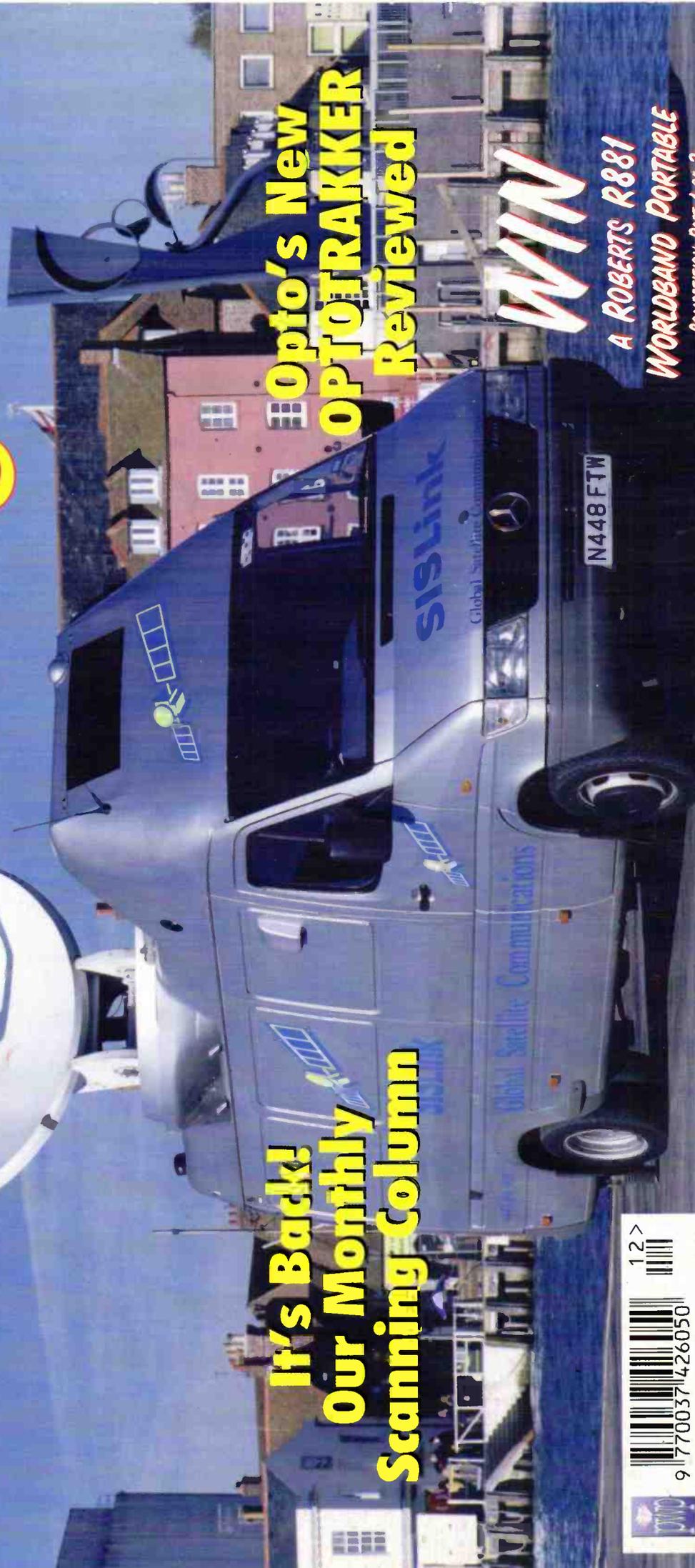


# short wave magazine

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MAGAZINE

DECEMBER 1998 £2.75



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OPTOTRAKker  
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*COMPETITION PART 1 OF 2*



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# short wave magazine

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Interception of Communications Act 1985. Some of  
the products offered for sale in advertisements in  
this magazine may have been obtained from abroad  
or from unauthorised sources. *Short Wave  
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to enquire whether the products are suitable for use  
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### 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. The printed circuit boards for SWM projects are available from the SWM PCB Service, **Badger Boards, 12 Hazelhurst Road, Castle Bromwich, Birmingham B36 0BH, Tel: 0121-681 4168**. A small catalogue containing components, projects and p.c.b.s is available, free, to anyone sending **Roy or Sue Martin** an s.s.a.e.

### 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 £2.85 each and photocopies are £2 per article.

Binders are also available (each binder takes one volume) for £6.50 plus £1 P&P for one binder, £2 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.

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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.

## ed's comments

**F**irst off this month I'd like to introduce a new member of the SWM Editorial team, Editorial Assistant Alison Frith. Fresh from finishing her English BA, Alison is currently busy 'learning the ropes' here at the Broadstone Editorial Offices and she'll very soon be up to speed. We're pleased to have her working on your favourite radio magazine - I'm sure you'll all join me in saying "welcome Alison".



## Scanning

I know that many of you have dearly missed a regular scanning column. Well, as I quickly noted last month, Scanning is back! This month we have a double bill from our new columnist - Faris Raouf. Faris is a very keen scanning enthusiast and experienced magazine journalist. An area of the hobby he is particularly enthusiastic about is

Trunked radio. So then, it is only fitting

that the subject of his first SWM review is the new Optoelectronics OPTOTRACKER trunking decoder. Take a look page 51 and see what Faris has to say about the Opto' unit. I'm sure you need no encouragement to check out page 77 for the return of the 'Scanning' column. I for one look forward to what Faris is set to reveal in forthcoming months...

Oh and before I forget, Icom's new bargain basement hand-held scanner the IC-R2 gets the Alan Gardener treatment, in a DXTV themed January issue of SWM.

## Scheveningen Radio

When I first started to listen to cross-town and further afield 'rag chewing' on 'Top Band', a regular station heard was Scheveningen Radio, Callsign PCH, the famous Dutch coastal station. Sadly, almost three decades later Scheveningen Radio, like our own Portishead Radio, is set to close down.

Recently I received the following message, "For 94 years Scheveningen Radio has operated the Dutch radio service for maritime radio stations all over the world. With its roots in the earliest days of wireless communication it is one of the longest established maritime radio services in the world. Sadly, as communications technology has moved on over the last century, so have the needs of PCH's largest group of users. So from January 1st 1999 the station is closing down permanently".

To mark the event especially for radio amateurs the world over, Scheveningen radio/PCH will be holding a radio amateur farewell day on its 94th anniversary.

From 0800UTC on December 19 1998 until 0800UTC 20th December 1998, PCH are inviting radio amateurs to contact the station on several bands. All the bands will be monitored by Scheveningen Radio operators throughout the day.

The farewell day has been specially approved by the Dutch Radiocommunications agency. Radio amateurs outside The Netherlands need to check the conditions under which their licence has been granted. In some countries this cross band operation could be prohibited.

This will be a sad event indeed, also an interesting 24 hours of activity. I'll be listening, will you?

### Where it's happening

Simplex 'phone			
Band	MHz	Mode	Callsign
2m	144.315	u.s.b.	PA6PCH
80m	3.687	l.s.b.	PA6PCH
Duplex CW			
PCH TX MHz	PCH RX MHz	Callsign	
4.250	3.525 ±QRM	PCH20	
8.622	7.025 ±QRM	PCH41	
12.7995	14.050 ±QRM	PCH51	
17.1989	18.085 ±QRM	PCH61	
There will be four different CQ calls in use as markers on channels without traffic, these are:			
a) CQ for PCH41/51/61 farewell radio amateur call 3.525 listen on 4.250MHz.			
b) CQ for PCH20/51/61...call 7.025 listen on 8.622MHz			
c) CQ for PCH20/41/61...call 14.050 listen on 12.7995MHz			
d) CQ for PCH20/41/51...call 18.085 listen on 17.1989MHz			
Time 1500UTC 19/12/1998 until 0700UTC 20/12/1998.			

## Competition

If you're new to the short wave broadcast aspect of this hobby of ours, a cost effective way to 'dip your toe in the water' is to invest in a low cost synthesised portable. The Sangean ATS803 used to be the benchmark beginner's set. These days you can only get hold of them second-hand. The new Roberts R881 is, to my mind, a pretty good replacement for the '803 - though it doesn't have an s.s.b. mode - but that's not a problem for broadcast is it? (now for the deluge of hard-core listeners who use nothing but product detectors for a.m. reception!).

This month we feature the first of a two part competition with an R881 as first prize, see page 59 for the details. So, some lucky reader can save having to buy their first receiver - good luck and thanks to Gerry Thorne at Roberts.

## Reader Survey

Speaking of competitions, we have had the preliminary result of our reader survey, the winner of the draw will be announced in next month's SWM. We have a very good response rate - many thanks to all of you that took the time to respond. One overwhelming figure that comes to light is that 70% of you buy every issue - I'm stunned! This is indeed a great statistic and I thank you all for your loyalty to the magazine.

## CDROM

Another fact that was revealed from the survey was that some 60% of you own computers. This coupled with a letter I recently received makes me think very seriously about compiling a cover mount CD with both data and for the 40% who don't have computers, sound samples. Go on, tell me what you think.  
73 es gud DX

*Kevin Nice*

If you are one of our readers who was wondering what had happened to SWM services panel, well we simply forgot to include it for a few months due to our last redesign. Now for your reference, here it is on the left.

**Dear Sir**

In the September '98 issue I really enjoyed JW's article on the RA1792. Recently I have had the option to purchase the RA6217E here in Canada for \$350 including the panoramic display unit attached. This is the American version of the RA1217 in the UK.

Not having seen any test reviews done on this receiver, I would ask JW his opinion on this receiver and if it is a good value or not.

I am primarily a s.w. listener, and the Icom R71A is now around \$375 and just squeezes into the upper end of my budget. Which way should I lean? The RA6217 comes with no manual.

**Daniel Neves**

**Dear Sir**

I had set my sights on replacing my JRC NRD-525, which had provided sterling service for some 16 years, with the new NRD-545 and looked forward to John Wilson's review(s). I am now the proud owner of said receiver and thought I'd like to share a few bouquets and criticisms.

Bouquets, well there are many, the set's controls function in a similar manner to the '525 so I was already at home driving the thing, what I was really looking forward to was the additional facilities the d.s.p. offers. Generally I have to agree with John that they work well.

I'm curious, however, about the AMS button which John referred to as switching in/out synchronous a.m. reception. The (poorly written) handbook does not say that this is a synchronous mode, but merely for 'listening to medium wave stations in hi-fi' and it was suggested to me by several American listeners that it was for listening to a.m. stereo stations in that country, albeit in mono for there is no stereo decoder in the receiver.

This control is, for me, a waste of time: its bandwidth is far too wide and, as John rightly comments, is not adjustable, why not? So what is it really doing, does anyone know? I'd have liked, too, to have been able to adjust the a.g.c. decay time in modes other than just s.s.b.

Another minor gripe is the poorly written handbook which reminded me of when Japanese rigs first hit the UK and gave us many moments of hilarity trying to understand what the heck the manufacturers were trying to explain to us mere mortals!

Whoever heard of a receiver with a built-in RTTY decoder, well this one has one! I haven't hooked it up to my PC yet, but it appears to tune in RTTY signals quite easily, quite a novelty.

John mentions the set sounding rather clinical. Indeed my previous '525 was the same, even fed through a hi-fi loudspeaker, and seems to be a trait of JRC. However, if the '545 is fed into ones hi-fi system via the loudspeaker socket at the rear of the set I can guarantee a significant improvement, it really is good and far superior to my old '525.

**Dear Sir**

The October issue of your excellent magazine had just arrived the day before my wife's sister and husband came to visit us from Ireland. We were therefore, all very interested in the article about Broadcasting In Ireland. My brother-in-law was quick to point out a slight inaccuracy in the article as follows.

They moved back to Ireland some twelve years ago to a small village just outside Cork City and have been receiving u.h.f. television all the time they have been there. I also contacted some other relatives and friends in Carlow and western Ireland, also central Ireland respectively, and they all say the same. In fact, my brother-in-law in Carlow thinks they have been receiving u.h.f. since the late seventies/early eighties.

Other than that, we all found the article to be well written and informative. Congratulations to the author, Robert Connolly.

**A. W. Guy  
Cambridge**

*Thanks for the update - Ed.*

Overall I'm extremely pleased with the receiver and have to say that it's streets ahead of the old '525. It would truly gild the lily on this remarkable set but I'm not sure whether I shall be splashing out on the v.h.f./u.h.f. module just yet at a staggering £299!

**Bob G8JNZ**

*Well Bob, take a look at page 56 and let John share his feelings and findings with the v.h.f./u.h.f. converter unit - Ed.*

**Dear Sir**

In order to try and save hours of scanning the bands for active frequencies, I have purchased books, listing the most probable frequencies to listen on. Try as I might, I just do not seem to have much luck, and so I wondered what might help.

Looking at adverts for various scanners and receivers of the most up-to-date kind, I notice that Bandscope are built-in or linked in via an interface to a computer. Obviously this must help a great deal. If this feature can be included in the latest sets, why can't a modestly priced stand alone Bandscope be produced for the thousands of

enthusiasts who do not have the latest scanner/receiver or even a computer, but have good quality sensitive sets, yet can't afford to spend £500-£700 on a separate Bandscope/SDU.

Surely a basic Bandscope/SDU unit could be produced with sufficient selectable band coverage so as to be a useful and time saving part of a s.w.l.'s set up. There must be thousands of s.w.l.s wanting a product like this and I would suggest that a manufacturer gives this serious thought.

**Gordon Griffiths  
Inverness-shire**

*Any other readers want to comment? - Ed.*

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 8PV.

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

**Dear Sir**

I note in the November issue (page 4) 'New Products' you have listed the MFJ414 and the MFJ554 from Waters & Stanton PLC. As both of these items are for Morse code, I wondered who the manufacturer has in mind for the purchase of this kit particularly now that Morse code is as dead as the Monty Python parrot.

To charge £189 and £79 each for these items shows either a lack of knowledge of the current marketplace or is a blatant attempt to make ill informed readers part with their hard earned cash.

The current issue of the magazine reports the closing down of Portishead Radio and the changes to satellite communications that are now applicable to shipping. There is no longer any professional Morse code out there to which one can listen.

Come on chaps, as we approach the 21st Century let's get it straight, no one ever again will be employed for their ability to send and receive Morse code. It is finished. Even 'hams' are using computers now.

**C.F. Goodall  
Cheltenham  
Gloucestershire**

*Whilst in principle I agree with your point that Morse has not long to live, it is worth noting that there still is lots of traffic around if you care to listen. Many Russian vessels use the mode as a primary means of communicating! You must remember that a system that relies only on the principle of turning on and off an unmodulated carrier is far less likely to fail in an emergency situation, ie. a damaging collision or the like. I would feel much more secure in the knowledge that there were at least some operators able to receive my distress call in an emergency if all I had was a TX and a switch! - Ed.*

## NEW PRESIDENT

At the 1998 WACRAL Conference, held at the beginning of October, the Association invested in a new



President, only the third in forty years! **John Corbett G3TWS** well known for his pioneering work in relief communications in Africa and the author of the book *Where There Is No Telephone*, is the new President. Well done John!

## ROLL UP, ROLL UP!

**John Beaumont G3NGD** is running an RAE course at Stretford, Manchester. The course will run on Monday evenings 1800-2030, for a duration of two and a half hours per week for 36 weeks, starting 4 January 1999 (subject to enrolments).

For more details, contact John G3NGD at **North Trafford College, Talbot Road, Stretford, Manchester M32 0XH, Tel: 0161-886 7077** or Admissions on **0161-886 7000**. Details are also available on the internet, so check out **www.fortunecity.com/meltingpot/kings/674**

## STOCKTON'S SPECIAL EVENT

Unfortunately, due to health problems, **Mike Dodds G0DOD** has had to resign from the **Stockton On Tees Special Events Group**, but he wants the rest of the group to know how pleased he is that they plan to keep the group up and running, and making it the success that it has been.

The next big event is planned for the Bank Holiday weekend in May 1999 on board the *Endeavour* on the River Tees in Stockton and will run from the Friday to Monday inclusive. Mike hopes to be able to make a visit to the event to show his support.

Finally, Mike would like to say that he knows the group will go from strength to strength over the coming months and years, which is great and will draw new amateurs into the hobby.

## WRN WELCOMES RSI

A new programme provider joined World Radio Network (WRN), one of the most innovative international radio broadcasters. From 1st October 1998 the world service of one of the youngest central European countries, the Slovak Republic, is contributing to WRN.

After the split of former Czechoslovakia five years ago into two separate countries, Radio Slovakia International (RSI) was established to inform people abroad in many different languages about the independent new republic. The fifth anniversary of the Slovak Republic's establishment is marked by the increased effectiveness of the country's international radio voice world-wide.

Broadcasting international programmes to the whole world for five years this autumn, World Radio Network now puts out Slovakia's English and German programmes. English is beamed on WRN1 to listeners across Europe and North America, while German is carried to Europe on WRN3. Following the award as *Most Innovative Webcaster* at the Production Europe awards at IBC in Amsterdam in September, both English and German programmes are available world-wide via Internet in RealAudio too (**www.wrn.org**).

Uniting dozens of leading public broadcasters World Radio Network truly provides a unique width of the world's news and current affairs. With three 24-hour-a-day services (WRN1/English, WRN2/multi-lingual, WRN3/German) WRN has listeners in more than 60 countries world-wide who tune in on direct-to-home satellite, cable radio and local f.m. and a.m. stations.

"WRN offers a brilliant opportunity for international stations to gain new audiences across the world," says Simon Spanswick, Director of Corporate Affairs at WRN. "Together with Radio Slovakia International we've developed a high quality yet inexpensive Internet audio feed from Bratislava to London where WRN assembles all its networks. This new delivery system for Radio

## YOUNG AMATEUR AWARDS

The 1998 Young Amateur of the Year Award has been won by 17 year old **Mark Shepherd** from Brighton. Mark was presented with the first prize of £300 by the RA's Director of Spectrum Services, Hazel Canter, at the RSGB's HF Convention, which was held back on the 11th October. Mark also received a

certificate signed by Peter Mandelson, Secretary of State for Trade & Industry, and will be invited to the Agency's Radio Monitoring Centre at Baldock, Hertfordshire, for a conducted tour.

Runner up was **Peter Evans (16)** from Kent, who was presented with Icom's IC-T22E 144MHz f.m. transceiver by **Chris Ridley** of Icom (UK) Ltd. Peter was chosen from hundreds of entrants and the final decision was based on an interview which took place at the RSGB. Peter also received a £50 cheque from the Agency, and will also be invited to visit Baldock Monitoring Station.



**This year's holder of the Young Amateur of The Year Award Mark Shepherd M0AGQ/G7WHL (front row second left) with proud father behind after the ceremony at the RSGB's HF Convention. Runner up Peter Evans M0B00 is shown to his right, accompanied by his parents and RSGB President Ian Kyle G8AYZ/M10AYZ. Hazel Canter (front row left) the newly appointed Director of the RA's RA2 Section presented the awards.**

Slovakia's programmes increases their availability from a relatively limited number of short wave listeners to a much wider range of listeners in Europe and North America at very convenient peak evening times."

Radio Slovakia International can be heard on World Radio Network at 1900CET on WRN1 in English to Europe, 2000CET on WRN3 in German in Europe (Astra satellite) and at 2030EST on WRN1 in English to North America (Galaxy 5). Programme guides can be requested at **World Radio Network, PO Box 1212, London SW8 2ZF, UK, E-mail: online@wrn.org, Internet: www.wrn.org**

## SELECTED OPERATORS

The following members of the **International Short Wave League** have been selected to operate the ISWL Club Callsign **GX4BJC/P** throughout 1999. Each member will use the call for a one month period, as shown on the list below.

A special club call QSL card will be available to

## LATEST ADDITION

Icom (UK) Ltd., specialist in radio communications, presents the latest addition to its ground breaking range of compact multi-band, multi-mode transceivers, the IC-706MKIIG.

This h.f./v.h.f./u.h.f. mobile transceiver takes radio technology a step further by incorporating an expanded frequency range, which now includes 470MHz, providing access to the 70cm band in addition to h.f., 6m and 2m bands. The operating possibilities are therefore much wider for local or DX operation whether as a base station, mobile transceiver, or in the field using only one rig.

The new IC-706MKIIG uses power MOSFETs in all p.a. sections, resulting in a considerable increase in the level of output power. The 2m band has been increased to 50W, with 20W on 70cm and 100W for the h.f. and 6m bands. A tone squelch system has also been built-in as standard, with an added tone scan function in order to find a repeater's tone frequency simply and quickly.

The IC-706MKIIG's compact case now has a carrying handle and the detachable front panel features many illuminated keys for operation in low light conditions. Developed for simple operation, the latest

anyone who either hears or works the station. QSL cards will be issued upon receipt of an incoming QSL card or reception report. The club call can be QSLd via the Bureau or direct to: **The ISWL Club Call Manager, 'Kenwood', London Road, Louth, Lincolnshire LN11 8QH.**

Month	Name	Callsign	QTH	Using
January	Walt	G3NYY	Tewkesbury	GX4BJC/P
February	Dave	MW0AYM	Llangollen	GC4BJC/P
March	Wally	G3MCO	Chelmsford	GX4BJC/P
April	Archie	G2WQ	Oswestry	GX4BJC/P
May	Tony	G4ZIB	Kidderminster	GX4BJC/P
June	Frank	GW3CNM	Holywell	GC4BJC/P
July	John	GM0PKW	I.o. Lewis	GS4BJC/P
August	Kevin	M0BJT	Derby	GX4BJC/P
September	Nigel	G0RRW	Burton-on-Trent	GX4BJC/P
October	Evelyn	G0OZI	Cheshire	GX4BJC/P
November	Derek	GJ3XOJ	Jersey	GH4BJC/P
December	Chris	G0WFH	Milton Keynes	GX4BJC/P

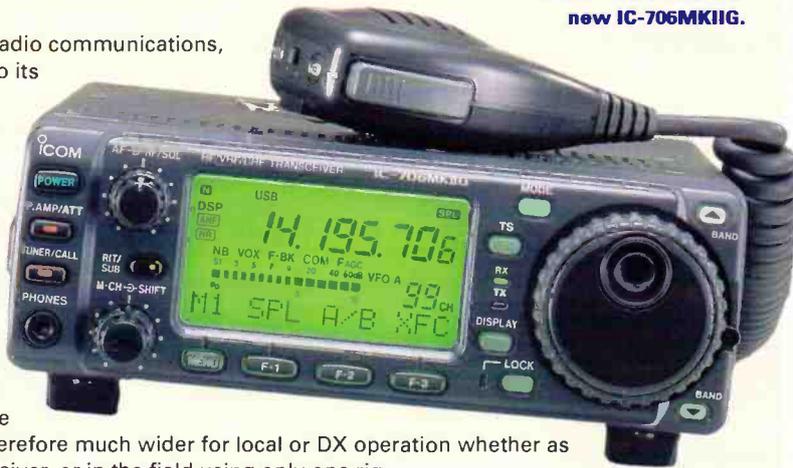
## RALLY ON THE MOVE

After 38 years at Woburn Park, the RSGB is moving its National Mobile Rally to a brand new venue. On **1 August 1999**, the Rally will be held in the grounds of **Hatfield House, Hertfordshire**, home of Lord Salisbury.

The event will not only be at a brand new location, but will also be an exciting fun day out for all radio amateurs and their families, with plenty of activities taking place for everyone. Activities include large amateur radio trade fair (in spacious marquees), large car boot sale and flea market, antenna park with expert advice at hand, radio controlled model display, plus special circuit for model cars, craft stalls, ARDF hunt, children's entertainment (face painting, clown, magician), refreshments and beer tent, Hatfield House and gardens to tour at your leisure, beautiful grounds to enjoy your picnic and all within easy access by road and rail. All in all a great day out for the whole family.

More details and information on stand bookings, contact **Marcia Brimson** at the **RSGB, Lambda-House, Cranborne Road, Potters Bar, Herts EN6 3JE, Tel: (01707) 659015.**

## Icom excels with the new IC-706MKIIG.



'706 features an individual band change key and a sub-dial to facilitate mobile and memory operation, which when combined with 107 memory channels, proves extremely user friendly.

A user programmable automatic repeater function is also available, and repeater frequencies can be programmed by the user, eliminating the need for repeater settings for 6m, 2m or 70cm operation. Other features include an i.f. shift to reduce adjacent frequency interference, a dedicated socket for 9.6kbs data, narrow f.m. capability (including the 2m band) and a wide range of options including d.s.p. capabilities, three step selectable passband widths and several automatic antenna tuners.

Icom can be contacted at **Sea Street, Herne Bay, Kent CT6 8LD, Tel: (01227) 741741, FAX: (01227) 741742, E-mail: icomsales@icomuk.co.uk** or visit Icom's web site at **http://www.icomuk.co.uk**

## DECEMBER MEETING

The **Aylesbury Vale Radio Society** meet on the first Wednesday of each month at the Hardwick Village Hall, three miles north of Aylesbury on the A413. On Wednesday 2nd December 1998 there is a G6NB Construction Contest, open to club members only, from 8pm.

More information from the Secretary, **Gerry G7VFFV**, on **(01296) 432234.**

# rallies

**November 28/29:** The London Amateur Radio & Computer Show is to be held at the Lee Valley Leisure Centre, Picketts Lock Lane, Edmonton, London N9 0AS. Doors open 1000 until 1700 each day. Admission is £3 for adults, £2 for OAPs and under 14s. There will be free parking for 2000 cars, a large trade show, Bring & Buy, catering, licensed bar, on-site camping, special interest groups, disabled facilities, cloakroom, Morse tests on demand, a talk in on 2m and 70cm and family attractions. **Steve Blayer G4UKR.**

**December 5:** The Rochdale & District Amateur Radio Society are holding their traditional radio rally at a **new venue**, two miles NW of Rochdale Town Centre on the A680 Rochdale to Edenfield Road at Cutgate. Look for the orange arrows. Talk-in on S22. There will be components, vintage radio and junk. More information from Rochdale & DARS, **John G7OAI** on **(01706) 376204** or **(0973) 689077** or E-mail: **johnhg7oai@which.net**

**December 13:** The Leeds & District Amateur Radio Society is to be held at the Pudsey Civic Centre (Dawsons Corner). There will be all the usual traders. Doors open at 1100 (1030 for any disabled visitors). There will be a talk-in, a licensed bar, etc. **John Mortimer M1CAI** on **(01943) 874650** or **Malcolm Robertson G7VCK** on Leeds **0113-225 3379.**

**\*December 13:** The Verulam Amateur Radio Club will hold its annual rally at the Watford Leisure Centre, Horseshoe Lane, Garston, Watford, Hertfordshire. **Ian Forsyth G0PAU** on **(01923) 265572.**

1999

**January 17:** The Oldham ARC Mobile Rally is to be held at the Queen Elizabeth Hall, Civic Centre, West Street, Oldham, Lancs. Doors open at 1100 (1030 for disabled visitors). The event features the usual traders and a Bring & Buy stall. Morse tests are available on demand. Talk-in on S22 via GB4ORC commencing at 0730. There will be refreshments and free parking. **(01706) 846143** or **0161-652 4164.**

**February 7:** The 14th South Essex Amateur Radio Society Radio Rally is to be held at the Paddocks, Long Road, Canvey Island, Essex. The Paddocks is situated at the end of the A130. Doors open at 1030. Features include Amateur Radio, computer and electronic component exhibitors, Bring & Buy, RSGB Morse testing on demand (two passport photos required), home-made refreshments, free car parking with space outside main doors for disabled visitors. **David G4UVJ** on **(01268) 697978.**

**February 14:** The 14th Northern Cross Rally is to be held at Thornes Park Athletics Stadium, Wakefield. There is one large hall, just out of town on the Horbury Road. Easy access from M1 junctions 39 & 40 - well signposted and with a talk-in on 2m and 70cm. Doors open 1100 (1030 for disabled visitors and Bring & Buy). **Roy G0TBY** on **(01924) 893321** or packet **G0TBY@GB7WRG**, E-mail **rally@waveg.demon.co.uk** or visit the web page at **http://www.waveg.demon.co.uk/rally/**

Send your news to Zoë Crabb at the Editorial Offices

## MONEY RAISED

The **Cockenzie & Port Seton Amateur Radio Club** raised £873 over the last year to their adopted charity, the British Heart Foundation. From left to right in the photograph: **Iain Lewis** (Director for Scotland for the British Heart Foundation), **Ron**



**Brown GM4IKU, Wallace Moodie MM0AMV, Margaret Chalmers GM0ALX and Bob Glasgow GM4UYZ.**

For those interested, the club are holding their Annual Radio Junk Night on **Friday 13th August 1999**, from 1830 to 2130 at the **Cockenzie & Port Seton Community Centre, South Seton Park, Port Seton, East**

**Lothian.** So why not take along your junk and sell it yourself?

Tables will be provided on a first come first served basis, (no charge for the tables). There will be a raffle at approximately 2100 and refreshments will be available, along

with disabled access. Entrance is just £1 (all persons) and all money will be donated to the British Heart Foundation.

More information from Bob Glasgow GM4UYZ @ GB7EDN on **(01875) 811723**, E-mail: **r.glasgow@edi0402.wins.icl.co.uk** or **bob.gm4uyz@btinternet.com**

## CASES & KITS

**Waters & Stanton PLC**

have informed us of two new product ranges. Firstly, they now have a range of three aluminium equipment cases, ideally suited for home construction and kit projects. The internal side cheeks of the boxes have elongated slotted holes for mounting circuit boards or a sub chassis. The front and back panels are undrilled (apart from the four mounting screws) and a set of rubber feet are included.

These boxes are ideal for a wide range of projects, including receivers and QRP transceivers. Order by quoting EM-01 equipment case, £10.95 RRP, EM-02 equipment case, £12.95 RRP and EM-03 equipment case, £15.95 RRP. The sizes (all in mm) are 160W x 120D x 75H, 210W x 150D x 85H and 260H x 170D x 110H

respectively.

Secondly, is a coaxial connector kit. The kit comprises a set of coaxial cable connector adapters. Six threaded interconnectors enable any of the supplied plugs and sockets to be assembled to back to form the adapter of your choice. The centre pins of all the connectors are gold plated. Order this



item as Con-K, priced at £49.95 RRP.

For more details, call Waters & Stanton's hotline on **(01702) 203353**.

## NEW PUBLICATION

The United Kingdom Hydrographic Office has just published the 1998/1999 edition of the Admiralty List of Radio Signals (ALRS) *Volume 1 Coast Radio Stations*. For the first time the Volume, which is in two parts and provides world-wide coverage, includes a section on the developing Global Marine Communications Services. This contains details of services available from companies such as Globe Wireless, Maritex, Inmarsat and Mobile Marine Radio.

In addition, 30 new coast radio station site location diagrams have been introduced making the publication more user friendly to a new generation of professionally certified radio and administrative officers, particularly relevant with the advent of GMDSS. With the increasing threat in certain regions of piracy and armed robbery, the updated Reporting Procedures contained in this Volume are, unfortunately, particularly relevant.

ALRS Volume 1) NP281 (1) & (2)): Coast Radio Stations is available from Chart Agents world-wide at a UK recommended retail price of £24. If you would like to find out more, contact **The United Kingdom Hydrographic Office, Public Relations Department, Admiralty Way, Taunton, Somerset TA1 2DN**.

## ANNUAL QUIZ NIGHT

The **Bangor & District Amateur Radio Society** are holding their monthly meeting and Annual Quiz Night at the Clandeboye Lodge Hotel, Bangor, at 2000 on Wednesday 6th January 1999. A warm welcome is extended to all club members and radio enthusiasts. More information from **Roy GI0WVN, QTHR, Tel: (01247) 460716**.

## A COMPLETE PACKAGE

**Javiation** are pleased to be able to offer a complete programming 'package' for the DJ-X10. This includes the RS-X10 computer interface, together with an excellent DOS based package from Bruce Pope in the USA. This is the only software currently available for the DJ-X10.

The RS-X10 computer interface is priced at £29.99 and is housed in a DB-25 for connection to a 25-way serial port. The RS-X10 connected directly to a cloning socket on the top of the DJ-X10.

The DJX10R programming software, priced at £14.99 is currently the only software available that supports the Alinco DJ-X10 receiver. An excellent DOS based package that runs within *Windows95/98* and allows the following:

- Channel data editing (Frequency, Mode, Step, Autostep, Skip, Attenuation and Label)
- Opening banner editing
- VFO editing (Frequency, Mode, Step)
- Bandplan edit
- PMS scan and Scan Pass edit
- Radio system set data edit (bleep, battery save, etc.)

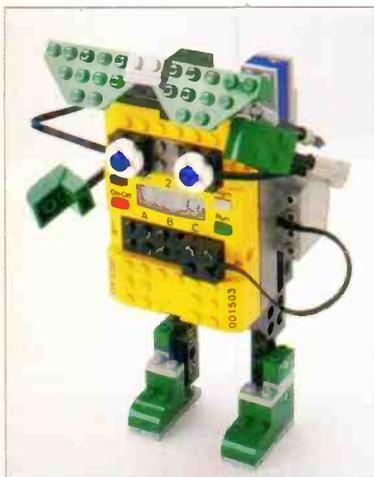
- MR and PMS Bank linking
- Read/Write radio information
- Read/Write individual areas of radio (channel, bandplan, banner, etc.)
- Save/Load datafile to disk
- Dump program information to a human readable text file for review
- Import and Export ASCII data
- Full reset of DJ-X10, reinitialising EVERYTHING to factory
- Cross checking mode/step entries with the bandplan for automatic setting of proper values
- Frequency sorting on any range of channels
- Quick p.m.r. entry from the channel screen (useful for building a p.m.r. table without keying each channel bank by hand)
- INI file for customising operating parameters

Program requirements: IBM compatible PC with at least on standard serial port. MS-DOS 3.30 or higher.

For more information, contact Javiation at **Carlton Works, Carlton Street, Bradford BD7 1DA, Tel: (01274) 732146, FAX: (01274) 722627**, E-mail **Info@javiation.co.uk** or visit the web at **http://www.javiation.co.uk**

## BUILD A ROBOT

**Maplin** has negotiated a deal to stock the market leading robotic invention system - **LEGO Mindstorms**. *Mindstorms* was designed to bring out and develop problem solving skills in the 'ever evolving' robotics area, and has taken 10 years to develop. It is aimed at the 12 plus age group.



The *Mindstorms* system comes in a 700 piece set, including two motors, light and touch sensors and lots of building parts including mechanisms, gears and wheels. Also included in the package is a CDROM to download the appropriate software in order to program your invention.

There are no wires or cables, communication is via infra-red. To

add to this challenge, *Mindstorms* comes without a comprehensive construction guide - intuition is required here!

The PC tempts the user with an additional challenge, that of building varying types of robot. Your learning curve can be further extended if you visit the *Mindstorms* website at

**www.Legomindstorms.com** Ideas, new programs and expert views can be shared using this forum.

LEGO don't stop there, they plan to release two additional expansion sets, *Robosports* and *Extreme Creatures* to further enhance the range of their market leading concept, later this year. The system costs around £160 and expansion sets from around £40.

For further information on participating store locations, call the sales customer services department on **(01702) 554002** or visit the Maplin website for on-line ordering and/or queries on **http://www.maplin.co.uk**

## CLEAR OUT REVEALS STOCK!!

Recent enquiries at the Leicester Rally and by telephone, prompted a Book Store search and tidy of dusty corners. The net result is good news for all those readers who have asked for the *SWM* Great Circle maps. We've found some!

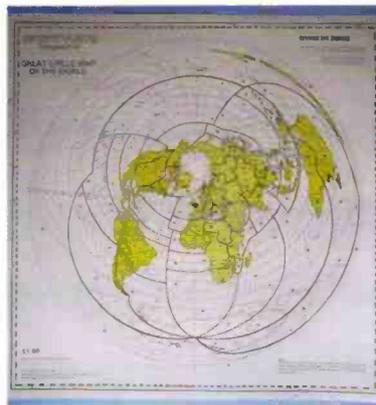
So if you were one of those desperate for a copy of this invaluable guide to global beam headings and bearings, a rolled copy is yours for just £1 inc. P&P.

For those of you who don't know what a great circle map is or what use it might be, here's a brief explanation.

The principle of a great circle map is all related to signal path. The map enables you to convert a beam heading into a path around the globe. The projection of the map is plotted in such a way that your station is located at the centre of a circle. The

rest of the planet is then arranged around your location. All the planet's surface being located as though a globe had been flattened out around your QTH whilst preserving every path of a great circle around the globe.

So, what you end up with is a flat projection of the earth, that allows you to affix a string to the centre point and determine a beam heading and path of any other point on the globe. The *SWM* Great circle map is centred on London, but there is only a minimal error for other UK and close European location.



## LICENCE EXEMPT FREQUENCY ALLOCATIONS

The Radiocommunications Agency has recently announced new and extended frequency allocations for licence exempt Low Power Devices.

The first relates to the previous allocation of 433.72 - 434.12MHz. This is the band which received attention from BBC TV's *Watch Dog* programme, with an item on desensitised car alarm and immobiliser receivers and the resulting inability of the owners to use their vehicles. This band is being extended to cover 433.05 - 434.79MHz, the restriction of its use only for Vehicle Radio Activated Key Entry Systems will be relaxed to accommodate General Telemetry and Telecommand application. Audio speech and music are not allowed in this band.

As this low power (10mW), allocation is a shared resource, the onus is on the manufacturers of low power exempt equipment to design their products to be immune to close proximity high power signal sources such p.m.r. and Radio Amateur installations.

The allocation of 863.00 - 864.00MHz for Cordless Audio Equipment has its upper limit extended to 856.00MHz.

A new allocation of 868.00 - 870.00MHz has been introduced to General Telemetry and Telecommand applications. The band is split into sub-bands, with the maximum radiated power permitted being dependant on which sub-band used.

Finally the current frequency allocation of 2.400 - 2.483GHz will be opened to permit General Telemetry and Telecommand applications, including Visual Image Transmission Equipment with a maximum permitted bandwidth of 20MHz. This band is shared with other applications including Local Area Networks, LANs, using Spread Spectrum Techniques.

# rallies

**February 21:** The Barry Amateur Radio Society Radio & Computer Fair has changed its venue. The **new and improved venue** is the Holmview Leisure Centre, Skomer Road, Barry. Facilities include lounge bar, catering and parking. Admission is £1.50 and doors open at 1000 for disabled visitors and 1030 for general public. **Brian GW0PUP** on **(01222) 832253** combined telephone and FAX number.

**March 7:** The Wythall Radio Club are holding their 14th Annual Radio & Computer Rally at Wythall Park, Silver Street, Wythall, near Birmingham on the A435, just two miles from junction 3 of the M42. Doors open from 1000 to 1600 and admission is £1.50. There will be the usual traders in three halls and a large marquee, Bring & Buy, bar and refreshment facilities are also on site. Talk-in on S22. There will also be a unique park and ride for easy and comfortable parking. Contact **Chris G0EYO** on **0121-246 7267** evenings and weekends for more details or FAX on **0121-246 7268** or E-mail **g0eyo@compuserve.com**

**March 21:** The Bournemouth Radio Society are holding their 12th Annual Sale at Kinson Community Centre, Pelhams Park, Millhams Road, Kinson, Bournemouth. Doors open at 1030 and close at 1630. Talk-in from G1BRS on 2m S22. There will be Amateur Radio and Computer Traders, clubs and specialised groups, excellent refreshments and a Bring & Buy. Admission is just £1. More details from **Olive** or **Frank Goodger**, 66 Selkirk Close, Merley, Wimborne, Dorset BH21 1TP or telephone on **(01202) 887721**.

**May 9:** The Drayton Manor Radio & Computer Rally is to be held at Drayton Manor Park, Fazeley, Tamworth, Staffs on the A4091. The main traders will be in four marquees with a large outside traders flea market. There will also be a Bring & Buy stall, local clubs and special interest stands. Open from 1000 onwards. Trader information from **Norman** on **0121-422 9787**, other information from **Peter G6DRN** on **0121-443 1189** evenings please.

**May 16:** The Ripon & DARS are pleased to announce that the Northern Mobile Rally will take place at the Great Yorkshire Showground. There will be all the usual stalls, talk-in, Bring & Buy, free car park, disabled access etc. Details on **(01765) 640229** or E-mail **gerald@bronco.co.uk**

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.

The Editorial Staff of *SWM* cannot be held responsible for information on Rallies, as this is supplied by the organisers and is published in good faith as a service to readers.

If you have any queries about a particular event, please contact the organisers direct.

Send your news to Zoë Crabb at the Editorial Offices

Editor



## THIS MONTH'S SPECIAL OFFERS!

### JRC NRD545



The latest model in the JRC range, the new NRD 545, which is their first receiver using DSP (Digital Signal Processing) from the IF stages onwards. The DSP enables a wide choice of digitally implemented filters to be provided, together with IF shift and continuously variable passband width. The combination of these facilities gives the NRD 545 a level of performance than has previously been unheard of in a receiver costing less than £10,000.

Every equipment reviewer that has had the opportunity to try the NRD 545 to date has been amazed at the performance that JRC engineers have managed to cram into this small box.

### JRC NRD345G



JRC need no introduction to most SWL's but their mini receiver does! An all-mode receiver, the NRD345 includes synchronous detection as standard, offering low signal distortion and clear sound. Direct Digital Synthesis is employed in a phase locked loop circuit to enhance the carrier to sideband noise ratio. The RF amplifier and the first mixer in the front end stage incorporate 4 low-noise junction-type FETs with excellent cross modulation characteristics respectively to ensure high sensitivity with wide dynamic range. Other features include a variable level noise blanker, clock and timer functions and a built-in RS232 interface for computer control.

**PLUS FREE NVA 319 SPEAKER WORTH £199.00**

**Lowe Price £1595.00** Carriage £10.00



**Lowe Price £529.00**

ALSO AVAILABLE: CHE199 WIDE BAND CONVERTER £299.00

### AIRBAND PACK

## YUPITERU MVT7100

PLUS  
AIRWAVES 98  
PLUS  
POOLEY'S FLIGHT GUIDE 97



**ALL for ONLY £229.00**  
Add £10 delivery

## Lowe AP150



The AP150 is a combined audio processor, amplifier and speaker combination that can be used with any shortwave receiver. Filters included.

**ONLY £99.00**  
Add £10 delivery

## Lowe

## RACK SYSTEM FOR THE HF150

The Rack System was introduced to stack either HF150 and AP150 together. With the addition of the RK150E you can stack the PR150 as well

**£30.00 RK150**  
**£10.00 RK150E**  
plus Post & Packing

## THIS MONTH'S SPECIAL OFFERS!

## THE SCANNER SPECIALISTS



**£369.00**  
**MVT9000**



**£139.00**  
**MVT3300**



**£299.00**  
**AOR8000**



**£399.00**  
**AR8200**



**£99.00**  
**PSR244**

### ICOM PCR-1000



**STILL ONLY**  
**£249.00**



Wide-band: 500kHz  
to 1310MHz

**£139.00**  
**IC-R2**

## BOOK BARGAINS

### POOLEY'S 1997 FLIGHT GUIDE

Details on all UK Airfields and Airspace

Bargain at £5.00

p&p £2.00

**UK Scanning Directory** £18.50 p&p £3.00

**Airwaves 98** £6.50 p&p £1.00

**Callsigns 98** £6.50 p&p £1.00

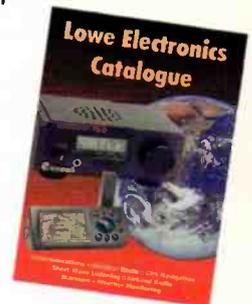
**Worldwide Aeronautical Comms** £19.95 p&p  
£3.00

## Lowe Electronics Catalogue

Order your **FREE** catalogue now. Full of interesting products with comprehensive descriptions.

- Communications
- Amateur Radio
- GPS Navigation
- Short Wave Listening
- Airband Radio
- Scanners
- Weather Monitoring

*Just send four first class stamps to receive your own catalogue!*



# BRISTOL OPEN DAY

Saturday 12 December  
Doors open 9.00

- **Raffle**
- **Refreshments**
- **Yaesu - ICOM - Kenwood in attendance**

## Lowe Electronics Ltd

Chesterfield Road, Matlock

Derbyshire, DE4 5LE

Telephone (General Enquiries) 01629 580800,

Fax 01629 580020

**Orders FREEPHONE 0800 174749**

Email: [info@lowe.co.uk](mailto:info@lowe.co.uk)

URL: <http://www.lowe.co.uk>

Showroom opening hours are 9.30am to 5pm Mon-Fri and 10am to 4pm on Sat, but check with our local branches as times may vary

### Branches

Bristol & Wales, 79 Gloucester Road, Patchway, Bristol BS12 5QJ,

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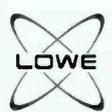
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# LM&S

**N**umerous reports of actual reception were sent to me during the year by listeners in the UK and abroad, which provided a reliable source of information for the preparation of 'LM&S'. Since this is the December edition of *SWM* I want to thank most sincerely everyone who contributed to the data in 1998.

Before detailing their latest findings in the broadcast bands, may I take this opportunity to wish all listeners and readers a Happy Christmas and good reception in 1999.

## 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 September.

After studying the 'BBC Engineering Information' on Ceefax page 698, which predicted that the R4 Droitwich transmitter (500kW) on **198kHz** would be 'off air' all day on September 27, **Brian Keyte** (Gt.Bookham) decided to check reception on that morning of R4 from the co-channel 50kW outlets at Westerglen and Burghead.

The combined transmissions rated SINPO 34443 at 0610UTC. He also took the opportunity to listen for the Rikisutvarpid 300kW outlet at Gufuskalar, W.Iceland on **189kHz**. At 0615 he heard music but no speech, which continued until 0700 when it faded out. At best the transmission rated 23341.

## Medium Wave Reports

A broadcast from WBBR in New York, NY on **1130kHz** was picked up at 0430UTC on September 11 by **John Slater** in Scalloway, Shetland. It was peaking SIO 222. There were no other reports of m.w. transatlantic reception.

Some of the many m.w. stations in the Middle East, N.Africa, Europe and Scandinavia reached the UK after dark - see chart. Two not previously heard were logged on the 14th by **George Millmore** (Wootton, IoW) - Kharkiv, Ukraine on **648kHz**, rated SIO 333 at 2045, also Sofia, Bulgaria on **963** - SIO 323 at 2105.

During daylight the ground waves from distant local radio stations attracted the attention of some DXers - see chart. In Ashton Under Lyne **Stuart Graham** compiled an interesting first list which includes BBC R.Cornwall on **630** and BBC Devon & Dorset on **801 & 855**. Brian Keyte heard ILR Cheltenham Radio announce 'Cat FM' on **603kHz**, which is the ident for their v.h.f. (**107.5MHz**) f.m. service!

## Short Wave Reports

The 'Propagation Forecasts' prepared by **Jaques d'Avignon** in Ontario, Canada for *SWM* indicate that paths to Africa, India and S/C.America are likely to be open in the **25MHz (11m)** band during part of the day, so the absence of broadcasters in the band is surprising and very disappointing.

Quite a few broadcasters are taking advantage of the conditions in the **21MHz (13m)** band. During the morning they include UAER, Dubai **21.605** (Ar to Eur 0615-1030) rated 55545 at 0600 by **Frank Miles** in SW.London; DW via Sri Lanka **21.680** (Eng to Africa 0600-0650?) 25532 at 0601 by **Andreas Erbe** in Landsberg, Germany; Voice of Turkey **21.715** (Tur to W.Asia, Australia 0500-1000) 43343 at 0624 by **John Eaton** in Woking; R.Australia via Shepparton? **21.725** (Eng to Pacific areas ?-?) 24333 at 0724 by **Tony Hall** in Freshwater Bay, IoW; Voice of Russia **21.790** (Eng to Australia 0700-0900) 25343 at 0905 by **Mike Casey** in Manchester; R.Prague, Czech Rep **21.745** (Eng to S.Asia 0900-0930) 45544 at 0910 by **Simon Hockenhuil** in E.Bristol; UAER, Dubai **21.605** (Eng to Eur 1030-1100) 44444 at 1030 by **Sheila Hughes** in Morden; RAI Rome **21.520** (It to Africa 0600-1300) 34433 at 1040 by **Vic Prier** in Colyton; BSKSA Saudi Arabia

**21.495** (Ar [Holy Quran] to SE.Asia 0900-1200) 34333 at 1100 by **Robert Hughes** in Liverpool.

After mid-day, REE via Noblejas **21.570** (Sp to S.America 1200-1800) was rated 44444 at 1245 by **Robert Connolly** in Kilkeel; DW via Wertachtal **21.705** (Ar to M.East 1300-1559) 43242 at 1335 by **Eddie McKeown** in Newry; UAER, Dubai **21.605** (Eng to Eur 1330-1355) 54443 at 1340 by **Stan Evans** in Herstmonceux; BBC via Rampisham, UK **21.640** (Eng to S.Africa? 13300-1415) 22222 at 1345 by **Bill Griffith** while in N.Italy; BBC via Ascension Is **21.660** (Eng to Africa 1100-1700) 44444 at 1500 by **David Hall** in Morpeth; HCJB Quito, Ecuador **21.455** (Eng [u.s.b. + p.c.] to N/S.America 1100-1600) 24333 at 1514 by **Darren Beasley** in Bridgwater; DW via Kigali, Rwanda **21.560** (Ger to M.East 1400-1755) 33333 at 1545 by **Ernest Wiles** in NE.Bedford; WYFR via Okeechobee, USA **21.525** (Eng, Fr, Port to Eur, Africa 1600-2000) 35433 at 1625 by **Fred Wilmshurst** in Northampton; BBC via Cyprus **21.470** (Eng to E.Africa 1400-1700) 45554 at 1642 by **David Edwardson** in Wallsend; R.Portugal Int via Sines **21.655** (Port to Brazil 0800-2100) SIO222 at 1720 by **Philip Rambaut** in Macclesfield; HCJB Quito, Ecuador **21.470** (Russ, Ger, Fr, Sp to Eur? 1800-?) 33323 at 2025 by **Bernard Curtis** in Stalbridge; HCJB Quito, Ecuador **21.455** (Eng [u.s.b. + p.c.] to Eur 1930-2100?) 34333 at 2035 by **Thomas Williams** in Truro.

The narrow **18MHz (15m)**, which will be allocated to s.s.b. broadcasting in the future, is being used for an a.m. transmission to Africa by R.Denmark via R.Norway **18.950** (Da 0830-0855), rated 34333 at 0850 in Scalloway; also by R.Norway Int on **18.950** (Norw to E/C.Africa 1600-1630) 43333 at 1629 in Stalbridge.

Broadcasts from many areas have been received in the **17MHz (16m)** band. R.Australia via Shepparton **17.750** (Eng to Asia 0600-0900) was rated SIO333 at 0809 by **Francis Hearne** in N.Bristol; AIR via Bangalore **17.387** (Eng to Pacific areas 1000-1100) 32322 at 1015 in Colyton; DW via Wertachtal **17.860** (Ger to W.Africa 1000-1200) 33233 at 1020 in Liverpool; BBC via Skelton & Woofferton, UK **17.640** (Eng to E.Eur, M.East, E.Africa 0700-1500) 45444 at 1045 in E.Bristol; R.Pakistan, Islamabad **17.835** (Eng to Eur 1100-1120) 45434 at 1102 in Freshwater Bay; Israel R, Jerusalem **17.545** (Heb [Home Scerly] to W.Eur, N.America 0500-1855) SIO555 at 1135 in Macclesfield; SRI via Schwarzenburg? **17.515** (Eng, Ger, Fr, It to Far East, SE.Asia 1100-1330) 34333 at 1137 by **Vera Brindley** in Woodhall Spa; R.Bulgaria, Sofia **17.585** (Eng to Eur 1100-1200) 34434 at 1140 by **Martin Dale** in Stockport; R.Sweden, Stockholm **17.870** (Eng to USA 1130-1200) 54554 at 1150 in Herstmonceux.

After mid-day, Africa No.1, Gabon **17.630** (Fr to W.Africa 0700-1100, 1200-1600) was 43443 at 1255 in Kilkeel; RCI via Sackville, Canada **17.820** (Eng, Fr to Eur, Africa 1330-1500 Mon-Sat) 22222 at 1330 in Truro; R.Romania Int **17.790** (Eng to Eur 1300-1356) 55555 at 1337 in Manchester; Channel Africa via Meyerton **17.675** (Eng to W.Africa 1300-1455 Sat/Sun) 43433 at 1400 in Bridgwater; Israel R, Jerusalem **17.535** (Eng to Eur, N.America 1400-1430) 54444 at 1405 by **Tom Winzor** in Plymouth; VOA via Morocco **17.895** (Eng to Africa 1600-1900) 44444 at 1745 in Stalbridge; BBC via Ascension Is **17.830** (Eng to W/C.Africa 0730-2100) 44333 at 1831 by **Rhoderick Illman** in Oxted; R.Nederlands via Bonaire, Ned Antilles **17.605** (Eng to Africa 1830-2025) 35232 at 1911 in Newry; RCI via Sackville **17.870** (Eng to Eur, M.East, Africa 2000-2100) 44444 at 2028 by **Martin Venner** in St.Austell; WYFR

BROADCAST

## LONG WAVE CHART

Freq (kHz)	Station	Country	Power (kW)	Listener
153	Bechar	Algeria	1000	G*.H*
153	Donebach DLF	Germany	500	A.B.E*.F.G*.H*.J*.J
162	Allouis	France	2000	A.B.E*.F.G*.H*.J*.J
171	Nador Medi-1	Morocco	2000	G*
171	B'shakovo etc	Russia	1200	B*.E*.F.G*.H*.J*.J*
177	Oranienburg	Germany	500	B*.E*.F.G*.H*.J*.J*
183	Saarouis	Germany	2000	A.B.E*.F.G*.H*.J*.J
189	Gufuskalar	W.Iceland	300	D*
198	Droitwich BBC	UK	500	A.B.E*.F.H*.I*.J
207	Munich DLF	Germany	500	A.B*.C*.E*.F.G*.H*.J*.J*
207	Azizal	Morocco	800	G*.H*
216	Roumoules RMC	S.France	1400	A.B*.C*.E*.F.G*.J*
225	Raszyn Resv	Poland	?	A.B*.C*.E*.F.G*.H*.J*.J*
234	Beidweiler	Luxembourg	2000	A.B*.E*.F.G*.H*.J*.J*
243	Kalundborg	Denmark	300	A.B*.C*.E*.F.G*
252	Tipaza	Algeria	1500	J*
252	Atlantic 252	S.Ireland	500	A.B*.E*.F.G*.H*.I*.J
261	Burg(R.Roza)	Germany	85	B*.F.G*
270	Topolna	Czech Rep	1500	B*.E*.F*.G*.J*
279	Sasnovy	Belarus	500	E*.J*

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

Listeners:-

- (A) Martin Dale, Stockport.
- (B) John Eaton, Woking.
- (C) Simon Hockenhuil, E.Bristol.
- (D) Brian Keyte, Gt.Bookham.
- (E) Eddie McKeown, Newry.
- (F) George Millmore, Wootton, IoW.
- (G) Fred Pallant, Storrington.
- (H) Robert Shacklock, Westwood, Notts.
- (I) Tom Smyth, Co.Fermanagh.
- (J) David Stevenson, Swansea.

via Okeechobee, USA **17.555** (Ger, Eng to Eur, Africa 1600-2100?) 44333 at 2035 by **Peter Pollard** in Rugby; HCJB Quito, Ecuador **17.735** (Eng to Eur 1900-2300?) 25533 at 1917 in Landsberg, Germany & 44333 at 2100 in Morden; RCI via Sackville **17.820** (Eng, Fr to Eur, Africa 1900-2200) 33333 at 2100 by **Adam Farnsworth** in Bridgnorth; R.Taipei Int via WYFR **17.750** (Eng to Eur 2200-2300) 54344 at 2210 in Woking; R.New Zealand Int **17.675** (Eng to Pacific areas? 2050 [2105 Fri/Sat] -0457) 24532 at 0106 in Wallsend.

In the **15MHz (19m)** band there is much to interest the listener throughout the day. During the morning R.Austria Int via Moosbrunn **15.410** (Ger, Eng to Eur, N.Africa, M.East 0500-0730) was rated 45554 at 0500 by **John Parry** in Larnaca, Cyprus; R.Australia via Shepparton **15.510** (Eng to Pacific 0200-0900) 32233 at 0550 in Morpeth; RFO Tahiti, Fr.Polynesia **15.170** (Fr to SE.Pacific) 34433 at 0631 in Woking; DW via Wertachtal? **15.185** (Ger to W.Africa 0600-0650) 54334 at 0645 in SW.London; R.Slovakia Int **15.460** (Eng to Australia 0700-0730) SIO 333 at 0707 in N.Bristol; Voice of Malaysia, Kajang **15.295** (Eng to Asia 04557-08257) 25532 at 0720 in Wallsend; BBC via Ascension Is **15.400** (Eng to Africa 0715-1130) 43433 at 0740 in Herstmonceux; VOIRI Tehran, Iran **15.084** (Home Sce relay) 44344 at 0823 in Oxted; R.Australia via Shepparton **15.415** (Eng to Asia 0100-0400, 0600-0900) 35434 at 0825 in E.Bristol; Voice of Nigeria, Ikorodu **15.120** (Eng to W.Africa 05007-1100) SIO333 at 1055 in Macclesfield; R.Pakistan, Islamabad **15.530** (Eng to Eur 1100-1120) 45434 at 1110 in Freshwater Bay.

During the afternoon R.Vlaanderen Int, Belgium **15.545** (Eng to N.America 1230-1300) was 44444 at 1232 in St.Austell; BBC via Masirah Is, Oman **15.310** (Eng to S.Asia 0300-0915, 1000-1400) 44444 at 1300 in Kilkeel; RCI via Sines, Portugal **15.325** (Eng to Eur, M.East, Africa 1330-1400) 44444 at 1330 by **Gerald Guest** in Dudley; R.Sweden via Horby? **15.240** (Eng to N.America 1330-1400) 64444 at 1349 in Plymouth; BBC via Skelton & Rampisham, UK **15.565** (Eng to Eur, M.East, Africa 0600-1500) SIO444 at 1400 by **Tom Smyth** in Co.Fermanagh; WEWN via Vandiver, USA **15.745** (Eng to Eur 1000-2200) 44444 at 1419 in Woodhall Spa; UAER, Dubai **15.395** (Ar to Eur 1355-1600) 54444 at 1500 by **Robert Shacklock** in Westwood, Notts; WWCN Nashville, USA **15.685** (Eng to N.America, Eur 1100-2200) 44444 at 1500 in NE.Bedford; R.Japan via Moyabi, Gabon **15.355** (Eng to Africa 1700-1800) 44333 at 1700 by **Clare Pinder** in Appleby.

Later, Israel R, Jerusalem **15.615** (Heb to W.Eur, N.America 0300-2055) was 44434 at 1745 in Colyton; Channel Africa via Meyerton **15.240** (Eng to W.Africa 1800-1830) 43553 at 1812 in Bridgwater; Voice of Nigeria **15.120** (Eng 1900-2100) 44344 at 1909 in Newry; R.Netherlands via Bonaire, Ned.Antilles **15.315** (Eng to Africa 1830-2025) 32233 at 1930 in Liverpool; VOA via Botswana **15.445** (Eng to Africa 1900-2200) 44444 at 1940 in Stalbridge; Voice of Indonesia, Jakarta **15.150** (Eng to Eur, Africa 2000-2100) 44444 at 2000 by **Ross Lockley** in Galashiels & 45544 at 2006 in Landsberg, Germany; RCI via Sackville **15.325** (Fr, Eng to Eur, Africa 1900-2129) 45544 at 2004 by **Fred Pallant** in Storrington; KTBN Salt Lake City, USA **15.590** (Eng to N.America 1000-0000) 44444 at 2030 in Morden; DW via ? **15.135** (Eng to W.Africa 2100-2150) 33323 at 2115 in Truro; WYFR via Okeechobee **15.695** (Eng to Eur, Africa 1600-2200?) 44444 at 2144 by **Martin Cowin** in Kirky Stephen; R.Taipei Int via WYFR **15.600** (Eng to Eur 2200-2300) 45444 at 2245 in Manchester.

Good reception from some areas has been evident in the **13MHz (22m)** band. R.Austria Int via Moosbrunn **13.730** (Eng to Eur 0730-0800) was SIO444 at 0754 in N.Bristol; SRI via Sottens? **13.685** (Eng, It, Ger, Fr to Australasia 0830-1030) 33323 at 0830 in Truro; DW via Wertachtal **13.780** (Ger to S.Eur 0600-2000) 43333 at 1200 in Stalbridge; R.Prague via Litomyšl **13.580** (Eng to Africa 1300-1327) 34433 at 1300 in Dudley; UAER, Dubai **13.675** (Eng to Eur 1330-1355) 45444 at 1332 in Freshwater Bay; R.Sweden via Horby **13.740** (Eng to Asia, Pacific 1330-1400) 54444 at 1347 in Plymouth; R.Austria Int via Moosbrunn **13.730** (Eng to Eur, Africa 1630-1700) 35434 at 1645 in E.Bristol Croatian R, Zargreb **13.830** (Cr, Eng to N.America 1230-2100) 44454 at 1706 in Manchester; R.Norway Int **13.830** (Norw to E.Eur, M.East 1700-1730) SIO444 at 1715 in Macclesfield.

During the evening Vatican R, Italy **13.765** (Eng to Africa 1730-1800) was 34333 at 1740 in Colyton; DW via Sines? **13.790** (Eng to W.Africa 1900-1950) 44444 at 1917 in Newry;

AIR via Bangalore **13.620** (Ar to M.East 1730-2000) 54434 at 1950 in Liverpool; WHRI via Noblesville, USA **13.760** (Eng to E.USA, Eur 1500-2100) 22321 at 1953 in Oxted; RCI via Sackville **13.650** (Eng, Fr to Eur, Africa 2000-2200) 55555 at 2029 in Bridgwater; R.Sweden **13.830** (Eng to Eur 2030-2100) 35533 at 2045 in Landsberg, Germany; R.Ukraine Int, Kiev **13.590** (Eng to Eur 2100-2158) 44444 at 2100 in Appleby; R.Havana Cuba **13.720** (Eng to Eur 2030-2130) 24432 at 2100 in Galashiels.

Later, R.Austria Int via Moosbrunn **13.730** (Eng to Africa 2130-2200) was SIO444 at 2130 in Co.Fermanagh; WEWN Birmingham, USA **13.615** (Eng to N.America 2130-2300) 23343 at 2207 in Woking; RCI via Sackville **13.670** (Eng to USA, Caribbean, S.America 2200-0000) 44444 at 2232 in St.Austell; R.Australia via Shepparton **13.605** (Eng to Pacific 0000-0800) 32332 at 0110 in Kilkeel.

Early risers in the UK may be able to receive R.New Zealand's broadcast to Pacific areas in the **11MHz (25m)** band. It now on **11.905** (Eng 04597-0706) and was rated 35533 at 0706 in Wallsend. Also received during the morning were R.Finland on **11.945** (Eng to Eur 0630-0700), rated 55555 at 0650 in Herstmonceux; Voice of Greece, Athens **11.645** (Gr, Eng to Eur, Australia 0600-0800) 34323 at 0652 in Woking; R.Australia via Shepparton **12.080** (Eng to Pacific



## LOCAL RADIO CHART

Freq (kHz)	Station	ILR BBC	e.m.r.p (kW)	Listener
1260	Brunel CG, Bristol		1.60	L,O
1260	Marcher G, Wrexham		0.64	C
1260	SabrasSnd, Leicester		0.29	C
1260	R.York	B	0.50	A
1278	Ci.Gold 1278 W.York		0.43	C,F
1296	Radio XL, Birmingham		5.00	ACE*,J,L,N,O*
1305	Magic AM, Bamsley		0.15	A,C,F
1305	Premier via ?		0.50	O*,J,L
1305	Touch AM, Newport		0.20	L,O
1323	Capital G, Southwick		0.50	B*,O*,J,L
1323	SomersSnd, Bristol	B	0.63	A,C,O
1332	Premier, Battersea		1.00	J,L
1332	Ci.Gold 1332 Pt'bo		0.60	A,C
1359	The Breeze, Chelms'd		0.28	J
1359	Ci.Gold 09, C'try		0.27	C
1359	R.Solent	B	0.85	L
1359	Touch AM, Cardiff		0.20	M
1368	Southern Counties R	B	0.50	O*,J*,J,L
1368	Wiltshire Sound	B	0.10	L,M
1377	Asian Sd, Rochdale		0.10	C,F
1413	R.Gloicester via ?	B	?	G,H,M
1413	Premier via ?		0.50	O*,J,L,O*
1413	Yks Dales R, Skipton		0.10	A,C,F
1431	The Breeze, Southend		0.35	J
1431	Ci.Gold, Reading		0.14	D*,J,L
1449	R.Peterboro/Camb's	B	0.15	A,C
1458	R.Cumbria	B	0.50	A
1458	R.Devon & Dorset	B	2.00	A,O
1458	1458 Lite AM March'		5.00	C,F
1458	Sunrise, London		50.00	O*,J,L
1476	CountySnd, Guildford		0.50	O*,J,L
1485	Ci.Gold, Newbury		1.00	J
1485	R.Merseyside	B	1.20	A,C,F*,J,N
1485	Southern Counties R	B	1.00	J,L
1503	R.Stoke-on-Trent	B	1.00	A,C,F*,J,L
1521	Heartbeat 1521AM,NI		0.50	A,B,N
1521	Fame 1521, Reigate		0.64	J,L
1530	R.Essex	B	0.15	J
1530	Ci.Gold W.Yorks		0.74	A,C,F,J
1530	Ci.Gold Worcester		0.52	J,M
1548	R.Bristol	B	5.00	O
1548	Capital G, London		97.50	J,L
1548	Magic AM, Merseyside		4.40	A,C,F,N
1557	R.Lancashire	B	0.25	A,C,F,I*
1557	Ci.Gold 1557 N.hant		0.76	I*,J
1557	Capital G, So'ton		0.50	J,L
1584	London Turkish R		1.20	J
1584	R.Nottingham	B	1.00	C*,J,L
1584	R.Shropshire	B	0.50	A,J
1602	R.Kent	B	0.25	J,L

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

Listeners:-

- (A) Robert Connolly, Kilkeel.
- (B) John Court, Birmingham.
- (C) Martin Dale, Stockport.
- (D) John Eaton, Woking.
- (E) Adam Farnsworth, Bridgnorth.
- (F) Stuart Graham, Ashton under Lyne.
- (G) Francis Heame, N.Bristol.
- (H) Simon Hockenhill, E.Bristol.
- (I) Sheila Hughes, Morden.
- (J) Brian Keyte, Bookham.
- (K) Frank Miles, SW London.
- (L) George Millmore, Wootton, IoW.
- (M) Harry Richards, while in Hereford.
- (N) Tom Smyth, Co.Fermanagh.
- (O) David Stevenson, Swansea.
- (P) Tom Winzor, Plymouth.

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areas 2300-0900) SIO333 at 0734 in N.Bristol; HCJB Quito **11.960** (Eng to Eur 0700-0900) 44433 at 0744 in Oxted; Voice of Indonesia, Jakarta **11.785** (Eng 0800-0900) SIO232 at 0830 by **Jim Fuller** in SE.London; REE via Noblejas **12.035** (Sp to Eur 0700-1700) 44444 at 1012 in Plymouth; R.Jordan via Al Karanah **11.690** (Eng to W.Eur, E.USA 1000-1630) 33343 at 1150 in Liverpool.

During the afternoon AWR via KSDA Agat, Guam **11.980** (Eng, Mand to China 1300-1500) was 44554 at 1315 in Larnaca, Cyprus; RCI via Skelton, UK **11.935** (Eng to Eur 1330-1400) 34333 at 1340 in Freshwater Bay; Egyptian R, Abis **11.560** (Pers to M.East 1330-1530) SIO111 at 1354 in Macclesfield; R.France via Allouis? **11.910** (Eng? to M.East, Africa 1400-1500) 13332 at 1419 in Stockport; R.Japan via Sri Lanka **11.880** (Eng to Asia 1400-1500) 32323 at 1440 in Stalbridge; R.Australia via Shepparton **11.660** (Eng to Asia 1330-1700) 33433 at 1539 in Bridgwater; Voice of Vietnam, Hanoi **12.020** (Eng to Africa 1600-1630) 33333 at 1600 in Morden.

In the evening R.Australia via Shepparton **11.880** (Eng to Pacific areas 1700-2200) was 24332 at 1810 in Newry; R.Kuwait via Kabd **11.990** (Eng to Eur, N.America 1800-2100) 44423 at

1810 in Colyton; Voice of the Mediterranean, Malta via Russia **12.060** (Eng to Eur 1900-2000 [Not Fridays]) 44444 at 1900 in Dudley; AIR via Bangalore **11.620** (Eng, Hi to Eur 1745-2230) 43543 at 1909 in Manchester; VOA via? **11.870** (Eng to Pacific areas 1900-2000) 32333 at 1909 in Woodhall Spa; Voice of Vietnam, Hanoi **12.020** (Eng, Fr to Eur 1900-2000) 44444 at 1940 in Rugby; Voice of Russia **11.675** (Eng to Eur, Africa 1800-2100) 55555 at 2010 by **John Court** in Birmingham; R.Damascus, Syria **12.085** (Eng to Eur 2005-2105) 55455 at 2013 in Kirkby Stephen; R.Algiers Int via Bouchaoui **11.715** (Eng to Eur, M.East, Africa 2000-2100) 44444 at 2020 in Galashiels.

Later, R.Budapest, Hungary **11.700** (Eng to Eur 2100-2130) was 22222 at 2100 in Appleby; DW via Wertachtal **11.865** (Eng to Africa 2100-2150) SIO444 at 2100 in Co.Fermanagh; BBC via Ascension Is **11.835** (Eng to W.Africa 1930-2300) 33333 at 2100 in N.Italy & 44444 at 2118 in St.Austell; R.Bulgaria, Sofia **11.720** (Eng to Eur 2100-2200) 55555 at 2120 in Bridgnorth; BBC via Ascension Is **12.095** (Eng to S.America 2000-0200) 35443 at 0018 in E.Bristol; RTM Rabat, Morocco **11.920** (Ar to E.Eur, M.East 0000-0500) 44433 at 0110 in Kilkeel.

R.New Zealand has also been reaching the UK in the 9MHz

## MEDIUM WAVE CHART

Freq (kHz)	Station	Country	Power (kW)	Listener	Freq (kHz)	Station	Country	Power (kW)	Listener
520	Hof/Wurzburg (BR)	Germany	0.2	B*	828	Rotterdam	Holland	20	H*,K*
531	Ain Beida	Algeria	600/300	H*,I*,K*	828	Barcelona(SER)	Spain	50	H*
531	Berg	Germany	20	H*,I*,K*	837	Nancy	France	200	H*
531	RNE5 via ?	Spain	?	H*,I*	837	COPE via ?	Spain	?	H*,I*,M*
531	Beromunster	Switzerland	500	E*,L	846	Rome	Italy	540	H*,I*
540	Wavre	Belgium	150/50	B,H*,I,K*,L*,M	855	Berlin	Germany	100	C,H*
540	Sidi Bennour	Morocco	600	I*	855	RNE1 via ?	Spain	?	B*,H*,I*,K*
549	Les Trembles	Algeria	600	I*,K*	864	Santah	Egypt	500	B*,I*,K*
549	Thurnau (DLF)	Germany	200	B*,I*,K*,M*	864	Paris	France	300	B,H*,I
558	Espoo	Finland	100	I*	864	Socuellamos(RNE1)	Spain	2	I*,K*
558	RNE5 via ?	Spain	?	H*,I*,K*,M*	873	Frankfurt(AFN)	Germany	150	H*,I*
567	Tullamore(RTE1)	Ireland (S)	500	B*,EF*,GJK*,LMN	873	Zaragoza(SER)	Spain	20	H*,I*,K*,M*
576	Muhlacke(SDR)	Germany	500	H*,K*	873	Enniskillen(R.U.I)	UK	1	B*,H*,L
576	Riga	Latvia	500	I*	882	COPE via ?	Spain	?	H*,I*
576	Barcelona(RNE5)	Spain	50	I*,M*	882	Washford(BBCWales)	UK	100	B,G,H*,I,LM,N
585	Drf Wien	Austria	600	I*	891	Algiers	Algeria	600/300	B*,H*,I*,K*
585	Paris(FIP)	France	8	B,I	891	Huisberg	Netherlands	20	I*
585	Madrid(RNE1)	Spain	200	B*,H*,I*,K*,M*	900	Brno(CRo2)	Czech Rep	25	H*,I*,K*
585	Dumfries(BBCScott)	UK	?	H*	900	Milan	Italy	600	F*,H*,M*
594	Frankfurt(HR)	Germany	1000/400	B*,H*,I*,K*,L	900	COPE via ?	Spain	?	B*,I*
594	Muge	Portugal	100	H*,I*	900	B'mans Pk(BBC5)	UK	140	B,I,L,M
603	Lyon	France	300	H*,M	918	Domzale	Slovenia	600/100	I*
603	Oradea	Roumania	50	I*	918	Madrid(R Int)	Spain	20	B*,H*,I*
603	Sevilla(RNE5)	Spain	50	B*	927	Volvertem	Belgium	300	B,H*,I,M*
603	Sousse	Tunisia	10	I*	936	Bremen	Germany	100	H*,I*,M*
603	Newcastle(BBC)	UK	2	G,H*,L	954	Brno (CRo2)	Czech Rep.	200	I*
612	Athlone(RTE2)	Ireland (S)	100	F*,G*,I*,L,M	963	Sofia	Bulgaria	150	I*
612	RNE1 via ?	Spain	10	I*	963	Pori	Finland	600	H*,I*,K*
621	Wavre	Belgium	80	B,H*,I,K*	963	Tir Chonail	Ireland (S)	10	LM*
621	Barcelona(OCR)	Spain	50	H*,I*	972	Hamburg(NDR)	Germany	300	H*,I*,K*
630	Vigra	Norway	100	I*	981	Alger	Algeria	600/300	B*,I*,K*
630	Tunis-Djedeida	Tunisia	600	I*	990	Berlin	Germany	300	H*,I*
639	Praha(Liblice)	Czech	1500	H*,I*	990	R.Bilbao(SER)	Spain	10	H*,I*,K*
639	RNE1 via ?	Spain	?	H*,I*,K*	990	Redmoss(BBC)	UK	1	H*,L
648	RNE1 via ?	Spain	10	H*,M*	990	Tywyn(BBC)	UK	1	G,M
648	Orfordness(BBC)	UK	500	B,F,G,I,K*	999	Schwerin (RIAS)	Germany	20	H*
648	Kharkiv	Ukraine	150	I*	999	Madrid(COPE)	Spain	50	H*
657	Napoli	Italy	120	I*	1008	Flevo(Hilv-5)	Holland	400	B*,H*,I,M
657	Madrid(RNE5)	Spain	20	H*,I*	1017	Rheinsender(SWF)	Germany	600	B*,H*,I*,K*
657	Wrexham(BBCWales)	UK	2	G,K*,L*	1017	RNE5 via ?	Spain	?	I*,K*
666	Messkirch(Rohrd(SWF))	Germany	150	H*,I*,K*,M	1026	SER via ?	Spain	?	B*,H*,K*,M*
666	Sirkunai(R.Vilnius)	Lithuania	500	H*	1035	Tallinn	Estonia	500	B*
675	Lopich(R10 Gold)	Holland	120	B,E,H*,I,K*	1035	Lisbon(Prog3)	Portugal	120	H*
684	Sevilla(RNE1)	Spain	500	H*,I*,K*	1044	Oresden(MDR)	Germany	20	H*
684	Avatla(Beograd-1)	Yugoslavia	2000	H*,I*,K*	1044	Sebaa-Aioum	Morocco	300	K*
693	Droitwich(BBC5)	UK	150	B,I,K*,M	1044	SER via ?	Spain	?	M
693	Enniskillen(BBC5)	UK	1	L	1044	S. Sebastian(SER)	Spain	10	H*,I*,K*
702	Flensburg(NDR)	Germany	5	H*,I*	1053	Zaragoza(COPE)	Spain	10	H*,K*
702	Monte Carlo	Monaco	40	H*,I*	1053	Talk R.UK via ?	UK	?	B,D*,I,K*,LM,N
702	Slovensko 1 via ?	Slovakia	?	C	1062	Kalundborg	Denmark	250	H*,I*
711	Rennes 1	France	300	E,H*,I,K*,M*	1062	R.Uno via ?	Italy	?	I*
711	Laayoune	Morocco	600	I*	1071	R.France via ?	France	?	I*
720	Langenberg	Germany	200	K*	1071	Brest	France	20	I*
720	Lisnagarvey(BBC4)	Ireland (N)	10	I*	1071	Lille	France	40	H*
720	Norte	Portugal	100	H*	1071	Riga	Latvia	50	I*
720	Lots Rd.Ldn(BBC4)	UK	0.5	B,G,I,L	1071	Bilbao(EI)	Ireland	5	I*
729	Cork(RTE1)	Ireland (S)	10	B,I,L,M	1071	Talk Radio UK via ?	UK	?	K*
729	RNE1 via ?	Spain	?	H*,I*,K*	1080	SER via ?	Spain	?	H*,I*,K*
738	Paris	France	4	I	1089	Talk Radio UK via ?	UK	?	B,I,K*,M
738	Barcelona(RNE1)	Spain	500	H*,I*,K*,M*	1098	Nitra(Jarok)	Slovakia	1500	H*,I*,K*
747	Flevo(Hilv2)	Holland	400	B,E,H*,I,K*	1107	AFN via ?	Germany	10	H*
756	Braunschweig(DLF)	Germany	800/200	H*,I*,K*	1107	Talk R.UK via ?	UK	?	B,I*,M*
756	Bilbao(EI)	Spain	5	H*,M*	1125	La Louviere	Belgium	20	H*,I*
756	Redruth(BBC)	UK	2	G,H*,I	1125	Deanovec	Croatia	100	K
765	Sottens	Switzerland	500	H*,I*	1125	RNE5 via ?	Spain	?	I*
774	Enniskillen(BBC)	Ireland (N)	1	H*,L	1125	Llandrindod Wells	UK	1	G,M
774	RNE1 via ?	Spain	?	H*,I*,K*	1134	Murmansk & Saransk	Russia	75 & 30	K
783	Leipzig(MDR)	Germany	?	H*,I*,K*	1134	COPE via ?	Spain	2	I*,M*
783	Miramar(R.Por)	Portugal	100	H*	1134	Zadar(Croatian R)	Yugoslavia	600/1200	A*,H*,I*,K
792	Limoges	France	300	I,K*,M	1143	AFN via ?	Germany	1	A*,H*
792	Lingen(NDR)	Germany	5	I*	1143	COPE via ?	Spain	?	I*
792	Sevilla(SER)	Spain	20	H*,I*,K*	1161	Ain-Salah	Algeria	5	I*
792	Londonderry(BBC)	UK	1	L	1161	Strasbourg(Flint)	France	200	H*
801	Muncheim-Ismaning	Germany	300	H*,I*,K*	1179	Solovborg	Sweden	600	B,D*,H*,I*,K*
801	RNE1 via ?	Spain	?	H*,I*,K*	1188	Kuurne	Belgium	5	H*,I*
810	Madrid(SER)	Spain	20	H*,I*,K*	1188	Szolnok	Hungary	135	I*,M*
810	Westerglen(BBCScott)	UK	100	G,I*,K*,L,M	1197	Munich(VOA)	Germany	300	H*
819	Batra	Egypt	450	B*,I*	1197	Virgin via ?	UK	?	B*,D*,J,K,L
819	Toulouse	France	50	H*	1206	Bordeaux	France	100	H*
819	Warsaw	Poland	300	H*,I*	1215	Virgin via ?	UK	?	B*,I,K,L,M
					1224	Lelystad	Holland	50	H*
					1233	Liege	Belgium	5	H*,I
					1233	Virgin via ?	UK	?	B*,K*
					1242	Marseille	France	150	E*,H*
					1251	Marcali	Hungary	500	H*
					1251	Huisberg	Netherlands	10	H*
					1260	SER via ?	Spain	?	H*,M*
					1260	Guildford (V)	UK	0.5	B*,I
					1269	Neumunster(DLF)	Germany	600	B*,H*,I*,K
					1278	Dublin(Cork(RTE2))	Ireland (S)	10	B*,G,H*,I*,K*,L,M
					1287	RFE via ?	Czech Rep.	400	H*,I*
					1287	Lerida(SER)	Spain	10	B*,H*,I*
					1296	Valencia(COPE)	Spain	10	B*,H*
					1296	Orfordness(BBC)	UK	500	B*,G
					1305	RNE5 via ?	Spain	?	H*
					1314	Kvitsoy	Norway	1200	B*,F*,H*,I*,K
					1323	W'brunn (V.Russia)	Germany	1000/150	A*,O*,E*,H*,K
					1332	Rome	Italy	300	B*,H*,I*,K
					1341	Lisnagarvey(BBC)	Ireland (N)	100	B*,F*,G,I*,K,L,M
					1341	Tarrasa(SER)	Spain	2	I*
					1350	Nancy/Nice	France	100	I*
					1350	Cesvaine/Kuldiga	Latvia	50	B*,I*
					1359	Madrid(RNE)	Spain	600	B*
					1368	Foxdale(Manx R)	I.D.M.	20	A*,F*,G*,H*,I*,L
					1377	Lille	France	300	H*,I,M*
					1386	Bolshakovo	Russia	2500	B*,E*,H*,I*,K
					1395	TWR via Flake	Albania	500	H*,K*
					1395	Lopic	Netherlands	120/40	B*,H*,I,M*
					1395	Petrozavodsk	Russia	50	K*
					1404	Brest	France	20	B*,H*,I,K*
					1413	RNE5 via ?	Spain	?	H*
					1422	Alger	Algeria	50/25	I*
					1422	Huesweiler(DLF)	Germany	1200/600	B*,H*,I*,K*
					1431	Kopani	Ukraine	500	B*,H*
					1440	Marnach(RTL)	Luxembourg	1200	B*,H*,I,K*,M
					1440	Damman	Saudi Arabia	1600	A*,B*,H*
					1449	Squinzano (RAI)	Italy	50	B*,H*
					1449	Redmoss(BBC)	UK	2	E*,K*
					1467	Monte Carlo(TWR)	Monaco	1000/400	B*,H*,I*,K*,M*
					1476	Wien-Bisamberg	Austria	600	D*,E*,K*
					1485	SER via ?	Spain	?	B*
					1494	Clermont-Ferrand	France	20	B*,H*
					1494	St.Petersburg	Russia	1000	E*,F*,H*,I*,K*
					1503	Tagard	Poland	300	B*,E*,H*
					1512	Volvertem	Belgium	300	B*,D*,E*,F*,H*,K
					1521	Kosice(Cizitate)	Slovakia	600	B*,H*,I*
					1521	Duba	Saudi Arabia	2000	I*,K*
					1530	Vatican R	Italy	150/450	G,H*,I*,J*,M*
					1539	Mainflingen(ERF)	Germany	350/700	H*,I*,K*,L
					1539	SER via ?	Spain	?	B*,K*
					1557	Kaunas (R.Vilnius)	Lithuania	75	H*
					1566	Sarnen	Switzerland	300	K*
					1575	SER via ?	Spain	5	B*,H*,I*,K*
					1584	SER via ?	Spain	2	B*,I*,K*,M*
					1593	Holzkirchen(VOA)	Germany	150	F*,H*,I*,K*

## TROPICAL BANDS CHART

Freq (MHz)	Station	Country	UTC	DXer	Freq (MHz)	Station	Country	UTC	DXer
3.200	TWR Manzini	Swaziland	1910	B,R	5.010	AIR Thiru'puram	India	0024	B,L,R
3.210	REE via Costa Rica	Costa Rica	0100	L	5.015	R.Brazil Tropical	Brazil	2314	C
3.223	AIR Simla	India	1725	R	5.020	La V du Sahel, Niamey	Niger	0505	B,R
3.240	TWR Shona	Swaziland	0315	R,U	5.025	R.Parakou	Benin	2319	C
3.245	AIR Lucknow	India	1730	R	5.025	R.Rebelde, Habana	Cuba	0545	A,B,R,U
3.255	BBC via Meyerton	S.Africa	2022	D,K,L,Q,R	5.025	R.Uganda, Kampala	Uganda	1842	L,M,R
3.270	SWABC 1, Namibia	SW.Africa	2015	B,H,K,L,M,R	5.030	AWR Latin America	Costa Rica	0407	A,B,R
3.290	Namibian BC, Windhoek	SW.Africa	2140	B,R,U	5.030	RTM Kuching	Sarawak	2020	M
3.300	R.Cultural	Guatemala	0300	D,U	5.035	R.Educacao Rural	Brazil	0025	B
3.306	ZBC Prog 2	Zimbabwe	1950	B	5.035	R.Bangui	C.Africa	1924	L
3.315	AIR Bhopal	India	0025	H,R	5.045	R.Cultura do Para	Brazil	2234	C
3.320	SABC (RSG) Meyerton	S.Africa	1914	B,L,R	5.047	R.Togo, Lome	Togo	2020	A,B,C,H,L,M,P,R
3.325	FRCN Lagos	Nigeria	0515	H	5.050	R.Tanzania	Tanzania	1927	B,L,R
3.345	AIR Jaipur	India	0027	R	5.055	RFO Cayenne(Matoury)	French Guiana	2355	B,R
3.365	GBC R-2	Ghana	1940	B	5.060	PBS Xinjiang, Urumqi	China	0010	L
3.365	AIR Delhi	India	1747	R	5.075	Caracol Bogota	Colombia	0408	A,B,H,N,R
3.915	BBC via Kranji	Singapore	2100	A,B,F,L,Q,S	5.100	R.Liberia, Totota	Liberia	2021	A,L,M,P
3.950	Qinghai PBS, Xining	China	2240	C,L					
3.955	BBC via Skelton	England	0400	L,U					
3.955	Nexus, Milan	Italy	2000	B,E,L,Q					
3.965	RFI Paris	France	2253	A,L,Q,U					
3.970	R. Korea via Skelton	England	2100	A,E,L					
3.975	R.Budapest	Hungary	1916	A,B,E,I,K,L,O,P					
3.980	BBC via Skelton	UK	0500	U					
3.985	Nexus, Milan	Italy	1928	A,G,K,L					
3.985	China R.Int via SRI	Switzerland	2100	A,E,L,Q,S,T					
3.995	DVW via Julich	Germany	2100	A,B,L,Q,U					
4.005	Vatican R.	Italy	1921	A,B,F,K,L,Q					
4.330	Xinjiang BS, Urumqi	China	0015	B					
4.500	Xinjiang BS, Urumqi	China	0005	B,L					
4.735	Xinjiang, Urumqi	China	0012	B,L					
4.755	R.Educ CP Grande	Brazil	0005	B					
4.760	AIR Port Blair	India	1647	R					
4.770	FRCN Kaduna	Nigeria	1910	A,B,L,M,Q,R					
4.775	AIR Imphal	India	1645	R					
4.775	TWR Manzini	Swaziland	0400	R					
4.777	R.Gabon, Libreville	Gabon	1925	B,R					
4.783	RTM Bamako	Mali	1925	A,B,L,R					
4.790	AIR Itanagar	India	0011	A,B					
4.790	Azad Kashmir R.	Pakistan	1749	R					
4.800	AIR Hyderabad	India	1732	R					
4.815	R.Difusora, Londrina	Brazil	0005	B					
4.815	R.diff TV Burkina	Ouagadougou	1920	B,L,R					
4.820	R.Botswana, Gaborone	Botswana	1930	B,L,P,Q,R					
4.828	ZBC R-4	Zimbabwe	1730	R					
4.830	R.Botswana, Gaborone	Botswana	0330	U					
4.830	R.Tachira	Venezuela	0032	B,D,R					
4.832	R.Rejo	Costa Rica	0500	H,R					
4.835	R.Tezulutlan, Coban	Guatemala	0015	B					
4.835	RTM Bamako	Mali	1928	A,B,L,M,Q,R					
4.840	AIR Bombay	India	0018	B,L,R					
4.845	RTM Kuala Lumpur	Malaysia	1817	R					
4.845	ORTM Nouakchott	Mauritania	1910	B					
4.850	R.Yaounde	Cameroon	1917	A,K,L,M					
4.850	AIR Kohima	India	0041	H,Q,R					
4.860	AIR Delhi	India	1845	M,N,R					
4.865	PBS Lanzhou	China	2305	A,C,Q					
4.870	R.Cotonou	Benin	2012	B,H,L,M,U					
4.870	Voz del Upann	Ecuador	0015	B					
4.885	R.Clube do Para	Brazil	0020	B					
4.885	R.Difusora Acreana	Brazil	0020	B					
4.885	KBC East Sce Nairobi	Kenya	1936	B,K,L,M,R					
4.890	RFI Paris	via Gabon	0400	A,L					
4.900	Haixia 2.V.of Strait	China	2220	A,Q					
4.915	R.Anhanguera	Brazil	0502	R					
4.915	GBC-1, Accra	Ghana	2012	A,B,M,Q					
4.915	KBC Cent Sce Nairobi	Kenya	1847	L,M,P					
4.920	R.Quito, Quito	Ecuador	0320	A,B					
4.920	AIR Chennai	India	0019	B,L,R					
4.930	AIR Shimla	India	1808	N					
4.940	AIR Guwahati	India	0021	B,L					
4.945	R.Ilimani, La Paz	Bolivia	2323	C					
4.950	AIR Srinagar	India	1735	B,N,R					
4.950	VOA via Sao Tome	Sao Tome	2012	A,B,I,L,M,Q,R					
4.955	R.Nac. de Colombia	Colombia	0047	A,B,C,H,R					
4.960	R.Cima	Dominion Rep.	0606	A					
4.960	VOA via Sao Tome	Sao Tome	0510	A,L,M,U					
4.960	Hanoi Z	Vietnam	2323	Q					
4.965	Christian Voice	Zambia	1940	B,R					
4.975	R.Uganda, Kampala	Uganda	1841	A,B,F,M,PLR					
4.980	PBS Xinjiang, Urumqi	China	0010	B,L					
4.980	Ecos del Torbes	Venezuela	0022	A,B,D,H,L,Q					
4.985	R.Brazil Central	Brazil	0035	A,B,C,H,R					
5.005	R.Nacional, Bata	Eq. Guinea	1842	M					
5.005	R.Nepal, Kathmandu	Nepal	0020	B,R					
5.009	R.TV.Madagascar	Madagascar	1736	R					
5.010	R.Garoua	Cameroon	2047	L					

DXers:-

- (A) Michael Casey, Manchester.
- (B) Robert Connolly, Kilkeel.
- (C) John Eaton, Woking.
- (D) David Edwardson, Wallsend.
- (E) Andreas Erbe, Landsberg, Germany.
- (F) Bill Griffith, while in Alassio, N. Italy.
- (G) Bill Griffith, while in Treora, N. Italy.
- (H) David Hall, Morpeth.
- (I) Simon Hockenhill, E. Bristol.
- (J) Robert Hughes, Liverpool.
- (K) Rhoderick Illman, Oxted.
- (L) Eddie McKeown, Newry.
- (M) Fred Pallant, Storrington.
- (N) John Parry, Larnaca, Cyprus.
- (O) Clare Pinder, while in Appleby.
- (P) Vic Prier, Colyton.
- (Q) Robert Shacklock, Westwood, Notts.
- (R) John Slater, Scalloway, Shetland Is.
- (S) Tom Smyth, Co.Fermanagh.
- (T) Martin Verner, St. Austell.
- (U) Ernest Wiles, NE.Bedford.

(31m) band. Their broadcast to Pacific areas on **9.700** (Eng 0707-7) was rated 35553 at 0707 in Wallsend & 23332 at 0926 in Oxted. Also noted during the morning were R.Nederlands via Bonaire, Ned.Antilles **9.720** (Eng to Pacific 0730-0925) 43434 at 0630 in SW.London; R.Australia via Shepparton **9.710** (Eng to Pacific areas 0800-0900) 32233 at 0815 in Stalbridge; TWR Monte Carlo, Monaco **9.755** (Eng to Eur 0700-0850 Mon-Fri) 44433 at 0820 in Colyton; HCJB Quito, Ecuador **9.640** (Eng to S.Pacific 0700-1100) 24332 at 0901 in Bridgwater; Christian Science SWB via WSHB **9.835** (Eng to Eur 0800-1000) 54545 at 0902 in Manchester; R.Vilnius, Lithuania **9.710** (Eng to Eur 0930-1000) 11111 at 0930 in Plymouth; R.Vlaanderen Int, Belgium **9.925** (Eng to Eur, M.East 1030-1055) 44444 at 1032 in St.Austell; R.Nederlands via Wertachtal **9.860** (Eng to Eur 1030-1225) 54444 at 1049 in Freshwater Bay.

During the afternoon R.Norway Int, Oslo **9.590** (Nor to Eur 1300-1330) was 33322 at 1300 in Truro; AWR via KSDA Guam **9.385** (Eng, Hin?) 33553 at 1440 in Larnaca, Cyprus; R.Mediterranean Int via Nador, Morocco **9.575** (Fr, Ar to N.Africa, S.Eur 0500-0100) 32232 at 1445 in Liverpool; ORTM Bamako, Mali **9.635** (Fr, Ar? to W.Africa 0758-1757) 44343 at 1525 in Woking; Voice of Azerbaijan, Baku **9.165** (Eng? to M.East) 35233 at 1700 in Newry.

Later, the BBC via Skelton, UK **9.410** (Eng to Eur, N/C.Africa 0300-0830, 1130-2230) was 55555 at 1849 in Kirkby Stephen; AIR via Aligarh? **9.950** (Hi, Eng 1745-2230) 43443 at 1915 in N.Italy & 55555 at 2050 in Bridgnorth; R.Bulgaria, Sofia **9.700** (Eng to Eur 1900-2000) 44444 at 1925 in Woodhall Spa; VOIRI Tehran, Iran **9.022** (Eng to Eur 1930-2030) 55434 at 1945 in E.Bristol; Polish R, Warsaw **9.525** (Eng to Eur 1930-2030) 33333 at 1955 in Rugby; Swiss R.Int via Sottens? **9.905** (It, Ar, Eng, Ger, Fr to Africa 1830-2130) 44344 at 2000 in Appleby; Voice of Armenia, Yerevan **9.965** (Eng to Eur, USA 2015-2045) 33433 at 2015 in Galashiels; R.Sweden **9.430** (Eng to Eur 2130-2200) SIO444 at 2130 in Co.Fermanagh; China R.Int, Beijing **9.920** (Eng to Eur 2000-2157) 54444 at 2150 in Herstmonceux; RCI via Sackville **9.755** (Eng [CBC progs] to USA, Caribbean 2200-0300) SIO444 at 2309 in N.Bristol; HCJB Quito, Ecuador **9.745** (Eng to N.America 0000-0400) 33443 at 0050 in Kilkeel.

Quite a few of the broadcasts in the **7MHz (41m)** band are intended for European listeners. Some originate from WYFR via Okeechobee, USA **7.355** (Eng 0600-0800, also to Africa), rated 44444 at 0615 in Plymouth; R.Japan via Woofferton, UK **7.230** (Jap, Eng 0500-0700) 44433 at 0640 in Herstmonceux; R.Prague, Czech Rep **7.345** (Eng 0700-0727) 45455 at 0701 in

Manchester; R.Vlaanderen Int, Belgium **7.290** (Eng 0730-0755, also to Australia, S.America) 34343 at 0737 in Newry; AWR via Forli, Italy **7.230** (Eng 0930-1000) 33333 at 0930 in Morden; Sudwestfunk via Rohrdorf **7.265** (Ger 24hrs) 43333 at 1520 in Stalbridge; R.Vlaanderen Int, Belgium **7.290** (Eng 1630-1655) 54444 at 1636 in St.Austell; AIR via Bangalore **7.410** (Hi, Eng 1745-2230) 42232 at 1910 in Liverpool & 43443 at 1920 in N.Italy; R.Budapest, Hungary **7.170** (Eng 1900-1930) 54444 at 1924 in Freshwater Bay; R.Thailand via Udonthani **7.210** (Eng 1900-1958) 43553 at 1935 in Bridgwater; RAI Rome **7.145** (Eng 1935-1955) 34333 at 1940 in E.Bristol; Polish R, Warsaw 7.285 (Eng 1900?-1955) 54233 at 1951 in Woking; RCI via Skelton, UK **7.235** (Eng 2000-2130, also to Africa) SIO555 at 2045 in SW.London; R.Romania Int, Bucharest **7.105** (Eng 2100-2156) 23332 at 2100 in Galashiels; R.Tirana, Albania **7.165** (Eng 2130-2200) 44444 at 2140 in Bridgnorth.

Many more may be received in the **6MHz (49m)** band. During the evening some originate from the BBC via Cyprus **6.180** (Eng 1700-2200), rated 53333 at 1802 in Kirkby Stephen; Sudddeutscher Rundfunk, Muhlacker **6.030** (Ger) 43354 at 1820 in Colyton; R.Slovakia Int **6.055** (Eng 1830-1857) 53553 at 1835 in Bridgwater; SRI via Lenk? **6.165** (Ger, It, Fr. Eng 1830-2030) 44333 at 1930 in Oxted; Bayerischer Rundfunk, Germany **6.085** (Ger 24hrs) 44333 at 1950 in St.Austell; R.Prague, Czech Rep. 5.930 (Eng 2000-2030) 54544 at 2000 in Galashiels; BBC via Rampisham & Skelton, UK **6.195** (Eng 0200-0730, 1530-2230) 55555 at 2015 in Liverpool; RCI via Skelton, UK **5.995** (Fr, Eng 1900-2100) 54444 at 2030 in Appleby; R.Sweden via Horby **6.065** (Eng 2030-2100) 54444 at 2052 in Plymouth; China R.Int via Russia? **6.950** (Ger, Eng 1900-2157) 43333 at 2120 in Stalbridge; R.Yugoslavia **6.185** (Eng 2100-2130) 43343 at 2123 in Newry; R.Tirana, Albania **6.025** (Eng 2130-2200) 32222 at 2130 in Rugby; R.Austria Int via Moosbrunn **6.155** (Eng 2130-2200) 54444 at 2150 in Bridgnorth; R.Ukraine Int **6.020** (Eng 2100-2200) 42443 at 2152 in Woking.

Some intended for other areas are seldom reported. They include the BBC via Nakhon Sawan, Thailand **5.965** (Eng to Asia 2100-0000), rated 34343 at 2328 in Manchester; R.Satellite, Santa Cruz, Peru **6.726** (Sp 2300-0300) 33333 at 0117 in Morpeth.





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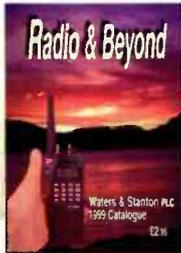
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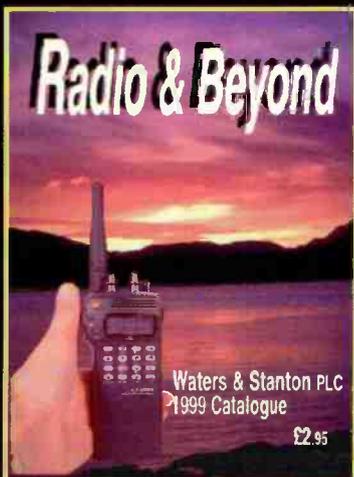
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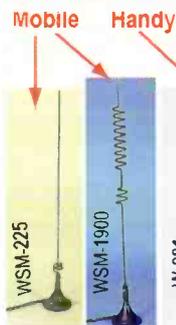
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- \* Plugs directly into the headphone socket
- \* Drives speaker or headset to good volume
- \* Requires 12v DC at approx. 500mA.

**PRICE MATCH**

# New NRD-545 Receiver



**£1299**

- \* 0 30MHz
- \* SSB AM FM
- \* DSP Filter
- \* Extensive filtering
- \* Notch filter
- \* Noise Blanker
- \* Huge memory capacity
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**£19.95** Fits easily onto sun visor.  
Supplied with 5m or cable fitted 3.5mm plug

# NEW QS-400 Mobile Mount

- \* Mounts handy or GPS on dash grill
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- \* Quick release feature.
- \* Doesn't use nasty adhesive!

**NEW**

# ICOM PCR-1000

+ FREE ACARS Software!



10kHz to 1300MHz SSB FM AM computer receiver. The remote black box plugs directly into your PC. Because it can be positioned remotely from the PC, there is no problem with interference. The is the next generation of receivers - here now! Its performance knocked our socks off.

**NEW DSP version £369.95**  
Offer ends 6th April, 1998

# WATSON Hunter Counter



**£59.95**

Displays the frequency of nearby radio transmissions in an instant. Ideal for use with scanners

- \* 10MHz-3GHz
- \* 8 Digit Display
- \* Battery Save
- \* Hold button
- \* 6hr batt. life
- \* Ni-cads
- \* Charger
- \* Antenna

Range up to 150ft

# Radio Controlled Weather Centre

Radio Controlled Clock, Weather Trend, Remote Wireless Temperature Sensor Barometer + Much More



**£69.95**

- \* 3-channel Temp (C or F)
- \* Forecast, Trend, Memory
- \* Clock (MSF Rugby)
- \* Barometer
- \* Day, Date, Month
- \* Alarm & Zone Time
- \* Low Batt. Indicator
- \* Clear LCD readout
- \* Requires 4 x AA cells
- \* 182 x 133 x 28mm

This unit will grace any radio room. At last you have accurate time and a full weather report without stepping outside. The remote outside sensor sends data back up to 75ft away. Two optional additional remote sensors can also be purchased.

# Radio Controlled Clock



**£19.95**

- Locked to Rugby
- Ideal shack clock
- Time Day & Date
- Second time Zone
- 2 Alarm times
- 2-minute crescendo alarm
- Low battery indicator
- Requires 2 x AAA cells
- Size 110 x 86 x 42mm

Offered at an amazing price, this radio controlled clock will always be right! It automatically locks to the Rugby standard time signal. Ideal for radio rooms.

# WMM-1 Multimode Modem

- \* Packet, AMTOR, CW
- \* SSTV, Fax, RTTY
- \* NAVTEX, SYNOP
- \* Transmit and receive
- \* Needs PC 286 or better
- \* Includes software
- \* No external power required
- \* Connects to RS-232



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HA22R hardware option

## Amateur Radio SSB/CW Receiver Kit - £22.90!

This great little receiver makes an excellent project for the novice constructor and experienced operator alike! The plug-in band system gives a wide frequency range. One band kit included, extra band kits £7.90 each (band kits from 1.8 to 30MHz). This receiver can also be expanded into an amateur transceiver with add-on kits! Amazing performance and easy to build!  
DC2000 Electronic kit: £22.90 (inc. one band module), with HA22R Hardware: £41.80.



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Clean up your reception!

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Companion transmitter kits from £24.90

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XM1	Crystal Frequency Marker - provides accurate calibration signals	£16.90

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DXR20 Kit, £39.90 + DCS2 "S meter" Kit + HA20R hardware pack = £79.70 (pictured)

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AA2.	Covers 150kHz to 30MHz. The neat compact answer for those with limited space.	Kit: £8.90	Assembled PCB module: £14.90
AA4.	Covers 25 to 1300MHz. Broad-band performance in a neat, compact package.	Kit: £19.90	Assembled PCB modules: £28.90
AB118.	Optimised for long distance reception on 118 to 137MHz air-band.	Kit: £18.80	Assembled PCB modules: £27.90
MB156.	156 to 162MHz marine band active antenna system (the brother of AB118!)	Kit: £18.50	Assembled PCB modules: £27.60



### Antenna Tuning Units for use with HF receivers

CTU8. Covers 500kHz to 30MHz. Matches antenna impedance and helps reduce spurious signals and interference with extra front-end filtering for the receiver. SO239 sockets. Factory Built: £49.90. Kit (including case and all hardware): £29.90.

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Please add £4.00 P&P, or £1.50 P&P for electronics kits without hardware.

HOWES KITS contain good quality printed circuit boards with screen printed parts locations, full, clear instructions and all board mounted components. Sales, constructional and technical advice are available by phone during office hours. Please send an SAE for our free catalogue and specific product data sheets. Delivery is normally within seven days.

73 from Dave G4KQH, Technical Manager.

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## Computer Interfaces for AOR & Alinco equipment

We now produce several interfaces for the AOR range of scanners together with the Alinco DJ-X10. The JAV-232 opposite remains the most versatile option available offering compatibility with various receivers. However, for those looking for basic computer control without some of the features found on the JAV-232 we now offer the following:-

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Basic computer interface for the new AR8200 housed in a DB-25 socket. Direct connection to AR8200 via the remote socket. £39.99.

### RS-8000/RS-2700

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### RS-X10

Computer interface for Alinco DJ-X10 in a DB-25 socket. Direct connection to DJ-X10 via the 2.5mm socket on the top. £29.99.

### DJ-X10R SOFTWARE

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If you would like further information please feel free to telephone, write or E-mail, it would be nice to speak with you. If you would like a catalogue would you please send a large SAE (31p). Thanks.

You can E-mail via [info@javiation.co.uk](mailto:info@javiation.co.uk) or visit our web pages <http://www.javiation.co.uk/> for further information

## New 1998 VHF/UHF Airband Frequency Guide with Callsigns

Our 1998 VHF/UHF Airband Guide is now available. Published in July the new edition has been expanded to over 300 pages and contains invaluable information for the airband listener including over 9000 military callsigns. Ring bound for easy reference. £12.50 including P&P.

### NEW JAV-232 Computer Interface

While the AR8000 was the main reason for us producing the JAV-232 it is now compatible with the new AR8200 together with AR2700. Icom equipment, Alinco DJ-X10, Optoelectronics Scout and any other receiver requiring a TTL interface.

#### Main features

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- Discriminator output when used with AR8200
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OS-8200 (£12.95) required for use with AR8200

■ Greg Baker, PO BOX 3307, MANUKA, ACT 2603, AUSTRALIA

■ E-MAIL: greg@pcug.org.au

# Bandscan Australia

**T**his time I have news of the latest Federal election in Australia, news of Radio New Zealand, the latest from Radio Australia, more news of the National Transmission Agency and government radio networks and a few other items.

## Australian Elections

The Australian federal elections were held in October. The conservative Liberal-National Party coalition were returned with their previously huge 27 seat majority in the House of Representatives reduced to single figures. At the time of writing, there has been no news on the composition of the next government front bench or whether Senator Alston the Minister for Communications and the Arts in the previous government has managed to retain his portfolio.

The government went to the polls with a promise to introduce a value added tax here referred to as a goods and services (GST) tax and a promise to put in place guarantees to keep the tax unchanged indefinitely at 10%. Among other things, the government claimed that the cost of radios and televisions would drop in this tax regime; the current wholesale sales tax on these items runs at 32%.

In the aftermath of the election where a majority of Australian voters expressed a preference for candidates against the introduction of a GST, the incoming government is claiming a mandate for these tax reforms because it has a slim majority of seats. It remains to be seen how this works out in practice, but probably very few Australians expect a future GST to remain at 10% for too long.

## Radio New Zealand

Radio New Zealand International (RNZI) was 50 years old on 25 September 1998. To commemorate, the station broadcast a special two hour program presented by Myra Oh who presents the RNZI Mailbox program and Adrian Sainsbury, RNZI's Frequency Manager.

The program traced the history of RNZI through archival material using the help of several veteran broadcasters. For those sending reception reports of this program or any others on 25 September, RNZI produced a special commemorative QSL card.

Radio New Zealand, like its cousin Radio Australia across the Tasman Sea, has had significant funding reductions amounting to 13% following New Zealand's latest budget. From early August, weekly transmissions were cut by 12 hours with station closure moved from 1200 to 1015UTC.

The breakfast segment has been retained but the 2230-1015UTC time slot is now a relay of Radio New Zealand's (RNZ) domestic National Radio output. Daily broadcasting segments prepared for audiences in the South Pacific have been reduced from eleven to five hours and all Pacific Island indigenous language services have been cut.

The station's staff numbers have been reduced by a quarter to nine people. According to former RNZI head Ian Johnstone reported in *Radio and Communications* magazine, three government sponsored reviews by independent analysts have shown the cost effectiveness of RNZI.

RNZI now runs for \$NZ700,000 (about £220,000) which observers seem to think is a remarkably small sum for the output achieved. I'm inclined to agree.

Meanwhile RNZI has been seeking applicants for a person to compile and produce a 30-minute weekly program on National Radio devoted to science, research and development. The person sought needed a science background and strong communication, planning, research and analytical skills.

Until 25 March 1999 RNZI can be found on 6.145MHz from 1650-1751UTC Monday to Friday, on 11.675MHz from 1752-1851UTC Sunday to Friday and from 1752-1858 on Saturday, on 17.675MHz from 1952-0705UTC Sunday to Thursday and 1959-0705UTC Friday and Saturday and on 9.700MHz from 0706-1015UTC every day. RNZI is off the air every day from 1015-1650UTC.

Radio New Zealand can be contacted at **PO Box 123, Wellington, New Zealand**. E-mail is at [info@rnzi.com](mailto:info@rnzi.com) and the RNZI web site is at <http://www.rnzi.com/contents.htm>

## Government Radio Networks

Government radio networks are in the news again. In South Australia the national telecommunications carrier Telstra has won the contract to provide a government trunk radio network to provide Motorola-based voice, data and paging services. The network will primarily deliver critical communications for emergency service organisations including the police, fire brigade, ambulance, country fire service and state emergency services.

Meanwhile in New South Wales (NSW) the state government has had to inject \$59 million (£21 million) into its troubled state government radio network (GRN). Emergency services organisations have complained that the system is too expensive, is technically inadequate and is too limited in coverage.

The NSW Rural Fire Service is reported as building its own network after complaining of brigades during bushfires being unable to communicate with one another and channels being unavailable. It also complains of the \$27 (£10) monthly charge per set for over 6500 transceivers.

The NSW ambulance service is building networks for areas not covered by the GRN. The GRN has run to double its original budget while only providing for half the originally projected number of users.

## National Transmission Agency

Before the election the government reaffirmed its intention of selling the National Transmission Agency, the agency responsible for operating 550 transmission facilities used by the Australian Broadcasting Corporation (ABC), the Special Broadcasting Service and others. The government announced that it would push the legislation for the sale through the Australian Senate as soon as possible.

If blocked there the government announced the intention of amending the sale strategy to allow the sale without Senate approval. The sale was scheduled to be completed by the end of June this year but the legislation was delayed undergoing enquiry by the Senate Legislation Committee.

The proposed sale is in line with current government economic thinking on the role of the public and private sectors throughout the economy. Now doubt this sale will be pushed through by the new government under whoever is chosen to lead up the portfolio.

## Radio Australia

In the light of drastic funding cuts over the past few years Radio Australia (RA) has been restructured and redefined in an attempt to retain a role as a provider of information in the Australian region. According to the RA web site at <http://www.abc.net.au/ra/> new specialist programmes such as *Asia Pacific* and *Pacific Beat* have been introduced to provide coverage of regional issues and to complement RA's extensive news coverage of events in Australia, Asia and the Pacific.

The station has also identified education as a field of opportunity in the international multimedia environment. RA believes in this context that it's experience at producing English language learning programs and its capacity to deliver programming in English and a range of Asian languages put it in a strong position to be a partner for educational institutions.

Initially RA has joined forces with Melbourne's Monash University to produce a 13 part radio series and website which RA claims is breaking new ground in production and delivery for RA and the University. In addition multimedia delivery has become a core activity for RA.

The station's English language programmes and programmes in Indonesian are available in audio and news bulletins in Chinese, Indonesian, Khmer, Pidgin and Vietnamese are updated daily on the web. RA's current schedule can be found at <http://www.abc.net.au/ra/swave.htm>

## RA Reception

**Martyn Gardiner** from Portsmouth has reported again on RA reception. He says that reception has been satisfactory on 9.500MHz at around 2000-2100UTC and that 15.415MHz comes in sometimes during the mornings at around 0700UTC. Martyn has also tried 17.750 and 21.725MHz without success.

In general he says that RA reception is improving to the extent that he can at times get a strong enough signal to be heard with a pocket sized Sony receiver with an in-built 300m antenna. At other times Martyn resorts to his JRC tuning one sideband to pull in the RA signal.



## Other News

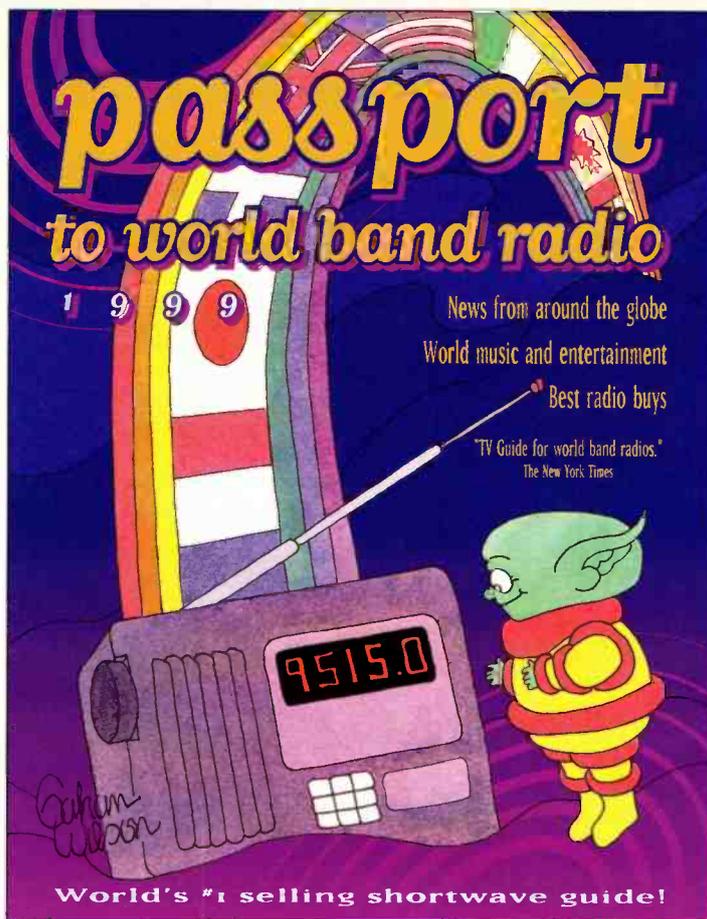
More spectrum space in the 3.4GHz band has been released for auction by the government. Senator Alston has said that he expects the spectrum will be used for Wireless Local Loop service as it has been in overseas countries. Part of this spectrum has been freed up from Department of Defence use for which it had been reserved.

As is usual in this country the conservative parties have complained of ABC bias against them during the recent election campaign and two NSW regional radio stations began charging election candidates for on air interviews outside normal news bulletins. The opposition Labour party promised a \$12.5 million (£4.5 million) injection into RA to re-open the Cox Peninsula RA transmission site if it won office. The re-election of the conservative Liberal-National government has meant this remains only a possibility under a future Labour government.

The Australian federal government's illicit drug strategy is funding a new secure radio communications network in the Torres Strait area between the northern tip of the Australian mainland and New Guinea. The network will link law enforcement agencies in the area and ensure clear communications between federal and state agencies. The system will be provided by Motorola and based around the APCO-25 digital system.

## And Finally

I welcome any news and comments. In particular I am interested in any s.w.l. information on Australian stations heard by SWM readers so I can chase up more details and interesting snippets from this end. My address is **PO Box 3307, Manuka, ACT 2603, Australia**. For personal replies please send two IRCs. Those with an Internet connection can get me at the address at the top of the page.



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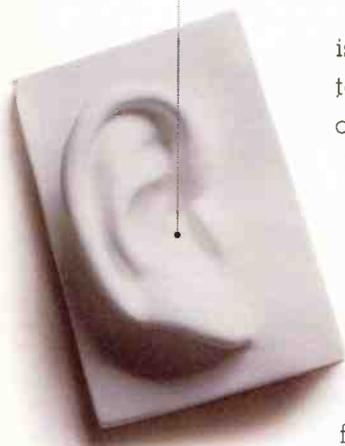
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# Welcome To The Satellite TV Special

Roger Bunney with an introduction to this month's mega satellite section...

**K**evin Nice our Editor approached me earlier in '98 with the suggestion of a mega satellite section incorporating the usual 'Satellite TV News' column and intimated a free hand to content and layout.

Rather than adopt a hard content approach to maximise information in minimum column centimetres - it's impossible to include everything and there are a couple of excellent books recommended later - I've used a conversational approach with information and fact coupled with past experience.

I've assumed you have an interest but know little about the subject - a bit like me I suppose! I regard this as a hobby, minimising outlay, a non competitive non QSLing activity - an entertainment perhaps that also informs - the media term is 'infotainment'! John Locker, a well experienced digital activist

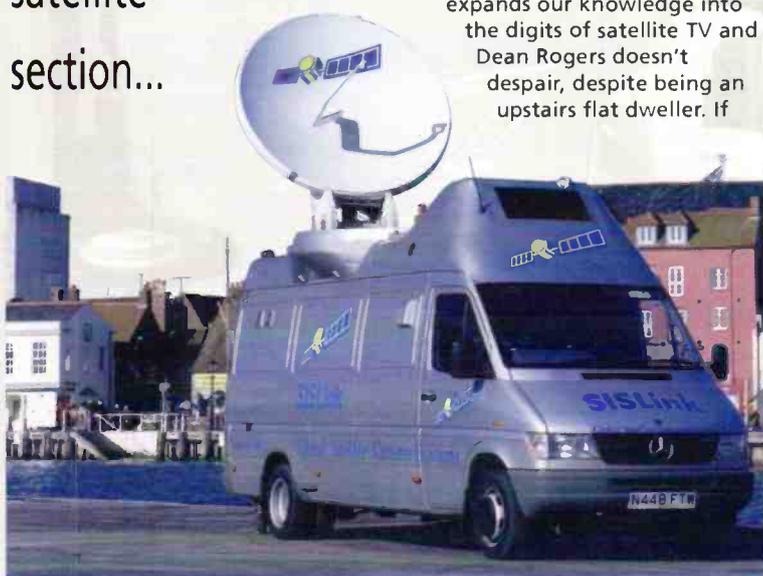
expands our knowledge into the digits of satellite TV and Dean Rogers doesn't despair, despite being an upstairs flat dweller. If

## Satellite - A Preamble

In the beginning there was Arthur C. Clarke - he spoke of the theory, then on October 4, 1957 the Russians flew *Sputnik-1* and we all heard the bleep-bleep of weak signals at 19.95MHz as the shiny sphere circulated the globe - theory was now approaching practice. November 3, 1957 and the Russians did it again - *Sputnik-2* with a dog on board, was up in space - the world marvelled but America was deeply concerned since the 'enemy' had the potential of satellite surveillance (and more) over their heads orbiting daily - you could set your clock to Sputnik! The Americans were rattled sufficient to throw more hardware into orbit during the early 60s and trans-Atlantic TV via *Telstar* - only about 20 minutes of signal access as geostationary orbital slotting still had to be achieved - but this in turn was perfected with early TV from stationary orbit into India 1975-6. Satellite television had arrived!

## In the Beginning...

It was the 70s when satellite television first became a rather specialised form of amateur (home) reception, few had the knowledge, awareness or



The SISLink truck on Poole Quay - and (right) some of the equipment inside.

you like this special feature section let both Kevin and me know. Feedback is most important so that I can get the content right for the next bash! Happy reading.



experience. I can cite several folk that revolutionised satellite TV reception 'in the backyard', Steve Birkill (UK), Bob Cooper and Tay Howard (North America), these guys saw the potential and

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Using the Telescopic whip provided this unit will act as a stand alone active antenna ideal for use in flats, bedsits and situations where an outside antenna is impossible.

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- Antenna: Tele whip inc for use as an active antenna

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- 15dB Front/Back



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BEARCAT UBC 200XLT.....Handheld Scanner 200 Memory Channels	225.00
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reacted accordingly with the design of equipment made out of tin cans and items readily to hand. Professional equipment for dish mounting was the realm of the industrial user with a matching cost so home grown electronics became the means of signal acquisition - it worked!

Although satellite TV had been the province of major groups like Intelsat operating at C-band (4GHz) an exciting experiment from NASA called 'SITE' - Satellite Instructional Television Experiment - via the ATS-F satellite woke up all TVDXers late 1975. I remember receiving a Christmas card December 24th 1975 and enclosed were dramatic photographs and a letter from Steve Birkill (Barnsley) showing Indian TV pictures from the ATS-F satellite @ 35°E received at u.h.f. ch.E70 - 860MHz. True the pictures were of only fair quality but from a TVDXing viewpoint it seemed incredible! Thus inspired and as the word spread TVDXers began to construct equipment, retune u.h.f. tuners to get that little much higher in frequency, a variety of dish antennas were constructed, chicken wire netting a favourite! I contracted mumps early 1976 and with three weeks absence from work I found an old sun lounger frame, stretched it out and made a mesh 'dish' reflector about 2m in diameter. A small dipole/reflector at the focal point worked and was later replaced with a Jaybeam C/D slot dipole/reflector but as the system improved I battled with trees coming into leaf and the signals reduced. But I and many other TVDXers actually received those afternoon TV pictures from India. These were true pioneering days for we early Sat-TVDXers! Meanwhile, Steve had progressed into C-band (4GHz) reception and his results and knowledge paid dividends, quality improved and international recognition followed.

### Late 1970s...

Into the late 70s and early 80s and satellite TV was becoming a recognised activity. Hugh Cocks, then in East Sussex, began making basic 4GHz systems for enthusiasts with 2m petal dishes from Harris Electronics. North America had by this time an active home backyard TVRO (TV receive only) market (4GHz) with programming appearing on many geostationary birds - though initially intended for broadcaster to transmitter link circuits, locations outside of conventional terrestrial coverage - or those seeking a richer variety in their viewing habits - were all buying into satellite TV in a big way - the term 'sat-zapping' appeared. Meanwhile in Europe the Russians had introduced their first *Gorizont-1* C-band bird into a (sort of) geostationary orbit, not forgetting the remarkable Ekran satellite series that slotted at 99°E and provided real DBS TV to the vast Siberian wastelands at high level u.h.f. 714MHz ch.51 output right hand circular. These birds had a fast, furious though short 56dBW life and required replacement every 12-18 months or so. Western Europe had opted for the upmarket Ku-band microwave bands between 10.9-12.75GHz for their early TV broadcasting and names like OTS, ECS stir memories across the late 70s onwards.

European television in the 70s maintained territorial and political independence across boundaries so as TV expanded after the war, old standards were retained where applicable and new

networks opening went straight to higher specification transmissions. The UK had system A 405-line v.h.f. and System I 625-line u.h.f., Western Europe with System B/G 625-line though France had System E 819-line v.h.f. and System L 625-line u.h.f. Eastern Europe generally used System D with 625 lines but differing transmission parameters. There are further technical variations within the above generalisations that further confuse the issue but in effect there was no common standard. Satellite TV changed all that and a common 625-line transmission standard was used (with a few subtle variations). No longer a.m. video but f.m., several tuneable audio subcarriers and perhaps the most important, a single satellite transmission downlink at relatively low power could cover vast areas - even the whole of Europe.

Wide coverage isn't good news for movie producers, music providers or for governments. Suddenly we're into copyright infringement or the potential for free speech or propaganda. Television without boundaries is good news for the consumer but bad news for a film company that seeks payment for their products being shown in all regions, suddenly anyone can receive the film - that's why Sky scrambles its output and will only supply 'smart cards' to UK addresses - it maintains viewing to the UK only (in theory that is). It's bad news for certain governments that censor news and suddenly there's a supply of the truth raining down from the skies into everyone's backyard! The usual reaction is to ban the use of satellite dishes.

### Mid 1980s...

Mid 80s and imported mainly US originated equipment started appearing on the market, early days brought manually tuned receivers - not unlike a radio and OK for the few satellites then available. It was basic, unsophisticated solid engineering. Rupert Murdoch and money changed everything, perhaps he is the Marconi of satellite TV. He took over Sky Television, then an early cable programme provider and thus Sky was formed. In competition with BSB (British Sky Broadcasting) that were to operate at 19°W using D-Mac transmissions on five high level output channels using 'Squarials', Rupert Murdoch opted to partner SES-Astra and operate conventional standard transmission - enter Amstrad with their basic 16 push button integrated decoder/receivers plus pressed dishes at rock bottom prices from the 19.2°E Astra slot. Astra 1A was orbital and operated first, Murdoch cornered the market and effectively killed BSB. Commercial forces triumphed.

### Into the 90s

TV into the 90s expanded, remote control tuning, threshold extension, many hundreds of memories with over 100 TV channels available from 19.2°E. Eutelsat and Hot Bird, Sirius and soon a veritable procession of TV downlinking satellites strung across the European sky in geostationary orbit some 36000km above our planet and only 3° apart. Sky used the FSS (fixed satellite service) band as Astra was not truly a DBS satellite but now frequencies between 10.70-12.75GHz are now regularly used for TV transmission and Astra has expanded across the DBS band with their Astra 2A digital series (Digital will be covered elsewhere).

It's not only TV programming that is available

from geostationary orbit. Services such as corporate news and sports all use satellite for linking and satellite zapping enthusiasts extract much enjoyment from tuning across known satellites employed within the telecommunications service seeking out rare, amusing and informative news transmissions. Unfortunately within journalism bad news is better than good news, bad news sells newspapers, has TV impact and attracts viewers. News feeds beaming back from the Yugoslavian conflict would portray headless torsos in close-up, a coach crash killing ten passengers in Spain would carry close-ups of bodies being extracted. Whereas such pictures are shown as a matter of course in Europe and elsewhere, UK viewers are usually protected from the excesses of violence and the nastier aspects of the real world are often edited out.

Live TV is now a matter of course, pictures from anywhere can be uplinked from a small SNG van via satellite to the TV centre and then back via Sky News

(and Astra) into your sitting room. Expansion of satellite TV has produced much of the World's TV programming being on tap in Europe - excepting perhaps SE Asia, Australasia and South America. The growth of LEOs - low earth orbiting satellites - may well spell the end of cellphone base stations and we must not forget the WorldSpace Corporations' L-band downlinking radio programmes from satellites such as *AfriStar*, *AsiaStar* and *AmeriStar* which launches October '98, January and June '99 respectively and offer digital, f.m. and a.m. fade-free radio at CD quality programming over vast tracts of the Earth's surface, will these spell the end of short wave radio as we know it today? Satellite delivered Internet is also just around the corner.

Satellite technology continually involves and evolves. Radio and TV stood the test of decades with little change, yet in the space of a few years the whole facade of communication has changed and is changing even quicker as technology accelerates. **SWM**

# Satellite Reception How Do You Start?

**T**he question often arises from aspiring DX enthusiasts and *SWM* readers considering satellite reception as a hobby 'How do I start with satellite TV reception?' The response is generally that I cannot write a book for them as a one-off and usually refer them to a learned volume such as *Satellite Know How!* by John Breeds, 6th edition, Swift Television Publications, ISBN 1 872567 12 6 from the *SWM* Book Store or for the more affluent *The Satellite Book* by the same author and publisher, the 1997, 5th edition ISBN 1 872567 11 8. End of a well intended commercial but there is much to know and read about - as a hobby one should tend to enjoy it without use of an open ended cheque book - once the reader has the awareness he can read advertisements in *What Satellite TV* and pick specific components suited to his needs.

As already intimated the satellites that we're interested in lie along the Clarke Belt, that is the geostationary belt some 36000km high over the Equator. Here in Europe, many of these satellites are spaced about 3° apart and so to receive them we need to track our satellite antenna (dish) along that invisible path - but we are North of the Equator and so that path rises in our South East, peaks due South at about 30 degrees (varies according to our location North - if we lived on the Equator then we'd track a line rising due East, passing directly over our heads and falling due West) elevation

and then falls away to the South West. It follows therefore that we need to select a position for our receiving dish that can maximise its clear view of the satellite belt from the SE through to the SW. The ideal location is perhaps South Wight or a South UK coastal location where you can track down to the sea horizon both ways. In practical terms, most of us are less fortunate and we have neighbours' houses, trees and other domestic trappings.

Satellite signals will not travel through trees in leaf, a fence or a house - it needs a clear view so select your position wisely taking into account possible vandals, neighbour nuisance (they may not like your dish) and council planners. If you live in a listed building, conservation area or that of outstanding natural beauty you need to speak to your council planner first. Generally, you are allowed to erect a single 900mm dish on or about your house, in the garden. Larger dishes need planning permission, I'd not bother to ask about a 1m example but if you have a 10m dish you need to talk to someone! (your bank manager for one! - Ed) There's a



Typical Ku-band EIRP performance (dBW) from In-Orbit tests.



600mm offset feed dish.

DOE book about satellite dishes in the domestic environment, your local planning department will have one on the counter. Established readers will recall my battle with planners and planning enforcement following a neighbour's complaint over my 1.2m and 1.5m dish garden installation which were in addition to the 650mm domestic Astra dish soon after my move to a new house. The battle was fought on loss of visual amenity, reduction of immediate property values, dangers to health, the need for so many antennas on or about my property - I won the war but you fight on your own behalf and photography is a good weapon in confirming sightlines from 'enemy' territory. Planners shouldn't use the view from upstairs bedroom windows looking down into your garden, this is invasion of privacy!



Typical LNBs.

### The Dish

We need a dish, my advice is to consider a size no smaller than a 900mm, if funds allow a 1 or 1.2m. You will regret buying a smaller dish later so opt if possible for the larger option. Generally there are two versions of dishes in common use.

Firstly, the **offset** dish, this is the usual one found on houses for Astra reception, there's an arm protruding from the bottom holding the electronics. It's usually an elliptical shape and may be mesh or solid, made in an aluminium or press steel in black, white or colours in between. These dishes usually are available up to about 1.2m and above that size manufacturers usually opt for a **prime focus** dish, circular with the electronics held at the focal point in the centre of the dish. Normally prime focus dishes are solid aluminium and pressed or spun into an accurate parabola - dishes for Ku-band use must have a surface accuracy better than  $\pm 0.5\text{mm}$ .

The larger the dish the greater the capture area from the weak satellite signals, in other words the higher the gain. The larger the dish diameter then the narrower the beam width - that is the pointing accuracy. A typical 800mm offset dish has a gain of 39.0dBi and beam width at 3dB points of  $2.1^\circ$  in the Ku-band @ 12GHz. A 2.4m dish in Ku-band will have a typical 48.1dBi gain with a 3dB beam width of  $0.72^\circ$  - the larger the dish the higher the gain and the narrower the forward pickup characteristics. Ku-band runs overall from 10.700-12.750GHz which includes the FSS (10.7-11.7), DBS (11.7-12.5) and Telecom (12.5-12.75) bands. C-band need not concern this discussion as larger dishes plus specialised equipment are necessary and it's better perhaps to gain your experience from Ku-band first.



LNB with 90° feed.



Polarisers from SMW.

### Keeping On Track

Tracking the Clarke Belt satellite arc thus needs a motor system that will rise from the south east horizon to a peak in the South and then fall again to the south west. Up to recent times there were two options, fixing the dish to a 'Polar Mount' and utilising an 'Actuator Arm' to provide the push or pull which in turn would track the dish via the mechanics accurately along the prescribed arc - fitted on dishes of all sizes though generally the larger versions. The alternative is the 'Horizon To Horizon' motor H to H) which is a 'tidier', self-contained assembly that provides the same function of arc tracking but limited to dishes up to about 1.2m

maximum. All the books describe the simplicity of setting up these tracking systems, personally I found them a time consuming fiddle and have always sought a friendly experienced dish installer to accurately set them up! The actuator arm or H to H motor will be controlled via wires from an indoor control unit - a stand alone box, sometimes integrated in upmarket receivers.

One final point - brilliant white as a dish colour might look good but it stands out in daylight and visually offends, I suggest a dark coloured dish, green, dark grey and the like, my older 1.5m dish was sprayed with a green water based silicone paint from Homebase - 'Plasti-kote' decorative water based all purpose spray paint in satin finish, approx. £5.20 a can - it took four cans but it's now visually inoffensive - the manufacturer claims  $1.9\text{m}^2$  coverage per can. As the dish tilts to receive signals more towards the horizon the signal path is longer and may encounter all types of weather *en-route*. Heavy rain will make the signal fall in strength and you'll suffer rain-fade. Very heavy rain is destructive to satellite signals and I have seen the downlink from Astra just fade into noise as rain completely wipes out the incoming signals.

### The LNB

The electronic bit in the focal point of the dish is the LNB - Low Noise Block Downconverter - it converts the received 10.7-12.75GHz down to a lower i.f. within typically the 700-2100MHz band for coaxial cable connection to your satellite receiver. You might find in use the LNBF - similar to the LNB but with an integrated **Feedhorn**. To ensure that the electronics receive optimum signal transfer from the dish reflector the feedhorn ensures that the pickup encompasses the shape of the dish with no overlap (i.e. over the edge of the dish as it would then pick up noise from your privet hedge, etc.). The LNBF is made for a specific dish shape and generally is for the offset type of dish. Prime focus dishes will have differing feed systems such as Scalar Rings and your dish supplier will provide the appropriate components - be guided by them.

The incoming signals, focussed into the feedhorn will be either vertically or horizontally polarised and need to be sorted into a single polarisation signal for the minute  $1/4$  receiving stub mounted inside the input waveguide aperture of the LNB input. Most installations use ferrite (magnetic) polarisers, a waveguide tube section with a ferrite core around which is a coil, it's current controlled and with switching allows for vertical and horizontal selection - skew control is also available on stand alone polarisers to optimise polarity slant when tracking down to the horizon.

The LNBF combines the function of feedhorn, polarity switching and LNB operation. Mechanical polarisers use a small motor that turns a probe within the waveguide to change polarisation - they're not too popular having a tendency to stick though have negligible insertion loss compared to the contemporary ferrite version that has typically 0.2dB over the Ku-band.

The LNB amplifies the weak signal within the designed (wide) bandwidth. The days of single band LNBs, those with a range of 10.9-11.7GHz are over and we're now into dual band (less popular) or universal LNBs - now the most popular. The dual band LNB will typically switch from 10.7-11.9GHz (low) and 11.8-12.8GHz (high) by changing the applied voltage between 13 and 18V from the receiver via the downfeeder. The universal LNB covers the similar two



bands but since a switching voltage is required for polarity change between vertical and horizontal, the band changing from low to high is achieved by sending - via the downfeeder - a 22kHz tone.

Typical LNB signal voltage gains on conversion to i.f. are around 55-60dB. However, the most important performance aspect of any LNB is the noise performance - the lower the noise the less sparklies on the picture for a given dish size - look for an LNB of known pedigree offering noise figures of under 1dB and in 1999 you can easily find a reasonably priced item offering 0.7dB - but lower noise means more £s! Incidentally, if you are offered an 'enhanced LNB' these were made to include the *Astra 1D* frequencies that went down to 10.7GHz i.e. total coverage of an enhanced LNB is 10.7-11.7GHz. The wise enthusiast will opt for a true wideband LNB covering the 10.7-12.75GHz bandwidth.

The downconverted satellite signal is now at an i.f. of between 700-2150MHz - these are high frequencies and use high quality coaxial cable, as a minimum CT100, it's foil and braid screened. I have actually used high quality u.h.f. domestic TV cable but I don't recommend it especially if you live near a cellphone base station as frequencies used lie across part of the LNB i.f. output band and interference breakthrough has happened. Treat the coaxial download carefully, smooth wide bends and don't hammer plastic clips to squash or damage the cable as this causes extreme mismatches, standing waves and signal loss.

### The Receiver - And I'm Talking Analogue

Buy a copy of the *What Satellite TV* magazine. Don't read my 'Satellite Search' article (!) but check the publication through for prices of satellite receivers - confusing isn't it. You can happily go and spend nearly £3000 for the latest Chaparral Monteray with digital add-ons and dish, high quality, works well and if you've a large cheque book - off you go...

If you're like me, the day job grind and the few articles still preventing an early retirement - at least with money - hobby toys have a low financial priority compared with the need for Kwik Save groceries. I'm often asked, "what do you recommend?"

I have several receivers and they all receive their Ku-band dish signal via a modified CB p.s.u. which provides +14/18V LNB band switching and LNB power and also via separate twin flex, a ferrite polariser adjustment with continuous skew. Out of the CB p.s.u. into a 1 to 8 output splitter-amplifier (Global). Each receiver is either modified or d.c. blocked to prevent internally generated LNB/switching voltages from 'getting at' the LNB on the dish, thus the CB p.s.u. controls all LNB functions on the dish independent of receiver settings. The splitter-amplifier connects to all receivers and avoids the inconvenience and ultimate damage to plugs and sockets due to constant replugging - splitter-amps are available in two outputs variants and upwards. Life is operationally simple.

Two of my receivers must be now 12 years old, they're Echosphere SR-1000 and have real knobs you tune like a medium wave radio. Easy to use, quick to tune over the whole band and very basic, thus cheap! Some versions have 70MHz i.f. looping at the back so you can include bandwidth filters for improving results on weak signals. There are available 'modern' rotary tuned satellite receivers which are manufactured for Asian regions though they are finding a market in the UK for enthusiast use, lots of knobs, bandwidth, filtering, etc., but they're specially imported at a price. But none of these rotary tune knob receivers have

accurate frequency read-out. Check out satellite dealers for older rotary tuned vintage receivers, they're obsolete in this modern world except to us enlightened enthusiasts.

Normally these receivers are used in C-band regions where 3-wire control mechanical polarisers are the norm, so you'll need a special interface box to convert to 2-wire magnetic polariser use.

I can also highly recommend the budget, current production bottom range Manhattan LT-6300 Plus MkII. It's a non IRD, IR remote control with no OSD (On Screen Display) fortunately and all functions appear on the i.e.d. read-out, it fast/slow and scan tunes, has threshold extension down to 3dB and weak signals really lift out of the hash. It's a high specification DXing receiver and covers both C and Ku-band. Once you've mastered the controls it's a dream to use, I use two of them and hope to review the receiver soon within these pages.

A word of warning if you buy one of these receivers, impressed with my comments as above. These receivers are imported into the UK via Eurosat and as unwrapped are fitted with u.h.f. modulators set for System B/G West European 5.5MHz sound and not the UK System I at 6MHz. If you buy one ensure that it is realigned to 6MHz - they will realign OK as I've done my two 6300s, though it requires a removal of the p.c.b. for this operation. Unless you know what you're doing **don't** attempt this yourself! Mains voltage kills. Another UK budget receiver recommended by another DXer is the BT SVS-300. A Chinese made receiver it has 200 memories, an internal Videocrypt decoder, three rear panel SCARTs, tone switching, lots of audio subcarriers/facilities, a wideband tuner 900-2150MHz and capable of C/Ku-band operation, trade price for a single unit is £50 plus VAT from Satellite Solutions Group - you may need a 'trade' account or friend to acquire one of these.

Receivers that have found favour with satellite enthusiasts include the Echostar LT8700 (with options for Videocrypt, D2MAC, etc.) and certain models from the Strong range. Several enthusiasts have spoken favourably of Pace receivers though you really need to study the catalogues. Things to check out in a receiver are dual bandwidths 18/27MHz and/or threshold extension; fast tuning both audio and video; during the tune mode that the screen remains as 'shash' and not blanked out - this may be a problem if on screen display (OSD) is used as the screen may go blue with just the inlaid menu present. Audio tune should run from 5.00-8.5MHz and should have several bandwidth options available, the 6300 runs in steps from 110 to 500kHz with DNR, J17, 50 and 75µs correction.

All satellite receivers have both u.h.f. (r.f.) output for a u.h.f. TV antenna socket between ch.30 and 45 (some have u.h.f. modulators covering ch.21-69) and video/audio baseband outputs via either phono, SCART sockets or both. A SCART will provide connections for decoder in/out for scrambled transmissions, again the satellite press carries decoder adverts though many are 'unofficial' requiring smart cards which may be rendered useless if the broadcaster initiates ECMs (electronic counter measures) which they often do - buy them with caution, they're very popular for uncensored hard core XXX movies at midnight!



Horizon to horizon mount positioner.



Polar mount positioner.



Scalar ring feed horn and mechanical polariser.



C/Ku-band feed horn/LNB matched set.

SWM

# AR8200 *The Superior Concept*



✓ 8.33kHz steps ✓ Slot cards ✓ FREE PC control software ✓ Opto Scout reaction tune ✓ Dynamic memory sizing ✓ AFC and Noise limiter



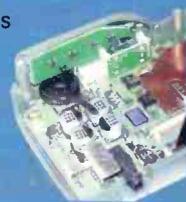
The AR8200 is the **'first'** and **'only'** (so far) receiver to correctly implement the new **8.33 kHz** airband channel step enabling spot on reception with correct tuning and searching. The flexibility of operation is proving to be marvellous with a multitude of slot cards and options available... the obvious safe investment beyond 1999.

The AR8200 is a capable receiver straight from the carton box offering 1000 memory channels, 20 memory banks, dynamic memory resizing, 40 search banks, priority, select scan, step adjust, frequency offset etc. Full frequency coverage from 530kHz to 2040MHz without gaps (minimum accepted input of 100kHz), all mode reception, programmable tuning step in all modes to a resolution of 50Hz (including 8.33kHz). All mode reception is included AM, FM, WFM, USB, LSB, CW with additional selective bandwidths for narrow AM and Super Narrow FM. Automatic Frequency Control and a Noise Limiter are also provided as standard. The bandscope facility adds a further dimension with save trace capability. Two frequency lines are provided with alphanumeric tags of up to 12 characters, edit and write protect is also featured. Side mounted arrow keys aid navigation through on-screen menus.



Supplied with the receiver is a set of 4 x AA 700mAh NiCad batteries, mains charger, 12V dc lead for mobile operation, whip aerial, bar aerial, belt hook with screws, wrist strap and (probably) the most comprehensive illustrated operating manual which has ever been provided with a hand-held receiver. The

addition of a wide range of plug-in options with supporting hardware & software places the AR8200 into a class of its own, a superior concept of design. Construction has a quality feel with internal build being miniaturised surface mount circuitry.



<b>AR8200</b>	Receiver	<b>£399.00</b>
<b>EM8200</b>	External memory slot card. Enables storage of up to 4000 memory channels for backup and restoring to the AR8200. The whole receiver's data can be saved four times over including spectrum trace. Very useful for security or when travelling around	<b>£49.90</b>
<b>CT8200</b>	CTCSS slot card. Enables detection of which sub-audible tone is in use and to control the squelch operation (particularly useful when scanning). Very useful for UHF amateur repeaters and PMR	<b>£59.90</b>
<b>RU8200</b>	Record / playback slot card. You may record and playback up to 20 seconds of audio, grab that interesting transmission!	<b>£49.90</b>
<b>TE8200</b>	Tone eliminator slot card. Enables the AR8200 to 'skip' over active channels which contain a pilot tone... used by some commercial services. <b>This is not an audio notch filter</b>	<b>£34.90</b>
<b>VI8200</b>	Voice inverter. Reconstruct certain analogue transmissions	<b>£49.90</b>
<b>CC8200</b>	PC lead with CD-ROM. Connection lead with built-in level shift for direct connection to a computer. Supplied with PDF protocol listing and PC Windows software	<b>£69.90</b>
<b>RT8200</b>	Opto Scout connection lead. Simply connect between the AR8200 and Opto Scout (V3.1 or higher) or Mini Scout for 'reaction tune'	<b>£20.26</b>
<b>OS8200</b>	ACC lead (open wire termination). Can be used for discriminator output, Scout, own PC interface building etc .....	<b>£12.90</b>
<b>CR8200</b>	Tape record lead. For remote controlled and voice activated tape recorders	<b>£34.90</b>
<b>SC8200</b>	Clear plastic protective case	<b>£17.95</b>

**Computer control** is available via a metallic side mounted robust connector. The CC8200 PC lead features a 9-pin D-type plug with built-in level shift and is powered from the radio. The CC8200 is also supplied with a CD-ROM featuring **free** PC control software (see screen shots in this ad), RS232 protocol listing plus other files including Adobe® Acrobat® reader and promotional PDF material. This software and protocol listing is also available as a **free download** from the AOR internet website [www.demon.co.uk/aor](http://www.demon.co.uk/aor) Within the first 37 hours of this appearing on the web, over 450 operators had downloaded it... very popular and a testament to the success of the AR8200!



### What's this about 8.33 kHz tuning steps?

From **7th October 1999** for parts of Europe (and a little later in the UK), the VHF airband is being revised. If your radio cannot tune in 8.33 kHz steps, you cannot correctly search the new allocation, although tuning within 1 kHz (or tuning in 1 kHz steps) will enable you to hear the traffic, you will **not** be able to search. Of course the AR8200 correctly support 8.33kHz steps.



**AOR (UK) LTD** 4E East Mill, Bridgefoot  
Belper, Derbyshire, DE56 2UA England

Tel: 01773 880788 Fax: 01773 880780

info@aor.co.uk www.demon.co.uk/aor E&OE



The AR7030 is now in its third year of production and has again been awarded **five stars** "Editor's Choice" in **Passport to World Band Radio 1999** (for the third year in succession). Interestingly, none of the newly arrived DSP competitors achieve five stars.

The AR7030 was designed to provide superior strong signal handling (especially useful for European listening at night) with low phase noise (for the best reciprocal mixing performance). *Still the AR7030 beats the recent DSP receivers in respect of close in dynamic range and ultimate rejection...* have a look at the reviews in the 1999 Passport to World Band Radio - which is now on sale.

Both Radio Netherlands and Peter Hart (RadCom) report the reciprocal mixing measurements as stunning, R.N. confirm our specification (-158dBc/Hz) and suggest this is ten times better than any comparatively priced receiver. **World Radio TV Handbook** have also awarded the AR7030 **five star** rating and in 1996/97 declared the AR7030 **Tabletop Receiver of the Year**.

A small number of cosmetic "B-grade" units are currently available directly from AOR at reduced prices. Please phone for details.

## AR7030 - still winning the analogue Vs DSP battle!!



### Monitoring Times & Radio Japan - Larry Magne

"All bandwidths have excellent shape factors. Image rejection is superb, as is IF rejection. Blocking and phase noise measurements are both excellent. Dynamic range is excellent at both 5 and 20 kHz separation points, and third order intercept measurements at 5 and 20kHz separation points are superb"

"...arguably the best receiver on the market, regardless of price..."

"...overall audio distortion is good-to-excellent... it becomes excellent-to-superb when the synchronous detector is used, and in the SSB mode is nearly nil"

### Radio Netherlands - Jonathan Marks

"Corners are rounded, there is a minimum of control knobs and the metal cabinet is beautifully engineered"

"Of the synthesiser... this is an extremely low sideband noise design..."

"We think that the phase noise of the AR7030 DDS is excellent, and much better than comparable priced and even much higher priced receivers. ...The measured phase noise values are exactly what is specified"

### RSGB RadCom - Peter Hart

"The excellent RF performance of the AR7030 is certainly most apparent in on-air tests. The receiver gives very clean results under all conditions and there is no sign of overload in demanding strong signal situations".

"The intermodulation measurements are at the limit of my measurement capability and the close-in result by far the best I have ever measured on any general coverage receiver".

"I was particularly impressed with the VLF performance".

"The AGC characteristic is ideal and I really cannot fault any of the functions of the radio".

"It is really packed with features and has a superb technical performance".

### Short Wave Magazine - John Wilson

"JT has wiped the slate clean on receivers as we know them and has rendered virtually everything else obsolete"

"...the appearance is stunning, the finish on every part is of the highest standard..."

"If you can't get sensible audio out of even a rotten signal with the AR7030 then nothing will do it"

"...there is a very good synchronous a.m. system which has the unique feature of being auto tuned"

"...I was simply amazed when I came to explore the i.f. filtering arrangements..."

### Ham Radio Today - Chris Lorek

"...rather stylish and extremely well-made cabinet"

"...I immediately thought how 'clean' the signals sounded"

"Regarding the RF performance of the set, my measured results say it all. If you're not technically minded just read these as superb. The blocking performance was so good that I found it was simply noise limited by the signal source..."

**AR7030** High dynamic range, short wave receiver. Supplied with mains power supply and comprehensive operating manual. **£799**

**AR7030 PLUS** Enhanced version, fitted with narrow AM filter, optical encoder, features CPU with 400 memory channels with alpha-tag, optimised components for highest performance. **£949**

### AR7030 'PLUS' - further enhanced version

- ✓ Wide frequency coverage 0 - 32 MHz using DDS
- ✓ All mode reception: USB, LSB, CW, AM, Synchronous AM, NFM, DATA
- ✓ High stability TCXO reference
- ✓ Features CPU fitted, 400 memories, clock, multi timers & alpha tag
- ✓ Bourns optical encoder for the smoothest DX tuning
- ✓ Typical IF bandwidth 2.2 kHz (metal cased), 4.0 kHz (metal cased), 5.5 kHz & 9.5 kHz... two spare positions still available
- ✓ Advanced IP<sup>3</sup> greater than +30dBm, high dynamic range, low reciprocal mixing
- ✓ Optimised mixer balance for greatest IP<sup>2</sup> & IP<sup>3</sup>, high tolerance 0.1% components in DDS ladder for low noise, high spec wire aerial input transformer for minimal mixing products, enhanced RF attenuator operation for minimal intermod
- ✓ Many options available...  
Collins mechanical filters, ceramic & crystal filters, FL124 daughter board for crystal filter mounting NB7030 notch filter, noise blanker, SM7030 service kit, Data-Master PC control software etc...



# Satellite DXing - the Digital Way



John Locker provides a chronology of his progress with digital reception.

It was back in 1994 that the first rumours began to circulate, digital TV was on the horizon, would this mean an end to satellite DXing as we knew it? Around that time I was involved with an educational event, which took place each year, called the 'Jason Project'. Brainchild of maritime expert, and finder of the wreck of the *Titanic*, Dr Bob Ballard. 'Jason' was a project to bring science alive by the use of 'Telepresence'.

For two weeks, each spring, live broadcasts were transmitted by satellite from a marine location to a number of receiving sites in the USA and Europe. One of those sites was the Maritime Museum in Liverpool, where I gave a hand.

Aimed mainly at students, both young and old, the transmissions, up to five a day, would attempt to give a flavour of what it was like to research the coastal area of Belize, the ancient history of the Mayan people, or the ecology of the Hawaiian Islands.

Getting the signal across the world was a masterpiece of engineering, done with military style precision, using digital compression techniques. So, it was during those broadcasts, live into Liverpool, that got my first taste of digital satellite TV!

## All Or Nothing

The system used was based on Scientific Atlanta conditional access technology and it was a particular onscreen graphic that embedded itself in my mind, when occasionally technical problems arose, it read "NO SIGNAL". That's how it was with digital, no sparklies, no weak images fighting through the noise, there was either a perfect picture, or nothing at all. No signal.

Project 'Jason' was broadcast into Europe via the *Pas 1* satellite at 45°W on the 11.639GHz vertical transponder. If I was not attending a show, and happened to be at home during transmission time, I would tune to *Pas 1*, and by fine adjustment of frequency and polarity, applying full threshold on my Echostar receiver, it was just possible to make out a slight darkening of the screen, as if tuning to a weak carrier...that was digital!

Being in constant touch with regular *SWM* satellite columnist Roger Bunney, I reported in.

"It doesn't look good Roger" I said. "Even if you have the correct equipment, if you don't know all the parameters of the transmission all you get is a blank screen!"

Would digital be the satellite DXers Nemesis?

## Everything Not Lost

Over the following months more information came to light about how digital satellite TV worked.

NTL produced an excellent pocket sized booklet which covered the mode in great detail. It was apparent that digital was like a jigsaw and only when all the pieces were together would the picture appear.

The main parameters, apart from frequency and polarity, would be FEC (Forward Error Correction rate) and Symbol rate. The final pieces of the jigsaw would be the PIDS (Packet Identifiers). All carried within the Transmission Stream (TS).

If all were known, and could be input or searched for, then, provided the broadcast was Free To Air (FTA) a picture, and sound, would appear.

That was the theory, but further investigation revealed the minefield of encryption methods and Conditional Access (CA).

1996 was to herald the arrival of the the Nokia series of digital satellite receivers. These boxes were in effect a computer based multi media machine, designed to receive the German Kirsch digital TV cable and satellite packages.

## Looking Up

Once in the hands of European satellite enthusiasts the Nokia machines were taken apart, literally! It was soon evident that earlier fears about digital newsfeeds and outside broadcasts disappearing for good were unfounded. There was a chance that these boxes could be coaxed into receiving feeds, which were broadcast in SCPC mode.

The general rule of thumb was that whilst the mainstream broadcasters took full advantage of the compressed facilities offered by digital, cramming up to 16 channels onto one transponder, the likes of Reuters, WTN and other SNG providers were using SCPC (Single Channel Per Channel). Here just one digital feed would be carried on part of or all of the transponder, and further more, the operating parameters of many of these feeds were similar. Things were looking up!

By the time variations of the Nokia D Box reached the UK, the tried and tested software was showing a few bugs. When pushed to the limits the machine would lock up. It was however apparent that whilst these machines were intended only for entertainment programming digital packages, the onboard chips would allow one SCPC channel to be stored. The world of digital satellite feeds was about to unfold!

## One Channel - Not Enough

Although storing one feed channel was a start, it was not good enough for the purists. Within a matter of weeks the European hackers had found a way into a

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Portable SW receiver with SSB and RDS. RRP ~~£199.95~~

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ATS-818  
Award winning portable SW receiver.  
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**£99.00**

Data Interface for receiving  
CW/Baudot/ASCII/Amtor/ARQ/FEC/Sitor  
A/B/Navtex, Weather Fax, and Slowscan TV.

**£39.95** P+P £2.

Including: interface and software connects to RS-232/  
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A fully adjustable desk top stand for use with all handhelds. Fitted coaxial fly (FAI) with BNC & SO239 connectors

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Allows the connection of any HF antenna to any scanner that has a BNC connector. Simply connect the long wire antenna to the push terminal on the top of the interface and attach to your scanner in place of your existing antenna.

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Superb quality short wave ATU. Ideal for scanners. Out performs any other tuner of its size. 100kHz-30MHz. BNC input/output. Connect to a long wire and you'll notice the difference.

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### Q-TEK APOLLO 2000MkII

A brilliant new compact indoor antenna that covers 0-1650MHz and is just 20" tall (collapsed). Supplied with coax and BNC plug fitted.

ONLY **£49.95** P&P £5

Comments from John Griffiths

*I have to say that I'm not a fan of indoor antennas like this as earlier desk mounted antennas tended to look like a mad scientist invention. However, I was surprised by the quality of construction of this piece of equipment and it appears to be up to the job it is designed to do. Without getting technical, the Apollo 2000 claims to be able to cover 0-1650MHz. I used it between 108-400MHz approx and was surprised by what it was able to do. It produced clean copy and there was good reproduction with very little breakthrough.*



### Q-TEK D.C. 2000

A high performance wideband antenna offering superb performance from 25-2000MHz. Transmit range: 6m, 2m, 70cm, 32cm & 23cm (power handling 200W). Fitted with low loss 'N' type connector. Supplied with mounting brackets.

OUR PRICE **£49.95** P&P £8.50

Comments from John Griffiths

*Putting the DC-2000 up gave me a tremendous boost to all signals with the ancient AR-2000 coming alive! Signals were well received and I found that I wandered out of airband - my usual haunt - into all manner of areas that previously have been less than good here due to my location!*

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AR8000	VGC	£189.95
Opto Scout	As new	£199.95
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ICF-2001D	VGC	£199.95
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now favour the digital mode.

Recently such favourites as the morning GMTV feeds regularly seen in analogue on 21°W, **Fig. 7**, have migrated to digital on the same bird.

NASA feeds too, during shuttle missions, went digital in mid 1997. **Fig. 8** shows a scene from the Cape Canaveral launch of a Hotbird satellite.

It's not only Reuters and NASA feeds that have gone digital, all the Eutelsat launches are now shown live in digital format via the Hotbirds at 13°E, **Fig. 9**.

Sky rarely use analogue these days, and the BBC have joined the digital pack.

## Good News

The good news is that 1999 should see the introduction of a number of new digital receivers, all with SCPC capacity and some with multi-sat facilities. There will even be analogue/digital combined units with dual CAMS.

Don't be put off by rumours that your existing bits and pieces won't be up to digital reception. Most quad-band LNBS purchased within the past couple of years should be fine. Existing cables, provided they are not damaged or water-logged shouldn't be a problem.

Don't forget the digital boxes also feature Electronic Programme Guides, Teletext, on screen graphics and many other features, plus hundreds of radio channels giving CD quality audio. All this and more will become familiar with the widespread introduction of Digital Terrestrial TV early in 1999, but that's another story. Meanwhile for satellite DXers, the future's bright, the future's digital!

## Quart In A Pint Pot

There's an old saying "You can't put a quart into a pint pot", and yet that's just what digital delivery does.

By taking advantage of the process of turning a picture into tiny bits of information, that information can be compressed into tiny packages. Those packages can then be reduced, or compressed, without loss of quality, using a process of redundancy.

Put simply, digital compression relies on redundancy to reduce the amount of information sent for each frame of video. Only the changes between frames of pictures are transmitted. In this way up to 90% of the information can become redundant at any one time.

It's not necessary to transmit virtually the same picture twenty five times a second, as with analogue methods. All that is needed is to transmit the difference between successive images.

This was evident during the early 'Jason' broadcasts. Sometimes the expression on the face of Dr Ballard, or his colleagues, seemed to be 'painted' on, and in effect it was, as only that part of the image was being updated - there was very little else moving in the frame, **Fig. 10** shows all.

Using this principle, the amount of transmitted data is reduced, as a result, far

more economic use can be made of the transponder bandwidth.

Where once there was only one programme being carried, with digital, two, four, eight or even sixteen transmissions can be downlinked for, in effect, the same price as one analogue transmission.

This ultimately means a reduction in costs, the real driving force behind this technology.

## Setting The Standards

The main transmission standard in Europe for digital satellite TV is 'MPEG2'. MPEG came about following a realisation that it was necessary to set industry ground rules for video and audio coding.

The basics were set by an international working group, who became known as the Moving Picture Expert Group. Initially the group came up with the basic 'design' MPEG1.

It was soon recognised that enhancements could be made to picture standards...enter MPEG2.

For the purpose of this article, it is sufficient to recognise the origins of the standard, and the basic parameters used.

The world of digital compression is a highly technical and complicated domain. To look at the subject in depth would take volumes, rather than pages! It is however important to be aware of the building blocks of the system, to ensure that the receiver you opt for can give the results you are looking for.

Most of the more recent digital receivers will now handle SCPC signals. This is a must for the reception of newsfeeds, OBs and the like.

Check that your chosen receiver also has the facility to input 'PID' values. Whilst these will normally be searched and stored automatically, occasionally a channel appears to be invisible unless the appropriate video and audio PIDs are entered manually.

## And There's More

If you are fortunate enough to have a C/Ku-band system don't overlook C-band digital - **Fig. 11** is from Comsat at 21°W. Ideally a dish in excess of 2m is required to pull in the signals from the Panamsat and Intelsat birds. The Gorizonts too are starting digital C-band transmissions.

To integrate C-band digital to your motorised system requires a couple more boxes, - see **Fig. 12** - but use the right components and you should find that signal loss is minimal.

You'll need another Power Pass filter and also a DiSEqC A/B auto switch. This is used as the present generation of digital receivers has only one LNB input, but can provide Diseqc switching.

The DiSEqC switch normally enables the digital receiver to switch between two or more LNBS, and is designed to be mounted near to the dish, on the mast - **Fig. 13**.

For this application however, it will be placed near to the receiver, and be used to switch between the C and Ku-band inputs from the two power pass filters.

Most of the present range of Digital boxes have DiSEqC switching ability.

When choosing a local oscillator frequency and band selection in the receivers set-up menu, you are prompted to input the DiSEqC info, either A or B.

If this set-up procedure is followed correctly, then the signal to the digital unit will be automatically selected, dependent on l.o. frequency. Hence the switching between C and Ku will be transparent.



Fig. 9

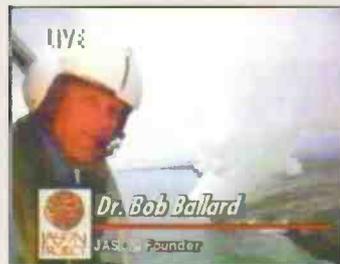


Fig. 10



Fig. 11

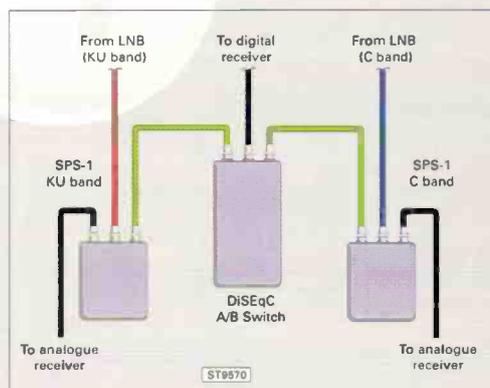


Fig. 12



Fig. 7



Fig. 8



Fig. 13

can order them direct from Global.

### Max Headroom

Whilst digital satellite TV is see/no see technology there is a very fine margin, or headroom, within which a picture may break up into tell tale digital 'boxes' and sound will be lost as per Fig. 14.

This usually happens when the received signal is marginal, due to one of a number of reasons.

The Nokia receiver has a second 'secret' engineering menu Fig. 15, the blue menu, which is much easier to access than the now, mainly redundant and dreaded 'red menu' - it's easier to use too.

Here, following a few keys strokes, you'll find a signal quality mode. It gives a numerical readout of the quality of the received signal.

In Ku-band anything above '50 unit and you're in business, anything below...nothing.

This 'signal meter' is an excellent aid to fine tuning polarisation on some of the more obscure digital transponders.

### Radio Ga Ga

Back in the August '94 issue of *SWM*, you can read an excellent article by John Hockenull about radio broadcast via satellite.

He catalogued the many short wave broadcasters who were using satellites for global distribution of their output. Well, the trend continues

with digital and the good news is that the majority are free to air, also they can be stored in separate audio menus in the Nokia and most of the other digital receivers on the market.

I'm no radio aficionado, but I have found hundreds of digital audio stations across the belt, and I'm sure there are many more to log.

There are also a number of specialist services such as the Independent Radio News (IRN) network feeds on 1°W.

This service, based in London, sends news bites out to radio stations around the country, updating stories throughout the day.

Check-out the obligatory in house 'musak' for supermarket chains, to help you practice your Friday night trolley dash at home!

In August 1998 the European Broadcasting Union (EBU) finally pulled the plug on analogue

transmissions. The most recent issue of the *Eurovision Network Services Newsletter* had this to say, under the banner 'Fully digital, fully operational'.

"The EBU-Eurovision Network Services analogue network is now officially part of history. On the night of the 24th of August 1998, transmission on the Eurovision network began in 100% digital format, using MPEG-2 4:2:2 (Professional Profile at Main Level) technology."

For some time the EBU has used *Eutelsat 2F4* at 7°E for all of its news and sports feeds. Encrypted in Sound In Synchronisation (SIS) standard these feeds provided a window on the world for satellite enthusiasts, however the prospect of increased capacity and better quality images offered by digital, led to the eventual switch over. Now the EBU has twenty digital circuits, using MPEG-2 4:2:2.

Most feeds are free to air, with only sports coverage being encrypted. However, the present generation of digital receivers are unable to handle this standard, so, for the time being the European Broadcasting Union transmissions are safe from prying eyes.

How long will it be before domestic receivers can 'see' MPEG-2 4:2:2? Well, that's anyone's guess. I doubt that existing receivers will be upgradeable, on the other hand, I don't think that EBU fare will stay invisible for long!

### Data Data Everywhere

Raw data is probably the most robust digital mode on satellite. Everything from International telephone circuits to credit card details, and lottery machine transactions.

For the serious data mode enthusiast linking your satellite receiver to a PC, via a data port and feeding the info through a suitable software package could produce some interesting results.

The word is that many of the existing corporate data transmissions, thought to be secure, have already been hacked.

### Where To Look

The digital satellite scene changes by the day, because of the vast potential, stations come and go

on a regular basis.

To get the most out of your system it's necessary to make sure you keep up with the changes. What better way to do this than, than by the Internet.

There are a number of sites offering daily updates, but by far the best is the European facility SATCODX.

Look at <http://www.satcodx.org> - Fig. 17, and you'll find a treasure trove of info, and can even register for automatic newsletters containing the latest information, E-mailed to you on a regular basis.

If you already have a multi-satellite system, on the second Friday of each month the satellite enthusiasts TV programme, *drdish@TV*, broadcasts via *Kopernicus 2* at 28°E.

In analogue format - Fig. 18 - at the time of writing, its envisaged that by early 1999 it will move to digital, on one of the Hotbirds at 13°E.

Both SATCO DX and *drdish@TV* are sponsored by Europe's foremost specialist magazine, *TELE-Satellite International*.

*SWM*



Fig. 14

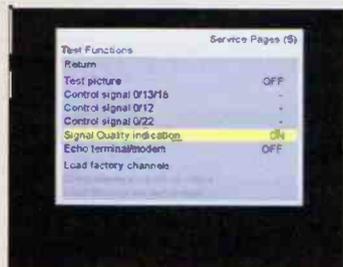


Fig. 15



Fig. 17



Fig. 18



Fig. 16



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STRONG SRT 4300 - Digital Receiver with Common Interface  
GRUNDIG DTR 2000 S - Digital Free-to-Air Receiver  
DOEBIS XSAT CDTV 350 - Analog & Digital Receiver with SCPC  
GALAXIS IQG.I - Digital Receiver for Open TV with Common Interface  
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# Your Window On The Modern World

We've discussed informally various aspects of the satellite receiving system, but what can you actually see? Asks Roger Bunney.

In general terms the mass of satellites along the Clarke Belt tend to be utilised for specific services. If for example you are interested in news feeds from North America then the bird to watch initially will be the *Intelsat K* slot at 21.5°W. Currently both analogue and digital feeds are carried on this bird and you've only to tune across the upper part of the spectrum, say from 11.500GHz upwards and you'll come across several strong analogue signals - BTI Washington, Vynx and Reuters, though these tend to be 'up' through the daytime into the evenings and close down overnight.

## Now The News

Another bird worth checking out for breaking news is the 43°W slot used by *PAS-3R/PAS-6*, you'll often find the *PANAMSAT* analogue colour bar test card just sat there for hours until news breaks - as it did recently with the loss of the *SwissAir* flight, the Louise Woodward case and in recent weeks the President Clinton/Monica Lewinsky sex allegations. *PanAmSat* always seems to fire up with live feeds - usually Sky News have a transponder up with live inserts and two way feeds into the Isleworth sourced news.

*Orion-1* at 37.5°W have always promoted the craft as a digital bird and rarely are analogue signals seen, I generally skip this one out of my scans.

Activity on the 30°W Spanish *Hispasat 1A/B* sats have generally gone down the digital plug hole and analogue activity is minimal. The same goes for the *Intelsat 705* slot at 18°W. A year ago there were numerous analogue transmissions such as outside broadcasts linking back to the studio within Italy, skiing was popular but a recent check also revealed the digits had moved in! Fortunately the French *Telecom* fleet - 2A @ 8°W; 2B/2D 5°W and 2C @ 3°E have generally remained loyal to analogue and there are massive signals available, a 900mm dish will provide good quality pictures right up into the UK Midlands. Outside broadcast circuits are generally carried on 5°W and 3°E, the latter is normally found in the *Telecom* band only (12.5-12.75GHz) whereas the others operate in FSS band as well. The BBC seem to buy time on *Telecom*



CNN digital on *Intelsat K*.



Setanta Sport Gold, colour bars. Via *Telecom 2C* @ 3°E, frequency: 12.606GHz vertical.

7°E at long last ceased their Sound in Sync. (SIS) transmissions are now are into MPEG 4:2:2 compression and there is little analogue seen on this bird other than perhaps an occasional sporting linkup. In the days of the Yugoslavian and Middle East conflicts many dramatic news feeds were carried on both *Eutelsat II F2* @ 10°E and *Eutelsat II F3* @ 16°E. The latter in *Telecom* band has mainly digitised though an occasional reader sees an analogue news feed. SISLink is a UK SNG operator and was frequently employed to uplink horse racing back to their HQ from the many race courses around the UK. The HQ then compile dedicated programme/information data for the UK 'bookie' trade and transmit same across the UK via the 27.5°W *Intelsat*, but in encoded B MAC - 11.591GHz horizontal. Look in a 'bookies' shop and you'll see horses on screens with racing form and prices. SISLink are present at the originating horse race courses covering each race, they uplink back to HQ using *Eutelsat* capacity and a favoured bird used to be the 25.5°E / *F4*, this a craft in inclined orbit - nearing the end of its working life and requires



Digital feed - 13°E for WTN.



CNBC on *Telecom 2D*.



BBC International feed via *Eutelsat*.

both for programme circuit feeds back into TV Centre and also for news inserts into local magazine programmes around the early evening 1800 local time. BBC Northern Ireland are often seen on 3°E with breaking news and live interviews - if there is a major 'event' in NI then within hours more SNG trucks will arrive, several are stationed permanently in NI just for this eventuality. There has been a gradual transition for BBC SNG regional trucks to convert into digital though several remain loyal to tradition. The 'Telecoms' are good for sports feeds around Europe.

## A Day At The Races

Occasionally, *Sirius 1* and *Sirius 2* can be seen with Scandinavian and other programme circuits but the old favourite *Eutelsat II F4* @

7°E at long last ceased their Sound in Sync. (SIS) transmissions are now are into MPEG 4:2:2 compression and there is little analogue seen on this bird other than perhaps an occasional sporting linkup. In the days of the Yugoslavian and Middle East conflicts many dramatic news feeds were carried on both *Eutelsat II F2* @ 10°E and *Eutelsat II F3* @ 16°E. The latter in *Telecom* band has mainly digitised though an occasional reader sees an analogue news feed. SISLink is a UK SNG operator and was frequently employed to uplink horse racing back to their HQ from the many race courses around the UK. The HQ then compile dedicated programme/information data for the UK 'bookie' trade and transmit same across the UK via the 27.5°W *Intelsat*, but in encoded B MAC - 11.591GHz horizontal. Look in a 'bookies' shop and you'll see horses on screens with racing form and prices. SISLink are present at the originating horse race courses covering each race, they uplink back to HQ using *Eutelsat* capacity and a favoured bird used to be the 25.5°E / *F4*, this a craft in inclined orbit - nearing the end of its working life and requires



Each morning the eastern circuits open up via 7°E.



CBC NTSC via *Intelsat 6D* from Paris.



Telefonica digital Hispasat.



Digital Feed, Intelsat K for Sky - Landspeed Record attempt.

tracking being in unstable orbit - the extra effort required to use the satellite results in very cheap leasing rates.

German TV make extensive use of satellite linking for their home grown live programmes and *Kopernikus 2* @ 28.5°E is usually active late afternoons with programme exchanges and live inserts into their regional programming. The bird is easy to find now that Astra digital is in operation since an analogue test card is transmitted from 28.2°E at 11.992GHz horizontal. Find that PM5544 test card and you're OK for *Kopernikus*. Often analogue feeds of complete church services are carried from the 'States into Europe, the Church of Latter Day Saints for example is often seen Sunday late afternoons on *Intelsat K*.

Corporate business meetings are often carried via satellite across Europe, this allows international companies to advise their various branches the latest news and developments - or breaking news such as the recent BP-Amoco take over. Normally the 'programme' originates from the company's HQ or a hired venue and feedback/questions are invited from their widespread employees via telephone circuits. Watch out for audio howl rounds! *Intelsat K* is a favourite for trans-Atlantic corporates and also for various religious conventions East bound into Europe. Even operations are seen in clear analogue.



During a digital feed of NASA TV the whole of the MIR flyaround was transmitted, showing the damage sustained during the famed collision.

## Space Stations

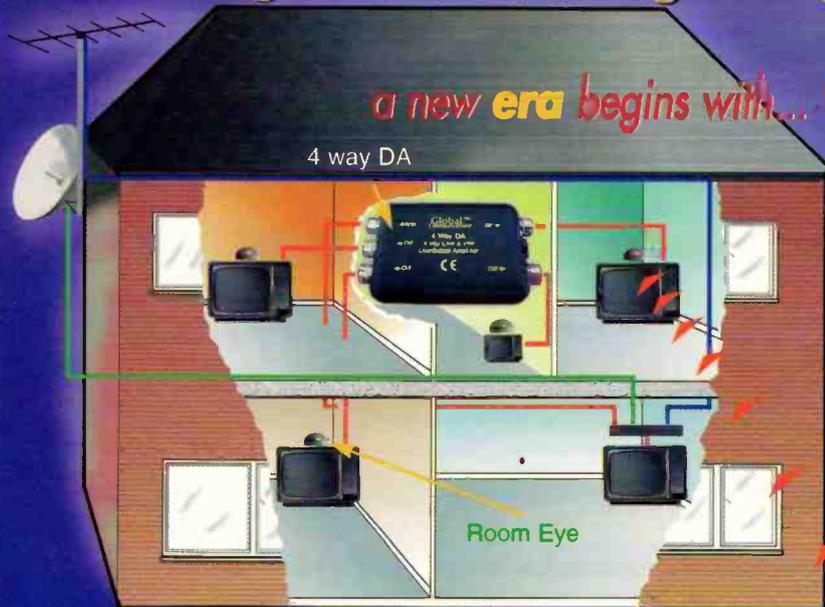
One exciting 'sighting' was the *MIR* space station downlink, a weak signal at 10.825GHz from a Russian bird at 16°E and the cosmonauts could clearly be seen waving - I assumed not for help! Such catches are very rare, the signals are circular and weak - I was using a 1.5m in Ku-band for that reception. Other 'real' DX seen has been the Israeli test card on a clear night from *Intelsat 1°W*, the downlink beam is tightly spotted onto Tel Aviv so radiation back into the South UK was non existent!

There's lots to see but having worked for many years previously in broadcasting I would ask readers/viewers to respect those reporters seen on live feeds. Often they are under great stress and may express themselves bluntly. I remember a live news feed from the CNN office in Tel Aviv when they were being hit by Scud missiles and the concerns by the reporter of poisonous gas - CNN Atlanta told him to go off air and get out, but the reporter stayed at his post - all this was live as were many feeds out of Saudi and Yugoslavia during the conflicts.

Checking out past 'Satellite TV News' columns will provide lots of frequencies to check out but much of what and where you see comes from experience...

I have not listed any TV programme satellites or channels, there are hundreds of them both analogue and digital across the sky. I would ask readers to consult with one of the satellite magazine listings such as appears in *What Satellite TV* or *Cable and Satellite TV Europe*. SWM

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# Satellite TV News

## A Preamble...

As you've probably already noticed, this month's issue features a special satellite feature and I hope the information here-in will encourage more of you to participate in the hobby. You don't need a 5m monster dish in your garden and **Dean Roger's** encouraging article demonstrates that even a flat dweller with **no** garden can achieve good results with just a simple, yet efficient dish installation on an upstairs balcony - provided of course it can see all or part of the Clarke Belt across the South East to South West sky. **John Locker** from the Wirral tells us of digital satellite television and greatly simplifies the mysterious digits from the belt. I personally, have attempted to tell of early hobbyist attempts at satellite reception and the sort of equipment that is needed. I am **not** involved professionally in the satellite TV trade and cannot recommend specific equipment or companies to deal with - I only comment on my experiences and equipment that I have used.

## On With The Show

**S**eptember into October, the leaves fall from the trees and I'm noticing that there is also a falling off in certain of the regular analogue satellite feeds, they've obviously gone the way of digital. Even our old and regular favourite, the 'UKI-149-GMTV SNG' that regularly appeared on *Intelsat K* for early morning breakfast show input including the political conference coverage has disappeared, last seen 30 September. The problems of my digital satellite reception that I spoke of last month seem to have been isolated to the Ku-band LNB on the dish - whereas it's OK for analogue, the more precise nature of digital, bits rates *et al* means that any slight drift in the LNB will throw the receiver into a 'non-lock confusion' and just will not provide pictures - you lose some of your bits and you lose your pictures. Equipment suppliers catalogues are currently being checked through for a WR75 flanged LNB suitable for the 'new world of digital' and a week off from the daily slog in November should hopefully see me digitised!

With a bout of 'flu' I dozed over a cup of tea on the afternoon of October 11 with *PAS-5* @ 58°W idling on a screen. I noticed that the test card slowly went into noise, 'odd' I thought. Then I realised, mid October, the Equinoxes and the dish is looking at the sun which tracks along the Clarke Belt at this time of the year, I rushed out to the dish but too late! The focused heat from the sun - despite it being a green colour dish and half is screened by a fence - had melted the feed tube cover away on the only sunny afternoon of the week. This happened last October but this year's April Equinox had cloudy afternoons! At least I was cheered up that same evening with the live ESPN Winston 500 car racing from Tallageda Superspeedway, Alabama in the NASCAR Speedworld series via *Intelsat K* - it was sunny there as well!

Perhaps the most interesting analogue sightings in September were via my favourite *Intelsat K* (21.5°W) on the 22/23rd mid evening when I came across an NTSC 525-line pictures showing US soldiers collapsing and stressed out, doctors trying to establish the soldiers illness. In fact they were suffering from inhaled anthrax from a gas attack and were acting the part in a medical series across four evenings entitled *Medical Response to Biological Warfare and Terrorism*. During the instructional programme extensive phone-ins featured from military bases and civil rescue groups around the world. The epic was carried at

11.688GHz horizontal and if you saw rather green-looking soldiers and others in large protective hoods then they were playing at a serious germ warfare enactment. The programmes were organised by facility company CDHR Television.

A few days later on the 27th Helmut Kohl, the German Chancellor, was defeated in their elections and extensive SNG (satellite news gathering) coverage was seen via *Intelsat K* - odd to relate that *Kopernikus 2* @ 28.5°E, the usual internal German carrier of programme feeds seemed empty of any TV activity. I noticed three German uplinks operational and two were identified on test card, the NDR-3 were using a Dutch truck 'Intrax HOL-9 Bonn/SDP' whilst NDR-1 used their own lorry 'NDR SAT Ka 3'. Since the main political drama would be enacted in Bonn there would undoubtedly be established terrestrial microwave circuits negating use of SNG facilities.

**Hugh Cocks** (Algarve, Portugal) writes to tell of more unusual sightings, check out *Intelsat 801* @ 31.5°W - 11.160GHz vertical for a video 'mess', this is an odd form of satellite 'bleedthrough' from the ORTN Niger C-band downlink that somehow is also appearing at Ku-band, at around 2300 they go onto test card which can just be made out in the 'shashy' lines. The signal spreads over quite a bandwidth and is certainly 'different'. If you've got a scanner then check out *Intelsat 705* @ 18°W - 11.008GHz vertical for a strong Danish wideband f.m. programme with weaker European pop music at 10.995GHz vertical. At 37°W, *Orion-1* has AFN Balkans on a Southern European beam at 12.602GHz horizontal in distorted f.m.

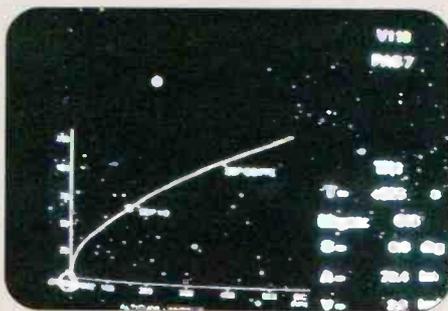
We would be interested to hear from any readers of this column that are using scanners in any part of their satellite monitoring, what they



An impressive Jordan TV test card via *Arabsat 2B* @ 30.5°E in C-band.



Tense military face answering germ warfare questions.



**PAS-7 launches without incident, via Intelsat K**

hear, equipment they use and so on. I won't include names if requested. I understand that it's possible to monitor some of the Inmarsat 'phone conversations around 1.6GHz. Hugh mentioned that the 'Smile FM' radio station, Manila, Philippines previously reported daytime at 269.50MHz is now audible from early evening onwards around 30kHz bandwidth. The signals apparently arrive courtesy an American *Fleetsatcom* bird at 70°+E, I checked on my Regency MX8000 (badged AR2002) and using a Howes SPA-4 preamp, the

discone acquired signal was 'quite strong'.

Back to TV, and the other day I checked out PAS-5 @ 58°W, a low elevation bird at my home and found their strong test card at 11.675GHz vertical, Hugh Cocks reckons that 11.490GHz vertical carries an occasional *Teleglobe Canada* in PAL, other spots to tune are 11.540 and 11.620GHz. Early October saw *Intelsat K* carrying 'Compaq Grand Slam Cup' football tournaments from Munich, Germany around 11.537GHz horizontal in clear PAL each afternoon through into the evening. The same bird was seen again @ 2145UTC, October 1 in clear NTSC with the live network ITV programme *Live by Request* with Phil Collins, uplinked out of New York into the UK, obviously live as problems continued to unfold with the UK 'phone-ins!

During September the various revelations and confessions relating to the Monica/Pres. Clinton activities appeared on various days, usually on *Intelsat K* and PAS-3R/6 @ 43°W. With solar panel problems on PAS-3R, PAS-6 is also co-sited and I suspect that the latter is taking Ku-band traffic and '3R carries C-band. A good start to the working day was the 16th September when Arianespace launched PAS-7 bird Kourou, French Guinea carried live on 'K, though I missed both Eutelsat launches of W2 and *Hot Bird 5* from Kourou and Cape Canaveral respectively, week starting October 5th. Both were carried live on 13°E digital 12.673GHz vertical according to the press release.

### Orbital News

The Iridium LEO (Low Earth Orbiting) satellite network is now operational. Some 66 satellites in low earth orbit (400-700km high) provide, through

interlinking, continuous communication capability between earth based telephone/FAX equipment. Motorola even produce a terrestrial/LEO mobile 'phone for international calls and provides automatic switching to LEO satellites if terrestrial networks cannot be accessed.

Arabsat hopes to launch their ARABSAT-3A Spring 1999 which will offer 20 Ku-band high power transponders, which in digital mode, provide eight

channels and will cover Europe, the Middle East and North Africa. They are seeking full European coverage for Arab communities, the service providing the local (home) TV services from all Arab countries uplinked onto Arabsat from Tunis.

SE Asian satellite operators ZEE TV and Star TV are in talks over a possible merger feeling that there's only enough room for one major player, their previous history is one of legal conflict. The current format of each programme provider will be retained.

Failures in several of Hughes HS 601 satellites (*DBS-1*, *Galaxy 4* and *Galaxy 7* over the US) have been diagnosed as a corrosion problem within a latching relay which serves as an on/off switch within the satellites' on-board control processor. The tin plated relay can suffer a crystalline structure growth between a terminal and the relay case causing a short circuit (somewhat like the growths in the old OC171 type transistors). The problem has been designed out in future craft.

*Galaxy 10*, another HS 601 HP satellite exploded on launch from Cape Canaveral via Delta 3 rocket. Intended to provide telecommunications capacity across the USA, it was fully insured and a replacement is on order.

Canal+ Polska have joined with Polsat, TVP and other media interests to form a new digital platform to rival the new (Mainstone produced) Wizja TV service. The Canal+ Polska group is known as TKP for short,

in full - Telewizynja Korporacja Partycypacyjna - it says here!

Tim McKlelland (Bournemouth Bay), reports that several channels from the French Telecom satellites has ceased, certainly Cine Cinema has gone from 2A @ 8°W and France Telecom has indicated when their birds eventually expire they may opt into leases on Eutelsat capacity. Yet another analogue loss, the long received Galavision Spanish language service ex Mexico via PAS-1 @ 45°W - 11.515GHz horizontal. Currently there's no analogue seen on this bird. All EBU SIS (sound in sync.) analogue circuits leased via *Eutelsat II F4* @ 7°E have now gone into MPEG-4:2:2 digital. The EBU have up to 20 channels available on four transponders with bit rates to +20MB and dial-up encryption for commercially sensitive feeds such as football. It looks a very empty bird now!

Spain's rival digital platforms - Sogecable's Canal Satellite Digital and Telefonica's Via Digital have merged into a single group to cut losses and hopefully make digital TV a commercial success...

It's not all C and Ku-band, *SatFACTS*, New Zealand publishes that Peter Merrett, Western Australia, has received Cakrawarta S-band @ 107.1°E with digital TV carriers between 2.536 and 2.656GHz well off boresight centre using a Nokia 9500S - but he is using a 5m dish!

Finally, in the Pacific the Solomon Islands administration have expressed concern over the future activities of the Sea Launch Partnership, a group that have constructed a mega floating rocket launching platform. The Islands folk observe that metal debris will fall from the launches - typical stage one weighs in at 36 tonnes, stage 2, 11.5 tonnes plus miscellaneous debris totalling 2 tonnes - and there will be at least six launches annually well into the next twenty years!

SWM



**WTN often show this attractive ident with clock count-down.**



**A muddy Iraq TV image via Nilesat @ 7°W.**

# Sport Feed DXing With A Small Dish

Dean Rogers watches programme feeds, you can too and enjoy advertising free DX.

**W**ith an increasing number of sports broadcasts now scrambled for PAY-TV, receiving the raw outside broadcasts can be very rewarding -

that is the originating sporting site transmission back to the studio prior to station presentation to network. Yet you do not need a really expensive satellite system to achieve good results.

My own set-up consists of an Amstrad SRD550. Fed from a Lenson Heath 800mm offset dish fitted with an IRTE multi-sat unit. The multi-sat moves the LNB across the general focal point area at the front of the dish allowing limited 'multi satellite' reception over a restricted arc of 20-25° without moving the dish. The LNB is a standard Cambridge Universal type covering 10.450-12.650GHz and a noise figure of under 1dB. I live in an upstairs London flat with the dish mounted on the generally South facing balcony.

## What's To See?

That describes my relatively simple equipment set-up - so what can be seen?

Football is always popular and many UEFA Cup and Champions League games appear via the Eutelsat satellites at 16°E, 10°E and 7°E (nos. 2F3, 2F2 and 2F4 respectively). The French Telecom satellites at 3°E and 5°W (2C and 2B/2D respectively) carry top French League matches for the French PAY-TV channel Canal Plus (Canal+).

These are the most popular sports I can receive but I have also watched tennis, basketball, swimming, golf, athletics, various motorsports rallying, touring cars, Grand Prix, motor cycling,

horse racing and the Motorcycle Grand Prix. The oddest thing I've watched with bemused interest was beach soccer from Spain!

All these feeds are generally 'in the clear' - that is unscrambled - except the occasional few via *Eutelsat 7°E* carried on leased circuits for the

European Broadcasting Union, which until recently used a technique called Sound in Sync (SIS). Here the audio is digitised and carried within the picture sync-

ronisation information. As a result the picture appeared unstable, moving according to the accompanying (and unheard)

audio. A special SIS decoder is required to stabilise pictures and recover the audio - the EBU ceased this method of transmission in favour of full digital MPEG 4:2:2 though an occasional SIS circuit is seen on other satellites. Picture quality varies from feed depending on the satellite e.i.r.p. down link strength

and the related up link satellite transmission from the remote outside broadcast site. Good results can be obtained from my 800mm dish and a smaller 600mm dish would provide acceptable quality on many circuits, particularly the Telecom satellites across the South UK. Further North and you'll need an 800mm dish.



Dean's balcony mounted dish. You can squeeze a dish into most dwellings. Note the multi-sat unit with the LNB clamped to it.



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## AOR AR-8200

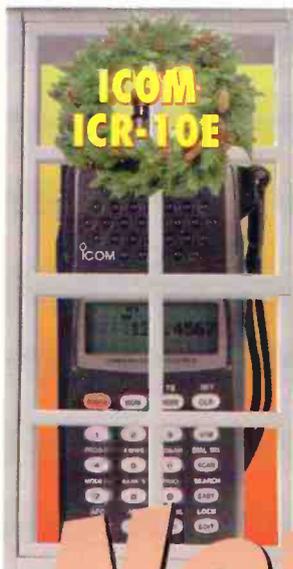
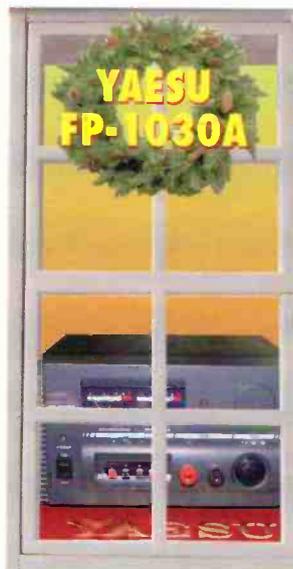
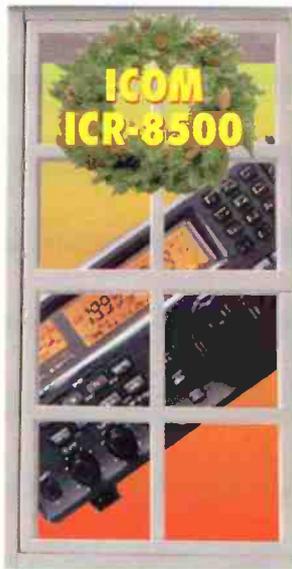
The latest in AOR's range of benchmark scanners. The new AR-8200 has arrived! Tak from AOR U.K. wondered in to our London showroom the other day with what looked like yet another scanner. Were we in for a surprise! The first comment from all of us was how solid the unit felt and excellent the audio was. In fact the audio was amongst the best we have heard from a handheld receiver.

Features include 530kHz-2040MHz coverage, Band Scope and 1000 'dynamic' memories, 40 programmable search banks, AM, Narrow AM, USB/LSB, WFM/NBFM. Tuning steps are from 50Hz and include the new 8.33kHz for AM Airband.

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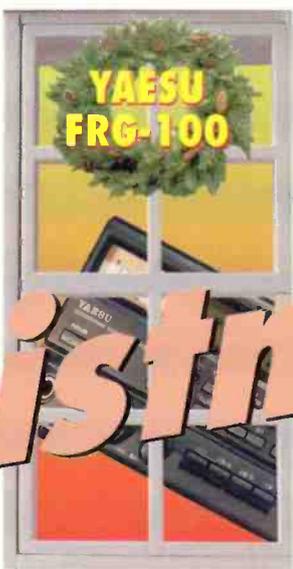
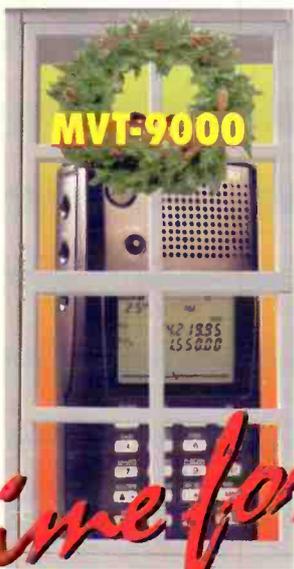
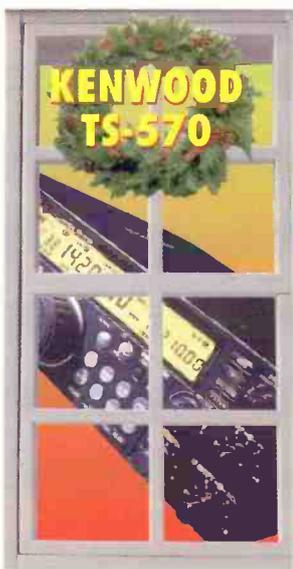
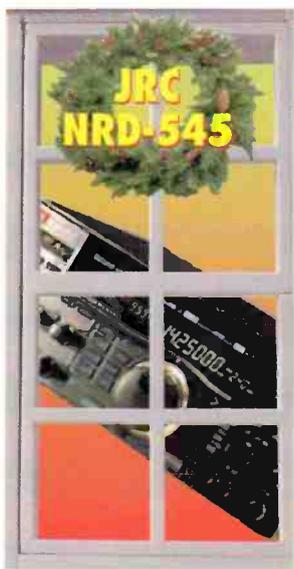
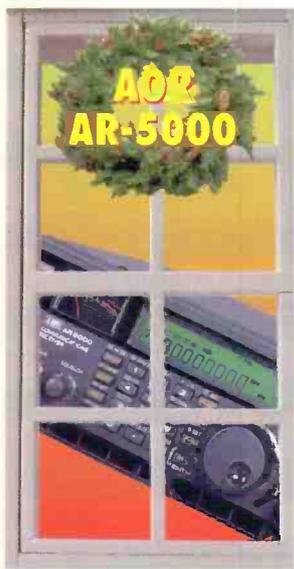
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If you actually take a look around at the receiver market and compare with fifteen years ago I'm sure you will notice there isn't quite the choice of equipment available today. Never mind. With startling performers like the new NRD-545 who cares? A summary? John Wilson paid the ultimate tribute, saying: 'The NRD-545 would be welcome in any listener's station. It is a sheer delight to use, well proportioned and with very pleasing styling and appearance.'

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I tend to view the Telecom birds which always give me excellent sound and pictures on my 800mm balcony mounted dish. Very recently the annual *Tour de France* provided remarkable pictures, always an enjoyable sporting event coupled

with remarkable technical quality from both car/motor bike and helicopter cameras. A few weeks later Spain ran their own cycle race with equally dramatic

pictures, some of the mountain shots are breathtaking and of course such complete coverage is never carried on UK television. The BBC also frequently use the Telecom satellites for their own programme circuits, other than

news inserts sporting offerings are seen both within and outside of the UK feeding into the London BBC TV Centre.

Another excellent source of sports feeds is the *Intelsat K* slot @ 21°W and the *PanAmSat PAS3R16* slot @ 43°W. The latter birds are very popular as live carriers for Sky - USA to UK over the North Atlantic path. Outbound west material is also carried in the clear, though the

dish size necessary for quality reception should be over 1m, a receiver with threshold extension will also give dramatic improvement to picture quality and reduce the sparklie count. Unfortunately, I cannot receive either of these two satellites as I'm blocked to the west by nearby building structures. Scandinavian flavoured sports have been seen such as pony-trap racing, dirt-track and snow-track motor bike speed racing - using spiked wheels - on the OB site-studio link via *Intelsat 1°W* capacity though most activity at this orbital slot is now in D2MAC. You'll need at least a 1m dish for reception as the satellite footprint is 'spotted' onto Scandinavia.



Most sporting feeds carry commentary in the appropriate language for the country that is being 'fed' on an audio subcarrier e.g. 6.60MHz with clean FX (that is the sound of the sport only with no commentary) on another sub carrier. This allows international

broadcasters to insert their own local commentary over the general sound FX of the sport being featured - typically 7.20MHz. Occasionally FX may be heard on both sub carriers, the main programme audio is either added back at base or is carried via an alternative route. Prior to the sporting event there is often a sequence of technical line-up, that is a test card plus audio recordings indicating the audio sub carriers in use plus 1kHz test tones. The test card will normally carry the site origination identification and possibly the satellite up link equipment number for example UKI-123 Wincanton.

### Most Exciting

In all the time I have been receiving sports feeds, the most exciting and satisfying for me came in October 1997 when I received the World Feed of the Ryder Cup golf event from Valderamma in Spain via *Eutelsat 2F4* @ 7°E. This event was carried on Skysports for those

that pay subscription to watch the sport plus commercial breaks! The golf World feed carried a different English language commentary which was superior to the Skysports offering - and of course you watched more golf thanks to no commercials! The main problem was that the lack of commercial breaks meant that no-one would get up and make a pot of tea!

I hope that this article has given you a flavour of the sports that can be seen with basic, simple equipment with minimum financial outlay and how satisfying all the programmes and inserts can be. For the more adventurous, you could try turning your dish by hand though take care to mark clamping points accurately so that you can return the dish to its original position later on. **SWM**

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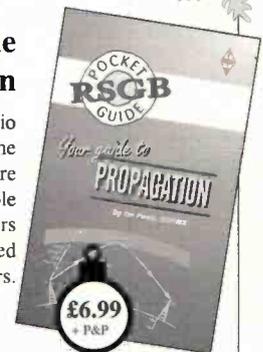
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# Trunk Tracking the Opto Way

## Optoelectronics OPTOTRAKKER

If you've read my 'Scanning' column first, (p77) you'll know I've always been infuriated by Trunked radio systems, mainly because it is very difficult to follow a conversation transmitted through one, despite the fact that no encryption is involved. It isn't impossible to do, but the effort involved, not to mention the rather poor quality of the results, makes manually tracking a Trunked conversation really only a task for die-hard scanner users. It was with great excitement, then, that I greeted the news that an affordable Trunk tracking device had just hit the streets.

The device in question is Optoelectronics' OPTOTRAKKER, a very clever £300 box of tricks whose main purpose in life is to allow you to follow Trunked conversations based on either Motorola or LTR Trunking technologies, but can also decode continuous tone squelch system (CTCSS), dual tone multi-frequency (DTMF) and digital coded squelch (DCS).

At this point a lot of you will undoubtedly be shaking your heads and thinking something along the lines of "Trunk tracking for less than £300? Impossible!" I'm afraid all you sceptics out there are right - although the OPTOTRAKKER does cost less than £300 and does track Trunked conversations, it is not a stand-alone device, requiring both a PC and a computer-controllable scanner in order to do its job. Almost any PC will do as long as it has a free serial port and has enough power to run *Windows 3.1x* or '95 at a reasonable lick - even a 486-based system will do. The OPTOTRAKKER is a little more picky when it comes to the type of scanner it will work with, however.

### What You'll Need

For a start, the scanner needs to be computer controllable, and in order for you to make use of all the features of the OPTOTRAKKER, it must be one of Icom's many models featuring an CI-V interface, an AOR AR8000, AR3000A or AR5000, or a Radio Shack/Tandy (Realistic) PRO-2035/42 or 2005/6 fitted with one of Optoelectronics' computer control interfaces.

The other main feature the OPTOTRAKKER requires, is that your scanner should have a discriminator output. A discriminator output is necessary because the tones that the OPTOTRAKKER is designed to decode are almost all sub-audible, and are therefore normally filtered out of the signal that reaches your scanner's speaker or normal audio output socket. Unfortunately, only a handful of scanners and receivers have a discriminator output -



What's in the box - p.s.u. out of shot.

I'm lucky enough to own an Icom IC-R8500 which needs nothing more than a jumper to be moved in order to turn one of its rear-panel connectors into a discriminator output, but owners of many other scanners, including AOR's AR8000, AR5000 and AR3000A, Icom's R10, R7000 and R7100 and Radio Shack's 2035/42, 2005/6 will need to perform some more radical modifications. For the most part, these involve adding a couple of resistors, a capacitor or two and possibly wire in an extra socket, but in some cases the modifications are more complex and require a great deal of electronics experience in order to carry out. It is therefore well worth checking your scanner's compatibility before buying an OPTOTRAKKER, and checking what sort of modifications might be needed. A good place to look for this information is [www.optoelectronics.com/trakkermods.htm](http://www.optoelectronics.com/trakkermods.htm).

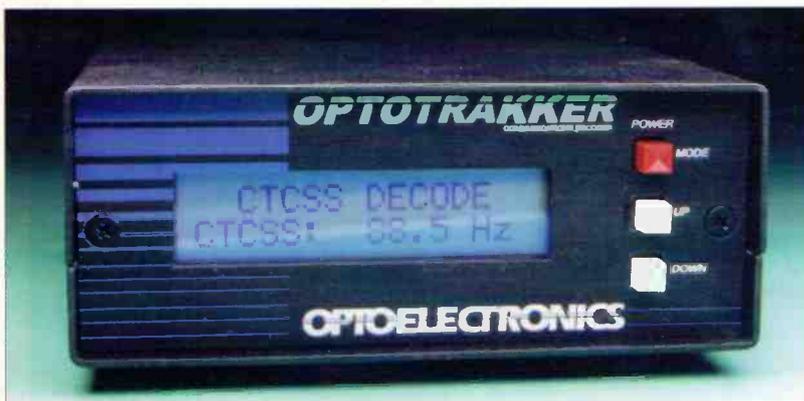
Having dealt with what you need in order to use the OPTOTRAKKER, let's have a more detailed look at what you get for your £300.

### What You Get

Unpacking the box reveals a 'wall war' 12V power supply, a selection of interface cables, a manual, a software disk and the OPTOTRAKKER itself. Housed in a solidly constructed black metal case measuring just 44 x 110 x 98mm, the OPTOTRAKKER certainly looks the part of a high quality device. At the front is a small back-lit l.c.d. panel and three push buttons, these being used to turn the OPTOTRAKKER on or off, change decode modes and to set and modify the unit's various configuration options.

For a product costing nearly £300, the l.c.d. is something of a disappointment. Not because of the clarity of the display, which is beyond reproach, but

Faris Raouf, our debuting Scanning columnist, has been giving the new OPTOTRAKKER from Optoelectronics a run for it's money. What did he find? Read on and discover!



Minimalist front panel.

because of the fact that when the backlight is active, the OPTOTRAKKER emits a high-pitched keening sound. The sound was so worrying that at first I thought it was a fault, but a quick call to Optoelectronics in the US revealed that the keening is the result of a trade-off designed to increase the intensity of the backlight. Hmm... At least you can turn the backlight off permanently if necessary, or set it to just turn on when new data is displayed, then automatically turn itself off after a small delay.

By default, the display shows the date and time, which you can set using the aforementioned buttons. A few button presses will set the unit to display any Motorola, LTR, DTMF CTCSS or DCS codes it detects in the input audio signal, though you can't display more than two of these types of data at one time. Very usefully, when a code is being received, a little lightning flash icon is displayed next to the decoded figure, the number then staying on the display until the next code is received.

Moving on to the rear of the case, you'll find a standard coaxial power input socket for connecting the supplied p.s.u. to the unit along with a 3.5mm stereo audio input socket into which you need to feed the discriminator audio output of your receiver. The tip of a jack plug inserted here carries the audio and the ring squelch level, but don't worry if your receiver doesn't output the latter, it doesn't make any real difference to the OPTOTRAKKER's operation. Optoelectronics supply a short cable with 3.5mm stereo jacks at both ends for use with this, but some receivers output their discriminator output via phono connectors, and you'll need an adapter of some sort for these, or the ability to construct a custom cable.

The rest of the OPTOTRAKKER's rear-panel connections relate to its digital interfaces. The first of these is a serial port used to connect the OPTOTRAKKER to your PC, and unusually takes the form of a standard 3.5mm stereo socket rather than

the 9 or 25-pin serial connectors you'll find on a PC. Luckily, you won't have to make up an interface cable to suit this non-standard arrangement as one is supplied with the OPTOTRAKKER, terminated in a standard 9-pin D-type connector at the PC end.

The next three connectors, again all 3.5mm stereo sockets, consist of standard RS-232, CI-V and TTL interfaces. These are normally used to pass through any control information sent from the PC to your scanner, and their presence means that you only need one free serial port on your PC in order to both control your scanner and receive data from the OPTOTRAKKER itself. All three of these sockets normally carry basically the same type of information, and which one you need to use will depend on the type of computer control interface your scanner is fitted with. A cable with 3.5mm jacks at both ends is supplied for use with these sockets, though if your receiver doesn't have a suitable 3.5mm data socket you'll have to get the soldering iron out again.

A final duo of real panel data connectors consist of a 2.5mm auxiliary CI-V socket which normally carries the same data as the main 3.5mm CI-V socket, and a special seven conductor FFC (Flat Flexible Cable) connector to allow the OPTOTRAKKER to be connected to an AOR AR8000 scanner, a suitable cable being provided for this purpose.

Interestingly, if you don't need to connect a radio to the OPTOTRAKKER's RS-232 interface, instead of sending pass through radio control information it can be configured to send a data log containing the time



Interconnections abound.

and date of any data decoded. A hard copy of this data can be made by connecting a serial printer to this port, or alternatively the information can be captured to a log file by routing the data to a PC.

## What You Do

Once you have the OPTOTRAKKER up and running and connected to your PC and receiver, its time to install the supplied software, a package called *TrakkStar* from Signal Intelligence. This is basically a cut down version of the company's *ScanStar* range of packages, a demonstration version of which can be found at the

*ScanStar* home page - [www.scanstar.com](http://www.scanstar.com) and whose role is to take complete control of your scanner

Supplied on a single floppy disk, *TrakkStar* installs in a couple of minutes and takes a similar amount of time to configure, all that's really necessary for this task being to select your scanner from an on-screen list and to select which of your PC's serial ports the OPTOTRAKKER it is connected to. A word of warning here though - the

## Data slicing

An additional feature of the OPTOTRAKKER is its built-in two-level data slicer. This basically works much like the *Hamcomm*-type interface you can buy from people like Pervisel, and lets you use the OPTOTRAKKER with a wide range of software-based decoding packages. Early versions of the OPTOTRAKKER need some internal modifications in order to enable this feature, while later ones simply require you to move an internal jumper in order to do so.

Enabling the data slicer does disable the OPTOTRAKKER's RS-232 pass-through and data logging facilities, these then being only available via the TTL interface. This means that you'll need two serial ports on your PC in order to make use of both the unit's data slicer and Trunk tracking facilities at the same time with some radios, one to connect the radio, and the other to connect the OPTOTRAKKER. You may also find that your decoding software doesn't like the way the interface cable supplied with the OPTOTRAKKER is normally wired - it certainly didn't work with *Hamcomm* when I tried it. In such situations, Optoelectronics sensibly suggest you buy an additional interface cable and make your modifications to this rather than the one supplied in the box.

very first OPTOTRAKKERS available in the UK were bundled with version 7.11 of the *TrakkStar* software, and this version contains several bugs, not the least of which is the fact that it is prone to crashing your PC, especially if you happen to own an IC-R8500 radio. A software update is available from the *ScanStar* web site that fixes these bugs, but if you don't have access to the Internet and happen to own this Icom receiver, make sure your OPTOTRAKKER is supplied with version 7.13, or later, of the *TrakkStar* software.

Having installed the software, you'll run into the only major complaint I have about the OPTOTRAKKER - the fact that exactly what data you need to enter and where in order to start tracking conversations isn't covered in the OPTOTRAKKER's manual, and only the most basic of clues are provided by *TrakkStar*'s on-line Windows Help file, the only documentation that comes with this package. Optoelectronics is working on a better manual and some handy hints and tips on how to get tracking, and this should be available soon. If you buy your OPTOTRAKKER now, though, you'll have to do a little experimenting in order to figure out how things work.

## How It Works

So far I've not described what *TrakkStar* actually does, how it fits into the grand scheme of things, nor what information you have to provide in order to start tracking conversation. This is actually all quite complicated, but you can get a very good idea by understanding how the OPTOTRAKKER package as a whole works when tracking a conversation being transmitted on a Motorola system.

Unlike the Trunking transceivers being listened to, which monitor a dedicated digital control channel that tells them what frequency to hop to for the next part of the conversation, all the OPTOTRAKKER does is to decode the talkgroup i.d. of a received audio transmission, a code that is unique to each group of users using a particular trunked network, and pass this information on to the *TrakkStar* software. In order to follow a trunked conversation, *TrakkStar* must be programmed with the frequencies used by the talkgroup you are interested in, which it then makes your scanner scan through repeatedly, the program only halting the scanning process when the OPTOTRAKKER notifies it that it has detected the i.d. of the talkgroup whose conversations you want to listen to. Once the transmission has finished, the scanning process begins again, and in this way complete conversations can be heard.

Any LTR systems you come across are followed in the same way, though to be honest I don't know of anyone using this technology in the UK - let me know if you know better!

Admittedly, tracking trunked conversations this

way is a little slower than doing things the 'proper' way, but it does allow you, through the *TrakkStar* software, to follow conversations on more than one trunked network at a time, and even inter-mix non-trunked frequencies in with the trunked ones you want to monitor too. More importantly, however, it also keeps the cost of the OPTOTRAKKER down to affordable levels, and actually works very well indeed, opening up a whole new world of interesting conversations for you to listen to.

In testing, I did find that the OPTOTRAKKER and *TrakkStar* missed chunks of quick-fire "Where are you? - Back at base" type conversations, however, and on many an occasion took ages to decode talkgroup i.d.s correctly, again causing large chunks of conversation to be missed. Some fine tuning of the OPTOTRAKKER's discriminator input gain control, hidden inside the unit and not mentioned in any of its documentation, helped alleviate the slow decode problem, but not completely. Optoelectronics suspect my IC-R8500 may be faulty, and say this sort of problem really shouldn't occur very often.

## What I Think

At the end of the day, I have to admit that even though I had a few problems, I was still extremely impressed with the results. The OPTOTRAKKER isn't perfect, its poor documentation and keeping I.c.d. panel being its main weaknesses, but compared to manually tracking a trunked network, the OPTOTRAKKER is nothing less than a God-send. If you have a suitable scanner, a suitable PC and a little patience, this is a product I can heartily recommend to anyone who wants to add a new feather to their scanners' cap.

Thanks to Optoelectronics, Tel: **001-954 771 2050**, web: [www.optoelectronics.com](http://www.optoelectronics.com) and **Waters & Stanton PLC, 22 Main Road, Hockley, Essex S55 4QS**, Tel: **(01702) 206835**, FAX: **(01702) 205843** or web: [www.waters-and-stanton.co.uk](http://www.waters-and-stanton.co.uk) for their assistance in obtaining the OPTOTRAKKER used in this review. **SWM**



**Unwrapped.**

## Basic Specifications:

<b>Signalling protocols supported:</b>	CTCSS (PL), DCS (DPL), LTR, Motorola Type I and II, DTMF
<b>Receivers supported:</b>	Icom R7000, R7100, R8500, R9000 and R10, AOR AR8000, AR3000A and AR5000, Radio Shack/Tandy (Realistic) PRO-2035/42 or 2005/6 fitted with one of Optoelectronics OS456/535 computer control interfaces.
<b>Display:</b>	2 x 16 character with backlight
<b>Controls:</b>	Mode, power.
<b>Audio/data input and outputs:</b>	3.5mm stereo phone discriminator/squelch input, 3.5mm CI-V, RS-232 x2, TTL, 2.5mm CI-V, FFC.
<b>Power requirements:</b>	7-15V d.c. (adapter supplied).
<b>Size:</b>	44 x 110 x 98mm (hwxwd).
<b>Software supplied:</b>	Signal Intelligence <i>TrakkStar</i> on 3.5in floppy.
<b>Minimum PC requirements:</b>	PC capable of running <i>Windows3.1x</i> or <i>Windows9x</i> with single free serial port. SVGA display and at least 8Mb of RAM highly recommended.

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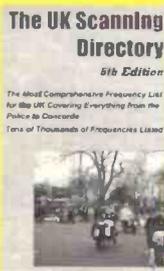
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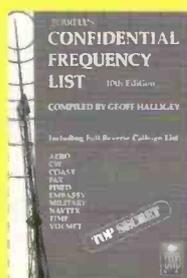
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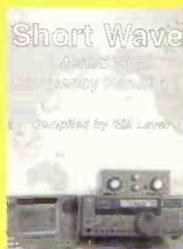
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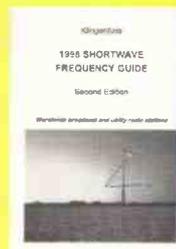
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# JW GOES WIDEBAND

This month, we finally get to see what John Wilson has to report on the optional wideband converter for the NRD-545 he reviewed in the July issue.

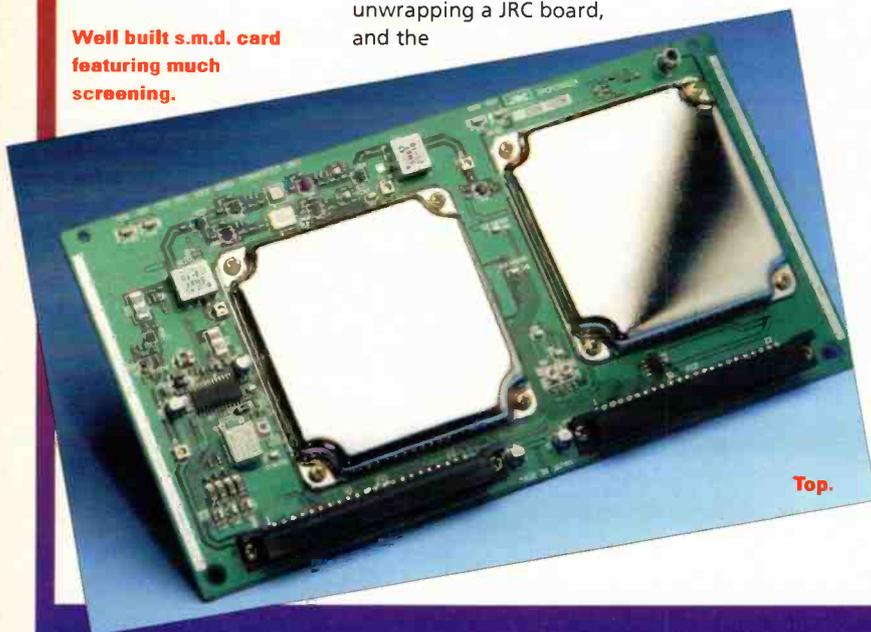
Well built s.m.d. card featuring much screening.

**A**t the time I reviewed the JRC NRD-545 receiver, the matching v.h.f./u.h.f. converter had not yet been shipped from Japan, but Lowe Electronics very kindly suggested that I hang on to the receiver so that I could fit and test the converter when it did finally arrive. Arrive it did, and although other reviews have intervened, here are my impressions of the converter as fitted to the original review NRD-545.

As some of you will know, there have been v.h.f./u.h.f. converters for earlier JRC receivers in the NRD series, and at the time these came on to the market I was the importer and distributor for JRC so I know quite a lot about them. I have to be frank and tell you that they were not a great enhancement to the otherwise excellent NRD receivers, being prone to a dancing cloud of internally generated spurious signals, rather like gnats which dance around your head on a summer's day and spoil your peace. So did the spuri. I felt sure that these experiences would not be repeated in the new converter...!

### Well Presented

It's hard not to be impressed when unwrapping a JRC board, and the



Top.

converter was superb to look at, with gnat proof metal covers front and back hiding all the internal serious stuff, with hints of high quality surface mount chips neatly laid out around the bits of board I could see. Installation is extremely easy; all one has to do is take off the top cover of the receiver and slide the board into its clearly labelled slot, not forgetting, as I did, to connect the micro coaxial connector which brings in the signals from the rear panel N-type socket which is already fitted when you buy the NRD-545. Plug in, switch on, and tune in to the bottom end of the converter range, which starts at 30MHz and carries on right up to 2GHz, at which point you have what must be the ultimate 'rollover' because the receiver jumps from 2GHz right back to 100kHz, with all the antenna switching being taken care of by software. But Oh Dear.

It was obvious from the moment I started tuning the receiver that we had another 'gnat' problem because I could hear plops, gurgles, squeaks and groans as I tuned. These were so intrusive that I transferred the receiver to the anechoic chamber and locked myself in so that I could ensure that the sproggies were really being produced in the converter and not by external signals. My chamber by the way, has a measured attenuation from outside to inside of better than 130dB all the way to 18GHz, so I was fairly confident that I would not be hearing external signals. The bloops, plops and gurgles remained, much (mush) to my sorrow. Some of the internal signals were real clankers, with S9 +60dB being recorded on 105.95, 99.4 and 100MHz (which happens to be Classic FM in Devon and Cornwall). Others I noted in passing were 75.3, 101.35, 130.435 (which was the best impression I have ever heard of a Blackburn Beverley cruising across India as we ferried it from 47 Squadron at Abingdon to Singapore), 144.1 (sorry about s.s.b. on 2m, but there's another dimension to this, see later), 174.5, 247.3, 258.0, 261.55, 309.6; the list goes on and on, but I think you see my message. JRC do mention the subject of spurious signals in the leaflet which accompanies the converter, with specific reference to harmonics of 20MHz, but I wasn't prepared for the multiplicity of signals found.

### Grey Jumper?

As I tuned through the entire range of the receiver I noticed that at some frequencies the display jumped across gaps, for example from 270.9 to 275.1MHz

# WITH THE



and 379.9 to 382.1MHz. It wasn't until I read the specifications for the converter that I discovered that although the converter itself covers the full frequency range from 30 to 2000MHz, the tuning range is restricted by the receiver into which it is plugged, and whilst the 'proper' European NRD-545 will tune the full range, the receiver I had in my possession was in fact a 'J' type intended for the Japanese home market, so beware those of you who might be tempted to buy a 'grey' import, because you won't get full v.h.f. coverage. Why did I have a 'J' type from the main UK importer? Probably because if you recall my original review, JRC rushed some new ROM chips to me direct from Japan in order to sort out the a.m. distortion problems, and I can only assume that these were actually 'J' type ROMs. Take care when buying however, there are wolves about, or should that be sharks? For your information, the gaps in the 'J' type receiver are: 252.9 to 255.1MHz, 261.9 to 266.1MHz, 270.9 to 275.1MHz, 379.9 to 382.1MHz, 411.9 to 415.1MHz, 809.9 to 834.1MHz, 859.9 to 889.1MHz and finally 914.9 to 960.1MHz. I take it that the gaps between 800 and 1000MHz are designed to restrict access to cellular telephone traffic in some markets, whilst the other gaps are not so obvious but they do put substantial holes in the military air band.

When I came to connect the receiver to an antenna and tune around I found that the tuning rate was unbelievably fast because the default minimum tuning step was 5kHz, which gave a rate of 5MHz for one rotation of the main tuning knob. The next step available was 50kHz, giving a tuning knob rotation of 50MHz, and finally a massive 100kHz step which gave a 100MHz per revolution tuning rate. I began to wonder how on earth I could tune s.s.b. signals with these tuning rates, then I discovered a special note in the NRD-545 user manual on page 17 to the effect that normally s.s.b. and c.w. modes are not available. They can be



Bottom.

selected with a hold key and power on sequence if required, though to quote the manual "These modes can be selected, but reception functions are not assured." - *hmm, I see - Ed.*

### Performance

As far as sensitivity goes, the JRC converter runs at between -112 and -118dBm for 12dB SINAD, measured on narrow band f.m. with 3kHz deviation. This is reasonable performance, but as I tried to step through the measurements at increments of 10MHz below 300MHz and 50 above 300MHz, I found that I could not actually measure on multiples of 10 or 100MHz exact frequencies because of

the presence of spurious signals, and had

to offset by 1MHz to do the actual measurement. The spuri were often at a fairly low level but were nevertheless of sufficient amplitude to make measurement impossible.

In actual use, tuning to my usual known signals from an antenna, the JRC receiver/converter combination proved to be a good wide range monitor system, and the coverage to 2GHz makes the whole arrangement very powerful. Therefore I would judge the converter to be a useful accessory for the owner of an NRD-545 who wanted to cover a wide tuning range in a 'one box' arrangement, but anyone contemplating spending a considerable sum of money for a wide range receiver should also be looking at the AOR AR5000 or the Icom IC-R8500, both of which would be worthy competitors for JRC, and possibly offering better all round performance, particularly the AR5000 which has true coverage right up to 2GHz. This is definitely a case of going to a dealer offering side by side comparison facilities before making the final decision. If I tell you which one I would choose, some people might accuse me of bias...!

SWM

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For more information about the Roberts R881, see the review in next month's *Short Wave Magazine*.

To enter this competition and make your bid to win a new portable, all you have to do is answer the questions on this page and save the entry form. Next month you will need to complete part two. Then attach that part to this page - a photocopy is acceptable with both original corner flashes included with your entry. Once completed, send your completed entry to: **Roberts R881 Competition, Short Wave Magazine, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.**

Short Wave Magazine, December 1998

## Questions

- What is the 1st prize?
- How many memories does the R881 have?
- Can the memories be scanned?

## Entry Form

Answers to Question 1

- a) .....
- b) .....
- c) .....

Answers to Question 2.

- a) .....
- b) .....
- c) .....

Your Name: .....

Address: .....

.....

Postcode .....

Telephone: .....

Send your entry to: *Short Wave Magazine*, Roberts R881 Competition, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.

If you do not wish to receive any related mailings please tick the box.....

The Editor's decision is final, no correspondence will be entered into.

COMPETITION  
 Part 1 of 2  
 ROBERTS R881  
 COMPETITION  
 DEC '98

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World-Wide Radio Guide	Sep

**Don't forget that we still have available SWM Back Issues for 1997, as well as 1994, 1995 and 1996, but hurry as stocks are limited. To order Back Issues, either use the order form on page 91 of this issue, or call the Credit Card Hotline on (01202) 659930. Back Issues for 1994-1996 are available for just £1 inc. P&P, all others are £2.85 inc. P&P.**

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# Amateur Bands

**S**ome of you overheard GW3KFE and UT7CT in contact on 14MHz with a YL voice this end speaking Russian. The YL voice is my XYL Galina UR5CMM, Anton UT7CT is her son. Careful reading of BR68 shows that UR5CMM operating my call under my supervision is quite legal - and of course to mention her own call is a matter of personal pride! Who knows, once she has got such trifles as the English-language course, the driving-test theory exam and whatever else out of the way, she might go for a UK 'ticket'.

## Earthing

An earth connection is normally electrolytic in nature, implying rectification. Clearly, for the transmitter TVI, for the receiver an increased noise level. A signal is just copiable when it is equal to the noise, therefore a signal just one dB lower is uncopiable.

Hence every single decibel of improvement you can make to antenna and/or earth will open up a new layer of DX. Notice, you can't do this with electronics in the shack. A perfect amplifier would amplify noise and signal equally. Further, the increased amplification would force the receiver into overload on a smaller signal. Anyway there's no such thing as a perfect amplifier, because a transistor f.e.t. or valve will generate and add its own noise to the system!

For the earth, then, counterpoise radials above ground and isolated from it are the goods. If they are short of resonant lengths, add a mite of series inductance and tune them.

G6XN seems to have been the first to suggest this in *HF Antennas for All Locations* and subsequent work has confirmed this. Four quarter-wave radials above ground seem to equate well to the theoretical 120 quarter-wave buried ones - so there is room for some interesting experimentation.

Find some reliable steady signals on each of the bands at the sort of times you are able to spare. Now, if you make a change and one of these steady signals goes up by, say, an 'S'-point, you can check the others and they should all have gone up likewise. If they haven't - your 'steady' signal wasn't! Which, one might comment, is nothing unusual in the lab, let alone an antenna farm. It doesn't matter what your 'reference' signal is, just so long as it is constant, over the period of the experiment, no matter how long that may be.

## Letters

Let's start with Paul Goodhall from Oxford, who operates at all sorts of hours. On 3.5MHz for instance we note at 0410 G4FIV called CQ DX spot on 3.8MHz and G3SBV was noted at 0600 with KE1Y working EA5/G3WMZ in the late evening, before seeking more useful bands.

A trial at 7MHz showed CO3JR, ZL2JR, 8P6FE and a DX Net with 5N5PW, VK1MJ, 9H1EU, Z31GX, DS5RNM and of course the Europeans. Paul left 10MHz alone, and went on to 14MHz where he found loads of VKs, UK8BWO, Z32KV, EA7BA, YV4GDR, N0HC, AB7IE, W7LAH, YV4GD, RA9XLA, EV200AM for a 'special', KM6BT, IS0/IK5FIQ, VE1SF, NA6NG, 8P6FE, JA6AP, K1UQV, JR2TQG, ZL4TV, ZA2NJI, CU3AV, KU4EC, W1DTU, WZ1Y, LU7MAL, JT1BG and JA8SW.

The list on 18MHz shows KC4VV, W6BZQ and G3JNJ, who first appeared in my own log back in the 1950s. Up again to 21MHz where JR6EA, JR2TQG, JF1RWF, Z31DX, KG2BU, YD7DJ, JA2FJP, VU2AWP, VE9PG, KC5QF, JL2APM, JJ3APB, HL4GQR, P29CC, 4Z4DX, DU3HNC, JA8ACV, JA2AQ, VE3SY, before finally turning to 28MHz for 4Z5FW. A different form of learning occurred when they put GB2CCC on for the Historic Churches Bicycle Ride, made 92

contacts, and in due course were rained upon while putting it all up and again when packing up!

Ted Trowell remarks that his apple crop is poor this year, and in QSO with ZL4AU and VE3BHZ, both stations said the crop in their countries were also poor. Ted notes Top Band with 4X4NJ and nearer home ON7BW, a sked which is often QRMed, mainly by Italian stations, unless they have football on their goggleboxes!

On 7MHz at 0500z LU5VC and ZL4AU were logged and at 2000 9K2HN, 4S7WP/MM in the China Sea and PY6DDI. The 14MHz crop is a singleton by way of 9H1LR, but on 21MHz Ted located CE2GLR DU1ODX, CE2LZV/MM, W6PU, W0RNA in Minnesota, FR5BT, 9K2MU, 4S7YSG, PY4ZF, CE2LZR, ZG2FX in Gibraltar, PY2OS, LU4DLL, K7ZYV, PY2CJ, LU2YA, LU1MBT and LU7AWP.

Up again to 24MHz, and FR5VZ, LU4FT, 9M2TO, HF0POL, EA8CN, K6HWT, DU3XNE, ZP5KO and PY2OW. Finally, 28MHz for D2BB, LU6VCD, FR5BT, ZS6KR, YV1NX, PY2RN, TR8XX, ZS5SBE, TL5A, LU9GBR and 9J2BO. Apart from the Top Band ON7BW sked, everything was logged on c.w.

## Forecasting

Keen DX operators are always on the lookout for up-to-date info. If you have access to the Web, you might care to investigate the Daily DX homepage at <http://www.dailydx.com> or write to **W3UR at Daily DX, 3025 Hobbs Road, Glenwood, Maryland 21738-9728, USA**. It comes up on every weekday, fifty weeks per year. In the 'weekly' line, try the *RSGB DX News Sheet* which lands every Wednesday.

## Clubs

Even if you aren't a 'clubbable' sort of person, you should still belong to a national society. The RSGB I'm sure you all know about, or ISWL, or UKRS, though that pays more attention to transmitters, or the **International Listeners Association, 1 Jersey Street, Hafod, Swansea SA1 2HF**. The current issue of their magazine has three pages listing programmes of s.w.l. interest on various radio stations with more to come next time. I await the next issue!

## More Letters

We have two this time from Colin Dean, one for the previous month, one for this. Though just how Colin's letter took about ten days to reach the Box, heaven only knows!

Colin 'spread his wings' a bit so we start at 24MHz for D44BS, and down to 21MHz for A41LZ, A61AP, A71EM, DX1E, DU4DX, D44BS, EL4AB, FM5GU, FS5PL, GM4JEF/MM off EA8, HC10T, HS98AG, HS0/G4JMB, HS0/G4UAW, OD5PN, OD5/9K2MU, TF8GX, TL5A, TT8FC, UK8GK, V51AE, YCs, 5R8EE, 5Z4RS, 7J2YAF, 7Q7s assorted, 9G1YR, 9J2BO, 9K2SS, 9M2TD and various 9V8s. Turning to 14MHz we see AP2WAP, BV2RS, DS5RNM, BV2KI, BV3CD, BV4YS, BV7GA, DX1DX, FR5CU, HL2KV, HS0/IK4MRH, HS1GUW, assorted JAs, JT1M, TR8CA, VU2PAI, VU3SUI, V51E, YB0DX, Y198BIF, 4S7RO, 5A1A 6W1QV, 9N1AA and 5R8LRG.

Space alas runs out but we must squeeze in a part of the letter from Karl Drage who answers the query on the 'FBC' prefixes - all French amateurs were allowed to use the prefix during the World Cup. Karl's log for 28MHz - yes, Ten Metres! - shows 3DA5A, 2W6EZZ, 4L3Y, 4Xs, 5A1A, 5B4RGE, 5B4MF, 5R8FL, 7X2RO, 9G1BJ, 9K2HN, 9K2QQ, 9K2SS, 9N1AA, A41LZ, A61RS, BV5BG, CX4JW, CX6ABE, CX8CP, DU4DX, ET3KU, EX0Y, FH5CB, FM5BH, FM5GU, HS1NGR, HS0/IK4MRH, JH4UYB, JH4UPD, KH2D, KH0I, KH0U, LUs, OD5PN, OD5SK, OX3SA, PYs, SU3YM, SVs, TA1s TA2s, TR8IG, UA9s, V51SG, VE1TK, VK6AOM, VK6s, VOs, VQ9IO, VUs, Ws, WH0AAV, WP3A, an assortment from YB/YC, ZS1, ZD7CTD, ZP50P, ZS1B/MM near ZD9, ZS1J, ZS1LUH, ZS1NL, ZS6BBN, plus RTTY from 9K2HN and VO1XC.

## Coming

The Space A DXpedition group's November Eritrea operators can't even apply for their licence until they get there, and each licence will cost \$500! At the time of writing, they still hope to be active. If you still want CQ Zone 17 on RTTY look out for UA9LP.

## Science Now!

Were you listening on any radio on August 27 at around 1022UTC? At v.l.f. there was around five minutes of radio black-out. The radio astronomers want to know how far up in frequency and for how long it lasted at that frequency. Surely the a.m. medium-wave broadcasters, but very likely higher in frequency still.

If you can recollect, or have log data covering that period, please let me know to the Box number address and I will forward the data on in bulk. Your data will be a very useful contribution to a rare and important scientific study.

## Close

That's it once again. Apologies to all for the various cuts made to their logs. Letters, comments and so on, to **Box 4, Newtown SY16 1ZZ** to reach me by the first of the month, as always.

■ GRAHAM TANNER, 64 ATTLEE ROAD, HAYES, MIDDLESEX UB4 9JE

■ E-MAIL: [ssb.utilis@pwpublishing.ltd.uk](mailto:ssb.utilis@pwpublishing.ltd.uk)

# SSB Utilities

Once again we are rapidly approaching the trans-global ballooning season. For the past few years, there have been several attempts to circumnavigate the Earth by balloon, and this winter is no exception. The period between December and April each year is the best time of year, due to the favourable wind conditions at high levels, and the most suitable wind and temperature conditions at various launch sites.

This is not, strictly speaking, a race, but there is friendly rivalry between the teams involved. Earlier this year, Steve Fossett launched from South America, flew for about 19200km, and managed to reach the Pacific Ocean just to the east of Australia. This was Fossett's fourth attempt at the flight, and gained him several records.

Once again, Richard Branson will be launching his Virgin Global Challenger in his latest attempt to capture this elusive prize. However, there have been some last-minute changes to the crew line-up on Branson's balloon.

American adventurer and entrepreneur Steve Fossett is to be the third member of the Virgin Global Challenger crew for this season's round-the-world attempt. He will join Richard Branson and Per Lindstrand on the flight, which is expected to take off from Marrakech, Morocco, in mid-to-late November this year.

Whenever previous flights have taken-off there are always lots of questions about which frequencies they will use, and when is the best time to hear them. I have also received letters asking me for the date of the balloon launch. I am unable to help with either of these requests, as I don't know which frequencies they plan to use, and the launch date depends upon the weather.

However, a bit of forward planning will not go amiss, and will help you to find out first-hand what is happening. In previous attempts, Branson has made contact with his HQ in England soon after take-off, and these communications have been via Portishead Radio in Somerset.

Almost all other communications are made via v.h.f. and u.h.f. radio, or via satellite. Therefore, they are outside the scope of this column. The web-site for this flight contains a wealth of technical information, including the fact that the capsule is fitted with h.f. radios, so we can only hope that they choose to use this at some point in the flight.

As the balloon flies around the world, it will be flying through many different aeronautical zones, and commercial aircraft will need to be kept up-to-date with the whereabouts of the balloon. So if you see TV reports that the balloon is in a particular area, try listening to the h.f. aeronautical ATC stations covering that area.

As an example, assuming that the balloon launches from Morocco and travels eastwards, try listening to 5.517 and 11.300MHz for reports about the balloon. Don't forget to try all the other h.f. frequencies in the AFI-2, AFI-3 and MID-2 nets, as these will cover the flight as far as the east coast of India.

A few days ago I heard about another team which is planning to launch a balloon this winter. A team of three from Albuquerque in New Mexico is hoping to launch in December from Australia. They will be cruising at more than 130000 feet above the earth, four times as high as commercial airliners fly.

The Re/Max team say that their giant helium balloon, once inflated, is 210m tall, and when it flies around the world, they will be floating at 130000 feet, with a small sealed capsule underneath. The balloonists plan to avoid flying over unruly regimes by taking the southerly path successfully followed by Steve Fossett this summer.

After taking-off around Christmas from Alice Springs, Australia, the trio plans to head west across the Indian Ocean, the southern tip of Africa and South America before flying over the Pacific back to Australia in less than three weeks. Once again, no frequencies are known, but you can be prepared for the flight by investigating the h.f. aeronautical frequencies covered by these areas.

## Questions

Adam Raybould wrote to ask about other frequencies worth listening to. He wants to know if there are any more exciting frequencies apart from the USAF frequencies? He says that he has seen my comments about coastal stations from all around the world in the lower frequencies, but has never heard such transmissions.

Well Adam, there are plenty of other frequencies to listen to, and part of the fun is finding new (to you, that is) frequencies, and managing to identify who they are, where they are, and what they are doing.

Certainly the best frequency to start with is 2.182MHz, which is the world-wide international distress, safety traffic, and calling channel. This is a very important frequency, as most UK coastal contacts start-out on this frequency and then move off to other frequencies.

The beauty of 2.182 is that there is a two-minute silence at the top of each hour and at 30 minutes past each hour. This allows low-powered stations to call-in. Once the two-minute period is up, you will hear lots of stations calling for contacts with shore stations, or shore-stations reading-out traffic bulletins and callsign lists.

In these few minutes you can hear stations from all over Europe, and sometimes even further. Some stations are very loud, and others are quite weak. Try listening at different times of the day to hear different stations.

Next up is Ian Johnson who has a question about the way that signals are transmitted. He wants to know if frequencies that are listed as l.s.b./u.s.b. really are transmitting on both side-bands at the same time.

Well Ian, I have always been under the impression that when you see this listed in any books, it means that the signal may appear on either of the side-bands, but not at the same time. When a signal appears on both side-bands at the same time, this is usually listed as d.s.b. - double side-band.

Ian uses an AOR AR8000 for h.f. listening, and while it does manage to pick-up signals, I would suggest that a dedicated h.f. receiver would be much better. Ian also asks what do the colour states mean when transmitted by the RAF on its Architect service. These represent the surface visibility (in kilometres) and the base of the lowest cloud-cover, these range from Red (worst conditions) to Blue (best conditions). The code Black indicates that the airfield is not usable for reasons other than weather conditions.

Ian sent along a list of frequencies and stations that he has heard, and details of his antenna set-up. He is unable to erect any form of external antenna, so he uses a strip of aluminium cooking foil pasted to the inner-roof of his shack! Ian, I would like to know if any particular brand of kitchen foil proves to be any better than another brand!

The following are Aeronautical ATC frequencies for balloon flights (all frequencies in MHz u.s.b.).

### AFI-2

3.419, 5.652, 8.873, 8.894, 13.273 and 17.961.

### AFI-3

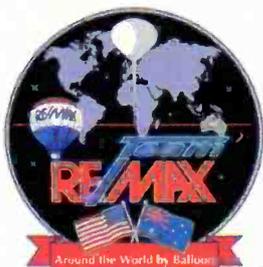
3.467, 5.517, 5.540, 5.658, 6.574, 8.854, 8.870, 8.959, 11.300 and 13.288.

### MID-2

3.467, 5.601, 5.658, 10.018, 11.285 and 13.288.

### Portishead Radio (including maritime freqs)

3.482, 3.747, 4.521, 4.807, 4.810, 5.610, 5.670, 5.690, 6.556, 6.634, 6.734, 6.854, 7.870, 8.170, 8.180, 8.185, 8.930, 8.960, 10.291, 10.884, 10.960, 11.306, 11.363, 12.133, 12.168, 13.865, 14.890, 15.964, 16.003, 16.273, 16.370, 16.443, 17.335, 17.405, 18.210, 19.510, 20.065, 20.665, 21.765, 23.142, 23.210, 23.412, 24.655, 25.109 and 27.218.



## Internet Web Sites For Balloon Info

Virgin Global Challenger -

<http://www.challenger.virgin.net/>

Re/Max -

<http://www.remax.com/balloon/>

Breitling Orbiter -

<http://www.breitling-orbiter.ch/>

J Renee -

<http://j.renee.iit.edu/>

# Propagation Forecasts

## How to use the Propagation Charts.

The charts contain three plots. The lower dashed line represents the lowest usable frequency (LUF), or ALF (Absorption Limiting Frequency). The chances of success below this frequency are very slim.

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

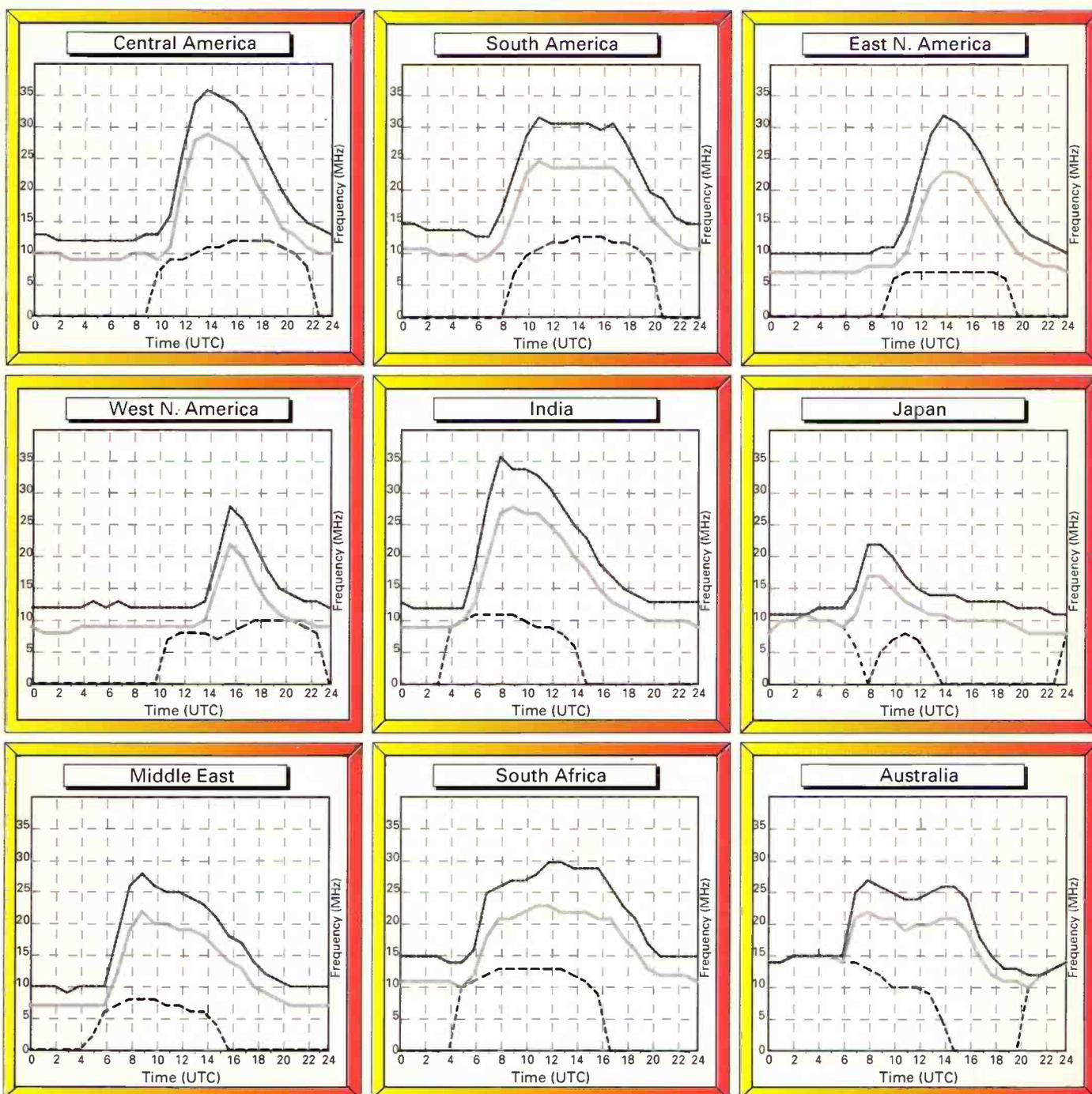
Lastly, the upper dashed line, represents the maximum usable frequency (MUF) a 50%

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.

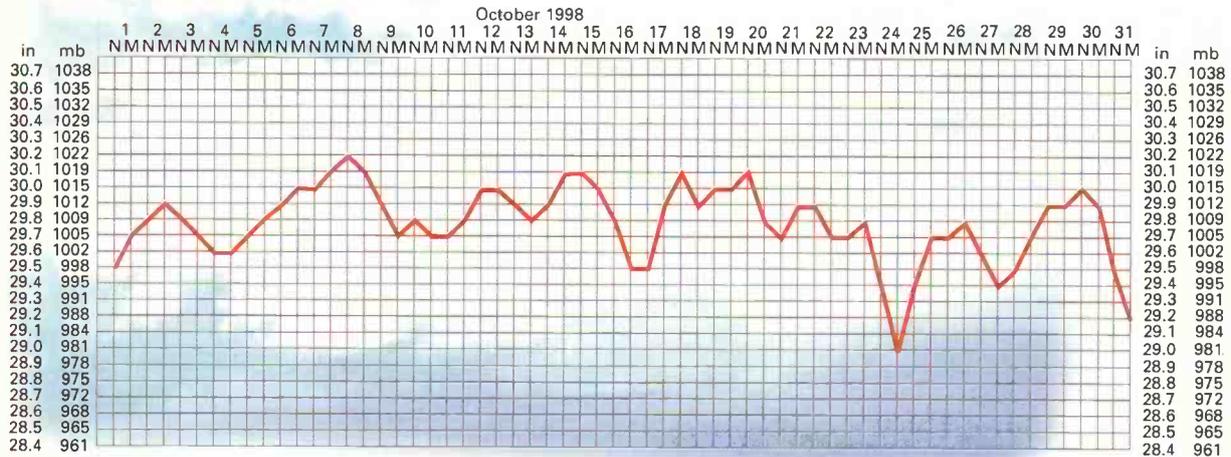
Good luck and happy listening.

December 1998  
Circuits to London

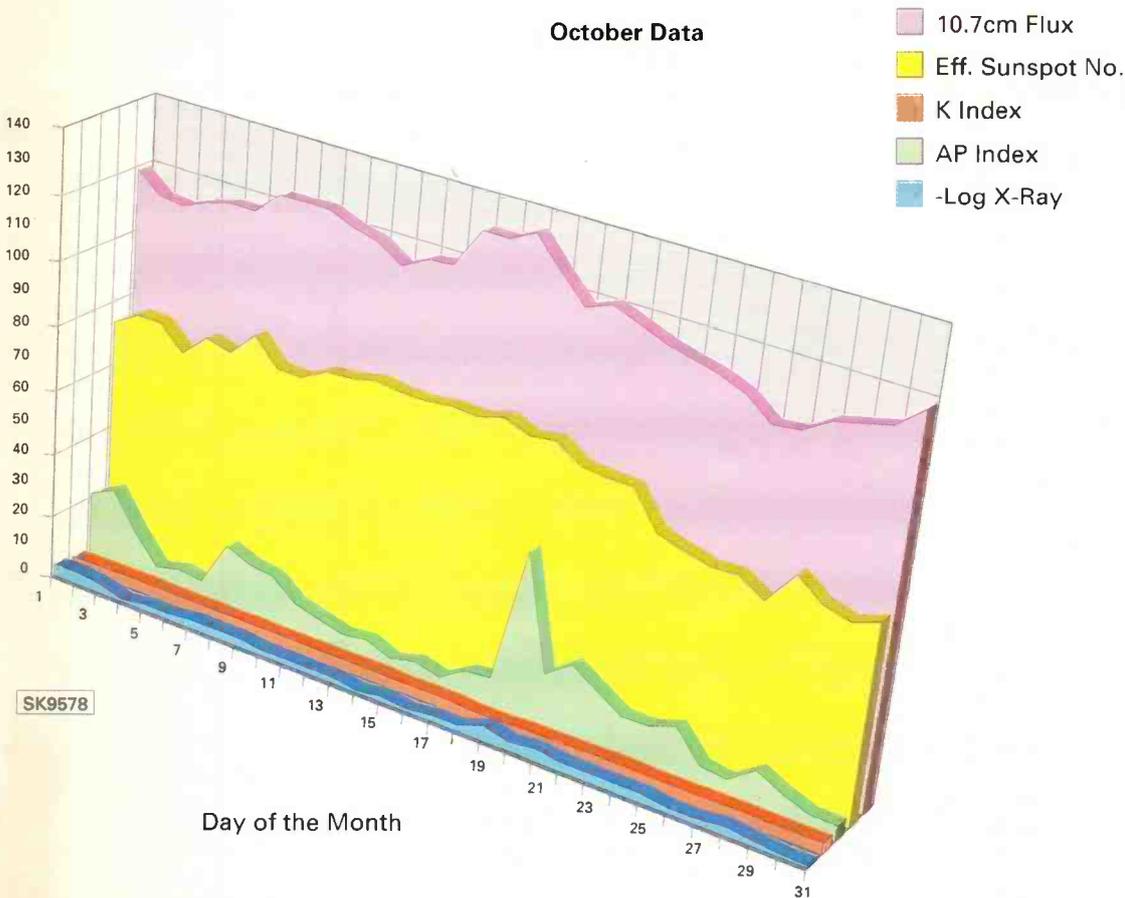


# Propagation Extra

Ron Ham's barometric pressure chart, taken at Storrington, W. Sussex, October 1998.



October Data



## guide to the chart

The 10.7cm solar radio flux is used as an indicator of the general level of solar activity.

The K and AP indices are measures of geomagnetic activity.

The K index ranges from zero (very quiet) to nine (severely disturbed).

K values of five or greater correspond to geomagnetic storm conditions that can relate to poor propagation conditions.

The AP index ranges from 0 to 400. An AP of 30 is the threshold for geomagnetic storm conditions.

# MilAir

**F**or once I have to admit that I have some sympathy with national newspapers. It must be a real pain to send a daily paper to the press at 9pm with the headline "NATO Jets Strike Serbia", only to wake up at 7am the next day to find that the headline should have been, "Midnight Deal Averts Air Strikes".

As I started to type this column on Sunday October 11th, the situation within Kosovo was finely balanced with limited air strikes against the Serb forces having just been approved. By Wednesday morning, after three days of continuously updating the text to accommodate the changing situation, it appears that military action has been averted. A four-point agreement that will hopefully avoid the need for military intervention is being implemented, but I suspect we haven't heard the last of this problem area.

In support of the UN/NATO forces, six B-52Hs from the 2nd Bomb Wing at Barksdale were deployed to RAF Fairford on Sunday October 11th. They were heard inbound working London Military on frequency **275.475**, using the callsigns, **HAVOC 11 to 16**. They then worked Brize radar on **127.25** and **342.45** for the descent into Fairford.

Note that 127.25 has replaced 133.75 as the primary v.h.f. approach frequency for Brize Norton Radar. 134.3 and 257.1 remain in use as the primary Initial Contact Frequencies. Also heard either over-flying or departing Fairford on route to Strumble, (STU), were **SWAP 11** and **SWAP 14** which were possibly two C-130s in support of the deployment?

Several other NATO forces have been deployed to the Mediterranean countries, (especially Italy), in support of the possible air strikes. From the UK, eight Lakenheath F-15Es have deployed to Cervia, whilst Harrier GR.7s from 3 and 4 Squadron RAF Germany have been sent to Gioia del Colle.

## 8.33kHz Spacing

More info on the 8.33kHz saga. The date for the European implementation of 8.33kHz spacing on the airband is confirmed as the 7th October 1999, the UK introduction date now looks almost certain to be the 1st June 2000. Already, several organisations have filed cases to be exempt from carrying the new equipment!

The RAF has announced that they will not be converting the equipment in all their aircraft and some are to be exempt from the ruling. BAe125 CC3, BAe146 CC2, Canberra PR9, Hercules C1/C3, Jetstream T3, Nimrod R1/MR1, Sentry AEW1, Tornado F.3, Tristar and VC-10 **are all to be 8.33kHz equipped**.

Canberra T4, Dominie, Harrier GR7/T10, Hawk T1/T1A, Jaguar, Jetstream T1/T2, Sea Harrier FA2/T8 and Tornado GR models are all to be exempt **and will not be 8.33kHz equipped**. Consequently, with a good percentage of RAF aircraft remaining unconverted, in theory very few London military frequencies will be changed, otherwise half of the RAF will not be able to talk to them!

## Co-operative Bear

The partnership for peace exercise took place at St. Mawgan between the 4th and the 11th September. The twelve participants arrived on the 4th/5th, which was fewer aircraft than was originally expected.

On exercise missions the callsign **BEAR** was used exclusively with numbers noted in the ranges, 0801-0814, 0901-0911, 1001-1011 and 1113-1114. The callsign number ranges related to the dates on which they operated, 0801 on the 8th, 0903 on the 9th, etc.

Each exercise mission appeared to have a mixed crew with English and foreign pilots being heard on each aircraft. No new frequencies were noted but it was noticeable that most of the operations were carried out on v.h.f.

The participants with their arrival callsigns are to the right:



A couple of visitors noted on the 8th were, BAe 125 from 32 (R) Squadron, callsign ASCOT 1338 and Swedish AF King Air 200/Tp 101, callsign Swedic 012. Whilst listening to the exercise near to Yeovilton, one correspondent noted a Yeovilton Operation frequency in use on **231.55**, using the callsign **ZULU Ops**. Many thanks to **Roger, Steve S, Martin** and 'The Globetrotters' for the information.

## Second-Hand Kit

With relation to my comments in previous 'MilAir' columns regarding second-hand military radio equipment, I am grateful to **Len W.** from Bude, who has written to me recently on this subject. He states that various ex-military items, such as antennas, transceivers and some h.f. receivers can be purchased from: **Anchor Surplus, The Cattle Market Depot, Nottingham NG2 3GY, Tel: 0115-986 4902**.

## HMS Ocean

The new British Aircraft Carrier or to be precise Helicopter Assault Carrier, HMS *Ocean*, (L12), has been undergoing Sea Trials in the English Channel during August/September. By the time you read this, she should have been commission into service with the Royal Navy.

HMS *Ocean* is 203m in length, which is just 3m shorter than the Invincible Class carriers. With a displacement of 20000tonnes she becomes the largest ship currently in use with the Royal Navy.

Designed to transport up to 24 helicopters with the normal compliment being 12 Sea Kings and six attack helicopters. The platform size will allow six Sea Kings and six attack helicopters to be on deck at any one time.

During the sea trials I spent two or three days by the coast scanning around to see if any frequencies could be found. Several Royal Navy Fighter Control frequencies were heard, **265.7, 279.8** (TAD 405) and **279.45**. Flight Refuelling Falcons were heard several times using their Air to Air frequency **292.9**. Data bursts, (AWACS?), were heard on **255.95**.

The one possible contact I had which may have been HMS *Ocean* was on **281.75**, which is a new frequency to me. **Dolphin 13**, (820 squadron Sea King callsign), made repeated approaches and landings on a ship which used the callsign Bravo One Victor and Bravo Victor. Any suggestions anyone?

## Co-operative Bear arrival callsigns.

### Aircraft

Hercules C.1  
Hercules C.1  
Antonov AN-26  
CN-235M  
Let 410 - UVP  
Antonov AN-26  
Fokker 60UTA  
C-130H  
Antonov AN-26  
C-130B  
Antonov AN-26  
Tp.84/Hercules

### Airforce

LTW/RAF  
LTW/RAF  
Czech AF  
French AF  
Latvian AF  
Lithuanian AF  
Netherlands AF  
Norwegian AF  
Polish AF  
Romanian AF  
Slovak AF  
Swedish AF

### Callsign

ASCOT 4975  
ASCOT 4976  
CEF 631A  
CTM 2664  
Latvian AF 145  
KOP 241  
NAF 61  
Norwegian AF 5043  
PLF 603  
Romanian AF 311  
SQF 2506  
Swedic 845

## Military Air Scan

A letter has reached me from **Mark** who is based in Norwich, he compiles a quarterly magazine called *Military Air Scan Network News*. As the title implies its main subject matter is concerned with monitoring the military airbands. Produced in A5 size it runs to over 30 pages and contains a wide variety of news, articles and aircraft movements.

The next edition, (No 4/December 98), is due out on the 25th November around the same time as the December *SWM*. For further information, write to: **MGT Publishing, PO Box 564, Norwich NR7 8DD, UK**.

Finally, once again I must include a reminder as I do not wish to disappoint readers.

Please **do not** send me an s.a.e. for a reply, all answers/replies will appear within this column. Our picture this month is not a B-52H from Fairford but a bit of nostalgia, a G model from the now disbanded 416th BW. See you next month!

# Airband

**If it weren't for technological developments, air travel would not be as fast and safe as it is now.**

**Nonetheless, if the daily number of flights increases faster than the percentage improvement in safe arrivals, there will be more crashes than ever before.**

Let's hope that technology for increasing traffic throughout is implemented safely. Take the North Atlantic Organised Track System, for instance. Navigating across the ocean is a problem that was solved long ago.

Modern aircraft, though, have to carry highly accurate navigation equipment of known minimum performance. This isn't so as to be sure of finding New York, but to be certain of not straying into the adjacent track of another, nearby, aircraft! Traffic is so dense that some pilots feel that, in the event of navigation equipment failure, all they have to do is follow the condensation trails remaining behind from a previous flight.

If cabin pressure fails, a rapid descent is needed. It is unsafe to descend straight ahead due to the likelihood of passing through the paths of flights at lower altitudes. Instead, the aircraft must be turned at right-angles to the tracks and then descended.

To cram more flights into the same airspace, the minimum vertical separation has been reduced from 2000 to 1000ft. That way, if one flight descends by as much as 300ft, and the one below climbs by the same amount, then a 400ft safety margin still remains - the minimum acceptable.

To enter this reduced minimum vertical separation airspace, individual aircraft must be demonstrated to keep to assigned level within these limits. Height Monitoring Units (HMUs) at Strumble and Gander can be overflown as a cross-check. The pilot calls "For Hmu flight" when asking air-traffic control to route the aircraft over one of the monitors (AIC 102/1998 from the CAA).

## Receiver Hardware

In August, **K. Sharples** needed help in reducing electrical noise plaguing reception conditions in a block of flats in Preston. I suggested the technique of phase cancellation. It works, but just how well can never be guaranteed. Noise is capricious and each situation is unique.

Our sister magazine *Practical Wireless* carried a review of this type of equipment in September, page 56. I recommend that K.S. reads this before buying any equipment.

By now it has been well publicised (here and elsewhere) that more v.h.f. airband communication capacity will be created by interleaving two new channels between each existing one. Present spacing is 25kHz (and has been since 1974). Now there will be

channels at 8.33kHz spacing. What next? According to AIC 106/1998 this is only a temporary measure until digital communications begin on v.h.f.

Meanwhile, 8.33kHz channels will apply to some airspace above FL245 in Europe from October next year (France has now come into line with this decision), although the UK won't make use of this until June 2000. As predicted, installation of the new equipment has not been as rapid as expected.

It is still not certain how controllers will tell pilots which frequency to select under the new system. One suggestion is that the actual frequency, rounded to a near convenient number, will be used. For example, 123.00833 will be spoken on-air as if it were 123.010, or 123.01666 will be treated as 123.015MHz.

## On the Ground

In October, I wondered what would happen to Finningley and **Ted Crease** (Bradford) notes that there are arguments against a civil airport here. Humberside Airport is leading the protest, Peel Holdings (owner of Liverpool Airport) wants to develop the site. Would a new airport here really be viable offering European and freight services, with so many rivals in close proximity?

In his time, Ted has seen Middleton St. George, Yeadon (now Leeds & Bradford) and Brigg all handed over from military to civil ownership. We'll watch and wait, Ted, and of course I'll report any new frequencies or airspace that I get to hear about.

## In The Air

How does d.m.e. work? Having sat behind one on enough occasions, watching it clock up the miles, I can reply to **Dick Ware** (Gillingham). The system simply displays the straight-line distance from the aircraft to the ground-based beacon.

If you were to taxi right up to the beacon then a reading of zero would result. Rarely is it possible to actually try this! More likely, the aircraft approaches and then overflies the beacon.

Let's say that the aircraft is around thirty-something thousand feet height, directly above the beacon. This equates to something like six nautical miles (the units in which d.m.e. is calibrated). Yes, you guessed correctly, the system measures the distance and actually displays six nautical miles!

When a long way from the beacon, say 100nm, the measurement error is small. The measured slant height won't be much greater than the distance from the beacon to the place that is being overflown. Approaching the beacon, though, the error gets worse until directly overhead.



## Abbreviations

AIC	Aeronautical Information Circular
AIP	Aeronautical Information Publication
CAA	Civil Aviation Authority
d.m.e.	distance measuring equipment
FIR	Flight Information Region
FL	flight level
ft	feet
ICAO	International Civil Aviation Organisation
kHz	kilohertz
MHz	megahertz
nm	nautical miles
STAR	Standard Terminal Arrival Route
UIR	Upper Information Region
v.h.f.	very high frequency
v.o.r.	very high frequency omnidirectional radio range

**Carrier-equipped  
Harvard. Christine  
Mlynek.**





**Cessna Aerobat 135.**  
*Christine Mlynek.*

Experience tells the pilot what reading will be seen when actually overflying. Also, the displayed number reduces as the beacon is approached and then starts to increase again after passing the beacon and commencing to fly away from it.

Most d.m.e. beacons are co-located with v.o.r. directional beacons. When overflying the v.o.r., the airborne equipment is momentarily unable to indicate direction. That's because the beacon is directly below and all radials meet there!

The VOR/LOC warning flag appears in the instruments and the radio-magnetic indicator's pointer can go round in circles. This is when flying within the so-called cone of confusion, which is quickly passed by maintaining constant heading.

Flying over the house of **Clive Allen** in Chesterfield (and elsewhere) has been a Short Skyvan, possibly with registration VR-VGL, certainly trailing some sort of boom almost as long as the aircraft. If it appeared fast, Clive, it must have been low - Skyvans don't go that fast! Also, low flight for special purposes would need exemption from the Air Navigation Order. If below 500ft above ground, it would otherwise be illegal (except for take-off and landing of course).

Can any reader let us know what this mysterious aircraft is up to? One guess on my part is that it carries a magnetometer. This device measures disturbances in the Earth's magnetic field caused by buried mineral deposits or metal objects (such as crashed aircraft!). The CAA might know something about it if they granted an exemption for low flying.

I can't find reference to VR-V registrations, but VR-B is Bermuda, -C Cayman Islands, -G Gibraltar and -H Hong Kong before Chinese rule. Australia use VH- (although it was once G-A, the G-E series being for England or UK!).

And, thanks for the compliment, Clive! If my column really does enable you to "...visualise what is going on up there..." then I have achieved success.

## Follow-Ups

Back in October I mentioned some aeronautical information sources on the Internet. **Len Woolley** (Bude) has found access without monthly fee at <http://www.x-stream.com> and <http://www.freeserve.net> and, yes, there is a catch.

You have to endure unsolicited advertisements appearing across the top of your screen while you work. This strikes me as anomalous. The Internet was intended as a medium for true computer enthusiasts who I am sure resent the intrusion of commercial exploitation. Anyway, who's going to notice the details on the adverts while concentrating on the more important information on the screen?

Len sent me waypoints of flights Between Heathrow and either Lisbon or Barbados, I think for occasional Concorde operations - although I wasn't quite clear about that. If any reader needs them, ask, they'll appear here. When requesting more details about anything I print here, remind me in your letter about which month's issue you are enquiring.

Also in October, page 66 ('Radio Procedures') **John Weir** (Edinburgh) asked about United callsigns. Speaking from personal/professional experience, **Dudley Baker** (Bishop's Stortford) informs us that the number corresponds to the aircraft's registration. For example, United 9499 would be operated by N9499UA. John also asked about the callsign "County". The latest official ICAO callsign list no longer includes this so perhaps the operator has ceased to exist. Many thanks to **Martin Sutton** (CAA) for updating my information on callsigns. It's hard for a museum to keep up with all the latest documents, they can be expensive! Any contributions of recently out-of-date reference/data publications are always warmly welcomed.

## Frequency & Operational News

Information from Martin summarises AIP amendments.

**Aerodromes:** New STARs: at Gatwick, TIMBA 1H; at Heathrow, BIG 3D (was 2D).

**Airways:** More reorganisation! New point BADGA is on a new extension to airway M604 between LOGAN and GABAD; UM604, when going south, now stops at LOGAN and also includes BADGA. New airways: (UJY4 from REPLO to BADGA, (UJY6 from new point SONDO to BLUSY on the U/FIR boundary, all in the Clacton area.

**Restricted airspace:** New danger areas are D061 at Woodbury Common and, presumably replacing the former small arms range there, D442 at Bellerby.

All letters/information received up to October 7 have been answered/included. The next three deadlines (for topical information) are December 7, January 11 and February 8. Replies always appear in this column and it is regretted that no direct correspondence is possible.

# DX Television

**S**poradic-E reception during September set new standards. Over the past few years the season has tended to fizzle out around mid-August with only a smattering of minor openings from then on. This year was different and activity flourished with sustained openings on several dates. Tropospheric reception also made quite an impact in several parts of the UK.

## Sporadic-E Reports

An opening on September 6th provided an all-day event with reception from the Iberian Peninsula, Italy, and the Baltic region. At 1222UTC, **Peter Barber** (Coventry) first noticed an archaeological dig on Channel R2 which was subsequently identified by the LTV logo in the top left of the picture. By 1329UTC, Estonian TV had seized the channel.

From the south, Spanish stations were present with news and weather at 1334 followed by a cycle race. Towards evening, TV Napoli was resolved on Channel IA simultaneously with the other Italian private station VIDEO on E2. Both stations broadcast from the same site at Mt. Faito. **Simon Hockenull** (Bristol) also received these Italian private stations during the month.

An intense opening during the morning of the 17th produced lots of Norwegian test cards showing transmitter locations, such as Steigen, Hemnes, Gamlem and Hadsel. **Stephen Michie** (Bristol) noticed an NRK PM5534 test card without transmitter location details during the opening on Channel E3. Even the Icelandic PM5544 test card made a rare appearance at 1014UTC, identified by Peter Barber.

In other parts of the World the amount of Sporadic-E this season has proved disappointing. **Lt. Col. Rana Roy** based in Northern India reports no signals after August 2nd. Fortunately, TEP (Trans-Equatorial Propagation) has returned and reception from an unidentified south-east Asian transmitter on Channel E2 has been possible most days during September. Reception occurred typically between 1430 and 1630, local time. Pictures have been fluttery and smeary with severe multi-path distortion.

## Mystery Logos

During the course of the season several unidentified logos have been reported, particularly from Eastern Europe. One major headache occurs when the programme producers also include their own logo, or several logos are used by the same broadcaster. For instance, a news bulletin might show a different symbol rather than the standard identification caption used during normal programmes.

A '1' logo can be most confusing since there might be only subtle differences between broadcasts of neighbouring countries. Many countries have dispensed with simple identifications such as 'SLO-1' (Slovenia) and 'HRT' (Croatia) in favour of stylised '1' symbols. Still, it keeps everyone on their toes!

Earlier this season **Ian Milton** (Ryton) spotted a logo consisting of a '3' inside a circle on Channel R1. Lithuania was present on Channel R2 at the time with their distinctive inter-linked 'LTV' logo. According to the WRTH a low-power relay for the Lithuanian TV-3 network operates on R1.

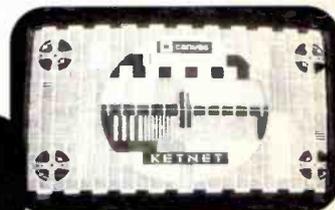
During a recent tropospheric opening, **Peter Barclay** (Sunderland) saw a stylised '7' logo on Channel E46 from an unidentified German source.

## Tropospheric Reports

Ian Milton (Ryton) and Peter Barclay (Sunderland) both have excellent locations for Scandinavian DX during tropospheric enhancement. On the 22nd, 23rd and 24th, many Norwegian signals were received from NRK-1 (mainly Band III), NRK-2, TV-2 and TV-Norge (the last three networks operate on u.h.f.).



**Fig. 1: The Dutch regional station TV Drenthe received on Channel E25 by Stephen Michie (Bristol).**



**Fig. 2: The Belgian 2nd network (French-language) wide-screen test card.**

■ KEITH HAMER & GARRY SMITH, 17 COLLINGHAM GARDENS, DERBY DE22 4FS

Peter also noted several Dutch stations including TV Drenthe on Channel E25 and TV Friesland on E28. Both stations were displaying text pages. Both Peter and Ian also managed to resolve RTE-1 from the Kippure outlet on Channel IE. **Kevin Bolger** (Dundee) tells us that this outlet can be received almost daily despite the incredible distance.

Further south, **Tom Crane** (Hawkwell) identified many Dutch, Belgian and German stations including the Dutch regional stations of TV Drenthe on Channel E25, TV Friesland E28, TV Gelderland E58 and Omroep Zeeland E54. The low-power relay of Télé Bruxelles on E36 also made a surprise appearance on the 20th.

### Band III Experiments

Equipped with a Grundig Globetrotter TV receiver, **Nigel Evans** (Aylesbury) hopes to receive French and possibly other European broadcasts. Experiments to receive Band III broadcasts have so far been unsuccessful. Initially a dipole cut to 1m has been tried but a Band III dipole needs to be roughly 800mm in total length.

It is possible to receive Band III signals on a simple dipole when tropospherics are belting in but a 5-element or 6-element antenna would be more appropriate. The array could be loft-mounted but it would be preferable to install it outdoors at a height of around ten metres.

### FM Reports

On September 19th, whilst on holiday in High Wycombe, **George Garden** (Edinburgh) heard France Inter in stereo on 103.7MHz from Lille. Strangely, no TV signals from any of the French stations could be resolved. George also heard a strong German station on 101.4MHz which is thought to have originated from the 100kW transmitter at Brocken.

Eastern European f.m. stations are interesting catches particularly during intense tropospheric activity. Listen out for the following:-

Blue FM (RDS display: Blue FM) on 97.7MHz (Wieliczka).  
Radio Koliba (RDS: R. Koliba) on 100.9MHz (Poprad).  
Slovensko Rock FM (RDS: Rock FM) on 100.3MHz (Kosice).  
Slovensko Deví (RDS: DEVIN) on 96.9MHz (Poprad).  
Frekvence 1 (RDS: RADIO F1) on 91.0MHz (Ostrava).  
CRo 2 (RDS: CR OVA) on 88.7MHz (Jesenik).  
FUN Radio (RDS: FUNRADIO) on 87.7MHz (Kosice).

### Service Information

**United Kingdom:** ITV have introduced a new identity with the familiar 'ITV' symbol reduced to lower-case lettering. A heart-shaped logo has also been introduced to portray the message 'from the heart' (whatever that is supposed to mean!).

**Sweden:** The SVT-2 PM5534 test card is shown for a large part of the day except for a couple of hours around midday when encrypted programmes are aired.

**Netherlands:** Many of the Dutch regional stations are on test for most of the day. Test transmissions are as follows:- TV Friesland on Channel E28 radiates text pages accompanied by pop music, TV Drenthe (E25) shows text pages with the sound channel of Radio Drenthe and TV Noord (E36) displays text pages and scenic views from a car accompanied by music.

### Keep On Writing!

Please send your DXTV and f.m. reception reports, news and information to arrive by the first of the month to:- **Garry Smith, 17 Collingham Gardens, Derby DE22 4FS.**



**Fig. 3: The Télé-21 logo used several years ago in Belgium. The network has been renamed 'La Deux'.**



**Fig. 4: A simple test card used at one time by RTBF TV5 in Belgium.**



**Fig. 5: The Télé-21 PM5544 test card with transmitter and channel details at the top.**



**Fig. 6: This month's 'Down Memory Lane' spot. The identification logo used in the UK by ABC TV during the late Fifties and early Sixties.**

### September DXTV Log

This month's collective log is supplied by Peter Barber (Coventry), Stephen Michie (Bristol), Tom Crane (Hawkwell), Simon Hockenhill (Bristol), Peter Barclay (Sunderland) and Ian Milton (Ryton). All reception is via Sporadic-E unless otherwise indicated.

Day	Log
1	Spain (TVE-1) E2 and E3; Portugal (RTP-1) E2 and E3.
2	Serbia (RTS-1) E3; Italy (RAI UNO) A and B; Italy (VIDEO) E2; Italy (TV NAPOLI) A; Spain E3 and E4. Tropospherics:- Netherlands (NED-1, NED-2 and NED-3); Belgium (VRT TV1 and RTBF-1); France (Canal Plus).
3	Italy (RAI UNO) A; Italy (TV NAPOLI) A.
4	Denmark (DR-TV) E3. Tropospherics:- Netherlands and Belgium.
5	Sweden (SVT-1) E3; Spain E3; Hungary (RTL KLUB) R2; Rumania(TVR-1) R2; Slovenia (SLO-1) E3.
6	Lithuania (LTV) R2; Estonia (ETV) R2; Spain E2, E3 and E4; Italy (VIDEO) E2; Italy (TV NAPOLI) A; Corsica (Canal Plus) L4; France (Canal Plus) L3.
7	Denmark E3; Croatia (HRT-1) E4; Italy (RAI UNO) A.
8	Portugal E2 and E3; Hungary (RTL KLUB) R2; Ukraine (YT-2); Serbia E3; Slovenia E3; Italy (RAI UNO) A; Italy (TV NAPOLI) A.
9	Denmark E3; Spain E3. Tropospherics:- Netherlands.
10	Denmark E3; Sweden E3.
14	Italy (RAI UNO) A; Italy (VIDEO) E2; Italy (TV NAPOLI) A.
15	Portugal E3; Spain E2, E3 and E4.
16	Italy (RAI UNO) A and B; Italy (VIDEO) E2; Italy (TV NAPOLI) A; Spain E3; Corsica L2; Ukraine (YT-2) R2; Norway (NRK-1) E3.
17	Sweden E3; Norway (NRK-1) E2 (Steigen), E3 (Hemnes and Gamlem), E4 (Hadsel); Iceland (RUV) E4.
18	Denmark E3.
20	Tropospherics:- Netherlands and Belgium.
21	Tropospherics:- Netherlands, Belgium, Denmark (DR-TV and TV-2); Norway (NRK-1, NRK-2, TV-2 and TV-Norge); Sweden (TV-2).
22	Tropospherics:- Éire (RTE-1); Denmark (DR-TV and TV-2); Norway (NRK-1, TV-2 and TV Norge).
23	Tropospherics:- Netherlands, Belgium, Germany, Denmark, Norway and Sweden.
24	Tropospherics:- Netherlands and Norway.
27	Spain E2 and E3.
28	Tropospherics:- Netherlands and Belgium.

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# Info in Orbit

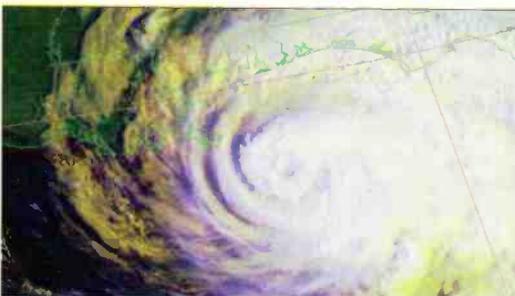
**F**or several years, whenever reporters or interviewers have asked me whether I believed the climate was changing, I always expressed my view that the various extremes of weather that we have seen occasionally were no more than 'average'. I should add that the interviews often follow from casual discussions on astronomy on local radio - I was not trained in professional meteorology.

My background is scientific satellite operations, astronomy and teaching. I even explain to reporters about my limited knowledge of 'weather matters', though these confessions are invariably edited out! The point I am making is that I now believe I was wrong - about the climate not changing.

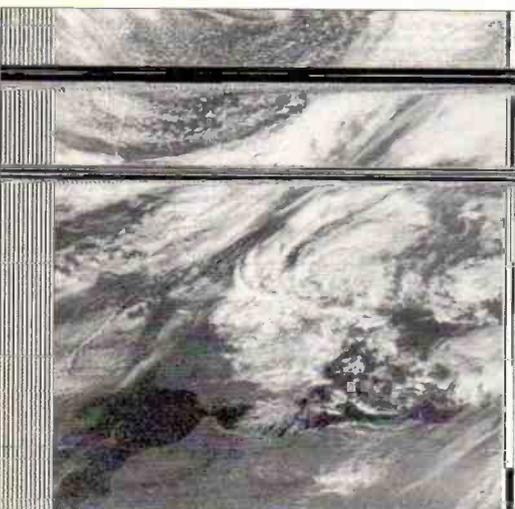
Month by month we are seeing records broken: wettest month somewhere for 100 years, driest month somewhere else, record breaking, powerful hurricanes - see Fig. 1 - the list seems endless. So many of the records have previously stood for perhaps hundreds of years that I am now certain that we are seeing our climate being modified. I wonder what 'Info' readers think?

## Current WXSATs

Although at the time of writing *METEOR 2-21* is transmitting on 137.85MHz, it seems likely that *METEOR 3-5* will return to active duty by the time of *SWM's* publication. *METEOR 2-21* is not in prime condition. Ever since launch in 1993 its telemetry has been variable, apparently due to the antenna



**Fig. 1: A multi-spectral image of Hurricane George from Steve Padar received on 27 September as it approached the Mississippi delta.**



**Fig. 2: METEOR 2-21 1300UTC 9 October at Plymouth.**

not deploying correctly.

The images that I have received are invariably short in duration, with deep fades, and a definite bias towards improved reception during the second half of each pass. Hopefully *METEOR 3-5's* rest will have helped restore its circulation!

A few weeks into autumn and the visible-light part of the images from *NOAA-14* and *NOAA-15* has lost much of the contrast seen in the summer images. A summer picture from **Brian Powell** and a September image from **Chris Seabridge** show what can be achieved using image enhancement to bring out the inherent detail hidden in the pixel values extracted from the telemetry. The detail is there - we just have to bring it out!

The *RESURS-01-4* resources satellite has not been logged by me since 11 August. It was scheduled to undergo three months of tests and I understand that these were essentially successful. It is worth continuing to monitor the frequencies 137.30 and 137.40MHz for telemetry, though note that both *SICH-1* and *OKEAN-4* make occasional transmissions on the latter frequency, so check your satellite predictions program if you hear any a.p.t. on this frequency.

I logged transmissions from *SICH* during late September, but have yet to set-up a permanently running computer to monitor and collect all a.p.t. transmissions for checking operations, though I know several 'Info' readers have done this.

## FENGYUN-2B

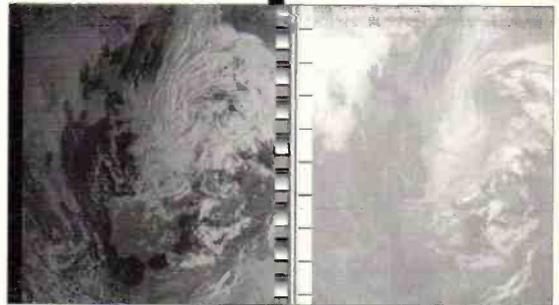
The Chinese geo-stationary WXSAT *FENG-YUN-2B* terminated high-resolution data transmissions and WEFAX in April when the S-band antenna de-spin mechanism apparently failed. Early in September it was learnt that *FY-2B* was able to operate for a few hours each day.

**Mike Kenny** of the Bureau of Meteorology in Melbourne, Australia, reported that monitoring there indicated that the 1702.5MHz telemetry signal is stable from 0030 to 0700UTC daily, indicating that the spacecraft has regained antenna pointing capability during this time. Although there have been no SV or WEFAX transmissions received in Australia, there have been reports of VISSR data being received from the spacecraft.

## Correspondence

Brian Powell of Hereford sent three images from his satellite receiving set-up, of which **Fig. 4** was appropriately well coloured. He used the RigSat 2 WXSAT receiver (essentially the same model that I reviewed in the 'WXSAT Special' edition) together with the *wxsat* program.

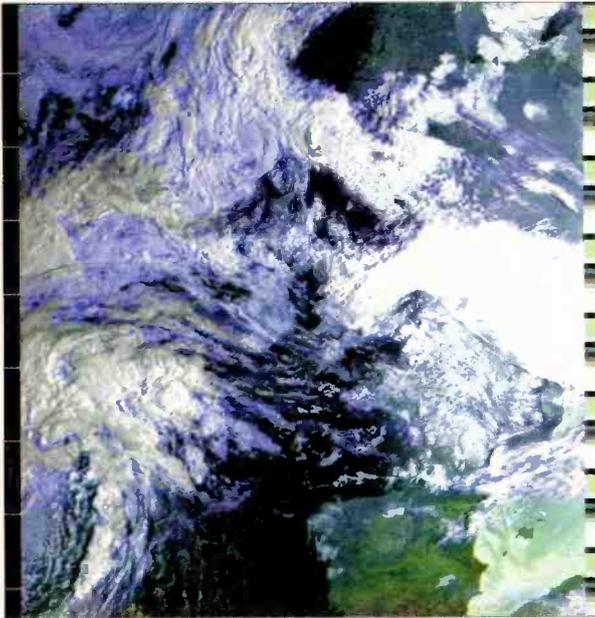
This program has an option to apply artificial colour to



**Fig. 3: NOAA-15 0809UTC 8 October at Plymouth.**



**Fig. 4: NOAA-14 Summer 1998 image from Brian Powell.**



**Fig. 5: NOAA-155  
September 0840UTC  
from Chris Seabridge.**

a.p.t. images, but Brian's image was exceptionally well produced - causing me to wonder whether he had personally adjusted the colour balance. The region of Norway-Sweden-Denmark is covered in this image extract, showing the Baltic Sea and much of the Gulf of Bothnia under clear skies.

Chris Seabridge G0VRK is running a similar satellite receiving system. His high-speed computer runs *wxsat* and is fed from the RIG RX2

receiver. Chris recently built the QFH (quadrifilar helix antenna) mentioned in the *RIG Magazine* and this column some months back - and praises its performance.

The design was provided by **Bill Sykes G2HCG** and **Bob Cobey G0HPO** and issued by them as an article on three pages. Several readers previously asked for these three pages and I have sent out perhaps 20 or so copies. Although I checked the quality of the copies before despatch, I did receive a comment from a third party that some people apparently felt that the copies were wrong or unusable in some way. Do contact me directly if your copies were not usable, and I will replace them with new copies.

Chris enclosed **Fig. 5** received from NOAA-15 showing eastern Britain under heavy cloud while the west basked in sunshine. The use of artificial colour helps to provide a realistic 'true-colour' picture. It is not too surprising to note that many of the



**Fig. 6: METEOSAT-5  
infra-red PDUS image  
from Arne van Belle.**

letters that I receive from new readers of *Short Wave Magazine* assume that colour forms part of the original image transmission. With the careful use of graphics software, or the use of colour options within various WXSAT programs, some effective colour presentations are possible - some perhaps too effective!

### **METEOSAT-5 Helping Indian Meteorologists**

*METEOSAT-7* is the current European geo-stationary WXSAT, and bringing it into operation provided the opportunity for *METEOSAT-5* to be allocated to a different environmental monitoring project. By manoeuvring *METEOSAT-5* to geo-stationary longitude 63°E, it has been able to image the region of the Indian Ocean for the INDOEX project. Here it has quickly been able to track cyclones - one transmission of which was captured by **Arne van Belle** on 9 June.

Arne van Belle is involved with Werkgroep Kunstmanen as the Co-ordinator of Radio Observers, and who operates a Primary Data system from his home in the Netherlands. His

location gives him access to transmissions from *METEOSAT-5* as well as *METEOSAT-7*.

The cyclone imaged had been spotted by meteorologists as a severe storm, and by 9 June it came inland and left a trail of death and destruction - the worst to affect the coast for 25 years.

Meanwhile, the Polish Institute of Meteorology and Water Management has been using *METEOSAT* imagery to track severe rainfall and to make predictions about river flow. My thanks to EUMETSAT for providing extensive information about *METEOSAT* application projects.

### **Dust Cloud Crosses From China To California**

The weather systems on planet Earth can do strange things. In Plymouth, it is not unknown for residents to wake up one morning, look outside and find a layer of fine red dust covering large areas of the city. This is usually identified later as having originated from the deserts of north Africa.

Local storms and the transport, by 'freak' weather systems, of tons of dust into the high atmosphere above the deserts set the scene, and the subsequent carrying of this dust northwards into Europe continues the process. The dust eventually falls wherever rain brings it down. The sequence of events is not usually predicted in advance but can be identified later.

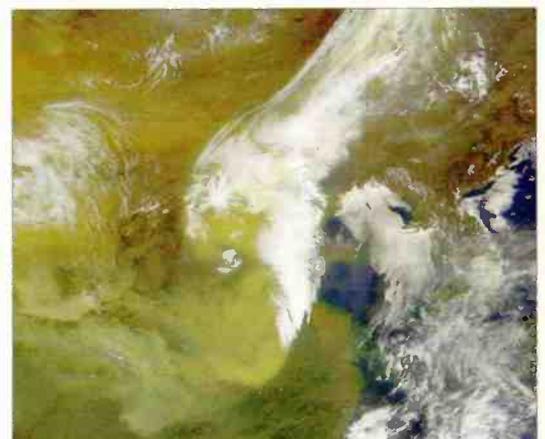
This was also the case with a dust cloud spotted by scientists using images from the Sea-Viewing Wide Field-of-View Sensor (SeaWiFS) - the main instrument onboard *ORBVIEW-2*, an ocean colour, observation satellite that was launched on 1 August last year, for Orbital Imaging Corporation of Dulles, Virginia. This is not a weather satellite, but it transmits encrypted data within the band used for high resolution picture telemetry (h.r.p.t.) by the NOAA WXSATS.

Several h.r.p.t. users were able to modify receivers to collect SeaWiFS images during the first few weeks before encryption. Licences to decode the data are available, but their cost take them outside the means of all but the most wealthy of amateurs.

On 16 April a large dust storm in China - seen as a yellow cloud in **Fig. 7** - interacted with a weather system and was carried far into the Pacific Ocean.

For the following several days a frontal system pushed the dust cloud eastwards. The circulation around a low-pressure system then carried it over the north Pacific Ocean, until the airborne dust reached the west coast of North America.

The second of the two SeaWiFS images - see **Fig. 8** - shows the west coast of North America on April 25, and the arrival of dust from China. The dust is visible in the clouds at the centre of the left edge of the image, and as streaks of light brown haze over Cape Mendocino on the California coast. The SeaWiFS images were produced by Norman Kuring of the SeaWiFS Project, NASA GSFC.



**Fig. 7: 1st image of Asian dust - 16 April.**

Apart from the SeaWiFS project, several NASA missions study the effects of *El Nino* and *La Nina* with orbiting satellites. The joint U.S.-French TOPEX/Poseidon satellite measures sea surface height, and TRMM measures precipitation and sea-surface temperature. The Tropical Atmosphere-Ocean Array consists of nearly 70 moored buoys in the tropical Pacific, designed by the National Oceanic and Atmospheric Administration (NOAA).

## A Golden Oldie

An E-mail from 'Robin' (location somewhere in Kent) told me that he is a recently qualified teacher who has just started working at a school, and discovered an ancient Nimbus computer running a Timestep WXSAT program. They have a METEOSAT receiver fed by a distant dish fitted with an LNB.

Robin tells me that the picture is never clear so they cannot really use the system effectively. The last time that I saw one of these units was when I introduced weather satellite image decoding to the trainees at Plymouth Information Technology Centre in 1985 (sadly long since closed). The choice of systems was between one unit costing about £200, and another at about £2000!

From Robin's description I would expect that the cable, connectors and any external electronics would have long since deteriorated. The METEOSAT receiver probably uses a down-converter (the external LNB) that transforms the received WEFAX signal on 1691.0 to 137.50MHz, but such an old unit - which once provided useful images - is unlikely to be in good condition following years of neglect.

If they are keen to investigate this unit further, they could check the receiver and see whether the volume control can provide an audio signal. This would then allow the system to be optimised.

If WEFAX tones can be heard on the 1691.0MHz channel, the dish can be adjusted for maximum signal. Until tones are heard, the complete unit is probably not functioning. There is much to recommend the acquisition of a modern WXSAT receiving system.

## Internet Sites

For those with access to the Internet, the following sites provide some fascinating images from the various WXSATs and other imaging spacecraft, together with



**Fig. 9: The shuttle Endeavour STS-88 is currently scheduled for launch on 3 December for the first flight of the International Space Station, carrying the Unity Connecting Module.**



**Fig. 8: 2nd image of Asian dust - 25 April. Provided by the SeaWiFS Project, NASA/Goddard Space Flight Centre and ORBIMAGE.**

detailed research information.

NOAA's Satellite Information Team provides a daily listing of the operational status of NOAA and GOES WXSATs, listing frequencies for a.p.t., WEFAX and PDUS, see <http://140.90.207.25:8080/EBB/ml/nic14.html>

The Goddard Distributed Active Archive Center (DAAC) provides data and related services for global change, research and education. Data from the Tropical Rainfall Measuring Mission (TRMM) satellite is available here, as will shortly be SeaWiFS images - as seen in this column, visit <http://daac.gsfc.nasa.gov/>

NOAA and the National Environmental Satellite, Data, and Information Service (NESDIS) provide an excellent service called the Operational Significant Event Imagery (OSEI) homepage. This provides daily information about severe weather or other environmental activity of note - and they even offer a free mailing service! Visit <http://www.osei.noaa.gov/updaterecent.html> for more information.

## Shuttle Launch Schedule

The shuttle Endeavour STS-88 is currently scheduled for launch on 3 December for the first flight of the International Space Station, carrying the Unity Connecting Module, see **Fig. 9**. This is an 11-day flight having an orbital inclination of 51° that brings it over Britain). Subsequent ISS flights may be delayed to accommodate expected delays in component deliveries.

Shuttle STS-93 is scheduled for launch on 21 January into a 28° inclined orbit.

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I also send monthly Kepler print-outs to many people. To join the list please send a 'subscription' of £1 (secured, plus four self-addressed, stamped envelopes) for four editions. Transmission frequencies are given for the operating satellites. This data originates from NASA.

## Frequencies

NOAA-14 transmits a.p.t. on 137.62MHz.

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NOAAs transmit beacon data on 137.77 or 136.77MHz.

METEOR 2-21 or 3-5 use 137.85MHz in sunlight only.

OKEAN-4 and SICH-1 use 137.40MHz.

RESURS 01#4 may transmit a.p.t. on 137.30MHz.

METEOSAT-6 (geostationary) uses 1691 and 1694.5MHz for WEFAX.

GOES-8 (where available on the western horizon) uses 1691MHz for WEFAX.

Mir (Russian space station) uses 143.625MHz for voice.

# Timestep

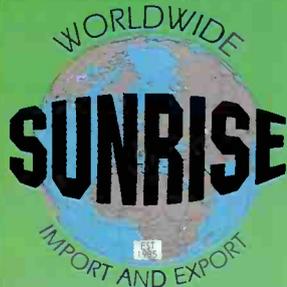


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# Scanning

**If you don't recognise my name, don't worry - until now, you'd only have found it at the bottom of reviews and features in the pages of magazines like PC Direct and PC Magazine. But a passion for the world of wireless communications dating back to the very earliest days of CB (well before it was legalised), several scanners and short wave receivers, and an unquenchable thirst to hear the secrets hidden in the airwaves have finally led me to the pages of Short Wave Magazine.**

When scanning up and down the radio spectrum, you'll come across many types of transmissions from all manner of different users. Some signals will be easy to follow conversations from the likes of taxi companies, aircraft, emergency services and p.m.r. users, while others will consist of the musical warble that usually indicates a digital transmission of one sort or another.

Most of these signals are transmitted in the clear, and even most of the digital signals can be decoded using a PC running suitable software and an inexpensive interface. Some transmissions are less easy to make any sense of, however, and arguably the most infuriating of these are transmissions from a Trunked radio network.

## Packed Trunk

Whether you are new to scanning or an old hand, you'll almost certainly have come across Trunked frequencies, identifiable from the fact that although the transmission is in the clear, you can only hear snatches of a conversation on a particular frequency, instead of a reply to a question being asked by one user, once they've finished, another user comes along giving a reply to someone else entirely about something completely unconnected with the first user, for example. In most cases, the number of users you'll hear sharing a frequency like this is quite high, and following even part of a conversation by listening to just this one frequency is almost impossible.

The reason you only hear snatches of conversations is because with a Trunked radio network, conversations hop between a fixed set of frequencies, a frequency change usually occurring each time a user presses the Transmit key on their transceiver. Although this does help to prevent eavesdropping, the frequency hopping isn't the primary purpose of Trunking. Instead, it was invented in order to make the most efficient use of a set of frequencies - instead of allocating one fixed frequency to each user group, Trunking allows several groups of users all to share the same set of frequencies, the number of these shared frequencies being significantly fewer than the number of user groups.

In other words, instead of allocating ten groups a dedicated frequency each, that would be wasted when the group it is allocated to isn't transmitting, in a Trunked network ten user groups might share, say, four frequencies. There's more to it than that, though, since each user group is normally totally unaware of the existence of any of the others, each user only hearing transmissions from others in their group.

In order to make this all work, each member of the group's transceiver must somehow be told which frequency it should listen to, and which it should transmit on, in order to keep group communications private and avoid having more than one user transmit on a single channel at a time. These instructions are sent to the transceiver, via a fixed-frequency digital control channel, from a central computer which controls all the transceivers in all the user groups using a particular set of frequencies. The instructions sent are based on which

frequencies are free and which user group the transceiver belongs to, something the computer can infer from a digital ID programmed into each transceiver and transmitted back to the control computer via the control channel's (again fixed) receive frequency when the Transmit key is pressed.

There are more complex, and also more simple, Trunking variants too, but all make use of the same basic idea of sharing frequencies between users. But at this point I'll stop waffling about the technical side of things and get on with telling you how to listen to Trunked radio systems. Unfortunately, in the UK at least, there are only two practical options; tracking frequencies manually, or investing in one of Optoelectronics' latest and greatest gizmos, the OPTOTRAKKER and the OPTOCOM, the other alternatives being too expensive or complicated for mere mortals, or simply unable to follow Trunked conversations in the frequency bands used for them in the UK.

The manual method is obviously the least expensive, as it doesn't involve buying any extra equipment. Unfortunately, it can take you hours if not days to determine which frequencies are being used by a particular set of users, and once you've done this and programmed the relevant frequencies into your scanner, you'll have to scan through them repeatedly to follow a conversation. If you are lucky, you may be able to save a great deal of time by differentiating between different user groups by their signal strength, however, and if the number of frequencies they use are small, you'll stand a very good chance of following conversations without too much trouble.

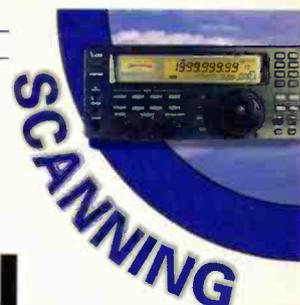
## Automated Reception

Investing in an OPTOTRAKKER, which can be used with many computer controllable scanners, or an OPTOCOM, which has its own built-in computer controlled scanner, is by far the best option, however, as both of these units can track Trunked conversations very effectively and with minimal effort on your part. Admittedly, you need to own a PC powerful enough to run Microsoft Windows to use either of these, and neither the OPTOTRAKKER nor the OPTOCOM can be considered inexpensive.

Both the OPTOTRAKKER and the OPTOCOM track Trunked conversations in the same way; rather than monitor the control channel to determine which frequencies to switch to, they simply decode the Talkgroup ID, a sub-audible digital code number unique to a particular user group. This ID is transmitted at the same time as any audio signal, and so by scanning through the user group's frequencies and looking out for a particular Talkgroup ID, a Trunked conversation can be monitored very easily.

With the OPTOTRAKKER and OPTOCOM, the only things you need to do are therefore to determine which frequencies are used by a particular set of TalkGroups, program these in to the special *TrakkStar* software supplied with these units, and then tell the software to make your scanner, or the OPTOCOM itself, scan through these frequencies, only stopping when the OPTOTRAKKER or OPTOCOM decodes an ID matching one you want to follow. Best of all, you don't even need to determine which frequencies are used by a particular set of Talkgroups by lengthy listening sessions, since the *TrakkStar* software can be used to do this for you almost completely automatically.

If you have Internet access and want more details on the OPTOTRAKKER (which is reviewed on page 51 of this issue) or OPTOCOM, you can visit the Optoelectronics Web site at [www.optoelectronics.com](http://www.optoelectronics.com) If you want even more details about Trunking, try [www.genesisworld.com/trunking.htm](http://www.genesisworld.com/trunking.htm) [www.motorola.net.au/trunking/index.html](http://www.motorola.net.au/trunking/index.html) or [www.trunktracker.com](http://www.trunktracker.com)



Hello and welcome to the return of the new and improved monthly scanning column, after so many of you wrote to Kevin to say how much you missed its presence in *SWM*.

Finally, a word of warning:

Listening to transmissions you aren't licensed to receive is illegal in many countries, including the UK. If you are caught, you risk a hefty fine, imprisonment, confiscation of your equipment - or even all three.

# Attention - 123!

**R**equests for our forthcoming ENIGMA booklet continue to pour in and due to the time involved in compiling station profiles and the need for accuracy, we have decided to issue it in two sections. Part One will have been issued by the time you read this. Part Two will be sent out separately, we hope, in December.

Whilst writing the booklet, all the usual pressing demands of ENIGMA have still to be dealt with and deadlines have to be met. It is far better to aim for accuracy, rather than feel compelled to rush through an inferior piece of work.

## Cherry Ripe Revisited

In the last article we gave details of E4 ("Cherry Ripe"). Unfortunately, it would seem that the operators didn't take too kindly to this, for they quickly made sure our frequency information became out of date! This is a good lesson for those who err by treating Numbers Stations as if they were international broadcasters.

## X6 - The Six Tone Station

When it comes to mystery signals this one takes some beating, as its purpose can only be guessed at. If you are a regular listener of the Fixed allocation bands you will doubtless have encountered this station from time to time. The operation dates back at least to the 1970s and has been unaffected by the ending of the Cold War.

It has a kind of hypnotic effect. You feel that you are compelled to listen to it, but in most cases, it simply disappears leaving nothing to follow. Transmissions consist of six electronic tones sent in a.m. full carrier. Many permutations of these tones exist, although one seems particularly predominant and its musical sequence can easily be memorised.

The station does not appear to use regular frequencies or times, so finding it is more a matter of good fortune than methodical searching. However, it does seem to display certain interesting habits. It always leaves the air without warning, **but stay tuned**, for occasionally further information is sent.

Up to two minutes after the carrier has gone off, a burst of hand keyed Morse (i.c.w.) is sent, followed by a short RATT (RTTY) message in FSK, (around 50baud, 850Hz shift). If no message appears, you may often find that X6 has moved to another frequency.

It's not uncommon to find the signal three times on different frequencies within the space of an hour. The repeated six tones may last from 5 to 20 minutes or more.

The transmissions are almost certainly of Russian origin, as intercepted Russian callsigns have been noted during the (often poorly sent) Morse. They are invariably very strong signals in Western Europe - look out for strong carriers prior to many Russian Family (I) number stations, including this one.

Very little is known about X6, but one school of thought suggests that they are designed to act as a general alert to the recipient, but this would not explain why so many transmissions send no further information, or continue for so long. Do the tones activate selective calling apparatus? This is another theory which doesn't quite fit X6's habits.

We would be interested in receiving logs of any X6 transmissions, particularly details of any Morse and teletype messages noted.

## An Appeal

Number stations have existed since before World War I, and until recently, have been a seriously neglected area in the history of h.f. radio communications. ENIGMA is slowly piecing together the history of these stations, often from tiny fragments. We are amazed that so few s.w.l.s can recall Numbers activity from even as late as the 1970s.

We always need information, logs, recordings, rumour, vague memories, etc. from the past, especially from World War II to 1980. We'd be most grateful for **anything** at all from this period.

If you yourself have nothing to offer, ask around at radio clubs, fellow radio amateurs, ex-service operators/technicians, etc. The wider we throw our net, the more Numbers intelligence we'll receive, and the more we'll be able to publish.

All aspects of Cold War history are now being published, yet Numbers stations, such an important part of the Cold War, are virtually unknown to history. This is a disgraceful situation, and probably results from their still highly secret nature. Not only were they used for espionage during this period, but so called Stay Behind Networks and even more questionable operations used them - **and still do**.

## Yodelling For The Cause - G1

While on the subject of shady outfits, we can hardly ignore this one, the Tyrolean Music Station - the archetypal cloak and dagger transmissions, which, now over two decades since its demise, still sends shivers down the spine when heard on tape!

Surely some of you remember those jolly German songs of the early 1970s played every weekend at 1130UTC on 6.650/6.425kHz. Usually the same three or four German beer-drinking songs (with brass band accompaniment) were broadcast followed by blank carrier until 1159 when an interval signature, seven notes from the "Internationale" took us up to 1159, after which it would speed up with a sense of urgency for the final minute - a warning that messages were impending.

On the hour a strident military sounding German male voice would announce several German names. Each name in turn, after a commanding "Achtung!" then received a short message of five figure groups and all would finish with "Ende!".

This was the usual format. Sometimes the songs were different, which must have had some meaning to the initiated. Often, this was a warning for messages of a different nature. These took the form of phrases.

The same live announcer would greet several named addresses with 'Gutentag! Hans, Adolf, Helmut', etc. and several very odd phrases were then read out to all addresses together, e.g. (translated) "Our hen has laid one egg", "The sunshine has faded", etc.

The yodelling would stop abruptly for the announcements, which were repeated twice, again by cutting off the music. After the final repeat he'd bid farewell to his listeners with "Auf wiedersehen!", and the usual number messages would appear on the hour.

Technical hitches were frequent - tapes being rewound and set before start time, loud clicks of toggle switches in the "studio", the wrong music being played, then stopped, and sounds of fumbling with tapes being the correct songs appeared, even coughs and sneezes, etc. Signal strength and audio quality were excellent, however, and at times it sounded as if "he" was just behind you!

Sometimes the two carriers stayed on after the Saturday broadcast ready for Sunday's transmission, which always carried different messages. An early Monday/Friday evening schedule on lower frequencies also existed, which probably sent repeats.

All this coincided with the life of Radio Northsea International, the DDR-funded pirate ship whose real function was far removed from entertainment. Late at night after closedown, their short wave carriers sometimes remained on, and a few tracks of Tyrolean music would be aired in the small hours. RNI's two Swiss directors were Stasi agents, and their company provided the timer used in the Lockerbie bomb.

Andrew (Fife) - The Czech man you heard on 10.642 at 1300 is a new station (S10E) and only seems to appear on the last few days of each month, sending four different messages in each transmission. We suspect it is run by Slovak intelligence. It has a more well-established Morse equivalent - M10E.

David (Cardiff) - E3, Lincolnshire Poacher now transmits from Ayios Nicolaos in the Troodos mountains North of the Akrotiri sovereign base area of Cyprus. It has long been a GCHQ/FO site (linked to a monitoring site at Mt Olympus), and is guarded by a detachment of the Anglian Regiment, known as... "The Poachers".

## Cherry Ripe - New Schedule

Time	Frequency
1000	20.747/23.461
1100	20.747/23.461
1200	20.747/23.461
1300	19.884/22.108
2200	15.624/17.499
2300	17.499/NF (not found)
0000	17.499/22.108

It seems as if third parallels have been dropped.

**Numbers Stations follow rules of their own. The new schedule is shown above (still Mon-Fri only).**

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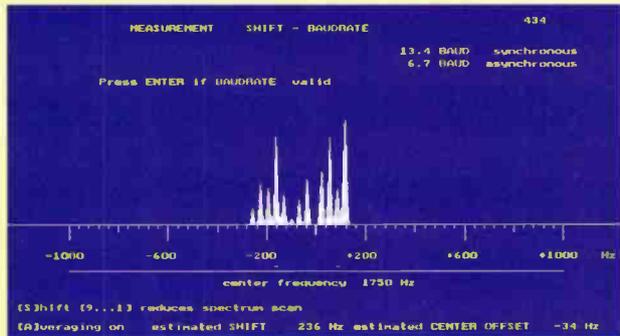
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# Decode

**F**or this month's main subject I'm going to take a look at the development of many of the common data modes with a particular accent on error detection and correction systems. There's nothing like starting at the beginning so let's go way back to the early days of Morse code.

Whilst this is generally thought of as a radio communications code, it was originally designed for use with wire telegraph systems back in the 1800s. These were really exciting days in the development of communications systems as the pioneers were developing a wide variety of ingenious systems, many of which have survived right through most of the 20th century! This is pretty incredible when you think of the other changes that have occurred over the past hundred years.

## Original Morse

The original Morse system used much the same code as the one we use today and relied on two experienced operators, one at each end, to handle the communications. The overall quality and integrity of the message was largely dependant on the skills of these operators. This dependency on skilled operators became even more important when Morse code was used for maritime radio communications.

One of the early developments to make the code more usable was the introduction of formalised abbreviations for common words and phrases. These helped speed-up the messages as well as helping to reduce errors.

There were also simple techniques such as break-in to help the flow. This is where the transmitting station's transmit/receive switching is set-up so that the operator can listen in-between characters. With this facility set-up properly, the transmitting operator can check that the channel is being kept clear and can also be interrupted by the receiving station to catch-up on any errors.

Although Morse code is a wonderfully simple and effective system, the main problem is the requirement for experienced operators at both ends of the link. From a commercial view point, this was an expensive option as at least two operators were required in order to maintain a 24hr radio watch. What was really needed was some form of printing communication system so the messages could be passed directly to the end user without the intervention of a radio officer.

If you've ever tried automatic decoding of Morse signals you will have some appreciation of how difficult it can be. The main problem is the variable timing that comes from hand sent Morse, this 'swing', as it's often known, is rather like a fingerprint that very experienced operators can use to identify the sender. However, when you try and program a machine or computer to decode Morse, this 'swing' becomes a real nightmare.

The other problem with simple implementations of Morse code over radio is that all manner of interference can bubble-up in-between characters/words which can further confuse any automatic decoder. The next significant development was to move to the teleprinter based Radio TeleTYpe (RTTY) system that we know and love!

## No Human Intervention

This system has many advantages over the Morse based systems. It uses a fixed timing and there's no scope for human intervention so decoding becomes very much simpler. This is also a digital system that operates in one of two states which are known as mark and space.

To further help the decoding process, the system uses a standard convention to link alphabet characters to blocks of code that are sent over the land-line or radio link. The most common is to use what's become known as the International Telegraph Alphabet Number 2 or ITA2. This wraps each character of the message with a code which comprises a start bit, 5 character bits and 1.5 stop bits.

If you're into the technical stuff you will note that 5 bits only provides 32 combinations which is not enough to handle the 26 characters of the alphabet, numbers and basic punctuation. The solution is to include two new characters known as letters and figure shift and two sets of meaning for the five data or character bits. The two sets are known as figures and letters and I don't think I need to explain this!

When using the link, the operator would type normally for text messages but would need to carry-out the following sequence to add

numbers to the text: press figure shift followed by the appropriate numbers and then letters shift to return to normal text mode. Whilst this process is not much trouble for the operator, it is a prime source of errors when RTTY is used over a radio link.

The weakness lies in the use of the shift character. As you can imagine, if a shift character gets lost for some reason, the rest of the message turns into gibberish until the next shift arrives to put things straight. In a practical system you'd be amazed just how many times the shift gets lost.

The other difficulty is that interference spikes can often be interpreted as a false shift character, which is equally effective at turning the message into gibberish. There have been lots of ingenious fixes put together to minimise this problem.

One of the most widespread is the unshift-on-space facility that's included in just about all modern decoders. All this does is force a return to letters whenever a space character is received. Whilst this doesn't stop the error in the first place, it is very effective at reducing the amount of subsequent text that's corrupted.

Another trick that was used extensively on commercial systems and is most well known because of its use on telegrams is to ignore the figures altogether and spell out the punctuation and numbers in the message. The net result of a simple message would look like this:

PLEASE SEND TWELVE BARRELS OF RUM STOP

Whilst this proved very effective it did tend to make all messages somewhat longer than they needed to be. It also failed to deal with the basic vulnerability of RTTY to interference. Whilst the systems I've described (and that was only a sample) help minimise errors, they don't provide what commercial operators needed i.e. an automatic, error free communications link requiring minimal technical knowledge to operate.

The next most important development was SITOR (Simplex Teleprinter Over Radio). This was the first successful commercial system that employed an error detection and correction system. The introduction of this system was really a major step towards the commercial ideal.

The secret to the system's success was the use of a new teleprinter alphabet which is known as CCIRR Rec 476. I know it sounds complicated, but the code itself, like all the best ideas, is remarkably simple. Here's a sample to show how the first half a dozen letters of the alphabet are converted: A 0001110

B 1011000  
C 0100011  
D 0011010  
E 1001010  
F 0010011.

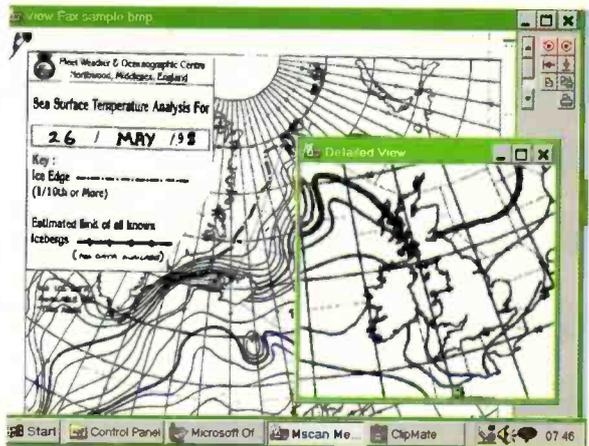
If you look carefully, you will see that the code for every character has one common characteristic. Spotted it yet? Well, if you count-up the 1's and 0's you will find that every letter contains 4 zeros and 3 ones. Yes it's really that simple. It's this pattern that is used at the receive end of the link to see whether or not a character is valid or corrupt.

The decoder looks at each character as it appears and discards any that don't have the right mix of 1's and 0's. OK, so that's got rid of the duff characters, but how does the system correct these errors? Yet again it's really simple.

First of all try listening to a SITOR signal and you will get a clue as to what's happening. A good place to start is around 4.21MHz. So what did you find?

If you found a running SITOR link you should have heard a regular chirping sound with what sounds like an answer in-between each chirp. What's happening here is the transmitting station sends a group of three characters then switches back to receive to listen for an acknowledgement from the distant station. If it hears the correct acknowledgement it then goes ahead and sends the next three characters.

This process goes on until the entire message has been sent.



Sample screen from the new **MSCAN Meteo**.

## MSCAN Meteo

The latest product to hit the market for FAX decoding is the new *MSCAN Meteo* from CombiTech. This is the latest development from the excellent *MSCAN SSTV* system and looks to be pretty impressive. The program is designed to run under Windows '95 or '98 and requires a PC with Pentium compatible processor and a special Multiscan interface unit.

I've had a very quick look at the 'lite' version from the Web site and it looks very good. However, I need to get my hands on an interface before I can form a full view. If you want to take a look you can find details on the *MSCAN Web page* at

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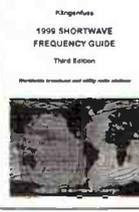
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If the receiving station detects a duff character, it sends a different acknowledgement back, which causes the transmitting station to repeat the last block of three characters. This process repeats until the group is finally received without error.

The weakness lies in the detection system which relies entirely on the 3:4 ratio to spot errors. This means you could have an error that creeps through the system simply because it has this 3:4 ratio. In practice, the error correction works extremely well, so much so that it has for many years been a prime communication system for ships at sea.

The system has also been enhanced through the use of exclusive SELCALs which mean that a receiving station can be set to come alive and start receiving when it detects messages with its unique Selcal. There are also two distinct modes associated with SITOR. These are known as SITOR-A and SITOR-B.

The system I've described so far featuring the characteristic chirp-chirp sound is called SITOR-A and is essentially a basic point-to-point system. By this I mean that the link can only really work properly with one transmitting station and one receiving station. The only exception to this is the listen mode that's normally included in the decoders used by short wave listeners. This is a special non-standard mode that provides monitoring of an existing link between two stations.

The SITOR-B mode is designed to provide a broadcast mode where the transmitting station can send an error corrected message to any number of receiving stations. To do this the system obviously can't wait for an acknowledgement from every station, so a different technique is required.

The trick used is to send the message twice with the repeated message delayed by three characters and interleaved with the first message. At the receive end the same 3:4 ratio checking is done, but if an error is detected the decoder just waits for the repeated character and uses that if it's free of errors.

The result of these developments is a very sophisticated messaging system with a high degree of automation - just what the commercial operators needed. Whilst the SITOR system is excellent



**SITOR - essential for maritime communication.**

for relatively short messages, such as Telegrams, it's not so good for continuous data links, especially as the early systems relied on electromechanical transmit/receive switching.

You can imagine that the switching relays would soon wear-out if the link was in continuous service. The solution to this was to move to the two frequency duplex systems that are in common use throughout the h.f. bands. There are lots of different variants but the basic principle is common. To avoid the constant transmit/receive switching and to increase the carrying capacity, separate frequencies are used for the transmit and receive links.

The simple result is that the pair of frequencies create what's known as a duplex link. This means you can communicate in both directions at the same time rather like a telephone line. Simplex on the other hand can be likened to an amateur radio link where

only one person can talk at a time.

So how do you carry-out error correction over a duplex two frequency radio link? It's easy really, all you have to do is interleave the acknowledgement and repeat request signals with the message in the opposite link. I'll provide a more detailed analysis of this mode in a later column.

This means of data communication over a duplex radio link is the basis of a whole range of commercial services, of which the most common is ARQ-E. This variant was manufactured by Siemens and is used extensively by the French military and German government.

The error detection system used for ARQ-E is known as parity checking. This is where the data bits that make up each character are checked before transmission to count the number of 1's in the signal. If there are an odd number the character is sent. However, if there is an even number, an extra 'parity' bit is added.

At the receive end of the link the decoder simply has to make sure every character has an odd number of bits. Any that don't are discarded and a repeat request is sent to the transmitting station. There are many adaptations of the system around and the idea of interleaving messages is used to enhance the system to carry four channels of data in the ARQ-M4 system.

## Hot News

Phil Perkins has just contacted me to let me know that Pervisell now have the exclusive UK dealership for the exciting new *JVcomm32 Windows 95 FAX* decoder. This is great news as Pervisell have been providing excellent service to Decode readers for many years. For more info, contact Pervisell at <http://www.pervisell.com> or Tel: (01494) 443033 or write to Pervisell Ltd., 8 Temple End, High Wycombe, Bucks HP13 5DR.

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# All At Sea

## Portishead Radio (GKA) 1920-1999 R.I.P.

**In my last article I mentioned the closure, of what is widely regarded by marine Radio Officers past and present, to be the biggest and best maritime coast radio station in the world, namely Portishead Radio. This mighty bastion of high-frequency marine communications has been in existence since 1920, then based in a redundant Imperial Wireless Chain receiving station at Devizes in Wiltshire. The 'station', comprising a receiver and a 6kW transmitter using the callsign GKT, had a guaranteed range of 2400km with traffic sent and received from ships up to five days from a UK port.**

This two-way 'long-range' service gained in popularity and by 1924 it became necessary to expand the station to cope with the increased demand. The GPO constructed a second long wave transmitter and built a new receiving station at the present site in Highbridge, Somerset, to which most of the Radio Officers transferred.

By 1926, experiments were well in hand using shorter wavelengths, and it was soon discovered that world-wide communication could take place. Tests were extremely successful, necessitating construction of yet another brand new transmitting station utilising the new short wave transmitters.

This new site was established at Portishead near Bristol and thus GKA 'the sleeping giant' was born. The new station was extremely successful and Devizes was soon closed.

### Service Expanded

Throughout the ensuing years the service rapidly expanded with the addition of flying boats passing traffic from as far away as South America and India. Throughout the war years, Portishead was kept very active and in 1943 the civilian staff were augmented with Naval operators from HMS *Flowerdown*.

An 'area' scheme was established in 1946 to enable British and colonial vessels to relay traffic through Naval Communications stations around the world, back to Portishead. Low powered transmitters (100W) were used by ships as distances to the nearest Naval station were fairly small.

Portishead continued to expand during the 1950s with a high volume of traffic coming from the trans-Atlantic liners all using c.w. (Morse code). A land-line telex service was developed, permitting customers to deposit and receive traffic directly with Portishead rather than using the internal Telegraph Service.

The 1960s saw the introduction of Telex Over Radio (SITOR), with a world first in 1968 of *Daily Telegraph* press transmissions direct to the *QE2* giving the passengers a daily newspaper with their morning cuppa. The Naval Area Scheme was terminated in 1972 and with it the Naval presence at Portishead. Ships were then forced to refit with high power transmitters of at least 1.5kW to enable them to communicate from the far flung corners of the world directly back to good old Blyth.

Traffic levels continued to rise with the oil industry and the leisure market making large contributions to the traffic figures. In 1974, over 20 million paid words of traffic were passed by Portishead employing over 154 personnel.

### New Station Constructed

In 1976, operations had expanded to such a point that the present operating areas were no longer large enough to house the equipment and personnel required so a completely new station was constructed on the same site with the now redundant buildings turned into storerooms. A 'state-of-the art' computer system was installed to handle c.w. traffic and the radio telex service was automated with the installation of 'BART' (Burnham Automated Radio Telex). Traffic figures continued to climb.

By the early 1980s, satellite communications had developed with the advent of the INMARSAT Standard A system offering an on-demand telephone and telex service. The cost of using satellites was fairly high at this time, so little impact was noticed on terrestrial communications.

In 1985, an aeronautical service began handling simplex radiotelephone operations traffic from scheduled and charter flights, with an on-demand airport weather service proving extremely popular with pilots, as the only weather service on offer before this was VOLMET operated by Shanwick. Piggybacked onto the aero service and mostly using the same frequencies was another popular widely used system called 'Gateway'.

'Gateway' handled, and still does handle, traffic from ground stations using basic amateur radio transceivers with a power output very rarely more than 100W, situated in very remote areas of the world where normal land-line telephone links are non-existent. Customers have ranged from MSF (Medicins Sans Frontiere) medical units dealing with famines and earthquake victims in places such as Russia, Iran and the Sudan, OXFAM and Save the Children Fund both working in remote parts of Africa, to army units on exercise and active service, in all parts of the world, using 'Gateway' with their military backpack transceivers.

During the Gulf War when the coalition forces retook Kuwait from Iraq, some of the first communications to come out of the country were from a tank and an armoured personnel carrier trundling up Kuwait City main street using their on-board transceivers to set up 'phone links through the Portishead Gateway.

### That'll Do Nicely

"American Express sir, that will do nicely" would have been heard frequently over Portisheads' circuits that night, with most of the British Army calling their wives. The ITN news team in Sarajevo reporting on the civil war suddenly, to their dismay, discovered that the satellite link, used for filing their news reports back to UK, was down.

An enterprising member of the team who was an active amateur radio enthusiast, was idly tuning around the bands and came across Portishead working an aircraft. A call on the same frequency elicited an immediate response from Portishead who then proceeded to link their reporter, Brent Sadler, back to ITN headquarters in London, enabling him to file his report just in time for *News at Ten*. These are just a couple of fondly remembered anecdotes from days gone by, demonstrating the versatility and professionalism of the Portishead staff.

By the end of the 1980s, satellite began to carve large lumps out of Portisheads' traffic figures. Standard C (store and forward telex) came on line and preparations for GMDSS (Global Maritime and Distress Safety System) intensified.

Staffing at Portishead began to run down as the traffic figures dropped and the writing on the wall was plain for everyone to see. Commercial marine terrestrial h.f. communications were fast becoming obsolete.

Although the aeronautical and Gateway service still remains popular, the maritime service has all but died, passing maybe ten telegrams a day with a staff of twenty Radio Officers. Portishead was due to close completely at the end of next April but at this moment in time, it has had a stay of execution and closure has been deferred until next September for operational reasons.

Nevertheless, it will definitely close and its passing will be mourned by many, seagoing and coast station R/Os alike, myself included. Many happy hours were spent at Portishead together with many unhappy hours struggling to keep awake on the night shift!!

The views expressed in this article are entirely those of the writer and are not to be construed as reflecting in any way the policies or views of the UK Hydrographic Office.

## Out With The Old

It is now the end of an era for maritime communications. The GMDSS is all but completed with full implementation in 1999, beginning a new and exciting era not only for the maritime community but for ALRS who service this community with their range of nautical publications.

In future columns I will discuss the upsurge in new, private coast radio stations, who obviously believe that there is still a market in maritime terrestrial h.f. communications, but instead of using traditional methods, are now using state-of-the-art digital transmission techniques.

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

# Maritime Beacons

## LONG WAVE MARITIME RADIOBEACON CHART

Freq (kHz)	C/S	Station Name	Location	DXer	Freq (kHz)	C/S	Station Name	Location	DXer
284.5	LZ	Lizard Lt	S.Cornwall	B.C.E.F.G.H.I.K.*L*.M.N*.O.R.S.T.U.V	304.5	MY	Cabo Mayor Lt	N.Spain	[NOW 303.0] C*.F*.T.V
284.5	MA	Cabo Machichaco	NE.Spain	C.F.G.*I.*K.*L*.M.*N*.O*.T.U	304.5	PS	Pt Lynas Lt	Anglesey	[WAS 304.0] A.C.E.F.G.I.*L*.M.N*.O.Q.T
284.5	PR	Porkkala	Finland	T*	305.5	AL	Pt d'Ailly Lt	France	[NOW CLOSED] C.L*.N*
285.0	NP	Nieuport W.Pier	Belgium	F.N*.S.T	305.5	FP	Fife Ness Lt	SE.Scotland	[WAS 305.0] A.C.F.G.I.M.T
286.0	TR	Tuskar Rock Lt	Co.Wexford	C.E.F.G.H.I.M.N*.O.Q.T.U	305.7	DA	Dalatangi Lt	Iceland	F*.G.M*
286.5	BC	Baily Lt	Co.Dublin	C.D.O.	306.0	FN	Walney Is Lt	Off Lancs	A.B.C.E.F.G.I.J.*L*.M.N*.O.T
286.5	FI	Cala Figuera	Majorca	C*.F*.I.*M.*N*.T*	306.5	H	Hel Lt	Poland	C*.F*
286.5	FT	Cap Ferret Lt	SW.France	C.F.G.*I.*M.*N*.T*	306.5	KL	Kolkasrags	Latvia	C*.F*
286.5	NK	Inchkeith Lt	F of Forth	A	306.5	RS	Ristna	Estonia	[NOW 307.5] C*
287.3	IB	I.Berienga	Portugal	N*	306.5	UT	Utsira	Norway	A.C*.E.F.G.I.M.N*.P.O*.T
287.5	DO	Rosedo Lt	France	N*	307.0	GL	Eagle Is Lt	Co.Mayo	A.C.G.I.M.N*.O
287.5	FR	Faerder Lt	Norway	C*.M*.N*	307.0	LE	Leba Rear	Poland	C*
287.5	IB	I.Berienga	Portugal	C*	307.5	RS	Ristna	Estonia	F*.G*.I.*M.*N*.R*.S*.T
287.5	MD	Cabo Mondego	Portugal	C.N*	308.0	PI	Cabo Espichel	Portugal	C*
288.0	HH	Hoek van Holland	Holland	F.N*	308.0	RC	Cabo Roca	Portugal	C*
288.0	KL	Skilinna Lt	Norway	C*.F*.G.N*	308.0	NZ	Roches Douvres Lt	France	C.L*.N*
288.0	OH	Old Hd of Kinsale	Co.Cork	C.*	308.5	AD	St Nazaire	France	C*.F.N*.T*
288.5	CT	Pt de Combril Lt	France	N*	309.5	BA	Punta Estaca Bares	N.Spain	C*.G*.M*.N*.O*
288.5	FI	Cabo Finisterre Lt	N.W.Spain	C.G*.I.*N*.O*.V*	309.5	FH	Fruholmen Lt	Norway	C*
288.5	UD	Cabo Salou	S.Spain	N*	309.5	MA	Marstein Lt	Norway	A.C*.F*.G.I.M.N*.P.T*
288.5	YM	Ijmuiden Lt	Holland	B.C*.E.F.N*.S.T	309.5	PB	Portland Bill Lt	Dorset	B.E.F.H.I.K.L*.M.N*.R.S.T.U.V
289.0	BL	Butt of Lewis Lt	Is of Lewis	[NOW 293.5] M.P	309.5	WE	Wangerooge Lt	N.Germany	C*
289.0	BY	Baily Lt	Co.Dublin	C.G.I.M.N*.O	310.0	ER	Pt de Ver Lt	N.France	C*.D.E.F.H.K.N*.R.T.U.V
289.0	RN	Rhins of Islay Lt	Is of Islay	[WAS 293.0] A.C.E.F.G.G.I	310.5	AS	Castellon	Spain	N*
289.5	KY	Oksoy Lt	Norway	F	310.5	DA	Damletta Mouth	Egypt	C*
289.5	SN	Ile de Sein NW Lt	France	C*.F.*K*.N*.T	310.5	RO	Rozewie	Poland	[WAS 287.3] C*
290.0	FD	Fidra Lt	F of Forth	A.C*.G.M	311.0	CE	Ceuta	S.W.Spain	N*
290.0	MR	Montedor	Portugal	C*	311.0	NF	N.Foreland Lt	Kent	B*.C*.D.E.F.H.I.K.L*.M.N*.R.S.T.U.V
290.5	DY	Duncansby Hd Lt	NE.Scotland	A.C.G.P	311.5	GD	Girdle Ness Lt	NE.Scotland	[WAS 311.0] A.C.G.M.P
290.5	SB	S.Bishop Lt	Pembroke	C.E.F.H.I.J.*K*.L*.M.N*.O.R.T.V	311.5	LP	Loop Hd Lt	Co.Clare	C.G.I
290.5	VI	Cabo Villano Lt	N.Spain	C.D*.F.*J.*K*.L*.M.*N*.S*.T*.V*	311.5	SA	Senigallia	Italy	C*
291.0	SM	Pt St.Mathieu	France	[WAS 292.5] K*.M.N*.T	311.5	SB	Sumburgh Hd Lt	Shetland Is	[WAS 304.0] C*.F.G
291.0	SU	Cabo San Sebastian	S.Spain	C*.F*	312.0	OE	Oostende	Belgium	C*.E.F.H.K.L*.M.N*.O.R.S.T.U.V
291.5	SN	South Rock LV	Co.Down	A.C.E.F.G.I.J.*L*.M.N*.O.O.T	312.0	SP	Cap Spartel	Morocco	C*.L*
291.9	LT	La Isleta	Canaries C	C*	312.0	UH	Eckmuhl Lt	France	C*
291.9	RN	Reykjanes Lt	Iceland	G.O	312.5	AK	Alkenrags	Latvia	C*
292.0	MH	Mahon, Minorca	Balearic Is	C*.F*	312.5	BT	Mys Taran Lt	Latvia	C*.M*.T*
292.0	SJ	Souter Lt	Sunderland	A.E.F.I.L*.M.N*.O.T	312.5	CB	Calais Main Lt	France	C.F.H.K.L*.N*.S.T.V
292.5	SM	Pt St.Mathieu Lt	France	[NOW 291.0] C.V	312.5	DS	Doobskiy	Ukraine	C*
293.0	CP	St.Catherine's Lt	I.O.W.	B.O*.E.F.H.I.K.*L*.M.N*.R.S.T.U.V	312.5	KA	Klaipeda Rear Lt	Lithuania	C*.T*
293.0	RN	Rhins of Islay Lt	Is of Islay	[NOW 289.0] L*.M.O.O	312.5	LB	Liepaja	Latvia	C*
293.0	SY	Svinoy Lt	Norway	A.C*.G.M.N*	312.5	SR	Skardsfjara	Iceland	C*.F*.G
293.5	BL	Butt of Lewis Lt	Is of Lewis	[WAS 289.0] C*.G	312.5	VS	Cabo Estay Lt	N.Spain	B.L*.M.N*.T*.U
293.5	RO	Cabo Silleiro Lt	N.Spain	C*.N*.O*	312.6	KB	Krautsand	Germany	C*
294.0	KH	Kullen High Lt	Sweden	C*	313.0	HA	Halten Lt	Norway	F*.N*.O*.T*
294.0	PJ	Cap d'Alprech	France	B.C.E.F.H.I.K.*L*.M.N*.R.S.T.U.V	313.0	PA	Cabo de Palos Lt	S.Spain	C*.F*.N*
294.5	BA	#Black Hd Lt	N.Ireland	C*	313.0	TY	Tony Is Lt	Co.Donegal	A.C.G.I.M.O
294.6	NO	Cabo de la Nao	Spain	C	313.5	BR	Cap Bear Lt	S.France	N*
295.0	SN	Sletnes Lt	Norway	C*.N*	314.0	HK	Hekkingen Lt	Norway	N*
295.5	CB	La Corbier Lt	Jersey C.I.	C.D.E.F.I.K.*M.N*.R.T.U.V	314.0	PG	Porquerolles	S.France	C.G.N*
295.5	CR	Cap Couronne	France	N*	314.0	VG	Ile Viege Lt	France	B.C.O.E.F.G.H.I.K.L*.M.N*.O.R.T.U.V
295.5	JA	Jaroslawiec	Poland	C*.F*.G*.M*.O.T	314.0	WU	Wustrow Lt	NE.Germany	C*
295.5	RE	La Rochelle	France	C	314.5	CM	Cromer Lt	Norfolk	[WAS 313.5] A.C.E.F.H.I.*N*.R.S.T.U.V
296.0	GR	Groere Lt	Holland	E.F.I.N*.O.S.T.U	315.5	ND	Niidden	Lithuania	C
296.0	KR	Skrva Lt	Norway	C*	316.0	IN	Ingolfshofdi Lt	Iceland	C*.N*.P
297.0	FG	Pt de Barileur Lt	France	B.C*.D.E.F.H.I.K.*L*.M.N*.R.S.T.U.V	337.0	MY	Myggenaes	Faeroe Is	[WAS 303.0] C*.F*.G.M.N*.P.T*
297.5	MA	Mantyluoto	Finland	C*	372.0	OZ	Prins Chris's Sund	Greenland	C*.F*.G.M.N*.T*
297.5	PS	Cabo Penas Lt	N.Spain	C.L*.M.N*.O*	381.0	AN	Akraberg	Faeroe Is	C*.F*.G.M.N*.P.T*
298.0	GX	Ile de Groix	France	C*.F.K*.M.N*.R.T.U	404.0	NL	Nolso	Faeroe Is	C*.F*.G.M.N*.P.S*.T*
298.0	TA	Cabo Gata	S.Spain	C*.N*					
298.5	RW	Round Is Lt	Is Scilly	A.B.C.E.F.G.H.I.*K*.L*.M.N*.O.R.S.T.U.V					
298.5	SK	Skagen	Denmark	C					
299.0	AD	Ameland Lt	Holland	C.N*					
299.0	BN	Les Baleines	W.France	C*.K*.N*.O*					
299.0	D	Tarifa	S.Spain	C*.O*					
299.5	NP	Nash Pt Lt	S.Wales	C.D*.E.F.H.I.K.*L*.M.N*.R.T.V					
299.5	SK	Skomvaer Lt, Rost	Norway	C*					
299.5	VR	Utvaer Lt	Norway	A.C*.G.M.N*					
299.5	VS	Viezste Lt	Italy	C*					
300.0	CL	Dloch Pt Lt	W.Scotland	C*					
300.0	MZ	Mizen Head	Co.Coik	C.F.I.M.N*.O*.R.T.U					
300.0	TI	Cap d'Antifer Lt	N.France	H.N*					
300.5	LA	Lista	Norway	A.C*.E.F.G.I.L*.M.N*.O*.R*.S*.T*					
301.0	CA	Pt de Creach	France	C.D.F.H.I.K.*M.N*.O*.R.T.U.V					
301.0	ER	Eierland Lt	Holland	C.N*					
301.0	HA	Pt del Hank	Morocco	C*					
301.5	OU	Oungeness Lt	Kent	[WAS 300.5] B.D.E.F.H.I.K.L*.M.N*.R.S.T.U.V					
301.5	KD	Kinnards Hd Lt	NE.Scotland	A.C*.G.M.N*.P					
301.5	L	Torre de Hercules	N.Spain	C*.N*					
302.0	RB	Cherbourg Ft W Lt	France	B.C.D.E.F.H.I.K.*L*.M.N*.R.S.T.U.V					
303.0	D	Rota	SW.Spain	C*.D*.F					
303.0	FY	Flamborough Hd Lt	Yorkshire	A.B.C.E.F.G.H.I.K.L*.M.N*.O.R.S.T.U.V					
303.0	YE	Ile d'Yeu Main Lt	W.France	C*.K*.N*					
303.5	BJ	Bjornund Lt	Norway	A.C*.F*.G.M.N*.S*.T					
303.5	FN	Felstein Lt	Norway	A.F.N*.T.U					
303.5	IA	Llanes Lt	N.Spain	C*					
303.5	OR	Punta de Liobregat	S.Spain	C*.F*.T*					
303.5	VL	Vieland Lt	Holland	C*.N*					
304.0	BR	Cap Bear	France	C*					
304.0	SB	Sumburgh Hd Lt	Shetland Is	[NOW 311.5] C*.M.P.T.U					

### DXers:-

- Kenneth Buck, Edinburgh.
- Dave Clench, Worcester Park.
- Robert Connolly, Kilkeel.
- John Eaton, Woking.
- Brian Heath, Stapleton.
- Brian Keyte, Gt. Bookham.
- Brian Keyte, while in Ullapool/Gairloch.
- George Millmore, Wootton, IoW.
- Albert Moore, Douglas, IoM.
- Robert Moore, Holywell.
- Fred Pailant, Storrington.
- Peter Pollard, Rugby.
- Victor Robb, Belfast.
- Peter Rycraft, Wickham Market.
- Tom Smyth, Co.Fermanagh.
- John Stevens, while in Melvich.
- Kelvin Sutherland, Anglesey.
- Andrew Tett, Hove.
- Eric Tubman, Whitstable.
- Fred Wilmshurst, Northampton.
- John Woodcock, Basingstoke.
- Ross Workman, Shoreham-by-Sea.

### Note:

Entries marked # are calibration stations.  
 Entries marked \* were logged during darkness.  
 All other entries were logged during daylight or at dawn/dusk.  
 Some entries were logged in July and/or August prior to frequency changes.

**T**he role of the UK beacons as navigational aids will cease at the end of next year and some will then be closed down. Those

remaining will radiate data in the form of differential corrections for use with the 'Global Positioning System' (GPS), which is now widely used by mariners and landlubbers too.

Twenty-four satellites beam the GPS data down to Earth. Each one transmits for precise periods, which are determined by an on-board atomic clock.

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In advance preparation for their new role the operating frequency of some beacons has been changed - see March & September articles. Further changes are likely in the coming months.

Those noted during July, August and/or September were the Rhinns of Islay (RN) on 289.0kHz (not 293.0) by **Brian Heath** (Stapleton) and others; Fife Ness (FP) on 305.5 [not 305.0] by **Albert Moore** (Douglas, IoM) and others; Girdleness (GD) on 311.5 [not 311.0]; Point Lynas (PS) on 304.5 [not 304.0]; Cromer (CM) on 314.5 [not 313.5] by **Kenneth Buck** (Edinburgh). Several DXers found Sumburgh Head, Shetland (SB) inaudible on 304.0 but it was heard on 311.5 by **Brian Keyte** (Gt. Bookham).

Confirmation that the Danish beacons at Blavandshuk (BH) on 296.9 & Gedser (GR) on 303.5 have closed came from **Peter Rycraft** (Wickham Market). He noticed that Hammerodde (MN) is now radiating DGPS data on 289.5. He was unable to detect any of the Swedish beacons.

No trace of Pt.d'Ailly (AL) on 305.5 was found by **Fred Wilmshurst** (Northampton) and others - it is listed as 'permanently withdrawn' by **Robert Connolly** (Kilkeel) in an amendment sheet to his popular guide to the LW Marine and Aero radiobeacons.

For an information sheet about this guide please send an s.a.e. to Robert via me. May I take this opportunity to wish all readers a Happy Christmas and good DXing in 1999.

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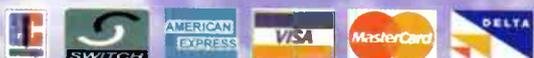
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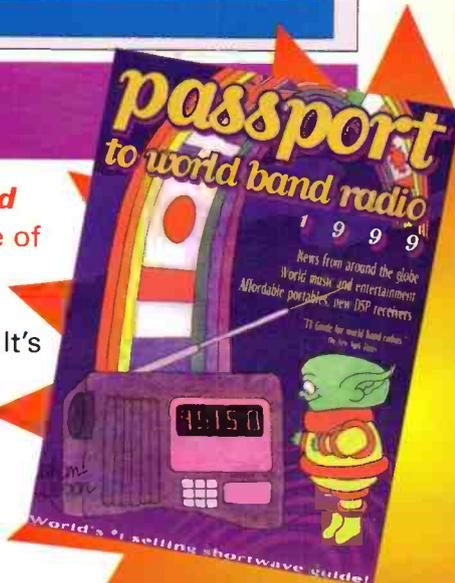
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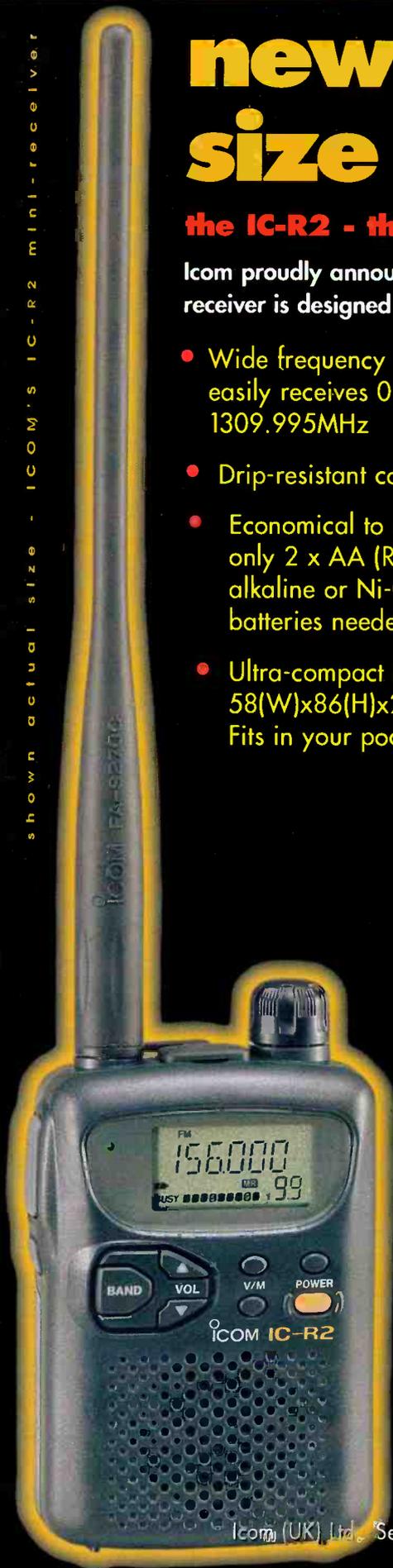
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