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# Ham Radio T O D A Y

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# RADIO

## WINDMILLS AND WATERMILLS, 11TH MAY

Following the success of last year's event, Denby Dale ARS (West Yorkshire) are again organising the above event to be held on the 11th May 1997 on behalf of the Society for the Protection of Ancient Buildings (SPAB)

Last year, 32 Windmills and Watermills were activated, and the society hope that this year many more can be added to the list. The Denby Dale ARS say it gives them the opportunity to promote the SPAB, and the opportunity to visit, via the airwaves, the diverse range of Watermills and Windmills besides bringing amateur radio to the general public who will be visiting the individual mills.

Last year, individual QSLs were designed with a line drawing of the mill on one side and a potted history of the mill and the relevant contact information on the other - making a superb collection. A certificate was also given to those who contacted ten or more mills.

We're told there was a tremendous response on the day, especially on 80m, and many mills had a successful day with a huge number of people through their doors. Some mills were 'working mills' and not only provide flour but also give informative conducted tours on the day. One radio amateur who was an ex mill engineer contacted one particular mill and then popped down to introduce himself and reminisce.

Contacts were made as far afield as America and Russia, which resulted in a query from a South African windmill who will hopefully join in the event this year. As the group expect even more mills on the air this year, they'd like to hear from anyone (as soon as possible) who feel they could put on or assist with setting up a station at one of the mills. For more information, or if you feel you can help, contact Jasmine Marshall G4KFP, Hedgeways B&B, 63 Highmoor Lane, Hartshead Moor, Cleckheaton BD19 6LW, Tel. 01274 869849



QSLs from the  
Windmills and  
Watermills  
Event

## RAYNET ACTIVE DURING N. YORKS EMERGENCY

RAYNET was called out to assist on 28th December when part of the market town of Bedale, in North Yorkshire, had to be evacuated because of a severe fire which threatened to spread to two 30 000 gallon propane tanks. The incident was widely reported on national television and in the national press.

Members of the Richmond RAYNET Group were asked to provide radio links from two emergency rest centres to the Emergency Planning Department's Communications Centre at County Hall in Northallerton.

Fire fighters from North Yorkshire and Durham were called to deal with tanks more than 30m high, after an accident in the former railway goods yard where bottled gas containers were filled from the bulk supply.

The depot stands in the centre of Bedale and 300 people had to be evacuated as fire fighters played water onto the two tanks to prevent them exploding. Below the fire was brought under control, exploding

gas cylinders were being thrown some 24m into the air. The incident which left four families temporarily homeless, was one of the largest fires in North Yorkshire for many years. RAYNET was involved for eight hours until the rest centres could close down.

1996 was another busy year for RAYNET members. 414 events and operations were logged in the national RAYNET diary during the year, and it is estimated that

RAYNET covered at least 650 events, exercises etc. in the calendar year. You can get further details on the RAYNET organisation from their Director of Publicity, David Hicks G6IFA, 12 Toll Inn Road, Christleton, Chester CH3 5QX. Email, 106473.100@compuserve.com



## AMATEUR PROSECUTED

The Radiocommunications Agency have informed us that they recently carried out successful prosecution action in respect of the misuse of amateur radio in the Midlands area.

At Worcester Crown Court on 12th February 1997, an individual who was a licensed radio amateur at the time of the offence pleaded guilty to the charge that on 22nd December 1994 he used apparatus for wireless telegraphy except under and in accordance with a licence issued on that behalf by the Secretary of State. He was sentenced on 21st February to 70 hours community service and ordered to pay £1 000 costs. A transmitter, an aerial and tapes were ordered to be forfeit.

## SOLENT ATV REPEATER ON AIR

The Solent Club for Amateur Radio Television (ISCART) tell us that, after three years of fighting bureaucracy and red tape, they have finally received their repeater licence and switched GB3AT (Amateur Television) on. The repeater is located at Park Gate just outside Southampton, at locator IO90IU. It transmits on 121.6MHz, running 4W into an 8dBd horizontally polarized omnidirectional aerial array with the receiver input at 124.9MHz, with 6MHz sound. Further details from Ian Bennett, G6HNU, Ravellwood, The Shires, Hedge End, Hants SO30 4BA. Email, scart@inside.co.uk

# TODAY

## NEW REPEATER WEB SITE

Dave Remnant of the South west Herts UHF Groups tells us that GB3BH, the London area 23cm FM voice repeater (on 1297 000MHz) has a Web site on the Internet. The site is at <http://remnant.demon.co.uk/~b/index.htm>

## COACH TRIP TO DUNKIRK RALLY

We're told there is a coach trip organised from the UK to the Dunkirk Amateur Radio Rally in France on Sunday the 13th April. The coach plans to leave Satday in Bedfordshire at 6.00am and return about midday. For further details contact Billie Elliot, G4VSG, tel: 01767 680043 during evenings or weekends.

## YEOVIL QRP FUN RUN

The Yeovil ARC holds a QRP Convention in May of each year, and prior to the event the Club have a small contest known as the 'CW QRP Funrun', in which low power operators take part. It runs for four evenings after the May bank holiday, on 80m and 40m. It's not meant to be a contest, but instead 'just a bit of fun' prior to the QRP Convention which this year takes place on Sunday, 18th May.

The rules are: *When*; Tues 6th May - Fri 9th May, 8.00pm-10.00pm UK local time each evening. *Frequencies*; 3.560MHz and 7.030MHz, each +/- 10kHz. *Contacts*; Must be between QRP stations, maximum 5W output. All stations may be worked once each evening on each band. Funrun bonus stations will be operating randomly for one hour on each band. *Call*; "QRP". *Scoring*; Each QSO with another QRP station scores 10 points. Each QSO with any Funrun Bonus Station (including GB2LOW) scores 25 points. All duplicates must be marked and no points claimed. Points will be deducted for unmarked duplicates at twice that particular QSO score. *Exchange*; RST, serial number (see below), output power and name. *Serial No.*; The three figure serial number must start at any random

number of your choice, not less than 100 and must be incremented by one for each QSO throughout the whole of the contest. However the three Funrun Bonus Stations will commence at 001. *Entry Sheets*; Separate log sheets for each band, with subtotals for each evening, preferably in the RSGB format. A separate signed RSGB style cover sheet stating the rig, power output and aerial. Entries should be sent to Eric H. Godfrey G3GC, Dorsal Reach, 60 Chilton Grove, Yeovil Somerset BA21 4AVW to arrive not later than Thursday 15th May 1997. *Awards*; Certificates will be awarded for the highest score for any three evenings out of the four on each band, also for the highest total overall score for any three evenings on both bands. These evenings do not necessarily have to be the same on 80m and 40m. A certificate will also be awarded to the station consistently using the lowest power. All four certificates will be presented at the Convention on 18th May 1997 immediately after the lunch break. *SW Listeners*; Listener reports will be appreciated and a certificate will be awarded to the listener who submits the most comprehensive report.

You can get further information from G3GC, address as above.

## TORBAY ARS 50TH ANNIVERSARY

The Torbay Amateur Radio Society was formed on the 22nd February 1947 at the Torbay YMCA. It then held monthly meetings, with a membership of about 25. In 1965 a more permanent HQ was found, a radio shack was made, and G3NJA was the society's callsign. In 1985 the Society then moved to Newton Abbot, and they are now there at the China Clay Social Club, with both G3NJA and G8NJA active on the Friday 'Club Nights'. 1997 is thus the Society's 50th anniversary, and the membership now stands at a very healthy 223 members.

As part of the celebrations, an Award Scheme has been introduced, where anyone submitting a list of TARS member stations worked or heard between 1st Jan and 31st Dec 1997, with any TARS member, society stations or the Special Anniversary station GB500TR which will be active throughout the year. Points towards the award are; GB500TR - 50 points, G3NJA and

G8NJA - 10 points each, TARS members - 2 points each. The total points required for the award are 50 or more, and the award costs £3.00 or 7 IRCs, cheques payable to "TARS". Just send a list of stations worked/heard showing the date, time, band, mode, and callsign, no QSLs are needed. Endorsements for a single band or mixed award etc. will be credited if stated on your claim. Further details from Derrick Webber G3LHJ, Awards Manager and TARS President, 43 Lime Tree Walk, Milber, Newton Abbot, Devon, TQ12 4LF.



Torbay ARS 50th anniversary award certificate and QSL card

## FIRST TWO-WAY CONTACT ON 73kHz?

Walter Dutton, G3MDV, and Peter Dodd, G3LDO, made what they claim to be the first two-way contact on the 73kHz band. The CW contact took place over a 175 mile path at 1240 UTC on the 14th of February. G3MDV was running 20W input to a 91m long loop aerial on his home station, while G3LDO was operating portable using about 7W input to a 115m long dipole, antenna loaded with about 3MHz of inductance. Since the distance involved was less than a wavelength of a wave-length, and the portable aerial was so small, they say there seems to be plenty of opportunity for this record to be broken soon.

In order to encourage experimentation and exchange news, views and technical information on the 73kHz band, an 80 metre net has been established. It is on 3573kHz at 9.00am local time on the first and third Saturdays of each month.

## GX3WNR/P, BIRKENHEAD

The Wirral ARS tell us they will be providing a special event station at Birkenhead Park, Birkenhead, Wirral, using the callsign GX3WNR/P, to celebrate the 150th anniversary of the park, from 1847-1997. The station will be on air from 0900 on April 5th, and will end throughout the year until September 1997 on all modes 80m, 40m, 20m, 17m, 15m, 12m and 10m, plus 2m and 70cm, a special QSL card will be available for each contact made. Further details from the Wirral ARS Secretary John Phillips G3PJK, Wirral Amateur Radio Society, c/o 18 Rocklam Drive, Little Neston, South Wirral L64 4DZ.

## BEACON NEWS

The German propagation beacon, DK0WCY, has changed frequency to 3.579MHz. The Sri Lanka beacon 4S7B has now joined the worldwide International Beacon Project. It transmits for 10 seconds in turn on 14100, 18110, 21150, 24930 and 28200kHz on a three-minute cycle. The New Zealand beacon ZL6B is expected to come on the air any day now as the 14th in the planned 18-beacon network. The Cornish 23cm beacon, GB3MCB, on 1296.860MHz, is off the air until further notice due to a failure. For details please contact the beacon keeper, Mr A. Varne G3YJX.

## ULSTER TITANIC SOCIETY EVENT

The Ulster Titanic Society commemorates the 85th anniversary of the Titanic's completion in Belfast in 1912, with a special event station manned by members of the UTS. It will be located at Belfast, Waterfront Hall, over the period April 14-16, using call signs GB0UTS and GB0WCT on 80m, 10m, and 2m. Every amateur who contacts the station will receive a special QSL card stamped with the Titanic's call sign and the UTS logo. A certificate will be made available at a cost of £3.00 or 5 IRCs. It is at UTS, from GIOSA (Keith Stevenson), 1 Newtown Road, Duncannon, Co. Down BT21 0DY, N. Ireland.

# TRADE TOPICS

The following information is based upon submissions by suppliers and is not necessarily endorsed by Ham Radio Today. We cannot be responsible for false or misleading claims by suppliers. Where indicated however, full and unbiased reviews of products are planned for a forthcoming issue of Ham Radio Today. Please kindly mention Ham Radio Today when replying to any items featured - thanks

## PMR CONVERSION HANDBOOK

The long-awaited follow-up to the 'Surplus 2-Way Radio Conversion Handbook' by Chris Lorek G4HCL has arrived! Chris's second book entitled 'PMR Conversion Handbook' is now available from the Radio Society of Great Britain as well as from radio outlets and bookshops. This book is completely different to his first one, and features conversion details for radios covering the 50, 70, 144, 430 and 1296MHz amateur bands.

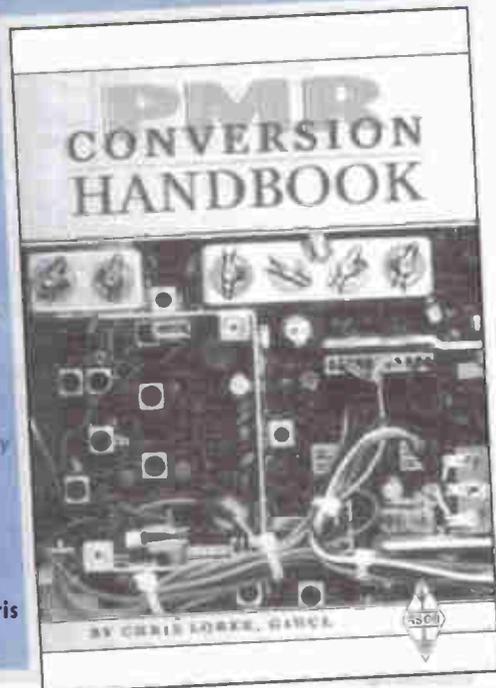
Chapter 1 outlines the different PMR systems and some of the tone signalling arrangements you will come across. Chapter 2 describes many of the possible pitfalls and gives good advice on buying surplus radio. Chapter 3 focuses on alignment using the minimum of test gear and includes a multimeter, SWR bridge and receiver. The remaining three chapters describe the most common mobile, base station and handheld radios available, and how to convert them for amateur use, including pocket radios. These include the Pye/Philips M290 and M290 series mobiles, Motorola MC80 F490 series, R400 including the R434 / T434 for 23cm and various handhelds: Bullhead BE470, BE600, Motorola MT700 and the FT85. Many circuit diagrams, layout diagrams and photographs are also included.

The 'PMR Conversion Handbook', ISBN: 1-872309-43-2 is priced at £12.99 for RSGB Members, £15.28 for non-members plus £1.25 UK postage and packing (£2.00 overseas surface mail), available from the RSGB, Lombard House, Carbone Road, Faversham, Essex, EN6 3JE. Tel: 01707 650888. You'll also find it available at specialist radio dealers and bookshops.

Chris's first book 'Surplus 2-Way Radio Conversion Handbook' is still

available from Poole Logic, Tel: 01202 683093, who also stock the following volume as well as the two books complement each other very well as both cover completely different models of PMR equipment! Please mention Ham Radio Today magazine when enquiring.

The new PMR Conversion Handbook by Chris Lorek G4HCL



## WAB SOFTWARE

GW3RQT has produced a program for use with the Worked All Britain Awards Group. The program called 'WAB4WIN' is used in a Windows environment and we're told it has all the facilities that the keen WAB enthusiasts require. The program costs £15.00 of which £5.00 is given to WAB. Further details of this program can be obtained from Alan Carpenter, GW3RQT, 1 Dewing Ave, Manobier, Tenby, Pembrokeshire, SA70 7TS. Tel: 01834 871604, please mention Ham Radio Today magazine when enquiring.

## KANGA CELEBRATE 10 YEARS

Kanga Products say "Doesn't Time Fly" as much to their surprise 1997 sees them celebrating their 10th year in business. They started supplying kits to the QRP enthusiast in Feb 1987, just one year after the firm's owner Dick GOBPS (our very own 'QRP Corner' columnist) retired from the Kent Fire Brigade. Their latest catalogue details a number of their new kits including the 'termination wattmeter', an active aerial that fits within a film canister, and a medium wave radio, together with plenty more of the well-known Kanga kits. You can get a copy of their Spring 1997 anniversary catalogue from Dick GOBPS at Kanga Products, Seaview House, Crete Road east, Folkestone CT18 7EG, please mention Ham Radio Today magazine when enquiring, or see them on the Web at <http://www.kanga.demon.co.uk>

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Kanga's QRP kits

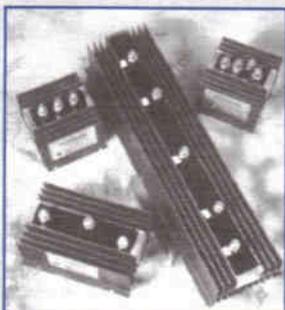


## POWERLINE BATTERY ISOLATORS

If you run a mobile rig drawing a high current, and you don't want to end up with a flat main vehicle battery, the new range of Powerline battery isolators from Merlin equipment may very well be of interest. These allow simple yet effective charging of multiple battery banks from a single alternator or DC power source. As such, they're very handy for use on vehicles or charging systems which require separate batteries for engine starting and ancillary equipment use.

The battery isolators automatically split the available charge between the multiple battery banks according to their individual requirements. The unit simply mounts on the bulkhead, with cables run to the respective battery posts, in most instances the installations takes just 20-30 minutes. The range is available for all electrical installations, with single or twin alternators up to 190A, prices start at £30.00 ex VAT and carriage.

For further information, contact Merlin Equipment, Unit L, Hithercroft Court, Lupton Rd, Wallingford, Oxfordshire, OX10 9BT, Tel. 01491 824333, Please quote Ham Radio Today magazine when enquiring.



Twin charging solutions from Merlin

## NEW FROM ALINCO

Alinco announce the arrival of their new miniature 2m handheld, the DJ-S11. The set measures 55 x 100 x 28mm and is due to sell for around £99.00. Features include 340mV RF output, repeater operation, adjustable retractable aerial, CTCSS tone encoder, two types of scan function and 20 memories. A review is planned for a forthcoming issue (see also the June 96 issue Ham Radio Today for a review of the DJ-S41, which is the 70cm version of this handheld).

Also from Alinco is the new DX-701 SSB transceiver. It is an AM/SSB 100W all band radio with general coverage receive, suitable for both home and mobile use. Priced at around £599.00, features include 100 memories, a microphone speech compressor, RX pre-amp and attenuator, detachable front panel, noise blanker and squelch. CW is an optional extra.

For further details please contact Nevada Communications, 189 London Road, North End, Portsmouth, Hants PO2 9AE, Tel. 01705 662145, please mention Ham Radio Today magazine when enquiring.



The Alinco DX-701 HF SSB Transceiver

## SGC HF/VHF ATU

SGC Inc. have just announced the release of their new SG-231 automatic aerial-coupler. The SG-231 joins SGC's series of 'Smartuners' which use microprocessor control of Pi and L networks to match virtually any load to any transceiver.

The SG-231 features an expanded frequency coverage of 1.0-60MHz continuously, and complete frequency agility with no operator intervention. Tuning solutions are stored in a nonvolatile memory for fast (10ms) automatic recall. The SG-231 operates with any HF or VHF transceiver having 3-100W output, requiring only 12V DC and RF connectors.

The unit measures 45mm x 254mm x 380mm and weighs 0.6kg. It's waterproof and is designed to be mounted at the aerial feedpoint for maximum efficiency. Common applications include end-fed wires, centred dipoles, inverted Ls, mobile whips etc. The retail price is US\$595 in the US, or contact your radio dealer for more information and local pricing.

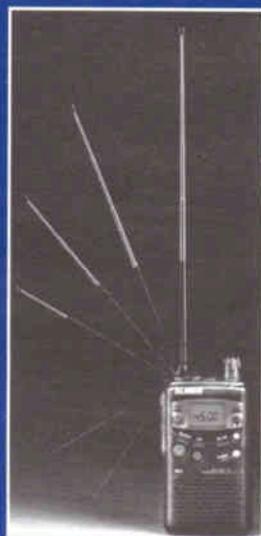


The SG-231 joins SGC's series of 'Smartuners'

## MORSUM MAGNIFICAT



The English language edition of MM has just celebrated its 50th issue with a bumper 60-page issue. It was first published in the Dutch language by the late Rinus Hellemons PA0BFN in 1983, and in 1985 a 'one-off' English language issue was produced. Over the last ten years, although only available by postal subscription, MM has become increasingly well-known in Morse circles around the world. It is an acknowledged and respected source of information on all aspects of Morse telegraphy, past, present and future, and it generates a unique enthusiasm amongst its readers. The latest issue features news on the support to keep the amateur radio Morse test, the closure of FFL, no more French coast stations on 500kHz, UK distress watch to close on 31st Dec 1997, Norddeich Radio, the World High Speed Telegraphy Championships 1997, and plenty more including articles on Morse learning methods, the Museum of Submarine Telegraphy, Canadian Railway Telegraph History, and 'Reining in the Bug'. MM is published bi-monthly and is available by post from GC Arnold Partners, 9 Wetherby Close, Broadstone, Dorset BH18 8JB, Tel/fax 01202 658474, sample copies cost £2.20 (overseas surface £2.25 or US\$5.00), and full subscription rates are £12.00 UK, £12.75 EU, £15.50 rest of world airmail, please mention Ham Radio Today magazine when enquiring.



~Alinco's new miniature 2m handheld, the DJ-S11

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# CQ FROM G8IYA EDITORIAL

## Do we bury our heads in the sand, or do we take the bull by the horns?

**O**n the front cover of this issue you'll see a handy 2m channel card, which I hope you'll find useful in helping to fathom out all the new 2m channel designations which have been decided at the recent IARU conference, for immediate application.

At the very least, when you're having a QSO you'll know what "Please QSY to V44" or "See you on repeater channel RV62" means! On the back of the card there's also a list of the new CTCSS designator letters, as used for repeater access across Europe. Each repeater with CTCSS access facilities (in the UK at least) sends the letter ID of the CTCSS tone it uses along with its callsign ID, and again the card should come in very useful here.

Next month brings a similar card with the new 70cm and 6m simplex and repeater channels, with the forthcoming introduction of 6m repeaters you'll even know what channel F63 is!

### NEW EPROMS

On a related note I know many readers enjoyed seeing the MX295 PMR conversion article in issue 2 this year, and all the MX295 EPROMs supplied (Issue 2) from the Reader's Service following the publication of the article have the channels arranged in both the 'old' and the 'new' channel forms, including every 12.5kHz FM channel allocation. These are still available, as well as similar Issue 2 EPROMs for the MX294 and MX296 from the date of this issue, the latter being suitable for use with all band versions of the MX296. Just contact Reader's Offers on 01442 66551 if you'd like to order your update.



### ARE WE DYING?

Is ham radio going to die? "Of course not" you'll probably say. Now, put yourself in the position of a lad or lass of around 14 or 15 years old. If you wanted to communicate around the world with others, would amateur radio have an immediate appeal? First off there's the mandatory course, or study period for the mandatory RAE, each taking a few months at least. Then it's a pile of money for a 'black box' transceiver (for VHF/UHF, remember that hardly any Novices go for the Class A) plus the aerial system for home use, maybe also a packet TNC or data interface to plug into the home PC with so they can play data communications and picture transmission. No, I'm not going 'over the top', as building a QRP CW transceiver and then trying to find QSOs with it *isn't* the thing most schoolchildren seem to be wildly excited about, no matter what some of us would like to believe. Just don't shoot the messenger, survey results clearly show that it's usually the *experienced* amateur who builds his own 'simple' projects. I'd like to think differently as well, because at 16 I built my own 30MHz

frequency counter, with 26 integrated circuits, on the dining room table.

An alternative to getting on air on 2m or 70cm at low cost for the beginner is to use a converted PMR rig. But this still needs some degree of work, and some construction and modification experience certainly comes in useful.

If you've mega-money and can afford a legal-limit HF station complete with a mast and triband beam you're in luck. You *will* work around the world easily. There certainly is a 'magic' feeling in getting through with a simple aerial and low power, but these events are the exception rather than the norm, the typical teenager with many other interests to tempt them will usually find something else more interesting. Like plugging a microphone into the sound card on the family PC linked into the 'net, and chatting in full-duplex with other enthusiasts around the world. For a lot less money than a legal-limit HF station that'll even approach doing the same.

So what do we do? Some people say "This isn't amateur radio, I want nothing to do with it". Our potential amateurs of tomorrow then

think that ham radio has even less to offer them, and carry on having interesting chats on the 'net with their friends around the world. What would you do if you were their age, in today's world?

### TRADITIONAL STANDARDS

There are many arguments for and against keeping with the traditional standards of entry into amateur radio, rather than moving with the times. The question that I've seen asked by others, is "does today's entry route into HF amateur radio act as an incentive, or a disincentive, to the youth of today?". I have little doubt what the answer will be.

Maybe the youth of today want everything handed to them on a plate. OK, then ham radio *will* die. Unless we do something about it. Like acknowledging the Internet and having promoted our hobby on it, sooner rather than later. Like showing, on the 'net, how you can get an ex-PMR rig going for next to nothing. Like promptly answering Emails, rather than ignoring the potential of Email. Like promoting the use of computers in the hobby by distributing radio PC software. Hang on, we at Ham Radio Today have been doing this for a while. So do someone a favour. If you know a budding young upstart, give them this copy of the magazine when you've finished it, or if you're reading this on the magazine bookshelf, go and buy it and do likewise. Or buy an extra copy and do likewise, keeping this one for yourself! Get your local newsagent to stock the magazine, so that youngsters can see it. Or at least the Internet Web site address which is on the front cover!

# KENWOOD TS-570D REVIEW

Chris Lorek G4HCL takes a look at Kenwood's latest 'middle budget' HF transceiver with 'upper budget' facilities



Kenwood's latest 'middle-priced' HF transceiver, the TS-570D

**T**he current 'buzz-word' amongst amateurs discussing HF rigs is clearly that of DSP - Digital Signal Processing. Connect an in-line DSP unit to the audio output of your receiver and suddenly interfering heterodynes disappear, the noise reduces, and readability can often be much clearer.

Kenwood's latest 'middle-priced' HF transceiver offering, the TS-570D, has just this built in, yet it's price is lower than that of the earlier non-DSP transceiver it replaces, the TS-450SAT.

## COVERAGE

The TS-570D covers all the amateur HF bands from 1.8MHz to 29.7MHz on transceive, together with a general coverage receiver covering 500kHz-30MHz. A further model, the TS-570S, adds transceive coverage of the 6m (50MHz) band and extends the receive coverage up to 60MHz. The set's transmit power can be varied between 100W and 5W in 5W

increments, making it useful for QRP enthusiasts - the minimum power level on many HF transceivers being 10W and thus above the 'official QRP' power level of 5W. All modes of operation are fitted, CW, SSB, AM and FM, plus an FSK selection for frequency shift keying data modes (the maximum transmit power in AM mode is 25W).

For CW enthusiasts there's a built-in CW memory keyer with three 50-character memories. There's also a claimed 'first' with a 'CW auto-tuning' feature. This automatically changes the VFO frequency to exactly match the CW pitch, which you can vary between 400Hz to 1kHz, to the set's transmit sidetone frequency,

## DSP

The DSP circuitry fitted is an audio-based system, not an 'IF-based' processor as used on transceivers such as the TS-870. Thus, the selectivity is determined by the IF filters fitted, these being supplied as standard for CW/SSB/FSK (2.2kHz), AM



The TS-570D measures 270mm x 96mm x 217mm and weighs 6.8kg. The set is supplied with a fist mic complete with up/down buttons.

(4kHz) and FM (12kHz), with further optional narrow filters being available should you require.

However, the DSP unit has variable audio 'slope tuning' with independently variable high and low cutoffs, and for CW the audio bandwidth can be preset to one of a number of narrow bandwidths for automatic selection.

Two noise reduction modes are provided, NR1 and NR2, one being most suitable for SSB with the other more suited for CW use. In addition, a 'beat cancel' facility can be selected which will automatically remove heterodyne tones from the received audio.

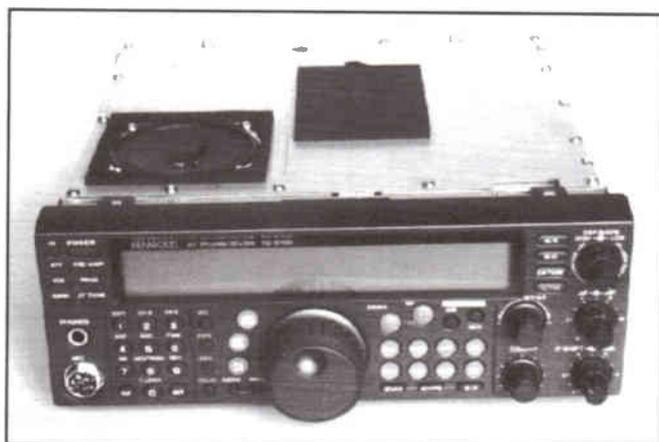
As well as receive audio filtering, the SSB transmit audio can be tailored to suit varying conditions, with upper and lower boost or a 'tailored filter' response for DX working. The set even has two 'personality' settings, A and B, in which you can store the settings you prefer for, say, two operators

or for switching between ragchew and DX working.

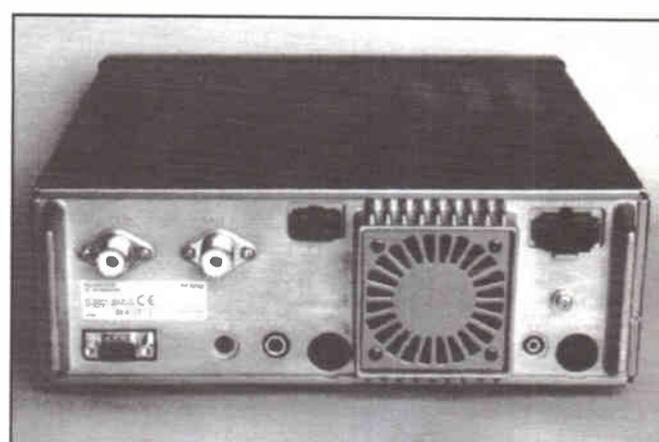
## AUTOMATIC ATU

The TS-570D usefully has an automatic aerial tuner built in as standard, such a unit is often an optional extra on such middle-priced sets. There are also two SO-239 aerial sockets fitted for use with two different aerials, with button selection of these from the front panel. A handy function is that the selection is memorized for you when switching bands, so the set remembers which band you use which aerial for.

An integral speaker is fitted to the top lid, and the transceiver comes supplied with a fist microphone fitted with a pair of up/down buttons. An optional microphone with four additional programmable 'function' buttons is also available. The transceiver needs an external 13.8V DC



**An integral speaker is fitted to the top lid**



**Rear panel connections, the set is also fitted with a cooling fan**

supply, the maximum current requirement being 20.5A. You can of course use your existing high-current shack supply for this, alternatively an optional matching supply, the PS-33, is available from Kenwood. This together with a matching SP-23 external speaker was supplied with the set I tested in this review.

**COMPUTER CONTROL**

As with virtually every HF transceiver nowadays, the TS-570D can also be remotely computer controlled from your PC by using a suitable RS-232 interface. For this, Kenwood can also usefully supply suitable custom-written software, in the form of the 'RCP-2' Radio Control Program. I freely downloaded my copy, which was just over 2Mb in compressed format, from the Kenwood Internet site; <http://www.kenwood.net>

The TS-570D measures 270mm x 96mm x 217mm and weighs 6.8kg. A carrying handle is fitted to the righthand side of the case, with four small rubber feet on the other side, to help with carrying the set around.

**ON THE AIR**

The first thing that struck me when I first switched the set on was the large, clear, orange-backlit LCD panel. The left-hand side section of this is also used to display a multi-purpose meter, with an S-meter reading on receive and transmit power level, plus selectable SWR, ALC, or SSB speech processing level in transmit mode.

I found the set's controls in general were intuitively very easy to use. For the lesser-used adjustments a 'multi' knob is used following a press of the appropriate button, i.e. 'PWR' to set the transmit power, 'KEY' to set the internal CW keyer speed (adjustable from zero to 100 WPM in 2 WPM steps), 'MIC' for microphone gain and so on. The LCD here gives a clear alphanumeric indication of the setting in each case.

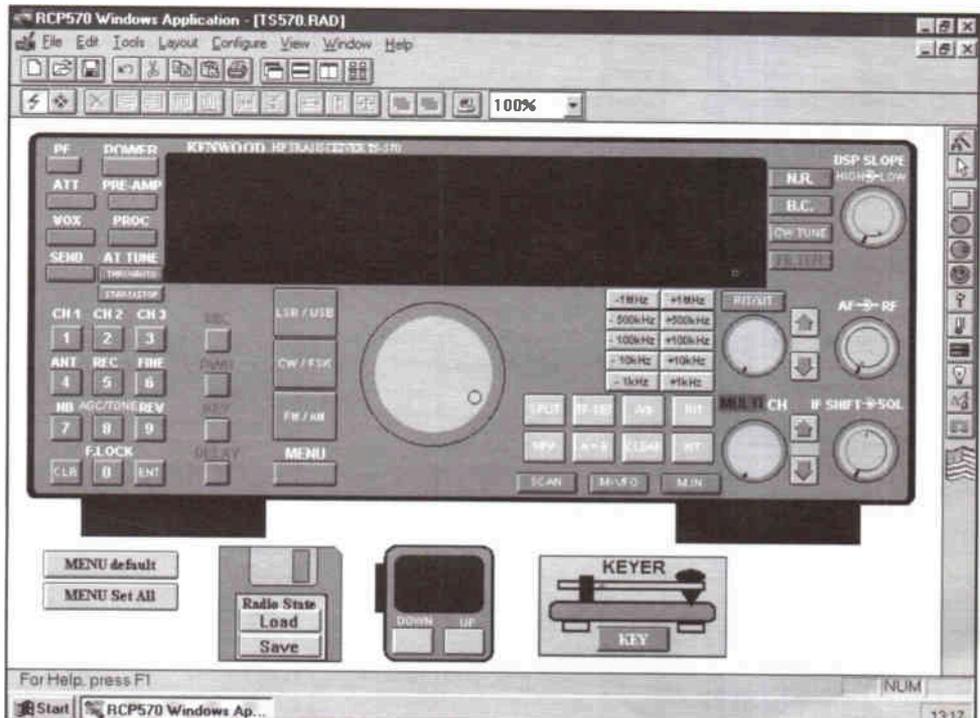
Tuning around the bands with the TS-570D brought signals in quite well on both LF and HF bands, although I tended to find I needed the preamplifier switched on on the higher bands - this in

any case being the 'default' setting of the receiver. Even on 7MHz at night, with my LF band trap dipole connected, I never needed to use the receiver attenuator to overcome intermodulation problems, as I didn't find any. Users of tower-mounted full-sized three element 40m beams might be in a different position though! I'm afraid I'm not in that league myself.

My HF aerial system includes a 160m/80m/40m trap dipole, separate dipoles for the 30m-10m bands, and a three element beam for 20m/15m/10m mounted on my Versatower which can also be used as a gamma-matched vertical for the lower bands. With this

system I can hopefully replicate several different 'typical' uses by readers by switching between aerials. On rather 'busy' bands using my dipoles, I occasionally found a degree of 'splitting' on SSB from adjacent stations, and on the narrow-band modes I wished several times for a narrower IF filter. The variable audio filtering fitted in the TS-570D did of course help, but a 500Hz IF filter would have been a lot better!

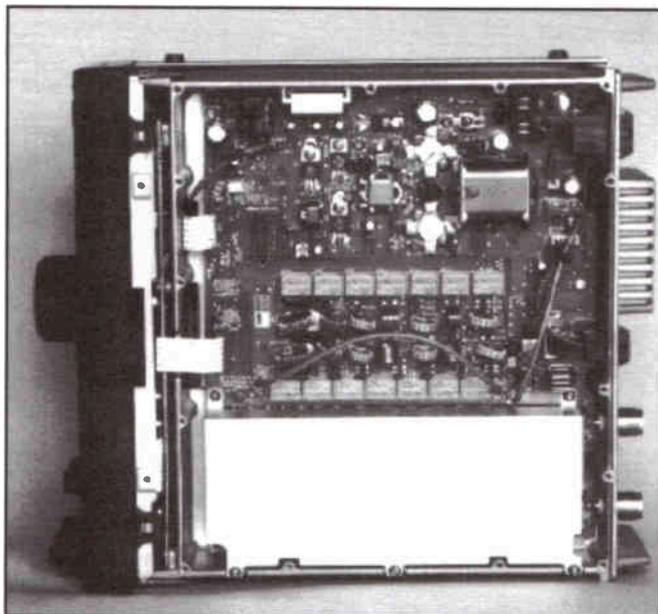
The 'beat cancel' automatic audio notch filter worked very effectively, certainly as well as the W9GR MkIII DSP filter which I usually use in my shack. I found the noise reduction facility useful



**The TS-570D can be remotely computer controlled from your PC by using an RS-232 interface. For this, Kenwood can also usefully supply suitable custom-written software**



on very weak 'in the noise' signals as long as there wasn't too much co-channel QRM. However, in common with other audio DSP filters I've used this did impart a varying amount of hollow-sounding 'bubbly' type echo to the resultant signal. For normal SSB and CW listening I tended to use just the variable upper/lower slope filter, where it really did improve readability somewhat in noisy band conditions. On weak signals on the higher bands, and when I quickly tested the TS-570D with my VHF/UHF transverter system on receive, the noise reduction facility did sometimes just make the difference between a very weak 'tropa' signal being almost unreadable, and being Q4 copy.



Top internal view

## TRANSMIT

Reports on my transmitted SSB audio were repeatedly very complimentary. Also, switching in the speech processor didn't bring any reports whatsoever of 'switch it off, it sounds horrible', even in ragchews with strong local stations. Further tests over a number of days running just 5W with the processor in resulted in several good reports, even occasionally 'across the pond' on 80m and 40m with greyline propagation. I naturally had fewer QSOs on the higher bands due to the present sunspot cycle, and that's where I *did* need the full 100W to get through.

The automatic aerial tuning unit operated very quickly, and a short period of mobile operation on 80m with my G-whip proved the ATU to be most useful for 'fine-tuning' the whip, without me needing to repeatedly stop the car to re-adjust the whip length. It must be remembered that the ATU is only that, a 'fine-tuner', it isn't a matching unit for long wires etc. so you'll need to make sure your aerial, whether mobile or at home, is reasonably resonant to start with. I found the large display superb for mobile operation, the VFO knob could also usefully be varied in tension to make use on the move that much easier.

## LAB TESTS

The measured SSB transmit intermodulation performance, i.e. the

amount of 'spreading' of the transmitted signal, was very good - even with 10dB of speech processing switched in it didn't noticeably degrade, echoing the very good audio reports I received on air.

On receive, the blocking performance was quite good, likewise the intermodulation, in the latter case switching the preamplifier out gave an overall performance improvement of a couple of dB or so. The IF selectivity tended to 'broaden out' at the -60dB level, this being particularly noticeable with the SSB/CW filter position, hence not really placing the transceiver into the 'contest grade'. You'll probably need better filters and/or a better synthesizer for this, but for the transceiver's price it certainly does offer quite acceptable performance..

## CONCLUSIONS

You get a lot for your money with the TS-570D, with an all-mode 100W HF transceiver, complete with an auto ATU, a CW memory keyer, and plenty of other nice accessories built in. The internal audio DSP filter is one of these of course, saving you the expense of buying an upmarket accessory DSP filter to otherwise fit in the speaker line to achieve the same performance.

My thanks go to Kenwood Electronics UK (Tel. 01923 816869) for the loan of the review equipment. The TS-570D is available from all Kenwood dealers in the UK, please mention Ham Radio Today magazine when enquiring.

## LABORATORY RESULTS:

All measurements carried out in SSB mode, with attenuator and preamp off, unless stated.

## RECEIVER;

### S-METER S9 LEVEL;

Freq. MHz	Sig. Level
1.8	61.9µV pd
3.5	46.4µV pd
7.0	50.6µV pd
10.1	51.0µV pd
14.0	70.1µV pd
18.1	69.7µV pd
21.0	58.0µV pd
24.9	45.5µV pd
28.5	47.4µV pd
29.5	47.9µV pd

## 3RD ORDER INTERMODULATION REJECTION;

Increase over 12dB SINAD level of two interfering signals giving identical 12dB SINAD on-channel 3rd order intermodulation product, measured at 21.4MHz;

	Preamp On	Preamp Off
10/20kHz spacing;	76.0dB	79.2dB
20/40kHz spacing;	93.4dB	94.2dB
50/100kHz spacing;	89.4dB	91.4dB
100/200kHz spacing;	88.5dB	90.6dB

## SELECTIVITY;

	CW/SSB	AM	FM
-3dB	2.34kHz	5.16kHz	12.43kHz
-6dB	.43kHz	6.66kHz	13.96kHz
-20dB	2.84kHz	9.34kHz	15.26kHz
-40dB	3.36kHz	10.20kHz	16.02kHz
-60dB	4.63kHz	16.35kHz	18.12kHz

## BLOCKING;

Measured on 21.4MHz as increase over 12dB SINAD level of interfering signal, unmodulated carrier, causing 6dB degradation in 12dB SINAD on-channel signal;

	Preamp On	Preamp Off
+/-50kHz;	96.0dB	95.6dB
+/-100kHz;	101.3dB	101.9dB
+/-200kHz;	104.9dB	105.4dB

### SENSITIVITY:

Input level in  $\mu\text{V}$  pd required to give 12dB SINAD;

Freq. MHz	CW/SSB		AM		FM	
	Preamp On	Preamp Off	Preamp On	Preamp Off	Preamp On	Preamp Off
1.8	0.17	0.45	0.47	1.21	0.30	0.80
3.5	0.10	0.35	0.43	0.95	0.23	0.63
7.0	0.14	0.38	0.38	1.03	0.26	0.64
10.1	0.16	0.37	0.39	0.99	0.26	0.61
14.0	0.20	0.52	0.51	1.34	0.35	0.82
18.1	0.18	0.52	0.46	1.35	0.30	0.87
21.0	0.15	0.47	0.41	1.14	0.27	0.77
24.9	0.08	0.35	0.22	0.90	0.14	0.57
28.5	0.10	0.38	0.24	0.90	0.16	0.61
29.5	0.09	0.36	0.25	0.94	0.16	0.61

### IMAGE REJECTION:

Increase in level of signal at the 1st and 2nd IF image frequencies, and the 1st and 2nd IFs (73.05MHz and 8.83MHz respectively), over level of on-channel signal, giving identical 12dB SINAD signal;

Freq. MHz	Image Rej.	1st IF Rej.	2nd IF Rej.
1.8	108.9dB	>120dB	93.1dB
3.5	>120dB	>120dB	>120dB
7.0	>120dB	>120dB	>120dB
10.1	>120dB	>120dB	81.7dB
14.0	>120dB	>120dB	>120dB
18.1	>120dB	>120dB	>120dB
21.0	>120dB	>120dB	>120dB
24.9	>120dB	>120dB	>120dB
28.5	>120dB	>120dB	>120dB
29.5	>120dB	>120dB	>120dB

### S-METER LINEARITY:

Measured at 14.25MHz;

Indication	Sig. Level	Rel. Level
S1	3.70 $\mu\text{V}$ pd	-26.1dB
S3	5.44 $\mu\text{V}$ pd	-22.8dB
S5	9.40 $\mu\text{V}$ pd	-18.1dB
S7	25.7 $\mu\text{V}$ pd	-9.3dB
S9	75.6 $\mu\text{V}$ pd	0dB ref
S9+20dB	842 $\mu\text{V}$ pd	+21.0dB
S9+40dB	8.19mV pd	+40.7dB
S9+60dB	67.6mV pd	+59.1dB

## TRANSMITTER;

### HARMONICS:

Freq. MHz	2nd	3rd	4th	5th	6th
1.8	-72dBc	-78dBc	-78dBc	-71Bc	<-80dBc
3.5	-68dBc	-70dBc	<-80dBc	-64dBc	<-80dBc
7.0	<-80dBc	-79dBc	-74dBc	-79dBc	<-80dBc
10.1	-76dBc	-63dBc	<-80dBc	-72dBc	<-80dBc
14.0	-58dBc	-60dBc	<-80dBc	-79dBc	<-80dBc
18.1	<-80dBc	-60dBc	-79dBc	-73dBc	<-80dBc
21.0	-62dBc	-63dBc	0dBc	<-80dBc	<-80dBc
24.9	-71dBc	-70dBc	-80dBc	-75dBc	<-80dBc
28.5	-75dBc	-72dBc	<-80dBc	-71dBc	<-80dBc
29.5	-76dBc	-72dBc	-78dBc	-72dBc	<-80dBc

### TX POWER AND CURRENT CONSUMPTION:

Connected to stabilised 13.2V DC using supplied DC lead

Freq MHz;	Min. Power	Max. Power;
1.8	6.2W/5.0A	118W/16.0A
3.5	6.1W/5.1A	115W/16.7A
7.0	6.0W/4.9A	113W/15.4A
10.1	5.8W/5.2A	111W/16.8A
14.0	5.9W/5.2A	112W/16.6A
18.1	5.7W/5.0A	108W/16.5A
21.0	5.5W/4.7A	110W/15.9A
24.9	5.6W/4.9A	108W/16.0A
28.5	5.5W/5.0A	108W/16.2A
29.5	5.6W/5.0A	108W/15.8A

### SSB IMD PERFORMANCE:

Measured on 14.25MHz with a two-tone AF signal, results given as dB below PEP level;

	3rd Order	5th Order	7th Order	9th Order	11th Order
Mid ALC	-26dB/ -30dB	-43dB/ -41dB	-50dB/ -49dB	-59dB/ -57dB	-55dB/ -59dB
Proc On	-26dB/ -29dB	-44dB/ -40dB	-50dB/ -46dB	-55dB/ -57dB	-58dB/ -58dB
10dB comp.					



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|-------------------------|--|
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### Other Features

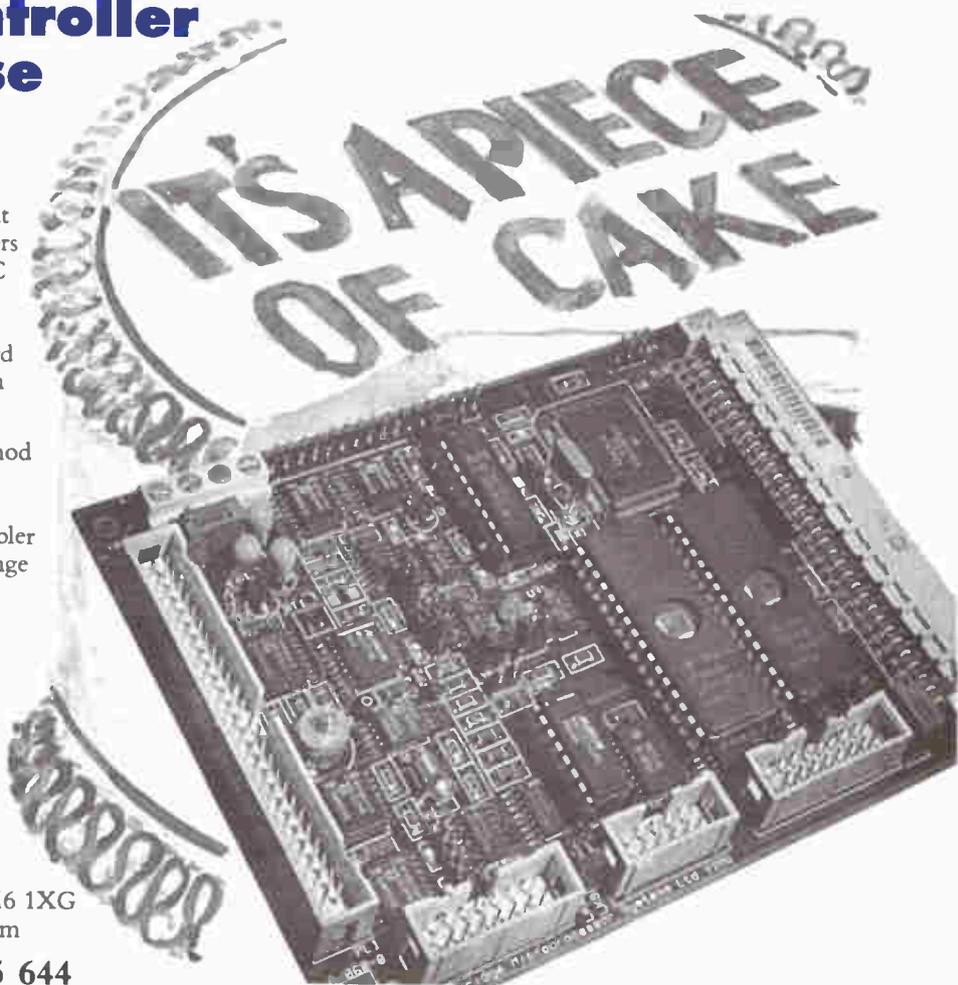
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# ON TEST: RADIO SHACK PRO-2045

The Consultant Technical Editor finds plenty of active frequencies using this set's 'auto-store' mode

**B**elieve Radio Shack must have been listening carefully to the needs of scanners users. Why? Their latest production of the PRO-2045 is one answer to this. It has plenty of useful up-market features for base station operation, which combined with its wide VHF/UHF frequency coverage could make it a rather tempting proposition to have at your listening post.

It was only after having a read of the manual, and using the set for even just a few minutes, that I realised this wasn't 'just another low-cost plastic scanner'. Instead, it was a rather powerful monitoring tool.



The PRO-2045 has a wide range of useful facilities accessible from the front panel

to 100 steps per second. However, a fast 'Hypersearch' mode, which you can switch in when you're using 5kHz steps on FM, claims a staggering search rate of up to 300 steps per second! Even the normal 'memory scan' mode is capable of up to 50 steps per second. This thing's no slowcoach. To speed up the scan rate, the set can, if you wish, automatically scan your stored channels in a given memory bank in frequency order rather than in memory channel order, thus saving the set's internal synthesizer 'hunting' up and down between channels and thereby giving a faster overall scan rate.



The PRO-2045 measures 57mm x 235mm x 205mm and weighs 960g. A pair of hinged plastic feet at the front of the case lets you tilt up the front of the set for table-top use.

## AERIAL

A telescopic whip terminated in an angled BNC connector to mate with the rear panel aerial socket is provided with the scanner for temporary use, although most hobbyists will probably connect a better-sited external aerial to the set. For this, Radio Shack have usefully incorporated a switchable internal attenuator, to help reduce any problems due to strong signal overload.

## AUTO STORE

To find new active channels, an 'auto store' mode lets the scanner search away between any two frequencies you've entered. It then automatically stores the active channels it finds into any number of memory banks you specify - it also 'remembers' what's already been stored and doesn't duplicate the frequencies.

## SEARCHING

The 'normal' search speed of the PRO-2045 is specified as being up

## SKIPPING CHANNELS

A 'search skip' facility also lets

## COVERAGE

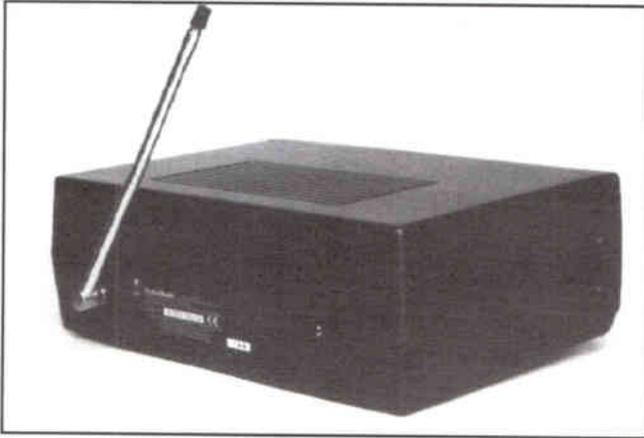
The PRO-2045 covers 68-88MHz, 108-174MHz, 216-512MHz and 806-1000MHz. It can receive both narrowband FM and AM modes on any frequency, although it usefully automatically 'defaults' to AM on the VHF and UHF airband ranges (108-137MHz and 225-400MHz respectively). Fixed tuning steps of

12.5kHz are used for these airband ranges and on the UHF ranges, however fixed 5kHz tuning steps are used otherwise.

200 memory channels are available, arranged in 10 banks of 20 channels each, plus 10 'monitor' memories. A large rotary knob with soft click-steps can be used as a 'VFO' tuning knob as well as for switching between memory channels.



A rotary 'tuning' knob can be used for channel selection. A 3.5mm jack socket is provided on the front panel for headphone use, this can also be used for plugging in an amplified extension speaker



A telescopic whip is supplied for local use, this plugs into the rear panel BNC connector

you automatically skip up to 50 individual frequencies, such as Volmet transmissions, busy repeaters etc., or indeed those you've already stored in a memory channel.

As well as this, a 'Data Skip' facility lets the scanner automatically skip frequencies with continuous data, such as cellular and trunking system 'control channels' as well as paging preambles.

## SCANNING

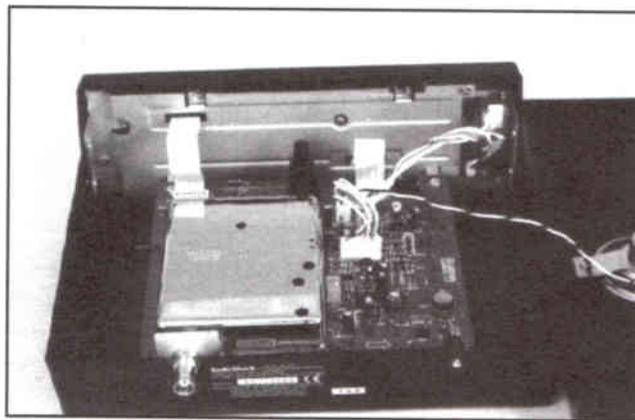
Any selection of the ten available banks of memory channels can be scanned for activity, and within the banks any of the channels can be individually 'locked out' as you wish. Each channel can also be programmed with the internal attenuator in or out, with FM or AM mode, and a two-second 'delay' prior to the scan resuming.

To help you organise your memory channels and banks, you can easily transfer a frequency to a different channel, or exchange frequencies between two programmed channels.

As a final touch, if you're monitoring a given channel then you can select a 'count' mode, where the set automatically counts the number of time the squelch raises, which could be interesting for sampling channel activity while you're away from the scanner.

## PHYSICAL FEATURES

An orange backlit LCD is used to display the received frequency, memory channel, bank, programmed parameters such as 'delay', lockout' and so on, and below this is the set's main keypad which uses 'soft-touch' rubberised



Inside the set, the RF circuitry is well-screened

buttons. The set normally gives a light 'bleep' when a button is pressed, although this can be turned off if you wish. A pair of hinged plastic feet at the front of the case lets you tilt up the front of the set for table-top use.

The set is powered from an external 12V DC source, requiring 500mA, and a suitable plug-in AC wall adapter is supplied with the receiver. An internal speaker is fitted to the top case lid, and the set is specified as providing 1W audio output. A 3.5mm jack socket is provided on the front panel for headphone use, this can also be used for plugging in an amplified extension speaker (the level's too low to drive a normal external speaker).

The PRO-2045 measures 57mm x 235mm x 205mm and weighs 960g.

## IN USE

My first operation when using the receiver, just like a 'child with a new toy', was to use the auto-

search feature to initially fill some of the scanner's channels with active frequencies. After programming in the lower and upper frequencies for a 1MHz sub-band on VHF, within a few minutes it had found, and automatically stored for me, quite a number of active channels - very useful! A few extra bands followed, auto-stored in different channel banks, and I was well onto the listening trail. Who needs a frequency guide? Well, one is useful to hopefully identify some of the many active channels found and automatically stored for me!

The 'data skip' (which only worked in FM mode) was often

get on other frequencies, particularly on UHF. However, I did find the 5kHz steps rather a nuisance, and in 'auto-store' mode the set would often store adjacent 5kHz frequencies from a 12.5kHz signal, e.g. 144.710 and 145.715, when the actual signal was on 144.7125, thus requiring an 'editing' job after such a search. On UHF, where I receive many strong signals in my area, I also found the set would unfortunately sometimes pick up the lower, and upper, 12.5kHz increments as well, with these unwanted offsets naturally being quite distorted. Thankfully the 'attenuator' function helped here, although it shouldn't really have been necessary.

## TECHNICALITIES

A triple conversion heterodyne circuit is used to give good image rejection in the set. Here, the first IF is 380.7MHz (254.4MHz at UHF), the 2nd IF being 10.85MHz with a 3rd IF of 450kHz. I measured the image rejection as being reasonable but not exceptional - I'd have expected a somewhat better 2nd image at VHF, although as you'll have read I didn't find any problems on air. The intermodulation and far-off blocking rejection performance was quite good, likewise the 25kHz adjacent channel rejection. However the 12.5kHz rejection was rather poor, explaining the effects found when I used the scanner on air.

## CONCLUSIONS

The PRO-2045 provides a number of very useful operating features when compared with other scanners from the same 'stable'. I found the scanner most enjoyable, easy to use, and the on-air performance in terms of strong signal rejection was particularly good. Switchable AM/FM across the frequency range however is a big 'plus'. The fixed 5kHz steps on VHF were rather a nuisance, in my mind this is the main operational limitation of the set although it still gave good reception with the unwanted 'offset'.

Our thanks go to Link Electronics in Peterborough (Tel. 01733 345731) for the loan of the review scanner - please mention Ham Radio Today magazine when enquiring.

# LABORATORY RESULTS:

All measurements taken at 145MHz,  
NFM, unless stated.

## SENSITIVITY;

Input signal level in  $\mu\text{V}$  pd required to give 12dB SINAD;

Freq.	Level
68MHz	0.31
78MHz	0.31
88MHz	0.30
108MHz	0.61 (AM)
120MHz	0.68 (AM)
136MHz	0.68 (AM)
137MHz	0.40
145MHz	0.37
165MHz	0.32
174MHz	0.31
216MHz	0.25
250MHz	0.72 (AM)
300MHz	0.57 (AM)
350MHz	1.08 (AM)
400MHz	0.45
435MHz	0.26
450MHz	0.33
470MHz	0.28
512MHz	0.39
806MHz	0.51
850MHz	0.48
900MHz	0.48
950MHz	0.55
1000MHz	0.49

## SQUELCH SENSITIVITY;

### Level of signal required to raise receiver squelch

Threshold; 0.29 $\mu\text{V}$  pd (9dB SINAD)  
Maximum; 0.59 $\mu\text{V}$  pd (16B SINAD)

## ADJACENT CHANNEL SELECTIVITY;

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

+12.5kHz;	7.7dB
-12.5kHz;	9.9dB
+25kHz;	51.2dB
-25kHz;	51.0dB

## INTERMODULATION REJECTION;

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

25/50kHz spacing; 61.5dB  
50/100kHz spacing; 62.3dB

## IMAGE/IF REJECTION;

Difference in level between unwanted and wanted signal levels, each giving 12dB SINAD on-channel 145MHz FM signals;

	70MHz	145MHz	435MHz	900MHz
1st Image	31.4dB	57.0dB	50.6dB	>100dB
2nd Image	27.7dB	57.9dB	45.0dB	32.0dB
3rd Image	73.3dB	79.6dB	98.6dB	97.2dB

## MAXIMUM AUDIO OUTPUT;

Measured at headphone socket, 1kHz audio at the onset of clipping (10% distortion), 8 ohm resistive load;

11.7mW RMS

## BLOCKING;

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

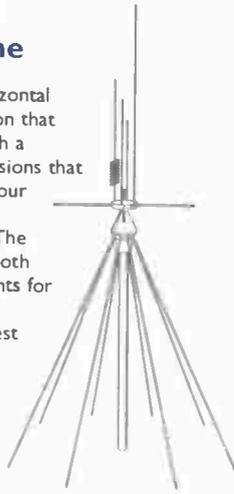
+100kHz; 51.9dB  
+1MHz; 82.6dB  
+10MHz; 96.6dB

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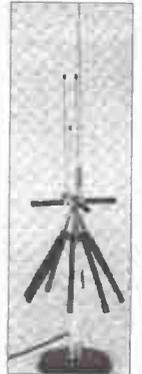
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## SKY SCAN Desk Top Antenna Model Desk 1300

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### MAJOR FEATURES

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 LW 150 - 509.9kHz  
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 Fine tunes the reception signal, especially when you tune to SSB and CW

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  - 29 page SW station name memory
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  - Soft carrying pouch
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- SIZE: 210 x 127 x 38mm (8.25 x 5.0 x 1.5in)  
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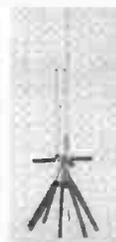
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### Frequency Coverage

Freq (MHz)	Step	Mode	Frequency Range	Step	Mode
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30.000-87.495	5.0kHz	FM	225.000-400.000	12.5kHz	AM
87.500-107.995	50kHz	WFM	400.005-520.000	12.5kHz	FM
108.00-136.995	12.5kHz	AM	760.000-1300.000	12.5kHz	FM



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Frequency range:	1MHz to 2.4GHz
Sensitivity (Typical):	800µV @ 10MHz 500µV @ 30MHz 225µV @ 150MHz 640µV @ 450MHz 1mV @ 850MHz <10mV @ 1.3GHz <200mV @ 2.4GHz
Maximum Input Power:	+15dB (50mW), 1.26V RMS
Input impedance:	50Ohm
Timebase stability:	+/- 1ppm 25-35°C
Timebase ageing:	1ppm per year typical

Timebase accuracy:	+/- 1 count in LSD
Gate time:	Fast 0.25 seconds for 1kHz resolution. Slow 2.5 seconds for 100Hz resolution
Power:	Internal nicad batteries 4 x AA, 700mAh or mains adaptor/charger, 240VAC input, 12VDC output, centre positive
Size:	100 x 87 x 28mm

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# TESTED - REALISTIC PRO-70 HANDHELD SCANNER

**A**re you in the market for an easy-to-use handheld scanner but don't want to pay the Earth? If so, you're in the company of a lot of others!

The PRO-70 is aimed at the 'beginner' or 'second scanner' buyer, and its wide availability will naturally make it a tempting choice. Let's see what it's capable of...

## SEARCHING

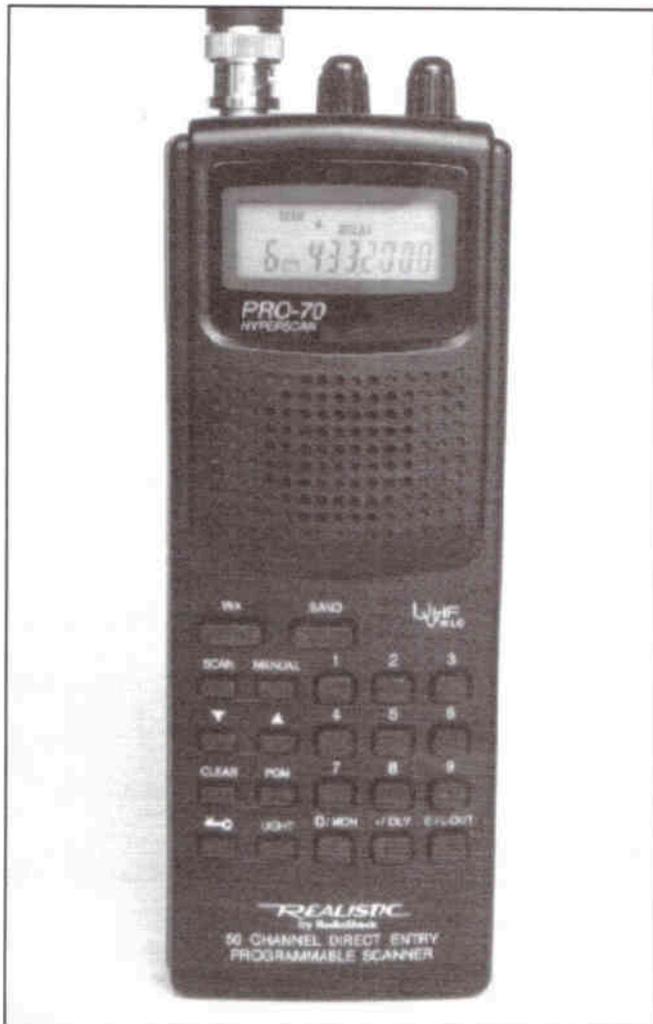
The scanner offers a frequency coverage of 68-88MHz, 137-174MHz and 380-512MHz, with a reception mode of FM. As such it covers the popular amateur VHF/UHF bands of 4m, 2m and 70cm, the VHF marine band, and virtually every PMR (Private Mobile Radio) band used in the UK. If you're an aircraft enthusiast however you'll need to pay a bit more for a different Realistic model, from Realistic, as the PRO-70 doesn't cover the VHF or UHF airband ranges.

The set has ten pre-stored 'search' ranges available, making it easy to find new active frequencies without a lot of button pushing or needing reference to a frequency directory. The search bands are:

- 0; 68-75MHz
- 1; 75-82MHz
- 2; 82-88MHz
- 3; 137-144MHz
- 4; 144-148MHz
- 5; 148-174MHz
- 6; 380-420MHz
- 7; 420-450MHz
- 8; 450-470MHz
- 9; 470-512MHz

Once the set has found an active channel you're interested in, you can store this easily into one of the 50 available memory channels in the set for

Chris Lorek finds an easy-to-use scanner that he can also use at home



The Realistic PRO-70 is made in China especially for Radio Shack. The front panel keypad lets you enter frequencies directly

subsequent scanning, or into the quick-access 'monitor' memory channel provided while you're deciding one way or the other.

## FREQUENCY STEPS

The frequency increments the scanner uses are 5kHz steps on VHF and 12.5kHz steps on UHF. You can also directly enter any frequency manually within these ranges for monitoring, or to commence a search up or down from that frequency with a further press of either the 'up' or 'down' arrow buttons on the keypad. The PRO-70 can search at up to 50 steps per second, and at up to 25 channels a second in memory mode.

## MEMORIES

Once you've searched around for a while, you'll no doubt have a number of memory channels programmed in, and you can subsequently scan through any selection of these as you wish with a quick press of the 'scan' button on the set's keypad. Any number of the channels can be locked out of the scan, the set will then automatically skip these in scan mode. Also, a two-second 'delay' can be programmed on a channel-by-channel basis. Here, the receiver pauses for a couple of seconds after the squelch closes to listen for a reply on that frequency, before it starts scanning through the channels again.

## POWER

The PRO-70 comes supplied with a battery case holding 6 AA sized cells, and you can use either dry cells or nicads here, an optional nicad pack

also being available. The set's liquid crystal display, besides indicating the frequency, memory channel etc., also has a small 'Batt' icon which lets you know when your batteries are getting low. As an alternative, you can plug in an external 9V DC supply via an optional lead, this uses a coaxial connector with the outer connection as positive, automatically cutting out the internal battery pack when plugged in.

The PRO-70 measures 171 x 62 x 40mm and weighs 229g. It comes supplied with a plastic belt clip, a set-top helical aerial and a user instruction book.



**The receiver measures 171 x 62 x 40mm and weighs 229g, it fits comfortably in the hand**



## ON THE AIR

It took me no longer than a few seconds to be receiving my first signals with the scanner, I found it really was easy very to use!

I found the pre-programmed 'search' ranges especially easy to use. However, after some time I did find the use of these to be a bit limited if, for example, I just wanted to scan through a small frequency segment, like the FM sections of the 2m or 70cm amateur bands. But then, if there was a facility for setting lower and upper scan limits this would easily detract from the 'simple to use' nature of the set. However, scanning upwards from a programmed channel to search for activity was extremely easy. Programming the memory channels, either from the keypad or in 'search' mode, was also very easy. I found a useful facility of the set here was that it would automatically tell me on the LCD if I tried to program a duplicate frequency into a further memory channel, thus saving 'duplicate scanning'.

When using the scanner out and about portable with the set-top aerial, I found the receiver was a little less sensitive than a typical amateur handheld or that of some other higher-priced scanners. But then it didn't have the problems of overload I've found on these either. This was very clearly demonstrated when I used the



**Six AA batteries are used for power, these fit into a battery pack which slides into the case**



**The top panel controls are easy to use**

set at home, connected to my rooftop-mounted VHF/UHF vertical aerial. Now why, whilst listening to my local 2m channels, wasn't I getting the VHF paging breakthrough I usually expect on handheld receivers? For a quick test I substituted the PRO-70 with a 'big-name' handheld scanner, costing several hundreds of

pounds, tuned to the same 2m channel - the latter just 'fell over' from the unwanted signals in my area. Reconnect the PRO-70 and I could hear the signals I wanted, with no interference whatsoever!

On the 'downside', I found the rejection of strong adjacent channel signals, i.e., 12.5kHz away, not too good. Also, the

5kHz channel steps on VHF were rather a 'pain' in use, in the UK we use 12.5kHz minimum steps on the frequency ranges covered by the PRO-70. The effective search rate here is rather slower than if 12.5kHz or 25kHz steps could be used, and I also sometimes found the set would halt in 'search' mode 5kHz lower than the actual signal. However its intended primary market of North America coupled with the economic price is probably the reason for these fixed steps.

## LABORATORY TESTS

My measured lab results show that the strong-signal handling, especially the intermodulation (one of the main causes of unwanted breakthrough problems in busy RF areas) was very good for such a scanner. A quick glance inside the set shows that it doesn't use sophisticated or extensively screened circuitry, it must just be down to good circuit design.

The blocking was also quite good at separations of 1MHz or greater, although as I found on-air the close-in selectivity was a little on the 'wide' side, i.e. +/-12.5kHz signals weren't rejected too well although the 25kHz rejection was quite adequate.

## CONCLUSIONS

The PRO-70 is economically priced, it offers quite good on-air performance in terms of strong signal rejection for its cost, and it's very easy to use. It doesn't of course offer the flexibility or sophistication of higher-priced sets, but it covers the most-often used two-way VHF/UHF radio bands on narrowband FM and should offer plenty of enjoyable listening. It's wide availability will I'm sure make it a very popular 'first handheld' scanner for many readers.

*My thanks go to Link Electronics in Peterborough (Tel. 01733 345731) for the loan of the review scanner - please mention Ham Radio Today magazine when enquiring.*

# LABORATORY RESULTS:

All measurements taken at 145MHz, NFM, unless stated, with set powered from a set of fully charged AA nicads,

## SENSITIVITY;

Input signal level in  $\mu\text{V}$  pd required to give 12dB SINAD;

Freq.	Level
68MHz	0.26
78MHz	0.22
88MHz	0.28
137MHz	0.37
145MHz	0.32
165MHz	0.30
174MHz	0.35
380MHz	0.39
400MHz	0.30
435MHz	0.23
450MHz	0.22
470MHz	0.23
512MHz	0.28

## SQUELCH SENSITIVITY;

Level of signal required to raise receiver squelch

Threshold;	0.30 $\mu\text{V}$ pd (10dB SINAD)
Maximum;	0.50 $\mu\text{V}$ pd (21dB SINAD)

## ADJACENT CHANNEL SELECTIVITY;

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

+12.5kHz;	8.7dB
-12.5kHz;	10.2dB
+25kHz;	56.8dB
-25kHz;	57.5dB

## BLOCKING;

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

+100kHz;	58.1dB
+1MHz;	95.0dB
+10MHz ;	93.5dB

## INTERMODULATION REJECTION;

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

25/50kHz spacing;	62.7dB
50/100kHz spacing;	63.4dB

## IMAGE/IF REJECTION

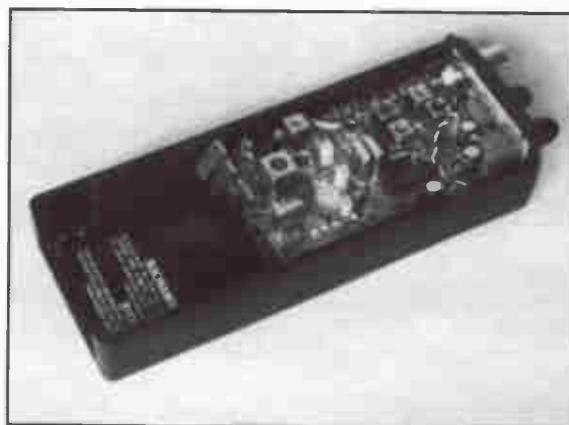
Difference in level between unwanted and wanted signal levels, each giving 12dB SINAD on-channel 145MHz FM signals;

	70MHz	145MHz	435MHz
1st Image	26.9	33.2	13.9
2nd Image	55.1	57.2	54.8

## MAXIMUM AUDIO OUTPUT

Measured at speaker/earphone socket, 1kHz audio at the onset of clipping (10% distortion), 8 ohm resistive load;

94mW RMS



A look inside the set shows a simple uncluttered circuit

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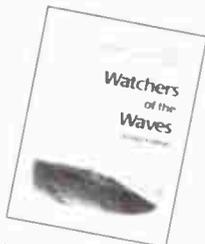
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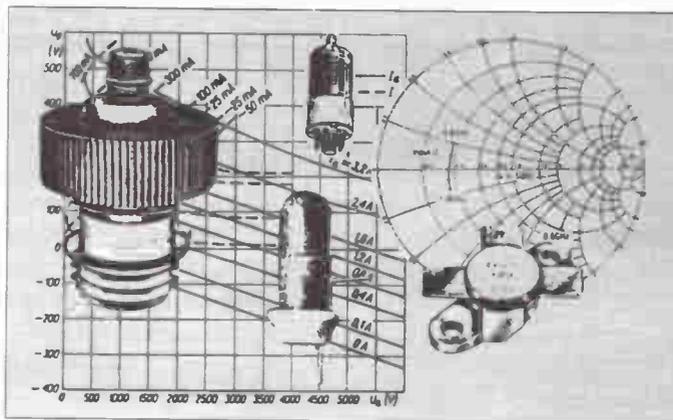
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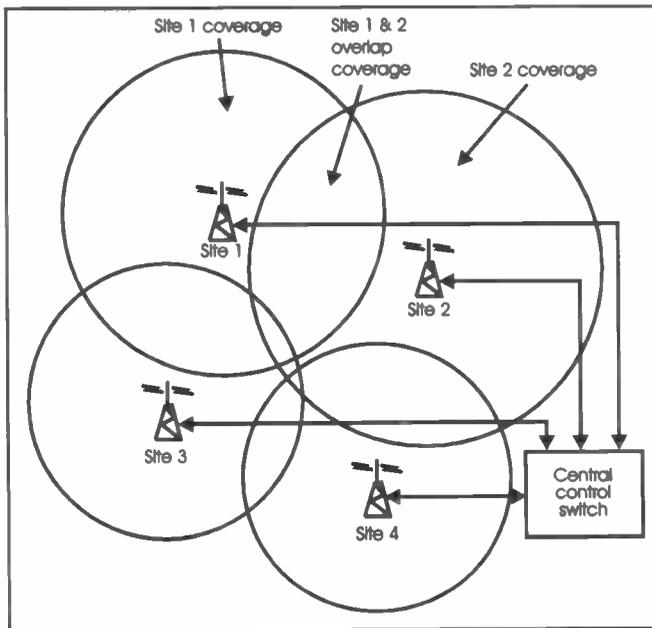
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# SCANNERS

Bill Robertson explains how mobile radio users get wide coverage on a single VHF/UHF channel, and offers a list of frequency updates



**Quasi-synchronous operation gives wide coverage on a single VHF/UHF radio channel**

To achieve wide-area two-way radio coverage, trunked radio systems are one answer, and these have been detailed in these pages in the past. However, prior to the advent of the latest microprocessor controlled digital signalling radios, an alternative system was used, and this is still extensively used throughout the UK by county-wide services, such as government agencies and national motoring organisations. It's called *quasi-synchronous* operation, sometimes called 'simulcast' for short.

The idea is that, throughout the two-way radio coverage area, a single two-frequency radio channel is used, with the PMR base stations usually operating in duplex mode on the two-frequency channel and the mobile/portable users operating simplex. To obtain the required coverage area, multiple base station transmitter

and receiver sites are used, all operating on the same channel. But for this, a few extra control features are needed.

Take a look at the accompanying diagram, and you'll see that each base station site has a well-defined coverage area, some of which naturally overlap. In these 'overlap' areas, if the mobile or portable radio users hears the signal from two transmitters, there will be a beat note, dependant upon the usually slight frequency difference between the two transmitters. In an uncontrolled situation, if they are 500Hz apart, a beat note of 500Hz will be heard, if they're 250Hz apart, a beat note of 250Hz will result. None of which helps towards good communications!

So, the precise frequency of each transmitter is carefully controlled, to be a small but

accurately defined 'offset' from its neighbour. This offset is typically 5-6Hz in a VHF system, and 3Hz on UHF systems. If a mobile station is located in the 'overlap' coverage area of two of the transmitters, the user would experience a beat 'note' of this frequency, which in practice would be a slow 'flutter' in the received signal strength, i.e. 3 fades per second on a typical UHF system, due to the slowly changing phase difference of the received signals. This would be the effect if the mobile station was perfectly stationary (or for example if a receiver or scanner connected to a fixed external aerial was used). If the receiver was moving about, the phase effects would typically be far less noticeable. This will hopefully explain the wide-area coverage that's reported on some systems, and the resultant 'signal flutter' on the signals from these systems from a fixed receiving site.

"But what of the multiple receiver sites?", the technically-adept reader might ask. This is where the clever bit comes in, as usually the receiver audio from all the sites is fed to a signal 'voting' unit. Here, the relative signal strength from each receiver site is electronically assessed, and only the audio path from the site having the best received signal is passed onto the central control system, which may then (if wished by the system operator) be relayed to all transmitter sites. To retain accurate audio from each of the transmitter sites, individual 'phase delays' are incorporated in the central distribution system to ensure the same audio phase from each transmitter site, irrespective of the individual link characteristics.

## FROM THE POSTBAG AND THE 'NET

Richard Davis says that on UHF frequencies around 453MHz, he hears a rhythmic 'drumming' noise, although it doesn't sound like typical packet radio. He asks is it a data mode, and if so who uses it and can it be decoded?

This signal is likely to be the commercial data-over-radio service run by RAM in the UK. This sounds just like a 'crunch, crunch' noise, and the system is used by companies for transmission of all kinds of data over the national network. The actual data ranges from automatic despatch reporting, remote bar-code reading and stock control, spare parts ordering, even share prices and customer orders. In view of the type of data being transmitted, you'll undoubtedly find a relatively secure algorithm is used by the service providers, so casual reception would be a rather difficult affair. If you'd like more information on the capabilities of the system, RAM have a home page on the web at <http://www.ram.co.uk/>

A query from James asks if it's possible to decode POCSAG data from pagers and if any PC software is available for this. The answer here is "yes", there's already been the 'PD' software for DOS, and the 'Semasoft' program for Windows to my knowledge. Both of these have been featured in the magazine's regular software offers over the last few months.

A message from Brian says that he's seen an advertisement for an active aerial, available in kit form or ready-built from Maplin Electronics, which covers the very wide range of 1MHz to 2GHz. Brian asks about the performance, thinking that overload and

intermodulation may be a problem, and also wonders what it would be like at HF.

Any aerial, if used with a wide-band amplifier, will of course amplify the signal received at the aerial before passing it to the scanner. If the amplifier is at the aerial location itself, rather than down next to your receiver, it can help in overcoming feeder loss at the upper frequency end and thus improve the overall receive sensitivity. However if the overall gain of the system is too high, then you will certainly increase the risk of having strong signal overload problems with your receiver. On the HF bands, as the aerial is usually physically much smaller than a 'full size' wire dipole, you'll often find the performance quite reasonable for the size when used with a wide-coverage scanner, although you'll need to be careful on the HF broadcast bands where high-powered signals are the 'norm'.

**LATEST SCANNER FREQUENCY UPDATES**

I'm frequently asked for new VHF/UHF frequency lists and updates for various areas, and I'd be very pleased to publish these here if the space allowed. However this could easily fill several pages each month, and a shorter listing could possibly only be of interest to a small number of readers. In the past there used to be printed frequency lists 'doing the rounds', to supplement published frequency directories. Now we have electronic means, with computer files commonly swapping between hands (and modems). I've managed to collate a large number of such frequency update lists in file form (all publicly available so there's no 'secrets' being let out) covering many areas of the UK, and all right up to date. These are included in this month's 'Software Collection' disk as a service to readers, see the relevant section in this magazine for details on getting your copy on disk. I'm sorry but I can't supply them in printed form, they'd take far too many sheets of paper!

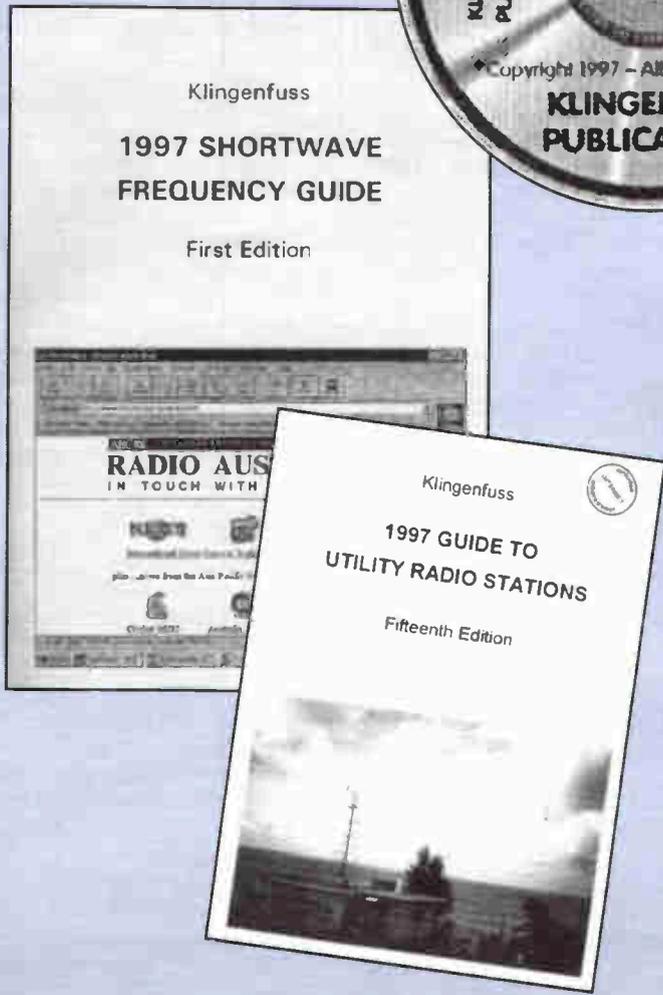
**SHORT WAVE FREQUENCY GUIDES**

A collection of the latest frequency guides from Klingenfuss publications have recently become available.

The '1997 Guide to Utility Radio Stations' has gained a solid reputation over the years as being the definitive information source on frequencies used by these HF services, including aeronautical, diplomatic, maritime, meteorological, military, police, press, and the like. The latest issue includes no less than 13,800 frequencies with 10,600 new updates, including those used in recent overseas conflicts. A comprehensive reference section also lists callsigns, abbreviations, modulation types, codes, and plenty more. In my opinion, an indispensable book if HF utility listening is your interest.

The '1997 Shortwave Frequency Guide' will be of interest to those who are also interested in HF broadcasters, including clandestine stations, with

Latest frequency guides from Klingenfuss



11,500 entries arranged in an easy-to-use form complete with schedules. As well as this, 13,800 utility stations from around the world are also detailed together with introduction sections on broadcast and utility listening, equipment, and modulation types. An excellent 'all round' HF reference guide for the serious listener

Also from the same publishers comes the '1997 Super Frequency List on CD-ROM', which this year also includes 11,500 broadcast entries together with 13,800 special frequencies from the Utility Radio guide, together with 14,100 formerly active frequencies. It's in Windows format, with search routines to help you instantly find the information you're looking for. Superb if you use your PC in your listening post.

The Shortwave Frequency guide has 484 pages, ISBN 3-924509-57-3 and sells at £23, the Utility Stations Guide having 588 pages, ISBN 3-924509-97-2 and selling at £36, with the CD-ROM at £27. You'll find them available or to order at your specialist radio dealer or bookshop, or you can contact the publishers direct; Klingenfuss in Germany, Tel. +49 7071 62830, Fax +49 7071 600849, Email 101550.514@compuserve.com. Please mention Ham Radio Today magazine when enquiring. My thanks go to Klingenfuss for the provision of the review copies.

**MPT1327 TRUNKING DECODER**

I recently came across what's described as the "World's first low cost MPT1327 trunking decoder aimed at the hobbyist". Although the decoder is being produced in Australia (where one state's Emergency services use an MPT1327 trunked network) it could also be used in the UK where MPT1327 trunking is used by the Band 3 trunked systems, plus many Gas, Electricity, Water and Rail companies as well as a number of other companies. Better still, I've now just received a prototype sample of the very decoder, and I've arranged for a review of this to be featured in next month's column when I've had a chance to give it a test.

Bill Robertson is always pleased to hear from readers, and will answer queries through this column. You can write to him c/o the Ham Radio Today Editor, either by post, fax, or Email.

Readers should note that, depending upon your country's regulations, reception of some services may not be allowed unless you have appropriate permission. The RA's "Receive-Only, Scanners" Information Sheet provides more information for UK listeners, you can obtain this free of charge from the Radiocommunications Agency.

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If you must sing for your supper, be your own duet. Tom Scarff's design is based around the MSM6322 real time audio pitch controller and beats commercial versions on price alone.

### BATTERY QUICK-CHECK

Bits box rattling with half-used batteries? Terry Balbirnie's battery health checker will tell you instantly whether those loose AA cells and PP3s are still ready to go.

### ETI FREEZER ALARM

Robert Penfold's household freezer meltdown detector will make sure you keep the chill in your ice-box, not in your heart.

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Part 4 of Experimenting with Video - a PIC-controlled video line trigger by Robin Abbott to use with an oscilloscope in isolating individual lines of video to test and debug video circuits.

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An inexpensive add-on from Raymond Haigh that stretches your meter to higher accuracy on high impedance and signal measurements.

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# SIMPLE MULTI RANGE AUDIO OUTPUT METER

Brian Kendal G3GDU shows how you can build a handy piece of test equipment for your station

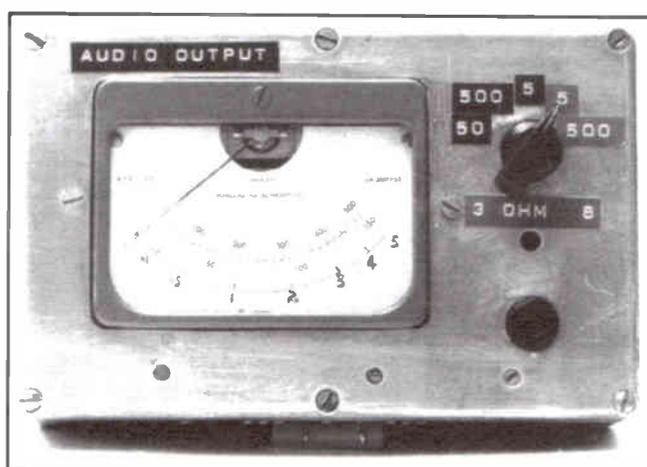
It often surprises me to see how little test equipment the average ham radio operator possesses. A multimeter - yes, a VSVR bridge - certainly, component bridges, output meters, oscilloscopes etc. Well - umm - err! Many hams build equipment but rely on nothing more elaborate than their ears to determine whether their new product performs better or worse than its predecessor.

In contrast, in professional workshops, the shelves are loaded with every type of test equipment that can be imagined and the engineer would not even consider releasing his work to the outside world without a complete specification which could prove beyond any reasonable doubt, that the new equipment was a substantial improvement on what had been produced before.

It may be argued that good test equipment is expensive, which is true, but many pieces can be constructed at home which, using the station multimeter as a standard, are of more than adequate accuracy for the home constructor. Typical of this is an audio output meter.

## BASIC PRINCIPLES

The basic principle of operation of an audio output meter is that a resistor is substituted for the loudspeaker. The voltage developed by the audio signal is then rectified and measured from



Front panel layout

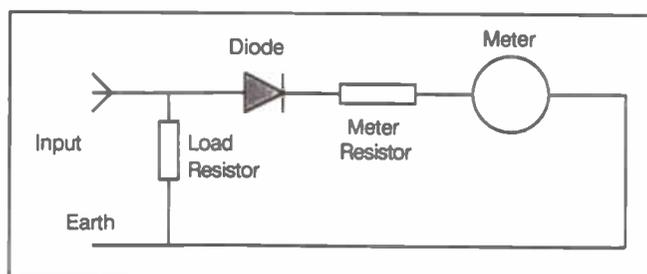


Fig.1. The basic circuit of a simple power meter

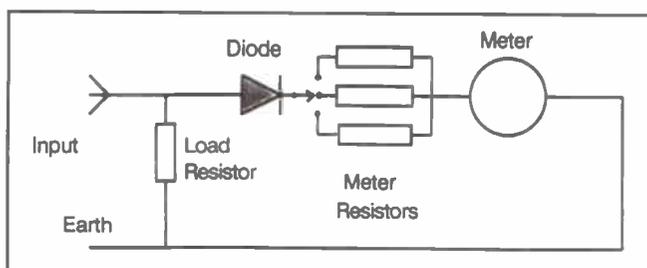


Fig.2. Modification to basic power meter circuit for multiple ranges

which the audio power can be calculated.

The first essential is therefore to select a load resistor of suitable value and rating. Most communications equipment uses 3 ohm loudspeakers, whilst with the addition of 8 ohms, most other domestic equipment can be covered. The power rating should be adequate for the equipment to which it may be attached.

There now remains the task of measuring the voltage generated. This can be simply achieved by use of a diode feeding a meter through a dropping resistor. The diode can be of almost any small-signal type, but it may be found advantageous to use a germanium diode if it is wished to measure very low power levels.

The meter should preferably be of a reasonable sensitivity, say 200  $\mu$ A FSD or better, and have the largest scale possible if only for ease of reading. A less sensitive movement may be used, but this may well have penalties when working at low audio levels. Most good commercial audio output meters use a 100mm scale and this is probably a fair trade-off between cost and accuracy, although smaller meters can still prove extremely useful.

To increase the versatility of the meter, several switched ranges should be available, which can be provided with the help of a rotary switch. This meter provides 50mW, 500mW and 5W ranges at 3 ohms, together with 500mW

and 5W at 8 ohms. The number of ranges available in this meter is only limited by the types of switches used.

Initially the dropper resistors for the meter are not wired in as these will be selected at a later stage.

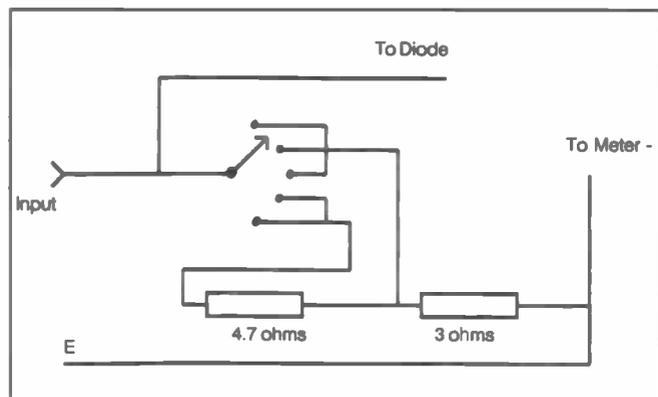


Fig.3. Switching arrangements to permit both 3 and 8 ohm operation

## CONSTRUCTION

The circuit was constructed in an Eddystone diecast aluminium box, this being selected as it is robust and it was intended that the meter would be in use for a very long time.

The meter movement was mounted in the lid of the box with the range switch by its side. This was chosen as a good quality meter movement was available, but this was of such a size that it could only be mounted in this orientation. The input connector is a standard 6.3mm jack socket.

The wiring is very simple with the only unusual feature being the use of the two load resistors, only one of which is used for 3 ohm measurements whilst both are in series on the 8 ohm ranges.

## CALIBRATION

The basic technique for calibration is that an appropriate voltage is applied to the load resistor and then the dropper resistor for each range is selected to give full scale deflection. There are two ways in which this can be done. The first is to apply power from an audio oscillator, measure the output on an oscilloscope and then adjust to the appropriate level. The second is to apply the voltage from a single cell battery in series with a 25 ohm potentiometer and again adjust for the required level. At various times during the construction of the meter, I used both methods and the

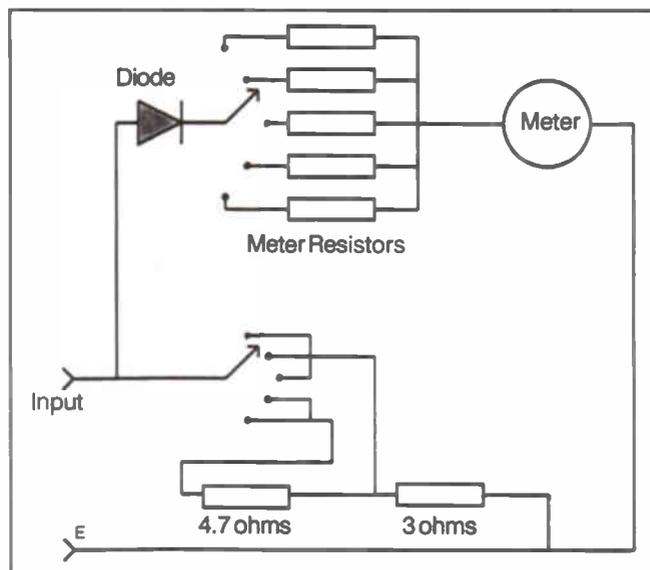


Fig.4. The complete circuit of the Audio Output Meter

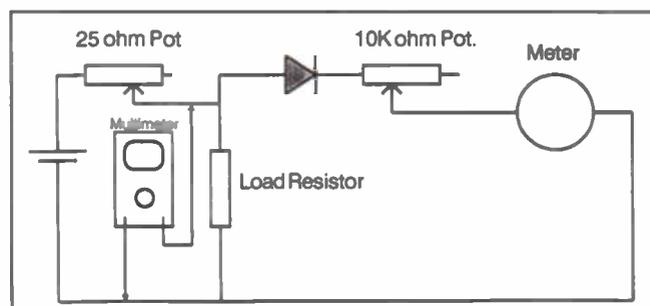


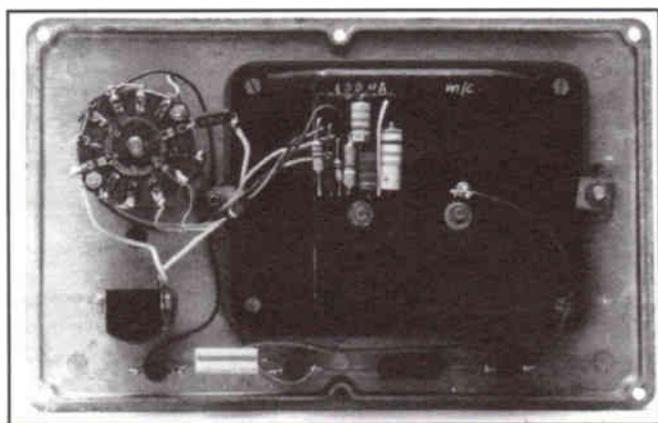
Fig.5. Method for determining value of meter resistors

results agreed within the limits of experimental error.

During calibration, a 10k ohm linear potentiometer was substituted for the meter dropper resistor. The first range calibrated was 50mW. A quick calculation revealed that at the 50mW power level, 0.39V would be generated across the load resistor. Using the DC calibration technique,

the 25 ohm potentiometer was adjusted until 0.39V was indicated on the multimeter. The 10k potentiometer was then adjusted until the meter read full-scale deflection. The input voltage was then disconnected and the value of the used part of the 10k potentiometer measured.

Your 'stock' of available resistors, if available, can then



Internal view, the load resistors are below the meter and the dropper resistors are mounted on a piece of Veroboard attached to one meter terminal

Power Level	% age of F.S.D.
50 mW, 500 mW, 5W	100
40 mW, 400 mW, 4W	91
30 mW, 300 mW, 3W	75
20 mW, 200 mW, 2W	60
10 mW, 100 mW, 1W	41
5 mW, 50 mW, 0.5W	23
1 mW, 10 mW, 0.1W	6

Table 1. Comparing power level with percentage of full scale deflection of meter reading

be searched until one of a similar value was found. If none is available, one or more resistors can probably be paralleled until the correct value is obtained.

The calibration of the second, 500mW, range is similar, except that the required voltage across the load resistor was now 1.2V. On the 5W range however, I found a problem arose. The voltage required across the load resistor was 3.9V, which meant that a current of over 1A would be flowing. This is more than a dry cell can supply, and it will also possibly be too much for the 25 ohm potentiometer. The answer is simply to keep the voltage across the resistor at 1.2V and adjust the 10k potentiometer such that the meter indicates 23% of full scale deflection.

For calibrating the 8 ohm ranges, exactly the same technique is used except that for the 50mW range, 0.63V is

required and 2.0V for 500mW. A two cell battery must obviously be used for this range.

With all the dropper resistor values selected, the resistors can be soldered to a piece of Veroboard, fixed into the case and wired into circuit. The only remaining task is to calibrate the scale for lower power levels. This can easily be done by comparing with the table shown in this article. Whether it is decided to redraw the meter scale, or attach a calibration chart, is a matter of personal choice. The table is valid no matter what sensitivity of meter movement is used.

## ACCURACY

If constructed and calibrated as described here, the overall accuracy should be between 10 and 20%. This may seem poor, but in practice it will be found adequate for all normal purposes. It is also highly

unlikely that the equipment which you are testing will have an output impedance of precisely 3.0 ohms, so there will inevitably be a small mismatch.

The absolute accuracy of the equipment is not particularly important. What is necessary, however, is consistency of measurements. The output meter as described here will meet this requirement admirably.

Since completion, tests which I've conducted indicate that the meter is not frequency conscious within the audio range and that the accuracy is well within the figures which I've quoted.

## FINALLY

The construction of this audio power meter is not an arduous task. The whole construction including metalwork, design and calculation, I completed in two afternoons in my workshop a

couple of years ago. Since then it has more than proved its worth to me during the construction and testing of many other projects.

Few projects which I have tackled over the years have been completed so quickly, yet have proved so useful over the succeeding years. I can only recommend that other constructors try it and see for themselves.

Any reported updates to this project following publication will be available on the Ham Radio Today Voicebank information line, Tel. 01703 263429 (use with a DTMF phone) for up to 12 months following publication.

Any other queries regarding this project should be addressed to the author, Brian Kendal, G3GDU, c/o the HRT Editor (ensure you write the author's name followed by the HRT address so that your letter can be forwarded), enclosing an SAE if a reply is required.

Here's one book I always make a point of looking out for each year, and I've also been known to regularly 'dig into my pocket' for it (rather than getting the Editor to buy it for me!). It's the annual edition of the ARRL Handbook of course.

This year's volume has a massive 1190 pages, and attempting to describe even a moderate fraction of its very comprehensive content is naturally an almost impossible task! The book starts off with a very readable and well-illustrated chapter on "What is Amateur Radio", and then covers just about anything you'd want to know in our hobby, from HF to microwaves, construction to 'black box' rigs, QRP to moonbounce, and sky wave to satellites.

In recent years, a number of construction projects have been added, and this has been continued with a number of 'weekend projects' in this issue. New additions include a modern switched-capacitor filter using one of the latest low-cost ICs, plus inductance and capacitance meter 'front ends' for your digital voltmeter.

Included with the Handbook is a companion 1.44Mb PC disk containing several small 'utility'

# REVIEWED - 1997 ARRL HANDBOOK

Our Technical Editor gets even more technical with the ARRL's latest 'encyclopedia of amateur radio'

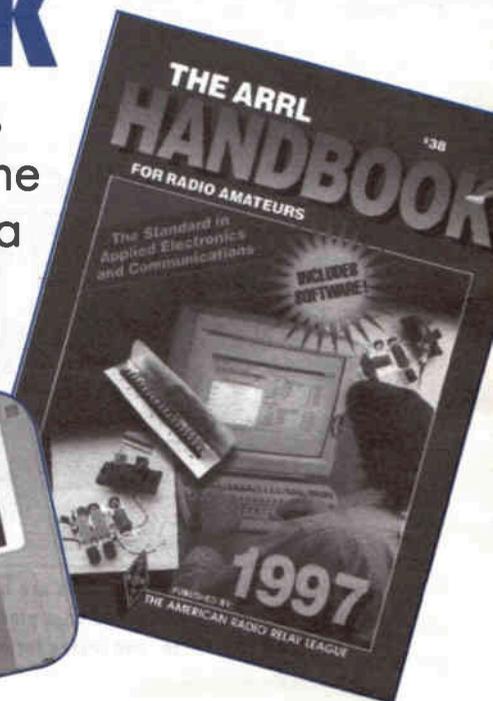
programs. Most of these are associated with the technical content of the book, i.e., design programs for inductance, Pi and Pi-L matching networks, and passive element filters using standard value capacitors. There's also a simple CW program and a grid locator utility.

With its extremely comprehensive and very up-to-date content, this book continues to receive my highest recommendation. It's published in the US by the American Radio Relay

A companion PC disk comes with the handbook



League, ISBN 0-87259-174-3, priced at US\$38. It's available in the UK from specialist radio dealers and bookshops, our 1997 copy came (as it also did in over many past years!) from Poole Logic in Dorset, Tel. 01202 683093, who also offer a mail order service (please remember to mention Ham Radio Today magazine).



# YES, IT'S RADIO, BUT IS IT ENOUGH?

Jeremy Boot G4NJH continues his series on Ham Radio and the Internet

**Y**esterday I received an e-mail from a correspondent in Canada. He told me that 150 employees were being laid off by CBC in accordance with some rationalisation programme in their shortwave transmissions at Sackville, one of their principle relay sites.

If you were a broadcaster, how best these days would you wish to get your message to listeners abroad? In the advanced countries, you might use local radio stations to carry your broadcasts (as the BBC do in the Far East and in the US); you might use local cable services, and in Europe you would certainly use satellite channels. One has only to tune around the channels on the Astra satellites to see how full they are of the VOA, Deutsche Welle, RSI, BBC etc.

But would you bother with short wave as a medium at the end of the 20<sup>th</sup> century, unless you had to? Well, for remote areas with limited technology, the outback of Australia where it is alive and well, yes; for much of Africa and South America, yes; and for other places not yet served by domestic satellites, probably yes again. But for the US, much of Europe? I suspect the answer would be "no" or "not for much longer". Short Wave is unreliable. It depends heavily on the sunspot cycle, and a host of other, not always very predictable, conditions.

Short Wave was the miracle of its age: it went world-wide: it needed little to receive it: most radio sets, however primitive, included the popular bands, and the listener's expectation of sound quality would be very limited. I do not believe this is any more the case.

On top of this, why would people listen to you anyway? Is your message one of political hope or

Salvation or something they cannot hear on their domestic station? Or is it a diplomatic, nation-shall-speak-untou-nation message, tourism or culture? Not that I am against any of these. But why do it at all? My point is that the product needs to be 'sold' and having the same old short-wave stuff as you had 50 yrs ago might not be much of a rival to an audience accustomed to CD sound and stereo. The medium no longer matches the product. Another hard fact of the modern age.

So let us suppose that the short-wave bands (HF to you and me) are freed up. Will we amateurs be given chunks of them because no-one else needs them? Not on your life! You can be sure that our government agencies are even now calculating the value of different bands and thinking of new uses for the freed-up space.

But what of us amateurs? Have we really made such progress apart from better receivers and transmitters? Or are we fundamentally doing what our founding fathers of the 20's did? Has moonbounce, UHF, Pactor, Packet radio and SSTV made us rethink our position, or fundamentally stay in one place? We still have fewer newcomers to the hobby than is healthy. Why? Could it be because we lack vision or the will to innovate? Could we be too complacent? Might we - heaven forbid - risk becoming more and more a rump of eccentrics in a fast-moving world of technology, left over from a glorious, but bygone age?

Herein lies a paradox for radio amateurs. We are happy as we are. We don't see the need for change, yet change we must. At this point, let me say the magic word 'Internet' again and let those - most of whom know nothing about it - say, "I told

you so!" and stop reading any more of this. Well, you've paid for the copy so you may as well read on anyway... Last time I wrote in HRT, it was about the relationship between Internet and Radio as I see it. In short, Internet can't be uninvented: it gives us an insight into what might be in a myriad of communication-related ways and it won't go away. Nor therefore must we if we are not eventually to become that rump of fusty old has-beens. It is not that we have to surrender what is dear to us, but someone, somewhere, Radio Society leading the way or inventing genius (and I am not one) needs to add to that catalogue of intriguing new things we have already seen. In part: Packet, SSTV, satellites, meteor showers, whatever. It was - it is - good, but it isn't enough.

With fairly simple equipment, an Internet connection and the right software (I am thinking of Iphone) you can have the equivalent of an HF-type 'QSO' with another fellow amateur, but with video, a whiteboard, the ability to transfer files whilst all this is going on, and privacy to boot.

"So what?" you gasp. "This isn't Radio! This isn't what I sweated through those exams for, did the Morse for, studied for, climbed on the roof in a howling gale for to get that aerial up!" No it isn't. I quite agree. But we belong to that group of people who all but perfected radio transmissions in the earliest days, before the broadcasters took it over, who were the boffins behind Radar in wartime, who led the way in all sorts of other areas too. Is it so much to ask that amongst us there isn't yet more out there? I'm not sure what, I admit it: I haven't the prescription or a crystal ball. Computers are not a substitute for Radio: Internet is not a substitute for all the knowledge and selftraining in

a hundred ways that we acquire in our amateur radio careers. Neither, indeed, substitutes the camaraderie, help, friendship that each one of us experiences as amateurs. But these other things must teach us not to tread water but to look forward, actively if we are able, or by encouragement if we have not the expertise ourselves. A start would be a substantial re-write of the WT Act and its antique and outdated provisions (3<sup>rd</sup> party traffic and the like). But one often feels that controlling authorities are bogged down in their own survival rather than real, practical and far-reaching action. This is the nature of the beast: I understand this. Perhaps it is inevitable.

But I do not write all this in a pessimistic vein. I am cheerfully confident that the future is bright, innovative and that what we presently enjoy will be in the end enhanced, not lost. But only if we wake up to reality now, not later. Men (and women) of Action and Vision, stand up!

I am sorry Sackville is on its way out and that short-wave broadcasting is slowly but surely going the same way. It closes the door on a marvellous and historic époque in real. But it isn't the end of the road for broadcasting, no more than it necessarily spells the end of the road for us in the amateur radio world either.

**Jeremy Boot G4NJH**

Email: [asperges@innotts.co.uk](mailto:asperges@innotts.co.uk)  
Web: <http://www.innotts.co.uk/~asperges/>

*Addendum: Since the above appeared, word has come that Sackville IS to be spared after all. It seems a Minister had made a promise that it would not close 'in her lifetime'. Good to see that. - Ed.*

# 22nd SANDOWN MODEL SHOW

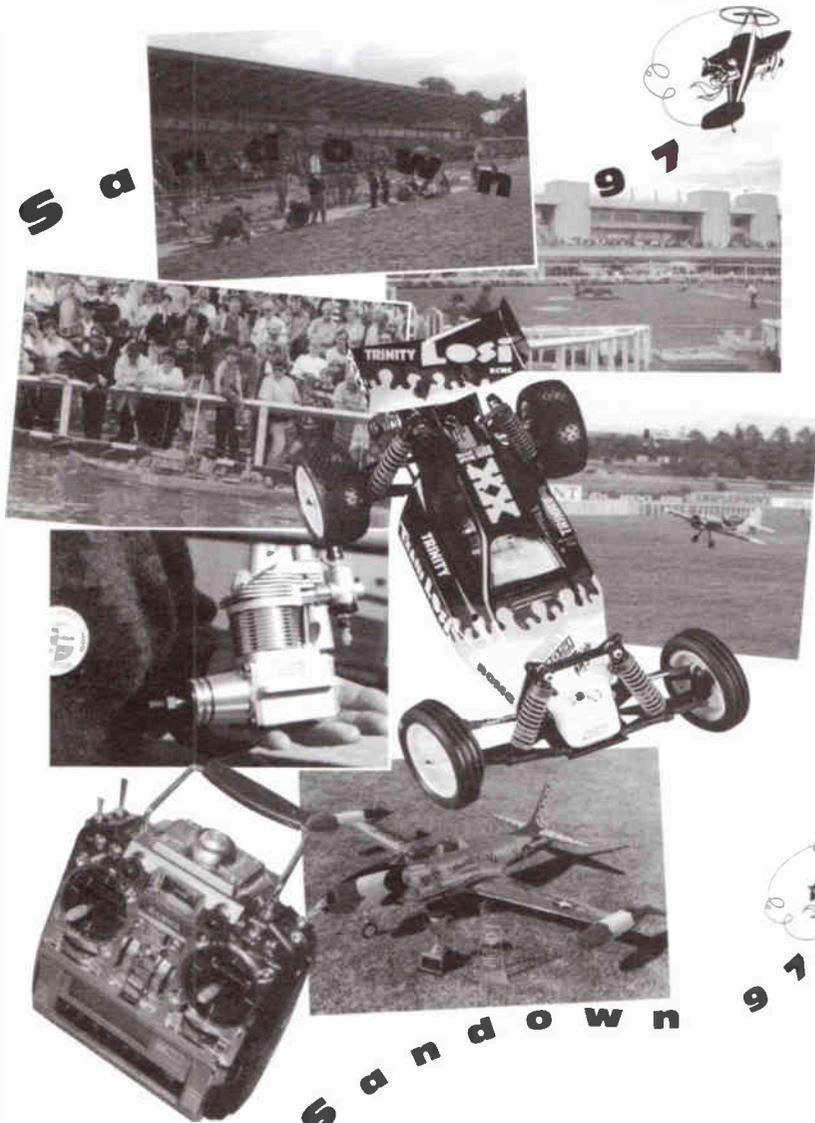
in association with the Elmbridge Model Club



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World Radio History

# EXPLORING BROADCAST BAND FILTERS

Ben Nock G4BXD offers a filter solution to the problem of breakthrough onto the lower short wave bands of strong MW signals on some receivers

Anyone who has an early Trio/Kenwood general coverage receiver such as the R600, or a collection of ex-military equipment and an urge to get it fired up and see how it performs today, is usually confronted with broadcast breakthrough on the lower shortwave spectrum, i.e., around the 160 and 80m bands.

Unfortunately, on a couple of the sets in my modest collection that cover this band, the front end of the receiver was such as to let through the very strong broadcast signals from the medium wave, thus making reception on 160 and 80m quite impossible. The option offered here is fit a filter, either in the set or as an 'add-on' in a small screened box.

This breakthrough was particularly bad on my old 22 and 62 sets. These ex-military sets have a 'Roller Coaster' in the front end, which is a large coil wound on a former that can be rotated whilst a sliding contact moves up and down the coil turns. This acts along with a variable capacitor as both the transmitter output L/C and the first tuned circuit on the receive side.

The plague of medium wave stations across the 2 to 4MHz range was strange,

more so as the oscillator is on the high side of the aerial frequency. So, tuning to 1.9 MHz the oscillator is on around 2.4 MHz, so one could expect to hear a signal on around 2.8 MHz. But as to where the broadcasters came from, it must be pure signal strength alone overloading and modulating the front end.

Disconnecting the aerial feed from the roller coaster tuned circuit to the grid of the RF Amp in the receiver removed the broadcast stations completely, showing that the interference was coming in via the RF feed to the first RF Amp and not by any other route.

Some form of filter was needed to remove the broadcast stations whilst allowing the required signals through. A high pass filter, with a cut-off just below the lowest frequency on the set, was thought desirable and a suitable circuit sought.

The ARRL 1986 handbook details a 10 pole broadcast filter. The response of this filter as it stands is shown in **Fig.1**. This is a computer simulation of the filter based on 50 ohm input and output feeds, using 'SPICEAGE' circuit simulation software.

The three series tuned circuits, L1/C5, L2/C6 and L3/C7 are tuned to spots in the MW band. The frequency

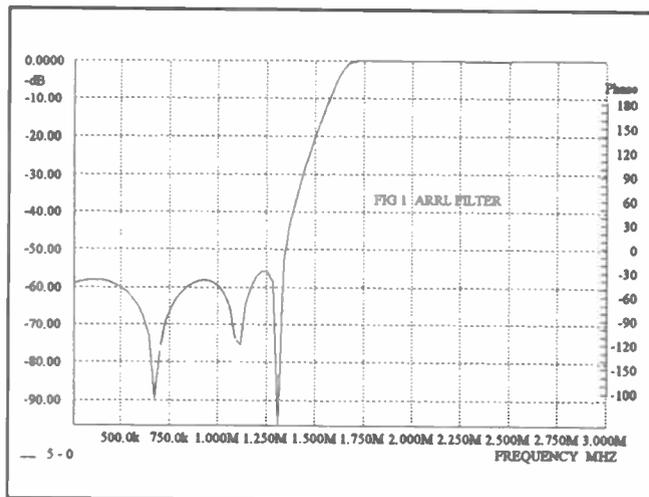


Fig.1. ARRL 10 pole BC filter response chart

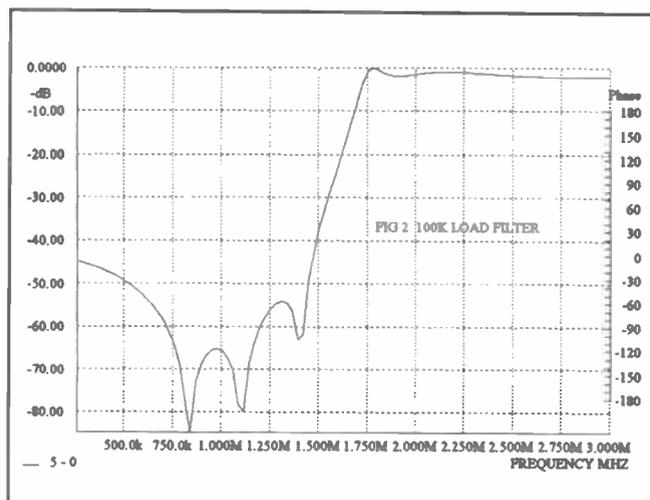


Fig.2. Result using a load of 100k and with slight alteration of component values

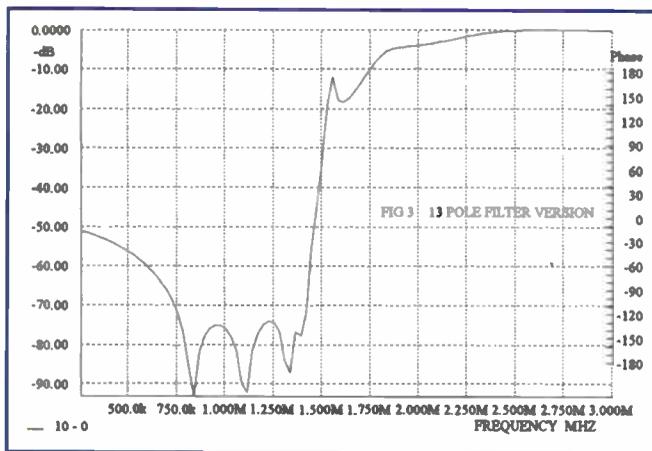
of each circuit can be found from the formula:

$$F = \frac{1}{2 \pi \sqrt{LC}} \text{ MHz}$$

Where L is in  $\mu\text{H}$  and C in  $\mu\text{F}$

Adjusting the values of the various capacitances deepened the trough in the middle of MW, especially helpful if you 'suffer' from a strong Radio 1 signal! The three tuned filters could be adjusted to reject some particular strong station, the

To this end I produced a 13 pole version, with the result shown in **Fig.3**. This used a 2mH choke as the load, representing the grid circuit of the 22 set RX. The attenuation in the 1.6-1.75MHz area is now starting to reach -10dB, but there is a slight reduction of the 160m band, in the order of 3 to 4dB. Of course, compared to the fact that this band was unusable before, the slight loss is better than nothing. This filter would of course be ideally suited to sets that do not quite, or fully, cover the 160m band,



**Fig.3. 13 pole filter version using a 2mH choke as the load**

dip at around 1.4 MHz being suited to a local radio station, the centre dip to Radio 1 and the lowest dip to Radio 3 say.

As the input impedance of the valve stages were going to be much higher than 50 ohm, I undertook some experimentation of the filter. Using a load of 100k and with slight alteration of component values I obtained the result in **Fig.2**, see component chart for details.

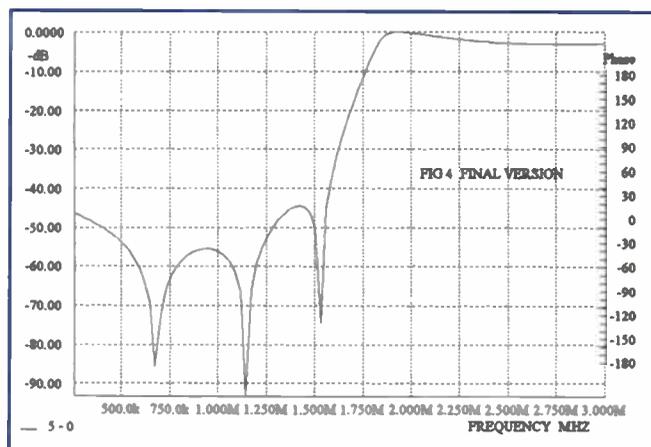
As can be seen the main body of the MW band has been reduced to below -60dB. The attenuation though does not start to fall until around 1.75MHz. As there are cordless phones in that area I thought that it might be nice if the attenuation could be moved closer to 2MHz and thus I started to work on the phone area as well.

the 19 set and ZC1 for instance.

Assuming that one does need the 160m band as good as possible, whilst still getting rid of the MW interference, then a further experimentation with the component values, and returning to the 10 pole type, produced the response shown in **Fig.4**. Here 160m is attenuation free, the gain starts to drop off at just below 1.8MHz and a good -55 to -60dB attenuation across the main MW band.

### CONSTRUCTION

The coils are wound on 0.7 OD / 0.35 ID powdered iron rings, 26 turns 22 SWG for L1, 30 turns 24 SWG for L2, 29 turns 24 SWG for L3. The actual notch frequency of each tuned circuit can be



**Fig.4. Final version for the 160m band**

varied slightly by opening or squeezing the turns around the ring.

Construction of the filter is on either single or double sided PCB. If double sided is used then the upper surface can be the ground plane and one end of L1/L3, and C2 can be soldered directly to it. Small pads of copper underneath are used to connect the other components. If single sided board is used then an earth track, running from one end of the board to the other, is needed, with separate pads for the top ends of C1/C3 and L2 along with the interconnecting capacitors.

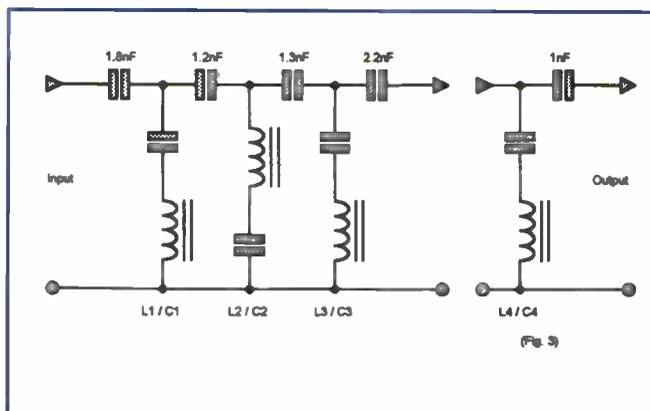
As well as use in the sets already mentioned, the filter would be suitable for any receiver requiring the reduction of MW interference. It's also suitable for placing after a QRP transmitter (50 ohm version) to get rid of any signals in the MW range reaching

either an amplifier or the aerial being used.

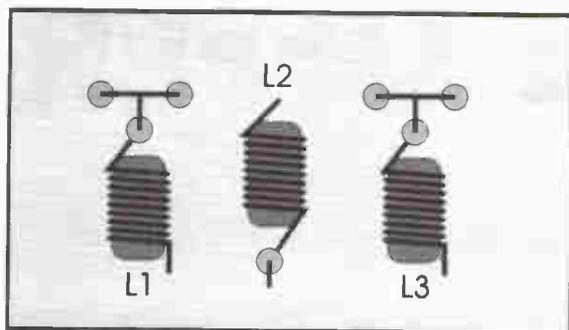
Should interference from only one station, say Radio 1, be experienced then a simple parallel tuned circuit, in series with the aerial lead, could be used. Assuming that it will need fine-tuning onto the exact frequency, the capacitor could be a variable or the coil adjustable. Assuming a capacitor of 300pF, an inductor of 91  $\mu\text{H}$  would be needed for a frequency of around 1052kHz.

Once completed, the filter can either be installed inside the set if it only covers 160m upwards, or in the case of a general coverage set with MW and LW coverage, the filter can be housed in a small case and plugged in and out as required.

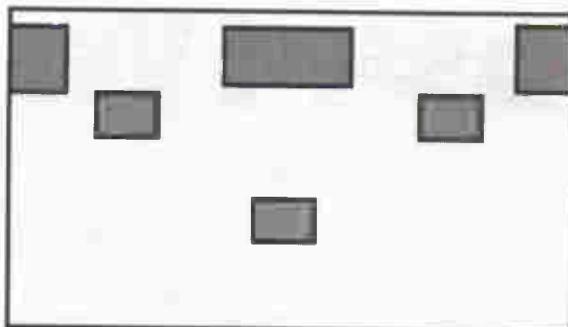
If the filter is housed externally to the set, then the connections to the box should be screened, with a good quality plug and socket used. I would suggest either SO-293 sockets and PL-259 plugs or better still, use BNC connectors. You could switch the filter in and out, but you will have to ensure



**Broadcast band filter circuit, high pass above 2MHz**



Layout of Filter



Underside Copper Pads

**Component layout. One end L1/L3/C2 goes to ground, small pads of copper underneath connect other caps/L**

the use of a quality switch with high isolation, otherwise all the good work is wasted due to leakage and capacity coupling.

Filtering out the unwanted signals should enable you to try a bit of 160m DXing, New Zealand and Australia are very active these days on that band. I hope it helps your broadcast interference problems, happy hunting!

**COMPONENT CHART**

	L1	C1	L2	C2	L3	C3	L4	C4	LOAD
Fig.1	3.6	15	4.9	3.0	4.8	4.3			50R
Fig.2	3.6	10	4.9	2.6	4.8	4.3			100k
Fig.3	3.6	18	4.9	3.3	4.8	5.5	4.8	3	2 mH
Fig.4	3.6	15	4.9	2.2	4.8	4.0			2 mH

L in  $\mu$ H, C in nF

# BOOK REVIEW - WORLD RADIO TV HANDBOOK

Reviewed by the Editorial Staff

For many years, the World Radio TV Handbook has been giving up-to-date information on broadcasters worldwide. The broadcast scene is certainly changing, especially on HF in the current sunspot 'minimum'. Broadcasters are also very active on satellite, with both Radio and TV, and increasingly you'll find audio 'clips' from programs are now also available on the Internet.

The Handbook has kept up with this admirably, and in this year's edition a new graphical format has been included to show the time and frequency information, making it easier to find the details needed. It also provides Internet addresses for the stations included, along with other contact information including phone and fax numbers, senior

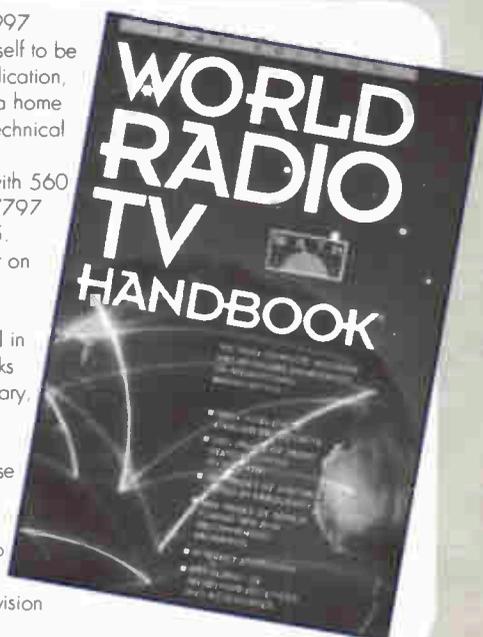
personnel etc.

Of course, the handbook contains a very comprehensive collection of up-to-date broadcast schedules, arranged by country, area, plus an 'hour-by-hour' section on international broadcasts in English on a country-by-country basis. There are reviews of broadcast receivers, together with a number of technical articles on subjects such as the solar cycle, what to expect in 1997, radio on the Internet, and a very useful receiver 'price table' where sets are compared with star ratings given for selectivity and dynamic range, plus prices in six different geographic areas including Europe. Also detailed are lists of clubs around the world for DXers, plus times of DX and media, and arts and culture programmes from a wide number of stations.

Once again, the 1997 handbook has shown itself to be a very authoritative publication, one that certainly finds a home each year in the HRT Technical Editor's shack!

143mm x 230mm with 560 pages, ISBN 0 8230 7797 7, it's priced at £19.95.

You'll find it available or on order from your local specialist radio store or bookshop. It's distributed in the UK by Windsor Books International, The Boundary, Wheatley Road, Garsingford, Oxford OX44 9JE, please mention Ham Radio Today magazine when enquiring. Our thanks go to Windsor Books International for the provision of the review copy.



# SOFTWARE OFFER

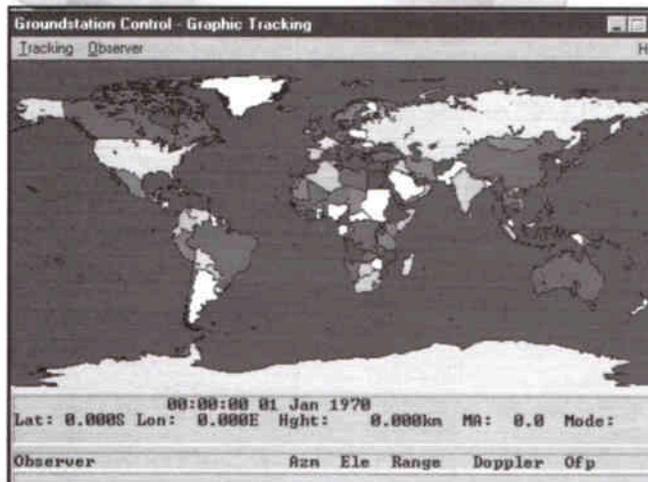
Another superb collection, exclusively for Ham Radio Today readers

**T**his month we've another bumper selection of the very latest Ham Radio PC software for you. Each selection is exclusive to Ham Radio Today readers, and is offered on a cost-only basis as a 'thank you' for buying the magazine.

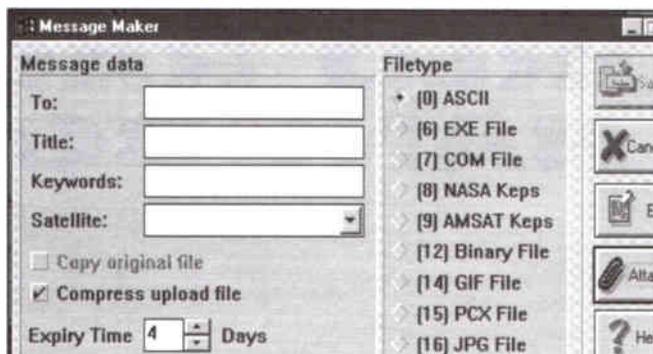
## UK VHF/UHF Frequency Updates and Listings

is a huge collection of text-based files containing frequency listings and updates for users throughout the UK (see this month's 'Scanners' column). As well as regional listings, i.e., London, Sheffield, Leicester etc., there are frequency compilation listings for many events such as several UK air shows, carnivals, rallies etc. In all, over 20 files packed with frequency listings together with their users including many airband listings. Note that all the information here is publicly available, but you'd probably need to spend a considerable amount of time in collating it!

**WiSP** is a complete Windows package for amateur satellite communication. Using the Low-Earth-Orbiting satellites you don't need large aerials, even a small 2m/70cm collinear is often enough, and with Phase 3D coming along soon this program is going to be very popular! There are full mail facilities including automated upload/download, taking the 'mystery' out of exchanging messages and files, including image files to and from the satellites. If you've never tried amateur satellites before, now's the time! Included on the disk are full help and information files, including details of the AMSAT organisation. The program is fully functional, however you're encouraged to register it with AMSAT-UK or if overseas your



**WiSP gives you total station control, including showing you when the satellites are in range and even controlling your station automatically**



**Message entry is made easy with WiSP**

local AMSAT organisation, if you find you like the program and regularly use it on the satellites, full information is in the extensive on-line 'help' files.

**RF Propagation Calculator** is a freeware Windows utility for calculating VHF/UHF line-of-sight and diffraction propagation distances, it even takes into account buildings and obstructions, good if you're in a 'less than ideal' VHF or UHF location. An excellent graphical format is used making the program easy to use with clear results.

Finally there's a large collection

of the very latest **Ham Radio Information Files** covering all sorts of topics ranging from buying a new rig, to curing telephone interference, to packet radio, to tips on increasing your CW proficiency, and much more. Plenty to keep you busy!

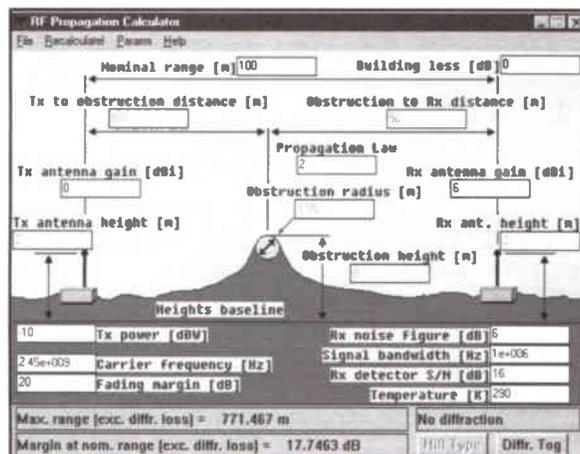
**All the above are contained on a single disk, as this month's collection.**

They are all fully functional freeware or shareware programs for amateur radio use, and are not 'demo' programs. Each program comes with full on-disk documentation, and each month's collection is provided with easy on-disk installation routines and an information sheet.

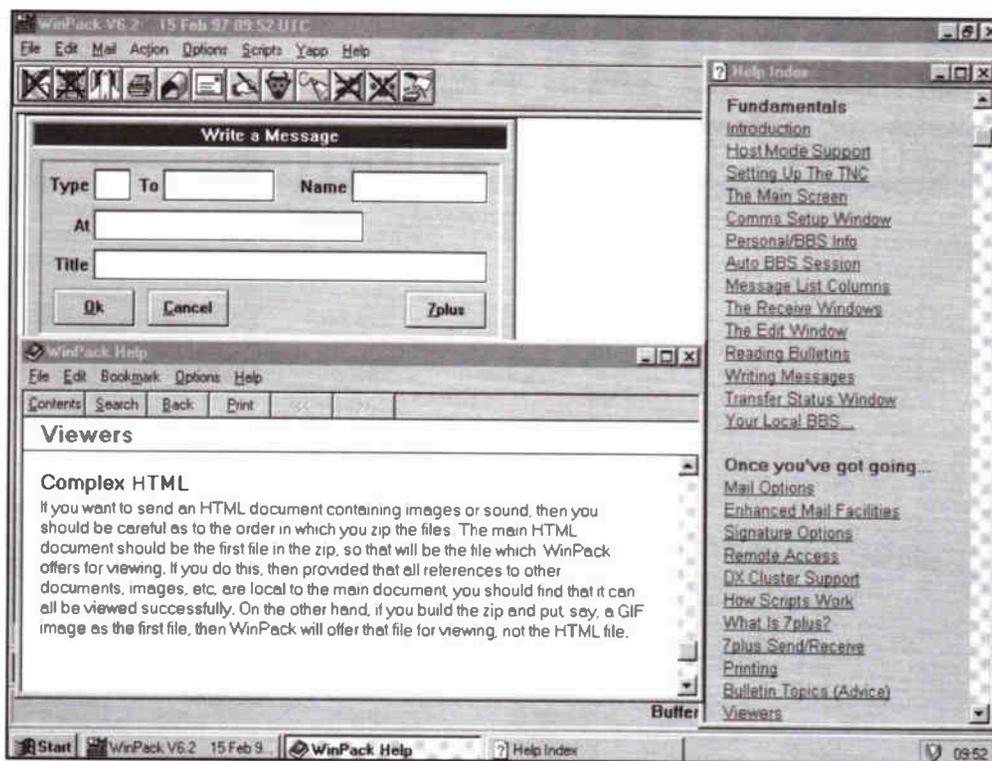
## FROM THIS MONTH'S COLUMNS

**Winpack V6.2 update plus over 40 'plug-in' files.**

Since Winpack V6.1 was released it's been incredibly popular, and an update has subsequently been released to upgrade it to version 6.2. Note that this is not a complete program, it's an update, which will unfortunately not fit onto the same disk as all the Winpack



**RF Propagation Calculator gives an easy-to-use graphical display**



The Winpack upgrade now also handles image and HTML files

V6.1 installation files, hence a separate disk is needed. However we've taken the opportunity to also collate over 40 'plug-in' file collections (over 2Mb worth, which are stored in self-extracting compressed form on the disk with an easy on-disk extraction routine to transfer/extract them to your hard disk). The plug-ins are additional programs written by independent authors, and don't normally come with the Winpack program. They include an outgoing message spelling checker complete with a full UK English dictionary file, message and file utilities such as a 'carbon' server, BBS

information finder, chat server, callbook utility, and plenty more to keep you busy!

### ORDERING

Ham Radio Today Software Collections are supplied on 1.44Mb PC disk format. Each of this month's disks, **HRT Vol.15 No.4** and the **WinPackVersion 6.2** disk, are priced at £2.00 per disk including UK p/p and VAT.

Readers outside the UK (including Eire) should instead send a Sterling (not foreign currency) bank draft/demand which can be drawn on an English bank, or cash (i.e. a UK £5.00 note for two disks), to

the value of £2.50 per disk. You send cash at your risk, use registered post if you wish added security. All UK orders are sent by standard post, those outside UK by airmail. These are offered as a service to readers and just cover costs, we believe it to be the cheapest postal service anywhere in the UK.

### HOW TO GET YOUR DISKS

Simply send a cheque or Postal Order (or as above for outside UK) payable to **S. LOREK**, together with your completed coupon to; Software

Offer, PO Box 400, Eastleigh SO53 4ZF England. If you don't wish to cut out the coupon, you can send your order on a photocopy or a plain piece of paper with the same details, but this **must be** accompanied by the **original** corner flash from this page as proof of readership. If you would like the added security of recorded delivery (UK only), include a fully completed recorded delivery form (available from your post office), add £1.00 to the total to cover the additional costs, and allow a few extra days for delivery.

**Important notes:** Please do not make your cheque or Postal Order payable to any other individual or any company (note that 'Mr. S. Lorek' is not acceptable), if you do, your order cannot be processed and will be 'held' awaiting an SAE from you. Other payment methods, such as foreign currency, unfortunately can't be accepted. Orders for this month's offer will be accepted up to 30th June 1997. Disks are sent by standard post at readers' own risk. Queries regarding supply of disks should be sent to the above address with an SAE for reply. Faulty disks will be freely replaced if returned with an SAE within 28 days of receipt. **Please do not contact Nexus or the Ham Radio Today Editorial staff with queries regarding these disks, they cannot help you.** Disks are usually placed in the post within 48 hours of the receipt of your order, but please allow up to 28 days for delivery.

### HAM RADIO TODAY SOFTWARE OFFER VOL 15 NO. 4

Please send me; Qty \_\_\_\_\_ of this month's disk (HRT Vol.15 No.4), Qty \_\_\_\_\_ of the latest WinPack V6.2 update plus 'plug-in' disk. Cheques/POs payable to S. Lorek (please not "Mr." nor any other individual or company). Disks at £2.00 per disk inclusive of disk and UK p/p, outside UK at £2.50 per disk inclusive of disk and airmail p/p. This month's offer is valid only until 30th June 1997. If you don't wish to cut this coupon, just use a separate piece of paper and include the corner flash from this article.

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# LETTERS

## £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 (paid during the month following publication). So write in or Email 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

publications only, for general readers queries, please see the 'Reader's Queries' section in the 'Who's Who and What's What in Ham Radio Today' section at the rear of this issue), or Email to [hrt@netlink.co.uk](mailto:hrt@netlink.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 magazine, and must include name and address plus daytime if held. **Reader's views published here are not necessarily those of the magazine.**

## LETTER OF THE MONTH

DEAR HRT,

These I was, thoroughly enjoying Vol. 15 No. 2 (why no date I wonder?), until I reached page 40, and there they were: fully paid up members of the BMAVC (the British Mooners and Winers Club) in full flood. Do these people get into amateur radio with no other intention than to just make other people's lives a misery every time they open a magazine, with their grunts and gibes about Morse code, the RSGB, pocket radio, having to buy a licence, having to sit an exam, contest, the weather, the price of tub, Novices, quipster, old timers, CB operators, and heaven only knows what other locations they may have. So in the wake of UKRS and BOFARS we now have ORACLE. I suppose with a name like that they must feel fairly confident of achieving their objectives.

Can it really be that people so well qualified, science graduates and chartered engineers, can get themselves into such a stew about a piddling little test that they could

probably sort out in a couple of months; that enabling them to get on with enjoying the hobby, and instead channel their abilities and drive into something more productive, the RAABC perhaps, or RSCG Council or Committee to enable them to bring about the changes they so fervently want, or fix that motor something outside the hobby? Clearly one of them did.

For my part I make no apology for being a quite enthusiastic member of the RSGB. In return for my subs, putting aside national and international representation and such farcical issues, if I choose, what I have found to be a very reliable Q&A Bureau over the years. I have available to me a wide range of first class books published by the RSGB, as well as those from other sources. How on earth such recent, and truly excellent examples as *The Radio Amateur's Guide to EMC*, *The Space Radio Handbook*, or the latest edition of the *Pocket Radio Primer*, by Dave Coombe and Marilyn Croft would have come into existence without the RSGB I find very hard to imagine. It's hard to believe that a purely commercial

British publisher would have taken them on. And the fact went on a bit of a jolly to Tok Aving goodness me. I've heard it said that radio amateurs are but a small slice of society as a whole, so is it really any surprise that when asked to vote on anything only a handful show up?

Morse code? I really don't know either way which way the cat jumps. My father often told me that most of life's fun comes from anticipation, not acquisition, and having taken that on board, I was able to quite enjoy studying for my PNE, and subsequently the Morse test, honest. I do keep reading that it's dead, gone, kaput, and out of date, but it's surely very strange that when I switch on a general coverage receiver I seem able to hear it all over the place. While composing this Epistle I'm listening to a CW transmission from British Radio on 8447.4Hz. It's been sailing away for ages. Because I had no choice but to take the Morse test for an HF ticket, I did it, so can now read the call sign, apart from the transmission. Armed with a copy of Fennell's, the SWL Conlist, or Kingfisher, I can identify it. Easy,

isn't it. But I couldn't do it twenty years ago. If I had my time over again I'd do it the right way round. Learn the Morse first for my SWLing, then do the PNE if the fancy took me. Among the RSGB's stock is a brilliant little book entitled *'Morse Code: The Essential Language'*, published by the ARRL. It's less than a fiver!

I've never written to a letter press before, quite enjoyed it. Very much looking forward to Mr. Lark's new RSGB book (this is the *EMV? Conversion Handbook*, by Chris Lark, G4HKL, available now from the RSGB! Eek!). Perhaps you might consider sending a complimentary copy to Mrs. Lark, try and put some amateur into her radio. She may not recall of course, but an unofficial experiment along the lines she suggests, was conducted in the early 80's, resulting in government action to stem the chaos. Many of the participants now hold Class A licences.

Roger Lee, GCE, C&G, Member RSGB, Member Silent Majority, G4JTK



## NOVICE ENCOURAGEMENT

DEAR HRT

I have just received Vol. 15 Issue No. 2 in today's post and I was quite surprised to read the article on Novice Radio Licensee drop-out. Though in a way I am not surprised, as the technical knowledge fed to the 'B' class licence holders is so narrow that it turns out operators that are too blinkered. So blinkered in fact, that the Novice has one thing over them, that is, 'practical application'. It is the practical knowledge that will leave many old 'B' class holders floundering in the fog of 'lack of Knowledge'.

Whoever thought up the Novice exam must be commended, for in time these Novices will go forward and gain 'B' and 'A' class licenses, knowing full well that they have a very good electronic grounding.

To encourage the Novice licensee, and for others to seek out and work Novice stations, the Wincanton Amateur Radio Club has formulated the 'Postcode Charity Challenge' (see Radio Today HRT Vol. 15 No. 3 - Ed). The Wincanton Club, though small, has done quite a lot to encourage the young and old Novice (for we

have both), to take part in Club events and given every encouragement. It took us three years, through no fault of our own, but we do have a 70cm repeater coming on-air this spring which will cover the area of South East Somerset, North Dorset and South West Wiltshire.

You might wonder why my original letter is written on 'Ex Canadian Radio Amateur Network' headed paper? Well that's another hat that I wear. At the end of World War II there were some 9,000 Canadians who decided to marry and settle down in Britain. Of course this original number has now dwindled and not all are radio amateurs, but there are enough of us who get together on air to chew the fat on a Thursday afternoon. Most of those who join in are now in their late 80's and 90's and can usually still operate with a degree of skill. One member though has to have a local friendly Ham come in and help as he has Parkinsons and Alzheimers, but Thursday afternoon is the highlight of the week for him.

Keep up the good work, Jim Hatch, G3OOL, ex VE2BEV and VE3CJ

## PROGRESSING FURTHER

DEAR HRT,

I have just read the letter of the month in Ham Radio Vol 15 No. 2 by Dr G. Brown also the one by Mr. A L Dick. To my way of thinking they say it all for the G1's G8's and G7's who wish to progress further into radio and onto the HF bands but are held back by the RSGB because they think if a person can't read or send Morse at 12 WPM they are not capable of being able to operate on HF. If that is so, what is the RAE needed for? Don't the powers that be know for every 100 people who pass the Morse, only 15 to 20 stay with it, the other 80% are glad to be rid of it. The RSGB say they work for all radio amateurs, so let's hear them doing something positively for the Class B's for a change then maybe the Radio Amateur hobby will begin to grow again.

Will anyone tell me why I need to know Morse to operate on HF? A test on HF operating would be more appropriate.

Roy Moss, G7UVO

As well as our post and fax facilities for receiving letters, you can Email your 'Letter' direct to; hrt@nlink.co.uk

## NOVICE RATIOS

DEAR HRT,

As an SWL for some 35+ years and a 'B' licence holder for 8 years, I would like to make the following comments.

I see from the Editorial of G8BYA (Vol. 15 Issue. 1) that the old 'Use it or lose it' flag is aloft again. Nothing is wrong with this statement, it is quite true, but as one who has spent many hours calling CQ on our supposedly busy NA crowded ham bands (with no takers), our numbers are spread far too thinly over the amateur spectrum for our own survival.

The fact that the Novice 'B' licence holders outnumber Novice 'A's' by about 10:1, must tell us something about the popularity of Morse as a whole. We have those who look down their noses at modern black box operators, but the ham gear of today is light years ahead of my first CR100.

Future commercial pressure for space on the radio spectrum, I have no doubt, will dictate the shape of amateur radio as a hobby in the future. The point I am trying to make is, if the powers that be in our hobby don't lighten up, soon it may be too late.

We have the old argument for and against the Morse test. Why do class B's have to pay the same licence fee as A's? Etc. etc. It is time for amateur radio as a hobby to get it's act together before it's too late.

A. McColl, G7BZU

## A DIFFERENT APPROACH?

DEAR HRT,

Once again the amateur press is full of letters about Morse testing, with some of the letters becoming very passionate and a little unreasonable. Dr George Brown G1CY's letter (HRT Vol. 15 No. 2) seems to imply that persons travelling overseas to represent the RSGB should do so at their own expense, and that the views of RSGB Members over 60 should be discounted. To try to calm things down a little, I have a comment and a suggestion, both of which I'm surprised not to have seen before.

Firstly the comment: Ever since before most of us were born, competence in Morse has been a requirement for transmission on the amateur bands below 30MHz. Everyone coming into the hobby has known about that, yet they still made the decision to spend their money and get involved! Of course, if they didn't know about the Morse requirement, then they've been poorly informed by those who taught them for the RAE, but it still isn't the fault of the RSGB, the RA, or anyone else in authority. How much sympathy would I receive if I complained that having spent a lot of money learning to drive, I still

wasn't allowed to do 100 MPH on public roads?

Now for the suggestion: Why not retain the current system, but add to it an option: For an A licence, pass at least one of the following in addition to the RAE: Morse test, or Advanced examination on data modes, or Advanced technical examination, or Test appropriate to voice modes - maybe a simple foreign language exam.

This way, people would tend to gravitate toward the test that interested them most: Those who intended to work data would take the datamodes test, being examined on things they'd

want to learn anyway: Morse fans, wanting to improve their Morse, would be happy to take the Morse test. I should add, for those who don't see the need for an advanced technical test - it was only when I studied for the American 'Extra' examination that I realised how much I didn't know!

Perhaps it's ironic that the eventual abolition of the Morse test worldwide, in bringing many more amateurs to the HF bands, would increase the need for power and bandwidth efficient modes, like Morse!

Paul Duell, G0TLG, AE4QC

# QRP CORNER

## Dick Pascoe G0BPS relates a sad story of a QRP Novice operator

The continuing explosion of the Internet has not yet apparently effected the QRP enthusiasts, in fact it appears to have increased their interest in the hobby. The *qrp1* group exchange information on a daily basis. This time last year we were struggling to get anyone on, but now we have several dozen from all over the world checking in on a regular basis.

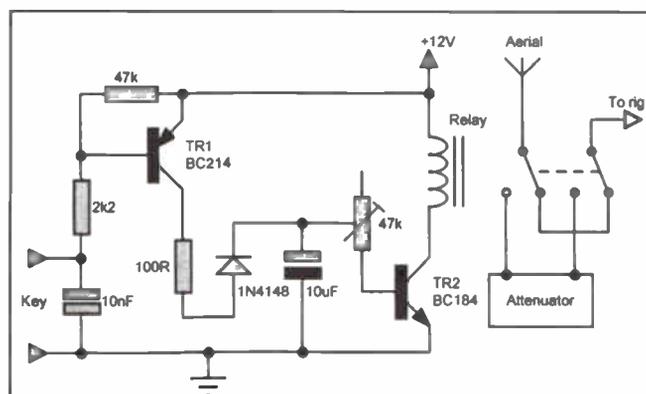
This type of group needs a mainstay. In the USA with their group it is the 'Rocket Scientist' Chuck Adams, over here we have Frank G3YCC. He keeps the group going with a regular input of news and views that he collects from many varied sources. (try <http://www.qrplclub.demon.co.uk> and <http://www.geocities.com/CapeC/anaver/5179> - note the lower and upper case).

Frank also runs a very well built set of world wide web pages (WWW). For the uninitiated, these are a set of pages that can be accessed by anyone with a web browser program. It reads much like a newspaper would, with links to many other WWW pages. Many items of interest are to be found on Frank's pages, including simple tips like "always cover the positive side of a sealed lead acid battery, this avoids problems if a metal object is dropped on it". He also has a very nice circuit for a simple HF MOSFET PA that should deliver up to five watts.

### EARS

Here's news of a QRP beacon and an experimental group. The South African group 'Experimental Amateur Radio Society' (EARS), has sent an invitation to all QRPers and SWLs to join the group. There are no membership fees, just postage costs to cover for their magazine (no details of this cost yet).

The purpose of EARS is to



Lower the power on your transmitted signal with this simple relay chonageover circuit

promote experimentation and analyses using reports from members worldwide. For further details contact EARS at PO Box 53090, Troyeville 2139, Johannesburg RSA. Email: [roger@inet.co.za](mailto:roger@inet.co.za)

The South African beacon is on 7.003MHz as ZS6FOR. This is apparently the only licensed beacon in that country on the band. The beacon will be giving out 25W increasing until it is reported. The transmitted signal will be VE VE DE ZS6FOR GRID, LOCATOR, QSL ADDRESS, (CODE WORD) BT (This code word will change on a weekly basis). Sent for about five minutes every 30 minutes each weekend between 1200 and 1600 UTC. Further information which arrived later, reports that the Tanzania People's Defence Force also uses this frequency as part of their digital net (another incursion into the amateur bands?).

### QRP FESTIVAL

A message from Les Jackson G4HZJ announces the 'Red Rose QRP Festival', which will be held on Sunday 1st June 1997, at the Formby Halls, Alder Street (off the High Street), Atherton, Manchester. The festival will be open to the public from 1100 until 1600, and

is organised by the West Manchester Radio Club to promote QRP and homebrew.

It is intended that this should be very much like the Rochdale event with few, if any, black boxes, computers etc.. Tables are available for £5 each. There will be a 'Bring and Buy' of course with refreshments (meat pie and mushy peas perhaps?). A huge car park is available with easy access from the motorways. A talk-in station is also available. For more details contact Les on 01942 870634. I am not certain yet, but I hope to be there and report back on this event.

To reinforce my previous comments about QRP not being solely limited to HF, I offer the following information about some 24GHz experiments. Petra and Charlie Suckling, G4KGC and G3WDG, carried out an experiment with Ari PA0EZ on 24GHz. Signal reports between the two were said to be 419 and 529 with a distance of 391km between them. Apparently just 5km short of a world record. They did try a further contact at 425km but were unable to establish contact, although Ari did hear a carrier from Petra and Charlie's equipment. The temperature at the time of the test was about nine degrees Centigrade, which had risen quickly

from zero.

I report this contact because of the typical QRP operators dedication. The equipment was mostly homebrew and the power levels were very QRP, with Petra and Charlie's being just 400mW and Ari's being 100mW. Thanks to Dave G0DJA and Simon G4M4PM for the information culled from the G-QRP Internet group.

### SSB QRP

SMOGKE has been very active on QRP SSB, with a total of 257 countries, using just five watts of SSB from his old Ten Tec 509. He took part in the 'All Asian SSB DX Contest', enjoying good conditions from SM to the far east. He reports 59+ signals from Greece causing him problems on the QRP SSB frequencies (we don't own them either). He reports acquiring an Icom 706 and hopes to work many 'G' stations about 14.280 - 14.280MHz.

Chris, G4LDS also has an interest in QRP SSB from his FT707, with a switchable attenuator between the driver stage and the PA. Living in a small flat causes problems, but he still manages to get a G3FGZ aerial in the loft. Only 27 countries confirmed, but all from a flat with an indoor aerial. You see, it can be done. The sunspot count increasing in 1998/9 should enable us to work a lot more on the bands up to 10m.

### TUNDRA TELEGRAPH

News of a new QRP club formed recently in Alaska. I sent for the information and was grateful for a reply by return by Email. I was also welcomed as member number 111 (that should be great on-air, better than my G-QRP club number 2559 where it is always taken as the signal report).

Their newsletter, the 'Tundra Telegraph', was sent in ASCII

format so I was able to read it with the PC's Notebook program. Many of the early members were of course from the northern part of the US continent, but there were also a few from overseas. Their aim is to get more QRP activity from Alaska. Details of their 'round table' nets showed that they can be found on Wednesdays on 80m; 3.725MHz at 0615 UTC, or for listeners in the UK on 40m; 7.125MHz at 0630 UTC. On Sundays at the same time and frequencies.

If you would like more information on the Alaska QRP club then check out their www pages at <http://www2.polarnet.com/~akqr> p, or Email Bruce KL7JAF on: [akqr@polarnet.com](mailto:akqr@polarnet.com) For those without Email facilities, I can send a request for you if you drop me a line.

### NOVICE GIVES UP

One of my recent disappointments was when a Novice I knew decided to call it a day and sell all his equipment. He

was elderly and although he had spent time doing the course and getting his Novice 'A' licence, he found that five to six words per minute were his maximum when sending, he could receive up to ten words per minute though. Many, many times he would go on the air, put out a call and get an answer back at fifteen or more words per minute. Very often the other operator wanted the contact, they wanted the UK call for their logs, but could not understand the need to slow down.

I am sure that, even now after several years of the Novice licence, many non-UK amateurs still think that we all have passed a twelve words per minute test. If only courtesy would prevail and all operators reply at the speed of the caller. Even with my modest 15WPM I still get answered by much higher speed stations. Remember 'QRS' means slow down please.

Another question, this time about power levels. I am sure that all readers are aware of the 5W

output limit for QRP awards (5W carrier, 10W PEP) and often this is not obtainable with modern rigs. Yes, we could use the negative supply on the ALC via the accessories socket on many rigs, but this is not always an option. The easiest way to lower the transmitted signal is to attenuate it some way. Unfortunately, by fitting an attenuator in line after the rig, the receive signal will also be attenuated. One way to overcome this is to fit a switch, either a physical switch, or a relay controlled by a simple changeover circuit.

The circuit shown here is one way that this could be done. When the key is depressed, the relay is thrown over and the signal sent through the attenuator. When the key is released, the receive path is remade bypassing the attenuator. Almost any transistors may be used providing they are a PNP transistor for TR1 and an NPN transistor for TR2. The switching time is controlled by VR1. It can be built 'ugly style' or on Veroboard. There

should be no problems, except for checking the contacts on the relay to ensure you get them the right way round.

### TRIVIA

Questions and ideas floating around recently included a question on what was a "hand key"? Answers included "something to wipe your nose on" and "an up/down switch".

Another idea which I had heard before but forgotten, was for those with speakers set into the top of their rigs or receivers. The use of a margarine or butter tub, with a side cut away fully and laid over the speaker, will reflect the audio to the front. The author insists that there is no difference between using margarine or butter for this. I beg to differ, surely butter is much better!

That's it for this month, news, views and comments to me via the Editor, via GB7RMS, Email: [Dick@kanga.demon.co.uk](mailto:Dick@kanga.demon.co.uk), or snail mail to; Seaview House, Crete Road East Folkestone, CT18 7EG.

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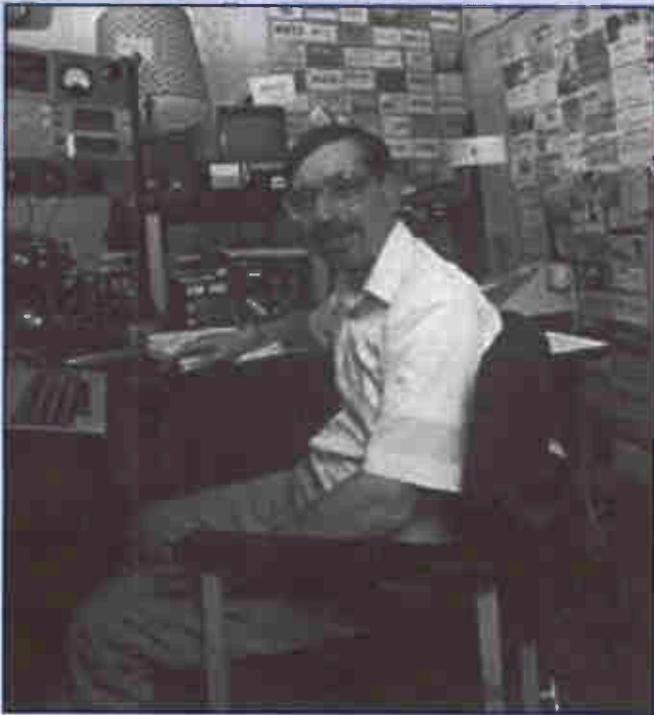
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# VHF/UHF MESSAGE

Geoff Brown GJ4ICD reports on superb conditions and suggests trying new propagation modes

**EME news from Allen K2UYH:** Here's a few interesting reports of what is happening on the EME scene.



EME operator Allen K2UYH

News from CT1DMK, Luis who writes on his 23cm activity; "I dedicated most of my free time to completing my 23cm PA. Actually completing one half of the PA, which in the near future will consist of two GI7b coaxial cavities in parallel for a bit more power. In December I was active with 500W, with good results. I could hear my echoes peaking 12dB above noise. SSB echoes were good, but not all the time".

On 14th December, Luis

worked ZS6AXT (O/O), W2UHI (559/439) and on SSB (44/41) - "my first QSO on SSB with a similar sized station". On 15th December,

IK3COJ (O/O), ZS6AXT (539/529), N21QU (54/43) on SSB, HB9BHU (549/549) #, KB2AH (559/559) and SSB (55/52) and W2UHI (559/549). On 20th/21st December, AA6WI (559/449), K2DH (555/O) - finally got the call correctly (some hum problem on K2DH's TX), AA6WI (559/449), K2DH (555/529), HB9SV (449/549), ZS6AXT, (449/559), G3LTF (449/559), VE6TA (O/O), PA3CSG (559/549), LA8LF

(559/559), WB5LUA (559/449), W2UHI (559/539), N21QU (55/45) on SSB, K2UYH (54/44) on SSB, F1ANH (539/549), ZS6AXT (539/559), F1ANH (52/43) on SSB, W2UHI (539/539), LA8LF (549/539) and VE3BGN (O/O).

On Christmas day at 0115 (also local time), he interrupted the traditional family festivities to show his father (CT1RO, an old timer) some EME echoes on 1296MHz, (an extremely high frequency in his opinion). We had the luck to find W2UHI for a QSO and we exchanged HO! HO! HO! for reports in CW and SSB.

Steve K1FO found 70cm conditions excellent throughout the month of December. Activity was OK but not great and he was disappointed not to work any initials. Stations worked in December were on 7th Dec WA8WZG, on 14th Dec W7QX (new call for W9QXP) and N21QU, on 15th Dec NU7Z, SM2CEW and DL8OBU, on 16th Dec KAORYT and JA5OVU, on 18th Dec KAORYT, on 19th Dec W8MQW and NC11, and on 20th Dec W8MQW and RA3LE.

Steve's elevation actuator was frozen up and stuck at 42 degrees elevation on the Friday afternoon. He did work RA3LE at 2240 as the moon passed through 42 degrees on the way up. On the moon's way down (around 0230 to 0300) he did not work anyone. He braved the cold on Saturday afternoon to put electric heat tape on the actuator, but found that he didn't need it, as it worked fine

on Saturday night even when the temperature dropped below 20 deg. F.

On 21st Dec he added LX1DB, YO2IS, G3SEK and G3HUL, on 22nd Dec ON4KNG, K5JL, W7CI, DF3RU, 15MPK - a very strong signal (589), UT7VF and K4QI, on 23rd Dec KORZ, KB8ZW, DK3FB and KL7HFQ, on 24th Dec W7QX, on 28th Dec WA4NJP, JA3IAF, JA5OVU, JO3RNL and JS3SIM, and on 29th Dec K5JL, KORZ, W7QX and JA9BOH.

Steve has increased his 70cm initial count by one. He originally worked JH1EFA, several years ago, in grid PM95. Shigeru was worked again in the 1996 EME contest located now in PM96. 70cm EME totals for K1FO are 50 initials, 49 states and 75 DXCC.

## 144MHZ OPENING VIA ES

Another winter surprise here, when 2m opened from Connecticut to Florida on the 11th January. Ron WZ1V reports working the following: W4CHA (E188), KD4ZAT (E199), WA4LOX (E187), WB4JEM (E189), with most signals being 59. WB4JEM also contacted KB2PLL at around 2211z.

## 50MHZ RANDOM MS

There are still a few weeks to go before the main sporadic E season starts. Readers may be interested, that it is worth trying other modes for

communications. Random meteor scatter is one such method used, whereby you can increase your country score, especially if the country in question is too near for ES, or too far for tropo.

One such station that has had success is Gavin GMOWDD in IO85. Gavin runs 50W to a three element beam, and was most surprised to find how easy and simple it really is.

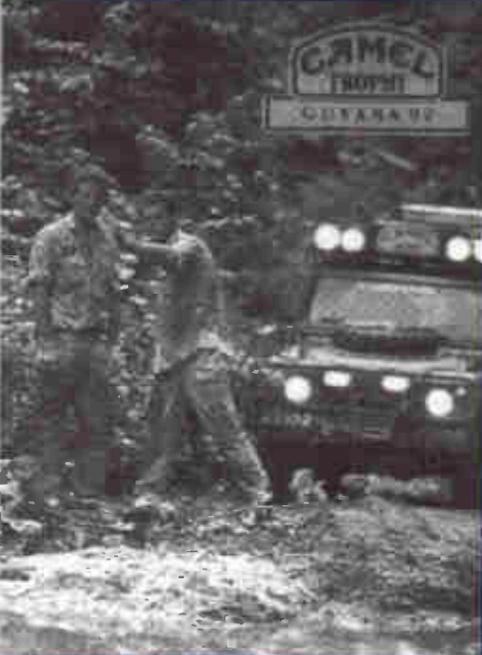
Using standard IARU Region 1 techniques, Gavin completed an SSB sked with myself in just over 15 minutes. He was astonished at the 45 second burst in mid-January, peaking S9+. Gavin's words were "This method is certainly under-used". Many operators think that only major showers produce results, however on 50MHz things are much easier, and, if you

# G4SMC/8R1

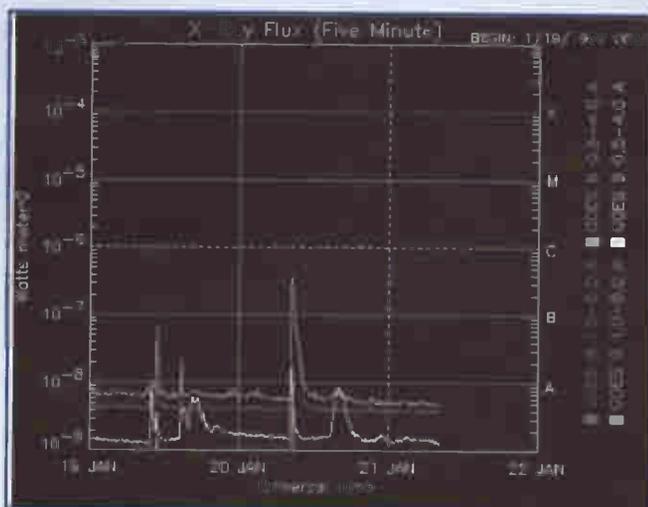
THE CLUB STATION OF  
SOUTH MIDLAND  
COMMUNICATIONS LTD  
ENGLAND

1992





G4SMC/8R1 which Richard G4CVI will be remembered by



X-ray chart showing the data for Jan 20th and the ES opening the same day.

monitor the 48.250MHz TV carriers you will soon learn that there's an awful lot of random activity. Have a go and let me know your results. Better still, Email me for a sked!

## JANUARY 20TH, A DAY TO REMEMBER!

Well what a day to remember for propagation in the winter! Europe had been watching all the openings the USA had been having, and at last it was our turn. The X-ray flux showed high levels on the 19th and 20th, as mentioned

before, this may be one of the causes of ES.

At 1800z the reported MUF in Germany was 88MHz, with 50MHz sounding like 20 metres! Most countries in Europe caught the openings, with even HB0LL getting in on the act. This is what was logged at my QTH; LA, SM, OH, SP, DL, OK, OE, HB9, HBO, GM, EA, CT, I, and PAO. Some very short skip was noticed with stations in Germany being S9+.

If you look at the X-ray chart for the 19th/20th, it is interesting to compare the opening and the large increases in activity.

## UK MICROWAVE RECORD

I speak with Bob G3GNR quite often on the 80m microwave net (0800 to 0900z most days on 3.625MHz). Bob reports that on the 14th of January at 2330z, he contacted SM6ESG in JO67CC on 10.3681GHz. The distance worked was 1275km, which is believed to be a new UK distance record for 10GHz tropo. Congratulations Bob!

## G4CVI

It is with sad news that I have to report the death of Richard Diamond G4CVI. Richard was an avid VHF/UHF operator. During past years he gave many a new country on 50MHz and 144MHz EME, whilst being part of the Camel Trophy Communications team in 8R1, 9M6, V31 and others. Richard also installed 50MHz beacons in V31 and 9M6. Our condolences go to all his family.

## BEACON AND GENERAL NEWS

George JY9QJ is interested in coming on 50MHz. JY4MB has offered George a 50MHz beam (probably the one we left in 1994). George has also asked about the beacon,

although it looks like JY4MB had forgotten about it, and May 97 has now been suggested as a date to get it on the air.

Eric F5JJK will go to TT8 in March, with his HF/50MHz radio and 5 element aerial, Eric is looking for more power.

The YBOZZ beacon which was prepared by Rex, VK8RH, was installed on 50.042MHz at the Jakarta Repeater site in OI33, with a ground plane at 20m high last month according to YCOUVO.

The 5W1WS beacon prepared by ZL2TPY is expected to be installed by Phil. 5W1AU, and operational on 50.050MHz in AH46, with 10W and a 5 element aerial.

Mick K1IKN advises the following; K1IKN on 50.061MHz, 25W to a vertical. GB3IOJ has been replaced with a new setup. It has better FSK and the frequency is spot on at 50.065MHz. The beacon on 50.070MHz, formerly identified as W2CAP/B, is now identified as W1RA/B, which is Steve's new callsign.

News and views please, along with any photos you may like to send, to: Geoff Brown, TV Shop, Belmont Rd, St Helier, Jersey, Channel Islands or phone/fax 01534 877067. or Email to [equinox@itl.net](mailto:equinox@itl.net)

# DATA CONNECTION

The latest WinPack upgrade, some useful 'plug-ins', and BBS/node news are covered by our resident datacomms SysOp

Just when you thought WinPack version 6.10 was the best ever, software author Roger G4IDE has done it again, with an update to provide even more facilities, including support for 'viewers' such as HTML as used for Internet web browsing. The possibilities are now even greater, with the optional addition of speech files, moving images, and so on in your packet messages. All we need are the required high-speed packet links!

Roger says it's an "experimental/development" update, and is designed to be used by people who have got WinPack V6.10 working totally successfully and who want to try something new. It's not for people who are having problems with V6.10! Some of the changes are new features not only to WinPack, but to

AX25 packet in general, the major new features being;

**1;** Support for Viewers for messages and for 7-plus files.

**2;** An extra program, WinPscape, which allows you to use Netscape interactively on AX25 packet.

**3;** Host mode support for TF2.7b and WA8DED.

**4;** Quick message reply with auto-quote

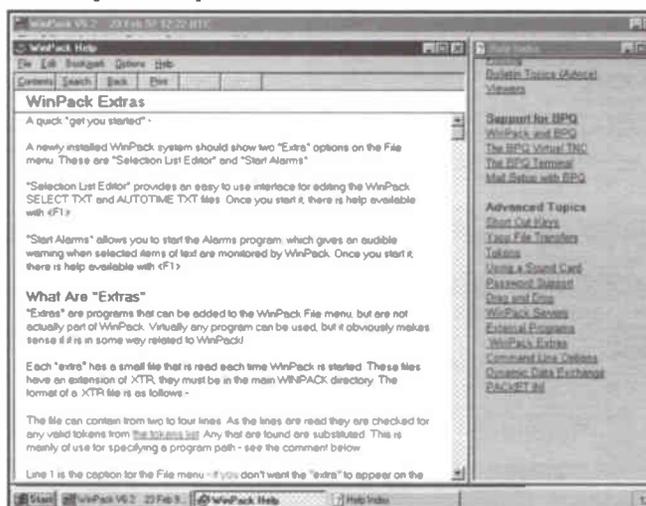
**5;** Support added for using WinZip instead of PKZIP/PKUNZIP.

**6;** The "Mail only this session?" prompt can be disabled from the "Mail", "Mail Options" form.

**7;** A change made to SPEECH.EXE to try and stop it taking the focus from other applications.

**8;** MD2 Password support files included within the program directories.

There are many other



'Plug-in' extras for WinPack can be very useful

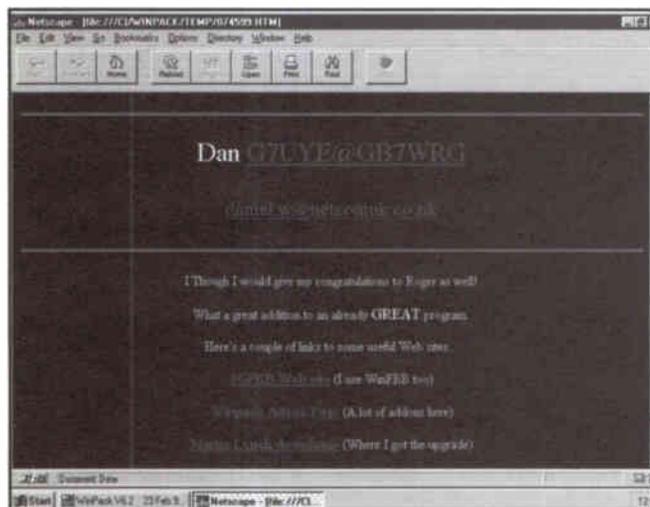
improvements (Roger lists 32 in total), and no doubt if you've been active on packet you may already have seen others using this update. The update has been issued purely as an update file, and not as a new V6.20 program, so at the time of writing you'll need V6.10 installed to use it. If you'd like a copy of the update on disk (together with rather a lot more for WinPack - see below), I've arranged to have this made available as a service to readers from the Ham Radio Today software service - see the 'Software Offer' section elsewhere in this magazine for ordering information. As usual, if a later version becomes available by the time this appears in print, this will be included.

Incidentally, if you have problems in contacting Roger G4IDE via packet, his local BBS has recently closed, but

you can instead send mail to his G8 callsign, G8MZX @ GB7SKG.

## WINPACK 'PLUG-INS'

As well as the 'core' program, a large number of software writers, both amateur and professional, have produced 'programs that can be used as 'plug-ins' for WinPack. These include news and information servers, file utilities, and routines where you can run external programs from WinPack. One very useful facility is WinPack's support for such external programs, and after many months I've finally got round to using the SPEL300E automatic spelling checker together with the UKENG dictionary file in an attempt to 'clean up' my



WinPack V6.2 now offers HTML facilities, here's a recent packet message received off-air using this format

outgoing mail message replies! Besides these, I've also collated over 30 more 'plug-in' program collections for WinPack, if you'd like a copy of all these on disk together with the spell checker and dictionary, I've added all these to the WinPack V6.2 upgrade disk available this month from the Ham Radio Today software service.

## SUNPAC NEWS

SUNPAC, the Southern Packet Radio Users Network group, tell me that following many problems with the computer at the GB7IW node system on Chillerton Down on the Isle of Wight, an upgraded PC was prepared and has now been installed. At the same time, the parameters were changed to bring it in-line with SUNPAC and DCC recommendations by removing all nodes broadcasts and internode linking on user access channels. This may mean some users will experience the error message of 'a port number is required' when trying to utilise a connection sequence that worked previously, such as connecting to a DX packet cluster via the 2m port (e.g. you'll need to specify port 2 to connect to the local GB7SMC cluster). Also, to connect to the GB7IOW BBS, until the restoration of the 4m link is completed you should use 'C 3 BBSIOW-1' to prevent a 'roundabout route'.

Recently 'on air' in the SUNPAC area is the GB7SUN BBS, located in Portsmouth. GB7SUN's user access ports are 144.550 and 432.675MHz, and there are plans for a 50.650MHz port later in the year.

At the GB7RS/GB7SIG BBS and node at RSARS Blandford in Dorset, there will be some changes taking place on 1st April. The plan is that Sandy G7MZR will be the SysOp of the BBS operating AX25 and TCP/IP facilities on VHF/UHF frequencies, as part of the NTS BBS system. Jim G3WGM will still be

operating the HF (AMTOR etc.) BBS, but under a separate callsign. At present it isn't certain which facility will be GB7SIG and which will become GB7RS, you'll need to see what happens! The RSARS team have also planned for a new 439MHz link frequency, which will provide a new 9k6 backbone across to the east, to become operational later in the year.

The SUNPAC committee plan to have a stand at the Aldershot and RNARS Collingwood rallies, both this June, and in August at the Hamfest FRARS rally. If you're visiting these, then I'm told you'll be made most welcome at the SUNPAC stand. They'll have plenty of information leaflets and node/BBS details available for you, and they may even twist your arm in becoming a member of the group! You can get further details on SUNPAC from their Secretary John G8OQN @ GB7SUN. SUNPAC is a non-profit making organisation, dedicated to the improvement and development of the packet network in Hampshire, Dorset and South Wiltshire.

## DCC MEMBERSHIP VACANCY

The RSGB's DCC Chairman, Paul G0MHD, says that it is with regret that he has accepted the resignation of Mike G0OPC as the Secretary of the DCC. Mike has worked very hard for the good of the network over the last few months, his work is valued by the DCC and they wish him all the best for the future. However, as a result of the resignation, there is now a vacancy on the DCC for a Secretary, with Ian GORDI having 'stepped in' to help out at the moment. If you are interested, are a full member of the RSGB, and have held a secretarial position in a local club or group in the past, the DCC say they would like to hear from you! You can contact Paul via packet with a message to G0MHD@GB7MH D.#38.GBR.EU or Email to paul@g0mhd.demon.co.uk.

## GB7TW NOW OPERATIONAL

GB7TW in Newcastle upon Tyne is now operational, serving the Tyne and Wear area, the system being run by Ernie, G3ZNX. You'll find it on the following frequencies; 70.3125MHz; 1200 Baud mail-link GB7ZXN - GB7MSF (Newcastle Upon Tyne), 430.650 MHz; possible direct DX Cluster link GB7TDX - GB7ZXN 439.875 MHz; backup mail-link, and 1299.725 MHz; 2400 baud mail-link to RHB18 (Robin Hoods Bay). You can get further details direct from Ernie G3ZNX @ GB7ZXN.#18.GBR.EU

## TU5EX FACTOR GATEWAY ON AIR

Didier TU5EX has placed a cross-mode gateway in operation on 20m. The TU5EX gateway is now operational 24hrs a day, on 14.072MHz (mark), so why not give it a try? Alternatively you can get more information from Didier via packet with a message to TU5EX@TU5EX.CIV.AF

## EMAIL 'LOOKUP' AVAILABLE FOR FBB BBSS

I'm informed by Deni WB0TAX that a system for running an Email address 'lookup' service on FBB type packet bulletin board systems bulletin program is now available. The software allows entry and lookup of the Email addresses of ham radio operators around the world, and although the database is not large yet, it is growing very rapidly. If you're running an FBB system, you can download the files EMAIL1.ZIP (the program itself) and EMAILDB.ZIP (the Email database) from either <http://www.dwatt.com/nk31.html> or by anonymous ftp from dwatt.coma. For more information via packet you can contact Deni with a message to WB0TAX @WB0TAX.#SHRV.LA.USA.N

OAM or Email  
deni@dwatt.com

## G7JJF PACKET SOFTWARE REGISTRATIONS

I've enthusiastically featured the packet radio software by Jon G7JJF in these pages before, and many copies have been distributed and in use in the UK, for standard TNCs, for BPQ node systems, and for use with a BayCom modem. I even know one commercial use of registered versions of Jon's program for vital international aid and relief work on HF data systems.

News is that G7JJF software can now be registered with just a telephone call. Venus Electronics have been appointed as the agent for Jon's software, and registration access codes can be obtained by phone using your credit card, the registration costing just £10.00. Venus Electronics tell me they will also be including a registered copy of the G7JJF terminal program either DOS or Windows with their popular DigiPack Packet Modems. For registration or more details contact Roland Brade at Venus on Tel. 01252 837860, Fax. 01252 837860, or Email [sales@venuswww.demon.co.uk](mailto:sales@venuswww.demon.co.uk), please mention Ham Radio Today magazine when enquiring (no, we don't get a 'cut'!).

## CTRL-Z, END OF MESSAGE

I'm very happy to cover topics of interest to readers in this column, so please do get in touch and let me know what your interests are. Also, if your local data group are 'showing the way' then don't be shy, let me know and I'll be pleased to publicise it - you might even get a few more people interested who aren't currently on data.

You can contact me via the Ham Radio Today Editorial mail, Email, fax and voicebank systems, or by packet with a message to G4HCL @ GB7XJZ.#48.GBR.EU

# HF HAPPENINGS

Don Field G3XTT shows how 160m can offer interesting possibilities, and discusses the relative costs of HF gear

**T**he VKOIR operation is over, and it's time to take stock. This operation was unique in many ways, one of which was the Internet Reflector set up especially in connection with the operation, which quickly attracted over 1500 subscribers. Predictably some were complaining, within hours of the operation starting, that their favourite band(s) hadn't been activated, that the operators didn't know what they were doing, and so on. However, the general opinion seems to have been that this operation was a great success. Certainly, within the first 24 hours amateurs in the UK had been able to work them on 17, 20, 30, 40 and 160 metres, which can't be bad! And there were still another nine days to go, for those still straining at the leash.

In the end they broke a number of records, with over 80,000 contacts in all, a new DXpedition record. On 160 metres alone they made 1241 contacts, which is some going given that they were thousands of miles from even the nearest centres of population. UK stations were able to work them on all HF bands except 10 metres which, unfortunately, never opened to that part of the world.

Just to put their 80,000 contacts into perspective, see the list of numbers of contacts made by major expeditions in recent years.

But, aside from sheer statistics, I suppose what will be remembered most about the operation is the sense of participation through being able to read daily bulletins on PacketCluster and the Internet (written by John ON4UN who was in daily touch with the team, over 80 of these were put out) and to view photographs (on the World Wide Web) whilst the expedition was still in progress. Once some problems with the PACSAT (amateur satellite) system were overcome, the logs were uploaded daily to the Internet and it was possible to check that you were in the log OK, and avoid making duplicate contacts.

By running up to six well-equipped stations simultaneously, the group were able to exploit all band openings and to work through the pile-ups right down to the weakest callers. I remember listening on one occasion when they had three stations simultaneously on 20 metres, on CVV, RTTY and SSB! The daily bulletins included many messages from happy callers, with stories such as having worked VKOIR with an indoor dipole, with powers as low as 1W, and so on. The sense of elation at these achievements was tangible, and must have given the VKOIR team a real sense that what they were doing was appreciated.

Of course, there were the usual problems of deliberate interference,

bad operating, and so on. But there were plenty of good signs, such as the way European callers stood by when requested, during the brief daily openings to the East Coast of the US.

In due course there will be a book and a professionally produced video of the operation. They should be fascinating! The group were unable to operate from the French Antarctic Islands (Kerguelen and Amsterdam Islands) on this occasion, so maybe they will make these the target of a future operation, and we can enjoy a similar experience all over again. Let's hope so. In the meantime, very

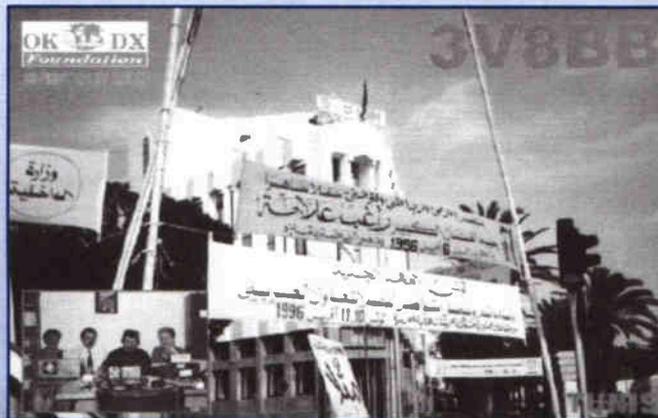
many congratulations to all who worked to make VKOIR such a success.

## 160 METRE DX

As well as VKOIR, there was plenty of other rare DX on 160 metres during January and early February, so much so that at times the band sounded more like 20 metres! To give some idea, my own log includes VG9QM (Chagos Island), XV7SW (Vietnam), a couple of VK3 stations (Australia, zone 30), 9X4VVV (Rwanda), PJ9JT (Curacao), VP2EV (Anguilla),



Two of the attractive QSL cards sent out by Tunisian club station 3V8BB



### Numbers of contacts made by major expeditions in recent years

0	VKOIR	Heard Island	Jan 1997	80673 QSOs
1	4J1FS	M-V Island	May 1992	74495 QSOs
2	ZA1A	Albania	Oct 1991	69500 QSOs
3	3Y0PI	Peter I. Is.	Feb 1994	60000 QSOs
4	AH3C/KH5J	Jarvis	Apr 1990	55000 QSOs
5	AH1A	Howland	Jan 1994	52000 QSOs
6	FOOCI	Clipperton	Mar 1992	50100 QSOs
7	XYORR	Near Burma	Aug 1991	50000 QSOs
8	3Y5X	Bouvet	Jan 1990	49000 QSOs
9	XF4L	Revilla Gigedo	Apr 1989	47943 QSOs
10	3D2AM	Conway Reef	May 1990	45000 QSOs

V5/ZS6YG (Namibia), ZS6EZ (South Africa), S21XX (Bangladesh), 6VV6JX (Senegal) and 7X2RO (Algeria). In fact, at one stage I worked all continents in the course of less than 24 hours!

The comment was made to me the other day that perceptions about 160 metre propagation have been changed radically in the last year, as a result of some well equipped expeditions which have shown what is possible. Examples include CEOZ (Juan Fernandez), VK9CR and VK9XY (Cocos and Christmas Islands), XZ1N (Myanmar) and the recent VK0IR and S21XX operations. Propagation paths which had been thought to be very difficult have been proven to be much more reliable than thought, and previous difficulties appear largely to have been because earlier operations have used low power and/or much less effective aeriels.

The VK9 and S2 operations, by German amateurs, are using a so-called Titanex vertical aerial which apparently is about 18m high, but made of a special alloy so that it is light and can be erected easily in field conditions. The VK0IR operation used a Battle Creek Special aerial (a 17m high, very substantial trapped vertical made by low band enthusiasts in Battle Creek, Michigan, not for commercial sale but for loan to bona fide expeditions), as well as a four-square array using the newly-developed Gladiator single-band vertical aeriels from the US (the 160m version is only 7.6m high).

These developments are beneficial to all of us, but especially those of us who have more modest stations, as they bring rare DX much more within our reach. If the XZ1N and VK0IR operations, for example, had put out a more 'typical' signal on 160 metres they may have expected to make a couple of hundred contacts on the band at the most. In practice, both operations made well over 1000 contacts on 160 metres, digging much deeper into the demand. To a large extent I suppose it is the downturn in high band conditions which has promoted this focus on low band station design. In a year or two it will be 15 and 10 metre aerial systems which are once again the focus of our attention.

## OTHER DX

On the higher bands there were some surprises. DJ6SI showed up as

TN6X from the Congo, and PA3CXC showed up /STO from Southern Sudan as just two examples. The Brazilian DXpedition to St. Peter and Paul Rocks also came off OK. Mind you, we have some rare DX on our own doorstep, if you're contemplating an expedition. Apparently, in a Japanese poll Jersey came out as the "Most Wanted European Country" on 80 metres, so pack your bags and an 80 metre dipole and become rare DX!

For the future, *DX News Sheet* reports that Peter PDOALB will be active from East Malaysia as 9M8CC from 19th April until 6th June. He will operate on SSB, AMTOR and RTTY, 80 to 10 metres, especially at 1100 on 15m, 1200 on 20m, and 0000 on 80m looking for Europe. QSL to his home call.

## 70 YEARS OF OUR HF BANDS

Prior to 1927 the allocation of spectrum (which, in those days, meant what we would now regard as HF spectrum) was on a national basis, with no international co-ordination. For example, US amateurs had slots from 7000 to 8000kHz, and from 14000 to 16000kHz, while Australian amateurs had a slot around 9000kHz. This made intercontinental contacts something of a challenge!

What is more, as it became obvious that, contrary to earlier expectations, the short waves were actually useful for long-distance communication, the professional users increasingly cast their eyes on amateur allocations.

An International Convention, the forerunner of subsequent World Administrative Radio Conferences, was convened in Washington in 1927 to sort out allocations on an international basis. As W6SAI tells the story in *CQ Magazine* (May 1994), the US representatives were strongly in support of amateur radio, while many other countries (including the UK) were suspicious of amateur radio and were determined to stamp

it out.

As in all these types of events, there were compromises, and lots of behind-the-scenes lobbying. But in the end, amateurs did well out of the Convention, with harmonically related allocations throughout the HF spectrum.

These allocations have, to a large extent, stood the test of time. There are regional variations, and some of the above allocations have since been trimmed slightly. But in return, the 15 metre band was allocated post-war, and the 30, 17 and 12 metre bands were allocated at the 1979 WARC. Many of the authorities who were sceptical about amateurs back in 1927 have, I'm delighted to say, come to recognise the important role that amateurs can play in providing a pool of trained communicators (invaluable during World War II), in providing emergency communications, in undertaking experimental work (amateurs, for example, pioneered a number of advances such as packet radio and low-earth-orbit satellites) and in providing a starting route into electronics as a career.

But 70 years on, the HF bands continue to have a significant role to play in both amateur and professional communications, largely due to technical advances.

Just as our HF bands were beginning to be unusable due to heterodyne interference between adjacent carriers, for example, single-sideband suppressed-carrier transmission came along and the problem was largely eradicated. Now DSP techniques are allowing error-free data transmission over marginal propagation paths with extremely modest power levels. Over the next few years we, as amateurs, can look forward once again to the delights of another sunspot peak and worldwide communication on the higher HF bands.

On a related topic, G3RZP argues cogently in the latest *Chiltern DX Club Newsletter* that amateurs in the UK receive a great deal of

support from the RA, much more so than, for example, US amateurs and the FCC. Peter believes this is, at least partly, because we continue to pay licence fees, which help to support RA resource for matters such as tracing intruders on the amateur bands and warning them off. US amateurs argued some years ago that charging them for their licenses was unconstitutional, and the licence fee was dropped. One result, however, has been that the FCC is not inclined to spend money on matters related to amateur radio, which has a number of detrimental impacts on the amateur service.

## COST OF HF GEAR

Finally, as a footnote to my remarks last month about equipment for split-frequency operation, I still see comments from time to time to the effect that HF amateur radio is becoming too expensive, and that this puts off newcomers. I was reflecting the other day that my first 'modern' transceiver, bought soon after I started paid employment, was an FT-101 Mk1, bought secondhand for £200 at a time when my salary as a fresh graduate was £2000 p.a. So a tenth of my salary for what, by current standards, would be regarded as very indifferent radio. The receiver was dreadful, with bipolar transistors in the front end that overloaded at the slightest provocation. To work 'split' I needed a separate receiver, as there was only one VFO. Of course, it only had six bands and certainly didn't offer FM or data mode capabilities.

Nowadays an equivalent salary would be £15,000 or so, and a tenth of that would buy you a very fine secondhand radio, or even a pretty good brand new one, with far more facilities, a computer interface, and an excellent general coverage all-mode receiver. Older generations of rig, still more than adequate, can be bought for a lot less. I have long considered that the real expense of a good HF station is the estate needed to give you enough space for some really effective aeriels. Several acres on a cliff-top somewhere sounds ideal. Oh well, I can but dream....

Until next time, good DX and 73. Please send your HF related news, views and photos to Don at 105 Shiplake Bottom, Peppard, Henley on Thames RG9 5HJ. Or contact him via Email at: 100646.2344@compuserve.com - Ed

### Original harmonically related HF band allocations:

1715-2000kHz	(allocated for 'amateur domestic')
3500-4000kHz	(allocated for 'amateur domestic')
7000-7300kHz	(allocated for 'international night')
14000-14400kHz	(allocated for 'international day')
28000-30000kHz	(allocated for 'experimental' purposes)
56000-60000kHz	(allocated for 'experimental' purposes)

# SATELLITE RENDEZVOUS

Richard Limebear G3RWL with news on amateur satellite use by the Heard Island Dxpedition together with the latest on Mir operation

**T**he Heard Island DXpedition, VKOIR, has been using digital amateur satellites to transmit log data from one of the most remote locations on earth.

Logs are uploaded from VKOIR, downloaded by ON1AIG, and transmitted from Belgium via the Internet to waiting hams around the world. Anyone wanting to find out if they are in the log, may send an Email message, with their call sign in the body of the text, to [heard-log@ve7tcp.ampr.org](mailto:heard-log@ve7tcp.ampr.org) or check out the log data on the expedition's Web site at

<http://www.aurumtel.com/heard-log.html> These servers will check the latest available log data.

## RUSSIAN SATELLITES

As of January 1st, the 2m voice and packet frequencies for *Mir* have reversed from 145.800MHz up and 145.200MHz downlink, to 145.800MHz downlink and 145.200MHz uplink for groundstations.

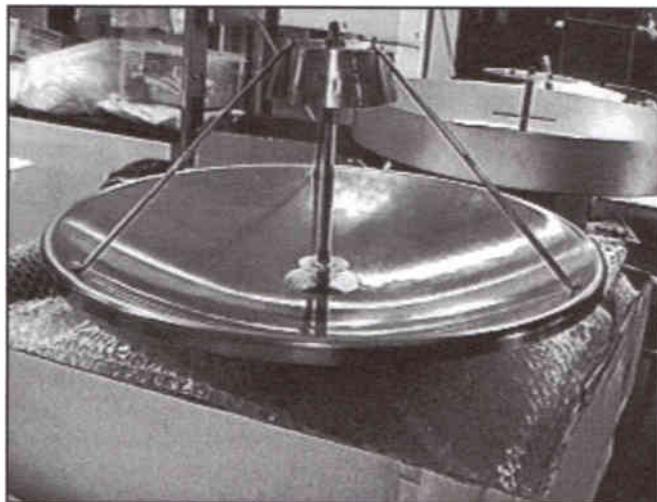
### FM voice ops:

uplink 145.200MHz TX  
downlink 145.800MHz RX

### Packet ops:

uplink 145.200MHz TX  
downlink 145.800MHz RX

Astronaut Jerry Linenger has replaced John Blaha aboard *Mir* and will return on STS-84 (scheduled for May). Jerry is the first of the long-term *Mir* astronauts who was licensed for a previous shuttle mission before his assignment to *Mir*. He earned the call sign KC5HBR while training for his only previous spaceflight, STS-64.



The S-band dish on Phase 3D (photos courtesy AMSAT)

As far as third-party agreements go, the temporary third-party agreement which permits John Blaha to talk to unlicensed students expires when John leaves *Mir*. So it will be illegal to permit non-hams to talk to Jerry until the paperwork is approved for Jerry's third-party agreement.

Also, unlike the previous *Mir* occupants, he's got a family which is just starting. He has a one year old son and another child expected in June. Jerry is quite aware that he may be in space while his second child is born if there are any delays. Jerry is scheduled to spend 132 days aboard *Mir*, but of course that may change for other reasons. He will become the first US astronaut to perform an EVA from *Mir* (wearing a Russian spacesuit).

In the past, astronaut's activities have changed, especially after long periods in space. So while Jerry may not plan on using the radio much while he's in space, that may change over time.

though, about a year ago they released the information that the next RS would have a store-and-forward capability.

While we're issuing rumours, here's another one: There appears to be some possibility of a throw-out spacecraft (or two) to be ejected from *Mir* (remember the *Iskra* series); orbital lifetime about 100 days. More information will be forthcoming once we get a decent translation of the text. Here's what's available;

"It is main positions on the small satellite with by radio amateur equipment of started with Russian orbital complex 'MIR'. I ask to deliver to all active principals AMSAT.

**Conditions:** Russian Space-rocket corporation 'ENERGY' By name S.P.Kopolev we are taken to install on the satellite radioamateur an equipment, to release the engineering specifications and to start, and AMSAT is taken to make radioamateur equipment according to our space requirements, to conduct her trials, to release the engineering specifications. The onboard equipment should be made for us in two full packages (Flight N1 and flight N2) and to give For Russian Center of Flight Control in city Korolev

## RS-16

Table 1 shows preliminary, unofficial, data for the new Russian Satellite, RS-16. A speculation is that it might be interesting to listen between the two 70cm beacons to see if there's a transponder downlink there. Likewise with ROBOTs. Places to try for a robot uplink might be; a) 40 kHz LF of uplink passband, or b) somewhere around 145.830/840MHz. Strange,

Preliminary, unofficial, data for the new Russian satellite, RS-16:

Period	95 min
Inclination	97.2 deg.
Uplink	145.915-145.948MHz
Downlink	29.415-29.448MHz
Beacons	29.408 , 29.451MHz
PWR 29 MHz Down	1.2 W/4 W
Beacon 1	435.504MHz
Beacon 2	435.548MHz
PWR 435 MHz Beacons	1.6 W

(For collective radio station with a call sign R3K) Full package of a ground tracking station of the satellite: (Aerials, cables, tracking drive, transceiver, power supply unit, the computer.

The satellite is gathered by astronauts on orbit and are started from a surface 'MIR'. Mass space vehicle, kg 120. sizes the cylinder of diameter about 0.8, Length 1,2 meters. 4 pieces of the solar battery are located under 90 degrees and have length of 5 metres, breadth 2 metres, life time about 100 days; Initial altitude orbit of 400 km; Rise of orbit in days about 100 km; Maximum orbital altitude 1500 km;

The duration of a shadow site of orbit makes 30-35 minutes in to initial phase of flight (first 10-12 days) and can be reduced up to 15-20 minutes in a final phase of flight;

Orientation of the vehicle -constant rotation axis on the Sun with by deviation up to 10. -15 first 10 days of flight and up to 30-35 in end to a phase of flight;

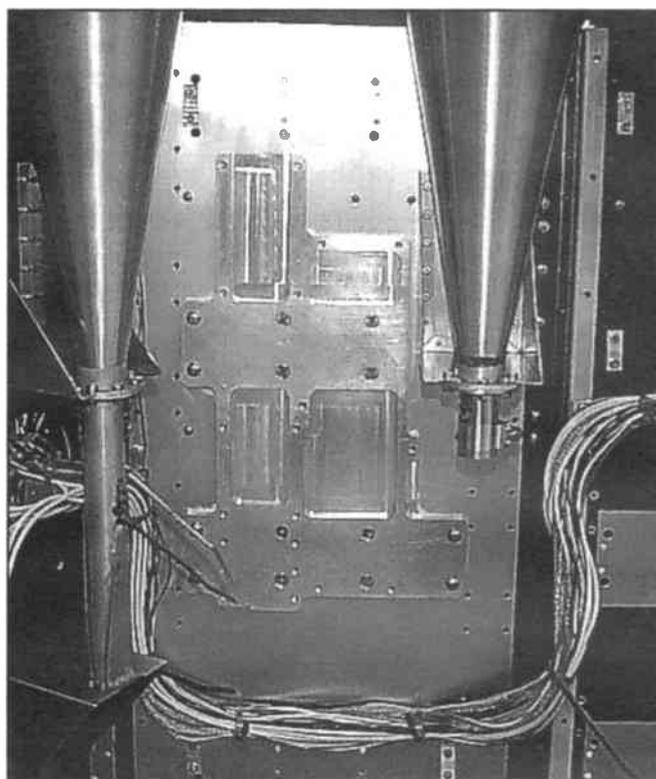
Two buffer storage batteries on the basis pressurized Ni-Cd of accumulators, onboard ensuring power supply systems on a shadow site. Total capacity of the battery no more tha."

## KEPLERS

There is a problem getting updated Keplers, with 1996 day 299 still being the current set. Apparently NORAD are having some problems observing the current orbital configuration. Although the orbit doesn't change very fast, things are now off by a bit, especially at perigee. Try adding about 15 minutes to any predictions.

## PHASE 3D

KBSMU has uploaded eight new photographs of ongoing Phase 3-D work onto the AMSAT-NA World Wide Web site. Contained in this release are photos of some of the support equipment and work ongoing at the Orlando Lab, as it appeared back in mid-October, 1996. There are also two photos that Dick Jansson, WD4FAB, took of some of the initial dynamic testing of the P3-D spaceframe and SBS carrying structure that he and Konrad Mueller, DG7FDG, accomplished while they were in France back in early November. Internet web browsers should be pointed to the AMSAT-NA Home Page at; [www.amsat.org](http://www.amsat.org) and click on the



10GHz feed horns mounted on Phase 3D

'New Phase 3-D Photos' announcement just under the 'Feature Article' banner. Doing so will link you directly to the area where these new photos can be viewed.

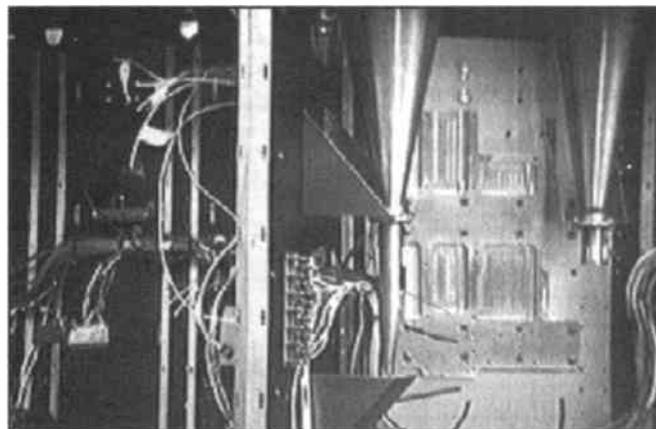
## OSCAR 13 CONTACT RECORDS

WB6LLO is compiling a list of stations who made QSOs during the first and last few orbits of AO-13. Interest in the project has come from a surprising number of sources. Opening day was orbit No.80, on 22nd July 1988 and the final orbit was on 22nd Nov 1996, No.6480.Those reporting are cautioned not to use orbit numbers

that were logged, other than from the satellite itself. Instead, use UTC date for all reference, unless the orbit number was obtained from AO-13's telemetry. NASA orbit numbers have been in error consistently sometimes by as much as two orbit numbers. Judging by the activity levels observed at W2RS (especially on RS-10 and RS-12), OSCAR SKN '97 was a great success, with lots of fun for all who took part.

## AMSAT IN QATAR

We have learnt of the establishment AMSAT-Qatar. Like all other AMSATs around the world, AMSAT-Qatar say they will actively work and donate on all AMSAT



Phase 3D equipment bay

projects. AMSAT-Qatar's president is Mohamed Althani, A71EY, and the board members will be announced soon. For more information contact AMSAT-Qatar at: AMSAT-Qatar P.O.Box : 2260 Doha -Qatar Tel: (974) 355535, Fax: (974) 427136.

## TRAKBOX SOFTWARE

Trakbox users may be interested to hear that, in a recent internet message, JA6FTL says that a new software version, TrakBox v3.40a, will be released soon. This version also includes compliance for dates after year 2000.

## OSCAR 10

It's still operational in Mode-B and currently available when in view, but please do not attempt to use it if you hear the beacon or the transponder signals FMing. Generally, once AO-10 hits darkness, it shuts down.

## AMSAT-UK NEWS

If it's not already in your diary, the 12th AMSAT-UK Colloquium will be held at Surrey University, Guildford, Surrey, UK, from Friday 25th to Sunday 27th July 1997. This year's event will comprise three days of technical matters only; there will be no 'political' subjects.

Last month Ron G3AAJ reported that sales were down and I said; "buy something from AmsatUK please." AmsatUK mouse-mats are now in stock at just under a fiver should anyone be interested, but the AmsatUK diaries are now out of stock.

For further information about AmsatUK contact: AMSAT-UK, c/o Ron Broadbent MBE, G3AAJ, 94 Herongate Rd, London, E12 5EQ. Big SAE gets membership info. SWL's are welcome. All new joiners get the USAT-P tracking program on 5-1/4 disk.

## LATEST KEPLERS

AMSAT-UK Keplers are put out on packet weekly sent to KEPLER @ GBR. The latest satellite Keplers are provided to us by AMSAT-UK are also available as a service to readers 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 46 from the satellite voice menu for this month's.

# MX290 SERIES EX-PMR CONVERSION EPROMS



Ready-programmed EPROMs are available for the MX290 series ex-PMR transceiver conversions featured in Ham Radio Today. These are available for the MX294 (2m or 4m, published Ham Radio Today Mar 94), MX295 (2m, published Ham Radio Today Vol.15 Issue No.2), and MX296 (70cm, published Ham Radio Today Dec 94).

Issue 2 EPROMs are now available, conforming to both 'old' and 'new' channel allocations on 2m and 70cm.

The 2m EPROMs are programmed for both the MX294 and the MX295 with all simplex, repeater, and reverse repeater channels, between 144.5000MHz and 145.8000MHz in 12.5kHz steps.

The 4m EPROMs are programmed with all channels between 70.1000-70.4875MHz in 12.5kHz steps.

The 70cm EPROMs are programmed with all 70cm simplex, repeater, reverse repeater and packet channels used in the UK, and is suitable for both 'low' and 'high' band variants of the MX296.

Each EPROM comes supplied with connection information and a channel list. Photocopies of the conversion articles should you require them are available from our photocopy service, see the rear of this magazine for ordering information.

The price below includes UK p/p, outside UK (including Eire) at £10.99 per EPROM.

## CREDIT CARD HOTLINE; 01442 66551 (24HR)

Please supply .....

..... HRT/6 (MX294, 2m)	@ £9.99
..... HRT/6A (MX294, 4m)	@ £9.99
..... HRT/7 (MX295, 2m)	@ £9.99
..... HRT/8 (MX296, 70cm)	@ £9.99

I enclose my cheque/P.O for £..... made payable to Nexus,  
or please debit my Master card/Visa card No.;

Signature.....Card Expiry Date.....

Name.....

Address.....

.....

.....Post Code.....

Send coupon to; Nexus Reader Offers, Nexus House, Boundary Way, Hemel Hempstead, Herts. HP2 7ST. Please allow up to 28 days for delivery. Price outside UK; £10.99 per EPROM.

Data protection; Occasionally we may make names and addresses available to carefully vetted companies who sell goods and services by mail that we believe to be of interest to our readers, if you would prefer not to receive such mailings please tick this box.

# CLUB NEWS

To include your club, or rally, in this section, make sure you send us your events details in time. 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). DATES TO BE INCLUDED IN THE ISSUE PUBLISHED ON THE 23rd May MUST REACH US BY THE 11th April LATEST (some clubs are being missed out because their details arrive too late) addressed to; The Editor, Ham Radio Today (Club News), Nexus Special Interests Ltd., Nexus House, Boundary Way, Hemel Hempstead, Herts HP2 7ST, or direct to the Editor's desk by fax on 01703 263429 or by Email to [hr@netlink.co.uk](mailto:hr@netlink.co.uk)

**Appledore & District ARC** meet on the third Monday each month, 7.30pm, at Appledore Football Clubroom, Devon. Club CW net; 8.00pm - 8.30pm every Wednesday on 28.200MHz, 8.30pm - 9.00pm SSB. Morse speed adjusted to the slowest sender. 2m FM every Tuesday 145.475 at 8.00pm. Planned club events/talks;  
Apr 21st - My work as a Novice Co-ordinator for the RSGB, by Roger GODIZ  
For further details contact Dave Brierley G3YGJ, Tel. 01237 476124

**Aylesbury Vale RS** meet on Wednesday evenings in the Village Hall in Hardwick, located off the A413 between Aylesbury and Buckingham. Club diary; Apr 2nd - Open evening  
For further details and meeting times, contact Gerry Somers G7VJV, Tel. 01296 432234

**Blackmore Vale ARS** meet on the second and fourth Tuesday each month, 8.00pm, at Shaftesbury Upper School, Dorset. A club net is held every Sunday on 145.550MHz at 7.00pm local time. Newcomers and visitors always welcome! Planned club events/talks;  
Apr 8th - AGM  
For further information contact Stuart G7JIF, Tel. 01747 838554, or @ GB7SIG.#45.GBR, Email: [stuart.ruffell@gecm.com](mailto:stuart.ruffell@gecm.com)  
Internet: [106135.2046@compuserve.com](mailto:106135.2046@compuserve.com)

**Bristol ARC** meet every Thursday, at the Scout Hut, Firtree Lane, St. George, Bristol. Planned club talks/events;  
Apr 3rd - Round table on fox hunting  
Apr 10th - Air time/checking aerials  
Apr 17th - Thoughts on Langlot  
For further details contact David G4ZBT, Tel. 0117 965 4886, or Derek G7HYS, Tel. 01454 772662.  
Internet: <http://www.gifford.co.uk/barc>

**Bristol (South) ARC** meet every Wednesday at the Whitchurch Folkhouse Association, Bridge Farm House, East Dundry Road, Whitchurch, Bristol. Club diary of events/talks;  
Apr 2nd - 10GHz activity evening  
Apr 9th - Microwave radio demo, G6PJS  
Apr 16th - Quiz night  
Apr 23rd - 3rd evening to build a basic receiver, G0TDS  
For more information and meeting times, Tel. 01275 834282 24hr Answerphone.

**RSGB 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;  
Apr 22nd - Aerials, Ears, Eyes & the Radio Operator Electricity in action, Peter Grainger, Bristol University  
May 20th - EMC Tentacles, Hilary G4JKS  
Further details can be obtained from Robin Thompson G3TKF, Tel. 01225 420442

**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;  
Apr 15th - Propagation, Alan G0TLK  
May 20th - Construction contest - Wavemeter  
Jun 17th - Direction Finding hunt  
Further details from Alan Messenger G0TLK, Tel. 0181 777 0420

**Bromsgrove ARC** meet on the second and fourth Tuesday of the month at Loley, Eric Worring Men's Club, Alcester Rd, Burco, Bromsgrove. The club run regular Night on the air/construction evenings.

Planned diary of events/talks;  
Apr 22nd - Loop aerials  
May 13th - AGM  
May 27th - DF hunt (on foot)  
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;  
Apr 8th - Home bre night  
Apr 22nd - Data related talk, by Peter G0FGB  
May 13th - Quiz night  
May 27th - Why don't you answer CQ calls?  
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 Presbury Library, The Burgage, Presbury, Cheltenham, at 7.30 for 8.00pm. Visitors and prospective members welcome. Club nets, Wed 9.00pm on 2m Mon & Thurs 1960kHz at 9.00pm. Sun 1848kHz at 10.00am Planned club talks/events;  
Apr 4th - Top Band DXing, by G3SNN  
For further details contact the Club Secretary, Mrs P.M. Thom G1NKS, Southern House, 9 Southern Rd, Cheltenham, Glas GL53 9AVV, Tel. 01242 241099

**Mid Cheshire ARS** meet every Wednesday, 8.00pm, at Colebrook Village Hall, North of Tarporley, Cheshire on A49. The club hold regular on air/construction evenings. RAE and CW courses available. Visitors and new members welcome. Planned club events/talks;  
Apr 16th - Hi-tech equipment & Internet display, G7LGD/G6JAK  
Apr 23rd - Techniques of safe driving, by Advanced Driving Instructor, Ron Porteus  
May 5th - Club rally  
May 7th - Natter night  
May 14th - Short quiz & HF on air  
May 21st - Talk: Backpacker radio  
For further details contact Ted Bannister, GORBA, Tel. 01606 592207, or via GB7PMB

**Cornish RAC** meet on the first Thursday each month, 7.30pm, at Perranvillage Village Hall, near Truro. Planned club events/talks;  
Apr 3rd - AGM  
May 1st - Radio activity down-under, by Ies  
Jun 5th - Night on the air  
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, Eitham SE9. Planned club diary;  
Apr 3rd - Balkanoing, G8KDC  
Apr 17th - AGM  
May 1st - Surplus equipment sale  
May 15th - G33RCV QRV  
For further details contact Tony G4WIF, Tel. 0171 739 5057 office hours only. Up-to-date information can also be obtained from the club Internet pages; <http://ourworld.compuserve.com/homepages/g4wif/index.htm>

**Dover RC** meets at Duke of York's Royal Military School, Goston, Dover on a Wednesday evening 6.30pm to 10.00pm during the school's term time. The club is a C&G examination centre for the RAE and NRAE. Morse & Navice training classes are held between 7.00 & 8.00pm at the school. The club also hold regular operating and natter nights. All ages over 8 welcome. Club net (The White Cliffs Net) on 3745Hz 11.00am every Sunday morning. Planned club talks/events;

Apr 30th - The origins of Icom, by Paul G3VJF  
May 14th - Experimentation, by Dr. K. Smith, G3JIX  
Jun 11th - Aerials in small gardens, by Ian G3ROO  
For further details contact Brian Hancock G4NPM, Tel. 01304 821007, packet via GB7YUH, Email: [Brian@Kenmet.co.uk](mailto:Brian@Kenmet.co.uk)

**Felixstowe & District ARS** meet, 8.00pm, at Orwell Park School, Nacton, Ipswich. For club visits/meals etc., names must be given to Paul G4YQC at least a week in advance. Visitors welcome to attend any meeting. Planned club events/talks;  
Apr 7th - The Packet DX Cluster, by G0OZS  
Apr 21st - Visit to Suffolk Constabulary HQ  
May 12th - RAE Examination  
May 17/18th - VHF 24hr Fixed Contest  
May 19th - ESWR Planning  
May 25th - East Suffolk Wireless Revival  
For further details contact Paul Whiting G4YQC, Tel. 01394 273507 evenings

**Halifax and District ARS** meet at 7.30pm on the first Tuesday each month, at The Tap and Spile Pub (formerly 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;  
Apr 15th - Converting PMR gear to Top Band, G4IZH  
May 20th - Early Radar, G1FDL  
Jun 17th - QRP and BBQ at Rishworth School, G3RJV  
Further details can be obtained from Mr. D. Moss G0DUM, Beechwood Lodge, Lightcliffe, Halifax HX3 8NU, Tel. 0142 2202306

**Hastings Electronics and RC** meet every third Wednesday of each month for their main meeting, at West Hill Community Centre, Craft 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;  
Apr 16th - Auction  
May 21st - Heristmonceux Castle, by Chas Parker  
Jun 18th - History of TV in the 1950's, P Marshal  
For further details contact Reg Kemp G3YFF, Tel. 01424 830454

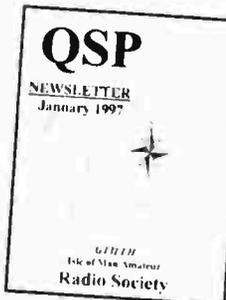
**Hoddesdon Radio Club** meet alternate Thursdays at the Conservative Club, Rye Road, Hoddesdon from 8.00pm. SVLs and visitors very welcome. The club run Morse training classes. Club diary of talks/events;  
Apr 10th - Aerials for back yards, P. Dodds, G3LDO  
Apr 24th - Open forum  
For more information contact Don G3JNJ, Tel. 0181 292 3678. Email: [gx01sat@aol.com](mailto:gx01sat@aol.com)  
Internet WWW: <http://members.aol.com/gx01sn>

**Hordean 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 1.955MHz 09.00hrs CW, 09.30hrs SSB, and Wednesdays 145.350MHz at 19.30hrs. Planned Club events/talks;  
Apr 22nd - CW operating techniques, G3JFF & G3UJK  
Further details can be obtained from Stuart Swain, Tel. 01705 472840

**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. Paul

Planned club events/talks:

Apr 1st to 6th - Warwick School visit to Eary Cushlin Sep 30th - End of Jim Christian Memorial Trophy Contest  
 For further information contact Club Secretary Vince Wilson MDOADD, 129 Ballabrookie Drive, Dauglas IM1 4HH, Tel. 624889



**'QSP' the monthly newsletter of the Isle of Man ARS**

**Ichen 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:  
 Apr 11th - Surplus equipment sale  
 Apr 25th - Development of amateur radio, G7CAV  
 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:  
 Apr 10th - Junk sale  
 Apr 24th - Talk by GOAEC  
 May 15th - Computer simulations  
 May 29th - Cable TV, by G4RCH  
 Further details from Jack Birse, G4ZVD, 178 Long Lee Lane, Keighley, W. Yorks BD21 4TT, Tel. 01535 212985

**Leicester RS** meet every Monday, 7.30pm, at The Chantry, Gilroes Cottage, Graby 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:  
 Apr 7th - Howes Communications, by Dave Howes  
 Apr 21st - Weather: shower & thunder clouds, D.Bassett  
 Apr 28th - IRS junk sale: donated items, proceeds to IRS  
 May 19th - Under a tenner & constructors competitions  
 For further details contact Stan Hay G3HYH, Tel. 0116 239 4367

**Liverpool and District ARS** meet at 8pm every Tuesday evening at The Churchill Club, Church Rd., Wavertree, Liverpool. They run RAE, Novice RAE and Morse courses every Tuesday evening beginning at 7.30pm and have regular 'on air' evenings. Planned club events/talks:  
 Apr 1st - Aerials  
 Apr 15th - Amateur Television  
 Apr 22nd - RAE question and answer night  
 Apr 29th - Surplus sale  
 For further details contact Ian Mant G4VWV, Tel. 0151 722 1178.

**Lothians Radio Society** meet on the second and fourth Wednesdays each month, 7.30pm, at Orwell Lodge Hotel, Colinton Road, Edinburgh. Planned club events/talks:  
 Apr 9th - 24GHz, Brian GM8BJF  
 Apr 23rd - Mini talks  
 For further details contact Tommy Main GM4DCL, Tel. 0131 663 8501, or GM3HAM@GB7EDN

**Loughborough and District ARC** meet every Tuesday (term time), 7.45pm, at Hindleys Community College, Shepshed, Leicestershire. The club have an 'On the air' evening on the first Tuesday each month. Planned club events/talks:  
 Apr 8th - Fun 2m DF with clues  
 Apr 15th - Forum 'Computer night'  
 Apr 22nd - Visit to Rugby Radio Station  
 Apr 29th - Junk Sale  
 May 13th - Basic faults - video recorders  
 For further details contact Ian G8SNF,

Tel. 01509 218259

**Maidstone YMCA ARS** meet at the YMCA Sports Centre, Melrose Close, Maidstone, Kent ME15 6BD. They run RAE and Morse courses. GB2CW is on Sundays, 8.30pm, 144.250MHz USB/CW, club net on same frequency at 9.05pm. Planned club events/talks:  
 Apr 4th - Junk sale (visitors £1)  
 Apr 11th - Club rally meeting  
 May 3rd - RSGB Morse tests  
 May 25th - Club mobile rally  
 For further details call Mike Grainger, Tel. 01634 856765

**Malvern Hills ARC** meet on the second Tuesday each month, at the Red Lion, Malvern, Worcester. Planned club events/talks:  
 Apr 8th - Transmission lines, by Dave Buick  
 May 13th - Construction contest  
 Jun 10th - Evening on the air - Malvern Common  
 For further details contact Jim Davis GOOWS, Tel. 01684 576538

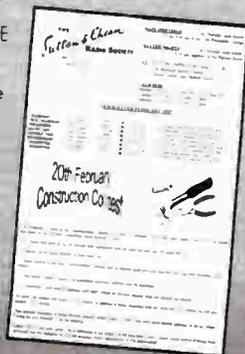
**Midlands AX25 Packet Radio Users Group (MAXPAK)**, meet on the first Monday each month (when this is a Bank Holiday, the meetings are on the second Monday), 8.00pm, at the Perton Community Centre, Perton, near Wolverhampton. Non-members and visitors welcome (non-members 50p per evening to help cover costs). Planned events/talks:  
 Apr 7th - AGM/packet software discussion  
 May 5th - A practical comparison of the Tiny2 and the PK232 TNCs  
 For further information contact Club Secretary Edward Loach G4ZXS, Tel. 01902 741877 (evenings), or via packet G4ZXS@GB7MAX

**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:  
 Apr 23rd - AGM  
 For further details contact the club secretary, Tel. 01635 863310

**Norfolk ARC** meet every Wednesday at The Norman Centre, Bignold Road, off Drayton Road, Norwich, 7.30pm for 8.00pm start. Informal meetings are usually held on alternate Wednesdays, where it is a night on the air, construction QRP and Morse practice evening. Club diary of events/talks:  
 Apr 2nd - AGM  
 Apr 23rd - Surplus equipment sale  
 Further details can be obtained from Mike G4EOL, Tel. 01603 789792. A programme of future club events/talks is available on packet by typing 'NARC'

**Salop Amateur Radio Society** meet at The Telesports Club, Abbey Foregate, Shrewsbury every Thursday. They presently run a Novice course on Tuesday evenings (details from Tony MOAMP @ GB7PMB) and have regular on air/natter nights. Planned club diary of events/talks:  
 Apr 10th - Construction evening  
 Apr 17th - Telford Rally discussions  
 Apr 24th - SSB, by Simon GOEYI  
 May 8th - Junk sale  
 For further details contact Ian G7SBD, 56 Roselyn, Harlescott, Shrewsbury SY1 4LP, or @ GB7PMB  
 Internet: <http://www.clemalv.demon.co.uk/>

**Sheffield ARC** meet every Monday (except bank holidays), 7.30pm, at the 197 Club, Brook Hill, Sheffield (this is the lecturer's social club opposite the main buildings of Sheffield University). The club also run RAE and Novice courses. Planned club diary:  
 Apr 14th - 'Message received', by Ron G4UMQ  
 Apr 21st - Fox hunt primer/packet night  
 Apr 28th - Talk by Rev. George Dobbs, G3RJV  
 May 12th - Fox hunt  
 For further details



contact Brian G7WVBV, c/o 158 Skinnertharpe Rd, Sheffield S4 8GH, via packet @ GB7WRG, or Email: [brian.j@virgin.net](mailto:brian.j@virgin.net)

**Silverthorn RC** meet every Friday, 7.30pm, at the Adult Education and Community Centre, Friday Hill House, Simmans 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 'an air' and social evenings. Planned club diary of events/talks:  
 Apr 11th - Junk sale  
 For further details contact Andrew Mowbray, GOLWS/G1NPT, at above address, or from Dave GOKHC, Tel. 0181 505 1871, or packet to G1NPT @ GB7TUT. A programme of club events can be obtained by using REQFIL on file C:\CLUBS\SILVERTH\CLUBINFO.TXT from GB7TUT

**West Somerset ARC** meet on the first Tuesday each month, 7.30pm, in Room GB7, Gibbs Block, West Somerset Community College, Minehead, Somerset. RAE and Morse instruction available. All visitors are welcome. Planned club events/talks:  
 Apr 1st - Construction contest  
 May 6th - Radar, invited speaker  
 Jun 3rd - Fox hunt, all invited  
 For further details contact Alan. C. Elliott, MOAOJ, Tel. 01643 707207

**Stourbridge and District ARS** meet on the first and third Mondays each month (except bank holidays), at the Robin Woods Centre, Scots Road, Stourbridge. The first Monday is usually an 'an air and natter night'. Visitors always welcome. Planned club events/talks:  
 Apr 7th - On air and natter night  
 May 12th - On air and natter night  
 Further details from Gordon Bryant GOTZV, Tel. 01384 395206



**'Starlite' monthly newsletter of the Stourbridge ARS**

**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:  
 Apr 14th - AGM  
 Apr 28th - Top Band direction finding competition  
 May 12th - Visit to the Technical Operations Centre, BBC Transmissions, Warwick (numbers limited)  
 Further details from Club Secretary Jeff Porter G4OHJ, Tel. 01789 773286

**Newsletter of the Sutton & Cheam ARS**

**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;  
Apr 17th - Military communications, by G8MOB  
May 15th - AGM  
Jun 19th - Junk sale  
For further details, Tel. 0181 644 9945

**Swindon and District ARC** meet every Thursday evening, 7.00pm, at the Eastcott Community Centre, Savernake 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;  
Apr 20th - Contest logging - practical session  
For further details contact Den G7PDV, Tel. 01793 822705

**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;  
Apr 18th - 90/10 junk sale  
May 17/18th - 2m contest from Mardon Down  
May 23rd - Flight simulation, by South Devon RC  
May 28th - Torbay hospital fair  
Further details from Peter G4VTO, Tel. 01803 864528 (day works No.)



'TARS Talk' monthly newsletter of the Torbay ARS

**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 also run an RAE course (for details contact Chris G0HFX Tel. 01225 764874 evenings). Visitors welcome, fee 50p. Planned club events/talks;  
Apr 2nd - Telewest Communications  
May 7th - QRP operating and construction, G0FUW  
Jun 4th - Fox hunt (G4YXS) from Southwick  
For further information contact Ian G0GRI, Tel. 01225 864698 evenings and weekends.

**Verulam ARC** meet 7.30 for 8.00pm, on the second and fourth Tuesdays each month (except December), at the RAF Association Headquarters, New Kent Road (off Marlborough Road), St Albans. On the second Tuesday they have an activity evening and on the fourth Tuesday the monthly meeting. Visitors welcome at all meetings. Planned events/talks;  
May 27th - GB3BH design, installation and operation, by Dave G7LXP and Dave G8ADM  
For further details available from Walter Craine G3PWF, 5 The Crescent, Abbots Langley, Watford, Herts WD5 0DR, Tel. 01923 262180

**Wakefield and District RS** meet every Tuesday, 8.00pm, in the first floor rooms, Osselt Community Centre, Prospect Road, Osselt, West Yorks. We're told the club has a well equipped station, library and licensed bar and run Morse and Morse classes, they also have regular 'on air' evenings. The club net is on 2m FM on Mondays. Club diary events/talks;  
Apr 8th - Malarrania with G4BLT  
Apr 22nd - AGM

Apr 30th - Visit to WY Police helicopter  
For further details contact Bob Firth G3WVWF, 6 Eastfield Drive, Woodlesford, Leeds LS26 8SQ, Tel. 0113 282 5519, or via packet G3WVWF @ GB7WVRG

**Weston-super-Mare RS** meet on the first and third Mondays each month, at the Woodspring Inn, High Street, Worle, Weston Super Mare (2 mins from junc. 21 M5). The third Mondays are usually 'Workshop' evenings. Planned events/talks;  
Apr 2nd - Video editing, by G3RXG  
Apr 22nd - GB3WB Repeater Group AGM  
May 12th - Using the GDO, by G3YOL  
For further details contact Graham Pinder G8WAR, Tel. 01934 415700

**Wimbledon and District ARS** meet on the second and last Friday each month, at St Andrew's Church Hall, Herbert Road, Wimbledon SW19. Planned club events/talks;  
Apr 11th - Microprocessors - applications in AR, G4ZXO  
May 9th - Switch Mode PSUs, by G8PYE  
Jun 13th - Desert Island Radio, by G4ZXO  
For further details contact J. Gale G4WYJ, Tel. 01737 356745

**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;  
Apr 9th - DX cluster, by Bob G4UJS  
Apr 23rd - Great Egg Race 97  
May 14th - Complimentary therapy, Elaine & Sue  
May 28th - Practice DF, Heswall Lay-bye  
For further details contact Phil G0JSB, Tel. 0151 677 1947, or SP G0JSB @ GB7OAR

**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;  
Apr 3rd - The Washford BBC Transmitter, Neil Wilson  
Apr 10th - An introduction to basic logic, by G3TSK  
Apr 17th - AGM  
Apr 24th - Club station on the air  
Further details can be obtained from Malcolm Sadler G7WAL, Tel. 01460 54657

## NATIONAL AND INTERNATIONAL

**British Amateur Radio Teledato Group (BARTG)** have a quarterly magazine, 'Datacom', and hold a rally and HF RTTY contest each year. For more details about the group contact Membership Secretary Bill McGill, G0DXB, 14 Farquhar Road, Malby, Rotherham, S. Yorks S66 7PD, Tel. 01709 814010 (Tues, Thurs & Fri, 7pm to 9pm, Sat/Sun before 9pm) or via GB7WVRG  
Internet: <http://www.bartg.demon.co.uk>

**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 BAATC membership write to: Dave Lawton, Grenehurst, Pinewood Road, High Wycombe, Bucks HP12 4DD.

**G-QRP Club** publish a quarterly journal, 'SPRAT', 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 Garage, 498 Manchester Road, Rockdale, 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  
Internet: <http://www.aber.ac.uk/~srj5/iswl.html>

**The Irish Radio Transmitters Society** publish regular newsletters giving details of local activities, and the yearly IRTS Calbook, they also have a video library. Their AGM is due to be held on the 26/27th April at Ballybofee, Donegal. For further details contact Dave Moore EI4BZ, 12 Castle Ave, Carrighowhill, Co. Cork, Tel. (Eire) 021 883555, or by Email: [jryan@iol.ie](mailto:jryan@iol.ie)

**Radio Amateurs' Emergency Network (RAYNET)** can be contacted at Hunters, 15 Newton le Willows, Bedale, N. Yorks DL16 1SL. 24hr national emergency contact line, 0141 521 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 723951. The Northern Ireland Club collect unwanted takens or vouchers (e.g. petrol etc.), these can be sent free of charge to: The Charities Appeal Officer, RAIBC NI, Freepost BE 1789, Belfast BT15 3BR.

**Radio Amateur Relief Expeditions (RARE)** is a registered charity made up of Radio Amateurs and friends who take aid to Eastern Europe and organise summer camps for young people to learn about Amateur Radio, English language and life in the UK. New members required to support this work both at home and by taking part in expeditions. Please contact The Secretary, RARE, 1 Allfield Cottages, Condover, Shrewsbury SY5 7AP, Tel. 01743 873815 Fax. 01743 874729 Packet: G6FHMW@GB7PMB, Email: [rare@donsun.demon.co.uk](mailto:rare@donsun.demon.co.uk)

**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 many aspects of licensing. They're currently in alternative temporary offices: New Kings Beam House, 22 Upper Ground, London SE1 9SA  
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 (RSGB)** are the National Society who have been representing UK radio amateurs and short wave listeners for many years. They are based at Lambda House, Cronbourne Road, Pottery Bar, Herts EN46 3JE, Tel. 01707 659015.  
Internet: <http://www.rs.gb.org>

**United Kingdom Radio Society (UKRS)** are a newly formed National Society (see 'Radio Today' Sept '96). They can be contacted at Box 100, Meadow Side, Northwich, Cheshire, CV8 1FA, Tel. 01606 783270, or 0115 925 6597. Via Packet: RADSOC@GB7OAR (please send as an 'SP' message). Email: [admin@ukrs.org](mailto:admin@ukrs.org) Internet: <http://www.ukrs.org>

**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 licences (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. (Inland) 8.30am - 10.00pm, Mon-Sat (inclusive) 0117 925 8333.

# RALLIES

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

## APRIL 6TH

**Launceston ARC Rally** Launceston College. Featuring traders, bring & buy and on demand RSCB Morse tests. Refreshments and hot snacks available from 7am. Doors open 10.30am. For further details contact G3KNE. Tel/Fax: 01288 354564

## APRIL 19TH

**SAMS '97 Computer & Electronics Show** Bingley Hall, Staffordshire Showground, Weston Rd, Stafford, JA518 Stafford (Uttoxeter Rd). Featuring many trade stands covering radio, computing and electronics, plus large bring & buy. Doors open 10.00am. Admission: Adults £2.50, under 14's 50p, concessions £1.50. Advance tickets £1.50 + SAE. For further details please contact Shaward Promotions. Tel: 01473 741533

## APRIL 27TH

**British Amateur Television Club Annual Rally** Sports Concession, Coventry. Featuring over 200 trading tables, bring & buy, large outdoor flea market, specialist television displays, ex broadcast vehicles, etc. GB6ATV talk-in on S22 and GB3CV PB9. Refreshments and licensed bar. Doors open 10.00am (9.30am for disabled visitors). Admission £1.00, 50p for OAPs and under 14s. For further details contact Mike Wooding, G6GF, Tel: 01788 890365, Fax: 01788 891883. Email: batc97@g6gf.com

## MAY 5TH

**Dartmoor Radio Rally** Bakeron Memorial Village Hall, Yeavy Lane, Yeavyton, Devon. Featuring trade stands, bring & buy, etc. Parking for 600 cars, access for disabled visitors, playground for children. Refreshments available. Doors open 10.30am, talk-in on S22. For further details contact Ron G7LGC. Tel: 01822 852580

**Mid Cheshire Amateur Radio Society** is holding their rally at Winsford Civic Hall, Town Centre, Winsford. Featuring traders and bring & buy stand. Bar and catering services available. Ample parking. Talk-in on 2m. Fully signposted. Doors open 11am (10.30am for disabled visitors). Admission £1.00, under 14's free with adults. For further details contact David G4XUV. Tel: 01606 77787

## MAY 11TH

**Drayton Manor Radio and Computer Rally** Drayton Manor Park, Fozzyl, Tamworth, Staffs. CV40911. Featuring many traders in four large marquees, large outside flea market, bring and buy, local radio clubs and special interest group stands. Open from 10.00am onwards, a great day out for all the family. Further details available from Norman G8BHE. Tel: 0121 422 9787 or Peter G6DRN. Tel: 0121 443 1189 evenings please

## MAY 18TH

**Dunstable Downs Radio Club - 14th National Amateur Radio Car Boot Sale** Stockwood County Park, Luton, nr junction 10 M11, 10am to 4pm. Talk-in on 2m. Free entry to the Mossman collection of horse drawn vehicles, craft museum, plus much more. For pilot details Tel: 01582 613899. Pre bookings for plots taken until May 14th, however plots can be purchased on the day.

**Mid-Ulster ARC Annual Rally and Bring & Buy** takes place at the Silverwood Hotel, Lurgan (1 1/2 a mile from M1 motorway). Doors open from 12.00 noon, with buffet bar and car parking facilities available in hotel. For further details contact Club Secretary Mr R Todd, G0STS. Tel: 01762 324383 or via packet: G0STS@GB7WRI#61 GBR EU

**Yeovil ARC 13th QRP Convention** Giggly Hall, Church Street, Sherborne. Featuring live performance, trade stands, bring & buy, prize draw, Morse test and demand line, on demand Morse tests, plus the big table, QRP Challenge. Join us for more fun with the Yeovil QRP group 9.00am, refreshment stand, talk-in on S22. Refreshments too, from the Yeovil Alps, town of Sherborne offers a wide range of interest for the YRP. For further details contact Peter G3CQR. Tel: 01935 81 3054

## MAY 25TH

**Plymouth Radio Club Rally** Plymouth College of Further Education, Kross Road, Devonport. Doors open at 10.30am 10.00am for disabled visitors. Admission £1.00. For further details contact Stephen Ramsden G7UHL. Tel: 01752 662051 office hours or 777189 after 9pm

## JUNE 21ST

**Royal Naval ARS Rally** HMC Colingwood, Portsmouth. This annual rally and event will be bigger and better than ever. For further details contact fully qualified Mike Mahoney, G3JFF, 127 Dn Rd, Corston, Wiltshire, Hurs, PO8 0PD. Tel: 01247 466557

## JUNE 22ND

**Bangor & District ARS Rally** will be held at Grandstand under Hotel, Bangor, Co. Down. Activities include off-road, Vespene, tri, a bring & buy, amateur demonstrations, park radio, amateur television, bring & buy, local and national traders. There's also there's something for all the family and not to mention. For further details contact Stuart G4OQK. Tel: 01247 454049 or Norman G3BDF. Tel: 01247 466557

**Bridgend & District ARC Mid-Summer Radio & Computer Rally**. For further details contact Maurice G4WJZN. Tel: 01456 864579

## JUNE 27TH TO 29TH

**Ham Radio '97 Friedrichshafen, Germany** Europe's largest gathering of over 20,000 ham radio enthusiasts, by the shores of the Bodensee Lake, Canton of the Messe Friedrichshafen. Wide and varied selection of interests, immediate trade presence with 280 exhibitors from 40 countries, large flea market, on-site camping and caravan facilities. For further details, contact: Tel: +49 7541 7080, Fax: +49 7541 75290. Accommodation: Youth information: Tel: +49 7541 21729

## JULY 6TH

**The York Radio Rally** will be held in the new Kingsmead Building, York Racecourse, York. Doors open 10.30am. Admission £1.50. Children accompanied by, adult free. Ample free parking. Featuring amateur radio, electronics and computers. Morse tests and repeat groups. Refreshments and licensed bar. Talk-in on S22. For further details contact Pat Tisk, G3DF. Tel: 01904 628006

## JULY 13TH

**Three Counties Radio and Computer Rally** This rally has moved from Volant, in the Three Valleys, Gwent, to King's Road, Worcester. Featuring amateur radio, computers and electronic component traders, bring and buy, talk along with RSCB Morse tests, please book on arrival and remember two passport photos will be required, refreshments and licensed bar, free car parking. Doors open 10.30am - 5.00pm. Admission £1.50. For further details contact Eddie G4PQZ. Tel: 01905 773181



**SAMS '96 Computer & Electronics Show, this year's show is due to take place on 19th April**

## JULY 27TH

**Colchester Radia and Computer Rally** with traders and leisure fair, St Helena School, Colchester. Doors open 10am. Family event. For further details contact Frank G3FF. Tel: 01206 851189

**Scarborough ARS Radia, Electronics and Computer Rally** The Spa, South Yorkshire. Featuring the usual traders, radio, electronics, computers, computer hardware and software. Doors open at 11am. Morse tests available on demand, but please remember the free and two passport sized photos. For further details contact Ross Nelson. Tel: 01377 257074 after 6pm

## AUGUST 10TH

**Flight Refuelling ARS Hamfest 97** Flight Refuelling Sports Ground, Merley, Wimpborne, Dorset. Featuring the usual mix of traders, bring & buy, craft exhibitions, car boot sale and food events. Overnight camping facilities available for Saturday, the 9th. Talk-in on S22, weather permitting between 10.00am to 5.00pm. For further details contact Richard Huggan G4KCC. Tel: 01208 691021

## AUGUST 15TH

**Cackenzie & Part Setan ARC Annual Junk Night**, Cackenzie & Part Setan Community Centre, South Seaton Park, Part Setan, Eastham. Bring along your junk and sell it yourself. Tables will be provided on a first come first served basis (no charge for the tables). Refreshments available, disabled visitor access. Admission £1.00. All money raised is donated to the British Heart Foundation. For further details contact Bob G4GNA. Tel: 01875 811723

## AUGUST 27TH

**8th Great Eastern Computer and Radia Rally**, by Kings Lynn Amateur Radio Club at a new venue, Walsingham Hall, between Kings Lynn and Downham Market, Norfolk. Features specialist indoor and outdoor exhibitors, outdoor car boot area, unlimited space available. Bring and Buy, free parking, talk-in on S22 and S22, refreshments available, easy access for disabled. Opens 10.00am - 9.45am for disabled visitors. For bookings or more info call Ian G0BVS on 01553 65414 or packet: G0BVS or email: ian@g0bvs.demon.co.uk

## SEPTEMBER 14TH

**BARTG Annual Rally** Sandown Park Racecourse, Esher, Surrey. This rally is organised by the British Amateur Radio Teledata Group and is of general interest to all amateurs with most aspects catered for, but notably there is an emphasis on Data Communications. Where told there is one major difference this year "DataCom 97". This is a series of lectures covering various aspects of data communications, in amateur radio. For general enquiries contact Ian Brothwell. Tel: 0115 926 2260. Internet: <http://www.bartg.demon.co.uk>

## SEPTEMBER 21ST

**Peterborough Radia & Electronics Society East of England Rally** will be held at the Peterborough Showground, with entry access from A1, A605, A47. Featuring trade stands, radio car boot sale and other local attractions. Acres of free parking, catering and bar etc. Doors open 10.30am (10.00am for disabled visitors). Admission £1.50. Talk-in on S22 via G3DQW. For further details contact Steve G8NGZ. Tel: 01733 831211 or g8ngz@compuserve.com

## NOVEMBER 23RD

**Bridgend & District ARC Radia & Computer Rally**. For further details contact Maurice G4WJZN. Tel: 01456 864579

## DECEMBER 14TH

**Verulam ARC Annual Rally** Waitford Leisure Centre, Horseshoe Lane, Garston, Waitford. Located off the A405 near junction 6 of the M1 and junction 21A of the M25. Featuring trade stands, bring & buy, grand rally, car boot sale, licensed bar and free parking. Morse tests will be available. For further details Tel: 01923 262180 or 01923 265572 (Trade bookings)

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**Yaesu FT-747GX,** all mode, general coverage transceiver, with hand mic and operating manual, £425 ovno. Cash only. Wanted: HF crystals, send your list, or fax 0181 505 6303. M. Evans, 120 Loughton Way, Buckhurst Hill, Essex IG9 6AR

**Yaesu FT-790R** MkII, mint condition, with box, manual and case, £240. Also 70MHz PMR radios, £10 each. Buyer to collect. For more info contact Ian Hughes (Walsall), Tel. 01922 30668 after 5.30pm.

**Yaesu FT-8500** FS10, brand new, in box. Watson W-30 and Watson W-770HB aerials, £550 the lot. C. Boydell (Bolton), Tel. 01204 840035

**Icom T42E** 70cm handheld transceiver, as new, CTCSS fitted, nicad, speaker mic, charger, case and manual, £150. Vic 20 plus 16k

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**Notebook computer,** latest Mitac 4023, TFT screen, Windows 95, 586, 8Mb, complete with software, Lowe Airmaster ACARS decoder, AEA Fax III for on screen pictures of Fax, RTTY, Navtex, package only few months old, boxed, £700. M. Wynn (Oxford), Tel. 01865 749374

**PRO-34 hand** held scanner, 200 memories, freq range 68-88, 108-136, 136-174, 380-512, 806-960MHz, AM, FM, £65. A. Cramp (Shrops), Tel. 01584 872618

**Vectronics VC-3000** aerial tuner, 1.8-30MHz, 300W continuous. Cross needle forward reflected SWR meter plus 21 segment bargraph, built in dummy load, manual, unmarked, excellent condition, £90. A. Brooks (Basingstoke), Tel. 01256 473715

**AR3000A,** £650. PRO-2006, £200 both mint condition, hardly used. PRO-2006 boxed. Manuals and aerial included. Grant (Barnsley, Yorks), Tel. 0410 411644

**AEA PK-232MBX** data controller, Icom and Yaesu connectors, boxed, excellent condition, £200 no offers. P. Noone (St. Helens), Tel. 01942 273143

**HRO(MX) UX valves,** original PSU, 9 general coverage coils and 5 bandspread coils, £90. Approx 75 1968/84 American magazines, 'Ham Radio', 'QST', 'CQ', 20p per copy. Collect or carriage extra. R. Grant (Hants), Tel. 01329 843219 MX295 SKI, as described in Feb 97

HRT, in very good condition, £12 plus postage. Jim (Grimsby), Tel. 01472 316094

**FT-1 general** coverage all mode transceiver, £550 ono. FC-107 ATU, £150, includes YM47 scanning mic, G5RV plus 103 coax, carriage or collect. Steve GOHMN (Hull), Tel. 01482 795646

**AKD 6m** radio model 6001, only few months old, used only four times, £180. 6m half way bottom fed aerial, 10ft high, £48. William Thomas (Kent), Tel. 01634 712270

**Packet TNC** kit, case, PCB, populated, no firmware, needs completing. 9600 PCB, case, populated, needs completing, £45 each. Various other items. Wanted: Eddystone EC10 receiver, mains power unit, handbook, good working order, good condition and appearance. G8SBU (Devon), Tel. 01395 265059

**Pye M294** (2m), £15. Pye Westminster, dash mount, £6. Amstrad 1640DD with colour EGA, £30. Want base station scanner. D. Graham (Harrogate), Tel. 01423 872045 weekends.

**Pakratt PK232,** manual, box, leads, £120. Also Datong FL3, boxed, £70. Both good condition. Brian (Cornwall), Tel. 01579 363192

**Icom R-7000** professional scanner, 25-2GHz, perfect order throughout, includes remote control and voice options, mains or 12V operation, £595. David G1XKR (Bournemouth), Tel. 01202 433199

**Cushcraft A4S,** brand new, boxed, £325. F. Godfrey (Notts), Tel. 01909 530204

**Yaesu FT-101ZD,** WARC, excellent condition, original box and manuals, full HF transceiver, £300 ovno. A. Grannon (Hull), Tel. 01482 814912

**WS No.52** receiver with PSU, £60. No.19 Set, AC PSU fitted, no TX, RX works great, £80. GRC-9 HF transceiver with PSU etc., £180. BE201 VHF, £80. Miniature Morse key, £20. Wanted: military radios, WHY? Ben (Mids), Tel. 01562 743253

**IC-3220H** dual band 2m/70cm transceiver, £185. FT-747GX, £200. FP-757GX power supply, £50. KPC2 Packet com II, £45. ACU FC-700, £30. Assorted aerials, £40. Tony (Fareham, Hants), Tel. 01329 312576 evenings.

**Quantity Storm** 600 modules, CQP, CQM, CQL tone boards, osc mods, control boxes, ITUs, some H/B, L/B CQM CQLs, other spares, lamps, PAs, transistors, Toan coils, Pye repeater T401, T402, ITU, offers. Wilf James (Perth), Tel. 01738 812611

**2m handheld:** Delcom U2, fully programmable 4.5W rig with two battery packs, simplex/duplex/scan modes, helical aerial, handbook, charger. Has LCD display, external mic/LS/12V jacks, lppower (1W) switch etc., in original packing, £75. G8AKA (Reading), Tel. 01189 701163

**Maxon CGX4020** PMR transceiver, 25W, 4 channels, converted to 70cm, one channel

fitted with crystals for 433.250MHz, boxed with accessories, manual, circuit, £40. Datong indoor active aerial, £35. Mike G7NBE (Leics), Tel. 01530 414473

**Kenwood TS-830S HF** transceiver, very good condition, only used GRP, £300. Standard C8900 2m FM mobile transceiver in good condition, £50. Geoff G4OVH (Bath), Tel. 0973 857595

**Realistic scanner**, portable handheld, 200 channels, programmable, with extra telescopic aerial and book, mint condition, still in box, £200. Nick (Chorley, Lancs), Tel. 01257 263603

**Yaesu FRG-100** comms. receiver, with Yaesu power supply and remote keypad for direct frequency access,

boxed as new, instructions, £350 inc. carriage. Yaesu FRT-7700 ATU, boxed, instructions, excellent condition, £45 inc. carriage. S. Clifton (N. Wales), Tel. 01492 878107

**Yaesu FT-290Mk2** 2m all mode transceiver with FL2025 25W matching linear, both boxed, VGC, £350. Tel. 01474 823797

**Kenwood TS-690S HF + 6m**, 1.8kHz filter fitted, boxed as new, £875. MFJ 784B DSP filter, as new, £175. Alan (Penzance), Tel. 01736 62809, or 362809 after 11th March

**Winch for tower**, Pfaff auto brake, as supplied by Strumech for P40, in box, never been used, £60. G. Perry (Manchester), Tel. 0161 723 4306

## WANTED

**For reception set R216**, the front panel metal cover contains two elevating screws. Also metal panel cover for supply unit containing a spares case and Festoon lamps. Any help please. Andrew Humphriss (Warwick), Tel. 01926 400876

**Heathkit SB101** transceiver and SB200 amplifier. Also Tokyo HT120 20W CW/SSB mobile transceiver. GM4PPT (Ayrshire), Tel. 01292 570517

**Yaesu NC-8 / FT-708R** battery charger and FNB-2 battery. Alan (Cleveland), Tel. 01642 478020

**455 IF SSB filter**, e.g. Kokusai MF455 10CK or similar. Also receivers G2OAF MkII, G3PDM, G4DTC 'Ultimate', working or not,

complete or incomplete. Tony (Worcester), Tel. 01905 641759

**Racal RA63G** or RA63H. Walter Gates, 16 High Mill Drive, Scarborough, N. Yorks YO12 6RN, Tel. 01723 365093

**Belcom LS102L** 10 metre multimode radio. Please call John GOCHQ (Middx), Tel. 0181 561 3837

## EXCHANGE

**Notebook laptop DX33** mono, 124Mb H/D, 3.25" drive, batt/pwr supply, log programmes installed plus others, for general coverage receiver with VHF or Signal R535 Airband receiver considered. W. Archibald, 32 Dunrobin Rd, Airdrie, Strathclyde ML6 8LR

HRT Vol. 15 No. 4

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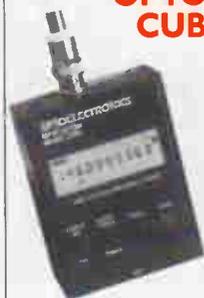


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