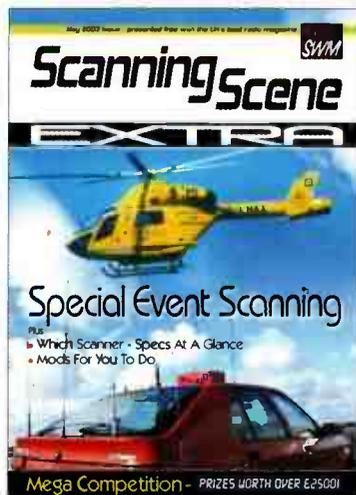


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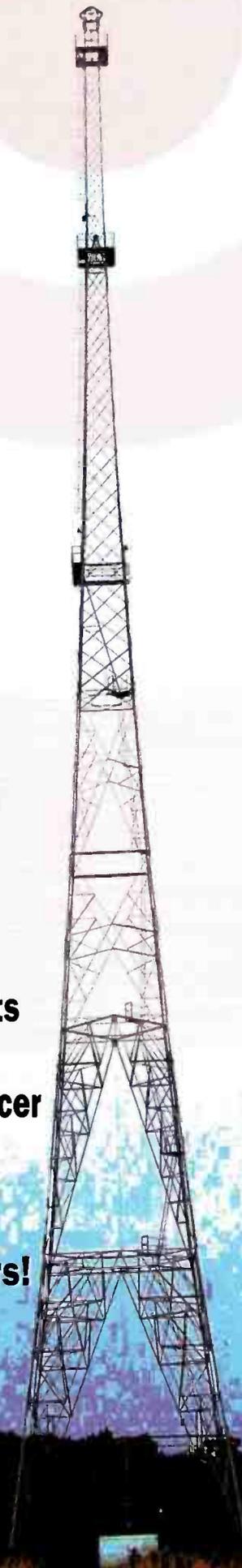
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May 2003

Vol. 61 Issue 05 May 2003 • ISSN 0037-4261
On Sale April 24 • June issue on sale May 22

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cover subject: *The
remains of a
Decca Navigator
mast. Plus our
free Scanning
Scope Extra
magazine.*

Broadcast

- 11 Bandscan America
12 LM&S

Features

- 22 **The Decca Navigator System**
Jon Trowsdale rubbed shoulders with the Decca logo as a child, he only realised the significance later on in life. Here Jon looks at the navigator system that supplied accurate navigation for mariners for many years.
- 25 **WIN! a bhi Noise Reducer**
Turn to page 25 quick to be in with a chance of winning the NEIM1031 noise eliminating in-line module as reviewed in the March SWM.
- 27 **You Never Know Where The Road Will Lead**
John Wilson's back again - this time he guides us through identifying a mystery receiver of the 1940s and discovers it could have been built specifically to avoid enemy direction finding techniques.
- 36 **How To QSL**
Clive Hardy G4SLU explains all you need to know about reception

report verifications and how to obtain lots of them. Welcome to the world of QSLs.

- 42 **WIN! Tickets To The RIAT 2003**
10 pairs of tickets up for grabs - enter our competition now and you could be in with a chance of jetting off to this truly stunning event in July. Not to be missed!
- 44 **Build a NAVTEX Decoder - Part 2**
NAVTEX is a continual source of fascinating automated maritime information. Roger Thomas brings us the second part of his neat project, that utilises both a programmed PIC microcontroller and some PC software to convert received audio to on-screen text.
- 46 **In The Ed's Shack - Receiving DRM**
Kevin Nice G7TZC takes a look at what's needed for reception of the new standard for digital broadcasts on h.f.
- 73 **SWM UK Radio Club Listing**
If you want to meet others with a radio passion, then look no further - use our comprehensive guide - which now includes International Radio Clubs on page 76.

Amateur Bands

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Regular Columns

Advertisers Index	78	Info In Orbit	65	Satellite TV News.....	60
Amateur Bands	55	LM&S	12	Scanning	51
Bandscan America	11	Order Form	78	ShackWare	57
Communiqué.....	7	Propagation Extra	63	Sky High.....	68
Decode.....	56	Propagation Forecast.....	62	SSB Utilities	52
DXTV	70	QSL.....	6	SWM Book Store Catalogue	58
Editorial	5	Rallies	9	Trading Post.....	71

Coming Next Month

in JUNE 2003 SWM

- SSB Special with Graham Tanner.
- Build a NAVTEX Decoder - conclusion.
- WIN! an AOR WL500 portable loop
- Kevin Nice builds a synthesised h.f. receiver.
- Keep on top of the world of monitoring with SWM.
- and much more...

*contents subject to change

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www.pwpublishing.ltd.uk/swm/news

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Share your thoughts

ED's comments



Last month I promised that due to overwhelming demand, we'd bring you the first of this year's two, yes two *Scanning Scene Extra* - 32 page free magazines for all you scanning enthusiasts. November will bring you the second, which will concentrate on antennas for v.h.f. and u.h.f. use. Contained in this month's *SSE* is a wide selection of extra scanning related features including a massive £2550 worth of prizes to be won in our easy-to-enter competition.

Contest

If you happen to be a reader who purchases their copy of *SWM* early on, then there's a chance that the *SWM* listening contest is still to happen - it runs from 0500 to 1700 on 4 May. If you are a licensed amateur, then please feel free to work the event station G35W. If you're not, or you just wish to enter the listening contest then please refer to either last month's *SWM* or the *Short Wave Magazine* web site at

www.pwpublishing.ltd.uk/swm/contest/ for details of how to enter.

Either way, I hope that you enjoy the activity. I very much look forward to sifting through the sacks full of entries to determine the winners - lets hope for good conditions both radio and weather.

Iraq Conflict

The conflict continues as I type this piece. There is of course news of activities within this very magazine. Today there are reports via the world's news media, of US troops having entered Baghdad and Presidential palaces. It is highly unlikely that military activity will cease before the June issue of *SWM*. To keep you abreast of conflict frequency information, we are introducing a new page to the *SWM* web site -

www.pwpublishing.ltd.uk/swm/news/ - you'll need to keep a close watch on this page, as it may update regularly.

Until next month - Good Listening

11/4 73 Kevin

SWM Services

Subscriptions

Subscriptions are available at £36 per annum to UK addresses, £43 in Europe and £48 (Airmail), £54 (Airmail) overseas. Subscription copies are despatched by accelerated Surface Post outside Europe. Airmail rates for overseas subscriptions can be quoted on request. Joint subscriptions to both *Short Wave Magazine* and *Practical Wireless* are available at £61 (UK) £74 (Europe) and £82 (rest of world), £94 (airmail).

Components For SWM Projects

In general all components used in constructing *SWM* projects are available from a variety of component suppliers. Where special, or difficult to obtain, components are specified, a supplier will be quoted in the article.

Photocopies & Back Issues

We have a selection of back issues, covering the past three years of *SWM*. If you are looking for an article or review that you missed first time around, we can help. If we don't have the whole issue we can always supply a photocopy of the article. Back issues for *SWM* are £3.25 each and photocopies are £2.50 per article.

Binders are also available (each binder takes one volume) for £6.50 plus £1.50 P&P for one binder, £2.75 P&P for two or more. UK or overseas. Prices include VAT where appropriate.

A complete review listing for *SWM/PW* is also available from the Editorial Offices for £1 inc P&P.

Placing An Order

Orders for back numbers, binders and items from our Book Store should be sent to: **PW Publishing Ltd., Post Sales Department, Arrowsmith Court, Station Approach, Broadstone Dorset BH18 8PW**, with details of your credit card or a cheque or postal order payable to PW Publishing Ltd. Cheques with overseas orders must be drawn on a London Clearing Bank and in Sterling. Credit card orders (Access, Mastercard, Eurocard, AMEX or Visa) are also welcome by telephone to Broadstone (01202) 659930. An answering machine will accept your order out of office hours and during busy periods in the office. You can also FAX an order, giving full details to Broadstone (01202) 659950. The E-mail address is bookstore@pwpublishing.ltd.uk

Technical Help

We regret that due to Editorial time scales, replies to technical queries cannot be given over the telephone. Any technical queries by E-mail are very unlikely to receive immediate attention either. So, if you require help with problems relating to topics covered by *SWM*, then please write to the Editorial Offices, we will do our best to help and reply by mail.

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Is there something you want to get off your chest? Do you have a problem fellow readers can solve? If so then drop a line to the Editor at QSL, Short Wave Magazine, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.

THE BEST LETTER WILL RECEIVE A £20 VOUCHER TO SPEND ON ANY SWM SERVICE.

Dear Sir

To the best of my knowledge, there has been no amendment to the receive only RA169 information sheet which the Radiocommunications Agency provide. Should there not be a revision to information to cover PMR446 and 461 licence free transceivers?

One of my mates was pulled over by the local police for a rear light out on his motor - at this time, an AOR AR8200 was present on the passenger seat, switched off at the time. He was questioned about the scanner on the seat, and advised the officer that it was used to monitor amateur radio repeater outputs on 145.600, 433.325 and PMR446 and 461 frequencies.

The police officer seized the scanner and advised him the use of said equipment to monitor PMR446 and 461 frequencies was an offence under the *Wireless Telegraphy Act of 1939* to listen, other than stated in section 5B.

I find this a bit backwards because of the fact that if you purchased a radio from an outlet to use these frequencies, you can run about listening to other users without breaking the law. My mate has since called into the police station and the handset was given back to him with a five minute talk on legal use of such equipment. Has anyone else been pulled over the coals on this one? Any comments would be welcome.

**K.J. Blythe
Cumbria**

Dear Sir

Poor BBC Reception Abroad

During a holiday to Gran Canaria in January this year, I took my old Panasonic RF-1110 radio with me, since it has a short wave band covering roughly 5.9-16MHz and I thought it would be interesting to see what reception would be like on a 'tranny' abroad, rather than using my normal professional gear at home. The bulky RA1772 and RA1792 do not make ideal travelling companions!

Although the Panasonic's short wave band is very crude compared with the latest expensive synthesised offerings from Sony and the others, it has worked well for years and the l.w., m.w. and f.m. bands are as good as anything bought yesterday.

Using just the whip antenna, I picked up Deutche Welle, Radio France International and numerous Spanish and other foreign broadcasts at good strength and intelligibility, but inexplicably the poor BBC World Service was jolly hard to find. Within the constraints of the Panasonic's simple string dial, I was able to tune to the usual frequencies, 5.975, 6.195, 7.325, 9.410, 12.095 and 15.400MHz.

The best was 12.095MHz, which happens to be the European Service, but it was rather watery, fading and 'thin' compared to the German, French and other stations. There was also a noticeable buzz on the signal which the others did not have. I could

just about use 15.400MHz from time to time during the day (the Ascension Island Relay). I could find no trace of 9.410MHz. Indeed, it seems almost to have disappeared, even on the radios at my QTH.

I tried Radio 4 long wave at night, which I used to be able to pick up in Gibraltar, but there was not a whisper.

When trying to listen to the BBC, the room's TV was switched off to avoid any r.f. contamination. The hotel was a series of pleasant bungalows built round a large pool, rather than a single steel-framed unit crammed with numerous electrical appliances, so the QRM level should have been quite low, but having seen some very dodgy Spanish electrics, I wonder.

I was disappointed that the World Service produced such a miserable signal. Have other readers found the same? It may be that DW was so much stronger because it was being rebroadcast from somewhere nearer, or the German antennas were targeting the Canaries. I say this because the vast majority of the tourists were Germans and some of the local f.m. stations and bars there are entirely German. Maspalomas felt almost like a suburb of Berlin were it not for the bright Spanish buildings, the cloudless blue skies and warm weather!

**Michael O'Beirne G8MOB
Surrey**

Michael, perhaps the AOR WL500 or similar would solve your problems. - Ed.

Dear Sir

I have been a subscriber to SWM for over a decade now and enjoy the wide range of articles. I particularly enjoy construction projects, frame antennas and receivers, etc.

I have recently been searching for an alternative supplier to the well known national chain whose prices seem to have risen while the choice of components for the radio hobbyist seems to have diminished in some areas. I have found Bowood Electronics Ltd. to be a very good supplier who I hope you may commend to your readers. They have a very easy to use ordering system on their website at www.bowood-electronics.co.uk Prices are competitive and delivery extremely efficient. The E-mail address is sales@bowood-electronics.co.uk and the postal address is **7 Bakewell Road, Baslow, Derbyshire DE45 1RE.**

I am sure you and your readership will find, as I did, many things of interest and use along with some interesting special offers. Great mag!

**Mike Smith
Staffs**

Dear Sir

Just a note to pass on my thanks to yourself and Roberts Radio for the C9950 Cassette Recorder recently received as a competition prize. This



Dear Sir

Just a line to say I buy SWM, but I have not read much on the short wave radios. I have bought one or two radio sets with short wave to try and pick up the stations from Australia and Canada, but I seem to have a hard time picking them up. So, is there a radio set that you can pick up the stations with good reception?

**E. Holdaway
London**

Any of the short wave receivers that we've mentioned in the various columns and features of the recent past plus those that feature in the many advertisements in SWM are very capable of receiving the stations you mention. There are several other important criteria which also need to be met. First and foremost, you need to be tuned to the correct frequency at the right time. Secondly, there needs to be a reasonable propagation path open and lastly, you'll need to have a noise floor which is lower than the signal arriving at your antenna. Perhaps you can let me have some more details of your current antenna and receiver set-up and I can offer some more specific advice. Good listening. - Ed.

versatile machine will be well used to complement my modest radio set-up based on a Lowe HF-150 receiver and in general listening around the house. Much appreciated - again many thanks.

I have been a reader of SWM for about 10 years and find the varied mix of articles provide a wide range of interesting topics - a good read. I find the 'LM&S' columns very helpful - although how the contributors find time to regularly send in their reports beats me! Some of the construction projects have formed the basis of home-made items, especially antennas.

May I conclude my sending you, and everyone associated with the magazine, best wishes for the future.

**Ron Boye
Gwynedd**

Ron, well done with the competition. I'm glad to learn that we've got the 'formula' right for you - many thanks for the feedback. I hope you continue to enjoy SWM for many years to come. - Ed.

communiqué

A MONTHLY REVIEW OF NEWS AND PRODUCTS

New Portable



The Celeste MkII is a new portable radio designed to receive both digital broadcasts from the WorldSpace satellite system and conventional a.m./f.m. Radio. WorldSpace programmes are broadcast from a network of satellites 34000km out in space without fading or interference. Reception is possible almost anywhere in the UK, Europe, Africa, the Middle East and Asia.

There are over 40 stations broadcasting on the satellite 24 hours a day, including the BBC World Service, CNN News, International News, Bloomberg, multi-lingual, educational, sport, weather, plus specialist music stations such as 'the original' Radio Caroline.

The Celeste is an original design with a digital display screen for program information. The 10 Preset memories allow favourite program selection along with a dataport and stereo line output and headphone socket.

The retail price is £129.

Visit www.nevada-radios.co.uk for more information.

Up & Running

Rusk Ltd. - the official distributor for RadioShack in the UK are pleased to announce that their web site - www.radioshack.co.uk - is now available. By logging onto this site, you will find over 3000 consumer electronic items, including RadioShack's famous and extensive accessory range. The site is also packed with gift ideas, gadgets, audio equipment, p.m.r. radios, scanners and products for the specialist market plus lots more. RadioShack UK are looking for dealers throughout the UK to represent their brand and product range, details can be found on their web site or by telephoning (01543) 468855 or E-mail: info@rs-rusk.com

EMC Talk

The Bangor & District Amateur Radio Society are hosting a talk on EMC by Jeff Smith M10AEX on 7th May 2003. The Society meet on the first Wednesday of every month in 'The Stables', Groomsport, County Down, at 2000. As always, visitors and new members are most welcome. More information from **Mike G14XSF on 0284-277 2383** or visit <http://welcome.to/bdars>



RIAT 2003

Despite the current world situation, The Royal International Air Tattoo (RIAT) 2003 is going ahead at RAF Fairford, Gloucestershire, on **19/20th July**, with a mega celebration for 100 Years of Flight. Deployment of UK Armed Forces to the Gulf region has led to the postponement until next year of Defence 2003, billed for RIAT this July. Airshow organisers, however, have a very up-beat message. The show is on and it is anticipated that Europe's biggest tribute to a century of aviation will attract over 200,000 spectators. The latest count shows close to 190 aircraft in the RIAT 100 Years of Flight panorama, with a star appearance by Eurofighter Typhoon, The future RAF front line jet will be on the ground for a close up of its sleek 21st century lines, but there will also be a spectacular performance for the fly-by-wire fighter.

The planned line up will see the Hawker P1127, prototype of the world famous Harrier Jump Jet, a Folland Gnat flown by the Red Arrows in the 1960s and 1970s and the Gazelle helicopter piloted by Prince Andrew as he trained for a career with the Royal Navy. A 1930s Junkers Ju-52 transport plane flown by the World War II Luftwaffe will be just one of the overseas rarities.

RIAT Director Paul Bowen says, "It is disappointing to learn Mildenhall Air fete has been cancelled for 2003 and other airshows may be in doubt. At the same time, especially in this landmark year for aviation, I am delighted to say we are well on track for perhaps our best ever Royal International Air Tattoo".

After the tailbacks of 2002, RIAT commissioned a Traffic Management Consultant to work with County Police Forces and the Highways Department on a new traffic plan, including additional routes into RAF Fairford. RIAT has invested heavily improving car park entrances and a specialist company, with longstanding experience in major public events, will design and manage the car parks. While in no way compromising its duty of care, RIAT has also streamlined the security check system to greatly reduce delays entering RAF Fairford.

A Good Time To Join

Interested in the history and heritage of amateur radio? Want to know more about how this fascinating hobby developed? Then membership of **RAOTA** is for you. RAOTA aims to encompass all of this by 'maintaining the traditions and spirit of amateur radio' mainly via its quarterly magazine *OTNews* and h.f. nets. RAOTA is also currently starting to organise regional members' meetings.

RAOTA's membership year runs from April 1st to March 31st so now would be a very good time to join. Full membership of is open to those who have been actively involved in amateur radio for 25 years or more (whether licensed or listener). Associate membership is open to those who do not (yet!) meet the 25 year qualifying period. The annual subs are £8 plus a one-off registration fee of £2 and, yes, this includes a RAOTA lapel badge for you.

OTNews carries a wide range of articles. The current issue (No. 65, with a full colour cover) has 60 pages and includes articles entitled: 'Amateur Radio Callsign Allocations', 'Interesting Circuits' by G3FEW, 'Memories of an old G' by G3JNJ, 'Relative Field Strengths' by G4VJV, 'The Humble Fuse' by G3FEW and 'Armstrong, The high fidelity Sound' by Jim Lesurf.

If you really do like amateur radio as a hobby, then please do find out more about The Radio Amateur Old Timers' Association. Further details and sample of *OTNews* from **Edward Rule G3FEW, 15 Norwich Road, Lenwade, Norwich, NR9 5S**, E-mail: edit@raota.fsnet.co.uk The RAOTA web site is at go.to/raota where you'll find more information.

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SSTV Winner

Winner of the **Dundee Amateur Radio Club's** bi-annual SSTV Competition was **Peter Deans MM3DCB**. Peter was presented with the SSTV Shield by Club President **George Duncan MM1DSD**. Peter managed a total distance of 47,302km miles for the reception of his Slow Scan Television images which he received on his amateur radio equipment which had been sent by fellow amateurs using a computer interlinked to an amateur radio transmitter. Visit the club's web site - <http://www.dundee-amateur-radio.co.uk> for detailed information about club activities.



***April 27:** West London Radio & Electronics Show organised by Radio Fairs takes place today at Kempton Park Racecourse, Sunbury-on-Thames, Middlesex. Several major radio traders will be attending this new event as well as a Bring & Buy sale manned by the Echelford Amateur Radio Society and Morse code testing. The Whitton Amateur Radio Group will provide a talk-in on S22 using GB2KRT. Show times are 1000-1700 hours, admission £3.50 (£3 after 1230), under 16s, Free. More details are available from **Paul Berkeley MOCJX** on (01737) 279108, E-mail: m0cjk@lineone.net or via the website at www.kemptonrally.co.uk

April 27: The Aldridge and Barr Beacon Amateur Radio Club are holding their 4th Annual Radio & Electrical Sale at Aldridge Community Centre, Anchor Meadow, Middlemore Lane, Aldridge, Walsall. Admission is just 50p and doors open at 1030 - there will be a free car park and refreshments. More information from **Doug G4LQY** on (01543) 571269.

May 4: The South Yorkshire Repeater Group are holding their 2003 Spring Great Northern

Hamfest at the Metrodome Leisure Centre Complex, Queens Road, Barnsley, South Yorkshire. Doors open at 1000. The venue is on all one level and has excellent disabled facilities. Features include all the usual trade stands, component and specialist interest groups and a large Bring & Buy. Admission is £2.50. More information from **Ernie Bailey G4LUE** on (01226) 716339 or mobile (07787) 546515.

May 5: The Dartmoor Radio & Computing Rally is to be held at Pannier Market, Tavistock, Devon - in the same new location as last year - giving plenty of space for traders to display their wares and for visitors to see them and talk to old friends. There is access for disabled visitors and plenty of public car parking within five minutes walking distance. There will be trade stands, a Bring & Buy and refreshments. Doors open at 1030 (1015 for disabled visitors), talk-in on S22. There are beautiful views over Dartmoor - ideal for picnics, why not bring the family. More information from **Ron G7LLG** on (01822) 852586.

May 5: The Winsford Amateur Radio & Computer Rally is to be held at Winsford Civic Hall. Doors open 1000 (0945 for disabled

visitors). There will be a large Bring & Buy, radio, computer and antenna traders, plus special interest groups. Full catering and bar. Admission is just £1.50. More information from **David G4XUV** on (01606) 77787.

May 18: The Drayton Manor Radio & Computer Rally will take place at Drayton Manor Park, Fazeley, Tamworth, Staffs, on the A4091, close to J9 and J10, M42. The main traders will be in three marquees, there will also be a large outside traders' flea market, loc area and special interest stands. Open from 1000 onwards. Trader information from **Norman G8BHE** on 0121-422 9787 or mobile (07730) 132726 or see <http://midamradi.members.beeb.net>

*** Look out for a representative from PW Publishing Ltd. at this rally. Go along to the stand for great deals on subscriptions to Practical Wireless, Radio Active and Short Wave Magazine, clearance books and a selection of back issues.**

If you're travelling a long distance to a rally, it could be worth 'phoning the contact number to check all is well, before setting off.

Convicted For Selling Illegal CCTV

A man who admitted selling illegal wireless CCTV equipment and illegal walkie-talkie radio transceivers, designed for use in North America, was given a 12-month conditional discharge and had his seized equipment worth over £3,000 forfeited when he appeared before Loughborough Magistrates on Tuesday 25 March.

Andrew Dennis Reid, from Belfast, pleaded guilty to the charge of putting illegal CCTV and radio equipment on the market that were not compliant with the Radio and Telecommunications Terminal Equipment Regulations 2000.

The prosecution by the Radiocommunications Agency followed a visit by the agency to a large annual Radio Amateur Exhibition held at the Donnington Park Exhibition Centre in Derbyshire. Reid was seen at his stall selling the illegal walkie-talkies and CCTV. Reid was later interviewed and agreed that he was responsible for importing equipment from Hong Kong and selling it at the show.

Smart & Necessary

The world's leading short wave radio manufacturer, Grundig, along with the fabled design skills of F.A. Porsche, have produced a compact and lightweight radio that will enable you to keep in touch with world events in times of trouble. The Grundig Porsche G2000A offers powerful radio features and top notch sound in a small package where every detail looks and feels just right. The radio's small size deceives its capabilities. Short wave, m.w. and f.m. reception, an alarm clock, 20 preset station storage and automatic scan tuning are all standard. It's titanium look finish is complimented by a glove soft genuine leather case that closes around the radio like a book, it also doubles as a table top stand for the radio.

With the government recommendation for each household to have a battery operated radio on hand, the Porsche G2000A gives the reassurance you want in uncertain times. Priced at £89.95 - for stockists call **Nevada** on (02392) 313090 or visit www.nevada-radios.co.uk



Foundation Rig Hits the Market

The new Icom IC-703, Foundation Licence/QRP portable transceiver is here. Aimed at the h.f./50MHz portable communications enthusiast, the IC-703 incorporates all the practicality and technical expertise of the IC-706MKIIG, but with the emphasis on portability and economy. The new transceiver incorporates integral antenna tuner, built-in d.s.p. unit, 10W of output power, an optional external battery pack and specified carrying case for portable operation allow the IC-703 to have base station ability with all the portable convenience of a mobile rig. Icom say the IC-703 is the ideal radio for the foundation licensee, QRP enthusiasts or any Radio Amateur who wants a convenient h.f. portable unit.



The internal antenna tuner covers from 1.8 to 54MHz. Field and mobile operation are made simple and efficient, especially when using a short antenna covering narrow bandwidth. Latch relays are used for the antenna tuner to greatly reduce the power consumption. The built-in antenna tuner eliminates the need to carry an extra one with you.

The built-in d.s.p. unit delivers superior receive performance. Including noise reduction and automatic notch, invaluable for a.m., f.m. and s.s.b. operation.

The newly designed PA unit provides 10W - max output power (4W in a.m. mode) when supplied with 13.8V d.c. and 5W output (2W in a.m. mode), while operating at 9.6V d.c. (9.6-11V) or with the optional battery pack.

The IC-703 has a receive sensitivity of 0.16µV in s.s.b., c.w. and RTTY modes on the h.f. bands, on par with that of a base station transceiver. The IC-703 provides excellent audio reproduction of both faint and strong signals even in crowded band conditions during contests.

The IC-703 features precise maximum output power settings, with 10/5/2.5/1/0.5W being selectable, instead of high/low only power settings. The power meter automatically adjusts its measurement range according to the max. power setting.

The optional 9.6V, 2.8Ah Ni-Cd battery pack can provide eight hours of operating time at 5W output. The IC-703 and the battery can be packed into a specific carrying case, making the IC-703 a go anywhere portable rig.

To reduce power consumption, the IC-703 includes a current consumption control setting. When 'Auto' is selected, the IC-703 automatically detects the power supply voltage and reduces the current consumption while operating with the external battery pack (or less than 11V power source). An l.c.d. backlight timer setting also controls the display backlighting depending on the power supply voltage. A duty-cycle control setting further reduces current consumption in the stand-by condition.

To achieve high stability, a superior TCXO unit is employed for the oscillator, to achieve ±0.5ppm high frequency stability, just the job for continuous operation using PSK3, RTTY or SSTV modes.

Additionally the IC-703 has a detachable controller which can be separated from the main unit, allowing flexible installation for use in vehicles, in the shack or during portable (manpack) operation. Microphone connectors are standard on both the controller and main unit. Separation cables are optional extras.

The IC-703 is well specified for c.w. operators, including the following:

- Built-in three channel memory keyer with 50-character capacity
- Electronic keyer with a variable dot/dash ratio
- c.w. reverse function to reduce adjacent interference
- c.w. pitch can be adjusted in the range of 300-900Hz
- c.w. narrow mode (optional c.w. narrow filters required)
- Full break-in (QSK) is available
- Paddle polarity reverse functions
- Bug-keyer simulation mode

The IC-703 uses a 455kHz crystal filter with good shape factor. One of the optional crystal filters below can be installed into the transceiver to further improve the selectivity and reduce QRM. A range of optional filters are available to cover a variety of uses.

Other features include; i.f. shift, spectrum scope function, s.w.r. graphic function, digital S-meter with 'Peak-hold' function, variable s.s.b. carrier-point, amber l.c.d. backlight, auto tuning step function, speech compressor, bandstacking register, built-in pre-amplifier, RIT, VOX and noise blanker are standard, CI-V system capability, fanless cooling system provides silent operation, RTTY mode, 9600bps data terminal on rear panel, a total 105 memory channels, combined SQL and r.f. gain control knob, optional voice synthesiser - UT-102, stabilisers added for standing IC-703 vertically.

The IC-703 will be available from your favourite radio dealer in May with a retail price of £645.08 (inc. VAT). It will come supplied with HM-103 microphone, d.c. Cable, Electric Keyer plug (6.5mm), plug adapter (3.5mm), ACC Cable and a handbook. Accessories for portable use including BP-228 Battery, PS-88 Charger and LC-156 carry case will be available from June 2003.

For more information contact, **Icom (UK) Ltd.**, Sea Street, Herne Bay, Kent CT6 8LD. Telephone: (01227) 741741. Web: www.icomuk.co.uk E-mail: info@icomuk.co.uk

CB Deregulation On The Way?

The Radiocommunications Agency recently published a consultation document on a proposal to deregulate Citizens' Band (CB) radio and withdraw the 40 UK only CB channels. CB is a short-range radio service for both hobby and business use, designed to be used without the need for any technical qualifications. To prevent interference to other radio users, all CB equipment must meet certain minimum performance specifications, and users must adhere to maximum power thresholds. Under the Wireless Telegraphy Act 1949, every CB radio user must obtain an individual licence, renewable annually.

The consultation seeks views on a proposal to deregulate CB in 2004, that is to remove the need for individual licensing while retaining the technical equipment requirements and the current operating rules. This consultation document also deals with a proposal to remove the 40 UK-specific CB channels from CB use in 2010, retaining only the 40 pan-European channels.

This deregulatory move is intended to comply with the lighter regulatory touch envisioned in the Communications Bill, to provide easier access to CB and to enhance enjoyment of the hobby.

Copies of the consultation document may be downloaded from the RA website at www.radio.gov.uk/topics/cb/documents/condoc/index.htm or requested in hard copy from the RA information centre on 0207-211 0502. Responses to the consultation should be sent to cbconsult@ra.gsi.gov.uk or to the postal address given in the document by 18 June 2003.

Download Link

Icom are pleased to announce that there is now a link on their website for customers to download a compatible version of the IC-PCR1000 control software for the latest Microsoft Windows operating systems. The link is <http://www.icom.co.jp/world/download/index.htm> There is also a link on Icom's web site - www.icomuk.co.uk - pointing customers to this download - this can be found on the links page. Information about this link also appears in the news section of their website, as well as the IC-PCR1000 product page. Applicable Microsoft Windows Operating Systems for this upgrade are Windows 98, Windows 98SE, Windows ME, Windows 2000 and Windows XP. Please note only the software has been updated - no hardware modifications need to be made to the IC-PCR1000.

Bandscan America

At the time this was being written, war with Iraq seems almost a certainty. Indeed, US psychological warfare operations began sometime ago 'Information Radio', broadcast from 'Commander Solo' EC-130E aircraft flying over Iraq was on the air well ahead of time broadcasting in Arabic from 1500 to 2000 on 9.715 and 11.292. (Although that is the official schedule, there have been some reports of reception during North American evenings, i.e. 0200 and 0600).

Unlike the earlier broadcasts over Afghanistan during the effort to oust the Taliban, the broadcasts to Iraq have only been heard in North America 'rarely and barely'. Medium wave and f.m. frequencies are also being used to beam in the programming. Hundreds of thousands of leaflets have been dropped over Iraq giving the frequencies on which the broadcasts can be heard. All this is the work of the 193rd Special Operations Wing of the Pennsylvania Air National Guard, which has performed similar work in several earlier conflicts.

The Information Radio broadcasts may not be the only such efforts being aimed at Iraq - although still largely supposition, there are hints that among the many less public broadcasts aimed at Iraq, there is at least one station operating with US government backing aimed at encouraging the overthrow of Saddam Hussein.

Meantime, despite its relatively short existence, Washington's Radio Sawa service, aimed at younger listeners in the Arab world, is said to have become very popular with its target audience.

Cutbacks for broadcasting in the new United States budget have caused programming in Eastern European languages such as Bulgarian to be dropped as coverage to that part of the world is de-emphasised, ironically just as those countries side with the US position on Iraq!

Radio Free Europe and Radio Liberty will also cutback or drop services in several East European languages, in fact have probably already done so. Those cutbacks were taken in order to release funds to double broadcasts to Indonesia and to fund an intended Arabic language TV network.

North American DXers are getting their kicks logging the various frequencies being used by the British Forces Broadcasting Service as it beams programming to British troops in the Gulf. 6.135, 12.040, 13.720 and 15.530MHz have provided the best reception, mostly in our evening hours. Matching frequencies to transmitter sites has proved a challenge though and one wonders why Merlin apparently has no part in providing this service.

Still Silent

Speaking of armed forces broadcasting, we remain puzzled as to why the s.s.b. outlet of the US Armed Forces Network on Diego Garcia remains silent when one would think there would be a lot of activity in that area now, and thus a need for a radio service. AFN outlets in Florida, Puerto Rico, Guam, Hawaii and (probably) Greenland are active on a regular basis, but no one has heard anything from Diego Garcia in a year or more. The station is still listed on the official web site, showing its initial frequencies 4.319 and 12.579.

The United States has yet another new religious broadcaster. After testing briefly some months ago, WBOH tested again in early March and ready to take the air on a full schedule. The station was running tone and ID tests on 5.920 or just a hair below that. By now it may well be on the air on a regular schedule. Reception reports should be sent to: **Fundamental Broadcasting Network (FBN), 520 Roberts Road, Newport, NC 28570.**

WBOH, of course, is just the latest in a long parade of religious or commercial religion broadcasters which have appeared on short wave in the United States over the last couple of decades. Ironically, the very first of the modern era private short wave stations, WRNO in New Orleans, has fallen on difficult times. Hearing this station in North America has become something of a challenge. The

station, now owned by Good News World in Dallas, Texas, is using 7.355MHz but with quite low power. Regular checks during North American evenings fail to turn it up. Although there is no timetable that we know of, the group is raising money for a new transmitter, which should improve their situation.

New Station

A new one on the air from Peru is Radio Santa Monica, using 4.965MHz and being heard around 2330. It's located in Cuzco Department.

Radio Imperial, the only short wave station active from El Salvador, is proving to be a very difficult catch, even in North America. But the signal (on 17.835 variable) does make it through on occasion, usually suffering from deathly fades that take it out for minutes at a time. Most receptions of this one seem to occur between 2300 and 0100. For a time there was some doubt as to whether this was a legitimate transmission, some kind of studio-to-transmitter link or a spurious signal. But they now announce the short wave frequency as well as their 810kHz medium wave channel so that has answered the question of broadcast legitimacy.

The Venezuelan government station, Radio Nacional de Venezuela, is said to be active again, using its former 9.540 spot from 1100-1400, 1800-2100 and 0000-0300. However, we've not seen any logs taken on this one during its current run.

In a related note, a station which some believe is the Venezuelan government outlet was heard on 15.570 earlier this year, announcing itself as Circuito RNV and taking a leftist line, which would be fit with the tack of the current Chavez government there. Whatever it was, it wasn't there very long. It is a bit surprising that the Venezuelan government isn't doing more short wave broadcasting in an attempt to make its views heard. For that matter, we wonder why no anti-Chavez clandestine broadcasters have appeared as yet.

Welcome Return

Another recent sighting has been the return of Radio Melodia in Colombia, varying around 6.140 - sometimes a bit above that, sometimes a sliver below. It's being noted with Spanish language programming during North American evenings, although under pressure from strong signals on either side. Reception reports for this one may be sent to: **Apartado 19823, SF de Bogotá, Colombia.**

Another Colombian, La Voz de tu Concencia, which is still fairly new, may be moved away from its 6.010MHz spot, possibly to 60m. The frequency 6.010 is a very busy channel and, even though the station isn't spot on 6.01MHz, it's still proving very difficult to pull out of the QRM.

The Voice of Guyana, 3.290, has a history of on-again, off-again operation. At the moment, it has recently come back to life after yet another long silent period and can sometimes be picked up as early as 0200, despite the usually noisy conditions affecting many North American listeners this DX season.

Brazil's Radio Nacional da Amazonia showed up on one of its ancient channels (9.665MHz) awhile back and seemed to drop 6.180 in the process. But the change was brief and things soon reverted to 6.180 and 11.780MHz. Both frequencies are being heard very well at present.

The frequency 15.820MHz continues to be a source for picking up various Argentine domestic broadcasters as they are relayed to Argentine personnel in Antarctica. La Red, Radio Commercial and Radio Rividavia are three of several that appear here from time to time. But if there is a precise schedule as to what station is carried when, we've never seen it!

That's it for this time. Join us again in three months for another look at the short wave scene in North America. Until then - good listening!



■ BRIAN ODDY G3FEX, THREE CORNERS, MERRYFIELD WAY, STORRINGTON, WEST SUSSEX RH20 4NS

LM&S



Propagation in the higher frequency short wave broadcast bands was disturbed by solar activity during some days in February. Such effects may continue in the months ahead, but the number of sunspots will gradually decline.

Seasonal variations in propagation will also affect s.w. reception during the summer. To compensate, some broadcasters will have altered the operating frequency of their transmissions at the end of March, but if reception from your favourite stations is not as good as you expect, do not jump to the conclusion that the performance of your receiving equipment is suspect!

Long Wave Reports

Note: l.w. & m.w. frequencies in kHz; s.w. in MHz; Time in UTC (=GMT). Unless otherwise stated, all logs were compiled during February.

During a holiday in Galloway **Michael Wasley** (Scunthorpe) stayed with his family in a cottage in Creetown which was made of granite and there were large hills to the east and north-east. He searched this band after dark on February 18 with his Grundig Yachtboy 400 portable, but reception there proved to be poor - see chart.

At 2210 on the 27th **Sheila Hughes** (Morden) heard a faint co-channel broadcast under DLF on **153kHz**, which she presumed came from Bod, Romania. At best it rated SINPO 22212. With the exception of Azilal, Morocco on **207kHz** (800kW), the stations in N.Africa which **Fred Pallant** (Storrington) logged were heard as co-channel interference during the evening of the 28th - see chart.

Medium Wave Reports

Some of the low power m.w. stations in the USA which operate at the high frequency end of the band have been attracting the attention of **Paul Hawkins** in Cinderford. Using a new AOR AR7030 receiver plus ALA1530 loop he searched the band between **1620 and 1700kHz** from 0500 before going to work; also during the same times at the weekends. The station most often heard was WPTX in Lexington Park, MD (1kW) on **1690kHz**, which he rated SINPO 22222. Others on **1630,**

1650, 1660, 1670, 1680 and 1700kHz were heard, but their IDs were elusive. On March 8 he heard WHP in Frederiksted, St Croix, US Virgin Is (1kW) on **1620**, which he rated 43333 at 0500. On the 10th he logged WTIR in Winter Garden, FL (1kW) on **1680** as 33233 at 0500.

The sky waves from some of the many m.w. stations in the Middle East, N.Africa, Europe and Scandinavia were picked up after dark by several listeners - see chart. Whilst in Creetown Michael Wasley searched this band after dark on the 18th and compiled a fairly extensive log - see chart. A few local radio stations were also heard, perhaps the most notable was BBC R.Devon via Barnstaple (2kW) on **801kHz**.

During two days Michael and his family drove to three coastal locations - the first was Port William at the south end of the Machars. The second and third were in the Rhinns of Galloway at the south end (Mull of Galloway) and the north end (Corsewall Point). At each location the band was searched as a joint effort by Michael and his daughter Louisa using a Volvo car radio and they compiled some interesting logs - see charts.

During daylight several listeners

searched the band for distant local radio stations. Quite extensive logs were compiled by **Simon Hockenull** (E.Bristol), **Peter Perkins** (Hemel Hempstead), **Ernie Strong** (Ramsey, Cambs) & **Fred Wilmshurst** (Northampton) - see chart.

Short Wave Reports

The daily broadcasts in the **25MHz (11m)** band from Radio France International (RFI) on **25.820** (Fr, Eng to E/C.Africa 0830-1300); Deutsche Welle (DW), Germany on **25.740** (Ger to Asia 0800-1400); also DW on **25.700** (Eng to Africa 1100-1145) continued during February, but no reports arrived here to indicate how well they reached the intended target areas.

The reception of them in the UK tends to be poor because it relies upon back scatter and other unreliable propagation modes. Sometimes solar activity results in high noise levels too. The SINPO ratings quoted in the reports for RFI on **25.820** were 23322 at 0916 by **Vic Prier** in Seaton; 45333 at 1015 by **Bernard Curtis** in Stalbridge; 34333 at 1042 by **Thomas Williams** in Truro; 25333 at 1103 in Storrington; 45522 at 1123 in E.Bristol; 34333 at 1128 by **Peter Pollard** in Rugby; 25343 at 1158 in Northampton.

Those for DW on **25.740** were 24322 at 0900 in Seaton; 45444 at 1020 in Stalbridge; 33333 at 1050 in Truro; 15332 'with echo' at 1106 in Storrington; 45522 with 'very strong echo' at 1125 in E.Bristol; 25333 at 1130 in Northampton; 33233 at 1132 in Rugby. Their broadcast in English on **25.700** was rated 32233 at 1100 in Seaton; 25443 at 1100 in Storrington; 43444 at 1102 in Truro; 25444 at 1123 in Northampton; 45523 at 1127 in E.Bristol; 34333 at 1135 in Rugby.

From time-to-time reception in the **21MHz (13m)** band was marred by the effects of solar activity. Sometimes R.Australia's early morning transmission to Pacific areas via Shepparton on **21.725** (Eng 0200-0900) reached the UK. It was rated 24331 at 0839 by **Rhoderick Illman** in Oxted. Their broadcast to Asia on **21.820** (Eng 0900-1400) was more often received here. It was rated 44434 at 1025 in Stalbridge & 34333 at 1146 in Rugby.

Other occupants of this band include R.Pakistan, Islamabad **21.465** (Ur, Eng to Eur 0700-1010), rated 43343 at 0835 in Seaton; BBC via Rampisham, UK **21.830** (Eng to S.Asia 0800-0900) 44333 at 0845 in Morden; BBC via Kranji, Singapore **21.660** (Eng to Far East 0500-1030) 25552 at 0905 by **John Parry** in Larnaca, Cyprus; R.Prague, Czech Rep **21.745** (Eng to E.Africa, S.Asia 1000-1030) 43334 at 1000 by **Gerald Guest** in Dudley; UAE R.Dubai **21.595** (Eng to Eur 1030-1050, 1330-1350, 1600-1635) 54433 at 1035 by **Stan Evans** in Herstmonceux; DW via Wertachtal **21.840** (Ger to Africa 1000-1400) 35432 at 1128 in E.Bristol; Voice of Turkey via Emirler **21.715** (Tur to Asia, Australia 1000-1300) 44344 at 1150 in Rugby; HCJB Quito, Ecuador **21.455** (Eng to Eur, Australasia [u.s.b.] 1100-1430) 33333 at 1212 by **David Hall** in Morpeth; R.Prague, Czech. Rep **21.745** (Eng to E.Africa, N.America 1400-1429) 33333 at 1410 in Truro; BSKSA **21.705** (Ar to Eur 0550-1500) 55445 at 1420 in Stalbridge.

In the **18MHz (15m)** band VOA via Sri Lanka? **19.010** (Dari to Afghanistan 1130-1230) was rated 44333 at 1210 in Morden; R.Sweden via Horby **18.960** (Sw to N.America 1130-1200, 1300-1330, 1400-1430 daily, 1140-1200 Sat/Sun; Eng to N.America 1230-1300, 1330-1400, 1430-1500) 45544 at 1240 in E.Bristol & 55544 at 1245 in Herstmonceux; R.Afghanistan via R.Norway **18.940** (? to W/S.Asia 1330-?) 33333 at 1340 in Truro & 34553 at 1355 in Larnaca, Cyprus; R.Norway Int **18.950** (Norw to N.America 1700-1730) 45544 at 1700 in Seaton; Family R, WYFR via Okeechobee FL, USA **18.980** (Eng to Eur 1600-1945) 44334 at 1825 in Stalbridge & 44243 at 1840 in Rugby.

During some days R.Australia's broadcasts to E/SE.Asia in the **17MHz (16m)** band have been

Long Wave Chart

kHz	Station	Country	Power (kW)	Listener
153	Bechar	Algeria	1000	C*,E*
153	Donebach DLF	Germany	500	A,B*,C*,E,F*,G,H,I,J
153	Bod	Romania	1200	B*
162	Allouis	France	2000	B*,C*,E,F*,G,H,I,J
171	Nador Medi-1	Morocco	2000	C*,E*
171	B'shakovo etc	Russia	1200	A*,C*,F*,G,H,I,J
177	Oranienburg	Germany	500	A,B*,E,F*,J
183	Saarlouis	Germany	2000	C*,E,F*,G,H,I,J
189	Gufuskalar	W.Iceland	150	A*,E*
196	BBC R-4 via ?	UK	?	F*,G,H
196	Droitwich BBC	UK	500	B,E*,J
207	Munich DLF	Germany	500	A,C*,E,F*,G,I,J
207	Eidar	E.Iceland	100	E*
207	Azilal	Morocco	800	A*,C*,E*
216	Roumoules RMC	S.France	1400	A,B*,C*,E,G,H,I,J
225	Polskie R-1	Poland	?	A,B*,C*,E,G,H,I*,J
234	Beidweiler	Luxembourg	2000	C*,E,F*,G,H,I*,J
243	Kalundborg	Denmark	300	A,B,C*,E,F*,G,H,I,J
243	Erzurum	Turkey	200	E
252	Tipaza	Algeria	1500	A,B,C*,D,E,H,I,J
261	Burg(R.Popa)	Germany	85	A,J
261	Taldom Moscow	Russia	2500	A*,B*,E
270	Topolna	Czech Rep	1500	A,B*,C*,E,H,I,J
279	Sasnovy	Belarus	500	A*,B*,C*,E,H,I,J

Note: Entries marked * were logged during darkness. All other entries were logged during daylight or at dawn/dusk.

Listeners:-

- (A) Simon Hockenull, E.Bristol.
- (B) Sheila Hughes, Morden.
- (C) Fred Pallant, Storrington.
- (D) Peter Pollard, Rugby.
- (E) Ernie Strong, Ramsey, Cambs.
- (F) Michael Wasley, while in Creetown.
- (G) Louisa & Michael Wasley, while at Port William.
- (H) Louisa & Michael Wasley, while at Mull of Galloway.
- (I) Thomas Williams, Truro.
- (J) Fred Wilmshurst, Northampton.

Tropical Bands Chart

MHz	Station	Country	UTC	DXer	MHz	Station	Country	UTC	DXer
3.200	TWR Manzini	Swaziland	1811	B,K	4.865	R.Alvorada, Londrina	Brazil	0305	B
3.205	R.Ribeirao	Brazil	0035	B	4.875	R.Roraima, Boa Vista	Brazil	0256	F
3.223	AIR Simla	India	1645	B	4.880	AIR Lucknow	India	1710	B
3.230	SABC Meyerton	S.Africa	1950	J,K	4.885	R.Clube do Para	Brazil	2306	B,F,K
3.240	TWR Manzini	Swaziland	0315	B	4.885	R.Difusora Acreana	Brazil	2305	K
3.255	BBC via Meyerton	S.Africa	2120	B	4.885	KBC East Sce Nairobi	Kenya	1950	B,J
3.279	La Voz del Napo	Ecuador	0419	B,F	4.890	RFI Paris	via Gabon	0432	F
3.315	AIR Bhopal	India	0040	B	4.890	R.Port Moresby	Pap.N. Guinea	1925	B,J
3.320	SABC (RSG) Meyerton	S.Africa	1947	B,J,K,M	4.895	AIR Kurseong	India	1611	B,J
3.325	FRCN Lagos	Nigeria	0555	B	4.900	Haixia 2.V of Strait	China	2308	B,K
3.345	Channel Africa	S.Africa	0315	B	4.905	Xizang-Tb, Lhasa	China	2304	B,K
3.365	GBC R-2	Ghana	1922	B,J,K,M	4.910	Tennami Creek	Australia	2025	H
3.365	AIR Delhi	India	1645	B	4.910	AIR Jaipur	India	1610	B,J
3.390	AIR Gangtok	India	0120	B	4.915	R.Anhanguera	Brazil	0105	B,K
3.900	Hulun Buir	China	2300	K	4.915	GBC-1, Accra	Ghana	2100	B,J,K,M
3.915	BBC via Kranji	Singapore	1745	B,G,K,M,D	4.915	KBC Cent Sce Nairobi	Kenya	1942	B,F,J
3.950	Qinghai PBS, Xining	China	2355	B	4.920	Xizang-Tb, Lhasa	China	2325	B,K
3.955	R.Korea via Skelton	England	2200	C,D,I,L,N,D	4.920	R.Quito, Quito	Ecuador	0255	B
3.955	R.Taipei via Skelton	England	1809	D,K,M	4.920	AIR Chennai	India	0050	B
3.965	RFI Paris	France	2102	C,G,K,N	4.927	RRI Jambi	Indonesia	2300	B
3.975	R.Budapest	Hungary	1811	G,K,M	4.930	R.Costena Ebenezer	Honduras	0300	B,F,G,K
3.985	VOIRI	Iran	1816	K	4.930	AIR Shimla	India	1650	B
3.985	China R.Int via SRI	Switzerland	2340	B	4.935	R.Capixaba, Vitoria	Brazil	0250	B
3.990	Xinjiang BS, Urumqi	China	1645	B	4.935	KBC Gen Sce Nairobi	Kenya	1946	B,J
3.995	DW via Julich?	Germany	1816	C,G,K,M,N,D,P	4.940	AIR Guwahati	India	0045	B
4.005	Vatican R.	Italy	2050	C,F,G,I,K,M,D	4.950	R.Nacional, Mulvenos	Angola	2015	B,F
4.190	CNR Minority Sce	China	2215	B	4.950	AIR Srinagar	India	1724	B,K
4.330	Xinjiang BS, Urumqi	China	1640	B	4.950	VDA via Sao Tome	Sao Tome	2053	A,C,J,K,L,M
4.500	Xinjiang BS, Urumqi	China	2325	B,E	4.955	R.Cultura, Campos	Brazil	0235	B
4.620	PBS Nie Menggu	China	2340	B	4.960	R.Cima	Dominion Rep.	0305	B
4.747	R.Huanta 2000	Peru	2325	B	4.960	AIR Ranchi	India	1635	B
4.750	Hulun Buir-Mo	China	0010	B,K	4.960	VDA via Sao Tome	Sao Tome	0315	B,G,K
4.755	R.Educ CP Grande	Brazil	0030	B	4.965	Christian Voice	Zambia	1957	B,J
4.760	AIR Port Blair	India	2327	G,B,K	4.970	AIR Shillong	India	0050	B
4.770	FRCN Kaduna	Nigeria	1957	F,B,J,K	4.975	Fujian 1, Fuzhou	China	2300	B
4.775	AIR Imphal	India	1727	B,K	4.975	R.Uganda, Kampala	Uganda	2053	B,C,F,J,K,M
4.790	AIR Chennai	India	0037	L	4.980	PBS Xinjiang, Urumqi	China	1720	B,K
4.790	AIR Itanagar	India	0030	B	4.980	Ecos del Torbes	Venezuela	0019	E
4.790	Azad Kashmir R.	Pakistan	1740	B,K	4.985	R.Brazil Central	Brazil	2356	B,F,K
4.800	CPBS 2 Beijing	China	2005	B,K,M,P	4.990	Hunan 1, Changsha	China	2322	B,K
4.800	AIR Hyderabad	India	1718	B,K	4.990	AIR Itanagar	India	0055	B
4.800	LNBS Maseru	Lesotho	0343	B,F	5.005	R.Nepal, Kathmandu	Nepal	0040	B
4.805	R.Nac. Amazonas	Brazil	0033	B,K	5.010	CPBS Beijing	China	2315	B
4.815	R.Difusora, Londrina	Brazil	0025	B	5.010	R.Misiones Int.	Honduras	2358	K
4.820	R.Botswana, Gaborone	Botswana	1934	K	5.010	AIR Thiru'puram	India	0045	B
4.820	Xizang, Lhasa	China	2104	B,J,K	5.014	R.Pioneira, Teresina	Brazil	0250	B
4.820	AIR Calcutta	India	1710	K,M	5.025	R.Rebelle, Bauta	Cuba	0307	F,G
4.825	R.Cancao Nova	Brazil	2324	B,K	5.025	R.Pakistan, Quetta	Pakistan	0245	B
4.835	RTM Bamako	Mali	1956	B,J,K,M	5.025	R.Uganda, Kampala	Uganda	2005	M
4.840	AIR Bombay	India	1612	B,G,J,K	5.030	CNR-1, Beijing	China	2025	B
4.845	ORTM Nouakchott	Mauritania	2102	B,C,J,K,M,P	5.040	PBS Fujian, Fuzhou	China	2305	B
4.850	CNR 2	China	2310	B,K	5.040	Jeyapore	India	0035	B
4.850	AIR Kohima	India	0100	B	5.047	R.Togo, Lome	Togo	2330	B
4.860	AIR Delhi	India	1926	A,B,G,J,K	5.050	Guangxi PBS, Nanning	China	2330	B
					5.050	AIR Azawl	India	0040	B
					5.060	PBS Xinjiang, Urumqi	China	1610	B,F



DXers:-

- (A) Bernard Curtis, Stralbridge.
 (B) Jim Edwards, Wigan.
 (C) Ian Evans, Ebbw Vale, Gwent.
 (D) Stan Evans, Herstonceux.
 (E) Geraint Gill, Llantfairfechan, Conwy.
 (F) David Hall, Morpeth.
 (G) Simon Hockenhill, E.Bristol.
 (H) Andrew Kirby, Bourne-mouth.
 (I) Ian Pakeman, Folkestone.
 (J) Fred Pallant, Storrington.
 (K) Peter Perkins, Hemel Hempstead.
 (L) Clare Pinder, Appleby.
 (M) Vic Prier, Seaton.
 (N) Michael Wasley, while in Creetown.
 (D) Thomas Williams, Truro.
 (P) Fred Wilmshurst, Northampton.

received quite well in the UK. Their transmission from Shepparton on **17.750** (Eng 0030-0400, 0530-0800, 0830-0900, 0930-1100) was rated 35444 at 0830 in Northampton & 34333 at 1048 in Truro.

Also mentioned in the reports were R.Japan via Ascension Is **17.650** (Jap to W.Africa 0800-1000), rated 44434 at 0945 in Seaton; All India R. (AIR) via Bangalore **17.510** (Eng to Australasia 1000-1100) 44333 at 1010 in Morden; Africa

No.1, Gabon **17.630** (Fr to W.Africa 0700-1600) 43343 at 1151 in Oxted; R.Ukraine Int, Kiev **17.760** (Eng to Eur 1200-1300) 34333 at 1215 in E.Bristol; World Harvest R. (WHRA) via Greenbush, Maine, USA **17.560** (Eng to M.East, Africa 1300-1600) 33433 at 1348 in Morpeth; Voice of Turkey **17.815** (Eng to Eur 1330-1430) 55444 at 1334 by **Ian Pakeman** in Folkestone & 44434 at 1350 by **Johan Leidcker** in Amsterdam, Netherlands; R.Rossii, Moscow

Listeners:-

- (A) Francis Hearne, N.Bristol.
 (B) Simon Hockenhill, E.Bristol.
 (C) Sheila Hughes, Morden.
 (D) Ian Pakeman, Folkestone.
 (E) Peter Perkins, Hemel Hempstead.
 (F) Ernie Strong, Ramsey, Cambs.
 (G) Michael Wasley, while at Creetown.
 (H) Louisa & Michael Wasley, while at Port William.
 (I) Louisa & Michael Wasley, while at Mull of Galloway.
 (J) Louisa & Michael Wasley, while at Corsewall Point.
 (K) Thomas Williams, Truro.
 (L) Fred Wilmshurst, Northampton.

Local Radio Chart

kHz	Station	ILR BBC	e.m.r.p (kW)	Listener	kHz	Station	ILR BBC	e.m.r.p (kW)	Listener
558	Spectrum, London	I	0.10	B,E,F,L	954	CI.Gold 954, H'ford	I	0.16	B,L
603	Capital G, Litt' bme	I	0.80	B,D,E,F,L	963	Liberty R, Hackney	I	1.00	B,C*,E,F,L
630	R.Bedfordshire(3CR)	B	0.20	B,C,E,F,L	972	Liberty R, Southall	I	1.00	B,C*,E,F,L
630	R.Cornwall	B	2.00	H,J	990	R.Devon, E.Devon	B	1.00	B
657	R.Clwyd	B	2.00	E	990	CI.G, Wolverhampton	I	0.09	L
657	R.Cornwall	B	0.50	F	999	CI.G GEM Nottingham	I	0.25	E,L
666	CI.Gold 666, Exeter	I	0.34	B,E,F,L	999	Magic 9-99 P'stn	I	0.80	H,I,J
666	R.York	B	0.80	E,F,H,I	999	R.Solent	B	1.00	E
729	BBC Essex	B	0.20	C,E,F,L	1017	CI.G, WAABC, Shr'shire	I	0.70	B,F,L
738	Hereford/Worcester	B	0.037	B,E,F,H,I	1026	R.Cambridgeshire	B	0.50	C,E,F,L
756	R.Cumbria	B	1.00	H,J	1026	Downtown R, Belfast	I	1.70	C*,H,I,J
756	The Magic 756, Powys	I	0.63	E,F,L	1026	R.Jersey	B	1.00	B
765	BBC Essex	B	0.50	C,E,F,L	1035	Mean Country 1035	I	1.00	E,F,L
774	R.Kent	B	0.70	D*,E,F,L	1035	West Sound AM, Ayr	I	0.32	J
774	R.Leads	B	0.50	F	1116	R.Derby	B	1.20	E,F,I,L
774	CI.Gold 774, Glas	I	0.14	F,L	1116	Valley R, Ebbw Vale	I	0.50	B
792	CI.Gold 792, Bedford	I	0.27	E,F,L	1152	CI.G Amber, Norwich	I	0.83	F
792	R.Foyle	B	1.00	G*,H,I,J	1152	Clyde 2, Glasgow	I	3.06	F
801	R.Devon	B	2.00	B,F,G*	1152	LBC 1152, London	I	23.50	E,F*,L
828	CI.Gold 828, Luton	I	0.20	B,F,L	1152	Magic 1152, Manch'ter	I	1.50	J
828	Asian Net Sedgley	B	0.20	E	1152	CI.G, Birmingham	I	3.00	B
828	CI.G 828 Bourne'm'th	I	0.27	B	1161	R.Bedfordshire(3CR)	B	0.10	E,L
837	R.Cumbria/Furness	B	1.50	H,I,J	1161	Tay AM, Dundee	I	1.40	I
837	Asian Net Leicester	B	0.45	B,C*,E,F,L	1170	CI.G Amber, Ipswich	I	0.28	E,F
855	R.Lancashire	B	1.50	G*,H,I,J	1170	Slgs Big.Stoke-on-T	I	0.20	H
855	R.Norfolk, Postwick	B	1.50	E,F	1170	Swansea Snd, Swansea	I	0.58	B
855	Sunshine 855, Ludlow	I	0.15	B,E,L	1242	Capital G, Maidstone	I	0.32	E
873	R.Norfolk, W.Lynn	B	0.30	E,F,L	1251	C.G Amber, Bury StEd	I	0.76	E,F
936	Brunel CG, W.Wilts	I	0.18	E,F,L	1260	CI.G 1260, Bristol	I	1.60	E,H,I
936	Fresh AM, Hawes	I	1.00	H,I,J	1260	CI.G Marcher/Wrexham	I	0.64	J
945	CI.Gold GEM, Derby	I	0.20	F,I,L	1260	SabrasSnd, Leicester	I	0.29	E,F,L
945	Capital G, Bexhill	I	0.75	E	1278	CI.Gold 1278 W.York	I	0.43	F
954	CI.Gold 954 via ?	I	?	F	1296	Radio XL, Birmingham	I	5.00	B,E,F,H,I,J,L
					1305	Premier via ?	I	0.50	E,F,L
					1323	Capital G, Southwick	I	0.50	B
1332	Premier, Battersea	I	1.00	E					
1332	CI.Gold 1332, Pt'bo	I	0.60	E,F,L					
1359	Breeze, Chelmsford	I	0.28	D,E					
1359	CI.Gold 1359, C'try	I	0.27	E,F,L					
1368	R.Lincolnshire	B	2.00	F,L					
1368	Southern Counties R	B	0.50	C*					
1368	Wiltshire Sound	B	0.10	A*					
1413	R.Goucester via ?	B	?	L					
1413	Fresh AM, Skipton	I	0.10	I					
1431	CI.G 1431, Reading	I	0.14	E,L					
1449	Asian Net Peterbro	B	0.15	F,L					
1458	R.Cumbria	B	0.50	H,I,J					
1458	Sunrise, London	I	50.00	D*,E,K*,L					
1458	Asian Net Langley	B	5.00	F,L					
1485	CI.G 1485, Newbury	I	1.00	E,L					
1485	R.Humberside (Hull)	B	1.00	F					
1485	R.Merseyside	B	1.20	H,I,J					
1485	Southern Counties R	B	1.00	L					
1503	R.Stoke-on-Trent	B	1.00	C*,I					
1521	CI.G 1521, Reigate	I	0.64	L					
1530	Big AM, W.Yorks	I	0.74	I					
1530	CI.G 1530 Worcester	I	0.52	B,I					
1548	Capital G, London	I	97.50	E,L					
1548	Magic AM, Sheffield	I	0.74	H,I					
1557	R.Lancashire	B	0.25	H,I					
1557	CI.Gold 1557, N.hant	I	0.76	L					
1566	CountySnd, Guildford	I	0.50	L					
1566	SomersetSnd, Taunton	B	0.63	B					
1584	London Turkish R	I	0.20	C					
1584	R.Nottingham	B	1.00	C*,L					
1584	R.Shropshire	B	0.50	B					

Note: Entries marked * were logged during darkness. All other entries were gged during daylight or at dawn/dusk.

GOING MOBILE

G. SCAN II MOBILE

Freq: 25-2000 Mhz Length: 620mm
Dual coil capacitor loaded vertical coils, 3.5" magnetic base with rubber protection, 4mtrs RG58 coax cable, terminated with a BNC. (Don't lose those signals while on the move, the G Scan II is the answer for continued high performance reception where ever when ever).
Our Price £24.95 plus £6.00 p+p.



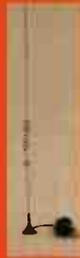
SKYSCAN MOBILE

Freq: 25-2000 Mhz Length: 650mm
4 tuned stainless steel vertical radials, 3.5" magnetic base with rubber protection, 4 mtrs RG58 coax terminated with a BNC. (With not just one but four vertical radials, take your scanner in the car & enjoy superior reception with this dedicated antenna).
Our Price £19.95 plus £6.00 p+p.



M NISCAN MOBILE

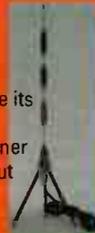
Freq TX: 144-146 430-440 Mhz
Freq RX: 100-1300 Mhz Length: 300mm
Spring loaded black stainless whip, 1" super strong magnetic mount, 4mtrs of mini hi-spec coax terminated with a BNC. (Ideal for "low profile" scanning while for those with transceivers with wideband receive, its the perfect choice for dual band TX and continued large scale reception).
Our price just £14.95 plus £3.00 p+p



PORTABLE ANTENNAS

TR-SCAN III

Freq: 25-2000 Mhz Length: 900mm
This Desktop Internal Antenna comes with 3 vertical capacitor loaded coils, mounted on a unique helically wound tri-pod, to give its own ground plane for smooth reception. Complete with 5 mtrs of RG58 coax, terminated with a BNC. (Get the most from your scanner with the Tri-Scan III Desktop and enjoy great performance without the hassle of erecting an external one).
Our Price £39.95 plus £6.00 p+p.



SKYSCAN DESKTOP

Freq: 25-2000 Mhz Length: 900mm
This discone style indoor antenna comes with 4 tuned stainless steel vertical whips, 8 ground plane 12" radials, plus 4 loaded horizontal 3" helical radials. Complete with heavy duty base 5 mtrs RG58 terminated with a BNC. (Don't lose those wanted signals while indoors. Use the SkyScan Desktop at your radio station, on the window seal or even in the loft for increased performance).
Our Price £49.95 plus £6.00 P+P.



SWP GLASS MOUNT ANTENNAS

These two superb universal antennas, one for VHF/UHF & one for HF have internal tuned wound coils encased in a fibreglass tube with black covering. Includes two suction cups for easy fitting to any smooth surface, complete with 5mtrs of mini hi-spec coax terminated with a BNC. (With these antennas, take your hobby mobile in the car, at home on the patio or bedroom window. A perfect solution for sometimes awkward antenna installations. Great results - No hassle)



SWP2000

Freq: 25-2000 Mhz Length: 515mm.
Our Price £29.95 PLUS £6.00 P+P.

SWPHF30

Freq: 0.05-30 Mhz Length: 770mm.
Our Price £39.95 PLUS £6.00 P+P.

MAX-5 ACTIVE

Freq:25-1800 Mhz Length:1400mm
This portable active antenna incorporates a easy fold away 300 Ohm receiving element joining to a matching coil, wideband pre-amplifier (9v batt not inc) 4mtrs RG58, terminated in a BNC. (Don't lose performance by not choosing an external antenna! Install the in the loft, hang by the window, or even from a tree while out and enjoy upto 14dB Gain with the MAX-5 pre-amplified Active Antenna).
Our Price £49.95 PLUS £6.00 P+P.



SHORT-WAVE WIRE ANTENNAS

MD37 SKYWIRE

Freq: 0-40 Mhz Length: 25mtrs
This complete HF wire antenna system comes with 25 mtrs of enamelled copper antenna wire, dog bone insulator, choke balun, & 10mtr RG58 patch lead terminated with a PL259.
Our Price £39.95 plus £6.00 P+P.



MWA-HFMKII

Freq: 0-40 Mhz Length: 25mtrs
This complete HF wire antenna system comes with 25 mtrs of high grade flexweave antenna wire, dog bone insulator, di-pole centre choke balun, guy rope, & 10mtr RG58 mil spec patch lead terminated with a PL259.
Our Price £49.95 plus £6.00 P+P.



(Both these wire antennas have our own ferrite wound baluns that give an extra 2 "S" points greater signal than some similar baluns. No ATU required as perfect 50 Ohm match is achieved over all 40 mhz).

Long Wire Balun

Balun only with SO239 socket and wing nut for wire connection.
Our Price Just £19.95 plus £2.00 P+P.



BASE VERTICALS

SUPERSCAN STICKS I & II

These two superb external antennas will receive on all frequencies unlike a mono base antennas. Both have capacitor loaded coils, (4 in the SuperScan Stick and 8 in the SuperScan Stick II) inside the vertical element to give maximum sensitivity to even the weakest of signals. Also the SuperScan Stick II has 3dB gain over standard SuperScan Stick !!!

(Perfect for every scanner, from the beginner starting out to the more experienced listener).

SUPERSCAN STICK

Freq: 0-2000 Mhz Length:1000mm Socket: SO239
Our Price £29.95 PLUS £6.00 P+P.

SUPERSCAN STICK II

Freq: 0-2000 Mhz Length:1500mm Gain: 3.00dB
Socket: SO239.
Our Price £39.95 PLUS £6.00 P+P.

(Both these antennas come complete with 3 ground plane radials 12" stub mast, v-bolts & clamps). ★ Also Available !!! Base Scan Sticks (as above) with Tx Capabilities !!! (for use with transceivers only) ★

MULTISCAN STICK I

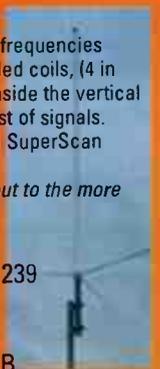
Freq RX:25-2000 Mhz TX 144-146/430-440 Gain 2.0/4.0dB
Length:1000mm Socket: N-type.
Our Price £39.95

MULTISCAN STICK II

Freq RX:25-2000 Mhz TX 144-146/430-440 Gain 4.0/6.0dB.
Length:1500mm Socket: N-type.
Our Price £49.95

IVX2000

Freq RX:25-2000 Mhz TX 50-52/144-146/430-440
Gain 2.5/5.0/7.0dB
Length: 2500mm Socket: N-Type. **Our Price £89.95**



AR-AIR BAND ANTENNAS

These dedicated civil & military fibreglass antennas are made pre-tuned & dual band trapped for both Air Band frequencies. Easy connection with an SO239 socket (With these antennas you can obtain high dual band gain which is not available on wideband antennas. Just don't miss take off !!!)

AR-30

Freq:Civil & Military Gain:3.0/6.0 dB
Length:1000mm.
Our Price £39.95 PLUS £6.00 P+P.

AR-50

Freq:Civil & Military Gain:4.5/7.0 dB Length:1500mm.
Our Price £59.95
(Both these antennas come complete with 3 ground plane radials 12" stub mast, v-bolts & clamps).

X1-HF VERTICAL

Freq:1-50 Mhz Length: 2005mm
Socket: SO239

The X1 incorporates loaded helical traps, similar to that of a horizontal di-pole, encapsulated in a heavy duty high impact plastic tube, with a top tapered stainless steel whip. (The answer for those enthusiasts looking for short-wave reception but haven't the space for a long wire).

Our Price £49.95 PLUS £6.00 P+P.



DISCONE ANTENNAS

STANDARD DISCONE

Freq: 25-1300 Mhz Length:1000mm
Socket:SO239

This antenna comes with heavy duty centre cone with 16 sturdy aluminium radials, no capacitor coils just pure elements, complete with mounting pole, clamps & v-bolts to mount upto a 2" mast. (The discone has been around for over 25 years and is generally recognised as the original and probably the best all round scanner antenna).

Our Price Just £29.95 plus £6.00 P+P.

SUPER DISCONE

Freq: 25-2000 Mhz Length: 1380mm Gain: 3.0dB Socket: SO239

The super discone has enhanced the original discone design with a vertical wire trapped fibreglass vertical element. Comes complete with mounting pole, clamps & v-bolts to mount upto a 2" mast. (Experience increase range and upto 3dB gain over standard conventional discone !!! Get more with the Super Discone !!!)

Our Price £39.95 plus £6.00 P+P.

HF DISCONE

Freq:0.05-2000 Mhz Length:1840mm
Socket: SO239

The HF Discone has the same spec as the Super Discone, but includes a 3ft heavily wire trapped vertical section, encapsulated in fibreglass, Thus enables to obtain a massive receive spectrum within the discone design. Come complete with mounting pole, clamps & v-bolts to mount upto a 2" mast. (Get the best of both worlds, use the HF discone for both scanner and HF receiver)

Our Price £49.95 plus £6.00 P+P.



ROYAL DISCONE 2000 (Stainless Steel)

Freq: RX 25-2000 Mhz TX: 50-52/144-146/430-430/900-986/1240-1325Mhz Length: 1550mm
Socket: N-type

The ultimate discone antenna !!! Highly polished centre cone, with 16 Stainless steel elements, loaded top coil & whip. Complete with mounting pole, clamps & v-bolts to mount upto a 2" mast. (With a WHOPPING 4.5dB Gain over standard discone, this highly sensitive, perfectly matched receiving and transmitting discone is the best there is !!!)

Our Price £49.95 plus £6.00 P+P.

★ Remember Discones can be placed in the loft with surprising results !!! ★



BE DEDICATED

TURNSTILE 137

Freq:137.5 Length: 1000mm

This weather satellite antenna has two di-poles adjacent to each other mounted on a 1mtr fibreglass section. Both di-poles have been internally connected, for easy use. Complete with mounting section & clamp to mount up to a 2" mast. (Beam skyward and reach those weather images)

Our Price £39.95 plus £6.00 P+P.

★ For dedicated Air Band Antennas see AR-Air Band Antennas ★



BEAM ANTENNAS

MLP32

Freq:100-1300 TX&RX
Gain:11-13 dB
Length:1400mm
Con: N-Type

Our Price £99.95
plus £6.00 P+P

These two professional quality antennas, come with aluminium booms, aluminium and stainless radial & stainless bolts & fittings. (Don't strain to hear those long distance signals, with near perfect matching of 2:1 SWR across the whole frequency spectrum, make your scanner come to life with the ultimate receiving antenna !!! Sold mainly to our commercial and military customers, you know your getting the best !!!) AR300XL Rotator for above beams **£49.95** plus £6.00 P+P.

MLP82

Freq:50-1300 Mhz
Gain:10-12 dB
Length:3000mm
Con: N-Type

Our Price £169.95
plus £6.00 P&P.



HANDHELD ANTENNAS

SUPER GAINER RUBBER DUCKS

Freq:25-1800 Mhz Length: 400mm

MRW-100 BNC fitting **Our Price £19.95** plus £2.00 P+P

MRW-210 SMA fitting **Our Price £22.95** plus £2.00 P+P

(Going Out ? Don't Miss Out! Replace your existing hand-held antenna with a Super Gainer one).



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17.600 (Russ to Eur, W.Africa 0830-1500) 54444 at 1240 in Stalbridge; BBC via Ascension Is
17.830 (Eng to W/C.Africa 1100-2100) 34443 at 1505 in Larnaca, Cyprus & 24343 at 1951 in Storrington; Channel Africa via Meyerton **17.725** (Eng, Fr to Africa 1500-1555) 43333 at 1530 in Herstmonceux; Voice of America (VOA) via Botswana **17.895** (Eng to Africa 1600-1700) 24333 at 1604 in Storrington; VOA via Morocco **17.640** (Eng to E.Africa 1600-1700) 44444 at 1607 by **Ian Evans** in Ebbw Vale; R.Prague, Czech.Rep **17.485** (Eng to W/C.Africa 1700-1730) 33233 at 1700 in Dudley; VOA via Botswana **17.895** (Eng to Africa 1800-2000) 44334 at 1844 in Rugby; VOA via Greenville **17.895** (Eng to Africa 2000-2200) 23222 at 2140 by **Jim Brown** in Dreghorn.

In the **15MHz (19m)** band R.New Zealand's broadcast to NZ peacekeepers in Bougainville, the Solomon Is and E.Timor on **15.175** (Eng 1100-1300) was rated 25343 at 1110 in Northampton, 44233 at 1147 in Amsterdam & 33333 at 1205 in Morpeth. Much later, their transmission to Pacific areas on **15.265** (Eng 1751-1850?) was rated 43444 at 1751 by **Clare Pinder** in Appleby and it peaked 55434 in Truro!

R.Australia has been reaching the UK on two frequencies from Shepparton: **15.240** (Eng to Pacific, Western N.America 0700-0900) 23222 at 0830 in Seaton; **15.415** (Eng to SE.Asia 2330-0900) 43333 at 0825 in Herstmonceux. The latter was logged in Larnaca, Cyprus as 35553 at 0615.

This band has much to offer the listener and many of the broadcasts can be received well. R.Kuwait on **15.110** (Eng, Ar to S/SE.Asia 0500-0930) was rated 44333 at 0700 in Morden; Voice of Nigeria via Ikorodu **15.120** (Eng to N.Africa, Eur 0500-0800) 53433 at 0755 in Herstmonceux; R.Vlaanderen Int, Belgium **15.195** (Dut to Eur 0600-0900) 44444 at 0805 in Oxted; Voice of Greece via Kavala **15.630** (Gr, Eng to Eur 0600-1000) 54444 at 0850 in Seaton; Voice of Armenia,

Yerevan **15.270** (Ger, Eng to Eur 0850-0930 Sun) 44344 at 0855 in Amsterdam; VOA via Tinian. N.Marianas **15.250** (Eng to E.Asia 1000-1300) 35333 at 1214 in E.Bristol; FEBA Radio, Seychelles **15.535** (Eng to M.East 1245-1300 Thurs, Fri, Sat), rated S2 by **Andrew Kirby** in Bournemouth; R.Romania Int **15.365** (Eng to W.Eur 1400-1500) 44444 at 1400 in Dudley; VOA via Woofferton, UK **15.205** (Eng to N.Africa, M.East 1500-1700) 44444 at 1510 in Ebbw Vale; British Forces Broadcasting Service via ? **15.530** (Eng) 54445 at 1540 in Stalbridge; Swiss R.Int via Sottens **15.555** (It, Ar, Eng, Fr to M.East, Africa 1630-1815) 55555 at 1755 in Appleby; BBC via Meyerton, S.Africa **15.420** (Eng to E.Africa 1700-1900) 44334 at 1855 in Stalbridge; VOA via Morocco **15.240** (Eng to Africa 1600-2200) 44344 at 1910 in Rugby; RAE Buenos Aires, Argentina **15.345** (Eng, It, Fr, Ger, Sp to Eur, N.Africa 1800-0000) 34333 at 2220 in Dreghorn.

The **13MHz (22m)** band may provide good reception from some areas too! The occupants include Swiss R.Int via Julich, Germany **13.790** (Fr, Ger, It, Eng to Nr East, Africa 0600-0800), rated 44433 at 0740 in Herstmonceux; BBC via Rampisham, UK **13.745** (Russ to Russia 0900-0915) 55555 at 0905 in Stalbridge; R.Austria Int via Moosbrunn **13.730** (Ger to Eur 0800-1200) 45544 at 0956 in Northampton; UAE R.Dubai **13.675** (Ar, Eng to Eur 0600-2045) 43333 at 1030 in Morden & 43433 at 1635 in Folkestone; RUV Reykjavik, Iceland **13.865** (Ic to Eur 1215-1300) 44434 at 1221 in Oxted; Voice International, Australia via Darwin on 13.685 (Eng to Asia 0900-1300) 44434 at 1240 in Stalbridge; also on **13.690** (Eng to Asia 1300-1630) peaked 44444 at 1425 in Truro and rated 44333 at 1425 in Amsterdam; Croatian R, Deanovec **13.830** (Cr to Eur 1000-2200) 54534 at 1635 in Dreghorn; All India R. (AIR) via Bangalore **13.605** (Eng to W/N.Africa 1745-1945) 34323 at 1820 in Seaton; R.Nederlands via Flevo **13.700**

Listeners:-

- (A) Jim Brown, Dreghorn.
 (B) Francis Hearne, N.Bristol.
 (C) Simon Hockenhill, E.Bristol.
 (D) Sheila Hughes, Morden.
 (E) Ian Pakeman, Folkestone.
 (F) Peter Perkins, Hemel Hempstead.
 (G) Clare Pinder, Appleby.
 (H) Harry Richards, Barton on Humber.
 (I) Ernie Strong, Ramsey, Cambs.
 (J) Michael Wasley, while at Creetown.
 (K) Louisa & Michael Wasley, while at Port William.
 (L) Louisa & Michael Wasley, while at Mull of Galloway.
 (M) Louisa & Michael Wasley, while at Corsewall Point.
 (N) Thomas Williams, Truro.
 (O) Fred Wilmshurst, Northampton.

Medium Wave Chart

kHz Station	Country	Power (kW)	Listener	kHz Station	Country	Power (kW)	Listener
531 Ain Beida	Algeria	600/300	C*,J*	747 Flevo(NOS-1)	Holland	400	A*,J*,J*,K,L,M,N*,O
531 Akkraberg	Faeroe Is.	100	C*,J*	756 Braunschweig(DLF)	Germany	800/200	C*,J*,O*
531 RNE5 via ?	Spain	?	I*	756 Redruth(BBC)	UK	2	N*
531 Beromunster	Switzerland	500	C*,J*,K,L,O	765 Sottens	Switzerland	500	C*,J*,L
540 Wavre-Overijse(VRT)	Belgium	150/50	C*,J*,O	774 Enniskillen(BBC)	N.Ireland	1	K,L,M
540 Sidi Benour	Morocco	600	I*	774 RNE1 via ?	Spain	?	J*,O*
549 Les Trembles	Algeria	600	I*	783 Leipzig(MDR)	Germany	100	C,D*,I*,O*
549 Nordkirchen (DLF)	Germany	100	I*	783 Barcelona (COPE)	Spain	50	D*
549 Thumau (DLF)	Germany	200	O	792 Limoges	France	300	C,O*
558 Espoo	Finland	50	I*	801 Munchen-Ismaning	Germany	300	I*
558 RNE5 via ?	Spain	?	I*	801 RNE1 via ?	Spain	?	I*
567 Tullamore(RTE1)	Eire	500	A*,C*,J*,J*,K,L,M,O	810 Madrid(SER)	Spain	20	D
576 Muhlackert(SDR)	Germany	500	C*,I*,O*	810 Westerglen(BBCScotUK)	UK	100	C,D*,I*,J*,K,L,M,O*
576 Barcelona(RNE5)	Spain	50	I*	819 Batra	Egypt	450	C*,I*
585 Paris(FIP)	France	8	I*	819 S. Sebastian(EI)	Spain	5	I*
585 Madrid(RNE1)	Spain	200	C*,J*,O*	823 Nancy	France	200	C,O*
585 Dumfries(BBCScot)	UK	2	J*,K,L,M	846 Rome	Italy	1200	I*
594 Frankfurt(HR)	Germany	1000/400	A*,C,D*,I*,O*	855 RNE1 via ?	Spain	?	C*,J*,J*,O*
594 Oujda-1	Morocco	100	C*	864 Paris	France	300	C*,J*,O*
603 Lyon	France	300	C*,J*	873 Frankfurt(AFN)	Germany	150	H*,O*
603 Sevilla(RNE5)	Spain	50	I*	873 Zaragoza(SER)	Spain	20	O*
603 Newcastle(BBC)	UK	2	I,K,L	873 Enniskillen(R.UJ)	UK	1	I*,K,L,M
612 Athlonel(RTE2)	Eire	100	A,C*,J*,J*,K,L,O	882 Washford(BBCWales)	UK	100	I*,J*,K,L,M,O
612 Sebba Aloun	Morocco	300	C*	891 Algiers	Algeria	600/300	J*,O*
612 RNE1 via ?	Spain	10	I*	891 Hulsberg	Netherlands	20	C*,I*
621 Wavre (RTBF)	Belgium	80	C*,J*,J*,O	900 Brno(CRo2)	Czech Rep	25	I*
630 Vigra	Norway	100	A*,C*,J*,L	900 Milan	Italy	600	O*
630 Tunis-Djedeida	Tunisia	600	C*	900 COPE via ?	Spain	?	I*
639 Praha(Liblice)	Czech	1500	L,O*	909 B'mans Pk(BBC5)	UK	140	I*,O
639 RNE1 via ?	Spain	?	C*,J*,O*	909 Westerglen(BBC5)	UK	50	J*,K,L,M
648 RNE1 via ?	Spain	10	C*	918 Domzale	Slovenia	600/100	O*
648 Orfordness(BBC)	UK	500	C,D*,J*,O	918 Madrid(R.Int)	Spain	20	I*,J*
657 Madrid(RNE5)	Spain	20	O*	927 Wolvertem	Belgium	300	C*,J*,K,L,O
657 Wrexham(BBCWales)	UK	2	C*,J*,J*,K,L,M,O	936 Bremen	Germany	100	I*,J*,O*
666 Messkirch(Rohrdt(SWF))	Germany	150	I*,O*	936 RNE5 via ?	Spain	?	I*
666 Lisboa	Portugal	135	I*	945 Toulouse	France	300	C*,J*,O*
675 R10 FM	Holland	120	C,E*,H*,J*,J*,K,L,M,O	954 Brno (CRo2)	Czech Rep.	200	I*
684 Sevilla(RNE1)	Spain	500	C*,J*,J*,O*	954 Madrid(CI)	Spain	20	I*,J*,O*
684 Avata(Beograd-1)	Yugoslavia	2000	C	963 Por	Finland	600	C*,J*
693 Burehead(BBC)	UK	50	J*,K,L,M	963 Vitoria(EI)	Spain	10	I*
693 Dronwiche(BBC)	UK	150	I*,O	972 Hamburg(NDR)	Germany	100	C,O*
702 TWR via Monte Carlo	Monaco	300	I*	990 Berlin	Germany	100	I*,O
702 Presov	Slovakia	200	I*	999 Redmoos(BBC)	UK	1	K,L,M
711 Rennes (R.Bleu)	France	300	C*,I*,O	1008 Flevo(NOS-5)	Holland	400	I,J*,N*,O
711 Heidelberg	Germany	5	I*	1017 Rheinsender(SWF)	Germany	600	C,D*,J*,O
720 Langenberg	Germany	200	I*	1035 Lisbon	Portugal	120	C*
720 Lisnagarvey(BBC4)	N.Ireland	10	J*,K,L,M	1044 Dresden(MDR)	Germany	20	O*
720 Crystal Palace BBC4	UK	0.75	C,D*,I*,O	1044 SER via ?	Spain	?	J*
729 RNE1 via ?	Spain	?	I*,J*,O*	1053 Talk Sport via ?	UK	?	H,I,J*,K,L,M,O
738 Paris	France	4	I*	1062 Kalundborg	Denmark	J	C,K,L,M,O*
738 Barcelona(RNE1)	Spain	500	C*,I*,J*,O*	1071 Bilbao(EI)	Spain	5	C*,O*
747 Petric	Bulgaria	500	I*	1071 Talk Sport via ?	UK	?	I,L,O
				1080 SER via ?	Spain	?	O*

Note: Entries marked * were logged during darkness. All other entries were logged during daylight or at dawn/dusk.

(Eng to Africa 1830-2025) 34233 at 2010 in Rugby; R.Canada Int via Sackville **13.650** (Fr, Eng to Eur, Africa 2000-2159) 25422 at 2122 in E.Bristol; R.Australia via Darwin **13.620** (Eng to SE.Asia 2200-0000) 33222 at 2200 in Appleby.

R.New Zealand's broadcasts to Pacific areas in the **11MHz (25m)** band have also been reaching the UK quite well. Their 100kW transmission on **11.675** (Eng 0700-1100) was rated 44433 at 1048 in Truro. R.Australia has been received here well on **11.660** from Shepparton (Eng to SE.Asia 1330-1700), rated 44444 at 1440 in Morpeth & 53445 at 1445 in Stalbridge.

Some of the many other broadcasts in this band come from R.Prague, Czech Rep. **11.600** (Eng to Eur 0800-0827), rated 55555 at 0825 in Herstmonceux; China R.Int via Jinhau, China **11.730** (Eng to Australia & Pacific 0900-1100) 34434 at 1015 in Oxted; BBC via Woofferton, UK **12.095** (Eng to Eur 0700-1800) 44444 at 1030 in Morden; R.Jordan via Al Karanah **11.690** (Eng to W.Eur, E.USA 1300-1730) 44344 at 1415 in Amsterdam; Voice of Korea, Pyongyang **11.335** (Eng to Eur 1500-1600) 34232 at 1500 in Dregghorn & 15322 at 1550 in E.Bristol; R.Kuwait via Kabd **11.990** (Eng to Eur, N.America 1800-2100) 44444 at 1650 in Amsterdam & 35544 at 1925 in Northampton; British Forces Broadcasting Service **12.040** (Eng - relay of BBC R-4) 43333 at 1720 in Stalbridge; All India R. (AIR) via Bangalore **11.620** (Eng to Eur 1745-1945) 42232 at 1820 in Seaton; Voice of Korea, Pyongyang **11.335** (Eng to Eur 1900-2000) 34333 at 1927 by **Geriant Gill** in Llanfairfechan; BBC via Ascension Is **12.095** (Eng to S.Africa 1900-2100) 35533 at 1930 in Larnaca, Cyprus; VOA via Sao Tome **11.775** (Fr to Africa 1830-2030) 45444 at 1946 in Storrington; R.Damascus, Syria **12.085** (Eng to Eur 2005-2105) 43324 at 2018 in Rugby; Voice of Indonesia **11.785** (Eng to Eur 2000-2100) 34333 at 2049 in Ebbw Vale; BBC via Rampisham, UK **11.680** (Eng to Falkland Is 2130-2145 Tues, Fri) 44344 at 2135 in Folkestone; R.Canada Int via Sackville, Canada **11.865** (Eng to N.C.America 2300-2330) 34333 at 2303 in Creetown by Micheal Wasley; Nat.R. of Cambodia, Phnom Penh **11.940** (Eng, Fr? to SE.Asia 0000-0030), noted as 'very weak' in Bournemouth.

Good reception from many areas has been noted in the **9MHz (31m)** band. R.Australia's broadcasts have been received in the UK on three frequencies from Shepparton: **9.710** (Eng, Tok Pisin to Oceania 0800-1100), rated 34333 at 0837 in Oxted; **9.475** (Eng to Asia 1330-1858) 43444 at 1620 in Dregghorn; **9.500** (Eng to Asia 1900-2130) 23433 at 1933 in Storrington.

Also mentioned in the reports were HCJB Quito, Ecuador **9.745** (Eng to N.America 0000-0600), rated 44343 at 0416 in Morpeth; WTJC Newport NC, USA **9.370** (Eng to N.America 24hrs) 44343 at 0800 in Northampton & 34333 at 2131 in Creetown; R.Netherlands via Bonaire, Ned.Antilles **9.790** (Eng to Asia, Far East, Pacific 0930-1130) 44323 at 1020 in Truro; R.Netherlands via Wertachtal, Germany **9.860** (Eng to Eur 1130-1330) 55555 at 1210 in Morden; R.Polonia (Polish R, Warsaw) **9.525** (Eng to Eur 1300-1400) 54533 at 1320 in Herstmonceux; BBC via Kranji, Singapore **9.740** (Eng to SE.Asia 0900-1600) 34553 at 1453 in Larnaca, Cyprus; BBC via Cyprus **9.410** (Eng to W.Eur 1600-2200) 44344 at 1600 in Dudley; R.Bangladesh, Dhaka **9.550** (Eng to Eur 1815-1900) 44333 at 1825 in Amsterdam; Voice of Vietnam, Hanoi **9.730** (Viet, Eng, Fr to Eur 1600-2130) 43334 at 1850 in Stalbridge; TWR via Meyerton, S.Africa **9.510** (Fulani to W.Africa 1830-2030) 34444 at 1935 in Storrington; RAI Int, Rome **9.745** (Eng to Eur 1935-1955) 44434 at 1940 in E.Bristol; R.Thailand, Udon Thani **9.535** (Eng, Ger, Fr, Thai to Eur 1900-2115) 33543 at 1945 in Larnaca, Cyprus & 55545 at 2030 in Seaton; Voice of Armenia, Yerevan **9.960** (Fr, Ger, Eng to Eur 2000-2100) 45444 at 2035 in Llanfairfechan; R.Ext. Espana via Noblejas, Spain **9.595** (Eng to N/W.Africa 2200-2300 Sat/Sun) 33333 at 2200 in Appleby; R.Taipei Int via WYFR Okeechobee, USA **9.355** (Eng to Eur 2200-2300) 34343 at 2205 in Folkestone; R.Cairo, Egypt **9.990** (Ger, Fr, Eng to Eur 1900-2245) 45333 at 2211 in Ebbw Vale; R.Canada Int via Sackville **9.770** (Fr, Eng to W.Eur, Africa 2000-2230) SIO 444 at 2227 by **Francis Hearne** in N.Bristol; R.Tirana, Albania **9.540** (Eng to Eur 2230-

2300) 33444 at 2240 in Creetown.

Some of the broadcasts in the **7MHz (41m)** band are intended for listeners in Europe. Those noted originated from R.Japan via Woofferton, UK **7.230** (Eng 0500-0700), rated 44433 at 0655 in Herstmonceux; R.Prague, Czech.Rep **7.345** (Ger 1100-1127) 44444 at 1104 in Oxted; R.Bangladesh, Dhaka **7.185** (Eng [Voice of Islam] 1745-1815) 44333 at 1750 in Amsterdam; V of Russia, Moscow **7.340** (Eng 1800-2200) 44333 at 1834 in Ebbw Vale; R.Vlaanderen Int, Belgium **7.465** (Eng 1830-1900) 45434 at 1845 in E.Bristol; R.Tunisia Int, Sfax **7.225** (Ar 1700-2300) 43333 at 1931 in Ebbw Vale; R.Budapest, Hungary **7.135** (Eng 2000-2030) SIO 444 at 2002 in N.Bristol; V of Vietnam, Hanoi **7.145** (Eng 2030-2100) 33433 at 2040 in Llanfairfechan; V of the Mediterranean, Malta via Russia **7.440** (Eng 2000-2100 Sat-Thurs) 44434 at 2040 in Truro; R.Canada Int via Skelton, UK **7.235** (Fr, Eng 2000-2200) 54444 at 2100 in Appleby; All India R. (AIR) via Bangalore **7.410** (Hind, Eng 1745-2230) 43433 at 2115 in Seaton & 43333 at 2123 in Creetown; R.Romania Int Bucharest **7.105** (Eng 2100-2155) 32223 at 2120 in Stalbridge; R.Bulgaria, Sofia **7.500** (Eng 2200-2300) 45544 at 2210 in Northampton; China R.Int via Russia **7.170** (Eng 2200-2300) 44434 at 2216 in Creetown & 55444 at 2235 in Folkestone; Family R. (WYFR) Okeechobee FL, USA **7.580** (Eng 2000-2245) 44444 at 2230 in Morden.

While beaming to other areas WBCQ in Monticello, USA **7.415** (Eng to N.America 2000-0515, 0515-0630 Sat) was 33333 at 0543 in Morpeth; World Harvest Radio (WHRA) via Maine, USA **7.580** (Eng to Africa 2200-1000) 44444 at 0750 in Northampton; R.For Peace Int. (RFPI), Costa Rica **7.445** (Eng to N.America 2200-0800, also to Europe) 44434 at 0758 in Oxted; KTBV via Salt Lake City, USA **7.505** (Eng to N.America 0100-1500) 22222 at 1035 in Truro.

Some of the many broadcasts to Europe in the **6MHz (49m)** band were mentioned in the reports. They came from R.Japan via Skelton, UK **5.975** (Eng 0500-0600), rated 44344 at 0500 in Appleby; HCJB in Quito, Ecuador **5.965** (Eng 0700-0900) 35544 at 0850 in Northampton; R.Netherlands via Flevo **5.955** (Dut 0600-1800) 44444 at 1022 in Oxted; Deutsch Welle (DW) via Julich **6.140** (Eng 0600-1900) 55555 at 1115 in Morden; R.Netherlands via Julich, Germany **6.045** (Eng 1130-1330) 55555 at 1300 in Herstmonceux; R.Slovakia Int. **6.055** (Eng 1730-1800) 44444 at 1730 in Dudley; R.Bulgaria, Sofia **5.800** (Ger, Fr, Eng 1730-1900) 44434 at 1745 in Dregghorn; R.Prague, Czech.Rep **5.930** (Eng 1800-1830) 55545 at 1800 in Seaton; R.Polonia [Polish R] Warsaw **5.995** (Eng 1800-1900) 34333 at 1801 in E.Bristol; V of Vietnam via Austria **5.955** (Eng, Viet, Fr 1800-2000) 55544 at 1825 in Amsterdam; R.Japan via Rampisham, UK? **6.175** (Jap 1700-1900) 54444 at 1855 in Stalbridge; V of Russia **6.235** (Eng 1900-200) 44434 at 1945 in Truro; Deutschland R, Berlin **6.005** (Ger 24hrs) 54534 at 2000 in Seaton; Adventist World R. via Slovakia **5.955** (Eng 2030-2100) 43444 at 2045 in Ebbw Vale; Vatican R, Italy **5.890** (Eng 2050-2110) 55444 at 2110 in Folkestone; R.Canada Int via Horby, Sweden **5.850** (Eng 2100-2200) 44233 at 2115 in Truro; R.Prague, Czech.Rep **5.930** (Eng 2100-2127) SIO 444 at 2124 in N.Bristol; R.Canada Int via Skelton, UK **5.995** (Eng 2100-2200) 43343 at 2141 in Creetown; Bayerischer Rundfunk, Germany **6.085** (Ger 24hrs) 43433 at 2202 in Creetown; R.Ukraine Int, Kiev **5.905** (Eng 2200-2300) 55445 at 2200 in Llanfairfechan; WWCR Nashville TN, USA **5.070** (Eng to N.America 2300-1200) heard at 2327 in Hemel Hempstead; R.Bulgaria, Sofia **5.800** (Eng 2200-2300) SIO 333 at 2236 in N.Bristol.

Noted to other areas were WEWN Birmingham, USA **5.825** (Eng to N.America 0000-1300), rated 24232 at 1026 in Oxted; British Forces Broadcasting Service **5.945** (Eng - relay of BBC R-5) 43333 at 1500 in Stalbridge; R.Myanmar (Burma), Yangon **5.985** (Bamar, Eng 0930-1600), heard at 1545 in Bournemouth; Voice of America (VOA) via Sao Tome **6.035** (Eng to W.Africa 1800-2200) 45444 at 2145 in Northampton; BBC via Antigua, W.Indies **5.975** (Eng to C/N.America 2200-0500) 43343 at 2230 in Folkestone; R.Havana, Cuba **6.000** (Eng to N.America 0100-0500) 44444 at 0329 in Morpeth.



The SINPO code is used for broadcast station reports, here is an explanation of the code.

Signal Strength
5 excellent
4 good
3 fair
2 poor
1 barely audible

Interference
5 nil
4 slight
3 moderate
2 severe
1 extreme

Noise
5 nil
4 slight
3 moderate
2 severe
1 extreme

Propagation Disturbance
5 nil
4 slight
3 moderate
2 severe
1 extreme

Overall Merit
5 excellent
4 good
3 fair
2 poor
1 unusable

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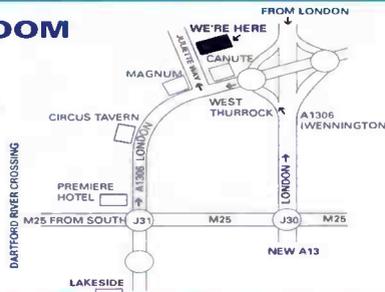
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50MHz-2.6GHz and under 1.3m long **£49.95** DEL £11.00

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£64.95 POST £5.00
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Deluxe SW ATU
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ONLY **£89.00**

(Probably the best ATU around) P&P £6.00
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Allows two antennas to be connected to one receiver without interaction. Can be used in reverse

£54.95 P&P £3.50

Ant A (0-30MHz) } To receiver low
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F) ALINCO DJ-X2000

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Includes 8.33kHz spacing **£449.95**
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Never before has one hand portable offered so much. ★ Covers 100kHz-3GHz (all mode) ★ Computer control capability ★ 8-33kHz steps for the new airband spacing ★ Reaction tune capability ★ Includes nicads/charger/antenna and car lead.

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2 YEAR WARRANTY

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Short Wave Magazine, May 2003

Q) REALISTIC DX-394

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This is JRC's latest professional receiver.

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Enjoy DAB digital indoors and out with the 'battery/mains powered' Evoke-2. High quality, interference-free DAB digital audio (stereo) without hiss, crackle or fade. (Subject to suitable area coverage).

OUR PRICE **£159.99**

Jon Trowsdale rubbed shoulders with the Decca logo as a child, he only realised the significance later on in life. Here he looks at the navigator system that for many years supplied accurate navigation for mariners.

The Decca Navigator System

Growing up in a Scottish fishing town I was always dimly aware of the Decca Company logo adorning the trawler masts berthed at the dockside. But since the only Decca that interested me in those days was the Rolling Stones' record label, I barely gave this a second thought.

Fast-forward to the present day, and my broadcast consultancy company is asked to examine alternative transmission scenarios for a major a.m. radio station. One possibility is to look at brown-field sites no longer in current use. As part of this work, I uncovered the Decca Navigator System (DNS) network of sites, silent since March 2000, but in some cases still complete with towers, accommodation, generators and even kitchen space.

There is something eerie and sad about an abandoned radio

installation. As I picked my way round the compound fence at Puckeridge in Hertfordshire, part of the southern English Decca chain, I fell to wondering about the story behind these sites. It turns out to be a fascinating one, stretching all the way back to World War II.'

The Need For Accurate Navigation

Like many technological innovations, accurate electronic navigation systems were a product of war. Allied all-weather bombing raids on Germany's industrial belt often missed their targets due to the near impossibility of navigating accurately from high altitudes. The solution to that problem was an ingenious pulsed radar system called OBOE, developed by Alec Reeves of Standard Telephones and Cables.

Pathfinder bomber pilots heard either a series of Morse dots or dashes, depending which side of the beam they strayed, and a continuous tone (sounding like an oboe, hence the name) when they were on track. A series of Morse letters was sent when they were nearing the bomb drop zone and a final code signalled the exact moment to release the bomb bay. The system was introduced in December 1942 and made an enormous difference to Bomber Command's hit rate.

As the D-Day landings loomed in June 1944, it became clear that a similarly accurate navigation system was necessary at sea to guide the invasion's leading minesweepers and landing craft. Precise navigation through minefields in the Channel and piloting accurate

landfalls at night was impossible using conventional techniques. In fact, it is sometimes said that if an electronic system had not been available, the nature of the Allied landings would have been very different.

The Navy already had access to a system developed by the RAF known as Gee. This was used in the Dieppe raid in 1942 and was later fitted as the standard surface navigation system. But the Admiralty wanted a standby system in the event of the enemy successfully jamming Gee, and in any case, wanted to improve on the accuracy.

They began to take an interest in an American system developed by W.J. O'Brien and brokered in the UK by HF Schwarz, who worked for the Decca Record Company. The system was originally developed for aircraft navigation, but the Air Ministry's radar expert Robert Watson-Watt rejected it on the grounds of being too prone to interference and jamming.

Although very different in terms of technology, both Gee and the Decca system used a principle known as hyperbolic navigation. In order to understand how they work, we need a basic understanding of this.

Hyperbolic Navigation

The principles of hyperbolic navigation are straightforward, but ingenious. Imagine you are on a football pitch and there is an official equipped with a whistle placed in the middle of each goalmouth. If both whistles are sounded simultaneously, it is possible to

Fig. 1: A master station controlling two slaves.

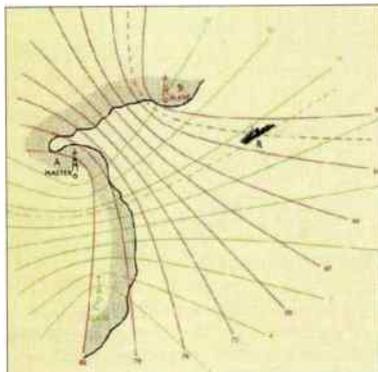


Fig. 2: A set of displays known as decometers.



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work out your position based on the relative time delay taken for each sound to reach you. If you hear both blasts at exactly the same time, you must be equidistant from each, meaning you are standing somewhere on the halfway line.

If you move around the pitch, it's obvious that one whistle will arrive before the other, and your position will be somewhere along a hyperbolic curve that describes all the possible positions for that time difference. (If, like me, geometry class is but a distant and unpleasant memory, a hyperbola is the shape of a graph produced by functions such as $y = 1/x$).

So far, so good - but all you really know at this stage is that you are located somewhere along a curve. You could be on the left or right wing, or somewhere in the middle. To get a fix on your actual position, you need a third whistle, say in the stand, also sounded simultaneously. Then, by measuring the time difference between all three sounds, you end up with an intersecting set of hyperbolas that give you your exact position on the field of play. (Fortunately professional footballers do nearly all of this by instinct!)

In electronic navigation systems such as Decca Navigator, low frequency transmitters in the 70-130kHz band took the place of the hypothetical whistling referees. A master station controlled the phase of two or three slave stations, so that the carriers are radiated with constant phase relationships (equivalent to blowing the whistles at exactly the same time). It was a continuous wave system, so it is possible to avoid mutual

interference with very small frequency offsets, 150Hz being typical.

Take a look at **Fig. 1** which shows the basic idea, with a master station controlling two slaves.

A Practical System

In a real-world Decca system, a master station controlled three slave stations, identified by the colours Red, Green and Purple. These corresponded to coloured hyperbolic curves on the special Decca charts. Although an accurate fix can be obtained from just two slaves, three ensures all round coverage of an area. Slave stations were arranged at roughly 120° from each other, 100-160km from the master. A complete set of transmitting stations was known as a chain.

On board ship, a Decca receiver compared the relative phases of the master and slave stations (and hence the time delay between them). It was possible to detect phase differences to within 4°, which near the 'baseline' (the equivalent of our football field halfway line) could theoretically represent distances as small as ten metres - no mean achievement. In practice, due to equipment tolerances and other operational errors, this degree of accuracy was seldom achieved, but nevertheless the Decca Navigator System offered very accurate position finding at sea.

Figure 2 shows a set of displays known as decometers, which presented indications from the three slave stations on a continuous basis. The ship's navigator would take the readings directly from the two relevant slave displays and plot them on the special Decca charts, which were standard Mercator format overprinted with the Decca coloured lattice.

System Limitations

Although the Decca Navigator System offered very high degrees of accuracy, there were several inherent flaws in the

concept that bedevilled early systems. It is to the credit of the Decca engineering team that most of these were ironed out over the years.

The first problem was so-called 'lane slip'. In DNS terminology, a lane is the area on a chart between two lines of zero phase difference. Because of their hyperbolic shape, the width of a lane can vary from a kilometre and a half near the base line to five kilometres or more at the outer ranges.

The decometers give accurate positional information within a lane, but it is obviously vital for the navigator to know which lane he is in at any time. If a ship is entering coastal waters from an ocean passage, or there is a break in transmission, there is the possibility of lane ambiguity. Later Decca systems provided a fourth dial, the lane identification meter, which allowed navigators to set their instruments up correctly. He would still have to know which zone he was in, but since each zone consisted of twenty or so lanes, dead reckoning was accurate enough to get a fix on this.

Later systems offered a direct readout of latitude and longitude, making the navigator's task even easier.

Another problem was the effect of interference. The Air Ministry's early rejection of DNS as a wartime navigational tool on the grounds of ease of jamming was probably correct: it is not hard to imagine the catastrophic effects of a co-channel interferer on a single frequency c.w. system. In peacetime, this was much less likely, but even with the choice of low frequencies, there was still the possibility of skywave interference and coastal effects caused by changing ground conductivity.



Fig. 3: An early Decca slave station.



Fig. 4: The Navy already had access to a system developed by the RAF known as Gee. This was used in the Dieppe raid in 1942 and was later fitted as the standard surface navigation system.

Success At D-Day

The Decca system proved invaluable during the D-Day landings. It was fitted at very short notice to the leading ships of twelve minesweeping flotillas, five headquarters landing craft and two launches. Compared to the overall amount of shipping involved in Operation Neptune, this was fairly insignificant, and certainly DNS was much less widespread than Gee.

But it did work. Despite strong winds and tides, minesweepers reported being only four minutes late and less than 370m off course as they took up their positions off the Normandy beaches.

Secrecy of course was stringently enforced over all aspects of the D-Day invasion, and there may have been special fears about hostile jamming operations (though there is no evidence that the enemy were even aware of its

The Decca Navigator System

existence). Those factors, combined with the relatively small numbers of sets fitted, means that Decca's contribution to the success of the invasion is sometimes sadly overlooked.

Commercial History

The original southern England Decca chain was switched off immediately after the D-Day landings, and it was not until after the war that the Decca Navigator Company Limited was able to offer the service on a commercial basis. The first chain of stations was established in south-east England in 1946, and during the next two decades expanded operations to all the major shipping areas of the world. At its peak, the system had over 200,000 users in Europe alone. **Figure 3** shows an early Decca slave station.

The business model Decca adopted fuelled the rapid growth of the system, but also proved to be its eventual downfall. Decca controlled all parts of the value chain, from the design, build and operation of the transmission systems to the hire of shipboard receivers. A dedicated team of Decca development engineers was maintained for many years, with the result that it was possible to optimise the system for maximum performance.

By 1989 the company operated 42 chains around the world in a network of 42 master stations and 119 slaves. Although Decca had scored successes in Canada, with the build-out of chains in Newfoundland, Nova Scotia and Quebec, and contracts with the Canadian Coastguard and Navy, the lucrative US military market remained closed to the company despite a concerted marketing push. Simply, the US warlords did not want to use a system invented elsewhere - apparently there was a joke at the time that DECCA stood for Dedicated Englishmen Causing Chaos

Abroad, which does seem a mite unfair!

Attempts to break into the aviation market in the 1960s were only partially successful. Interference problems and limited range meant that the system could not compete competitively with systems such as Loran-C, and even in the mid 1970s, there was a growing realisation that satellite based navaid for aircraft was the way to go.

But at sea Decca Navigator became synonymous with accuracy, reliability and security. Ironically, it was these virtues that eventually spelt doom for the system. By the 1980s advances in semiconductor electronics meant that cheap receiver clones could be produced, wiping out the company's profitable receiver rental business. With a disappearing revenue stream and the high costs of maintaining the transmission chains (despite a modernisation programme) it was only a matter of time until the business was declared non-viable as a self-funding venture.

From 1992 onwards parent company Racal operated the network on behalf of the General Lighthouse Authority, who effectively subsidised the system. The final nail in the coffin was the advent of the satellite Global Positioning System (GPS), which made the Decca system technologically redundant. The system finally closed on March 31st 2000, after over half a century of guiding generations of mariners safely home to port.

Some users still mourn its passing, especially fisherman, who trusted it for decades to guide them back to fishing grounds with a degree of accuracy only matched by modern differential GPS systems.

A Job For Life

In its heyday, Decca Navigator offered a job for life. Many of

the more remote chains, such as the Master North Scottish station at Dounby in the Orkneys, required constant maintenance, not only against equipment failures, but also against the weather.

Jim Anderson joined the service in 1956 and was still there to switch off the transmitters forty-four years later in April 2000. Quoted in *The Orcadian*, he remembered a particularly severe storm that took out the antenna system, "It was in wet snow, which pulled two wires down off the top of the antenna. Luckily, Ken King was in Stromness at the time. He was the antenna man and took charge of the repair. We got the loan of Dounby Farm's tractor and cattle float to give us some shelter while we were working in the field, because it was horizontal sleet that day. The wires were repaired on the ground and hoisted up again. The system was off for a few hours. It was dark when the wires came down. All coastal stations sent out warning signals to all shipping telling them about the problem".

The station at Dounby, together with its slaves at Lewis, Peterhead and Shetland, provided work for local men for many years. The engineers' skills were updated by occasional courses run at the company's training facility in Brixham in Devon.

Staff worked a shift pattern to provide the constant cover required. Tommy Mainland, who joined at the end of 1966, remembered, "When I joined, we used to do 12 hours on a day shift, from nine in the morning till nine at night. The next day, you went on at nine at night and worked till nine in the morning, and then you 'allegedly' had two days off. I worked that shift pattern for a while, and then eventually we changed that to one week at nine to five, a week of five till midnight, and a week of midnight till nine in the morning. It ended up that when we got 'sleeping' night watches, we did 24-hours on, and 48 hours off".



Fig. 5: De-commissioned Decca.

The station at Dounby, together with the rest of the UK chains, was switched off forever in early 2000. Jim Anderson had mixed feelings about shutting the system down, "It will take a nerve to switch it off after keeping it on for 44 years. It's against your nature, I suppose".

What Now?

The Decca Navigation System has been decommissioned now since March 2000. Some of the sites, like the Hebridean chain master on the Isle of Barra, have been cleared and the masts dismantled. At others, such as the one at Puckeridge shown in the photograph, the antenna tower and accommodation halls survive intact.

Two of the sites, at Wormleighton in Warwickshire and Stirling in Scotland, have been recommissioned by the lighthouse authorities as marine differential GPD (DGPS) stations. As for the rest, my enquiries drew a blank on what might happen to them in the long term. But if a remote site with living accommodation, a 91m self-supporting tower and earth system, and an on-site diesel alternator doesn't set any self-respecting radio amateur drooling, I don't know what will! **SWM**

The author is extremely grateful to Jerry Proc VE3FAB for his kind permission to re-use material from his website <http://webhome.idirect.com/~jproc/hyperbolic/> in the preparation of this article.

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Many thanks to **bhi**, for the donation of the NEIM1031 as a prize. They can be contacted by 'phone: **(01293) 530147** or E-mail: **info@bhinstrumentation.co.uk** For more details on bhi's products and news of new developments visit: **www.bhinstrumentation.co.uk**



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You Never Know Where The Road Will Lead

John Wilson's back again, this month he guides us through identifying a mystery receiver of the 1940s. He discovers how it could have been built specifically to avoid enemy direction finding techniques...

In this case, the first step down a particular road was prompted by Michael O'Beirne who told me of finding a handbook for a receiver which he had not encountered before. As he described the unit I suddenly realised that amongst the receivers I had tucked away 'to do something with one day' was something which fitted the description from this manual, so off I went to take a look, and sure enough I had one of these mysterious receivers in my collection. Since this seemed to be the only one in existence (for the moment) I dug it out and started the long task of restoring it to electrical health with a view to comparing its performance with more modern units. Whilst doing this, Michael has had published both an article in issue 80, a long follow-up letter in issue 82 of *Radio Bygones* magazine in which he gave his carefully thought out appraisal of what this receiver could have been used for. His final conclusion was that it was probably an American marine receiver of vintage 1942-45 but could find no records of its use anywhere in the US Forces. Michael did comment on the considerable amount of screening boxes used in the receiver and suggested that this may have been the result of attempts to minimise local oscillator radiation to prevent h.f. d.f. location by enemy listening stations or vessels.

Michael's piece prompted a swift letter from an enthusiast in America which said (amongst other things) "The receivers being d.f.ed by local oscillator radiation is a canard which by now richly deserves to be put to rest", and



The Collins TCS-12 receiver.

also stated that the receiver could not possibly have been for marine use as it had a loudspeaker on the front panel, and no provision for crystal control. As an example of a 'real' marine receiver, the writer quoted the well known Collins TCS, and since I also have a very nice, fully restored TCS receiver I simply couldn't ignore the coincidence and the opportunity to set the units side by side to compare them. However, I first of all had to complete the work on the mystery receiver so let me describe it to you.

Best Practices

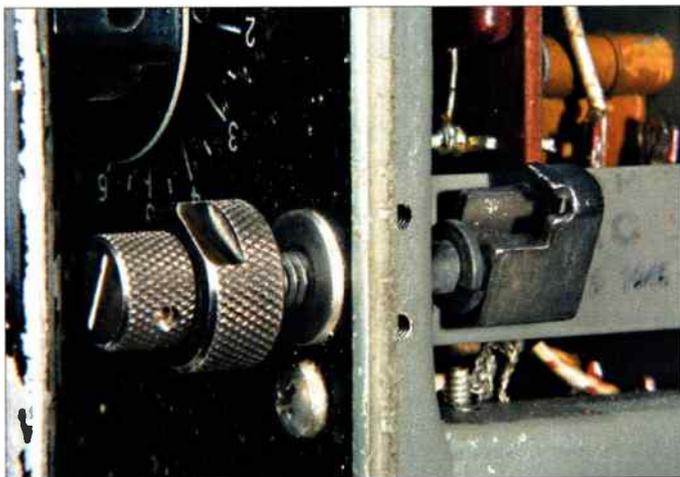
Once forming part of a transmitter/receiver installation (as was the TCS), the receiver has the type number R-50M, and before

you all go off assuming that this was made by Redifon, you would be wrong. Redifon did produce a marine receiver in about 1950 designated the R-50 (or R-50M) but this has no connection with the R-50M to which I am referring. This one was made by the Technical Radio Co. of San Francisco and the design shows all the best practice features used in the 1940s, such as the use of the 'metal' series of valves, a separate local oscillator section with h.t. voltage stabilisation, single conversion down to an i.f. of 455kHz with a low level tuneable b.f.o. injected into the detector system for c.w. and a.g.c. disabling for that mode. There is no built-in power supply, since the necessary power was fed via the transmitter and into the R-50

through a massive (it seems massive now) 8-pin Jones plug on the bottom right of the front panel. The tuning range is 1.5 to 12MHz covered in two bands, and originally there was a dial locking mechanism behind the main tuning knob, but this had been removed before I acquired the receiver.

You may be able to see from the photographs just how much screening is used in this unit, and take particular notice that the tuning capacitor for the r.f. amplifier is not part of the usual multi-gang arrangement, but a totally separate capacitor driven through an insulating coupler from the mixer/local oscillator twin

JW on the R-50M



The TCS-12 cabinet lock, somewhat tricky in use.



The Technical Radio R-50M receiver.

gang sections. I wondered why, but the possible reason dawned on me only later down the road. The chassis is constructed from copper plated steel, and all the screening compartment covers have double skinned edges which make tight contact with the screening box sides, much in the same way that good EMC screened enclosures do to this day. In fact, they are such a tight fit that it is quite difficult to get them off and on again. In addition to this, the entire front-end of the receiver is constructed as a separate sub-chassis, mechanically isolated from the rest of the receiver by rubber mountings, alas

somewhat 'soggy' in my receiver.

Another detail I noted was that the r.f. amplifier section of the band switch has no metallic connection with the shaft driving the mixer and local oscillator stages, being coupled by a paxolin (Tufnol) shaft, thus making the whole of the r.f. amplifier section of the receiver an isolated unit as far as the tuned circuits are concerned.

Restoration involved the usual wholesale changing of every coupling and decoupling capacitor, all of them leaky, together with most resistors having a marked value greater than about 47k Ω since these old

carbons usually end up being closer to 1M Ω than their design value. Eddystone owners always know that virtually every resistor will have to be changed in the EA-12 and 940 receivers, with the 220k Ω values being, for some unknown reason, particularly prone to going open circuit. Good tip, always change the 220k Ω anode load resistors in the first audio stages of an Eddystone: you will be amazed at the difference this makes. The R-50M responded well to the treatment and the patient was soon sitting up in bed and waiting to be connected to some power.

Vital Signs

Performance checks revealed that the R-50M was much the same as receivers of the period, with an a.m. sensitivity of less than 1 μ V for 10dB S/N ratio at 60%

considerable rigidity, and this shows in the electrical stability of the receiver when subjected to a quick kick in the teeth. Circuit design is again typical of best practice for the period, although the Collins 'designed for purpose' approach clearly shows in the three section variable tuning capacitor, in which the oscillator section has twice the normal vane spacing and was probably made by the Collins company itself. However, the r.f., mixer and oscillator tuning sections are all mounted on a single continuous shaft, and in this respect the TCS is different to the R-50M. Also different to the R-50M is the provision for fitting up to four crystals for fixed frequency operation.

Looking at the receiver local oscillator in the TCS shows that it employs a 12A6 power pentode running fairly well flat out with no cathode bias and relying on grid current bias only. Screen grid voltage is quite high at +185V, and since the 12A6 has an anode dissipation of 7.5W, it is capable of producing a lot of oscillator power (a couple of watts at least) under the conditions encountered in the TCS receiver. Oddly enough, when crystal control is used, the 12A6 is disabled and the crystal oscillator configured using the low power oscillator section of the 12SA7 mixer. The R-50M in comparison uses a 6J5 triode for the local oscillator, as did the AR88 receivers, the BC-348 (6C5) and other receivers of the period. With an anode dissipation of 2.5W maximum, this resulted in a much lower power output from the oscillator stages of these receivers, and presumably lower radiation from the antenna socket. Having mentioned the BC-348, I dragged this off the shelf and did a three-way comparison in my measurements.

Michael O'Beirne dealt with the various points raised by the letter from America (not Alistair Cooke) by doing some very good research, and he has allowed me to summarise the various points for the benefit of *Short Wave Magazine* readers. First of all the "It's not a marine receiver" issue. Well it seems odd to me that the R-50M and the TCS have absolutely identical frequency coverage from 1.5 to 12MHz, and this tells me that they were potentially designed to meet the requirements of a particular US military contract specification, although neither Michael nor I have located the actual contract

modulation, and c.w. sensitivity better than this, although b.f.o. injection was set lower than usual, with the b.f.o. tuned range rather too wide for ease of setting. Nonetheless the R-50M is a handsome looking beast, and driving it took me back to my teenage years when this would have been a receiver I might have owned and used on Top Band with pleasure.

Now to the TCS, which in my case is a genuine Collins manufactured unit and has had the JW restoration treatment in the recent past. The mechanical concept of the TCS is somewhat different to the R-50M in that it is constructed on an alloy framework which gives it

number - so far. If the R-50M was not a marine receiver, why does my receiver carry the US Navy 'anchor' mark prominently on the front panel? The concept of a 'two-box' transmitter/receiver combination is also common to both the R-50M and the TCS and again suggests design to a US Navy contract specification. It may be true, indeed it is absolutely true, that the R-50M does not have the ultimate bomb-proof ruggedness of the TCS, but I think that there is enough circumstantial evidence that the two receivers were intended for use by the US Navy and can both be called 'marine' receivers.

Non-Existent?

Next, the assertion that, and here I quote directly:

"The 'receivers being d.f. ed by local oscillator radiation' is a canard which by now richly deserves to be put to rest. This topic has been discussed on the Internet E-mail groups 'Boatanchors' and 'Milsurplus'. I have not seen, nor read, any official US Navy literature that warns of U-Boats, for example, d.f. 'ing ship's receivers, nor have come across any WW2 German literature that mentions the possibility, altho' the manufacturers of such equipment, namely Scott Co., certainly touted this so-called advantage, for example in ads in early WW2 National Geographic Magazine"... "I challenge anyone to practically demonstrate that any receiver with an r.f. stage radiates a signal over any usefully detectable distance."

Well, the fact that no information has been seen does not mean that such instruction does not exist. As I have just said, despite careful searching, I have not found the contract number for the TCS equipment, but that doesn't prove that it doesn't exist! It is better, in research of this kind, to state what has been found and demonstrated by source documentation, rather than to assume that because something has not been found that it doesn't exist. So what can be proved to exist? For starters, take the location of 'licence dodgers' by the British Post Office with their detector vans. These prowled the streets, and still do, using directional antennas and spectrum analysers to locate the local oscillator radiation from unlicensed TV and radio receivers, and they are demonstrably

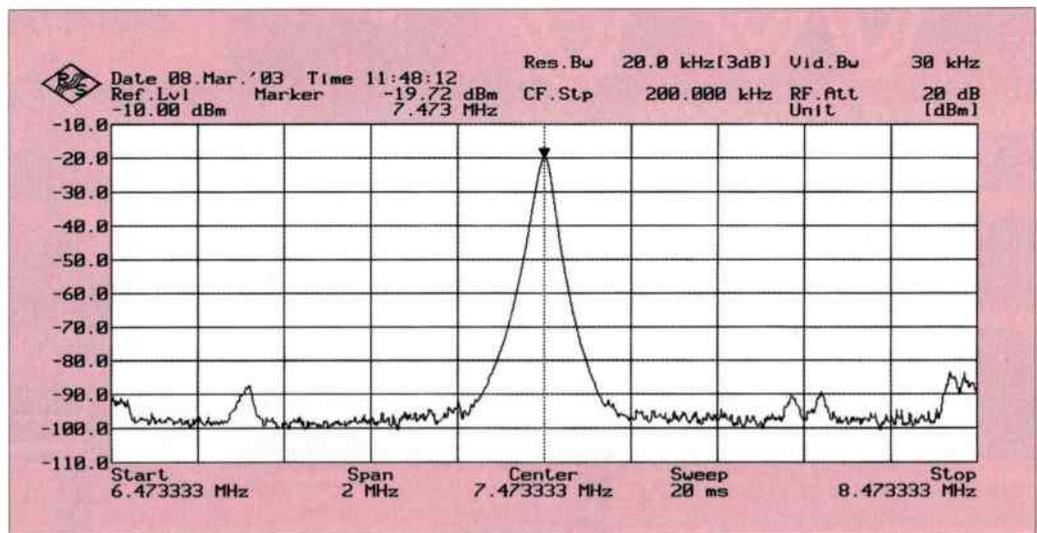


Fig. 1: TCS-12 local oscillator output measured at the antenna socket, an amazing -20dBm.

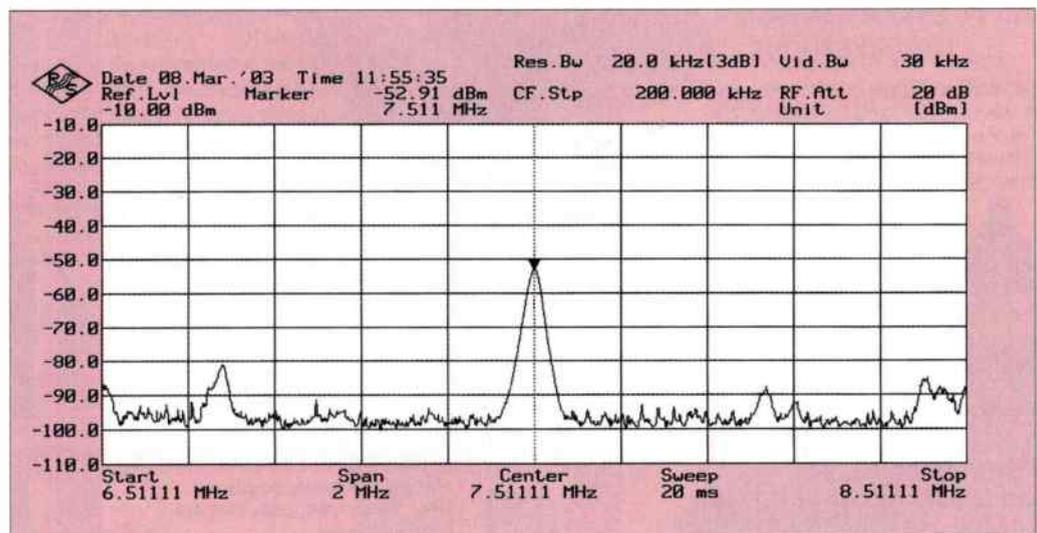


Fig. 2: R-50M local oscillator output measured at the antenna socket. Significantly less than the TCS-12.

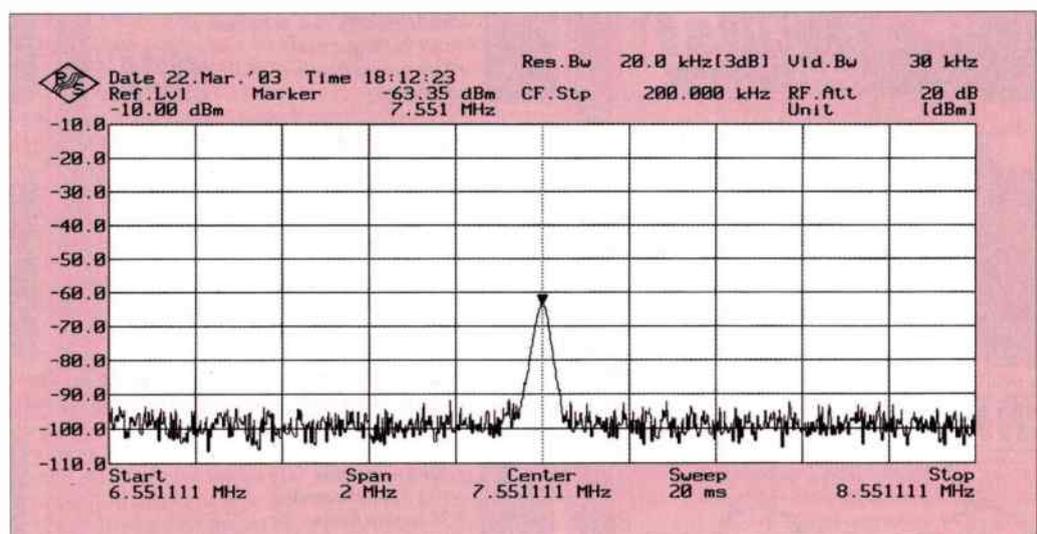


Fig. 3: For reference, the BC348 local oscillator output measured at the antenna socket.

successful. I acknowledge that this is not direction finding on the high seas, but the technique is well known and documented. Michael referred me to the book *Spycatcher* which I have to admit I had not read when it first

appeared, but which described in considerable detail the use of prowling listening vans in the streets of London, with the specific target of locating the local oscillator radiation from Soviet Embassy h.f. receivers, and once

again, although not the high seas the technique was successful and documented.

And so to the high seas: Michael O'Beirne located the proceedings of the Second Annual Symposium of the Centre for the

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- NES10-2: Speaker with built-in DSP noise filters "Dip switches for 8 filter settings (NES10-2) *DSP settings preset, no user adjustment (NES-5) *Plugs directly into 3.5mm speaker socket *Handles up to 5 Watts input *Max 2.5 Watts output *Requires 12V at 0.4 Amps max *Use mobile with cigar adaptor
- NES-5

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£79.95 B

ICOM IC-R5 NEW

- 150kHz - 1310MHz
- AM, FM, WFM
- 1250 memories
- Built-in ferrite rod antenna
- CTCSS & DTCS tone squelch
- Cloning capability
- 2xAA Ni-Cds + AC Charger
- Flexible Antenna

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ICOM IC-R3 "SCANNER & TELEVISION"

- 495kHz - 2450MHz
- AM, FM, WFM, AM-TV, FM-TV
- TV mode PAL (UK)
- 450 memories
- 50.8mm (2in) TFT colour display
- Simple bandscope
- BP-206 Lithium-ion battery
- Telescopic Antenna

£339.95 B

ICOM IC-R10 "ICOM QUALITY SCANNER"

- 500kHz - 1300MHz
- AM, FM, WFM, SSB, CW
- 1000 memories
- 14 tuning steps
- Real-time bandscope function
- CI-V compatibility (option)
- 4.8V DC Ni-Cds
- Flexible Antenna

£259 C

ICOM IC-R75 "BARGAIN SW RECEIVER"

- 300kHz - 60MHz
- USB, LSB, CW, AM, FM
- 101 memories
- Automatic Notch filter
- RF Gain/Squelch
- Synchronous AM detection
- DSP (with optional UT-106)
- Clock

£599 C

ICOM IC-PCR1000IS

- 100kHz - 1300MHz
- USB, LSB, CW, AM, FM, WFM
- Unlimited memories
- Synchronous AM detection
- RS-232 interface D-sub 9-pin
- BNC Antenna connector
- New Icom version 2 software
- Requires PC (Not included)

£309 B

ROBERTS R-861

- 153kHz-30MHz, 87.5-108MHz
- AM, SSB/CW, FM (Stereo)
- Memories 261SW, 18MW, 18FM
- RDS (Radio Data System)
- Stereo through earphones
- Auto time set + 3 Alarm timers
- 4 x AA cells (Alkaline)
- 110/230V AC adaptor

£199.95 B

ROBERTS R9914

- 153kHz-30MHz, 87.5-108MHz
- AM, SSB/CW, FM (Stereo)
- 45 Station preset memories
- Stereo through earphones
- Dual time
- Clock/Alarm
- 4 x AA cells (Alkaline)
- 230V AC adaptor

£99.95 B

MFJ-461 "INGENIOUS ACCESSORY"

- The MFJ-461 is a stand-alone pocket sized Morse code reader. Similar in size to the MFJ Morse tutors, all you do is hold it close to your receiver, and it instantly displays CW on the 32 character high contrast LCD. It has automatic speed tracking and a serial port. Truly pocket sized at 57 x 82.5 x 25.5mm and 158g.

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SCANNER PRE-AMP 20-0041 NEW

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- Adjustable gain control 0 to 20dB.
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OREGON SCIENTIFIC PDA-188 NEW

- This great Personal Digital Assistant allows you to enter your daily schedule information. It has 3 telephone directories, a calculator, currency converter, built-in calendar and built-in clock. Data can be transferred to a PC via a serial link. Comes with case, stylus, batteries, serial cable, CD-ROM and instructions. *Display 192-206 characters *Touch sensitive screen *Memory 384KB *2xCR2032 Batts *73.7x114x11.5mm*86g

£19.95 A

OREGON SCIENTIFIC BAA 898 HG NEW

- The BAA898HG Wireless Weather Station offers more info than ever! Weather, temperature, pressure trends as well as pressure readings, history and max and min readings. Operates with up to 3 remote thermo-hydro sensors, one supplied. *Wireless freq. 433MHz *Main unit 195x105x77mm, 4xAA cells *Remote unit 92x60x20mm, 2xAA cells. Optional Thermo-Hydro Sensor: THGR28N

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WS-2300 WEATHER STATION NEW

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GARMIN GPS-V DELUXE NEW

- Compact Handheld GPS with detailed street-level maps provided from MapSource City Select CD. Will automatically calculate a route and guide you to your destination with turn-by-turn directions and audible beeps to alert you to approaching turns.
- *Size: 127x59x41mm
- *Weight: 255g

£499.95 B

WATSON HUNTER "FREQUENCY COUNTER & FREQUENCY FINDER"

- 10MHz-3GHz
- LCD readout
- 8-digit display
- Black anodised case
- BNC socket
- Whip antenna provided
- Internal Ni-Cds
- AC charger
- 9V DC 300mA

£59.95 B

WDP-30 Short Wave Dipole

- 8.5m long!

£49.95 B

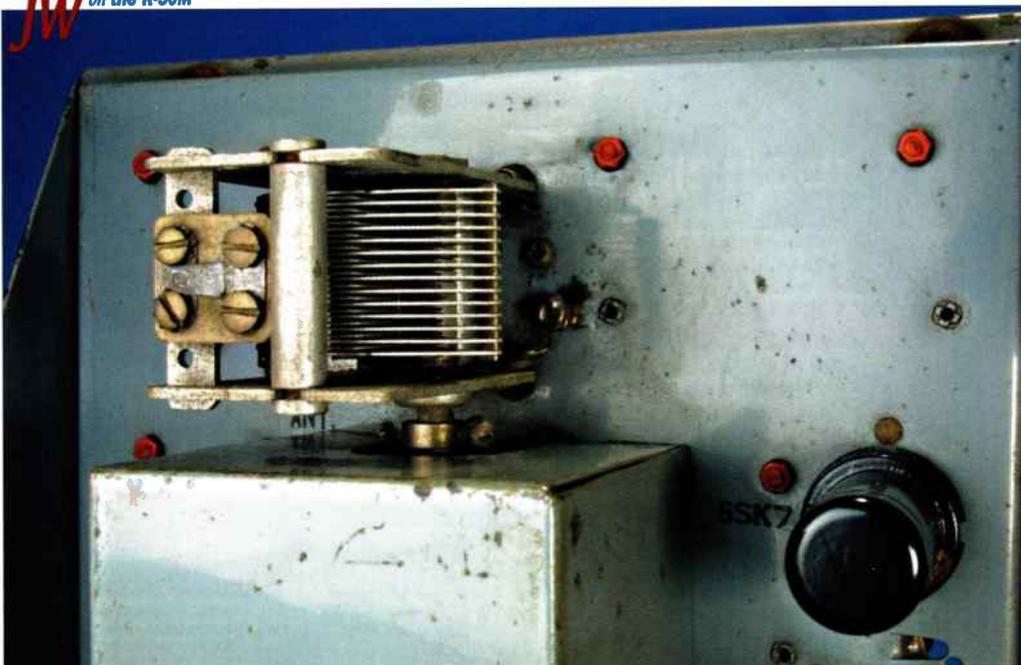
This new design from Watson gives you dipole performance across the entire short-wave bands. Unlike random wires, it reduces the background noise and pulls in the signals. And its small size means it will fit most gardens. Absolutely no adjustment required. 10m coax feeder included

W&S 2003 CATALOGUE !!

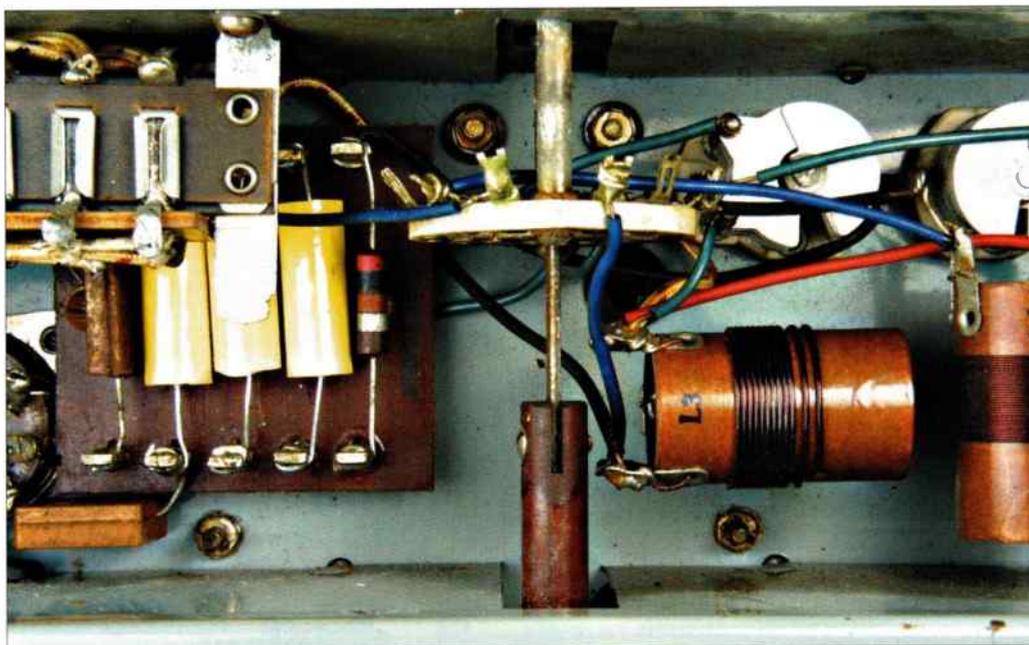
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- PACKED WITH PRODUCTS, TIPS & INFORMATION
- £2.95 B carriage £1.25



JW on the R-50M



R-50M the separate r.f. stage variable capacitor.



R-50M The isolated r.f. stage tuning shaft.

History of Defence Electronics (CHIDE) on the subject of Naval Electronics, held on the 20 September 2002. One paper with the title *Radio Communications Equipment in HM Ships during WWII* was presented by Lt. Commander T. Morgan, and contained a detailed description of the radio equipment fitted to various classes of vessel serving in the Royal Navy during WW2. Under the description of the Grenville Class serving with the British Pacific Fleet we find the following paragraph:

"Two low-power

transmitter/receivers known as Type TCS were also fitted, each having a netting facility. TCS was a USN equipment designed in 1941 with a frequency range of 1.5 to 12MHz. The power output of the transmitter was 40 watts on CW and 20 watts on voice. The receiver was a superhet, but had a reputation for radiating and its use was eventually banned during periods of radio silence."

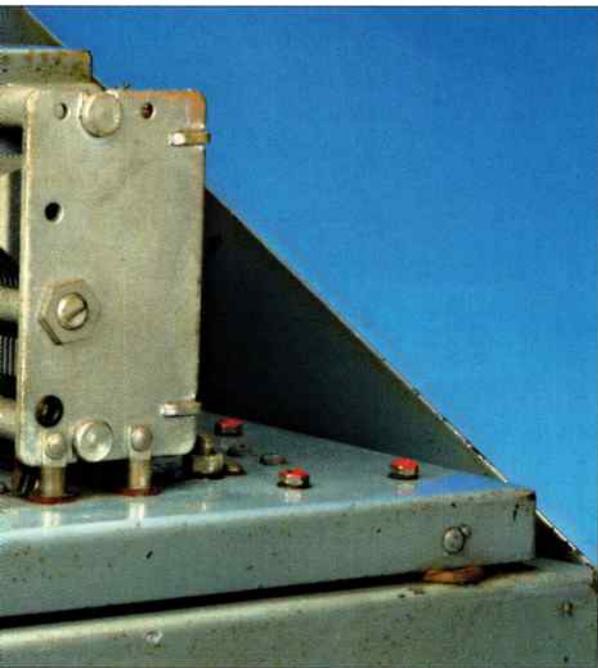
Although this points a finger at the TCS receiver for 'radiating' it still doesn't mean that the radiated signal was at a level which could be heard over long

distances, and the banning of its use during radio silence may have been to reduce the effect of locally generated signals on the listening ability of other ships in the fleet, but it is nevertheless a strong suggestion of problems. At this point I decided to get involved and try to quantify by measurement on my own receivers - since I had working examples of the types mentioned, and Michael had done all the research spade work. I simply set up each receiver and tuned it to a typical mid-band frequency within its tuning range, and connected the antenna and ground feeds to a spectrum analyser. I accepted the potential for a mismatch

between the receiver and the input impedance of the analyser, but since the circuits of the TCS and the R-50M showed low impedance input windings on the antenna coils I assumed that the measurements would be reasonably representative. I was astonished by the TCS, as you might imagine when you take a look at **Fig. 1**, which shows local oscillator radiation from the receiver to be greater than -20dBm at 7.5MHz. I was also surprised to find that the second and third harmonics of the local oscillator were equally huge. By comparison, **Fig. 2** shows that the R-50M local oscillator power was some 33dB lower at the same frequency in the TCS, down at -53dBm, a massive difference. No wonder the Royal Navy banned the use of the TCS.

How Far?

The next step was to try and determine if these signals could be heard at any distance from the source, keeping in mind that the receivers would be connected to an efficient antenna system. I referred to the real authority on this subject, the ITU in Geneva, and looked at the tables for ground wave propagation given in Recommendation ITU-R P.368-7. The second figure of the ITU document shows that at a frequency of 5MHz and a radiated power of -20dBm, the field strength at a distance of 20km over a salt water path would be about 3µV per metre, which is plenty of signal for a sensitive direction finder to detect and take



R-50M This section is mounted on isolating rubber bushes, rather sloppy half a century on.

most of their voyages...Later in the War, E.H. Scott Laboratories of Chicago developed a line of low radiation receivers especially designed for shipboard use. In relating this information, I must underscore the fact that there was not a single documented record of any

German submarine ever locating an Allied ship by the detection of radiation from a regenerative receiver."

On the face of it, therefore, there are no confirmed reports of a successful d.f. operation being used to locate a ship at sea by finding the radiation from the local oscillator of its receivers, but the fact still remains that it would have been technically possible since the signal level from a TCS receiver coupled into a matched (as they were) antenna system could have been significant at moderate distances from the ship. As for proving it - well, the difficulty these days is the sheer level of h.f. signals which compared to the levels experienced in the middle of the Atlantic or Pacific during World War 2 are overwhelming. However, since a challenge has been issued, if someone is wealthy enough and daft enough to send me off to somewhere like the Cook Islands with a TCS receiver and a tuned antenna system, I am more than happy to have a drift

a bearing on, even with the equipment of 1943 vintage. Obviously the signal would be higher the closer one approached the source, but I estimated that a submarine commander would be quite pleased to be able to sit off at 12 miles and get a bearing on an unsuspecting TCS receiver driver. However, it is also patently obvious that the R-50M with oscillator radiation more than 30dB lower than the TCS would be totally undetectable under the same conditions.

More trawling of the Internet turned up a report regarding the radio equipment and operational details of ships in the Royal Canadian Navy which contained the following:

"Early in World War 2, the German Navy had been highly successful in pin-pointing convoy locations. Their radio intelligence service, B-Dienst, using sensitive direction finders, could reportedly detect radiations from regenerative receivers on board ships from a distance of up to 100 miles away, but there is no evidence to actually support this claim. If there was a likely source of radiation it would have come from receivers like the IP500 fitted aboard many pre-war merchantmen...Simple regenerative designs without RF amplifiers are famous for radiating, even to the point of being usable as transmitters over very short range. In time, this was suspected by the Allies as a source of radiation (real or imagined) so merchantmen in convoys came under strict radio silence for both receivers and transmitters through

around the South Pacific in a boat carrying a decent h.f. receiver and see if I can really detect and measure the oscillator radiation at 15 to 30km offshore. A couple of dusky maidens and a case or two of good beer would add to the scientific nature of the project, and I don't doubt there would be a few willing volunteers to come along and rig the antennas.

Surprisingly Far

It is surprising just how far a low power signal will radiate, and I remember all too well the magic test box that I made for v.h.f. receiver alignment in the early days of Lowe Electronics. This was in the days when all amateur 2m rigs were crystal controlled, and aligning a multi-channel receiver could take quite a long time. I took a scanning receiver and made it scan continuously with all the standard crystals fitted to 20 channels. This gave me a frequency hopping low power signal which dwelt some 200ms on each of the popular two metre channel frequencies. I then used a 10.7MHz crystal oscillator and injected this into the receiver being aligned, which meant that as the scanning oscillator 'hopped' on to the channel to be aligned, you could hear an audio beat between the incoming signal and the 10.7MHz oscillator. All you had to do to get the unit under test on to frequency was to tweak the appropriate crystal trimmer to achieve zero-beat with the 'hopper' and there you were - bang on frequency. Simple and straightforward until I started getting complaints from local two metre users that they were experiencing a funny intermittent signal on every channel across the

2m band, but only during the working day...Oops! I took a receiver with me in my car and drove around the district to check what was happening, and found to my distress that my 'hopping' alignment oscillator with a power level of a couple of milliwatts and no antenna could be heard for about three miles in every direction around Matlock. Similarly, you only have to refer to the exploits of the QRP amateur radio enthusiasts to learn of transoceanic contacts being regularly made with just a few milliwatts of power on regular h.f. amateur bands, so in my view it is foolish to dismiss out of hand the possibility that a good d.f. operator could easily detect and take a bearing on a TCS receiver dumping -20dBm into the antenna system. Anyone care to comment?

Finally, and to amaze you all still further, I coupled up my BC-348 to see how the US Air Force managed in this d.f. business. **Fig. 3** shows the antenna radiation from the BC-348, and what a surprise. The local oscillator level is at -63dBm which is an astonishing 43dB below the TCS. Someone got their design right, and looking at the mechanical layout of the BC-348 you can immediately see that the local oscillator was totally enclosed in its own separate screening enclosure, arranged to be as far away from the r.f. stages as mechanically possible. In the case of the R-50M the electrical isolation of the r.f. stage from everything else, and the splitting of the common impedance coupling through the band switch shaft and the tuning capacitor shaft must have something to do with the low oscillator radiation, whilst the TCS used a very high power local oscillator and employed none of the 'shaft-splitting' techniques of the R-50M, nor the screening and low power oscillator configuration of the BC-348.

Conclusions

I do believe that it would have been possible to take a d.f. bearing on a ship using the TCS receiver, and at up to 15 or 30km over a clean sea path. It would have not been possible to do the same thing with the R-50M because the local oscillator radiation was 30dB lower and therefore under the noise floor of the d.f. system. I think that the R-50M was probably designed to the same basic marine specification as the TCS, and the evidence of a US Navy 'anchor' stamp on the front panel supports this view. However, I'm not so foolish as to make any dogmatic statements about this because you never know what's lurking out there waiting to be discovered, and I treat this as a diverting exercise in trying to ascertain the truth behind what is, after all, a fairly obscure subject, only of interest to like-minded dedicated enthusiasts.

Happy listening *Herr Unterseeboot Kapitan.*

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How To QSL

QSL /kjuesel/ adj. & v. H adj. **1 QSL card** - type of postcard confirming a radio transmission - can be decorative. **2 QSL bureau** - receives and forwards QSL cards - national office working with similar offices in other countries. **3 QSL manager** - one man QSL bureau. H v. **1 confirm**. **2 send QSL card**. [Morse *qsl* 'confirm']

prove that you've had the contacts that you say you have?

With written confirmation of the contacts from the other stations, that's how. Called QSL cards after the Q code for 'confirm', the cards basically say 'we spoke', and it rapidly became the norm for amateurs to send each other cards after contacts. In those early days, and to some extent even now, it was *de rigueur* to cover the wall of radio shacks with these paper trophies.

Non licensed listeners joined in the fun by sending cards to amateurs saying 'I heard you!' and amateurs, being polite, would send cards back saying 'Yes you did!'. Precisely when the first

conveying that request is another QSL card. If you've the expertise and inclination, you can design one yourself. If not, scan the adverts in this issue of *SWM* for suppliers, all of whom will send a selection of samples for your perusal. Whatever the design, there's some basic information that needs to be on the card. The obvious one is the callsign of the station to whom it's being sent, but the time, date, frequency and mode are also essential. A signal report is pretty important too. If it's a listener report, other information such as the callsign of any station being worked is helpful.

A very basic card with a little additional information. More elaborate cards would have a picture on the front and more details on the reverse. Getting your card to the amateur station. There are two main routes and both involve the Post Office.

Route One - Direct

Simply sending your card through the postal system to the other amateur, which results in him sending his card back to you. If only it were that simple!

To be honest, for UK based listeners sending to UK amateurs, it is that simple. A stamped self-addressed envelope should accompany your card, and a turn round time of a few days is within the realms of possibility.

Things start to get to be more fun when the amateur is outside the UK. A stamped self-addressed envelope is out unless you've got the stamps for that amateur's country. One option is to send one or more International Reply Coupons (IRCs) with a self-addressed envelope. The IRC is accepted in the post offices of countries in the Universal Postal Union as

payment for the return postage of your amateur's QSL card by the cheapest, and therefore slowest, method.

Another option is to send currency. A \$1 or \$2 bill is usually acceptable, particularly when the IRC isn't. Special event and DXpedition stations are often quite specific about the payment required to ensure that they send back a card direct. Something that these stations also do regularly is to appoint a QSL manager who will handle the receipt and despatch of cards. Hopefully the special event station will mention on the air that QSLs should be sent via the manager's callsign, otherwise a little detective work on the Internet or in the national society's magazine is required. One reason for appointing a QSL manager is that the country where the station is located doesn't have a postal service, or the service is very unreliable.

Unreliable usually means that items of value such as cash or IRCs are unlikely to make it to the intended recipient. Lots has been written on paper and the Internet about how best to ensure that the envelope containing your card and payment doesn't fall into the hands of light fingered postal workers in less affluent countries. Using an envelope that suggests that the content is valueless correspondence, or hiding the cash or IRC in amongst nondescript papers are some suggestions. Seasoned direct QSLers all have their own tricks to fool the thieves.

The US dollar. Money in any language.

Of course, none of this advice is of any use if you don't know the address to send your card. If the other station or its manager is QTHR, i.e. the details are on a published



QSLing

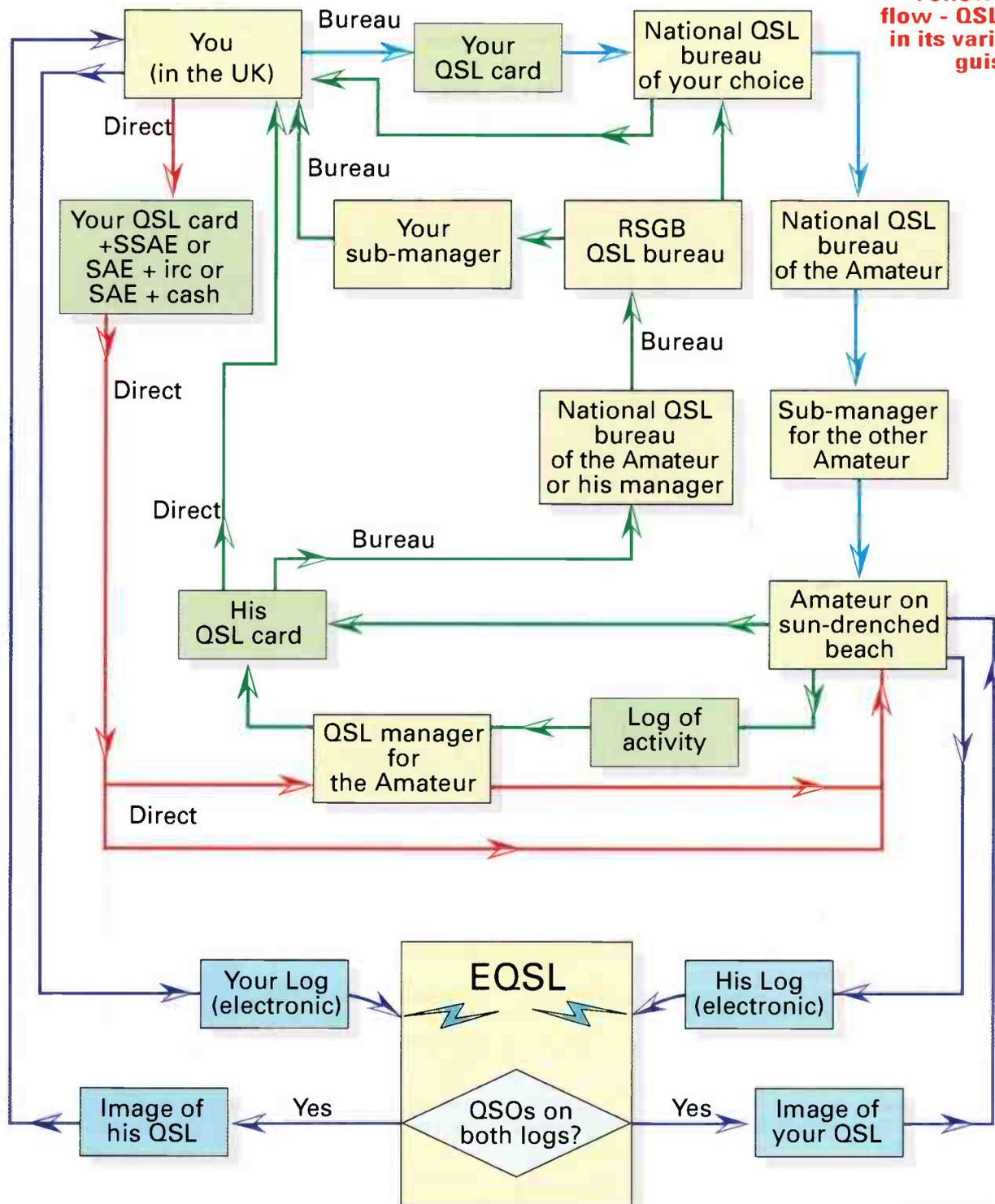
Back in the early days when radio communication was pretty new to mankind, receiving a radio transmission was worth getting excited about. And the people sending out those signals were also keen to know where their transmissions were going. As a radio amateur there was always the hope that you'd find out by another amateur replying to your calls. All very well, but having made the contacts, how do you impress your friends with your success? More to the point, how do you

postcards were sent as QSL cards is uncertain, but since then, many millions have travelled the globe.

Today the reasons for collecting QSL cards are pretty much the same as then. Some do it simply to obtain material reminders of contacts made, others as the written evidence of contacts required to claim awards. Whatever the reason, how do you get that amateur radio station that you've heard to send you a card confirming that it was his station that you heard?

Well, the best medium for

Follow the flow - QSLing in its various guises.



ST9964

database, then it can be looked up. The main database for the UK and Eire is available in printed form from the RSGB in their year book and on CD. Sister magazine *PW* also publish callsign CDs regularly. The next one is due this year. International calls are listed on CDs and websites. Try Buckmaster at

<http://hamcall.net> or www.qrz.com
 Interestingly, when checking a club call that I hold, I found that one website had a station location for the address that was two years old, another had an equally old postal address, and only the RSGB and *PW* listings had an up-to-date address.

Route Two - The Bureau

If you don't want to use route one, or can't because there's no address to send your card, then the alternative - which many people use as the first choice - comes into play. The bureau. It's much cheaper, but can be very very slow. Because of the

cost of sending individual cards around the world many national societies set up bureaus. The way the bureaus operate reduces that cost by consolidating postings to other countries.
 The bureaus works like this. You join a national society, for example the RSGB, which operates a QSL bureau. Any

cards that you wish to send to other amateurs you send to your national society. The society sends the cards for each different country to that country's national society, and that national society sends it to the amateur.

So let's look at how the bureaux work for one card. Imagine that yours truly - G4SLU - a UK amateur, sends a bundle of cards to the RSGB bureau including one for a French amateur, let's call him Pierre, whose card I would like to receive in return. When enough other cards for French amateurs have arrived at the UK bureau they and mine are sent to the French national society Réseau des Emetteurs Francais (REF) in Paris who operate a system that gets my card to Pierre. I won't elaborate here on how it gets from REF to Pierre as it can be worked out from the route Pierre's card takes to get to me.

So, Pierre receives my card and sends his in return to the French national society. When REF have enough cards for UK stations they post the cards, which includes Pierre's card for me, to the RSGB. The RSGB then takes all the cards for amateurs with the callsign G4S something, which includes the one for me, and sends them to the G4S series sub manager.

There are many sub managers around the country, each one dealing with a different series of callsigns. The G4S series sub manager sends me Pierre's card using a stamped self-addressed envelope that I have previously sent to the sub manager. As it could take some time for the sub manager to receive enough cards for me to fill the envelope, Pierre's card could stay with the sub manager for some time. It doesn't take much thought to realise that, with all this sorting, waiting, sending, sorting and waiting that it could be a long time between me posting my card to Pierre and receiving his in reply - and he's only in France!

Choose Your Own Company

An important point to make is that it's not necessary to join the main national society to

gain access to a bureau system. All bureaux have a single address to which outgoing cards are sent, and from which those cards are sent to the relevant national bureaux in other countries. Whilst all incoming cards will go to the national bureau, the cards for other UK bureaux are forwarded by the RSGB to the relevant bureau for onward distribution.

As a listener belonging to another society with a bureau, you will be issued with an identifying number with a prefix particular to that society. In that way it's easy for incoming cards for that

normal way. Then mark clearly on your card 'via G9XXX' and send it to the bureau in the usual way.

Whatever route you choose, success rates vary. Something around a 60-70% return is likely. And the time for returns via the bureaux can regularly be measured in years. There is plenty of potential for discussion on the pros and cons of various methods to optimise the chances of getting a return QSL card for that rare DX station you've worked or heard. Similarly, the conditions that some stations require to be fulfilled before they send a return card will continue to

to the site, the system checks the log to see if a station listed in the log is registered with the site. It then checks to see if that station has also downloaded a log. If so, and a QSO between the stations can be found in both logs, an image of a QSL card with all the appropriate information is E-mailed to the stations concerned. Designs for cards can be selected from the sites own library of images, or stations can submit their own designs. To eliminate as far as possible the scope for fraud, there are various criteria that need to be satisfied before a person can register a callsign with site.



International Reply Coupon. Currently costs 60p from the Post Office. Recognised in many countries and covers the cost of surface mail to the UK.

ENGLAND					
G4SLU					
IO 90 ar					
TO RADIO	DATE	TIME	FREQ	MODE	RST
Equipment			Antenna		
Best 73					

society's members to be sorted out and directed to the relevant bureau.

Members Only

Beware, some national bureaux won't handle cards to or from amateurs in their country that aren't members of the national society. And if the country that you want to get the card to doesn't have a bureau, then it's back to the direct route. A good clue to the existence of a bureau is if a national society is listed in the *Amateur Radio Operating Manual*, but it's not a guarantee!

If you're sending a card via the bureau to a station that has, for example, G9XXX as a station manager, then fill in the details for the station you've worked or heard in the

generate much heated debate.

So there you are. The two main routes for QSL cards are: Direct, via Bureaus and E-QSL cards. The three main routes... There'll be trouble at 'mill if I don't learn to count.

Route Three - E-cards

When is a card not a card? When it's a virtual card. The newest method for confirming radio contacts is over the Internet, with an image of a card being sent to the person requesting by E-mail instead of a real card through the post. E-QSLing requires users to send electronic versions of their logs to a website. The most well known is at www.eQSL.cc and has been running for about five years.

When a log is downloaded

So, you can't just log on as a rare DX station, submit a false log with your own call as one of the stations worked, then log on as yourself and claim a card! As time goes on, particularly with DXpedition and rare stations, the majority of cards such stations send are likely to be electronic.

The system is available to listeners and as it's supported by advertising, has the added bonus of being free. Donations, however, would never be refused.

Which One To Choose?

Direct - quick, but costly in terms of postage. Bureau - cheaper as it only requires payment of a fixed fee to a society, but slow. E-QSL - quick, reliable and free, but not universal. The dilemma is yours!

I hope if you've wondered what this QSLing lark was all about that this has been of some help. This is not the definitive guide, but a brief overview of the basics. It should give you enough information to make a start if you've never tried it before. Good Luck.

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- The Arrow** Rocking good music from the 60's, 70's, 80's, 90's and today
- Purple Radio** Dance music for the gay community
- The Groove** Classic soul and disco of the 60s, 70s and 80s
- Travel Now** Travel news for London
- XFM** Alternative Rock music
- PrimeTime Radio** Hits from the 40 and 50s to the present
- Capital Disney** The fresh young station exclusively for kids
- Kiss 100** Fresh Rhythm Driven Radio
- Planet Rock** The rock specialists
- SBN** Student Broadcasting Network, new alternative music
- Classic FM** Classical music
- Core** Fresh hits for the UK
- The Storm** Real rock radio
- Virgin Radio** Guitar-based rock music - the home of Real Music
- Oneworld** Books, plays, comedy
- Passion for the Planet** Adult contemporary and world music, plus health and environment features.
- News Direct** Rolling news
- Capital Gold 1548AM** Greatest hits of the 60s, 70s and 80s
- 1Xtra from the BBC** New black music
- 6 Music from the BBC** Music for people passionate about pop and rock
- BBC 7** Comedy, drama and children's programmes
- BBC Asian Network** British Asian Radio
- BBC LDN** Local news, information, sport
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- BBC Radio 2** The nation's favourite music
- BBC Radio 3** Live music and arts
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- Saga Radio** Easy, melodic music from the 40s to today, with news, information and general interest features
- talkSPORT** 24 hour coverage of Sport and News
- The Arrow** Rocking good music from the 60's, 70's, 80's, 90's and today
- 95.8 Capital FM** London's number one hit music station
- The Hits** Chart hits from today and yesterday with entertainment news and features
- TAP** The Asian People - contemporary music for London's young Asians
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Paying tribute to the gallant veterans of RAF Coastal Command on the 60th anniversary of the Battle of the Atlantic, international maritime and Search & Rescue units will fly into RAF Fairford for *Ocean Watch 2003*. This fascinating array of aircraft is normally seen on patrol from the Arctic Circle to the southern oceans.

Flying For Glory

The world's best pilots get airborne for a sensational eight-hour flying display - breathtaking solo jet and helicopter routines, legendary vintage aeroplanes, graceful gliders and a star appearance for the RAF's latest front line jet, Eurofighter Typhoon.

Musical Extravaganza

Tchaikovsky's famous 1812 overture, complete with Army cannons, is the highlight of a two-hour Musical Extravaganza performed by military bands at the close of flying. The big-sound concert also features 1940s swing, the classics and popular hits from the last 100 years, with even more entertainment as hot air balloons are released into the evening sky. **Admission free.**

Airshow Traffic Improved

A professional traffic management consultant has been commissioned by RIAT to liaise with the County Police and Highways Agency. The new traffic plan is designed to speed vehicle flow, and improvements have been extended to car parking arrangements through investment in wider, resurfaced gateways. A Traffic Management company will oversee the car parks for both inbound and outbound flows. Plans are also underway for the introduction of a comprehensive Park & Ride scheme from Swindon. (Full traffic information on www.airtattoo.com from 1 April).

Shuttle Bus

Frequent shuttle bus service from Swindon Bus Station to RIAT, taking around 40 minutes on the express route. First bus leaves Swindon at 0730, last bus returns from RAF Fairford at 2000. Adults £5 return, children £2.50.



It's that time of year again. Summer is just around the corner and *Short Wave Magazine* is givi

TTOO 2003

10 pairs of tickets up for grabs!
£660 worth of tickets to be won!

Tattoo Timetable

The public gates to RAF Fairford (near Swindon on the Wiltshire/Gloucestershire border) open at 0730 on Saturday and Sunday 19th and 20th July. Flying display from 1000 to 1800, followed by free outdoor concert.

Tattoo Tickets

Adults in advance £27.95, on-the-day £33. Children 15 and under go free if accompanied by an adult.

Extra Options

Five Star Aviation Club

The Friends of the Royal International Air Tattoo enjoy a ring-side seat from the first aircraft arrival on Tuesday 15th July to the last departure on Monday 21st July. The seven-day package for aviation fans includes pre-show access to the airfield. Adult subscription £125, children £62.50.

Aviation Club

Marquee with private grandstand and garden overlooking the runway. All inclusive price £109 per guest (RIAT admission, lunch, morning coffee & afternoon tea).

Waitrose Jubilee Garden

Traditional deck chair enclosure, offering a selection of summer refreshments. Advance tickets £15 per person (does not include RIAT admission or food and drink).

Public Grandstand

Reserved seating, great view of the flying display. Advance tickets £15 per person (does not include RIAT admission).

Park & View

Count them in as aircraft arrive for the Tattoo from Tuesday 15th July to Friday 18th July, and watch them take off for home on Monday 22nd July. Two Park & View enclosures - advance tickets £10 per adult for Tuesday, Wednesday, Thursday and Monday and £15 per adult for Friday. Children 15 and under go free if accompanied by an adult.

For all RIAT information or bookings (admission tickets, FRIAT, Aviation Club, Waitrose Jubilee Garden, Public Grandstand or Park & View) phone (0870) 7581918, or buy direct from www.airtattoo.com Admission tickets only also available from branches of Waitrose and Stroud & Swindon Building Society and from selected Tourist Information Centres

The Royal International Air Tattoo 2003 Competition Don't miss this chance to win a pair of tickets, courtesy of SWM.

Questions

- Q1. How many years of Flight will be celebrated at RIAT 2003?
- Q2. The Royal International Air Tattoo is held in support of which charity?
- Q3. In which year was the first International Air Show held?
- Q4. Which aircraft is the star of the film 'Memphis Belle'?
- Q5. Who or what is a 'Fat Albert'?
- Q6. How many Red Arrows fly in the display?
- Q7. Concorde's maiden Flight flew from RAF Filton, in April 1969. Where did it fly to?

ENTRY COUPON

Answer the seven questions and post your entry to **Short Wave Magazine, RIAT 2003 Competition, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.**

Name:

Address:

Post Code:

Tel No:

E-mail:

Do you receive SWM every month?

Where do you buy SWM?

Answers

A1:

A2:

A3:

A4:

A5:

A6:

A7:

Entries must reach us by the 27th June 2003. The draw will take place on the 30th June and tickets will be despatched in time for the RIAT 2003. The winners will be announced in August 2003 SWM. The Editor's decision is final.

Please tick the box if you don't wish to be contacted by SWM or associated companies.

ng you the chance to win one of ten pairs of tickets for this truly stunning event.

Build A NAVTEX Decoder

Part 2

NAVTEX is a continual source of fascinating automated maritime information. Roger Thomas, brings us the second part of his neat project, that utilises both a programmed PIC microcontroller and some PC software to convert received audio to on-screen text.

This month we look at the way the NAVTEX information is broadcast over radio and the message format. We begin to look at the hardware elements of the decoder and provide the all important 'Shopping List'.

NAVTEX Character Set

Although each NAVTEX character is made up of seven bits - which gives 128 possible combinations - only 35 combinations are actually used. This reduction is due to error detection, which is explained later.

With only 35 characters available there are not enough combinations to cover the entire alphabet, numbers and punctuation. To overcome this restriction there are two different character sets - one for letters and the other for figures and punctuation. For example, if code 85 is received then the

text will appear either as a 'R' or '4' depending on which character set is selected. All letters are transmitted in upper case.

This dual character set concept, and all letters being in uppercase, will be familiar to anyone that decodes RTTY (Radio Teletype) transmissions. Selection of the appropriate character set is done by sending the relevant letter or figure control character. To reduce the number of times that the character set needs to be changed the most frequently used characters, such as space, are implemented in both tables - Fig. 2.6.

Error Detection

NAVTEX transmission incorporates two error detection features to help

You Will Need...

Resistors
Carbon film 0.25W, 5%
470Ω 1 R1, R2
680Ω 1 R3
56kΩ 2 R6
180kΩ 1 R4, 5

Potentiometers - preset
50kΩ 1 R7

Capacitors
Ceramic
10nF 2 C3, C4
15pF 2 C1, C2

Electrolytic 16V
10μF 2 C5, C6

Semiconductors
Integrated Circuits
PIC 16F877-20 1 IC1
74HC14 1 IC2
TL081 1 IC3

Light Emitting Diodes
0.2in 10mA 1 D1

Miscellaneous
20MHz HC18U crystal, 1off, (Xtal1), 40 by 2 line liquid crystal display e.g. model DM4002B, 1off, Maplin. Stripboard. Interconnecting wire. Suitable case and hardware.

ensure correct text reception.

The first error detection method is that each character transmitted is **always** made

up of four '1's and three '0's, (as can be seen from character tables), hence only 35 combinations are available. This makes the transmission more robust.

Any character that does not have this 4:3 bit ratio has not been received correctly. However this is not perfect as interference could change a '1' to a '0' and also a '0' to a '1' within a single character thus still maintaining the correct 4:3 ratio. The character would pass the test so occasionally the incorrect character may be printed if reception conditions are poor.

Forward Error Correction

The second error detection feature is called Forward Error Correction (FEC). The FEC concept is simple and works by sending each character twice, separated by four characters, allowing for time diversity reception. This character interleaving reduces the risk of a burst of interference or noise

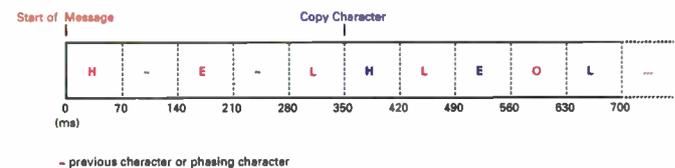


Fig. 2.7: The text 'HELLO' showing forward error correction (FEC).

corrupting both characters as they are spaced some 350ms apart. However, it comes at a considerable cost as the effective text throughput of the transmission is halved. If there is no text available for the copy (i.e. message just started to be transmitted) then the phasing character is used.

If any received character fails the 4:3 bit ratio test then the software looks at the copy. If the FEC copy

character also fails the ratio test then a '*' is printed out. If there are only a few errors then the text can usually still be understood - see Fig. 2.7.

Format Of NAVTEX Messages

A NAVTEX transmission begins with a phasing signal followed by the message. The NAVTEX message starts with ZCZC letter sequence followed by a four character header

(designated B1, B2, B3, B4), then the maritime text

Fig. 2.6

Function	Binary	Code
select letters	1011010	90
select figures	0110110	54
carriage return	1111000	120
line feed	1101100	108
space	1011100	92
phasing 1	0001111	15
phasing 2	1100110	102

Fig. 2.6 NAVTEX characters common to both letter and figure table.

message, followed by NNNN text sequence.

The **phasing signal** uses

an alternate sequence of phasing 1 and phasing 2 characters to allow the receiver to adjust to the NAVTEX signal level and the decoder to synchronise with the data transmission. This alternate character sequence is transmitted for several seconds before the NAVTEX messages. A few phasing

Fig. 2.8

ISPHIIPNPGI NIGS IRSE QRUEEQSUTEESDT ETDQ TPOA SPSA SAST ASTA FSEA
 [i p p i n g i s r e q u e s t e d t o p a s s a t s a f e]
 [s h i p p i n g i s r e q u e s t e d t o p a s s a t s a]

Fig. 2.8: The text in uppercase may look encrypted but it is an example of FEC interleaving, the 2 copies of the message is shown in brackets.

characters are also inserted within the body of the text and between individual messages to help maintain synchronisation. Reception of these phasing characters does not produce any characters on the display.

These phasing signals do not follow the usual FEC convention of transmitting an identical second copy. The Phasing One character is transmitted followed by the Phasing Two character as the copy, with the appropriate number of characters in between. If the NAVTEX decoder was to attempt synchronisation only on normal text then if a sequence of the same characters (e.g. NNNN) was received the decoder would not be able to determine which character was the original or the copy, as the characters would all be the same.

ZCZC This is a unique start of message sequence that will never appear in any transmitted text and alerts the decoder to a new message being transmitted. In the decoder, whenever the PIC microcontroller software receives this sequence the l.c.d. is cleared and the cursor is positioned at the first position on the top line.

B1 The station identification character B1 is a single letter allocated to each NAVTEX transmitter service. As there are many more NAVTEX stations around the world than letters in the alphabet, stations that are a considerable distance apart are allocated the same identification letter. Where the same NAVTEX transmitter broadcast to different coastal areas, for example the Niton and Oostende transmitters, each service is allocated a different letter.

B2 is a letter used to identify the subject or type of the message - as shown in Fig. 2.9. Not every NAVTEX message uses the correct specific indicator, many messages transmitted use the

more generic 'A' (navigational warning) designation.

B3 B4 is a two-digit number to identify individual messages. This number is used by a NAVTEX radio to keep track of what messages have already been received. If this number is '00' then this denotes urgent text and will always be displayed or printed out. NAVTEX messages are not necessarily transmitted in numerical order.

NNNN This unique character sequence is used to inform the NAVTEX decoder that the end of a particular message has been reached. After the last message is transmitted phasing characters are sent to ensure that the text still held in the FEC buffer is displayed.

NAVTEX Message

Examples of NAVTEX received with the PIC decoder and text saved using the *Windows XP* software while writing and testing the software. As can be seen there is a variety of different types of messages being transmitted. Some are verbose others can be rather cryptic. All text is in English, apart from NAVTEX messages from the Niton transmitter (K) for vessels off the French coast, which is bilingual. The use of bilingual text broadcasts has only happened recently.

The transmitter used to broadcast each message can be determined by the letter (B1) immediately following the ZCZC (start of message) text. Message starting with 'S' was received from the Niton transmitter prior to the recent changes.

The first block is examples of complete NAVTEX messages to show the message format. Second block is the text of some of the more interesting

messages received while writing this article - Fig 2.10.

NAVTEX Receiver

A commercial NAVTEX receiver would typically have a multi-line l.c.d. display and store received messages for later display thus permitting unattended operation. Selection from the NAVTEX

Fig. 2.9

- A navigational warning.
- B weather warning.
- C ice reports (unlikely to apply to UK).
- D search and rescue information.
- E weather forecast.
- F pilot service message.
- G DECCA message (discontinued).
- H LORAN message.
- I OMEGA message - (discontinued).
- J satellite navigation message (GPS).
- K other navigational message.
- L oil rig movement.
- V more detailed navigational warning.
- W information on submarine operations (subfacts) and live gunnery firings (gunfacts).
- X special services (not defined).
- Y special services (not defined).
- Z no message.

Fig. 2.9: NAVTEX message indicators - reception of A, B, D, L messages is mandatory.

receivers' menu would allow certain transmitters (B1) and particular types of messages (B2) of interest or relevance to be displayed, or certain categories to be ignored. However some messages types, such as search and rescue information, have to be received and cannot be rejected by the receiver.

More expensive receivers may also have an integrated small printer allowing a permanent record of messages received. The internal microprocessor stores which messages have already been printed to prevent the same message being printed again. This helps reduce the amount of printer paper used. These NAVTEX receivers may also integrate to GPS satellite and the navigational system to log the ships' position, speed and other navigational data.

NAVTEX Format

The transmission is synchronous - there are no start or stop bits - and transmission speed is 100

baud. Compared with asynchronous transmission this increases the potential data throughput as all the bits are conveying information but does require a more complicated decoder. Each bit of a NAVTEX character takes 10ms to transmit, and as there are seven bits per character then total transmission time for each character is 70ms.

PIC NAVTEX Decoder

The decoder can easily be built on strip board. The decoder requires a 5V d.c. supply and with the PIC, i.e.d. and op-amp draws around 15mA. However most current will be consumed by the backlighting option of the display, if available. The l.c.d. I used (model DM4002B manufactured by 'Orient Display') consumes around 200mA with the backlight enabled - you will need to take this into account if the decoder is likely to be battery operated. I purchased this particular

display from Maplin.

Please note - care has to be taken when wiring the backlighting as l.c.d. displays from alternative manufacturers have the power polarity of pins 14 and 15 reversed. It is advisable that the PIC decoder circuit should be housed in a metal enclosure.

A pre-programmed 16F877-20 PIC microcontroller and decoder software (requires *Windows XP*) is available for £25, the PC software which requires *Windows XP* is available separately for £8.00 from the author - **Roger Thomas, 24 Slave Hill, Aylesbury, Bucks HP17 8AZ**. Please enclose an s.a.e. with any queries.

Examples of received NAVTEX showing the diversity of maritime information transmitted can be seen at: www.pwpublishing.ltd.uk/swm/navtex/examples.html

We will bring you the concluding part of this project next month.

In The Ed's Shack

This month something a little different. Kevin has quick look at receiving and decoding DRM broadcasts.

Digital Broadcasts for Short Wave Bands - DRM

official one developed by DRM affiliated organisations and specifically Fraunhofer IIS. The software is available from DRM but it's not free.

The block diagram Fig. 1 shows the functionality provided by the Fraunhofer software. There is now an alternative available from www.tu-darmstadt.de/fb/et/uet/fguet/mitarbeiter/vf/DRM/DRM.html but this requires compiling on the users hardware. Next time, I'll run through what's needed to install and run this *Dream* software.

Sound Card DSP

There are integrated receivers being developed so that a DRM radio will be self contained, but currently a modified conventional receiver and a computer is required to effect reception and demodulation of the digital transmission, it works like this.

The current method of processing a DRM signal is to arrange that the signal is received by a conventional

I'm not constructing a kit this month. Was that a sigh of relief I hear? Instead I'm going to investigate a way of resolving Digital Radio Mondiale standard signals that may well soon be filling the h.f. broadcast bands. For those of you that read the explanation of DRM in *SWM* July last year, I apologise for boring you, for everyone else, a little refresher.

The DRM signals are encoded in much the same way as most high rate digitally encoded radio transmissions. They are phase modulated carriers or rather groups of carriers. Similar to DAB and GSM digital radio systems. To receive these types of transmission and reconstruct the original, pre-encoded signals requires more than just a conventional analogue receiver we all know and love.

The beauty of the DRM system is that it allows existing analogue a.m. transmitters to be utilised and so seriously reduces the cost to the broadcasters. Not so the listeners however. All is not bleak though. As is common these days with any of the digital modes covered by *SWM*, it's down to the shack computer to provide the signal conversion. More specifically the combination of the computer and the in-built audio d.s.p. processor - the sound card. Plus some clever programming to shuffle the recovered base band signal.

Initially and not surprisingly, the only receive system was the

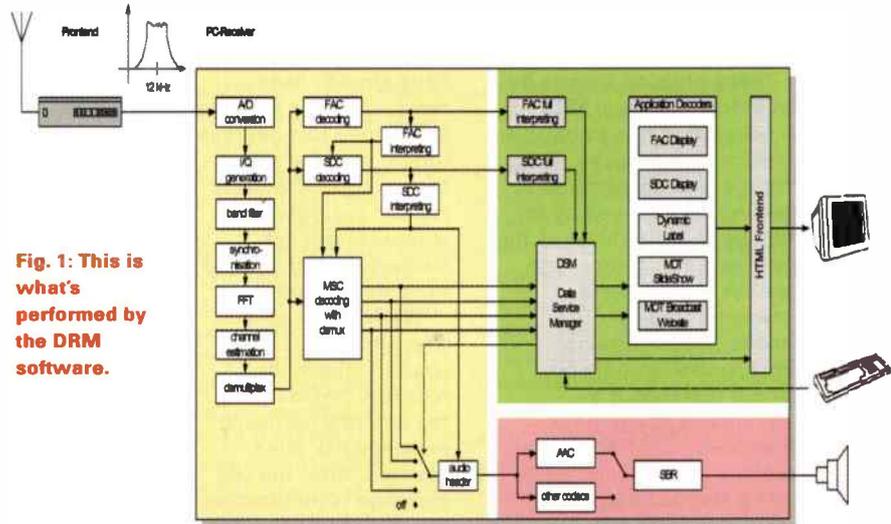


Fig. 1: This is what's performed by the DRM software.

Fig. 4 (a): DRM Test Transmissions.

Start (UTC)	End (UTC)	MHz	Station	Broadcaster	Programme
0000	0000	0.531	Burg	Medienanstalt Sachsen Anhalt	Medienanstalt Sachsen Anhalt
0000	0000	0.855	Berlin	DeutschlandRadio	DeutschlandRadio
0125	0255	15.525	Bonaire	Radio Netherlands	RNW Spanish
0300	0400	11.955	Sackville	BBC	BBC Worldservice
0430	0530	15.400	Bonaire	Radio Netherlands	RNW English
0930	1200	15.440	Sines	Deutsche Welle	DWL
1000	1300	6.140	Jülich	Deutsche Welle	DWL
1305	1455	5.975	Jülich	T-Systems Mediabroadcast	Multimedia
1600	1900	6.140	Jülich	Deutsche Welle	DWL
2300	0000	9.795	Sackville	BBC	BBC Worldservice
2330	0125	15.525	Bonaire	Radio Netherlands	RNW English
2330	0125	15.525	Bonaire	Radio Netherlands	RNW English
2330	0125	15.525	Bonaire	Radio Netherlands	RNW English

* Different beams in alternate week
** May be interrupted for analogue coverage of special events

Fig. 4 (b): DRM Long Term Test Transmissions.

TX	Broadcaster	UTC	MHz
Sackville	RCI / CBC	1400-1555	9.660
Sackville	RCI / CBC	1600-1900	11.975
Sines	DWL	1800-1955	21.550
Bonaire	RNW	1900-2200	17.725
Sveio	Norkring / Telenor	2000-2100	15.175
Sines	DWL	2230-0030	13.665
Juelich	T-Systems Media Broadcast	2300-0100	5.925
Juelich	T-Systems Media Broadcast	2300-0100	9.530
Sackville	BBC	0000-0100	6.010
Rampisham	BBC	0100-0300	9.810
Sackville	BBC	0400-0500	6.010

analogue long, medium, short wave receiver acting as an r.f. 'front-end'. In theory, any 'front-end' (analogue receiver) that can provide an i.f. output of 12kHz direct or with an adapter circuit as per the block diagram **Fig. 2** should be usable. The i.f. output must have a bandwidth of greater than 10kHz for normal transmissions and greater 20kHz for transmissions with channel bundling - more than one programme per broadcast. This signal is then fed into a standard computer sound card. The sound card must be able to run with a sampling rate of 48kHz. For output of the audio signal as well another sound card with a sampling rate of 48kHz is required. If one sound card is used for sampling the signal and output of the audio the sound card must provide full duplex operation. Most of the newer sound cards provide all these features for instance, SoundBlaster Live! from Creative Labs to name one. It is important that the sound card's internal a.g.c. is disabled as this can corrupt the DRM signal due to unpredictable level changes

. It appears that most of the internal sound cards of newer notebook computers have the a.g.c. permanently enabled and offer no way to disable it. They also very often have low pass filters which also can not be disabled. In order to get the system working with such computers, or others without suitable sound card, use of an external USB sound card is recommended such as the 'USB One' USB Audio Interface.

The working screen provided by the Fraunhofer software can be seen in **Fig. 3**.

Trial Transmissions

If you obtain a copy of either the official Fraunhofer software or the Freeware *Dream* package you'll need some signals to convert. There are two possibilities until DRM services are launched on a permanent basis later this year. The first option is to obtain a download of a sample audio file for direct processing with your p.c. or it's possible to receive one of the long term test broadcasts, as shown in **Fig. 4**.

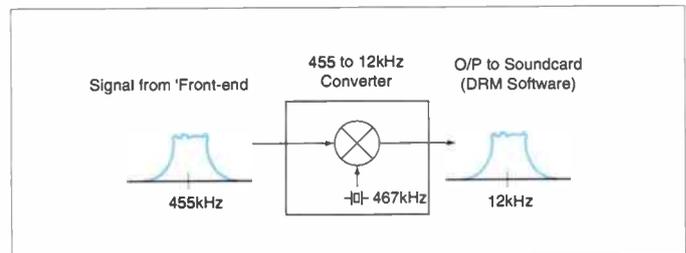


Fig. 2: The block diagram of a converter to produce baseband output from a 455kHz i.f.

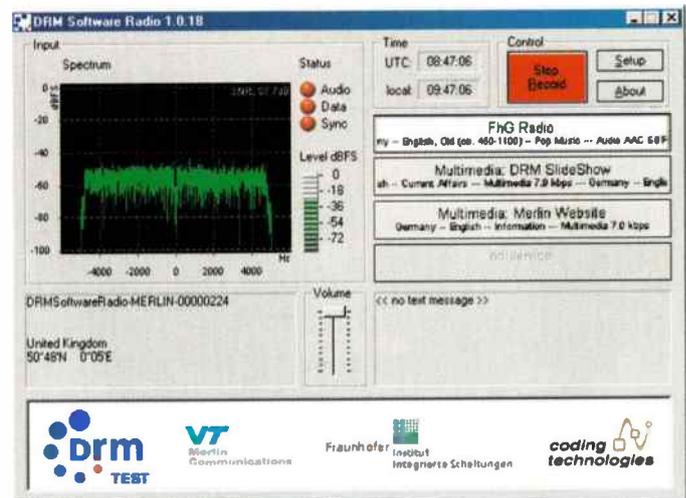


Fig. 3: The official software processing a DRM transmission.

Target Area	Regularity	Azimuth (degrees)	Antenna	P avg. DRM	Start Period	End Period
Burg	24 hours			2		
Berlin	24 hours**					
Las Vegas (NAB)	Daily	320	CHR 4/4/0.3	10	5-April-2003	10-April-2003
USA West	Daily	285		70	30-March-2003	25-October-2003
New Zealand	Saturday	230	CHR 4/4/1	10	30-March-2003	25-October-2003
Europe	Daily	40	HR 4/4/5	80	30-March-2003	25-October-2003
+ SE Australia	+ Sunday					
W + Central Europe	Daily	120	LogPeriodic	40	30-March-2003	25-October-2003
W + Central Europe	Daily	290/60*		40	30-March-2003	25-October-2003
W + Central Europe	Daily	-	N Directional	40	30-March-2003	25-October-2003
USA East	Daily	268		70	30-March-2003	25-October-2003
NE USA + NE Canada	Daily	350	CHR 4/4/0.3	10	30-March-2003	5-April-2003
Las Vegas (NAB)	Daily	320	CHR 4/4/0.3	10	5-April-2003	10-April-2003
NE USA + NE Canada	Daily	350	CHR 4/4/0.3	10	11-April-2003	25-October-2003

Pdrm	Programme	Remarks
70	RCI / CBC	
70	RCI / CBC	
70	DWL	
10	RNW English / Dutch	Backup: 17.790 / 17.620. QoSAM Test
180		March 6 only
70	DWL	
40	Pre-recorded Multimedia IQ-file	
40	Live RNW English	Parallel with RNW English AM Bonaire 6.165/9.845 to USA East
70	BBC WS	
30	BBC WS	
70	BBC WS	

For more information regarding DRM you can visit their web site at www.drm.org

RADIOWORLD

42 Brook Lane, Great Wyrley, Walsall, West Midlands WS6 6BQ

Phone: 01922 414796 Fax: 01922 417829

E-mail: sales@radioworld.co.uk Web: www.radioworld.co.uk

AOR



AR5000

Model Description £ RRP inc VAT

AR5000 High performance full featured wide band all mode base receiver 10kHz - 2600 Mhz. IF selection as standard 220kHz, 110kHz, 30kHz, 15kHz, 6kHz, 3kHz (500Hz optional). Supplied with mains power supply. **£1295.00**

AR5000+3 High performance base receiver with three enhanced options factory fitted: noise blanker, synchronous AM, automatic frequency control. **£1449.00**



AR3000A

AR3000A Unique all mode extremely wide band base-mobile receiver 100kHz - 2036mhz with no gaps. RS232 port fitted. **£699.00**

AR3000A + (plus) Customised AR3000A with switchable narrow SM & SAT filters, Tape relay, SDU ready and discriminator output. **£799.00**

ICOM



PCR1000

AR8200 MkIII 3 New advanced wide band all mode hand-held receiver with enhanced microprocessor facilities, slot card options available, multi-function display. **£399.00**

AR8000 The New Concept. Wide band all mode hand-held receiver with many microprocessor facilities, dot matrix display and computer compatibility. **£296.00**

YAESU VR-5000



£549.00

ICOM R2 0.1300mhz Handie. Fits in the palm of your hand. AM/FM, FM Narrow - 450 memory channels **£139.00**

IC R8500 100kHz - 2GHz Continuous. All mode no gaps. 1000 Memories. 4IF band widths Excellent all round for the professional listener **£1440.00**

IC-R75E 0-60MHz. High Stability receiver circuit 100 DB Dynamic range. Twin bandpass Tuning. Optional digital processor. Best selling receiver **£529.00**

IC-PCR1000 & PCR 100 ICOM PCR1000 - 0-1300mhz. All modes. Computer driven. On screen programming. Band scope. Instant band scope access via mouse. List of features, call for brochure.

PCR 1000 £319.00 + £20.00 for XP software PCR 100 £199.00 (SAME SPEC WITHOUT DSP)

GARMIN GPSIII



Moving map features basemap, built-in European, African and Middle East to 20mi; includes

lakes, rivers, cities, railways, coastlines, motorways and roads. Uploadable CD ROM, detailed map data available from MapSource CDs.

RWP **£325.00**

GARMIN STREET PILOT ONLINE



Built-in international map contains motorways, major roads, lakes, rivers,

streams, airports, cities, towns, coastlines, motorway exits plus waypoints.

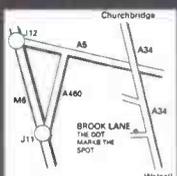
£950.00

GARMIN GPS12



The Garmin GPS12 series products are as rugged as GPS gets. Military-tough construction and waterproof cases make these units ideal companions for any outdoor adventure. All feature a 12 channel receiver that locks onto satellites fast and stays locked on, even under extreme conditions. These units may be tough on the outside, but their operations are easy and logical.

RWP **£129.00**



FINANCE NOW AVAILABLE. PHONE DAVE FOR DETAILS!

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WORLD

E&OE

YUPITERU

YUPITERU MVT 6000 SW

Yupiteru's flagship model, with a range exceeding 2000mhz, a real time bandscope.



- 531 kHz - 2039 Mhz
- 1000 memory channels
- All modes: W-FM, FM, N-AM, AM, LSB, USB, CW
- Multiple scanning steps 50Hz - 125kHz
- Alpha numeric display
- Band scope with marker function for direct access to displayed frequencies
- Duplex receive capability - hear split frequency signals easily with VFOs
- 20 search bands
- Fast tune facility gives 10 times function for quick tuning
- Built-in ferrite rod antenna for AM broadcast reception
- OP90 Soft Case

£329.00

WEIGHT AND RANGE RECORDS



Freq 25 - 1300MHz
500 Channels
Modes AM, FM,
WFM Trunktracker
Alpha Tagging
With UK mains
adapter, Telescopic
aerial.

£299.00

WEIGHT AND RANGE RECORDS



Desktop scanner with TURBO SCAN
Freq 25 - 1300MHz
AM,FM,WFM

£249.00

YUPITERU MVT 13000

An exciting new handheld packed with features - but at a price you can afford! The receiver has "breathtaking performance" ensuring this set is destined to be a number one seller



- FREQUENCY
66 - 88MHz
108 - 170MHz
300 - 470MHz
806 - 1000MHz
- MODES: AM/NFM
- STEPS: 5, 6.25, 10, 12.5, 25kHz
- MEMORIES: 200
- BAND MEMORIES: 10 (user re-programmable)
- PRIORITY CHANNELS: 10
- SCAN/SEARCH SPEED: 30 per sec
- POWER: Requires 4 x AA batteries
- SUPPLIED WITH: Antenna, Earpiece, Carrying Strap and built-in Desk Stand

£159.95



AOR AR5000 MKII



All mode, wideband desktop scanner
530KHz - 2040MHz. Additional slot cards
PC Control, 1000 memories

£649.00 Excluding power supply

YUPITERU MVT 7100 SW

Probably the most popular high end scanner. It's easy to use and can receive just about anything going!



- 530kHz - 1650mhz
- AM/FM/WFM/SSB/CW
- 1000 Memories
- C/W N/Cads & charger
- OP51 Soft Case £17.95 + £2 p&p

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AOR	AR-3000 WIDE RECEIVER.....	£450
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AOR	AR-3030 HF RECEIVER.....	£399
AOR	AR-5000 TOP CLASS RECEIVER.....	£999
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AOR	AR-8000 WIDE BAND RECEIVER.....	£199
AOR	AR-8200 WIDE BAND RECEIVER.....	£230
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DRAKE	SW-2 RECEIVER.....	£275
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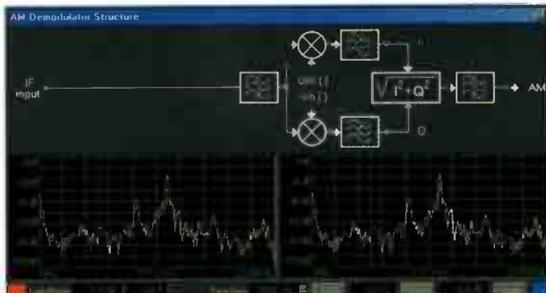


An intuitive control panel features a wide variety of tuning and scan modes, memory functions, and many other facilities.

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The Professional Demodulator (optional) includes interactive block diagrams for all modes, with two real-time spectrum scopes and THD and SINAD measuring facilities.

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- Sound Blaster 16 (or compatible sound card)
- Windows 98/ME/NT/2000/XP

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UI Sales Information

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Falcon Equipment and Systems

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Fax: (0)1684 850011

Email: winradio@sda-falcon.co.uk

Just when you thought that there is nothing in shortwave that could surprise you anymore, here comes the new WINRADIO G303i Receiver.

This new receiver continues in the fine tradition established by WINRADIO's successful range of wide-band PC-based receivers. The "G3" stands for "the third generation": As the original, award-winning, first-generation WR-1000i receiver was the world's first commercially available wide-band receiver on a PC card when launched seven years ago, the newly introduced WR-G303i is the world's first dedicated shortwave receiver on a PC card. It is also the first commercially available receiver where the entire final intermediate frequency stage and an all-mode demodulator are entirely executed in software, running on a PC.

The advantages of this receiver are too numerous to list in this limited space: In addition to the flexible and friendly user interface of a PC-based receiver, with its numerous functions and facilities not normally available on any conventional receiver, the WINRADIO G303i Software-Defined Receiver excels particularly by the ability of its demodulators: While the Standard Demodulator provides the performance of a highly respectable shortwave receiver including synchronous AM demodulation and a real-time spectrum scope, the optional Professional Demodulator offers even more: continuous IF bandwidth adjustment (in 1Hz increments), interactive block diagrams with two additional audio spectrum scopes, and even built-in THD and SINAD measurement facilities. Additional demodulators are planned as further options, including a DRM (digital radio) demodulator.

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Scanning Scene

This is going to appear at the end of April. I'm typing it mid March. By the time that you read this there may be a big punch up ensuing in the Iraq area. It may have finished or all the troops may be home without getting their guns dirty. If the war is still ongoing and radio conditions allow, I bet we'll hear some of the communications on v.h.f. low band.

The Personal Role Radios will be much in evidence, as will some u.h.f. military radios, but monitoring between 30 and 40MHz f.m. will no doubt get some hits from all sides of the war.

Accurate log keeping of frequencies heard, mode, date/time and traffic type will pay dividends for monitoring future operations. This is something that I invariably forget to do or am just too darn lazy to get involved with, but it's really worthwhile. Oh well!

The people that take this very seriously indeed are the United States Army. Although much of their Signals Intelligence (SIGINT) is accomplished by satellite, they employ signal intelligence teams at divisional level. The Divisional Commander will usually keep operational tasking authority and control over his SIGINT and EW (Electronic Warfare) teams. Each division will have a number of teams assigned to them.

There are generally six Voice Collection Teams assigned to a division. Each unit is self-contained and self-sufficient and is tasked with monitoring the entire radio frequency spectrum. They provide audio recordings of all enemy voice traffic on a real-time basis.

Division will also have around three Transcription and Analysis Teams. They translate the data into English, supply it to command as text and provide a non-technical and technical analysis of the radio traffic.

Communications Jamming Teams are assigned specific frequencies and bands to jam. They are tasked with jamming

certain priority frequencies continually and timed jamming on target frequencies for specific periods of time. Generally there are six jamming teams per division.

Three Non-communications Collection Teams per division will focus on radio signals that are used for radar, guidance, target acquisition and the like. They will provide telemetry data to the Transcription and analysis teams regarding the efficacy of enemy radar and weapons control systems. There will be three of these teams per division.

Finally, there is a Multi-Channel Communications Collection Team. They collect digital communications data from enemy signal centres.

The collection, analysis and jamming teams have, at their disposal, a flight platoon of three helicopter units who give them the range and mobility that they need. Now that is fancy scanning.

Superb Set

I've been given a scanner by me mate 'Arry. An old AOR AR2002. If you can get one that is in serviceable condition, they really are superb little sets. "Somdeel stape in age" as Chaucer would have said (around twenty years old actually) but sensitive and, importantly, easy to drive. The unit that I have acquired boasts the fairly early serial number of 998 and has minor damage to the cabinet which 'Arry made a fine job of fixing with Superglue.

If you ever need to telephone AOR you'll find that the person that answers the 'phone is knowledgeable and helpful. These folks know the product and all the wrinkles.

I was directed to the AOR website www.aoruk.com and within minutes I had downloaded the handbook for the set and a 'tips' sheet too. I have ordered a 12V power lead for the radio and will pop it in a vehicle when all the kit is amassed. The AR2002 scanners are sometimes offered for sale in various publications and on the

Internet. Provided that you can give the set a thorough 'road test', you may be able to get yourself a useful radio at a sensible price. Twenty channels on either a.m., f.m. or w.f.m. modes between 25-550



Old, but still very capable, the AR2002 well worth having in your collection of radios.

and 800-1300MHz.

Step size is either 5, 12.5 or 25kHz. Teamed up with a search facility, priority channel and channel lockout it was the choice of the Radio Communications investigators for a while. They and other users had them fitted in vehicles. Governments were major purchasers of these gadgets and I expect that many are still ticking away on dusty shelves in various offices to this day. It picks up Radio 3 and Radio 4 a treat.

TETRA

TETRA has a lot of space devoted to it on the Internet. Below is an extract from an article on David Icke's website. David used to be a footy commentator on the telly, but now makes a living persuading us that the world's leaders are all lizards - honestly.

"Use of the TETRA system by the police will lead to psychotronically controlled officers who may be totally controlled in any situation and are very useful for states of economic or social chaos where extreme and violent behaviour is needed without any conscious or moral compunction - so-called police robots".

And there was me thinking that all you had to do was offer them double time! Seriously though, many people are now looking at a quiet scanner since the police in many areas of the UK have now migrated

to the Airwave TETRA system.

All is not lost. Although you can't hear the police anymore, you are able to monitor security staff, shopwatch channels and taxi frequencies. Shopwatch, for instance, is concerned with security at retail premises and anything that affects public safety or crime in a retail area is likely to be mentioned on the local Shopwatch channel. These systems are prevalent between 440 and 444MHz. Others are on 163, 165 and even 166MHz near the current ambulance allocation. Councils also have 'security' patrols who are radio equipped.

The 'Community Patrol' in the Wirral on Merseyside is audible on 166.0875 and a similar scheme in Newport Wales operates on 166.125.

As per the 'Shopwatch' operations, so called 'Community Patrols' are very prevalent in the 440-442MHz range of the band. I had to visit Barnet in Hertfordshire a bit earlier this year and their 'Community Wardens' were operating on 435.975 and 453.0625MHz.

Status Codes

I get many mails and bits of information passed to me, some anonymously so many thanks to the anonymous reader that sent me the codes in use by the police in the west of Scotland. It's a comprehensive list and I should imagine that all officers have to carry a copy in their pockets because you'd never remember that lot. Initial incident codes give an indication of the job to be dealt with, i.e. code 46 is an abandoned vehicle, 26 is a sudden death. Results codes run from numbers 101 False Alarm Good Intent to 117, no persons injured.

A common result code used to be Area Searched No Trace (or was it Area Traced No Search). Status codes indicate the crew disposition. All very informative and thanks very much for that one.

Right, I'm off to monitor Radiation Levels - you can't be too careful!

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SSB Utilities

USAF B-52s to RAF Fairford

By now everyone will be fully aware of the arrival of a fleet of fourteen B-52H Stratofortress aircraft at RAF Fairford in Gloucestershire. The base is being used as a forward operating base for flights against Iraq, the other being on the British island of Diego Garcia in the Indian Ocean.

Prior to their actual arrival, the enthusiasts grapevine was full of stories of aircraft about to be deployed to Fairford, and there were suggestions that this would include the B-2 Spirit. In the early weeks of this year, the USAF announced that two bases had been selected as overseas forward operating locations for these aircraft - these were Diego Garcia and RAF Fairford, so people were correct to anticipate something.

I first became aware of the arrival of the B-52s while listening to Shanwick OACC on **5.616MHz** on the morning of 3rd March before going to work. At this point I was unaware of their imminent arrival, but I was aware of a number of 'Ripper' callsigns stretched out across the north Atlantic at about 30 minute intervals, all heading for UK airspace. The first flight arrived at RAF Fairford later that morning, and its arrival was shown on British TV, and it was then that I realised exactly what I had heard.

Subsequent information received shows that all eight aircraft on the Monday arrived direct from their base at Minot AFB in North Dakota, USA. In fact, there should have been nine aircraft arriving that day, so maybe one dropped out with a technical problem, or perhaps was an 'air-spare' which only intended to complete the flight should one of the first eight aircraft drop out for any reason. A press release by the American and British governments said that up to fourteen aircraft would be based there, and as only eight aircraft had arrived that day, I set my alarm for early the following morning.

I was not disappointed, as from 0630 I started to hear the second wave of aircraft crossing the north Atlantic working Gander OACC and Shanwick OACC. The second wave of aircraft were using the same 'Ripper' callsigns as the first wave. The flight of eight aircraft on the 3rd were 'Ripper 11' to 'Ripper 18', and those on the 4th were 'Ripper 21' to 'Ripper 26'.

The first flights from Fairford were training flights, on 13th and 14th March two aircraft each day went up to Scotland and back again. On the 13th they used the callsign 'Choir 11/12'. More training flights were done on the 17th, probably to Scotland again as I heard them returning to Fairford that evening from the north, callsign that day was 'Prim 11/12'. Another two aircraft flew on the 18th, and their callsign sounded like 'Juice 11/12'. Did anyone hear any of these flights?

On the day of the start of the war against Iraq, the Fairford B-52s were not used. Their first missions were on Friday 21st March when eight aircraft made a much-publicised departure from Fairford during the mid morning. The callsigns used by these aircraft was 'Rattler', and they appear to have adopted this callsign for their flights to Iraq as they were still using the callsign a few days later. I have not heard of any h.f. frequencies being used by these B-52s yet, although I have heard them being mentioned by their supporting tanker flight (callsign 'Lager 13').

During the Kosovo crisis in the late 1990s, when B-1Bs were stationed at RAF Fairford they had a h.f. frequency which was used to contact Fairford, but nobody has reported anything similar this time.

I have no idea how long events in Iraq will continue,

but as I write these words in mid March, the war is just starting. By the time you read these words in late April (or even later in other parts of the world), it could be all over, or it could still be going on.

More Maritime information

Last month I wrote about some maritime information that I had found on the Internet, and commented that it was quite unusual to find this particular kind of information. Much to my surprise, this month I have some more maritime information which will be of interest to those who monitor the h.f. maritime bands.

The first of these comes from reader **Rab Thomson** who sent details of the web-page containing a database search engine from the International Telecommunications Union (ITU). On this page you can enter the name, callsign or MMSI number of a vessel, and the system will return a long list of details of the vessel. This is particularly handy for those who listen to (and decode) GMDSS transmissions, as the GMDSS broadcasts include the MMSI number. I have tried it myself using a few ship names (*QE II, Oriana, HMS Ark Royal*) and the system quickly returns the information.

The second web page is that of **Peter Thompson**, who is (or was) involved in maritime shipping. His web page contains pictures of the vessels that he has worked upon and there is a link to a further web-page which is a collection of links to various world-wide ship databases. This includes the above ITU web-page, but it also contains a number of other maritime related web-pages broken down by category.

India

Christopher Wilshire in Norfolk wrote to ask about some aeronautical signals he heard on **11.285MHz** one evening. He was listening to the SEA-1 aeronautical network during the early evening, and he heard a ground station with a callsign like 'Sanay' or something similar. He would like to know which station this was.

Well Christopher, this is the ATC station at Chennai in south-eastern India, but it may be better known in the west as Madras. Madras is the western name for the city, and it reverted to its original Indian name in the 1990s, along with several other Indian cities - Bombay is now Mumbai, while Calcutta is now Kolkotta. This change of name was not limited to India, as Rangoon in Burma is now known as Yangon.

Most of the enthusiast frequency guides continue to use the westernised names for these cities, which does tend to cause some confusion, when (as in Christopher's case) the name you are looking for is not listed. In an ideal world the producers of these frequency guides would list both the old 'original' name as now used, as well as the westernised name. One book which has got it correct is *Ferrell's Confidential Frequency List*; although this does not name the stations in the frequency listing, the correct names are shown on the aeronautical coverage maps at the very back of the book.

Christopher reports that he has had a lot of success listening to the SEA-1 network during the early evening; he suggests 1830-2100. He says that he can hear both the aircraft and the ground stations clearly enough to work out the flight routings and instructions.

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www.itu.int/cgi-bin/htsh/mars/ship_search.sh

Ship's flag search -
www.pthompson.getfreeinternet.co.uk/Shipsearch.htm

B-52 arrival at RAF Fairford -
www.usafe.af.mil/news/news03/uns03106.htm

457th Expeditionary Group at RAF Fairford -
www.usafe.af.mil/news/news03/uns03120.htm

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PORTABLE PRACTICE

- The mini-series Licensed & Ready To Go continues as **Rob Mannion G3XFD** looks at basic antenna designs for portable use and how to enjoy this mode to the best advantage!

CONTEST PREPARATIONS

- **Neill Taylor G4HLX** encourages you to get out there and set-up your portable station and take part in this year's *PW* QRP Contest

REVIEW

- **Rob G3XFD's** been busy looking at the KRC-2 Regenerative Receiver kit and the KRC-A-3 Active Antenna Tuner kits from the Kit Radio Company



Plus all your regular favourites including:

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MADE IN USA



The TEN-TEC **RX-331** is a multi-mode HF receiver operating from **5 kHz to 30 MHz**, fully synthesized and utilizing state-of-the-art **Digital Signal Processing**. DSP technology brings the performance and repeatability of expensive military grade communications receivers into the more economic range of commercial receivers.

The design flexibility of DSP provides **57 standard selectivity choices from 100 Hz to 16 kHz**. It is also practical to customize filter bandwidths, shape factors and time delays to match unique customer requirements.

The RX-331 is designed specifically for remote controlled applications. Multi-drop RS-232 interface permits simultaneous operation of multiple receivers on a single network at baud rates from 300 to 19,200. Receiver may be controlled by either internal or external frequency reference and an optional high stability internal reference is available.

This receiver is a compact, U1 rack mount unit **only 45mm high** - ideal when available rack space is at a premium. Power consumption is a nominal 30 Watts which can provide a measured advantage when comparing recurring system costs. All connections are arranged on rear panel. Front panel provides ON/OFF switch, headphone jacks with independent volume controls, serial port status indicators and power supply indicators.

Built-in Test (BITE) allows quick field verification of major subsystems. Built-in software provides a "field test" mode to allow complete receiver operation from a simple terminal without need of customer's complete control system.

The RX-331 is based on the award winning RX340 - but without the front panel, this provides a massive saving in height (and saving in cost). The RX-331 can be supplied to order for government use on a COTS# basis (Commercial Off The Shelf). £ P.O.A. Sales leaflets are available to request, details can be found on the TenTec UK web site.

Other products include the RX320, **RX340**, RX350 DSP short wave receivers and an extensive range of kits. Details may be viewed on the TenTec UK web site, kit catalogue and price list available to request, separate leaflets for receivers.

MADE IN USA



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"An excellent easy-to-use plug-in accessory that can significantly improve your receivers audio performance and readability"
Radcom review Dec 2002



NEIM1031

◆ Flexible in-line unit ◆ Fully adaptive noise cancelling - typ 20dB ◆ 8 filter levels ◆ Input sensitivity control with LEDs ◆ Audio output 2.5W RMS max (8 ohms) ◆ On/off switch with bypass facility ◆ Audio connections: Line level in/out (RCA Phono), Audio in/out 3.5mm mono jack ◆ Headphone socket ◆ Power 12-24 V DC 500mA ◆ Supplied with a fused DC power lead and a 3.5mm audio lead for immediate operation

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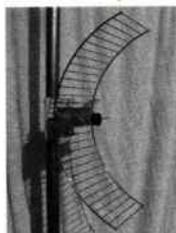
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23cm Covers 1240-1367MHz in 500kHz steps, 50mW (nom) power output, sends video & audio, runs from 12V.....£42.50
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FM ATV receivers

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Amateur Bands

Unless you've been a bit slow obtaining your copy of *SWM*, as you read this there's only a handful of days to go to the *SWM* Listening Contest. Don't forget - 0500 to 1700 on Sunday 4th May 2003. You could well hear your scribe on the air. Get those radios switched on!

Echolink - An ABC Guide

I've had a couple of enquiries about Echolink recently, so time for a brief explanation. Echolink is a system for linking radio amateurs by voice over the Internet. Not particularly spectacular perhaps, but its unique feature is that it's only available to licenced amateurs, and can be accessed over the amateur airwaves.

First the ordinary bit. Imagine Amateur A, sat in his shack in sunny Seattle, running Echolink on his computer and connected to the Internet. Imagine Amateur B, ditto, but in rainy Runcorn. Add many more alphabets of similar amateurs around the world and the image is complete. Amateur A's computer screen shows him that Amateur B is logged on, and Amateur A wants to talk to Amateur B. A bit of typing and mouse clicking and the link is set up.

Amateur A speaks into the microphone on his computer. The signals make their way across the Internet, and his voice emerges from Amateur B's speakers, and vice versa. It's a bit like an Internet chat room for two so far and, apart from the users being amateurs, has nothing to do with amateur radio. Now here comes the special bit.

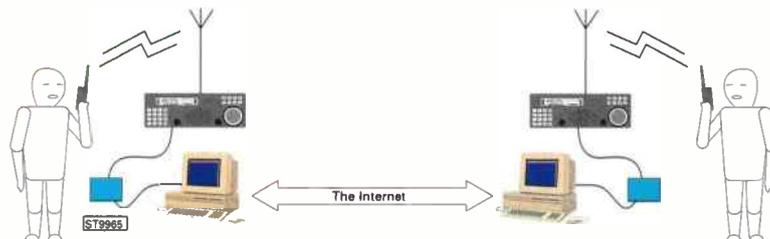
This time, Amateur A is sat in his backyard in sunny Seattle. The Echolink and Internet set up remain, but there's an interface between his computer and the radio in his shack, which is set to 434.500MHz. Sat by his BBQ with a u.h.f. hand-held, he transmits on that frequency. It's received by the main rig. He presses the DTMF keys on the hand-held. The main rig receives the tones, passes them through the interface to the computer, and the Echolink program sets up the link with Amateur B's computer.

The radio connected to Amateur B's computer is on 145.3375MHz. Conversation then takes place between Amateur A on his u.h.f. hand-held in Seattle, and Amateur B on his v.h.f. hand held in Runcorn. Plenty of Internet activity, but lots of amateur radio involvement as well. Away from the computer screen Amateur A had to know which keys to press in order to access Amateur B's machine, but he could have pressed a sequence of keys that would have caused the system to randomly select which station would be at the other end of the link. A sort of 'pot luck' option!

Any amateur within range of a radio linked to Echolink could access the system. So if Amateur B in Runcorn wasn't listening when Amateur A's call was transmitted by his radio, it might be answered by Amateur C up the road in windy Widnes. For more detailed info visit www.echolink.org and www.g3vfp.org/index.html

Island Activities

You might just have time to catch Ivan 8Q7VR who has been active from the Maldives in the Indian Ocean since February and will be there until May. In the southern Pacific Australians June and Doug will be active as ZK1AYL and ZK1SIM from the South Cook Islands. Their first stint will be on Aitutaki from the 27th April to the 14th May, after which they're off to Rarotonga from the 15th to the 26th May. Seven Italians will be in a similar



part of the world, but to the north east on the Marquesas Islands for two weeks from the latter part of April. Looks likely they'll be using FO/ own calls.

East of the Philippines, JH0MGJ will be operating with an NH0 call from Saipan in the Commonwealth of North Mariana Islands, over the last weekend in May for the CQ WPX CW contest. From the 26th to the 30th of that month Andre, ex 5Z4KL now GM3VLB, will be on Beachcomber Island, Fiji. Not forgetting Europe.

There's a DXpedition to note on Croatia's Palagunza Island in the middle of the Adriatic Sea. Some Croat mainlanders assisted by a handful of Germans will use the call 9A0CI from this lump of rock which has a lighthouse as its main feature. Four Brazilians and a Portuguese are off to Mexiana Island at the mouth of the River Amazon from the 21st to the 25th May. The island group is described as the "the most wanted IOTA group in South America" so a huge pile up can be assured. As yet the callsign is not known.

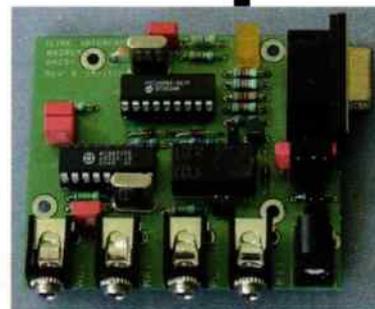
Chart Time

Continuing the 'most wanted' theme, Bernie McClenny W3UR, Editor of *The Daily DX*, has combined the results of a couple of surveys and reckons that the top ten wanted countries are:-

Andaman (VU4) between the Bay of Bengal and the Andaman Sea, Scarborough Reef (BS7) in the South China Sea, Lakshadweep, also known as the Laccadives (VU7) north of the Maldives and off the west coast of India, Juan de Nova & Europa Islands (FR/J) south of Mayotte in the Mozambique Channel, Peter Island (3Y) in Antarctica, Desecheo (KP5) off the west coast of Puerto Rico, Yemen (7O), Navassa (KP1) south west of Haiti, North Korea (P5), and Aves (YV0) in the Lesser Antilles north of Venezuela.

Most of the countries at the beginning of the list appear in almost every version of a 'top ten most wanted' list. Some are in the list because the authorities won't allow amateur radio operation. Others because they're small, uninhabited and difficult to access. The picture of the 1995 BS7H DXpedition to Scarborough Reef gives a bit of a clue as to why it's so far up the list!

Looking at that picture, you may be inclined to the view that people who plant themselves on a very small rock way out in the ocean just to play radio need serious psychological help. Eccentricity is not just the preserve of the English!



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Decode

Regular readers will recall my sortie into *Linux* about a year ago. Well the open source people that have brought many excellent programs to *Linux* have come-up with a really powerful audio editing suite. The package is called Audacity and is now available in *Windows* versions. If you want to get a copy go to: <http://audacity.sourceforge.net/>

At the time of writing the latest stable version was 1.0.0, but there was a new version in development, so it's worth keeping a check on the site for that. The download is quite small at just 1.6MB so it shouldn't take too long. Installation followed the normal process and everything ended up in the right place.

When you run the program you are presented with a very simple interface with graphic play stop and record buttons and a conventional *Windows* menu system at the top. However, this simple interface belies the powerful features of the package. If you want to try it out, either record yourself something simple or go to the WUN club at www.wunclub.com to download a .wav sample of a RTTY signal.

At first go this probably won't seem that impressive because you need to adjust a setting or two to get the best out of utility signals. Go to File - Preferences - Spectrograms. In the maximum Frequency box type 3000. Now on the main screen put your cursor just at the bottom of the display and you will find you can drag it downwards to make it taller. That should be starting to look a bit more interesting.

Next step is to zoom-in on the signal. To do this click the magnifying glass and left-click to zoom-in and right-click to zoom-out. If you get in a muddle just go to

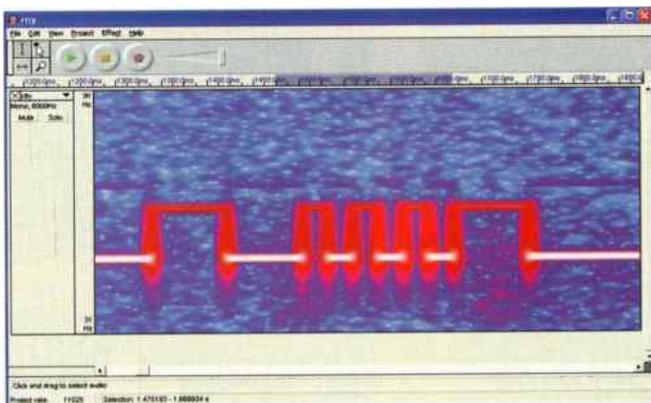
the main View menu and choose Zoom Normal or just hit CTRL+2. Now if you really want to get clever you should choose the selection tool and drag your cursor over a section of the displayed signal. Now go to the View menu and choose Plot Spectrum CTRL U - you should see the spectrum analysis window.

As you can see, this produces a really good detailed analysis of a signal segment. You have the option to change the resolution of the frequency display by altering the sample size or changing to a logarithmic frequency display. You can further enhance this by choosing the autocorrelation option. This is an advanced analysis tool, and this particular implementation is fully configurable to deliver some excellent results.

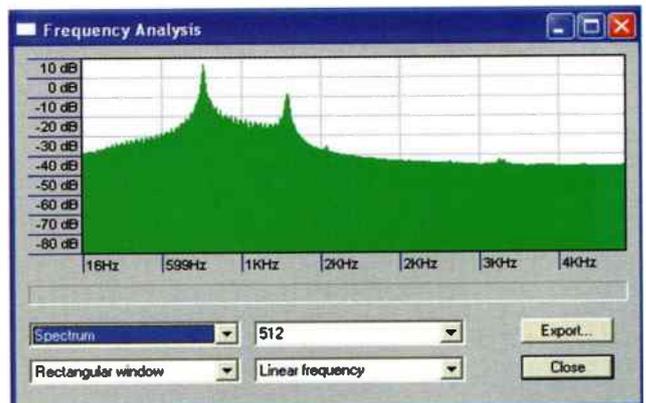
There are three autocorrelation functions with enhanced autocorrelation proving particularly good for a raw data signal. However, for examining a modulated signal such as a RTTY or other data signal the standard autocorrelation is best. The analysis technique takes a bit of practice and I'll cover the details in a later column.

Another excellent tool is the noise removal which is particularly effective. First of all you find a gap in your recorded signal and select it. Now go to the Effects menu and choose noise reduction and click the Get Noise Profile button. This causes the filter to go away and capture a picture of the noise that's to be removed.

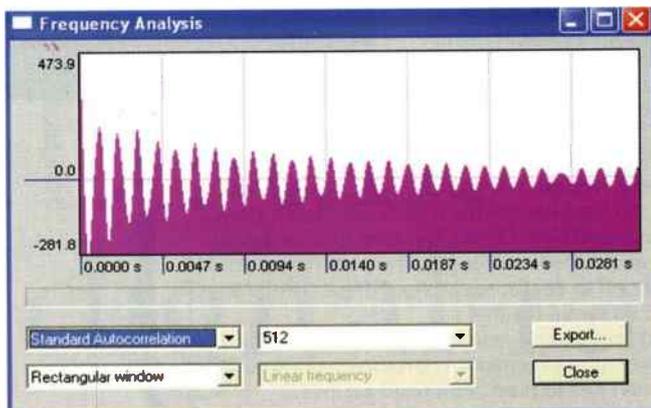
Next you select the entire audio signal and press Noise Reduction again. This time you select Remove Noise and the noise will disappear as if by magic! This is a really excellent audio manipulation tool with lots of uses in the utility enthusiasts shack.



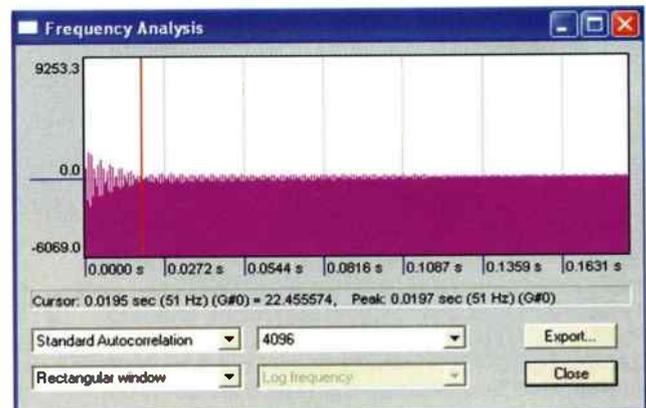
Here's the simple Audacity main screen.



Audacity's detailed spectrum display.



The revealing autocorrelation feature.



Baud rate detection using Autocorrelate.

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ShackWeb

Out with the old, in with the new - hello and welcome to the last 'ShackWare' - the last in its guise as proponent of old computers in the shack anyway. When I started way back in 1995, 'ShackWare' was the first ever regular column in *SWM* devoted exclusively to using computers in support of our wonderful hobby. At the time I decided that rather than drone endless on about the latest PCs with price tags better spent on receivers, I'd concentrate on the silicon of yesteryear - the machines you could pick up for a song at car boot sales, Bring & Buy sales and the like and yet squeeze a few years of useful decoding, logging and so on from. A reasonable premise I thought.

Well, over the years the PC has marched inexorably into the shack and the boot sale finds are now fetching tens (and occasionally hundreds!) of pounds on web auction sites such as Ebay. Computers feature regularly in all the other *SWM* columnist's pages too and it's difficult for me to write about what they can do in the shack without simply doubling up on information, so with great sadness, I decided that 'ShackWare' was no longer giving readers value for money and that it should be pensioned off.

Before it goes though I want to thank all the correspondents who have taxed me with problems over the years or else offered valuable advice for their listening peers: thank you everyone. You have been the lifeblood of 'ShackWare' and it wouldn't have been the same with you.

New & Improved

But it's not quite the end. A little after I started writing 'ShackWare', the word 'Internet' began to be mentioned by people who otherwise had no idea what a computer network was or what it might be used for. Within a few years, the Internet - once the domain of academics and the military - became one of the world's foremost communications media. Internet access accounts which once cost around £150 a month are now free, but for the cost of a local call, Internet cafes sprang up, libraries and other institutions began to offer terminals for free public access and there are few who haven't spent an hour or two surfing what the web has to offer and no-one (surely?) who is yet to hear of the net.

The world-wide web is just one part of the Internet (alongside other networks such as E-mail, Usenet and so on), but the web is vast and the mountains of information it offers all hobbyists, but especially those with a technical bent such as short wave listeners is unimaginable. What's more, the web neatly circumvents restrictions on broadcasting. Essentially, anyone with an ISP account can broadcast over the web ('webcasts') and reach everyone on the planet with access to a computer and 'phone line. There are many

thousands of 'radio' stations broadcasting everything from country music to Christian doctrine, political rhetoric to ribald humour. And while these webcasts are not listening in the strictest sense, I think most s.w.l.s would be happy to bend the definition a little to appreciate what's out there!

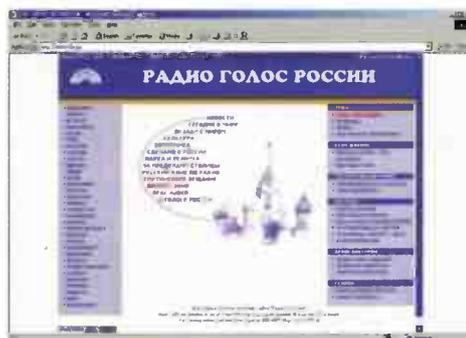
With that in mind then, it seemed a good idea for 'ShackWare' to evolve into a 'web-watch' style column, bringing you the best of what the web has to offer, information that will support and expand the pleasure of your listening. So it's goodbye to the old ShackWare and welcome to the all-new 'ShackWeb' (with the occasional computer website for good measure). Fire up your modem and let's get started...

Favourites

I'll start by featuring some of my personal favourites, the web sites which I visit again and again and which offer something of interest every time. Among my true favourites is HF-FAX - www.hffax.de - created by Marius Renson who lives in Hannover, Germany, and devoted to the short wave reception of FAX, SSTV and related 'picture' modes. Navigated using a picklist at the left side of the screen, HF-FAX is absolutely packed with information on hardware and software, received pictures, frequencies and insights into the FAX modes. Marius begins with a history of his web site, a peek into his shack (why are pictures of other s.w.l.'s shacks always so compelling?!), guides for novice to FAX and SSTV and a weekly picture. There are pages devoted to marine and wefax, SSTV, APT and a comprehensive selection of decode software together with the latest news from this area of listening.

The National Oceanic and Atmospheric Administration - NOAA to you and me - is the US government department which measures, logs and distributes data about the physical world. It was while trying to make sense of NOAA HF-FAX images using a home-brew decoder and an 8-bit Atari which first attracted me to decoding the data modes many years ago now. NOAA is still responsible for making available vast quantities of weather and natural phenomena data from satellites, coastguards, ships at sea and other sources. The organisation's web site - www.noaa.gov - sports comprehensive details of its many activities including schedules and operational information about weather satellites, climate and coastal monitoring, search and rescue by satellite activities and large picture archives. A place to spend many happy hours surfing!

When it was still blasting the ether with blanket coverage, Voice of Russia was my favourite broadcast station. Communist propaganda maybe, but VoR



managed to wrap up its message in interesting programming with personable presenters such that you always found your way back to its frequencies (and with so many operating at any given time who could miss them?). Though there are fewer broadcasts on even fewer frequencies nowadays, VoR still manages an impressive output and its web site at www.vor.ru/world.html provides details of scheduling and frequencies for all parts of the world (and there's the familiar VoR jingle to welcome you). You can also listen to live webcasts and a simple-to-use listing shows what's available and what's currently broadcasting.

Those who will lament the passing of ShackWare's previous guise and who love old computers as much as I do can find many sites of interest on the web. One of the best, www.obsoletecomputermuseum.org has pictures and information about dozens of old machines from both sides of the Atlantic. And for Norman White of Birmingham who wrote to me with some questions about the BBC B computer, have a look at

www.swattons.freemove.co.uk/brian/bbc/menu.htm which is packed with info and even includes some radio-oriented software for use on the Beeb.

Of course, no round-up of favourites can possibly go by without mention of *SWM*'s own excellent web pages at www.pwpublishing.ltd.uk/swm/ Here, you can find a breakdown of the features in the latest issue to whet your appetite and spur you down to the newsagent!

And Finally

And that's about it for this time. Once again, thank you to everyone who has supported 'ShackWare' and apologies to those who hated it and would rather computers stayed firmly outside the shack. Do write with your own favourite web sites and until next time, good listening (and surfing!).

	pages	price	code		pages	price	code
TECHNICAL TOPICS SCRAPBOOK.				Phil Anderson W0X1	88	£7.00	XTNL4
1995-99 Pat Hawker (RSGB)	310	£14.99	TT9599	CRYSTAL RECEIVING SETS & HOW TO			
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AMATEUR RADIO OPERATING MANUAL (RSGB)	257	£24.99	AROPM	Society Newsletter	226	£15.00	XTBONZ
ARRL OPERATING MANUAL 7th Edition	420	£18.50	RROPM	CRYSTAL SET BUILDING & MORE - Xtal Set Society	168	£10.50	XTNL67
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AMATEUR RADIO (VALUE) LOGBOOK (RSGB)	80	£4.95	TXLOG	CRYSTAL RADIO HISTORY. FUNDAMENTALS			
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LOW BAND DXING (ARRL) (WSL)	586	£12.00	LBDXNG	1934 OFFICIAL SHORT WAVE RADIO MANUAL			
RADIO AMATEURS MAP OF THE WORLD 2002				Edited by Hugo Gernsback	260	£11.85	1934SW
(Traxel)	980 x 680mm	£7.00	RAMAPW	AMATEUR RADIO - A BEGINNERS GUIDE			
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Dick Biddulph/Chris Lorek (RSGB)	580	£29.99	RCOMHB	COMMUNICATIONS RECEIVERS - THE VACUUM			
RSGB PREFIX GUIDE	34	£8.95	PFXGDE	TUBE ERA R.S. Moore	141	£17.95	COMRXV
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				ELECTRONICS 11th Edition	292	£20.99	SCROGY
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				Clive Smith G4FZH (RSGB)	170	£12.99	TESTEQ

(WSL - While stocks last - please call to check availability before ordering)

Telephone



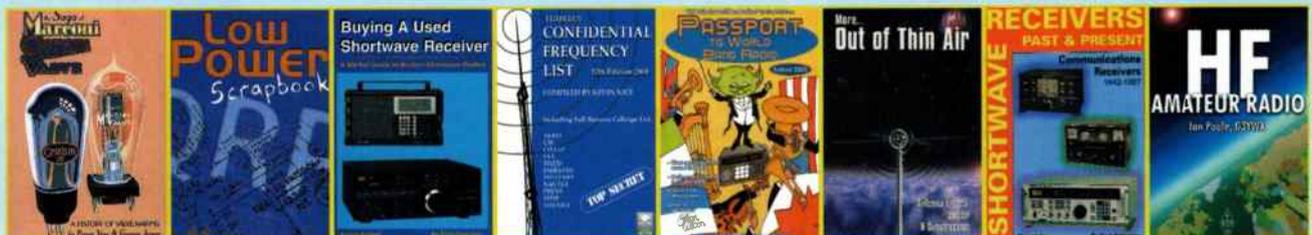
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■ ROGER BUNNEY, 35 GRAYLING MEAD, FISHLAKE, ROMSEY, HANTS SO51 7RU

Satellite TV News

There's a *Club TV/Ham Radio* TV transmission occurring each month courtesy of radio amateur SM6CKU and sponsored by the microwave company 'Parabolic'. I was alerted initially by an early morning 'phone call (0900 is early for me on a Sunday!) from **Mike Evans** (Bungay, Suffolk) advising that the March 9th transmission was in progress over *Astra 1-A* @ 5.2°E. Quickly tapping in 11.323GHz-horizontal (SR 6667+FEC 0.5) there appeared pictures of a dish amidst a snowy background, then the call sign SM6CKU and other captions.

Talkback was being invited back over two amateur frequencies which were retransmitted on the satellite audio downlink. Unfortunately at about 0920 the signal levels fell, resulting in breakup of the signal and with minutes total loss. *Astra 1-A* is of course the original 19.2°E satellite launched way back in December 1988 that carried Sky TV in its infancy, now with its onboard station keeping fuel low, the bird has been moved to a geriatric orbit at 5°E. The inclined orbit characteristic means that the satellite is not stable at 5.2°E, but is drifting around that general slot giving in variable reception on dishes that have no elevation tracking capability - hence my initial signal lock soon after 0900 on the 9th was lucky, within 30 minutes the satellite had drifted outside of my dish pick-up lobe and signals were lost.

The next *Club TV/Ham Radio* programme over *Astra-1A* will be April 27th 2003 @ 0900, check out the www.parabolic.se site for the latest from 'Club-TV/Ham Radio'.

With the build-up to a possible war in the Gulf continuing into March so much of the past week's activity has been monitoring the various satellite feeds from the news organisations now setting up reporting centres in Iraq, Kuwait, Qatar and immediate surroundings. APTN News have an additional uplink out of Qatar which has been received at 10.987GHz-V (4167+5/6) with ident 'APTN DOHA' on Eutelsat's W1 @ 10°E.

Last month I reported extensive tank exercises in the desert, several more prolonged recordings have been dumped back over Fox capacity detailing landings from sea. One dramatic reception was the CBS presenter Dan Rather as he interviewed Saddam Hussein in Baghdad, carried live for 'recording into CBS New York' over *Eutelsat W2*, 16°E - 11.098GHz-H (5067+5/6), another call alerted me. Dan Rather has interviewed Saddam before and so was able to meet Saddam with relative ease - an interesting transmission.

Occasionally, BBC appear with news feeds and reports over *Europe*Star-1* capacity at 45°E, unlike their Fox News and APTN colleagues the BBC pop up, do their thing and then close down so there are no continuous transmissions of test cards. Frequencies monitored with signal activity have been - 12.669; 12.675; 12.681*, 12.682* and 12.684GHz-Vertical (4425+a variable FEC of 5/6 or 7/8). Due to AFC action the 12.681* and 12.682* frequencies may be the same uplink...a variety of service ids have been seen such as 'DEFAULT' 'UKI 117 P1', BBC UKI 303 KUWAIT' and 'GB-BBC Sat Ops'.

One interesting frequency on *Eutelsat W1*, 10°E is the Fox News 11.166GHz-V normally identifying as 'KUWAIT FNC'. This is something of a 'wanderin' star' and appears to be used for any other Fox News portable uplink stations in the region using frequency sharing, for example uplinks have been seen from Adana, Turkey and 9th March with 'FOX NEWS GERALDO KABUL' - the Kabul, Afghanistan activity has been resurrected following intensification in the hunt for Bin Laden. Check the April *SWM* column for other relevant 'Gulf' frequencies.

Roger Shaw (Lincs) uses a 1.1m offset dish and has recently fitted elevation control enabling the searching out of inclined orbiting sats such as the errant *Eutelsat 2F3* @ 21.5°E. But more important was his sighting of the *Eutelsat W2*, 16°E CBS-NY circuit (11.190GHz-H (5632+3/4) has recently (mid February) been seen splitting into a 3 channel bouquet - namely 'CBS NEWSPATH 1', Newspath

2 and 3 though as of early March only 1 channel has been seen with pix.

Meanwhile, 'ABC QATAR' has also generated their own three channel bouquet on 16°E at 11.022GHz-H (5632+3/4). Roger operates several receivers, the NewWave 9000VICI which has an excellent auto search function, but can 'play up' if confronted with a very high level input signal. He also uses a Manhattan Skyline 1000 digital together with an old analogue Grundig SRT200S for searching out active frequencies. The 'FOX NEWS QATAR' feeds are not encrypted, but transmit in MPEG 4:2:2 which our 'bog standard' receivers cannot produce acceptable pictures. Most digital transmissions are still in MPEG-2, an increasing number are now opting into 4:2:2 including most French OB links and the Italian football feeds.

For enthusiasts with a computer to hand a 'cheapish' answer may be available. Manufacturer TECHNISAT has introduced to the UK their 'Skystar 2' card which offers both MPEG-4 and MPEG-4:2:2 plus a bonus auto SR/FEC search function - the 'Skystar 2' card simply slots into a computer and costs £59.

If you do catch *2F3* you may find that the signal levels vary as the craft slowly moves around its nominal orbital slot. Interesting therefore to see **Roy Carman's** (Dorking) reception on February 19th with 'SisLINK 20 UKI 190' carrying horse racing from Limerick in the Irish Republic (11.679GHz-H (5632+3/4) and from 'SIS CODER 2' featuring horse racing from Lingfield at 11.639GHz-H (5632+3/4).

Sunday afternoon I ran a scan over *Atlantic Bird-1* @ 12.5°W, an active satellite that I suspect undercuts carriage prices on rival *NSS-7* just along the arc at 21.5°W. AB-1 is noted for its Globecast bouquet at 11.114GHz-H weekends.

I found a couple of new frequencies that have activity most days. 'SERVICE 1' appeared at 11.189GHz-H (5632+3/4) with colour bars downlinking most of the time, but early evening weekdays this feed carries live 2-way interviews from a London studio - usually Parliamentary guests. But at 11.095GHz-H (24468+3/4) is a bouquet inbound from the 'States comprising 3 channels of colour bars with inlaid ident - 'DSI-DC1-202' and a 4th channel 'EBU WSHT' (Washington) - mostly in 525 line NTSC.

Our early mention of *Astra 1-A* in the 5.2°E slot reminds us that *Sirius-3* is also active from 5°E - and *Sirius-2* closely adjacent at 4.8°E. **Edmund Spicer** (Littlehampton) tuning over the 5°E slot has just found 'TV CENTER' running FTA (free-to-air) at 12.380GHz-H, 27500+3/4 - this appears to be a Russian or other Eastern European language, meanwhile nearby is the Dutch 'Shop on TV' channel at 12.111GHz-H 27500+3/4.

With war in the air, the 13°E *Hot Bird* may be worthy of checking at 12.597GHz-V (27500+3/4) as the MBC channel has been replaced with 'Al-Arabiya TV' rolling news channel. 'Al-Arabiya' is owned by MBC, the latter however have 'upped-sticks' and moved to an operational studio in Qatar. 'Al-Arabiya' has been established to compete with arch rival 'Al Jazeera TV'. 'Al-Arabiya TV' can also be found on *Atlantic Bird-1* at 12.5°W @ 11.155GHz-H with a very low SR2892+3/4.

Unfortunately, 'Reuters WNS' (WNS = World News Service) continues with encryption over on *NSS-K*, but **Dave Dyson** (Accrington) is following the developments at the White House and the UN Security Council NY over the 'CNN NEWSOURCE' feeder channel which transmits frequently and FTA, check out 11.561GHz-H (6117+3/4) for live news as it happens!

Another interest of Dave's has been viewing the output of NILESAT 1 and 2 at 7°W upon which are numerous Arabic TV channels and curiously signal levels seem to lift considerably at night. For a detailed breakdown of every satellite check www.lyngsat.com - for the horizon to horizon view from the UK click on 'Lyngsat SatTracker' on 'Europe DIG' for 3°E to 71.5°E and then on 'Lyngsat SatTracker' on 'Atlantic DIG' which will cover from 0.5°W to 58°W.

A very active month!



Canadian TV about to roll a news feed via *Atlantic Bird-1*.



The view from the 'Fox News Baghdad' hotel balcony, 10°E.



A 'Fox News Kuwait' feed video taping during military exercises showing a large comms centre in the desert.



The camera was left running during the video crew move and it captures these young GIs in an armoured personnel carrier (Fox).



A Europe*Star/BBC feed from the World Cup Cricket Stadium Capetown.



Middle East press statement and microphone display!



Meridian regional TV feed after the end of Brighton Pier caught fire (Telecom 2D).



Early February news report from NASA detailing the breakup of Columbia (*NSS-7*).

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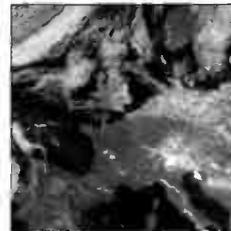


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The middle line indicates the optimum working frequency (OWF) with a 90% probability of success for the particular path and time.

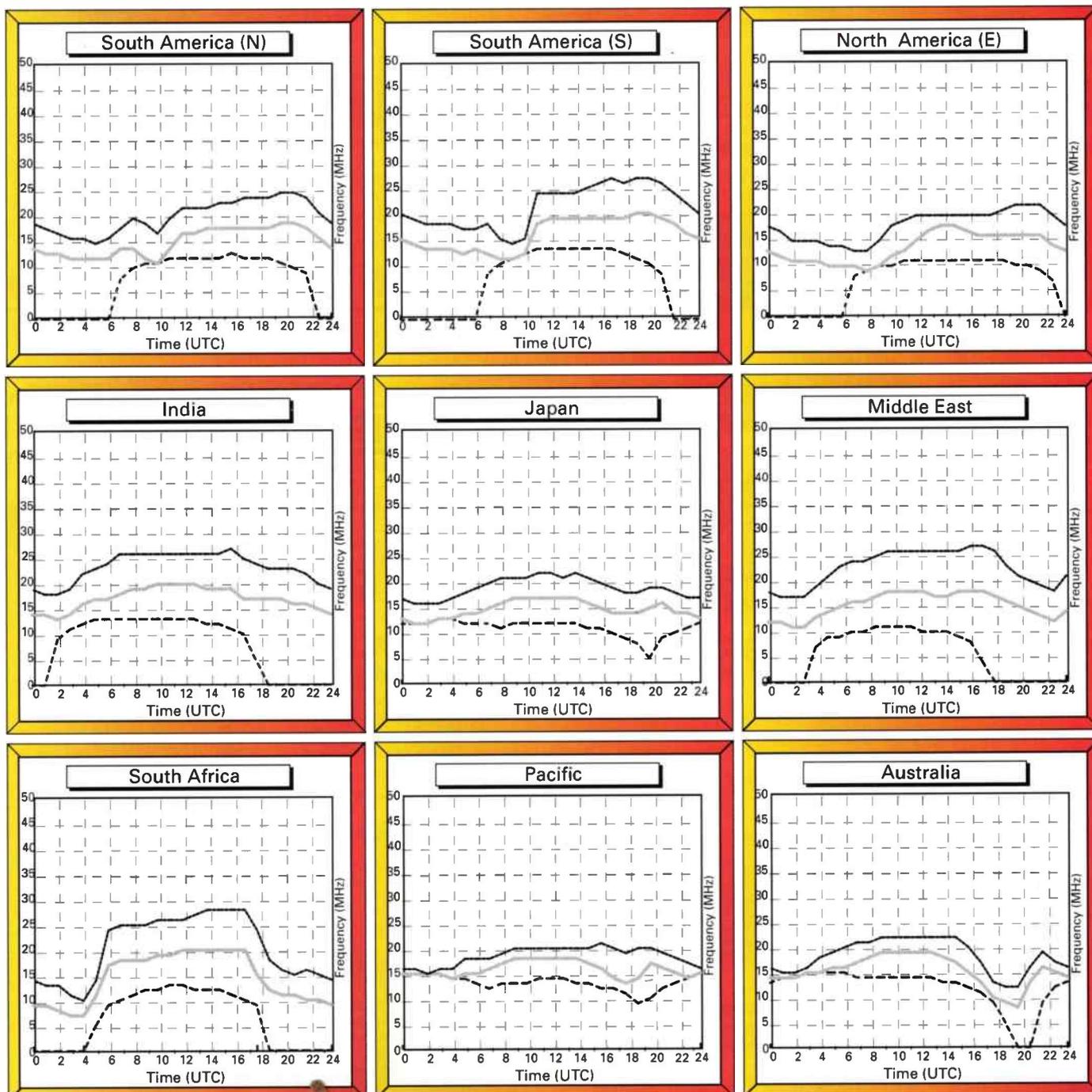
Lastly, the upper dashed line represents the maximum usable frequency (MUF), a 50%

probability of success for the path and time.

To make use of the charts you must select the chart most closely located to the region containing the station that you wish to hear. By selecting the time chosen for listening on the horizontal axis, the best frequencies for listening can be determined by the values of the intersections of the plots against frequency.

Good luck and happy listening.

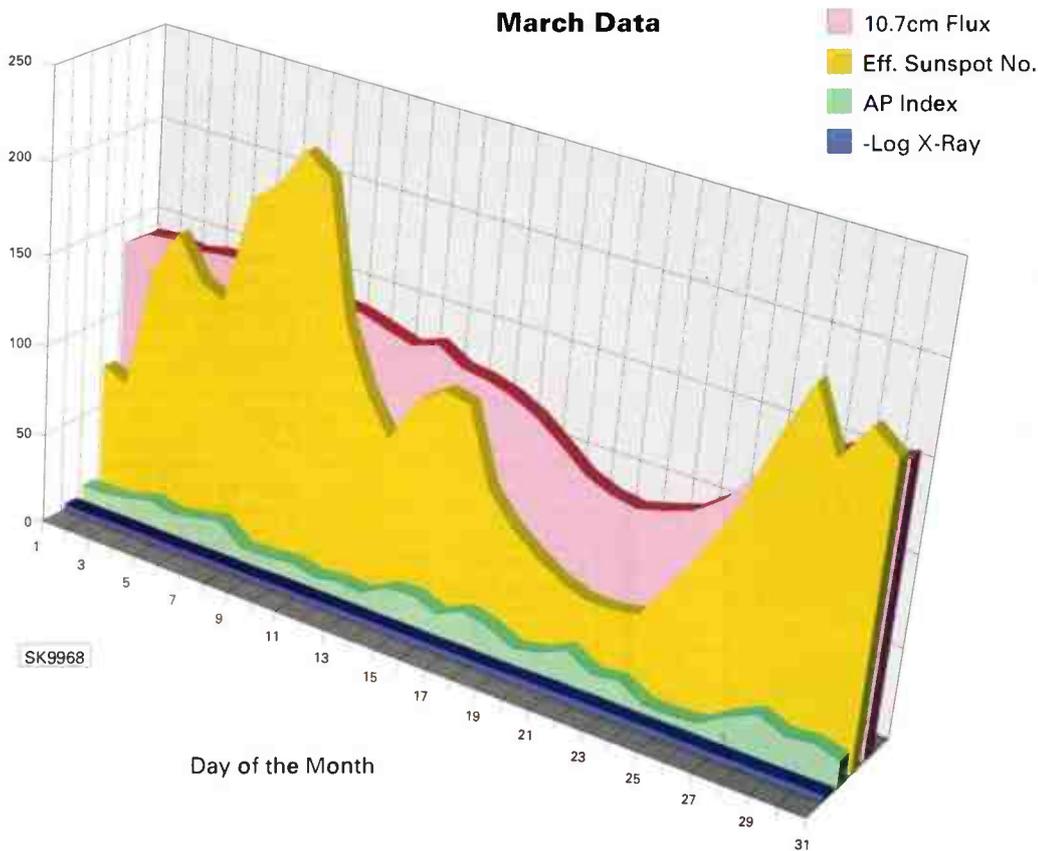
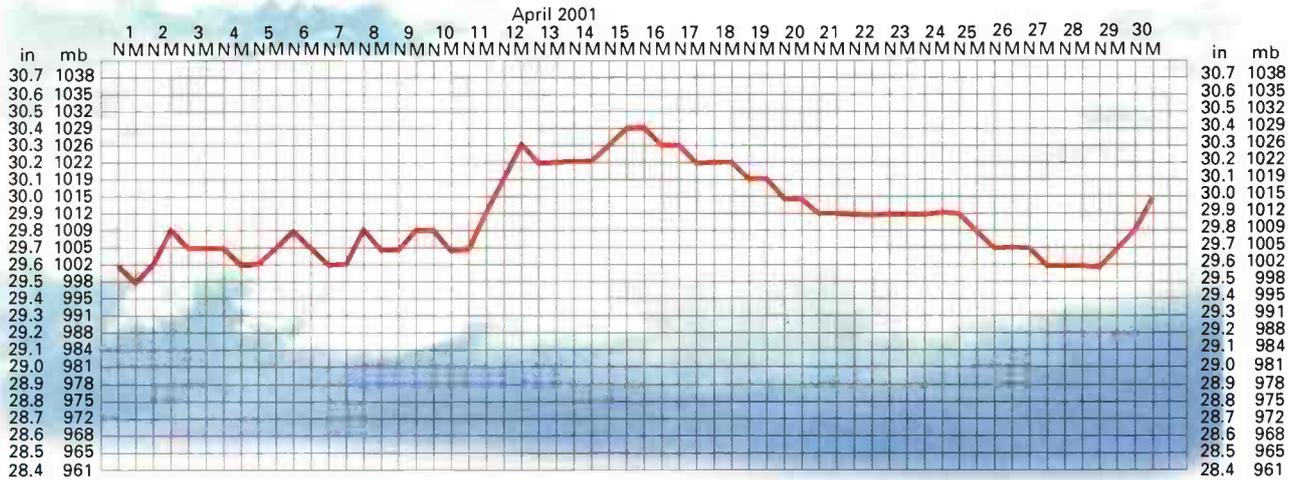
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Propagation Extra

Ron Ham's barometric pressure chart, taken at Storrington, W. Sussex, March 2003



guide to the chart

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Info in Orbit

MSG-1 - The Story Unfolds

For the long-term reception of image data from *MSG-1* - Europe's newest weather satellite (WXSAT), users may well have to set up their stations for LRIT (Low Rate Information Transmission) images, or - for the institutions - HRIT (High Rate Information Transmission). However, the picture for the early reception of *MSG-1* data is changing fast. Users, including possibly thousands from the amateur community, are likely to be able to receive *MSG-1* data re-transmitted from the Hot Bird satellite - possibly starting as soon as this month (April)! As I write, EUMETSAT is re-designing its application forms to cover the changing situation.

Until autumn 2002, the plan was for image telemetry from *MSG-1* to be transmitted, as normal, from *MSG-1* itself to users who were suitably located - see **Fig. 1** - and suitably equipped for the required data set.

The footprint is divided into three zones:

Zone 1: The Central Zone includes a large part of central and southern Europe.

Zone 2: The Nominal Zone includes EUMETSAT member states, most of Africa and locations at which the satellite's elevation is at least 10°.

Zone 3: The Global Zone includes all locations in the field of view of the satellite, where the elevation is at least 5°. This zone is the area in which data dissemination services should be accessible.

MSG-1 Events In Sequence

The successful launch of *MSG-1* and its entry to transfer orbit was completed by Arianespace, the European Space Operations Centre (ESOC). They commanded *MSG-1*, and placed it in geosynchronous orbit before handover to EUMETSAT in late September 2002. Commissioning then began.

On 17 October, SSPA-C, a solid-state power amplifier failed, causing the suspension of commissioning until 26 November. This unit is apparently the only redundant amplifier on board. The first test images were taken from the SEVIRI (Spinning Enhanced Visible and Infra-Red Imager) on 28 November, and from the GERB imager on 12 December 2002.

In January 2003, more SEVIRI instrument tests were conducted and more image datasets were acquired to allow determination of the Image Rectification System parameters. This was completed, and in February 2003, the first set of images from all 12 spectral channels was made available on the EUMETSAT web site. A first animation series of images was also produced - see **Fig. 2**.

EUMETSAT announced: "The plan for April 2003 (to be confirmed) is for the trial dissemination of level 1.5 images based on IQGSE (rectified images) using alternative DVB broadcast methods". The end of May 2003 sees the end of commissioning phase A.

Enter Hot Bird

The 'alternative DVB broadcast method' mentioned above refers to the use of the *Hot Bird* (television and

radio) satellite for transmitting a data stream.

The Hot Bird 'family' is a constellation of five satellites located at 13°E longitude, and forms one of the largest broadcasting systems in the world, delivering hundreds of analogue and digital television channels to satellite and cable homes in Europe, North Africa and large parts of the Middle East. In addition to broadcast television services, the system provides hundreds of radio and multimedia services over the same wide coverage area - see **Fig. 3**.

The Hot Bird satellites provide full coverage of Europe, as well as parts of Africa and Asia, including the entire Middle East. A typical receiving system is shown in **Fig. 4**. A 'Superbeam' enables Direct-To-Home (DTH) reception in the centre of the beam using antennas smaller than 0.6m, and a 'Widebeam' requiring slightly larger antennas, offers reception throughout Europe, North Africa and as far east as Moscow. My thanks to EUTELSAT for providing this information.

Get Licensed

It is important for all potential *MSG-1* data users to register with EUMETSAT. Although the actual form of the data transmission (and therefore the actual cost of a reception system) is not fully defined at the moment, formal application for reception should still be made. The EUMETSAT Help Desk, advised me: "Due to the current situation regarding the dissemination of MSG data, the licensing procedure has been put on hold for the moment. Please feel free to send in your registration form, we will then keep it until the procedure is up and running again".

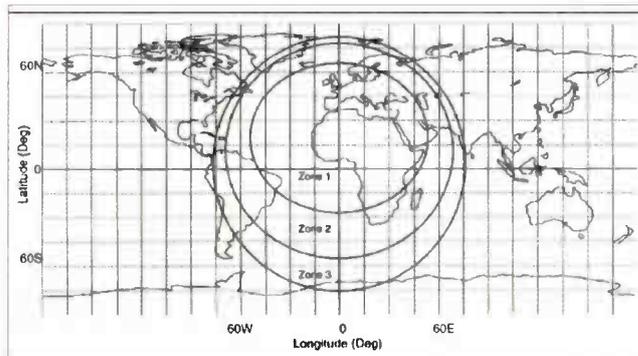


Fig. 1: Transmission footprint of MSG-1.

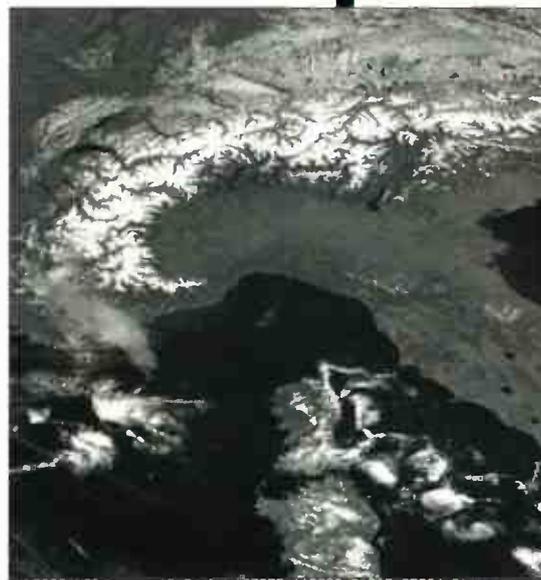


Fig. 2: MSG-1 Image from first animation series 1100 24 February 2003 copyright EUMETSAT.



Fig. 3: Hot Bird download coverage footprint.



Fig. 4: Satellite television reception system.

The View From Above

I contacted the UK Meteorological Office to enquire about the difference in the official view between users wanting to receive *MSG-1* imagery via the direct transmission from *MSG-1* (if and when that might occur) and the probable earlier transmissions from Hot Bird. **Colin Cuthbert** is the contact and he told me: "As far as we are concerned, there are no licensing changes as a result of the amp failure - although there will be alternative dissemination; the license is for the data stream and not the method of disseminating it". This statement clarifies the situation for UK users who are now free to apply for those services that they feel are reasonable and appropriate. As of mid-March, I have applied for HRIT and LRIT reception (via Hot Bird,) and am now considering applying for ATOVS (see later) as well!

EUMETSAT - www.eumetsat.de - explains the

desire for registration: "We would like to encourage all our data users to register with us. With the information supplied in the user registration forms, we can better monitor and map the location of METEOSAT data reception stations. The information given will also allow us to develop a profile of METEOSAT data users, which in turn, will enable us to match our services to your needs. Initial registration with EUMETSAT is at no cost. Users who register with us receive regular operational news bulletins and other relevant information. Some of our services (e.g. DCP, MDD, HRI) will only be accessible after successful registration with us".

RIG secretary **John Tellick** explained "The agreement I secured a couple of years ago from the UK Meteorological Office and EUMETSAT stated that UK amateur users will have free access to both

HRIT and LRIT data from *MSG-1* under the terms of the MSG Data Access Policy. Access to HRIT and LRIT data in other EUMETSAT Member States may however differ. *MSG-1* data via Hot Bird dissemination will be subject to the original data access policy".

EUMETCast On Hot Bird

The EUMETSAT Multicast Distribution System (EUMETCast) uses the satellite services of satellite operator and telecommunications provider EUTELSAT to distribute data files using Digital Video Broadcast (DVB) from Hot Bird to a wide audience located within the coverage zone, including most of Europe and all EUMETSAT Member and Cooperating States.

Currently, Hot Bird transmits "EUMETSAT ATOVS Retransmission System (EARS), and the Rapid Scanning Service (RSS). It is planned to include additional EUMETSAT services in the future". Information was released in March in the

publication *MSG-1 td15.pdf* and the EUMETSAT Help Desk kindly sent me a copy updating this changing situation.

EUMETSAT Hot Bird MSG-1 Reception Equipment Specification

To reliably receive and decode transmissions from Hot Bird, users have to have equipment of a suitable specification. This means that both the receiving system (dish and receiver) and the decoding system (the computer) have to meet and preferably exceed a minimum specification. The following requirements are based on trials performed by the telecommunications provider **Tsystems** using a variety of different hardware components. EUMETSAT has tested a configuration at several locations in Europe and the system has been running satisfactorily without the need for interaction. The requirements given reflect this configuration.

For EUMETCast, EUMETSAT Recommends:

Technisat SkyStar 2 PCI DVD card.
Technisat 0.85m dish. (Triax 0.88m dish will do nicely).
Technisat Universal V/H LNB. (MTI LNB will be OK).

A PC with a minimum 1.5GHz CPU,
Pentium 4 (or faster);
512MB RAM;
40GB hard-disk;
5V PCI bus (compatible with the recommended DVB PCI card);
Graphics card, monitor, keyboard and mouse.

To set up my own reception system computer, I have decided to upgrade my backup computer to at least a 2GHz processor. The hard drive size quoted is rather smaller than that installed in most new computers these days; I shall aim for nearer 80GB.

The receiver card requires installing inside your computer, and then you can install the decoding software. The dish size of 0.85m quoted by EUMETSAT is based on their tests. **Dave Cawley** of **Timestep** asked them about a 0.8m dish because these are cheaply available. He told me that their response was "You will see slightly higher data loss" and "The effect of using a smaller antenna is therefore hard to predict from our side and we would always propose to use the recommended antenna size".

Dave comments "This is a purely digital system so it really is not advisable to use a smaller dish, even if it appears to work 100% right now. So we recommend the well-known high quality Triax 0.88m dish. The LNB we recommend is the MTI Blue Label Universal 0.6dB, the blue label is the selected version. There is only one receiver PCI card, and that is the latest version of the TechniSat SkyStar 2". Timestep is now supplying a receiving system for Hot Bird *MSG-1* data and I hope to review it shortly.

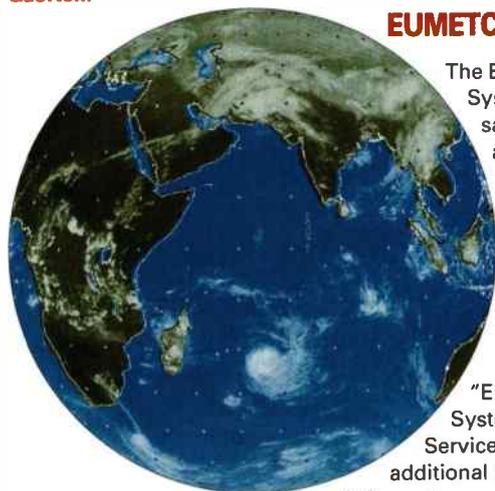
Software For EUMETcast

Tellique GmbH - www.tellique.com/tellicast/index.html - are expected to be the providers of the essential tq®-



Fig. 5: NOAA-17 1001 14 March from Kevin Hughes.

Fig. 6: METEOSAT-5 1500 13 March from Jean-Louis Querton.



TELLICAST client software for which a user licence will be required for reception of Hot Bird transmissions. This cost is unknown as of mid-March.

Unless an alternative source of decoding software becomes available, we require, and have to apply for, the tq® -TELLICAST software and licence for which charges apply. The proposed Hot Bird dissemination of *MSG-1* data will not require the use of the 400 Euro MSG SKU (Station Key Unit), but EUMETSAT intend to use a security device like a 'dongle' to ensure only authorised users have access to the data. This will require a free USB port on the computer.

Not Only - But Also

With the recommended dish carefully aligned on Hot Bird at 13°E, using a second LNB (the low noise block fitted on a six degree bracket used to receive and downconvert satellite television carriers) you could also receive *Astra* at 19.2°E. Free-to-air digital TV and radio channels transmitted by Hot Bird become available, and the possibility of access to fast Internet services.

The MSG HRIT service via Hot Bird should be fully operational by the end of April. The MSG LRIT service via Hot Bird should be fully operational by the end of August. Both are subject to interruptions due to the further commissioning of *MSG-1*. The Failure Enquiry Board has yet to report on whether *MSG-1* could be safely used for direct dissemination of HRIT/LRIT data.

Software For MSG-1

David Taylor's *GeoSatSignal* program is widely used for *METEOSAT-7* (and similar) imagery; he has been adapting it for use with *MSG-1* data. He explains: "My work on this is at an advanced stage, using the test data supplied by EUMETSAT on the three-CD set a couple of years back. Of course, this is not real *MSG-1* data, so I anticipate having to make adjustments once the final data is available. LRIT decoding (which uses JPEG) is done, but not the HRIT decoding which uses 'wavelet transforms' and it has so far proved impossible to obtain decoding algorithms. The Hotbird satellite broadcasting route looks attractive, and again I would expect a development of my *AutoGet* software to function for the users". David adds finally, "As the DVB route gets you free ATOVS data, I am just starting writing a decoder for ATOVS data, and would welcome contact from anyone using or interested in this data". David has promised to keep me up-to-date with his developments.

I plan to write a review of the Hot Bird *MSG-1* data stream and the costs associated with setting up the system very shortly.

ATOVS - The Sounders

Instrumentation on the operational NOAA series satellites includes the Advanced High Resolution Radiometer (AVHRR) and the Advanced TIROS Operational Vertical Sounders (ATOVS), consisting of the Advanced Microwave Sounding Units (AMSU-A/B) and the High Resolution Infrared Radiation Sounder (HIRS/3). The EUMETSAT ATOVS Retransmission Service will collect ATOVS (AMSU-A/B and HIRS/3) and AVHRR data from

operational NOAA satellites, and process the data.

The ATOVS/RSS service is free access but requires registration with EUMETSAT. Having done this you will be directed to T-Systems, Germany for application of the Telligence software and licence required to receive ATOVS/RSS.

Pictures From Correspondents

Kevin Hughes of Tamworth commented about looking forward to summer, illustrated by Fig. 5. Personally, I prefer the late winter season because as well as offering nicely dark skies for my telescope work, the WXSAT pictures offer some dramatic cloud systems and twilight effects near the northern terminator.

From its location over the Indian Ocean Jean-Louis Querton received Fig. 6 from *METEOSAT-5*. He explained: "While I am upgrading my station to receive h.r.p.t. pictures, I installed a steering dish few days ago. To test the tracking software and dish, I looked at *METEOSAT-5* over the Indian Ocean located at 63°E. I attach a picture I got using *JVcomm32*. For the time being, I cannot yet receive h.r.p.t."

If you use David Taylor's h.r.p.t. software you may know that it offers a vegetation index option. Cedric Roberts sent Fig. 7 that shows this display applied to the 1358 *NOAA-16* image. He added "I used David Taylor's *ReadHRPT* to produce this and was most impressed with the result at full resolution.

Dave Ball's home-constructed QFH (quadrifilar helix antenna for a.p.t. reception) produced Fig. 8. He explained, "I made the QFH from 3mm galvanized steel fencing wire. The dimensions are the same as used for the 8mm copper tubing type QFH, and I have used the 4-turn coaxial type balun. The antenna is loft mounted and seems to out perform my home-brew 15mm copper tubing QFH, and is certainly on a par with my 8mm home-brew QFH mounted outside".



Fig. 7: NOAA-16 1358 h.r.p.t. pass from Cedric Roberts.

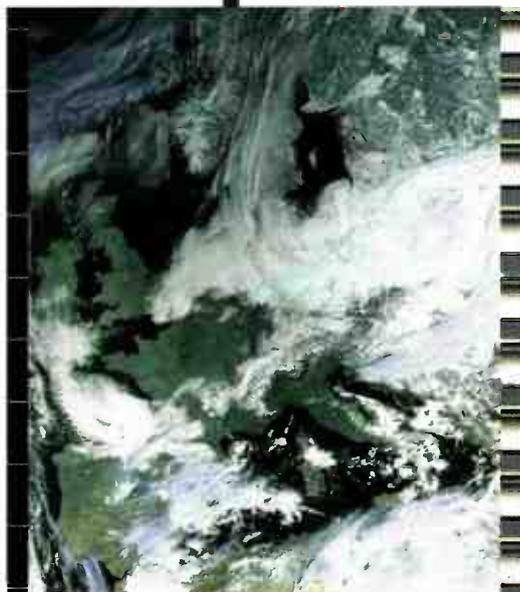


Fig. 8: NOAA-17 1008 15 February 2003.

Frequencies - a.p.t.

NOAA-12 and *NOAA-15* transmit a.p.t. on 137.50MHz.
NOAA-17 transmit a.p.t. on 137.62MHz.
 during overlap periods, *NOAA-12*'s a.p.t. may be switched off.
METEOR 3-5 (formerly 137.30MHz) has failed.

Sky High

The 20th March was quite a significant date for those enthusiasts who take an interest in aviation and airband listening. Firstly, there was the implementation of the far ranging airspace changes within the UK and secondly it was also the date of the initial strikes against Iraq.

The Gulf

With the build-up of equipment in the Gulf, the UK airwaves became increasingly busy from January through to mid March. After a relatively quiet winter, the first months of 2003 provided some interesting and sometimes absorbing airband listening. I may have missed some information as initially 'Sky High' correspondents and airband newsgroups had voluntarily censored their reports so as not to infringe the security of the coalition forces. I note that this has now been relaxed a bit as there is little point in not reporting B-52 movements when BBC, ITV, SKY, etc., are all camped out around the fence at Fairford, showing every movement and re-arming in great detail. Whatever happened to 'loose talk costs lives'?

As mentioned last month, February and March saw a dramatic increase in transport and other movements through Mildenhall. Support movements have been numerous with C-130s, C-5s, C-17s and primarily C-141s pouring through Mildenhall. One correspondent reports seeing 14 C-141s during one day, but the record reported to me is 16 C-141s present on the deck at the same time. (Those of you who managed to get to the Hall during this period have been very lucky). On a couple of occasions, aircraft have actually had to hold and wait for an aircraft to depart to free up a hard stand for parking. Because of this congestion, it is not uncommon to see parked aircraft doubled up on the same hard stand.

One anonymous E-mail I received stated that on one Friday in late February the ground teams at Mildenhall handled 52 movements including 27 visitors in one day. The same E-mail also said that John's field adjacent to the Runway 11 approach looked more like airshow weekend with 50 to a 100 cars present on many days. A number of E-3s have passed through with five being noted on the 24th February, all have used the usual callsign SHUCK.

There were too many other visitors to mention at length, but worthy of note were the two E-8s who used their usual callsign RAZOR with one making a brief mission, (cut short due to technical problems), using the callsign BAGIN 71. Also, one of the E-8s requested a DSN 'phone patch to PEACHTREE on Mildenhall AMC Ops on 396.45MHz - anyone any idea who PEACHTREE is? Ramstein and Rhein main in Germany have both also seen significant movements with numerous C-17s passing through Rhein Main. On the 19th February, Rhein Main quick turned 108 aircraft in one day - an impressive site for anyone who was there!

Fairford's Military Air Traffic Zone was re-activated by NOTAM on the 27th February until the

31st May. It wasn't long before the first interesting visitors passed through in the form of four U-2s. Early in the morning on Sunday 2nd March DRAGON 66 and 77 arrived for a short stop-over, they were closely followed by DRAGON 88 and 99. All four of the U-2s departed on the 3rd and 4th March using the callsigns DEUCE 30/40/50/60, (DEUCE being a regular 9th RW positioning callsign). One E-mail I received stated that there was a fifth U-2 present, but I have seen no other reports of this. DRAGON OPS on frequency 379.475 was in regular use, plus one other report noted 139.9 (a.m.) in use as a U-2 air to air, can anyone else confirm this?

The day after the U-2s arrived, the first real sign that conflict was not far away was the arrival of 14 B-52Hs at Fairford from the 5th Bomb Wing at Minot. First heard on h.f. on 5.616 and 11.175MHz, the first B-52s arrived on the 3rd March over a period of a couple of hours using the callsign RIPPER 11-18, they were followed on the 4th March by RIPPER 21-26. A B-52 Command Post was established on 249.975 with the callsign FORTRESS CONTROL, according to my records this is a USAF air refuelling frequency that has not been noted for some time.

In the interim period, training missions were carried out by the B-52s using the callsigns, CHOIR, CHOOSE and TENOR, (also noted as TUNA). The first live missions took place on Saturday 22nd March with eight B-52s taking off as RATTLER 51-52, 61-62, 71-72 and 81-82. The callsign RATTLER was still in use up to the 25th March with GURU and WILCOX being used for missions from the 26th March.

Support for the B-52s was made by 100 ARW Mildenhall based KC-135s using the usual callsign QUID. In addition, they were supported by 18 tankers from the Air National Guard who arrived on the 19th and 20th March as SODA 51-54, (151st ARS Tennessee ANG), WILEY 61-64 (117th ARS Kansas ANG) and STEEL 41-49 (146th/ 147th ARS Pennsylvania ANG). Callsigns used by the tankers in support of live B-52 missions were LAGER up to the 24th March and then TERRY.

UK Airspace Changes

The major UK airspace changes that were brought in on the 20th March, caught a few aircraft by surprise. An E-mail from **David L** tells of problems encountered by one USAF aircraft trying to find new reporting points and especially NAVPI, (formally MIKE CHARLIE 16). London Military on 299.975 were in contact with REACH 6005, there was obvious confusion the pilot commenting that the reporting points were not on his charts. REACH 6005 then asked London how long specific reporting points had been in operation, the reply was seven hours 39 minutes, (it was 0739UTC). There was a silence for a while whilst the pilot presumably called his operations frequency, he then called London and told them that apparently the new US charts didn't come out until tomorrow!

To give you an idea to the extent of the UK airspace changes, by my calculations there were 127 Airways introduced, revised or withdrawn. Over 120 new reporting points introduced, 29 had a revised purpose and 37 were withdrawn. Fairly major changes by anyone's imagination.

Innovations

Whether you have had an interest in radio listening for many years, (as I have), or you are relatively new to monitoring, many of us always think that there is that extra piece of equipment out there that will aid our lot. You know the scenario - in the pages of *SWM* you spot a new antenna advertised, let's call it the Hoki Koki 3000, which claims to have gain of 35dB on the v.h.f./u.h.f. airbands and for a mere £59.95 will let you pick up Lakenheath Ground from 480km away - hmmm!

All too often new items turn out to be a bit disappointing. It is therefore not very often that something new comes along that really gets my interest, but this month I have found two. Now both items have been reported on recently within the pages of *SWM*, but I felt that I would briefly pass on my hands-on experiences to 'Sky High' readers as both are an asset to airband listening.

I must admit, I owe **Don W** from Bristol an apology. Back in early January he sent me an E-mail telling me about an interesting piece of software he had found on the Internet. I downloaded the software and then promptly forgot all about it - sorry Don. It was only when I saw the same software mentioned in the *SWM*, March 'Scanning' column that I remembered about the download, (see this earlier column for further info). Consequently, I unzipped the software and put it into operation. The software in question is *Xcorder* which is Freeware and a beta test version is available for download from www.xcorder.com Very simply, this is an easy to use, but comprehensive piece of radio recording software. Just connect you radio's 'Record Out' socket, (or similar) via a screened lead to the sound card on your computer. With radio and computer up and running, start the software press record and away you go - easy.

I found no obvious bugs in the beta test version which performed well at all times. The only problem I did come across was on a couple of occasions when an Internet connection was made using AOL whilst *Xcorder* was running. There was some sort of conflict within the computer and *Windows 98* and *Xcorder* threw a wobbly and a re-boot was necessary. With this in mind, the process was not repeated and no further problems were encountered. Download it and give it a go, you won't be disappointed, it's a very useful tool for airband listening - and it's freeware!

The second item was a real revelation to me. Now I am still doing my h.f. airband listening on a



steam driven h.f. receiver, in other words I have not yet moved on to the world of Digital Signal Processing, (the necessary large dent in the bank balance may well have something to do with it!). Consequently, when I read the Editor's report on the bhi NES10-2 noise eliminating speaker and subsequently the NEIM1031 noise eliminating module, I was intrigued, but I will own up to being slightly sceptical. Was this really a cheaper way to move into d.s.p. listening using your existing radio, could it really be that good? There was only one answer and that was to have several conversations with our esteemed Editor and to ask the relevant questions. The result - I now own a NES10-2 Speaker, (the Editor is a very persuasive man).

I have to say I was very impressed, on the h.f. airbands the noise suppression is dramatic and allows for weak signals to be extracted from the mush, it also makes general listening with the squelch open much more agreeable to the ear. The speaker is not exactly designed for use on v.h.f./u.h.f. scanning, but on spot frequencies it works well. For example, by selecting a week ATIS signal that is almost inaudible due to background noise, by switching on the speaker a readable signal could be obtained. The same also applied to aircraft on a spot frequency, as aircraft descended into a distant airfield, I could keep contact with them for that bit longer. I have to admit, I did not think that such a general improvement could be made possible, but this was one of the best additions to the listening post I have made for some years.

MAY AIRSHOWS

Date	Location	Event	Contact
4	Abingdon	Fayre & Flying day	www.abingdonfayre.latest-info-com
4	Duxford	Spring Air Show	(01223) 835000
4-5	Bexhill	Seafront Airshow	No Tel
5	Old Sarum	Auster/Piper Fly-in	(01722) 322525
9-11	Kemble	Vintage Weekend	(01202) 737430
11	Popham	Fly-in	(01256) 397733
17	Shuttleworth	Evening Airshow	www.100yearsofflight.org.uk
18	Kirkbride	PFA Fly-in	(01697) 342142
23-25	Perth	Centenary Fly-in	(01738) 551631
25-26	Southend	Seafront Airshow	(01702) 215166
25-27	Bembridge	Vintage weekend	No Tel
31-1 June	Coventry	Classic Airshow 2003	(02476) 511047

Thanks this month to **Dave P, Dave L, Jim, Pete S, Steve S, Martin** and **Neil H**. Sadly, work has prevented me getting to Fairford to photograph the action so our photo this month is a classic B-52. Seen on the ramp at Edwards AFB in 1994 is the NASA NB-52A.

DX Television

The UK was plunged into sub-zero temperatures during the middle of February as high-pressure developed over the North Sea. This provided tropospheric enhancement of Scandinavian signals with high-level signal penetration into much of the country.

Reception Reports

Monitoring to the south paid off when, on February 7th, there was evidence of TEP (Trans Equatorial Propagation). Reception occurred towards late afternoon with extremely weak video on channel E2, hovering at noise level, possibly from the 1kW Malabo transmitter in Equatorial Guinea. Monitoring also confirmed that the Spanish TVE-1 E2 transmitter at Madrid is still in existence.

British DXers **Stephen Michie** and **Simon Hockenhill** frequently monitor Band I channels for signs of Meteor-Shower reception, even outside of the main activity periods. As you would expect most 'pings' are of programme material and difficult to identify because of their short duration. Stephen feels that some of this brief reception could be due to reflection from aircraft, rather than Meteor Shower propagation.

The sustained appearance of Lopik E4 (NED-1 Netherlands) and Wavre E10 (VRT TV1 Belgium) on the 11th were good indicators that high-pressure was building up and enhanced tropospheric conditions were emerging. The best day was the 15th, according to the logs of Stephen Michie and **Peter Barber** (Coventry). Peter adds that there was evidence of Lopik E4 most days until the end of the month.

By the 16th, Danish and Norwegian Band III signals were visible well into southern England. On the 17th at 0245 **George Garden** (Edinburgh) tuned into TV2 from Norway displaying its '2' identification in the top-right on E44 from the 270kW Bokn transmitter. At 1242 conditions had intensified and TV NORGE was seen on both E51 and E52 supporting good colour and sound.

At one point a NORGESHUS caption was seen. NRK-1 was also received on E6 from Oslo (100kW e.r.p.) and E9 Bergen (80kW e.r.p.) at fair strength using only a vertical f.m. dipole! Unidentified foreign text was visible floating behind the local Black Hill pictures on E43 and E50. By 2155 a French 'Canal +' logo was seen over a heavily jammed Scottish Television ITV on E43! This is a mystery because Canal Plus transmits mainly in Band III, although it could have been a programme promotion shown via one of the other French networks. Does anyone have any ideas about this?

FM Reports

George Garden (Edinburgh) heard strong signals from the Norwegian NRK P5 network on the 16th with non-fade reception for over 90 minutes on 91.8MHz from the Bjerkreim 60kW e.r.p. outlet. From 0245 on the 17th the band became flooded with European signals causing severe interference to local ones. One particularly strong signal on George's NAD receiver was NRK P3 on 91.8MHz. Norwegian stations were still being heard on the 19th before conditions quietened.

Moon-Bounce Record

Following his success with u.h.f. TV reception via moon-bounce from the US, **Tony Mann** (Perth, Australia) has now detected European and Middle East u.h.f. carriers, but on higher frequencies. Initial experiments concentrated on channels E22 to E25, but towards the end of February, Tony

had detected Dubai E33, Kuwait E39 and Sutton Coldfield on 43 and 50. The extremely weak video carriers were detected using very sophisticated computer techniques and consequently actual pictures would not be obtainable.

For the record, the strongest moon-bounce signal from the US is usually from the 5mW transmitter at Muskogee, Oklahoma, on 501.248MHz (US Channel A19).

Roll On The Next Sp-E Season!

Tony Jones (Basilidon) recently bought *Short Wave Magazine* for the first time and was intrigued by this column and was impressed by what the magazine has to offer. Our 'DXTV Special' epic in the January 2003 issue (available as a back copy) should answer most of the frequently asked questions. As a general guide, mid-May until early September is the most active period for DX reception in the northern hemisphere, so there isn't too long to wait. This is when signals are 'bounced' from distant transmitters by ionised layers.

Reception is random and this is one of the intriguing aspects of the hobby. A receiver or converter covering Band I (48-70MHz) and a dipole antenna can provide a simple DXTV set-up. When conditions are good, the rewards and satisfaction can be fantastic. **Kevin Hughes** (Tamworth) wonders where all the signals are at this time of the year.

With little F2 activity this time around, reception is sparse and can be uninspiring for the beginner. **John Lees** (Cheltenham) asks if we can still expect the usual crop of countries in Band I via Sporadic-E this coming summer and whether reception will be as good as usual? Many established DXers felt that the last Sporadic-E season was disastrous and the worst in living memory!

Peter Barber actually constructs an annual chart of daily observations, but has been unable to determine why Sporadic-E activity occurs in intense and not-so-intense cycles throughout each season, with each cycle lengthening as the season progresses. It is obviously not synchronised to the sun's rotational period. Perhaps it has something to do with the inclination of the Earth's orbit with respect to the Sun's axis of rotation which, when viewed from Earth, changes its angle throughout the year. Do any readers have comments on this?

Keep On Writing!

Please send your DXTV, slow-scan TV and f.m. reception reports, news, off-screen photographs and information to arrive by the first of the month to: **Garry Smith, 17 Collingham Gardens, Derby DE22 4FS**. We can also use off-air pictures stored as JPG files on PC discs and good-quality video recordings. Our DXTV and Archive TV website can be found at: www.test-cards.fsnet.co.uk



Fig. 1: The Norgeshus caption from Norway, received in Edinburgh by George Garden.



Fig. 2: Canal Plus (France) caption photographed by Stephen Michie.



Fig. 3: The main TV news programme from North Korea.



Fig. 4: The final BBC-1 Identification Symbol from the original bizarre series of eight. This one is called, for some reason, 'Tapdogs'. The latest series is even more incredulous!

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Price: £5.00. Postage: UK free.

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SWM UK Radio Club Listing

If you want to meet with others with a radio passion, then this guide is provided to help you make contact...

NORTH WEST

CHESHIRE

CHESTER & DRS, G3GIZ. Meets at the Burley Hall, Waverton, Chester. Details from Bob Campbell G4CML. Tel: (01224) 378699.

HALTON RADIO CLUB, M0BVK. Meets at the Play Centre, Norton Hill, Windmill Hill, Runcorn. Details from Alan Parker 2E1DSF. Tel: (01928) 790228.

MACCLESFIELD WIRELESS SOCIETY, G4MWS. Meets at the Pack Horse Bowling Club, Abbey Road, Macclesfield. Details from Mrs Hazel Parrot.

MID CHESHIRE ARS, G3ZTT. Meets at the Cotebrook Village Hall, Cotebrook Nr. Tarporley, Cheshire. Details from Nail Reilly G0VOK.

NORTH CHESHIRE RC, G0BAA. Meets at the Morley Green Club, Millersley Road, Winslow, Cheshire. Details from Jill Gourley G0OZJ. Tel: 0161-485 5036.

RADIO OFFICERS ARS, MOROA. Details from Mr J. Bell G0CMM.

UKFM GROUP WESTERN, G3BMP. Meets at the Morley Green Club, Moberley Road, Wilmslow, Cheshire. Details from Gordon Adams G3LEQ. Tel: (01565) 652652, FAX: (01565) 634560.

WARRINGTON & DARS, G0WRS. Meets at the Grappenhall Community Centre, Bellhouse Lane, Grappenhall, Warrington, Cheshire. Details from John Riley G0RPG. Tel: (01925) 762722.

WIONES & RUNCORN ARC, G0PWR. Meets at the Scout Hut, Castle Road, Halton Chase, Runcorn, Cheshire. Details from Martin Tut G4LUU. Tel: (01928) 714843.

CUMBRIA

CARLISLE & DARS, G4ARS. Meets at the Morton Community Centre, Wigton Road, Carlisle. Details from Mr J.A. Ennis G3XWA. Tel: (01228) 27463.

EDEN VALLEY RS, G0ANT. Meets at the BBC Club, Penrith. Details from John Roze G0VMP. Tel: (01931) 716421.

FURNESS ARS, G4ARF. Meets at the Farmers Arms Hotel, Newton-in-Furness. Details from Mr K. Moore M1BWA. Tel: (01229) 465691.

WHITEHAVEN ARC, M0BEE. Details from Mr N. Williams M0CRM.

GREATER MANCHESTER

BURY RS, G3BRS. Meets at the Mosses Centre, Cecil Street, Bury, Lancs B19 0SB. Details from Steve Gilbert G3OAG. Tel: 0161-881 1850.

DOUGLAS VALLEY ARS, G3BPK. Meets at the Wigan Sea Cadet HQ, Training Ship Sceptre, Brookhouse Terrace, off Warrington Lane, Wigan. Details from Mr D. Snape G4GWG. Tel: (01942) 211397.

ECCLES & DARS, G3GXI. Meets at the Eccles Liberal Club, Wellington Road, Eccles, Manchester. Details from Chns Hamson G8KRG. Tel: 0161-773 7899.

MANCHESTER & DARS, G5MS. Meets at the Simpson Memorial Community Hall, Moston Lane, Moston, Manchester. Details from Mr T. Lever, Snr.

OLDHAM ARC, G4ORC, G1ORC. Meets at the Royston Air Training Corps, Park Lane, Royston, Oldham. Details from Michael Crossley M1CVL. Tel: (01706) 367454.

OULDER HILLS ARS, G0QUA. Meets at the Oulder Community School, Hudsons Walk, Oulder Hill, Rochdale. Details from Carolyn Hope G7WFF. Tel: (01706) 522687.

ROCHDALE & DARS (RADARS), G0ROC. Meets at the Barnfield & Fieldhouse, Cncklet Club, Barnfield Village. Details from John Cannell G7OAI. Tel: (01706) 376204.

SOUTH MANCHESTER RAD & COMP CL, G3FVA. Meets at the Sale Cricket Club, Dawe Road, Sale, Cheshire. Details from Chns Ward G4HON. Tel: 0161-483 5174.

STOCKPORT RS, G6UQ, G8SRS. Meets at the T.S. Hawkins, Stockport Sea Cadets HQ, Pearmill Ind. Est., Stockport Road, West Howe, Lower Bredbury, Stockport. Details from David Simcock M1AJNT. Tel: 0161-456 7832.

TRAFFORD ARC, G0TRC, G1TRC. Meets at the Watch House, Cruising Club, Canal Bank, Stretford, Manchester M32 8WE. Details from Roger May G4VYQ. Tel: (01457) 866575.

TRAFFORD RADIO GROUP, G0TRG. Meets at 17th Stretford Scouts HQ, Barton Road, Stretford, Manchester. Details from Jon Mossman G7JKK. Tel: 0161-865 5609.

WEST MANCHESTER RC, G4MWC. Meets at the Astley & Tydesley Miners Welfare Club, Meany Road, Astley, Tydesley, Manchester. Details from Jeffrey Moran M0BGU. Tel: (01204) 497694.

WIGAN & DARC, G0HRW. Details from Mr D.H. Barkley G0DPI. Tel: (01942) 237162.

ISLE OF MAN

ISLE OF MAN ARS, G3DFH. Meets in the Sea Cadets Hall, Tromode Road, Tromode, Douglas. Details from Dave Walton M0DBX. Tel: (01624) 816308.

LANCASHIRE

BURNLEY & DARS, R5B7674. Meets at Barden High School, Barden Lane, Burnley, Lancashire. Details from Bill Scvener G0BQC.

CENTRAL LANCS ARC, G0FDX. Meets at the Priory Club, Broadfield Drive, Leyland, Lancs. Details from Steve Shearn M1ACJ.

DARWEN ARC, G4JS. Meets at the Darwen Catholic Club, Wellington Fold, Darwen, Lancashire. Details from Len Jackson G0NPJ.

FISTS CW CLUB, G0FPX. Details from Mr E. Longden G3ZQS. Tel: (01254) 703948.

FYLDE ARS, R5S3939. Meets at the A.N.T. Flying Clubhouse, Blackpool Airport. Details from Ken Randall G3RFH. Tel: (01253) 407952.

MORECAMBE BAY ARS, G4YBS. Meets at the Trimple Sports & Social Club, Outross Lane, Morecambe, Lancs. Details from Brian Watson G0RDI. Tel: (01524) 424522.

PRESTON ARS, G3KUE. Meets at the Lonsdale Club, Fulwood Hall Lane, Fulwood, Preston. Details from Mark Procter G1PIE.

ROLLS-ROYCE ARC, G3RR. Meets at the Club Room, Rolls-Royce Sports Ground, Barnoldswick. Details from Mr J.A. York G3KYJ.

ROSSENDALE ARS, G1RRS. Meets at the Old Fire Station, Burnley Road, Rawtenstall, Rossendale, Lancs BB4 9EW. Details from Ken Slaughter. Tel: (01706) 830306.

THORNTON CLEVELYS ARS, G4ATH. Meets at the Frank Townsend Centre, Beach Road, Thornton Clevellys, Lancs. Details from Mr J.E. Duddington G4BFH. Tel: (01253) 853554.

MERSEYSIDE

LIVERPOOL & DARS, G3AHO. Meets at the Churchill Conservative Club, Church Road, Wavertree, Liverpool L15. Details from Dawd G. Parr G8DEY.

SOUTH WIRRAL CONTEST GROUP, G3CSA. Details from Mr T.B. Saggerson G4WSE. Tel: 0151-339 0842.

SOUTHPORT & DARC, G2OA. Meets at St. Marks Church Hall, Scarisbrick, Lancs. Details from Don Atkins M1BUL.

WIRRAL & DARC, G4MGR. Meets at the Irby Cricket Club, Mill Hill Road, Wirral. Details from Brian Black.

WIRRAL ARS, G3NWR, M11ARC. Meets at the Club Room, Ivy Farm, Aroon Park Road, Wirral L49 5LW. Details from Alan Upton G3UZU. Tel: 0151-677 3266.

NORTH EAST

CLEVELAND

EAST CLEVELAND ARC, G4CRD. Meets at the Committee Room Of The New, New Marske Institute Club, Gurney Street, Cleveland TS11 8EG. Details from Malcolm Brass G4YMB. Tel: (01287) 638119.

STOCKTON & DARG, G4XG. Meets at the Billingham Community Centre, Billingham, Cleveland. Details from David J. London G0VGB. Tel: (01642) 896395.

CO DURHAM

BISHOP AUOKLAND RC, G4TTF. Meets at the Stanley Village Hall, Rear High Road, Stanley, Crook, Co. Durham. Details from Mark Hill G0GFG. Tel: (01388) 745353.

DERWENTSIDE ARC, G4PFQ. Meets at the Steel Club, 36 Medomsley Road, Consett, Co. Durham. Details from Mr G. Darcy G7GUJ. Tel: 0191-370 2032.

GREAT LUMLEY AR & ES, G4EJZ. Meets at the Community Centre, Great Lumley, Chester-le-Street, Co. Durham. Details from Mr D.J. Barclay M0BPM. Tel: 0191-388 8113.

PETERLEE RADIO CLUB, G0KVJ. Details from Andrew Pennell G0NSK.

HUMBERSIDE

EAST YORKSHIRE ARS, G0ECR. Meets at the Northern Foods Sports & Social Club, Millhouse Woods Lane, Cottingham, E. Yorks. Details from David Taylor G4EBT. Tel: (01482) 876702.

GOOLE R & ES, G0OLE. Meets at the West Park Pavilion, Goole, South Humberside.

GRIMSBY ARS, G3NCX. Meets at Cromwell Social Club, Cromwell Road, Grimsby, South Humberside. Details from Mr G.J. Smith G4EBK. Tel: (01472) 887720.

HORNSEA ARS, G4EKT. Meets at The Mill, Alfwick Road, Hornsea, North Humberside. Details from Jeff Southwell G4GY. Tel: (01964) 533331.

HULL & DARS, G3AMW. Meets at the SWL Centre, Club Room, Gothland Close, Walton Street, Hull. Details from Mr R. Hatton.

RAYWELL PARK SCOUTS ARS, G4CMT. Details from Mr A.D. Russel M0AXU.

SCUNTHORPE STEEL ARC, G4FUH. Details from Alistair Butler M1ECF.

NORTH YORKSHIRE

DARLEY ARC, G0FOS.

HAMBLETON ARS, G0JQA. Meets at the Mencap Centre, Northalerton, N. Yorks. Details from Ian Brinkwood G0JQA. Tel: (01609) 775598.

QUEEN MARY ARS, G6QM. Meets at Blazefield, Pateley Bridge, Harrogate, North Yorks HG3 5DR. Details from Frank Hams G4IEY. Tel: (01242) 236715.

RIPON & DARS, G4SJM. Meets at the Bunker, rear of Ripon Town Hall, North Yorkshire. Details from Nigel Drumm M1BZD. Tel: (01423) 884733.

ROYAL SIGNALS SCARBOROUGH ARC, G0RCS. Details from Mr A.W.W. Timme G3CWW. Tel: (01484) 842330.

SCARBOROUGH ARS, G4BP. Meets at the Scarborough Cricket Club, Pavilion, North Marine Road, Scarborough, North Yorks YO12 2TL. Details from Mr D.P. Tipper G3UBR. Tel: (01723) 377296.

SCARBOROUGH SE GRP, G0XOO. Details from Roy Clayton G4SSH. Tel: (01723) 862924.

THE VINTAGE & MILITARY ARS, RS183536. Details from H.A. Aspinall.

YORK ARS, G3HWV. Meets at the Guppy's Enterprise Club, 17 Nunney Lane, York. Details from Keith Cass G3WVO. Tel: (01904) 422084.

YORK RADIO CLUB (AMATEUR) G4YRC. Meets at the

Bishopthorpe Social Club, Bishopthorpe Main Street, York. Details from Gareth Foster G1DRG. Tel: (01904) 421392.

NORTHUMBERLAND

NORTHUMBERIA ARC, G4AAK. Meets at the Old Telephone Exchange, Cresswell Road, Ellington, Morpeth, Northumberland. Details from Mr D. Stansfield G0EVL. Tel: (01670) 513026.

SOUTH YORKSHIRE

FINNINGLEY ARS, G7HAH. Details from John Fennell G4HOY. Tel: (01427) 872522.

MALBY & DARS, G4SKM. Meets at the Centenary Hall, Clifford Road, Hellaby, Rotherham. Details from Keith Johnson G1PQW. Tel: (01709) 798098.

MEXBOROUGH & DARS, G4BTS. Meets at the Harrop Hall, Mexborough, South Yorks. Details from Mr R.T. Sheppard G0KSK. Tel: (01709) 586329.

SHEFFIELD ARC, G0INF, NRAE/RAE tuition provided. Meets at the Sheffield University Staff Club, 197 Brook Hill, Sheffield. Details from Mrs Irene Glossop G0SFH. Tel: (01246) 812230.

TYNE & WEAR

HOUGHTON-LE-SPRING ARC, G3NMO. Meets at the Dumfries Royal British Legion, Dumfries, Fencheshouses, Tyne & Wear DH4 6LJ. Details from Foster Angles G0ABF. Tel: 0191-584 4873.

SOUTH TYNESIDE ARS, G0WQW. Meets at the Boldon Scout Hut, Grey Horse Car Park, Front Street, Boldon. Details from William Wilson M0BWI. Tel: 0191-421 9921.

TYNEMOUTH ARC, G0NWM. Meets at the Lnskill Centre, Lnskill Terrace, North Shields, Tyne & Wear. Details from Mr G.N. Thompson G0SBN.

TYNESIDE ARS, G3ZQM. Meets at the St Teresa's Club, 200s Heaton Road, Newcastle-upon-Tyne NE6 5HP. Details from Mr J. Pickersgill G0DZG. Tel: 0191-265 1718.

WEST YORKSHIRE

DENBY DALE & DARS, G4CDD, G8KMK. Meets at the Pie Hall, Denby Dale, West Yorkshire. Details from Mr J.P. Morley G4FSQ.

HALIFAX & DARS, G2UG. Details from Mr S.P. Ortmeier G4RAW. Tel: (01422) 203062.

KEIGHLEY ARS, G0KRS. Meets at the Cricket Club, Ingrow, Keighley, West Yorkshire. Details from Mr I. Townson M1BGY. Tel: (01274) 723951.

LEEDS & DARS, G4LAD. Meets at The Radio Shack, Yarnbury (Horsforth), RUFC Grounds, Brownberne Lane, Horsforth, Leeds LS18 5HB. Details from Mr E. Howden G0IBU.

NORTH WAKEFIELD RC, G4NOK. Meets at the East Ardsley Cricket Club, Nr. Wakefield. Details from Mrs Olga Parker 2E1ASV. Tel: 0113-253 9087.

OTLEY ARS, G3XNO. Meets at The RAOB Club, Westgate, Otley, West Yorkshire. Details from Jack Worsnop G0NSV. Tel: (01274) 636197.

PONTEFRAC & DARC, G3PQY. Meets at the Carleton Community Centre, Pontefract, West Yorkshire. Details from Colin Wilkinson G0NQE. Tel: (01977) 677006.

SPEN VALLEY ARS, G3SVC. Meets at the Old Bank WMC, Midfield, West Yorkshire. Details from Mr J.R. Wide G0FOI. Tel: (01274) 875038.

WAKEFIELD & DARS, G3WRS. Meets at the Ossett Community Centre, Prospect Road, Ossett, W. Yorks. Details from Ian Roberts. Tel: (01924) 216502.

WAKEFIELD RPTR GP, G0KNR. Details from Mike Chaffton G60XZ.

WHITE ROSE ARS, G3XEP. Meets at the Mooruton RUFC, Moss Valley, Kings Lane, Leeds LS17 7NT. Details from Mr M. Wilson G7SDW. Tel: 0113-273 6039.

MIDLANDS

BEDFORDSHIRE

DUNSTABLE DOWNS RC, G4DDC. Meets at the Chevs House, 77 High Street South, Dunstable, Beds LU6 3SF. Details from Phil Seaford G8XTW. Tel: (01525) 384419.

SHEFFORD & DARS, G3FJE. Meets at the Church Hall, Amphill, Shefford, Beds. Details from John West. Tel: (01462) 812739.

ST SWITHUN'S ARC, M0AJV. Meets at St. Swithun's Church, Rectory Rooms, Sandy, Beds. Details from Kelynn Darton G0WOD. Tel: (01767) 683179.

CAMBRIDGESHIRE

CAMBRIDGE & DARC, G2XV. Meets at the Coleridge Community College, Radeburg Road, Cambridge. Details from Ron Huntsman G3KBR. Tel: (01223) 501712.

DUJFORD ARS, G2MNM. Meets at Building 177, Imperial War Museum, Duxford Airfield, Cambs. Details from Mrs B.L. Pope. Tel: (01279) 656149.

GTR PETERBOROUGH ARC, G4EHW. Meets at the 6th Form Building, Stanground College, Farcot Road, Fletton, Peterborough. Details from Alan D. Ralph G8XLH.

HUNTINGDONSHIRE ARS, G0HSR. Meets at the Medway Centre, Medway Road, Huntingdon. Details from David Leach G7OJU. Tel: (01480) 431333.

MARCH & DRAS, G3PMH. Meets at the British Legion Club, Rookswood Road, March, Cambs PE15 8DP. Details from Mr J. Braithwaite G3PWK. Tel: (01353) 698885.

PETERBOROUGH R & ES, G3DQW. Details from Mr V. Edwards G8NGZ.

WISBECH AR & ELEC. CLUB, M5ARC, G4POL, G8NED. Meets at RAFA Club, Old Market, Wisbech. Details from Alan Brndgeland M0DUU. www.werec.org.uk

DERBYSHIRE

BOLSOVER ARS, G4RSB. Meets at the Blue Bell, High

Street, Bolsover, Derbys. Details from Colin Morns G0RXT. Tel: (01246) 822856.

BUXTON RA, G4SPA. Meets at the Leewood Hotel, Buxton. Details from Derek Carson G4IHO. Tel: (01298) 25506.

DERBY & DARS, G2JJD. Meets at Carlton Road United Reform Church, Carlton Road, Littleover, Derby. Details from Martin Shardlow G3SZJ. Tel: (01332) 556875. **EREWASH VALLEY ARG, G0PCX.** Meets at The Sitwell Arms Public House (between Horsey Woodhouse and Woodside). Details from Peter Russell M0AQL.

MOUNT ST. MARY'S ARC, G4MSM. Meets at the College, Spinkhill, Sheffield. Details from Rev. P. McArdle G0DAG. Tel: (01246) 812230.

NOTTS & DERBY BORDER ARC, G4NID. Meets at Marpool United Reform Church, Chapel Street, Marpool, Ilkeston. Details from Graham Bromley G4UTN. Tel: (01773) 834308.

NUNSFIELD HOUSE ARG, G3EEU. Meets at the Nunsfeld House, Boulton Lane, Avaston, Derby. Details from William F. Smith G7PJJ.

STH OERBYS & ASHBY W ARG, G0SRC. Meets at the Moira Replan Centre, 17 Ashby Road, Moira, Swadincote, Derbyshire DE12 6DJ. Details from Mrs B. Wayne. Tel: (01263) 760222.

STH NORMANTON, ALFRETON & DARC, G0CPO. Meets at the New St. Community Centre, New Street, South Normanton, Derbyshire. Details from Peter Gething M0CJL. Tel: 0115-955 5766.

GLOUCESTERSHIRE

CHELTENHAM AR ASSN, G5BK. Meets at the Prestbury Library, Prestbury, Cheltenham. Details from Ivan Wilson G4B6W. Tel: (01452) 731956.

CHELTENHAM CLUSTER SUPP GP, G67DXC. Details from Mr A.M. Davies G0HDB. Tel: (01684) 72178.

GLOUCESTER AR & ES, G4AYM. Meets at the Churchdown School, Churchdown. Details from Mr A.J. Martin. Tel: (01452) 618930.

SMITHS INDUSTRIES RS, G4MEN. Meets at the Sports & Social Club, Evesham Road, Bishops Cleeve, Cheltenham GL52 4SF. Details from A.J. Hooper G1JMF.

STROUD RS, G4SRS. Meets at the Minchampton Youth Centre, Nr. Stroud. Details from Mr S.G. Spencer G3ILO.

WHITE NOISE LISTENING G0WNL. Details from Adnan Deane G7KCC.

HEREFORD & WORCESTER

BROMSGROVE & DARC, G3GVG. Meets at the Avoncroft Arts Centre, Bromsgrove, Worcs. Details from Mr J.F. Burford G4OKZ.

BROMSGROVE ARS, G4TUI. Meets at the Likey End WMC, Bromsgrove, Worcs. Details from Barry Taylor G0TGP. Tel: (01527) 542286.

DROITWICH ARC, G4PVO. Meets in the Community Hall, Droitwich Spa, Worcs. Details from Hector Wragg M1BUV. Tel: (01905) 794399.

HEREFORD ARS, G3YDD. Meets at the Civil Defence HQ, Magistrates Court, Gao' Street, Hereford. Details from Tim Brndgeland-Taylor G0JWJ. Tel: (01432) 279435.

KIDDERMINSTER & DARS, G0KRC. Meets at the Sutton Arms, Sutton Park Road, Kidderminster, Worcs. Details from Mr A.W. Saunders G0OZB. Tel: (01299) 400172.

MALVERN HILLS ARC, G4MHC. Meets at the Red Lion Inn, St. Anne's Road, Malvern, Worcs. Details from Dave Hobro G4IDF. Tel: (01905) 351568.

REDDITCH RC, G4ACZ. Meets at the WRVS Centre, Ludlow Road, Redditch, Worcs. Details from Mr R.J. Mutton G3EVT. Tel: (01789) 762041.

VALE OF EVESHAM RAC, G0ERA. Meets at the BBC Club, High Street, Evesham, Worcs. Details from Mr A.C. Lindsay G4NRD

LINCOLN SHORT WAVE CLUB, G5FZ. Meets At The Railway Club, Triton Road, Lincoln. Details from Mrs Pam Rose G4STO. Tel: (01427) 788356.

RAF CONINGSBY ARC, G3LQS. Meets at Essex Block, RAF Coningsby. Details from Peter Hanson G0NYY.

RAF WADDINGTON ARC, GORAF. Meets at Pyewee Inn, Fossebank, Saxby Road, Lincoln. Details from Robert Pickles G3VCA. Tel: (01522) 528708.

SPALDING & DARS, G4D5P. Meets at The Old Fire Station, Spalding, Lincs. Details from Raymond Pearson G8ELV. Tel: (01775) 711953. Web: www.sdrs.org.uk

SPILSBY ARS, RS91468. Details from Clive Ironmonger G6HYF. Tel: (01790) 752712.

NORTHANTS

KETTERING & DARS, G5KN. Meets at The Lilacs Public House, 39 Church Street, Isham, Kettering, Northants NN14 1HD. Details from Fay Barwell G6AFK. Tel: (01536) 390954.

MID NORTHANTS AR EXP, GOING. Details from Lionel Parker G5LP.

NORTHAMPTON RC, G3GWB. Meets at the British Timken, Social & Athletic Club, Cotswold Avenue, Duston, Northampton. Details from Norman Miller G0GBZ. Tel: (01327) 349188.

NORTHAMPTON SCOUT ARS, G6NDS. Meets at Overstone Scout Activity Centre, Northampton. Details from Ian Rætt G8WPU.

PARALLEL LINES CG, G4LUP. Details from Mr P.S. Lidsay G4CLA.

NOTTINGHAMSHIRE

ARC OF NOTTINGHAM, G3EHW. Meets at the Haywood Road Community Association, Haywood Road, Mapperley Road, Nottingham NG3 6AD. Details from Ron Hague G4XOU. Tel: 0115-919 9177.

DUKERIES ARS, G4XLT. Meets at Ambleside Community Centre, Ambleside, New Olerton, Notts. Details from Colin Foster G7DEX.

HUCKNALL ROLLS ROYCE ARC, G5RR. Meets at the Hucknall Rolls Royce Sports & Social Club, Watnall Road, Hucknall, Nottingham. Details from Mr P. Hart G4JSM.

MANSFIELD ARS, G3GQC. Meets at the Debdale Park Sports & Recreation Club, Debdale Lane, Mansfield Woodhouse, Notts. Details from Dawd Peat GORDP. Tel: (01623) 631931.

NORTH NOTTS DATA GROUP, G0WNN. Details from Tony Jenkins G8TFB.

SIEMENS ARC, G8ZK, G8IGQ. Meets at the GPT Sports Ground, Beeston, Nottinghamshire. Details from Chris Archer G4VFK. Tel: 0115-943 3387.

SOUTH NOTTS ARC, G0QAU. Meets at the Fairham Community College, Farnborough Road, Clifton, Nottingham NG11 9AE. Details from Gary Bishop G0WUG. Tel: (01509) 672846.

WORKSOP ARS, G3RCW. Meets at the Club House, 59-61 West Street, Worksop, Nottingham N1P. Details from Terry Calvert G4GBS. Tel: (01302) 743130.

SHROPSHIRE

OSWESTRY & DARC, G4TTO, G1ORA. Meets at the Sweeney Hall Hotel, Oswestry, Shropshire. Details from Art Astley G0WAJA. Tel: (01691) 860545.

SALOP ARS, G3SRT, M1AXW. Meets at the Teletop Club, Railway Lane, Abbey Forgeate, Shrewsbury. Details from John Burnford G0GTN.

TELFORD & DARS, G3ZME. Meets at the Dawley Bank Community Centre, Dawley, Telford, Shropshire. Details from Mr M. Vincent G3UKV. Tel: (01952) 255416.

STAFFORDSHIRE

BURTON-ON-TRENT & DARS, G3NFC. Meets at the Staplehill Institute, Main Street, Staplehill, Burton-on-Trent, Staffs. Details from Mr M.W. Cotton G4HYD.

CANNOCK CHASE ARS, G6SW. Meets at the Four Crosses Inn, Watling Street, Hatherton, Cannock. Details from Arnold Matthews G3FZW. Tel: (01543) 262495.

CHAD RC, G4CAR. Meets at the Swrnfren Officer's Club, Swrnfren, Lichfield, Staffs. Details from Bernard Jayne G8BFL. Tel: (01543) 268569.

LICHFIELD ARS, G3WAS. Meets at the Queens Head, Sandford Street, Lichfield. Details from Roger Smethers G3NLY. Tel: (01543) 672762.

MOORLANDS & DARS, G4NHT, G1MAD. Meets at the Creta Woods, Blythe Bridge, Stoke-on-Trent, Staffs ST11 9LJ. Details from Mr B.J. Butcher G4HKH. Tel: (01782) 395793.

NEWCASTLE-U-LYME SCOUT AR COM GR, G7UJG

STOKE-ON-TRENT ARS, G3GBU. Meets at the '45' Club, 92 Lancaster Road, Newcastle-under-Lyme, Staffs. Details from Albert Allen G4DHO. Tel: (01782) 638801.

SUTTON COLDFIELD RS, G3RSC. Meets at the Rugby Club, Walmley Road, Sutton Coldfield, West Midlands. Details from Paul G. Turner G7MWD. Tel: 0121-350 4263.

WARWICKSHIRE

AVON VALLEY ARC, MORAD. Details from Mr Peter Bradham G0WJX. Tel: (01905) 724531.

MID WARWICKSHIRE ARS, G3UDN. Meets at the St. John Ambulance HQ, 61 Emscote Road, Warwick. Details from Bernard Pittaway. Tel: (01926) 420913.

RUGBY ARS, G4APD. Details from Tony Humphres G0OLS. Tel: (01455) 552883.

STRATFORD-UPON-AVON & DRS, G0SOA. Meets at the Home Guard Club, Tiddington, Stratford-upon-Avon, Warks. Details from Ron Horsley G0MRH. Tel: (07970) 145204.

WEST MIDLANDS

ALDRIDGE & BARR BEADON ARC, G0NEQ. Meets at the Aldridge Central Hall Community Centre, Middlemore Lane, Aldridge WS9 8AN. Details from Mr C.J. Baker G0NQL. Tel: (01922) 636162.

COVENTRY ARS, G2A5F. Meets at the Binley Church Hall, Bnklow Road, Coventry. Details from John Beech G8SEQ. Tel: (01203) 673999.

DUDLEY ARC, G4DAR. Meets at the Community Centre, Seagley, Central Library, St. James Road, Dudley. Details from Tony Lucas G4LVA. Tel: (01384) 277925.

HILLCREST ARS, G0SPM. Meets at The College, Simms Lane, Netherford, Dudley, West Midlands. Details from Stuart Viney. Tel: (01384) 232457.

KYNOCH R & S, G3HPP. Meets at the Club Workshop, IMI Ltd., Sports Field, Perry Bar, Birmingham. Details from Mr G. Nicholls. Tel: (01922) 625376.

MIDLAND ARS, G3MAR. Meets at Unit 22, 60 Regent Place, Hockley, Birmingham (jewelry quarter). Details from John A. Crane G0IAI. Tel: 0121-628 7632.

SANDWELL AMATEUR RADIO CLUB, G0CWC. Meets at Sandwell ARC, Broadway, Oldbury, Walsley, West Midlands B68 9DP. Details from Stuart Collins M0BTO. Tel: 0121-561 4663.

SIERRA HOTEL ARC, G0OBS. Details from Warwick M. Hall G4WWH.

SOUHULL ARS, G3GEL. Meets at The Shirley Centre, 274 Stratford Road, Shirley, Solihull, West Midlands. Details from Paul Gaskin G8AYY. Tel: 0121-783 2996.

SOUTH BIRMINGHAM RS, G3OHM. Meets at Hampstead House, Fairfax Road, West Heath, Birmingham. Details from The SBRs Secretary.

STOURBRIDGE & DRS, G60I, G6SRS. Meets at the Old Swinford Hospital/School, Stourbridge, West Midlands. Details from Tom Edwards.

WEST BROMWICH CENTRAL RC, G4WBC. Meets at The Sandwell Public House, High Street, West Bromwich, West Midlands. Details from Ian Leitch G0PAL. Tel: 0121-561 2884.

WEST MIDLANDS POLICE ARC, G0COP, G1WMP. Details from Steven Jones G6LRL.

WILLENHALL & DARS, G4ETW. Meets at The Liberal Club, Villiers Street, Willenhall, West Midlands. Details from Dave Bradbury. Tel: (01902) 411252.

WOLVERHAMPTON ARS, G8TA. Meets at the Electricity Board Sports Club, St. Marks Road, Chapel Ash, Wolverhampton. Details from Mrs J. Smith. Tel: (01902) 751936.

WORDSLEY RC, G4WRA. Meets at the Brick Maker's Arms, Mount Pleasant, Brierley Hill, West Midlands. Details from Andy Evans G1PKZ.

LONDON & CENTRAL

BERKSHIRE

ARNSFORD ARC, G3IHH. Details from Mrs E.W. Harding 2E1AUQ.

BRACKNELL AEC, G4BRA. Meets at the Coopers Hill Community Centre, Bagshot Road, Bracknell, Berks. Details from John Ellerton G3NCC.

BURNHAM BEECHES RC, G3WRM. Meets at the Farnham Common Village Hall, Victoria Road, Farnham Common, Bucks. Details from Mrs Eileen Chislett G6EIL. Tel: (01268) 625720.

MAIDENHEAD & DARC, G3MYK. Meets at the Red Cross Hall, The Crescent, Maidenhead, Berkshire. Details from Neil Savin G0SVN. Tel: (01628) 626210.

NEWBURY & DARS, G5XV. Meets at the Rugby Club, Monk's Lane, Newbury. Details from Mark Slade M0CUK. Tel: (01488) 638985.

READING ARC, G3ULT. Meets at the Woodley Pavilion, Woodford Park, Haddon Drive, Woodley, Reading. Details from Marnoch Standen G0JMS. Tel: 0118-972 3504.

BUCKINGHAMSHIRE

AYLESBURY VALE RS, G4VRS. Meets at the Harwick Village Hall, Aylesbury, Bucks. Details from Mr L.I. Cropley G0DFC.

CHESHAM & DARS, G3MDG, G1MDG. Meets at the White Hill Centre, Chesham, Bucks. Details from Mr T.J. Thirwell G0VFW. Tel: (01442) 832169.

CHILTERN ARC, G3CAR. Details from Roy Page G4YAN. Tel: (01494) 534216.

MILTON KEYNES ARS, G3HIU. Meets at Bletchley Park Museum (The Green Room, B Block Annex), Wilton Avenue, Vlechley, Milton Keynes. Details from Mrs J. Battersby M1EPL (Secretary on (01908) 565636 or Frank Collins M0RPM (Chairman on (01234) 713148

MILTON KEYNES SCOUT ARS, G0SMK. Meets at The Quarries, M.K. Scout Campsite, Cosgrove. Details from Mr P.A. Orchard G0RYZ. Tel: (01908) 648186.

GREATER LONDON

ADDISCOMBE ARC, G4ALE. Meets at the Lion Inn, Pawns Road, Croydon. Details from Mr Q.G. Collier G3WRR. Tel: 0208-653 6948.

BARKING R & ES, G3XBF. Meets at the Parkside Community Centre. Details from Bill Chewter G0IQK. Tel: (01708) 474443.

BROMLEY & DARS, RS89030. Meets at the Victory Social Club, Kechill Gardens, Hayes, Bromley. Details from Alan G. Messenger G0TLK.

CLIFTON ARS, G3GHN. Meets at the Kidbrooke House, Community Centre, 90 Mycenae Road, London SE3 7SE. Details from Mr J. Veaney G7BKH.

CRYSTAL PALACE & DRC, G3VCP. Meets at the All Saints Church, Parish Rooms, Beulah Hill, London. Details from Bob Burns G30OU. Tel: (01737) 552170.

DARENTH VALLEY RADIO, G0KDY. Meets at the Crockenhill Village Hall, Swanley, Kent. Details from Mr K.W. Halls G8VJG. Tel: (01322) 663022.

ECHFORD ARS, G3UES. Meets at The Community Centre, St. Martin's Court, Kingston Crescent, Ashford, Middlesex. Details from Robin Hewes G3DTR. Tel: (01784) 456513.

EDGWARE & DRS, G3ASR. Meets at the Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware, Middlesex. Details from Stephen Slater G0PQB. Tel: 0208-953 2164.

HAVERING & DARS, G4HRC. Meets at the Fairkites Arts Centre, 51 Billet Lane, Hornchurch, Essex.

RS OF HARROW, G3EFX. Meets at the Harrow Arts Centre, Uxbridge Road, Hatch End, Middlesex. Details from Mr C. Fnel G4AUF. Tel: (01895) 621310.

SILVERTHORNE RC, G3SRA, G2HR, G8CSA. Meets at the Chingford Adult Education and Community Centre, Fnday Hill House, Simmons Lane, Chingford, London E4 6JH. Details from Dave Chnsty G0KHC. Tel: 0208-504 2831.

SOUTH LONDON COLLEGE ARS, G3HFY. Meets at the Lambeth College, Norwood Centre, Knights Hill, West Norwood, London. Details from Mr M. Knott G0WCR.

SOUTHGATE RC, G3SFG. Meets at the Winchmore Hill Cricket Club, First Lane, London N21 3ER. Details from Mr D.F. Berry G4DFB.

ST. DUNSTONS COLLEGE ARS, G3JDC. Details from Sam Kennard G40HX. Tel: 0181-690 1274.

SURREY RADIO CONTACT CLUB, G3SRC. Meets at the T.S. Terra Nova, 34 The Waldrons, Croydon, Surrey. Details from Maurice Fagg G4DVF. Tel: 0208-669 1480.

WEST LONDON ARS, RS95599. Details from Robin Clay G0VJI.

WHITTON ARC, G0MIN. Meets at the Whitton Community Centre, Percy Road, Whitton. Details from Ian Clabon G00FN. Tel: 0208-894 9131.

HERTFORDSHIRE

BISHOPS STORTFORD ARS, G5ZG. Meets at the Royal British Legion Club, Windhill, Bishop's Stortford, Herts. Details from Tony Judge G0PFF. Tel: (01279) 506933.

DAORUM ARTS, G7RIH, G0WHH. Meets at the Guide Meeting Rooms (next to the Royal British Legion), Queensway, Hemel Hempstead. Details from Ian Hamilton G0TDC. Tel: (01442) 211925.

HODDESDON RADIO CLUB, G0TSN. Meets at the Rye Park Conservative Club, Rye Road, Hoddesdon, Herts. Details from Don Platt G3JNJ. Tel: 0208-292 3678.

MIMRAM CONTEST GP, M0ABC. Details from Alan Haldsworth G800. Tel: (01707) 392950.

RADIO SCOUTING TEAM, G82RST. Meets at Tolmers Scout Camp, Tolmers Road, Cuffey, Herts EN6 4JS. Details from Mill Lewis G2CKB. Tel: (01992) 558493.

STEVENAGE & DARS, G3SAD. Meets at the Stevenage Day Centre, Chells Way, Stevenage, Herts SG2 0LT. Details from Peter Beil 2E1CRK. Tel: (01462) 674505.

VERULAM ARC, G3VER, G8VER. Meets at the RAF Association HQ, New Kent Road, St. Albans, Herts. Details from Walter Crane G3PMF. Tel: (01923) 262180.

WELWYN & HATFIELD ARC, G3WGC. Meets at the Royal Naval Association, Black Fan Road, Welwyn Garden City, Herts. Details from Dean Jackson G7PKF. Tel: (07973) 560649.

SURREY

BENTLEY ARC, G0VZS. Details from Derek Gilbert G0NFA.

CATERHAM RG, G0SCR. Details from Mr P.N. Lewis G4APL.

COULSDON AMATEUR TRANS. SOC., G4FUR. Meets at St. Withuns Church Hall, Grovelands Road, Purley, Surrey. Details from Andy Bners G0KZT. Tel: (01737) 552139.

DORKING & DRS, G3CZU, G7DOR. Details from John Greenwell G3AEZ. Tel: (01306) 631236.

FARNBOROUGH & DRS, G4FRS. Meets at The Community Centre, Meudon Avenue, Farnborough, Hants. Details from Mr M. Hearsey G8ATK. Tel: (01252) 715765.

GUILDFORD & DRS, G0GS. Meets at the Guildford Model Engineers HQ, Stoke Park, Guildford, Surrey. Details from Stella Whitcomb G0SWE.

KINGSTON & DARS, G3KJN. Details from Mrs Mary Ashdown G0BQV.

REIGATE ATS, G5UK, G7PAT. Details from Mr A.C. Embling G1JNT. Tel: (01883) 344723.

SUTTON & CHEAM RS, G2XP, G7SAC. Meets at the Sutton United Football Club, Borough Sports Ground, Gander Green Lane, Sutton, Surrey. Details from John Puttock G0BWW. Tel: 0208-644 9945.

THAMES VALLEY ARTS, G3TVS. Meets at the Thames Ditton Library, Watts Road, Giggis Hill, Thames Ditton, Surrey. Details from Cdr. J. Pegler G3ENI. Tel: (01483) 284279.

WIMBLEDON & DARS, G3WIM. Meets at St. Andrews Church Hall, Herbert Road, Wimbledon, London. Details from Mr Reg Blackwell M1EEK. Tel: 0208-696 9857.

SOUTH & SOUTH EAST

EAST SUSSEX

BRIGHTON & DRS, G4G0R. Meets at the Roast Beef Bar, Brighton Racecourse, Elm Grove, Brighton. Details from Mr P.J. Fellingham.

CROWBOROUGH DARS, G0CRW. Meets at the Plough & Horses, Walsheas Road, Jarvis Brook. Details from Mrs M. Clark. Tel: (01892) 663666.

EAST SUSSEX AMATEUR TV GROUP, RS178475 was G83VY. Details from Keith Ellis G8HGM. Tel: (01323) 720220.

SOUTHDOWN ARS, G3WQK. Details from Jim Harris G4ORV. Tel: (01323) 728479.

THE ORZ ARC OF SUSSEX, G83VX. Meets at the Coach Station, Worthing Road, Eastbourne. Details from Stuart Constable M0CWH. Tel: (01435) 863020.

HAMPSHIRE

ANDOVER ARC, G0ARC. Meets at the Village Hall, Wildem, Andover, Hants. Details from Mr R.S. Coleman G0WYD.

BASINGSTOKE ARC, G3TCR, G8JYN. Meets at the GEMS Social Club, Lister Road, Basingstoke, Hants. Details from Bob Brown M0CJ1.

FAREHAM & DARC, G3VEF. Meets at the Portchester Community Centre, Westlands Grove, Portchester, Hants. Details from Andrew Sinclair G0AMS. Tel: (01329) 235397.

HIGHFIELD PARK RC, G4WD. Meets at Highfield Park RC, National Air Traffic Service, Highfield Park, Heckfield, Hants RG27 0LD. Tel: (01734) 225019.

HORNDLEAN & DARC, G4FBS. Meets at Lovedean Village Hall, Lovedean Lane, Lovedean, Hants. Details from

Stuart Swain G0FYX. Tel: (01705) 472846.

ITCHEN VALLEY ARC, G0NVR. Meets at the Scout Hut, Brockfield Lane, Chandlers Ford, Eastleigh, Hants. Details from Sheila Williams G0VNI. Tel: (01703) 813827.

SONY BROADCAST ARC, G4S2C. Accredited C&G RAE Centre. Meets at Sony Sports & Social Club, Prestley Road, Basingstoke. Details from Stephen Harding G4JGS. Tel: (01256) 55011.

SOUTH HAMPSHIRE INT. TELE SOC., G3DIT. Meets at R3ZJ's QTH. space is limited. Details from Rev. T.R. Mortimer G3JZV. Tel: (02392) 649254.

SUMMARINE ARC, G3BZU. Meets at HMS Collingwood, Newgate Lane, Fareham, Hants PO14 1AS. Details from Mr R.S. Blyth G0PPH. Tel: (01329) 232386.

THREE COUNTIES ARC, G4WWR. Meets at the Bramshot Pansh Inst. & Club, Headley Road, Uphook, Hants. Details from Damian Kamm G7RFV. Tel: (01428) 724456.

WATERSIDE ARS, G4JYN. Meets at the Applemore Scout HQ, Applemore, Hythe, Southampton. Details from Tony Horton G0LKG. Tel: (01703) 841794.

ISLE OF WIGHT

BRICKFIELDS ARS, G0BAR. Meets at Brickfields Horse Country Cent, Newnham Road, Binstead, Isle of Wight. Details from Mr Pebody.

ISLE OF WIGHT RS, G3SKY. Meets at The Old Cafe, Whitecliff Bay, Holiday Park, Bembridge. Details from Alan Reeves G4ZFQ. Tel: (01983) 294309.

OXFORDSHIRE

BANBURY ARS, G0BAR. Meets at St. John's Church Social Club, South Bar, Banbury, Oxon. Details from Mr R.S. Marsden G1YSY. Tel/FAX: (01295) 253509.

HARWELL ARS, G3PIA. Meets at the Social Club, Harwell Laboratory, Didcot, Oxon. Tel: (01235) 223250.

OXFORD & DARS, G5LO. Meets at the Grove House Club, George Street, Summertown, Oxford. Details from Mr D. Walker G3BLS. Tel: (01865) 247311.

VALE OF WHITE HORSE ARS, G5RP, G4VWH, G6VWH. Meets at The Fox, Stevenston. Details from Ian White G3SEK. Tel: (01235) 531559.

WEST SUSSEX

CHICHESTER ARC, G2NMC. Meets at the St. Pancras Hall, Chichester. Details from Graham Swann G0WSD.

CRAWLEY ARC, G3WSC. Meets at the Tilgate Forest Rec. Centre, Hut 18, Tilgate Forest, Crawley, West Sussex. Details from Mr J.S. Spence G0PFI.

HORSHAM ARC, G4HRS. Meets at the Gulde Hall, Denne Road, Horsham, West Sussex. Details from Alister Watt G3ZBU. Tel: (01403) 253432.

MID SUSSEX ARS, G3ZMS. Meets at Marie Place, Leylands Road, Burgess Hill, West Sussex. Details from Mr

ST AUSTELL ARC, GOECC. Meets at Poltair School. Details from Reg Pears G4TRV. Tel: (01726) 729551.

DEVON

APPLEDORE & DARC, G2FKO. Meets at the Appledore Football Club. Details from Mr B. Jewell M0BRB.

AXE VALE ARC, G8CA, G7AXE. Meets at the George Hotel, Axminster, Devon. Details from Pat Cross G0GHH. Tel: (01297) 33756.

DARTMOOR RADIO CLUB, G1RCD, G0DRC. Meets at the Yelverton War Memorial Village Hall, Meavy Lane, Yelverton, Devon. Details from Ron Middleton G7LLG. Tel: (01822) B52586.

EXETER ARS, G4ARE. Meets at the Moose Centre, Spinning Path Lane, Blackboy Road, Exeter. Details from Ray Donno G3YBK.

EXMOUTH ARC, G0XRC. Meets at The Scout Hut, Maripool Hill, Exmouth.

NORMAN LOCKYER OBSERVATORY ARG, G0AXC. Meets at the Norman Lockyer Observatory, Salcombe Hill, Sidmouth. Details from Ron Hanson G0NOC. Tel: (01395) 515349.

NTE (PAIGNTON) ARS, G0OSH. Meets at Paignton Community College, Upper School, Waterat Road, Paignton. Details from Rod Maude G0SWM. Tel: (01803) 521066.

SOUTH DEVON ARC, GASSD. Meets at the Hillhead, Kingswear, Devon. Details from John May G0CDB. Tel: (01803) 522995.

TORBAY ARS, G3NJA. Meets at the Highweek Family & Social Club, Highweek, Newton Abbot, Devon. Details from John Olway G3YMA. Tel: (01803) 556425.

UNIVERSITY OF PLYMOUTH ARS, G0UOP. Details from Alan Santillo G0XAW.

DORSET

BLACKMORE VALE ARS, G4RBV. Meets at Shaftesbury Club for Young People, Coppice Street, Shaftesbury, Dorset SP7 BPF. Details from Mr A. Marmot G0GFL. Tel: (01258) 860741.

BOURNEMOUTH RS, G2BRS. Meets at the Kinson Community Centre, Kinson, Bournemouth, Dorset. Details from Chris R. Ellis M5AGG, Broken Ridge, Fir Tree Close, St. Leonards, Ringwood, Hants BH24 2QW. Tel: (01202) B93126.

CHRISTCHURCH ARS, G0MUD. Meets at the Siemens Plessey Sports & Social Club, Grange Road, Somerford, Christchurch, Dorset. Details from Mr K.P. Hams G7WSN. Tel: (01202) 484892.

FLIGHT REFUELLING ARS, G4RFR. Meets at the Flight Refuelling Social Club, Merley, Wimborne, Dorset. Details from Martin Axon 2E1DFZ. Tel: (01202) 693334.

POOLE RS, G4PRS. Meets at the Bournemouth & Poole CFE, Constitution Hill Site, Poole, Dorset. Details from Phil Mayer G0XKL. Tel: (01202) 700903.

PORTLAND ARC, G0VOP/G7VOP. Meets at Clifton Hotel, Grove Road, Portland. Details from Kerry Morns G1WIK. Tel: (01305) 788591.

SOUTH DORSET RS, G3SDS. Meets at the Church Hall, Chickwell, Weymouth, Dorset. Details from John Rose M0BQO. Tel: (01305) 832057.

SWANAGE & PURBECK ARC, M0BLJ. Meets at Kings Arms, Langton Matravers, Dorset. Details from Peter Wakefield M1WCH/M3WCH. Tel: (01929) 424413.

WESSEX AMATEUR WIRELESS CLUB, G1WAW. Details from Ken Powell G1NCG. Tel: (01202) 549376.

JERSEY

JERSEY ARS, G13DV. Meets at the German Signal Station, Rue Baal, La Moye, St. Brelade. Details from Mrs Anne Mourant M0BJU. Tel: (01534) 734948.

SOMERSET

PRESTON COMMUNITY SCHOOL ARC, G0PCS. Details from Craig Douglas G0HDI. Tel: (01935) 71131.

TAUNTON & DARS, G3XZW. Meets at The Memorial Hall, Trull, Taunton. Details from David Rosewar M0CPI.

WEST SOMERSET ARC, G0OWK. Meets at the West Somerset Community College, Minehead, Somerset. Details from Alan Elliott G7RSU. Tel: (01643) 707207.

WINCANTON ARC, G0WRA. Meets at King Arthur's Community School, West Hill, Wincanton. Details from Mr G.A. Fingerhut G0ENW. Tel: (01963) 370506.

YEOVIL & DARC, G3CMH, G8YEO. Meets at the British Red Cross HQ, 72 Grove Avenue, Yeovil, Somerset. Details from George Davis G3ICD. Tel: (01935) 425669.

ESSEX

BRAINTREE AR & CCC, G4JXG. Meets at the Baintree Hockey Club, Church Street, Bocking, Braintree. Details from Keith Farthing 2E0ARS. Tel: (01376) 347736.

CHELMSFORD ARS, G0MWT. Meets at the Maroon Social Club, Beehive Lane, Chelmsford, Essex. Details from David Bradley M0BQC. Tel: (01245) 602838. E-mail: cars@g0mwt.org.uk

CLACTON RADIO CLUB, G3CRC. Details from Mr D. Fitzpatrick M0CHL.

COLCHESTER ARS, G3VCO. Meets at the Colchester Institute, Sheepen Road, Colchester. Details from Frank R. Howe G3FJ. Tel: (01206) B51189.

DENGIE HUNDRED ARS, G0UTT, G7SDH. Meets at the Henry Samuel Hall, Maryland, Essex. Details from Mrs Christine Wade. Tel: (01621) 772986.

HARLOW & DARS, G8UT. Meets at the Mark Hall Barn, First Avenue, Harlow, Essex. Details from Len Brackstone G7UFF. Tel: (01279) 832700. FAX: (01279) 864973.

HARWICH ARIG, G0GRH. Meets at the Park Pavilion, Barrack Lane, Harwich. Details from Eugene Kirk G4FTF.

LOUGHTON & EPPING FOREST ARS, G4ONP. Details from Marc Litchman G0TCC. Tel: 0208-502 1645/(07803) 023501.

SOUTH ESSEX ARS, GARSE. Meets at the Paddocks, Long Road, Canvey Island, Essex. Details from Mrs Betty Maynard G6LUO. Tel: (01268) 695474.

SOUTHWEND & DRC, G5QK. Meets at the Alexandra Yacht Club, Clifton Parade, Southend-on-Sea, Essex. Details

from Alan Radley G0TTM. Tel: (01268) 741229.

STANFORD-LE-HOPE & DARC, G4SLH. Meets at the St Joseph Pansh Rooms, Scratton Road, Stanford-le-Hope, Essex. Details from Ken Thompson G4PAD. Tel: (01375) 612138.

VANGE ARS, G3YCW. Meets at the Barnstable Community Centre, Basildon, Essex. Details from Mrs D. Thompson. Tel: (01268) 552606.

KENT

BREDHURST RX & TX SOC., G0BRC. Meets at Rock Avenue Working Mens Club, Brook Avenue, Gillingham, Kent. Details from Mr T.M. Wheeler G7MIM.

CRAY VALLEY RS, G3RCY, G1RCY. Meets at the Progress Hall, Admiral Seymour Road, Eltham, London SE9. Details from Richard Perzyna G8ITB. Tel: (01689) 602948.

DOVER RADIO CLUB, G3YMD. Meets at the Dover Grammar School for Boys, Astor Avenue, Dover. Details from Brian Hancock G4NPM. Tel: (01304) 821007.

EAST KENT RADIO SOCIETY, G0EKR. Meets at St. Bartholomew's Church Hall, Heme Bay. Details from Paul Nicholson G3VJF. Tel: (01227) 743070, FAX: (01227) 742288.

HASTINGS ELEC. & RC, G6HH, G1HHH, G6LL. Meets at West Hill Community Centre, Croft Road, Hastings, East Sussex. Details from Mr J. Boothroy G0MTJ. Tel: (01233) 732658.

HILDERSTONE ARS, G0HRS. Meets at Hilderstone A.E.C., Broadstairs, Kent. Details from Mr G. Shaw M0AQA.

HOME COUNTIES ATV GRP, G6HCT. Meets at the Binfield Club, Binfield (near M4/J10). Details from Mr A. Brooker G4WZ.

MAIDSTONE YMCA ARS, G3TRF. Meets at YMCA Sports Centre, Melrose Close, Maidstone, Kent. Details from Colin Wilson G0VAR. Tel: (01622) 736636.

MEDWAY ARTS, G5MM, G8WMA. Meets at Tunbury Hall, Catkin Close, Tunbury Avenue, Walderdale, Chatham. Details from Mr J. Hale G3FTH.

NORTH KENT RS, G4CW. Meets at The Pop-in-Parlour, Graham Road, Bexleyheath, Kent. Details from Mr A.V. Frobens G8MLQ. Tel: (01474) 365894.

SWALE ARX, G4SRC, G6SRC. Meets at the Ivy Leaf Club, Dover Street, Sittingbourne, Kent. Details from Gordon Powell M0AKA. Tel: (01795) 665559.

THE MORSE CLUB, G00XK. Details from Mr K. Churchill M1CZA. Tel: 0208-301 5067.

WEST KENT ARS, G3WKS. Meets at the St. Marks School Hall, Tunbridge Wells, Kent. Details from Malcolm Sheppard G4FWG. Tel: (01892) 652272.

NORFOLK

ANGLIA TELEVISION ARS, G0TXV. Meets at Anglia TV, Norwich NR1 3JG. Details from Jim Bacon G3YLA. Tel: (01603) 615151.

GREAT YARMOUTH RS, G3YRC. Meets at the Bradwell Community Centre, Bradwell, Great Yarmouth, Norfolk. Details from Mr A.D. Besford G3NHU.

GRESHAM'S SCHOOL ARC, G3XPXO. Details from Rev. R.N. Myerscough G3PXO.

KINGS LYNN ARC, G3KYZ. Details from Derek Franklin G0MQL.

NORFOLK ARS, G4ARN. Meets at Norwich Aviation Centre, Norwich Airport. Details from John Wadman G0VZD. Tel: (01953) 804789.

NORTH NORFOLK ARG, G82MC. Details from Keith J. Martin G0GFQ. Tel: (01263) 588506.

SUFFOLK

BURY ST EDMUNDS ARS, G2TO. Meets at the Cufford School Cufford, Bury St. Edmunds, Suffolk. Details from George Woods G3LFT.

FELIXSTOWE & OARS, G4ZFR. Meets at the Orwell Park School, Nacton, Near Ipswich. Details from Paul Whiting G4YQC. Tel: (01473) 642595.

FRAMLINGHAM COLLEGE ARC, M0CBB. Tel: (01728) 727232.

IPSWICH RADIO CLUB, G4IRC. Meets at the Golden Hind, Nacton Road (3rd Wednesdays at the Hollies, Bucklesham Straight Road), Ipswich. Details from Keith Gaunt G7CY. Tel: (01394) 420226.

LEISTON ARC, G0TUQ. Meets at Leiston Town Athletic Assn., Victory Road, Leiston, Suffolk. Details from Sam Lydiate G4IFD. Tel: (01728) 832999.

LOWESTOFT DRS, G3JRM. Meets at The George Barrow Hotel, Oulton Road, Lowestoft. Details from Phil Holden G0JSG. Tel: (01502) 585448.

MARTLESHAM RS, G4MRS. Meets at the BT Laboratories, Martlesham Heath, Ipswich, Suffolk. Details from Darren Hatcher. Tel: (01473) 644475.

SUDBURY & DRA, G0SWI, G7SRA. Meets at the Old School, Wells Hall Road, Great Comard, Sudbury, Suffolk. Details from Bryan Pantou G1TWY.

SUFFOLK DATA GROUP, G87MXM. Details from Peter Pryke G8HUE. Tel: (01473) 631313.

NORTH WALES

CLWYD

CONWAY VALLEY ARC, G6WTM. Meets at the Studio, Penmos Road, Colwyn Bay, Clwyd. Details from Mr R.W. Evans G6WPM. Tel: (01745) 855088.

HALKYN & DARS, G63HRG. Details from Mr D. Austin G7UXG.

NORTH WALES RS, G6WNR. Meets at the Old YMCA, Queen's Drive, Colwyn Bay, Clwyd. Details from Ted Supton G6WDSI. Tel: (01745) 336939.

WREXHAM ARS, G6WXM. Meets at the Community Centre, Maesgwyn Road, Wrexham. Details from Mr P. Moran G6WWR.

GWYNNEDD

MEIRION ARS, G6WLP. Meets at the Royal Ship Hotel, Dolgellau, Gwynedd. Details from Gervase Chavasse G6WURJ. Tel: (01341) 421028.

PORTHMADOG & DARS, G6WMI. Meets at The Yacht Club, The Harbour, Porthmadog, Gwynedd. Details from Mr G. Cadwaladr M0VDFN.

THE DRAGON ARC, G6W4TTA. Meets at the Ebenezer Church Hall, Lon Foel Graig, Llanfairpwll, Isle of Anglesey. Details from Stewart Rolfe G6WEIF. Tel: (01248) 362229.

POWYS

POWYS ARC, G6W4HVN. Meets at the ATC HQ, Park Lane, Newtown, Powys. Details from Mrs Jean Brown 2W1CEZ. Tel: (01686) 640814.

SOUTH WALES

DYFED

ABERPORTH YMCA, G6W4SZV. Meets at the Hut B17, The Airfield, Aberporth. Details from Mr G. Camruther G6W4HJ. Tel: (01239) 811205.

ABERSYSTWYTH & DARS, G6W0ARA. Meets at the Scout Hut, Plasrug Avenue, Abersystwyth. Details from John Woodward G6W6DK. Tel: (01970) B90657.

CARMARTHEN ARS, G6W4YCT. Meets at The Aelwyd Care Home, Carmarthenshire County Council, Tregynwr Road, Llangunron, Carmarthen SA31 3BS. Details from Mr W.D. Hughes G6W4ZL. Tel: (01267) 231359.

CLEDDAU ARS, G6W0SYG. Details from Trevor Perry G6W4XK. Tel: (01646) 600725.

LLANELLI ARS, G6W0EQZ. Meets at the Furnace Community Hall, Furnace Square, Llanelli. Details from Roy Jones G6W4ZK. Tel: (01554) B20207.

PEMBROKESHORE RS, G6W0EJE. Meets at Furzy Park Community Centre, Furzy Park, Haverfordwest, Pembrokeshire. Details from Ian M. Jones M0W0CAB. Tel: (01437) 76302B.

GWENT

ABERGAVENNY RS, G6W4GL. Meets at the Hill Residential College, Pen-y-Pound, Abergavenny, Gwent. Details from Glyn Hughes G6W0DQY. Tel: (01653) 483186.

BLACKWOOD & DARS, G6W6GW. Meets at the Oakdale Comprehensive School, Oakdale, Blackwood, Gwent. Details from John Evans G6W8IT. Tel: (01495) 22517B.

EBBW VALE COLLEGE RS, G6W0IM. Meets at the Gwent Ternary College, Ebbw Vale Campus, College Road, Ebbw Vale, Gwent. Details from Mr T. Hayden G6W0HCN. Tel: (01495) 305192.

NEWPORT ARS, G6W4EZW. Meets at the Brynigas Community Centre, Brynigas Road, Newport, Gwent. Details from Paul Nicholls.

PONTYPOOL ARS, G6W3RNN. Meets at the Settlement, Rockhill Road, Pontypool, Gwent. Details from Graham Smith G6W00LZ.

MID-GLAMORGAN

BRIDGEND & DARC, G6W4NPL. Meets at the Club Brynmryn, Brynmryn, Bridgend. Details from Alun Hulmes. Tel: (01856) 721574.

HOOPER (MERTHYR) ARC, G6W3RDB. Meets at the Hoover Sports Pavilion, Hoover Ltd., Pentrebach, Merthyr Tydfil, Mid Glamorgan. Details Robert Cummings G6W0RFG.

MID GLAMORGAN ARG, M0W0CNA. Meets at Aberkenfig Sports & Social Club. Details from Mervyn Carey G6W4VSE. Tel: (01656) 734668.

SOUTH GLAMORGAN

BARRY ARS, G6W3VKL. Meets at Sully Sports & Leisure Club, South Road, Sully, S. Glamorgan. Details from Richard Mortimore G6W4BVJ. Tel: (01446) 738756.

HIGHFIELDS ARC, G6W4LFO. Meets at the Highfields Physically Handicapped Centre, Allensbank Road, Cardiff. Tel: (01222) 561542.

WEST GLAMORGAN

PORT TALBOT (BS PLO) ARS, G6W3EOP. Meets at the British Steel PLC Sports & Social Club, Mangam, Port Talbot, West Glamorgan. Details from Mr J. Chinnock M0W0AGE.

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Avyation Software.....	77	Pervisell Ltd.....	77	Sycom.....	77
bhi.....	54	Photavia Press.....	72	Telford Electronics.....	64
Computer Aided Technology.....	61	Practical Wireless.....	53	Ten-Tec.....	53
Electrovalue.....	77	QSL Communications.....	64	The Shortwave Shop.....	64
FDS Graphics.....	72	Radio Active.....	76	Timestep Weather Systems.....	64
GIMFG.....	54	Radio Shack.....	61	Waters & Stanton.....	30, 31
Haydon Communications.....	18, 19, 20, 21	Radio Sport.....	72	Winradio.....	50
Interproducts.....	72	Radioworld.....	48, 49	Yaesu UK Limited.....	8
Martin Lynch & Sons.....	39, 40, 41	Remote Imaging Group.....	61		
Moonraker (UK) Ltd.....	14, 15	Roberts Radio.....	26, 80		

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Reviewed by John Wilson in the UK Short Wave Magazine November 2002:

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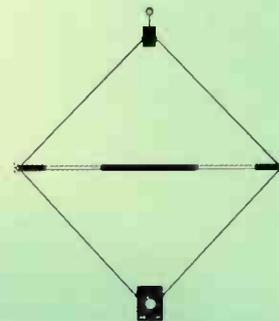


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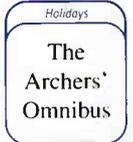
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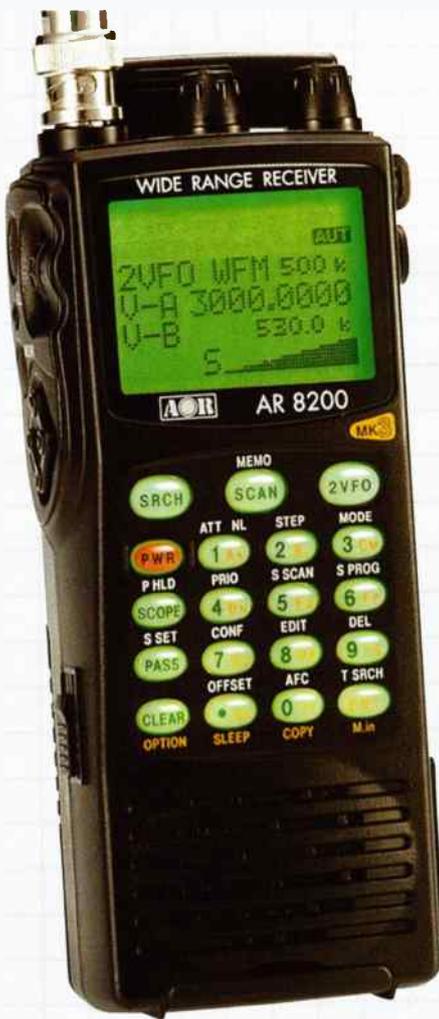
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The MK3 changes are in the following areas: Some RF component change with a positive performance advantage with sensitivity and strong signal handling increasing on some frequencies. The frequency coverage has been extended to 3GHz. The AR8200 MK3 is supplied with 1500mAh NiMH batteries (in place of NiCads) for extended operation. The LCD illumination may be switched to AUTO so that the illumination will automatically switch-on (for just a few seconds) when the squelch opens, ideal for noting the active frequencies at night time.

AR8200MK3 review SWM March'03: This is a compact little hand-held with some innovative design ideas. It performed well on the bands that I monitored and the powerful scan, search and other facilities are a great asset to good scanning.

Many options are available including SLOT CARDS for CTCSS, analogue voice inverting, external memory, recording / playback, tone eliminator, computer interface lead, reaction tune lead, soft case, free PC software from the AOR web site.

Summary: A Temperature Compensated Crystal Oscillator (TCXO) forms the heart of the AR8200 MK3 resulting in **high stability with minimal internal spurious**. RF preselection in the mid-VHF bands ensures **best sensitivity and strong signal handling** with a wide coverage up to 3GHz (all mode receive without gaps).

Flexible tuning steps including 8.33kHz, programmable in all modes down to 50Hz. LCD illumination is nice and bright with sharp display of LCD characters and adjustable contrast, the beep is also configurable.

Flexible power, a set of 4 x 1500mAh AA rechargeable high capacity NiMH are provided, a DC lead with cigar plug is also provided along with AC charger which doubles up as a power supply. The receiver may also be powered from standard dry batteries such as alkaline.

Computer control, nearly all functions can be controlled via computer (optional 8200PC interface required). **£439.00 inc VAT**



AR8600 MK2 RECEIVER *wider coverage all mode receiver 100 kHz - 3000 MHz with RS232 port*

The **AR8600 MK2** is an amazingly versatile receiver which can be used mobile, base or trans-portable... powered from an external 12V d.c. power supply, 12V vehicle or from an optional internally fitted NiCad battery pack. Due to continuous development of our products, the AR8600 MK2 has been enhanced in several areas. The upper **frequency range has been extended to 3000MHz (3.0GHz)**, lower band sensitivity has been increased (now officially covering to 100kHz) with an **enhancement to short wave performance** by the addition of further bandpass filters and revision to I.F. filters. **Mini-Circuits RMS1 / RMS2 mixers** have been employed with **active SPM aerial switching devices** (not diode-switching) abundantly employed throughout the signal path. **Technical boffins** will recognise the significance of such devices in minimising signal loss & maximum spurious free range, and will be versed with the quality of Mini-Circuits parts). The AR8600 MK2 provides remarkable short wave performance, making other similar wide band competitors mediocre by comparison. When the AR8600 MK2 arrived in the UK, **short wave listeners were amazed at how the AR8600 MK2 sounds so much like a dedicated short wave receiver** with pleasant audio on SSB and good CW tone with Radio Japan rolling in on a simple telescopic whip, much less like the usual expectations of a scanning receiver!

AR8600MK2 review SWM March'03: I assessed the performance of the AR8600MK2 not only on the airbands but also on a variety of v.h.f and u.h.f. bands between 40 and 1000MHz, the overall performance was good to very good.

An RS232 port further extends the capabilities with free supporting control software available from the AOR web sites. The all important 8.33 kHz airband channel step is correctly implemented. Computer control is available via a standard 9-pin RS232 D-type connector on the rear chassis, just a standard RS232 cable is required for connection to a PC, the extensive RS232 command list is printed in the operating manual. A FREE software package is available as a download from the AOR web sites.

In addition, **'optional internal SLOT CARDS'** (which fit into the rear chassis of the AR8600 MK2) extend the capabilities even further, five cards may be fitted with two operational simultaneously •**Memory slot card** (increase storage to 4,000 memories, 160 search banks). •**CTCSS slot card** squelch & search. •**Record chip slot card** (records up to 20 seconds of audio) with 'continuous loop' capability. •**Tone eliminator slot card**. •**Voice inverter card**. The slot cards are common to the AR8600 and AR8200 receivers.

Portable operation is a reality, when the optional BP8600 battery is fitted, **several hours operation** is provided away from the base or vehicle power supplies (optional PSU7030 15V power supply recommended for charging).

£719.00 inc VAT



AOR (UK) LTD 4E East Mill, Bridgefoot, Belper, Derbyshire, DE56 2UA England
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 info@aoruk.com www.aoruk.com E&OE

editorial

Welcome to the second edition of *Scanning Scene Extra* - a free magazine from *Short Wave Magazine*. Inside, Dave Roberts takes a look at Radio Direction Finding and what's involved. He also explains how to go Special Event monitoring and ensure success. You're attached to your current radio, but you want more from it. Dave suggests that modifying may be the way to go.

Considering buying a scanner? We've got a scanner selection chart to help you choose in this dedicated scanning publication.

So you don't have a radio but you're still curious, perhaps 'Net Scanning is the answer. Dave Roberts explains what can be heard via the Internet. Alternatively, you may just need to enter the SSE Bumper Scanner Competition and possibly win one of the amazing scanning prizes... We hope you read and enjoy. Please remember that in the UK, listening to transmissions other than broadcast stations and radio amateurs is prohibited. Anyone using a scanner needs to exercise discretion.

Be careful and enjoy.

Kevin Nice - Editor



Scanning Scene EXTRA



Cover - The subject of 'The Other Man's Shack' - has he caught the helicopter yet?

contents

- 3** Editorial
- 4** Introduction
- 5** Radio Direction Finding *Dave Roberts*
- 8** Modifications *Dave Roberts*
- 13** Special Event Scanning *Dave Roberts*
- 18** Bumper Scanner Competition
- 20** The Prizes
- 21** Net Scanning *Dave Roberts*
- 26** The Other Man's Shack *with Kevin Nice*

scanner quick reference

- 28** Scanner Selection Chart - Specifications
- 30** Abbreviations

Bumper Scanner Competition!

Win one of five fantastic scanning prizes. See page 18 now! £2550 of prizes to be won.

index of advertisers

Kenwood Electronics UK Ltd.	12
Nevada	31
AOR (UK) Ltd.	2
Fairhaven Radio	24
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Short Wave Magazine May 2003

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Scanning Scene

INTRODUCTION

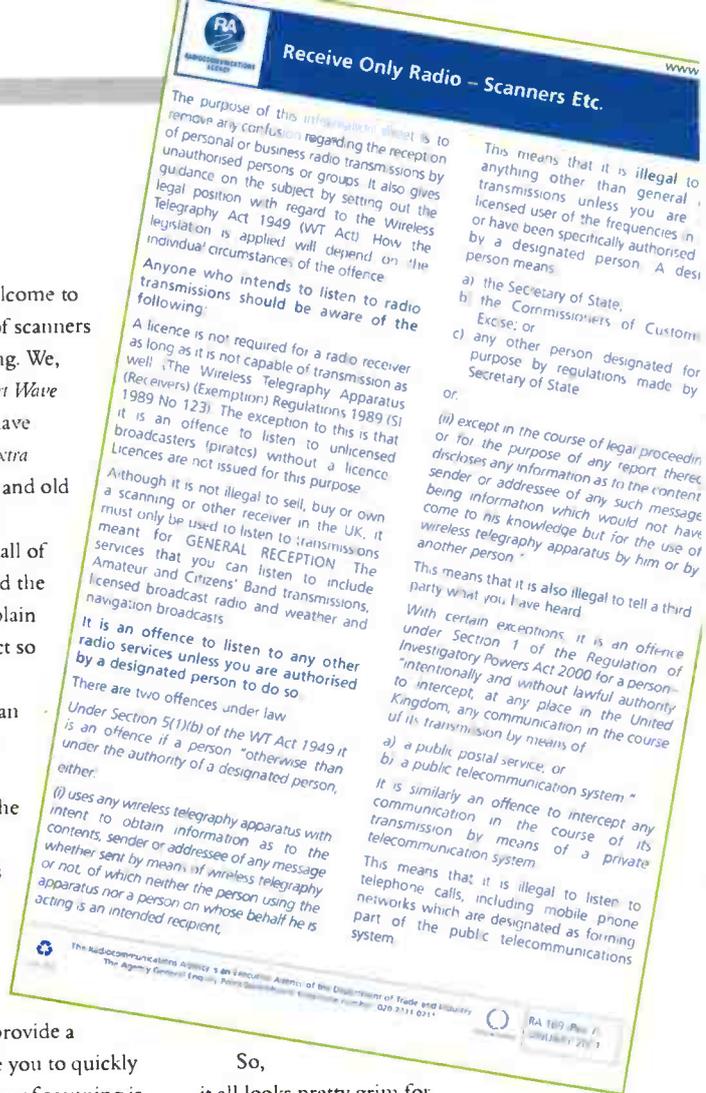
Hello and welcome to the world of scanners and scanning. We, here at *Short Wave Magazine*, have produced this *Scanning Scene Extra Magazine* for both newcomers and old hands alike. Hopefully there is something within its pages for all of you. Unfortunately, it is beyond the scope of this publication to explain all the 'ins and outs' of a subject so vast as scanning. This short introduction, however, makes an attempt to answer some of the most fundamental questions. There are books dedicated to the subject and these include frequency guides, explanations of radio communication systems in general, and specifics related to monitoring specific services. What we intend to do here is provide a starting point. I hope to enable you to quickly get an idea as to what the hobby of scanning is all about.

Also included in this guide is 'What Scanner' a tabular at a glance guide to what the current range of scanning radios, hand-held and base station have to offer.

Is Scanning Legal?

You can legally buy and own a scanner. You can use it to listen to programmes from the world's many broadcasters, both radio and TV - though you won't see a picture. You may legally listen to radio amateurs in conversation with each other around the world on a variety of bands ranging from long waves to microwaves. For most of the population - that's it! Generally speaking, everything else is illegal including listening to CBers doing their thing too.

The actual position in law is something like this. You may not listen to any service or part of the spectrum unless you possess a licence to do so. The DTI have a leaflet, *RA169*, which explains. This document in turn refers you to the *Wireless Telegraphy Act*, section 5(b). It is this somewhat aged act that governs the monitoring and interception of radio signal and traffic in the UK. There is another act of Parliament, the *Interception of Telecommunications Act*, that also governs radio interception and this relates specifically to Cellular Telephones.



So, it all looks pretty grim for *SWM* readers and scanner owners. This need not be the case. The key to this hobby is discretion. If you don't tell anyone what you've picked up, then no-one will know! So, using your scanner discretely and wisely allows you to gain maximum enjoyment and return on your investment in the latest radio.

It is also worth noting that, technically speaking, sharing information with others can be considered as incitement to commit an offence. So, the utmost care is required with this particular hobby.

I will observe however that those who would bring a prosecution about have far better things to do than hunting down casual users of scanners and other monitoring equipment.

If, on the other hand, your interest in interception is somewhat more sinister, and you wish to turn anything you may hear into personal gain, then watch out!

So, everybody with an interest in radio monitoring, please take this advice - be careful!

VY 73 Kevin

There's one aspect of radio monitoring that's rarely discussed in any forum but is widely utilised by law enforcement and security agencies, by marine and aviation safety authorities and, occasionally, the radio enthusiast. What's more, under some circumstances, it can even be accomplished legally! And it's fun...

Invaluable

Finding the transmitter, otherwise known as Radio Direction Finding, may be attempted for several reasons. In aviation d.f. acts as a navigation aid with pilots being aware of the actual location of transmitters and by taking bearings on them they are able to establish the location of their aircraft. The coastguard services around the world use d.f. to establish the location of vessels at sea. Mountain rescuers in some countries have found d.f. to

be invaluable in finding skiers or climbers buried in avalanches where those in distress are equipped with a small transmitter manufactured for the occasion. It's not as welcoming as a St. Bernard dog fitted with a brandy barrel but it is more efficient.

Security and law enforcement services use d.f. to keep tabs on suspects and as an aid to surveillance.

Amateur radio operators have competitions to locate v.h.f. or u.h.f. transmitters and they call the activity - Fox Hunting. Amateurs hide with a v.h.f. or u.h.f. radio and put out sporadic calls on a prearranged frequency. Suitably equipped hunters try and locate them. It has an advantage over real fox hunting, in that nothing gets killed (hopefully) and you don't get people with metal ornaments through their faces slashing your car tyres and cussing you out! There are also amateur DF competitions that take place on the lower frequency bands such as 160m. This pastime is called a.r.d.f., requires a high degree of fitness and insanity and can be

interfere with the legitimate use of the amateur v.h.f. and u.h.f. bands.

What's The Interest?

Why should the scanning enthusiast show any interest in d.f.ing? I wondered this until, a few years ago, I had difficulty in identifying voice transmissions on a high band simplex



RADIO DIRECTION FINDING

A rarely discussed aspect of monitoring is that of locating signal sources. Dave Roberts is on the trail.

cured with the application of patches available from your local pharmacy. I have some experience of a.r.d.f., I am still in therapy and shall confine myself to discussing d.f. at v.h.f. and u.h.f.

Finally, amateur radio operators have used d.f. to locate jamming devices placed so as to

frequency. The channel wasn't mentioned in any frequency guide or listing that I possessed and the f.m. transmissions gave no clue as to the location or type of business in which the users were engaged. They certainly weren't giving much away on the radio. After a few days it seemed that around four hand-held

radios were in use most of the time, with the number decreasing to half that figure after around midnight until four in the morning. I realised that they weren't immediately going to disappear and that if I wanted to find out more about these people I should have to take a look at them in person. Easier said than done.

Firstly, I press ganged an old mate into service. He is a keen radio amateur and has a beam antenna for the 2m band (145MHz) mounted on a rotator. Fortunately, he likes a beer and with suitable bribery I was able to persuade him to alter the polarity of his antenna through ninety degrees thus vertically polarising it. He was located around 16km away from me and was able to take a bearing on the transmissions from his home.

I then acquired a small beam antenna that I plugged into the top of my Standard C520 hand-held radio. I tuned in the offending frequency and was able to start taking a series of bearings by driving around the county and hopping out of the car at lay-bys to take note of the direction of the transmissions. I took details of the bearings using my Suunto compass and pencilled them onto the OS map of the region. By now I had narrowed their field of operation to an area of roughly five square kilometres. By this time the signals were, for the most part, so strong as to render the beam antenna useless. Time to unplug the beam and replace it with the rubber ducky helical originally supplied with the set. Now as you know, these antennas are notoriously insensitive, but in this application it was a positive advantage. By holding the radio adjacent to the centre of my chest and turning slowly on the spot I was able to ascertain the direction from which the transmissions were emanating by, as with the beam, listening for the strongest signal. In any case when you are so close to the signal source it doesn't always pay to draw attention to yourself by waving beam antennas around. At this point, eyes and ears play as much a part in the hunt as gadgetry and by strolling around the area I was soon able to spot a chap using a (not very) covert radio. Turning the tables I followed him and within ten minutes I had

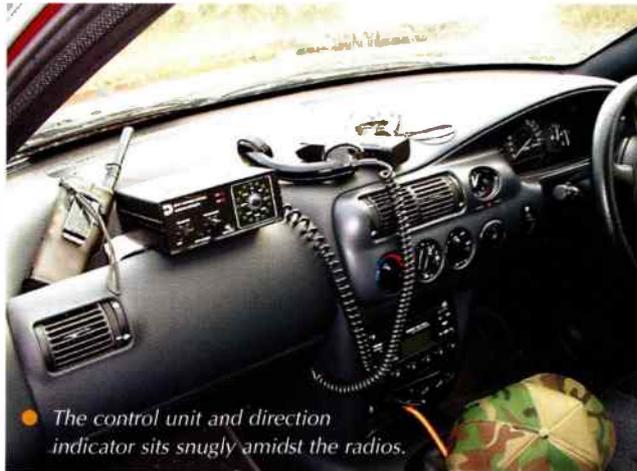
identified a building and vehicle from which his mates were operating. A few days later, having made some subtle enquiries, I established that these boys were from an animal welfare agency, keeping watch on some

of the transmitter. Well, that's the theory anyhow. It doesn't always work just like that, but it's a good position from which to start.

My investigation was most definitely in the hobbyist category and was conducted, for the most part, as a one man operation. The radio was ten years old and the beam antenna had cost a few pounds at a rally. With a bit of knowledge and common sense (not attributes with which I'm overburdened) I obtained the same result as many a 'professional' operation costing a lot more cash.

While beam or directional antennas are used to locate the general area of the transmission to

- The antennas for a mobile d.f. set-up fixed to an unsuspecting Dagenham dustbin.



● The control unit and direction indicator sits snugly amidst the radios.

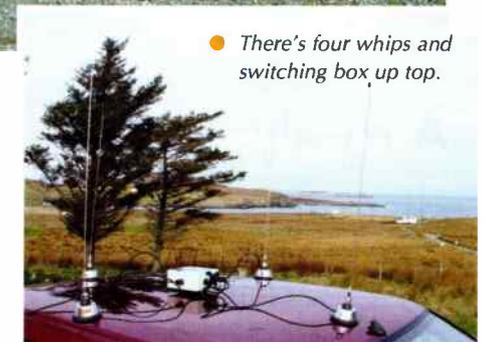


● There's four whips and switching box up top.

people thought to be involved in organising dog fights. I don't know where they had obtained their radio sets, but my guess was that they were purchased second-hand from a dealer or from the Internet on a "I don't want to know what you're doing with them", basis.

Same Principle

Whether you are a hobbyist or professional, the basis of direction finding is the same and consists of obtaining a series of bearings on a transmitter from locations where the transmission is audible. When the bearings are obtained they are drawn out on a map and where they cross should indicate the location



be identified, there are a number of agencies that need to locate transmitters that are more mobile than the walkie-talkie users that I found with my basic set up.

The security agencies, police and similar organisations that deal with rogue radio often use a Doppler direction finding system.

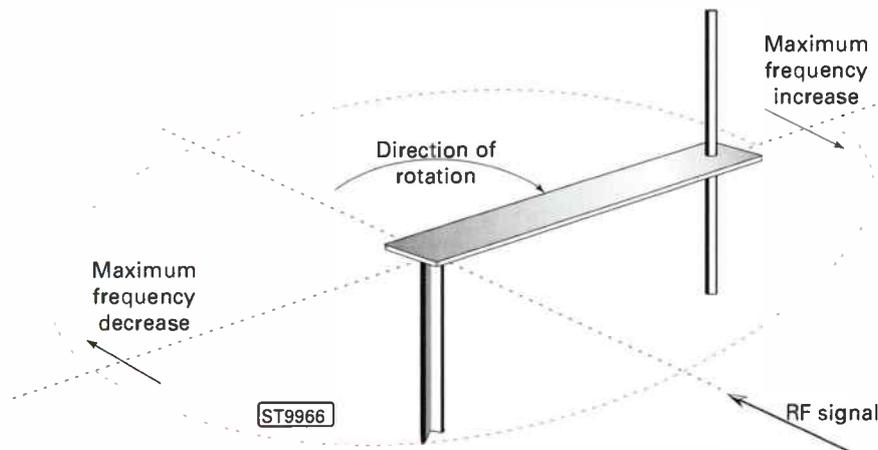
Why Doppler?

Christian Doppler was a mighty clever Austrian physicist who, in 1842, researched the apparent change in frequency of a wave by relative motion between the source and the observer. This is most obvious by listening to the apparent change in pitch of a car engine as it screams past you on a race track or motorway. It starts off as a high pitch and, as the vehicle draws away, the audio wave is less compressed in relation to the listener and the pitch of the sound decreases. Mr Doppler wasn't hampered by motor cars, but managed to work it out anyway. I said he was clever.

The same principle applies to radio waves and several manufacturers have harnessed it to construct r.d.f. equipment. In theory, they use a system whereby a single antenna rotates in a circular path. When the antenna approaches the incoming signal an increase in frequency is perceived and when it travels in the same direction as the wave the frequency decreases.

The signal is then fed into a receiver on the frequency being monitored and it produces a tone that is added to the normal audio from the receiver. The phase of this tone is relative to the clock speed of the antenna commutation and is used to calculate the bearing of the signal relative to the location of the unit and displays it visually on a panel, usually mounted in a vehicle. It's not practical to have an antenna whizzing around on a car's roof so systems of this type tend to use a minimum of four antenna elements mounted on the vehicle roof with a central box switching them, so as to emulate a constantly turning element.

Even with such a sophisticated system it



● Fig.1 The theory behind Doppler d.f. antennas.

will sometimes give dud readings and most systems have a panel switch to invert the display direction should the signals suddenly reflect off a tall building or tree line to give a bearing that is 180 degrees out.

The police use this system that they call 'Tracker' to locate suitably equipped nicked vehicles.

There are several manufacturers of this kind of equipment in the world but here in the UK, Datong have been the market leaders and their products are in law enforcement and government use throughout the world.

Bumper Beeper

In law enforcement, government and private investigation work the Direction finding unit is normally mated to a receiver set operating on a frequency that picks up a tracking device, or 'bumper

beeper' as they are called in the USA and Canada. Here in the UK, they tend to be known as a 'tango' or the 'lump'. They consist of a transmitting device that sends an audible

indication of whether the vehicle is moving or stationary. Normally operating in 80-82MHz and powered by manganese alkaline batteries these gadgets are encased in magnets and are popped up under the body work of a vehicle, usually in the middle of the night. They transmit a low power signal that is received by a car equipped with Doppler d.f. capabilities and this acts as an aid to surveillance of the subject. Simple, but have you ever tried hiding roof mounted antennas and a switching box? The authorities have mastered this and often the antennas are disguised as a roof rack system.

On a less covert basis the Department of Trade & Industry enforcers have similar systems to track down rogue and illicit transmitters. You have been warned.

Discretion Recommended

For hobby d.f.ing you will need a few basic bits of kit.

Firstly, you'll require a receiver on the frequency of the user that you wish to locate.

Secondly, suitable small beam antenna and coaxial patch leads to plug it all together.

Thirdly a good compass is necessary, also Ordnance Survey maps are essential.

Don't forget pencils and a waterproof map case and notepad. Spare radio batteries for the hand-held are a must.

Finally private transport is recommended, even if it's only a bike.

Discretion is advisable as not all users will appreciate your attention and it's best to remain covert so as not to draw attention to yourself.

Direction finding is a most interesting and challenging part of the scanning hobby and is well worth the effort and small amount of expense involved.

Why not give it a try?

SWM/SSE



● Sophisticated commercial offerings.



● Compact hand-held unit.

MODIFY it!

-imPROVE it?

Why trade it in when that good old reliable scanner can be modified to do the same job? Dave Roberts brings us a selection of d.i.y. scanner improvements.

I just dread to think how many different makes and models of scanning radios have been made over the last twenty five years or so. Who remembers the early Bearcat units that in 1979 cost around £200? It's a tidy sum these days, but it was a fortune then. Those old radios, although efficient enough, represented fairly early development in scanning evolution. Some of these sets were easy enough to get into to undertake minor modification tasks to enhance the facilities or performance of the radio. Nowadays all communication devices are much more complex and are often capable of much more than the

manufacturers claim.

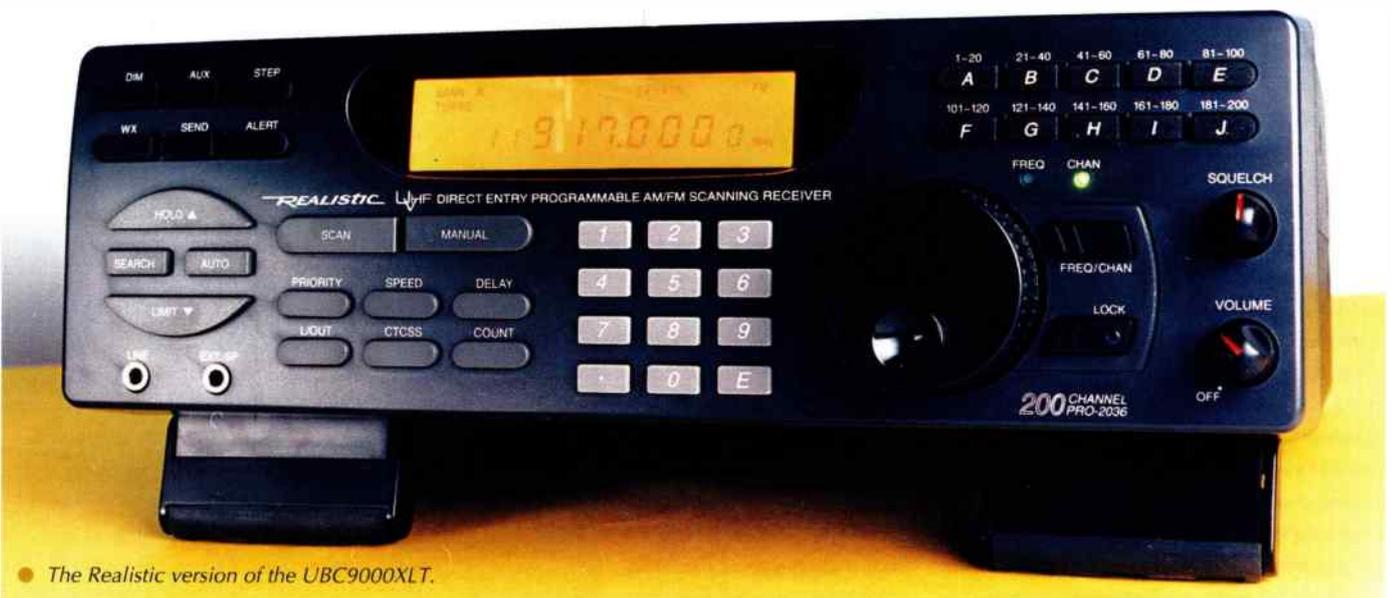
The reason for this being that many radios share common or 'core' components. In some manifestations not all of the unit's capabilities are used, in others all are utilised having been enabled by the inclusion of small additional parts such as resistors. Some modifications of this type are simplicity itself, on occasions only involving re-programming the set by punching buttons on the front panel. Other modifications require more intense work and most of this type also need the application of a steady hand and eye (neither of which I possess).

As there are so many models of scanner about

it will be impossible to mention them all, but here are a few tips for popular radios.

These alterations can only apply to radios manufactured for the European market. Radios made for North America and other parts of the Globe have different firmware and settings. All modifications invalidate the manufacturers guarantee in any case. Having said that, I have modified some radios and they actually still work! I amazed myself.

Please note that any modifications that you undertake are done entirely at your own risk. If the set doesn't work or the house catches fire or your girlfriend leaves



● The Realistic version of the UBC9000XLT.

home you can't blame me, Kevin or Zoë or anyone else.

From 120 to 220

Here's a simple little job for those of you with a Uniden Bearcat UBC120XLT, 20/20 vision and a temperate lifestyle.

Look at any advert for the UBC120XLT and you will see that it looks pretty much like a UBC220XLT.

Even the cabinets are identical. The difference between the UBC120XLT and UBC220XLT is that the latter has 200 memories and coverage up to 956MHz with gaps whereas the 120 has 100 channels and only covers as far as 512MHz. The UBC220XLT costs £20 more than the UBC120XLT.

Personally, if I wanted the extra 100 channels in the first place I would spend the extra twenty quid and forego an evening in the pub. But if you have inherited, been given, or picked up a

UBC120XLT at a boot sale then you could consider the mod. that will give you the extra 100 channels that the 220 has. This modification does not increase coverage up to 956MHz but extra memory is always of use.

You are going to need a small Phillips screwdriver...

Slide off the battery pack and remove the antenna from the 120.

Using your screwdriver unscrew the two screws from the back of the scanner. Remove the two screws that hold the battery retaining spring at the base. Also remove the battery spring.

Very gently prise open the bottom of the rear panel from the radio and remove it.

There are two screws at the base of the circuit board, remove them and carefully pull the front panel off the mainframe at the base of the radio. Now you can see the circuit board.

You will see a large microchip marked UC

followed by a number. Now study the photograph. At the location ringed as number 1 you will see a small resistor. This resistor must be moved to the location marked '2'. That sounds a simple task but you need very steady hands, a small desoldering tool and soldering iron and nerves of steel.

Once you have accomplished this task you must re-assemble the radio by inserting the top panel into the slot under the volume/squelch control panel. Make sure that the dual in-line connector at the bottom of the panel is correctly aligned with the socket. Then press gently but firmly into place. Ensure that the screw holes at the bottom of the circuit board are aligned with

their plastic fittings. Insert the two screws and tighten them up.

The back panel goes on by inserting the top of the panel into the slot under the volume and squelch control panel. Press it into place and put the screws back in. Now the battery retaining spring has to be put back in. Make

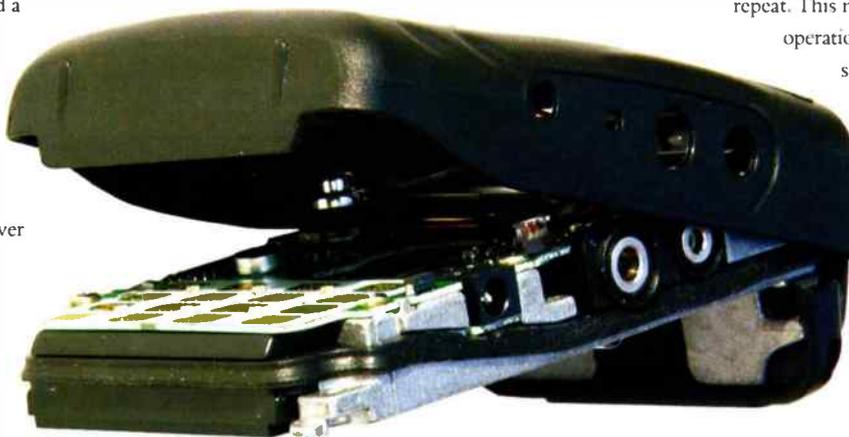
sure that the slotted side is towards the notched hole. Insert the two screws and tighten them up.

Finally, slide the battery pack into place. Now turn on the scanner. If the battery isn't flat, the display will come on and you



TH-F7E Step 1

Undo and retain these two nuts.



TH-F7E Step 3

now have 200 channels. If the

display does not come on and the battery is OK, the problem lies in the alignment of the dual in-line connector. You'll have to make sure that it's aligned up properly and try again.

Pour yourself a large drink and load up the channels.



TH-F7E Step 2

The two screws at the bottom need removing too.

Extend Your Alinco

Three years ago at the Leicester Rally at Donnington (confusing ain't it) I noticed that a reputable dealer was knocking out brand new Alinco DJG5EY radios for £150. I didn't buy one and have regretted it ever since.

The Alinco DJG5 is a v.h.f./u.h.f. transmitter receiver capable of a.m. reception and cross band repeat. This modification is an armchair

operation, a much more relaxed way of

spending ten minutes than jousting

with a soldering iron. It extends receive operation on u.h.f. to 400 - 512 and from 800 - 1000MHz. On v.h.f. you'll be able to receive from 108 - 174 MHz. Transmission will be possible from 130 - 174MHz on v.h.f. and from 400 - 512MHz on u.h.f.

Press and hold the function button on the side of the set and press the FL button twice. Then, while holding the function button press #212, the display should

now show 'OPEN'.

The frequency lock may be on in which case it now needs to be off.

To restore coverage to the factory default just press and hold the function button again and then push FL once. Again press Function and



● If armchair mods are your bag, then this one's for you.



the main circuit board of the UBC9000XLT there is a point marked 'TP3'. It's about 75mm behind the AUX socket. You need to connect a wire from this point to the core of the phono socket that you have just installed. There is an area of solder at TP3 to connect this to, but if you look at the other side of the board you'll see that there is a larger solder patch there and it may be easier to solder the wire to that one at TP3 on the obverse side of the board. Tag another wire from the outer of the phono socket to any ground solder tag on the p.c.b. or attach the end to one of the screws that attaches the p.c.b. to the frame of the radio.

Voilà! - baseband audio for a few bob.

Hook the

UBC9000XLT's baseband audio up to a d.t.m.f. decoder or your computer and open up a whole new world of information. You can even see what that FLEX paging is all about by running the PDW software that decodes pager traffic

While on the subject of the excellent UBC9000XLT. It shares many functions with other Uniden scanners whether portable or base station types. Some of these keystrokes will work for many of the UBC range of receivers.

If you can manage to hold keys 2, 9 and DELAY on the UBC9000XLT and at the same time turn the set on:

- a) you could probably make a successful career as a professional piccolo player and;
- b) the radio enters a different mode. If now you hold LOCK and then press C the set should dump the memories. Quite handy if you are under a bit of pressure, if you see what I mean. LOCK and D will

display the firmware version and best of all... LOCK and PROG sends the thing loopy and the display bleeps four times and continuously rolls a scrolling text that says something like "DECTEL 1994 PRESENTS YOU A NEW UBC9000XLT. Specifically Designed for Professional Scanner Users." It bleeps a lot too. Problem is, they have spelt scanner incorrectly!

I leave the gadget scrolling this display when I want to impress the chicks!

Widen That TH-F7E

I've got one of those little Kenwood TH-F7E dual-band hand-held scanner/transceivers.

The sets have two v.f.o.s unsurprisingly labelled A and B. The 'A' v.f.o. will only tune the 144 and 430MHz amateur bands while the 'B' v.f.o. goes anywhere between a few kHz and 1300MHz. Any mode, i.e. n.b.f.m., w.b.f.m., a.m., u.s.b. and l.s.b., is available up to 450MHz. Thereafter it's a.m. or f.m. only. The TH-F7E has 400 channels and is thoroughly useful for the scanning enthusiast. The main drawback is that it will only cover amateur bands on the 'A' v.f.o.

Help is at hand. When this modification is completed, the radio will transmit anywhere

#212 and the legend 'CLOSED' will appear in the display.

Job done!

Discriminating UBC9000XLT

Being a nosy sort of bloke I occasionally need to monitor data traffic on a scanner. Some of the computer programs that I use need 'pure' baseband audio from the receiver prior to any amplification and conditioning. I have a UBC900XLT receiver that thankfully has enough room inside it to identify components and to work on. This is a modification that your average middle aged drinking man with duff eyesight can accomplish, and I did.

The object here is to drill a hole in the back of the set, mount a phono socket and wire it to the right tag on the main printed circuit board.

There's a coaxial socket on the back of the UBC9000XLT marked 13.8V. You must **carefully** drill a 6.3mm hole through the case near that socket. Obtain a phono socket kit and mount it in the hole and secure it. On the top of



TH-F7E Step 4 Open and lie two assemblies flat.



TH-F7E Step 5 Here are the diodes in question.

between 137 - 174 and 410 - 470MHz.

More importantly it opens up the 'A' band v.f.o. to receive these frequencies, so that you can now bung 3m or so of wire in the SMA socket on top of the set and listen to 156MHz or mountain rescue or whatever on the 'A' band while monitoring 5.680 or 11.175MHz u.s.b. on the other. Neat or what?

Performing this modification unfortunately



● Two steps to a UBC220XLT.

resets the radio, so you lose all the memory contents and settings you had, but it's worth it.

This is one of those 'prayer mat' modifications that requires a steady hand and better eyesight than the *Hubble* telescope.

You'll need a low power soldering iron, plastic tweezers and a small Phillips screwdriver.

Remove the antenna, battery and grey rubber protective cover from the right hand side of the radio.

Gently pull the volume and frequency change knobs from the top and remove them.

Carefully unscrew the nut that holds the SMA antenna socket in place. Also remove the similar nut from the frequency change/volume control.

Now turn the TH-F7E over and examine at the back of the set where the battery previously sat. At the bottom you'll see two screws at the base. Remove them.

You then have to open the radio's case. Gently pull the case halves open from the bottom and when you have a small gap hold the front panel in your left hand and move the main part of the radio down with your right hand so that the control and antenna stubs are slid clear of the case. Open the radio slowly and carefully. The set is now in two halves, but still connected by the speaker wires, these are **very** delicate. Left and slightly below the microphone on the board you'll find two diodes towards the left hand edge

of the board. They are mounted above each other. Below the second one is a gap where a third diode could be fitted but it's absent on the UK model.

Remove the top diode. There will now only be a diode in the middle slot.

Now look below the lowest diode gap (where the third diode could have been) and you'll see a tiny resistor to the left of, and in line with, the keypad key, numbered '1'.

Remove this resistor.

Put the radio back together with great care.

You should be aware of a couple of possible difficulties here. Firstly, remember that a transmitting antenna must be resonant to be efficient and to avoid damage to the transmitter power amplifier circuit.

this is the cyber equivalent of heroin. Personally, I'm well hooked.

All sorts of gadgets for sale there!

I recently noticed that some brand new covert earpieces were being flogged. They went for around twelve pounds apiece. Made by Sonic, the new cost is around a hundred quid.

If you acquire one of these things, either by befriending a covert operator, or from Ebay, or even buying one from Tardis Communications in Aylesbury, you'll need an induction loop to drive it. Simple. Make a coil of thin wire of around twelve turns. The coil should be large enough to go over your head and around your neck and the wire should be thin enough so as not to draw attention to yourself. It should be wearable under a shirt without being seen.

The wire can be held together by looping it through heat-shrink tubing of an appropriate bore.

Hook up the two ends of the wire to a jack plug that fits the earpiece socket on your receiver. Plug the loop into radio. Plug tiny battery into earpiece and the earpiece into the ear of your choice (if you have more than two options here consult your vet). Adjust volume on your receiver in the normal way and monitor covertly. To avoid damage to your scanner the volume on the radio should not have to be set to over three quarters of maximum to make the earpiece work well. Basically, you don't want

to make the radio run flat out to hear the audio in your ear. If you find that the radio is struggling, make a coil with more turns - you may have to experiment a little.

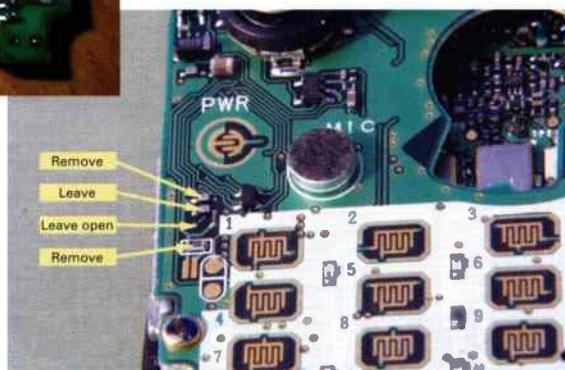
This is a great accessory and many folks have made these coils and are using them. I love it!

More Mods

That's it for this taster of the many extra facilities that you can bring to scanning to enhance your hours spent using your radio.

If you have any interesting modifications you'd like to share then please let me know and we can include them in the November issue of *SSE*.

For those of you with a hunger for this kind of thing, if you have Internet access you can visit the most excellent site at www.mods.dk where there are many modifications for receivers, transceivers and assorted ancillaries. **SWM/SSE**



TH-F7E Step 6 This is what you need to do.

Transmitting outside amateur bands can therefore cause damage to the PA. (*More importantly, you'd be breaking the terms of your amateur licence - Ed.*)

Secondly, some users have found that they have damaged the u.h.f. pre-amplifier transistor by transmitting at frequencies in the v.h.f. range above around 158MHz.

I know that many people are using their modified TH-F7Es as effective scanners and PMR446 radio transceivers. This is eminently possible as the TH-F7E has 6.25kHz channel spacing and the transmit power can be set to a low 0.05W i.e. a twentieth of a Watt.

This modification makes the radio one really versatile set.

Covert Listening

Ever heard of Ebay? It's the Internet auction site. The UK Ebay site www.ebay.co.uk has a 'radio equipment' section. For many radio enthusiasts

KENWOOD

Special K

Kenwood's new FM
dual-channel RX capability
special

Dual Bander (144/430MHz) gives you
and prime performance - all in a truly
palm-sized design



FM DUAL BANDER TH-F7E

KENWOOD

BATT	MODE	DUAL	
1 LOW	2 BAND	3 A/B	A
4 INFO	5 VOX	6 PRI	M-V
7 T.SEL	8 SQT	9 BAL	VFO B
8 TONE	9 SHIFT	MN-IN	M-IN
* LOUT	0 REV	MN-f	MR C
* MH+	0 STEP	#	C.IN
	0 FINE	#	ENT
			CALL D

- Receives 2 frequencies simultaneously, even on the same band
- 0.1~1300MHz RX (B band)
- FM/FM-W/FM-N/AM plus SSB/CW receive
- Bar antenna for receiving AM broadcasts
- Special information memory channel RX mode (10 channels)
- 1200/9600bps packet compatible (ext. TNC)
- 434 memory channels, multiple scan functions
- 16-key pad plus multi-scroll key for easy operation
- 7.4V

1550mAh lithium-ion battery (std.) for 5W output and extended operation

- Built-in charging circuitry for battery recharge while the unit operates from a DC supply
- Tough construction: meets MIL-STD 810 C/D/E standards for resistance to vibration, shock, humidity and light rain
- Larger frequency display for single-band use
- Automatic simplex checker
- Battery indicator
- Internal VOX
- MCP software (Free download from Kenwood website)

144/430MHz FM DUAL BANDER

TH-F7E

Available from all official Kenwood amateur radio dealers. For full details of our dealer network and all Kenwood amateur products contact your local dealer or Kenwood Electronics UK Ltd. 01923 655284.

E-mail: comms@kenwood-electronics.co.uk

SPECIAL events

A fascinating aspect of the listening hobby is special event monitoring. Dave Roberts guides us through just what's required to increase your chances of success and enjoyment.



Like most of us, my first scanning receiver was a small portable unit. It was marked up as being made by a company called 'Regency' and had little slider controls on the top to control the squelch and volume controls. It was very plasticky and suffered badly from microphonic resonance which is a fancy way of saying that once you cranked up the volume it would emit a low wail from the speaker. I took it everywhere and despite its faults, it served me well for a few years. I ran it at home on the shelf, on the dashboard of the

I take radios with me everywhere. But I'm not the only one.

car and it sat on my desk at work. People would visit me in the office just to listen to my radio and hear what was going on in the area. People even started bringing me jars of coffee for my filter machine. It was all very satisfactory. The mere act of lugging the thing around everywhere with me certainly increased my interest in the hobby as I was able to monitor events wherever I happened to be. Inadvertently, I had started a compulsion to constantly carry a radio around with me. This has, on occasions, caused an amount of domestic discord but has always proved to be

entirely worthwhile.

Now, of course, the Regency is long gone and the equipment package has become more sophisticated but the principle remains. I take radios with me everywhere.

But I'm not the only one.

Secretive Number

There are a select and secretive number of people in Britain (and I'm sure elsewhere) who spend a great deal of their time getting out and about with scanning receivers. They monitor incidents that occur in their local areas. Some



● *Ready to receive - mobile.*

make a point of attending visits to specific areas by prominent world leaders or royalty. Others will attend events such as major demonstrations and acts of public disobedience. Some visit public attractions like the Lord Mayor's Show in London or perhaps the London Marathon. Military exercises are popular as are air shows. Any event that utilises a number of radio frequencies may be targeted by these individuals. For some, it is to gain knowledge of the events as they happen and for others, the challenge of identifying new frequencies and users is the goal. Aircraft enthusiasts may use scanning receivers as just another tool in order to identify the ideal location at which to spot their targets, then the cameras appear.

Those engaged in these activities are a secretive bunch because the activity is basically illegal. It is important to note that the reception of radio signals other than licensed broadcast stations and amateur traffic is unlawful unless you are the intended recipient of the traffic.

In most countries of the world travelling around an area with a radio scanner, camera, notepad, maps and other equipment is rightly categorised as spying and those discovered engaging in this activity are always treated harshly. In my experience, countries that are less developed have an inversely proportional paranoia quotient when it comes to their security.

Get caught photographing the newest warship in Moronia and you get locked up pretty smartly despite the fact that usually the thing was purchased fifth hand from the firm that did trips round the bay at 'Skeggy'. Even

the Americans who are probably the least secretive nation in the world don't take kindly to foreigners poking their noses in the wrong places.

Most Hazardous

In the UK and Europe most people reside, work and spend their leisure time in towns or other built-up areas and this

environment is probably the most hazardous in which to operate any radio gear and scanners in particular.

clandestine behaviour for many reasons. Firstly, the police appear to have a serious sense of humour failure when it comes to folks using radio scanners. For this reason alone it isn't a good idea to be seen to have one clamped to your ear. But it certainly isn't the only reason.

At most events there are a number of people who intend to engage in criminal activity. This may range from simple theft or robbery to riot involving serious assaults, arson, looting and any number of other antisocial acts. In this scenario, you are at best likely to be robbed of your radio and at worst you may be mistaken for authority and become a target for attack. The first rule therefore, is not to stand out and make yourself a target for anyone.

Your vehicle may well have a scanner fitted, but this should be secreted in the car and should not be visible. The antenna can be fitted

It is important to note that the reception of radio signals other than licensed broadcast stations and amateur traffic is unlawful unless you are the intended recipient of the traffic.

Take for instance the example of a major public event, say Notting Hill carnival in London, or perhaps a football final at the Millennium Stadium in Cardiff. These events differ in almost every respect, but for the radio scannist they are strikingly similar. Clearly both involve large numbers of people, both events involve the supervised movement of participants along a predetermined route. At Notting Hill this will be along the carnival route and at Cardiff it will be the route from the railway station to the Stadium. The events will involve police, stewards, media coverage (including broadcasters), fire, rescue and medical emergency cover as well as local authority input and other services including catering and volunteer services. All these people are likely to have radio equipment in use and they will all be of interest to the event scannist. Operating in these circumstances involves a large degree of subtlety and

inside the passenger compartment as you are not chasing long distance signals when you are scanning events. All the action will be up close and so will the radio transmitters that you are monitoring.



Having arrived at the event it's likely you will spend much of your time out and about on foot. This is where you are at your most vulnerable and where you'll get the most rewarding results. The amount of equipment that you take will obviously depend on what



● Two MVT-7100s plumbed and ready for action.

equipment you have and how much cash you are prepared (or allowed) to spend on the hobby.

Rationalise

OK so here goes... How many portable receivers to take? I prefer to take a couple together with spare battery packs for each. A good tip with batteries is to try and rationalise the type that you use. All my receivers utilise AA size Duracells in battery trays. So does my pocket recorder, torch and digital camera - likewise my GPS receiver, image intensifier and any number of other gadgets including my battery razor, though I don't use these at events - so that all the cells are interchangeable to keep me operational. A frequency counter is useful and I prefer a stand alone device. I have found the Techtoyz Microcounter by OptoElectronics to be a really useful gadget. It looks like a radio pager and, as such, can be viewed without attracting undue attention. I like to have a counter of this type handy as there is nothing more frustrating than to see someone nearby using a radio and not being able to hear what is being transmitted. I'm personally no great fan of reaction tuned receivers, as I have found that they lock into



plenty of things that you don't need while often missing the one thing that you do and in any case I prefer to control the set myself. This is a disadvantage when trying to remain covert but a practised operator can usually tune his radio pretty swiftly and unobtrusively. And

pocket as a spare. The stubby antenna makes the little Kenwood set look very much like a mobile 'phone, an added advantage when attempting a re-tune or other control function as you can haul it out and peer quizzically at it while punching the buttons. Most folk around you assume that you are about to initiate some

This kind of scanning is very much 'up close and personal' and you don't need the most efficient antenna ever made mounted on the set.

yes, the Microcounter also runs on an AA Duracell.

Now To Antennas

This kind of scanning is very much 'up close and personal' and you don't need the most efficient antenna ever made mounted on the set. Happily the antennas supplied by the original equipment manufacturer usually fall neatly into this category while not being too obvious. A small spare antenna is a must and I generally have a low profile stubby antenna about 45mm long fitted to my Kenwood TH-F7E while keeping the original antenna in a

asinine conversation and may even walk away from you. Talking loudly at the set helps. "Can you hear me? I'm on my mobile, yeah?", is a good gambit. If you really want to keep people at their distance, don't wash for a week before the event. This works for new age travellers.

Although I take two receivers with me, I don't have a multi-tasking head and I just can't listen to them both at the same time and so the second set is carried as a spare. Both my sets are dual v.f.o., dual banders and as such I can search one band and scan another or even monitor one channel while scanning others. As to actually recovering the audio from the radio there are a few options available. Most people

will use personal stereo earplugs or 'phones. They look unobtrusive these days but I always find that I need one ear tuned to what's happening in the real world so stereo headsets don't suit me personally. I have acquired a covert wireless earpiece and have made a loop to drive it. The loop fits neatly under my shirt and is plugged into the earphone socket of the radio. I have no visible earpiece at all and the volume is controlled from the set as usual. A similar set up is installed in the headlining of the car and can drive the same earpiece when I'm in my little Ford Escort. (I have a 4x4 Jeep for rural work).

The earpiece batteries are definitely **not** AA cells!

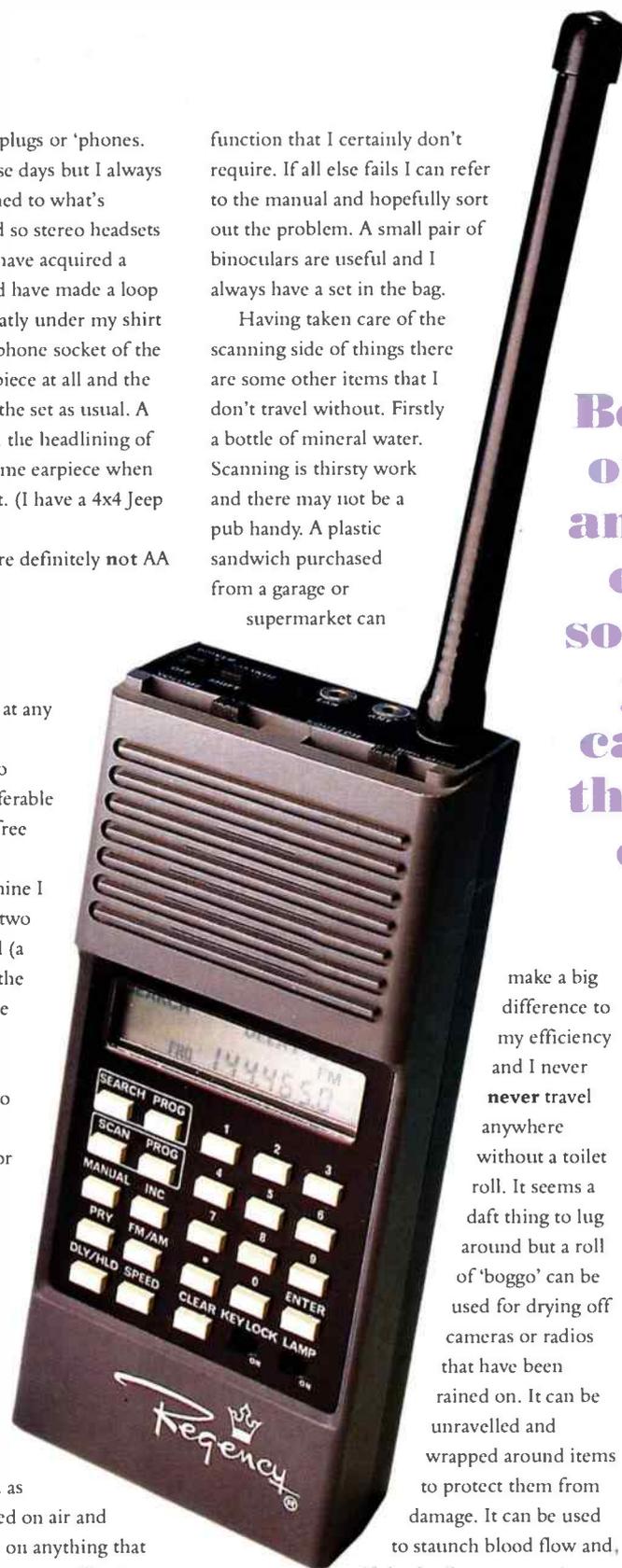
Back Pack

You'll see that most people at any event carry a small back or rucksack and you should do likewise. A backpack is preferable as it will leave your hands free and it's harder to lose if it's strapped to your back. In mine I carry a reporter's notepad, two ball point pens and a pencil (a pencil will always work in the rain, ball pens don't). I have the digital camera and a pocket tape recorder. This may be useful if you have to record any log details or possibly to record any major event as it happens 'on the ground' not on the air. A small Kel-Lite torch, spare stereo earpiece (in case of covert earpiece failure) and spare battery trays also live in the pack plus an extra box of Duracell AA batteries.

A street map of your operational area is essential as locations may be transmitted on air and you may want to follow up on anything that you overhear. An added advantage of having a map of the area is that you can plan your exit from an area should any violence or other difficulty occur. I have made up a quick guide to operating the receivers and that is stashed in the back pack as well. Scanners are extremely complex these days and I occasionally find that I have managed to turn on some sort of

function that I certainly don't require. If all else fails I can refer to the manual and hopefully sort out the problem. A small pair of binoculars are useful and I always have a set in the bag.

Having taken care of the scanning side of things there are some other items that I don't travel without. Firstly a bottle of mineral water. Scanning is thirsty work and there may not be a pub handy. A plastic sandwich purchased from a garage or supermarket can



● *Dave's first hand-held scanner. This Regency went everywhere!*

Distance

You will also want to plan ahead for any scanning operation. I don't recommend carrying frequency lists around with you but you will want to have some idea of the frequencies that you wish to monitor. Some will have to be found on site and searching for

Being in a crowd of people can be an overwhelming experience for some. Don't allow yourself to be carried along by the group in spite of your better judgement.

make a big difference to my efficiency and I never **never** travel anywhere without a toilet roll. It seems a daft thing to lug around but a roll of 'boggo' can be used for drying off cameras or radios that have been rained on. It can be unravelled and wrapped around items to protect them from damage. It can be used to staunch blood flow and, if absolutely necessary, it can

be deployed in accordance with the manufacturer's intended function. Always take wet weather kit with you. You may find yourself confined to a specific area for a while and if the weather should change you'll definitely be ahead of the game if you have a waterproof in your pack.

these is a major part of the hobby for many folks. Inevitably frequencies will have to be entered into the radios prior to the event but just make sure that you have pre-planned a method to clear all the channels and searches in short order should this become necessary. Figure out your best vantage points and as you move around the locale continue to mentally plot alternate routes to get you out of the area should this become necessary.

Being in a crowd of people can be an overwhelming experience for some. Don't allow yourself to be carried along by the group in spite of your better judgement. Some elements within a crowd will always behave irresponsibly. Distance yourself from these and always be prepared to leave the area, have a pint or go home if things begin to look ugly.

Focused Variant

A more expensive and focused variant of the Scanning Expedition is practised by an even more select and secretive number of individuals.

At various times of the year military exercises are held around the United Kingdom. Some of these involve all three military services

and the military forces of other NATO nations.

The times and locations of these events have to be made public in order that vessels at sea and aircraft can be advised to keep out of the region. By being aware of these notifications from the Maritime and Coastguard Agency and the Civil Aviation Authority the dedicated hobbyist can soon find out where and when these exercises are to take place. Individuals pool resources and experience and in no time have an information database to cover each exercise that no doubt rivals the briefing pack issued to those personnel actually taking part.

I recently had the pleasure of meeting and talking with someone who spends several weeks a year engaging in this activity and his patience and application has been amply rewarded in that he has been witness to

● *This is most of the kit you'll need to go special event scanning.*



military activity that you could never pay to watch. He described how he had viewed bombing practice with aircraft using live ordnance and how he could actually see the pressure waves as the bombs exploded. You



● *Everything in a discrete case. AOR AR2700 and Scout combo.*

don't get that at Farnborough!

As you can imagine his information file was impressive including CAA maps with the best locations for viewing activity clearly marked.

The names, designators and nationalities of all naval vessels involved in the particular exercise were listed together with a frequency file like a phone book. The mapping also included the various exercise areas.

Simple But Impressive

His scanning hardware is simple but impressive. The vehicle has two Yupiteru MVT-7100 scanners fitted on the dash. One of them is hooked up to a duplexer purchased from Solid State Electronics which was clearly a well made item of equipment. Two antennas, one cut to military v.h.f. band and the other cut for u.h.f. milair are mounted on the roof of the car and feed one of the 'Yupis'. The remaining MVT-7100 is dedicated to u.h.f. mil frequencies and a suitable antenna is utilised. All

antennas were supplied by SSE. As you would expect binoculars and suitable photographic equipment augment this simple but highly effective set up.

For portable use, one of the scanners is

removed from the vehicle and hooked up to a flexible antenna, spare batteries are carried and the action can then be followed on foot if necessary.

The cost involved in pursuing the hobby at this level can be prohibitive. Just travelling within the UK is an expensive business and accommodation charges will add greatly to this, but the people involved in following military exercises reckon that the money is well spent.

One such intrepid military monitor said to me that he didn't know what his hobby could be described as.

My response, "Its called espionage!"

Hooked

Should you decide to take to the hills on foot in pursuit of those elusive signals, additional equipment will be required and that means more weight to carry. In the past I have hiked for a whole day just to reach a location that I thought would be a great place to pick up signals. I carried a portable mast and a darn great antenna up that hill and nearly wore my legs to stumps in the process. The amount of gear that I had to carry rather tarnished my view of the experience, but I enjoyed a couple of days camping in a remote area even if I didn't get to hear the signals I wanted.

If you consider that sort of expedition, try and remember to let someone know where you are headed and when you should be back. This may save a fair bit of activity on the rescue channels.

I consider this aspect of the radio hobby to be the most exciting and rewarding way of spending time. It involves a considerable amount of planning and expertise and if you give it a try you could well become truly hooked.

SWM/SSE

Win prizes to Scanning Scene Extra May

Win one of five amazing prizes brought to you by *Short Wave Magazine* and the advertisers featured in this edition of *Scanning Scene Extra*. Whether you are a seasoned scanner user or a total newcomer here's a chance to win either the new addition to your arsenal of receivers or your very first radio.

Scanning Scene Extra in conjunction with *Short Wave Magazine* and the generous advertisers who have kindly donated the fabulous prizes on offer, wish you luck and urge you to enter our unbelievable competition.

The prizes

- AOR AR8200 Mk3 hand-held scanner and accessories worth £519
- Icom IC-R10 hand-held scanner worth £300
- Kenwood TH-F7E wide-band receiver and transceiver and accessories worth £333
- Fairhaven RD500VX base scanner worth £899
- Alinco DJ-X2000 scanner worth £499



totalling £2550

2003 bumper competition

Total of £2550 of prizes to be won.

To enter our massive seven prize competition, you need to answer the six questions featuring on the entry form.

Our thanks go to AOR (UK) Ltd., Icom UK Ltd., Fairhaven Ltd., Kenwood Electronics UK Ltd. and Nevada for their generous donation of the prizes for this spectacular prize draw.

Good Luck Everyone!!!

ENTRY FORM

To enter this prize draw, please fill in your details on the entry form, (photocopies can be accepted with the original corner flash attached), answer the seven questions and post your entry to: *SWM - SSE May 2003 Draw*, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.

Name

Address

.....

Tel:

E-mail:

How long have you been reading *SWM*?:Where do you buy *SWM*?:

Do you receive *SWM* every month?:

Q1: Which prize has the widest frequency range?
.....

Q2: How many of the prize radios can be computer controlled?
.....

Q3: Which of the prizes also transmits on two amateur bands?
.....

Q4: Which prize was the first to be reviewed by *SWM*?
.....

Q5: Which prize was the latest to be reviewed by *SWM*?
.....

Q6: What is the magazine's amateur radio callsign?
.....

AR8200 Mk3

DJ-X2000

RD500VX

TH-F7E

IC-R10

Please tick the prize you would most like to win.

If you wish not to be contacted by PW Publishing Ltd. or associated companies please tick here.



PRIZES

AOR AR8200 Mk3

The AR8200 quickly established itself as the 'top notch' hand portable receiver providing unsurpassed features. As technology has advanced, so the AR8200 has evolved through the AR8200 MK2 drawing from the successful award winning AR5000 base receiver and more recently from the AR8600 MK2 transportable receiver, resulting in the AR8200 MK3 with an upper frequency coverage of 3GHz coverage. Along with an extended receive frequency coverage, the illumination has been further enhanced and high capacity (1500mAh) NiMH batteries supplied.

AOR (UK) Ltd.
4E East Mill, Bridgefoot
Belper, Derbyshire, DE56 2UA
Tel: (01773) 880788. www.aoruk.com

Ainco DJ-X2000

This is no doubt a fine receiver for its size. It performs well on all of its bands. The flash tune and frequency count functions are effective and really useful. Memory management is exceptionally comprehensive and you can play with the other functions when there's a thunderstorm raging, but otherwise you may as well leave them alone.

The only real difficulty I experienced was occasionally if I made an error while punching the buttons the screen would display a mass of Japanese characters and then lock up. No controls would then work and the only way to reset the X2000 was to remove the battery pack. On reconnecting the supply, the set became most well behaved again and let me carry on from where I left off.

Nevada
Unit 1, Fitzherbert Spur
Farlington, Portsmouth
Hamshire, PO6 1TT
Tel: 023-9231 3095. E-mail: info@nevada.co.uk

Fairhaven RD500VX Radio Database

The RD500 provides: Video and TV sound outputs. Stereo f.m. with phono outputs. Upper

and lower sideband modes. Pass Band Shift. Synchronous detection. Choice of bandwidths in most modes. Stereo c.w. filters with three bandwidths. Noise Blanker. Clock and timers for recording programs etc. Cassette switch controlled from squelch.

RS232 computer interface. Data Slicer for decoding. FM output for POCSAC etc. Tuning meter (centre zero) Signal strength meter. Notch and peak filter (Variable). Peak hold a.g.c., user controllable. 26 VFOs for temporary frequencies. 55 thousand memories, (54 thousand more than the competition). 234 groups. 20 Text characters per memory. Clear 'plain English' menu's on-screen. Text searching with review of matches - find any station by name. 99-band set-ups with start and end frequencies. Skip list. Easy memory store and retrieve. Edit entries, move groups, tag/untag, move/delete entries, without PC. Priority channel. PC Keyboard socket. 8.33, 9, 12.5kHz steps, etc., or user definable. 5Hz tuning steps for really smooth tuning. Hold, pause, Stop or continuous scanning. Auto tuning (a.f.c.) Auto memory write. Definable pause and hold times. Sound recording and playback with start and end point editor. Whip antenna i/p for h.f.. Mains Power supply. Separate antenna inputs for different band ranges. Antenna changeover output. Stereo headphones and loudspeaker output. Great short wave reception. PC remote control software. Database software, for backing up and editing. File converter software, for importing files from the Internet, etc. Ability to import files from paper documents. Remote control handset. Large example database pre-loaded. 20kHz to 1750MHz tuning range, superb sensitivity.

Fairhaven Electronics Ltd.
Tel: (01332) 670707
www.fair-radio.demon.co.uk

Icom IC-R10

The 'Bandscope' function allows you to 'see' activity up to ± 100 kHz either side of the frequency the receiver is tuned to. This equates to approximately five channels either side of the centre frequency, however the i.f. filter bandwidth is so great that half the screen is filled when a strong local signal is being received. The

Bandscope circuit is also used to provide a fast search facility which Icom call 'Signal Navigation'. The idea of this is that during a search when an active signal is found and the receiver has stopped on a channel, the Bandscope circuit checks 100kHz higher or lower in frequency (depending on the direction of the search) for other signals. When the scan resumes, the receiver can jump directly to the next active channel without wasting time trundling through the other inactive frequencies. In theory this is a great idea, but the limited search range means that unless you are monitoring a very busy chunk of the spectrum you are not likely to notice any great improvement in search speed.

Icom UK Ltd.
Sea Street
Herne Bay, Kent
CT6 8LD
Tel: (01227) 741741
www.icomuk.co.uk

Kenwood TH-F7E

As the specification says, the radio tunes from 0-1300MHz on receive on the B band. The F7 being a true dual-band rig has two bands available for display and use. Both at the same time if you require. The A band will only tune in UK amateur v.h.f. and u.h.f. bands and allows transmit in these areas. The B band tunes right across the range, but again only allowing transmit in the 2m and 70cm segments. This means that if you have an amateur licence you can monitor the calling channel on v.h.f. and perhaps your local v.h.f. repeater at the same time. Or you can monitor one frequency at v.h.f. and one at u.h.f. Or if you prefer to scan around or perform a search you can do this on the B band while monitoring your local repeater on the A side. Or listen to Radio 4 while waiting for a call on two or seventy. Pretty impressive, eh?

Kenwood Electronics UK Ltd.
Kenwood House
Dwight Road
Watford
Hertfordshire
WD1 8EB
Tel: (01923) 816444
www.kenwood-electronics.co.uk

As I write this I'm listening to a police dispatcher sending officers to an office building where some vagrants have set up home in a stairwell. They appear to have moved in with their possessions that seem to consist mainly of

So much so that last month I actually signed up to a payment deal with an Internet service provider.

The main reason for this mad moment was the growing realisation that as more and more scanning resources became available 'on line' - you see I'm really getting into this - the more

time, but if you start monitoring something from a remote scanner you don't want to lose it half way through because you are out of your hours.

Gio, however, were way ahead of most other providers.

I eventually settled on Freeserve anytime. I had a good look through their documentation and couldn't find anything that restricted my

net scanning

bottles of booze in brown paper bags and a mad mongrel collie dog. The officers will be on scene in a minute or two and I'll hear them arrive and I'll monitor the resolution of the job.

At this stage here in the UK I expect to hear wood splintering as the police mash in my front door with one of those big door opener 'thingies'. Hold on fellers... I'm listening to the cops in Las Vegas and they don't mind a bit - honestly. In fact you can hear and see events in other parts of the world that are shrouded in massive secrecy here at home.

You guessed. It's the Internet.

I don't generally natter on about the Internet because, well, not everyone has an interest in computing or even the cash to hook up to the Internet for any appreciable length of time, but if you do...!

On-Line Resources

Anyone who knows me will confirm that my knowledge of computing is akin to my experience of motor mechanics. Having said that, you don't need to know how to fix the car to drive it and over the last couple of years I have become much more involved with the Internet.

If your wish is to monitor fire, police and emergency medical services from the US and Canada, then there are more to choose from than you can wave a stick at.

time I would spend peering into the computer screen and this was costing me about 2p per minute with British Telecon (note the spelling error here).

Before I committed myself to a deal with a service provider I considered a few factors.

Firstly, what time of the day and for how long did I want to be on-line? Then I thought about the cost and finally I considered payment methods.

I found one of the cheapest service providers to be Gio. They offer several packages that work out ahead of many other providers in terms of price and accessibility. There are two disadvantages that I found with their service. The first was that they restrict your usage time to either 80 or 160 hours per month. This may seem like a lot of on-line

on-line time at all. The cost was a pound a month less than the 160 hour deal offered by Gio.

I already had a Freeserve 'pay as you go' account and so I didn't have to alter my E-mail addresses. This is one way that the service providers tie you to their company, changing your E-mail address is a real chore.

The third reason was that they would accept payment by direct debit. Many companies flogging products or services are just dying to get into your credit card account. Once they have the authority to take monthly payments stopping them doing so is the sort of endeavour that would drive some nations to exercise the nuclear option.

It must be pointed out, that to date, I have never found an Internet service provider in

the UK that doesn't disconnect you every two hours. They all do it. Gio inform you of this when you sign up, Freeserve do but in **very** small print in the 'Terms' section.

(Sorry to disagree Dave, but Demon Internet don't break connection. I have spent literally months connected at a time with no break whatsoever - Ed.)

Having sorted out the connection, the world, quite literally, is your oyster.

If your wish is to monitor fire, police and emergency medical services from the US and Canada, then there are more to choose from than you can wave a stick at. To monitor any audio for web TV broadcasts you may have to download and install some extra software, but don't worry, you are helped through the process by on screen prompts. In any case, the two main software packages called *Real Player* and *Winamp*, have free versions and when you log into a site requiring either programs they will load automatically if you have them installed, and will give you the option to download them if you don't already possess them.

Scanning Lists

The first thing that you may consider doing with your Internet connection is signing up to one of the scanning lists operated by Yahoo Groups and other similar organisations.

A look at www.groups.yahoo.com will take you to the main Yahoo Groups site, then you can browse the groups and sort out which interest you.

I have joined the 'Scanpromauk' group and

they can sell your E-mail address - to absolutely anyone!! Thanks to them I am now receiving E-mails from about three dubious computers masquerading as women who send me mucky pictures every day. In addition to this I get around eight E-mails a day from South Korea and I still don't have a clue what they're after as it's all in squiggly script.

Apart from this, the system is seamless.

Search Hard & Long

Using an efficient search engine is important, I don't want to be burdened with seeing pictures of some pop star every time I make a search so I made www.google.co.uk my home page. It offers swift efficient Internet searches without stupid adverts and time wasting ephemera with which other search engines annoy their customers.

Straightforward web searching by simply entering the name of a location or town of interest and the words 'scanning' or 'frequency' will deliver details of scanning



from many parts of the Americas, Australia and some countries in Europe if you happen to speak Dutch or German. For the most part though it is English speaking North America that you will be able to hear with many

I have joined the 'Scanpromauk' group and some of its associates, 'Scottish scanning', 'Metradio', 'VHF skip' plus a few others including, of course, the 'SWM Readers list'!

some of its associates, 'Scottish scanning', 'Metradio', 'VHF skip' plus a few others including, of course, the 'SWM Readers list'! These groups will E-mail you should anyone post mail to the group. Many frequencies are exchanged in this way and files can be posted as well for any member to download. This is a great way to amass frequency knowledge.

Yahoo groups have one big disadvantage,

frequencies for almost anywhere in the world right to your screen. Even towns in the UK will be listed. Many of these sites will refer to the 'Scanproma' files already mentioned.

On-line Listening

Now to the on-line monitoring. As I mentioned before, you can hear the action

scanners on-line including some rail road operators.

Don't expect too much from the system if anything devastating happens in the area. When New York's World Trade Centre was attacked, resulting in the murder of 2,823 people (including 67 Britons), the scanners covering the area all went off-line.

Half the fun of scanning is finding new

frequencies and radio users and the same goes for the on-line version of the hobby. You will constantly find new scanners being streamed onto the 'net so I'm not going to spoil it for you.

But there's more. If you are a short wave listener or have an interest in amateur operation at v.h.f. or u.h.f. you can pop into a site called EQSO at www.eqso.net and monitor amateur radio operation from around the world.

This site is linked to several repeaters and amateur radio links. As an s.w.l., you can plug in a microphone and have voice contacts with other listeners, but you may not 'transmit' in any amateur nodes or 'rooms'. Having said this, many amateur operators that are on EQSO appreciate the experience that s.w.l.'s have and enjoy contacts with listeners in nodes that allow two-way non-amateur conversations.



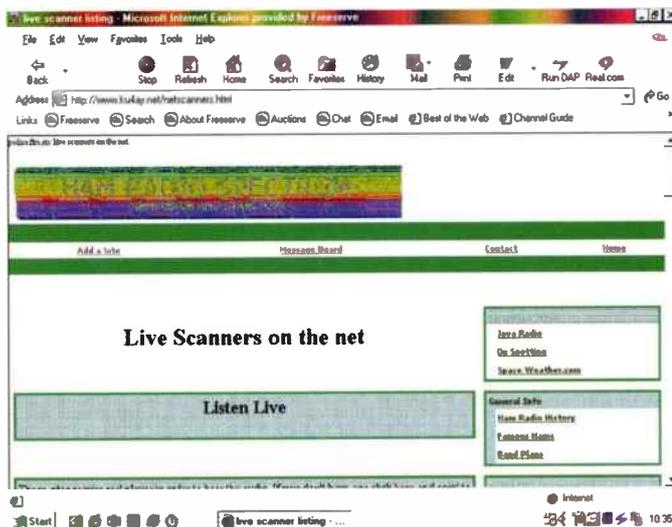
EchoLink

For amateur operators there is the fast expanding EchoLink at www.synergenics.com/el. This program allows amateur operators to have voice contacts with each other over the 'net' and also to connect to Internet linked radios throughout the world. Many amateur repeaters world-wide are also hooked up to EchoLink and I often make

contacts with friends in different parts of the world via their local repeaters.

Two EchoLink conference servers were re-transmitting the radio communications from ham operators in Texas who were engaged in the search for fragments of the *Columbia* spacecraft following its disintegration over that state. Another server taking the traffic was linked to EQSO so that s.w.l.s could also monitor the radio talk.

There are large numbers of audio files also stored in Internet pages, some are recordings of communications associated with recent events while others set a new slant on more historical occasions such as anti-terrorist operations in the former Rhodesia.



For these see the files listed as 'sounds of scanning' in the www.xcorder.com site.

There's Lots More

Many files and scanning utilities are available on the world-wide web. I have spent many happy hours searching for obscure programs and radio modifications that may be of use to scanning enthusiasts. It's where I located the audio inversion program that has been mentioned in a recent edition of *SWM* - available from my magazine page at www.pwpublishing.ltd.uk/swm/scanning/ - and where, more recently, I located a recording of a telephone call between two

employees of an American media company discussing sources of information regarding the loss of the space shuttle *Columbia*. It gave me a most interesting insight into the disaster. Many recording programs are also available as freeware to enable audio to be saved to your computer's hard drive, again try the *xcorder* site for the one that I consider the best.

More information is also available on NASA TV www.nasa.gov an on-line channel that also runs live video and audio from spacecraft and from the Mission Control Centre in Houston.

For scanner specifications and manufacturers details, the Internet is the hottest source of information and no matter how ancient your receiver is, you will almost always find details of the set on the web. Radio handbooks and control software are also available on-line, mostly at no cost though please bear in mind who owns the copyright of some material. Pirating is theft after all.

Without Drama

Well, I know you'll be pleased to know that the cops cleared out the vagrants without any injury or further drama and I'm now listening to the local radio station from my old home in British Columbia.

<http://ekradio.cintek.com/outlaw.ram>
Even the adverts bring back memories. Arby's in Cranbrook are doing a Sourdough Melt for \$3 Canadian. A bargain! **SWM/SSE**

...bring your scanning directories to life!

With 2 Megabytes of Memory

FAIRHAVEN RD500VX
RADIO DATABASE



The RD500VX is a new kind of wideband receiver with sleek, robust styling, ...only 8 inches wide!



Its massive memory can store information equivalent to several scanning directory books. Any word such as "Fire", "Air", "Voice Of America", or even your local town can be searched for. It can hold 54,682 entries, each with 20 characters of text, mode, and frequency. A 45 key TV style remote is provided for text entry and control, and a PC keyboard can be plugged into the receiver.

...No more thumbing through scanning directories, and no PC needed!

Price: £899

FAIRHAVEN
RADIO

Includes software, PSU, remote and 2 year guarantee.

The RD500VX gives wideband coverage with auto memory, skip list, priority channel, pause/hold, AFC, world time clock, and S.meter, and its HF performance is complemented with pass band shift, notch and peak filter, noise blanker, and smooth 5Hz tuning steps.

Modes include USB/LSB, AM, sync AM, stereo CW, NBFM/WBFM and stereo FM, with TV sound and video output as standard.

We include Windows software to make it easy to gather information from document scanners, the Internet and other sources. The RD500VX can be linked to your PC to backup or download information, and a database is loaded into the receiver before shipping.

It also has a built in digital sound recorder and editor so a news flash or rare DX can be recorded. Up to 4 minutes of sound can be permanently stored!

Specifications:

Sensitivity (10dB S/N) HF SSB 0.2uV. IP3 +10dBm.
VHF/UHF NBFM 0.3uV. Scan speed 50/second.
Frequency range 0 - 1750MHz
Collins filters available.

Phone +44(0)1332 670707 Fax +44(0)87 00 55 88 99
<http://www.fair-radio.demon.co.uk>
47 Dale Road, Spondon, Derby DE21 7DG

FAIRHAVEN ELECTRONICS LTD

Tel: +44 (0) 1332 670707 Fax: +44 (0) 87 00 55 88 99

www.fair-radio.demon.co.uk

Fairhaven RD500VX Radio Database

RD500 General Facilities

1. Video and TV sound outputs.
2. Stereo FM with phono outputs.
3. USB and LSB modes
4. Pass Band Shifting
5. Synchronous modes.
6. Choice of bandwidths in most modes.
7. Stereo CW filters with 3 bandwidths.
8. Noise Blanker.
9. Clock and timers for recording programs etc.
10. Cassette switch controlled from squelch.
11. RS232 computer interface.
12. Data Slicer for decoding.
13. FM output for pocsac etc.
14. Tuning meter (centre zero)
15. Signal strength meter.
16. Notch and peak filter (Variable).
17. Peak hold AGC, user controllable.
18. 26 VFO's for temporary frequencies.
19. 55 thousand memories, (54 thousand more than the competition).
20. 234 groups.
21. 20 Text characters per memory.
22. Clear 'plain English' menu's on-screen.
23. Text searching with review of matches - find any station by name.
24. 99 Band set-ups with start and end frequencies.
25. Skip list.
26. Easy memory store and retrieve.
27. Edit entries, move groups, tag/untag, move/delete entries, without PC.
28. Priority channel.
29. PC Keyboard socket.
30. 8.33kHz, 9kHz, 12.5kHz steps etc., or user definable.
31. 5Hz minimum steps. (Not 5 kHz!), really smooth tuning.
32. Hold, pause, Stop or continuous scanning.
33. Auto tuning (AFC)
34. Auto memory write.
35. Definable pause and hold times.
36. Sound recording and playback with start and end point editor.
37. Whip antenna i/p for HF.
38. Mains Power supply.
39. Separate antenna inputs for different band ranges.
40. Antenna changeover output.
41. Stereo headphones and loudspeaker output.
42. Great HF (Shortwave) reception.
43. PC remote control software.
44. Database software, for backing up and editing.
45. File converter software, for importing files from the Internet etc.
46. Ability to import files from paper documents.
47. Remote control handset.
48. Large example database pre-loaded.
49. 20kHz to 1750MHz tuning range, superb sensitivity.
50. 2 year guarantee.

The RD500 is still the only wideband scanner that can store entire scanning directories in it's massive memory, and its HF performance, features and sensitivity are excellent. No other radio comes close to its 55 thousand internal memories, and it has a great suite of Fairhaven PC software on CD

Support British electronics and get great technology for your £, this is one great piece of radio equipment that is made in the UK !

What the Press Say...

"Sometimes, when you pick up a piece of equipment for the first time, you know your handling quality kit. It's the nearest thing to perfection in a receiver that I've ever had the privilege of operating. In use, the Fairhaven is an absolute joy to operate. Putting it simply, it just plain works: it does what you'd expect it to do, and it does it very well. The Fairhaven RD500VX Radio Database is a truly great radio. It really is an insult to its massive capabilities to just call it a scanner: it makes a perfect main base station all-band, all-mode receiver, yet is small enough to fit under a dashboard for mobile use." - Giles Read, *Radio Active Magazine*.

"If you're after a 'do-everything' receiver having the advantage of a massive built-in frequency and user database, then take a very serious look at the RD500, you'll be pleasantly surprised. It's a receiver I'd be happy to use as my own." - Chris Lorek, *Radio Today*.

"I was impressed with the RD500 at our first meeting, and I'm even more impressed now. This is really innovative design and deserves success. I know of no other receiver which combines all the features found in the RD500." - John Wilson, *Short Wave Magazine*.

"A singular vision of how radios of the future might be conceived" Star ratings for sensitivity, dynamic range, RF intermodulation, IF filters, IF performance and audio quality:- 23 stars, - *WRTH Handbook*.

THE OTHER r MOBILE madness?

Kevin Nice, takes a look at a reader's rather impressive mobile radio set-up.



For this special edition of the Other Man's Shack, I didn't have to go and visit this *SWM* readers' radio set-up, he brought it to me. As you'll have noticed by now, our anonymous readers' shack is fitted into his daily transport and represents perhaps the ultimate in amateur mobile monitoring capability.

Cast your eyes over these pictures and you can see the extent to which our reader indulges in their mobile monitoring pastime.



now. Take a look at the red box mounted on the roof of the mobile monitoring station and you'll find an example of the Doppler array nestling amongst the other whips. There are, as you can see, plenty of those! I certainly don't envy the next owner if they are not also radio enthusiasts. I count a total of nine whips and therefore, nine holes in the body work.

Busy Interior

Inside the car is no less busy. It seems there's little unused space left to fit any more radio equipment, though the owner probably disagrees. On reflection, it wouldn't surprise me if he's planning the next radio(s) to be installed.

Currently residing in the mobile radio listening post are radios from AOR AR8000 and AR8200, Icom IC-2800, Kenwood TM-U700E, TM-G707, Uniden UBC-780XLT Trunk-tracker, President Lincoln CB, all expertly installed to operate in a reliable and flexible configuration. If you examine the picture in this

From a signal collection point of view, there is certainly no shortage of antennas fixed to this porcupine like vehicle. In addition to the many visible whips there are several 'stealth' antennas fixed discretely to the car's windows.

Dave Roberts discusses d.f. systems elsewhere in this edition of *SSE*, so you'll know all about what they can do by



seeing is believing!

man's SHOCK



feature, you'll see the various features such as power breakout boxes, which allow rapid temporary installation of ancillary gear. One thing that particularly strikes me is number of external speakers mounted around the car. From my own experiences, I can say that this easily allows the rapid determination of just which radio audio is coming from - though I imagine it takes a while to learn which is which initially.

Ultimate?

So, is this the ultimate in mobile monitoring? Perhaps you know different - if so please let me know. There is one thing for sure, this vehicle has plenty of In-Car Entertainment as it's owner is only too pleased to tell me. **SWM/SSE**



WHICH scanner?

Model	Coverage				Modes						Memories						8.33 Steps
	Min. Frequency	Max. Frequency	Continuous Coverage	Hand/Base/Comp	a.m.	w.b.f.m.	n.b.f.m.	s.s.b.	c.w.	Banks	Channels	Lock-out	Total	Scan Speed (ch/s)	Search Bands	Search Speed (steps/s)	
Alinco																	
DJ-X2	0.522	1000	Y	H	✓	✓	✓			10			700	10			
DJ-X3	0.5	1300	Y	H	✓	✓	✓			10			700	10		20	
DJ-X10E	0.1	2000	Y	H	✓	✓	✓	✓	✓	10	40		1200	5		25	
DJ-X2000	0.1	2150	Y	H	✓	✓	✓	✓	✓	50	40		2000	5		30	
AOR																	
AR5000+3	0.01	2600	Y	B	✓	✓	✓	✓	✓	10	100		1000	45	20	45	
AR8200	0.53	2040	Y	H	✓	✓	✓	✓	✓	20	50		1000	37	20	37	
AR8600	0.5	2039	Y	B	✓	✓	✓	✓	✓	20	50		1000	37	40	37	
Bearcat																	
UBC60XLT-2	66	512	N	H	✓		✓						80				
UBC120XLT	66	512	N	H	✓	✓	✓						100	100		300	
UBC220XLT	66	956	N	H	✓	✓	✓			10	20	10	200	100		300	
UBC280XLT	29	956	N	H	✓	✓	✓	✓	✓	10			200	100	10	300	
UBC3000XLT	25	1300	N	H	✓	✓	✓	✓	✓	20	20		400	100		300	
UBC278CLT	29	956	N	B	✓	✓	✓	✓	✓	5	20		100	25		25	
UBC780XLT	25	1300	N	B	✓	✓	✓	✓	✓	10	50		500	100		150	
UBC9000XLT	23	1300	N	B	✓	✓	✓	✓	✓	20			500	100		100	
Fairhaven																	
RD-500VX	0.02	1750	N	B	✓	✓	✓	✓	✓	234			54682	50	99	50	
Icom																	
IC-R3	0.495	2450	Y	H	✓	✓	✓			8	50		400	15	25	30	
IC-R5	0.15	1310	Y	H	✓	✓	✓			8	50		1250	15	50	30	
IC-R10E	0.5	1300	Y	H	✓	✓	✓	✓	✓	18			1000	6		17	
IC-R8500	0.1	2000	Y	B	✓	✓	✓	✓	✓	20	50	50	1000	15	20	15	
IC-PCR100	0.1	1300	Y	C	✓	✓	✓	✓	✓				Computer dependant				
IC-PCR1000	0.1	1300	Y	C	✓	✓	✓	✓	✓				Computer dependant				
Kenwood																	
TH-F7E	0.1	1300	Y	H*	✓	✓	✓	✓	✓	8			410		10		
Maycom																	
FR100	66	470	N	H	✓	✓	✓			5	20		100				
AR108	108	180	Y	H	✓		✓						198	10		25	
Yaesu																	
VR-120D	0.1	1300		H	✓	✓	✓			10		64	640	12	8	20	
VR-500	0.1	1300		H	✓	✓	✓	✓	✓	10	100		1000	12	10	20	
VR-5000	0.1	2599		B	✓	✓	✓	✓	✓	100	20	100	2000	15		15	
Yupiteru																	
MVT-3300 EU	66	1000	N	H	✓		✓			10	20		200	40	10	50	
MVT-7100 EU	0.53	1650	Y	H	✓	✓	✓	✓	✓	10	100	500	1000	30	10	30	
MVT-7300	0.521	1320			✓	✓	✓	✓	✓	10	100	500	1000	30	10	30	
MVT-9000 EU	0.53	2000	Y	H	✓	✓	✓	✓	✓	20	50	500	1000	30	20	30	

scanner quick reference chart

Features													Review			Model
Rechargeable	Charger	Rotary Tuning	Case	Battery Saver	Computer Control	Data Cloning	Trunking	Bandscope	AFC	Noise Blanker	DSP	AFC	Review	Current Model	Guide Price (£)	
✓✓	✓✓	✓	○	✓✓✓	✓✓	✓✓		✓✓					Aug-00 SSE 2002 Sep-96 Jul-01	Y Y Y Y	170 130 300 499	Alinco DJ-X2 DJ-X3 DJ-X10E DJ-X2000
○	✓	✓✓		✓	✓✓✓	✓		✓	✓✓	✓✓			Jun-96 Jun-98 Nov-00	Y Y Y	1500 399 600	AOR AR5000+3 AR8200-2 AR8600
✓✓✓✓	✓✓✓✓	✓✓✓												Y Y Y Y Y Y Y	80 130 150 180 200 159 329 325	Bearcat UBC60XLT-2 UBC120XLT UBC220XLT UBC280XLT UBC3000XLT UBC278CLT UBC780XLT UBC9000XLT
		✓			✓		✓						Aug-98	Y	899	Fairhaven RD-500VX
✓✓	✓✓	✓✓✓		✓✓	✓✓✓	✓		✓✓✓		✓✓		✓	Jun-01 Dec-02 May-97 Sep-96 May-99 Oct-97	Y Y Y Y Y Y	449 159 259 1549 185 385	Icom IC-R3 IC-R5 IC-R10E IC-R8500 IC-PCR100 IC-PCR1000
✓	✓	✓		✓									SSE 2002	Y	289	Kenwood TH-F7E
		✓											Sep-99	Y Y	100 70	Maycom FR100 AR108
○		✓✓✓		✓✓	✓✓	✓✓		✓✓		✓	○		SSE 2002 Jul-01	Y Y	159 199 599	Yaesu VR-120D VR-500 VR-5000
✓✓✓	✓✓✓	✓✓✓✓	○	✓	✓			✓					Feb-98 Apr-93 Oct-00 Feb-97	Y Y Y Y	180 269 259 369	Yupiteru MVT-3300 EU MVT-7100 EU MVT-7300 MVT-9000 EU

WHICH scanner?

Your scanner selection guide

If you're thinking of buying a scanner, new or used, then it is important that you can make your purchasing decision based on facts. To help you spend wisely we've compiled the selection guide on the two pages overleaf. The radios that feature in the guide are those that are currently available in the UK. Hand-held, base station and solely computer controlled receivers are featured. Vital information such as frequency range covered, modes available, numbers of channels, scanning speed, and price are some of the vital information presented. Additionally, a reference to the review that has been published in an earlier issue of *SWM* is given to allow further in-depth information to be obtained on specific models of interest.

If you wish to obtain a copy of a full review, these are available from the *SWM* Book Store - contact information is given on this page.

Key to Which Scanner Selection Guide

- ✓ Included
- Optional
- * Transceiver

Further Reading...

There are numerous books covering all aspects of scanning which can be obtained from the *SWM* Book Store.

A selection follows, a full listing can be found on page 58 of this month's *SWM* so can an order form. The *SWM* Book Store can be contacted on (01202) 659930.

Abbreviations used in SSE

a.c.	alternating current
a.f.	audio frequency
a.f.c.	automatic frequency control
a.g.c.	automatic gain control
a.m.	amplitude modulation
B	Bell
c.w.	continuous wave (Morse)
d.c.	direct current
d.s.p.	digital signal processing
dB	decibel (logarithmic ratio)
dBd	decibel referenced to a dipole
dB _i	decibel referenced to an imaginary isotropic radiator (one dimensional antenna)
dBm	decibel referenced to 1mW into a 50Ω load (standard units for radio measurement)
dBW	decibel referenced to 1W
f.f.t.	fast fourier transform (mathematical function used by d.s.p.)
f.s.k.	frequency shift keying
h.f.	high frequency
Hz	Hertz (cycles per second) unit of frequency
i.f.	intermediate frequency (in a superhet receiver)
IM	intermodulation
IP	intercept point
K	Binary multiplier x1024
k	Decimal multiplier x1000
kHz	kilohertz
λ	lambda symbol for wavelength
l.c.d.	liquid crystal display
l.s.b.	lower sideband
l.w.	long wave
M	mega x1,000,000
m	milli /1000
m.w.	medium wave
MHz	megahertz
MW	megawatt (1,000,000 watts)
mW	milliwatt (one thousandth of a watt)
MΩ	one million ohms
n.b	noise blanker
n.b.f.m.	narrow band f.m
n.f.m.	narrow band f.m (alternative)
p.s.k.	phase shift keying
r.f.	radio frequency
RX	receiver
s.s.b.	single sideband
s.w.	short wave
SINAD	ratio of signal plus noise to noise (used for performance measurement)
SINPO	scheme for recording reception quality
SNR	signal to noise ratio
t.c.x.o.	temperature controlled crystal oscillator
TX	transmitter
V	Volt unit of electrical potential difference
v.c.o.	voltage controlled oscillator
v.h.f.	very high frequency
W	Watt, Unit of power
w.b.f.m.	wide band f.m.
w.f.m.	wide band f.m. (alternative)
Ω	ohm (unit of electrical resistance)

LISTENING

Airband

Airwaves 2003
£9.95

Airband Radio Guide (abc)
5th Edition
£8.99

Airband Radio Handbook (Haynes)
£12.99

Air Traffic Control (abc) 8th Edition
£9.99

Callsign 2003
£9.95

Civil Aircraft Markings 2003 (abc)
£7.99

Flight Routings 2002 Williams
£8.95

Military Aircraft Markings 2003 (abc)
£7.99

Military Air Scan 2002
£15.99

Frequency Guides

Proma Scanning Scene CD
£4.75

UK Scanning Directory 8th Edition
£19.75

General Scanning

Scanners 4 Scanning Into The Future
Bill Robertson
£9.95

Antennas

Antenna Toolkit (inc. CD-ROM)
Joseph J. Carr
£25.00

More Out Of Thin Air
£6.95

Receiving Antenna Handbook Joe Carr
£17.50

VHF UHF Antennas I.D. Poole
£13.99

VR-500

ALL MODE WIDEBAND RECEIVER

The VR-500's tough polycarbonate semi waterproof case is designed to withstand the rigours of heavy treatment on the move. It's ideal for Airshows and other outdoor activities

- 100kHz-1299.99945MHz
- FM, Wide FM, USB, LSB, CW, AM
- Direct keypad frequency entry
- Large high output speaker
- Ideal for outdoor use
- Real-time 60 channel band scope
- Full illumination for display and keypad

£199.95 P&P £8
 3 CHEQUES OF **£69.31**
 PAY BY CHEQUESREAD INTEREST FREE!



Professional grade monitoring

for the airband enthusiast

pay by chequesread INTEREST FREE see our main advert for details

VR-120

To survive the rigours of outdoor use, the VR-120 is housed in a durable, high impact polycarbonate semi waterproof case. Ideal for use outdoors, at Airshows, or on the move.



- 0.1 - 1299.995MHz
- AM, FM, Wide FM
- Auto select channel steps
- 12 preset memories
- 89 channel Memory Bank
- One touch recall for 4 high priority stations
- 640 channel memory system
- Slot machine game!
- Front panel key lock
- Key beeper On/Off selection
- Battery saving time-out timer
- Ultra long battery life
- * Charge Socket
- * Mains Adaptor

£159.00 P&P £8 | 3 CHEQUES OF **£55.66**
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VR-5000

The Ultimate wideband Communications receiver allows you to monitor just about everything from Longwave to Microwave. It covers all Airband allocations in the Shortwave, VHF and UHF frequency ranges

£699 **£599** P&P £10 | 3 CHEQUES OF **£203**
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- 100kHz - 2599.99998MHz
- LSB, USB, CW, AM-Narrow, Wide FM
- 'Auto' tuning steps
- Dual receive
- Preset Shortwave Broadcast Station Memory Bank
- World clock with UTC/Local settings
- Program/Alarm/Sleep timer

- Real-time spectrum scope for visual activity viewing
- Radio-control band search
- 2000 channel memory
- Scanning: VFO, memory, PMS, Smart Search, Main-Sub two channel screening, Priority operation
- Digital signal processing for leading edge selectivity
- RF tune
- 20dB attenuator
- IF noise blanker
- Digital voice recorder
- Field strength meter
- Audio tone control
- All-mode squelch control
- Personal computer interface port
- Audio wave meter
- Optional voice synthesiser

NEVADA

available from our Airband dealers throughout the UK - or direct
 RETAIL ENQUIRIES: 023 9231 3090 DEALER ENQUIRIES: 023 9231 3095

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- 3 Interface screens to choose from: Display screen showing all you need, as on a real receiver; Component screen for tuning and mode choice etc.; Radio screen shows presets for stations and frequencies etc.
- Easy external connection to your PC or laptop.
- Real-time bandscope function allows easy location of the busiest frequencies.
- All-mode Rx - 100kHz-1300MHz.
- Optional UT-106 DSP Digital Filter Unit for Automatic Notch Filtering and Improved Noise Reduction.



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