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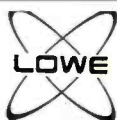
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Ham Radio T O D A Y

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Field Day Fun!



The Belcom Liner 2 SSB
Transceiver

RADIO

New Amateur LF Allocation



The Radiocommunications Agency have announced that a new Amateur Radio frequency band is now available. They say the allocation (71.6kHz to 74.4kHz) has been assigned following requests from the Amateur Radio community, particularly from Radio Amateurs who want to investigate propagation through the ground by transmission from underground caves. The allocation will be available to any holder of a class A Amateur Radio licence who wishes to investigate LF propagation. Use of this allocation will require a variation of the individual's licence and applications should be made to the Radio Society of Great Britain at the following address; LF Allocation, The Chairman, RSGB HF Committee, RSGB, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE. Colin G3PSM (who is the RSGB HF Committee's Chairman) tells us that the following conditions will apply; ERP; 0dBW (1 Watt), Status; Non Interference basis, no mobile/maritime mobile operation. Operation at a temporary location requires 7 days notice to the District R.I.S. Applications should be made stating: Name, Callsign, Main Station Address, Modes (emission designators) to be used (all modes are permitted but the RA would like to be aware of the modes being used), and whether the applicant intends to operate at a temporary address.

Beacon News

Ham Radio Today has been informed of a new beacon which has joined the International Beacon Project worldwide network. 4X6TU in Tel Aviv is now operational on 14100, 18110, 21150, 24930 and 28200kHz with stepped powers of up to 100 Watts to a vertical aerial. This is on a three minute cycle with 10 second transmissions on each frequency in turn. It joins ZS6DN, LU4AA and YV5B while JA2IGY is expected on air soon. The network once completed next year, will comprise of 17 five band beacons synchronised by satellite control.

Geoff Watts (Memorial) Award

The International Short Wave League (ISWL) have introduced a new award, the Geoff Watts (Memorial) Award. Geoff Watts ISWL G-7187/BRS-3129 was the first short wave listener in the world to be honoured with the CQ Magazine 'DX Hall Of Fame Award' with distinction. He was also the first British SWL to have 40 zones and 300 DXCC Countries confirmed. Geoff founded the 'Islands On The Air Award' and his prefix lists were used by Amateur and Short Wave Listeners world wide.

World QRP Day

June 17th is designated annually by the IARU as World QRP Day. It's not a contest, the idea is to just to get amateurs to try working with low power. Many QRP stations will be on air, using

powers of 5W down to a few milliwatts. High power stations are asked to avoid interference to these QRP stations, or indeed turn down their power and join in with the fun!

Contest Call Signs for Amateur Radio

The Radiocommunications Agency have also announced that special call signs are now available for clubs who wish to participate in Amateur Radio contests. The aim of these contests is to make as many contacts as possible in a specified period. The contest call signs are shorter than those normally issued for Amateur Radio making them invaluable in such contests. They will comprise of a G or M, a regional locator (e.g. W for Wales), a digit corresponding to the year (e.g. 6 for 1996) and a chosen single suffix letter, for instance GW6A, G6B, M16A etc. 52

callsigns are available each year.

The contest call sign must not be used outside the UK or on bands above 30MHz, applications must be made separately for each year. The first allocation of special call signs takes place at a meeting of the RSGB Contests Committee on 13th June, so application forms must arrive at RSGB HQ by noon on the 10th June to be considered. Any subsequent applications will be dealt with as they arise. To obtain a form, and full details of the scheme, write to the Amateur Radio Dept. at the RSGB HQ.

RAE changes 'on hold'

At a meeting with the Radiocommunications Agency on 11th March, proposals from the City & Guilds for changes to the

RAE were discussed. Following representations by the RSGB, these proposals have been put on hold pending further discussions.

The award is open to all radio amateurs and short wave listeners. To claim the award the claimant must have verified contacts, either worked or heard, since 1st January 1995 with the following islands; Greenland, Europa Island, Orkney Islands, Falkland Islands, Faroe Island, Wake Island, Ascension Island, Taiwan, Trinidad, and St. Lucia Island.

Special claim forms, which *must* be used, and a full set of rules can be obtained from the ISWL Awards and Contests Manager, Herbert Yeldham, Wade Reach, Walton-on-the-Naze, Essex CO14 8RG



TODAY

1996 Young Radio Amateur Of The Year Award

The Radiocommunications Agency, an Executive Agency of the DTI, in conjunction with the Radio Society Of Great Britain, have announced the Young Amateur of the Year Award 1996. The competition, which is for the most outstanding achievement by a young Amateur Radio enthusiast, is open to anyone under 18 who has an interest in radio. Candidates don't have to be licence holders to apply but the following areas of activity will be taken into account when applications are assessed: DIY radio construction, operation of radio, community service (e.g. helping the disabled or assisting in emergency communications), encouraging others (e.g. through the Novice licence scheme), and school projects. The award was first launched in 1988, the idea behind the scheme is to generate interest in Amateur Radio and to encourage people to become involved for themselves.

The prize, for the most outstanding achievement between 1st August 1995 and 31st July 1996, will be awarded by the Radiocommunications Agency and presented at the RSGB's HF Convention in October 1996. All entrants will receive a copy of the RSGB's Amateur Radio log book, while the winner will receive a £300 cash prize from the Agency and the runner-up a £50 cash prize from the Agency. Both winner and runner-up will also be invited to visit the Agency's Radio Monitoring Station at Baldock, Hertfordshire. In the past, the radiocommunications industry has also been very supportive of this award and has provided additional prizes for both the winner and runner-up.

Last year's winner was 16 year old Leroy Kirby from Cardigan, Dyfed. Leroy was a keen promoter of amateur radio through both the Scouts and the Air Training Corps. He had run a number of special event stations including two for 'Jamboree On The Air'. He was an active member of his local amateur radio emergency service and had successfully revived a local YMCA amateur radio club. A keen participator in contests, Leroy had won a number of awards for successful contacts. Leroy's main interest was in packet radio and he had helped to set up a new local Bulletin Board System.

Last year's runner-up was 15 year old Charles Banner from Birmingham. A GB2RS newsreader, Charles had set up a number of special event stations and has helped with the running of a novice licence training course. He was assistant secretary of his school's amateur radio society, his main interest being in low power operation.

The closing date for applications is 31st July 1996. The award is open to any resident of the UK, the Channel Islands or the Isle of Man, who has not reached his or her 18th birthday by the closing date. Entrants must be nominated by an adult sponsor however there is no requirement for entrants (or nominees) to hold an Amateur Radio licence. Applications should be sent to: Young Amateur Of The Year Award, Radio Society Of Great Britain, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE



Air Cadet Radio

The Air Training Corps, 'Air Cadets', was formed in 1941 and from 1948 Cadets have been operating Radio Frequencies allocated to them by the RAF. In the early days Cadets were taught using airborne type equipment such as the T1154 and R1155. The training remained much the same for many years with a regular Sunday morning net on HF which continues to this day.

In the early 1970's the lack of suitable HF equipment available from RAF sources prompted the issue of VHF equipment and various suitable frequencies were allocated. At the same time some UHF frequencies also issued. Since then Air Cadet radio has progressed with the wider use of radio by many more units. Equipment has over the years been acquired from many sources

other than from the RAF and in particular ex-PMR equipment. At this year's London Show for example, exhibitors South Midlands Communications Ltd. presented the Air Training Corps with several ex-PMR transceivers as a donation to their communications systems.

The introduction of the Novice licence some time ago attracted the attention of Air Cadet Radio Officer, Sqn Ldr Tony King. The scheme was well suited for an addition to the Air Cadet Radio training syllabus and discussions took place with the RSGB. After lengthy talks and proposals most of the practical exercises have been included in the revised Air Cadet Radio training document. It is expected to take a Cadet about 30 hours training to complete the course at the end

of which they will be awarded an Air Cadet Radio Operators Certificate. On completion of the course Cadets will be encouraged to undertake further training with a Novice Instructor with the aim of sitting the Novice Exam.

At the London Amateur Radio Show held in March, the new Radio Training Document was launched. This was the culmination of 4 years hard work with advice coming from many instructors and in particular the main team lead by Sqn Ldr Tony King which comprised of Flt Lt Malcolm Wood, Mr Ray Degg, Mr Robert Maskill and Mr Eric Hersenander. The team are now looking forward to organising a major Air Cadet Radio event to celebrate the Millennium. The Air Training Corps is looking for Instructors to help teach the new Radio syllabus. Anyone interested, or for further information contact HQ Air Cadets (TG2), RAF Cranwell, Sleaford, Lincs NG34 8HB, Tel. 01400 261201 ext. 7619

4m QSO Party

In celebration of the 40th anniversary of the release of 70MHz within the UK, Four Metres News is organising a 4m QSO Party, to run from 1st July through to 30th September 1996 (except on the days of the RSGB contests on 4m). The aim is to encourage 4m stations to work as many different Worked All Britain (WAB) squares as possible, and to encourage mobile and portable operation. The modes of operation will be AM, CW, FM and SSB (cross-band QSOs will not count). There are six station categories and the leading station in each

category will receive a certificate and a one year free subscription to Four Metres News. The portable or mobile station operating from the largest number of qualifying squares will receive a certificate and an award (to be decided). The runners-up in each category will receive a certificate. Four Metres News is very grateful to Peter G3VPS for a donation towards the funding of the awards, and also to Mike G3FDW for offering a bottle of Whisky (or cash equivalent) for a special prize, details to be decided. If you would like a copy of the rules, please send a stamped self-addressed envelope to; Derek Thom G3NKS, Southern House, 9 Southern Road, Cheltenham, Gloucestershire GL53 9AW

Bromsgrove 4m Convention

Again to celebrate the 40th anniversary of the allocation of 4m within the UK, the Bromsgrove and District Amateur Radio Club have organised a 4m Convention. The event is to be held at the Avoncroft Art Society Main Building, off Redditch Road, Stoke Prior, Bromsgrove on Saturday 15th June 1996, 10.00am to 4.00pm, featuring lectures, test bench with spectrum analyzer etc., bring and buy stand for 4m and related gear, and trade stands selling 4m equipment, 'Four Metres News' will also be in attendance. The entrance fee will include a buffet lunch and light refreshments will be available throughout the day. If you would like to attend, please inform Barry Palin G4AHK of your interest in the event, as this will assist the organisers to plan the day. Barry can be contacted on 0121 445 5464 (answerphone/fax), or at 11 Ash Grove Close, Marlbrook, Bromsgrove, Worcs B60 1HW

ILA Prefix/Countries Contest

The International Listeners Association are running an Amateur Radio Prefix/Countries Contest from 0000hrs on 1st June to 2400hrs on 30th June 1996. The aim of the contest will be to log as many Amateur Prefixes as possible on the 160, 80, 40, 20, 15 and 10 metre bands. Prefixes can be logged once only on each band. Logs must show callsign, frequency, time, date, prefix claimed and points claimed. Stations in your own continent count as one point, stations outside your continent count as two points. The final score will be the total number of points scored multiplied by the total number of countries. Entries must be sent to the Contest Manager with the entry fee of £1.00 Sterling (or \$1.50) before July 1st 1996. Send your entry to; Ken Burnell, Contest Manager, 91 Mablins Lane, Coppenhall, Crewe CW1 3RG

Some 12,000 people worked at Bletchley Park in Buckinghamshire during the war. Many, many more have followed them since. After the

war the Park was used for training, by the Foreign Office, Civil Aviation and the Post Office. Were you ever involved with Bletchley Park? Did you go there afterwards to do your training prior to moving on elsewhere?

On Sunday 1st September 1996, The Milton Keynes ARS will be holding a rally / car boot sale / fayre at Bletchley Park. Come along and join in the grand re-union to be held in the Bletchley Park Club, alongside the mansion at 1.30pm. Have a pint and a natter with old mates from years past. Leave your name and phone number by the bar. Look up old friends who may be there that same day.

If you can't make it that day, then never mind, just send your name and details with someone who is going and get them to enrol you. Maybe you can make it next year? They'll still be there. For further details contact Des Shepherd G3LCS, Station Manager GB2BP, 35 The Crescent, Haversham, Milton Keynes MK19 7AN

Where you at Bletchley ?

RAE Course

Trowbridge and District Amateur Radio Club, intend to run a Radio Amateurs examination course starting in September 1996. The course will be held weekly in the village of Southwick, near Trowbridge, Wiltshire. Further details can be obtained by contacting the course tutor Chris Parnell G0HFX, Tel. 01225 764874 evenings, or Club Secretary Ian Carter G0GRI, Tel. 01225 864698 evenings.

RSGB Emergency Communications Officer vacancy

The following statement has been issued by the Council of the RSGB:

"Council wishes to inform members of the Society that G. Reilly-Cooper G0MAM, no longer acts as the RSGB Emergency Communications Officer. Council wishes to place on record the Society's appreciation of Mr Reilly-Cooper's past efforts in this field of amateur activity. The vacancy for the position of RSGB Emergency Communications Officer will be advised in the Society's journal and all applications will be treated on their merits. Until such time as an appointment is made, queries relating to talk-through permits should go to the Licensing Advisory Committee Chairman, I. D. Suart GM4AUP. Any other query relating to RAYNET matters should be directed to the Membership Liaison Committee, I. J. Kyle G18AYZ.

"Council reiterates its wholehearted commitment to the role of RAYNET groups in training for and providing emergency communications and will, to the best of its ability, continue to fully support all groups wishing to be affiliated to the Society. To this end, the Radio Society Of Great Britain proposes to host an open meeting later this year in order that all who have an interest in the field of emergency communications may make a contribution to the formulation of a policy for the future. The venue and date of this meeting will be published well in advance".

TRADE TOPICS

Radio and Telecommunications Correspondence School

For many years the RTCS has been conducting tutored and untutored correspondence courses for the City & Guilds of London Institute, including the RAE and professional qualifications in Telecommunications and Electronics Engineering, course No. 2710, which is now in the process of being updated to 2720. The latter course comprises of three levels, namely the Technician Certificate, Technician Diploma and the Advanced Technician Diploma.

This course can be started at any time of the year and can be undertaken by anyone with a reasonable background of basic mathematics and science as taught at school. The school's correspondence course is designed especially for City & Guilds 2710/2720 and all students are under the general supervision of Mr. A. A. Goddard BSc (Eng) MIEE, who is a past member of the examining body of the City & Guilds. Each subject is taught by a combination of standard approved textbooks, lesson and revision notes, worked examples and examination questions from past years' City & Guilds programmes.

The RAE courses can again be started at any time of the year and a student of say average ability and interest can successfully complete their studies in six to nine months. For further details contact the RTCS, 12 Moor View Drive, Teignmouth, Devon TQ14 9UN, Tel. 01626 779398 or see their advert in the classified section of HRT.

New Yaesu Handheld

Yaesu have announced the availability of the latest in dual band handheld technology, the FT-50R. They tell us this engineering achievement offers features never before found in such a rugged, weather resistant, ultra-compact design offering a full 5W of power output. The FT-50R includes wide-band coverage to 999MHz, keyboard and PC programmability, rugged MIL-STD 815 rating, CTCSS and Digital Coded Squelch. The set is due to sell for around £339.00. For further details contact Yaesu UK, or your local Yaesu dealer. Watch out for the review soon in HRT!

New Realistic Base Scanner

The PRO-2037 is the very latest scanner to be released from Realistic. This 200 channel base unit has a very useful coverage of 66-88, 118-174, 380-512 and 806-960MHz. It can scan at 25 memory channels per second, or 50 steps per second in search mode, so you will not miss many stations at this speed. The scanner is AM/FM switchable which ensures you do not miss out

SMC acquire Siskin Electronics

South Midlands Communications tell us they are very pleased to announce the acquisition of Siskin Electronics, the UK's premier supplier of digital amateur radio equipment transmission equipment. The well known and highly respected driving force behind Siskin, Phil Bridges G6DLJ, has moved the complete company operation to a dedicated facility at SMC's HQ in Chandlers Ford factory headquarters. Phil comments...

"This has got to be great news for Siskin's customers old and new. We now have far better demonstration facilities, direct internal access to SMC's systems development and EMC department and the additional bonus that Siskin products and know-how will be available at all SMC branches including ARE Communications (London), SMC Leeds and Reg Ward in the West Country. I am very flattered to be part of this already successful team with a proven track record."

SMC's Retail General Manager, Graham Taylor, comments *"Siskin's approach to a plug-in-play solution with all the radio/computer being cables ready-made and bundled with software has got to be the answer for today's*

busy radio amateur. As Siskin and SMC were both already Official Factory Appointed AEA distributors it made sense to team up and offer our customers a complete solution to what can often be a very bewildering first step into the unknown. All existing Siskin products such as PacComm, Kantronics, BayCom, Buckmaster's HamCall world wide CD callbook and the Siskin Multi-CAT, will also be introduced into SMC branches making one-stop shopping for the radio enthusiast a reality at last. We also intend to apply Phil's expertise to many of our commercial radio projects."

For the Siskin team it's business as usual except for the daunting task of learning the names of SMC's 65 odd Southampton staff members! Siskin's unique out-of-hours helpline and comprehensive warranty facilities will of course be available to both companies customers' old and new. For further information, contact Graham Taylor at SMC, Tel: 01703 255111, email smc@tcp.co.uk. (Siskin's phone, fax and email currently remains unchanged with an additional amateur radio data hotline number on 01703 254507).

with either mode. The triple conversion virtually eliminates any interference from IF images, so you don't get any odd stations appearing at any odd frequencies. The PRO-2037 can be powered by 240 volts AC, or from a 12V DC supply. The 10dB attenuator helps reduce local station interference. The scanner is supplied with aerial and manual, the retail price is £249.99. For further details contact Link Electronics, Tel. 01733 345731, Fax. 01733 346770



SOFT OFFER
JULY '96

THIS MONTHS SOFTWARE COLLECTION

QRP HomeBuilder version 2.0 is a freeware Windows program, for amateurs who enjoy building their own radio equipment, or indeed are interested in learning! Included are designs and schematics for a universal VFO and universal diplexer, a capacitor code reader, coil builder, power converter, and QRP article references.

NEC4WIN V1.5 is described as 'Mininec for Windows'. If you ever wanted to know what your aerial's really doing, or how it's height difference above ground affects your signal take-off, this one's for you. It's a very user-friendly and fully-featured aerial simulation program, you define the aerial and the program then can then plot and print Azimuth and Zenith patterns, compute impedance, SWR, lobe angles and width, F/B ratio, and plenty more. Full on-line Windows-based help is given in this shareware program.

LogSat Windows V3.0 is a very impressive satellite tracking program, with data on a very wide range of orbiting satellites.

As well as multi-window tracking and orbit information in both 'real time' and future scheduling, it includes aerial analysis including 3D radiation diagrams, a logbook and even a callbook section, plus propagation and locator calculations. A very impressive shareware program!

From this month's magazine columns;

G4SGI Collection - MUFsight is a superb world-map based HF propagation program, giving MUF and LUF to any point on the globe from your location, even graphs of MUF/LUF based on the time of day - fully working but limited to fixed sunspot count and date. MONITOR - a public-domain DOS program control of the Yaesu FRG-8800 HF receiver and the FRG-9600 scanner. Also several demo programs which all run under Windows, i.e. Quicksilver (Icom rig control, time limited for each session), Sprite (for FRG-100 remote control, time limited for

each session).

Also there's the Oscar 13 disk (see this month's *Satellite Rendezvous*) - the very latest information on AMSAT-Oscar 13 including decay elements and re-entry information, a disk packed full of files and useful information.

How much does it cost?

Each copy of our Ham Radio Today Software Collections is supplied on a 1.44Mb High Density PC disk. The cost is just £1.00 per disk including UK p/p - which only covers costs and which we believe to be the cheapest anywhere in the UK.

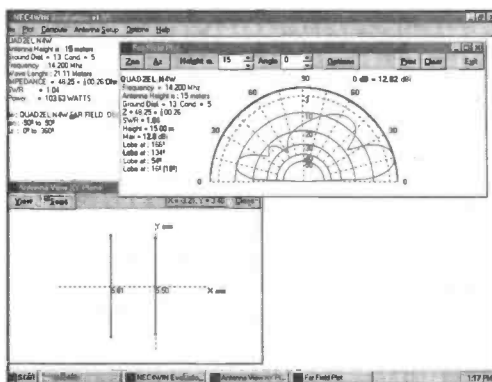
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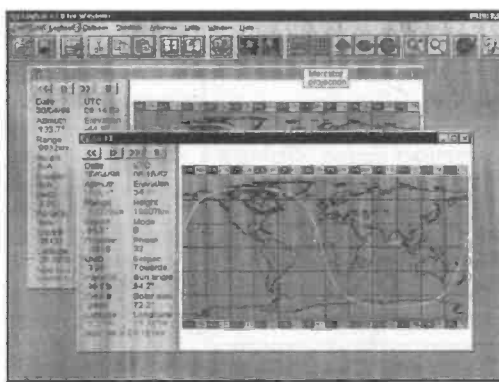
To get your copy of this month's Ham Radio Today Software Collection(s), simply send a £1.00 cheque or Postal Order for each disk, payable to Mr Steven Lorek, together with your completed coupon. A copy of the coupon, or letter similarly laid out, if accompanied by the original corner flash from this page, is also acceptable.

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Please do not contact Nexus or the Ham Radio Today Editorial staff with queries regarding these disks, they cannot help you, it also slows down the staff who are already busy enough getting the magazine ready! Please still allow up to 28 days for delivery. *Orders for this month's offer will be accepted up to 30th September 1996 only.*



NEC4WIN



LogSAT Windows

Ham Radio Today Software Offer - Jul 96

Please send me; Qty_____ of this month's disk (HRT Jul 96), Qty_____ of G4SGI Collection, Qty_____ of Oscar 13 disk
Disks at £1.00 per disk inclusive of disk(s) and UK p/p. This month's offer is valid only until 30th Sept 1996

Name _____ Address _____

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Post this coupon to; Software Offer, P.O. Box 400, Eastleigh, Hants SO53 4ZF.

Cheques/POs payable to Mr. Steven Lorek.

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CQ

from G8IYA Editorial

Are we becoming just black box operators? No way!

If you came along to the to see Chris and I at the Yeovil QRP convention last month, I hope you enjoyed the event, as well as the Ham Radio Today lecture there with the free 'giveaways'. As I'm writing this before the event, I can't really say it was nice to meet everyone (the joys of magazine publishing lead-times!), but if you did come and say hello, maybe asked a few questions about the magazine, then I do hope you left happy!

The monopoly ends - oop's

In last month's *CQ from G8IYA* Editorial I mentioned the formation of the UK Radio Society, but unfortunately a slight 'gremlin' got into the works! The coordinator was mentioned as Greg GOMAN - this should have been GOMAM. GDOMAN (there is no GOMAN) is actually an Isle of Man club station callsign - my apologies to all concerned. GOMAM's address isn't listed in the callbook, but the current address for the UKRS is; United Kingdom Radio Society, Box 100, Meadow Street, Northwich, Cheshire, CW9 5SZ.

Virtual Radio

We've seen the PC plug-in card multimode receiver in the WiNRADiO product where the 'front panel' is your computer screen. Well, I suppose it's a natural progression, as the virtual 'transceiver' is now also with us. As well as all-mode

receive, the unit also generates a low power transmission, to feed to an external linear amplifier (you don't really want 100W of RF power generated inside your PC, do you?). Alternatively, just use it 'barefoot' for QRP operation!

Build your own virtual QRP rig?

With the move more and more towards digital communication, with digitally generated speech and CW as well as 'keyboard tapping' modes, can this make experimentation possibilities by amateurs more likely, or is it becoming more and more 'above our heads'? I chatted to a G7 amateur the other day, who told me he'd just designed a tiny handheld VHF receiver. He did it in one day, and said he was going to design the matching transmitter tomorrow. But he hadn't touched a component, or soldering iron, or even a piece of paper. He did it all on his PC, including the circuit design, complete 'RF modelling' (to check it would actually work as required), and the PCB and component layouts. He'll be modelling the transmitter as well, checking the harmonic and spuri levels, power output, modulation quality, and plenty more, again before even starting to build it. 'Fine tweaking' is done on the PC - if the receiver audio is a little too 'toppy' or whatever, just change a few values of 'virtual components' on the 'virtual circuit board' and test again. One stage further is to tell the

design program what you want, i.e. the frequency coverage of a VFO, and it'll do it for you based on the value of that surplus variable capacitor you have in your junk box. Is homebrewing dead? Is all this beyond the realms of 'average amateurs', like you and I? Think again. In this month's 'Software Offer', you'll see a *QRP Homebrewers* program, which let's you do just that. It'll even draw the final circuit out on your screen for you.

Aerial experiments

Many of us also like 'messing with aerials', modifying a length here, feedpoint there, height above ground, adding a few ground stakes or buried radials, all to get your signal out to the best effect. The design of these previously was either down to the technical experts amongst us who used Smith charts and the like, or the 'experimenter' who just tried something to see if it would work or not. Again, computers come to the rescue, and we can do a lot of this now in our shack - no more going up on the roof or lowering the tower every few minutes to shorten or lengthen wires or elements. Guess what else has been chosen for inclusion on this month's software collection? How about amateur satellite QSOs, which nowadays you can even operate through with a dual-band handheld or mobile FM rig. When will Oscar 21 be in range next for a quick QSO, or the next NOAA weather satellite for a JVFAX picture download?

OK, I'll stop going on about what else you'll find on the disk!

If you're not 'into' computers then remember, our hobby is all about communication and sharing of knowledge, including homebrew rig and aerial designs and the like. Which is one reason why you're reading this issue of Ham Radio Today right now, where amateurs share their knowledge and experiences with you. Maybe you'll soon be seeing some even better homebrew rig projects in its pages. How about some rigs and aerials for our new 73kHz band?

From all this, I hope you'll see that, at least in Ham Radio Today, we're keeping up with the way our hobby is changing, and that we don't need to resign ourselves to becoming solely 'black box operators'.

Better web site

Finally if you have Internet Web access, have you seen the 'new look' Ham Radio Today site? You'll be able to read lots of features, equipment reviews, ex-PMR conversions, there's a project for you to build, a free competition to enter, as well as a couple of entire magazine issues to read 'on-line'! We're currently getting over 3,000 'hits' (i.e. accesses from around the world) every single day - that's nearly 100,000 every month! It's also been independently nominated for the 'best UK site' award. You'll find it at <http://www.netlink.co.uk/users/hrt>

Icom IC-2710H

Chris Lorek G4HCL tests a high power dual band mobile which comes with full remote control on the mic

Safe driving and operating the controls of a multi-function dual band mobile rig often don't go together. Which is why many operators prefer either a 'simple' rig with just a few controls, or quite often just leave the rig set on one channel and use that all day on their local repeater (even when they can easily go simplex, but don't want to change channel!).

'Head-up' displays can help a great deal for operation on the move, as they can minimise the eye-travel distance between the rig's frequency readout and the road ahead. But the greatest problem is usually in operating the rig, and here you really need complete 'head up' operating controls as well. Or of course, everything, or alternatively just enough, on the microphone.

The IC-2710H can give you all of these, as well as being a fully-featured high power 2m and 70cm dual bander. Besides the front panel controls, which are 'mirrored' for each band - 2m on the left and 70cm on the right as a 'mirror image', the supplied fist microphone has the now-usual up/down buttons, VFO/memory and band switching, plus two programmable user function buttons (e.g. reverse repeater/monitor and instant audio mute). Remove the lower clip-on cover on the mic, and there's also a fully backlit keypad controlling all of the rig's many functions, even the volume and squelch levels for each band.



Add an optional remote extender lead, and you can also unclip the rig's main front panel from the transceiver body and mount it on your dashboard or sun visor, with the rig under your seat or whatever. There's also an optional wireless remote control microphone, which uses an infra-red link, for even easier operation on the move.

Features

The set has all the usual facilities you'd normally expect from a modern dual bander, like simultaneous receive of both bands, CTCSS encode as well as 1750Hz toneburst, CTCSS decode (i.e. 'Tone squelch') with an optional plug-in unit, manual and automatic DTMF encode, plus DTMF selective calling and



paging with another optional plug-in unit. There are plenty of memory channels (99 plus three pairs of scan-edge channels on each band) together with various scan modes and the like.

On transmit, the set offers 50W on 2m and 35W on 70cm,

with switchable mid and low power settings of 10W and 5W on each band. The receiver, besides offering twin band (2m/70cm) reception, can also be set to receive 2m/2m and 70cm/70cm, i.e. two frequencies on the same band



simultaneously. A wideband receive facility is also available where allowed, this includes VHF airband receive on AM over the 118-136MHz range (although the set's operation is only guaranteed on the amateur bands).

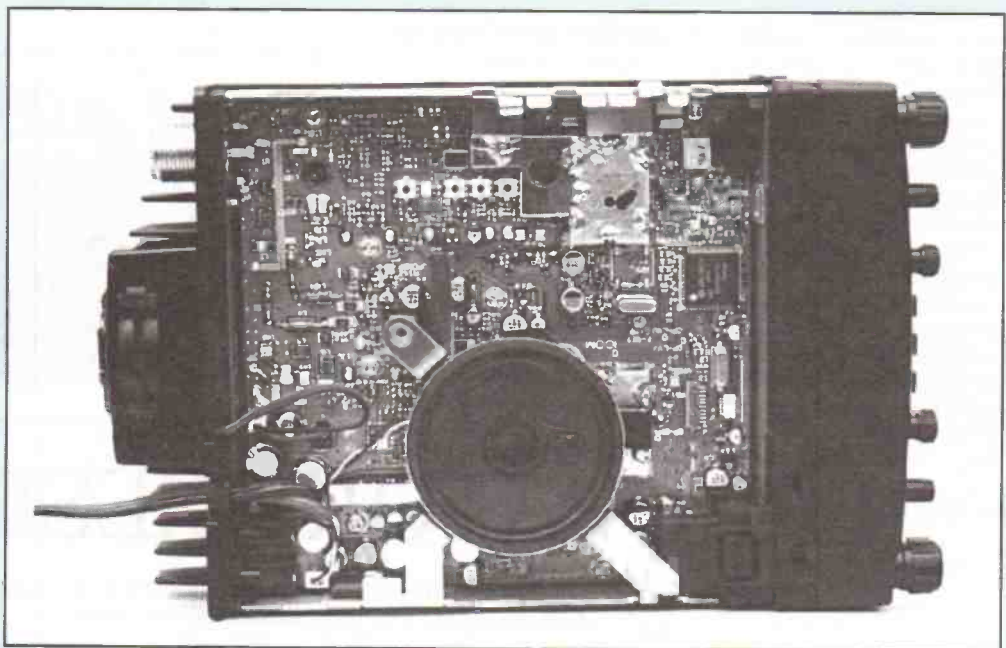
A built-in speaker is fitted to the lower case lid, and two rear panel 3.5mm jack sockets are fitted for either a single external speaker, or for separate speakers - one carrying 2m audio and the other 70cm. A single SO-239 coax socket is fitted for connection to a dual band aerial, and a flying DC connector lead is used, a substantial length of fused DC cable being supplied. The set measures 140mm (W) x 40mm (H) x 212mm (D) and weighs 1.4kg. A rear panel mounted fan is used to keep the heatsink size down, and besides the rear panel the entire upper section of the set is also a substantial heatsink panel. A mobile mounting bracket comes supplied, and various optional mounting brackets and extension leads are available for remote mounting of the control head.

On the air

First off, I had a good read of the set's 82 page instruction manual, which I must confess I found rather daunting at first. Even though I'm a self-confessed 'gadget freak', I found the constant references in the early part of the manual (i.e. the

'basics' of operation) to other functions on page so-and-so meant that I initially tended to keep skipping pages to and fro. If I wasn't writing this review, I just wouldn't have bothered and instead learned by 'trial and error'!

Anyway, 'moan-mode' over, I had a good read and a good digest, and then got down to



the serious business (it was fun, really!) of using the set on-air. The first thing I noticed was that the 2m receiver was extremely sensitive, probably the best on 2m I've used up to now - it put my 'regular' rig to shame! The 50W of 2m transmit power also helped me get my signal to the

distant stations I could hear. The 70cm side wasn't quite as 'hot', although it still matched the 35W transmitter power quite nicely. I found only one problem due to strong off-channel signals with the set used at home with my rooftop aerial system, that of very slight intermodulation on 2m (a number of other sets I've tried have been far worse). But increasing the set's squelch control past the 12 o'clock position automatically placed a receive attenuator in - a very nice 'touch' which also nicely got rid of this occasional receiver overload problem. Using my tower-mounted 2m/70cm beams also got rid of this, by discriminating against the unwanted signals (from my local fire brigade, on 146MHz), but then most users would probably use a 2m/70cm colinear with a set like this, as I did for most of my operation.

On transmit, my audio was usually described as being clear and of good quality, but I found the set's receive audio to be quite 'boxy', using both the

G4HCL/M. Here, I really *did* appreciate the superb mic controls - especially the up/down volume and squelch controls usefully positioned on the bottom row of the keypad for easily location in eyes-off 'fumble' mode! Even adjustments I confess I sometimes wouldn't attempt performing when on the road, such as high/mid/low transmit power selection, I found extremely easy with the one-touch buttons. The buttons were all gently backlit for night-time use, which incidentally also made locating the position of the mic at night very easy, for when I wanted to either put out a call or respond to a 'CQ'. A four-level main display dimmer saved any 'glare' from the set at night, although I'd have liked to have tested the remote display option as well - this unfortunately wasn't available at the time of the review.

Due to the small internal speaker, I found that an extension speaker was virtually essential for use when mobile. In practice I used two speaker with

internal speaker and my usual 'test' external speakers.

After I'd become used to the set's operating modes - using both the front panel and microphone controls, I felt reasonably confident of using the set on the move in the car. In it went, and off went

the IC-2710H - one for 2m and one for 70cm mounted separately in 'stereo' mode, which gave a very nice 'differentiation' between bands - no need to glance at the set's display to see which band to reply on. The set also had a three-channel 'scratch pad'



memory - which retained the three last frequencies I'd transmitted on and which could be quickly recalled - after I'd got used to this I must say I found it most handy.

The set also has a selectable 'one touch' PTT mode, where a press of the PTT puts it into transmit, another back to receive - another function I found useful when mobile. The set does also have a selectable transmit time-out timer, of 3, 5, 15 or 30 minutes, to guard against any accidents! About the only function I did find awkward to use was the 1750Hz toneburst - this used a 'second function' (i.e. a two-button push, one after the other) available *only* on the multi-button keypad section. I feel an easily located single push button should really have

been provided for this by Icom.

I found that, both mobile and in the shack, I needed to locate the set in a well-ventilated position - during QSOs using high power it became quite hot (I sometimes couldn't keep my hand on it), although usefully the entire upper section of the set is a heatsink area. No chance of just 'stuffing it in the glove compartment' here.

Lab tests

My measured results showed that the 2m receive side was indeed extremely sensitive, as I found on air (I'm glad I wasn't imagining it!). The set uses a dual conversion superhet, with high 1st IFs of 45.05MHz on 2m and 57.65MHz on 70cm, plus a 2nd IF of 455kHz on

not high enough for satisfactory 12.5kHz use should we ever move to that spacing in the future. I also found the set to be slightly low in frequency, particularly on 70cm. On transmit the set gave a very healthy power level on both bands, with well-suppressed harmonic levels.

Conclusions

I found the IC-2710, despite its initial 'complex' appearance, allowed very easy operation, and indeed potentially much safer operation on the move than many other current sets. I found the mic-mounted controls instinctively easy to use, and even in the shack I often preferred using the mic-mounted buttons to the tiny volume and squelch knobs on the set - even with my small fingers!

My thanks go to Icom (UK) for the loan of the set for review.



LABORATORY RESULTS:

All measurements taken on 145.0MHz/435.0MHz, high power TX, with 13.8V DC stabilised supply to supplied DC lead, unless otherwise stated.

RECEIVER:

Squelch Sensitivity;	145MHz	35MHz
Threshold;	<0.06µV pd (<4dB SINAD)	0.12µV pd (5dB SINAD)
Maximum;	0.45µV pd (21dB SINAD)	2.99µV pd (29dB SINAD)

Maximum Audio Output;	145MHz	435MHz
Measured at 1kHz on the onset of clipping (10% distortion), 8 ohm load;	2.84W RMS	2.83W RMS

Sensitivity;	Input level required to give 12dB SINAD;
144MHz;	0.11µV pd
145MHz;	0.10µV pd
146MHz;	0.10µV pd
430MHz;	0.17µV pd
435MHz;	0.18µV pd
440MHz;	0.18µV pd

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;	79.5dB	79.6dB
+1MHz;	94.8dB	90.3dB
+10MHz;	97.4dB	93.5dB

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;	66.6dB	67.0dB
50/100kHz spacing;	66.5dB	66.4dB

Adjacent Channel Selectivity;

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

	145MHz	435MHz
+12.5kHz;	37.7dB	40.4dB
-12.5kHz;	22.1dB	11.3dB
+25kHz;	68.6dB	67.5dB
-25kHz;	67.5dB	64.1dB

TX Power Output and Current Consumption;

Freq.	Power	10.8V supply	13.8V supply	15.6V supply
144MHz	High	39.8W/9.65A	53.5W/11.40A	54.0W/11.45A
	Mid	11.1W/5.25W	11.3W/5.35A	11.4W/5.50A
	Low	5.71W/4.00A	5.76W/4.00A	5.86W/4.10A
145MHz	High	41.8W/9.80A	53.5W/11.40A	53.5W/11.4W
	Mid	11.1W/5.20A	11.2W/5.30A	11.4W/5.40A
	Low	1.42W/3.95A	5.81W/4.00A	5.86W/4.05A
146MHz	High	43.4W/9.80A	53.5W/11.25A	53.5W/11.35A
	Mid	11.2W/5.25A	11.3W/5.35A	11.4W/5.45A
	Low	5.76W/3.95A	5.76W/4.10A	5.86W/4.05A
430MHz	High	21.9W/6.80A	37.2W/8.90A	37.2W/8.65A
	Mid	10.3W/4.70A	10.2W/4.70A	10.2W/4.75A
	Low	5.35W/3.60A	5.40W/3.85A	5.35W/3.60A
435MHz	High	21.9W/6.95A	38.0W/8.90A	38.0W/8.60A
	Mid	10.4W/4.60A	10.4W/4.70A	10.5W/4.70A
	Low	5.45W/3.65A	5.45W/3.80A	5.45W/3.75A
440MHz	High	21.7W/6.85A	38.5W/8.90A	38.5W/8.60A
	Mid	10.5W/4.75A	10.5W/4.70A	10.5W/4.70A
	Low	5.50W/3.65A	5.50W/3.80A	5.50W/3.95

S-Meter Linearity;

	145MHz		435MHz	
	Sig Level	Rel. Level	Sig. Level	Rel. level
S1	0.40µV pd	-14.9dB	0.83µV pd	-11.9dB
S3	0.71µV pd	-9.9dB	1.22µV pd	-8.6dB
S5	1.18µV pd	-5.5dB	2.06µV pd	-4.0dB
S7	1.71µV pd	-2.2dB	2.56µV pd	-2.2dB
S9	2.20µV pd	0dB ref.	3.26µV pd	0dB ref.
S9+	2.94µV pd	+2.5dB	4.10µV pd	+2.0dB
S9++	4.27µV pd	+5.8dB	4.79µV pd	+3.3dB

Image Rejection;

Increase in level of signal at 1st and 2nd IF image frequencies, and half 1st IF, over level of on-channel signal, to give identical 12dB SINAD signal;

	145MHz	435MHz
Half 1st IF	>120dB	99.5dB
1st Image	>120dB	85.5dB
2nd Image	81.9dB	71.9dB

TRANSMITTER

Harmonics;

	145MHz	435MHz
2nd Harmonic;	-85dBc	-78dBc
3rd Harmonic;	-76dBc	-76dBc
4th Harmonic;	<-90dBc	<-90dBc
5th Harmonic;	<-90dBc	-
6th Harmonic;	<-90dBc	-
7th Harmonic;	<-90dBc	-

Peak Deviation;

145MHz	435MHz
5.17kHz	5.36kHz

Toneburst Deviation;

145MHz	435MHz
4.36kHz	4.43kHz

Frequency Accuracy;

145MHz	435MHz
-495Hz	-1.47kHz

WiNRADiO

Ham Radio Today's Technical Editor tests a wideband multimode scanner that plugs into a PC

I first saw the *WiNRADiO* in an Australian amateur magazine - little wonder, as it's the product of Rosetta Labs who are based in Melbourne. Described by Rosetta as "Your Window to the World", it isn't just another receiver. Instead, it's a plug-in PC card, containing an SSB/AM/NFM/WFM receiver covering the very wide frequency range of 50kHz to 1300MHz. The software provided runs under Windows on a PC, and emulates the front panel of a 'top of the range' communications receiver, complete with digital frequency readout, a large tuning knob which rotates under the control of your PC mouse, mode switches, bargraph S-meter, even world and local time and date displays.

I then saw via the Internet that *WiNRADiO* was to become available in the UK, distributed by Lowe Electronics - and an email to Lowe via their Web site brought forth one of the very first samples for review in *Ham Radio Today*. Well, being a PC product, one does have to follow the appropriate protocol!

Features

You'll see the general layout of the set's 'controls' from the screen shot. To

control the many front panel facilities, you've a choice of using either the PC mouse or the keyboard - for example the up/down/left/right keyboard arrow keys in conjunction with various letter buttons, or simply 'point - click - move' with the mouse buttons. You'll need a suitable PC, a minimum of a 386 running Windows 3.1 or higher, plus a vacant 16 bit slot for the *WiNRADiO* PC card to slot into.

The unit is currently priced at £409, which is about what you'd pay for a typical handheld scanner with similar frequency coverage and modes of operation.

Connecting up

The PC receiver card itself comes supplied with a 1.44Mb disk containing the *WiNRADiO* software, a useful operating handbook containing lots of general receiving information and SWL hints, and a short insulated wire aerial. You'll need either a pair of stereo headphones, or a speaker terminated in a 3.5mm stereo plug, to use with the receiver. It only took me a couple of minutes to plug the card in - just like a 'sound card' in fact, and installing the software was similarly easy by just following the on-screen step-by-step instructions. Then, the great moment



came. I plugged in my rooftop 2m/70cm colinear to the card's BNC aerial connector, a speaker (I used a spare pair of PC type stereo speakers), and double-clicked on the 'WiNRADiO' icon which had appropriately appeared on my PC screen. Click on the frequency display, enter the frequency of my local 2m repeater, and in it came, loud and clear. Now then, let's see what the system is capable of

Scanning and memories

Here's where, in my opinion, the system *really* shows what it's worth. Computer control of scanners is nothing new, and by coupling an RS-232 interface to your remote-capable set and running suitable

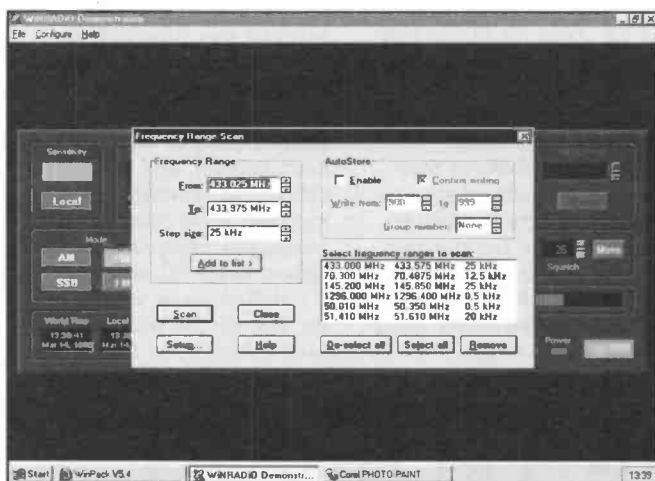
software, you can usually have a wide range of operating features, unlimited memory channels, automatic scanning and storing, and so on. That's if you buy a suitable (usually expensive) receiver, an appropriate interface, and pay up to £100 or so for the software. With *WiNRADiO*, it's all built in, and comes in the price! You can scan over whatever ranges, modes, and channel steps you like, selecting any number of ranges or groups. In 'Auto Store' mode, the set will even automatically store active channels it's found in a frequency range scan into memory channels for you.

Each memory, either manually entered by you or automatically entered for you, can be 'tagged' with a call sign and comment besides the usual channel number, mode, and frequency. A

programmable 'duplex' separation also lets you quickly check repeater input/output frequency signals, or of course split-frequency channels. With virtually unlimited memory channels, finding a wanted channel can sometimes be a bit difficult with a 'normal' scanner. However, in 'recall frequency' mode, this alphanumeric 'tag' provision can be used to good effect. Let's say I want to find the frequencies of all GB3xx amateur FM repeaters I've stored - I enter 'GB3' in the search string, click on FMN, and then click the 'find' button - they all instantly pop on the screen for me to select. Various 'hotkeys' can also be assigned for quick recall and scanning - indeed the PC control possibilities are extremely comprehensive and well up to the '£100 plus' type of PC control program. I'm told that an optional frequency database is also available for the software, which adds the frequencies of over 300,000 world-wide transmitters to the system, which could also be worth looking into.

Tuning

I found the various 'manual tuning' controls were intuitively very easy to use. Despite having the instruction book by my side, the on-line Windows-based 'help' screens, with hypertext links between them (Windows users will know this makes 'searching' for information very easy), gave me all the information I needed. Clicking anywhere in the 'frequency' window allowed me to enter frequencies directly from the keyboard - I could also do this by simply tapping in the frequency at any time followed by an 'M' (for MHz) or 'k' (for kHz). For tuning around, the 'step' size can be manually changed to any frequency step in 0.5kHz increments, i.e. 12.5kHz for VHF/UHF, 5kHz or 1kHz for HF broadcast, 100kHz for Band II FM, 9kHz for medium



wave, and so on. An 'auto-step' mode is also available, where the set will automatically select the step increment you've configured the set for, individually over any number of frequency ranges. The up/down buttons besides the frequency display also step the frequency up and down, and if I moved the mouse pointer onto the tuning knob, could use the left and right mouse buttons as tuning controls.

There was only one SSB mode, for use with USB, LSB, and CW - a 'BFO offset' tuneable in 5Hz steps is used to 'interpolate' between tuning steps. This is about the only time I found tuning around for signals a little awkward. For example, to tune around the HF amateur bands I had to step up and down in 0.5kHz increments to tune a signal in as closely as possible, then go to the offset window and tune again to accurately resolve the station. Maybe a future software upgrade will interpolate 50 or 100Hz BFO offsets with the 0.5kHz steps?

On-air performance

Enough of the operation, which you'll see gives quite comprehensive facilities, how did the receiver really perform on air? Throughout my tests, I had to remember to try to compare it with something like a handheld scanner, rather than as full-blown HF or VHF/UHF communications

receiver which together could otherwise have cost a couple of thousands of pounds. With this in mind, I coupled my outdoor HF aerial to the set, and wasn't too surprised to find the receiver overloaded on 'busy' bands. Here, I initially had the receiver in 'DX' mode, i.e. with the gain flat out - so this wasn't too surprising. Clicking my mouse on the 'Local' button gave an immediate improvement, and I had great fun tuning around the various broadcast bands with the set.

Tuning into my local Band II broadcast band stations gave very good performance, which I suppose is to be expected. Weak Medium Wave stations and signals on the LF amateur bands however suffered from computer generated 'hash', but I also found this on my separate HF receiver when the computer was switched on. "Now's the time to fix this" I thought (I'd been meaning to for a while, before I even knew of the WinRADiO unit). Earlier deduction had shown that all my computer leads, monitor, keyboard etc. were not the cause of the interference (I'd already checked these for amateur radio data operation), and the computer was in a completely metal screened case, so there was only one culprit left as the 'aerial' - the computer's mains lead. In went a chassis-mounted RFI filtered IEC mains connector in place of the computer's unfiltered type, the result being perfect peace. After

this, I'm pleased to say, the WinRADiO unit was hardly affected at all from 'internal' computer QRM - the good screening on its plug-in board was obviously working very well.

I found the set to be quite reasonable for narrowband FM listening on the VHF/UHF bands, although AM airband reception seemed a little 'distant' - possibly due to a slight level of background hiss on signals which I also found on narrowband FM. On HF AM, with all the other co-channel interference etc. this was hardly noticeable though. SSB reception seemed to be rather a compromise. Besides the tuning difficulties, i.e. 0.5kHz steps plus BFO offset, I found the receiver bandwidth to be rather wide, although to be fair it seemed virtually identical to a £400 handheld scanner with HF SSB that I'd tested a year or so ago. Scanning around VHF/UHF, I found I rarely suffered from strong signal blocking, even though I live in a congested RF area with strong local PMR signals coming in from all corners. I did however find the rejection of 12.5kHz spaced signals wasn't all that good, nor was the intermodulation (where two off-channel signals combine to give a third on-channel signal). But having said that, I must remind readers to compare 'like with like', maybe I was expecting £1000+ performance which the set's PC on-screen display really could suggest to the user!

Lab tests

In coupling the system up to my test equipment, I was a little horrified to find that, as soon as I touched the 'earth' side of the WinRADiO's BNC connector to my signal generators, the receiver 'hash' level went up tremendously. This is *not* what I found in 'real use' on air, thus I'd advise you to treat the measured results with some caution! I tried to reduce the

RF hash without success, so I suppose some results are better than none at all.

Conclusions

The WiNRADiO arguably isn't for the serious, discerning listener who wants the best RF performance possible. For that, you'll need to buy a £1000 plus receiver,

and pay extra for PC control if you also want that facility. But, for £409 when you compare the system to other hardware (never mind software!) available at that price, i.e. a handheld scanner, it compares very favourably indeed. I found the system a pleasure to use for scanning around VHF/UHF, with HF and SSB 'thrown in' for good measure. The control

software was superb. With 'quieter' PCs, RF-wise, now being available, computer-controlled scanning is, I'm certain, likely to be more and more popular, and for this I believe the WiNRADiO is an excellent pioneering move. I thoroughly enjoyed using the system in my PC, albeit with its limitations of selectivity etc. But for the relatively low cost, overall I feel that a

rather satisfactory 'end product' has been the result. I'm told a higher performance 'professional' version of WiNRADiO with DSP facilities will also be available in the future, this I feel will be of great interest to those wishing even better RF performance.

My thanks go to Lowe Electronics Ltd. for the loan of the review sample.

LABORATORY RESULTS:

All measurements taken at 145MHz, NFM, unless stated. Note that many measured figures, particularly LF/HF and AM, suffered from induced test equipment/computer ground loop 'hash' - see text.

Sensitivity;				
<i>Input signal level in μV pd required to give 12dB SINAD);</i>				
Freq.	Level			
	SSB	AM	FMN	FMW
0.5MHz	5.12	0.98	1.35	-
2MHz	3.60	0.66	0.43	-
5MHz	1.55	0.97	0.46	-
10MHz	2.41	0.38	0.33	-
20MHz	3.85	0.46	0.30	-
30MHz	3.81	0.25	0.29	1.22
50MHz	0.39	0.43	0.30	1.91
75MHz	0.54	0.50	0.39	2.20
100MHz	0.41	0.54	0.39	1.84
120MHz	0.40	0.51	0.40	1.55
145MHz	0.86	0.45	0.46	1.50
165MHz	0.41	0.45	0.36	1.85
200MHz	0.33	0.49	0.31	1.72
400MHz	0.27	0.44	0.36	1.03
435MHz	0.29	0.37	0.36	1.10
450MHz	0.31	0.44	0.37	1.38
500MHz	0.29	0.36	0.29	1.06
750MHz	0.42	0.34	0.28	0.89
934MHz	0.35	0.45	0.37	1.44
1000MHz	0.72	1.02	0.60	1.96
1296MHz	2.24	-	2.01	7.90
1300MHz	3.51	-	2.39	9.61

Adjacent Channel Selectivity;	
<i>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;</i>	
+12.5kHz;	15.8dB
-12.5kHz;	13.9dB
+25kHz;	45.5dB
-25kHz;	48.1dB

Blocking;	
<i>Measured as increase over 12dB SINAD level of interfering signal modulated with 400Hz at 1.5kHz deviation to cause 6dB degradation in 12dB SINAD on-channel signal;</i>	
+100kHz;	48.8dB
+1MHz;	76.9dB
+10MHz;	86.0dB

Attenuator Level	
10MHz;	8.2dB
145MHz;	9.8dB
435MHz;	13.7dB

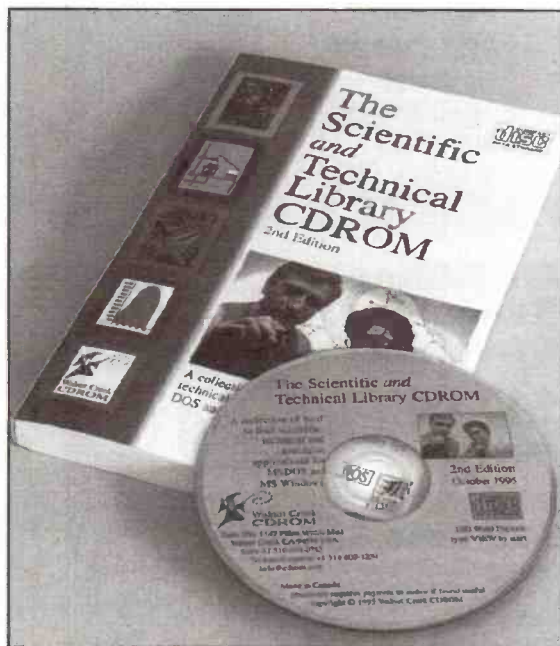
Intermodulation Rejection;	
<i>Measured as increase over 12dB SINAD level of two interfering signals giving identical 12dB SINAD on-channel 3rd order intermodulation product;</i>	
25/50kHz spacing;	59.2dB
50/100kHz spacing;	57.2dB

Image Rejection	
<i>Difference in level between unwanted and wanted signal levels, each giving 12dB SINAD on-channel 145MHz FM signals;</i>	
1st Image;	63.2dB
2nd Image;	>100dB

Maximum Audio Output	
<i>Measured at speaker/headphone socket, 1kHz audio at the onset of clipping (10% distortion), 8 ohm resistive load;</i>	
2.62W RMS	

Scientific and Technical Library CD-ROM Review

Reviewed by the Ham Radio Today Editorial staff



If you received the front cover disk on the May '96 issue Ham Radio Today magazine, you may have seen an on-disk section detailing the many programs available from the Public Domain and Shareware Library, run by licensed amateur Rod Smith. These are each available on separate floppy disks from the PDSL, but if you fancied trying all of them, you'll probably find every single one on this CD-ROM. The Scientific and Technical Library CD-ROM contains, in our opinion, the most comprehensive collection of quality public domain and shareware programs in this field that you'll find on any such disc collection. No 'demos' or whatever, just good programs. Like fax, SSTV and CW programs, logging and HF propagation, rig modification information, packet radio, rig control, and satellite programs.

As well as ham radio programs, as its name suggests the CD-ROM is also packed with program sections on other scientific and technical topics. Like Artificial Intelligence, Astronomy, Communications, Electronics, Engineering, Mathematics, Medical, Printing Utilities, Programming, Scientific, Security and Technical Drawing. So as well as ham radio programs, you'll also find electronic design help, even manufacturer's semiconductor information, a selection of PCB design and circuit drawing programs, even stress calculation programs for your new home-brew aerial mast.

With this very large program selection, each usually being in compressed form to allow the disc to contain over 1Gb worth of programs, it's good to know that a comprehensive 240 page book comes with the disc, detailing the contents and features of every single program.

The CD-ROM is priced at £29.00 inc. p/p, and our thanks go to the PDSL for the provision of the copy for review.

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AVAILABLE SOON MODEL No. DX-394



SPECIFICATIONS

Frequency Coverage:

LW	150-509.9kHz
MW	510-172.9kHz
SW	1.73-29.9999MHz

SW Sub-Bands:

2.300-2.495 MHz (120 meters); 3.200-3.400 MHz (90 meters); 3.900-4.000 MHz (75 meters); 4.750-5.060 MHz (60 meters); 5.950-6.200 MHz (49 meters); 7.100-7.300 MHz (41 meters); 9.500-9.900 MHz (31 meters); 11.650-12.050 MHz (25 meters); 13.600-13.800 MHz (21 meters); 15.100-15.600 MHz (19 meters); 17.550-17.900 MHz (16 meters); 21.450-21.850 MHz (13 meters); 25.670-26.100 MHz (11 meters)

Sensitivity: (AM 10 dB (S+N)/N at 30% modulation)

LW	10 μ V
MW	7 μ V
SW	1 μ V
(SSB 10 dB (S+N)/N)	
SW	0.3 μ V
(CW 10 dB (+N)/N)	
SW	0.1 μ V

Selectivity:

± 7 kHz (AM)	50 dB
15 kHz (SSB/CW)	50 dB

IF Rejection (Lo-Z)

	80 dB
--	-------

Spurious Rejection (Lo-Z)

	80 dB
--	-------

IF Frequency:

1st	45 MHz
2nd	455 kHz

Antenna Impedance:

Lo-Z	50 ohms
Hi-Z	2 ohms

Audio Out Power (10% THD)

	800 mW
--	--------

Built-in Speaker

	77 mm (3") 8-ohms dynamic type
--	--------------------------------

Power Requirement

	AC 120 volts, 60 Hz, 13 watts
	DC 13.8 volts, 8 watts

Operating Temperature

	0 C to 43 C (32 F to 109 F)
--	-----------------------------

Dimensions

	96 x 233 x 230 mm
	(3 11/16 x 9 1/8 x 9 inches)

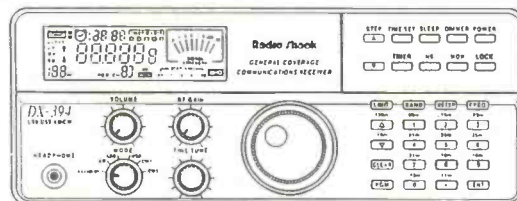
Weight

	2.1 kg (4.6 lbs)
--	------------------

Specifications are typical; individual units might vary. Specifications are subject to change and improvement without notice.

CONTROLS

A quick glance at this section should help you to understand each control's function.



VOLUME — adjusts the sound level.

RF GAIN — adjusts the receivers sensitivity.

MODE — sets the receiving mode.

FINE TUNE — fine tunes the reception signal, especially when you tune to SSB and CW.

MAIN TUNING KNOB — selects frequencies.

STEP \blacktriangle , **STEP** \blacktriangledown — selects the 0.1, 1.5, or 10 (9) kHz tuning frequency step sequentially.

TIME SET — sets the built-in clocks.

SLEEP — turns off the receiver after 30 or 60 minutes.

DIMMER — selects two levels of display back lighting brightness.

POWER — turns the power on and off.

TIMER — sets the built-in clocks and turns the timer on or off.

NB — turns noise blander on and off.

MON — stores the current frequency into a monitor memory and recalls the frequency from memory.

LOCK — disables the main tuning knob and all buttons except **POWER** and **LOCK** to prevent accidental operation

LIMIT — turns on the limit mode and sets

the frequency range.

BAND — selects LW (150-509.9 kHz), MW (510-1729.9 kHz), or SW (1.73-29.9999 MHz) sequentially.

METER — selects one of the 13 International Broadcasting Bands.

FREQ — directly tunes to the frequency with number and decimal keys.

\blacktriangle and \blacktriangledown — tune up or down, select the higher or lower limit frequency in the limit mode, and the search direction in the limit, band, and meter modes.

CLEAR — clears an incorrect entry.

PGM — turns on the program mode to set a limit frequency, store a frequency or set the time.

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SCANNERS

Bill Robertson has another bumper mailbag this month, but finds time to look through a new scanner frequency guide book

Kenneth from Co. Tyrone writes in to say that it's been some time since he constructed anything, but when he saw the article in this column in the January 1996 issue on the POCSAG paging decoder, he thought he'd give it a try and ordered the parts. He designed the circuit from the simple theoretical circuit diagram, building the unit on Veroboard (Kenneth said he had to use his 'brain power' here for the correct layout!). However, he managed to arrange the components appropriately, soldered them in, and connected the modem up to the speaker output of his MVT7100 scanner and the COM1 serial port of his Amstrad 486 PC.

Kenneth says his two teenage sons were looking on, and had rather dubious thoughts as he loaded up the POCSAG program. Suddenly, a stream of messages appeared on his monitor, and he turned around with a knowing wink that he'd achieved a goal. Kenneth is now looking forward to constructing the modem for the Hamcomm interface so that he can receive RTTY and SSTV.

A hint here is that the POCSAG decoder has a similar, but not quite identical, circuit arrangement to the POCSAG interface, so maybe a slight modification with a toggle switch between the two could be worthwhile. Having said that, the simple circuit arrangement and inherent low cost of the components used makes it much of a 'toss-up' between the two choices!

Packet TNC with a built-in POCSAG paging decoder

The Kantronics KPC-9612 packet radio TNC now has a POCSAG decoding facility built-in as standard in its firmware. The version 7.0 firmware now also monitors 512 and 1200 bps numeric and alphanumeric POCSAG paging messages, as well as supporting page

Built-in pager decoding now as standard on the Kantronics KPC-9612



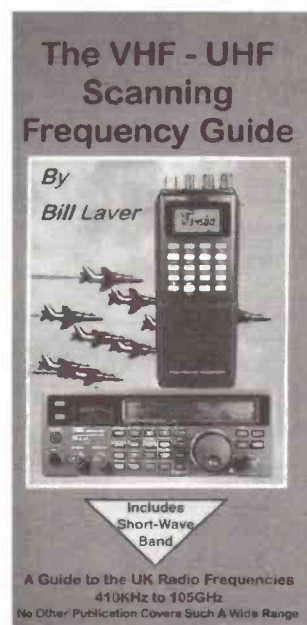
transmissions and a packet paging server with ten new paging commands having been added. A pager book and pager log can also be established in the unit's random access memory, the page log storing all pages sent and the page book storing callsign and pager capcode pairs. So, if you're a packet 'buff' this could be worth a closer look! You can get further information on the KPC-9612 or firmware upgrades for your existing KPC-9612 from Lowe Electronics (Tel. 01629 580200) or Siskin Electronics (Tel. 01703 254247).

New VHF/UHF Scanning Frequency Guide

Hot off the press is a new book, the VHF/UHF Scanning

Frequency Guide 1996, which replaces the earlier A4 sized version. This one's in a 'reporter's notebook' format, and measuring 110mm x 228mm it's a size that can be carried in a jacket pocket or easily slipped into a car glove compartment or door pocket. The guide covers not just VHF/UHF, but all the way from 27MHz to 105GHz, plus information on the use of bands from 410kHz upwards

The new VHF-UHF Scanning Frequency Guide



pages, ISBN 1 873076 10X and published by Spa Publications, it's priced at £12.95 and should be available from a number of specialist radio dealers as well as bookshops.

Formula One Frequencies

John Davies from Kent writes in to say he's interested in motor racing, and would like to know the frequencies used for track-side communication such as marshals and pit to car communication. He tells me he's had difficulty in obtaining information of frequencies used, having even written to the motor racing governing body, who've replied to say that he'd need to apply to each race track and to each race car team

to obtain this. Asking fellow spectators at the track with scanners and earphones has resulted in replies such as "I'm only listening to the news mate".

This of course is probably to be expected, as, in the UK at least, you need to have the permission of the person or organisation doing the transmitting in order to listen in. However, a frequency guide can often give some useful tips, the latest guide (detailed above) from Spa Publications for example gives 455.2350 (probably 455.2375) and 456.615 (probably 456.6125) for the Ferrari Racing Team Voice link, 456.975 and 457.500 for Formula One Racing teams, 457.0250 for Minardi Formula One, 460.325 and 462.425/456.925 duplex for Lotus Formula One, 467.725/462.250 duplex for Benneton Formula One. The band 456.000-456.975 paired with 461.500-462.475 is also listed as being used for mobile racing teams. You may also like to take a look back at the October '95 *Scanners* column for more racing frequencies, although these could easily have changed this year.

Realistic / Commtel scanner frequency expansion

Neil Houliker from Lancashire writes to express thanks for the information in the May 96 column on modifications to the Realistic PRO-43. He's tried these on his Commtel 203 scanner, the modifications required being slightly different, as I had expected. Neil found that by removing diode 3, labelled as diode 4 in his scanner, enabled reception of 30-54MHz but disabled the 68-88MHz range. Neil received several stations on the new range of frequencies, and all seemed OK. He decided to modify the set further by cutting the track to the keylock switch, and adding the diode in line with the switch, to in effect switch in the diode to receive 68-88MHz or switch it out to receive 30-54MHz. He advises that if other readers try this

mod, they should be sure to cut the print on *both* sides of the PCB. The only limitation Neil found was that the scanner needed to be switched off, then back on again, before switching down to 30MHz. This no doubt is to correctly instruct the set's microprocessor of it's 'new' range.

Many thanks for sharing this information with us Neil, I join you in hoping other readers also find it useful!

Computers and Scanners

Richard Parker from Essex writes to say that, last November, he 'took the plunge' and bought an AR2700 scanner. He's very happy with and admits he's now totally 'hooked' to the hobby. Since then, besides having operating the set mobile with an externally mounted aerial, he's also tried to connect the set up to his DX4/100 PC at home, intending to use the AOR control software to drive the set.

He then discovered the problem which besets many others, that of RF interference from the computer. Living in rented accommodation, Richard is limited to an indoor aerial, and has tried a 'Nomad Active Scanning Antenna' hung from the curtain rail about 1m from the computer. In order to try and reduce the interference, he's gone to the extent of screening the entire computer with tin foil, and wrapping this round the scanner, but to no avail. He can't use the aerial in a different room for domestic reasons, and asks if I can offer any suggestions, as he's getting desperate! He'd like to upgrade to an AR8000 to try HF modes such as RTTY, FAX, and SSTV, but needs to get rid of the interference first!

I'd advise here that the best way to get rid of it is to cure it at source, but if that isn't possible (which it isn't with many such devices, they'd stop working if you stopped the various oscillators and data pulses) then at least reduce the level of radiation from the source. As the case of the

computer is apparently not the culprit, this leaves the things connected to the computer. Like those nice unscreened leads (i.e. aerials) such as the RS-232 cable, the monitor cable and the monitor itself, keyboard and lead, printer lead, not forgetting the mains cable.

With the computer switched on and running, first try unplugging all the leads (apart from, of course, the mains *input* lead), but switching off and unplugging the video monitor, and see what happens. Still getting interference? Then try adding an RF mains filter, preferably right at the computer case end, or even replace the computer's IEC connector with a specially filtered type (available from good component dealers). Then plug each connecting lead, one by one, ending with the video monitor lead, and then finally switching the monitor itself on, and see if or when the interference increases. Filtering the appropriate lead is then called for, try one of the 'clamp-on' RF ferrite chokes, again available from good component dealers, or specialist suppliers like amateur radio shops. Ferrite toroids are one often-recommended solution here, but unfortunately you'll usually find the multi-way computer plugs won't fit through the middle of these, hence my recommendation of the 'clamp-on' types. If it's mains-borne interference from the monitor, then an RF mains filter here is again called for.

I hope the above gives you a few 'starting points' Richard, and that you'll be able to get your interference level down somewhat. I would however advise that techniques to reduce HF interference (for when you upgrade your scanner) can be quite different from those for VHF/UHF, so what cures VHF/UHF may need further work on HF, and vice-versa. Good luck, and do let me know how you get on, so hopefully other readers might get a few 'hints' through these pages.

AOR Interface kits

Still on the subject of the AR2700 and AR800 and PCs, I recently read an interesting message from Donald Gray regarding his future kit availability for a PC interface for these scanners. A full kit of components is to be offered by him, consisting of;

- 1 x MAX232 IC
- 2m double screened RS-422 cable
- 5 x tantalum capacitors
- 2 x resistors
- 1 x piece strip board
- qty terminal pins, grommets, and mounting pillars
- 1 x die-cast metal box
- 1 x special ribbon cable for connection to AR8000 or AR2700 radio.
- 1 x "D" connector.

The good news is that the cost is due to be just £22.50 plus £5.00 p/p. It comes complete with working drawings and fully detailed step-by-step instructions, although you'll need a fine tip soldering iron to assemble the unit. Although the concept is to supply a DIY kit of parts, Donald says he will be happy to supply a built and tested unit in case you don't wish to build your own.

Donald also gives a 'hint' of new software for the AR8000, called "Channel Commander V2.0", which should be completed by around the time this appears in print.

You can get further details and ordering information by email from D.Gray@AutoComm.Cityscape.co.uk

Bill Robertson is pleased to hear from readers and will answer queries through this column - address your letters to; Bill Robertson, c/o HRT Editor, Nexus, Nexus House, Boundary Way, Hemel Hempstead, Herts HP2 7ST, or by fax or email to the Ham Radio Today direct Editorial contact points.

Please remember that reception of some services may not be permitted without appropriate authority. The RA's information sheet on 'Scanners' has full information for the UK.

The Belcom Liner 2 SSB Transceiver

Ben Nock G4BXD describes a 2m DX rig which is often available at a bargain price

It struck me at a rally recently, after overhearing a couple of new licensees talking, that the Belcom Liner 2 transceiver was old enough to be unknown to a large proportion of

newcomers to the hobby. That lack of knowledge was preventing them from picking up one of the little treasures of the age.

Arriving in this country in the 70's, the Liner 2

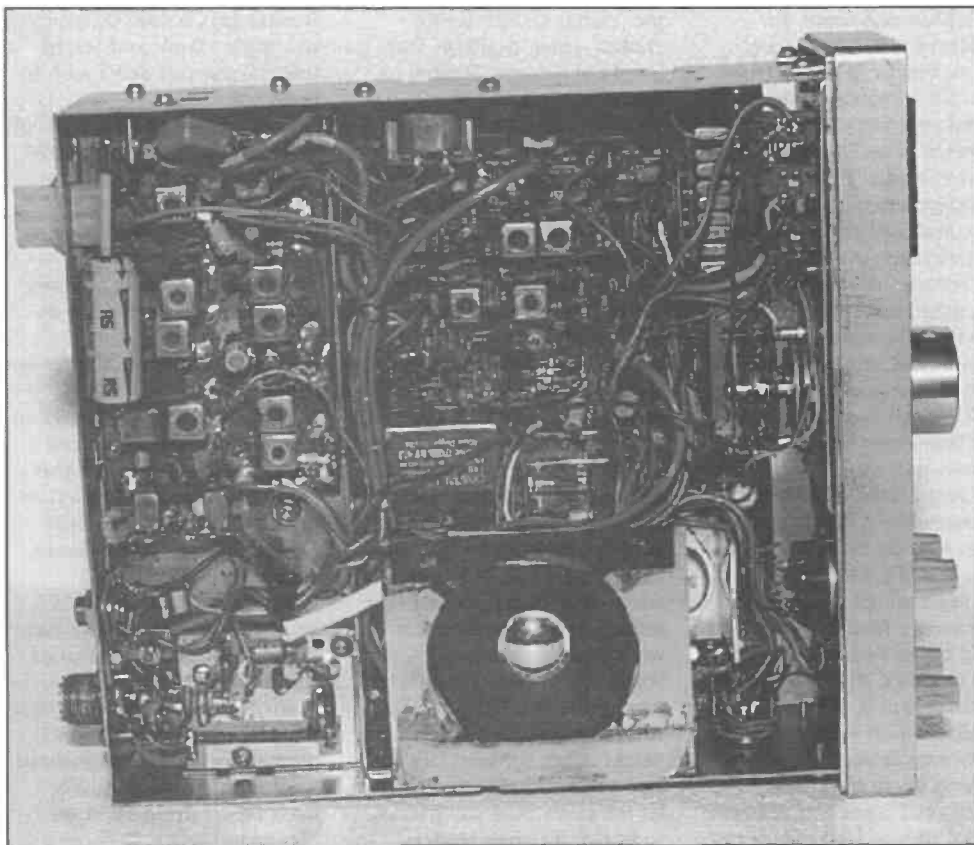
revolutionised the world of SSB and mobile communication. Prior to its introduction most SSB operators on the 2m band used either a transverter from an HF rig, or built a

purpose-designed SSB rig.

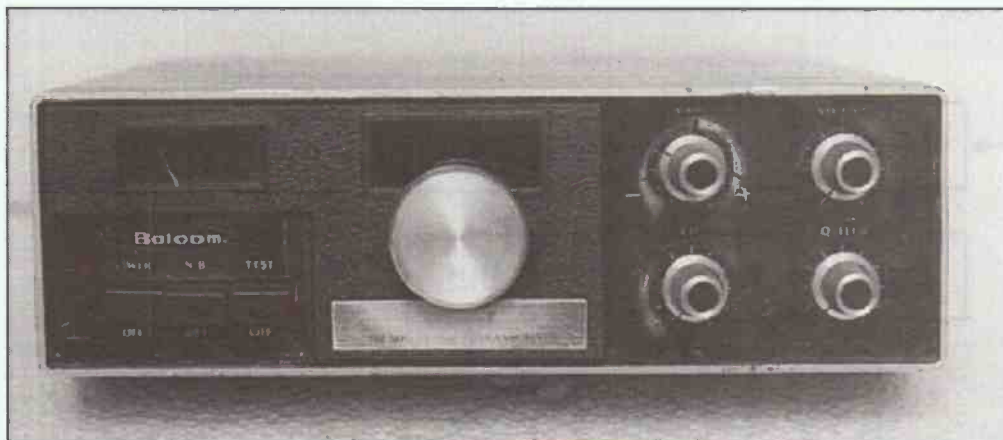
The introduction of the Liner 2 opened up 2m SSB for those not able to construct, or who could not afford an HF rig. Designed for 12V operation, it gave 10W of SSB (or, after slight modification, CW), had a built-in speaker, and came with a mobile bracket. There was also an optional matching 12V mains supply, which it could sit on top of.

There were those that derided the Liner 2. True, its spectral output left a lot to be desired, more about that later. But, it has to be said, it was a revolutionary piece of kit which gave many that first step into 2m SSB which they would otherwise never had.

Apparently the Liner 2 was a derivative of a 10m type rig produced by Belcom. It is nothing like the Belcom LS-102, which is a multimode 10m mobile rig. The Liner 2 seemed to be a modified CB/10m rig which had been fitted with a 2m transverter inside. In fact, one or two users removed the transverter PCB and fitted an amplifier to it for use on the 10m band. Originally the set covered the portion of the 2m band around 145.400MHz. But the SSB allocation was changed to 144.150 to 144.350MHz, which entailed older sets



Inside the Liner 2, main PCB in the centre, SSB filter just above the speaker, channel crystals top right, 2m transverter PCB on upper left of set



The Belcom Liner 2, displaying the typical wear and tear found on many rally offerings

having to be modified with new crystals fitted and the set realigned. Later sets came with the new allocation as standard. The actual coverage is from 144.110 to 144.330 in 10kHz steps.

Fitted with a fine tuning control, the set can be continuously tuned between the upper and lower limits. There is also an RIT function which adjusts the receiver tuning alone. An AF gain pot, Squelch pot and three push switches; ON/OFF, NOISE BLANKER ON/OFF and a TEST button, complete the facilities.

A small meter on the front panel monitors S strength on receive and power out on transmit. In unmodified versions the microphone plugs into a jack socket on the side of the rig. A common modification is to remove the squelch control and fit a mic socket in its place.

Set construction

Internal examination of the Liner 2 does give the impression of CB type rigs. A motherboard houses all the main generating and receive stages, IF, AF etc, with a smaller PCB towards the rear of the set housing the 10m to 2m transverter. Servicing is quite easy, the open nature of the PCB, and the ability to reach the solder side easily, make repairs or modification quite within the reach of even beginners.

As stated earlier, the output of the set did give rise for question when it first came

out. The problem only appeared to those with the luxury of a spectrum analyzer, a servicing tool beyond the scope of many in those days. The single ended mixers, 3SK39 and 3SK35 FETs, gave rise to the poor output spectrum.

It is true that if the set is tuned up for maximum output the spectrum analyzer output looks like an up turned comb. I was most surprised when I used my own analyzer to tune up a set recently. The 2nd, 3rd and 4th harmonics were very prevalent, and as the 3rd harmonic falls in 70cm, there was need to investigate.

Careful tuning can reduce the harmonic and other unwanted content quite a lot. There have been numerous modifications published over the years to further reduce this, especially concerning the mixer circuits in the set (see later comments). But unless you are a competent constructor I would guess the easiest solution is to have a good bandpass filter between the rig and the aerial. As the tuning range is so limited, 144.100 to 144.330, then even a sharp cavity type filter might suit.

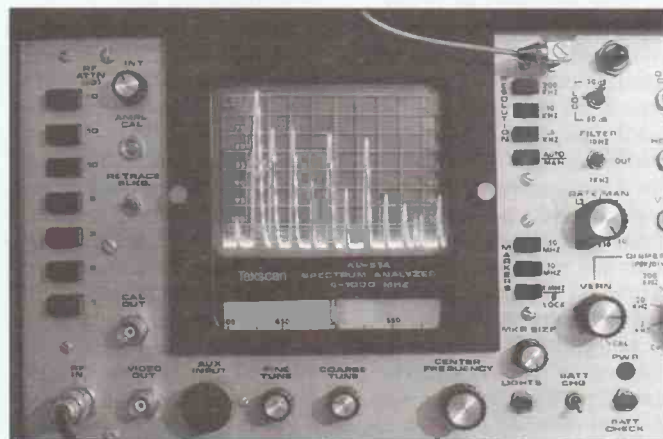
In use today

The condition of a typical rig may be rather dull. The outside front plate is of a material that does seem to show the wear and tear quite a lot. After the years of service, many of these sets

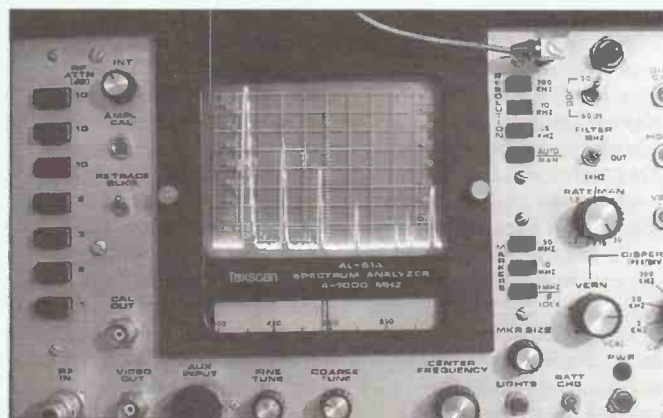
have been modified, and not always in the best of ways. Having said that, most of the wear should be cosmetic, simply fingers rubbing up against the face plate. Usually the set inside is quite OK. The best thing is to remove the case, four screws at the rear

and two in the speaker underneath, and have a look inside the set. If it looks a mess, mods everywhere etc, then you will have to judge it by its asking price and your abilities in restoration.

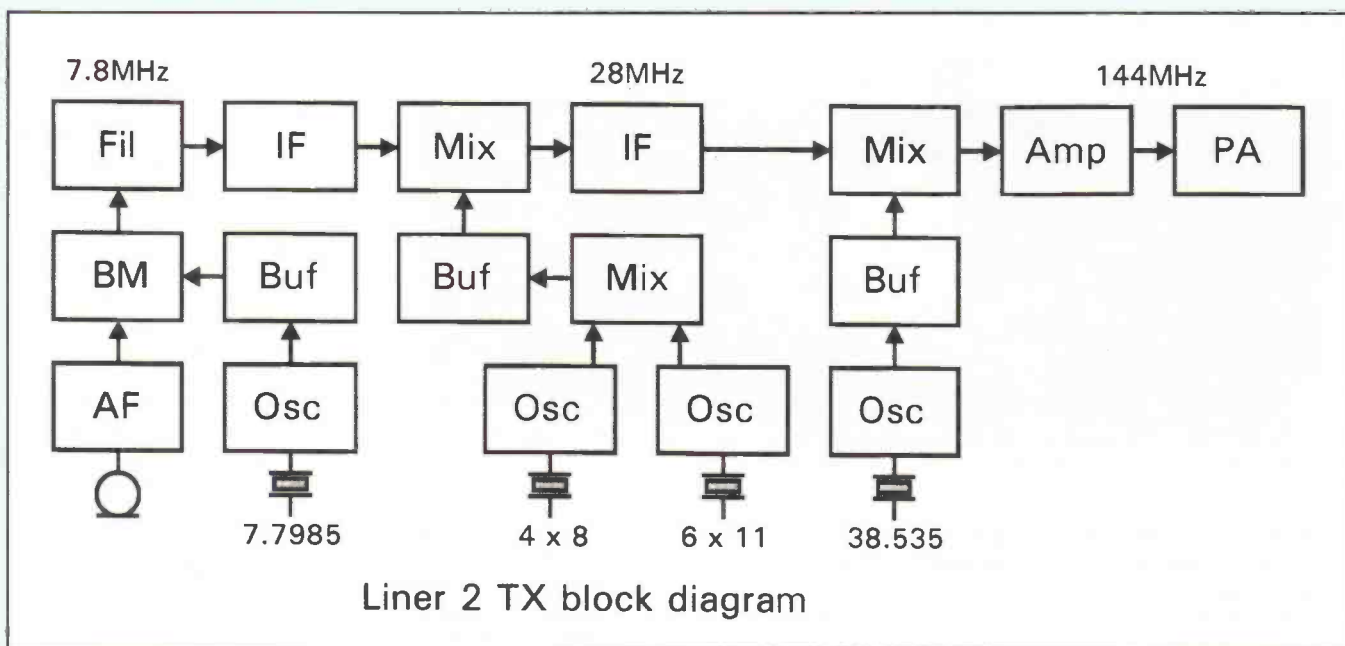
Asking around on the airwaves brought many replies from Liner 2 owners, past and present. Steve, G3ZVW, commented on his Liner 2 "OK, I admit it, I owned a Liner 2! In the early 1970's, when SSB on 2m was in its infancy, I was one of those running a Belcom Liner 2. I sold it many years ago, but as I recall it was a 24 or 25 channel rig, which switched 2 banks of xtals in various combinations to cover approx. 250kHz of the lower end of 2m. A VXO enabled operation between the 10kHz steps. I believe it ran 10W output, but I'm not sure. I was told that in fact the Liner 2 was a 28MHz



Spectrum output of Liner 2 tuned for maximum output. Scale represents 0 to 1000MHz. first peak on left is the 2m signal, the rest are harmonics and mixer signals captions



Spectrum of Liner 2 adjusted for best output, same scale as before. Note that the second and third harmonics are still very prevalent



SSB rig with a built-in transverter, but again I'm not sure."

Steve also went on to say "The one thing I am sure about is that it was not a very clean transmission. One of the mixers (all three in fact - Ed) used a single-ended circuit, which resulted in less than ideal performance. A balanced mixer would have been much better, indeed some people (not me) modified this section of the rig and got much better results from it."

John, G8KVP, mentioned an interesting problem with the Liner 2; "Never have the noise blanker switched on when on transmit, this, for some reason, makes your signal about 10 times wider than normal."

Rick, G4BLT, recalls "Yes, I remember the Liner 2. They were noted for having spurious outputs that were acceptable when they were used 'barefoot', but which were a major problem when used with a linear amplifier and a large beam! That led to the common nickname 'Liner Spew'."

John, G3KHC, mentioned an interesting point when adding a preamp to the receiver "Years ago I had a secondhand Liner. It was OK and I had fun working SSB with it. However some previous owner had added a

preamp but it had too much gain, and if a local came on the air I knew all about it even though it was unnecessary for me to tune for him! I didn't keep it too long." Steve, G3USE, mentioned a couple of standard mods that were done to this set. "I did two mods, one was to fit a receive preamp as the basic receiver was, it was said, geared to a crowded 2m band in JA land. The QSY to the bottom of the band made this easy to adjust as GB3VHF was on 144.150MHz (in those days). The second mod was adding a CW facility, by keying the test tone."

"However", Steve continues, "I did not make many contacts on the key because the lowest frequency covered was 144.10 and trying to call SSB stations that I could not raise on SSB (a tried and tested play on 160m and 4m) did not wash with VHF no-code licensees. Overall it was super rig that I had a lot of fun with, especially from hilltops during contests. Coming back to the spurious signals. I think it was due to a design factor where a degree of overdriving of either the 28.5MHz SSB source or the 116MHz +/- VXO chain produced these unwanted outputs from the mixer. Later

on, Belcom produced a 70cm version."

In use

Despite the mention of spuri, the set today is a useful little rig. It is easy to use, is self-contained, and only requires the simplest of supplies. In fact I also used a Liner 2 in the late 70's, along with a 12V motorcycle battery, and a whip, all in a small shoulder bag, from atop Barr Beacon in Birmingham for many years (a certain G8IYA also used a motorcycle battery powered Liner 2 and hand-carried 2m beam from the top of Blackpool Tower many years ago - Ed!)

One problem is that the internal speaker is on the bottom of the set, so if the rig is placed on a shelf, the speaker becomes blocked and the audio muffled. Using the mobile bracket to hold the set off the shelf gives better audio quality. Another idea is to use the mobile bracket, screwed to the underside of a shelf, the speaker is then unobscured and the audio is quite good.

With the set powered from a 12V supply, the only other connections are aerial and mic. The aerial should, of course, be horizontally polarized, this being the norm for SSB, communication.

Omnidirectional horizontal aerials, crossed dipoles, the "halo", the turnstile, will all work fine, just give a lower 'gain' if any but will remove the need for a rotator. Even on something as simple as crossed dipoles, DX can still be worked, especially during 'lift' conditions. Otherwise, something like a 6 or 8 element beam would be ideal for general working, better still a 10 or 14 element beam if you can manage this.

The set is very easy to operate, though tuning does involve two actions. Let's assume we wish to tune from the calling frequency (144.300) down. The channel switch is set to 30 and the VXO knob rotated. This will tune 5kHz or so each side of the channel. The channel knob is then set to 29 (144.290) and the VXO again swished about. This process continues until you find a station, or come to the end of the channels, when the whole procedure can start again.

You should note that stations often call CQ on other frequencies than just .300, so it pays to tune around on SSB.

So, if you see this little rig at the next rally, you now know what it is: Why not have a look at 2m SSB the cheap way, I am sure you will enjoy it. Good hunting.

Amateur Radio Operating Manual

Reviewed by the
Ham Radio Today Editorial team

We all have to gain operating experience somehow, and many of us usually learn the 'hard way'! The RSGB's latest Operating Manual is a very good effort to give introductory help, not just to the newcomer to ham radio, but also to the amateur who'd like to try a new operating mode, whether be this repeaters, AMSAT satellites, digital modes, or even helping out with the talk-in station at their local club's rally.

As well as giving information on operating practices and procedures, there are chapters specifically

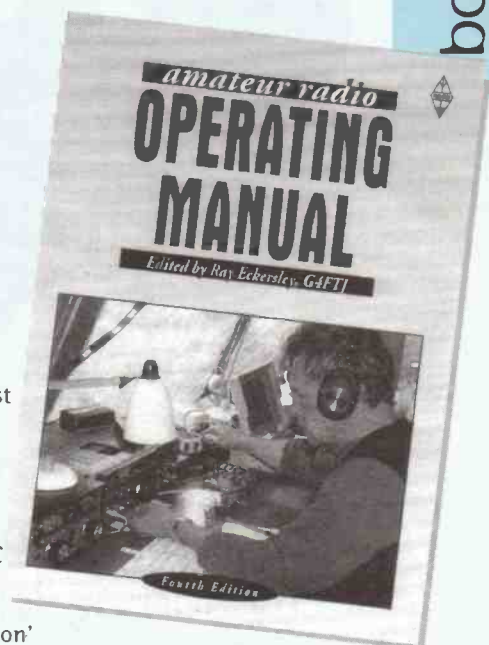
devoted to setting up a ham station, DX, mobile and portable operation, data, special event stations, satellite and space communications, and image techniques, plus appendices on many other subjects.

Some of the information is naturally on an 'updated' basis from the RSGB's earlier Operating Manual, although the very latest available information has been included wherever possible. For example, there's details on the forthcoming Phase 3-D satellite, even the latest UK repeater coverage maps (these for example being more up-

to-date than the RSGB's 1995 callbook we have here). Likewise, the latest data communication information is included, including Pactor II and G-TOR, plus a 'help you get started' guide on getting your packet TNC set up for the first time.

This book is a very handy source of 'hands-on' operating information, one that could find a welcome place in many amateur's stations.

ISBN 1 872309 34 8, 249 pages, 272mm x 198mm softbound, it's priced at £11.65 plus p/p. It's



published by the RSGB (who's contact details follow 'Club News' in each issue of Ham Radio Today), to whom our thanks go for the supply of the review copy.

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A Synchronous Detector For AM

Raymond Haigh says "Why not try out the technique by adding this simple and inexpensive unit to an existing receiver?"

Manufacturers now often include synchronous detection circuitry in their high-quality, HF (Short Wave) broadcast band receivers. Claims made for the technique include improved audio quality, increased sensitivity, and a reduced susceptibility to fading and the distortions which accompany it.

It is quite easy to add a synchronous detector to an existing receiver, and this article describes a unit which can be put together in an evening. Although simple and inexpensive, it will enable constructors to gain experience of the circuitry and judge for themselves the advantages it can offer.

Basic principles

Originated by D. J. Tucker almost 50 years ago, the concept is not new. The practical exploitation of the technique for the detection of double-sideband AM signals has, however, had to await the development of integrated circuits capable of carrying out the necessary functions.

Since the late 60's,

amateurs have been using a simple form of synchronous detection for the reception of SSB (single-side-band) signals. Known as direct conversion, the process involves generating a local oscillation at, or very close to, the signal frequency, and combining this with the signal in a mixer or product detector. The output

from the mixer is the required audio modulation; hence the term, *direct conversion*. The local oscillator must be reasonably stable and drift-free, but it does not need to have a fixed phase relationship with the incoming signal.

The use of synchronous detection to render double-sideband AM signals

intelligible requires the local oscillator to be kept in phase with the carrier of the incoming signal. This is ensured by means of a phase locked loop and, until the advent of the integrated circuit, the large number of discrete components required in order to achieve phase coherence made the process

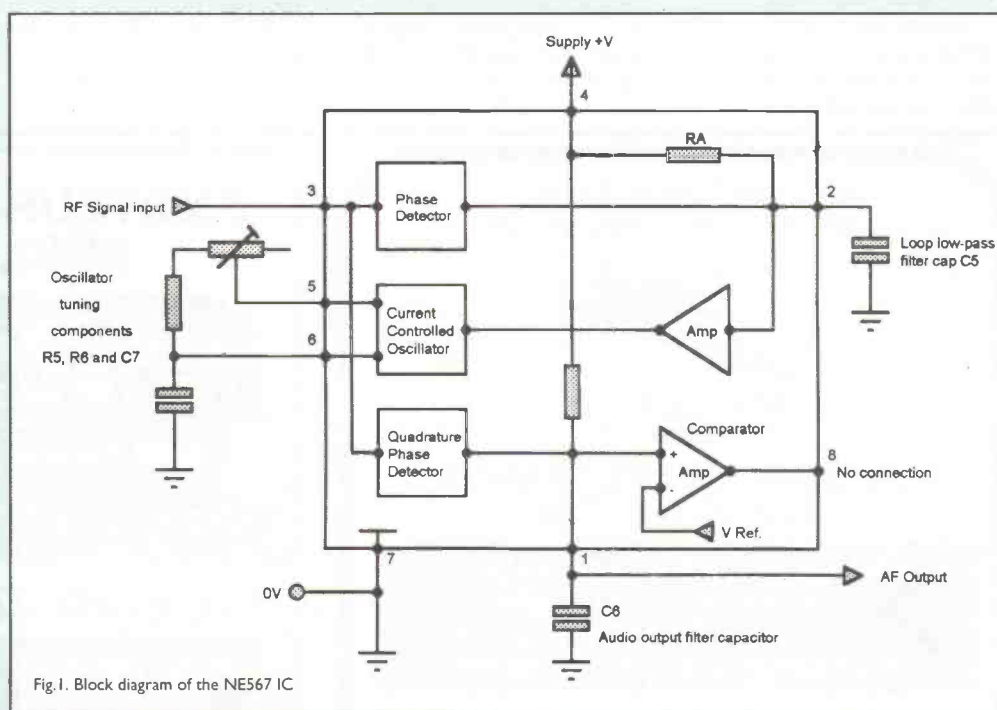


Fig.1. Block diagram of the NE567 IC

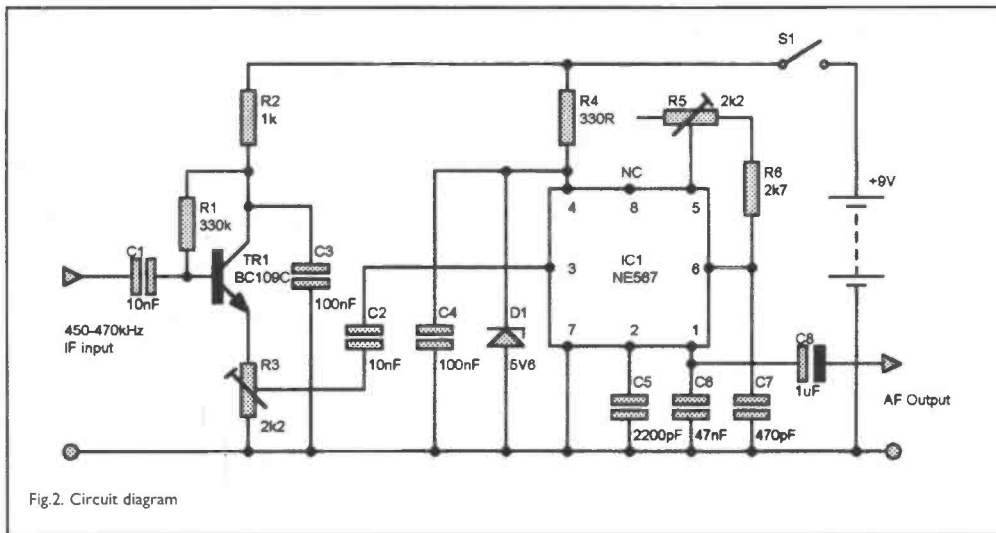


Fig.2. Circuit diagram

complex and uneconomical for AM detection systems.

Synchronous extraction of the audio modulation is carried out by a quadrature phase detector. With this technique, the local oscillator triggers a switching circuit which functions as a precision rectifier, demodulating the carrier to recover the audio signal. A filter capacitor removes residual RF, and the precision rectifier operates in a linear manner, even with signals of very low amplitude.

This may appear to be no different, in practice, to the conventional diode envelope detector. Semiconductor diodes are, however, relatively insensitive to very weak signals, even when forward biased by a small standing current. They also introduce harmonic distortion.

The Integrated Circuit

A block diagram of the NE567 chip, which carries out the required functions, is given in Fig.1. To avoid confusion, key discrete components included in the diagram have been given the identification numbers assigned to them in the full circuit diagram (Fig.2).

External resistors, R5 and R6, and capacitor C7, determine the operating frequency of the on-chip oscillator. Devices of this kind usually apply a voltage to control the frequency of the oscillator. This device effects

control by varying the current, but the operating principles are the same.

The phase detector, sometimes called a phase comparator, compares the frequency and phase of the input signal (in this case the receiver's IF) with the frequency and phase of the local oscillator, and applies a correction current, via an amplifier, to ensure phase locking or coherence. On-chip resistor, RA, and low-pass filter capacitor, C2, integrate the pulsed output from the phase detector to produce the

direct current which controls the oscillator.

The input signal and the signal generated by the local oscillator are fed into a quadrature phase detector where a switching action results in synchronous detection. Residual RF in the audio output is filtered by external capacitor, C6.

Comparator circuitry is also included. This is required when the chip is used as a tone detector (the purpose the device was really designed for). Output from the comparator amplifier is connected to pin 8, but the facility is not used in this application.

The IC is designed to operate up to 500kHz. Whilst this presents no problems for the majority of receivers, which have an IF in the region of 450 to 470kHz, the circuit should not be used with sets which have a final IF much in excess of this figure.

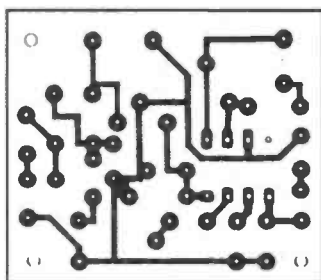


Fig.4. PCB pattern, track side, shown full size

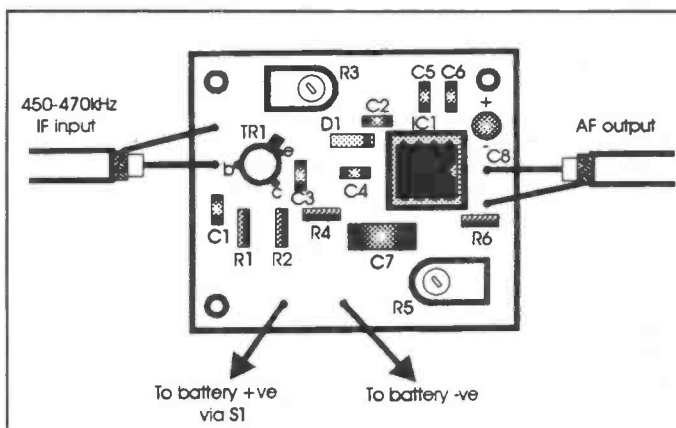


Fig.3. Component layout

The detector circuit

The full theoretical circuit of the unit is given in Fig.2. Input from the receiver's IF stages is applied to the base of TR1 via DC blocking capacitor, C1. This transistor acts as a buffer stage, the common-collector configuration providing the required high input and low output impedance. R1 sets the bias level and R2 and C3 decouple the stage from the supply rail. Pre-set potentiometer, R3, acts as the emitter load resistor, permitting adjustment of the signal level applied to the NE567 IC.

The functioning of the chip is affected by variations in supply voltage, and Zener D1, and resistor R4, are included to hold the supply reasonably constant. C4 acts as a decoupling capacitor and also bypasses noise generated by the diode.

The input and output ports of the IC are protected by DC blocking capacitors, C2 and C8.

Components

Almost any small-signal NPN transistor should work in the TR1 position, but the low-noise, high-gain, BC109C is recommended. This stage acts as a unity-gain buffer, and it is desirable for its input impedance to be as high as possible. With the common-collector configuration, input impedance is equal to the gain of the transistor (hFE) multiplied by the value of its emitter load resistor in ohms (in parallel, of course, with bias resistor, R1).

The NE567 IC is listed in several component supplier's catalogues. Versions bearing an 'N' suffix (NE567N) are also suitable (see Ham Radio Today ads for details of components and complete kits for this project - Ed).

Construction

All of the components are mounted on a small PCB. Component placement is

Parts list;

Resistors; all 1/4 watt, 5% tolerance or better

- R1 330k
- R2 1k
- R3 2k2 pre-set potentiometer
- R4 330
- R5 2k2 pre-set potentiometer
- R6 2k7

Capacitors; all 16V working or greater

- C1 10nF (0.01µF) ceramic
- C2 10nF ceramic
- C3 100nF (0.1µF) ceramic
- C4 100nF ceramic
- C5 2200pF ceramic
- C6 47nF (0.047µF) ceramic
- C7 470pF, 5% tolerance (or better) polystyrene
- C8 1µF radial lead electrolytic

Semiconductors;

- TR1 BC109C
- D1 5V6 Zener diode, 500 mW
- IC1 NE567

Sundry Items;

PCB materials, IC holder, Vero pins, hook-up wire. Small slide switch, battery connector, phono sockets and 75 x 56 x 25mm plastic box for case.

See Ham Radio Today display and classified ads (rear pages) for PCB services and component suppliers - please mention Ham Radio Today when replying to adverts.

shown in Fig.3, and the copper track side of the board is illustrated in Fig.4. The use of a holder for the IC makes substitution checking easy, and Vero pins inserted at the lead-out points simplify off-board wiring. The PCB and a PP3 battery can be installed in a standard 75 x 56 x 25mm plastic box with phono sockets for IF input and AF output connections, together with a miniature slide switch.

Setting up and testing

Check component placement, particularly the orientation of the semiconductors and the IC. Check for bad soldered joints and any bridging of the copper tracks. If all is in order, connect a fresh 9V battery. Current consumption should be

approximately 10 mA.

For setting-up purposes, feed the audio output into a separate power amplifier and speaker. Output from the detector will fully load small IC power amplifiers such as the TBA820M or the TDA7052 or, indeed, the audio amplifier stages of most transistor radios.

A domestic transistor portable, preferably one with long, medium and short-wave bands, can be used for experiments with the unit. The case of the receiver has to be opened up, and constructors who have no experience of building mains-powered equipment should disconnect it from the mains and fit batteries: mains voltages can be lethal.

Remove the back of the radio to expose the printed circuit board, set R3, R5 and

the power amplifier volume control to mid-travel, and, with all items of equipment switched on, connect the detector unit input to the collector of the radio's final transistor IF amplifier. The location of this stage is usually pretty apparent from the layout of the receiver's PCB. Use a short length (no more than 200mm) of screened cable terminated with a miniature crocodile clip to make the connection. DC blocking capacitor, C1, will prevent any damage to the receiver or the detector unit if a wrong connection is made, and the signal take-off point should be found quite quickly. The cable screen should, of course, be connected to the receiver's 'earth' plane (invariably battery negative with sets using NPN transistors; battery positive with older receivers incorporating germanium PNP devices). Try connecting the detector unit to the output of the single IF filter in more modern portable receivers designed around IC's.

When the IF take-off point has been located, the audio signal being reproduced on the transistor portable will also be reproduced via the amplifier and speaker connected to the detector unit. Adjust R5 to precisely tune the detector local oscillator to the receiver's IF frequency. This adjustment will be correct when one setting of the receiver's tuning control produces undistorted reproduction of the same station from both the portable and the detector unit.

Input control, R3, will probably have to be set close to minimum to avoid detector overload on strong signals. Receivers with a particularly good AGC system will permit a higher setting and more fully utilize the weak-signal capability of the unit.

The high input impedance presented by the buffer stage minimizes disturbance to the receiver's IF circuits,

and no retuning of the final IFT should be necessary, especially if a short connecting lead has been used.

Performance

Improvements in radio reception are usually made in small increments, not quantum leaps, and the introduction of synchronous detection for AM signals is no exception. An improvement in audio quality is evident on some transmissions, but receiver tuning is more critical. The effects of some types of fading are less marked, but when the signal level becomes very low the circuit will go out of lock and momentarily cease to function. The unit is more sensitive to weak signals. However, unless the receiver has a good AGC system or an RF attenuator, or the operator is prepared to keep adjusting the input to the unit, this increased sensitivity cannot be fully utilized in practice.

Why not give it a try? If you find you like this method of detection, it wouldn't be too difficult to install the unit in an existing receiver and connect it to the set's audio output stages via simple switching. A better form of supply regulation should be considered for a permanent arrangement of this kind. An LM78L05ACZ regulator chip would be ideal and it could be accommodated on the PCB with only minor changes to the track layout.

If you have any queries regarding this project please write to the author Raymond Haigh, c/o the Ham Radio Today Editor at the magazine address, enclosing an SAE if a reply is required.

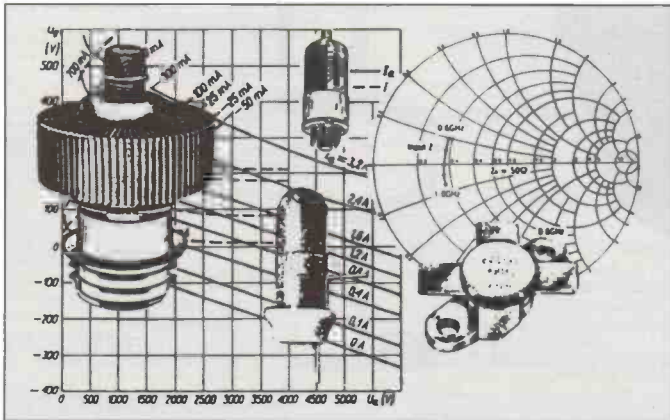
If there are any reported updates to this article, the information will be available for at least the next twelve months on the 24hr Ham Radio Today Voicebank/fax-back information line Tel. 01703 263429



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Field Day FUN

Dave Lawley G4BUO encourages you to get motivated on the air this summer!

Does your club 'do' Field Day? The original idea behind this type of event was to put on a station under emergency conditions, and it is a portable contest which means that you must operate from a tent or caravan, use a generator or other portable source to supply power, and erect all of the aerials no more than 24 hours before the start of the contest.

Some groups approach it as a serious competition but just as many use it as a club social event: a fun weekend maybe with a barbecue which can be enjoyed by all the family.

The first National Field Day was held over 60 years ago, in 1933, when groups located in 16 districts battled it out over a 27-hour period. The leading group representing the West London District had two portable stations active, and made a grand total of 64 contacts. These days there are three 24-hour field day events held in the UK each year: *NFD* (CW) on the first weekend of June, *VHF FD* on the first weekend of July, and *SSB FD* on the first weekend of September. The leading groups in all three events make in excess of one thousand contacts in a 24-hour

period. As a 'gentler' introduction to portable contesting, *Low Power Field Day* in mid July lasts for just seven hours.

You don't have to be a recognised, or RSGB-affiliated, club to join in the fun. Many teams, particularly in VHF FD, are drawn from groups of contest-minded individuals in an area. Equally, some clubs who are not 'gung-ho' contesters still put on a field day station, but treat it as a social event and an excuse for a barbecue and quite a few drinks.

Essentials

There are a few essentials you need to have in order to put on a field day station. First of all, of course, you need a site. In the absence of a club member or other fellow ham with several acres of land to spare, approach a landowner. Few of the farmers I have approached had heard of ham radio but all of them proved very cooperative, and a gift of a bottle of whisky after the event ensured that we would be welcome again the following year. One farmer was extra

helpful and set up an electric fence in the next field to make sure his sheep would not bother us: in fact the 20dB over nine pulses from the fence on 80 and 160m were a far greater nuisance!

To make sure that ham radio leaves a good image with the farmer, ensure that gates are closed at all times and that you do a 'sweep' of the field at the end of the event to pick up rubbish such as cable ties, crisp packets, scraps of wire etc. Your choice of site will of course vary between VHF field day (generally you need a high site) and HF (operate from a swamp if you can).

In the past, the usual 'shack' was a tent, and this is still what is used by most groups. But if you can find a caravan and someone with a tow bar who can get it on site, so much the better. The second requirement is a power supply. For a high power station a generator will be needed, but for the restricted sections you may be able to get away with fully-charged car batteries, perhaps float-charged from a generator or even from a car if need be. If you decide to run entirely from 12V, remember *everything* must run on low voltage: keyer, rotator, soldering iron, lighting, etc. If you have a large 240V generator you will be able to heat the tent with electric fan heaters (if your generator has the extra capacity - Tech Ed) but if not, don't make the mistake of thinking that it can't get cold in the middle of the night in June

or July: it can. Make sure you have plenty of warm clothes and either propane or paraffin heating if the 'mains' from the generator isn't up to the job.

The next question is, what rig and aerials to use. To avoid disappointment, test out the equipment *before* the event, using the generator if possible. A number of '12V' rigs give less power than expected if the supply voltage is not in fact 13.8V. If the gear is coming from more than one source, connect it all together a few weeks beforehand and make sure the interconnecting leads work OK. This is also a chance for all the operators to have a 'driving lesson' before the heat of battle. Make up headphone splitters so that more than one person can hear what is going on or even better, work out how to drive a loudspeaker as well as headphones. Field Day is so much better if everyone in the tent can hear what is happening on the bands.

Aerials

It pays to test out the aerial(s) a few weeks before the event to get some assurance that (1) the aerials work; (2) you can erect them and take them down safely and reliably; (3) in the case of wire aerials especially, there are no problems with RF feedback or inability to tune the aerial on all bands.

I once operated with a local



Chris G4FJW operating the Windmill CG 23cm/13cm station G8XIR/P in VHF FD



Windmill CG in the Open Section of VHF Field Day 1993. L to R, 4m, 23cm, 2m and 70cm masts. The stack of 2m yagis are on an 18m mast rotated by hand.



Windmill CG in VHF FD 1991. The 15m rotatable mast for 4m has its base in the middle of the tent and rotation is by the 'armstrong' method. The 30m tower to the left supports two 70cm yagis and was put up using a gin pole made of 12m of tower section, and a winch mounted on a Land Rover.



Sometimes the weather is nice on Field Day! With an hour to go, the tent has been removed and packed away. Chris G0FDZ acts as an aerial rotator, Dave G4BUO operating and John G4ILH checks the log.

club who used a commercial ATU which claimed to "tune anything". It couldn't manage a 40m long centre-fed doublet on all five bands 80-10m, and I had

to drive 15 miles home to collect my homebrew ATUs which don't look as pretty as the commercial offering, but really will tune anything.

Operating

The question of who is going to do the operating can cause friction. A few successful groups have managed to divide themselves into a ground crew who set up the station and aerials, and a crack team of operators who arrive fifteen minutes before the start and win the contest, thereby adding to the glory of the whole group. Far more commonly, those who sweat blood (and often draw blood) erecting monstrous aerials expect to be allowed to sit at the rig and make some contest contacts.

The group as a whole must decide whether the idea behind the weekend is for all club members to have some fun, or to compete all-out to win the contest. In the latter case, of course, only those with a proven ability in contesting should be given charge of the mic or key. Most groups will fall into the former category and field day is an ideal opportunity for people who cannot operate from home to gain valuable contest experience from a well set-up station in an ideal location, free from TVI problems. Well, nearly free. I know a VHF operator who found that just 25W of 2m SSB from his portable site turned on a security light in a house a quarter of a mile away, and in my first NFD our station was suspected of giving false readings to RAF radar some fifteen miles away!

Which event?

Which field day and which section to enter? All three events have a restricted section which means just a single aerial of limited height, and a power limit of 100W on HF. Greater numbers of QSOs can be made in the open sections, but these require more equipment and aerials. For QRP aficionados there is a low power section in NFD (5W output) and VHF FD (25W). The leading QRP entrant in NFD in 1992, when the section was first introduced, made 571 QSOs and this compares well with the leading station in the restricted section

which made 1042 QSOs.

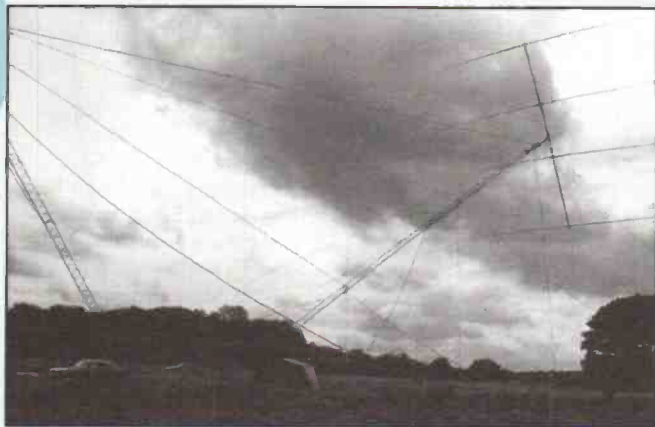
Additionally, Low Power Field Day in mid July is a shorter seven hour event limited to 80 and 40 metres, which provides a gentler introduction to this particular variety of summer madness.

Remembering that all field days are multi-operator contests, you may have enough people available to have one doing the operating, a second writing the log, and a third maintaining the checklist ('dupe sheet'). This is a good way to get everyone in the groups involved, but you must avoid the time-consuming debates as to what the call sign was that you just worked! A simple rule is that the operator (the one using the mic or the key) is always right. Even when he is wrong.

Techniques

No matter how serious or otherwise your entry is, there are plenty of techniques which can help to boost your score. The first is to know your contest: study the rules before the event, particularly the scoring system, and examine how entrants in previous events built their scores. Contesters are usually happy to help newcomers and a request for information sent with an SAE to a well-established group can be a good source of ideas. Work out some realistic targets for QSOs (or points) on each band, and draw up an outline band schedule. This is not to be followed slavishly but will give guidance to less experienced operators as to which bands should be used at which time.

Unless you are a well set-up Open Section entrant, you must be prepared to make many of your contacts by calling stations rather than calling CQ, and you must not be afraid of changing bands. My group makes in excess of sixty band changes in a 24-hour period, and this means that lengthy re-tuning of rig and aerials wastes a lot of time. In the open section, have all your aerials coax-fed and in



Putting up a 20m 4 element beam on an 18m lattice mast, using 9m of mast as a gin pole. Gravesend RS G3GRS/P.



'Open plan' ATU system - six separate ATUs allow instant band change



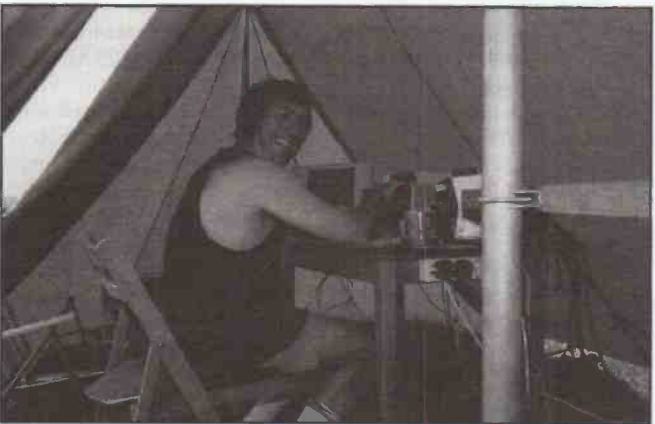
You don't need a big aerial on Field Day. Gravesend RS G3GRS/P have had great success with an 82m centre fed on an 11m mast, with one end of the aerial across a river.



Laurence G4HTD operating 4m In VHF Field Day



Cris G4FAM operating SSB Field Day while Phil G0HSS keeps the log.



Field Day fun - Phil G4EGU enjoying operating on 4m

the HF restricted section, mark your ATU for easy re-setting. Use six pretuned ATUs and a good balun and a rig with an auto-ATU. Don't wait until 10.00pm in NFD, when everyone QSYs to 160m, to discover that 100W causes RF feedback no matter how you adjust the ATU! By the time you sort the problem out, all those lovely double-point QSOs will have gone to other bands.

through its paces by as many operators as possible. If you are going to use a PC, don't assume it will solve all your problems without introducing some new problems of its own, and make sure all your operators get some practice before the contest starts.

Lots more

There's plenty more that could be written about choice of aerials, how to erect big arrays, operating strategy, choice of equipment and the most difficult problem, how to keep your generator producing a stable mains voltage for 24 hours whilst powering the rig, lights, electric heater, toaster, on-site fridge etc. However, in any contest, part of the fun is to go out and *have a go* in the first year, then learn your lessons and see how much you can improve in subsequent years! Alternatively, your measure of success might be how many club members turn up for the Saturday evening barbecue and beers, while the radio aspect pales into insignificance.

Documentation

Writing up and scoring the entry can be a chore, but these days programs like E15DI's *Super Duper* (which we provided on the front cover of the Nov 1995 Ham Radio Today - Ed), G3WGV's LOG, or CT, NA, TRLog from the States can be used either during the contest or after the event to prepare your entry. Don't make the mistake of one group I was with by starting the contest with most operators never having used computer logging before. Have a club training evening where the chosen program is put

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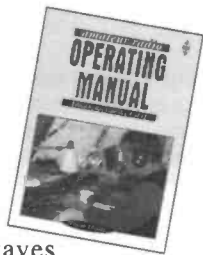


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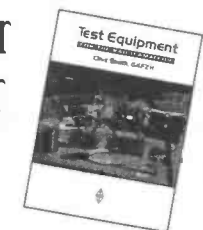


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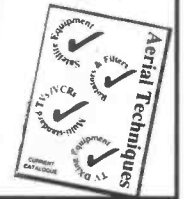
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Letters

Letter of the month

Dear HRT,

I have heard numerous suggestions that a number of members of the Radiocommunications Agency are licensed, and from what you have said in the past, are listening on packet. I wonder if Ham Radio Today would float the idea of the RA issuing a licence to themselves to put out important messages on

the packet network. Many people are in the same position as myself regarding announcements put out in the press, all we get are fragments filtering down to us.

73 de Allan, G3YRT

Editorial comment

The RA were once asked by the RSGB if they'd also publish 'formal notices', i.e. the ones that go into the London and

Edinburgh Gazettes regarding changes to our amateur licence conditions, in the amateur press also, which they unfortunately had to decline to do. Realistically, the RA do issue 'press notices', and we're pleased to publish these in the magazine. Even my local RA office staff are active on packet radio, but again I'm sure they're restrained from issuing 'official' notices this way! Also, how would you know the

message was genuine, and not from a 'pirate'? Formal channels are of course the 'done thing', but there's usually nothing to stop an individual amateur reproducing such on the packet network, as a number already do. This for example happened with the recent RA press release on the new LF allocation for UK amateurs - see this month's 'Radio Today', before even the amateur press received it!

As well as welcoming input to this 'Letters' page by post and fax, we do of course receive many letters, views, and

general queries via email, either via Fidonet (HRT Conference), Internet email (chris@radshack.demon.co.uk) or via our

web site (<http://www.netlink.co.uk/users/hrt>). Here's a selection;

To: chris@radshack.demon.co.uk

By far the most interesting items in HRT are the PMR conversions. Various articles (including the conversion articles themselves) have tended to imply that HRT's shelves are groaning under a backlog of unpublished conversions, so it breaks my heart when a new HRT flops onto the door mat and there are no conversions in it!

Graham G7SMP

Editorial comment

We do have to retain a 'balanced' content, but we do try to get an ex-PMR conversion in at least every few months! But you're right, there is a pile of them waiting here to go in!

To: chris@radshack.demon.co.uk

What a great Web site! My congrats! I would like to know how you created the "Ham Radio Today" 3D effect. I am impressed. Maybe I could have you improve our business site, do you take commercial assignments?

Joe AD4BB, Roswell, USA

Editorial comment

Many thanks Joe, we're blushing! I trust by now our web site designer has been in touch with you!

To: chris@radshack.demon.co.uk

I grabbed a copy of HRT yesterday and saw that you mentioned my Web site in 'Data Connection'. Thanks very much for this. It seems to have got people's attention since the 'page hit count' has risen quite dramatically!

Jon G7JJF

Editorial comment

You're welcome Jon! Readers may be interested to know that the 'hit count' each day on the HRT web site is currently over 3,000 (yes, that's every day!).

To: chris@radshack.demon.co.uk

Re. the May HRT cover disk, I don't know if anyone else has had the courtesy to say thank you, but your hard work is very much appreciated.

John Evans. G7CEC.

Utility Editor, Short Wave News, Danish Shortwave Clubs International.

Editorial comment

Many thanks John, it's nice to know readers appreciate the work that goes into compiling the cover disk collections!

£10 for letter of the month

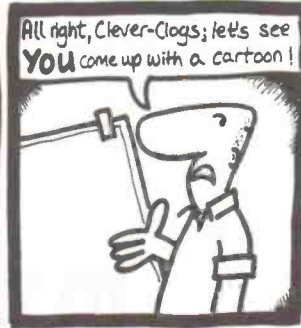
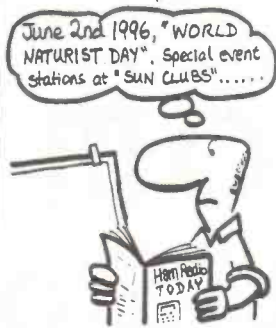
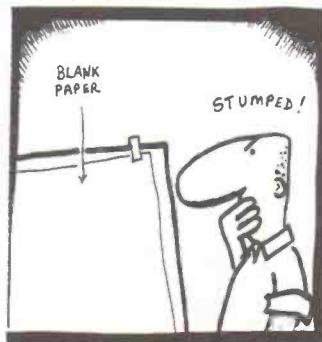
Do you have something constructive to say on the state of Amateur Radio today? Perhaps you'd like to put your viewpoint to the readers, get some discussion going, or give an answer to one of the issues raised? We'll pay £10 for the best letter we publish each month (normally paid during the month following publication). So write in with your views, to: *Letters Column*, Ham Radio Today, Nexus, Nexus House, Boundary Way, Hemel Hempstead, Herts HP2 7ST, or fax your letter direct to the Editor's desk on 01703 263429 (fax letters for publication only, for general readers queries please see the 'Readers queries' section in the 'Who's Who and What's What in HRT' section at the rear of this issue), or Email to chris@radshack.demon.co.uk. Please keep your letters short, we reserve the right to shorten them if needed for publication. Letters must be original and not have been sent to any other magazines, and must include names and addresses plus callsign if held. Reader's views published here may not necessarily be those of the magazine

"TONE" BURST



Let's take a peek 'behind the scenes' in the ARTIST'S STUDIO of.....

G6MEN



Here are a few general queries, the answers we hope will be of interest to all:

To: chris@radshack.demon.co.uk

I saw a usenet posting that said you had a book available called "Two way radio conversions". Where can I get it from?
Ken G4WBW

Editorial comment

We receive many queries asking this! You'll find the answer on the 24hr HRT Voicebank, however the book is "Surplus 2-Way Radio Conversions", but unfortunately it's now out of print. Poole Logic in Dorset however do have copies, see their ads in recent issues of the magazine.

To: chris@radshack.demon.co.uk

In the IC-T7E dual band handheld review, you mention that it has wide band receive capabilities by a combination on the keypad. I used to own an IC-W2E and this had the same capabilities. However, what are the necessary keys to press on power on? I have tried a few combinations without much joy!
John Midwood, G7PTD

Editorial comment

We tend not to publish such details in print in the magazine, as for one reason this 'wideband' use of amateur gear isn't allowed in some of the countries that Ham Radio Today magazine gets to, and we wouldn't like to condone illegal operation. For example, Australia has one import duty rate for gear on amateur-only frequencies, and another for wideband TX/RX equipment. The simple answer is, ask the dealer you purchase the set from - if it's possible and legal for you to use it this way, they'll be able to tell you.

Where are they now?

Dear HRT,

Many old timers returning to the hobby after much 'QRT', in my case after 45 years, have many culture shocks on returning to the bands and listening for familiar call signs (nostalgia increases with age!), but of course many have 'popped their clogs'. The purpose of this letter is to ask Ham Radio Today to consider a small feature for the magazine "Where are they now?", or "QUA? have you news of.....?".

Jim Knox, G3GMT

Editorial comment

We already have a column for that, this one! If readers would like to know what has happened to another amateur, all you need to do is write a letter for publication, if the person makes contact and writes to us, we can then publish their letter!

DX contacts

Dear HRT,

I am sure that most amateurs have been interested in DX contacts at one time or another and have called CQ on the calling frequency for hours, but to no avail.

To: chris@radshack.demon.co.uk

How about more ATV articles etc. This is something that is seeming to become more popular. I think the sat TV and old receivers have something to with it.

Mark Pritchard G7EVP

Editorial comment

We published a multi-issue feature back in 1986 on getting going on 23cm ATV, including the use of satellite TV receiver modules as a 23cm FM receiver plus how to modify a UHF TV aerial to produce a low-cost 23cm yagi. Maybe it's about time we did another! What do other readers think?

The Far North

Dear HRT,

With reference to the letter by Paul Thompson G6MEN (April '96 HRT) and many others on the subject of the Morse test and supposedly congestion on the Ham bands over the years.

There may well be heavy congestion down in the south of England. I'm fortunate enough to live on the Outer Hebrides, where congestion to me could well be some kind of common medical condition. There certainly isn't any congestion here anyway, I suppose the midges make up for it when they come out! I understand there are 431+ Scottish islands, many still uninhabited, so there is still plenty of space for everyone.

The world doesn't revolve around parts of England, so enough about congestion and the dreaded Morse. The sooner Morse tests end, the better for everyone. If it's too hot in the kitchen.

John MacDonald

The best way of all to get a reply is just to loosen the microphone plug a little, so that when you call 'CQ' your transmission will be intermittent! The world and his dog will answer, from Joe Bloggs down the road on his portable, to Michael J Crocodile Dundee in the far outback of Australia.

OK it's not common practice, but it sure works!
73, Neil Haulker

From my notebook

A suitable title for this month's *Notebook* might be "Cutting it Short", for I plan to talk about abbreviations which you're likely to encounter in radio and electronics.

Many of these abbreviations are listed in data books, but there are lots more which are simply not mentioned in any of the usual lists, and quite a few which can cause confusion because they mean different things in different technologies.

To give an extreme example of this, take the abbreviation AC. To anyone in the fields of radio, electronics and electrical engineering, it means alternating current, but it also means Aircraftman to a RAF type, air conditioning to a heating and ventilating engineer and, of course, Appelation Controlée to a French wine buff! No doubt there are more.

As I've mentioned before, publishers of magazines and books tend to work to a thing called a 'house style', which is a set of rules devised by the editorial and design departments on how information shall be presented. In the last paragraph, I put AC in capital letters (technically known as 'upper case') but in some of the applications I mentioned, it could just as well appear in small letters ('lower case'), sometimes with full stops ('periods') after each letter.

Examples of this are the abbreviation for television, which may appear as TV, Tv or tv, or that for high frequency, which might appear as HF, hf or h.f. The modern trend in even the most respected technical journals is to use a minimum of full stops, and very few capital letters. This

makes an article look less cluttered, and generally presents no problems until you come to an abbreviation which actually forms a word, such as 'if' meaning intermediate frequency.

House style might then rule: 'we never abbreviate intermediate frequency', which is cumbersome, or a rather better half-way house of 'always spell out in full where there is likelihood of confusion'.

Where life really begins to get difficult is with abbreviations which take on different meanings according to whether they are printed in upper case or in lower case. This is particularly true of abbreviations and symbols used for units of measurement.

The SI System

Although earlier systems of units for the measurement for all types of physical quantities are still in use, the SI (Système Internationale) System, devised at an international conference held in 1948 - almost fifty years ago now - is the one you're most likely to encounter nowadays in engineering. SI covers technical and scientific measurements across all technologies, and I cannot possibly cover even the part of it relating to radio and electrical matters in the space I have here. Instead, I shall mention just a few of the more common points of potential confusion.

The SI System is firmly wedded to the metric and decimal systems, in fact it is really an extension of them. This means that expressing large and small quantities can be made much easier by adding a prefix to the unit

Geoff Arnold G3GSR discusses electronic abbreviations

name or abbreviation - the prefix indicating some multiple or sub-multiple of 10. For example milli, meaning 'a one-thousandth of', as in millimetre - a thousandth part of a metre, or mega, meaning 'a million of', as in megahertz - a million hertz.

I chose these two as examples because they illustrate probably the biggest potential source of confusion in the SI System. The symbol or abbreviation used to represent milli is a small 'm', as in mm (meaning millimetre), but the one for mega is a capital 'M', as in MHz (meaning megahertz).

You may think it will always be obvious what is meant even if, as often happens, people write or type a small 'm' when they mean 'mega'. Unfortunately that isn't necessarily so. For example, there are electronic instruments called function generators (producing sine, square or triangular waveforms) which can provide outputs at frequencies ranging from millihertz to megahertz - you need to be careful which you are talking about. Then again, specialised electrical resistance-measuring instruments are available which can check the goodness of continuity down to milliohms and of insulation up to megohms.

Moving on from multipliers to the units of measurement themselves, probably the only ones likely to cause confusion in everyday radio and electronic circles are the small 's',

meaning seconds of time, and the capital 'S', which stands for siemens. What the heck is a siemens, I hear you ask - well it is the unit of conductance, which is the reciprocal of resistance. In earlier days, the unit of conductance was the 'mho', a name which was derived by the delightfully logical step of reversing the word 'ohm', being the unit of resistance.

What's in a Name?

You will probably have noticed that I've been writing units like hertz, siemens and ohm with a small initial letter, even though they are based on the surnames of famous scientists Heinrich Hertz, Werner von Siemens and Simon Georg Ohm. The same applies to volts, amperes, watts and so on. In fact, the general rule in the SI System is that all unit names have small initial letters when spelt out, but those that are based on famous names are abbreviated to a single capital letter. Hence watt becomes W, volt becomes V, farad becomes F, etc.

As in any scheme, there have to be exceptions. Thus ohm becomes the Greek capital omega - Ω , presumably because to have abbreviated it to a capital 'O' would have caused no end of confusion. Then there are hertz, abbreviated to Hz to distinguish it from H for henry, and weber, abbreviated to Wb to distinguish it from W for watt.

Binary Thousands

If you're into computers and all things computing, you will have encountered the multiplier 'K' standing for 'kilo' (a thousand). This is not the same as the small 'k' standing for 'kilo' in the SI or decimal systems - it's not even the same thousand!

Computers are all based on vast numbers of binary devices, and all calculations are carried out in powers of two, even though the results are converted to other formats for presentation to the outside world. A single binary device has two possible states - it can be either on or off. A circuit containing two binary devices can have four possible states ($2^2 = 4$), one with three devices can have eight states ($2^3 = 8$), and so on.

Each further binary device added, doubles the number of states available, so that the series runs 16, 32, 64, 128, 256, 512, 1024, etc. That figure of 1024 (which is 2^{10}) is sometimes dubbed a 'binary thousand'. Its capital 'K' abbreviation hailed originally from the USA, but is now accepted by standards authorities around the world for the purpose.

This K is used in the abbreviation for kilobytes of computer memory, but as you move up the scale to megabytes, the prefix is capital 'M', indistinguishable from the conventional 'M' meaning 10^6 , but in this case meaning 2^{20} or 1,048,576.

Identifying Marks

All electronic components need some sort of identifying marks, ranging from the colour or letter codes which reveal the value, working voltage, etc., of simple passive components such as resistors and capacitors, through to type or part numbers of valves, transistors and integrated circuits.

These codes, some of which are devised and used by individual manufacturers, and others which are used by agreement throughout

countries and even continents, are well documented in reference and data books. What can be useful in tracking down data on unfamiliar components is some clue as to the manufacturer.

Sometimes the maker's name is actually incorporated into a device type number, examples being HP for Hewlett Packard, IR for International Rectifier and TI for Texas Instruments. Look out for other examples in catalogues.

Connectors seem to be fairly simple and straightforward devices, although they come in an enormous variety of shapes and sizes. This seems to stem from a lack of standardisation between the designs of different manufacturers, although this state of affairs has gradually improved.

One of the most common coaxial connectors used on amateur equipment for the HF and VHF bands is the one known as a 'UHF' connector. The name appears to stem from the time when the UHF band officially started at 30MHz (in the days of World War II), and no-one in their right mind would dream of using one in the present-day UHF spectrum at 300MHz and up. They are better referred to nowadays by their generic type numbers of PL-259 for the free plug and SO-239 for the chassis-mounting socket, though I guess the UHF tag will never really die.

Capable of better performance at frequencies up to around 1GHz (1000MHz) are the BNC series (commonly found on amateur rigs for the 70cm band) or TNC series. The type code BNC is reputed to have come from the names of the engineers who first devised the design, with the 'B' identifying it as being retained with a 'bayonet' lock. The TNC is a screw-locking version of the same connector, the 'T' standing for 'threaded'.

Complete equipments also need identifying, and though they are often given names, basically for promotional purposes, they are usually identified by type numbers in the manufacturer's catalogue.

Ex-military

Anyone dabbling in ex-military radio will know that the various national armed services have used their own numbering systems, occasionally changing them to cope with advancing applications and technology.

Confining our attention to the UK, the Royal Navy traditionally called transmitters simply No. xx, but receivers (or tuner-amplifiers as they were originally called) were identified by the letter 'B' followed by a number - B28 was their number for a Marconi CR100, for example. I've never been able to discover the reasons for the allocation of the letter B.

In Army circles, the letters 'WS' followed by a number indicated 'wireless sender' or 'wireless set', in other words a transmitter or a transmitter-receiver, whilst 'R' followed by a number indicated a receiver.

In the RAF, 'T' indicated a transmitter and 'R' a receiver, and logically TR was a transmitter-receiver.

Manufacturers tend to have their own systems, and although in part these are self-evident in their meaning, at times they leave you wondering just what their background may be. The prefix CR to indicate a communications receiver has been used by, among others, Marconi's Wireless Telegraph Co. (MWT) - now GEC-Marconi - and also by RCA in the USA. The Marconi International Marine Communications Co. (MIMC or MIMCO) identified all their equipment by the letter 'T' (meaning 'Type') followed by a number, so that for example, a T.1018 is an 'Electra' HF communications receiver, not a transmitter as you might otherwise expect.

Redifon, part of the Rediffusion group, used the prefix 'R' for their communications receivers, sometimes with the addition of another letter to indicate a particular variety, e.g. 'RE' for an emergency receiver. Transmitters and associated

equipment were all blessed with the prefix 'G', which stood for 'generator'. Separate transmitter exciter units were prefixed 'GK', (although I worked for Redifon for a while, I never did discover the origin of the 'K'), and linear amplifiers 'GA'. Transceivers were prefixed 'GR'.

Commercial manufacturers, like the military, have changed their equipment numbering systems over the years, reflecting changing technology, company mergers and take-overs, and new management policies and ideas. The examples above should give a flavour of the type of ex-professional equipment (other than private mobile radio (PMR)) currently changing hands at radio rallies and the like.

And Finally ...

I've already referred to the possibility of confusion by the same abbreviation being used in different engineering disciplines, but even within radio we're in danger of falling into that trap. Take TNC, which I mentioned just now as a type of coaxial connector, but which can also stand for a terminal node controller in data communications set-up.

Then there's the term 'DC' as applied to receivers. It could either mean a receiver designed to be driven from DC supplies, or it could mean a direct-conversion receiver, one in which the incoming RF signal is heterodyned with a local oscillator operating at the same frequency as the carrier, to convert it directly to audio.

Watch out, too, for DBM, meaning doubly-balanced mixer, a device used in single sideband transmitters and receivers, and dBm, describing a signal level in dB relative to a standard level of 1 milliwatt. Especially confusing, this one, because if you look at specifications for such devices, you will find the required carrier drive level specified in dBm.

QRP corner

There is both good news and bad for QRP enthusiasts this month. The good news is that there has been an announcement by the RSGB that amateur radio kits produced in the UK are now exempt from the new EC regulations (which became mandatory on the 1st January this year). Readers may recall the horror stories of a cubic inch transmitter kit selling for under a fiver costing up to £2,000 to get tested to CE standards.

That the kits sold must be aimed at *licensed amateurs*, and not anyone else such as short wave listeners is a shame, but it is a boon to the kit suppliers, who may otherwise have called it a day and gone out of business. Of course this means that there will still be cheap, easy to build equipment available for the British amateur instead of the worst case scenario, a black box culture.

The UK Kit Manufacturers Association has been working closely with the RSGB for the past two years to get this legislation removed from amateur kits.

The initial meeting between those companies producing kits for the UK amateur market and the RSGB took place at their HQ a couple of years ago, and was chaired by Peter Chadwick of the RSGB. At that time there were no links between the kit manufacturers except for perhaps a chat at rallies. It must be stressed that although most were competitors, they were mostly all friends and helped each other whenever it became necessary. I well remember one collapsing at a rally, the others packed his gear and ensured

that it was safe for his trip home.

It was at the suggestion of Peter Chadwick to the existing kit manufacturers at that time, that an association should be formed to fight for their rights against the proposed legislation. All but one of the kit suppliers in the UK joined the association, and over the two years they have worked closely together. It now appears we have been successful. This has been mainly because of the stalwart work done by Hilary Clayton-Smith G4JKS.

This is good news for all amateurs, not just in the UK but around the world. The UK has the largest, and arguably the best kit manufacturers in the world and I know that most export to up to 50 (or more) countries.

The Bad News

It was with great regret that I heard that Ten Tec, the well known American amateur equipment manufacturer, has decided not to export any more equipment to the EEC. Again this is purely because of the stringent legislation that kits have only now been exempted from.

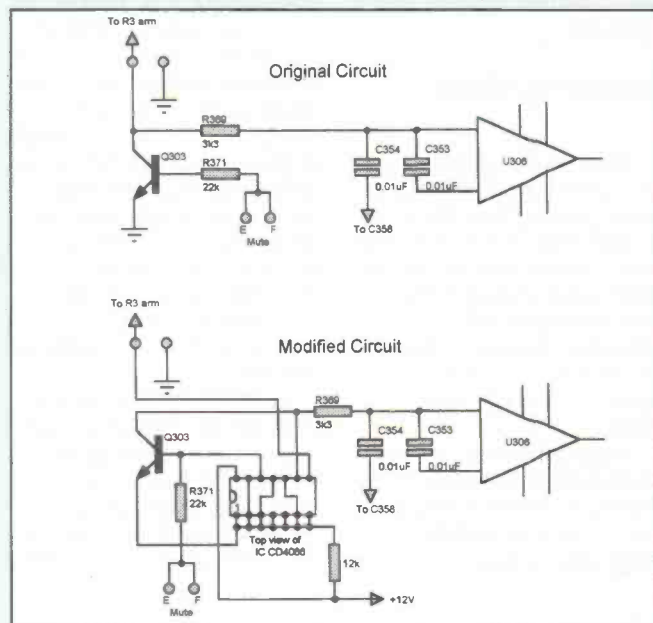
Ten Tec have been well known for some of the greatest QRP rigs of all time, with favourites such as the Argonaut 509 and the 515 still changing hands at about the £300 mark (I saw one advertised on the Internet at \$550 which equals about

£365). These analogue QRP transceivers had a following that many would love to emulate. Their latest offerings, the Ten Tec Scout 555 and the QRP Argo 556, are fast becoming the standard of their time. Their higher power rigs such as the Paragon and the Omni VI also have a dedicated following. It seems a shame that they may no longer be available in the UK. If this remains the case I would bet that the second hand price of their used gear will increase in price much like the Heath range of kits did after their demise.

I had the chance to chat to Geoff from Waters & Stanton recently, and he offered a glimmer of hope, he told me that "there may be a way round it yet". I know he would love to see the rigs back in the UK.

Good and bad news comes from the Index 'QRP Plus' labs. They are now 'on stream' with production of the new QRP Plus MkII, and several upgrades have been made. Readers may remember that I gave the address of a German company that was to make them under licence. It now appears that because of various difficulties this did not happen. The success of the QRP Plus has created more difficulties than the manufacturers may have perceived.

More good news: Many readers will remember the great summer parties held in early August by Chris G4BUE for members of the G-QRP club. Visitors travelled from far afield as the USA for this venture such was its success. For various reasons, Chris had to call it a day last year. The



Heathkit HW9 keying modification

good news is that Chris will now be hosting the party, not 'BUE but Chris G3TUX of the QRP Component Company. (Chris stocks a great range of Morse keys and kits). Members are welcome to attend on Saturday August 3rd 1996 from 1400 onwards at 2 Courst Hill Road, Haslemere, Surrey. I suggest a telephone call first to confirm on 01428 641771. I hope to be in attendance and look forward to seeing many of you there.

More bad news: Last September, George G3RJV and I were invited to attend the first QRP week in Dublin Ireland. We had a great time sharing QRP ideas and information with locals and some visitors from afar, both from the USA and another couple from the UK. Although the week could have had a lot more visitors it proved to be a great success. It also saw the introduction of the Irish QRP club as reported earlier this year.

It had been hoped that there would be a follow-on this year. Albeit a weekend

event only. George and I (with our wives) enjoyed the Irish hospitality so much we looked forward to getting back to the real Guinness and the modern Kilkenny ales. Sadly, because of other commitments by the organisers at the venue it has been cancelled for this year. We have been promised that every effort will be made to get it off the ground for next year. Watch this space for more details.

HW9 Modifications

The HW9 was the last of the Heath range of QRP transceivers to be made available to the amateur market. They are very popular and I know of one Scottish amateur who actually recently found one that was unbuilt. I well remember walking around the Dunstable Downs boot fair a few years ago and spotting a Heathkit box under a table. A dive on all fours got my hands on it before a couple of others.

I found an almost complete HW9 inside and it was also unbuilt. A few shekels changed hands and two happy amateurs parted company.

Having got the HW9 I also found that there was a profusion of modifications for this beast. One major problem was that it suffered from nearby strong signals and that the IF pass band could cause weaker signals to be distorted or 'pumped' by the AGC. There was an easy modification that could be done to correct this. During construction the R329 (AGC set, 500k preset) is set and not adjusted again. If this preset is removed and a pot is brought through to the front panel using a length of shielded wire, the AGC can be set at any required level.

The VFO is also not as good as my own homebrew version but it also can be improved. As built, the Heath VFO suffers from drift after turn on as it is being over compensated by the operation of C184. If we remove this capacitor (C134,

33pF) and replace it with a good quality NPO 33pF ceramic, also remove C186 (18pF) and replace with either a 18pF or 20pF NPO. These capacitors will be found on the oscillator board. If the board is laid flat with the cutout nearest you, components uppermost, the two capacitors will be found about half way along the front edge between the cutout and the board's left hand side. Having done this, realign the VFO as per the instructions, but beware only minor adjustments will be required.

The rig can also suffer from 'key thump' this modification has not been tried here but comes recommended. It was first done by KB1M, the diagram says it all.

That's it for this month, news and views to me via the editor, via packet to GB7RMS. Email to Dick@kanga.demon.co.uk or snail mail to me at Seaview House, Crete Road East, Folkestone CT18 7EG.



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VHF / UHF message

Geoff Brown GJ4ICD brings news of an unusual opening on 2m

Yes, it's June again and this month sees the peak of the Sporadic E season. There should be lots of rare DX both on 50 and 144MHz. The best times for long haul propagation seem to be early morning and late afternoon, plus openings to the USA mainly happen at night (2200 to 2400z), so don't be caught out.

Keep a sharp eye on the cluster for C6 (Bahamas), CY0 (Sable Island), 4K6D (Azerbaijan), D44BC (Cape Verde, it may even be your's truly operating!), JX (Jan Mayen) and I'm sure many more for those 50MHz fanatics.

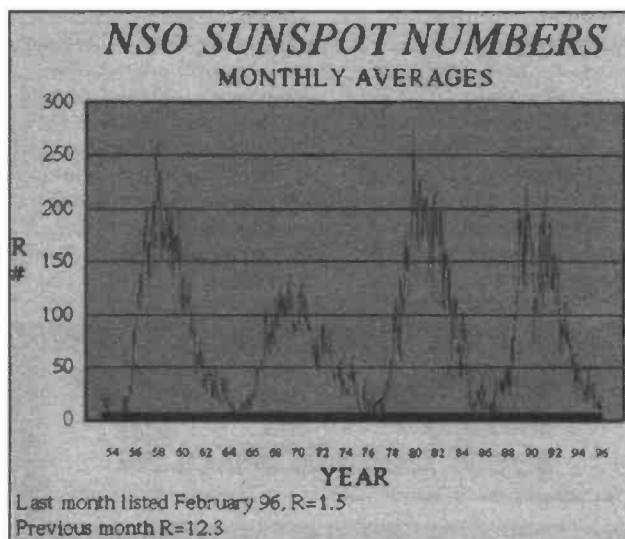
John WZ8D will be operational from the Bahamas

from June 7th to the 17th. His main band of operation will be 50MHz and the call will be C6AIE. QSL information will be: John Walker, 1930 Meredith Ln. Loveland, Ohio 45140 USA. Direct *only*, not via Bureau. His grid square will be FL16, and John will also monitor 28.885MHz.

144MHz opening in February

144MHz was open via 'ES' in February! Jukka OH2BUA in KP20 writes:

"My automatic monitoring-alerting system just captured this single packet on 144.625 FM: Sat Feb 3 10:30:01 1996 -



ttyS2 recv: KISS: Data, AX25: F5XN-8->F1GKN v F5KOR-2* FA1PRV RR(F) NR=3

"I believe this is a real one! The system has been up and running for one and a half years continuously, and this is the first time it captured real DX. Equipment: 3 x 5/8 whip, FT-

23R HT. I'm not able to scan the bands with a multimode, but what a catch! Who would believe Es reaches 144 MHz in February, especially up here in the north!"

I read Jukka's message on Saturday afternoon, only a few hours after his post, and

IPS latest news on Cycle 23;

Here is the latest prediction on cycle 23 for DX fans.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1990	151	128	135	128	127	139	137	138	142	137	123	133
1991	143	176	170	163	136	121	142	125	136	130	120	130
1992	152	173	156	134	96	80	89	66	67	66	84	89
1993	75	77	79	64	63	65	62	49	37	40	34	44
1994	57	42	43	27	16	15	23	17	19	20	20	23
1995	25	34	23	*13	*2	*9	*11	*11	*12	*-1	16	9*
1996	8*	8*	8*	8*	9*	8*	8*	9*	10*	11*	12*	13*
1997	15*	16*	18*	20*	22*	25*	29*	33*	38*	43*	49*	54*

* = New data. T index may have changed.
^ = IPS predicted T index

checked tropo conditions immediately: No lift at all. Checking the local cluster showed me there had been Es on 50 MHz at that time. Could it have reached 144 MHz? On Saturday I couldn't tell, but now it has been confirmed by a Finnish SWL that there was an Es opening to the Benelux countries on 100MHz. Here are some of the catches made in Pirkkala (KP11) by Jouni Keskinen (ID via RDS; also other networks were heard);

Feb 3, 1996: 87.6MHz, 1044 UT, RTBF1 (Belgium). 87.8MHz, 1047 FUN Radio (France). 88.9MHz, 1052 RTL Oldie (Luxemburg). 91.5MHz, 1057 RTBF2 (Belgium). 103.2MHz, 1112 RF Berry Sud (France).

So, the question is, what causes Es in February? Or could it have been something else? It seems likely that meteor scatter can be ruled out, since Jukka's monitoring system has been unable to pick up any reflections from even major showers, and meteor-wise February is the worst month of the year. Up here at 60 degrees north, it's extremely rare to have Es at this time of the year. The only occasion I know of was more than ten years ago during the Quadrantids meteor shower.

Well, I think we could have missed this one without Jukka's system. Just wonder, if there were observations in other countries? Does anyone know where this French packet station is located?

March

March started off pretty quiet regarding VHF conditions, even the VHF/UHF contest had the usual poor conditions. March 3rd and the 5th saw stations in Japan have a nice ES opening between JA3 and JA8, typical distances were around 1000km.

On the 11th at around 0100z there were great eruptions on the Sun, this featured an Aurora in VE land but no reports in Europe. At 1551z the same day DJ6TF reported C56?? (The Gambia) on 50.110MHz. This still has to be confirmed, as it may have been somebody calling the C56 gang who were



IOJX at HV3SJ in June 1995

active at that time. If it really was C56, was it via TEP or some other enhanced mode after the geomagnetic storm? There was a good rare 50MHz tropo event from GJ to PA on the 24th, but really a poor month as to be expected.

Transatlantic Expedition news

Here's some WIARC DXpedition news on the 1996 DXpedition: The West Island Amateur Radio Club of Montreal have announced that once again this summer, it will conduct a DXpedition to Atlantic Canada.

This year's DXpedition will be conducted in two phases. The first, from Wednesday 17 July to Monday 22 July 1996, will take place at the Marconi National Historic site near Glace Bay, Cape Breton in Nova Scotia (46 deg 13 min. N., 059 deg. 57 min W, grid GN06AF). It was from this site in late 1903 that the first commercial transatlantic messages were sent to a sister-station at Poldhu in the UK. The station in Glace Bay was one of three eventually built at Marconi in Cape Breton, and today is the location of a museum celebrating the 'Wizard of Wireless'. It is therefore fitting that the primary emphasis of this phase of the DXpedition will be an attempt to span the Atlantic on two metres.

Using full legal power and high-gain aeriels, a CW beacon-type CQ will be transmitted on 144.020MHz at intervals of approximately one minute. The DXpedition will listen for a reply on the same frequency. It is requested that European operators transmit on this frequency only if the CQ is heard. The signals will be aimed at Central Europe, but the aerial

beamwidth will be such that stations from North Africa to Scandinavia should have an opportunity to hear them, conditions permitting.

The second phase of the DXpedition will take place from Thursday 25 July to Thursday 1

August 1996, from the historic lighthouse on Seal Island some 12 nautical miles off the southern tip of Nova Scotia (43 deg 24 min. N., 66 deg. 01 min W, grid FN63XJ, IOTA NA-126). Founded in 1827, it has permitted countless ships and sailors to safely navigate past the treacherous rocks in the area. Emphasis will again be placed on a two metre transatlantic contact. Two separate transceiver and aerial systems will be employed. The first will transmit and receive on 144.020MHz, and the second on 144.030MHz. The systems will be synchronised so that the transmit and receive cycles will be the same.

Operators for the DXpedition will include Fred VE2SEI, Helen VE2YAK, Reg VE2AYU, Jeff VE2TBH, Al VE2DAV, Lowell VY2OX, and Al VO1NO. Those requiring further information may contact Fred Archibald VE2SEI, Tel. +1 514 694 3441, Fax. +1 514 630 4134, or e-mail archibal@pubnix.net, or Al Penney VO1NO at Tel. +1 902 427 0550, or +1 902 876 2779. QSL cards may be sent to VE2CWI.

Beacon news

Ralph, 4X1IF informs G0JHC about a new beacon in Israel. Ralph now has permission to run a 50MHz beacon from his home QTH. A halo has been installed on his tower and the beacon is now complete. Keying will commence in the Summer months, running about 3W and initially with his call. It is hoped to get a special beacon call sometime in the future, the frequency is 50.058MHz. The circuit diagram and component layout for the GJ3RAX beacon has been forwarded to Ralph in April.

JW7SIX: The 50MHz beacon JW7SIX is now on-air from a new location. It has been moved to the shack of the Svalbard Radio Club, JW5E, in JQ78TF. It is providing 10W RF into a new, solid 4 element yagi. The aerial is mounted 25m above the ground on a steel tower, and is beaming 210 degrees (Europe!). ES1CW has volunteered to supply an extra 10W PA and a directional coupler. Another aerial will be mounted later at a lower altitude. This equipment will be used to provide an additional beam to KL7/VE8 during the months of June and July. Thus, the facility for transpolar studies would be retained. The beacon is now operated by the Svalbard radio club, and the beacon keeper responsible is Ola Johan Oestvig, JW8GV. Contributions to the operating costs and reception reports are welcome and can be submitted to Svalbardgruppen JW5E, Postboks 486, N-9170 Longyearbyen, Norway.

The VS6SIX beacon is now active again, having come back on air on the 28th March. The beacon was damaged by the typhoon in 1993 and it cannot be put it up again on the same site. The beacon is now sitting at the Tate's Carin which is about 472m ASL, locator OL72CH, it is running about 7W into a GP ant.

Radio news

News has just broken that MFJ are to launch a 50MHz SSB/CW radio, the model number is 9406 and is rumoured to be very competitively priced.

Well that's all for this month, do make time to get on the VHF bands this month and work some new DX! News and views as always can be sent to: Geoff Brown, TV Shop, Belmont Rd, St Helier, Jersey. Channel Islands, or faxed to 01534 877067, or Email equinox@itl.net and finally packet, GJ4HXJ@GB7GUR or GJ4ICD@WD5B.

DATA connection

Chris Lorek G4HCL finds the Automatic Packet Reporting System works well for event communications

Bill G0IQK @ GB7HSN asks if I can give a mention in this column about himself and two other locals who've recently set up 10m ports on their packet switches, on 29.250MHz. Bill tells me that 2m packet is very congested in his area, and they thought the use of 10m might just relieve the congestion. The switches are ILFORD:G0IQK-1, WIGGY:G0WYG-1 and PARROT:G0UBA-1. Bill's setup is located in Ilford, Essex, the others being just across the Thames in south east London. Bill says that all three have good links to local BBSs, and that WIGGY has a link to the LONNY node, an IP 'chat' node, plus two DX Clusters. Users are free to use the 10m system, and Bill says he's very pleased to assist if anyone would like help or indeed just further information.

Packet on the Frostbite Event

Mike Tyrell G6GAK recently sent me a very interesting rundown on the use of packet radio and APRS by Cheshire RAYNET on the 'Frostbite' event. The use of packet radio on this event has developed over the several years. In 1994 a series of tests were carried out by a mobile 70cm packet station travelling to each checkpoint during the event and testing the quality of the radio path back to the control centre. These tests highlighted the need to operate a packet station in a position which would have good coverage of the whole event, for example on the top of a suitable hill, so that mobile stations

could then use this node to relay packets back to main control.

For Frostbite 95 a packet network was set up with mobile stations at three checkpoints, and fixed stations at the main control and finish. RAYNET had been asked to assist in the production of the race results and the allocation of start times for each day. This was accomplished using the packet radio system while the conventional voice networks provided the primary function of safety communication.

In order to process the results, a series of simple programs were written around a spreadsheet package, and used with normal Packet TNC programs. The checkpoints and finish stations filled in the times in the spreadsheet as competitors arrived and, on a periodic basis, sent this information back to control as plain text files. The use of the Node on a hilltop provided fair coverage of the course but there were still some problems with poor signal strength. The use of spreadsheets was fairly successful (the results were produced in time for the prize-giving!) but the method was found to be cumbersome and more information than was necessary was being sent from each checkpoint.

Frostbite 96

Analysis of the packet logs after the 1995 event highlighted three main types of information being sent between packet stations;

- 1) Competitor times
- 2) How many people had

passed through a checkpoint

3) The location of equipment or personnel (e.g. drinking water van, ambulance etc.)

Although the use of spreadsheets and conventional packet radio was effective for the competitor times, it was not efficient for 2) and 3). A search for a more effective method to use packet radio to distribute this information found a suitable program known as APRS (Automatic Packet Reporting System). APRS is widely used across America both for day-to-day amateur activity and during emergencies. The fundamental difference in its approach is that it uses *unconnected* packets to distribute information. This means that as soon as one station enters a piece of information it can be seen by all the other stations on the network.

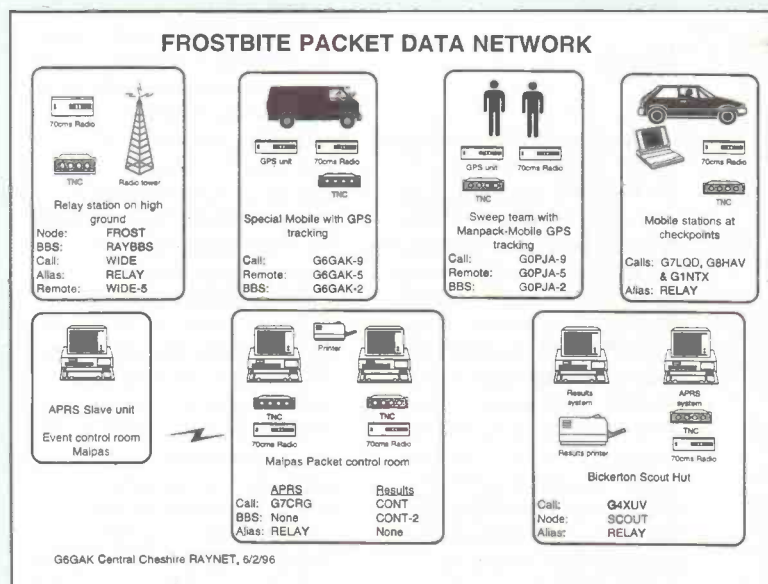
As well as being able to distribute messages as text

information, APRS can also display the location of stations and objects on a map. These may either be placed manually on the map by the operator or, with the use of satellite tracking technology, they can be automatically displayed as they move about.

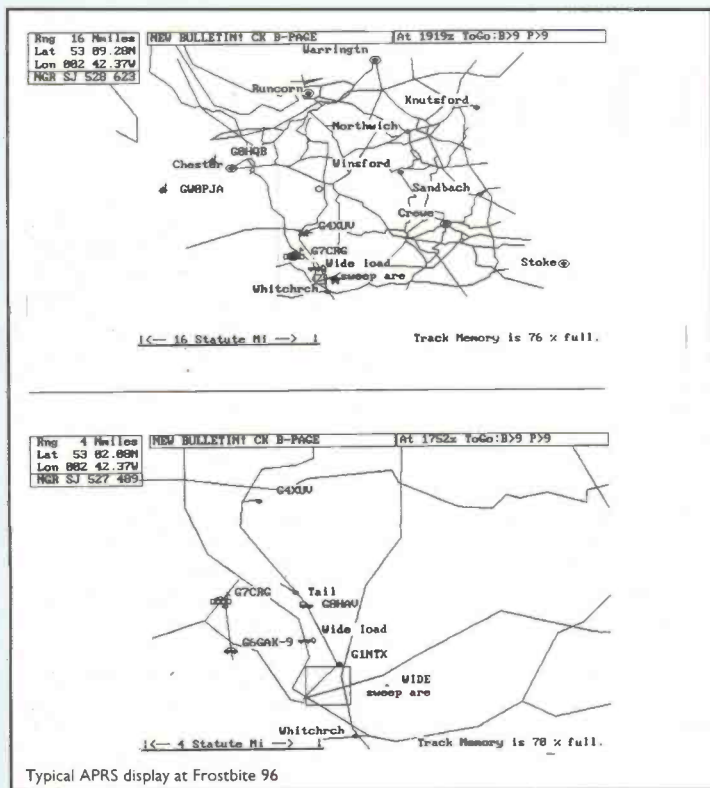
How APRS was used

The diagram shows the different types of stations used on the event. At the control centre, two APRS systems were set up, these shared a single TNC and radio. One system was used to provide overall control of the network, the other was used as a 'read only' system, i.e. information could be read from the map and message lists but could not be modified. This provided an opportunity for people unfamiliar with APRS to see what it could do without the risk of interfering with the operation of the network. Three mobile outstations were distributed around the course, and fed information into the APRS network on a regular basis.

At the finish point, a fixed



The packet data network at Frostbite 96



station was set up and as the competitors arrived their race time could be calculated quickly and provisional results lists were printed from time to time and posted on a notice board. Every hour or so the APRS program was shut down and a conventional packet terminal program was used to communicate all the latest finish times back to the event control centre. Two mobile stations were equipped with Global Positioning System (GPS) receivers, and were able to transmit their location automatically every few minutes.

The first of these tracking systems was used on the vehicle used to transport drinking water to the checkpoints around the course. Using the APRS map display the event controller could see their exact position, speed, and direction of travel whenever required.

The second system was used as a 'manpack mobile' with one of the RAYNET sweep teams. These teams carry out an important role to walk the course behind the last runners and locate any lost or injured teams before that section of the course is closed. Usually the control centre only know the

exact position of the sweep team when they reach a manned checkpoint, but with the use of GPS they were able to continually monitor their progress as they walked along the course.

One of the most important things during the event is the location of the first and last teams. This is used when making decisions about moving people and vehicles around the course. In previous years, control have had to keep track of this by recording the time at which checkpoint operators report the first and last team past their post.

A special feature in APRS enables the user to position a marker on the map and assign a speed to it. The software will then automatically move the marker along a predefined course at the given speed. This was used with symbols representing the first and last teams, their estimated positions were transmitted over packet and could be seen by any of the APRS equipped checkpoints. The estimated positions were manually updated by control when the teams actually passed a manned checkpoint. These estimates were found in practice

to be very accurate and only minor corrections were needed over most of the course.

More information

Mike tells me the Frostbite 96 event was the most effect use of packet radio to date by Cheshire RAYNET, and the APRS software was shown to be more versatile for this type of activity than conventional packet programs. You can get more information on the use of APRS on this event from Mike Tyrrell G6GAK, 189 Runcom Road, Barnton, Northwich Cheshire CW8 4HR, or email

100321.1327@compuserve.com

A reminder that the latest version of the APRS shareware software is available as an 'at cost' service to readers from the Ham Radio Today software service, see elsewhere in this issue for ordering details.

Maxpak node news

Following a visit from the RA and a request to reduce the power level on the 70cm rig, DY71 was taken out of service. Having carried out the necessary adjustments, the group say they have been unsuccessful in getting the RA to return and check the rig before it went back into service. Hopefully by now it should be running again.

WV23 on 144.525MHz is now operational on 9600 baud for fast access, and the BNOR node on 144.650MHz now has a new EPROM to provide service with an alias of BNOR21. The latest Maxpak newsletter, sent to all members, contains an updated Local Area Network plan, together with updated LANs for the Fourpak and G8PZT areas. The group have regular meetings, you'll find details of these plus contact information for the group in this month's 'Club News'.

PacTOR II QRP

If you attended my talk at this year's Yeovil QRP Convention (although as I write this, I haven't yet given it!), you may have heard me mention

the great gains that are being made in digital communications and QRP. PacTOR, for example, has the possibility of maintaining error-free throughput in minus 20dB signal to noise, i.e. the wanted signal being totally inaudible to the human ear. I've used PacTOR and more recently PacTOR II with my FT990 and a PTC-II controller, both to great effect, and I was interested to read that Markus HB9BRJ has been having similar success with PacTOR II on QRP using his PTC-II with his FT-990. Markus uses a single multiband vertical, and recently he had a 20m PacTOR II contact with Karl, 5R8KH, who was running a PTC-II into his FT-1000 and a simple ground plane aerial. Karl was running 1W, Markus 10W, the two stations having a "wonderful" link. Karl now plans to go a step further into the mW range, to see what the limits of PacTOR II really are.

As well as occasional weekend and evening activity, I hope to be able to try and get a PacTOR II station in operation in daytime attended use at my work's QTH, possibly scanning 80m, 40m and 20m. There will of course be a mailbox on the PTC-II if I'm not able to answer myself immediately. If you'd like a sked with a view to testing weak-signal propagation and data throughput, preferably around mid-day (i.e. lunch-time) just drop me drop me a message by packet, email, fax, or whatever and I'll see what can be done.

CTRL-Z, end of message

That's it for this month. As always, please *do* let me know what you're up to in the ham radio data comms field, or indeed what your local group are doing. If you'd like a specific topic covered in this column, or a question you'd like to ask, just get in touch and I'll try and help. You can contact me either direct via packet, or via post, fax or email c/o the Ham Radio Today Editor. Until next month, 73 from Chris G4HCL @ GB7XJZ.#48.GBR.EU

HF happenings

Don Field G3XTT gives some tips on HF tuning and successful RTTY operation

Band conditions were disappointing, at least here in the UK, for the CQ WPX Contest at the end of March. 10 metres was almost dead apart from a few South American stations, and even 15 metres never really opened up to the US. One station of particular interest, with a loud signal on 15 metres, was YB7/G0SMC. This was Andy G4PIQ and colleagues in Indonesia to support the Camel Trophy rally, and taking time out for the contest.

4U1SCO was another interesting one active in the contest. This station was operating from the grounds of UNESCO in central Paris, the licence having been issued by the UN Telecommunications office in New York. As many of you will know, some years back it looked as though stations like these, which were not under the jurisdiction of the host country, would count as additional 'countries', effectively being part of the UN, but separated from each other by more than the

requisite mileage. However, the ARRL eventually drew the line after they realised that the whole thing could get out of hand, with large numbers of UN and related buildings scattered around the world.

The German amateurs who operated during early March from the Gambia, signing C56CW and C56DX, did a terrific job. Their QSO total was 29,313, and I can vouch for the fact that they were easy to find and work on almost all bands. I even managed an RTTY (teleprinter) contact with them on 20 metres, running my transmitter at about 100 watts output into my 80 metre dipole!

Andy G4ZVJ showed up as promised from St.Helena, but had some problems with his linear amplifier, which meant that he was limited to 100 watts for most of the time. Nevertheless, UK stations worked him on all nine HF bands.

One of the more interesting contacts I made during the period was FT5WE on 30 metres. This station is on

Crozet Island, a French possession off the south-eastern end of Africa, in the southern ocean. The operator is there for a year and promises some low frequency operation in due course. Many of the operations from these remote French territories are by radio amateurs who have volunteered for these inhospitable postings for their mandatory military service. Now that France has announced the end of national service and a move to a fully professional military, such operations may become increasingly rare.

Operating tips - tuning

Perhaps one of the biggest culture changes if you come to the HF bands from VHF is the move away from channelised operation to continuous tuning. Although SSB and CW operation on the VHF and UHF bands is not channelised, many VHF operators have no experience beyond channelised FM operation. Getting used to tuning in SSB signals, frequently under conditions of fading and interference, can be a daunting experience. And of course the quality of reception is considerably lower than with FM. Frankly, success will only come with experience.

There is no short cut. Time spent listening on the HF bands, even before you have

your Class A licence, will pay dividends when you are finally ready to make your first HF contacts. If you fail to tune in correctly to a station you want to call, then you will end up calling him off frequency, which will lower your chances of making the contact.

The tuning rate of modern transceivers varies considerably. Some offer coarse and fine tuning so that you can quickly move to a particular frequency, and then precisely complete the process. Some transceivers allow user selection of tuning rate. My own transceiver tunes 10kHz for every turn of the main tuning control, which I find very satisfactory for careful tuning, but it requires lots of turns to get from one end of the band to the other! I rather like the shuttle/jog tuning feature in the new FT-1000MP, copied from video recorders.

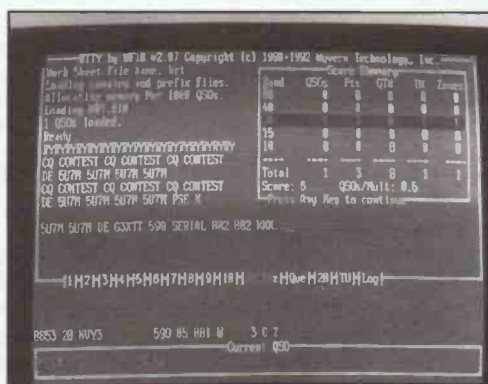
If you are using narrow filters, especially on CW (where 250Hz bandwidth filters are not uncommon) you need to tune very carefully indeed - it is very easy to miss a weak signal if you tune too fast. Narrow CW filters have another problem which is that, when you are calling CQ, if anyone calls you slightly off frequency you may not even hear them.

RTTY operating

I wonder how many *HF Happenings* readers are active on the data modes (RTTY, AMTOR, Packet). With the advent of multimode TNCs for packet operation, many amateurs buy one of these for VHF packet, and then press it into service on the HF bands with varying degrees of success.

I used to use my PK232 on HF RTTY, and worked well over 100 countries with it, despite the fact that the tone spacing is not quite correct for HF operation and that the filters

Typical screens from WFIB RTTY program (see text)



are rather too wide for HF data operation, in order to pass the higher-speed VHF data signals. There were also some other problems with early PK232 units like mine, but even so multimode units like these work adequately on HF, especially if you can use the narrow filters in your receiver ahead of the TNC (I use 500Hz filters or, under extreme conditions of interference, 250Hz).

Dedicated terminal units usually offer much better results. I now use the excellent Multyterm from the British Amateur Radio Teledata Group - BARTG - along with BMKMULTY software by G4BMK. Nowadays you don't even need a terminal unit - there is software available from the US (RITTY by K6STI) which will drive a computer sound card as an RTTY terminal. There are also some excellent plug-in terminal units (such as the HAL P38) coming available from the US, which sit directly in one of the slots in your PC.

Operation on the HF data modes is very different from operating on SSB or CW. It really is a case of the strongest signal getting through, and tuning needs to be exact to get good copy. AMTOR has some basic error detection built in, and will ask for a block of characters to be re-sent if it fails to copy them correctly. However, setting up an AMTOR link is relatively cumbersome, so the mode is rarely used by DXpeditions, or during Teletype contests (and these are the opportunities to work new countries, if you are interested in RTTY DXing).

There are RTTY, AMTOR and packet mailboxes on the HF bands, though I have little personal experience of their use. I imagine that their function, to permit message passing and bulletins, has now largely been superseded by the VHF packet network and the various ham radio user groups on the Internet.

Back in the bad old days of mechanical teleprinters, the operating procedure was rather long-winded, because it was necessary to allow the operator time to tune the signal and get

a lock. To do this, the sending station would begin each transmission with a tuning signal consisting of a string of Rs and Ys such as RYRYRYRY.

You will occasionally still run across this on the RTTY bands, but it is unnecessary and time-consuming when the vast majority of operators are using computerised decoders. In fact RTTY contacts can be very slick indeed if the operators at both ends know what they are doing. As an example, the contest exchange for the BARTG-sponsored RTTY contest each March is RST plus serial number plus time (in UTC).

There is a temptation to send an over which goes something like; (CR) RYRYRY (CR) G4HCL DE G3XTT UR 599 001 1423 BK (CR), but this is unduly cumbersome. As I said, the string of RYs is unnecessary, and so are the carriage returns (CR) which, again, were necessary with mechanical teleprinters to stop them trying to print beyond the edge of the paper, but are taken care of automatically by computer RTTY programs.

Spaces between number groups are also dangerous, because it is common practice in RTTY operation to have Unshift-on-Space as a default, so the following number group might be interpreted as letters instead. Why? Because Baudot RTTY (as against other variants) uses just five symbols per character, which gives only 32 different combinations.

To permit the 26 letters of the alphabet, plus ten digits and common punctuation marks to be sent, RTTY has a 'letters' and a 'figures' shift, with two of the character combinations being used to tell the receiver to shift to 'letters' or 'figures' as required (thus, every time you change from letters to figures or vice versa, you add an extra hidden character to your transmission).

To minimise the risk of confusion, it is better to separate figure groups by one of the symbols, such as a dash, which is also in figures case. So a better transmission, in terms of brevity and less risk of corruption, would be G4HCL

DE G3XTT 599001-1423 BK.

Of course, characters do get lost in conditions of fading and interference, and if this includes the case shift character, you may end up with numbers where the far end is sending letters or vice versa. An experienced operator knows which letters and numbers match, but even an inexperienced operator can quickly learn to recognise the common ones. For example, 599 becomes TOO if transformed to letters case. So quite often you can unscramble the information which has been sent without having to ask for a repeat.

With slick operating, a good DXpedition operator can make RTTY contacts at up to 100 an hour, particularly if he is listening 'split', with the callers not all piling on top of one another on a single frequency. Do your bit to keep things moving by making sure your own operating is equally slick. By the way, don't worry if your typing isn't that fast. Most good RTTY programs, such as that by G4BMK, or the popular RTTY contest program by WF1B, allow you to pre-program things like contest exchanges or other commonly-sent information, so that you hardly need to do any typing at all.

Before ending this mini-tutorial, I also want to emphasise that you don't have to have an especially loud signal to be successful on RTTY, although it certainly helps! One friend of mine who is a great RTTY enthusiast operates from a flat in London, with a multiband vertical on the roof, running just 50 watts (because RTTY is a high duty-cycle mode, you should never run your transceiver at more than 50% of its rated output). Nevertheless, my friend has enjoyed considerable success in RTTY contests, and has amassed a very respectable RTTY country score. Have fun!

DXCC turnaround

The ARRL certainly seem to be on top of the processing of DXCC award applications and

updates after the problems of recent years. I sent my annual update a few weeks back, and it was dealt with the day after it arrived at Newington. The total turnaround time was about two weeks, most of which must have been time spent in the post.

The new DXCC Yearbook came out during March. This contains lots of interesting background on DX in 1995, including a 'Most Wanted Countries' list based on actual QSL submissions, and also has the Honor Roll and other listings for participants in each of the DXCC awards. The Yearbook is sent automatically to ARRL members, but is available for \$5 to anyone who is interested.

By the way, the Yearbook names the Conway Reef (3D2CU / 3D2CT) expedition as its DXpedition of the Year, although I imagine European DXers might not agree, as that was a tough one to work from Europe.

By the time you read this article we will be well into summer band conditions, with lots of static on the low bands, compensated for by Sporadic E openings to Europe on 10 metres. But don't write off the low bands completely. This is winter-time in the southern hemisphere, and therefore a good time to be looking for southern African and South American stations on 160 and 80 metres, especially on those nights when static levels are low. As an example, my first contact with CP8HD (Bolivia) on 160 metres was in July of 1984, albeit at the rather unsociable hour of 0200 GMT! I also recall having worked Brazilian stations during the RSGB Summer 1.8MHz contest in June.

Finally, a reminder that if you take the radio away for your summer holiday and manage to do some HF operating, then do please drop me a line, with photos as well if possible.

(Please send your HF related news, views and photos to; Don Field G3XTT, 105 Shiplake Bottom, Peppard Common, Henley on Thames, Oxon RG9 5HJ - Ed).

Satellite rendezvous

Oscar 13: The re-orientation to attitude ALON/ALAT 180/0 is complete, and the new transponder schedule is in place. Please note that the higher powered engineering beacon 145.985MHz is *ON* for two periods: MA 0-25 and MA 90-100. This beacon is about 6dB stronger than the general beacon (which is *OFF*), so facilitating telemetry collection at perigee when the omnidirectional aeriels are in use. The Engineering Beacon is PSK only; it does not transmit CW or RTTY.

Oscar 13 re-entry

Re-entry is expected around Dec 5th-19th 1996, so that by mid November the spacecraft may well have expired due to overheating, or be non-maneuvrable due to buffeting at perigee (under 100 km). This will be an interesting time, and the command team welcomes suggestions which we could implement to make use of this unique opportunity to observe an amateur spacecraft at re-entry. None has been received thus far. As more NORAD Keplerian elements arrive, tuning of the drag factor improves. The following files on the AMSAT database have been updated:

<ftp://ftp.amsat.org/amsat/satinfo/ao13/decaykep.zip>
(13k Re-entry keps)
<ftp://ftp.amsat.org/amsat/>

Richard Limebear G3RWL with this month's collation of AMSAT-UK news

<satinfo/ao13/mmplot.zip>
(15k Mean motion plot).

'DECAYKEP.ZIP' is a file of some 200 predicted Keplerian element sets from now up to re-entry and 'MMPLOT.ZIP' shows a plot of mean motion from NORAD elements vs predicted mean motion from 1995 Oct 05 - 1996 Mar 30. Both files are accompanied by full explanations. (Ed's note - remember that, as a service for the benefit of readers without Internet access, I've arranged for the latest versions of these plus many other AO13 files to also be available on disk from the HRT Software Service until the satellite's re-entry - just ask for the 'Oscar 13 disk').

A Raduga comsat was launched from Baykonur on Feb 19. The launch vehicle entered a 185 km circular orbit inclined at 51.6 deg. The Raduga and the Blok-DM2 upper stage separated and the Blok-DM2 ignited for its first burn, placing the spacecraft in a 241 x 36502 km x 48.6 deg transfer orbit. The Blok-DM2 should have restarted six hours later at apogee to circularize the orbit at geostationary altitude, but this did not

occur, and the payload separated in transfer orbit. This is the first failure of a Blok-DM2 stage since Feb 1988, when three Glonass/Uragan satellites were stranded in low orbit. The decay of this spacecraft may be of interest to people who are trying to figure out what will happen to AO-13; the object number is 1996-010D and catalogue number is 23797.

Continuous up-to-date information about AO-13 operations is always available on the beacons, 145.812 MHz and 2400.646 MHz in CW, RTTY and 400 bps PSK.

Satellite SSTV

Slow scanners are invited to join the SSTV sessions on Oscar 13. The frequency is 145.955MHz. The net meets at 45 minutes before Mode S, and on Mode B following Mode S on Saturdays and Sundays. This is *not* a formal net. Join the group at anytime, but *do* ask for your turn in the queue. Join these sessions or contact wb6llo@amsat.org for other skeds and he will coordinate your efforts.

Oscar 10

It's currently available in mode-B when in view but *please do not* attempt to use it if you hear the beacon or the transponder signals FMing.

WO-18

Here's news on WO-18's digipeater; Weber State do intend to keep the digipeater *ON* indefinitely. No plans to turn it *OFF*. (145.900MHz uplink)

Phase 3D

The German company Dornier has delivered the solar panels, batteries and the TWTA, which were ordered and paid by AMSAT-DL. The six solar panels cost about 200,000 DM and will generate 600W of electrical power. The TWT-Amplifier will generate 60W on 10 GHz for the X-Band transmitter; together with the flight battery, it costs 70,000 DM. This price paid is significantly lower than standard prices and the remaining amount is a donation by Dornier. The flight hardware will soon be shipped to the AMSAT P3D integration lab in Orlando, Florida.

AMSAT France formed

Members of several clubs interested in space telecommunications have

Scenes from the 95 AMSAT-UK Colloquium (photos by Larry GOKIZ)



decided to create AMSAT France in order to promote activity in the field of the amateur satellite service in France. They have supplied two models of the L band aerial reflector for Phase 3D which are composed of a 500 mm disk with a straight 78 mm border all in one piece without soldering and manufactured using a special process. The addition of France brings to fourteen the number of countries participating in the Phase 3D Project.

Fuji-Oscar 20

John G7HIA says that recently FO-20 has been very good with plenty of Stateside stations, including WL7CMC in Alaska. Uwe DD1LT is also very active and looking particularly for contacts with GJ, GD and GU.

Celestial BBS

After over 10 years of near continuous operation, the Celestial BBS operated by Dr Tom Kelso has been shut down. Tom will be moving again and since there has been very little activity lately on the system, there is little point in establishing a new line for the

BBS at the new residence. Of course, the orbital elements will continue to be provided via the Internet and Dr. Kelso will establish a WWW site to distribute the software at this location before the move. The URL for the new WWW site is: <http://www.mindspring.com/~tkelso/> or: <http://www.grove.net/~tkelso>. This site will now be the only source for data and software. Of course the current Internet site (archive.afit.af.mil) will continue to carry all the Keplerial data. Enquiries regarding these systems should be sent to Dr Kelso at; tkelso@mont.mindspring.com or tkelso@afit.af.mil.

New satellite awards

AMSAT-PA has released two satellite awards. These are; Worked Alle Modes (WAMSAT) and Worked Different Satellites (DIFSAT). WAMSAT can be earned by users who can prove successful contacts via any satellite in a minimum of two band-modes (mode-A, mode-B etc). The DIFSAT award is to stimulate working on all available amateur satellites. For this you must prove to have a minimum of 2 times 5 complete QSO's via two different satellites, proved by sending ten QSL cards (or copies) with the application. You can count QSO's beginning from RS3 and OSCAR 4. Send applications to: AMSAT-PA Award Manager, P.O. Box 200, 1780 Ae Den Helder, Netherlands.

W3XO honoured

Bill Tynan, W3XO, President of AMSAT-NA, has been named HamVention 1996 Amateur of the Year by the Dayton Amateur Radio Association.

AMSAT-UK News

The 11th AMSAT-UK Colloquium will be held at Surrey University, Guildford, Surrey, U.K., from Thursday 25th to Sunday 28th July 1996. The Thursday will be devoted to international/IARU matters and other subjects will be structured across the following three days. There will also be the usual social events including: Command Station visits, the Annual Dinner and Auction, AMSAT-UK AGM, and other light-hearted fun. Up-to-date information about the Colloquium can be accessed via Internet at the University of Surrey web site; the URL is: <http://www.ee.surrey.ac.uk/E/CSE/UOSAT/new/amateur/colloquium.html>, also, the Amsat-UK web page at: <http://www.mcc.ac.uk/AMSA T/colloquium96.html> has all these details, as well as a set of images taken at the colloquium in 1995 by GOKIZ [thanks John GIYYH]. Please send all other enquiries about Colloquium'96 to the AMSAT-UK office.

Also in the AMSAT-UK Office, the reprint is in of G3ZUM's book 'Introduction

to Digital Satellites'. A new supply of P3D patches is also now in stock.

P3D fund: the Spanish have sent us £2000 and NZARTS sent £1000 recently. The personal engraved plaques (for donations over £150) should have started going out, but there's over 80 of these so the engraver may take some time.

For further information about AMSAT-UK contact: AMSAT-UK, c/o Ron Broadbent MBE, G3AAJ, 94 Herongate Rd., London, E12 5EQ. A large SAE gets you membership info. SWL's are welcome. All new joiners get the USAT-P tracking program on 5 1/4in disk. G3RWL can be reached via Internet as g3rwl@amsat.org.

Latest Keplers

AMSAT-UK Keplers are put out on packet fortnightly, sent to **KEPLER @ GBR**. The latest satellite Keplers as supplied by AMSAT-UK are also available by automatic fax retrieval from the 24hr Ham Radio Today fax-back line, 01703 263429 (use with a personal DTMF, i.e. 'touch-tone', phone/fax keypad - follow the voice menu), request fax document 22 from the satellite menu for this month's. You can also get a copy in the post by sending an SAE together with the corner flash from this page to the Ham Radio Today Editor, marking your envelope 'Keplers' and stating whether you want *all amateur satellites* (one A4 page) or *all satellites* (10-15 A4 pages - you'll need an A5 or A4 sized SAE with postage for 100g for this).

CLUB NEWS and rallies

Aylesbury Vale RS meet on Wednesday evenings in the Village Hall in Hardwick, located off the A413 between Aylesbury and Buckingham. Club diary;
Jun 5th - Images from space, G4OAV
For further details and meeting times, contact Ivan Eamus G3KLT, Tel. 01296 437720

Braintree and District ARS meet on the first and third Monday of the month (except bank holidays), 8.00pm, at the Braintree Hockey Club, Church Street, Bocking. 2m club net on the 2nd and 4th Mondays at 20.00 GMT, 145.375MHz. Planned club events/talks;
Jun 3rd - Operating evening
Jun 17th - Talk: Production of the BARSCOM newsletter
Jul 1st - Operating evening
For further details please contact Club Secretary John Button G1WQQ, Tel. 01787 460947

Bristol (South) ARC meet every Wednesday at the Whitchurch Folkhouse Association, Bridge Farm House, East Dundry Road, Whitchurch, Bristol. Club diary of events/talks;
Jun 5th - 80m activity evening
Jun 12th - Aircraft video night
Jun 19th - VHF NFD operators preparation
Jun 22nd - VHF NFD operating weekend
Jun 30th - Longleat rally
Jul 3rd - 10m activity evening
Jul 10th - Sales of plants (if ready for sale)
For more information and meeting times, Tel. 01275 834282 24hr. Answerphone.

City of Bristol Group meet on the last Tuesday in the month, 7.00pm for 7.30pm, at New Friends Hall, Purdown, Bell Hill, Stapleton, Bristol BS16 1BG. Club diary of events/talks;
Jun 25th - Mobile aerals
Jul 30th - Half yearly meeting
Further details can be obtained from Dave Bailey G4NKT, Tel. 0117 9672124

Bromley and District ARC meet on the third Tuesday of each month, 7.30pm for 8.00pm at the Victory Social Club, Kechill Gardens, Hayes, Kent. Club net; Sundays 11.00am on 145.350MHz FM. Planned events/talks;
Jun 18th - Direction finding hunt
Jul 16th - Crystal set contest, G4NPD
Aug 20th - Barbecue
Further details from Alan Messenger G0TLK, Tel. 0181 777 0420

Bromsgrove ARC meet on the second and fourth Tuesday of the month at Lickey End Working Men's Club, Burcot, Bromsgrove. Club diary of events/talks;
Jun 11th - Technical topics
Jun 25th - Talk on Aerials
Jul 9th - Mobile DF hunt
Jul 23rd - Discussion on DF hunting
Further details from Barry Taylor G0TPG, Tel. 01527 542266

Buxton ARC meet at the Lee Wood Hotel, Buxton, at

8.00pm on the second and fourth Tuesdays each month. Club diary of events/talks;
Jun 11th - Ron's night
Jun 25th - Live radio at the Lee Wood Hotel
Jul 9th - Natter night, what is the best way to get our DXCC?
Jul 23rd - Junk night
For further information contact Derek Carson G4IHO, Tel. 01298 25506, or G4IHO@GB7DAD

Cheltenham AR Association, meet on the first Friday of the month at the Prestbury Library, The Burgage, Prestbury, Cheltenham, at 7.30 for 8.00pm. Planned club talks/events;
Jun 7th - Operating from Gozo 9H3, John G4PDQ
Jul 5th - Rochester (USA) VHF Group - video
For further details contact the Club Secretary, Mrs P.M. Thom G1NKS, Southern House, 9 Southern Rd, Cheltenham, Glos GL53 9AW, Tel. 01242 241099

Conwy Valley ARC meet on the first Wednesday each month, in The Studio, Penrhos Road, Colwyn Bay, Clwyd. Planned club events/talks;
Jun 5th - Club AGM
Further details are available from Club Secretary Wynne Evans GW6PMC, Tel. 01745 855068, Ans/Fax. 01745 856406

Cornish RAC meet on the first Thursday each month, 7.30pm, at Perranwell Village Hall, Nr. Truro. Planned club events/talks;
Jun 6th - Talk by G3XFD
Jul 4th - Talk by a Trading Standards Officer
Jul 13th - Club rally and computer fair
For further details contact Robin G0MYR, Tel. 01209 820118

Cray Valley RS meet on the first and third Thursday of each month, 8.00pm at the Progress Hall, Admiral Seymour Road, Eltham SE9, club net 3.720MHz 8.00pm every Monday. Planned club diary;
Jun 6th - Power Generation part 2, by G6SDO
Jun 20th - Annual DF hunt
Jul 4th - Visit to Littlebrook Power Station
Jul 18th - Impromptu Lecture and Discussion evening
For further details contact Tony G4WIF, Tel. 0171 739 5057 office hours only.

Dragon ARC meet on the first and third Mondays of each month at the Four Crosses Hotel, Petraeth Road, Menai Bridge, at 7.30pm for 8.00pm. Visitors and new members are welcome. The club run several special event stations throughout the year. Club diary of events/talks;
Jun 3rd - "Where is it?", by GW3HCL
Jun 17th - ATV, by GW3JGA
Jul 1st - Vice Chairman, John GW3VVC
Jul 15th - Kenya, by Dr. Ieuan Jones GW4FQU
Further details from the Secretary Tony Rees GW0FMQ, Tel. 01248 600963

Dunfermline RS, meet every Thursday evening, 7.30pm, at Outh Muir, 5 miles north of Dunfermline on the A823

(near Knockhill Race Circuit), and have regular radio operating evenings and 'natter' nights. Planned club events/talks;
Jun 16th - 2m QRP contest and barbecue, bring the family and some food and drink!
Jul 18th - The Radiocommunications Agency, by Alan Fletcher, Operations Manager Scotland
For further details contact Adrian GM0SRD, Tel. 01383 735967

Dunstable Downs RC, meet every Friday (except Bank Holidays), 8.00pm at Chews House, High Street South (A5), Dunstable, Bedfordshire. Visitors and new members very welcome, just drop in. Planned club events/talks;
Jun 7th - Quiz, book night
Jun 14th - Informal meeting
Jun 21st - DDRC Grand Prix - Scalextric racing
Jun 28th - Informal meeting
For further details contact Paul G7TJSJ, Tel. 01582 861936

Halifax and District ARS meet at 7.30pm on the first Tuesday each month, at The Tap and Spile Pub (formally Royal Oak), Clare Road, Halifax, for committee and Morse tuition. On the second and fourth Tuesdays they meet, 7.00pm, at Queens Road (note Queens Road is closed for some periods at school holidays). Planned club events/talks;
Jun 18th - HF radio in the RAF WW2 onwards, G1FDL
Jul 18th - Talk by John G3TSA
Aug 20th - Junk sale
Further details can be obtained from Mr. D. Moss G0DLM, Beechwood Lodge, Lightcliffe, Halifax HX3 8NU, Tel. 01422 202306

Hastings Electronics and RC meet every third Wednesday of each month for their main meeting, at West Hill Community Centre, Croft Road, Hastings, and every Friday for a social evening, at the Sea Anglers Club, 16 Grand Parade, St. Leonards. The club is a registered City and Guilds examination centre, and also run RAE, Novice and Morse courses. Planned club events/talks;
Jun 19th - The development of the Pan-European Optical Super Highway, by Prof. O'Mahoney of Essex University
Jul 17th - Summer auction of equipment
Aug 21st - Bring your thingy competition
For further details contact Reg Kemp G3YYF, Tel. 01424 830454

Hoddesdon Radio Club meet alternate Thursdays at the Conservative Club, Rye Road, Hoddesdon from 8.00pm. SWLs and visitors very welcome. The club run Morse training classes. Club diary of talks/events;
Jun 6th - Visit by Chris Taylor of 'Martin Lynch'
Jun 20th - Barbecue at Tolmers Scout site, Cuffley, Herts
For more information contact Don G3JNJ, Tel. 0181 292 3678

Horndean and District ARC meet on the first and fourth Tuesday of each month, 7.30pm, at Lovedean Village Hall, Lovedean Lane, Lovedean, Hants. The first Tuesday is usually a 'Natter Night'. Visitors welcome. Club nets are Sundays 1955kHz 09.00hrs CW, 09.30hrs SSB, and

Wednesdays 145.350MHz at 19.30hrs. Planned Club events/talks;
Jun 8/9th - Club station at Clanfield Carnival
Jun 25th - Broadband ISDN, by G7CAW
Jul 23rd - History of Portsmouth Dockyard
Aug 27th - American supper
Further details can be obtained from Stuart Swain, Tel. 01705 472846

Horsham ARC meet on the first Thursday each month, 8.00pm, at The Guide Hall, Denne Road, Horsham, W. Sussex. All welcome. Planned club talks/events;
Jun 6th - 160 and 80m aerials, by Louis Varney G5RV
For further details contact Miss M. J. Dixon G7EYL, 6 Lambs Farm Road, Horsham, W. Sussex RH12 4DJ, Tel. 0181 686 5701 (daytime), or 01403 27552

Isle of Man ARS meet on Mondays, 8.30pm, at The Royal Naval Association, Regent Street, Douglas. The 1st Monday of the month is supplemented with a 30-60 mins talk of general interest to members, held at the TGWU building in Fort Street, Douglas. On Thursdays they have an informal get together, 9.00pm, in The Manx Legion, Douglas Street, Peel. Planned club events/talks;
Jun 10th - QSLing, QSL cards, the QSL bureau and DXCC, by GD3AHV
For further information contact Club Secretary Chris Wood G6TWF, 2 Lyndale Ave, Peel, IM5 1JY, Tel. 842786

Itchen Valley ARC meet on the second and fourth Fridays each month, at the Scout Hut, Brickfield Lane, Chandler's Ford, Hants (just up the road from SMC), 7.30pm for 8.00pm. Planned club events/talks;
Jun 14th - Follow the trail from Netley Marsh Community Hall, Woodlands Road
Jun 28th - Save the Dace! - Radio & Electronics in fishery management, by Mr Mike Ladle
Further details from Sheila GOVNI, Tel. 01703 813827

Keighley ARS meet at the Cricket Club, Ingrow, near Keighley, every Thursday at 8.00pm. Many club meetings are 'Natter nights' and 'nights on the air', other events/talks include;
Jun 13th - Weather fax and data, by G4ZVD
Jun 27th - Treasure hunt
Jul 4th - One hand in your pocket, by three G3s
Jul 18th - Visit to W.Y. Police Air Support Unit
Further details from Kathy Conlon G1IGH on 01274 496222

Leicester RS meet every Monday, 7.30pm, at The Chantry, Gilroes Cottage, Groby Road, Leicester. The HF and VHF shacks are available at each meeting, and have regular HF/VHF nights on the air combined with a general natter evenings. The club also run RAE, NRAE and Morse courses. Planned club events/talks;
Jun 3rd - 'PMR', speaker; Barry GOLCU
Jun 24th - Equipment check! What have you got and where is it?
Jul 1st - Demo; 'The Submarine' of John Robinson G7SCL, plus barbecue?
Aug 5th - 'Personal Safety' by John Alexander G7GCK
For further details contact Stan Hay G3HYH, Tel. 0116 239 4367

Liverpool and District ARS meet at 8.00pm every Tuesday evening at The Churchill Club, Church Rd., Wavertree, Liverpool. They run RAE, Novice RAE and Morse courses. Planned club events/talks;

Jun 4th - Demonstration and talk
Jun 11th - Club on the air
Jun 18th - RAYNET (provisional)
Jun 25th - Surplus sale
Jul 2nd - Amateur Television (provisional)
Jul 9th - Club on the air
For further details contact Ian Mant G4WWX, Tel. 0151 722 1178.

Loughborough and District ARC meet every Tuesday (term time), 7.45pm, at Hindleys Community College, Shepshed, Leicestershire. Planned club events/talks;
Jun 4th - Maps, just what do they show, by G7HZZ
Jun 11th - 2m DF hunt - Lost? You soon will be!
Jun 18th - 20 & 40m night on the air
Jun 25th - Golf match at Shelthorpe Golf Course
Jul 9th - 2m DF competition, hoaming beacon in local pub!
Jul 16th - Uboat operations & portable station at Chamwood Water
For further details contact Alan GOPHT, Tel. 01509 231289

Mansfield ARC meet on the second Monday every month, 7.30pm, at The Polish Catholic Club, off Windmill Lane, Woodhouse Road, Mansfield. Visitors welcome. Planned club diary of events/talks;
Jun 10th - Club stations on the air
For further details contact Howard G1JGY, Tel/Fax. 01623 423697, or David G0RDP, Tel. 01623 631931

Maxpak, the Midlands AX25 Packet Radio Users Group, meet on the first Monday each month (when this is a Bank Holiday, the meetings are on the second Monday), 8.00pm, at the Perton Community Centre, Perton, near Wolverhampton. Non-members and visitors welcome (non-members 50p per evening to help cover costs). Planned events/talks;
Jun 3rd - Internet and packet radio
Jul 1st - TCP/IP, talk and practical demo
Aug 5th - Natter night
For further information contact Club Secretary Edward Loach G4ZXS, Tel. 01902 741877 (evenings), or via packet G4ZXS@GB7MAX

Medway ARTS meet 7.30pm on Fridays at Tunbury Hall, Catkin Close, Tunbury Avenue, Walderslade, Chatham. Morse practice, construction and Novice help available. Visitors welcome. Club diary;
Jun 14th - SSTV - talk & demo by G6IVP
Jun 21st - Annual barbecue
Further details from Gloria G3VUN, 40 Linwood Ave, Strood, Rochester, Kent ME2 3TR, Tel. 01634 710023

Newbury and District ARS meet on the fourth Wednesday each month at the Bucklebury Memorial Hall, Bucklebury near Thatcham, at 7.15pm. Planned club events/talks;
Jun 16th - Club radio boot sale, Acland Hall & Rect. Field, Cold Ash, Newbury, Berks
Jun 26th - RAYNET
Jul 24th - Visit by G3NNG
For further details contact the club secretary, Tel. 01635 863310

South Normanton and District ARC meet at the Community Centre, New Street, South Normanton, every Monday (except Bank Holidays) at 7.30pm. Visitors very welcome. Planned club events/talks;
Jun 3rd - Night on the air 'High Ordish'

Jun 10th - Video night
Jun 17th - RSGB Liaison talk, Ken Frankom
For further details please contact Russell Bradley G0OKD, Tel. 01773 863892

Plymouth Radio Club meet Tuesdays, 7.30pm, at the Royal Fleet Club, Devonport, Plymouth. All newcomers welcome. Planned club diary;
Jun 4th - Talk on GB3WD, by Arnold G4RIM
Jun 30th - Club trip to Longleat Rally
Jul 2nd - Packet in Plymouth, by Pete G7DQC
Jul 6th - VHF NFD
For further details contact the Public Relations Officer, F. P. Russell, Tel. 01752 563222

Preston ARS, meet every Thursday evening, 7.00pm, at the Lonsdale Sports and Social Club, Fulwood Hall Lane, Fulwood, Preston, Lancs. The club run Novice and Morse classes on Thursday evenings every week. Planned club events/talks;
June 6th - RSGB video, an evening's viewing
June 20th - General discussion evening, G3KUE on air
July 4th - 'Maplin Kit' construction competition
July 18th - General discussion evening, G3KUE on air
Aug 1st - Fox Hunt seek and find competition
Further details from Eric Eastwood, Tel. 01772 686708

Salop Amateur Radio Society meet at their new venue which is The Telesports Club, Abbey Foregate, Shrewsbury every Thursday. They run regular RAE tuition and workshop evenings. Planned club diary of events/talks;
Jun 6th - DX TV, by G4FBZ
Jun 13th - Open evening, on air night and practical construction demo
Jun 20th - Fox hunt, 7.00 at the Oak
Jun 27th - National Field Day preparations
Jul 4th - NFD, the final check
For further details contact Ian G7SBD, 56 Roselyn, Harlescott, Shrewsbury SY1 4LP

Shefford and District ARS meet every Thursday, 7.45pm, at the Church Hall, Amphil Road, Shefford, Beds. They plan to run a Novice course on alternate weeks starting in September and have regular activity nights. All newcomers are welcome. Planned club events/talks;
Jun 6th - Member's activity night
Jun 13th - VHF field day planning and final equipment count
Jun 19th - Gliding evening at Cambridge University gliding club
Jun 20th - Member's activity night
Jun 27th - Pedestrian DF hunt
Jul 4th - Last meeting before summer break, planning for NFD, barbecue and DF hunt
Jul 6/7th - VHF/UHF NFD contest
Further details contact Derek Clarkson G4JLP, Tel. 01462 851722

Silverthorn RC meet every Friday, 7.30pm, at the Adult Education and Community Centre, Friday Hill House, Simmons Lane, Chingford, London E4 6JH. A warm welcome is given to everyone. They offer Morse tuition and tests, and have a fully equipped shack with packet radio facilities for members to use, plus regular 'on air' and social evenings. Planned club diary of events/talks;
Jun 7th - Junk sale
Jun 21st - Quiz against Epping Forest & Dist. ARC
Jul 19th - Visit by Waters and Stanton
Jul 26th - Club camp weekend

For further details contact Andrew Mowbray, GOLWS/G1NPT, at above address, or from Dave GOKHC, Tel. 0181 505 1871, or packet to G1NPT @ GB7TUT.

West Somerset ARC meet on the first Tuesday each month, at the West Somerset Community College, 6th Form Block, Minehead, Somerset. Planned club events/talks;
 Jun 4th - Fox hunt, all welcome
 Jul 2nd - Short amateur radio videos
 Aug 6th - Models and radio control
 For further details contact Alan. C. Elliott, Tel. 01643 707207

Southgate ARC meet on the second and fourth Thursdays of each month at the Winchmore Hill Cricket Club Pavilion, Firs Lane, Winchmore Hill, London N21. Meetings are held each 2nd and 4th Thursdays of the month, between 19.30 and 22.00. The club also runs Novice licence courses and have regular 'on air nights'. Planned club diary of events/talks;
 Jun 27th - Radio on the air
 Aug 8th - Barbecue in the Spinney, bring your own food
 Aug 26th - Annual DF hunt
 For further details contact M. E. Viney GOANN, 20 Auckland Road, Potters Bar EN6 3ES, Tel. 01707 850146.

Stourbridge and District ARS meet on the first and third Mondays each month (except bank holidays), at the Robin Woods Centre, Scotts Road, Stourbridge. The first Monday is usually an 'on air and natter night'. Planned club events/talks;
 Jun 17th - Personal experiences of radar, Arthur Parkes
 Jun 22/23 - Special event station GB2MS
 Jul 16th - Making your own, by John Badger G4YZD
 Further details from Gordon Bryant G0TZV, Tel. 01384 395206

Stratford upon Avon & District RS meet on the second and fourth Mondays, at the Home Guard Club, Main Road, Tiddington, Stratford upon Avon, at 7.30pm. The club also run an RAE course (write to Mr. J. Harris, 57 Evesham Road, Stratford upon Avon CV31 2PB, enclosing an SAE, or Tel. 01789 295257 for details). Club events/talks include;
 Jun 10th - 2m direction finding contest
 Jun 24th - G4AFJ of the Repeater Management Group
 Jul 6th - Summer social
 Jul 8th - 160m direction finding contest
 Jul 22nd - Construction competition
 Further details from Club Secretary Jeff Porter G4OHJ, Tel. 01789 773286

Mid Sussex ARS meet on the first and third Fridays each month, 7.45pm, at Marle Place Further Education Centre, Leylands Road, Burgess Hill, West Sussex. Club shack open all other Friday evenings. The club also run RAE and NRAE courses (contact John G00IO, Tel. 01444 450957 for details) and have regular 'operating evenings'. Club net; Sundays 8.00am 3.740MHz (+/- QRM), 11.00am 145.350MHz FM, 8.00pm 70cm Novice net on GB3HY. Planned club events/talks;
 Jun 7th - The GB3HY repeater, by G3XTH and G00JA
 Jun 21st - Barbecue evening
 Jun 28th - Project problem solving
 Jul 5th - Preparation for club VHF NFD
 Jul 6/7th - Club VHF NFD, Keymer Post, Sussex Downs
 Further details from Mike G0GNV, Tel. 01444 241407

Sutton and Cheam RS meet on the first Thursday (natter night) and third Thursday (formal meeting) each month, 7.30pm for 8.00pm at the Sutton United Football Club, The Borough Sports Ground, Gander Green Lane, Sutton, Surrey. Club 'natter freq' 70.3875MHz, Club nets; 20.30 Mon starting on 145.500MHz then QSY, Tue at 10.30 on 3.760MHz. Club talks/events;
 Jun 6th - Natter night
 Jun 20th - Junk sale
 Jul 6/7th - VHF NFD
 Jul 18th - Global Positioning Systems, by Lyn Dutton
 For further details, Tel. 0181 644 9945

Swindon and District ARC meet every Thursday evening, 7.00pm, at the Eastcott Community Centre, Savemake Street, Old Town, Swindon. The club hold regular 'natter and operating' evenings. Visitors and new members always welcome. We're told that those considering preparing for the RAE and Morse tests, will always find experienced operators and skilled technicians to provide support and advice. Planned club events/talks;
 Jun 6th - VSWR and ATUs, Peter G3RZP
 Jun 20th - Cellular radio technology, Dave G4ZAZ
 Jun 27th - AGM
 Jul 4th - Low cost aerials, Dave G8ELH
 Jul 18th - Alternative energy sources
 For further details contact Ian G3YBY, Tel. 01793 770838, or Den G7PDV, Tel. 01793 822705

Three Counties ARC have moved to a new meeting place in Liphook, at the Bramshot Institute and Parish Club, which is in the middle of the village at the top of Headley Rd, Liphook. This active club meets on the 2nd and 4th Thursdays of each month, 8.00pm onwards. All welcome, non-members please contact an official in advance so you can be 'signed in' as a guest visitor. Planned club events/talks;
 Jun 13th - Preparation for radio contests
 Jun 27th - Fox hunts using radios (not animals!)
 Jul 11th - Fax for radio communication (JVfax demo)
 Jul 25th - Field Day preparation of equipment
 For further details contact Tom Milne G4CMG, Tel. 01428 606298

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;
 Jul 6/7th - VHF NFD
 Aug 23rd - Barbecue
 Further details from Peter G4VTO, Tel. 01803 864528 (day works No.)

Trowbridge and District ARC meet at Southwick Village Hall, Southwick, Trowbridge, Wiltshire for a main meeting every first Wednesday of the month, and a natter night every third Wednesday (except October). The club plan to run an RAE course starting in September (for details contact Chris G0HFX Tel. 01225 764874 evenings). Visitors welcome, fee 50p. Planned club events/talks;
 Jun 5th - 2m direction finding event
 Jul 3rd - Summer social/inter-club skittles
 For further information contact Ian G0GRI, Tel. 01225 864698 evenings and weekends.

North Wakefield RC meet every Thursday, 8.00pm, at East Ardsley Cricket Club, East Ardsley, Wakefield. Novice classes are every Thursday, 7.00pm in the club shack. Planned club events/talks;

Jun 13th - QRP construction, Rev. George Dobbs
 Jun 27th - Barbecue with archery demo & military comms. vehicle display
 Jul 4th - Members visit to American base at Menwith Hill for 4th July celebrations
 Jul 23rd - Members visit West Yorkshire Police helicopter at Carr Gate, Wakefield
 Jul 25th - Barbecue with a band
 For further details contact Ian 2E1EGV, Tel. 01274 783583, or @ GB7KLY

Wakefield and District RS meet every Tuesday, 8.00pm, in the first floor rooms, Ossett Community Centre, Prospect Road, Ossett, West Yorks. We're told the club has a well equipped station and run both Morse and Novice classes. The club net is on 2m FM on Mondays. Club diary;
 Jun 4th - 2m DF tuition, G4BLT
 Jun 11th - On the air
 Jun 18th - 2m fox hunt, G0BQB
 Jun 25th - Coax traps without a GDO, G0BQB
 Jul 2nd - Carrier waves, G0ISJ
 For further details contact Bob Firth G3WWF, 6 Eastfield Drive, Woodlesford, Leeds LS26 8SQ, Tel. 0113 282 5519, or via packet G3WWF @ GB7WRG

Mid-Warwickshire ARS meet on the second and fourth Tuesdays each month, 8.00pm, at 61 Emscote Road, Warwick. Planned club events/talks;
 Jun 11th - Fox hunt
 Jun 25th - WAB
 For further details contact G8HRI, Tel. 01926 424465

Weston-super-Mare RS, normally meet on the first and third Mondays each month, at the Woodspring Inn, High Street, Worle, Weston super Mare (2mins from junc. 21 M5). The third Mondays are usually workshop evenings. Planned events/talks;
 Jun 3rd - Aircraft EMC problems
 Jul 1st - Annual DF hunt and buffet - find G4ZUX
 Aug 5th - Video presentation - the secret war
 For further details contact Graham Pinder G8WAR, Tel. 01934 415700

Wincanton ARC meet on the first and third Mondays (except bank holidays - then second and fourth) in the Community Lounge, King Arthur's Community School, Wincanton, Somerset BA9 9BX at 7.30pm. Planned club events/talks;
 Jun 17th - Natter night with RSGB video
 Jul 1st - Club talk
 Jul 15th - Mobile 2m DF hunt, start 7.00pm
 Aug 18th - Treasure hunt
 For further details contact Tim Stellar G6RCT, Tel. 01963 31788

Winchester ARC meet on the third Friday of the month, 7.30pm, at the British Red Cross Centre, Dumgate House, Winchester (adjacent to North Walls Police Station). Club diary;
 Jun 21st - Talk by Mike Homer G6AIQ
 Aug 16th - Discussion evening
 Sep 20th - Sea and mountain rescue experience, G0TLG
 For further details contact Peter Simpkins G3MCL, Tel. 01962 865814

Wirral and District ARC meet at 8.00pm, at the Irby Cricket Club, Mill Hill Road, Irby, Wirral, every second and fourth Wednesday each month, and have regular D&W

evenings every first and third Wednesdays at various other locations. Planned club events/talks;
Jun 12th - Eileen Medley Challenge Cup DF Hunt
Jun 26th - Club visit
Jul 5th - The QE2 Liner visits the Mersey - GB2QE from the lighthouse
Jul 10th - Mobile treasure hunt, from ICC.
Jul 24th - UHF DF hunt, 8pm Heswall lay-by
For further details contact Bob Smith G4NCI, Tel. 0151 677 0210

Yeovil ARC meet every Thursday at 7.30pm, at the Red Cross Centre, 72 Grove Avenue, Yeovil, Somerset. The club run Novice and RAE courses, plus Morse tuition if required, by arrangement with G3GC. All are welcome. Club nets, Sundays 10.30 on 3.665MHz (80m SSB), Tuesdays 20.30 on 145.350MHz (2m FM) and Fridays 20.00 on 3.550MHz (CW). Club events/talks;
Jun 6th - Cycle 23, by G3MYM
Jun 13th - Morse techniques, by G3KSK
Jun 20th - Preparation for SSB FD, G7WAL
Jun 27th - Club station on the air
Further details can be obtained from Cedric White G4JBL, Tel. 01258 473845

National and International

British Amateur Radio Teledata Group (BARTG) have a quarterly magazine, and hold a rally and contests each year. Their membership officer is Peter Adams, G6LZB, Tel. 01923 220774, for other information the group's Secretary is Ian Brothwell G4EAN, 56 Amot Hill Road, Arnold, Nottingham NG5 6LQ, Tel. 0115 926 2360, or via packet G4EAN @ GB7BAD.

British Amateur Television Club, are particularly active with Amateur Television (ATV) - the transmission and reception of vision. They produce a quarterly magazine entitled 'CQ-TV' and have regular get-togethers at their rally stands, and hold their own rally each year. For details of BARTC membership write to; Dave Lawton, 'Grenehurst', Pinewood Road, High Wycombe, Bucks HP12 4DD.

G-QRP Club publish a quarterly journal devoted to low power communication, and hold regular get-togethers at their rally stands throughout the country. For membership details, contact their Secretary, Rev. G. Dobbs, St. Aiden's Vicarage, 498 Manchester Road, Rochdale. Lancs. OL11 3HE. Tel. 01706 31812.

International Short Wave League who as well as running an International QSL bureau for amateurs and SWLs, have a monthly magazine and regular get-togethers at their rally stands plus several on-air nets on HF and VHF. For more details send an A4 sized SAE to; ISWL HQ, 3 Bromyard Drive, Chellaston, Derby DE73 1PF

The Irish Radio Transmitters Society publish regular newsletters giving details of local activities, and the yearly IRTS Callbook, they also have a video library. Their contact man is Dave Moore E14BZ, 12 Castle Ave, Carrigtwohill, Co Cork. Tel. (Eire) 021 883555, and the IRTS are on Internet; jryan@iol.ie

Radio Amateurs' Emergency Network (RAYNET) can be contacted at Hunters Moon, Newton le Willows, Bedale, N. Yorks DL8 1SX. 24hr national emergency contact line;

0141 621 2121. The RAYNET Training Team produce a quarterly newsletter for people interested in the National Training Scheme, and can be contacted at P.O. Box 2, Chinnor, Oxon OX9 4JY,

The Radio Amateur Invalid and Blind Club are a registered charity who raise money for radio/computer equipment, and audio cassette courses for home study, for blind, deaf and disabled amateurs. Information from Vice Chairman Margery Hey, Tel. 01953 454920. The club attend rallies throughout the year, and collect surplus equipment for resale. If you have equipment to donate, contact Ian 2E1EGV, Tel. 01274 783583. The Northern Ireland Club collect unwanted tokens or vouchers (e.g. petrol etc.), these can be sent free of charge to; The Charities Appeal Officer, RAIBC NI, Freeport BE 1789, Belfast BT15 3BR.

Radiocommunications Agency are the licensing authority for all UK radio amateurs. They have a large number of free publications, including the booklet 'How to Become a Radio Amateur', and their 'Novice Licence Information Sheet', and can offer advice on general aspects of licensing. Postal address only (they're currently in alternative temporary offices: New Kings Beam House, 22 Upper Ground, London SE1 9SA); South Quay Three, 189 Marsh Wall, London E14 9SX. Direct Amateur Radio line; Tel. 0171 211 0160. General enquiries; Tel. 0171 211 0211, answerphone service; Tel. 0171 211 0591

Radio Society of Great Britain are based at Lambda House, Cranbourne Road, Potters Bar, Herts EN6 3JE, Tel. 01707 659015. They have a unique blend of full-time staff at Potters Bar, coupled with many volunteer officials around the country, and can help their members with many aspects of amateur radio.

Subscription Services Ltd. handle the issuing of amateur licenses in the UK, on behalf of the Radiocommunications Agency. They can help regarding enquiries concerning individual licenses (rather than general licensing matters which the RA handle, see above). Contact details; The Radio Licensing Centre, SSL, P. O. Box 884, Bristol BS99 5LF, Tel. (manned 8.30am - 10.00pm, Mon-Sat inclusive) 0117 925 8333.

To include your club, or rally, in this feature, make sure you send us your events details early. We only list active clubs, i.e. those who send us their diary of planned talks/events, (due to space restrictions we can only include clubs who send us details of events and talks, not natter nights for every meeting) so if they're not listed here they're obviously not very dynamic! Is your club listed? If not then give your Secretary a boot! If your club also has a regular 'net', let us know, we'll let your prospective members know. Dates to be included in the issue published on the 2nd August must reach us by the 19th June (we cannot guarantee to include details received after this date, several clubs are being missed out either because their details arrive too late, or the club newsletters we receive don't contain any events/talks dates which we can use. Ham Radio Today is published on the first Friday each month, therefore club events/talks details which occur before this date should be included in the previous issue), addressed to; The Editor, Ham Radio Today (Club News), Nexus Special Interests Ltd., Nexus House, Boundary Way, Hemel Hempstead, Herts HP2 7ST, or you can fax your club's details direct to the Editor's desk on 01703 263429.

Rallies

If you're travelling a long distance to attend rallies, we recommend you contact the organisers of the events first, before travelling, to check if there has been any changes since this magazine went to press. If the magazine is informed of any changes, the information will be available on the 24hr Ham Radio Today Voicebank line, Tel. 01703 263429.

June 15th

Royal Navy Amateur Radio Society Rally held in conjunction with the HMS Collingwood Field Gun Day, at HMS Collingwood, Newgate Lane, Fareham, Hampshire. June. 11 m27, directions signposted, talk-in S22 and SU22. Open 12.00 noon - 17.45, admission adults £2.00, children up to 14, £1.00, family two adults and three children £5.00. As well as the amateur rally there will be the plenty of adult and children's entertainments. Collingwood Naval Communications Museum open to visitors. Hot and cold refreshments. Further information from Philip Manning G1LJK, Tel. 01483 579486b(answerphone) or mobile PCN 0973 298287, or email 100741.2615@compuserve.com

June 16th

Newbury and District 9th Annual Car Boot Sale, at the Recreation Ground, Cold Ash, Newbury, Berkshire, just under two miles from the A4/A34 junction and signposted. Admission and parking free for buyers, generous plot for £8.00 to those selling. Access for setup up from 8.00am. Refreshments, toilets, disabled parking and children's playground on site. Talk-in by GB4NBS on 2m S22. NGR 510703 sheet 174. Further information from George Tel. 01488 682814.

June 28-30th

Ham Radio '96 Friedrichshafen, Germany Europe's largest gathering of over 20,000 ham radio enthusiasts, by the shores of the Bodensee (Lake Constance) at the Messe Friedrichshafen. Wide and varied selection of interests, immense trade presence with 280 exhibitors from 40 countries, large flea market, on-site camping and caravan facilities. For further venue/rally details Tel. +49 7541 7080. Accommodation/tourist information; Tel. +49 7541 21729

June 30th

Longleat Amateur Radio and Electronics Rally, Longleat Park, near Warminster Wilts. Six large marquees are planned to house a total of over 200 different traders. A major feature of the rally will be the bring and buy section. For those not interested in computers or electronics, one marquee is devoted to a major craft fair exhibition and another to refreshments. There is also the Safari Park, House and beautiful lake and grounds to see. Further information from Gordon GOKGL, Tel/Fax. 0117 940 2950

July 14th

Sussex Amateur Radio and Computer Fair, is to be held at Brighton Race Course from 10.00am to 4.00pm. Admission £1.50, free parking and a picnic area with views over the Sussex Downs. The rally organisers claim it to be one of the largest in the south of England, with over 100 trade stands and a dedicated room for bring & buy, with over 40ft of display area. Refreshments and bars available. For further details Tel. 01273 501100

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HELPLINES

Independant video producer seeks help / guidance relating to scanners, for low budget documentary. Would ideally like to find groups or individuals in West Midlands region. Chris Oakley (Wolverhampton), Tel. 01902 680315

Storno RX612 TX612 modules, does anyone have info which will help me get these working on 2m? All expenses paid. Rod GW4SLK, Garden Cottage, Mostyn Hall, Mostyn, Holywell, Clwyd CH8 9HN, Tel. 01745 560165 after 5.00pm.

Technical manuals urgently required for KW 'Atlanta' transceiver and KW201 receiver overhauls, any cost, desperate! G3AOY (Paignton, Devon), Tel. 01803 520065

FOR SALE

Yaesu FT-1 general coverage, solid state transceiver, memory board, extra filters, all mode, 150kHz to 20MHz continuous, with Yaesu MH-1 mic with up/down buttons, owners and service manuals. Excellent condition, £735 carriage extra. K. Michaelson (London), Tel. 0181 455 8831 anytime.

Lowe HF-150 receiver, VGC, operators manual, PSU, remote keypad, two baluns, G5RV half wave, sixty metres coax, £350 ovno. Ray Lewis (Herts), Tel. 01923 404341 anytime.

Eddystone 730-4 receiver with matching ATU and speaker, VGC, cash offers. 13.8V 30A PSU, as new, £65. Thirty old radio books 1933 onwards, offers, WHY? Wanted - amateur

bands receiver Trio JR310, consider WHY? Bill (Hereford), Tel. 01432 279641 after 6pm.

Yupiteru MVT7000 multi band receiver with leather case, mains adaptor and charger, £220. A. Cooper (Merseyside), Tel. 0151 677 1719 evenings.

ADI 2m mobile transceiver model AR146, just a few weeks old, CTCSS option fitted. Price new £299. Don't be put off by the name, it's a Kenwood with a different badge!! Sell for £225, will deliver locally. Vince (SW London), Tel. 0181 788 3151

Kantronics KAM all mode TNC version 5.0. All leads, manuals, and 'Practical Guide To Packet Operation In The UK', £200 plus P/P. Phil (Redhill, Surrey), Tel. 01737 762753

Trio TR-9000 2m multimode, £225. Yaesu FT-811 70cm handheld, £150. Yaesu FT-4700RH dual band mobile, £350. Sony Air-7 scanner, £110. All plus carriage or collect. Brian G8INL (Near Castleford, Leeds), Tel. 01977 684394

Yaesu FRG-7700, £200. Lake ATU TU2, £20. Plus manuals. Howard (Merthyr, Mid. Glam), Tel. 01685 387382

Yaesu FT-77 HF transceiver, FM and CW filter fitted, boxed with manual, £275. J. Travers (Swansea), Tel. 01792 817957

Sony Air-8, PSB, Air, FM, AM receiver, good frequency range, preset memory, complete with full instructions, as new, £100 ono, vast saving on new model. I. Price (Hants), Tel. 01256 469377 anytime.

Kenpro KT44 70cm handheld transceiver, VGC with charger, £120. Datong Morse keyboard, can be used as Morse tutor, £50. R. Howes (Dorset), Tel. 01305 777494 after 6.00pm, or Email; 100733,3463@compuserve.com

BNOS 6m transverter, 10m IF, superb performance, suitable for 6m contests, with MuTek attenuator, £210 ono. BNOS 2m linear with preamp, 3W in, 50W out, £80 ono. New 11-ele Tonna, never assembled, £40 ono. Ian (Staffs), Tel. 01782 771058

Sony PRO-80, good condition, £180, or exchange for MVT-225, PRO-43, or something similar. C. Doran (Cumbria), Tel. 01900 605903

Silent key sale; Kenwood TS-50 and auto ATU, £650. Trio TS-830S, SP-230, £400. Daiwa CN620A, £40. LPF, £20. Alinco DJ-560, £150. 1-ele Mosley aerial, 3-band, rotator,

£150. ATU, £25. Mark GOLGJ (Norfolk), Tel. 01362 691099

Kenwood TS-830S with MC50 mic, £800. Kenwood VFO-120, works with 830S, £40.

Drake MN 2000 2kW ATU, built-in PWR meter, SWR. All items must be collected. B. Hayes G3JBV (Northampton), Tel. 01604 401800

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Yaesu FT-51R with many extras, £320. Two FNB nicads for 51R, £30 each. Two cases for large nicad, £7 each. All mint condition. P. Hillman (Hants), Tel. 01256 51836 after 6.00pm any evening.

Uniden UBC200XLT, used condition with extras, £100, boxed, clean. Yupiteru 7100, mint condition, all usual extras, £290, boxed. Kenwood TH-78E, good condition, various extras, £340. M. Silvester (Coventry), Tel. 01203 650572 24hr ans. svc.

Yaesu FT-7B HF transceiver, £275. Kenwood AT-230 ATU, £125. BNOS 12A PSU, £50, or £400 for complete station, or exchange for 2m handheld in mint condition with cash adjustment. Bev GW00SQ (Pontypool), Tel. 01495 757221

Pye Reporter MF6AM high band, good working order, converted to 2m band, complete with mic, speaker and circuit diagram. 2m crystals included for R4, £15. GOVUN (Kent), Tel. 01732 847359

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Julian (Tregaron, Dyfed), Tel. 01974 251420

Skyscan car mag mount MkII, 25-1300MHz, 4m RG58 coax, BNC connector, £15. Base stand for pocket scanners, adjustable bracket holder, BNC lead fitted, new from SSE, cost

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 Clearance; BT8 dry battery pack, TH27 power lead, TH205 power lead, two rubber duck aerials, SMC53 speaker mic, 486DX33, CPU, fan, 4m Europa, two 4m Pye 290s, telescopic aerial for handheld, 2m/70cm. F. Porter (Tyne and Wear), Tel. 0191 512 0373
 Icom IC-730 transceiver, excellent condition, narrow CW filter fitted, manual and mic included, £250. M. Knights (Northants), Tel. 01933 652111
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 Kenwood TS-140S HF gen. coverage transceiver, with Shure 444 mic, £550. Yaesu FC700 ATU, £75. Both items good condition, prefer buyer inspects/collects. Alex GOATV (Northants), Tel. 01536 515311
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Who, who and what's what in HRT

Editor:
Sheila Lorek, G8IYA

Consultant Technical Editor:
Eur Ing. Chris Lorek B.Sc.(Hons) C.Eng. M.I.E.E. G4HCL, AA0RX

Creative:
Designer: Mark Thornicroft
Photographer: Manny Cefai

Advertising:
Tel. 01442 66551 Fax. 01442 66998
Display Advertisement Sales: Andrew Forder
Classified Advertisement Sales: James Gale
Advertisement Copy Control: Marie Quilter

Management:
Divisional Director: Terry Pattison
Business Manager: Claire Jenkinson
Copy Sales Manager: David Pagendam
Group Advertisement Manager: Diane Farnham
Marketing Manager: Jason Doran
Production Administrator: Theresa Davis

Ham Radio Today Address:
Ham Radio Today, Nexus Special Interests Ltd., Nexus House,
Boundary Way, Hemel Hempstead, Herts HP2 7ST

24hr HRT Editorial Voicebank and automatic fax-back information line:

Tel. 01703 263429

(use with a DTMF, i.e. 'touch-tone', phone/fax keypad - follow the voice menu)

Internet WWW site: <http://www.netlink.co.uk/users/hrt>

Email (Editorial): chris@radshack.demon.co.uk

Fax (Editorial desk): 01703 263429 (same as voicebank, 24hr) for information messages only (i.e. news items for Club News, Radio Today, etc.). Readers queries please see below.

Subscription/Back Issues Orders Hotline: 01858 435344.
Enquiries Hotline: 01858 435322

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High Powered 2-m FM Transceiver FT-3000M

It's Awesome!

You know who you are. You drive farther, use your mobile rig longer, and buy the most dependable radio products you can get. The FT-3000M is the *only* amateur 2-m FM mobile radio with 70 full watts of TX power! Reassuring, when you're driving a lonely stretch of highway!

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champs. Plus, the FT-3000M is a great base, too.

The new FT-3000M comes equipped with some sensational exclusive features!

- WIDE BAND RECEIVE! From 110-180 MHz, VHF and 300-520 MHz UHF to 800-999 MHz. And, AM aircraft receive!
- TWIN COOLING FANS! Unique, twin fans keep the FT-3000M running cool without a problem! So, don't worry about long transmission keydowns.
- SELECTABLE POWER OUTPUT! An awesome 70 watts, plus 50, 25, and 10 Watts.
- TRUE FM! Voice clarity has never been better.

- INTERACTIVE PROGRAMMING! Continual scrolling menu guides you through 50 settings—and won't let you forget the next step!
 - SIMPLIFIED FRONT PANEL! New Quick-Touch™ dual-concentric knob controls menu programming and adjustments.
 - PC PROGRAMMABLE! Optional ADMS-2B Windows™ Programming Software programs your FT-3000M in seconds!
- The FT-3000M is feature-rich just like the FT-2500M, 50-Watt mobile, and built to the tough performance standards you've come to expect from Yaesu. We think you should have at least one, don't you?

"This is true Wide Band receive! VHF, UHF, and 800-999 MHz."

"Digital Code Squelch gives me more privacy than CTCSS."



"Smart-Search™ scans and stores active channels for quick access."

"Yaesu did it again!"

Features

- Frequency Coverage
Wide Band Receive
RX: 110-180 MHz,
300-520 MHz,
800-999 MHz
TX: 144-146 MHz
- AM Aircraft Receive
- MIL-STD 810 Rating
- Interactive Programming
- High Power Output:
70 Watts, plus 50, 25 and
10 Watts
- Quick-Touch™ Dual
Concentric Control Knob
- Twin Cooling Fans
- ADMS-2B Windows™
Programmable
- Digital Coded Squelch (DCS)
- 81 Memory Channels
- Auto Range Transpond
System™ (ARTS™)
- 1200/9600 Baud Packet
Compatible
- Smart-Search™
- Alphanumeric Display
- Dual Watch
- Full line of accessories



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IC-2710H

Remote-Head, Dual-band FM Mobile

ICOM's new IC-2710H dual-band transceiver is designed for both beginners and experienced operators. It is also equipped with ICOM's newly developed HM-98 DTMF microphone.



- **Multi-function remote control microphone as standard.**

This DTMF mic can be used for both simple and advanced operations. When using the keypad without the cover, multi-function operations, such as direct entry, DTMF operation etc. are possible. When covering the keypad, only simple operations are possible.

- **Optional wireless remote control microphone.**

With the HM-90 microphone and the EX-1759 infra-red receiver, real wire-less operation is available. The BC-96 mic holder can be used to charge the internal batteries in the HM-90.

- **Optional front panel separation.**

By using the OPC-600 or the OPC-601 separation cable, the front panel can be separated from the main unit, allowing you to mount the control panel in the most convenient position.

- **Easy operation with independent dials for each band.**

ICOM's original independent tuning control system is employed to give smooth tuning without the problems of main band selection.

- **Loads more features, get in touch for more details.**

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