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best selling
listening
magazine

SWM

January 2004
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& Scanning Scene

DXTV Special

Resplendent Rampisham

Kevin Nice visits another UK HF transmitter site



SWM Covers Concorde's Final Flight!

Wire Antennas with Joe Carr

www.pwpublishing.ltd.uk/swm



World Radio History

ALINCO wideband scanning receivers

perform

Alinco DJ-X10E

advanced featured scanning receiver

- Receives: 100kHz - 2000MHz
- Multi mode reception AM - WFM - NFM - SSB - CW
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 - Programmed scan (up to 10 groups)
 - Programmed memory scan
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 - Any channel skip scan
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THE ALINCO POWER to perform



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- Bug detector
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- CTCSS - Search facility
- Frequency counter
- Field strength meter
- S Meter
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- Lithium ion battery pack
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- Earphone



£129.95

THE ALINCO POWER to perform



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- Steps: 5/6.5/8.33/10/12.5/15/20/25/30/50/100kHz
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- Bug detector
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- Battery saver cct
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with 8.33kHz for airband



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- Internal or external supply
- RX attenuator
- Bug detector
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World Radio History



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- Smartscanner™ interface
- Alpha tagging
- Auto store
- PC control
- Control channel only mode
- Full frequency display and backlit controls

- Clone feature
- CTCSS/ DCS
- Beep alert
- Record functions
- VFO control
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£349.00
Bearcat Scanners

UBC 278CLT

Base Scanner with MW/FM Radio & Alarm Clock

- Freq: 25 to 956 MHz (WITH GAPS)
- VHF: 88-108 MHz
- MW: 520-1720 KHZ
- 100 Memories
- 20 Radio Presets
- Full frequency LCD readout
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- Channel Lockout
- Priority Channel
- Scan Delay
- Alarm Clock
- FM/MW Radio



£159.00
Bearcat Scanners

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A stylish new Sports Scanner with 8.83kHz Airband steps

- Frequency: 25 - 87, 108 - 174, 406 - 512, 806 - 960 MHz
- AM/FM
- 100 Memories
- Twin Turbo Scan
- Alpha Numeric display
- Supplied c/w: Mains Adaptor/charger, Nicad re-chargeable batteries, Earphone, Belt clip.

£119.00
Bearcat Scanners



NEW!

UBC 68XLT NEW UK BAND scanner

The UBC68XLT is the very FIRST Bearcat scanner to come pre-programmed with UK search bands. An ideal scanner for the newcomer or novice, it's so easy to use - be up and running in an instant. Listen to - MARINE - PUBLIC SERVICES - PMR - LAND MOBILE - AMATEUR and much more!

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- Priority Channel Scanning
- Memory Backup
- Preset 2-sec delay
- LCD Back-Light
- Scan rate: 10 Ch/Sec
- Search: 10 Ch/Sec
- Keypad Lock Feature
- Low Battery Indicator

- Supplied c/w: Antenna, Earphone, Beltclip, Operating Guide
- Requires 4 x AA batteries (NOT SUPPLIED)
- OPTIONAL EXTRAS
- UK mains adaptor£12.95
- Maha C204 battery charger+(4 x 1,800MAH HI-POWER NIMH RE-CHARGEABLE BATTERIES)£39.95

£79.95
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NEW!

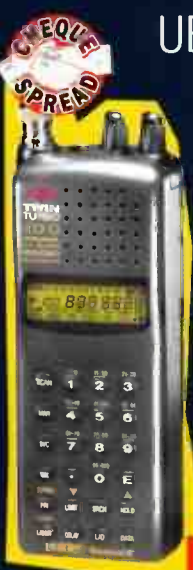
Bearcat Scanners



UBC 280XLT

- Triple conversion Receiver
- 25 - 956 MHz (WITH GAPS)
- 200 memories
- CTCSS/DCS Tone Search facility
- CTCSS/DCS receive
- Alpha-numeric display
- Turbo search 300 steps/sec
- Turbo Scan 100 channels/sec
- Supplied c/w: Antenna, Earphone, Belt Clip, Nicad battery, 240V UK Mains adaptor

£179.95
Bearcat Scanners



UBC 120XLT

- 66 - 512 MHz (WITH GAPS)
- AM/FM/WFM
- 100 memory channels
- TURBO SCAN 100 Channel/Second
- TURBO SEARCH 300 St/Second
- Data Skip facility
- 10 Priority Channels
- Programmable Search
- Channel Lockout Key

£129.95
Bearcat Scanners



UBC 220XLT

- 66 - 956 MHz (WITH GAPS)
- AM/FM
- 200 memories
- TURBO SCAN 100 Ch/Second
- TURBO SEARCH 300 St/Second
- Data Skip facility
- 10 Priority Channels
- Memory Backup
- Supplied c/w earphone, belt clip, charger and rubber duck antenna

£149.95
Bearcat Scanners



UBC 3000XLT

- 25-550, 760-1300MHz
- AM/FM/WFM
- 400 memory ch
- TURBO SCAN 100 Ch/Second
- TURBO SEARCH 300 St/Second
- Automatic Freq Storage
- Selectable Attenuator
- Automatic Frequency Sorting
- Data Skip
- Delay Key
- Channel Count Key
- Supplied complete with earphone, case, belt clip, charger and rubber duck antenna

£199.95
Bearcat Scanners

ALINCO and UNIDEN BEARCAT products are available from our dealers throughout the UK or direct

ORDER HOTLINE: 023 9231 3090

FAX: 023 9231 3091

January 2004

On Sale December 23
Vol.62 No 1
(February Issue on sale 22 January)

Published by
PW Publishing Limited
Arrowsmith Court
Station Approach
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All our 0870 numbers are charged at the BT Standard National Rate

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UK based audio d.s.p. specialist bhi have kindly donated a NEDSP1061 noise reducing module for this month's competition. Turn to page 27 now to be in with a chance of winning.
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Are you alone with your radio interest? If you want to meet others with a passion for radio, then look no further. Use our comprehensive guide to local clubs - now includes National and International Radio Clubs.



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cover subject: *The stunning antenna farm at VT Merlin's Rampisham site. Concorde lands for the last time.*



Share your thoughts

For the latest radio news, see our website www.pwpublishing.ltd.uk/swm/news/

Join in with the on-line action on the SWM Readers' E-mail Forum - send an E-mail to swm_readers-subscribe@yahoogroups.com to subscribe - don't miss the on-line action!

Coming Next Month

in SWM February 2004

- Opto's X-Sweeper - Reviewed
- Uniden UBC68XLT - Reviewed
- Competition - win a Roberts RD3 DAB radio
- The Sun & Radio Propagation
- Home Defence Radio
- This S-Meter Business
- News, reviews and essential data from the world of listening
- Keep on top of the world of monitoring with SWM
- and much more...

**contents subject to change*

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Subscriptions

Subscriptions are available at £36 per annum to UK addresses, £44 Europe, £54 (Airmail) overseas. Subscription copies are despatched by accelerated Surface Post outside Europe. Airmail rates for overseas subscriptions can be quoted on request. Joint subscriptions to both *Short Wave Magazine* and *Practical Wireless* are available at £61 (UK), £75 (Europe) and £92 (Airmail) overseas.

Components For SWM Projects

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

Photocopies & Back Issues

We have a selection of back issues, covering the past three years of SWM. If you are looking for an article or review that you missed first time around, we can help. If we don't have the whole issue we can always supply a photocopy of the article. Back issues for SWM are £3.25 each and photocopies are £3.25 per article inc P&P. Binders are also available (each binder takes one volume) for £6.50 plus £1.50 P&P for one binder, £2.75 P&P for two or more, UK or overseas. Prices include VAT where appropriate.

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

Placing An Order

Orders for back numbers, binders and items from our Book Store should be sent to: **PW Publishing Ltd., Post Sales Department, Arrowsmith Court, Station Approach, Broadstone Dorset BH18 8PW**, with details of your credit card or a cheque or postal order payable to PW Publishing Ltd. Cheques with overseas orders must be drawn on a London Clearing Bank and in Sterling. Credit card orders (Access, Mastercard, Eurocard, AMEX or Visa) are also welcome by telephone to Broadstone **0870 224 7830**. An answering machine will accept your order out of office hours and during busy periods in the office. You can also FAX an order, giving full details to Broadstone **0870 224 7850**.

The E-mail address is bookstore@pwpublishing.ltd.uk

Technical Help

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

ED's



comments

There has been a phenomenal response to the *SSE Extra* competition which was featured back in the November issue of SWM, that's not surprising really as we were offering a superb set of prizes.

One of the entries really caught everyone's attention here and I guess that was the intention. First prize for stunning packaging must go to this reader. The rest of the winners will be announced in the February issue.



Woofferton Celebrations

As you can probably tell from the picture below, the 60th Anniversary celebrations went well at the Woofferton h.f. broadcast station. When PW Editor **Rob Mannion G3XFD** and I visited earlier this year, the Sender Hall looked very different indeed. There are a few faces that I recognise in the picture as I've now had the pleasure of visiting three of the VT Merlin transmission facilities. **Dave Porter**, who looked after Rob and I so well back in July, sent me the picture of the afternoon's party. There were 230 attending with some of the original staff present from 60 years earlier. It's good to know the celebrations went well.



ISS Bump

Just recently the *International Space Station* has been passing overhead the UK with the potential for visible passes. It has been possible for UK licensed radio amateurs to 'work' the crew on these occasions. This was the start of a month-long Amateur Radio special activity event where the Amateurs on board the *ISS* will be trying to make as many contacts as possible. The *ISS* frequency is 145.800MHz f.m., they operate split frequency so anyone trying to call them should transmit on 145.200MHz.

Alexander Kaleri and **Michael Foale** arrived at the station in October. The American-Russian crew of the *International Space Station* say their craft may have hit an object in orbit. Michael Foale and Russian Alexander Kaleri reported hearing a metallic crushing sound, apparently from an unoccupied part of the station.

Russian space officials said there appeared to be no damage to the outside of the craft or change in air pressure inside and that the two men were safe. Michael Foale, the station's commander and Alexander Kaleri said they heard the sound as they were completing their breakfast and cleanup period. Although no damage has been found, mission controllers are still trying to determine what happened.

The USA's Department of Defence monitors the *ISS'* orbit for space debris using radar. In the event of a forecast of material close by, the *ISS* can move out of the way.

Michael Foale, who was born near my home town of Louth in Lincolnshire, is no stranger to space station impacts. He was onboard the *MIR* space station in 1987 when a Progress supply tanker crashed into it - one of the most dangerous incidents to have ever taken place in space.

The latest incident appears to be minor. Michael and Alexander are carrying on with their planned duties.

Worrying Feedback

I've recently been advised that there are readers who have had problems locating their copy of *Short Wave Magazine*. Unlike in the past, when it was due to it not being stacked by their newsagent of choice, but now rather worryingly due to us having changed the logo on the front cover. It seems that there are those of you who have just not recognised us on the shelf. This came to light recently when a persistent reader had made enquiries of his usual store. He was told by the manager that he wasn't alone in missing his essential radio read on the shelves. My concern is that this is not an isolated case.

I'm very interested to learn of anyone who had problems due to our change of cover design. Obviously, if it has defeated some readers entirely then I guess I'll get no response from them to this comment. I certainly hope that's not the case.

Seasons' Greetings

We blinked and another action packed year seems to have flown by. As always at this festive time of year I wish everyone reading this the very best of the Season. See you in the New Year.

AVY 73 Kevin

QSL

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

Dear Sir

A rather bizarre situation arose recently, or so it felt like, when I made a rare business-like 'phone call. That is something I do not often try to do as someone with disabilities, and the outcome of such an 'on the spot' experience illustrates why, as so many such ventures seem to turn out to be so embarrassing.

I 'phoned one of your advertisers, having read that they are the licensed UK distributor for the manufactures of my scanner. My attempts to contact the old distributor by 'phone had already failed. I had hoped that part of the UK operation had continued, but no one was answering the 'phone, so I am not sure even now if they are still there, given that the number was ringing out.

My requirement seemed simple enough. I just wanted a replacement telescopic antenna for my scanner. As you read on, keep in mind that the manufacturer's name is in very small lettering underneath, but I had not spotted that at the time, with my poor vision - just one of my disabilities.

The man who answered the 'phone at the UK company sounded to shudder by the sound of his voice as I said the antenna was for the radio. He commented that they only deal with the new brand products and pointing out that the UK stores closed their doors about a couple of years ago. I went on to query the situation, commenting that the name on my scanner was just the brand name - and I even said, like St. Michael is at Marks & Spencer - but it did not seem to do any good. He was still of the opinion that they only deal with the new name products. The only consolation from this bizarre experience may be, is he gave me another 'phone number, of a repair centre. If it brings forth the right antenna, that is, but see the end of this letter about that.

I sat down in amazement after all that. Only then did I see the small lettering on the front panel under the name on my set. I was already inclined to go and try to check things out in the local library (because I do not have a 'phone line and Internet access at home) and that just tipped the scales to decide to do so.

When a search engine found a suitably named website I was immediately surprised to find the page that appeared when I clicked on it had the name I was looking for, I read the history section and found out the name was changed in the year 2000. Also in the history was the precise point I was looking for. They produced their own products under the brand name of that on my set.

Had I been able to find an E-mail address or a complete postal address, not just that they are based at Fort Worth, I would have already written to the company about my findings. As I have not yet been able to find an address to write to however, I write to you to see if you wish to try to extract a satisfactory explanation out of the licensed UK distributor for not providing product support for older products, which are branded products. This is the point, and seemingly a contentious point, in case it is not clear amidst the detailed account of this saga.

While writing to you, I would also like to point out that the advertiser does not provide a postal address for their company. That is primarily why I have not tried to write to them for an explanation and I feel it would be futile - as well as costly - for someone on Incapability Benefit to try to pursue it by 'phone during peak time. This is also a good example of why I have a policy of not dealing with companies who do not give a postal address and I only noticed they did not after 'phoning them. However, after finding I could not get through to the original UK distributor, I felt cornered, so tried to make an allowance on this occasion. I am not inclined to make an allowance any longer for them however, after them trying to claim my radio is not made by the manufacturer stated on the case, this will be the basis of my gripe when I get as far as writing to the manufacturer unless this is fully resolved in the UK before I find their address.

Put another way, I feel to have been wronged, and as one who is not as capable and resourceful as many others, I am not inclined to let such things slide. I want things put right so things are easier in the future. That seems logical to me, as well

Is there something you want to get off your chest?

Do you have a problem fellow readers can solve?

If so then drop a line to the Editor at QSL, Short Wave Magazine, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.

as wanting things right and fair play. I get the impression and/or feeling however, that this distributor perhaps just wants to be concerned with current range of products and sales - a sell, sell, sell attitude and not to also be the UK representatives of the manufacturer. This seems to be the only hypothesis that seems to account for the reception I got to mention of the brand name.

If that does turn out to account for it, one could perhaps go on to ask if that should be so. I have already experienced as a Radio Amateur, other examples of other companies who do not seem to think they should be looked upon as the representatives of the big name they want to be seen as being the UK office of. I asked one company about a problem with an optional extra circuit board, for example, adding that if they did not know, would they get the answer from the Head Office in Japan. However, all I got back was a comment to the effect that they had not dealt with the board because the UK company was set up after it was produced, so they had no experience of it. I know I have digressed somewhat with this last paragraph, but it serves to show why I am so rattled about a similar sort of thing possibly having occurred again. I also know the Americans attach more importance to customer support, so that is another reason I intend to write to the manufacturer if this situation is not resolved immediately in the UK.

In closing, a final comment is that I do not feel very confidence at all that a telescopic antenna that the repair centre said they could offer is the genuine item for my scanner. It is a feeling I got from the way the conversation went and some of the words and phrases used, such as 'I think I can fix you up' and during my second call, 'I have tried an antenna on the 'radio here and it screws on'. It feels as though it is a trial and error approach with substitute parts without disclosing they are substitute parts if they are.

**Keith Burrows
Cheshire**

Keith, thank you for your letter, I am investigating the matter - Ed.

Dear Sir

It has been a pleasure to hear from correspondents that the Woofferton feature has been so well received. To **John White's** question in November SWM I can say that as both Technical Assistant and Engineer at Daventry I was cycling along the top of the Borough Hill some 1.4km at 0030 and 0330 to reverse/restore Array 33 as late as 1976. Full pneumatic, automated operation of the array switching was not then in place. It was even later at Woofferton, not being completed until 1988.

Re John's comments on Back Scatter, at Daventry we used to run Frequency Shift Pulse Keying (FSPK) of the 25.650MHz drive to Sender 12 on the 0845 - 0900 *Oranges and Lemons* Interval signal prior to 'Green' World Service. This was used in Sunspot Maximum during 1971 and 1972. Tatsfield used to take accurate readings of the backscatter. These days with Internet controlled and linked receivers it's probably not necessary!

Talking of Tatsfield I well remember the cold sweat when as a TA on the Daventry Control Desk you heard those seven blood curdling words on the telephone "The SME please, this is SME Tatsfield!" This normally meant that the monitoring staff at Tatsfield had detected either **wrong programme, wrong frequency** or even worse no r.f. at all being received...were we actually on the air?

John was correct when he said he hoped we'd swapped the bikes for Range Rovers as in 1985 with the h.f. stations also being involved in the domestic transmissions we were sent all round 'the patch'. Following the privatisation in 1997 we have under VT Merlin reverted to just the h.f. operations.

To **P. Jones** of BR I recall a series of test transmissions being run from WOF in the late 80s mainly on 74°, so straight across the railway. These were to ascertain which broadcast band most affected the control system in the locos. The BR boffins 'parked' and then traversed a brand-new multiple unit near to their Woofferton Signal Box. As Kevin says, modifications were made to the loco control system, no doubt with some 0.01µF capacitors and some ferrite rings. We have never had to repeat the exercise so they have probably been more EMC conscious since.

**Dave Porter G4OYX
via E-mail**

Dave, even more interesting broadcast history revealed - thanks - Ed.

Dear Sir

I bought a short wave converter for my Realistic PRO-2006 scanner and it was purchased from Howes Electronics and it says c1990 CV100 h.f. to v.h.f. converter. Through your magazine I would like to know if you have their address because I have lost the instructions on the way the converter is used in conjunction with the scanner. I would also like to know if there's any converter available to pick up mobile 'phones, etc., I would be very grateful for any help. Thanks.

**C. McArthur
Chester**

Unfortunately Howes Electronics have left the hobby radio market. Hopefully a kind reader will supply a copy of the instructions via the Editorial Offices. Mobile 'phones cannot be monitored as they are digital and encrypted. It is also 'illegal' - Ed



You really should have one of these you know...

If you are serious about scanning, this is the rig for you. The IC-R8500 brings you super wideband, all-mode coverage from HF to 2GHz, including SW and VHF/UHF, while maintaining a constant receive sensitivity. The IC-R8500 is not simply a scanner, it is a professional quality communications receiver with versatile features from high-speed scanning to computer control.

This is what John Wilson had to say in Shortwave Magazine...

"Frankly I loved having the R8500 in my hands, even for such a short time and I was impressed by everything about it. It looks like, and handles like a classic HF receiver, but has this capability of receiving everything from 100kHz to 2.000GHz. Above all, it was easy to use and get to know, and for the real listening enthusiast, or indeed the listening professional, the R8500 allows you to dispose of every other receiver and simply have it all in one stylish box... It's a great product!"

ICR8500



This is what you get...

- WIDE 100kHz~2GHz COVERAGE
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Retro Redesign

Inspired by their heritage, Bush has tapped into their archives to redesign the most famous radio of the 1960s. But, to give it a modern twist, it incorporates the latest DAB digital radio technology. The famous retro Bush TR130 transistor radio is now a design icon and Bush has restyled this classic model to give it a contemporary retro look with its own unique design identity. The new **TR2003DAB** model has a pale grey, soft-touch rubberised finish with matching handle, so this beauty is easily carried around the home. What's more, it's powered by mains or batteries for garden or garage or holiday listening.

With cutting-edge DAB digital radio technology built-in this new model gives a far greater choice of radio stations delivering the very best digital sound quality through its stereo speakers. For convenience DAB stations are automatically tuned and with the added benefit of scrolling text information you can read on the display panel exactly what stations you can get in your area. This radio also incorporates an f.m. tuner and 10 DAB and 10 f.m. stations can be stored in the memory.

The Bush TR2003DAB transistor radio is available now from leading high street retailers selling at **£99.99**.

The new and improved 'retro' look TR2003DAB radio.



Stylish Kitchen Radio

Goodmans' fourth Digital Radio product - the **GSR80DAB** - will be in the shops just in time for Christmas shopping selling at **£89.99**. Goodmans' latest DAB offering is a stylish Portable Stereo Kitchen Digital Radio. Incorporating a DAB and f.m. tuner this radio more than doubles the choice of radio stations you can get in your area compared to standard radios.

This digital radio also dramatically improves the sound quality delivering crackle-free reception through stereo speakers. Tuning into digital radio is automatic without the pain of fiddling with controls to get the best signal. For added convenience, 20 radio stations can be stored.



This stylish radio sits neatly on kitchen worktops and shelves and has a handy 'flip-up' carry handle for portability. Other clever features include a cooking timer to avoid burning the dinner and a self-adjusting clock that automatically copes with daylight saving time and hour when the radio is not in use.

The GSR80DAB can be powered by mains or batteries and the vivid blue display panel shows useful scrolling information like song playing, artist and radio station details. Stockists include Dixons, Argos, Comet, Index and John Lewis.

Narrators Found

The **Radio Amateur Invalid & Blind Club (RAIBC)** have successfully formed a team of narrators for their recording operations following our earlier publicity about their search for volunteers on these pages. The team went into action for the first

time to read the September edition of their house magazine **RADIAL**. The next project has been to read the **RSGB Intermediate Licence Book** onto CD. This is for blind Amateurs who by using the tape and disk versions of Alan Bett's **Foundation Licence Now!** book have passed that examination and want to move on to the next level.

Foundation Licence Now! a book written by Alan Betts, read by **Alan GM4FLX** and produced by **Kelvin MOAID** is still available

to order on both audio and data CDs. The idea being that any blind person with the latest RNIB reading machine, any CD player, a PC or a portable CD player capable of reading MP3 files can prepare themselves for the licence at home and then move onto the intermediate licence if they wish.

The new Intermediate Licence, **Building on the Foundation** written by **Steve Hartley G0FUW** is offered in the same formats and is available now! The recording is nine hours long and is fully

indexed allocating tracks to pages and worksheets in MP3 format. A blind student can easily skip backwards and forwards through the recording taking full advantage of the latest technology.

Please tell your blind friends about this latest venture and suggest they get in touch with Kelvin MOAID to get themselves onto his list. Kelvin's E-mail is **kelvin@qti.org.uk** and he can be contacted via the RAIBC's Help Line on **0208-204 2347**.

Subs Time for RIG

The Remote Imaging Group, the longest running club of its type, has 2100 members

world-wide with direct contact with the satellite operators, is now taking new subscriptions for the year 2004. RIG produces a colour journal four times a year and often has over 100 pages. Their website is **www.rig.org.uk** and subscriptions are £15.00 a year from the membership secretary **John Din**, **59 Woodend Toad, Coalpit Heath, Bristol, BS36 2LH**. E-mail: **membership@rig.org.uk**



Rally News

The **Stevenage Communication & Electronics Show** are holding their rally at the Stevenage Arts & Leisure Centre, Lytton Way, Stevenage, Hertfordshire on the **15 February 2004**. Doors open 1000 till 1600 and admission is £3. More information from **RadioSport Ltd., 126 Mount Pleasant Lane, Bricket Wood, St. Albans AL2 3XD, Tel: (01923) 893929, FAX: (01923) 678770** or visit **www.radiosport.co.uk** Please note that representatives from PW Publishing Ltd. will be attending this rally, so why not go along to their stand for great deals on subscriptions, clearance books and a selection of back issues.

Next Generation Digital Radio

The **A-2000**, launched by **Aria Digital**, is a stylish desk-top DAB/f.m./RDS Digital Radio. On first operation, simply press the 'scan' button and all the available stations are stored. Subsequently the unit's selector wheel can be used to browse through the stations: six pre-sets can also be assigned. All functions can be accessed by the remote control.

Underneath the solid cherry wood exterior, the A-2000 combines Aria Digital's outstanding electronic engineering with Aria Acoustic Tuning. The cabinet has been designed to enhance its high sound quality and the powerful amplifiers are perfectly matched to the loudspeakers. The result is a gloriously rich big system sound from a compact unit.



Giving the best sound possible from the new Digital Radio format, the Aria A-2000 simply blows traditional radio away! The unit receives both Band 3 and L-Band, conforming to international DAB standards, so operating in more than 30 countries so far. With the BBC and commercial sectors' ongoing commitment to expand DAB output, there has never been a better time to enjoy the superior sound quality and massive variety of Digital Radio.

Priced at £139, for more information call (02392) 313090 or visit www.nevada-radios.co.uk

Watch Out... There's A New Scanner About!

Nevada are pleased to announce the imminent arrival of a sophisticated new scanner - the **UBC68XLT** - which is both simple and easy to use. This new scanner from Uniden Bearcat comes pre-programmed with UK search bands that will enable the newcomer to scanning to be up and running within seconds. Features include:



- * UK frequency coverage
- * Pre-programmed UK search bands
- * 80 channels
- * Frequency coverage: 66-512MHz (with gaps)
- * Programmable chain search
- * Priority channel scanning
- * Memory back-up
- * Pre-set two second delay
- * Display back-light
- * Scan rate: 10 ch/sec
- * Search rate: 10 ch/sec
- * Keypad lock feature
- * Low battery indicator
- * Supplied complete with antenna, earphone, belt-clip and operating guide.

The UBC68XLT will sell for just **£79.95** and is available from Nevada at **Unit 1 Fitzherbert Spur, Farlington, Portsmouth PO6 1TT** or visit www.nevada.co.uk for more details. Look out for a review in *SWM* very soon!

Space Symposium

AMSAT-UK are holding a Space Symposium at the University of Surrey, Guildford. The event features a full lecture programme, Tours of the SSTL Satellite Control Centre, antenna testing range and beginners sessions. If you want to find out more about Amateur Satellites then this is the event to attend. For further information contact **Jim Heck G3WGM** on (01258) 453959, E-mail: g3wgm@amsat.org or visit www.uk.amsat.org



Oscar News, the official journal of AMSAT-UK.

Stop Press!

Due to the abrupt & permanent closure of the Swansea Leisure Centre by the city council, **Swansea Amateur Radio Society** have managed at very short notice to find an alternative location for their Annual Amateur Radio & Computer Show, which was previously arranged to take place on February 29th.

The new venue will be **The Afon Lido, Aberavon Seafront, Port Talbot**. Unfortunately, the original date advertised cannot be maintained at this new location, so the new date for your diary is **Sunday 22 February 2004** - this is one week earlier than the original planned date. Doors open at 1030 and admission is £1.50, children 50p. There will be many trade stands, Bring & Buy, Special Interest Groups, Repeater Groups, Talk-in on 2m. More details are available from **Roger Williams GW4HSH** on (01792) 404422.

DSP Abounds

The UK based audio d.s.p. specialist **bhi** are not resting on their laurels. The purveyors of the NES10-2 and NEIM1031 have launched a universal internal noise reducing module called the NEDSP1061. It is this add-on p.c.b. which is the basis of the FT-817 upgrade kit that was reviewed by Editor Kevin Nice in last month's *SWM*.

The NEDSP1061 is available in a variety of configurations to allow fitment into a variety of designs. Both retro-fit and equipment at the design stage.

The 33 x 27mm p.c.b. can be supplied with three different connector configurations which provides a flexible solution for mounting the d.s.p. module which features

fully adaptive noise cancelling from 9 to 35dB.

The NEDSP1061 provides on-board input and output sensitivity control. The module requires a 5-15V d.c. supply and can be controlled by single button. There are four levels of noise reduction available with audio visual indication of the current level selected.

For more details please contact: **bhi Ltd, PO Box 136, Bexhill-on-Sea, East Sussex TN39 3WD**. Tel: 0870 2407258, FAX: 0870 2407259, E-mail: sales@bhi-ltd.co.uk or visit their website: www.bhi-ltd.co.uk



Garex Acquires AKD Products

You may recall that we recently announced that AKD had taken the sad decision to close their long established business. *SWM* has just learned that Garex Electronics have negotiated a deal to acquire the design and manufacturing rights to the AKD range of TVI filters and will now take on production of these items.

We also understand that discussions are taking place regarding AKD's other products including their range of excellent v.h.f./u.h.f. transceivers. Hopefully, there will be more news soon.

For further details contact: **Garex Electronics, PO Box 52, Exeter EX4 5FD**. Tel: **07714 198374** or visit their website at: **www.garex.co.uk**

Escape Veterans Make A Dash For Tattoo

The last two surviving UK-based veterans of *The Great Escape* will join a special tribute at The Royal International Air Tattoo, RAF Fairford, Gloucestershire, on July 16-18 to mark the 60th anniversary of one of most daring - and infamous - episodes in World War Two history.

Squadron Leader 'Jimmy' James, from Shropshire, and **Dick Churchill**, from Devon, are two of only seven living veterans from Stalag Luft III in eastern Germany, who survived recapture after crawling through Tunnel Harry and making their getaway on the night of March 24/25 1944. Of the 76 Prisoners Of War who escaped through the tunnel, the Gestapo murdered 50, 23 were returned to captivity and three made it back to the UK.

The two former POWs will be invited to view a special exhibition of artefacts from *The Great Escape* and discuss their involvement in this legendary bid for freedom with visitors to RIAT 2004. Next year will also see the Tattoo mark a number of other historic milestones including the 60th anniversary of D-Day and the centenary of the Anglo-French *Entente Cordiale*. There will also be a spectacular Fighter Meet plus one of the largest peacetime gatherings of Lockheed Martin C-130 Hercules to mark the aircraft's 50th anniversary.

Additionally, the Tattoo will also be hosting *Defence 04*, an ambitious series of exciting demonstrations and activities bringing defence to the nation by illustrating the wide range of UK military warfare capabilities at close quarters.

The Defence Series, which replaces The Royal Tournament, will be led by the RAF in 2004 and by the Navy - on the bi-centenary of the Battle of Trafalgar - in 2005.

Keep your eye on future issues of *SWM* for more news of RIAT 2004.

rallies

February 1: The South Essex Amateur Radio Society are holding their 19th Mobile Radio Rally at the Paddocks, Long Road, Carvey Island, Essex (the Paddocks are situated at the end of the A130). Doors open at 1030. There will be Amateur Radio, Computer and Electronic component exhibitors, home-made refreshments and free car parking with space outside the main doors for disabled visitors. Visit **www.southessex.btinternet.co.uk** or contact **Brian F. Bellamy G7IIO/M3IIO** on (01268) 756331 (no phone calls after 2100 please), E-mail: **briang7iio@yahoo.com**

February 8: The Harwell Rally is to be held at the Didcot Leisure Centre, Merelard Road, Didcot, Oxon, signposted from the A34. Bring & Buy,

trade stands, special interests, crafts, catering, licensed bar and talk-in on S22. Free car parking. Doors open 1030 (1015 for disabled visitors) and admission is just £1.50. **Ann G8NVI** on (01235) 816379 or E-mail: **ann.stevens@btinternet.com** or visit **www.hamradio.harwell.com**

***February 15:** The Stevenage Communication & Electronics Show are holding their rally at the Stevenage Arts & Leisure Centre, Lytton Way, Stevenage, Hertfordshire. Doors open 1000 till 1600 and admission is £3. More information from **RadioSport Ltd., 126 Mount Pleasant Lane, Bricket Wood, St. Albans AL2 3XD**, Tel: (01923) 893929, FAX: (01923) 678770 or visit **www.radiosport.co.uk**

February 15: The Northern Cross Radio Rally is to be held at Thornes Athletics Stadium, Wakefield, West Yorkshire. One large hall on ground floor - just out of town on the Horbury Road. There will be ample parking on-site, with easy access from M1 J39 & 40 - well signposted. All the usual attractions and doors open at 1030 (1015 for disabled visitors and Bring & Buy). Admission charge is £2. More details from **John G7JTH** on (01924) 251822 or visit **www.wdrs.org.uk** on (01935) 414452

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.

Wakefield's News

The **Wakefield & District Radio Society** meet every Tuesday at 2000 at the Ossett Community Centre, Prospect Road, Ossett, (nr Wakefield), W. Yorkshire. Just a few of the up and coming events in January are: January 6: Rally meeting, 13th: Ten-pin bowling night, 20th: On the air night, preceded by a committee meeting and 27th: RSGB video. More information from **Rick G4BLT** on (01924) 255515 or visit **www.wdrs.org.uk**

The Society are also holding their **Northern Cross Radio Rally** on the **15 February 2004** at **Thornes Athletics Stadium, Wakefield**. There is easy access from the motorway, with ample parking on-site and good disabled access. There will be a Bring & Buy, refreshment facilities and a miniature steam railway in the afternoon (weather permitting of course!). Doors open 1030 (1015 for disabled access) and admission is just £2.

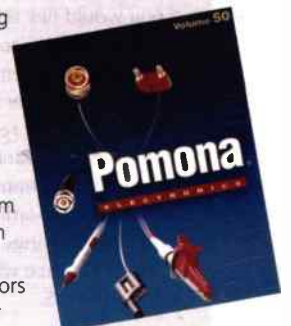
More details from **John G7JTH** on (01924) 251822 or visit the above website for further information.



50th Anniversary Catalogue

Pomona Electronics have recently published a new, free 100 page full colour catalogue, which offers the world's broadest range of electronic test accessories. Celebrating 50 years of innovative design and high quality manufacture, the 50th edition *Full Line Catalogue* from Pomona Electronics includes everything from individual connectors in virtually every size to coaxial cables, connectors and companion kits for leading test tool manufacturers.

Simplifying the task of choosing the right accessories, easy to use selection guides help users find the most suitable models or kits for many specific instrument brands and types. Users can also identify their accessories online from the Pomona website - **www.pomonaelectronics.com** and the complete catalogue can also be downloaded from the site in PDF format.



50th Anniversary catalogue from Pomona.

Club Corner

The **Bangor & District Amateur Radio Society** meet on the first Wednesday of every month in 'The Stables', Groomsport, County Down, at 2000. On Wednesday 7 January 2004 at 2000 they are holding their Annual Quiz Night. This is always a great night out and visitors and new members are most welcome to attend. More information from **Mike G4XSF** on 0284-277 2383 or visit **www.bdars.org**

Members of the **Dover Radio**

Club meet every Wednesday at 1930 during term time in the Dover Boy's Grammar School. They are also a centre for the Foundation Course, the Intermediate Training Course and an Exam Centre for the area. Take a look at **www.darc.org.uk**

Meetings take place at The Harrow Arts Centre, Uxbridge Road, Hatch End, Middlesex for **The Radio Society of Harrow**. More information about club

activities from **Jim Ballard** on (01895) 476933 or E-mail: **g0aot@blueyonder.co.uk**

The **Horndean & District Amateur Radio Club** meet on the 1st and 4th Tuesday each month at the Lovedean Village Hall, 160 Lovedean Lane, Lovedean, Hants. Meetings take place from 1930 and visitors are always welcome. More information from **Stuart Swain** on 0239-247 2846 or visit **www.qsl.net/g4fbs/**

LM&S

Long, Medium & Short Wave Bands

● **Brian Oddy** Three Corners, Merryfield Way, Storrington, West Sussex RH20 4NS

Before revealing the details of the latest reception in the Long, Medium and Short wave broadcast bands I want to wish all readers and listeners a very Happy New Year!

It seems likely that during the year some broadcasters will introduce a number of changes to their programmes and/or mode of transmission and not all of them will be welcomed by the listeners. No doubt the decision by Swiss Radio International (SRI) to close down their short wave service at the end of October 2004 will disappoint many listeners. Until then they will continue to broadcast their programmes on s.w. to the Middle East, Africa and South America. Details of their intended transmissions in each s.w. band from 26 October 2003 have been included in the data herein.

If you would like to send the details of your latest reception to me for inclusion in LM&S please post them to the above address to arrive here not later than the first week of the month following reception. Please group the entries in wavebands, state frequencies in Megahertz (MHz), transmission times in Universal time Co-ordinated (UTC=GMT) and include SINPO ratings. As many extracts from your report as space will allow will be included in LM&S.

Listeners:-

- (A) Simon Hockenhill, E. Bristol.
- (B) Simon Hockenhill, while at Polgooth, Cornwall.
- (C) Sheila Hughes, Morden.
- (D) Ernie Strong, Ramsey, Cambs.
- (E) Thomas Williams, Truro.
- (F) Fred Wilmshurst, Northampton.

Long Wave Chart

kHz	Station	Country	Power (kW)	Listener
153	Bechar	Algeria	1000	D
153	Donebach DLF	Germany	500	A,C*,D*,E*,F
153	Bod	Romania	1200	A*,D*
162	Allouis	France	2000	D,E*,F
171	Nador Medi-1	Morocco	2000	D
171	B'shakovo etc	Russia	1200	A*,C*,D*,E*,F*
177	Oranienburg	Germany	500	A,D,F*
183	SaarLouis	Germany	2000	C*,D,E*,F*
189	Gufuskalar	W.Iceland	150	A*,D*
198	Droitwich BBC	UK	500	C,D,F
207	Munich DJF	Germany	500	A*,D*,E*,F*
207	Eider	E.Iceland	100	D*
207	Azilel	Morocco	800	A*,B*,D*,E*
216	Roumoules RMC	S.France	1400	A,D,E*,F*
225	Polskie R-1	Poland	?	A*,C*,D*,E*,F*
234	Beidweiler	Luxembourg	2000	D,E*,F*
243	Kalundborg	Denmark	300	A,C,D,E*,F*
252	Tipaza	Algeria	1500	A,B*,C,D*,E*,F
252	Kazan	Russia	150	D*
261	Sofia	Bulgaria	60	A*
261	Tajdom Moscov	Russia	2500	D*,F*
270	Topolna	Czech Rep	1500	A*,C*,D*,F*
279	Sasnovy	Belarus	500	A*,C*,D,F*

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

band are actually going out on **1296kHz** and not **648kHz**, as mentioned in the November edition of SWM. He says "The work had to be carried out without causing any interference to the a.m. broadcasts on **648kHz**".

During daylight the local radio scene attracted the attention of some listeners - see chart. Although **Sheila Hughes** listened to ILR Mean Country 1035 playing country music on **1035kHz** at 0710 on the 25th she has read elsewhere that the Radio Authority has approved the take over by Sunrise Radio. The name may change to 'Easy London Radio' but it is not known if the format will be changed.

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 October.

The Rikisutvarpid (RUV) 300kW outlet at Gufuskalar, W.Iceland on **189kHz**, which many listeners use as a guide to propagation conditions at night, was only heard on October 6 by **Simon Hockenhill** in E.Bristol. He logged the transmission as SINPO 25442 at 2316. On the 7th the broadcasts from Sasnovy, Belarus on **279kHz** were audible from 1830. Their transmission peaked 25432 at 2126. Simon listened to their very long National Anthem, which started at 2255 and ended at 2259 - the transmitter was then switched off.

Owing to the absence of RTE test transmissions from Clarkestown, Eire on **252kHz** it was possible to receive during the daytime the broadcasts from co-channel Tipaza, Algeria. Simon rated their transmission 25442 at 1215 on the 5th.

Medium Wave Reports

During the last week of October the propagation conditions in the l.w. and m.w. bands were disturbed by the effects of intense solar activity. Whilst enjoying a short holiday in Polgooth, Cornwall **Simon Hockenhill** noticed that during the evenings of the 29th and 30th the northern sky became brighter with a bluish to green look about it. Rays could also be seen. The display lasted from 1945 until 2200 on the 29th and was slightly later, 2200 to 0000, on the 30th. During both evenings the m.w. sky wave conditions were very poor, being more like daytime conditions. The normally strong signals from the north suffered the greatest attenuation. On the 30th, Simon found the transmissions from Kvitsoy, Norway on **1314**, Slovesborg on **1179**, Kalundborg on **1062**, Westerglen on **810** and Lisnagarvey on **1341kHz** had all but disappeared into the noise!

Prior to these events several listeners searched m.w band after dark for the sky waves from stations in the Middle East, N.Africa, Europe and Scandinavia and they compiled some interesting logs - see chart. Those from **Eddie McKeown** (Newry, Co.Down), **Ernie Strong** (Ramsey, Cambs) and **Fred Wilmshurst** (Northampton) were quite extensive.

Bernard Curtis (Stalbridge) has noticed that the new DRM transmissions in the m.w.

Short Wave Reports

Propagation in almost all of the short wave bands was disturbed by the effects of massive solar flares which occurred towards the end of October. The bursts of noise resulting from the flares were at such an exceptionally high level that they rendered all but the most potent transmissions impossible to receive!

Many broadcasters altered their transmission schedules on October 26 to allow for seasonal changes in propagation during the winter period. There are a number of entries in the data this time which indicate the frequencies, languages, target area(s) and transmission times in UTC now being used by some broadcasters. In some instances they do not include a SINPO rating because no report of reception arrived here. If you search the bands and are able to receive any of them please post the details to me at the above address for inclusion in the LM&S data. Be sure to state the time of your reception in UTC (=GMT) and include a SINPO rating.

Since the schedule changes R.France International (RFI) has continued to broadcast daily to Africa in the **25MHz (11m)** band but their transmission on **25.820** now commences at 1200 instead of 0900. It is in English from 1200-1230 and French from 1230-1300. There is no broadcast in English on Saturdays and Sundays. On October 27 their transmission was logged as SINPO 44333 at 1205 in Morden. On the 28th it was noted as 35333 at 1250 by **Geriant Gill** in Llanfairfechan. On November 2 it was rated 25122 at 1248 in Newry, Co.Down. Further reports on their transmission would be very welcome for inclusion in the LM&S data. Please post them to me at the above address.

Reception over long distances in the **21MHz (13m)** band varied from day-to-day during October. There were no reports of R.Australia's early morning transmission to Pacific areas via Shepparton on **21.725** (Eng 0000-0900) having reached the UK but their broadcast to Asia on **21.820** (Eng 0900-1400) was sometimes received here. During favourable conditions it was rated 44333 at 1055 in Stalbridge and 43333 at 1335 by **Stan Evans** in Herstmonceux.

Other occupants of this band include Swiss R.Int (SRI) via Sottens **21.770** (Eng, It, Ger, Fr to Nr.East, Africa 0830-1030), rated 45243 at 0830 in Newry; R.Pakistan **21.465** (Ur to W.Eur 0800-1104) 24332 at 0926 by **Rhoderick Illman** in Oxted; R.Prague, Czech.Rep. **21.745** (Cz to M.East, E.Africa

- DXers:-
 (A) Michael Casey, Manchester.
 (B) Bernard Curtis, Stalbridge.
 (C) Jim Edwards, Wigan.
 (D) Stan Evans, Herstmonceux.
 (E) David Hall, Morpeth.
 (F) Simon Hockenhill, E Bristol.
 (G) Eddie McKeown, Newry.
 (H) Clare Pinder, Appleby.
 (I) Vic Prier, Seaton.
 (J) Richard Reynolds, Guildford.
 (X) Geriant Gill, Llanfairfechan.

Tropical Bands Chart

MHz	Station	Country	UTC	DXer
2.310	ABC Alice Springs	Australia	2040	J
2.325	ABC Tennant Creek	Australia	2042	J
2.485	ABC Katherine	Australia	2044	J
3.200	TWR Manzini	Swaziland	1845	C
3.215	AWR via Meyerton	S.Africa	1905	C
3.255	BBC via Meyerton	S.Africa	1840	C,F,J
3.279	La Voz del Napo	Ecuador	0335	C
3.315	AIR Bhopal	India	1805	C
3.320	SABC (RSG) Meyerton	S.Africa	1850	C,F
3.345	AWR via Meyerton	S.Africa	1905	C
3.350	R.Ext.Espana	Costa Rica	0305	C
3.365	AIR Delhi	India	1810	C,J
3.915	BBC via Kranji	Singapore	1855	C,F,I,J
3.955	R.Korea via Skelton	England	2000	D,G,H,J
3.955	R.Taipei via Skelton	England	1833	A,D,F,H
3.965	RFI Paris	France	2002	G
3.975	R.Budapest	Hungary	1845	D,X
3.985	VOIRI	Iran	2003	G
3.985	Nexus, Milan	Italy	2100	I
3.995	DW via Julich?	Germany	2004	G,I
4.005	Vatican R.	Italy	2004	G,I
4.460	CPBS 1, Beijing	China	2210	C
4.760	AIR Port Blair	India	0200	C
4.765	R.Rural, Santarem	Brazil	0115	C,E
4.765	RTV Brazzaville	Congo	1810	J
4.770	FRCN Kaduna	Nigeria	2221	C,E,G,I,J
4.775	AIR Imphal	India	1740	C,J
4.783	RTM Bamako	Mali	2310	C
4.790	AIR Itanagar	India	0150	C
4.790	Azad Kashmir R.	Pakistan	1606	J
4.790	R.Atlantide	Paru	0335	C
4.800	CPBS 2 Beijing	China	2222	C,F,G,I,J
4.800	AIR Hyderabad	India	1825	C,J
4.800	LNBS Maseru	Lesotho	1747	J
4.805	R.Nac.Amazonas	Brazil	0220	C
4.820	R.Botswana, Gaborone	Botswana	1825	C,F,I
4.820	Xizang, Lhasa	China	2222	C,E,F,G,I,J
4.820	AIR Calcutta	India	1742	C,J
4.830	R.Tachira	Venezuela	0210	C
4.832	R.Litoral, La Ceiba	Honduras	0330	C,J
4.835	RTM Bamako	Mali	1900	A,C,E,F,G,I,J,X
4.840	AIR Bombay	India	1800	C,F,J

0930-0957) 33333 at 0945 by **Thomas Williams** in Truro; R.Ext Espana (REE) via Noblejas **21.540** (Sp to Africa 0900-1500) 45544 at 1020 in Polgooth, Cornwall; R.Prague **21.745** (Eng to S.Asia, W.Africa 1000-1029) No rating; Deutsche Welle (DW) via Nauen? **21.840** (Ger to M.East) 25522 at 1102 in Polgooth; R.Prague **21.745** (Eng to M.East, E.Africa 1130-1157) 24222 at 1130 in Morden; BSKSA Riyadh **21.705** (Ar to Eur 0600-1500) 55555 at 1334 by **Peter Pollard** in Rugby; BSKSA Riyadh **21.505** (Ar to N.Africa 0600-1500) 45455

at 1335 in Rugby; R.Finland via Pori **21.800** (Fin to Africa 1300-1400) No rating; BBC via Ascension Is **21.470** (Eng to E.Africa 1300-1900) 44444 at 1425 by **David Hall** in Morpeth; R.Ext.Espana ((REE)) **21.700** (Sp to S.America 1200?-1800) 43343 at 1455 by **Robert Hughes** in Liverpool; R.Finland **21.800** (Fin to America 1400-1500) No rating; UAE R.Dubai **21.605** (Ar, Eng to Eur 0600-1630) 34433 at 1600 by **Vic Prier** in Seaton; WYFR Okeechobee FL, USA **21.455** (Eng to Eur, Africa 1600-1800) 44333 at 1640 in Morden.

In the **18MHz (15m)** band the Voice of America (VOA) via Sri Lanka? **19.010** (Pashto 0430-0530, 1030-1130, 1430-1530; Dari 0530-0630, 1130-1230, 1530-1630 to M.East) was 44444 at 1105 in Truro; R.Sweden via Hoerby **18.960** (Eng to Asia, Australia, N.America 1330-1400) was 44444 at 1330 in Morden.

Reception over long distances in the **17MHz (16m)** band was unreliable and often poor during October. Sometimes R.Australia's broadcast to E/SE.Asia via Shepparton on **17.750** (Eng 0030-0400, 0530-0800, 0830-0900, 0930-1100) reached the UK. It was rated 15421 at 0943 in Polgooth.

Other broadcasters using this band include SRI via Sottens **17.665** (Fr, Ger, It, Eng to Nr.East, Africa 0600-0800) No rating; BBC via Cyprus **17.640** (Eng to E.Africa 0500-0700) No rating; BBC via UK **17.640** (Eng to E.Africa 0700-0800), rated 44333 at 0700 in Morden; R.Slovakia Int **17.550** (Eng to Australia 0700-0730) 44444 at 0705 in Morden; BBC via UK **17.640** (Eng to Eur, M.East, Iran 0800-1500) 44444 at 0852 in Rugby & 45554 at 1425 by **John Parry** in Larnaca, Cyprus; Vatican R, Italy **17.515** (Oriental Liturgy to Asia?) 44444 at 0937 in Truro; R.Japan via Abu Dhabi? **17.585** (Eng to

MHz	Station	Country	UTC	DXer
4.845	ORTM Nouakchott	Mauritania	1855	A,C,E,F,G,I,J,X
4.850	AIR Kohima	India	1540	A,C
4.860	AIR Delhi	India	1845	B,C,F,J,X
4.875	R.Roraima, Boa Vista	Brazil	0350	C,J
4.880	AIR Lucknow	India	1755	C,J
4.880	R.Comas	Peru	1848	F
4.880	SABC Radio 5	S.Africa	1905	C
4.885	R.Clube do Para	Brazil	0345	C,E
4.885	R.Difusora Acreana	Brazil	0230	C
4.890	RFI Paris	via Gabon	0435	E
4.895	AIR Kurseong	India	1535	C
4.905	Xizang-Tb, Lhasa	China	2224	C,G,I,J
4.910	Tennant Creek	Australia	2135	J
4.910	AIR Jaipur	India	1815	C,J
4.910	R.Zambia, Lusaka	Zambia	2007	C,G,J
4.915	R.Anhanguera	Brazil	0405	C,J
4.915	R.Difusora, Macapa	Brazil	0127	E
4.915	GBC-1, Accra	Ghana	2224	C,F,G,I,J,X
4.920	Xizang-Tb, Lhasa	China	2225	A,C,F,G,J
4.920	AIR Chennai	India	1545	C,J
4.925	R.Educaco Rural	Brazil	0240	C
4.930	R.Costena Ebenezer	Honduras	0335	C
4.935	R.Capixaba, Vitoria	Brazil	2335	C
4.940	AIR Guwahati	India	1825	C
4.950	AIR Srinagar	India	0145	C
4.950	VOA via Sao Tome	Sao Tome	2008	A,B,C,G,X
4.960	AIR Ranchi	India	1810	C
4.960	VOA via Sao Tome	Sao Tome	0510	E
4.965	Christian Voice	Zambia	1750	C,J
4.970	AIR Shillong	India	1555	J
4.975	R.Pacifico, Lima	Peru	0640	J
4.975	R.Uganda, Kampala	Uganda	0409	C,J
4.985	R.Brazil Central	Brazil	2305	E,F,J
4.995	R.Andina, Huancayo	Peru	0325	C
5.009	R.TV Malagasy	Madagascar	1752	J
5.010	AIR Thiru puram	India	1600	C,J
5.015	R.Brazil Tropical	Brazil	2242	E,I
5.025	R.Parakou	Benin	2245	E,J
5.025	R.Rebelde, Bauta	Cuba	0646	J
5.025	R.Pakistan, Quetta	Pakistan	1835	C
5.025	R.Uganda, Kampala	Uganda	1910	J
5.030	R.Burkina	Burkina Faso	2156	C,J
5.040	AIR Jeyapore	India	1810	C
5.047	R.Togo, Lome	Togo	2125	C
5.050	R.Tanzania	Tanzania	1810	C

Asia? 1000-1100) 54433 at 1025 in Herstmonceux; All India R. (AIR) via Delhi **17.510** (Eng [Gen.Overseas Svce] to Australia, New Zealand 1000-1100) 34222 at 1030 in Seaton; R.Japan via Sri Lanka? **17.820** (Eng to S.Asia? 1400-1430) 43334 at 1410 in Stalbridge; R.Tunisia Int via Sfax **17.735** (Ar to N.Africa, M.East 1200?-1700) 54444 at 1520 in Liverpool; BBC via Cyprus **17.790** (Eng to S.Asia 1600-1700) 44444 at 1606 in Oxted; SRI via Montsinery, Fr.Guiana **17.660** (It, Ar, Eng, Ger, Fr to Nr.East, Africa 1830-2130) 14121 at 1931 in Newry; R.Nederlands via Bonaire, Ned Antilles **17.725** (Eng to N.America 1900-2100, Sat/Sun) No rating;

- Listeners:-
 (A) Simon Hockenhill, E.Bristol.
 (B) Simon Hockenhill, while at Polgooth, Cornwall.
 (C) Sheila Hughes, Morden.
 (D) Ernie Strong, Ramsey, Cambs.
 (E) Fred Wilmshurst, Northampton.

Local Radio Chart

kHz	Station	ILR BBC	e.m.r.p (kW)	Listener	kHz	Station	ILR BBC	e.m.r.p (kW)	Listener
558	Spectrum, London	I	0.80	A,D,E	1368	Southern Counties R	B	0.50	C*
603	C.G.Litt'brne	I	0.10	A,D,E	1413	R.Gloucester via ?	B	?	D,E
630	R.Bedfordshire(3CR)	B	2.00	A,C,D,E	1413	Premier via ?	I	0.50	D
630	R.Cornwall, Redruth	B	2.00	B	1413	Fresh AM, Skipton	I	0.10	D
657	R.Cornwall, Bodmin	B	0.50	B	1431	Breeze, Southend	I	0.35	A*,D
666	Cl.Gold 666, Exeter	I	0.34	A,B,D,E	1431	Cl.Gold, Reading	I	0.14	A*,E
666	R.York	B	0.80	D	1449	Asian Net, Gunthorpe	B	0.15	E
729	BBC Essex	B	0.20	A,C,D,E	1449	R.Camb's, Gunthorpe	B	0.15	D
738	Hereford/Worcester	B	0.037	A,D,E	1458	R.Devon, Torbay	B	2.00	B*
756	The Magic 756,Powys	I	0.63	A,D,E	1458	Sunrise, London	I	50.00	A,B*,D,E
765	BBC Essex,Chelmsf'd	B	0.50	A,C,D,E	1458	Asian Net, Langley	B	5.00	A,E
774	R.Kent,Littlebourne	B	0.70	C,D,E	1485	Cl.Gold, Newbury	I	1.00	A,E
774	R.Leeds, Farnley	B	0.50	D	1485	R.Humberside (Hull)	B	1.00	D
774	Cl.Gold 774, Glos	I	0.14	D,E	1503	R.Stoke-on-Trent	B	1.00	D,E
792	Cl.Gold 792, Bedford	I	0.27	A,D,E	1521	Cl.Gold, Reigate	I	0.64	C,D,E
801	R.Devon,Barnstaple	B	2.00	A,B,D	1530	R.Essex, Southend	B	0.15	D
828	Cl.Gold 828, Luton	I	0.20	A,D,E	1530	Big AM, W.Yorks	I	0.74	D
828	Cl.G 828,Bournemouth	I	0.27	A	1530	Cl.Gold Worcester	I	0.52	A,D,E
837	Asian Net Leicester	B	0.45	A,D,E	1548	R.Bristol	B	5.00	B*
855	R.Devon, Plymouth	B	1.00	B	1548	Capital G, London	I	97.50	B*,D,E
855	R.Norfolk, Postwick	B	1.50	D	1557	Cl.Gold 1557,N.hant	I	0.76	D,E
855	Sunshine 855,Ludlow	I	0.15	A,D,E	1566	CountySnd,Guildford	I	0.50	D*,E
873	R.Norfolk, W.Lynn	B	0.30	D,E	1566	SomersetSnd,Taunton	B	0.63	A
936	Brunel CG, W.Wilts	I	1.18	D,E	1584	London Turkish R	I	0.20	D
936	Fresh AM, Hawes	I	0.10	D	1584	R.Nottingham	B	1.00	E
945	Cl.Gold GEM, Derby	I	0.20	D,E	1584	H/Worcs, Woofferton	B	0.50	A
954	Cl.Gold 954, H'ford	I	0.16	A,E	1602	R.Kent	B	0.25	D
963	Asian Club, Hackney	I	1.00	A,D,E					
972	Asian Club, Southall	I	1.00	A,D,E					
990	R.Devon, Exeter	B	1.00	A,B					
990	Cl.G, Wolverhampton	I	0.09	A,E					
999	C.Gold GEM Nott'ham	I	0.25	D,E					
999	R.Solent	B	1.00	A					
999	Valley R, Aberdare	I	0.300	A					
1017	Cl.G,WABC,Shr'shire	I	0.70	A,E					
1026	R.Cambridgeshire	B	0.50	C,D,E					
1026	R.Jersey	B	1.00	A,B					
1035	Mean Country 1035	I	1.00	C,D,E					
1116	R.Derby	B	1.20	D,E					
1116	R.Guernsey	B	0.50	A,B					
1116	Valley R, Ebbw Vale	I	0.50	A					
1152	Cap.G 1152,Birm'ham	I	3.00	A					
1152	CIG Amber, Norwich	I	0.83	D					
1152	ILB 1152, London	I	23.50	E					
1152	Cl.G 1152, Plymouth	I	0.32	B					
1161	R.Bedfordshire(3CR)	B	0.10	D,E					
1161	Magic 1161, Goxhill	I	0.35	D					
1170	Swansea Snd,Swansea	I	0.58	A,B					
1242	Capital G,Maldstone	I	0.32	D					
1251	C.G Amber,Bury StEd	I	0.76	B*,D					
1260	SabrasSnd,Leicester	I	0.29	E					
1260	R.York	B	0.50	B*					
1296	Radio XL,Birmingham	I	5.00	A,D,E					
1305	Premier via ?	I	0.50	D,E					
1332	Cl.Gold 1332,P't'bo	I	0.60	D,E					
1359	Cl.Gold 1359, C'try	I	0.27	D,E					
1368	R.Lincolnshire	B	2.00	D,E					

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

BASE VERTICALS

SUPERSCAN STICKS I & II

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

SUPERSCAN STICK

Freq: 0-2000 Mhz Length:1000mm Socket: SO239

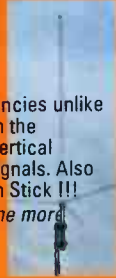
Our Price £29.95 PLUS £6.00 P+P.

SUPERSCAN STICK II

Freq: 0-2000 Mhz Length:1500mm Gain: 3.00dB

Socket: SO239. **Our Price £39.95** PLUS £6.00 P+P.

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



DISCONE ANTENNAS

STANDARD DISCONE

Freq: 25-1300 Mhz Length:1000mm

Socket:SO239

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

Our Price Just £29.95 plus £6.00 P+P.



SUPER DISCONE

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

Socket: SO239

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

Our Price £39.95 plus £6.00 P+P.



AR-AIR BAND ANTENNAS

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

AR-30

Freq:Civil & Military Gain:3.0/6.0 dB

Length:1000mm. **Our Price £39.95** PLUS £6.00 P+P.



AR-50

Freq:Civil & Military Gain:4.5/7.0 dB Length:1500mm.

Our Price £59.95 PLUS £6.00 P+P.

(Both these antennas come complete with 3 ground plane radials 12" stub mast, v-bolts & clamps).

X1-HF VERTICAL

Freq:1-50 Mhz Length: 2005mm

Socket: SO239

The X1 incorporates loaded helical traps, similar to that of a horizontal di-pole, encapsulated in a heavy duty high impact plastic tube, with a top tapered stainless steel whip. (The answer for those enthusiasts looking for short-wave reception but haven't the space for a long wire). **Our Price £49.95** PLUS £6.00 P+P.



HF DISCONE

Freq:0.05-2000 Mhz Length:1840mm

Socket: SO239

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

Our Price £49.95 plus £6.00 P+P.



ROYAL DISCONE 2000 (Stainless Steel)

Freq: RX 25-2000 Mhz TX: 50-52/144-146/430-

430/900-986/1240-1325Mhz Length: 1550mm

Socket: N-type

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

Our Price £49.95 plus £6.00 P+P.

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



GETTING RIGGED UP

5' SWAGED POLES

Heavy Duty Ali (1.2mm wall)

SINGLE 1 1/4"£7.00

SET OF FOUR 1 1/4"£24.95

SINGLE 1 1/2"£10.00

SET OF FOUR 1 1/2"£34.95

SINGLE 2"£15.00

SET OF FOUR 2"£49.95

CONNECTORS

PL259/9£0.75 each

PL259/6£0.75 each

PL259/7 for mini 8£1.00 each

BNC (Screw Type)£1.00 each

BNC (Solder Type)£1.00 each

N TYPE for RG58£2.50 each

N TYPE for RG213£2.50 each

SO239 to BNC£1.50 each

PL259 to BNC£2.00 each

N TYPE to SO239£3.00 each

HI-SPEC COAX CABLE

RG58 6mm standard£0.35 per mtr RG213 9mm mil spec£0.85 per mtr

RG58 6mm mil spec£0.60 per mtr RH200 9mm mil spec£1.10 per mtr

RF mini 8 7mm mil spec£0.85 per mtr (Phone for 100 mtr discount price)

BE DEDICATED

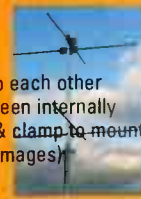
TURNSTILE 137

Freq:137.5 Length: 1000mm

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

Our Price £39.95 plus £6.00 P+P.

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



BEAM ANTENNAS

MLP32

Freq:100-1300 TX&RX

Gain:11-13 dB

Length:1400mm

Con: N-Type

Our Price £99.95

plus £6.00 P+P

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

AR300XL Rotator for above beams

£49.95 plus £6.00 P+P.

MLP67

Freq:50-1300 Mhz

Gain:10-12 dB

Length:3000mm

Con: N-Type

Our Price £169.95

plus £6.00 P&P.



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R.Nederlands via Bonaire, Ned.Antilles
17.810 (Eng to W.Africa 1900-2100) No rating; R.Nederlands via Sackville, Canada
17.875 (Eng to N.America 1900-2100, Sat/Sun) 24121 at 1900 in Newry.

Reception in the **15MHz (19m)** band tended to be more reliable than the higher frequencies. However, it was badly affected by the intense solar activity at the end of October.

The broadcasts from R.New Zealand Int on **15.530** (Eng to NW.Pacific, Asia 1100-1259) have been received in the UK. Their transmission was rated 33222 at 1100 in Truro. R.Australia's broadcasts have been reaching the UK on two frequencies from Shepparton: **15.415** (Eng to Asia 0000-0900), logged as 43433 at 0705 in Herstmonceux; **15.240** (Eng to Pacific 0000-0800, Eng to Asia 0800-1130), noted as 34333 at 0845 in Stalbridge.

Other occupants of this band include Adventist World R. (AWR) via Meyerton, S.Africa **15.345** (Eng to Africa 0530-0630), rated 34122 at 0619 in Newry; BBC via Ascension Is **15.400** (Eng to W/C.Africa 0630-

1000) 44434 at 0745 in Seaton; BBC via Rampisham? **15.565** (Eng to C/E.Eur 0700-1800) 24332 at 0745 in Oxted; China R.Int **15.210** (Eng to S.Pacific 0900-1100) 54433 at 0920 in Herstmonceux; R.Bulgaria, Plovdiv **15.700** (Eng to Eur 1230-1300) 54444 at 1230 in Morden; HCJB via Kununurra, Australia **15.390** (Eng to S.Asia 1230-1700) 33323 at 1420 in Stalbridge; VOA via Kavala, Greece **15.205** (Eng to M.East, Asia 1400-1800?) 33233 at 1500 by **Gerald Guest** in Dudley; R.Nederlands via Madagascar **15.595** (Eng to S.Asia 1400-1600) 24232 at 1506 in Newry; R.Kuwait, Kabd **15.110** (Ar to S/SE.Asia 1330-1600) 33333 at 1555 in Rugby; Israel R.Jerusalem **15.760** (Heb to W.Eur, N.America 0500-1800) 44454 at 1555 in Liverpool; SRI via Sottens **15.555** (It, Ar, Eng, Fr to Nr.East, Africa 1630-1815) No rating; AIR via Bangalore **15.075** (Eng [Gen.Overseas Svce] to E.Africa 1745-1945) 35553 at 1805 in Larnaca, Cyprus; R.Nederlands via Bonaire, Ned Antilles **15.315** (Eng to N.America 1900-2100, Sat/Sun) No rating; AWR via Meyerton, S.Africa **15.295** (Eng to Africa 2000-2100)

34343 at 2000 in Newry.

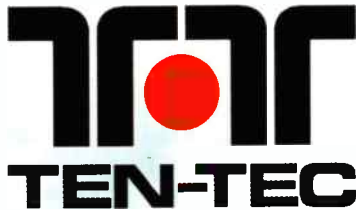
In the **13MHz (22m)** band SRI via Julich, Germany **13.790** (Fr, Ger, It Eng to Nr.East, Africa 0600-0800) was rated 44333 at 0730 in Morden; R.Nederlands via Flevo **13.700** (Dut to S/SE.Eur 0900-1600, Sat/Sun) 44444 at 1020 in Truro; R.Nederlands via Khabarovsk **13.820** (Eng to E.Asia 1000-1100) 24112 at 1030 in Newry; R.Nederlands via Flevo **13.700** (Dut to S.Eur 1500-1800) No rating; UAE R.Dubai **13.675** (Eng to Eur 1330-1350) 43333 at 1340 in Herstmonceux; R.Kuwait, Kabd **13.620** (Ar to Eur, N.America 0930-1600) 54455 at 1555 in Rugby; R.Norway via Sveio **13.800** (Norw to M.East 1700-1730) 33343 at 1725 in Liverpool; AIR via Bangalore **13.620** (Ar to W.Asia 1730-1945) 45434 at 1830 in Seaton; AIR via Bangalore? **13.605** (Eng [Gen.Overseas Svce] to W/NW.Africa

- Listeners:
 (A) Simon Hockenhill, E.Bristol.
 (B) Simon Hockenhill, while at Polgooth, Cornwall.
 (C) Sheila Hughes, Morden.
 (D) Rhoderick Illman, Oxted.
 (E) Eddie McKeown, Newry.
 (F) Ernie Strong, Ramsey, Cambs.
 (G) Fred Wilmshurst, Northampton.

Medium Wave Chart

kHz	Station	Country	Power (kW)	Listener	kHz	Station	Country	Power (kW)	Listener
531	Ain Beida	Algeria	600/300	F*	792	Limoges	France	300	A*,E*,G*
531	Berg	Germany	20	E*	792	Lingen(NDR)	Germany	5	E*
531	RNE5 via ?	Spain	?	A*	792	Londonderry(BBC)	UK	1	E
531	Beromunster	Switzerland	500	A*,E*,F*,G	801	Munchev(Ismaning)	Germany	300	A*,E*,F*,G*
540	Wavre-Overijsse(VRT)	Belgium	150/50	A*,E*,F*,G	810	Westerglen(BBCScot)	UK	100	A*,C,E,F*,G*
540	Sidi Bennour	Morocco	600	E*,F*	819	Batra	Egypt	450	A*,F*
549	Les Trembles	Algeria	600	B*,F*	819	S.Sebastian(EI)	Spain	5	E*,F*
549	Sasnovy	Belarus	1000	F*	828	Hannover(NDR)	Germany	100/5	A*,F*
549	Nordkirchen (DLF)	Germany	100	F*	828	Barcelona(SER)	Spain	50	E
549	Thurnay (DLF)	Germany	200	G*	837	Nancy	France	200	E
558	Espoo	Finland	50	E*,F*	837	COPE via ?	Spain	?	E
558	RNE5 via ?	Spain	?	B*,E*,F	846	Rome	Italy	1200	A*,B*,E*,G*
567	Tullamore(RTE1)	Eire	500	A,B,C,E,F*,G	855	RNE1 via ?	Spain	?	E*,F*,G*
576	Muhlacker(SDR)	Germany	500	E*,F*,G*	864	Paris	France	300	A,B*,E*,F*,G*
576	Barcelona(RNE5)	Spain	50	A*,F*	873	Frankfurt(AFN)	Germany	150	A*,E*
585	Paris(FIP)	France	8	A*,C,E*,F	873	Zaragoza(SER)	Spain	20	C*,G*
585	Madrid(RNE1)	Spain	200	A*,B*,E*,F*,G*	873	Enniskillen(R.U.I)	UK	1	E
585	Dumfries(BBCScot)	UK	2	E	882	Barcelona	Spain	20	F*
594	Frankfurt(HR)	Germany	1000/400	A*,E*,F*	882	Washford(BBCWales)	UK	100	B,C,E*,F*,G
594	Oujda-1	Morocco	100	F*	891	Algiers	Algeria	600/300	B*,F*,G*
594	Muge	Portugal	100	B*,E*	891	Hulsberg	Netherlands	20	A*,E*
603	Lyon	France	300	A*,E*,F	891	Bmo(CRo2)	Czech Rep	25	E*
603	Sevilla(RNE5)	Spain	50	A*,B*,F*	900	Milan	Italy	600	E*,F*,G*
603	Newcastle(BBC)	UK	2	E	900	COPE via ?	Spain	?	F*,G
612	Athlone(RTE2)	Eire	100	A,B,C,E,G*	909	B'mans Pk(BBC5)	UK	140	F*,G
612	Amman	Jordan	10	A*	918	Domzale	Slovenia	600/100	A*,E*,F*,G*
612	RNE1 via ?	Spain	10	F*	918	Madrid(R.Int)	Spain	20	F*
621	Wavre (RTBF)	Belgium	80	A,B,D,E*,F*,G	927	Wolvertem	Belgium	300	A*,E*,F*,G*
621	RNE1 via ?	Spain	10	F*	936	Bremen	Germany	100	E*,G*
621	Barcelona(OCR)	Spain	50	E*	936	RNE5 via ?	Spain	?	B*,F*
630	Vigra	Norway	100	E*	945	Toulouse	France	300	A*,F*,G*
630	Tunis-Djedeida	Tunisia	600	A*,E*	954	Bmo (CRo2)	Czech Rep.	200	E*,F*,G*
639	Praha(Liblice)	Czech	1500	A*,E*,F*,G*	954	Madrid(CI)	Spain	20	A*,F*,G*
639	RNE1 via ?	Spain	?	B*,E*	963	Pori	Finland	600	A*,E*
639	La Coruna(RNE1)	Spain	100	A*,F*	972	Hamburg(NDR)	Germany	100	A*,E*,F*,G*
648	RNE1 via ?	Spain	10	E*	972	RNE1 via ?	Spain	?	F*
648	Orfordness(BBC)	UK	500	A,B*,E*,F*,G	972	Nikolayev	Ukraine	500	F*
657	Napoli	Italy	120	F*	981	Alger	Algeria	600/300	E*,F*
657	Madrid(RNE5)	Spain	20	A*,E*,F*,G*	981	Megara	Greece	200	F*
657	Wrexham(BBCWales)	UK	2	A,C,E,G	990	Berlin	Germany	100	A*,E*,F*,G*
666	Messkirch(Rohrd(SWF)	Germany	150	A*,E*,G*	990	Lopic (Biz News)	Netherlands	120/40	A*,E*,F*,G
666	Situnai(R.Vilnius)	Lithuania	500	E*,F*	1404	Brest	France	20	B,E*,F*,G
666	Lisboa	Portugal	135	E*,F*	1413	RNE5 via ?	Spain	?	E*,G*
675	Lopic(ArrowCl.Rock)	Holland	120	A*,E*,F*,G	1422	Heusweiler(DLF)	Germany	1200/600	A,E*,F*,G*
684	Sevilla(RNE1)	Spain	500	A*,E*,F*,G*	1440	Marnach(RTL)	Luxembourg	1200	A*,E*
693	Droitwich(BBC)	UK	150	F*,G	1440	Dammam	Saudi Arabia	1600	A*,E*
702	Monte Carlo	Monaco	40	E*,F*	1449	Squinzano (RAI)	Italy	50	E*
702	TWR via Monte Carlo	Monaco	300	E*	1449	Redmoss(BBC)	UK	2	A*,E*
702	Presov	Slovakia	200	A*,F*	1458	Eilat	Israel	10	F*
711	Rennes (R.Bleu)	France	300	A,B,E*,F*,G*	1467	Maia	Moldova	150	E*
711	Laayoune	Morocco	600	E*,F*	1467	Monte Carlo(TWR)	Monaco	1000/400	E*,F*,G*
720	Langenberg	Germany	200	F*	1476	Wien-Bisamberg	Austria	600	A*,E*,G*
720	Lisnagarvey(BBC4)	N.Ireland	10	A*,F*	1485	SER via ?	Spain	?	F*,G*
720	Norte	Portugal	100	A*	1494	Clermont-Ferrand	France	20	A*,E*,F*,G*
720	Crystal Palace BBC4	UK	0.75	C,G	1494	Krasny Bor	Russia	1200	A*,E*,F*
729	Cork(RTE1)	Eire	10	A,B,E*	1503	Bashahr	Iran	50	E*
729	RNE1 via ?	Spain	?	E*,G*	1512	Wolvertem	Belgium	300	E*,F*,G*
738	Paris	France	4	E,F	1521	Kosice(Citazice)	Slovakia	600	E*,F*,G*
738	Barcelona(RNE1)	Spain	500	A*,E*,F*,G*	1521	Duba	Saudi Arabia	2000	A*,F*
747	Flevo(NOS-1)	Holland	400	A*,E*,F*,G*	1530	Vatican R	Italy	150/450	E*,F*,G*
747	Cadiz(RNE5)	Spain	10	E*	1539	Mainflingen(ERF)	Germany	350(700)	A*,B*,E*,F*,G*
756	Braunschweig(DLF)	Germany	800/200	A*,E*,F*,G*	1548	?(VOA)	Kuwait	600	F*
756	Bilbao(EI)	Spain	5	F*,G	1557	Nice	France	300	A*,B*,E*,F*
756	Redruth(BBC R-4)	UK	2	B	1575	Genova	Italy	50	F*,G*
765	Sottens	Switzerland	500	F*	1575	SER via ?	Spain	5	E*,F*,G*
774	Abis	Egypt	500	F*	1584	SER via ?	Spain	2	F*,G*
774	Enniskillen(BBC)	N.Ireland	1	E	1584	Ceuta (R.Ole)	Spain	5	F*,G*
774	RNE1 via ?	Spain	?	E*,F*,G*	1593	Polonne	Ukraine	1	F*
783	Plymouth(BBC)	UK	1	B	1602	SER via ?	Spain	?	E*,F*
783	Leipzig(MDR)	Germany	100	A*,E*,F*,G*	1602	Vitoria(EI)	Spain	10	E*,G*
783	Barcelona(COPE)	Spain	50	E*	1611	Vatican R	Italy	15	E*
792	Limoges	France	300	A*,E*,G*					
792	Lingen(NDR)	Germany	5	E*					
792	Londonderry(BBC)	UK	1	E					
801	Munchev(Ismaning)	Germany	300	A*,E*,F*,G*					
810	Westerglen(BBCScot)	UK	100	A*,C,E,F*,G*					
819	Batra	Egypt	450	A*,F*					
819	S.Sebastian(EI)	Spain	5	E*,F*					
828	Hannover(NDR)	Germany	100/5	A*,F*					
828	Barcelona(SER)	Spain	50	E					
837	Nancy	France	200	E					
837	COPE via ?	Spain	?	E					
846	Rome	Italy	1200	A*,B*,E*,G*					
855	RNE1 via ?	Spain	?	E*,F*,G*					
864	Paris	France	300	A,B*,E*,F*,G*					
873	Frankfurt(AFN)	Germany	150	A*,E*					
873	Zaragoza(SER)	Spain	20	C*,G*					
873	Enniskillen(R.U.I)	UK	1	E					
882	Barcelona	Spain	20	F*					
882	Washford(BBCWales)	UK	100	B,C,E*,F*,G					
891	Algiers	Algeria	600/300	B*,F*,G*					
891	Hulsberg	Netherlands	20	A*,E*					
891	Bmo(CRo2)	Czech Rep	25	E*					
900	Milan	Italy	600	E*,F*,G*					
900	COPE via ?	Spain	?	F*,G					
909	B'mans Pk(BBC5)	UK	140	F*,G					
918	Domzale	Slovenia	600/100	A*,E*,F*,G*					
918	Madrid(R.Int)	Spain	20	F*					
927	Wolvertem	Belgium	300	A*,E*,F*,G*					
936	Bremen	Germany	100	E*,G*					
936	RNE5 via ?	Spain	?	B*,F*					
945	Toulouse	France	300	A*,F*,G*					
954	Bmo (CRo2)	Czech Rep.	200	E*,F*,G*					
954	Madrid(CI)	Spain	20	A*,F*,G*					
963	Pori	Finland	600	A*,E*					
972	Hamburg(NDR)	Germany	100	A*,E*,F*,G*					
972	RNE1 via ?	Spain	?	F*					
972	Nikolayev	Ukraine	500	F*					
981	Alger	Algeria	600/300	E*,F*					
981	Megara	Greece	200	F*					
990	Berlin	Germany	100	A*,E*,F*,G*					
990	Lopic(Biz News)	Netherlands	120/40	A*,E*,F*,G					
990	Tywyn(BBC)	UK	1	E*					
999	Schwern(RIAS)	Germany	20	E*					
999	Madrid(COPE)	Spain	50	A*,F*,G*					
1008	SER via ?	Canaries/Spain	?	A*,F*					
1008	Flevo(NOS-5)	Holland	400	F*,G					
1017	Rheinsender(SWF)	Germany	600	A*,E*,F*,G*					
1017	RNE5 via ?	Spain	?	E*,F*					
1035	Lisbon	Portugal	120	E*					
1044	Dresden(MDR)	Germany	20	A*,E*,F*,G*					
1044	Sebaa-Aiouen	Morocco	300	B*,F*					
1044	SER via ?	Spain	?	E*					
1044	S.Sebastian(SER)	Spain	10	A*,F*					
1053	Zaragoza(COPE)	Spain	10	E*					
1053	Talk Sport via ?	UK	?	E*,F*,G					
1062	Kalundborg	Denmark	250	A*,E*,F*,G*					
1062	R.Uno via ?	Italy	?	F*					
1071	Prague	Czech Rep.	60	A*					
1071	Cairo	Egypt	100	F*					
1071	Bilbao(EI)	Spain	5	A*,E*,F*,G*					
1071	Talk Sport via ?	UK	?	F*,G					
1080	SER via ?	Spain	?	E*,F*,G*					
1089	Talk Sport via ?	UK	?	E*,F*,G*					
1098	Nitra(Jarok)	Slovakia	1500	A*,E*,G*					
1098	RNE5 via ?	Spain	?	F*					
1107	AFN via ?	Germany	10	E*					
1107	Talk Sport via ?	UK	?	A*,E*,F*,G*					
1116	Pontevedra(SER)	Spain	5	E*,G*					
1125	La Louviere	Belgium	20	E*,F*					
1125	Deanovec	Croatia	100	G*					
1125	RNE5 via ?	Spain	?	F*					

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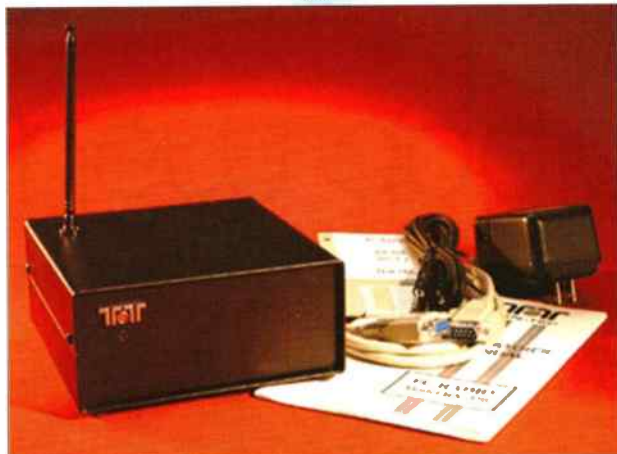
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John Wilson, SWM April 2002 ... Third order intercept point measured at a nominal 14MHz was +15dBm with a 50kHz signal spacing as used by TenTec themselves (handbook specification +10dBm). Dynamic range was 98dB against the specification of 90dB, so all better than manufacturer's figures. In conclusion, the TenTec RX-320 is an amazingly satisfying receiver to use, and despite its simple appearance when you look inside, it really does perform and has perhaps come the closest yet to marrying the power of a PC with a high performance short wave receiver.

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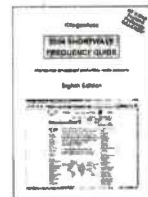
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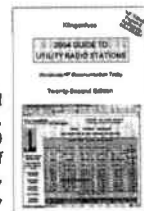
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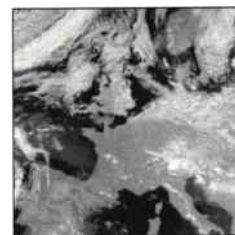
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1745-1945) 44334 at 1940 in Stalbridge; SRI via Julich, Germany **13.660** (It, Ar, Eng, Ger, Fr to Nr.East, Africa 1830-2130) 24211 at 1932 in Newry.

R.New Zealand may be heard in the UK in the **11MHz (25m)** band. Their 100kW transmission on **11.675** (Eng to Pacific, W.USA 0800-1059) was rated 22222 at 1058 in Truro. R.Australia's broadcasts have been reaching the UK on two frequencies from Shepparton: **11.880** (Eng to Asia 0800-1330), rated 34333 at 1100 in Morpeth & 23323 at 1200 in Dudley; **11.660** (Eng to E/SE.Asia 1330-1700) 53434 at 1405 in Stalbridge.

Other broadcasters using this band include the BBC via Cyprus **12.095** (Eng to C/E.Eur 0600-0800) No rating; BBC via UK **12.095** (Eng to C/E.Eur 0400-1700) 34343 at 0845 in Seaton & 33333 at 1552 in Rugby; R.Finland via Pori **11.755** (Fin to W.Eur, W.Africa 0800-2300) 44444 at 0824 in Oxted; R.Nederlands via Irkutsk **12.065** (Eng to E/SE.Asia 1000-1100) No rating; China R.Int, Kunming **11.675** (Eng to Africa? 1400-1500) 34433 at 1400 in Dudley & 34333 at 1450 in Llanfairfechan; R.Nederlands via Tashkent **12.070** (Eng to S.Asia 1400-1600) 44333 at 1500 in Morden; R.Nederlands via Madagascar **12.080** (Eng to S.Asia 1400-1600) No rating; RFI via Issoudun? **11.615** (Eng to Mid.East 1600-1730) 55455 at 1610 in Llanfairfechan; SRI via Julich, Germany **11.810** (It, Ar, Eng, Fr to Nr.East, Africa 1630-1815) No rating; R.Finland via Pori **11.755** (Fin to Eur 0800-2300) 55555 at 1650 in Liverpool; R.Japan via Yamata, Japan **11.970** (Eng to Eur 1700-1800) 33222 at 1700 by **Clare Pinder** in Appleby; BBC via Cyprus **12.095** (Eng to Eur 1700-1900) 43333 at 1710 in Liverpool; R.Nederlands via Madagascar **11.655** (Eng to E.Africa 1800-2000) 24222 at 1839 in Newry; SRI via Sottens **11.920** (It, Ar, Eng, Ger, Fr to Nr.East, Africa 1830-2130) 24122 at 1933 in Newry; AWR via Julich, Germany **11.845** (Eng to Africa 1930-2000) 44344 at 1950 in Newry; AIR via Bangalore? **11.620** (Eng [Gen.Overseas Svce] to UK, W.Eur 2045-2230) SIO 222 at 2131 by **Francis Hearne** in N.Bristol; SRI via Montsenery, Fr.Guiana **11.660** (Fr, Ger, It, Eng to S.America 2200-0000) No rating.

R.Australia's broadcasts in the **9MHz (31m)** band have been received in the UK on the following frequencies from Shepparton: **9.710** (Eng to Pacific 0800-0900), noted as 'just audible' at 0836 in Oxted; **9.500** (Eng to Asia 1900-2130), rated 32222 at 1948 in Truro.

Other broadcasters using this band include R.Nederlands via Bonaire, Ned Antilles **9.845** (Eng to N.America 0000-0200?) No rating; R.Nederlands via Bonaire, Ned Antilles **9.590** (Eng to N.America 0400-0500?) No rating; SRI via Julich, Germany **9.885** (Fr, Ger, It, Eng to Nr.East, Africa 0600-0800) No rating; AWR via Moosbrunn, Austria **9.660** (Eng to Eur 0830-0900), rated 45344 at 0830 in Newry; R.Vilnius, Lithuania **9.710** (Eng to Eur 0830-0900) 54544 at 0850 in Herstmonceux; R.Nederlands via Bonaire **9.785** (Eng to E.Asia, Far East, Pacific 1000-?) No rating; R.Canada Int (RCI) via Flevo **9.815** (Eng to

W.Eur 1400-1430) No rating; BBC via Cyprus **9.410** (Eng to W/SW.Eur 1500-2200) 33343 at 1515 in Liverpool; SRI via Julich, Germany **9.755** (It, Ar, Eng, Fr to Nr.East, Africa 1630-1815) No rating; R.Nederlands via Flevo **9.895** (Eng to Africa 1800-2100) 54444 at 1800 in Morden; AIR via Aligarh? **9.445** (Eng [Gen.Overseas Svce] to W/NW.Africa 1745-1945) 44444 at 1840 in Rugby & SIO 333 at 1902 in N.Bristol; SRI via Julich, Germany **9.820** (It, Ar, Eng, Ger, Fr to Nr.East, Africa 1830-2130) 22222 at 1934 in Newry; AIR via Delhi? **9.950** (Eng [Gen.Overseas Svce] to UK, W.Eur 1745-1945) 54445 at 1935 in Stalbridge; R.Ext.Espana (REE) **9.595** (Eng to Eur 2000-2059 Mon-Fri, 2100-2159 Sat/Sun) 43443 at 2000 in Newry; R.Cairo, Egypt **9.990** (Eng to Eur 2115-2245) 44333 at 2115 in Appleby; SRI via Sottens **9.885** (Fr, Ger, It, Eng to S.America 2200-0000) 44444 at 2200 in Seaton; WTJC Newport NC, USA **9.370** (Eng to N.America 24hrs) 23442 at 2221 by **Michael Casey** in Manchester & 54444 at 0456 in Morpeth.

Noted in the **7MHz (41m)** band were R.Japan via Skelton, UK **7.230** (Eng to Eur 0600-0700), rated 44433 at 0655 in Herstmonceux; R.Nederlands via Petropavlovsk **7.260** (Eng to Far East 1000-1100) No rating; R.Slovakia Int **7.345** (Slov, Ger, Eng, Fr to W.Eur 1630-1830) 34543 at 1730 in Newry & 55555 at 1825 in Rugby; Voice of Russia **7.290** (Eng to Eur 1800-2200) 44444 at 1930 in Morden; AIR via Bangalore? **7.410** (Eng [Gen.Overseas Svce] to UK, W.Eur 1745-1945) 54444 at 1930 in Stalbridge; VOIRI Iran **7.320** (Eng to Eur 1930-2030) 34343 at 1935 in Llanfairfechan; R.Slovakia Int **7.345** (Eng to W.Eur 1930-2000) 55555 at 1935 in Liverpool; Vatican R. Italy **7.250** (Various to Eur) SIO 333 at 1951 in N.Bristol;

R.Nederlands via Madagascar **7.120** (Eng to E/S.Africa 1900-2100) 32232 at 1900 in Seaton; AIR via Bangalore? **7.410** (Eng [Gen.Overseas Svce] to UK, W.Eur 2045-2230) 35455 at 2203 in Manchester; American Forces R. via ? **7.507** (Eng [u.s.b.] to ? 44444 at 0240 in Morpeth.

In the **6MHz (49m)** band DW via Julich **6.140** (Eng to Eur 0600-1000, 1300-1600) was 54243 at 0805 in Newry & 35433 at 0915 in Polgooth; Deutschland R, Berlin **6.005** (Ger 24hrs) 33333 at 0840 in Liverpool; R.Nederlands via Sackville, Canada **5.965** (Eng to N.America 1200-1300) No rating; R.Prague **5.930** (Cz to W.Eur 1630-1657) 44444 at 1643 in Oxted; R.Vlaanderen via Julich, Germany **5.910** (REng to Eur 1830-1900) 55555 at 1830 in Llanfairfechan; R.Nederlands via Madagascar **6.020** (Eng to S.Africa 1800-1900) No rating; VOA via Sao Tome **6.035** (Eng to Africa 1800-2230) 43333 at 1925 in Stalbridge; R.Canada Int via Hoerby, Sweden **5.850** (Eng to Eur, N.Africa 2100-2200?) 34433 at 2100 in Dudley; R.Finland via Pori **6.120** (Fin to Eur 0700-2215) 44444 at 2200 in Truro; R.Budapest, Hungary **6.025** (Eng to Eur 2200-2230) 43433 at 2210 in Morden; R.Prague **5.915** (Eng to N.America 2330-2357) SIO 444 at 2332 in N.Bristol; AWR via Bonaire, Ned Antilles **6.165** (Sp to America 2300-0100) No rating; WEWN Birmingham, USA **5.825** (Eng, Sp to N.America 0000-1200) 34443 at 0027 in Manchester & 23322 at 0830 in Seaton; R.Nederlands via Bonaire, Ned Antilles **6.165** (Eng to N.America 0100-0200) No rating; R.Havana, Cuba **6.000** (Eng to N.America 0100-0500) 44444 at 0152 in Morpeth; R.Nederlands via Bonaire, Ned Antilles **6.165** (Eng to N.America 0400-0500) No rating.

Equipment Used for LM&S \$ = November # = December 2003 * = January 2004

- # Robert Connolly, Kilkeel, Co.Down: JRC NRD-525 + Datong AD-370 active antenna. Timewave DS9+ filter.
- * Michael Casey, Manchester: Roberts RC828 + Howes CTU9 a.t.u. + MFJ DSP Filter + 60m & 49m loops in loft.
- \$** Bernard Curtis, Stalbridge: Realistic DX400 + outdoor r.w.
- * Jim Edwards, Wigan: JRC NRD-535 + 80m wire on a block of flats.
- \$# Ian Evans, Ebbw Vale: Sangean ATS-818 + 11m indoor wire.
- \$** Stan Evans, Herstmonceux: Kenwood R-2000 + Balun + 11m wire in loft.
- * Geriant Gill, Llanfairfechan: Grundig Yacht Boy 400.
- \$** Gerald Guest, Dudley: Roberts RC818 + r.w.
- \$** David Hall, Morpeth: ADR AR7030 or Ten-Tec RX350 + Global AT-2000 + 13m wire.
- \$** Francis Hearne, N.Bristol: Sharp WQT370 + r.w.
- \$** Simon Hockenhuil, E.Bristol: Battery powered Roberts R876, R871 + built-in antennas or AKD HF3 + 4m wire in loft.
- * Simon Hockenhuil, while in Polgooth, Cornwall: Roberts R617 + internal antennas and powered by batteries.
- * Robert Hughes, Liverpool: ADR AR7030 + 15m indoor wire or Drake R8E + RF Systems MTA on roof.
- \$** Sheila Hughes, Morden: Sony ICF-7600DS + home-built loop or Panasonic DR48 + 16m inverted L.
- \$** Rhoderick Illman, Oxted: Kenwood R-5000 + r.w. or AN-1, Sony ICF-7600DS.
- # Johan Leidekker, Amsterdam: Sony ICF-2001D.
- \$** Eddie McKeown, Newry: Grundig Yacht Boy 400 or Sangean ATS-818.
- * John Parry, Larnaca, Cyprus: Realistic DX-394 + r.w.
- \$** Clair Pinder, Appleby: JRC NRD-525 + Yaesu FRT-7700 a.t.u. + r.w.
- \$** Peter Pollard, Rugby: Sony ICF-2001D + r.w.
- \$** Vic Prier, Seaton, Devon: Fairhaven RD500VX + Datong AD-270 active dipole with helical elements erected east/west inside indoor balcony.
- \$** Richard Reynolds, Guildford: Two Sangean ATS803A + tuned loops or two helix antennas in loft.
- \$# Harry Richards, Barton-upon-Humber: Grundig Satellit 700 + AO270 or r.w. or Grundig Yacht Boy 400 or Matsui MR4099.
- \$** Ernie Strong, Ramsey, Cambs: AKD HF3 or Yaesu FRG-8800 + a.t.u. + 30m wire.
- # Michael Wasley, whilst in Lerwick and Kirkwall: Grundig Yachtboy 400 portable
- # Louisa & Michael Wasley whilst touring Shetland and Orkney: Volvo Car Radio in Car.
- \$ Bruce Watt, W.London: Not stated.
- \$** Thomas Williams, Truro: Grundig Yacht Boy 400 or Yacht Boy 206 + r.w.
- ** Fred Wilmshurst, Northampton: JRC NRD-525 + r.w. in loft.

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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.

NEW Q-TEK INTREPID 2000

TOP PERFORMER FOR SCANNERS



An amazing vertical (glass fibre) colinear antenna. Quality construction with incredible performance. For the serious scanner enthusiast.

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INTRO PRICE £64.99 RRP: 79.99

50-2000MHz Covert appearance Q-TEK SS-2000



Compact - indoor/outdoor scanning antenna. (50MHz-2.6GHz). Superb glass fibre construction. Ideal in areas affected by "nosey neighbour syndrome". This antenna can be put in the loft or outside on the building. SO-239 socket (PL-259 plug needed) 1.3m long (mast clamps supplied).

50MHz-2.6GHz and under 1.3m long

£49.95 DEL £11.00

AIR-44 PROFESSIONAL QUALITY

(Airband base) Prof quality base antenna for AIRBAND. (Civil & military). With SO-239 fitting (1.7m long). Gain 4.5/7dB.

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AIR-44N As above "N-type" fitting£84.95

AIR-33 (As above) 1m long. Gain 3/6dB. £49.95 P&P £8.50

items of interest

Q-TEK APOLLO 3000

A brilliant new compact indoor antenna that covers 0.1-3GHz and is just 24" when collapsed. Features "horizontal or vertical" adjustable elements. Ideal for table top mounting or by the window. Patch lead with BNC plug fitted. (Frequency range: 0.1-3GHz).

£59.95 P&P £6.00

SUPER-GAINER RH-9090 (SMA)

SMA fitting
 SMA 40cm flexible whip that is ideal as replacement.

OUR PRICE £26.95 P&P £1.50

SUPER-GAINER RH-9000 (BNC)

BNC 40cm flexible whip for the ultimate in gain. (Rx: 25MHz-2GHz).

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M-75 SCANNER PRE-AMP EP-300



Superb BNC in-line amplifier to boost signals! Fits on top of your scanner and away you go. (Powered by PP-3 battery - not supplied). Freq: 24MHz-2.1GHz. Gain: -

10dB to +20dB. OUR PRICE £79.95 P&P £5.00



A high quality superb 'police style' earpiece that hangs over the ear. (3.5mm straight plug fitted).

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top buys



NEW 8th EDITION THE UK SCANNING DIRECTORY

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WATSON HUNTER



Frequency counter covers 10MHz-3GHz. Incl's nicad, charger, antenna.

ONLY £59.95 P&P £6.00

Optional case £14.99£7.50



OPTO CD-100

10MHz-1GHz multimeter. Unit combines an RF frequency counter and an off-the-air decoder in one unit. Decodes: CTCSS, DCS, LTR & DTMR on a 16 character LCD display. Also features "reaction tune" for AOR/Icom scanners.

RRP £369.95. OUR PRICE £149.95

combination aids

SP-3 (PROFESSIONAL)



Two way combiner. one antenna feeds two scanners (without mismatch). 10-2500MHz. High isolation (BNC sockets).

Can be used in reverse £59.95 P&P £3.50

SP-1 TWO WAY COMBINER (PROFESSIONAL)



Very high quality combiner allows two short wave receivers to be connected to one antenna without interaction. 50kHz-30MHz (SO-239 fitting).

Can be used in reverse £59.95 P&P £3.50

DPX-30 ANTENNA DUPLXER/COMBINER

Allows two antennas to be connected to one receiver without interaction.

Can be used in reverse £54.95 P&P £3.50

Ant A (0-30MHz) } To receiver low
 Ant B (30-2000MHz) } insertion loss

xmas specials

ALKALINE STARTER KIT



Starter kit includes charger & 4 x AA cells. Was £12.99 £6.99 + £3.00 P&P.

Please note that only the special cells can be recharged with this charger.
 Extra cells available @ 8 x AA pack £10.99
 £1 P&P. 4 x AA pack £5.99 £1 P&P. 4 x AAA £6.25 £1 P&P. Rechargeable Alkaline. No memory effects. 1.5V cells. 3 x capacity of nicads.



PD-293

Touch screen display memory pad, credit card size. Stores more than 10,000 addresses includes PC docking station & lead to PC. 200 year calendar + world time for 100 cities. RRP £29.99.

LAST FEW TO CLEAR £19.99 P&P £4.00



EMR-899

State of the art, cable free thermometer. Supplied with one outdoor (waterproof) sensor. Will measure min/max indoor/outdoor temp. Up to three extra sensors can be used (available @ £19.99 each). RRP £49.99.

OUR PRICE £24.95 P&P £5.00



EM-112

Large thermometer with weather forecast detachable sensing probe for outdoor use (3m cable). Indoor/outdoor measurements, storm warning feature, pressure trend indication. RRP £49.99.

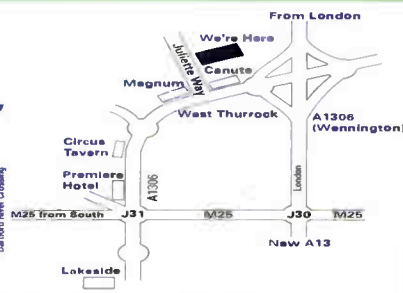
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**SIMPLY SLING UP
AND LISTEN IN**

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MLBA (R.F. SYSTEMS)



Ready assembled wire antenna offering low noise reception on long, medium, short wave (100kHz-40MHz) adjustable from 6mts to 20mts long. Magnetically coupled transfer system ensures reduced static noise levels and allows unwanted build-up to leak harmlessly to earth without damaging the receiver. (Subject to recr. being earthed).

£64.95 POST £5.00

PL-259 to PL-259 4mtr patch lead£8.99

DX-10 (R.F. SYSTEMS)



A superb quality active antenna with a very high intercept point ideal for weak signal reception without increases in radiated noise. A truly amazing antenna! Freq: 100kHz-30MHz. Bomb-proof over loading figures, 90cm long, mains PSU + controller supplied (coax optional). Atmospheric-noise compensated sensitivity.

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E.M.F. ANTENNA

A low cost, superb passive broadband (500kHz-30MHz) antenna useable down to 150kHz. Ideal for indoor or outdoor use and at only 5mtrs long you most certainly will find the space! Using magnetic transfer technology, interference & noise is minimised. Ready assembled + PL-259/coax. (5mtrs long.)

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DX-1 PRO (R.F. SYSTEMS)



This is a professional wide band receiving antenna with a very high intercept point that ensures a low noise level allowing even the weakest signals to be heard. Constructed of high-impact plastic and aluminium alloy - the amplifier is protected inside a waterproof stainless steel vessel. The unit is supplied complete with mounting hardware and an indoor controller with PSU (coax not supplied). Freq. 20kHz-54MHz. Gain: +6dB (ref dipole). Intercept points: >+75dBm (2nd ord), >+50dBm (3rd ord). (Static protection included). For the true professional.

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AT-2000 ANTENNA TUNER



Deluxe SW ATU
0.30MHz. SO239 fittings.

ONLY **£89.00**

(Probably the best ATU around)

P&P £6.00

PL-259 to PL-259 patch lead (0.6m).....£5.99

PL-259 to PL-259 patch lead (4m long).....£9.99

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The MLB contains a special impedance matching transformer which converts any piece of wire between 6 and 20 metres long into a wide band receiving antenna. 100kHz-40MHz. Low noise - probably the best there is!

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Broadband amplifier for short wave, medium & long wave. 50kHz-50MHz. 10dB gain. Superb low noise amplifier. Ideal for short wave improvement. Requires 12V (150mA).

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NOISE REDUCTION



NES-10-2 NOISE ELIMINATING SPEAKER. Fully adaptive noise cancelling - no adjustments necessary. Easy connected via 3.5mm jack lead. (Unit requires 12V supply)

IDEAL FOR SW RECEIVERS

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The ultimate short wave receiver with DSP - for the real perfectionist.

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● PC control capability.

OUR BEST SELLING HF RECEIVER

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★ Superb performance SW receiver ★ 0.2-30MHz (all mode)
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Send SAE for review

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HD-1010 optional headphones.....£9.99

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£159.95 240V Power Supply...£24.95
P&P £10 AN-100 active aerial...£64.95

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The ideal holiday partner!
★ Fully digital world receiver
★ FM/MW/SW ★ Covers all short wave broadcast/MW plus FM stereo (on h/phones)
★ Programmable memories
★ Sleep timer + alarm function
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A superb performance all mode synthesized world receiver with true SSB and 40Hz tuning for ultra clean reception. The same radio is sold under the Roberts name at

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SANGEAN ATS-505

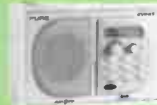


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Car DC lead.....£14.99 Optional spkr.....£29.99

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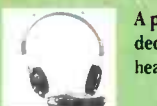
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Superb padded professional communications headphones. Designed specifically for SWL. 1/4" jack.

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(incl's power supply). Del £10.00

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**UNIDEN
UBC-780XLT**

New comprehensive scanner (25-1300MHz) Alpha Tag, PC cloning control. Smart scanner + trunk track facility. Includes power supply.



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Software 780XLT.....£34.99



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PSR-225**

500 channel. 25-1300MHz. (25-550/760-1300MHz) AM/FM/WFM selectable. Includes power supply.



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SWM, January 2004

Winter warmers that you can afford



**SANGEAN
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Voice activated desktop recorder with quarter speed record. (Sold for more under Roberts name:- C-9950). Superb accessory for the radio enthusiast.

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Micro-handy scanner. 100kHz-1300MHz. 700 memories/stereo FM (earphones)/attenuator/bug detector/audio descrambler. AM/FM/WFM/ Selectable tuning steps (incl's 8.33kHz).

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Optional battery pack and drop in charger £39.99

Soft case.....£15.99
PC interface.....£42.95



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New pocket hand-held scanner (0.1-1310MHz) AM/FM/WFM. Superb high-speed scanner featuring alpha tag and much more.

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MVT-7100**



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OUR PRICE INCLUDES FREE EP-300 EARPIECE **£199.95** Del £10

Soft case for 7100EU/9000 - specify.....£19.99
MVT-9000 MkII.....Our price £325.00
MVT-7300EU.....Our price £219.00



**ALINCO
DJ-X10**

Full-featured handy. 100kHz-2GHz all mode. Includes SSB/CW band scope, alphanumeric display plus loads more. (Includes battery/drop-in charger).

OUR PRICE INCLUDES FREE EP-300 EARPIECE **£269.95** Del £10

Optional case.....£15.00
Optional battery box.....£14.99
PC interface.....£42.95
Cigar power lead.....£19.99

**ALINCO
DJ-X2000**



The intelligent scanner! 100kHz-2.15GHz. All mode incl's SSB, "Flash Tune" reads frequency of nearby signal & tunes the handie for you. Incl's battery, charger & loads more.

INCLUDES FREE EP-300 EARPIECE **£419.95** Del £10

Optional case.....£15.00
Optional battery box.....£14.99
Cigar lead.....£19.99
PC interface.....£42.95



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Bandscan

Europe

● **Martin Peters** c/o SWM Editorial Offices, Arrowsmith Court, Broadstone, Dorset BH18 8PW
● **E-mail:** martin.peters@pwpublishing.ltd.uk

The big news in the UK this time around is the launch of the industry-wide regulator, Ofcom. The new Office of Communications will merge the functions of five existing regulatory bodies, namely the Independent Television Commission, the Broadcasting Standards Commission, the Office of Telecommunications, the Radio Authority and the Radiocommunications Agency. These five organisations have pledged to work closely together to manage their transition into a "single world-class regulator for the UK's flourishing broadcasting and telecommunications industries".

One of Ofcom's first major tasks will be to conduct a far-reaching review of public service broadcasting. The 12 month review will involve detailed analysis of all the UK public service broadcasters: BBC, ITV1, Channel 4, Five and S4C. Ofcom's review will be "evidence-based and research-driven, rooted in responses from viewers themselves" and the outcome will feed into Government's review of the BBC's Charter. Let's hope that it's not 'sexed-up' to the detriment of the Corporation.

WorldSpace News

Those of you with WorldSpace satellite receivers may have noticed Virgin Radio appearing on the dial. The London-based, national station signed up to the service in October. That's the good news.

Unfortunately, WorldSpace has plans to encrypt a number of its hitherto free-to-air services from January 1, charging around £14 a year for access to its WorldSpace-branded channels. For their part, Virgin Radio will also encrypt when it becomes part of a premium package intended for US and UK expatriates.

If you'd like WorldSpace in your car, you'll be able to soon, courtesy of an omni-directional vehicle antenna that's currently on the drawing board at designers Bluedelta. Given a clear, line-of-sight path between it and the satellite, the innovative device will provide access to the satellite whilst on the move without the need for constant reorientation.

WRTH 2004

The *World Radio and Television Handbook 2004* is out now. As 'old hands' will already know, this mighty tome, is a very worthwhile investment and contains a mine of information. Not only are there long, medium and short

wave listings from around the world, but under each country heading, each national and local broadcaster is listed along with frequency and contact information. Then there's a receiver review section and propagation forecast for the coming year. Worth its weight in gold.

Martin, you forgot to say that it's available from the SWM Book Store! - Ed.

Station News

To Ireland, where the fate of 252kHz by national broadcaster RTE was sealed with an announcement on their website that the channel will relay their Radio 1 service from January 1. Test transmissions



A picture from Radio Jackie.



The world's last offshore radio station - Arutz 7 - closes down.

Kol Israel QSL card.



have been running for a while now, with not insignificant interference here in the south of England, from Algiers Radio. That said, if listening on a portable radio (or using a loop) a quick spin of the set or antenna eliminates the problem.

Closer to home, Radio Jackie, south west London's medium wave pirate during the seventies and early eighties, returned to the capital's airwaves in October, this time, as a *bona-fide* operation. Failed Thames Radio was bought out by the management team from Jackie and the station, on 107.8MHz, relaunched amid a wave of euphoric nostalgia. If you don't reside in London, you can listen online go to www.pwpublishing.ltd.uk/swm/bandscan for a link to this and other websites associated with this month's stories.

Over in Israel, the world's last offshore radio station, Arutz 7, has closed ahead of forthcoming legislation designed to starve pirate radio operators of their advertising revenue.

At first it was thought that the station closed down to garner public opposition to the proposed anti-pirate law. However, all the signs are that the closedown is for real and that the ship is about to be sold and broken up for scrap. Whatever happens, Arutz 7 will continue to be heard in the Middle East via

satellite and globally through the Internet. Meanwhile, the station owners and on-air personalities have been charged with illegal broadcasting activities and it's possible that some will receive jail sentences.

From the Israeli coast to the mainland and the Voice of Israel has announced that it will close its overseas service, Reshet Hei, at the end of the year. English, French and Persian will have a presence within the Hebrew Network, but all other languages will be discontinued on short wave. Another one bites the dust.

Radio Nederlands reports that all short wave services from Radio Denmark will cease from the end of the year. The station has, for some time now, been relayed from facilities in Norway but declining numbers of Danish expats listening to the short wave transmissions has led to the conclusion that the service should terminate.

By way of compensation, Radio Denmark has expanded its Internet service by offering all of its regional and national networks on-line. Finally, and bizarrely, Danes abroad can subscribe to a free service offering a CD every 14 days containing 10-20 hours of radio programmes. Let's hope they don't contain any urgent announcements.

To Sweden now, where according to newspaper *Svenska Dagbladet*, Radio Sweden's short wave transmissions are being jammed by the Vietnamese authorities. Since the start of winter time, Radio Sweden's broadcasts in Swedish to Southeast Asia have been regularly jammed and Vietnam is responsible for the disturbances. The country has two powerful jamming stations near Hanoi.

The main intention of the Vietnamese, continues the report, is not to jam the Swedish broadcasts, which are directed at Swedes living abroad, but those from the Far East Broadcasting Corporation, which use the same frequency, albeit at an earlier time.

Disappointing Tests

You may recall that in October's 'Bandscan Europe', I told you about Radio London and some fairly disappointing tests on 1008kHz to the UK from the Flevo transmitter facility in Holland. Since then, an alternative plan has come to light and that is to broadcast from REM Island, off the Dutch coast.

The long-abandoned structure was purpose-built back in the sixties as a broadcasting platform for Nordzee TV and radio. After its forced closure by the authorities, the island was used to house remote metrological measurement systems. Now the Department of Public Works in Holland no longer has a use for REM and plans to dismantle it.

Whether Radio London's eleventh hour proposal will mean a stay of execution for the island remains to be seen. Certainly, even a modest medium wave transmitter broadcasting from such a structure would serve a wide audience. Not to mention Radio London's desire to be recapture the essence of broadcasting from the high seas.

Have a wonderful Christmas and a happy and healthy year ahead.

Resplendent Rampisham

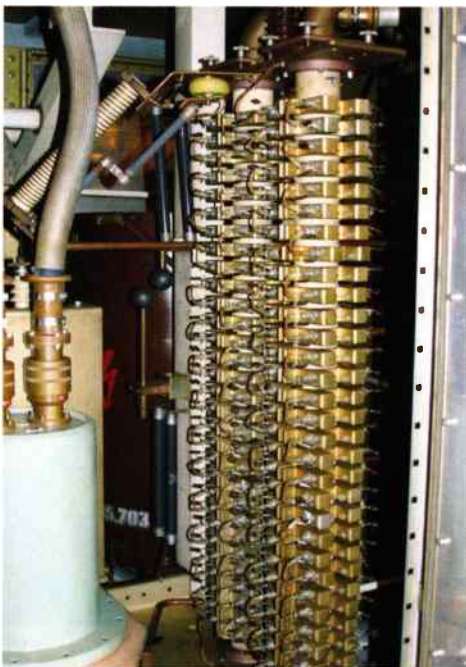
Kevin Nice reflects on his recent visit to another UK h.f. broadcast site. This time it's the turn of VT Merlin's Rampisham Transmitting Station located in Dorset.

It was a bright crisp late October day that saw the Editor head off for a short drive North West from the Broadstone offices to visit VT Merlin's short wave broadcast relay station, which is located just off of the A345 in the county of Dorset some 30 or so miles away from SWM's nerve centre. It's odd but considering how close the station is located to both my home and work until this glorious day I'd never been past its perimeter. As anyone who's driven on any of the roads in the vicinity will know, Rampisham is very visible for many miles. I have personally lost count of how many times I've admired the magnificent antenna farm from the southerly aspect as I've travelled along the A35.



● The magnificent antenna field view from the east on a cold and fresh October morning.

● Alternative views of the p.a. compartment of Sender 45.

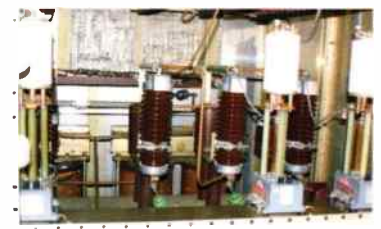


● A Thomson TH558 tetrode p.a. valve in-situ inside Sender 45.

● A bank of 2 μ F 31kV capacitors located in the modulator section of Sender 45.



● The power amplifier tuning mechanism. Control is automated for rapid band changing.



● Alternative view of the p.a. compartment of Sender 45.

I took advantage of my luck regarding the weather, it had been very poor in the days leading up to the visit and so I departed with an hour to spare. This was to enable me to take some pictures in the early morning light. Fortunately, the adjacent field offers a very good vantage point and I'm pretty pleased with the resultant shots of the yet more antenna towers. I'm building quite a collection slowly but surely, I really find it hard to accept that most non radio enthusiasts can't see the beauty in such structures.

Rampisham Transmitting Station, to use the correct name is one of the three ex-BBC World service relay stations located in the UK, which is now owned and run by VT Merlin.

There had been a long standing invitation for SWM to visit Rampisham, as a result of the involvement of AOR in the DRM trialling activities which were being carried out at the Rampisham site. We covered these activities in detail in SWM July and August 2002 in the feature 'DRM Revealed'. It was **James Briggs** the DRM Projects Coordinator who extended the invite but sadly James was on leave during my visit. Instead I was very well looked after by **Station Manager, Ian Jennings**.

A Little History

The 189 Acre site at Rampisham Down, Dorset on which the Rampisham Transmitting Station is situated was acquired in November 1939. Some two years of construction later the station was on air, with transmissions commencing 16 February 1941. The Station had the designator OSE3 or Overseas Station Extension 3 - this BBC numbering scheme was later dropped in 1969 at which time the stations were

referred to by name.

Rampisham was originally fitted with four Marconi Type SWB18 100kW a.m. transmitters - know as Senders 31 to 34. The transmitter halls, each containing two of the SWB18 transmitters, were separated by heavy blast walls. Senders 31 to 34 fed a comprehensive system of 29 antenna arrays which were suspended between 15 masts of heights between 30 and 100m. Full world coverage was provided by this system, even though the programme material of the time was mainly intended for areas outside Europe.

Rampisham was the first BBC short wave station to be provided with 4-wire transmission lines which had been previously tested at Daventry and a new system of remotely controlled switching to allow any Sender to be connected to any array without having to resort to bicycle assistance. The exposed switching tower was to experience some reliability issues due to the formation of ice in the winter. This was subsequently prevented by the use of soil heating cable.

The site was designed to be self supporting with respect to electrical power and water supply. To this end, there were two diesel powered standby generators installed that could provide a total of 850kW of power. These engines had originally been intended for use in Indian railway locomotives and therefore were equipped with electric rather than compressed air starters, no doubt, wartime necessity had its role to play with the new deployment of the engines for the power supplies. Water was supplied from springs located in the nearby valley and pumped up to the transmission site mainly for transmitter cooling purposes. The cooling reservoirs remain to the present day, though they now serve as 'water features' and I was told



● Sender 45, a Marconi B6128 500kW a.m. transmitter.



● The primary source of programme feeds are now satellites.



● Unlike Woofferton, the senders at Rampisham provide coaxial output. Here, behind the well stocked 'water feature', are the coaxial feeders running along the main building.

● An original cast iron rainwater gutter featuring the original BBC logo and the 1940 date of installation still in use at Rampisham.



● Sender 41's feeder making its way to the array switching area on the edge of the antenna field



● The business like Rampisham sender hall.

by Ian that they carry a good stock of fish!

All the programmes being broadcast by Rampisham, in 38 languages, were originated from Bush House. If the programme line should have been lost, Rampisham had a small studio and the provision to use records or rebroadcast another station's output.

During World War II there was concern that the Dorset station would be on the receiving end of German ordnance, hence the aforementioned transmission hall blast walls, however it transpires that the Luftwaffe were actually using the signals emanating from Rampisham to aid their navigation and so had no intention of causing damage to the station.

After the war, the whole nation was suffering a shortage of resources, electricity was also a precious commodity, in a move to reduce consumption, many BBC stations ran at reduced power. Rampisham, which has always operated on a 24 hour-a-day basis had the power of its four Marconi SWB18 reduced and ran at a reduced level of 50kW. At this time, each of the shifts were staffed by 10 people, during the war years, half of whom had been women there were quite a few that stayed on after that period.

Being located high up in the Dorset countryside has resulted in weather extremes having take their toll on the station. Back in 1947 extreme icing caused the station to be off air for a period of two weeks due to the antenna arrays being seriously damaged. One of the supporting masts collapsed. Later, in 1963 Rampisham was isolated for 10 days due to snow storms and drifts. The antenna riggers are still the busiest of all the UK h.f. sites owned and run by VT Merlin due to its vulnerable position.

1956 saw the installation of an automatic sequential monitoring and switching unit, a development of the one fitted at the Cumbrian Skelton site. The equipment incorporated uni-selector, which switched the monitoring loudspeakers to a number of different programmes so as to sample them at five second intervals. Each of the programmes were monitored at the incoming feed and the output of the transmitter. A similar but rather more refined system is still in use for a.m. monitoring today.

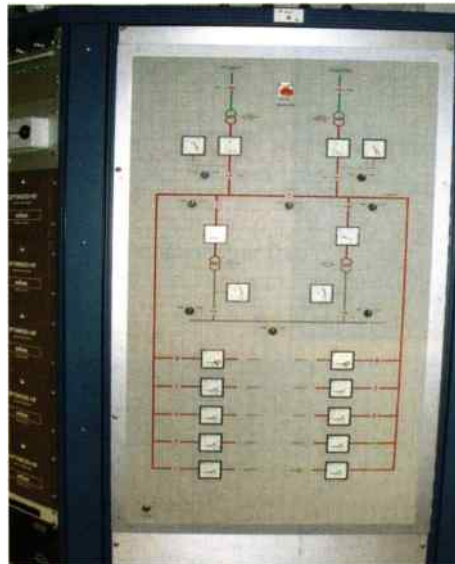
A programme of antenna work took place between 1957 and 1960 with tests being carried out to determine the vertical radiation pattern of selected arrays. The arrays were rebuilt in 1958 to cope with the output power of the 250kW transmitters and tests were made with two types beamed at Singapore. The testing failed to establish any benefit of either type. In 1960 further tests were performed using a rhombic antenna in the 13m band. Whilst the gain of the rhombic was estimated to be comparable with the curtain arrays, the vertical propagation angle was different and the rhombic antenna failed to prove it superior for the Rampisham-Singapore path.

March 1961 saw the first of a new Marconi transmitter, type BD253C put into service (Sender 35) This new type was significantly more efficient than the older SWB18 models as it offered about 47% against their nominal 15%. Two months later saw Sender 36, a second BD253C, commissioned. Special attention was given, in the design of these transmitters for the need for screening and filtering to reduce interference with v.h.f. communications as the use of these bands was experiencing growth at this time.

Marconi were no doubt pleased at the arrival of 1963, as



● The rack of Optimod 9105A audio processors used for programme feed enhancement prior to feeding the modulators.



● Keeping a watch on the Rampisham's mains supply. The status of the two 11kV feeds from the grid and each of the 10 senders can be monitored on this panel.

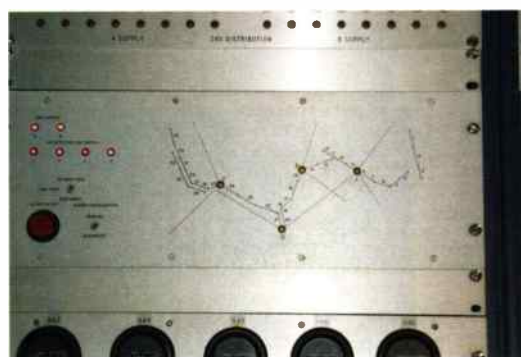
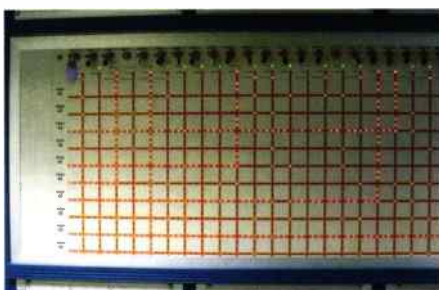


● The newly developed graphical interface to the station control system.



● Part of the new Sender cooling water plant.

● How can you tell which sender is feeding which array? Here's how, the at-a-glance status panel.



● And here's a physical representation of the antenna arrays featured on another control panel. The station control system, which was installed between 1980 and 1986 was designed by the engineers responsible for the creation of 'BBC Micro'. It is still performing reliably today.

this year saw the arrival at Rampisham of four new 250kW transmitters - Marconi BD272 - to replace the four originals which had provided service since 1941. These new units, senders 37 to 40, were still manually band changed.

The first of the overseas rebroadcast stations was built on Ascension Island located in the Atlantic Ocean in 1967. The Ascension station needed a feed and although they could receive the signals from the main transmitters in the UK, fading was a significant problem. The solution came in the form of the Marconi type H1200 60kW s.s.b. transmitters - sender SSB3 and SSB4, being installed at Rampisham. This was the first of the completely automatic transmitters which had the added advantage of being able to transmit two programmes simultaneously to Ascension Island and later to Antigua. This method of sending programme material to relay stations continued until the use of satellites was introduced.

Rampisham saw a major rebuild in 1986 with the present towers replacing the former. New antenna arrays and control systems were also installed at this time. The Marconi 250kW BD272 transmitters were removed and replaced with eight 500kW units, four Marconi and somewhat politically sensitive, four AEG units. These remain the only German short wave broadcast transmitters in the UK. Two additional later model Marconi units were also added in 1991.

The modernisation and drive for increased efficiency didn't stop there. Although transmitter efficiency at this time had hit a figure of 65%, somewhat better than the 15% delivered by the original SWB18s, there were still more gains to be had from the installation of semiconductor modulators. These units allowed the development of more energy efficient

techniques such as Dynamic Carrier Control - DCC. The replacement of the 'grid boxes' from senders 45 to 48 was the cause of celebration at the station. All these moves towards improved efficiency can be easily rationalise when you consider that the monthly electricity bill for Rampisham is about £60000!

Another area where excellent economies are made, is that of transmitter PA valves. A Thomson TH558 tetrode as used throughout the station, costs in the region of £33000 each. Ian Jennings told me that the specified operating life for the valve is 20000 hours. The engineers at Rampisham have been achieving twice that, due to cunning modifications developed at the station.

DRM

As those of you who have followed our various items covering the development of Digital Radio Mondiale, DRM in SWM will be aware that Rampisham has been broadcasting DRM test signals for sometime. These transmissions are made by Sender 50 a linear transmitter which currently produces 30kW of DRM signal. The s.s.b. capable transmitter is rated at 300kW p.e.p. Development work continues at Rampisham under the leadership of **Peter Gordon** - VT Merlin's DRM Programme Manager.

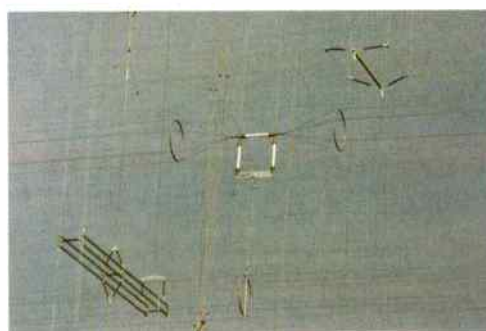
I would like to extend my thanks to everyone I met at Rampisham for their excellent hospitality. I really was made to feel most welcome. A special thanks go to Ian Jennings for taking time from his busy schedule to give me a tour of the station. ■



● This is definitely not a room for the faint hearted. The 11kV switching room. The contactors which are used to power the selected senders are very loud when operating. Similar in level to a large calibre gun shot.



● The array baluns and switching area. Note the screened feeders running out to the arrays.



● Slew control for an array.

● Out in the antenna field, the weather again on my side helping to get a good shot of this curtain array feeder.

● The only way to get here!



● DRM Control, modulation and monitoring rack.



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Q1: How many reduction levels does the NEDSP1061 provide?

Q2: What is the max. noise reduction available?

Q3: In which radio did Kevin install the NEDSP1061?

The closing date for this competition is 22 January 2004, the winner will be drawn on 29 January 2004 - the first correct answer drawn will win. The winner will be announced in the March 2004 *SWM*. The Editor's decision is final.

If you do not wish to be contacted by PW Publishing Ltd. or associated companies please tick here.

Long-Distance

TV & FM Reception

Keith Hamer and Garry Smith bring us the low-down on TV DXing with many tips and details of just what's needed and what to avoid for successful reception of distant terrestrial TV signals.

Most readers of this magazine will have had their curiosity aroused about propagation at an early age. The thought of being able to pluck something rare from the airwaves has held a fascination for many ever since radio was discovered. The study of propagation and the behaviour of radio waves is an on-going science. Propagation anomalies affect every form of r.f. communication, sometimes assisting but often disrupting. The long distance reception enthusiast, more commonly referred to as the DXer, revels in these anomalies particularly when local radio or TV stations are completely replaced by transmissions from a distant country, much to the annoyance of the domestic listener or viewer.

A Personal Account

The interest in long-distance TV reception was instigated by a trip to a local Radio and TV trade show in the early 1960s. At the time, TV in the UK used 405 lines in Band I (Channels 1 to 5) and Band III (Channels 6 to 13). A brochure obtained from one of the exhibitors showed the diversity of v.h.f. TV antennas available and of more complexity than those needed to receive the local BBC and ATV (ITV) signals on Channels 4 (BBC Sutton Coldfield) and 8 (ITA Lichfield) transmitters, some 40km away. Within the booklet were coverage maps of the various BBC and ITA transmitters, plus technicalities such as transmitter power and polarisation. This prompted the question: 'How come it's possible to tune into far-flung Radio Luxembourg but not the adjacent ITV regions such as Granada (from Emley Moor and Winter Hill) or even Rediffusion from London?' A flick through the spare channels, while parents were out of the room, sometimes revealed BBC pictures on other channels but never other ITV channels. It was later discovered that the turret tuner was only equipped with 'biscuits' or tuned coils for Band III channels 8, 9 and 10!

Sporadic-E Activity

Throughout the summer, mysterious white lines would often interfere with the BBC pictures. These varied in intensity, obliterating the picture



Fig.1: Test Card 'G' from Norway suffering Sporadic-E distortion, received on an indoor dipole feeding a modified Bush TV53 405-line TV receiver dating back to the late Fifties.

completely at times, then all would seem well for several days. The BBC announcer would refer to this hiccup as 'Continental Interference' and it was wrongly assumed that French signals were the culprit as France was the closest country. The fact that these signals might have been Russian or Spanish was unthinkable but the phenomena known as 'Sporadic-E' had been encountered.

No amount of fiddling with the knobs at the rear of the TV would resolve a foreign picture. The knowledge about the differences in TV standards was still a few years away.

Tropospheric Reception

Exhausted after a gruelling school cross-country run one foggy November's day in late 1967, the urge to play around with the TV tuning in the comfort of a warm living room became irresistible. For some reason the TV had been moved away from its normal location for decorating and a portable rod antenna was in use. Amazingly, there were pictures on Channel 9 with the Rediffusion star symbol appearing between adverts. The signal went into a succession of deep fades and finally disappeared after about 15 minutes at 1700. Tropospheric DX had been unknowingly encountered.

F2 Experiences

The same winter, curious Russian-sounding communication channels were heard on Channel 1 just before noon. It was over ten years later when F2 signals, governed by sunspot maxima, were to reappear but this time with a test card from deepest Russia.

Modifying A TV Set

While working in the TV trade in 1969, a casual chat to a colleague about this past 'freak' reception prompted him to disclose that in the past he had successfully received pictures from abroad on modified TV sets. All that was needed were modifications to make a 405-line receiver work at 625-lines but with opposite video polarity. That summer an old Bush TV53 405-line TV was modified in the workshop and left running while connected to an outdoor f.m. 'H' antenna. After an hour or so of patterning a strange test card emerged. It looked similar to Test Card C, as used by the BBC, but with an added outer circle and the letters 'NRK' in a white segment. The test card had originated in Norway and it was a strange feeling seeing such a test card materialise out of nowhere, distort uncontrollably at times, only to disappear completely some twenty minutes later. A similar TV was eventually obtained and modified at home and within minutes of switching on, a Spanish bullfight was resolved, even though the TV was sat on the kitchen table with only 1m of wire poking out of the antenna socket. That summer, over 11 countries were identified although some test cards, notably Eastern European ones, were difficult to identify. Unfortunately, the summer went by quickly and in early September the final Sporadic-E opening occurred with TVE-2 from Spain on test card and programmes at 1800, ablaze in all its glory. The signal strength seemed phenomenal just using a piece of wire with the TV running in an upstairs bedroom. The lack of wintertime reception seemed sad and depressing although running the receiver on a vacant channel would often show short bursts of Test Card 'G' which was used by Scandinavian

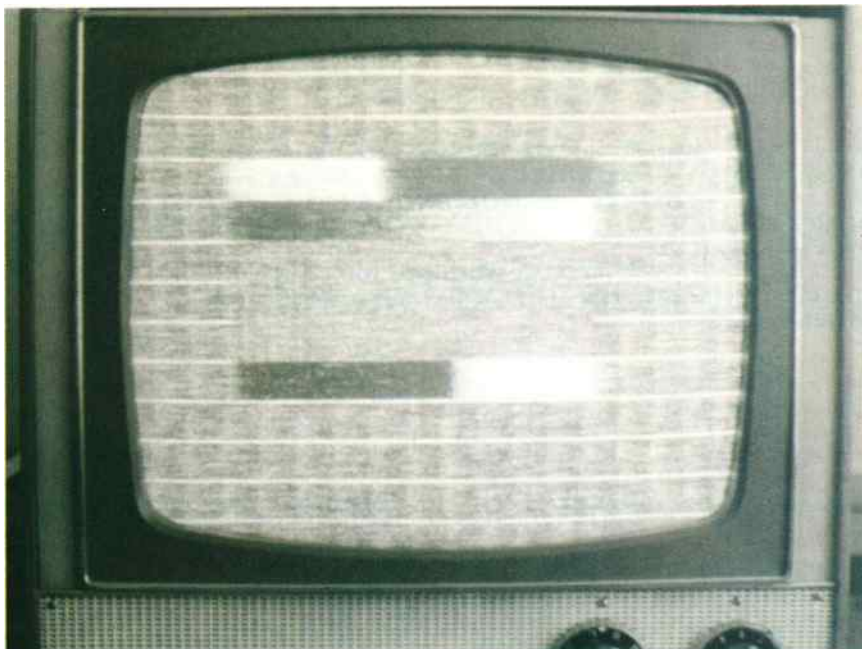


Fig. 2: A German test card from the Seventies, received at u.h.f. during an autumn tropospheric opening, using a set-top loop antenna feeding an unmodified Ferguson 1400 Series receiver.



Fig. 3: A simple Spanish test card aired during the afternoon siesta period. The receiver is a modified Ferguson 980 Series 'Junior 12-inch' 405-line valve-portable.

countries at the time. The bursts of pictures were later discovered to coincide with periods of increased meteor-shower activity.

Selectivity

The following year, a brand-new Thorn dual-standard (1400 series) black-and-white receiver was purchased with the intention of adjusting the system switch so that the receiver would function on 625-lines on v.h.f. as well as on u.h.f. One of the drawbacks encountered was the wider i.f. bandwidth which was necessary to produce higher definition pictures on the 625-line system. On very strong signals the picture definition looked superior to that of the modified 405-line receiver with its narrower (3MHz) vision i.f. bandwidth but it was found to be

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DAB £169 B

DR-201 PERSONAL DAB + MP3 NEW



The DR-201 is a fully portable all-in-one digital radio, FM radio & MP3 player. *DAB Band III (174-240MHz) *FM 87-108MHz *MP3 player & 64Mb memory built-in *Large full graphic 4-line display *Backlight *USB connector *Stereo headphone output *Windows 98/ME/XP compatible *2x AA alkaline batteries

DAB £229.95 B

GLOBAL AT-2000 RECEIVER ATU



- *100kHz - 30MHz
- *SO-239 socket
- *Size: 150 x 67 x 146mm
- *Weight 300g

£89.95 B

Improves any short wave receiver. Lets you hear more! A 'Q' switch adjusts the front-end selectivity to match the band and QRM conditions. Handles end fed wires and coax systems.

ALINCO DJ-X3

Many extra features make this a top-selling budget scanner.

- 100kHz-1300MHz
- AM, FM, WFM
- 700 Memories / 8.33kHz
- Stereo FM (with headphones)
- Audio Descrambler
- Bug Detector
- 3xAA dry cell battery case

£109 B

AOR AR-8600 MKII



- 530kHz-2040MHz
- FM, AM, SSB, CW
- 1000 memories
- Tuning steps programmable
- 8.33kHz airband spacing
- RS232 PC interface fitted
- Power 10.8-16V DC
- Telescopic antenna
- Optional slot card sockets

£599 C

AOR AR-8200 MKIII

- 100kHz-3000MHz
- WFM, NFM, SFM, WAM, AM, NAM, USB, LSB, CW
- 1000 Memories
- 8.33kHz Channel Step
- Detachable MW Bar antenna
- Versatile Band Scope (10MHz-100kHz)
- Twin Frequency Readout
- Illuminated LCD and Keypad
- Optional slot cards for extended capabilities
- Computer control via RS-232

£379 B

YUPITERU MVT-3300EU



- VHF airband plus lots more inc. emergency services
- 66-88/108-170/300-470/806-1000MHz
- AM & FM
- 200 Memories
- 5 Tuning steps
- Fast scan speed
- Very sensitive
- Requires 4x AA cells (not supplied)
- Includes flexible antenna, earpiece and carry strap

£129 B

YUPITERU MVT-7100

- 530kHz-1650MHz
- LSB, USB, AM, WBFM, NBFM
- 1000 Memory channels
- High Sensitivity
- Illuminated keypad
- High Speed search & scan functions
- Battery save function
- Priority channel
- Individual power/volume and squelch controls
- Free NiCad batts & charger, belt clip, earpiece and telescopic antenna

£199 B

Save £50! on Maplin price. (@3/11/03)

YUPITERU MVT-7300



- 521kHz - 1320MHz
- NFB, WFM, NAM, WAM, USB, LSB, CW
- 1000 memories
- 500 Pass channels
- 16 tuning steps
- 8.33kHz airband spacing
- 3x AA Ni-Cds
- 12V DC/230V AC mains
- Telescopic Antenna

£239 B

YUPITERU MVT-9000 mk2

- 530kHz - 2039MHz
- NFB, WFM, NAM, WAM, USB, LSB, CW
- 1000 memories
- 500 Pass channels
- 25 tuning steps
- Voice-reversed scrambled decoder
- 4x AA Ni-Cds
- 12V DC/230V AC mains
- Telescopic Antenna

£349 B

UNIDEN-BEARCAT UBC-3000XLT



- 25 - 1300MHz with gaps
- NFM, WFM, AM (Airband)
- 400 memories
- 10 Priority channels
- Twin Turbo scan & Search
- 6V 600mAh Ni-Cd pack + AC charger
- BNC Flexible Antenna
- Leatherette case
- Earphone

£189 B

UNIDEN-BEARCAT UBC-280XLT NEW



- 25 - 956MHz with gaps
- NFM, AM (Airband)
- 200 memories
- 10 Priority channels
- 5/12.5kHz channel steps
- 4.8V 800mAh Ni-Cd power pack
- AC Charger
- BNC Flexible Antenna
- Earphone

£179 B

UNIDEN-BEARCAT UBC-220XLT



- 66 - 956MHz with gaps
- NFM, AM (Airband)
- 200 memories
- 10 band coverage
- 100 Ch/sec scan speed
- Priority channel
- 4.8V 600mAh Ni-Cd int.
- AC Charger
- BNC Flexible Antenna

£119 B

UNIDEN-BEARCAT UBC-120XLT



- 66 - 512MHz with gaps
- NFM, AM (Airband)
- 100 memories
- 10 Priority channels
- 5/12.5kHz channel steps
- Data skip (lockout channels)
- 4.8V DC Int. battery
- BNC Flexible Antenna
- Earphone

£99 B

GRE PSR-282



- 66-88/118-137/137-174/380-512MHz
- Modes AM, FM
- Memories 200 (10x20)
- Search speed 50 steps/sec
- Scan speed 25Ch/sec
- 4xOne-touch search banks
- 8.33kHz steps in airband
- Audio 180mW into 8 Ohms int. spkr
- 4xAA (not included) ext. power 9V DC

£99.95 B



GENERAL ENQUIRIES:
01702 206835/204965
FREEPHONE ORDERLINE:
08000 73 73 88



UNIDEN-BEARCAT UBC-60XLT-2



- 66 - 512MHz with gaps
- NFM
- 80 memories
- 1 Priority channel
- 5/12.5kHz channel steps
- Data skip (lockout channels)
- 4x AA cells (not provided)
- BNC Flexible Antenna
- Earphone

"BUDGET VALUE"

£69 B

ICOM IC-R5 NEW



- 150kHz-1310MHz
- AM, FM, WFM
- 1250 Memories
- Name Tagging
- AM Ferrite antenna
- Civil & Military
- Emergency Services
- 2xAA cells (extra)

£159 B

ICOM IC-R3 SCANNER & TELEVISION

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

£339.95 B

20-0041 PREAMPLIFIER SPECIAL OFFER



RADIO SHACK HANDHELD SCANNER AMPLIFIER
 Specifically designed for handheld scanning receivers using BNC antenna connectors (male/female) for ease of connection. *100-1000MHz *Gain variable 0-20dB *Bypass switch *Requires PP3 batt or ext. 9V DC 100mA min. *In/Out BNC connectors *Size: 40x95x35mm *Weight: 100g
SPECIAL OFFER WAS: £69.95

£29.95 C

ICOM IC-R8500 "THE EDITOR'S GOT ONE"

- 100kHz - 2000MHz
- USB, LSB, CW, AM, FM, WFM
- 1000 Memories
- 3x Antenna Connectors
- Audio 2.5W (8 Ohms)
- Supply 13.8V DC
- Free PSU included
- Weight 7kg



£1199 C

ICOM IC-PCR1000IS

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



£309 B

PALSTAR R-30HF NEW

The R-30HF is a compact, high performance, long, medium & short wave receiver covering the range 100kHz to 30MHz
 *Modes: AM LSB USB CW
 *Memories: 100 channels *Supply: 12V DC
 *Size: 210x65x195mm
 *Weight: 1kg



£449 C

WINRADIO G303i



HF PC RECEIVER
 9 kHz to 30 MHz
 *Tuning resolution: 1Hz
 *Modes: AM, AMN, AMS, CW, FM3, FM6, FMN, (ISB & DSB, Pro Demodulator Option only) *Antenna: 50ohm (SMA) *Dynamic Range: 95dB *IP3: +8dBm

£440 C

bhi NEIM1031 NEW



NOISE ELIMINATING IN-LINE MODULE
 * Noise attn 9-35dB * Noise Attn levels 8 * Audio output power 2.5W RMS max (8 Ohms) * Audio connections: Line level in/out (RCA Phono), Audio in/out 3.5mm mono jack * Line in impedance 10K * Line out impedance 100 Ohms * Line in sensitivity 300mV -2V RMS * Headphone socket 3.5mm mono jack * Power 12-24V DC 500mA

£129.95 B

bhi NES10-2 & NES-5



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

£99.95 B



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

£79.95 B

ROBERTS R9914



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

£99.95 B

MFJ-784B DSP FILTER



The MFJ-784B Tunable DSP filter automatically eliminates all heterodynes, random noise, white noise, impulse noise, static, ignition noise, power line interference, atmospheric noise etc. There are 16 factory pre-set filters to match all the popular modes which can be re-programmed by the user and saved.

£259.95 B

OREGON SCIENTIFIC BAA 898 HG NEW

The BAA898HG Wireless Weather Station offers more info than ever! Weather, temperature, pressure trends as well as pressure readings, history and max and min readings. Operates with up to 3 remote thermo-hydro sensors, one supplied. *Wireless freq. 433MHz *Main unit 195x105x77mm, 4xAA cells *Remote unit 92x66x20mm, 2xAA cells. Optional Thermo-Hydro Sensor THGR228N

£79.95 B

WS-2300 WEATHER STATION NEW



This professional wireless weather station is a high quality system that measures the indoor surrounding area and receives weather data from 3 outdoor sensors through 433MHz signal. *Base receiver station *3 Outdoor sensors - Thermo-hydro transmitter, Wind sensor, Rain Sensor *PC program on CD-ROM *RS-232 serial data transfer *AC/DC power adaptor

£199.95 C

GARMIN GPS-V DELUXE NEW



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

£359 B

WATSON FC-130 "MICRO COUNTER"



- Off-air Frequency Counter
- 10MHz - 3GHz range
- 4 Switched Gate Spreads
- Hold Display Button
- 2 Switched ranges
- Internal ni-cad battery
- Whip Antenna
- AC Charger

£59.95 B

WDP-30 Short Wave Dipole



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

£49.95 B

WORLD RADIO & TV HANDBOOK NEW

The 2004 Edition of the most respected source book on international broadcasting, this is the 58th edition. Features more than 680 pages of International Radio Station listings, worldwide TV station contacts & addresses, broadcaster websites and email addresses. A section is devoted to a survey of SW receivers and accessories.

£22 A



bhi T042 SWITCH BOX NEW



No more swapping of wires. Allows up to six pieces of equipment to be connected to one bhi noise eliminating module/spkr or even a standard extension speaker. *6x inputs: 3x loaded (8 Ohms spkr level), 6x unloaded (h/phone/line level), 1x output (to spkr/module) *Sockets 3.5mm mono Size *c/w 2x 3.5mm mono - 3.5mm mono leads

£29.95 A

ALINCO DJ-X2000 "FABULOUS FEATURES"

- 100kHz - 2150MHz
- AM, NFM, SSB, CW
- 2000 memories
- 23 tuning steps
- Channel scope
- Fully programmable
- 4.8V Ni-Cd battery pack
- 8-15V DC ext.
- Telescopic Antenna

£419 B

UNIDEN-BEARCAT UBC-780XLT



- 25-1300MHz with gaps
- NFM, WFM, AM
- 500 memories
- Analogue Trunk Tracking
- Alphanumeric display
- Automatic Tape recorder option
- Antenna BNC
- 13.8V DC 700mA

£349.95 C

AOR AR5000A/AR5000A+ NEW

The new AR5000A now offers a frequency coverage of the entire radio spectrum that is practical to cover. The +3 version offers even more with synchronous AM (USB/LSB/DSB) AFC & Noise Blanker. *10kHz-3GHz *AM, FM, USB, LSB, CW *2000 memories *45 CH p/s scan speed *Audio 1.7W (8 Ohms) *Supply: 12V DC @ 1A *217x100x260mm *3.5kg



AR5000A £1599 C

AR5000A+ £1799 C

YAESU VR-5000 "DESKTOP RECEIVER"



- 100kHz - 2599MHz
- FM, AM, SSB, CW
- 2000 memories
- Large digital display
- Real-time band scope
- DSP Noise & notch filters (Opt)
- Super HF performance
- Automatic Tape recorder option

£569 C

YAESU VR-500

- 100kHz-1300MHz
- NFM, WFM, AM, USB, LSB, CW
- 1000 Memories
- 100 Skip channels
- Smart search feature
- 8 char. alphanumeric display
- Band scope
- PC programmable

£199 B

YAESU VR-120D



- 100kHz-1300MHz
- AM, FM, WFM
- Adjustable steps
- Over 600 memories
- Skip channels
- Smart search
- Alphanumeric tags
- Requires 2xAA cells

£119 B

OPTOELECTRONICS SCOUT

The Scout frequency recorder automatically stores frequencies as it locks onto them
 *10MHz-1.4GHz *Input: 50 Ohm *Sens: <3mV @ 150MHz *Measurement: 10mS *Records: 400 freqs *Display: LCD *Bargraph: 16 segments *Supply: Int Ni-Cads *Battery life: 8hrs *AC adaptor AC90 *Size: 94x70x30.5mm *Weight: 240g

£349.95 B

OPTOELECTRONICS X-SWEEPER NEW

Top-of-the range product from optoelectronics, a fully featured nearfield receiver that displays nearfield analogue signals in spectrum format.
 *30MHz-3GHz *FM Analogue *64x128 graphical display with white LED backlight *20 memory banks, 100 freqs in each *Sens: 100uV @ 500MHz *Pwr: 8xAA alkaline or AC adaptor (optional) 12V DC 350mA *Size: 203x108x22.5mm
X-SWEEPER with GPS: £1699.95

£1499.95 C



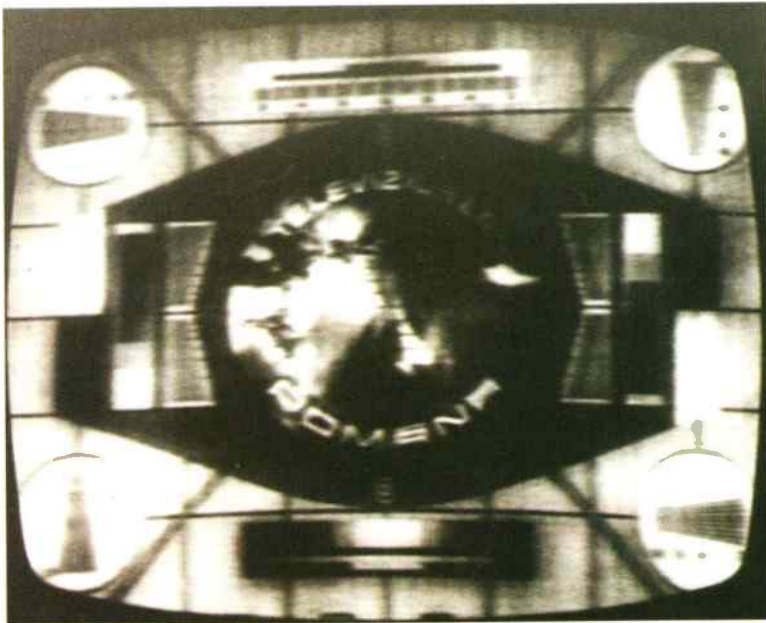


Fig. 4: Early-morning stable Sporadic-E reception from Rumania.

very difficult to reject adjacent DX and BBC channels. The dual-standard set with its wider bandwidth would simultaneously 'see' adjacent channels whereas the modified 405-line receiver would separate them. Also, weaker signals would show more readily using the narrower bandwidth.

One solution popular with DXers in the 1970s was to modify the system switch of a dual-standard receiver so that a narrow or wide i.f. could be selected depending on conditions. Some receivers such as the Bush TV125 range were well suited for modification, with three stages of vision amplification, albeit using EF80 valves. Unfortunately, the line transformers failed frequently and it came as no surprise that most DXers of the time needed to be TV technicians!

During this period 405-line, 525-line, 625-line and 819-line systems were used in Europe, some using positive video modulation (with a.m. sound) and others using negative with f.m. intercarrier sound. Nowadays things are simpler with only 625-lines negative-going signals to contend with, apart from France with its odd positive-going video and a.m. sound!

Sound Advice

Receiving sound has always been a problem due to the different spacing used within Europe. It was simple to retune the sound i.f. stages from its 6.0MHz (System I for the UK) to either 5.5MHz (System B for Western Europe) or 6.5MHz (System D for Russia), but to cater for all three was an r.f. nightmare.

Using a narrowed bandwidth, the intercarrier sound signal was lost and as a result many DXers concentrated on picture-only reception.

By the late 1970s, dual-standard TV receivers were becoming a rarity and difficult to maintain because of their age, so a different approach was tried. An external tuning unit was developed which allowed the vision bandwidth to be reduced considerably. The great advantage was that the unit could be fed into a normal TV set (at u.h.f.) without having to modify its original specification. A later development was the inclusion of a variable sound i.f. feeding an external f.m. radio to provide any normal or non-standard sound spacing, even with a narrowed vision i.f. The bonus was its ability to tune into any sound carriers including the OIRT f.m. band (62-72MHz) then favoured by Russia and Eastern Europe, thus providing stereo DXing in this band. The converter, known as the D-100, is still going strong two decades later, albeit with many refinements.

Bands

The r.f. spectrum is divided into bands. The u.h.f. TV and the CCIR f.m. bands are fairly orderly regarding channel allocations but this cannot be said of v.h.f. TV allocations where there is a legacy of interleaved channels. This is why selective DXing equipment is



Fig. 5: The transmitter at La Dôle, located in the west of Switzerland. The French-language broadcasts are aired on Channel E4.

essential to minimise adjacent channel interference. Here are some useful frequency ranges:-

MHz	Use
From 40 To 70	Band I VHF TV
62 72	FM band (ex-OIRT. This band is still used by Russia, Bulgaria and some CIS countries)
75 100	Band II VHF TV (Russia and CIS countries)
87 110	FM band (CCIR)
175 230	Band III VHF TV
470 860	Bands IV and V UHF TV

Propagation

Several forms of propagation exist, which allow the reception of TV and f.m. radio signals over vast distances. Sporadic-E and tropospheric reception are the most commonly encountered and easily recognised forms of propagation.

Sporadic-E

Sporadic-E propagation is the most unpredictable but spectacular of them all and is guaranteed to get the budding enthusiast hooked on the hobby. The phenomenon is caused by the formation of intensely ionised gases accumulating within the ionosphere's E-layer some 75km above the Earth's surface.

Activity spans the summer months, typically from early May until early September in the Northern Hemisphere (early November to early March in the Southern Hemisphere). This is referred to as the **Sporadic-E Season**. Less frequent reception may occur outside these periods with usually a small peak of mid-winter activity. It can occur at any time of the day or night and may last from less than a minute to several hours.

Sporadic-E mainly affects Band I (48-70MHz) but the f.m. radio band can become alive during intense openings if the Maximum Useable Frequency (m.u.f.) rises sufficiently. Very occasionally, Band III (175-230MHz) is affected.

Since the signals are reflected back to Earth by the ionised layers, a **skip distance** is involved. This is in the order of 1100km although reception can sometimes span almost double that distance. Very short-skip Sporadic-E occurs on rare occasions, with paths as short as 350km.

Characteristics include unstable and random reception with signal levels ranging from almost undetectable to overload within a short time. Severe phase distortion is commonplace, so colour and sound reception may be



Fig. 8: Internal view of a typical dipole junction box, suitable for outdoor use.



Fig. 6: A bank of 'hotted-up' Bush dual-standard receivers, each equipped with varicap tuners, capable of displaying four different channels.



Fig.7: The D-100 external tuning system with its variable vision i.f. bandwidth.

selective and intermittent. Reception on the higher frequencies is usually more stable. Co-channel transmissions may fight for supremacy and openings can be multi-directional or favour certain geographical areas.

Enthusiasts should periodically tune through the band for signs of reception as openings begin without warning. Different countries have different channel allocations and numbering schemes but do not let this deter you by

B GRADE

NEW DAB DIGITAL RADIOS

Treat yourself to these **HOT PRODUCTS** at a very special **B Grade** price!

B Grade SPECIALS

EX DEMO/MAIL ORDER RETURNS

- Fully QC Checked
- One Year Warranty

NB: Outer packaging may be damaged, all products in A1 condition
FIRST COME, First served!

SUBJECT TO AVAILABILITY

GRUNDIG
Satelli 800

- 100-30,000kHz (0.1-30MHz) for AM Broadcast and Shortwave
- 87-108MHz for FM Broadcast
- 118-137MHz for Aircraft Band
- AM, USB, LSB modes (0.1-30MHz)
- AM mode only for 118-137MHz
- WFM mode only for 87-108MHz
- Three built-in bandwidths for SW
- C/W Deluxe Stereo Headphones

~~£549.00~~ **£399.00** P&P £8
PAY BY CHEQUES/SPREAD 3 CHEQUES OF INTEREST FREE! **£136.33**

GRUNDIG YB400
Hi-Performance SW Radio

- supplied c/w
- SW HANDBOOK
- CARRYING CASE
- EXTERNAL WIRE ANTENNA
- CARRY STRAP

- 144kHz - 30MHz
- SW, FM Stereo, MW/LW
- SSB reception (both USB/LSB)
- Dual alarm clock
- Narrow/Wide bandwidth
- Mains or Battery (with optional mains adaptor)

~~£129.00~~ **£79.00** P&P £10

PORSCHE G-2000
Stylish Radio

- FM Stereo, AM/FM/MW/SW
- Clock, alarm, sleep function, world times
- Mains/Battery (optional AC adaptor)
- Supplied c/w leather cover & in-ear stereo headphones

~~£89.95~~ **£74.95** P&P £8

USED EQUIPMENT

ALL SAFETY TESTED & GUARANTEED for THREE MONTHS

SCANNERS		
ALINCO DJX-10E	HANDHELD SCANNER	225.00
ALINCO DJX-2000	HANDHELD SCANNER + EDH16	375.00
ALINCO DJX-3	MILITARY SCANNER C/W ACC & BOOK	350.00
AOR AR-8200MK2	HI-PERFORMANCE BASE SCANNER	1199.00
AOR AR-8200MK2	CASE - HANDHELD SCANNER	285.00
STANDARD AX-700E	BASE SCANNING RECEIVER	229.00
YUPITERU MVT-7100	HANDHELD SCANNER	149.00

RECEIVERS		
AOR AR300A	WIDEBAND RECEIVER	399.00
GRUNDIG YB 400	SHORTWAVE RECEIVER	75.00
ICOM IC-R71E	HF RECEIVER	425.00
ICOM IC-R750SP	HF RECEIVER + SOFTWARE	549.00
ICOM IC-R750SP	HF RECEIVER + DSP	525.00
ICOM IC-R8500	WIDEBAND RECEIVER	849.00
JRC NR0345	HF RECEIVER	350.00
SONY ST-SE200	FM/AM TUNER	59.00
YAESU FRG-8800V	HF RECEIVER + VHF CONVERTER	325.00

Easy to pay & GENUINE INTEREST FREE with CHEQUES/SPREAD

- Pay by three post dated cheques
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- No hidden charges!
- No hassle!
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- No problem!

- Simply divide the price (including carriage) into 3 equal payments.
- Write 3 cheques dated in consecutive months starting with today's date.
- Write your telephone number, cheque card number and expiry date on the back of each cheque.
- Post them to us, enclosing your name & address & we will (subject to status) send your goods immediately.

CHEQUES/SPREAD AVAILABLE ON ITEMS OVER £100 ONLY

PERSTEL DR-101
Personal DAB Radio

- Two Band Coverage: DAB digital Radio Band, FM Radio Band
- Large full graphic 4 line display with backlight Shows programmes and programme info
- Stereo Headphone output
- Audio Output Power: 5mW @ 16 KHz
- C/w 2 x AA size alkaline batteries
- Size: 69 x 88 x 22 mm
- Weight: 40g (without battery)
- Carrying case. User Manual

~~£169.00~~ **£99.00** P&P £8

PERSTEL DR-201
Digital Audio Centre

- DAB Digital Radio
- FM Analogue Radio
- MP3 Audio Player
- Removeable 64MB PC disk
- Supplied c/w: Personal Stereo Headphones, 2 x AA Batteries
- 60 x 84 x 24 mm

~~£229.00~~ **£139.00** P&P £8

BEARCAT UBC 220-XLT

- 66 - 956 MHz (with gaps)
- AM/FM
- 200 memories
- TURBO SCAN/SEARCH
- Data Skip facility
- 10 Priority Channels
- Memory Backup
- Supplied c/w earphone, belt clip, charger and rubber duck antenna

~~£149.95~~ **£99.00** P&P £8

MAYCOM FR100

New Dual Civil/Military Airband Radio

- 66-174, 420-470 MHz
- AM/FM/WFM
- 150 Memory ch.
- S meter bargraph
- 3 x AA cells (not supplied)
- Supplied c/w: SMA antenna, belt clip, carrying strap

~~£99.95~~ **£79.95** P&P £8

ALINCO DJ-X3
Ultra modern Scanning Receiver

- 100kHz-1300MHz
- AM/FM/WFM
- 700 memory channels
- Bug detector
- Stereo FM (with headphones)
- Size: 56w x 102h x 23d mm
- Supplied c/w: 3 AA dry cell battery case, carrying strap

~~£129.95~~ **£94.95** P&P £8

JIM NF96 Adjustable Notch Filter

- Eliminate interference and breakthrough on your scanning receiver from paging tones, voices, etc. with this fully adjustable Notch filter.
- Notch attenuation -40dB
- -60dB attenuation below 1MHz
- RX range up to 2000MHz

~~£29.95~~ **£4.50** P&P

PRICE MATCH

YAESU VR-5000

Yaesu's Flagship Desktop "Ultra Wideband" Scanning Receiver

- 0.1 to 2600 MHz
- Tons of features!

~~£600~~ **£599** P&P £10 3 CHEQUES OF £203.00
PAY BY CHEQUES/SPREAD INTEREST FREE!

YAESU VR-500

Handheld Scanner

- 100 kHz to 1300 MHz
- AM/FM/WFM/SSB/CW
- 1,000 Ch Memories

~~£199.95~~ **£170** P&P 3 CHEQUES OF £69.31
PAY BY CHEQUES/SPREAD INTEREST FREE!

YAESU VR 120D

New D model with

- NEW! Charge Socket
- NEW! Mains Adaptor
- 0.1 - 1299.995MHz
- AM, FM, Wide FM
- Auto select ch steps
- 12 preset memories
- 89 ch Memory Bank
- 640 ch memory system
- Slot machine game!

~~£159.00~~ **£130** P&P 3 CHEQUES OF £55.66
PAY BY CHEQUES/SPREAD INTEREST FREE!

YUPITERU MVT 7100

- 530kHz-1650MHz
- 1000 memories
- AM/FM/WFM/SSB/CW
- C/w NiCads, mains charger, 12VDC cigar lead, belt clip, carry strap

~~£240~~ **£229** P&P £10 3 CHEQUES OF £79.66
PAY BY CHEQUES/SPREAD INTEREST FREE!

YUPITERU MVT 3300

- 66-88MHz
- 108-170MHz
- 300-470MHz
- 806-1000MHz
- Modes: AM/NFM
- Memories: 200

SPECIAL OFFER

~~£450~~ **£429** P&P £10 3 CHEQUES OF £46.66
PAY BY CHEQUES/SPREAD INTEREST FREE!

AOR AR-8600

All Mode Wideband Base Receiver

- Now 100kHz-30GHz
- Increased RX sensitivity
- New Bandpass filter
- 12V DC or optional internal NiCad pack

~~£600~~ **£599** P&P £10 3 CHEQUES OF £203.00
PAY BY CHEQUES/SPREAD INTEREST FREE!

CABLE DEALS at WHOLESALE PRICES!
HIGH QUALITY MILITARY SPEC

50Ω Coax per 100 metre drums (ADD P&P £10)

RG58 C/U Mil spec	£26	£25
RG213U Mil spec low Loss	£36	£55
H100 Semi Airt spaced	£86	£65
Westflex 103 Ultra Low Loss	£90	£89
300 Ohm Twin feeder (slotted)	£80	£69
450 Ohm Twin feeder (slotted)	£90	£79

FLEXWEAVE (style) ANTENNA WIRE
HIGH QUALITY VERY FLEXIBLE

- 168 strands of 14 AWG copper wire.
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- Supplied c/w: 3 AA dry cell, battery case, carrying strap

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World Radio History

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overcomplicating things initially. Simply tune, receive and enjoy! Full details of TV systems and channels can be found in reference guides such as *DX-TV Data File* (available from HS Publications) or the *World Radio TV Handbook* which can be obtained from the *SWM Book Store*.

Tropospheric Enhancement

Temperature inversions are created by high-pressure (anti-cyclonic) weather systems giving periods of settled weather. Reception can occur at any time of the year with mornings and evenings being the most productive. Signal stability with slow fading means colour, sound and even text reception is possible.

No skip is involved so transmitters received vary between semi-local to those located 1000km away. Towards the end of an opening, **ducting** can occur where only distant transmitters are present. The f.m. band, Band III and u.h.f. are mainly affected. Band I channels are sometimes propagated but rarely below 60MHz.

Apart from following the weather forecasts, periodically check semi-local transmitters for signs of improvement. Beware of channels which appear to be free of signals as digital multiplexes may be present. Unfortunately, the digital 'noise' makes the channel look blank but in reality the hefty, almost invisible, digital multiplex will block out any weaker analogue signals.

F2-layer Reflection

Around every 11 years, during sun-spot cycle peaks, high solar activity creates a reflecting layer some 350km above the surface of the Earth. As a rough guide, noon needs to be roughly between the receiving site and the transmitter. Consequently, signals from the Far East are more likely to be received from around 0700, with signals from the west during the afternoon.

F2 characteristics include smeary pictures with multiple images thus making identification extremely difficult. Signal-strength can rise from zero to full strength within a minute of the opening commencing.

Reception distances are in excess of 2000km. In the UK, reception from the Middle East is very common but on rare occasions Australian TV signals have been received. African Band I transmitters are

Fig. 9: Wideband u.h.f. grid with reasonably level gain characteristics.



few and far between, so reception of these is rare.

Lower Band I channels around 48-50MHz (Channels E2 and R1) are usually affected, although reception has occurred as high as 70MHz. Unless the m.u.f. is exceptionally high, the reception of USA TV signals in Europe is difficult as the lowest USA vision frequency allocated is 55.25MHz (American Channel A2).

F2 signals were last encountered during the spring of 2003.

Fig. 10: Typical Continental-style Yagi with the highest gain at the upper end of its operating range.



Choosing A Suitable Receiver

A combination of TV receivers will often feature in a typical DXers shack. For Sporadic-E experiments, a means of covering 48-70MHz (v.h.f. Band I) is needed. Many High-Street catalogue and novelty shops stock small-screen monochrome portables equipped with v.h.f. bands (look for Band I channels 2 to 4 and

Band III channels 5 to 12). Most feature a simple rotary tuning mechanism. These sets are relatively cheap and make for an ideal inroad into the hobby.

Such receivers will only resolve the UK's 6.0MHz sound but this is no hardship if you happen to have a scanner capable of covering the appropriate sound frequencies.

Multi-System Sets

A multi-system TV may at first seem the ideal receiver but many of its features will be seldom used. Some

Fig. 11: A rotatable wideband Band I 'H' array mounted on the gable-end of a house.



signals but for weak signal work, or for trawling interleaved v.h.f. channels, a reduced vision i.f. bandwidth is desirable. External tuning systems such as the D-100 (multi-band coverage with variable sound-spacing) and the recently-introduced D-500 (45-86MHz vision-only coverage) feature a variable vision i.f. bandwidth to suit all types of reception situations.

Up-Converters

Up-Converters shift a span of v.h.f. frequencies to a similar range within the u.h.f. band by mixing them with a fixed frequency oscillator. Avoid them at all cost, unless you enjoy a desperate technical challenge!

PC Boards

Internal cards for use in personal computers are readily and cheaply available covering v.h.f. frequencies but there are drawbacks such as video-muting, not to mention the possibility of internally-generated r.f. interference caused by the computer itself.

Scanners

With a scanner you can measure precisely the frequency offset of a video signal. Using reference lists it's possible to accurately identify a transmitter in a particular country where several outlets may share the same nominal channel.

Some scanners are available with a video output but reports suggest that these tend to be 'deaf' and are only suited to reception of local signals.

Some enthusiasts are using the Icom PCR1000 scanner connected to their PC to provide an ultra-sensitive

multi-system sets feature direct access tuning which is convenient for u.h.f., with its fixed channel spacing, but for exploring interleaved v.h.f. allocations, a simple rotary tuner is more suitable, such as the type found on small portables or the D-100 DX-TV Converter.

Avoid receivers with electronic search-tuning, especially if the search is one-way only. A strong signal is often required before the search will stop and often there is no way of identifying the channel or frequency. Receivers with 'blue-screen' video muting will not allow low-level signals to be resolved and are therefore a hindrance.

External Tuners

TV receivers, with their inherently wide vision i.f. stages, are best suited to handling strong, steady

Fig. 12: A single-boom array for Bands I, II and III.





Fig. 13: An ambitious antenna system comprising separate multi-element beams covering Bands I, II and III. The top antenna is an imported 'deep fringe' parabolic u.h.f. array with a diameter of around two metres!

receiving system capable of detecting extremely low-level carriers. Some Continental transmitters are detectable for much of the time. This form of DXing provides a diversion from the traditional hobby of resolving actual pictures.

Antennas

Sporadic-E reception in Band I and the f.m. band is possible using indoor antennas. Bear in mind that there are more sources of domestic interference around these days, such as PCs, microprocessor-

controlled central heating systems, etc., so some experimenting may be needed for minimum pick up. Baby alarms (bedroom bugging devices) operating around 49MHz cause interference even with outdoor arrays. A tuneable notch filter fitted at the set-end can work wonders.

One of the simplest antennas for Band I DXing is the dipole where frequency determines its length. A dipole cut to 2.550m is an ideal compromise for Band I coverage. Two separate dipoles can be mounted at 90° to provide all-round coverage. For outdoor antennas, a waterproof terminal box is essential.

If wishing to erect a rotatable multi-element Band I array to improve gain, do not be put off by awkward neighbours. The antenna might look huge on the ground but remember they were commonplace during the reign of 405 lines. However, planning permission may be necessary in some locations.

For Band III and u.h.f. reception, outdoor antennas mounted as high as possible and free of obstruction are recommended. Antennas need not be large and for Band III DXing a 4-element or a 5-element array is quite adequate. Use a wideband type (Channels 21 to 69) for u.h.f. unless you want to concentrate on receiving specific channels. Many enthusiasts speak highly of the wideband u.h.f. grid, mainly because of its compact size and because it can also be used for mobile reception explorations. The Continental-style Yagi has a higher gain but the drawback is its boom length of several metres.

Most Continental TV transmitters are horizontally polarised so the antenna should be mounted with its elements horizontal.

Amplification

Experience has shown that using an amplifier for Band I rarely offers any visual improvement and can be a hindrance, attracting interference from out-of-band signal sources. Amplifying Band III and u.h.f. is more successful, especially when the unit is mounted at mast-head to overcome cable losses. Choose one with a low-noise figure rather than allowing high gain to be the deciding factor.

Cabling

Double-screened satellite coaxial cable is cheap enough these days for use on all bands. It is advisable to use separate cable runs to avoid signals mixing.

FM DXing

The f.m. broadcast band (Band II) can become active during Sporadic-E and tropospheric openings. The biggest headache is finding clear channels among all the current mayhem of transmissions. A receiver with RDS is essential for identifying stations. Reducing the i.f. bandwidth will drastically improve receiver selectivity but sound quality may suffer and the RDS may fail to work correctly. A simple antenna such as a dipole will usually suffice but 5-element to 8-element beams are common among the more serious recruits to the hobby.

DAB DXing

The upper part of Band III (approximately 217-230MHz) is used by the UK and most European countries for DAB broadcasts. Distant DAB transmitters have now been successfully received during tropospheric openings.

Keeping A Log

It is advisable to keep a log book with entries such as the date, time, channel and reception details. This will enable a comparison with other DXers' logs at a later stage and provide memories in years to come.

A spin-off from the hobby is collecting TV graphics. Video recordings can be made using a normal video recorder connected to the SCART socket of the TV to extract the vision and sound if a multi-system TV is being used.

Further Information

We hope that you have found this special article interesting and useful. For further information about DXTV and f.m. DXing, visit the website at www.test-cards.fsnet.co.uk which covers not only the DX hobby but also Archive TV.

An electronic catalogue featuring DX equipment (including the D-100 DXTV Converter) and publications is available by sending an E-mail to: garrysmith@dx-tv.fsnet.co.uk or, alternatively, a printed version is available, price £1.25, from: **HS Publications, 7 Epping Close, Derby DE22 4HR.** Tel: **(01332) 381699.** Plus, of course, there is the regular 'DX Television' column every month in *Short Wave Magazine*.

DIAGRAM 1: Dimensions for a simple dipole antenna suitable for Sporadic-E reception.



Band 1 Reception

DXTV - The column

An upsurge in Sporadic-E ionisation meant a busy October with activity much better than expected. Tropospheric enhancement and Auroral propagation were also encountered but what has happened to F2 reception this autumn?

Simon Hockenhill (Bristol) reports a brilliant month for Sporadic-E activity with multiple openings. There was a good daytime display of reception, particularly on October 6 with the m.u.f. exceeding 60MHz and reaching Channel E4! An unusual evening display occurred on the 8th from 1638 with Italy (RAI UNO) on Channel A and Portugal (RTP-1) on E3. Both signals suffered very rapid and deep fading, possibly due to Auroral-E rather than Sporadic-E propagation.

On the 21st, Spain (TVE-1) materialised on E2 between 1839 and 1900; at times the signal was both strong and stable and clear of multi-path distortion. Later at 2125 on E2 and E3, Norway (NRK-1) appeared but only just strong enough to identify the source.

Stephen Michie (Bristol) reports a sustained opening into Central Europe and the Adriatic area on the 7th, commencing at 1253 with a dreary soap opera from the Czech Republic (NOVA TV) on R1 and R2. Hungarian service RTL KLUB was co-channel at times on R2. From 1300, a path was open into Italy, Slovenia and Croatia. A feature film from Switzerland (SF-1 DRS) was showing at 1433 and at 1441 the state Italian service RAI UNO was seen on Channel A with a slow moving band of text.

On the 17th at 0826, **Peter Barber** (Coventry) noticed a sudden flurry of activity affecting all Band I 'E' channels lasting some 10 to 15 seconds. Peter suggests this might be ionisation from some space junk re-entry. In theory, orbiting satellites might be capable of reflecting v.h.f. signals over considerable distances.

Between 0925 and 1004 on the 26th, Peter identified Italy, Corsica, Spain and Hungary. On the following morning, the band was awash with Spanish signals on E2, E3 and E4. Italian stations RAI UNO, TELE A and TVA were visible from 0953 on the 28th with encrypted Canal Plus signals on Channel L2 from Bastia, Corsica showing at 1036.

Peter noted Auroral activity on the 29th at 1925 with the Norwegian news on E2, E3 and E4. On the following evening further activity affected Channels E3 and R2.

On the 27th from around 1545 a steady, but weak, noise-level signal emerged on E2 from the south-Equatorial Guinea no doubt.

Tropospheric Reception

George Garden (Edinburgh) describes the tropospheric lift between the 14-17th as "very intense". On the 15th, spasmodic bursts of identification on 87.6MHz sounded like Yorin FM, the Dutch commercial station. However, this frequency does not seem to be listed in the *WRTH*. The f.m. band was decidedly more productive with TV reception limited to TV2 from Norway on E44 and NRK-1 E6 from Oslo on the 15th.

Conditions lingered further south and on the 19th Stephen Michie (Bristol) switched on at 0528 to find NED-2 E27 with news and trailers for the hard-of-hearing. On

Channel E30, NED-3 was airing the 'ZENDER LOPIK' FuBK test card. This was replaced by a widescreen PM5544 test card at 0530 and the station opening clock at 0558.

Sharp Purchase

Tony Jones (Basildon) has acquired further DX equipment following the purchase of a D-100 Converter earlier this year. A Sharp flat-screen TV Model 32JF-73H, obtained from Comet as part of a TV/VCR/DVD package, was found to be equipped with v.h.f. Channels A to J (for Eire) but the accompanying video recorder was u.h.f. only. Tony suggests that there should be detailed point-of-sale information available for you to read before you buy.

We know what you mean Tony - one Derby shop rudely refused point-blank to discuss even the basic technicalities of a video recorder despite two pending sales. It wasn't Comet by the way! Tony confirms that the Sharp receiver will tune down to Channel E2 as he received TVE-1 shortly after switching on.

Spanish Antennas

Nick Brown (Rugby) recently visited Madrid and the area around the Navacerrada E2 transmitter, where a few Band I antennas of the 'folded dipole plus reflector' type could be seen. There were sets of large satellite dishes in front of the Torre España tower with illuminated signs for 'Retevisión' and 'TVE-2' over the office-type building at the base of the mast.

John Lees (Cheltenham) has just returned from Ibiza where many Band III antennas (all horizontal) could be seen. John wonders whether Band III is still active on the island as most v.h.f. channels have closed in mainland Spain. For some reason, many homes sported both horizontal and vertical u.h.f. antennas, pointing in the same direction.

In Tenerife, Band I antennas of up to eight elements are commonplace, particularly in the Puerto de la Cruz area overshadowed by the Izaña E3 transmitter perched at 2400m above sea-level. At 350kW ERP, and the most powerful Band I transmitter in Europe, the service area must be extensive. Band III antennas are hard to spot but u.h.f. arrays are everywhere.

While holidaying in the Spanish resort of La Mata, **Iain Menzies** (Aberdeen) confirms that the Aitana E3 transmitter was still active with a local u.h.f. replacement now operating. The u.h.f. band is crammed with 'adult' channels, making UK screens seem quaintly Victorian. No doubt these Spanish channels inspired the choice of postcard which Iain sent. No doubt the postman enjoyed it!

Keep On Writing!

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

Finally, our DXTV and Archive TV website at www.test-cards.fsnet.co.uk is well worth a visit.



Fig. 1: Dutch NED-1 identification caption received from Goes on Channel E29 by Stephen Michie.

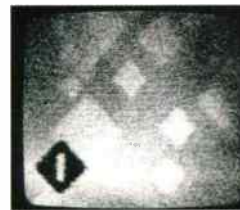


Fig. 2: A Dutch identification caption from NCRV received on E29 by Stephen Michie.



Fig. 3: The BBC-1 'watch-strap' clock caption transmitted in 1965.

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So that we could catch the action as it happened, we sent Peter Bond to provide on-the-spot cover of the last ever flight of the UK supersonic masterpiece that is Concorde



Concorde - The

Much was heralded about the arrival of the final commercial flight at London Heathrow on 24 October 2003 but to my mind this was not quite the end of an era. The final moment would only come with the very last flight of Concorde and it was therefore with a heavy heart that I set off early in the morning on 26 November to witness that event. My journey was to take me north-east up the M5, the destination Bristol Filton airport where it all started with the first UK flight 34 years ago. As seems to be the norm with my recent photo trips, the weather was once again to play an integral part in the day's proceedings.

After an 0700 start, I travelled through heavy rain, strong winds, poor visibility, plagues of locusts, traffic jams, etc., before the sun came out, only briefly, 30 miles from Filton. An early arrival was essential as very large crowds were expected and the A38 was due to be closed on the east end of the airfield at 1100, two hours before Concorde arrived! The predictions were not wrong as enthusiasts were camped out on the A38 flyover at 0940, over three hours before the arrival, now that's

dedication for you! It was difficult to assess, but I would guess that by touchdown well in excess of 50,000 were present for the homecoming, both on and off the airfield - this figure has subsequently been confirmed by the organisers.

Pounded With Hail

Having checked in, I opted to get on the press gantry well over an hour early to book a good spot, a sensible choice in some ways but not in others. With tens of thousands of pounds worth of TV, video and still cameras all set up and ready to go, the airfield was hit by a vicious squall and the biggest hailstorm I have seen for years. For 15 minutes we were pounded with hail which when it died away left a substantial layer of ice across the press enclosure and saw the temperature drop by about 8°C. The hail plus the sudden drop in temperature caused more than a few problems for the many photographers, including me with the auto-focus going into slow motion - then the sun came out!

The last ever flight by a Concorde was made by G-BOAF from Heathrow to Filton, departing at 1120 and arriving for a flypast at 1245, its British Airways callsign was BAW9020C but used the actual callsign Concorde Alpha Foxtrot. After the flypast in bright sunshine it held off, circling over the local area including the Severn Bridge, whilst a Spitfire gave a short display of welcome. As Concorde descended onto an eight mile final the black clouds started once again scudding across the sky and most of the press enclosure kept a wary eye over their shoulder at the swiftly advancing band of heavy rain. With the sun almost gone and the first spits of rain starting to fall, in almost prophetic weather conditions the final flight of Concorde touched down at 1307 on 26 November 2003. With flags on display from the cockpit windows and with 'Pudsey Bear' clearly visible on the dashboard, Concorde taxied back up the runway stopping for a short photo-call in front of thousands of the cheering public. The final taxi then took Concorde to the front of the media centre to be met by the **Duke of York** and then the engines were shut down for the final time. Then, right on cue, the heavens opened!

Our main picture this month shows the arrival of Concorde G-BOAF at Bristol Filton to a backdrop of thousands of onlookers. The Final Touchdown of a great aircraft, no longer to grace our skies. Gone but not forgotten.



Final Touchdown

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Build a Wire Array Antenna

Whether you listen to high frequency short wave or the v.h.f./u.h.f. scanner bands, wire antenna arrays may be for you. The late Joe Carr K4IPV explains a few designs you could try out.

Wire array antennas provide gain and thus can be used to increase the signal strength of weak signals that you seek. More importantly, perhaps, they can be used to null unwanted signals from less favoured directions, making the signal-to-noise ratio better. In this article Joe discusses various array antennas and gives the formulas for calculating their dimensions.

Perhaps the simplest form of array antenna is to connect two half-wavelength ($\lambda/2$) dipoles end-to-end (or in-line) as shown in **Fig. 1**. This antenna provides about 3dB of gain over a single $\lambda/2$ dipole. The elements can be spaced $\lambda/2$ apart (or an integer multiple), or they can be only a few centimetres apart.

The length of each of the two dipoles is $\lambda/2$, so the correct formula for calculating the dimensions is:

$$\text{Length} = \frac{144}{F_{(\text{MHz})}}$$

Where the element's length is the physical length in metres and $F_{(\text{MHz})}$ is the frequency in megahertz. For v.h.f./u.h.f. use, replace the 144 with 144000 to find the dimensions in millimetres directly.

The important thing to bear in mind about the design shown in **Fig. 1**, is that an impedance matching stub must be provided. The impedance at the ends of a half-wave element is around 2.8k Ω , or so. That means the impedance at the feed-point of a pair of half-wavelength dipoles (as shown in **Fig. 1**) is very high.

A quarter wavelength ($\lambda/4$) shorted stub and a 4:1 balun transformer should be used to reduce the impedance to the 50 Ω , or so, needed by your receiver. The length of the $\lambda/4$ stub is given by the formula:

$$\text{Length} = \frac{75}{F_{(\text{MHz})}}$$

A variant on the antenna of **Fig. 1**, is the double-extended Zepp antenna, which consists of a pair of longer-than-half-wavelength elements connected end-to-end. The dimensions of the double-extended Zepp antenna elements are given by $183/F_{(\text{MHz})}$. A short matching stub $31.4/F_{(\text{MHz})}$ long reduces the feed-point impedance to about 150 Ω . A 2:1 transformer will reduce this impedance to 75 Ω and a 3:1 transformer reduces it to 50 Ω (use broadband transformers).

Collinear Antennas

A collinear array antenna can be used, mounted either vertically or horizontally. It is frequently used vertically in the v.h.f./u.h.f. bands. There are several types of collinear array, but we will consider the straight collinear and the Franklin array, as shown in **Fig. 2**.

The Franklin antenna provides about 4.5dBd of gain

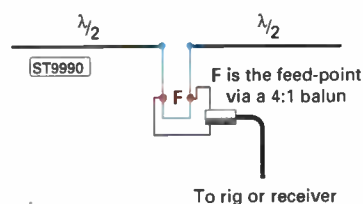


Fig. 1: A simple 'end-to-end' or in-line wire antenna array

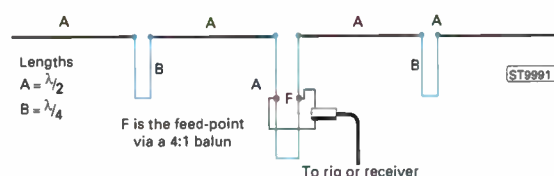


Fig. 2: The Franklin collinear array gives about 4.5dBd gain.

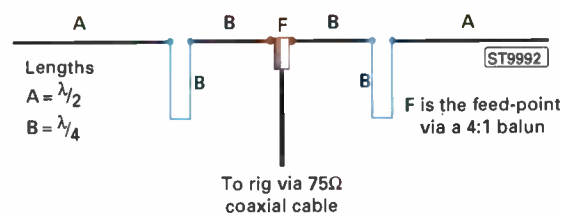


Fig. 3: Two $\lambda/2$ elements connected via a pair of $\lambda/4$ elements.

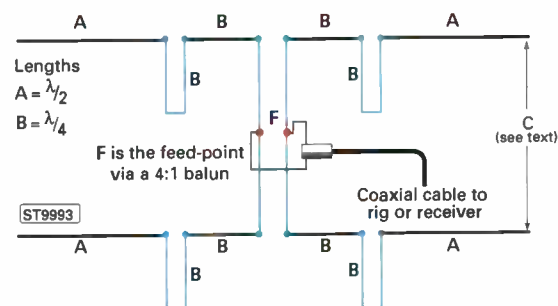


Fig. 4: Stacking two antennas like those in Fig. 3, gives around 6dBd gain.

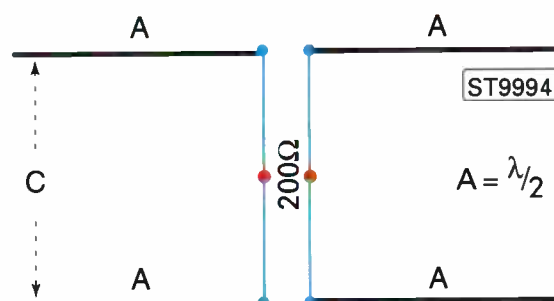


Fig. 5: The 'Lazy-H' antenna. See text for dimensions.

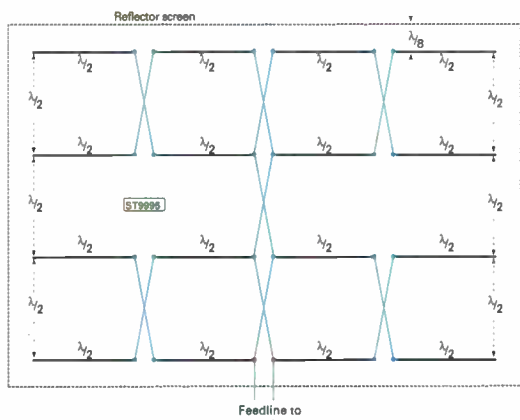


Fig. 6: A reflector screen array has the reflector overlapping the antenna by $\lambda/8$ all around and is spaced $\lambda/4$ 'behind' the array.

(over a dipole). It consists of two collinear array antennas fed end-to-end through an impedance matching stub. In this case, a $\lambda/2$ stub is used. The feature identifying the antenna as a collinear array is the phase reversal stubs that are present in each one wavelength element (marked B in Fig. 2). These stubs reverse the phase of the r.f. electrical currents flowing in the antenna at resonance.

The dimensions of the Franklin collinear array antenna are defined as:

$$A = \frac{144}{F_{(MHz)}} \quad B = \frac{72}{F_{(MHz)}}$$

To calculate the lengths of v.h.f./u.h.f. antennas replace the 144 with 144000 and the 72 with 72000, which yields the dimensions in centimetres.

The impedance matching section is necessary for the same reason as on the end-to-end $\lambda/2$ dipoles. The impedance at the feed-point of the antenna is very high. A half-wavelength shorted stub (marked as length A) and a 4:1 balun transformer save the day.

The straight collinear array antenna is shown in Fig. 3, an antenna that provides a gain of about 3dBd. It's basically a pair of collinear arrays that share an element and are fed in the middle of the shared element. In other words, it consists of two half-wavelength elements connected with a pair of quarter wavelength elements.

Lengths A and B are calculated as above. And again, to calculate the lengths of v.h.f./u.h.f. antennas replace the 144 with 144000 and the 72 with 72000, which yields the dimensions in millimetres.

The interesting thing about the straight collinear array antenna is the feed system. It consists of a 4:1 balun transformer at the mid-section of the centre element and no quarter or half-wavelength stub. This results in an impedance that is a good match for the 50 to 75Ω used on most receivers, so it can be fed with coaxial cable.

Stacked Collinear Arrays

One of the classic ways to increase the gain of an antenna is to stack multiple versions of it. In Fig. 4 you will see a pair of straight array antennas stacked to provide more gain (5.5 to 6.5dBd). The dimensions for the lengths A and B are calculated as above for the straight collinear antenna. The spacing dimension C, is calculated from:

$$C = \frac{150}{F_{(MHz)}}$$

The feed system for this stacked antenna consists of a $\lambda/2$ stub connecting the two feed-points of the straight collinear arrays and tapped by a 4:1 balun transformer. There is 75Ω coaxial cable to connect the antenna to the receiver.

Lazy-H Antenna

The Lazy-H antenna, Fig. 5, is older than the hills, but it still performs as well as it did when it was first proposed, providing about 5.5dBd of gain. The antenna gets its name from the fact that it resembles a letter H laying on its side. The dimensions of the elements of the Lazy-H antenna are given by:

$$\text{Length} = \frac{143}{F_{(MHz)}}$$

and the spacing by:

$$\text{Spacing} = \frac{150}{F_{(MHz)}}$$

The two arms of the "H" are joined by a half-wavelength matching stub. If fed in the centre of the matching stub, the impedance will be about 200Ω. That means a 4:1 balun transformer at the feed-point shown will give an impedance of 50Ω.

Another version of the Lazy-H antenna uses non-resonant feeders. But that antenna has the matching stub reversed (twisted on itself) and a quarter wavelength shorted stub connected to one of the feed-points. The non-resonant feed line (or a 1:1 balun transformer if coaxial cable is used) is connected to the matching stub. I've not actually shown this variant.

Reflector Screen Array

A reflector screen array antenna is shown in Fig. 6. This antenna uses a reflector screen located quarter wavelength behind the antenna, away from the direction that you wish to receive. The reflector adds around 3dB to the gain figure for the original antenna.

The reflector screen array antenna has a gain in the order of 9.5 to 12dBd depending on construction. The reflector screen itself should be bigger, with an 'overlap' of at least $\lambda/8$ in both dimensions, calculated by the formula:

$$\text{Overlap} = \frac{37.5}{F_{(MHz)}}$$

Looking closer, you'll see that the antenna in Fig. 6 shows two arrays of $\lambda/2$ elements, spaced $\lambda/2$ apart, with the arrays spaced $\lambda/2$ apart. The dimensions for the antennas are given by: and the spacings by:

$$\text{Length} = \frac{143}{F_{(MHz)}}$$

The individual elements are cross-connected with

$$\text{Spacing} = \frac{150}{F_{(MHz)}}$$

each other, as are the two array elements.

The feed-point of the whole array is of the feed-point of one of the minor array elements. This feed-point is high impedance, so a 4:1 balun transformer should be used.

Conclusion

The antennas shown in this article are relatively simple array antennas and as such, can be built for v.h.f./u.h.f. to suit every location. You will need more room though, if you're going to build them for medium wave and short wave bands.

Satellite

TV News

● Roger Bunney 35 Grayling Mead, Fishlake, Romsey, Hants SO51 7RU

A curious programme 'bouquet' appeared during middle October over on *NSS-7*, 21.5°W identifying as 'Boucha oui' with four TV channels aboard signing as 'TDA1' through to 'TDA4'. The 1st channel in Arabic carried the logo '3', TDA2 was the Arabic 'ALGERE' TV channel, TDA3 provided just colour bars and inlaid caption 'video lock error TDA3' and with TDA4 totally empty. Up to 20 radio channels, mostly Arabic accompanied the TV channels. This is an unusual satellite to carry an Arabic language bouquet and to whom is it directed? A suggestion from **Alan Richards** (Nottingham) thought that this bouquet package was directed at French Foreign Legion military now on operation station in either Ethiopia, Kenya or Afghanistan? Check out 'Boucha oui' on *NSS-7*, 12.734GHz-H (SR16635 + FEC3/4). One of the most attractive and ornate test cards seen for a long time is now being transmitted over 'Eritrea TV' via Arabsat capacity 26°E capacity, a camel, flag within a circular logo, colour bars across the bottom - shades of analogue art within a digital environment. It's well worth having a look at a test pattern that isn't a PM5534 test card, check the 11.747GHz-V (27500+3/4) slot.

Over the mid-October period there was considerable activity with Pope Paul at the Vatican and his selection of cardinals who will be instrumental in choosing the successor upon Pope Paul's death. Important indeed for the Roman Catholic church and several satellite feeds carried the events out of the Vatican. *Eutelsat W1*, 10°E was the main carrier of satellite feeds 18 to 20 October. 'Fox News Rome' on *W1* ran both PAL and NTSC reports, the latter for onwards feeding into the 'States via the London bureau (11.110GHz-V), Italian TV carriage was active via 'UP STREAM ITA@ - 11.090GHz-V together with 'TES 61 ITA' at 11.081GHz-V (all using SR5632 + FEC 3/4). The following night the Pope blessed a large crowd in St. Peter's Square followed with a magnificent firework display, outlinked on 'APT N ROME UKI 48' @ 10.967GHz-V (4167+5/6) 10°E. Curiously during the Vatican activities there appeared over on *PanAmSat-3R (PAS-3R)* @ 43°W a news feed for the BBC's *Scotland Today* programme covering the events in Rome but particularly the promotion of Scottish Bishop O'Brian to Cardinal. **Roy Carman** (Dorking) noted this signal at 12.535GHz-V (5632+3/4) with the service identification 'TARIDAN SCOPUS'. 'APT N LONDON' can often be seen on *W1* running colour bars and ident at 12.732GHz-V (5632+3/4). The Luxembourg based ENEX (European News Exchange) operates at times during the day and evening with European distribution over on *Eutelsat W2*, 16°E on more than one frequency, often running parallel feed material. This can cause a degree of confusion with a receiver having a wider a.f.c. capture range since the ENEX frequencies have recently been noted at 12.510 and 12.515GHz-H (5632+3/4) - close enough for a wide a.f.c. range receiver mid tuned to say 12.512GHz to lock up both signals. The service ident usually resembles 'ENEX II LUX-LXB1'.

Early November and terrorism became rather more high profile in Baghdad with the shooting down of a Chinook helicopter with a ground-air missile, a second missile just missing another. 'CBS NEWS BAGHDAD' fired up with their uplink with news reports feeding into the 'States - 12.525GHz-H (5632+3/4, NTSC), colour bars also with ident 'RIMAL HOTEL' which is where the CBS news team had established their base. The 12.525 slot is a favoured Sky News frequency and the 'RIMAL HOTEL' uplink moved and re-appeared on 12.533GHz. The ground camera crew were seen being moved on by GIs 'securing' the area of the crash and overheard one soldier suggesting they move 5km away.

Sports

The afternoon of 8 November Nigeria fought out a hard won football match against Ghana in the 'All Nations Cup' competition 'somewhere' in Africa. The match was carried over *Europe*Star-1* @ 45°E, 11.515GHz-V (6109+3/4). The service ident of the uplink was 'TELEMEDIA TELEPORT RSA'

suggesting a South African based location for the match. The previous weekend early winter sports from the Austrian Alps were carried over 10°E from the snowy mountains of the Tirol. 'MEDIA CENTER TIROL' carried the skiing championships in the freshly covered mountain slopes, nearby pine trees against a pure blue sky. The snow seems to have come early this year, perhaps a sign for a White Christmas! Mention of 'Fox News' above leads onto 'FOX NEWS LONDON' and several live reports near to Big Ben evening of November 11. A very attractive female reporter shivering in an Easterly wind carried out several live inserts into 'Fox News' USA running NTSC at 11.153GHz-H (5632+3/4) over *Eutelsat W2*, 16°E - the satellite truck service ident was 'Links n Things'!

More football... **Edmund Spicer** (Littlehampton) in recent weeks established that an important match - England v. Turkey wasn't available in real time on UK TV but that a live commentary was available over Radio 5 Live. Edmund scanned across the *Turksat 42°E* slot that evening and found an FTA feed on N-TV 11.988GHz-V (12800+5/6). Commentary was of course in Turkish - but - taking the pictures from 42°E and the audio from local Radio 5 Live there was only about a 1s shift in picture/audio sync and certainly acceptable in a house without a Sky Sports subscription! Often RAI will carry their football FTA over Hot Bird and Edmund's found that Radio 5 Live commentary is only ±1s out of sync with the relating picture.

We have three rare sightings by **Dr. Richards** (Nottingham). The first on October 29 was a broadcast over *Eutelsat W1* @ 10°E (11.014GHz-H (6111+3/4) - a live football match with River Plate v Rosario Central in a massive three tiered stadium with the distant skyscrapers of Buenos Aires in the distance, 1915. Service ident was 'TSA MADRID' which may well suggest the *W1* signal was a European distribution feed taken from the first pan-Atlantic hop most likely over *Hispasat 30°W*. Another unusual signal a couple of days prior to the Argentinian event was over *Intelsat 707*, 1°W. This a weekend religious conference held in Brunstadwerk Church, Greenland with languages in German, Norwegian and English. Both morning and evening sessions were covered - though not the lunch break socialising. Curiously the conference attendees were all male - at least no female delegates were visible. 'DKM GREENLAND' downlinked at 11.587GHz-H (6111+3/4), Greenland is an extremely rare catch! And 'NON-CAT THAILAND' appeared on *SESAT*, 36°E Guy Fawkes night with a 'PTV NEWS' (Pakistan TV) uplinked from Nonthaburi Earth Station, Bangkok (11.512GHz-H, 6111+3/4).

Just a mention that Chichester Hospital Radio (CHR) - as do many other LPAM/RSL radio stations - have been taking a clean feed of IRN as an opt-out insertion into their own news programmes from the 1°W slot. *Sirius-2* @ 4.8°E is now carrying IRN output and CHR have now moved their dish from the 1°W heading onto the *Sirius* bird. IRN appears on *Sirius* in the clear within the Kingston 'InMedia' bouquet on 12.111GHz-H (27500+3/4). One ongoing problem apparently is the cost of using the feeder, in earlier times student and hospital radio stations could take the IRN downlink for a nominal sum but charges have now increased to a more 'realistic commercial' level.

Can I suggest that readers and satellite enthusiasts refrain from contacting broadcasters, satellite teleport and sat truck operators over sightings of news, outside broadcast feeds, etc. These commercial groups are very unhappy to hear that their signals are being monitored by enthusiasts and it can only drive more signals into encryption, MPEG 4:2:2 or fibre. A recent response from a broadcast company having received a query from a satellite enthusiast over received downlink images suggested that the enthusiast was illegally intercepting their transmissions and could be prosecuted for such theft, the RA backed up this reaction by also advising that the domestic receiving doesn't cover this type of reception from satellite - merging the satellite hobby into the same grey area as scanning! My advice is to enjoy the hobby but not to discuss or comment on images received to the broadcaster or satellite operator!



Veteran racing driver, Stirling Moss and friend at a recent Germany car event.



The 30°E Hellas satellite with its house logo



The Luxembourg based ENEX prepares a news exchange for clients over *Eutelsat W1*, 10°E



Live heli-cam pictures of the Southern Californian forest fires via KABC-TV over the CNN feeder (*NSS-7*, 21.5°W).



More live pictures of the forest fires from a low flying TV heli-cam for KCAL and KCBS TV stations (CNN).



NASA-TV show their latest fashions that every astronaut is wearing this season! (*NSS-7*).



More troubles in Iran, CBS prepare for a live report (*Eutelsat W2*, 16°E).



Live pictures are expected from New York (*Atlantic Bird-1*, 12.5°W).

Amateur

Bands

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Only twice since its discovery in 1821 has Peter 1 Island in the Antarctic seen Amateur Radio activity and both of those occasions were fairly recent - 1987 and 1994. A team is about to re-activate the island for about three weeks from sometime around the 9 January 2004.

There will be 15 people in the team, which intends to operate using c.w., s.s.b. and RTTY on all h.f. bands. Americans **Bob K4UEE** and **Ralph K0IR** are the main movers behind the DXpedition to this location, which rates quite highly on various 'most wanted' lists.

The island is formed from an extinct volcano and is surrounded by ice cliffs, which make access to the island impossible except by helicopter. No wonder it took over 100 years from after its discovery for someone to land on the island.

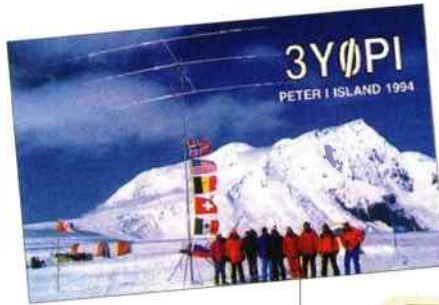
At the time of the 1994 DXpedition, which used the call 3Y0PI, the island had been visited fewer times than the surface of the moon. So, expect continuous 'pile-ups' when the stations go on the air.

Around the same time **Chris Tran GM3WOJ** will be operating from the small Stewart Island off New Zealand's south island. He'll be there from the 11-15th January operating on 7 and 14MHz c.w. and s.s.b. and hopes that he isn't forgotten whilst the world is trying to work the 3Y0 station!

Chris' call will be ZL4CT/4 and he'll be using a TS-850 plus linear working into vertical antennas. For more details visit www.qsl.net/gm3woj/

Another to one to try and 'catch' over the holiday time is **HF8KAF**. This station celebrates the 50th anniversary of the Polish club **SP8KAF** and will be active until the end of the year. Another special call that will be about until the same time is **3W22S**. Operated by **Eduard Visser XV9DT** from Hanoi, it celebrates the 22nd South East Asian games hosted by Vietnam. Not a country to operate in if you're one of those people who changes their rig every five minutes. Eddy's licence is for one specific transceiver, which it identifies right down to the serial number. No details of frequencies for the special call have been given, but a look at www.xv9dt.com could be informative.

Back onto island activity now. Four Germans will be on the air from late January until mid-February with the call **4V200YH**. The special event station will be on the Caribbean island of Haiti to celebrate its 200th anniversary and will be operating three



stations from 1.8 to 50MHz. They'll be using the usual speech and data modes.

Mike Parker G4IUF should be on the equatorial Galapagos Islands of Darwin fame in the eastern Pacific at the moment and if so will be there until 11 January using the call G4IUF/HC8. He'll be on all the h.f. plus 'top' bands using s.s.b. and c.w.

Another One Bites The Dust

Last summer, land based **Harry How** of Blunham, Bedford was caught using h.f. aeronautical frequencies to chat with his fellow pirates and ended up in the town's Magistrates Court. £500 lighter after the experience, Mr How had operated from his car using the call 'BEN01'. "His actions could have had potentially serious implications" said a Radiocommunications Agency spokesman, who hoped the case would act as a warning to other people.

As the report only appeared in a local paper I don't suppose the advice reached too many potential offenders, a view that motivated a SWM reader to send me the press cutting. Thank you for that, I'm more than happy to give it a wider audience.

Soap Box Time Again

A couple of months ago I commented on the slow rate of issue for Intermediate licences and so far things haven't improved much. Over a period of six weeks in early autumn, of over 200 alphabetically issued licences, only two were Intermediates. Of the others, almost all were Foundation licences.

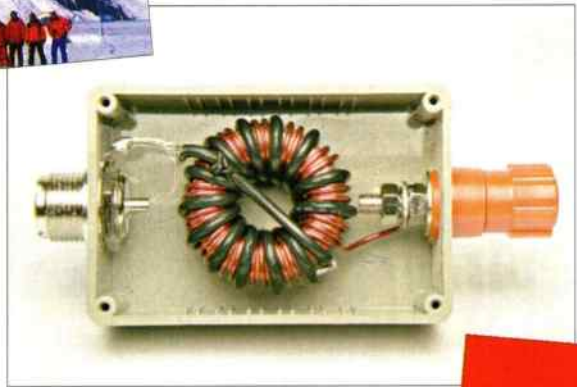
Although the figures don't account for callsigns issued out of alphabetical sequence, they do indicate a trend. It's a sobering fact that CB radio, which is all but dead, appears to have more licences issued per month than

Intermediate and Full Amateur licences combined. What is going on?

Is it lack of demand, or lack of opportunity? After some Internet searching I found plenty of places offering Foundation licence courses, but only one place listed in my part of the world, the south west of England, where Intermediate courses were run. When so many clubs run Foundation licence courses, why do so few cater for the next licence up?

What Antenna Do You Suggest?

I'm often asked what is the 'best' antenna to put up for listening on the h.f. bands, a question that's impossible to answer. Ideally the antenna should be resonant on the frequency being received and if the signals are coming from a particular place, have some gain in that direction. Easy to say.



Hard to fit into the space available around many homes.

The good news is that antennas don't stop working just because they're not erected spot on to the theoretical requirements. They just behave differently.

When it comes to putting up the 'best' antenna in a small space, compromise is the answer. There never is a perfect solution! Where there isn't the space for an antenna farm try these simple rules of thumb:

- * Use as much wire as possible as high as possible.
- * Try to keep the antenna away from electrical noise.
- * Use an a.t.u. to optimise the impedance match between the antenna and the radio so reducing the level of unwanted signals getting into the radio.
- * Within reason, don't worry about a few bends in the wire.

G5IJ Antenna

Interest and enquiries about this end-fed h.f. antenna continue, so next month I'll supply more detailed information on the construction of the transformer. If you're looking to build one then lay your hands on a T130-2 toroid, a metre of RG174 miniature coaxial cable, an SO-239 chassis socket, a screw terminal, a couple of metres of 20s.w.g. enamel coated wire and a plastic box and you'll be ready.



The Publishers and Staff of

Short Wave Magazine

**would like to wish all our
Readers, Advertisers and
Authors a very Merry Christmas
and a Prosperous New Year.**

Please note that the the SWM Offices will be
closed from **24 December 2003** until
5 January 2004.



Shack

Web

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Hello and welcome to 'ShackWeb' during (for me) the run up to Christmas (early November) and for you the festive season in full swing. As always at this time of year may I wish all SWM readers an enjoyable Christmas and a happy and peaceful new year. You are the lifeblood of this column and your correspondence is always welcome - keep it coming!

Handy Helpmates

Kicking off this time with an E-mail from **Michel** (and that's the trouble with E-mails, you don't know where your correspondents are!) who says: "The websites mentioned in the November issue are very interesting. May I add a comment to your small computers list? OK, this is to write few words about another Pocket PC. Not the Poqet one, but rather similar. This is a clamshell model, about 245x115x25mm (when closed), with a NEC V30 (compatible 80C86) at 4.77/7.15MHz, an l.c.d. screen 640x200 (80x25), 32K video SRAM, 512K ROM as C: and 1MB ROM as D: plus 384K RAM as E: and 640K RAM as system. Two PCMCIA slots. Possibility to extend RAM up to 2-8MB (with PCMCIA RAM). One RS-232 port, one Centronics port, BIOS Phoenix (XT), MSDOS 5.0 (in ROM), Works 2.0 (in ROM) and Race Pen (in ROM).

It is an interesting pocket computer. Application software, OS and BIOS are all in ROM so it's impossible to damage them with a virus or keying errors. Second, it works with only two AA batteries and for around 10 hours at a time. Three, I think (but I have not yet run trials) it is possible to use *Hamcomm 3.0* (last DOS version) software with it. In this case you get a very light and small digital signals station, if coupled with something like a Sony 7600 (receiving only), or a QRP transceiver. Four, as there are no mechanical parts (no hard drive or floppy drive), it is very strong and insensitive to impacts and vibrations.

Another old (but also interesting) small computer is the Olivetti Quaderno, fitted with a 386SX microprocessor and a mono VGA screen, plus a 60MB hard drive and 3.5in floppy drive. It is able to run *Windows 3.1*. It could be a good outsider too. Lastly, there are also some HP products, like the LX200 models (2 or 4MB RAM), that are worthwhile naming. They are good MSDOS tiny computers, aren't they?"

Thanks for that Michel. It's true that I forgot to mention the Hewlett Packard Windows CE-based PDAs as detailed in your last point, though I think I've referred to my own HP LX320 in a previous column. One of the first of the *WinCE* machines, it has 4MB RAM, infrared communications and slots for Compact Flash cards and PCMCIA. It was acquired at a time when I'd been commissioned to write a book about the latest Microsoft operating system and when my great goal was to put together a pocket listening station that could be transported anywhere.

As documented in the columns of 'ShackWare', I failed miserably with the HP and *WinCE*. Though powerful, the computer had

neither the I/O capabilities nor the software support to process the data modes. Ironically, my best bet was a DOS emulator which I hoped would enable software such as *JVFax* and *Hamcomm* to run. I was wrong!

The HP now sits alongside my Poqet PC, Atari Portfolio and others and comes out to play occasionally just to keep it in operating condition. If I could be bothered I'd fill it full of contacts, diary dates and the like and use it day-to-day but frankly, I find a notebook and pencil just as easy. Ah well...

NB: I did, eventually, put together that pocket station, but it was later when I acquired a Toshiba Libretto, a true pocket PC with a Pentium P75 processor (mine's overclocked to P100) and a full complement of I/O ports. Teamed with the truly remarkable Sony SW100 receiver (or a PCR1000), the Libretto performed impeccably and remains in regular use even now.

PDA's continue to attract legions of users and grow ever more powerful and there is plenty of support on the web for everything from the earliest



Tandy to the most recent and powerful examples. Simply type 'PDA' or the brand name of the model you're interested in into a search engine such as Google www.google.com for a comprehensive selection. A good site is www.totalpda.com (thanks for that, **Roy Merritt** of Dorchester).

If you're interested in exploring the excellent features of the Sony SW100 receiver visit **Chris Malcolm's** web pages at www.dai.ed.ac.uk/homes/cam/gadgets/SW100.html which offers good information from the user perspective and details of how to fix the clamshell hinge if the ribbon cable within is damaged. Chris's site also has an excellent section devoted to the Psion Series 3a PDA at www.dai.ed.ac.uk/homes/cam/gadgets/psion.html lcom's PCR1000 is very well supported on the Internet, but one or two sites offer interesting insights which go beyond the usual information. Visit geophysics.ou.edu/ahern/home/pcr1000/ for a comprehensive list of links.

The world has moved on and more or less left those original outings of *Windows CE* far behind. However, for continued support you could do worse than fetch up at the *Windows CE* web ring www.windowsewebring.com

Day of 'Reckoning'?

There was a time when students of computer history and those interested in old silicon could pop along to a local boot sale of a Sunday morning and emerge from beneath pasting tables following a few minutes of rummaging with a big smile and an exotic obscurity such as a Sord M5, Husky Hunter or Tatung Einstein, theirs to take home for a 'fiver' or so.

Well, I'm sorry to say those days are long gone. Now everyone is junk-savvy, boot sale sellers expect big bucks for the most awful rubbish that they imagine to be valuable and rare and even if there were a few bargains, other sellers who do that kind of thing for a living have already been around

all the tables at 0515 and bought them up for substantial repricing on their own stalls.

Not that I'm bitter of course, it's just a shame when innocence and genuine transactions which please both seller and buyer are elbowed aside in favour of hard profit. Economic good sense I suppose but a pain nonetheless.

So what do you do if you want to explore the origins of the computers and processor-driven receivers we have today but without re-mortgaging the house to do so? A bit of lateral thinking helps. What was it that we of the Baby Boomer age were all so turned on by before home computers? Video games, perhaps, but before 'woody' Atari consoles and Pong cartridges even? Yes, calculators!

Examples of early calculators contain some very interesting components, from the tiny, quaint red l.e.d. displays complete with bubble lenses to magnify them to a point at which the eagle-eyed can just about make out what's being displayed, to the combination of low-density ICs and discrete components, the great-uncles-twice-removed of the Pentium 4 that's powering the PC on your desktop.

Interestingly (but perhaps not surprisingly) manufacturers who later became big players in home computers began by getting rich on the calculator craze of the early 1970s. Texas Instruments flooded the market with a device for every occasion including a 'Lady' model - as if women require a calculator that is in any way different from the standard. Another biggie was Commodore with calculators for every possible use from students to accountants, shop assistants to office workers to teachers to well, you get the idea.

Of course, the inevitable happened. Where once a calculator was seen as a prestige tool for the academic and executive it became an item given free with breakfast cereals, a bauble to dangle at the end of a keyring, a thing to despise and which cost more to make than could ever be had at the recommended retail price.

Back to the present. Calculators have once again found a niche and are no longer despised. Long since eschewing novelty status and now returned to useful tool, the remaining calculator manufacturers (including TI) have culled their range to perfectly tuned models which fit a need. The oldies are yet to be thought valuable principally because with the exception of a few programmable models, they aren't. Boot sales, charity shops and the junk draws of older relatives are all happy hunting grounds. You'll find excellent examples for pennies and never more than a pound or two. I'm enjoying happy hours amassing a bit of a collection as I write.

Inevitably, the web has many sites devoted to the history of calculators. One of the best is the Datamath Calculator Museum at www.datamath.org which features pictures and specs for virtually the entire output of Texas Instruments and a downloadable virtual TI Datamath (the company's first calculator) which can be used just like a real calculator on your PC. Another good site is www.vintage-technology.info which among its pages devoted to vintage receivers, valve specs, electronic components and old domestic equipment, has an excellent section filled with calculators from manufacturers worldwide. Comprehensive specifications, a look under the lid of many calculators and some really interesting mathematics to put your old calculator through its paces and locate its shortcomings.

Finally

A quick thank you to **Ian Brothwell G4EAN** for the Dragon software which arrived safe and sound and is now in the heaving hold of my silicon-heavy ship. That's it for now, until next time, good listening!

Decode

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With the winter nights well and truly established and all those extra hours in the shack, I'm going to dedicate this month's column to a download of hints and tips to help you get the best from h.f. FAX reception. I've divided the tips into broad categories to try and keep some structure in the proceedings.

What antenna to use? Nothing really special about antennas for h.f. FAX reception other than the need to cover the full h.f. bands. FAX signals are broadcast right through the h.f. spectrum so, you do need an antenna to cover the lot as you'll see in a later section. My old friend the 'magnetic' loop does very well on this front, though you can get away with a long random wire. The trick is to use as long a wire as possible, as high as possible and well away from

interference sources.

What receiver? As with the antenna, full coverage of the h.f. bands is a good start point. Tuning stability is particularly important as FAX images can take up to 15 minutes to receive. Most modern receivers offer excellent stability, but you need to consider this aspect if you have an older receiver. If your receiver does drift you will find that the brightness of the received image will gradually change, in-line with the rate of drift. If the receiver drifts up in frequency the picture will get darker. Conversely the image will lighten with a downwards drift.

Filtering: I've mentioned this before, but careful control of receiver filtering is essential to make the most of a given FAX signal. Those new to the use of receiver filters are always tempted to 'over-filter' to improve reception, whereas the best results always come from using filters with caution.

Filtering is particularly important with h.f. FAX because the fine details in the chart use the higher audio frequencies in the recovered signal. If you wind-in the filtering too tightly you simply cut out the detail. Of course there are situations when the levels of interference on the band might mean that you have to suffer some degradation in order to receive a chart at all. My point is that you should always use the minimum amount of filtering possible.

What Frequency? Once you've tried receiving a few FAX signals you will soon notice that the published frequencies are always different to those shown on your receiver's display. The reason for this comes down to frequency reporting conventions. Most people receive FAX signals with their receiver set to the s.s.b. mode

When in the s.s.b. mode the receiver usually displays the carrier frequency of the notional s.s.b. signal. However, common practice in frequency lists is to quote the white frequency of the FAX station. For most

receivers that results (assuming the receiver is set to u.s.b.) in a 1.8kHz negative off-set. In simple terms, to listen to Hamburg Meteo on 7.880MHz you would have to tune your receiver to show 7.8782MHz on the display.

Which receiver output? When making the connection to your decoder always use the 'Line-out' or 'Tape-out' socket on your receiver. This output connection is taken from the audio stages before the volume control and so provides a fixed output level. The notional line level offered by most receivers is ideally suited to the input requirements of most decoders and soundcards. You also have the added advantage that you can adjust the loudspeaker volume without effecting your decoder.

Which decoder inputs? If you're using a soundcard based decoding program make sure you connect the receiver output to the 'Line-in' socket. I would strongly recommend avoiding the 'Mic in' connection, as it's all too easy to overload the soundcard. An overloaded sound card is one of the most common causes of decoding problems for new users.

The nature of digital encoding means that any overload of the soundcard creates chaos with the decoding software giving major glitches in the received image. Much like filtering, it's better to operate with a weaker input signal than to risk overload. Most of the better decoding packages include signal level monitoring so, you need to check the instructions and make sure you get this right.

Techniques

Now I'll look at the techniques needed. Firstly, are you on the right frequency? One of the first tips is to find the right frequency, which might seem obvious, but it's particularly important for FAX signals. If you look through the FAX schedules you will note that most of the larger stations advertise several operating frequencies. They have to do this because h.f. FAX signals do not travel well on h.f. and can suffer some pretty awful distortions.

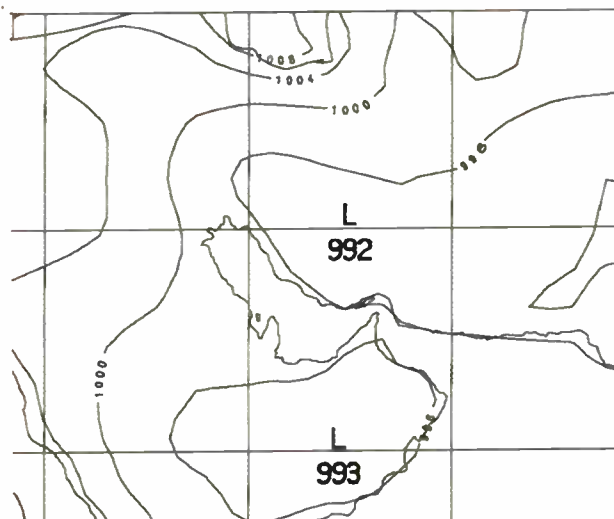
One of the most common and destructive distortions is due to multi-path propagation. This occurs when a signal reaches your receiver via more than one path. A typical example would occur if you're able to receive a station via the direct ground wave and via refraction from the ionosphere. Due to the different path lengths, the time taken for the signal to reach you will be different, so the reception of each part of the signal is rapidly followed by a repeat a fraction of a second later.

In a simple case with just two signal paths, this



Typical 'smudged' FAX - caused by multi-path distortions.

OCEANOGRAPHIC CENTRE, NORTHWOOD, ENGLA



Fine detail you can expect to see without multi-path distortions.

manifests itself as a ghost image right next to the main image. In severe cases the signal will arrive by lots of different paths and will also carry all manner of phase distortions. The result is usually an image that looks as though it's been smeared across the page!

Signal Fading

A second and more obvious problem is signal fading, caused by the path through the ionosphere, taken by the radio wave. Fading is usually the result of phase cancellations in the signal path and its effect on the image, is usually to add bands of noise, often accompanied by distortions either side of the noise band.

The solution to both the fading and multi-path problem is to change frequency, hence the multiple broadcast frequencies used by many stations. Choosing the right frequency first time is not easy, but is soon learnt, though most people naturally tune through the available frequencies and choose the strongest. This technique is usually fine in the daytime, but often doesn't work at night, as the strongest usually suffers dreadful multi-path distortion this is particularly true when monitoring European stations. Trial and error is the order of the day.

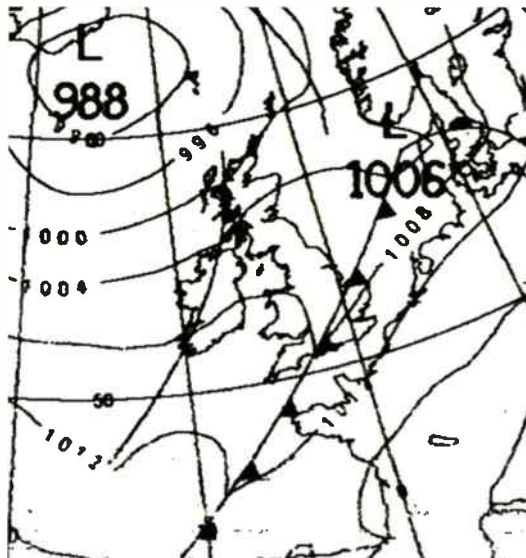
Receive Mode: Many decoding systems give you the opportunity to receive either as black and white (chart) or greyscale. I would strongly recommend using greyscale for everything because it makes the received image much easier to clean-up and edit after reception. When you choose black and white the decoding software defines the break point between black and white and fixes that in the final output. If your receiver drifts, or you suffer any interference, the errors come out either as pure white or black.

The use of greyscale results in these interference elements taking-on a greyscale value that you can then filter-out in a photo manipulation program. My favourite program for this is Adobe's *Photoshop*, but you can process images equally well in many other packages. One good program that's available for free is *GIMP*, which is an Open Licence Program with a huge range of tools that can carry out very sophisticated adjustments. If you want to try a copy it can be downloaded from the following site: www.gimp.org/

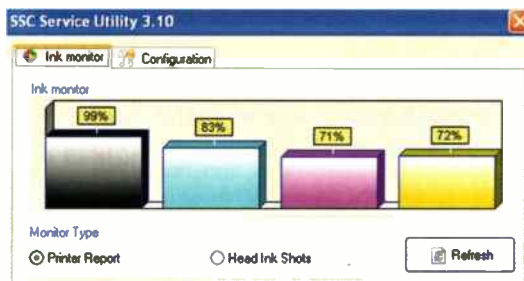
For tidying-up greyscale FAX charts using *Photoshop* I find the best approach is to use the 'Curves adjustment' to alter the brightness of different parts of the image. You can also use the eraser and rubber-stamp tools to help get rid of interference artifacts. A particularly useful tool

that's available via the filter menu is dust and scratch removal. This is great for quickly removing the fine dots that are caused by general noise on the radio channel.

Once the image has been tidied-up you can use the 'Unsharp mask' to sharpen-up all the edges. I've shown a 'before and after' comparison so you can see the type of improvement you can expect. If you want to



Noisy FAX image after level adjustment and 'dust' removal.

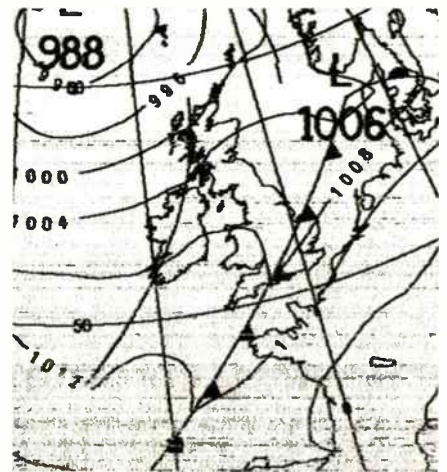


The latest Epson printer utility - it's great for FAX pictures.

know more on this drop me a note and I'll put a section in a future column. (*Photoshop Elements 2 costs about the same as PaintShop Pro, but installs on either PC or Macintosh. Ed.*)

Now to consider printing out the FAX. Getting a good quality printout is relatively straightforward thanks to the continuing development of quality inkjet printers. If you're thinking of buying a new printer I can offer a few tips. Number one is to check the cost and capacity of replacement ink cartridges. Many of the really cheap printers around use expensive cartridges and you can end-up paying a small fortune for what you thought was a bargain.

I would also advise against buying the latest printer models, mainly because you will be stuck with having to use the manufacturer's cartridges. If you go for a model that's been



Noisy FAX image before manipulation

around a while you will find the compatible cartridge market in full swing offering some really good prices.

To use my aging Epson Stylus Colour 860 as an example, the manufacturer price for a colour cartridge is around £16 but I can get replacement **PrintRite** cartridges from **InkRaider** for around £3! That makes a real difference to your printing costs. If you want a really smart print-out it's well worth using photo paper. You don't need to use fancy paper, just bargain photo paper from a mail order supplier will make the world of difference to the final print-out.

Epson Utility Update

If you have an Epson printer that you use for FAX print-outs, etc. you need this utility! I've mentioned the service software before, but **John Wills** has written this month pointing out that a new and much improved version of the software is now available. The original version of this software was mainly used to reset the head cleaning counter to get past Epson's infamous all lights flashing problem.

The new version of *SSC Service Utility* provides a host of new features that can help solve chart printing problems. One of the first big changes is to the status display which now shows the full status for all the colours. This is great for seeing if you're using lots of one colour. The other area that's really useful is the increased range of print-head cleaning options. Whereas you normally have to clean colour and black at the same time, *SSC* gives the choice.

You can also choose different levels of cleaning with standard, powerful and initial charge available. This is great for tackling stubborn blockages, but be warned though, that you can get through a lot of ink this way. To add to the fun you can also carry-out full and soft resets from the control panel. All-in-all a great utility that's just got a whole lot better. This is an essential extra if you print a lot of charts using compatible cartridges. If you want a copy of the software pay a visit to:

www.listsoft.com/13300/

Propagation

Forecasts

- Jacques D'Avignon VE3VJA
- E-mail: Jacques@pwpublishing.ltd.uk

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.

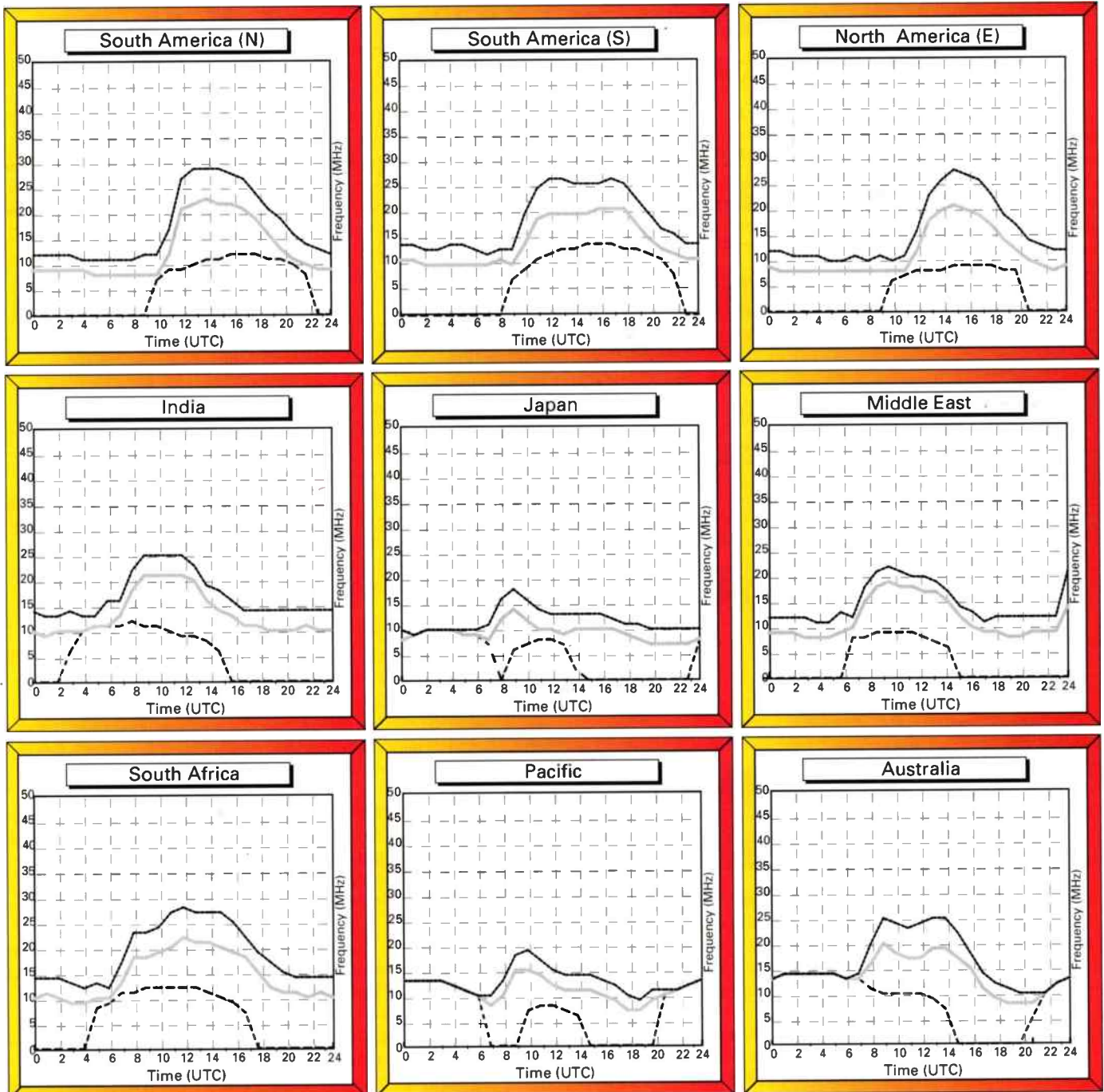
The middle line indicates the optimum working frequency (OWF) with a 90% probability of success for the particular path and time.

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.

January 2004
Circuits to London



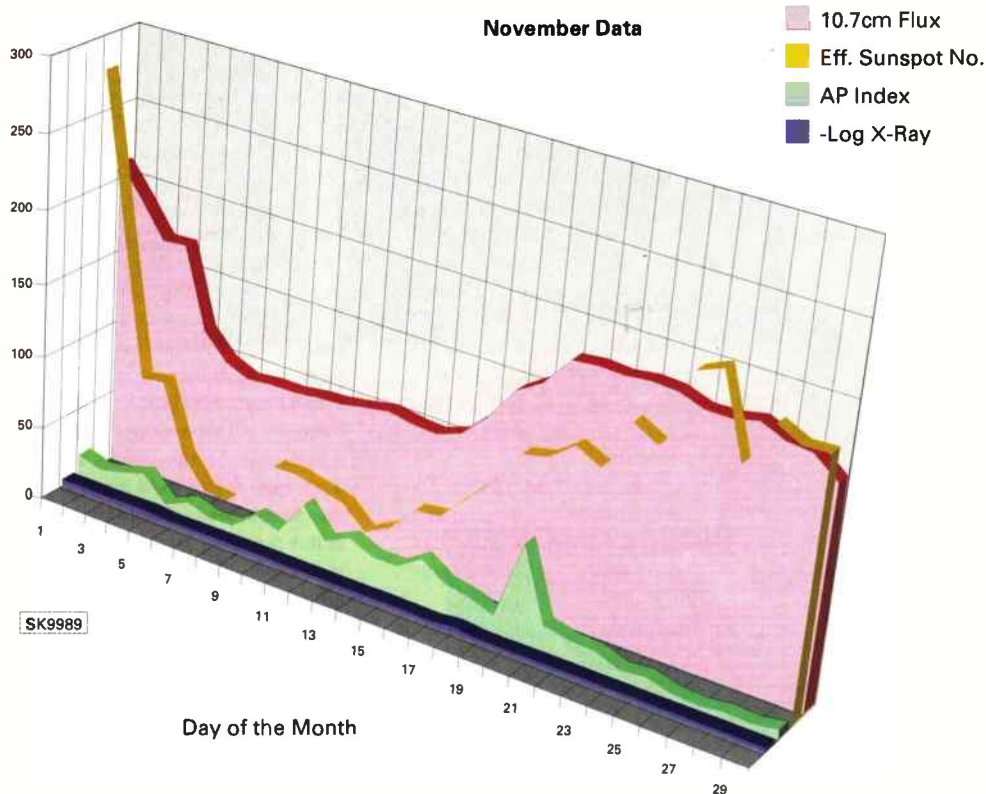
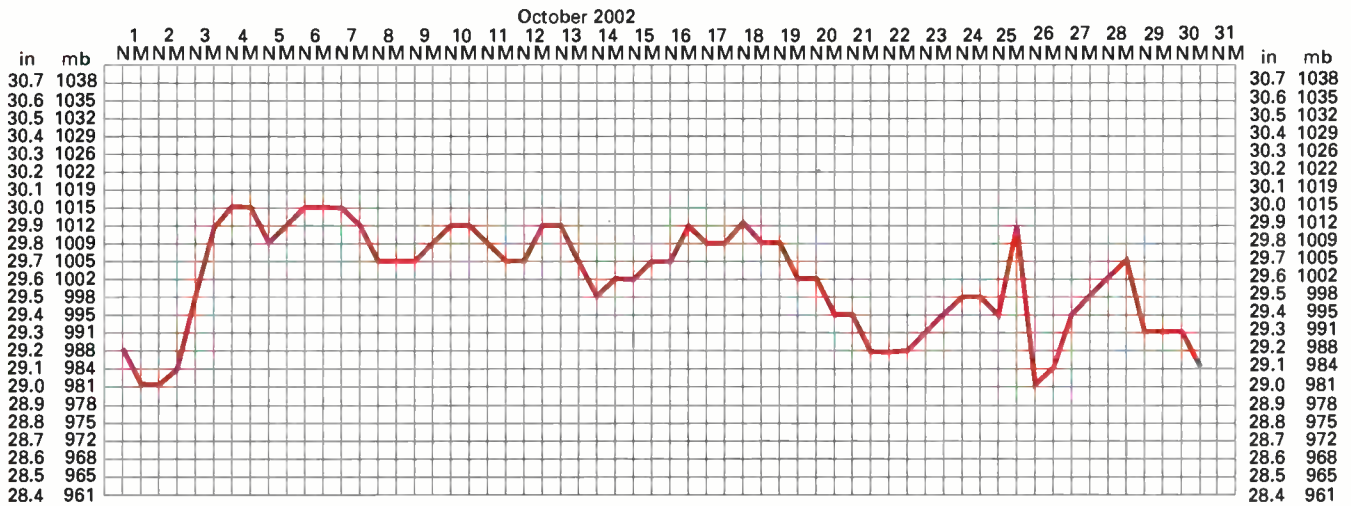
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Propagation

Extra

- **Kevin Nice** G7LZC/M3SWM,
SWM Editorial Offices, Broadstone
- **E-mail:** kevin.nice@pwpublishing.ltd.uk

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



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.

Infoⁱⁿ Orbit

● **Lawrence Harris** 55 Richville Road, Shirley, Southampton SO16 4GH
● **E-mail** info.orbit@pwpublishing.ltd.uk **Web Site** www.astronomer.plus.com

It might have been the mistake of the year, but fortunately it didn't happen. Every few weeks the weather satellites (WXSATs) NOAA-12 and NOAA-15 share an overlapping footprint. This is because their orbital planes are not widely spaced, so periodically their v.h.f. (137.50MHz) transmission footprints overlap.

A few days before the November overlap was due to happen, NOAA announced that, contrary to normal practice, NOAA-12 would be left transmitting a.p.t. low resolution images whereas NOAA-15 would have its a.p.t. transmitter switched off for the duration of the overlap. Fine so far, until David Taylor pointed out that NOAA-15 carries the same generation of hardware as NOAA-16, the satellite that suffered permanent a.p.t.

transmitter failure following the first switch-off under these same conditions.

Within a day or two NOAA announced that they had decided against the new strategy. Perhaps when NOAA-15 reaches the end of its working life, this might be tried as an experiment?

Current WXSAT Activities

For several days in late October we received really good (synchronised) h.r.p.t. (high resolution) imagery from NOAA-14, so I reported this to Douglas Deans who issues a weekly status report on the Internet. Unfortunately, the first pass following the issue of the new report showed a return to



Fig. 1: MSG-1 infra-red image showing clear Britain at midnight (@EUMETSAT).

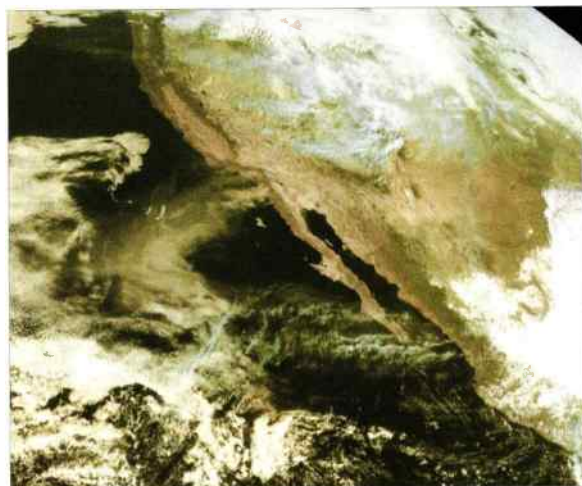


Fig. 2: The view from GOES-W 27 October 1800 (@EUMETSAT).



Fig. 3: Californian fires photographed by ISS astronaut Ed Lu on 26 October - courtesy NASA.

unsynchronised images! For other NOAA WXSATs, check the listing at the end of this column.

Meanwhile, user tests of data from MSG-1 continue. Like most other monitors, I have received excellent data - usually complete images. I had noticed that the 0945 image set was often incomplete, so I set about trying to find the cause of this problem.

I use the (EUMETSAT recommended) two-computer method for monitoring MSG-1 (also known as METEOSAT-8) transmissions. My receive computer - a 1.5GHz Athlon - is used only to receive the DVB transmissions from HotBird-6, so I do not have any anti-virus software running on it, neither is there any known software that might start doing background

(effectively pointless) jobs at intervals. So far I have not identified any specific

cause for the segment loss, except possibly the automatic Windows update check that I have now disabled! Many others report similar losses, so my problem is not unique and investigations continue. As of mid-November, the loss had reduced significantly.

On Tuesday 25 November 2003, three hourly Indian Ocean Data Coverage (IODC) was added to the Foreign Satellite Data service on EUMETCast. This means that MSG-1 users will have routine access to a flow of images from across virtually all longitudes - from Europe (METEOSAT-8 and METEOSAT-5), GOES-9 (Japan), GOES-W (east Pacific ocean) and GOES-E (north America). For the price of the hardware and software, I believe this is the bargain of the year.

In October I decided to spend more time doing practical astronomy, more WXSAT work and more writing. The night time infra-red images from METEOSAT-8 have continued to provide an excellent indication of imminent clear or inclement weather.

At the telescope I am concerned to know whether there are going to be temporary or permanent interruptions from cloud. Figure 1 is the channel 9 (infra-red) image that I find most useful to show the position of clouds. An animation of the infra-red imagery from MSG-1 is excellent as a guide to a night's work at the telescope. No doubt others have different uses for the data flow do tell me about them!

Californian Fires Monitored

The wildfires that destroyed large areas of southern California were routinely imaged by GOES WXSATs as well as being photographed by NASA astronaut Ed Lu. He took still photographs of the fires through the windows of the International Space Station (ISS). The GOES image - see Fig. 2 - shows plumes of smoke rising from several locations along the west coast of America.

The Future Of WXSAT Activities - Part 1

Christmas and the New Year is traditionally the time when we reflect on the year's activities - but this year I am looking at what the future has in store for the weather satellite industry. Significant changes are planned to take place during the next decade and beyond.

I believe that within 15 years, the monitoring of WXSATs by amateurs will have taken on a whole new meaning. Reception of WEFAX from METEOSAT will be a distant memory, but more importantly to thousands of amateurs and professionals all over the world, a.p.t. from the NOAAs may have ended.

Should we be concerned (as in worried) at this time? In my view - no. We have at least a decade to anticipate continuing to receive a.p.t. Meanwhile, in the background there are many changes underway to bring to fruition a new generation of weather satellites using new frequencies and requiring new equipment for reception. This month, therefore, I am starting a series to explain the background and the new satellites.

One thought as I start this task, I wonder how long it was, after the launch on 1 April 1960 of the world's first weather satellite,

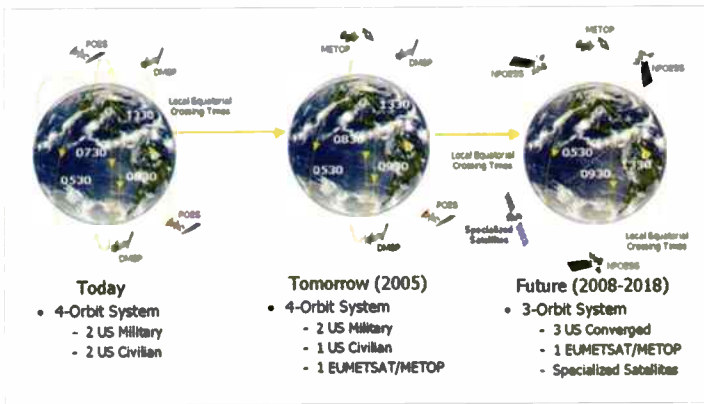


Fig. 4: Transition - the change from NOAA/DMSP to NPOESS to the IJPS.

before an amateur built a state-of-the-art receiver for a.p.t. and received a recognisable image? No computers, no memory modules, just a Maplin shop or equivalent!

For WXSAT monitors, the future involves two significant processes - the bringing together of two American satellite programs (NOAA and DMSP), followed by the introduction of EUMETSAT's contribution - METOP - to the polar satellite programme. The final result will be the Initial Joint Polar-Orbiting Operational Satellite System (IJPS). This will comprise two polar-orbiting satellite systems and their respective ground segments.

The IJPS will provide, and improve on, world-wide operational meteorological and environmental forecasting and global climate monitoring services. It will continue long-term environmental observations from polar orbit that started in April 1960 and will contribute to and support the World Meteorological Organisation (WMO) Global Observing System, the Global Climate Observing System, the United Nations Environmental Programme (UNEP), the Intergovernmental Oceanographic Commission (IOC) and other related programs.

Take a look at Fig. 4, which shows the transition planned to be implemented during the next decade and beyond. There are clear stages and they involve both NOAA and EUMETSAT. The development of the new



Fig. 6: METOP - courtesy EUMETSAT.

satellites is underway within both organisations and the satellites are to incorporate equipment under development.

Where Are We Now?

The current situation is to some extent as described in the earlier current WXSAT activities section, with the additional constellation of the DMSP to which, as amateurs, we have no direct access. The two USA civilian satellites referred to in Fig. 4 are the NOAA morning and evening WXSATs - currently NOAA-17 as morning primary, and NOAA-16 as evening primary WXSAT.

The currently active standby and backup WXSATs (NOAA-12 and NOAA-15) are not involved in the transition plan. By the time the plan is implemented, it will probably involve new satellites. Note that 2005 is only two years away!

There is a huge amount of information available about the new technology being planned for the NPOESS and METOP satellites. There are also some questions that cannot yet be answered. The satellites are under development, but some facts are known.

Initial Joint Polar System (IJPS)

This initiative will be a two independent, but fully coordinated, polar satellite system, operated by NOAA and EUMETSAT. EUMETSAT will assume responsibility for the morning constellation and NOAA will continue operating the afternoon constellation to provide environmental data from space.

NOAA-N & N' Characteristics

- * 1400MLST (Mean Local Solar Time = 1400UTC in Britain) with ascending node.
- * S-band Spacecraft Command and Control.
- * Direct broadcast with existing HRPT and analogue APT links.
- * Common instrument suite plus additional instruments.

METOP-1 & 2 Characteristics

- * 0930MLST (= 0930UTC in Britain) with descending node.

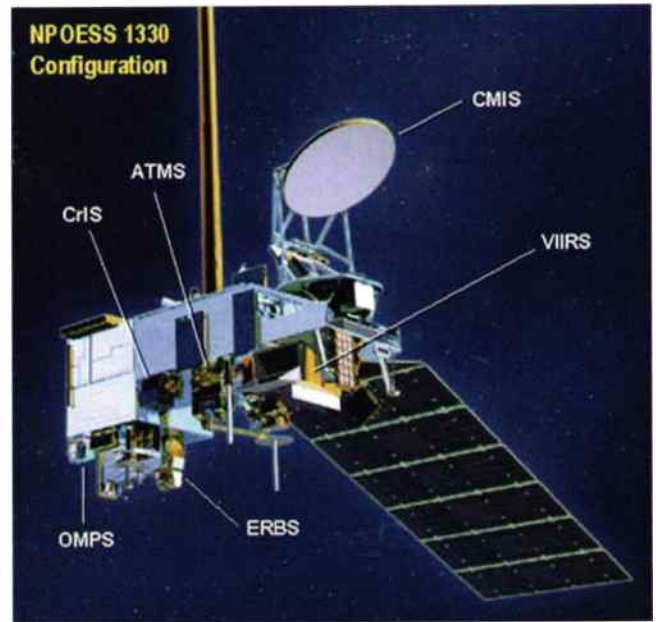


Fig. 5: NPOESS configuration.

- * S-band Spacecraft Command and Control.
- * Direct broadcast with advanced HRPT and digital LRPT links.
- * Common instrument suite plus additional instruments.

The term ascending node means that the spacecraft crosses earth's equator moving north, descending means moving south.

METOP

METOP will be Europe's first polar-orbiting satellite dedicated to operational meteorology. This represents the European contribution to the new cooperative venture with the United States, providing data for climate monitoring and improved weather forecasting. The satellite will carry a new generation of European instruments offering improved remote sensing capabilities to both meteorologists and climatologists, with a set of 'heritage' instruments provided by the United States.

METOP is a series of three satellites to be launched sequentially over 14 years, starting in 2005 and forms the space segment of EUMETSAT's Polar System (EPS). The METOP payload will provide high-resolution images, vertical temperature and humidity profiles and temperatures of the land and ocean surface on a global basis. The Advanced Very High Resolution Radiometer (AVHRR/3) is one of the complement of American instruments provided by NOAA to fly on METOP-1, 2 and 3.

Experimenters Sought By NOAA!

The National Oceanic and Atmospheric Administration (NOAA) is conducting planning activities for enabling civil access to the next generation of polar satellites scheduled for launch in 2010. These satellites will combine the POES and DMSP satellites into a single constellation called the National Polar-Orbiting Operational Environmental Satellite System (NPOESS).

As a risk reduction project, NOAA will



Fig. 7: NOAA-17 14 November 1111 from Kevin Hughes showing the intense weather system to the west of Britain.

launch a test satellite, Fig. 6, in 2006 under the NPOESS Preparatory Project (NPP) to test selected instruments and data transmissions. The NPP satellite will transmit data to field terminals using continuous High Resolution Data (HRD) in the X-band at a nominal downlink frequency of 7.812 to 7.830GHz. When the HRD capable terminals are within the communications footprint of the satellite, the 20Mbps data rate will enable them to receive NPP sensor data as it is being collected at that time, at maximum resolution.

The NOAA is interested in knowing who, amongst the civilian user community, may be interested in obtaining NPP data. Interested users will have to build or obtain a ground terminal at their own expense. Ground stations are expected to be relatively expensive, but NOAA plans to provide generic software and equipment specifications to help keep the cost down.

In addition, the investment should provide users with the experience needed to be on the vanguard of the NPOESS terminal development. Those interested should send an E-mail identifying their organisation and describing the reason for their interest to darrell.robertson@noaa.gov

Group For Earth Observation

I'm sure readers will be interested to learn of a new satellite user group which has been formed recently. It is the 'Group for Earth Observation', GEO for short. I asked Francis Bell to explain something of the group's formation.

"It's background has arisen from the perceived need to enable amateur reception of the new generation of weather and earth imaging satellites which are already in orbit or planned for launch in the near future. EUMETSAT's MSG-1 with its spectacular images of Earth every 15 minutes is an example of the latest satellite being received by the Group's members. The people leading

this Group have experience in Amateur Radio, electronics, meteorology, oceanography, satellites, computing and publishing, hence they are a very strong and competent team and just wish to share their skills freely with other amateurs.

This new Group intends to support Amateur and educational users quite independently of any single equipment manufacturer. Advice about equipment and software from a range of sources will be available to members and there are plans for publishing construction projects.

As home computers become more widespread it's expected that there will be a steady influx of people new to the weather satellite hobby so every effort will be made to cater for the absolute beginner as well as those with more experience and a sense of adventure. The Group recognises the long and distinguished contributions that amateurs have made in the use of r.f. over the past 100 years and wish to continue this tradition using truly Amateur skills in the area of satellite reception and image processing.

The Group has a quality Journal in preparation. It will have colour images, advice plus commentary about the latest Earth imaging satellites and other developments. The first Journal will be published early in the new year. Other resources available to new members will be computer software, equipment advice and support from other members. They have an existing library of interesting CD-ROMs covering Earth imaging and space. These were originally published by BNSC. New members will receive these automatically.

A one day meeting is planned at the National Space Centre, Leicester, in May 2004. Workshops for total beginners and the more advanced use of MSG-1 will be on the

programme. As a big bonus for those attending there will be free access to the Centre's spectacular exhibition area. Details will be published in the Journal.

Initially there is no charge for joining this amateur Group and the first Journal will be free, but eventually just to cover the cost of the Journal publication a small membership

Satellite Status Information

NOAA Operational Satellites

Satellite	Transmission Frequencies	
NOAA-17	APT - ON 137.62 MHz	HRPT - 1707.0 MHz
NOAA-16	APT - OFF since 11/15/00	HRPT - 1698.0 MHz
NOAA-15	APT - ON 137.50 MHz	HRPT - 1702.5 MHz
NOAA-14	APT - OFF since 8/14/02	HRPT - 1707.0 MHz
NOAA-12	APT - OFF until 12/7/03	HRPT - 1698.0 MHz
NOAA-11	APT - OFF	HRPT - not operating
GOES-12	WEFAX/LRIT - 1691.0 MHz	GVAR PDUS - 1685.7 MHz
GOES-10	WEFAX - 1691.0 MHz	GVAR PDUS - 1685.7 MHz
GOES-9	WEFAX - 1691.0 MHz	GVAR PDUS - 1685.7 MHz

Fig. 8: NOAA-GOES WXSAT status - courtesy NOAA.

subscription may be requested - not more than a few pounds a year".

In the short term, if you wish to register your interest in this Group the best course of action is to go to the Group's website www.geo-web.org.uk or E-mail 100523.1037@compuserve.com giving your name, postal address and personal E-mail address. If all else fails, write a brief note with your name, postal and E-mail address to **Francis Bell, Coturnix House, Rake Lane, Milford, Godalming, Surrey GU8 5AB UK** and he will put you on the Group's database.

Christmas!

With Christmas just days away, I want to thank the many people that have sent me images for inclusion in this column during the year. Please continue to send in those images that you feel are representative of our hobby and if you include some details of your station, so much the better.

WXSAT Frequencies & Transmission Modes

Figure 8 is the monthly listing published by NOAA to show the frequencies and status of both NOAA and GOES WXSATs. Those with h.r.p.t. receiving equipment can also monitor the Chinese FENGYUN polar satellites.

FENGYUN-1C & -1D Transmit On 1700.5MHz

WEFAX: METEOSAT-7 (geostationary) transmits WEFAX on 1691 and 1694.5MHz and Primary Data on 1691.0MHz.

HRIT-LRIT-FSD from METEOSAT-8 (MSG-1) via HotBird-6's EUMETCast transmission.

Timestep



PROsat for Windows is used by most leading weather satellite enthusiasts. They have grown up using Timestep products and now rely on the superior image quality and ease of use provided by PROsat for Windows. Features such as real time reception, auto-scheduling, temperature readout, totally automatic reception of all NOAA's and Soviet satellites and automatic animation have made PROsat the preferred package. For weather satellite systems contact :

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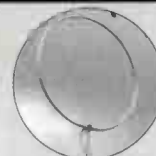
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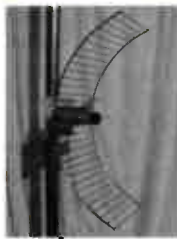
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Scanning

Scene

- **Dave Roberts** do SWM Editorial Offices, Broadstone
- **E-mail** scanning@pwpublishing.ltd.uk

A few months ago I mentioned the audio recording software called *Xcorder*. This freeware program is available at www.xcorder.com and has proved immensely popular amongst scanning types.

The *Xcorder* software has now been updated and offers a visual representation of audio input and playback. It also features event logging, showing date/time and event time details on screen for each recorded transmission. You can click on to the log entry of a recorded event and the recorded file will play from that point.

All this and a programmable timer. It's no surprise that *Xcorder* is being used in many applications from the straightforward recording of radio programmes to its use in a commercial environment as a dictation facility. Give it a try and join the many thousands who are currently using this program specifically designed for the scanning hobby.

Digital Curse

As all active monitors know the digital curse is well and truly upon us. Although Uniden have made receivers capable of decoding APCO25 systems used in America and elsewhere their sales have not been as brisk as they would have hoped, as it seems that several types of APCO25 are in use with the control channel data rates varying from system to system. Hobbyists 'across the pond' are keeping their dollars in their pockets until a scanner is marketed that 'does the lot'.

The well known Japanese company, AOR, have joined the digital scene with their ARD9800 Digital Voice Modem. This little box plugs into an h.f. radio that operates in any mode and digitises the signal allowing f.m. quality on h.f. It's slick stuff, but not at this stage, without problems. However, AOR are getting there and it won't be long before we'll need digital modems just to listen to Amateurs!

More Digi Stuff

Known as Warring, War Driving, War Walking or similar this is hobby computer scanning. With the advent of Wireless Local Area Networks (WLAN) for laptop computer users there were bound to be people who found that using other folk's systems was fun. As networks have been set up at airports, hotels and businesses, it was inevitable that the signals would overspill to locales other than those in the intended coverage area. This is where 'Joe Computerhead' rolls up with his laptop hooked up to a wireless LAN card and an antenna suitable for 2.4GHz (one antenna design available on the web is based around a Pringles carton, flavour not specified).

Then run software such as *NetStumbler* and

your computer will bleep when it has detected a wireless LAN. You get a visual signal strength indicator, the name of the network you have found and information as to whether the signal is encrypted or not. If it isn't - away you go, surf the web, send E-mails or whatever.

NetStumbler also allows a connection to a GPS receiver so that you can mark locations where access is available. Also look for strange chalkmarks on walls and pavements in towns. Yes, they are indications to Warrers that a LAN is accessible from that location - spooky.

Caught Red-Handed

Time and time again people get caught transmitting on police frequencies, usually just winding up the officers. This will all end when the Airwave digital scheme is introduced throughout Britain but in the meantime the 'doughbrains' come out to play.

This month's cerebral hero is one Nathan Stack, 21 years old. Stack found a police radio at a petrol filling station, trousered it and then transmitted phrases from the old TV show, *Some Mothers Do Have 'Em*. He was eventually sentenced to 160 hours community service at Worthing Magistrates' Court having previously pleaded guilty to Theft and Wireless Telegraphy Act offences on 24 September - I say eventually sentenced, as he somehow neglected to turn up at court initially.

Stack 'came up' on police frequencies with little sayings like, "Ooh Betty" and "Goodbye little fairies". What a hoot, I bet the cops fell around at those gags!

Anyway he got stopped for a motoring offence and being a switched on sort of chap he spoke to the officer in his best Frank Spencer voice. Wrong move Einstein, the traffic cop recognised his voice, searched his car and found the radio.

Stack of York Gardens, Littlehampton is described as a 'student'. Well the Prime Minister does want all young people to go to university. I expect this one's doing media studies (radio you see...).

Mysterious Signals

More news, this time it's from GCHQ. Yes that's right, the Government's own radio set. Intelligence officials were recently baffled for days by mysterious signals being received at their monitoring site at Scarborough, Yorkshire. The noises were unlike anything monitored previously and were thought to be a unknown communications mode.

The signals were only received during the day and were spread throughout the h.f. bands. It turned out that it was a randy ram rubbing his horns on the antenna masts - yes it happens here too.

There's good news if you would like to use *Sky Sweeper* software but are frightened off by the cost. Now available from **Pervisell** is *Sky Sweeper Lite*. At £29.99 by post or £27.99 if you by on-line ordering from this program supports c.w., RTTY, PSK31, PSK63, PSK125, MFSK16, 2MFSK16, 4MFSK16 and SkyBoost modes. Basically this is the modern replacement for *Hamcomm*. Check the website and see if it's for you www.pervisell.com

Military Ship

There I was, on the quayside, when I noticed a rather large military looking ship. Closer inspection showed it to be a large tri-hulled machine painted battleship grey. It was, however, clearly not a Royal Navy vessel and when I looked at the sharp end its name, *Triton* seemed familiar.

I soon realised that the vessel was the ship that was intended to launch the balloon that was going to head for the edge of space carrying two absolute nutters. You must have seen them on the TV wearing those old Russian spacesuits they got off eBay!

You'll be aware then that the balloon broke or something and they didn't get any further than Pompey, but they say that they are going to have another go sometime next summer or thereabouts.

I reckoned that *Triton* should have some interesting communications on board, but my query to the chap on the gangplank along the lines of, "Hey mister, can I have a look around your boat?" received a polite refusal. The control facility looked interesting from the outside and the antenna farm on the top was extensive. Remember the name of this ship. I'm sure that it has many uses other than balloon deployment. Should you get a view of it or hear it on marine v.h.f. checking into a harbour near you it's well worth a peek.

World Rally Championship

The British stage of the World Rally Championship was held in South Wales last November. A number of frequencies were captured by a monitor who resides in that area.

Frequencies captured included: 169.3625 n.b.f.m. simplex was where the St. John Ambulance people were found. The frequency 169.150 n.b.f.m. was in use in a simplex mode but the comms gave no clue as to the users, (could it have been the National Trust?) 457.280 n.b.f.m. was also monitored and again the user was unable to be identified and 457.420 n.b.f.m. was a film director telling his 'boys' what to do.

452.750 n.b.f.m. found a repeater output with European voices advising the police of the location of some vehicles. Swansea airport was busy on 119.700 a.m.

Finally, the monitor heard 457.305 in use with the race course technical services people advising the crews of the cars of a radar speed trap after 'Box 10'. Obviously they weren't told soon enough as many of the drivers were caught exceeding the 30mph speed limit and were fined. Some have been disqualified by Neath Magistrates who heard the cases.

This has resulted in the strong possibility that the event, which brings £15 million into the local economy, will not be held in that area again. Well, that's another big success for the local police then!

● **Peter Bond** do Editorial Offices,
Broadstone

● **E-mail** skyhigh@pwwpublishing.ltd.uk

This month's 'Sky High' column, very sadly details the final chapter in a great piece of aviation history. I am sure readers will not mind if I take time out to pay a tribute to one of the finest, if not the finest aircraft ever built. Much has been written about the Concorde in recent weeks but I wanted to take a quick look back and report on the final days of this magnificent aircraft.

Early Days of Interest

So, where did it all start? The prototype Concorde 001 first took to the skies on 2 March 1969 from Toulouse airport in France. The first flight of the British built prototype Concorde 002 was a few weeks later from Bristol Filton on the 9 April 1969. On September 20 1973, Concorde 002 made its first, (somewhat controversial), visit to the USA the first destination being Dallas/Fort Worth.

In 1974, Air France wanted to demonstrate the speed capabilities of Concorde, so on the 17 June at the same time that a company Boeing 747 took off from Paris Orly to Boston, Concorde departed from Boston on the reciprocal route to Paris. Travelling at Mach 2, Concorde was in Paris long before the 747 was halfway across the Atlantic, they then refuelled and presumably changed crews, spending just over an hour on the ground. They then took off on the return route to Boston arriving 11 minutes before the Air France 747! A great demonstration but sadly as subsequent sales showed, it was all to no avail.

On 21 January 1976, British Airways made its first supersonic commercial flight to Bahrain, it was a co-ordinated simultaneous departure with an Air France Concorde en-route to Rio from Paris. (I was working in Heathrow Tower that day and I still have a copy of the very first flight plan). After much political wrangling, the first service to the USA started on the 24 May 1976 with a flight to Washington, the New York service started over a year later on the 22 November 1977.

The Land Of The Free!

One of the most controversial periods in Concorde's history was the drawn out negotiations to allow the aircraft to operate to and across the USA. The attempts in the early seventies by the US environmental lobby to have Concorde banned from the USA on the basis of sound and air pollution plus

destruction of the Ozone Layer was in some ways quite simply laughable, (not to mention hypocritical). Don't get me wrong, I am all in favour of protecting the environment but not with some of the arguments they used 30 years ago.

Sound pollution caused by the aircraft breaking the sound barrier travelling through Mach 1 at lower levels could indeed cause problems but this was never going to be the case with Concorde and so quite honestly was an invalid argument. In the past, anyone who has been in mid-channel on the morning Plymouth to Roscoff ferry will have heard Concorde go supersonic around 1030. I would equate the noise level to that of a maroon fired at a November 5th firework display. (I won't mention all the US military aircraft that went supersonic over the USA every day, admittedly in pre-defined areas).

As for air pollution, well as I said earlier the argument was laughable, I think that someone should have pointed out the facts of life to the campaigners. As an example - in the early seventies the US Air Force had over 800 C-135s in service the large percentage of which were 'A models', using the old J57-P-59W engines.

Anyone who has sat on the end of the runway at Mildenhall when a KC-135A has taken off fully loaded will know all about sound and air pollution. The eardrum rattling noise level and the amount of black exhaust emissions, that poured out of the four engines, would have been a real eye opener for the environmental campaigners, especially when they realised it was one of theirs! I rest my case on the defence of Concorde on air pollution!

I am no scientist so it would be wrong of me to comment on whether aircraft flying at up to 60,000 feet and therefore close to the ozone layer, can actually do any damage. But if such a claim had been scientifically proven, then I presume that the SR-71A, U-2 and all the other US military aircraft that can operate above 50,000 feet would have been grounded in the interests of the protection of the ozone layer. Somehow, I think not. How much all this arguing in the early seventies may have affected the future sales of Concorde is open to debate!

Almost The End

At 1605 on the 24 October 2003 the (current?) era of Supersonic passenger transportation came to an end, when

Speedbird 002, (G-BOAG), from New York JFK touched down on runway 27R at Heathrow. It was joined by Concorde Alpha Echo returning from Edinburgh on the last leg of its UK tour and Concorde Alpha Foxtrot which had been on a final VIP supersonic flight over the Bay of Biscay.

The drawing power of Concorde was fully displayed by the tens of thousands of people who witnessed the event from on the airfield and around the perimeter fence. A great deal of sentimental farewells and thanks were made by the various controllers and *Speedbird 2* as he passed from frequency to frequency, but possibly the most poignant conversation was with the Heathrow director on 134.975MHz. An abbreviated version is as follows:

Concorde: Heathrow good afternoon, Speedbird Concorde 2 is with you for the last time descending from 100 to 90 to Ockham. (Heathrow then take give him a brief hold at Ockham before starting the final descent).

Heathrow: Speedbird 2 you're going to pass right overhead West Drayton.

Concorde: I'm very pleased, I wish we could see you but we've just gone right through a cloud.

Heathrow (laughing): Understood. (There is then a conversation to establish the landing sequence between the Concordes, G-BOAE and G-BOAF are also on frequency).

Heathrow: They've all rushed out of the door now to look at you over the top.

Concorde: Don't you go.

Heathrow: No, not just yet. (The controller then descends Concorde to 3000 feet and onto a heading of 100, downwind).

Heathrow: There's only meant to be me and you on this frequency, but I am sure that there's a lot, lot more people listening to what's going on at the moment, would you like to say something to them on the RT, it's all over to you. (However did he guess that a few of us would be listening?).

Concorde: If there are, then it's an opportunity to say thank you to everyone in the UK that's supported Concorde over all the years. We realise that Concorde has been a very popular aircraft, an icon of the 20th and 21st Centuries

and she's been successful and popular because of the support of the general public. Particularly those, who have taken the time out to watch her as she's taken off and landed during the last six months and we're very privileged and proud to have been part of the British Airways team that's flying Concorde today.

Heathrow: *Speedbird 2*, that's wonderful, for the last and final time contact radar 120.4.



Concorde: Radar 120.4, thanks for your help as well.

Final Resting Place

I would have been more than happy to be telling you that Concorde had received a reprise and one example was to have been kept flying for display purposes but sadly that is not the case. The aircraft are to be disposed of as follows:

G-BOAA is to be transported by road to go on display at the Scottish National Museum of Flight by the late Spring of 2004. G-BOAB is to be put on display at Heathrow at a location as yet to be decided. G-BOAC flew to Manchester on the 31 October using the callsign BAW9020C, after decommissioning it will be displayed at the viewing park, where a specially constructed glass hanger will be built in the future. G-BOAD was flown to New York/JFK on the 10 November, (callsign BAW9095C), it is to be transported by water on a 79m barge and will be moored permanently next to the aircraft carrier *USS Intrepid*. There have been some concerns regarding the long term survival of this airframe because of the increased corrosion risks due to the marine/saline environment.

At 1244 on the 17 November the penultimate Concorde flight departed from Heathrow. G-BOAE was flown to Barbados for display at Grantley Adams Airport, Bridgetown, a destination it flew to for over 20 years. The callsign according to British Airways was BAW9095C, but when he departed they used the callsign Concorde

Alpha Echo. Climbing out of Heathrow on frequency 134.125MHz, the controller asked him how many people he had on board, the reply was "75 on a one way flight to Barbados", the controllers reply was "Lucky Buggers"! I'm sure they didn't use RT procedure like that in my day as a controller!

G-BOAG was flown to Seattle, (Boeing Field) via New York between the 3rd and 5th November, callsign BAW9094C. Even in its final flying days, Concorde was still able to break yet another aviation record when it arrived at Seattle.

The Canadian authorities granted the aircraft a special ATC clearance to fly supersonically over the barren wastes of Northern Canada, thereby allowing the aircraft set up a new record time from New York to Seattle of 3 hours 55 minutes and 12 seconds. It is reported that it will be displayed along side a BOAC Comet 4B which is currently under restoration at the Seattle Museum. A few 'wags' on the Internet have suggested that this destination was chosen so that Boeing could see how to build a proper supersonic airliner! - Far be it from me to comment! (Note: The *Speedbird* flight numbers are those I was passed by a BA source but may not be the actual callsign in use, the departure of Concorde Alpha Echo being an example that I heard personally).

The End - The Final Touchdown

Much was heralded about the arrival of the final commercial flight at London Heathrow on the 24 October but to my mind this was not the end, that moment would only come

with the very last flight of Concorde. It was therefore with a heavy heart that I set off early in the morning on the 26 November 2003, my journey was to take me northeast up the M5, the destination Bristol Filton airport, where it all started with the first UK flight 34 years ago.

The last ever flight by a Concorde was made by G-BOAF from Heathrow to Filton, departing at 1120 and arriving at 1245 using the callsign BAW9020C. For a more detailed report on the flight to Filton see pages 42/43 in this issue.

The photo this month shows the arrival of Concorde G-BOAF at Bristol Filton - The Final Touchdown of a great aircraft - gone but not forgotten.

Selcall Book

Briefly, I just have space to tell you of a new book. Photavia Press, the publishers of *Airwaves* and *Callsign 2003* and regular contributors of information to this column, have published a new book called *Airwaves Selcal*. This is a new Selcall directory which lists over 13,000 Civil and Military Aircraft Selcals presented in two formats, including over 1,000 Military and Government Selcalls. (They tell me that they believe it has the largest listing of RAF and US Military aircraft Selcals ever published).

Published on the 10 December 2003, *Airwaves Selcal* costs £11.95 and is available from the SWM Book Store or direct from Photavia Press, (see their advert on page 60).



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12 Tuning Steps.



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5 Tuning Steps.
200 Memory Channels.



TRX-200
£199.00

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1000 Memory Channels.
Alpha numeric tagging.
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Programmable voice inversion.



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Supplied with flexible antenna, wrist strap.
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new additions

The Essential Guide To Scanning

This little booklet has been written in the hope that it will be a useful aid for anyone new to scanning, with the aim of helping you to get the most from this interesting and very absorbing pastime. Within its pages, the author **Martin Peters**, takes a look at the diversity of services that depend on the radio spectrum for their work and how best to intercept their communications. There's also guidance on buying the scanner or scanners to meet your particular needs, selecting

and siting of that all-important antenna and a look at some of the accessories you can use to enhance your listening experience. Order your copy of the *Essential Guide To Scanning* for just **£6 plus P&P.**

The Essential Guide To Scanning

Martin Peters



Easy-to-follow advice for the novice on what you can hear and where to hear it - choosing a scanner - understanding its features - antennas - accessories - video monitoring - tips & tricks - shortwave listening and more

LISTENING

Airband

	pages	price	code
AIRWAVES 2003 (Photavia)	144	£9.95	AIR23
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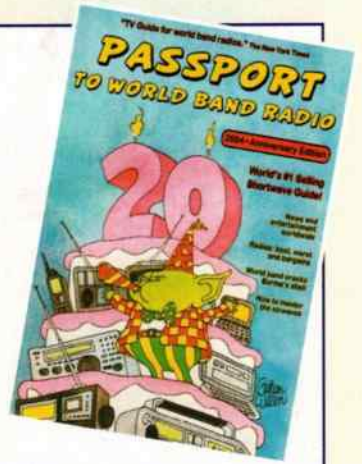
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HULL & DARS, G3AMW. Meets at the SWL Centre, Club Room, Gothland Close, Walton Street, Hull. Details from Mr R. Hatton.

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

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

NORTH YORKSHIRE

DARLEY ARC, G0FOS.

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

QUEEN MARY ARC, G8QM. Meets at Blazefield, Pateley Bridge, Harrogate, North Yorks HG3 5DR. Details from Frank Harris G4IEY. Tel: (01242) 236715.

RIPON & DARS, G4SJM. Meets at The Bunker, rear of Ripon Town Hall, North Yorkshire. Details from Nigel Drumm M1BDZ. Tel: (01423) 884733.

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

SCARBOROUGH ARS, G4BP. Meets at the Scarborough Cricket Club, Pavilion, North Marine Road, Scarborough, North Yorks YO12 2TJ. Details from Mr D.P. Tipper G3JBR. Tel: (01723) 377296.

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

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

YORK ARS, G3MMW. Meets at the Guppy's Enterprise Club, 17 Nunney Lane, York. Details from Keith Cass G3WVO. Tel: (01904) 422084.

YORK RADIO CLUB (AMATEUR) G4YRC. Meets at the Bishopthorpe Social Club, Bishopthorpe Main Street, York. Details from Gareth Foster G1DRG. Tel: (01904) 421392.

NORTHUMBERLAND

NORTHUMBER ARS, G4AAX. Meets at the Old Telephone Exchange, Cresswell Road, Ellington, Morpeth,

Northumberland. Details from Mr D. Stansfield G0EJV. Tel: (01670) 513026.

SOUTH YORKSHIRE

FINNINGLEY ARS, G7HAH. Details from John Fennell G4HOY. Tel: (01425) 872522.

MALTBY & DARS, G4SHW. Meets at the Centenary Hall, Clifford Road, Hessay, Rotherham. Details from Keith Johnson G1PQW. Tel: (01709) 798098.

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

SHEFFIELD ARC, G0INF, NRA/RAE tuition provided. Meets at the Sheffield University Staff Club, 197 Brook Hill, Sheffield. Details from Mrs Irene Glossop G0SFH.

TYNE & WEAR

HOUGHTON-LE-SPRING ARC, G3NMD. Meets at the Dumfri Royal British Legion, Dumfri, Fencehouses, Tyne & Wear DH4 6LJ. Details from Foster Aungles G0A6F. Tel: 0191-584 4673.

SOUTH TYNEDSIDE ARS, G0XWK. Meets at the Boldon Scout Hut, Grey Horse Car Park, Front Street, Boldon. Details from William Wilson M0BWL. Tel: 0191-421 9921.

TYNEMOUTH ARC G0NMM. Meets at the Linskill Centre, Linskill Terrace, North Shields, Tyne & Wear. Details from Mr G.N. Thompson G0SBN.

TYNESIDE ARS, G3ZQM. Meets at the St Teresa's Club, 2006 Heaton Road, Newcastle-upon-Tyne NE5 5HP. Details from Mr J. Pickersgill G0DZG. Tel: 0191-265 1718.

WEST YORKSHIRE

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

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

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

LEEDS & DARS, G4AAD. Meets at The Radio Shack, Yarnbury (Horsforth), RUF, Croft Grounds, Brownberry Lane, Horsforth, Leeds LS18 5HB. Details from Mr E. Howden G0BU.

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

OTLEY ARS, G3XNO. Meets at The RA0B Club, Westgate, Otley, West Yorkshire. Details from Jack Worsnop G0SNV. Tel: (01274) 636197.

PONTERFRACT & DARC, G3PQ. Meets at the Carleton Community Centre, Pontefract, West Yorkshire. Details from Colin Wilkinson G0NQE. Tel: (01977) 677006.

SPEN VALLEY ARS, G3SVC. Meets at the Old Bank WMC, Mirfield, West Yorkshire. Details from Mr J.R. Wilde G0FO. Tel: (01274) 875038.

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

WAKEFIELD RPTG GP, G0KAR. Details from Mike Chaffton G6XZ.

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

MIDLANDS

BEDFORDSHIRE

DUNSTABLE DOWNS RC, G4DDC. Meets at the Chevs House, 77 High Street South, Dunstable, Beds LU6 3SF. Details from Phil Seaford G8XTW. Tel: (01525) 384419.

SHEFFORD & DARS, G3FJE. Meets at the Church Hall, Ampton, Shefford, Beds. Details from John West. Tel: (01462) 812739.

ST SWITHUN'S ARC, M0AJV. Meets at St. Swithun's Church, Rectory Rooms, Sandy, Beds. Details from Kelvin Darton G0WDD. Tel: (01767) 683179.

CAMBRIDGESHIRE

CAMBRIDGE & DARC, G2VY. Meets at the Coleridge Community College, Radesgr Road, Cambridge. Details from Ron Huntsman G3KBR. Tel: (01223) 501712.

DUKFOUR ARS, G82WM. Meets at Building 177, Imperial War Museum, Duxford Airfield, Cambs. Details from Mrs B.I. Pope. Tel: (01279) 656149.

GTR PETERBOROUGH ARC, G4EHW. Meets at the 6th Form Building, Stanground College, Farret Road, Fletton, Peterborough. Details from Alan D. Ralph G8XLH.

HUNTINGDONSHIRE ARS, G0HSR. Meets at the Meadow Centre, Meadow Road, Huntingdon. Details from David Leach G7DUJ. Tel: (01480) 431333.

MARCH & DRAS, G3PMH. Meets at the British Legion Club, Rookswood Road, March, Cambs PE15 8DP. Details from Mr J. Braithwaite G3PWK. Tel: (01353) 698885.

PETERBOROUGH R & ES, G3DQV. Details from Mr V. Edwards G8NGZ.

WSBECH AR & ELEC, CLUB, M5ARC, G4PQL, G8NED. Meets at RAFA Club, Old Market, Wisbech. Details from Alan Bingleland M0DUQ. www.wseac.org.uk

DERBYSHIRE

BOLSOVER ARS, G4RSB. Meets at the Blue Bell, High Street, Bolsover, Derbys. Details from Colin Morris G0RXT. Tel: (01246) 822856.

BUXTON RA, G4SPA. Meets at the Leewood Hotel, Buxton. Details from Derek Carson G4HHO. Tel: (01298) 25806.

DERBY & DARS, G2DJ. Meets at Carlton Road United Reform Church, Carlton Road, Littleover, Derby. Details

from Martin Shardlow G3SZJ. Tel: (01332) 556875.

EREWASH VALLEY ARG, G0PCX. Meets at The Stowell Arms Public House (between Horsely Woodhouse and Woodside). Details from Peter Russell M0AQJ.

MOUNT ST. MARY'S ARC, G4MSM. Meets at the College, Spinkhill, Sheffield. Details from Rev. P. McArdle G0DAG. Tel: (01246) 812230.

NOTTS & DERBY BORDER ARC, G4NID. Meets at Marpool United Reform Church, Chapel Street, Marpool, Ilkeston. Details from Graham Bromley G4UTN. Tel: (01773) 834308.

NUNSFIELD HOUSE ARC, G3EEO. Meets at the Nunsfeld House, Boulton Lane, Alveston, Derby. Details from William F. Smith G7PJJ.

STH DERBYS & ASHBY W ARG, G0SRC. Meets at the Moira Replan Centre, 17 Ashby Road, Moira, Swadincote, Derbyshire DE12 6DJ. Details from Mrs B. Waley. Tel: (01273) 760822.

STH NORMANTON, ALFRETON & DARC, G0CPO. Meets at the New St. Community Centre, New Street, Sough Normanton, Derbyshire. Details from Peter Gething M0CJL. Tel: 0115-955 5786.

GLOUCESTERSHIRE

CHELTONHAM AR ASSN, G5BK. Meets at the Prestbury Library, Prestbury, Cheltenham. Details from Ian Wilson G4BGW. Tel: (01452) 731956.

CHELTONHAM CLUSTER SUPP GP, G87DXC. Details from Mr A.M. Daves G0HDB. Tel: (01684) 72178.

GLOUCESTER AR & ES, G4AYM. Meets at the Churchdown School, Churchdown. Details from Mr A.J. Martin. Tel: (01452) 618830.

SMITHS INDUSTRIES RS, G4MEN. Meets at the Sports & Social Club, Evesham Road, Bishops Cleeve, Cheltenham GL52 4SF. Details from A.J. Hooper G3JMF.

STROUD RS, G4SRS. Meets at the Minchampton Youth Centre, Nr. Stroud. Details from Mr S.G. Spenser G3ILO.

WHITE NOISE LISTENING GOWNL. Details from Adrian Deane G7KOC.

HEREFORD & WORCESTER

BROMSGROVE & DARC, G3VGG. Meets at the Avoncroft Arts Centre, Bromsgrove, Worcs. Details from Mr J.F. Burford G4QAZ.

BROMSGROVE ARS, G4TUI. Meets at the Liky End WMC, Bromsgrove, Worcs. Details from Barry Taylor G0TGP. Tel: (01527) 542266.

DROTWHICH ARC, G4PVD. Meets in the Community Hall, Drotwhich Spa, Worcs. Details from Hector Wragg M1BLV. Tel: (01905) 794399.

HEREFORD ARS, G3YDD. Meets at the Civil Defence HQ, Magistrates Court, Gool Street, Hereford. Details from Tim Brigland-Taylor G0WJL. Tel: (01432) 279435.

KIDDERMINSTER & DARS, G0KRC. Meets at the Sutton Arms, Sutton Park Road, Kidderminster, Worcs. Details from Mr A.W. Saunders G0OZB. Tel: (01299) 400172.

MALVERN HILLS ARC, G4MHC. Meets on the second Tuesday of the month at the Town Club, Great Malvern. Details from Mike G3TGD. Tel: (01905) 830752, E-mail: mike@allenson.fanet.co.uk

REDDITCH RC, G4ACZ. Meets at the WYRS Centre, Ludlow Road, Redditch, Worcs. Details from Mr R.J. Mutton G3EVT. Tel: (01789) 762041.

VALE OF EVESHAM RAC, G0ERA. Meets at the BBC Club, High Street, Evesham, Worcs. Details from Mr A.C. Lindsay G4NRD. Tel: (01386) 41508.

LEICESTERSHIRE

1F ATC, G7MCD. Details from Sqn. Cmdr. Adrian Utting G1MQR.

BEAUMONOR ARC, G3BMR

DEMONTFORT UNIVERSITY, G3SDC. Open to past & present students. Details from Mr R.G. Titterton. Tel: 0116-257 7059.

HINCKLEY AR & ES, G3VGL. Meets at the United Services Club, St. Mary's Road, Hinckley. Details from Mr R.A. Bennett G8BFF. Tel: (01455) 846493.

LEICESTER RS, G3LRS. Meets at Gtross Cottage, Groby Road, Leicester LE3 9QJ. Details from Mr S.P. Hay G3VYH. Tel: 0116-224 2598.

LOUGHBOROUGH & DARC, G3RAL. Meets at Hind Leys College, Shepshed, Loughborough, Leics. Details from Chris Walker G1ETZ. Tel: (01509) 504319.

MELTON MOWBRAY ARS, G4FOX. Meets at the St. John Ambulance Hall, Asfordby Hill, Melton Mowbray, Leics. Details from Mr R. Winters G3NVK. Tel: (01664) 63369.

NATIONAL SPACE CENTRE ARS, M1NSC. Details from Mr J. Heath G7HIA.

TAMWORTH ARS, G8TRS. Details from Mr A.I. Dyson G0HJW. Tel: (01827) 830437.

WELLAND VALLEY ARS, G4WVR. Meets at The Village Hall, The Green, Great Bowden, Leics. Details from The

RAF WADDINGTON ARC, GORAF. Meets at Pyewipe Inn, Fosebank, Saxby Road, Lincoln. Details from Robert Pickles G3VCA. Tel: (01522) 528708.

SPALDING & DARS, G4DSP. Meets at The Old Fire Station, Spalding, Lincs. Details from Raymond Pearson GBELV. Tel: (01775) 711953. Web: www.sdars.org.uk

SPILSBY ARS, RS91468. Details from Clive Ironmonger G6HYF. Tel: (01790) 752712.

NORTHAMPTONS

KETTERING & DARS, G5KN. Meets at The Litacs Public House, 39 Church Street, Kettering, Northants NN14 1HD. Details from Fay Barwell G6AKS. Tel: (01536) 390954.

MID NORTHAMPTONS AR EXP, GOING. Details from Lionel Parker G5LTP.

NORTHAMPTON RC, G3GWB. Meets at the British Timken, Social & Athletic Club, Cotswold Avenue, Dunston, Northampton. Details from Norman Miller G0GBZ. Tel: (01327) 349188.

NORTHAMPTON SCOUT AR, G6NDS. Meets at Overstone Scout Activity Centre, Northampton. Details from Ian Rivett G8WPU.

PARALLEL LINES CG, G4LIP. Details from Mr P.S. Lidsay G4CLA.

NOTTINGHAMSHIRE

ARC OF NOTTINGHAM, G3RNV. Meets at the Haywood Road Community Association, Haywood Road, Mapperley Road, Nottingham NG3 6AD. Details from Ron Hague G4XOU. Tel: 0115-919 9177.

DUKIERES ARC, G4XLT. Meets at Ambleside Community Centre, Ambleside, New Otterton, Notts. Details from Colin Foster G7DXC.

HUCKNALL ROLLS ROYCE ARC, G5RR. Meets at the Hucknall Rolls Royce Sports & Social Club, Watnall Road, Hucknall, Nottingham. Details from Mr P. Hart G4JSM.

MANSFIELD ARS, G3GQC. Meets at the Debdale Park Sports & Recreation Club, Debdale Lane, Mansfield Woodhouse, Notts. Details from David Peat G0RDP. Tel: (01623) 631931.

NORTH NOTTS DATA GROUP, G0WNN. Details from Tony Jenkins G8TBF.

SIEMENS ARC, G8ZK, G8GQ. Meets at the GPT Sports Ground, Beeston, Nottinghamshire. Details from Chris Archer G4VFK. Tel: 0115-943 3387.

SOUTH NOTTS ARC, G0QAU. Meets at the Fairham Community College, Farnborough Road, Clifton, Nottingham NG11 9AE. Details from Gary Bishop G0WJG. Tel: (01509) 672846.

WORKSOP ARS, G3RCW. Meets at the Club House, 59-61 West Street, Worksop, Nottingham S80 1JP. Details from Terry Calvert G4GSS. Tel: (01302) 743130.

SHROPSHIRE

OSWESTRY & DARC, G4TTO, G10RA. Meets at the Sweeney Hall Hotel, Sweeney, Oswestry. Details from Ant Astley G0WAA. Tel: (01691) 860545.

SALOP ARS, G3SRT, M1AXW. Meets at the Telepost Club, Railway Lane, Abbey Foregate, Shrewsbury. Details from John Burnford G0GTV. Tel: (01743) 249943. E-mail: john.burnford@virgin.net

TELFORD & DARS, G3ZME. Meets at the Dawley Bank Community Centre, Dawley, Telford, Shropshire. Details from Mr M. Vincent G3UKY. Tel: (01952) 255416.

STAFFORDSHIRE

BURTON-ON-TRENT & DARS, G3NFC. Meets at the Stapenhill Institute, Main Street, Stapenhill, Burton-on-Trent, Staffs. Details from Mr M.W. Cotton G4HBY.

CANNOCK CHASE ARS, G6SW. Meets at the Four Crosses Inn, Watling Street, Hatherton, Cannock. Details from Arnold Matthews G3FZW. Tel: (01543) 262495.

CHAD RC, G4CAR. Meets at the Swinfen Officer's Club, Swinfen, Lichfield, Staffs. Details from Bernard Jayne G8BFL. Tel: (01543) 288569.

LICHFIELD ARS, G3WAS. Meets at the Queens Head, Sandford Street, Lichfield. Details from Roger Smeethers G3MLY. Tel: (01543) 672762.

MOORLANDS & DARS, G4NHT, G1MAD. Meets at the Creta Works, Blythe Bridge, Stoke-on-Trent, Staffs ST11 9LJ. Details from Mr B.J. Blatcher G4HKG. Tel: (01782) 395793.

NEWCASTLE-U-LYME SCOUT AR COM GR, G7UQG

STOKE-ON-TRENT ARS, G3GBU. Meets at the '45' Club, 92 Lancaster Road, Newcastle-under-Lyme, Staffs. Details from Albert Allen G4DHO. Tel: (01782) 638801.

SUTTON COLDFIELD RS, G3RSC. Meets at the Rugby Club, Walmley Road, Sutton Coldfield, West Midlands. Details from Paul G. Turner G7MWD. Tel: 0121-350 4263.

WARWICKSHIRE

AVON VALLEY ARA, MORAD. Details from Mr Peter Bradham G0WJK. Tel: (01905) 724531.

MID WARWICKSHIRE ARS, G3UDN. Meets at the St. John Ambulance HQ, 61 Emcoate Road, Warwick. Details from Bernard Pittaway. Tel: (01926) 420913.

RUGBY ATS, GAAPD. Details from Tony Humphries G0OLS. Tel: (01455) 552683.

STRATFORD-UPON-AVON & DRS, G0SOA. Meets at the Home Guard Club, Tiddington, Stratford-upon-Avon, Warks. Details from Ron Horsley G0MRH. Tel: (07970) 148204.

WEST MIDLANDS

ALDRIDGE & BARR BEACON ARC, GONEQ. Meets at the Aldridge Central Hall Community Centre, Middlemore Lane, Aldridge WS9 8AN. Details from Mr C.J. Baker G0NOL. Tel: (01922) 636162.

COVENTRY ARS, G2ASF. Meets at the Binley Church Hall, Binlock Road, Coventry. Details from John Beech G8SEQ. Tel: (01203) 673999.

DUDLEY ARC, G4DAR. Meets at the Community Centre, Sedgley, Central Library, St. James Road, Dudley. Details from Tony Lucas G4LVA. Tel: (01384) 277925.

HILLCREST ARS, G0SPM. Meets at The College, Simms Lane, Netherton, Dudley, West Midlands. Details from

Stuart Viney. Tel: (01384) 232457.

HYNOCHE R & TVS, G3HPP. Meets at the Club Workshop, IMI Ltd., Sportsfield, Perry Barr, Birmingham. Details from Mr G. Nicholls. Tel: (01922) 635376.

MIDLAND ARS, G3MAR. Meets at Unit 22, 60 Regent Place, Hockley, Birmingham (jewelry quarter). Details from John A. Crane G0LAI. Tel: 0121-628 763C.

SANDWELL AMATEUR RADIO CLUB, G6WC. Meets at Sandwell ARC, Broadway, Oldbury, Warley, West Midlands B68 9DP. Details from Stuart Collins M0BTO. Tel: 0121-561 4663.

SIERRA HOTEL ARCG, G0OBS. Details from Warwick M. Hall G4WMM.

SOLIHULL ARS, G3GEI. Meets at The Shirley Centre, 274 Stratford Road, Shirley, Solihull, West Midlands. Details from Paul Gaskin G8AYT. Tel: 0121-783 2996.

SOUTH BIRMINGHAM RS, G3OHM. Meets at Hampstead House, Fairfax Road, West Heath, Birmingham. Details from The SBRs Secretary.

STOURBRIDGE & DRS, G6QI, G6SRS. Meets at the Old Swinford Hospital/School, Stourbridge, West Midlands. Details from Tom Edwards.

WEST BROMWICH CENTRAL RC, G4WCC. Meets at The Sandwell Public House, High Street, West Bromwich, West Midlands. Details from Ian Letch G0PAI. Tel: 0121-951 2884.

WEST MIDLANDS POLICE ARC, G0COP, G1WMP. Details from Steven Jones G6LRL.

WILLENHALL & DARS, G4ETW. Meets at The Liberal Club, Villiers Street, Willenhall, West Midlands. Details from Dave Bradbury. Tel: (01902) 411252.

WOLVERHAMPTON ARS, G8TA. Meets at the Electricity Board Sports Club, St. Marks Road, Chapel Ash, Wolverhampton. Details from Mrs J. Smith. Tel: (01902) 751936.

WORDSLEY RC, G4WRA. Meets at the Brick Maker's Arms, Mount Pleasant, Brierley Hill, West Midlands. Details from Andy Evans G1PKZ.

LONDON & CENTRAL

BERKSHIRE
ARBORFIELD ARC, G3IHM. Details from Mrs E.W. Harding 2E1AUQ.

BRACKNELL AEC, G4BRA. Meets at the Coopers Hill Community Centre, Bagshot Road, Bracknell, Berks. Details from John Elerton G3NCC.

BURNHAM BEECHES RC, G3WR. Meets at the Farnham Common Village Hall, Victoria Road, Farnham Common, Bucks. Details from Mrs Eileen Christiet G6EIL. Tel: (01628) 625720.

MAIDENHEAD & DARC, G3WOL. Meets at the Red Cross Hall, The Crescent, Maidenhead, Berkshire. Details from Neil Savin G0SVN. Tel: (01628) 626210.

NEWBURY & DARS, G5XV. Meets at the Rugby Club, Monk's Lane, Newbury. Details from Mark Slade M0CUC. Tel: (01488) 638985.

READING ARC, G3ULT. Meets at the Woodley Pavilion, Woodford Park, Haddon Drive, Woodley, Reading. Details from Marnoch Standon G0JMS. Tel: 0118-972 3504.

BUCKINGHAMSHIRE

AYLESBURY VALLE RS, G4VRS. Meets at the Harwick Village Hall, Aylesbury, Bucks. Details from Mr L.I. Copley G0DFC.

CHESSHAM & DARS, G3MDG, G1MDG. Meets at the White Hill Centre, Chessham, Bucks. Details from Mr T.J. Thirwell G0VFW. Tel: (01442) 832169.

CHILTERN ARC, G3CAR. Details from Roy Page G4YAN. Tel: (01494) 534216.

MILTON KEYNES ARS, G3HU. Meets at Bletchley Park Museum (The Green Room, B Block Annex), Wilton Avenue, Bletchley, Milton Keynes. Details from Mrs J. Battersby M1EPL (Secretary) on (01908) 565636 or Frank Collins M0RPM (Chairman) on (01234) 713148.

MILTON KEYNES SCOUT ARS, G0SMK. Meets at The Quaries, M.K. Scout Campsite, Cosgrove. Details from Mr P.A. Orchard G0RYZ. Tel: (01908) 648186.

GREATER LONDON

ADDISCOMBE ARC, G4ALE. Meets at the Lion Inn, Pawnsors Road, Croydon. Details from Mr Q.G. Collier G3WRP. Tel: 0206-653 6948.

BARKING R & ES, G3XBF. Meets at the Parkside Community Centre. Details from Bill Chewter G0QJK. Tel: (01708) 474443.

BROMLEY & DARS, RS9030. Meets at the Victory Social Club, Kechill Gardens, Hayes, Bromley. Details from Alan G. Messenger G0TLK.

CLIFTON ARS, G3GHN. Meets at the Kidbrooke House, Community Centre, 90 Mycenae Road, London SE3 7SE. Details from Mr J. Vesney G7BH4.

CRYSTAL PALACE & DRC, G3VCP. Meets at the All Saints Church, Parish Rooms, Beulah Hill, London. Details from Bob Burns G30OU. Tel: (01737) 552170.

DARENTH VALLEY RADIO, G0KDV. Meets at the Crockenhill Village Hall, Swanley, Kent. Details from Mr K.W. Halls G8VJG. Tel: (01322) 663022.

ECHELDFORD ARS, G3UES. Meets at The Community Centre, St. Martin's Court, Kingston Crescent, Ashford, Middlesex. Details from Robin Hewes G3DTR. Tel: (01784) 456513.

EDGWARE & DRS, G3ASR. Meets at the Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware, Middlesex. Details from Stephen Sharp G0PQB. Tel: 0208-953 2164.

HAVERING & DARS, G4HRC. Meets at the Fairyties Arts Centre, 51 Bilet Lane, Hornchurch, Essex.

RS OF HARROW, G3EPX. Meets at the Harrow Arts Centre, Uxbridge Road, Hatch End, Middlesex. Details from Mr C. Fiel G4AUF. Tel: (01895) 621310.

SINETHORNE RC, G3SRA, G2HR, G8CSA. Meets at the Chingford Adult Education and Community Centre, Friday Hill House, Simmons Lane, Chingford, London E4 6JH. Details from Dave Christy G0K4C. Tel: 0208-504 2831.

MITCHAM & DISTRICT ARS. Meets at the ATC Hut, Commonside West, Mitcham, Surrey CR4 4HB. Details from Mr M. Knott G0WCA.

SOUTHGATE RC, G3SFG. Meets at the Winchmore Hill Cricket Club, Firs Lane, London N21 3ER. Details from Mr D.F. Berry G4DFB.

ST. DUNSTONS COLLEGE ARS, G4SDC. Details from Sam Kennard G4OHH. Tel: 0181-690 1274.

SURREY RADIO CONTACT CLUB, G3SRC. Meets at the T.S. Terna Nova, 34 The Waldrons, Croydon, Surrey. Details from Maurice Fagg G4DDY. Tel: 0208-669 1480.

WEST LONDON ARS, RS95599. Details from Robin Clay G0VJI.

WHITTON ARC, G0MIN. Meets at the Whitton Community Centre, Percy Road, Whitton. Details from Ian Clabon G0OFN. Tel: 0208-894 913L.

HERTFORDSHIRE

BISHOPS STORTFORD ARS, G5ZG. Meets at the Royal British Legion Club, Windhill, Bishop's Stortford, Herts. Details from Tony Judge G0PQP. Tel: (01279) 506933.

DACORUM ARTS, G7RIH, G0WH. Meets at the Guide Meeting Rooms (next to the Royal British Legion), Queensway, Hemel Hempstead. Details from Ian Hamilton G0TCD. Tel: (01442) 211925.

HODDESDON RADIO CLUB, G0TSN. Meets at the Rye Park Conservative Club, Rye Road, Hoddesdon, Herts. Details from Don Platt G3JUN. Tel: 0208-292 3678.

MINRAM CONTEST GP, M0ABC. Details from Alan Holdsworth G800. Tel: (01707) 392950.

RADIO SCOUTING TEAM, G8ZBST. Meets at Tolmers Scout Camp, Tolmers Road, Cuffley, Herts EN6 4JS. Details from Mill Lvens G2CKB. Tel: (01952) 558493.

STEVENAGE & DARS, G3SAD. Meets at the Stevenage Resource Centre, Chells Way, Stevenage, Herts SG2 0LT. Details from Don Bache M0XJP. Tel: (01462) 434611.

VERULAM ARC, G3VER, G0VER. Meets at the RAF Association HQ, New Kent Road, St. Albans, Herts. Details from Walter Craine G3PWF. Tel: (01923) 262180.

WELWYN & HATFIELD ARC, G3WGC. Meets at the Royal Naval Association, Black Fan Road, Welwyn Garden City, Herts. Details from Dean Jackson G7PKF. Tel: (04973) 580649.

SURREY

BENTLEY ARC, G0VZS. Details from Derek Gilbert G0NFA.

CATERHAM RG, G0SCR. Details from Mr P.N. Lewis G4APL.

COULSDON AMATEUR TRANS. SOC., G4FUR. Meets at St. Swithuns Church Hall, Grovelands Road, Purley, Surrey. Details from Andy Briens G0KZT. Tel: (01737) 552139.

DORKING & DRS, G3CZU, G7DOR. Details from John Greenwell G3AEZ. Tel: (01306) 631236.

FARNBOROUGH & DRS, G4FRS. Meets at The Community Centre, Meudon Avenue, Farnborough, Hants. Details from Mr M. Hearsay G8ATK. Tel: (01252) 715765.

GUILDFORD & DRS, G6GS. Meets at the Guildford Model Engineers HQ, Stoke Park, Guildford, Surrey. Details from Stella Whrbourn G0SWE.

KINGSTON & DARS, G3KIN. Details from Mrs Mary Ashdown G0BQV.

REIGATE ATS, G5UK, G7RAT. Details from Mr A.C. Embling G1LNT. Tel: (01883) 344723.

SUTTON & CHEAM RS, G2XP, G7SAC. Meets at the Sutton United Football Club, Borough Sports Ground, Gander Green Lane, Sutton, Surrey. Details from John Puttock G0SWV. Tel: 0208-644 9945.

THAMES VALLEY ARS, G3VTS. Meets at the Thames Ditton Library, Watts Road, Gigg's Hill, Thames Ditton, Surrey. Details from Cdr. J. Pegler G3ENI. Tel: (01483) 284279.

WIMBLEDON & DARS, G3WMM. Meets at St. Andrews Church Hall, Herbert Road, Wimbledon, London. Details from Mr Reg Blackwell M1EEK. Tel: 0208-696 9857.

SOUTH & SOUTH EAST

EAST SUSSEX
BRIGHTON & DRS, G4GQR. Meets at the Roast Beef Bar, Brighton Racecourse, Elm Grove, Brighton. Details from Mr P.J. Fellingham.

CROWBOROUGH DARS, G0CRW. Meets at the Plough & Horses, Walshes Road, Janis Brook. Details from Mrs M. Clark. Tel: (01892) 663666.

EAST SUSSEX AMATEUR TV GROUP, RS178475 was G83VX. Details from Keith Ellis G8HGM. Tel: (01323) 720220.

SOUTHDOWN ARS, G3WQK. Details from Jim Harris G4DRV. Tel: (01323) 726479.

THE QRZ ARC OF SUSSEX, G83VX. Meets at the Coach Station, Watling Road, Eastbourne. Details from Stuart Constable M0CWH. Tel: (01435) 863902.

HAMPSHIRE

ANDOVER ARC, G0ARC. Meets at the Village Hall, Wickham, Andover, Hants. Details from Mr R.S. Coleman G0WYD.

BASINGSTOKE ARC, G3TCR, G8JYN. Meets at the GEMS Social Club, Lister Road, Basingstoke, Hants. Details from Bob Brown M0CJJ.

FAREHAM & DARC, G3VEF. Meets at the Portchester Community Centre, Westlands Grove, Portchester, Hants. Details from Andrew Sinclair G0AMS. Tel: (01329) 235397.

HIGHFIELD PARK RC, G4WD. Meets at Highfield Park RC, National Air Traffic Service, Highfield Park, Heckfield, Hants RG27 0LD. Tel: (01734) 225019.

HORNDEN & DARC, G4FRS. Meets at Lovedean Village Hall, Lovedean Lane, Lovedean, Hants. Details from Stuart Swain G0FYX. Tel: (01705) 472846.

ITCHEN VALLEY ARC, G0VVR. Meets at the Scout Hut, Brickfield Lane, Chandlers Ford, Eastleigh, Hants. Details from Sheila Williams G0VNI. Tel: 023 8081 3827.

SONY BROADCAST ARC, G4SZC. Accredited C&G RAE centre. Meets at Sony Sports & Social Club, Priestley Road, Basingstoke. Details from Stephen Harding G4JGS. Tel: (01256) 55011.

SOUTH HAMPSHIRE INT. TELE SOC., G3DIT. Meets at G3JZV's QTH, space is limited. Details from Rev. T.R. Mortimer G3JZV. Tel: (02392) 649254.

SUBMARINE ARC, G3BZU. Meets at HMS Collingwood, Newgate Lane, Fareham, Hants PO14 1AS. Details from Mr W.S. Blyth G0PPH. Tel: (01329) 223288.

THREE COUNTIES ARC, G4WWR. Meets at the Bramshott Parish Inst. & Club, Headley Road, Liphook, Hants. Details from Damian Kamm G7RFV. Tel: (01428) 724456.

WATERSIDE ARS, G4JYN. Meets at the Applemore Scout HQ, Applemore, Hythe, Southampton. Details from Tony Horton G0LKS. Tel: (01703) 841794.

ISLE OF WIGHT

BRICKFIELDS ARS, G0BAR. Meets at Brickfields Horse Country Cent, Newnham Road, Brinsted, Isle of Wight. Details from Mr P. Bady.

ISLE OF WIGHT RS, G3SKY. Meets at The Old Cafe, Whitecuff Bay, Holiday Park, Bembridge. Details from Alan Reeves G4ZFX. Tel: (01983) 294309.

OXFORDSHIRE

BANBURY ARS, G0BRA. Meets at St. John's Church Social Club, South Bar, Banbury, Oxon. Details from Mr R.S. Marsden G1YSY. Tel/FAX: (01295) 253509.

HARWELL ARS, G3PIA. Meets at the Social Club, Harwell Laboratory, Didcot, Oxon. Tel: (01235) 223250.

OXFORD & DARS, G5LO. Meets at the Grove House Club, George Street, Summertown, Oxford. Details from Mr D. Walker G3BLS. Tel: (01865) 247311.

VALE OF WHITE HORSE ARS, G5RF, G4WVH, G0VWH. Meets at The Fox, Stevenston. Details from Ian White G3SEK. Tel: (01235) 531559.

WEST SUSSEX

CHICHESTER ARC, G2NM. Meets at the St. Pancras Club, Chichester. Details from Graham Swann G0WSD.

CRAWLEY ARC, G3WSC. Meets at the Tilgate Forest Rec. Centre, Hut 18, Tilgate Forest, Crawley, West Sussex. Details from Mr J.S. Spence G0FFI.

HORSHAM ARC, G4HRS. Meets at the Guide Hall, Denne Road, Horsham, West Sussex. Details from Alistair Watt G3ZBU. Tel: (01403) 253432.

MID SUSSEX ARS, G3ZMS. Meets at Marie Place, Leylands Road, Burgess Hill, West Sussex. Details from Mr C. Childs 2E1DCP. Tel: (01444) 244689.

T.S. VINDICATRIX ASN, G0WVB. Details from Don Still G000C.

WORTHING & DARC, G3WOR. Meets at the Lancing Parish Hall, South Street, Lancing, West Sussex.

WORTHING & DISTRICT VIDEO RG, G83VR. Details from the Treasurer. Tel: (01903) 211919 (w).

WILTSHIRE

CHIPPENHAM & DARS, G3VRE. Meets at the Sea Cadet HQ, Chippenham. Details from Jon Ainge G4LZG. Tel: (01249) 462610.

SWINDON & DARC, G3FEC. Meets at the Eastcott Community Centre, Savenake St., Swindon. Details from Den Fomest M0ACM.

TROWBRIDGE & DARC, G2BQY. Meets at the Southwick Village Hall, Southwick, Trowbridge, Wilts. Details from Ian Carter G0GRJ. Tel: (01225) 864898.

SOUTH WEST & CHANNEL ISLANDS

AVON
BRISTOL ARC, G3TAD. Meets at the Lodgeside Club, Lodge Road, Kingswood, Bristol. Details from Dave Bendry G7BYN.

GORDON ARS, G6GRG. Meets at The Ship, Redcliffe Bay, Portishead, Avon. Details from Mr R.T. White G8SPC. Tel: (01275) 874001.

NORTH BRISTOL ARC, G4GCT. Meets at the Self Help Enterprise, 7 Braemar Close, Northville, Bristol. Details from David Coxon G0GHM. Tel: (01275) 790448.

SEVERNIDE TV GROUP, G83ZZ. Meets at NBARC, Filton, Bristol. Details from Paul Stevenson G5VMM. Tel: 0117-965 5386.

SHREHAMPTON ARC, G4AAG. Meets at the TS Enterprise Sea Cadet Unit, Station Road, Shirehampton. Details from Mr R.G. Ford G4GTD. Tel: 0117-985 6253.

SOUTH BRISTOL ARC, G4WAW. Meets at the Whitechurch Fk. House, East Dundry Road, Bristol. Details from Mr L.F. Baker. Tel: (01275) 834282.

THORNBURY & SOUTH GLDS ARC, G4ABC.

AXE VALE ARC, G8CA, G7AXE. Meets at the George Hotel, Axminster, Devon. Details from Pat Cross G0GHH. Tel: (01297) 33756.

DARTMOOR RADIO CLUB, G1RCD, G0DRC. Meets at the Yehertal War Memorial Village Hall, Meavy Lane, Yehertal, Devon. Details from Ron Middleton G7LLG. Tel: (01822) 852586.

EXETER ARS, G4ARE. Meets at the Moose Centre, Spinning Path Lane, Blackboy Road, Exeter. Details from Ray Donno G3YBK.

EXMOUTH ARC, G0XRC. Meets at The Scout Hut, Marpool Hill, Exmouth.

NORMAN LOCKYER OBSERVATORY ARC, G0AXC. Meets at the Norman Lockyer Observatory, Salcombe Hill, Sidmouth. Details from Ron Hanson G0NOC. Tel: (01395) 515349.

NTE (PAIGNTON) ARS, G0OSH. Meets at Paignton Community College, Upper School, Waterleaf Road, Paignton. Details from Rod Maude G0SWM. Tel: (01803) 521066.

SOUTH DEVON ARC, G4SSD. Meets at the Hillhead, Kingswear, Devon. Details from John May G0CDB. Tel: (01803) 522995.

TORBAY ARS, G3NJA. Meets at the Highweek Family & Social Club, Highweek, Newton Abbot, Devon. Details from John Owey G3FMA. Tel: (01803) 556425.

UNIVERSITY OF PLYMOUTH ARS, G0UOP. Details from Alan Santillo G0XAV.

DORSET

BLACKMORE VALE ARS, GARBV. Meets at Shaftesbury Club for Young People, Coppice Street, Shaftesbury, Dorset SP7 8PF. Details from Mr A. Mannott G0GFL. Tel: (01202) 860741.

BOURNEMOUTH RS, G2BRB. Meets at the Kinson Community Centre, Kinson, Bournemouth, Dorset. Details from Chris R. Ellis M5AGG, Broken Ridge, Fir Tree Close, St. Leonards, Ringwood, Hants BH24 2QW. Tel: (01202) 893126.

CHRISTCHURCH ARS, G0MUD. Meets at the Siemens Plessey Sports & Social Club, Grange Road, Somerford, Christchurch, Dorset. Details from Mr K.P. Hams G7WSN. Tel: (01202) 484892.

FLIGHT REFUELLING ARS, G4RFR. Meets at the Flight Refuelling Social Club, Marley, Wimborne, Dorset. Details from Martin Axon ZEDDFZ. Tel: (01202) 693334.

POOLE RS, G4PRS. Meets at the Bourmouth & Poole CFE, Constitution Hill Site, Poole, Dorset. Details from Phil Mayer G0KUL. Tel: (01202) 700903.

PORTLAND ARC, G0VOP/G7VOP. Meets at Clifton Hotel, Grove Road, Portland, Dorset. Details from Kerry Morris G1WIK. Tel: (01305) 788591.

SOUTH DORSET RS, G3SDS. Meets at the Church Hall, Chickensell, Weymouth, Dorset. Details from John Rose M0BQO. Tel: (01305) 832057.

SWANAGE & PURBECK ARC, M0BLJ. Meets at Kings Arms, Langton Matravers, Dorset. Details from Peter Wakefield M1ZWCH/M3WCH. Tel: (01929) 424413.

WESSEX AMATEUR WIRELESS CLUB, G1WAW. Details from Ken Powell G1NCG. Tel: (01202) 549376.

JERSEY

JERSEY ARS, G3JDCV. Meets at the German Signal Station, Rue Baal, La Moya, St. Brelade. Details from Mrs Anne Mourant M0BJU. Tel: (01534) 734948.

SOMERSET

PRESTON COMMUNITY SCHOOL ARC, G0PCS. Details from Craig Douglas G0HJD. Tel: (01935) 71131.

TALUNTON & DARS, G3XZV. Meets at The Memorial Hall, Trull, Taunton. Details from David Rosewar M0CIF.

WEST SOMERSET ARC, G0OWX. Meets at the West Somerset Community College, Minehead, Somerset. Details from Alan Elliott G7RSU. Tel: (01643) 707207.

WINCANTON ARC, G0WRA. Meets at King Arthur's Community School, West Hill, Wincanton. Details from Mr G.A. Fingerhut G0ENW. Tel: (01963) 370506.

YEOVIL & DARC, G3CMH, G8YEO. Meets at the British Red Cross HQ, 72 Grove Avenue, Yeovil, Somerset. Details from George Davis G3ICQ. Tel: (01935) 425669.

ESSEX

BRAINTREE & DISTRICT AMATEUR RADIO SOCIETY, G3XG. Meets at the Baintree Hockey Club, Church Street, Bocking, Baintree. Details from John M5AJB. Tel: (01787) 480947.

CHELMSFORD ARS, G0MWT. Meets at the Marconi Social Club, Beehive Lane, Chelmsford, Essex. Details from David Bradley M0BQC. Tel: (01245) 602838. E-mail: cars@g0mwt.org.uk

CLACTON RADIO CLUB, G3CRC. Details from Mr D. Fitzpatrick M0CHL.

COLCHESTER ARS, G3VCO. Meets at the Colchester Institute, Sheepee Road, Colchester. Details from Frank R. Howe G3FUJ. Tel: (01206) 851189.

DENGIE HUNDRED ARS, G0UTT, G7SDH. Meets at the Henry Samuel Hall, Manningtree, Essex. Details from Mrs Christine Wade. Tel: (01621) 772986.

HARLOW & DARS, G6UT. Meets at the Mark Hall Barn, First Avenue, Harlow, Essex. Details from Len Blackstone G7UFF. Tel: (01279) 832700. FAX: (01279) 864973.

HARMCH ARIG, G0GRH. Meets at the Park Pavilion, Barrack Lane, Harwich. Details from Eugene Kraft G4FTP.

LOUGHTON & EPPING FOREST ARS, G4ONP. Details from Marc Litchman G0TDC. Tel: 0208-502 1645/(07803) 023501.

SOUTH ESSEX ARS, G4RSE. Meets at the Paddock, Long Road, Convey Island, Essex. Details from Mrs Betty Maynard G6LUO. Tel: (01268) 695474.

SOUTHEAST & DARC, G5QK. Meets at the Alexandra Yacht Club, Clifton Parade, Southend-on-Sea, Essex. Details from Alan Radley G0TMM. Tel: (01268) 741229.

STANFORD-LE-HOPE & DARC, G4SLH. Meets at the St Joseph Parish Rooms, Scratton Road, Stanford-le-Hope, Essex. Details from Ken Thompson G4PAD. Tel: (01375) 671236.

VANGE ARS, G3YCW. Meets at the Barnstable Community Centre, Basildon, Essex. Details from Mrs D. Thompson. Tel: (01268) 552606.

KENT

BREDHURST RX & TX SOC., G0BRC. Meets at Rock Avenue Working Mens Club, Rock Avenue, Gillingham, Kent. Details from Mr T.M. Wheeler G7MIM.

CRAY VALLEY RS, G3RCV, G1RCV. Meets at the Progress Hall, Admiral Seymour Road, Eatham, London SE9. Details from Richard Perzyna G8TBT. Tel: (01689) 602948.

DOVER RADIO CLUB, G3YMD. Meets at the Dover Grammar School for Boys, Astor Avenue, Dover, Kent. Details from Mr J. Hale G3FTH. Tel: (01304) 852773.

EAST KENT RADIO SOCIETY, G0EKR. Meets at St. Bartholomew's Church Hall, Heme Bay, Details from Paul Nicholson G3VJF. Tel: (01227) 743070. FAX: (01227) 742288.

HASTINGS ELEC. & RC, G6HH, G1JHH, G6LL. Meets at West Hill Community Centre, Croft Road, Hastings, East Sussex. Details from Mr J. Boothroyd G0MTI. Tel: (01223) 732656.

HILDERSTONE ARS, G0HRS. Meets at Hilderstone A.E.C., Broadstairs, Kent. Details from Mr G. Shaw M0AQA.

HOME COUNTIES ATV GRP, G6HCT. Meets at the Binfield Club, Binfield (near M4/J10). Details from Mr A. Brooker G4WZ.

MAIDSTONE YMCA ARS, G3TRF. Meets at YMCA Sports Centre, Meirose Close, Maidstone, Kent. Details from Colin Wilson G0VAR. Tel: (01622) 736636.

MEDWAY ARTS, G5MW, G8MWA. Meets at Tunbury Hall, Catkin Close, Tunbury Avenue, Walderside, Chatham. Details from Mr J. Hale G3FTH.

NORTH KENT RS, G4CW. Meets at The Pop-in-Parlour, Grahams Road, Bexleyheath, Kent. Details from Mr A.V. Fribbens G8MLQ. Tel: (01474) 365694.

SWALE ARX, G4SRC, G6SRC. Meets at the Ivy Leaf Club, Dover Street, Sittingbourne, Kent. Details from Gordon Powell M0AKA. Tel: (01795) 665559.

THE MORSE CLUB, G4OXE. Meets at The Five Wents Memorial Hall, Swanley/Hextable Road, Details from Ken M3CZA. Tel: 0208-306 3544.

WEST KENT ARS, G3WKS. Meets at the St. Marks School Hall, Tunbridge Wells, Kent. Details from Malcolm Sheppard G4FWG. Tel: (01892) 652272.

NORFOLK

ANGLIA TELEVISION ARS, G0TVX. Meets at Anglia TV, Norwich NR1 3JG. Details from Jim Bacon G3YLA. Tel: (01603) 615151.

GREAT YARMOUTH RS, G3YRC. Meets at the Bradwell Community Centre, Bradwell, Great Yarmouth, Norfolk. Details from Mr A.D. Besford G3NHU.

GRESHAM'S SCHOOL ARC, G3PXO. Details from Rev. R.N. Myerscough G3PXO.

KINGS LYNN ARC, G3XYZ. Details from Derek Franklin G0MQL.

NORFOLK ARS, G4ARN. Meets at Norwich Aviation Centre, Norwich Airport. Details from John Wadman G0ZVD. Tel: (01953) 604769.

NORTH NORFOLK ARG, G8ZMC. Details from Tony Smith G4FAI. E-mail g4ai@connectfree.co.uk

SUFFOLK

BURY ST. EDMUNDS ARS, G2TO. Meets at the Clufford School, Bury St. Edmunds, Suffolk. Details from George Woods G3LPT.

FELIXSTOWE & DARS, G4ZFR. Meets at the Orwell Park School, Nacton, Near Ipswich. Details from Paul Whiting G4YQC. Tel: (01473) 642595.

FRAMLINGHAM COLLEGE ARC, M0CBB. Tel: (01728) 727232.

IPSWICH RADIO CLUB, G4IRC. Meets at the Golden Hind, Nacton Road (3rd Wednesdays at The Hollies, Bucklesham Straight Road), Ipswich. Details from Keith Gaunt G4CIY. Tel: (01394) 420226.

LEISTON ARC, G0TUQ. Meets at Leiston Town Athletic Assn., Victory Road, Leiston, Suffolk. Details from Paul Cattermole M3MIG. Tel: (01728) 746044.

LOWESTOFT DRS, G3JRM. Meets at The George Barrow Hotel, Oulton Road, Lowestoft. Details from Phil Holden G0JSG. Tel: (01502) 585448.

MARTLESHAM RS, G4MRS. Meets at the BT Laboratories, Martlesham Heath, Ipswich, Suffolk. Details from Darren Hatcher. Tel: (01473) 644475.

SUBBURY & DRA, G0SMV, G7SRA. Meets at the Old School, Wells Hall Road, Great Comard, Subbury, Suffolk. Details from Bryan Pantton G1TWY.

SUFFOLK DATA GROUP, G87MOM. Details from Peter Fryke G8HUE. Tel: (01473) 631313.

NORTH WALES

CLWYO

CONWAY VALLEY ARC, G6WTM. Meets at the Studio, Penrhos Road, Colwyn Bay, Chwyd. Details from Mr R.W. Evans G6WPM. Tel: (01745) 855068.

HALYUN & DARS, G6WHRG. Details from Mr D. Austin G6WJXG.

NORTH WALES RS, G6WNR. Meets at the Old YMCA, Queen's Drive, Colwyn Bay, Chwyd. Details from Ted Supton G6WDSJ. Tel: (01745) 336939.

WREXHAM ARS, G6W4WM. Meets at the Community Centre, Meeswyn Road, Wrexham. Details from Mr P. Moran G6W0ER.

GWYNEDD

MEIRION ARS, G6W4ZP. Meets at the Royal Ship Hotel, Dolgellau, Gwynedd. Details from Geravase Chavasse G6W4URJ. Tel: (01341) 421028.

PORTHMADOG & DARS, G6W0VI. Meets at The Yacht Club, The Harbour, Porthmadog, Gwynedd. Details from Mr G. Cadwaladr M6W1DFN.

THE DRAGON ARC, G6W4TTA. Meets at the Ebenezer

Church Hall, Lon Foel Graig, Llanfajwll, Isle of Anglesey. Details from Stewart Rolfe G6W0ET. Tel: (01248) 362229.

POWYS

POWYS ARC, G6W4HVN. Meets at the ATC HQ, Park Lane, Newtown, Powys. Details from Mrs Jean Brown ZW1CZZ. Tel: (01686) 640814.

SOUTH WALES

DYFOD

ABERPORTH YMCA, G6W4SZV. Meets at the Hut B17, The Airfield, Aberporth, Details from Mr G. Caruther G6W4HGJ. Tel: (01239) 811205.

ABERYSTWYTH & DARS, G6W0ARA. Meets at the Scout Hut, Plasrug Avenue, Aberystwyth. Details from John Woodward G6W4ZXL. Tel: (01970) 890657.

CARMARTHEN ARS, G6W4YCT. Meets at The Aelwyd Care Home, Carmarthenshire County Council, Tregwrn Road, Llanguor, Carmarthen SA31 3BS. Details from Mr W.D. Hughes G6W4ZXL. Tel: (01267) 231359.

CLEDDAU ARS, G6W0SYG. Details from Trevor Perry G6W4XQK. Tel: (01646) 600725.

LLANELLI ARS, G6W0EZO. Meets in the Furnace Community Hall, Furnace Square, Llanelli, Details from Roy Jones G6W0KJZK. Tel: (01554) 820207.

PEMBROKESHORE RS, G6W0EJC. Meets at Furzy Park Community Centre, Furzy Park, Haverfordwest, Pembrokeshire. Details from Ian M. Jones M6W0CAB. Tel: (01437) 763028.

GWENT

ABERGAVENNY RS, G6W4GFL. Meets at the Hill Residential College, Pen-y-Pound, Abergavenny, Gwent. Details from Glyn Hughes G6W0DQY. Tel: (01633) 483186.

BLACKWOOD & DARS, G6W6GW. Meets at the Oakdale Comprehensive School, Oakdale, Blackwood, Gwent. Details from John Evans G6W8IT. Tel: (01495) 225178.

EBBW VALE COLLEGE RS, G6W0IWW. Meets at the Gwent Tertiary College, Ebbw Vale Campus, College Road, Ebbw Vale, Gwent. Details from Mr T. Hayden G6W0HCH. Tel: (01495) 305192.

NEWPORT ARS, G6W4EZW. Meets at the Brynigas Community Centre, Brynigas Road, Newport, Gwent. Details from Paul Nichols.

PONTYPOOL ARS, G6W3RNH. Meets at the Settlement, Rockhill Road, Pontypool, Gwent. Details from Graham Smith G6W0OLZ.

MID-GLAMORGAN

BRIDGEND & DARC, G6W4NLP. Meets at the Club Brynnyen, Brynnyen, Bridgend. Details from Alan Hulmes. Tel: (01656) 721574.

HOOPER (MERTHYR) ARC, G6W3RDB. Meets at the Hoover Sports Pavilion, Hoover Ltd., Pentrebach, Merthyr Tydfil, Mid Glamorgan. Details Robert Cummings G6W0RVG.

MID GLAMORGAN ARG, M6W0CNA. Meets at Aberkenfig Sports & Social Club. Details from Mervyn Carey G6W4VSE. Tel: (01656) 734668.

SOUTH GLAMORGAN

BARRY ARS, G6W3VNL. Meets at Sully Sports & Leisure Club, South Road, Sully, S. Glamorgan. Details from Richard Mortimore G6W4BVJ. Tel: (01446) 738756.

HIGHFIELDS ARC, G6W4LFO. Meets at the Highfields Physically Handicapped Centre, Allensbank Road, Cardiff. Tel: (01222) 561542.

WEST GLAMORGAN

PORT TALBOT (BS PLC) ARS, G6W3EOP. Meets at the British Steel PLC Sports & Social Club, Margam, Port Talbot, West Glamorgan. Details from Mr J. Chinnock M6W0AEG.

SWANSEA ARS, G6W4CC. Meets at the Applied Sciences Building, Swansea University. Details from David Williams G6W4BJU. Tel: (01792) 519046.

SCOTLAND WEST & WESTERN ISLES

CENTRAL REGION

FALGIRK & DARS, G6W0FRK. Details from Scott Waterall G6W0KBU.

STIRLING & DARS, G6W6MX. Meets at Bandede Industrial Estate, Throsk, Nr. Stirling. Details from John Shery G6W0AZC. Tel: (01324) 824709.

DUMFRIES & GALLOWAY

WIGTOWNSHIRE ARC, G6W4RTV. Meets at the Aird Unit, Stranraer Academy, Stranraer, (entrance from Cairnpot Road). Details from Neil Macdonald G6W4LQS.

STRATHCLYDE

AYR ARC, G6W0AYR. Meets at the Cridal Leisure Centre, Ayr. Details from Peter Sturgeon M6W0BQP.

CENTRAL SCOTLAND FM GROUP, RS3872B. Details from Thomas Stalker M6W7TZU. Tel: (01698) 816793.

DALRY ARC, M6W0ARG. Meets at The Turf, In Dalry Court, Hill Street, Dalry. Details from Alex McKeeman M6W0ABM. Tel: (01294) 823295.

DUNOON & DARS, G6W0COD. Meets at the Edward Street Community Centre, Edward Street, Dunoon. Details from A.B. Horton G6W0BUL. Tel: (01369) 840217.

HELENSBURGH ARC, G6M4HEL. Details from G. Capstick G6W7OAF. Tel: (01346) 675922.

INVERCLYDE ARC, G6W0GNK. Meets at the Cardwell Bar, Cardwell Road, Gourcock, Strathclyde. Details from Andrew Gwens G6W3YOR. Tel: (01475) 638226.

KILMARNOCK & LOUDOUN ARC, G6W0ADX. Meets at the Hurford Community Centre, Cessnock Road, Hurford. Details from Steve Campbell G6M4OSS. Tel: (01560) 483800.

LARGS & DARS, G6W0VWG. Details from Mr J. Clough G6W0MDD. Tel: (01475) 568584.

LORN ARS, G6W0LRA. Details from T. Olsen G6W0EQV. Tel: (01866) 2580.

MID LANARK ARS, G6M3PXK. Meets at the Newarthill Community Ed. Cent., High Street, Newarthill,

Motherwell, Lanarkshire ML1 5GU. Details from John Newry G6W0XFK. Tel: (01698) 822860.

MILTON OF CAMPSIE ARS, G6M0MOC. Meets at The Red Cross Hall, Kirkintilloch. Details from John MacKenzie G6W0HJU. Tel: (01360) 212954.

PAISLEY ARC, G6W0PYM. Meets at the Paisley YMCA Hall, 5 New Street, Paisley PA1 1XU. Details from John Quagley G6M0TQA. Tel: (0141) 889 6860.

SCOTTISH DIGITAL COMMS. GRP, G6M7VSR. Details from Stuart Clink G6M1VBC. Tel: (01698) 884803.

WEST OF SCOTLAND ARS, G6S4AGG. Meets at the Multi Cultural Centre, 21 Rose Street, Glasgow. Details from Hon. Sec.

SCOTLAND EAST & HIGHLANDS

BORDERS

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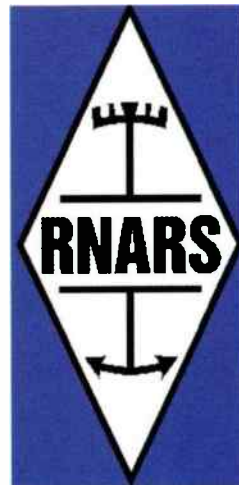
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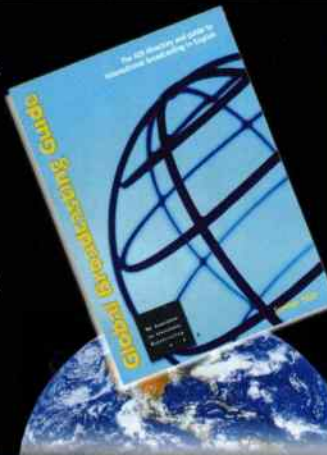


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