most welcome. Club events/talks;

Aug. 19th SSB event meeting.

Sep. 2nd Construction contest.

Sep. 4/5/6th SSB field day.

Sep. 16th New licences on the air.

Further details from Alec Seed G3FOO, 31 Withert Avenue, Bebington, Wirral L63 5NE.

**Wolverhampton ARS** meet every Tuesday, 8.00pm, at the Wolverhampton Electricity Sports and Social Club, St. Marks Road, Chapel Ash, Wolverhampton. Planned club talks/activities;

Aug. 11th Birmingham International Airport - talk.

Sep. 22nd Junk and surplus equipment sale.

Further details about the club from Mr. K. Atack G4WAS, Tel. 0922 475057

**Wrexham ARS** meet at Maesgwyn Rd Community Centre, Wrexham. During the 19/20th Sept the club will be covering the Scottish Tourist Board's National Trust celebrations. We are told the callsign will be GC4WXM/P from Erddig Hall, Nr Wrexham. Other forthcoming events/talks;

Aug. 18th Field evening - as before.

Sep. 1st Magnetic loops - by John GW3RBM.

Sep. 15th Slow scan television - Mike GW0HWK.

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;

Aug. 13th RSGB video.

Aug. 20th A single side-band transmitter - 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. To join BARTG contact Peter Adams, G6LZB, Tel. 0923 220774. For information on the group's publications contact Ian Brothwell G4EAN, 56 Arnot Hill Road, Arnold, Nottingham NG5 6LQ or via packet, G4EAN @ GB7BAD.

**British Amateur Television Club (BATC)** is run for those interested in television transmitting, receiving, video, and SSTV, they also hold an annual rally. For further details contact the membership secretary, Dave Lawton, Grenehurst, Pinewood Road, High Wycombe, Bucks HP12 4DD

**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 newsletter and regular get-togethers at their rally stands. See their feature in HRT June 92 issue. 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, 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 HRT July 92 issue.

**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, their AGM and social is on the 10th October this year. Information from their Secretary Mick Puttick G3LIK, 21 Sandfield Cres, Cowplain, Waterlooville 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 details of their 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 October must reach us by the 15th August, addressed to 'HRT Club News', P. O. Box 73, Eastleigh, Hants SO5 5WG.

# Rallies

## August 9th

**Derby Rally**, Littleover Community School, Pastures Hill, Littleover, Derby, details from G3SZJ, Tel. 0332 556875

**Flight Refuelling Hamfest**, Merley, Wimbourne, Dorset. Details from G0API, Tel. 0202 691649

## August 16th

**Southend** and District Radio Society Rally and Car Boot Sale, to be held at The Rochford Centre, Rochford, near Southend-on-Sea, Essex. Bring and Buy, bar and refreshments, ample parking, aids for the disabled. Talk-in/Talk-out on S22. Tables (supplied or bring your own) available, e.g. outside pitch (bring any amount of tables) £5.00. For table bookings and information, contact John Stone G0DFE, Tel. 0702 202216.

## August 23rd

**West Manchester RC Red Rose Rally**, Bolton Sports and Exhibition Centre, details from G1IOO, Tel. 0204 24104

## August 30th

**Torbay ARS Mobile Rally**, STC Social Club, Brixham Road, Paignton, details from G3HTX, Tel. 0803 526762

## August 31st

**Huntingdon ARS** will be holding their annual Rally and Junk Sale at the usual venue of the Medway Centre, Coneygeare Road, Huntingdon, Cambridgeshire. Doors open 10.00am, rally closes at 4.00pm. Trade stands, Bring and Buy, components, junk, and the usual excellent refreshment bar. Car boot pitches available. Talk-in on 2m S22 and 70cm GB3OV (433.125MHz). Further details from David Leech G7DIU, Tel. 0480 431333

## September 6th

**Vange Amateur Radio Society** are holding their annual rally at the Laindon Community Centre, Laindon High Road/Aston Road, Laindon, Basildon, Essex. Doors open from 10.30am to 4.30pm, admission is 75p, the rally will include traders, Bring and Buy, refreshments and a free raffle. Approach roads will be signposted, talk-in on S22, and for those travelling by train the centre is a short walk from the BR Laindon station on the Fenchurch St. to Shoeburyness line. For further details, contact Mike Musgrave G4NVT, Tel. 0260 543025, or Doris Thompson, Tel. 0268 552606.

**Preston ARS 25th Annual Mobile Rally**, to be held at the University of Lancaster, as in previous years. Trade stands, Club and repeater groups, and a large Bring and Buy. Snack bar, lunchtime restaurant, licensed bar, and a free prize draw. Free parking on campus. Doors open 11.00am, 10.30am for disabled. Details from George Earnshaw, Tel. 0772 718175, or Godfrey Lancefield, Tel. 0772 53810.

## September 12th

**Wight Wireless Rally** will be held, as in past years, at the National Wireless Museum, Arretton Manor, Near Newport, Isle of Wight, from 11.00am to 5.00pm. Free admission and free parking, a collection for the RAIBC will be held. Trade stands free, under cover if wet, flea market and boot sale. Further details from Douglas G3KPO/GB3WM, Tel. 0983 67665.

# Free Readers Ads!

## HELPLINES

Do you need local help getting that PMR rig going, or with the repair of your (for example) AR88, 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'. Send your Free Readers Ads coupon to the HRT Editorial address; P.O. Box 73, Eastleigh, Hants SO5 5WG (see last month's CQ de G8IYA Editorial).

**Help,** I need info on a cable to work a printer from a Microwave Modules RTTY MM4001, so that I can get hard copy on my printer. Write to; Mr. R. Wassell; 215 Pasture Rd, Stapleford, Nottingham. NG9 8JB, or Tel. 0602 399556  
**Daiwa CNA** 1001 automatic ATU instruction manual, would appreciate photocopy and will refund all expenses. Contact Brian Williams, 16 Mandale Road, West Howe, Bournemouth BH11 8ET Tel. 0202 574002

**Words and diagram** for FC700, borrow or photocopy. Contact Ian Wilson GM1XOG, 41 Laburnum Road, Abornhill, Cumbernauld. G67 3AA

**Owner Operating manual** for KW Vespa transmitter 5-band HF rig. Contact J.D. Bolton G4XPP, 20 Appleton Crescent, Willington, Crook, County Durham DL15 0DX, Tel. 0388 745787 after 6pm daily.

**Secondhand books** on packet radio for new amateur, also copy of 'Interference Handbook' by Nelson, or 'RF Interference' by ARRL. Must be reasonable price as unemployed. Please contact Wait Spencer (Hull), Tel. 0482 589849

**Denco coils,** any range any colour, BFO coils, IF transformers, any literature. Contact Dave Bodman (Wilts), Tel. 0380 870801  
**Pair of 6in 'D'** type equipment handles, chrome finish preferred. Contact Mr. D. Wellings, 'Nordheide', Shurton, Stogursey, Bridgwater, Somerset TA5 1QE, Tel. 0278 732099

**Renovating Codar AT5,** need spares, especially spare PSU, and undamaged front panels for PSU

and transmitter. Contact Ian Smith G4JQT, 48 Swansea Road, Reading RG1 8HA, Tel. 0734 596806

## FOR SALE

**Kenwood TS-440S** HF transceiver, auto ATU fitted, YK88C, YK88SN filters fitted, good condition with box, fist mic and manual, £850 ono. Contact Dave (Blackpool), Tel. 0253 595300

**Bremi 200** valve linear. Prewar Pye/Invicta radios. 21 spools Sony V60/V62 video tapes. Cylinder player/recorder as in 'Allo Allo'. Help with IC numbers Cossor 4100 oscilloscope. Exchange WHY, other bits available. Contact Tony (Milton Keynes), Tel. 0908 373114

**Pye Vanguard** ex-PMR, converted 70.26MHz AM/FM, no xtals, 25W out. TX xtal 8.78250, RX 29.7800. Base station or boot mount, coupling lead to control box 8ft long, may be shortened. £25. Rob G8BSK, Tel. 0703 552247, 290 Priory Road, Southampton SO2 1LS

**Realistic PRO-2006** programmable scanner, not 6 months old, paid £329 will sell for £240. (Cheltenham). Tel. 0242 239281 after 5.00pm.

**Racal Frequency** timer counter 9837, frequency to 60MHz, time interval, time average etc., with circuits, £55. Ian (Staines), Tel. 0784 450947

**Yaesu CAT (FIF232C)** interface, £30. GVP-720 2/70 ground plane, £15. Capco 10-20 magnetic loop, £120. Z88 128k, PC-Link, ideal portable packet terminal, £130. Sig gen LSG-17, £20. Meteor 100MHz counter, £65. Amiga 1500, 40Mb disk, 3Mb RAM, as new, £550 (Stevenage, Herts). Bob, Tel. 0438 728461

**Icom IC-448E** 70cm mobile, 3 months old, £295 (Needwood, Staffs). Tel. 0283 712103

**Ranger RCI-2950** 10m mobile, LCD display, £315 (Burton on Trent). Tel. 0283 221870

**FT-480R** all-mode 2m transceiver, 2m 8 ele cross beam, 6m 5 ele beam, £265 ono. Amstrad 1512PC DD MM 32 Meg hard drive, various software, ideal for packet, £275. Trio 9R59D valve receiver, old favorite, 0-30MHz, £40 ono. (Heywood, Lancs). Contact Jon, Tel. 0706 620793 after 7.00pm

**HRO Communications** receiver, complete with PSU, speaker, set of coils, also HROMX not working

for repair, OK spares, offers. (Olney, Bucks). Tel. 0234 712938 or 0831 323804

**Yaesu FT-747GX** with FM board, FC700 ATU/stabilised power supply 25A mod 1220S, boxed, £600 (Southampton). Tel. 0703 639342

**Kenwood TS-120V** HF transceiver plus matching VFO-120 plus SP-120 speaker plus TL-120 100W linear amplifier. All matching units, 10m-80m. Excellent condition mobile/home base. Also PSU included. All together for just £495 ono. Contact Robert Barrow (Poole), Tel. 0202 604509, quick sale required.

**Icom IC-W2E** dual band transceiver, mint, complete with sp/mic, case, box etc., £310 incl. p/p. Paul (Abergees, Clwyd), Tel. 0745 833847 after 6.00pm.

**1926 Vintage** wireless by Brandes, three valve TRF, complete with horn speaker and bth headphones, all good condition, £350. (Mid Glamorgan) Owner emigrating. Tel 0222 892425

**ERA Microreader Mk2**, only used approx. 30 mins, £140. Yaesu FT-290 complete with nicads, £185. Pye SG5U UHF sig gen, complete with nicads, £45. Set HRO coils (6), offers. Signal Corps US Army radio receiver, mint condition, offers. GOLXP (near Preston, Lancs). Tel. 0995 603988

**FRG-7700** in as-new condition. Unmarked and boxed with manual, £175. AOR-2001 scanner, 25-550MHz, AM, FMW, FMN, boxed with manual, £175. Buyer to collect (Kettering). Tel. 0536 522007

**Kenwood R-5000** receiver, in very good condition, VHF converter fitted, in original box, with manual, £550 ono. (Saffron Walden). Tel. 0799 527155

**Yaesu HF** transceiver FT-747GX, 0-30MHz, no gaps, G-Comm 13.8V 15A surge power supply. Kenwood extension speaker, Lan CTE International HQ2000 SWR power meter, matcher, twin aerial switches. All nearly new, very good condition. Plus Antron 99 aerial. £525 ono (Great Yarmouth). Tel. 0493 651497

**Trio R-2000** receiver, frequencies from 100kHz-30MHz, 118-174MHz, all bands, as new, in original boxes with manual, £375 ovno. G1XAE (Bury, Lancs), Tel. 061 764 3332

**Trio TS-830S** with MC-50 mike, £625. Contact G. Tweedy (York), Tel. 0904 656179

**Sinclair Spectrum ZX** microdrive 2, plus cartridge, offers? Turbo socket twin 9 pin plus 27 pin, offers? ERA Microreader, £90. Yaesu 221R transceiver, £200. All items cash only. Contact G. Farrer (Kent), Tel. 0634 856853

**Icom 725 HF** all band transceiver, 2 years old, recent check to specification by Icom (UK), VGC, £520. Contact J. Martin (Harrogate), Tel. 0423 872997

**Sony World Zone CRF-320** 32 band receiver, excellent condition, £375. National Panasonic RF.B-600-L, computer control tuning, memory, direct access, MW, LW, FM, 1, 6, 30MHz, SW double superheterodyne receiver, cost £550, sell for £250. Also Zenith 7000-1 solid state, VGC, very sensitive Rolls Royce radio, offers. Contact Mr. R. Rai (Middx), Tel. 081 571 5759

**Icom IC-32E** 70cm/2m transceiver, £200 ono. Also Navico AMR1000 2m transceiver, hardly used, £100 ono. Both are in excellent condition, looking condition, hardly used, £190. Contact G. Butcher (Surrey), Tel. 0306 887057

**UHF single** channel, 25W, ex-PMRs, £40 each (Storno 5000). 2m aerial MET 10-ele, £20 ono. 40 channel, 10m FM rig (conversion), £40 ono. Contact Adam Willis GONIS (Wolverhampton), Tel. 0902 337342

**Alinco DR-112EM** 2m mobile transceiver, only 7 months old, mint condition, boxed, only used as base station, £180. Contact Gary G7KXX (Walsall), Tel. 0922 57136

**13.8V PSU**, £40. Avo 8 Mk4, with case, £55. Marconi LCR bridgemeter, £25. Marconi TF2603 voltmeter, 15kHz-1500MHz, £30. Pye 10-1000MHz aerial Amp/distn. system, £15. Farnell 0-50V bench PSU, £10. Advance 7 RF voltmeter, £10. 1.7kVA variac, £15. S. G. Brown headphones, £8. Contact Mr. B. Sirignano G4FZG (Cheltenham), Tel. 0242 580329

**Kenwood TS-680S**, HF side unused, free 6m 4-ele beam, £650 ono. Yaesu FT-290R, works well, £120. Contact Ron Spence (Cambs), Tel. 0487 812046

**Complete set** of home study books for the radio amateurs examination, cost £117 new, will sell for £45 ono. Please write to; P. D. Shelling, 393 Heol Treilai, Caerau, Cardiff, S. Wales CF5 5QP. No phone calls due to shift work.

**KW2000B PSU/SPK**, plus external VFO, spares, manual, plans, offers. Contact K. Barrow (Manchester), Tel. 061 775 7066  
**BBCB computer** minus disc drive chips, with 14in screen colour monitor, in working order, £50. Realistic PRO-2008 scanner with handbook, mint condition, £80 post paid. ZX Spectrum 16k expandable RAM, plugs into back of computer, £15 post paid. Tandy TR5-80 TP10 thermal printer, 240V AC, £40 post paid. Contact Mr. M. Marsden (Lancs), Tel. 0704 892088

**Icom IC-726 HF/50MHz** all mode transceiver, Icom PS35 power supply, Icom AT120 automatic tuner, comes with handbooks, any reasonable offer considered. Contact Ben Lynch (Manchester), Tel. 061 834 7187

**Trio 751E 2m multimode**, as new, unmarked, £425. MC80 desk mic, £50. 14 ele parabeam, 3 months old, £60. KC400 rotator, £100. Sell or exchange shooting equipment, scope, shooting box, reloading press, WHY? Contact 'Ialcolm Element (Shrewsbury), tel. 0743 367087

**Ten-Tec Paragon** and accessories, including 960 power supply, filters; 250Hz, 500Hz, 1.8Hz, modules; 256FM, 258, RS232 interface, 705 desk mic, dummy load No.209, £1,100. Buyer collects. Contact L. Ashdown G0HVY (A24, W. Sussex), Tel. 0903 892459  
**Oskerblock SWR-200 SWR**/power meter, 3.5-150MHz, twin meter, switchable 50/75ohms, VGC, £20 plus carriage. Contact P. Lawrence (Warwick), Tel. 0926 498388

**Diamond CP5 HF** vertical multiband aerial for all 5 bands, 80m-10m, complete with radials and instructions, only 15ft high, portable/base use, ground/roof mounting, excellent bandwidth, VGC, £110. Contact Chris Knowlson (Cheshire), Tel. 0625 531154

**4CX350A 144MHz** Heatherlite Explorer RF amplifier, complete with full instructions, connecting leads, and packaging, VGC, £495 ono. Prefer buyer collects. Contact Phil Boorman G0JBA (Sittingbourne, Kent), Tel. 0795 478839

**Sony PRO-80**, 8-way tuning, airband, 40 pre-sets, boxed and as new condition, £170 ono. May deliver if relatively close. Contact Rob Pepper (Camberley, Surrey), Tel. 0344 777730 evenings, or 0494 471111 ext. 2133 daytime.

**JRC NRD515 receiver**, £450. Contact Michael Musgrave, G4NVT (Basildon, Essex), Tel. 0268 543025

**Robot 1200C** colour SSTV unit, plus G3OQD Eprom/oscillator, together with Microvite 1435

14in analogue monitor/cable, mint, £945. TS-940S HF transceiver (internal ATU), and AT-940 extension speaker, both new and unused hence mint condition, £1,395. Contact Paul Chamberlain (Crawley), Tel. 0293 515201

**Sommerkamp FL-1000**, including spare set of valves, £265. Contact Paul Young G0HWC (Northampton), Tel. 0327 41267  
**Ten-Tec 585 Paragon** general coverage transceiver, mic, PSU, FM board, 0.5 crystal filter, handbook, showroom condition, £1,095 ono. Contact Wayne Barron (Cheshire), Tel. 0836 582490 anytime.

**TS-440S 80m-10m 100W** HF transceiver, fitted with auto ATU, SSB and CW filters, recently serviced, £700. PS-250 power supply, £100. SP-480 speaker, £30. MC85 mic (unused), £90. Yaesu LR400RC rotator and controller, £100. Moonraker 4 AU140 4 element quad beam, 14.5dB gain, 26-30MHz virtually brand new, £100. Write to: Ian Ward, 515 QNRAF Regiment, RAF Catterick, N. Yorks DL10 7NP.

**JRC NRD525** receiver, mint condition, little used, original box, manual, fitted CFL-233 1kHz filter, cost £1,150, bargain at £600. Contact Mr. G. Gregg (Eastbourne), Tel. 0323 768176  
**AR88D**, no case, working, spare valves, handbook, £40 collected. SEM VHF converter, new, £30. Spectrum 48k, updated, keyboard, recorder, RTTY/CW slow scan programs, filters, instructions, £60. Morsen PC10 terminal unit, RTTY program for Spectrum, excellent unit, instructions, £75. Contact John Randall G0OAZ (Basingstoke), Tel. 0256 465126

**Pakratt PK232 MDC** with manual and leads, last used with BBC, £180. Trio TS-530SP fitted narrow CW/SSB filters, little used, £400. ERA microreader Mkl, £50. Lowe FX1 wavemeter, 7-250MHz, £15. Codar PR30 valve preselector, £15. Carriage extra. Contact A. Hunt-Duke G4IOT, Tel. Folkestone 276063

**Trio R1000** receiver with speaker, excellent condition, £185. Contact Jack Butcher (Dorking), Tel. 0306 887057

**Sony CRF-320** world zone receiver, classical radio, 32 band, digital, £375. Drake SPR-4 communications receiver, VGC with manual, £150. Securicor deliveries. Contact Mr. Rai (Middx), Tel. 081 571 5759

**Yaesu FT-290Mkl**, good condition, with mobile mount, carry case, charger, lighter power adaptor for car, 5/8s mobile whip and gutter mount, plus home base Slim Jim type aerial, £200 ono. Must collect. Contact Tony

Kemp G7JGB (Crawley), Tel. 0293 529808

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**Trio TS-940S** transceiver in excellent condition, only two years old with all mods done, boxed and complete, £1,150. Contact Alfred Bowie GM4YWQ (Fochabers, Morayshire), Tel. 0343 820955 anytime.

**Avo valve tester**, VGC, £125. Another fair, £90. Tektronix signal generator, type 067/506, 1.75/100MHz, AC mains, VGC, £50. Various boxed valves, unused, from £2. Contact Eric Page, Seacroft, Clos du Murier, St. Sampson, Guernsey. Tel. 0481 47278 evenings please.

**Burndept BE600** ex-PMR six channel, 600mW, UHF hand held, converted professionally to 70cm, guaranteed, with spare rechargeable batteries, ideal for Novice and upwards, £100. Contact Tony Skaife G4XIV (York), Tel. 0904 792208 (answerphone).

**Yaesu FT-415** 2m hand held, complete with nicads and charger, boxed with manual, as new, £200 ono. Contact J. Blackburn (Stockport), Tel. 061 449 9176

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**CapCo 300D ATU** (handles 1kW), mint, £160. Icom PS55 20A PSU (mint), £105. Contact Paul G4XHF (Crawley, West Sussex) Tel. 0293 515201

**Alinco DJ-100E** 144MHz FM transceiver. Extended receive coverage 140MHz-170MHz, excellent condition, see December 1988 HRT review, £100. Also Bearcat DX1000 all mode 10kHz-30MHz, excellent condition, £200 ono, see March 1987 HRT review. (Wood Green, London) Dave, Tel. 081 881 0824 evenings/weekends.

**Collectors Items.** Sky Champion Hallicrafters Inc. 190's communication receiver, 550kHz to 43.5MHz in four bands, working, £60. Marconi T21A valve radio, three preset stations, vgc, working, £40. Bush PB12 valve LW, MW, SW, G, eight illuminated push buttons, 10in speaker, vgc, £40. M. Sharples, 13 Beryl Avenue, Blackpool. FY5 3PA

**Trio 751E 2m multimode**, hardly used, as new, in box, £425. Trio MC80 desk mic, £50. 14 ele parabeam, 3 months old, £60. KC400 Yaesu rotator, £100. Malcolm (Shrewsbury), Tel. 0743 367087

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**2m linear**, 25-50W output, to suit FT290R. Contact Ian Wilson GM1XOG, 41 Laburnum Road, Abbrons, Cumbernauld. G67 3AA

**No.19 Set** to complete Daimler Dingo restoration. Prefer clean example with ancillaries (Warwick). Tel. 0926651772 evenings.

**Front Panel** and covers for Icom IC280E, or scrap set bought. Also FM board for Yaesu FT-101ZD. Any help appreciated, all letters answered. Len Patey GM0PIQ, 17b Chapel Street, Airdrie, Strathclyde. ML6 6LG

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**Sanyo RP880** 9 band world wide RX, good price for good rig. Similar quality set considered (Weston-Super-Mare). Tel. 0934 418829 after 6.00pm.

**Matching receiver** to KW Vespa transmitter 5-band HF rig. Contact G4XPP, J. D. Bolton, 20 Appleton Crescent, Willington, Crook, County Durham. DL15 0DX, Tel. 0388 745787 after 6.00pm daily.

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erably whole and working, assembly manual also required. Any assistance appreciated. Please contact Eddie Greenhalgh, 31 The Crescent, Friern Barnet, London N11 3HH, Tel. 081 368 6910

**MkII Microreader**, AMR1000 2m rig, vert R7 to cover 40m to 10m, Bearcat BC200XLT scanner, G11 ARRL books. Send details, prices and post to; M. Seaward, 7 St. Oats Road, Stratton, Nr. Bude, Cornwall EX23 9AF.

**Eddystone** communications receiver, valved or transistorised, must be in mint or near mint condition, can pay cash and possibly collect. Please ring Peter Lepino (Surrey) on 0372 454381 **Wanted** by serious enthusiast, Collins TCS receiver. HRO bandspread coils or complete unit, military radios, vintage valves, test equipment, home built items, 1154/1155 or similar, educational electronics, American radio related books, magazines and equipment. Coil winding machine. Contact J. Raynham (London), Tel. 081 870 6316

**FD1LRR** looking for cheap FT-290 or equivalent, plus HF transceiver TS-120, FT77 or similar. Write to, or phone Perrier Remy, The Bell, 617 Forest Road, Walthamstow, London E17 9NE, Tel. 081 531 2779

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**Heath HW16**, working or not. Please send details of condition and price required to; R. Marris, 35 Kingswood House, Farnham Road, Slough, Berks SL2 1DA

**Quad wanted** for 10, 15, and 20m, 2 ele. Pay cash or part exchange my 3 ele tri-bander. Contact Paul Young G0HWC (Northampton), Tel. 0327 41267

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**Zetagi B550P** HF linear amp, cost £250. Exchange for 6m or 4m transverter, TRX. Also matching Transmatch TM1000, ATU, AE selector, and VSWR meter, any reasonable offers taken. Contact Phill Hills (Washington), Tel. 0903 892822

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