

# shortwave magazine

October 1995 £2.25 ISSN 0037 - 4261

**PORTISHEAD RADIO  
CELEBRATES**

**75  
YEARS**

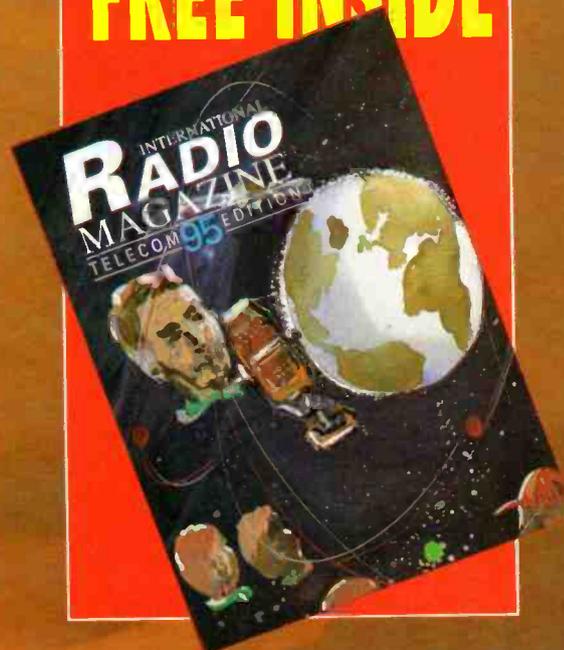


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*You're Just Not A Serious Listener Without SWM*

**FREE INSIDE**



**Sony CRF-V21 Executive World  
Band Receiver Revisited**

**2-Valve VHF Receiver - Part 2**

**How the Wartime Y Stations  
Operated**

**Stand Up the Real Short Wave  
Listener**



*Plus*

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- **Mods for the Saisho R700D**

**AIR TATTOO  
REPORT**

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  - Recommended!!
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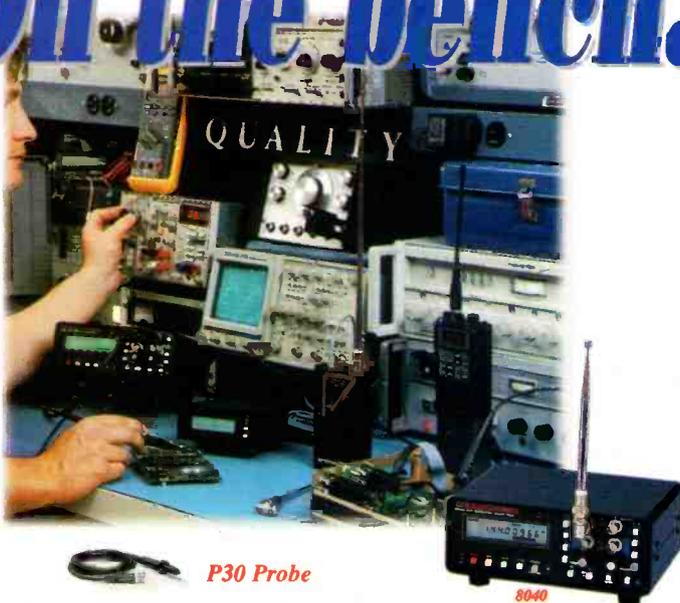


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# On the bench...



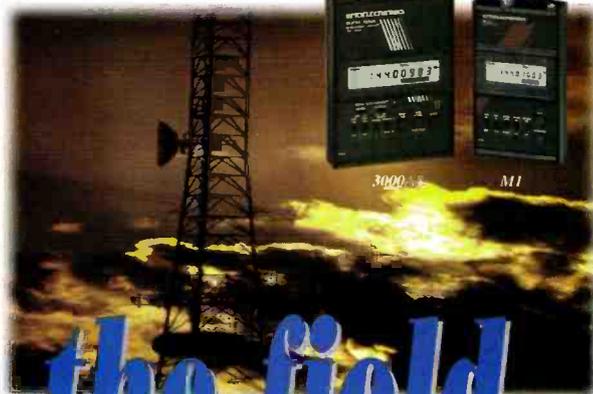
## 3000A+

- Frequency Counter •10Hz - 3GHz range •Digital Filter reduces random noise & oscillation •Digital Auto Capture locks on first reading to pass filter •6 hour NiCads •10 Digit Backlit LCD •16 segment RF bargraph •250MHz direct count
- Serial Data Interface •Multi Function: Period, Ratio, and Time Interval Measurement •Dual High Impedance Amplifiers
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*Optional: +/- .2ppm TCXO Timebase*

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# in the field...

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the  
new  
Cub



CC30 Case

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*Ask About*

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# short wave magazine

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## Cover Subject

The dramatic picture on this month's cover shows microwave antennas at Portishead Radio station. This year marks the 75th anniversary of Portishead Radio, as reported on page 8.



**DISCLAIMER.** Short Wave Magazine wishes in no way to either condone, or encourage, listeners to monitor frequencies and services which are prohibited by law. We respectfully refer you all to both the Wireless Telegraphy Act 1949, and the Interception of Communications Act 1985. Some of the products offered for sale in advertisements in this magazine may have been obtained from abroad or from unauthorised sources. *Short Wave Magazine* advises readers contemplating mail order to enquire whether the products are suitable for use in the UK and have full after-sales back-up available. The Publishers of *Short Wave Magazine* wish to point out that it is the responsibility of readers to ascertain the legality or otherwise of items offered for sale by advertisers in this magazine.



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## Good Listening

## SWM SERVICES

### Subscriptions

Subscriptions are available at £25 per annum to UK addresses, £28 in Europe and £30 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 £42(UK) £47 (Europe) and £51 (rest of world).

### Components for SWM Projects

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

The printed circuit boards for SWM projects are available from the SWM PCB Service, Badger Boards, 80 Clarence Road, Erdington, Birmingham B23 6AR. Tel: 0121-384 2473.

### Photocopies and 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, or whatever 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 are £2.30 each, photocopies are also £2.30 per article, plus £0.50 for subsequent parts of serial articles.

Binders, each taking one volume are available for £5.50 plus £1 P&P for one binder, £2 P&P for two or more, UK or overseas. Please state the year and volume number for which the binder is required. Prices include VAT where appropriate.

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### Technical Help

We regret that due to Editorial time scales, replies to technical queries cannot be given over the telephone. If you require help with problems relating to topics covered by SWM, please write to the Editorial Offices, we will do our best to help and reply by mail.

# editorial

Inside this issue you will find your own free copy of the 16-page *International Radio Magazine*. This has been compiled by the Association for International Broadcasting for their stand at Telecom 95. I hope that you find it interesting.

### The Detailed Spectrum Investigation

Our 'Amateur Bands Round-up' columnist, Paul Essery GW3KFE wrote the following piece for his column this month. However, I felt that it is serious enough to warrant a place on this page, so here it is. You can help the cause by writing a suitable letter, as detailed below.

"The Detailed Spectrum Investigation is a Consultative Document put out by the Radiocommunications Authority in conjunction with all the other European countries. Now, *DSI 1* proposes cutting a chunk out of the middle - yes, the middle, would you believe! - of the 10GHz band. As for *DSI 2*, it offers a few sops here and there, but balances this against the loss of the top and bottom of the 430MHz band. Overall, radio amateurs will lose out! The losses on 430MHz, for example, would mean that amateur TV would no longer be able to use that band, and that all the existing packet radio linkings would have to be relocated.

The Radio Society of Great Britain is sending a carefully-reasoned, forty-page reply to the proposals in the Consultative Document. A brief summary appeared in the August 1995 issue of RSGB's *Radio Communication* magazine.

If you are non-technical, write to say you have studied the RSGB comments and you agree with their reasoning - there's not much mileage to a letter that just says something like 'I think it's a blooming liberty!'. If you are a technical type, please write a letter giving reasoned 'why-it-shouldn't-happen' evidence. Send your letters to: Chairman, LAC, c/o Radio Society of Great Britain, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE.

Please do write - if you aren't a member, say so, but still write. To have letters from non-members in the dossier is an enormous boost to the case. Get your friends to write as well.

**Let us be quite clear about this; if DSI gets through unaltered, I think I can say that we will be the last generation to enjoy the privileges of amateur radio!"**

Dick Ganderton G8VFH

# letters

The Editor reserves the right to shorten any letters for publication but will try not to alter their sense. Letters must be original and not have been submitted to any other magazines. The views expressed in letters published in this magazine are not necessarily those of *Short Wave Magazine*.

### Dear Sir

I recently sent my scanner, a Regency MX7000, to the AOR (UK) workshop in Derbyshire to get a new keypad. I was pleased that they were willing and able to take it in as it is not an AOR (though it is a 'clone' of one) nor had I bought it from there. The new keypad is fine but more to the point, they sorted out a long standing problem with the displayed frequencies being 5kHz below the heard one.

For years I had got used to keying in frequencies 5kHz below what I wanted to hear, and on reflection the fault may have been there from the start, with me assuming the speaker quality was causing scratchy signals. The fault was a nuisance when I wanted to search sequentially through the bands that have 25kHz channel spacing, because a step of 5kHz had to be used instead of 25kHz to avoid missing faint signals. This meant scanning past four superfluous frequencies for each 'real' one.

There may be lots of scanner owners out there who are just putting up with this annoying error, so its worth 'phoning around to get it fixed. One person told me his hand-held scanner was 10kHz adrift, so he often couldn't hear the displayed signal at all! Its easy to check the read-out accurately if you have s.s.b. mode on the rig, but if not it's still possible to do a rough check to within 1 or 2kHz by selecting 5kHz increment then stepping back and forth past a reliable station such as an amateur repeater while comparing the audio quality on either side of the repeater's frequency. If you have no read-out error, the amount of distortion either side should be the same.

So, my thanks go to AOR (UK) for curing the problem by retuning the fundamental crystal oscillator on my rig, and I hope other users can take heart from this.

**Richard Gosnell  
Swindon  
Wiltshire**

### Dear Sir

I have just returned from a visit to my local WH Smith here in Southampton, and noticed that there were many magazines dealing with computers. To my knowledge, there are only three dealing with amateur radio (four if you include *RadCom*, but not available off the shelf).

I am writing to say that I am very much opposed to Darren Bruton's letter (*SWM* September 1995) suggesting that more computer related articles appear in the magazine. It's amazing how many young people come into the hobby and then want to change things to suit themselves, and perhaps give up short wave listening when they get bored.

Although I think that the magazine could be improved, including computer articles is certainly not one of them. I am perfectly capable of controlling my short wave receiver without the aid of any computer and I think that half the fun would be lost if I allowed this to happen.

I hope that you will ignore Darren's letter and concentrate on being a magazine for short wave listeners, not for computer buffs. Although it might come as a devastating blow to some, I can say that life did exist before the arrival of the computer!

**Harold McIntyre G3FLJ  
Southampton  
Hampshire**

*So what do our other readers think on this subject? Please write and let us know.*

# letters

IF YOU HAVE ANY POINTS OF VIEW THAT YOU WANT TO AIR PLEASE WRITE TO THE EDITOR. IF YOUR LETTER US PUBLISHED YOU WILL RECEIVE A £5 VOUCHER TO SPEND ON ANY SWM SERVICE

## Dear Sir

I enjoyed your Antenna Special and particularly John Wilson's article in September *SWM*, which dealt clearly, and in his usual style, with the choices for antennas, such as long wires, baluns, active antennas and other peripheral devices like atu's and pre-selectors. My own selection of antenna has been dictated in a somewhat unusual way.

Until recently, I used a 11m long sloped wire with a balun and coaxial cable attached to my Lowe HF-150 which I use mainly for decoding and other general purpose listening. My QTH however, is a summer roost for around 40 or so Pipistrelle bats, which live in the cavity wall, and there is of course much aerial activity in our garden on summer evenings as the bats catch their meal of insects on the wing. Sadly, I found one of these little creatures lying dead near the long wire. On examination it seems the poor thing had flown into the wire, breaking his wing as he did so. Although their echo-location is very good, it sometimes misses very small targets, particularly if it is not directed in the right direction. Feeling sure that both the bats and I could enjoy our respective pastimes, I took the long wire down and replaced it with a C.M. Howes' active antenna with the vertical whip in a 38mm plastics water pipe, a solution which John Wilson does not seem to favour, but which appears to give as good a result as the long wire.

So far there have been no further bat casualties as the water pipe appears a bigger target and would be less fatal if a bat were to hit it, and I haven't heard any complaints from them yet. I listen to their echo-location pulses as a.f. at 45kHz on a Tandy Sports radio, modified with an ultra-sonic transducer across the mw coil of the (removed) ferrite rod - is this yet another aspect of our listening hobby?

**Michael Pettman**  
**E. Wittering**  
**W. Sussex**

*There really is no right or wrong when it comes to antennas, except it seems when their use is fatal. I'm pleased to hear that both you and your bat population are both happy with your latest choice - KN.*

## On The Net

**To: dick@pwpub.demon.co.uk**  
Subject: Internet and s.w.l.

You may have heard from other sources, but if not the Internet Guide to International Broadcasters is at URL <http://www.informatik.uni-oldenburg.de/~thkoch>  
**Peter White....via the 'net**

**To: dick@pwpub.demon.co.uk**  
Subject: Radio related Internet Sites

Your list of usenet newgroups on page 5 of the September issue of *SWM* missed a couple of groups which are of particular interest to readers in the UK: **uk.radio.amateur** and **alt.radio.scanner.uk**.  
**Nigel Horne GOLOV....via the 'net**

## Dear Sir

In the September issue of *SWM* you mention the refurbishment of the Moel-y-Parc transmitter. The top of the Moel-y-Parc mast is 601m above sea level and the base 364m. I live less than five miles from the transmitter and often walk around the mast to admire the stupendous views.

However, like many thousands living to the north of the transmitter I receive no signal. Because of the shadow of the low hills to the north, there is nil or poor reception in parts of central and western Deeside. We therefore have no local TV news and the Welsh speakers have no Welsh language programmes.

We are promised relays to relieve part of this problem in the near future. For the

present, our programmes come from Winter Hill, over 50 miles away in the Pennines, north of Manchester, while the Moel-y-Parc signal goes 59m over my house. This is an interesting example of the problems of propagation and of the difficulties in providing good radio and TV services in hilly areas.

**Robert Moore**  
**Holywell**  
**Ciwyd**

*I find N. Wales to be very frustrating, radiowise! My daughter lives high up overlooking Caernarfon and so I drive up there several times each year. My favourite radio station, Classic FM, is unlistenable to almost anywhere in N. Wales - Ed.*

## Dear Sir

I read with interest Keith Taylor's letter in the September *SWM* regarding the Radio Security Service Special Communications Units in WWII. If he does not already have a copy then I commend to him 'Codebreakers'. This was published by the Oxford University Press in 1993 (ISBN 0-19-820327-6).

It contains a wealth of information and references from some thirty contributors brought together under the editorship of F. H. Hinsley and Alan Stripp who are, of course, pre-eminent in this field. It is overall a fascinating study of the subject and, in particular, Bletchley Park.

While writing may I say how intriguing I found David White's revealing series of articles on these matters - the more so to learn how many of what were jealously guarded secrets are now in the public domain. I shall look forward to purchasing a copy of Keith's work if he decides to go into print.

Wishing *SWM* continued success in the worthwhile work it is doing.

**K. Heath**  
**Moffat**  
**Dumfriesshire**

*There's more wartime radio operations revealed this month on page 17. David White looks at the operation of the Y Stations -*

**KN.**

## Dear Sir

With reference to Mr Keith A. Artherton's letter in September's issue of *SWM* regarding a listeners' club, the answer is simple - join 'The International Short Wave League'. The ISWL is open to both licensed amateurs and s.w.l.s. The monthly issue of *Monitor* covers all aspects of Radio Amateur bands, broadcast bands, VHF, news, sales and wants, v.h.f. news, etc., the ISWL award certificates cover ten awards available to s.w.l.s and licensed amateurs covering Century Awards, continental, states, broadcast band DX.

If you are interested in collecting QSLs from amateurs, they have a bureau available for an additional cost. The ISWL has different contests each month, to which a listener can easily get hooked.

The cost is UK £18, Europe and Overseas £25 or \$40, QSL Bureau Annual Charge £6. They also have a family membership, but you will have to share *Monitor*.

For further details contact: **ISWL**  
**Headquarters, 10 Clyde Crescent, Wharton, Winsford, Cheshire CW7 3LA. Tel: (01606) 553834.**  
**John O'Neill**  
**Waterford City**  
**Eire**

*Make sure to say where you heard about the League when you contact them, thanks - KN.*

*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.*

# grassroots

## rallies

**October 1:** Blackwood & DARS rally is to be held at the Community College, Oakdale, near Blackwood, Gwent. Doors open at 10.30am. There will be traders, a Bring & Buy and a raffle. Talk-in on S22. Further details from **Norman GWOMAW** on (01495) 227550.

**\*October 1:** The Great Lumley Amateur Radio & Electronics Society will take place in the Community Centre, Gt. Lumley, Chester-le-Street. Doors open at 10.30am for disabled visitors and 11am for others. There will be trade stands, a Bring & Buy and much more. **Barry G1JDP** on 0191-3885936.

**October 8:** Computercations '95 Computer & Radio Rally, Hillhead Camp Site, Dartmouth Road, Brixham, South Devon. Overnight camping, car boot sale (weather permitting), trade stands, professional flight simulator demonstration, Bring & Buy, refreshments, unlimited free parking. Talk-in on S22-G7FDC. Special event station GB2CPU. Morse test on the day. **John May** on (01803) 522995. Details for rally from **W. Trezise G6ZRM** on (01803) 522216.

**October 15:** The North Monaghan Hobby Radio & Computer Exhibition will be held at Cupids Nightclub and Restaurant, Smithborough, County Monaghan. Proceedings start at 11.30am and continue until 5.30pm. All the usual retailers will be in attendance along with a large display of computer equipment and a Bring & Buy. Refreshments will be available all day in the adjoining restaurant along with full facilities for QSLing via the brewery! Admission is £2 and half price for all under fourteen. Talk-in will be on S22 from 10.30am. Facilities will be provided for disabled access. **Stephen Hand G17UIM (08) (013657) 51479** evenings or **Ken O'Reilly G17UIP** on (08) (013657) 38955 daytime.

**\*October 20/21:** Leicester ARS is being held at the Granby Halls, Leicester. Doors open at 10am each day (9.30am for disabled visitors). All the usual facilities. **Frank G4POZ** on (01533) 871086.

**\*November 4-5:** The Eighth North Wales Radio & Electronics Show is being held at the Aberconwy Conference & The New Theatre, Llandudno. The show opens at 10am, both days. **B. Mee GW7EXH** on (01745)591704.

**November 12:** Martlesham Radio Society will be hosting another Microwave Round Table event at BT Laboratories, near Ipswich, Suffolk. The event will commence at 10am and will include round table sessions testing facilities (including 24GHz Noise Figure measurements) and a Bring & Buy. This year the event is expecting participants from several European countries including DB6NT and DCODA who will argue the lecture programme with a microwave update. For BT Labs security requirements, all access is by advance booking only. MRS Secretary on (01473) 644285 or for tickets, send an s.a.s.e to Roy Smith G0RRC, Lykkebo, The Street, Burstall, Ipswich, Suffolk IP8 3DN.

**November 12:** The 7th Midland Amateur Radio Society, Birmingham, Radio & Computer Rally is being held at the Stockland Green Leisure Centre, Slade Road, Erdington, Birmingham. Doors open 10am to 4pm. Admission is £1, children free. There will be a free Christmas draw, trade stands, local clubs, special interest exhibits, refreshments and a large, free car park. **Peter Hayler G6DRN** on 0121-443 1189.

**November 19:** The Bishop Auckland Radio Amateurs' Club will be holding its annual radio rally at the Newton Aycliffe Leisure Centre. Doors open at 10.30am for disabled visitors and 11am for everyone else. Further info. from **Mike Shield**. (01388) 766264.

**\*November 26:** The Bridgend & District Amateur Radio Club will be holding its 9th Amateur Radio & Computer Rally at the Bridgend Recreation Centre in Bridgend. The rally will have all the usual amateur radio and computer dealers, a Bring & Buy, RSGB Morse test on demand (two passport size photos must be produced). Doors open at 11am, 10.30am for disabled visitors. Admission is £1. Further details from **Maurice GW0JZN (01656) 864579** or **Don GW3RVG (01656) 860434**.

**December 3:** The SDX Cluster Support Group will be holding a Radio, Electronics & Computer Rally in the Maryhill Community Centre, which is located just along from junction 17 of the M8 motorway and is located on major public transport routes. Doors open at 10.30am for disabled visitors and 11am to 4.15pm for everyone else. Entrance fee is £2 for disabled, UB40 holders and £2.50 for all other visitors (children under 14 accompanied by a parent free of charge). There will be many traders, club stands, lectures and demonstrations. Further information can be obtained from **John Dundas GMDOPS**. Rally Organiser, on 0141-638 7670.

**\*December 3:** The Verulam Amateur Radio Club are holding their rally at the Watford Leisure Centre, which is located less than five minutes drive from the Junction of the M1 and M25 motorways. Trading will be from 10am to 4pm. (01923) 222284.

**December 3:** The Thames Valley Electronics Rally is being held at Kempton Park, Race Course, Sunbury-on-Thames, Middlesex. Doors open 10.30am to 4.30pm (10am free entry to the Bring & Buy stand). Major manufacturers and retailers, accessory supplies, antenna supplies, Bring & Buy stall, computers and component retailers and specialist groups. Admission for adults £1.50, OAPs £1 and children under 14yrs free. (01494) 450504.

If you're travelling a long distance to a rally, it could be worth phoning the contact number to check all is well, before setting off. The Editorial staff of *SWM* cannot be held responsible for information on Rallies, as this is supplied by the organisers and is published in good faith as a service to readers. If you have any queries about a particular event, please contact the organisers direct.

Editor

### AVON

**Bristol International RC:** Tuesdays, 8pm. The Fighting Cocks Public House, Hengrove. All visitors are welcome. The club has been formed so that all radio enthusiasts, whether they be Licensed Amateurs, s.w.l.s or CBers can get together and have a good natter and do things that you do in radio clubs. PO Box 28, Bristol BS99 1GL.

**South Bristol ARC:** Wednesdays, 7.30pm. Whitchurch Folkhouse Assoc., Bridge Farm House, East Dundry Rd., Whitchurch. October 4 - CW practice evening, 11th - Club annual skittles match, 18th - Judging home construction contest, 25th - History of W. D. & H. O. Wills. For more information ring (01275) 834282 on a Wednesday evening.

### CLWYD

**Conwy Valley ARC:** 1st Wednesdays, The Studio, Penrhos Road, Colwyn Bay, Clwyd. October 4 - An evening with a camcorder by Trefor Edwards GW0PZS & Norman Grice GW0MKP. R. W. Evans GW6PMC (01745) 855068.

### DEVON

**Appledore & DARC:** 3rd Mondays, 7.30pm. Appledore Football Clubroom. October 16 - The Bring & Buy sale of the year - not to be missed! Dave Brierley G3YGJ. (01237) 476124.

**Torbay ARS:** Fridays, 7.30pm. ECC Social Club, Highweek, Newton Abbot. October 20 - Monthly meeting - Walford Kits by Tim Walford G3PCJ. Peter G4UTO. (01803) 864528.

### EAST SUSSEX

**Southdown ARS:** First Monday of the month, The Chaseley Home for Disabled Ex-Servicemen, Bolsover Road, Eastbourne, 7.30pm. October 2 - Annual auction. Vic Robins G0THX on (01323) 846774 or John Vaughan G3DQY on (01323) 485704.

### GREATER LONDON

**Edgware & DRS:** Thursdays, 8pm. Watling Community Centre, 145 Orange Hill Road, Burnt Oak. September 28 - *Practical Wireless* - A personal history by Rob Mannion G3XFD, Editor. Rod Bishop. 0181-204 1868.

**Southgate ARC:** 2nd & 3rd Thursdays, 7.30pm. The Pavilion, Winchmore Hill Cricket Club, Firs Lane, Winchmore Hill, London N21 3ER. September 28 - ROTA, October 12 - Second surplus equipment sale, 26th - ROTA. M. E. Viney GOANN. (01707) 850146.

### HAMPSHIRE

**Hordean & DARC:** 1st & 4th Tuesdays, 7.30pm. Lovedean Village Hall, Lovedean Lane, Lovedean, Hants. October 3 - Natter night, 24th - AGM. S. Swain (01705) 472846.

**Winchester ARC:** 3rd Fridays, Red Cross Centre, Durngate House, North Walls, Winchester. 7.30pm. October 20 - An in-depth talk on radio by Frank Penton G0RZK. P. Simpkins G3MCL. (01962) 865814.

### Club Secretaries:

Send all details of your club's up-and-coming events to: Lorna Mower, *Short Wave Magazine*, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Please tell us your County and keep the details as brief as possible.

### HEREFORD & WORCESTER

**Bromsgrove ARS:** 2nd & 4th Tuesdays. Lickey End Social Club, Alcester Road, Burcot, Bromsgrove. October 10 - Talk 'DX logging', 14/15 - JOTA - Weekend on the air, 24th - Quiz night. Barry Taylor. (01527) 542266.

### HERTFORDSHIRE

**Hoddesdon RC:** Alternate Thursdays, 8pm. Conservative Club, Rye Road, Hoddesdon. September 28 - Natter night, 30th - Visit to Dulwich Wireless Museum, October 12 - Better results from your camera by Ken Newman, 26th - Wine making by the Enfield Society. Dave G1CAY on (01992) 460841.

### KENT

**Bromley & DARS:** 3rd Tuesdays, 7.30pm. The Victory Social Club, Kechill Gardens, Hayes. October 17 - Junk sale. A. Messenger G0TLK. 0181-777 0420

**Maidstone YMCA ARS:** Fridays, 8pm. YMCA Sports Centre, Melrose Close, Maidstone, Kent, ME15 6BD. September 29 - RAE - Capacitance by Paul Austin, October 6 - 'Repair It' evening, 13th - RAE - Inductance by Paul Austin, 20th - Down on the (antenna) farm by Peter G3ORP. (01622) 743317.

### LINCOLNSHIRE

**Lincoln SW Club:** Wednesdays, 8pm. City Engineer's Club, Waterside South, Lincoln. October 25 - Junk sale. (01427) 788356.

### NORFOLK

**Norfolk ARC:** Wednesdays, 7.30pm. Formal and informal meetings at The Norman Centre, Bignold Road, Off Drayton Road between 'Asda' and Three Mile Cross Roundabout, Norwich. October 4 - Phase locked loop by Mike G4EOL, 11th - Night on the air/construction QRP/Morse practice, 18th - Construction contest, 25th - Night on the air/construction QRP/Morse practice. Mike G4EOL. (01603) 789792.

### OXFORD

**Oxford & DARS:** 2nd and 4th Thursdays, 7.30pm. The Grove House Club, Grove Street, off Banbury Road, Summertown, Oxford. D.A. Walker G3BLS on (01865) 247311.

**Vale of White Horse:** 1st Tuesday of each month. 8pm at The Fox, Stevenon. Ian White. (01235) 531559.

### SOMERSET

**Yeovil ARC:** Thursdays, 7.30pm. The Red Cross Centre, 72 Grove Avenue, Yeovil. September 28 - Committee meeting and club station on the air, October 5 - The national v.h.f. postcode charity challenge by G3ZXX, 12th - Club visit to RNAS Yeovilton Meteorology Station, 19th - Sun spot cycles by G0DAB, 26th - Committee meeting and club station on the air. Cedric White, QTHR. (01258) 473845.

### SUFFOLK

**Bury St. Edmunds ARS:** 3rd Tuesdays, 7.30 for 8pm. Culford School. October 17 - Talk by Alan

Martindale G3MYA. Kevin Waterson G1VGI, 20 Cadogan Road, Bury St. Edmunds, Suffolk IP33 3QJ. (01284) 764804.

### TAYSIDE

**Dundee ARC:** Tuesdays, 7pm. Dundee College, Graham Street, Dundee. October 10 - Construction evening, 17th - Club mini talks 1) How to solder by George GM3EFH, 2) Resistors by Alf GM4UZP, 3) Capacitors by John GM3LCP, October 24 - Construction evening. Allan Martin GM7ONJ, 11 Langlee Place, Broughty Ferry, Dundee, Tayside DD5 3RP.

### WEST MIDLANDS

**Sandwell ARC:** The Broadway, Warley, RAE class on Monday nights, Morse class on Wednesday nights and RAE Novice class on Thursday nights. Three operating shacks, h.f./v.h.f./u.h.f., Phone, c.w., RTTY, AMTOR, Packet, all bands. Talks, outings, contest and demonstrations. For further information please ring 0121-552 4619/0121-552 4902.

### WEST SUSSEX

**Worthing & DARC:** Wednesdays, 7.30 for 8pm. The Parish Hall, South Street, Lancing. October 4 - Discussion evening, 11th - DIY PCs, 18th - Playing arials by G3NDJ, 25th - AGM. Roy G4GPX. (01903) 753893.

### WEST YORKSHIRE

**Denby Dale ARS:** Wednesdays, 8.30pm. Pie Hall, Wakefield Road, Denby Dale, West Yorkshire. October 4 - 'The day the gas cooker talks back' by Robert Miles, 18th - Aerial clinic. Denby Dale ARS also provides RAE, Morse and Novice RAE classes and is a registered City & Guilds examinations centre for both the RAE and Novice RAE exams. Further details from the examinations secretary Brenda G4OTE on (01484) 424776 or secretary Malcolm McKenzie G8RWN, 9 Broomhouse Close, Denby Dale, Huddersfield, W. Yorkshire HD8 8UX on (01484) 861782 for club activities.

**Keighley ARS:** The Ingrow Cricket Club, Ingrow, Keighley. Thursdays, 8pm. September 28 - Quiz V Northern Heights (pie/peas), October 5 - Night on the air, 12th - Natter night, 19th - Natter night, 26th - Junk sale. Kathy G0RLO. (01274) 496222.

**Wakefield & DRS:** Tuesdays, 8pm. The Ossett Community Centre, Prospect Road, Ossett. October 3 - History of W&DRS, 10th - Fast Scan ATV by G8HUA, 17th - Survival techniques, 21/22nd - JOTA Woolley Edge, 24th - On the air. Bob 0113-282 5519 or G3WWF@GB7WRG.

### WILTSHIRE

**Trowbridge & DARC:** 1st & 3rd Wednesdays, 8pm. The Southwick Village Hall, Southwick, Trowbridge. October 18 - 1995 planning application procedures by Gordon Reed. Ian G0GRI on (01225) 864698.

Elaine Richards  
PO Box 1863,  
Ringwood,  
Hants BH24 3XD.

# junior listener

## Fund Raising Competition

The Radio Amateur Invalid & Blind Club (NI Area) have organised a Christmas Fund Raising Competition. It costs just £1 to enter and the questions are really easy (well I think so). The prize is a Food Hamper for Christmas and all the funds are for a very good cause, so why not have a go. There are 20 questions and the answers are all names of chocolate bars! How about 'Full of eastern promise' or 'Out of this world'? For a full list of questions and an entry form, send an s.a.e. to RAIBC (NI Area) Competition, PO Box 87, Belfast BT12 5PU. You have plenty of time as the entries must be received no later than 15 December.

## Propagation

Knowing what frequency a broadcast station is on is fine, but how do you know if you should be able to hear them. This is when those 'in the know' start muttering propagation at you. But what on earth is propagation? It's how a radio signal gets from one place (the transmitter) to another (hopefully your receiver!). The trouble is that a 21MHz signal from Radio Australia might be heard at eight in the morning (after you've headed off to school or work) but there is no sign of it come six o'clock in the evening when you get your radio fired up ready. So how do you know what time of day to listen and which of the three frequencies listed in the schedule will be the most productive. As usual, there are computer programs by the dozen that can give you all kinds of useful (and useless) information. The trouble with that is that you may not have a computer or you may find that having it switched on doesn't do much good for radio reception. So, let's look at manual means of getting the information. Brian Oddy's LM&S column is a good place to start as you can see which bands have the most signals heard. Brian will also tell you which bands aren't being used by major broadcasters too. Now, although his column is always discussing the past, things don't change that rapidly. So, where else can you go to get information? Long

term propagation forecasts are often contained in things like the *World Radio TV Handbook*. Those that study propagation trends try to predict month by month what will happen in the year ahead on the various bands. If you read through this it will give you a fair idea of what to expect. More up-to-date again are the World Propagation Forecasts in *Short Wave Magazine*. These are printed every month predicting what the bands will do. They are so easy to use, let's take RCI and their Sackville in Canada signals on 13.67MHz. Now, Sackville is on the eastern side of Canada - New Brunswick, I think. The best chart to use is the East N.America one, and you can draw a pencil mark along the 13/14MHz line. The chart for September (this is being written at the start of the month) shows that 13/14MHz is likely to be a good frequency to listen on as it should be useable between about 1100-2100ish. The big snag is that the 13.67MHz transmission goes out between 2200 and 0000. That is not surprising as I picked a transmission that is aimed at the Caribbean. Now, just because the chart says it can't be heard doesn't mean that it is impossible. With radio signals almost anything is possible! But if I was trying to hear one station in particular and the charts say it's unlikely, I probably wouldn't waste time and would try listening for station in South America instead. Of course, there is one

final up-to-date source of info on propagation that I know about. If you listen to the RSGB news broadcast on a Sunday morning, they give details of the latest propagation information. This report comprises of details of the past weeks news and a forecast for the next week. I hope that this has given you some ideas of how to try your DXing. Let me know how it goes.

## Transmitter Information

When you are new to the hobby you can't seem to get enough information. I've heard of a new booklet all about short wave transmitters. The Transmitter documentation Project is a 60-page booklet listing short wave broadcast transmitters world-wide. The listing is arranged by country and indicates the name of the station, the transmitter site and geographical coordinates. It also tells you the number of transmitters at the site, their power, manufacturer, type number and year of installation. If you are interested, the publication costs £5 (no cheques or credit cards please) from **Ludo Maes, PO Box 1, 2310 Rijkevorsel, Belgium.**

## RAIBC



Who are the RAIBC anyway? As s.w.l.s you may not have heard of them, but they provide a very valuable service for both radio amateurs and short wave listeners alike. RAIBC is a club that exists to help blind, disabled and (where possible) deaf people to get involved in and enjoy the hobbies of amateur radio and short wave listening. Local representatives carry out the practical work of installation and maintenance of members transmitting and receiving equipment. They also raise funds to help provide the basic equipment for the disabled members, who are unable to purchase their own. Many years ago, our local RAIBC Net was run by Harry G4TLQ, who was himself blind. You would never know it when he was on the air as he could remember all the call signs of those on the net and the order they went in and he kept order beautifully. (He also could play skittles at Radio Club nights out with amazing accuracy, but that's another story). If you, or indeed someone you know would benefit from help, contact:  
**Margery Hey,  
29 Besthorpe Road,  
Attleborough,  
Norfolk NR17 2AN.**

INTERNATIONAL RADIO STATION

**WWCR** SHORTWAVE

*Nashville, Tennessee USA*

## Country Music Fans

If you like country music and listen to WWCR (World Wide Country Radio) then a new three hour programme of country music is being aired. Every day Monday to Friday at 1800UTC on 12.160MHz. The first two hours is being sponsored by CURB Records and will feature many of their artists. The QSL address for WWCR is: **1300 WWCR Avenue, Nashville, TN 37218, USA.**

## National Transmitter News

### New BBC FM Transmitters

**July 17, Ben Gullipen**, Central Scotland, now brings good f.m. radio reception, including stereo, to an extra 9,000 people in Stirling, Callander and the surrounding areas, including Dunblane, Doune, Lake of Menteith, Kippen, Buchlyvie, Gargunnoch and Killearn.

Located about 5km south west of Callander, it entered service following a period of test transmissions which began on Wednesday 17 May 1995. The new transmission frequencies are:

Radio 1	98.3MHz
Radio 2	88.7MHz
Radio 3	90.9MHz
Radio 4	104.9MHz
Radio Scotland	93.1MHz

On some radios, the f.m. band may be marked as v.h.f. This transmitter broadcasts with vertical polarisation. External or loft-mounted antennas must be mounted so that their rods are vertical - not horizontal as would be the case with most other f.m. stations.

Further information on f.m. reception in Scotland - including advice on fitting an external f.m. antenna - is available from:

**Engineering Information**  
**BBC Broadcasting House**  
**Queen Margaret Drive**  
**Glasgow G12 8GH**  
**Tel: 0141-338 2284**

or

**BBC Engineering Information**  
**Villiers House**  
**The Broadway**  
**Ealing, London W5 2PA**  
**Tel: (0345) 010313 (local call rate)**

**July 20, Axe Valley**, East Devon, now brings good f.m. radio reception to an extra 10,000 people in the Axe Valley Area. Coverage of the new transmitter stretches from Seaton in the south to the villages of Chardstock and Membury in the north and includes Axminster, Colyton, Kilmington and surrounding areas.

Located about 1km east of the village of Musbury it entered into service on Thursday July 20 following a brief period of test transmissions. The transmission frequencies are:

Radio 1	99.1MHz
Radio 2	89.5MHz
Radio 3	91.7MHz
Radio 4	93.9MHz

On some radios, the f.m. band may be marked as v.h.f. This transmitter broadcasts with vertical polarisation. External or loft-mounted antennas must be mounted so that their rods are vertical - not horizontal as would be the case with most other f.m. stations.

Further information on f.m. reception in the Axe Valley area - including advice on fitting an external f.m. antenna - is available from:

**BBC Engineering Information**  
**Villiers House**  
**The Broadway**  
**Ealing, London W5 2PA**  
**Tel: (0345) 010313 (local call rate)**

### Portishead Radio Celebrates

Portishead Radio celebrated 75 years of long-range maritime radio communications on 8 September 1995. In 1920 a redundant Imperial Wireless Chain receiving station at Devizes in Wiltshire was converted for long-range maritime use with a receiver and 6kW transmitter. The station, call sign GKT, had a

guaranteed range of 2400km.

In 1926 experiments had proved that world-wide communications could be established on short wave frequencies. So, in 1927, a brand new station was established at Portishead, near Bristol, equipped with three long wave transmitters, followed two years later by a new short wave transmitter.

Over the years, 'Portishead Radio' has been at the forefront of long-range

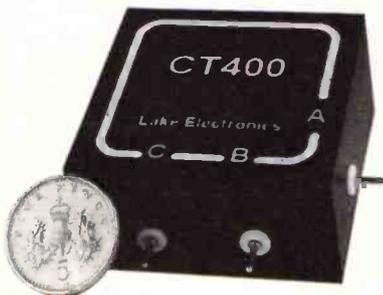
maritime radio communications. The antennas and receivers are now located at Somerton, remotely controlled from Highbridge - since 1978 Portishead Radio has been located at Highbridge, further down the Somerset coast, rather than at Portishead itself.

Although the services provided by Portishead Radio have dramatically changed over the years as technology has provided other means of

communicating with ships at sea, the most famous maritime radio station in the world continues to provide a valuable service to shipping world-wide.

Our cover pictures show Portishead Radio's microwave antenna, which provides the essential links with Somerton, and the old Control Room at Highbridge, opened in 1948 and replaced in 1983.

## new products



### Lake CT400

A low-cost solution to the long wire balun problem comes from Lake Electronics in the form of the CT400. The addition of a coaxial feeder to an end-fed antenna to reduce radiated pulse type interference can lead to signal reduction due to mis-

match. Enter the CT400, a broad-band transformer, providing inductive (magnetic) coupling for h.f. antennas. Suitable for virtually any length of antenna. Price only £6.75 plus £1 P&P. Available from **Lake Electronics, Middleton Close, Nuthall, Nottingham NG16 1BX. Tel: 0115-938 2509.**

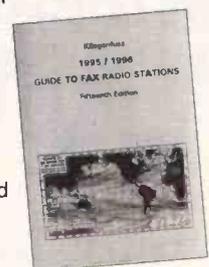
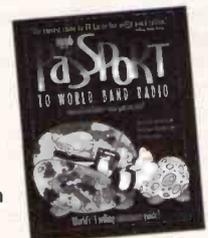
### Book Store Update

New arrivals at the SWM Book Store are the 1996 *Passport To World Band Radio* This latest version of the invaluable broadcast station guide is now available at £14.50 plus P&P. The *Klingenfuss 1995/1996 Guide to FAX Radio Stations* (15th Edition) is now in stock also, price £20.00 plus P&P.



*Understanding ACARS*, an essential guide for h.f. aero listeners with an interest in in-flight data has been updated too. The third edition can be found at the 'Book Store, priced

at £9.95. To order any of the above titles please use the form on page 83.



# news

For the latest in the World of Listening

## Radio and TV DX News

A cutting from George Gaskin (Gibraltar) advises that the 'Central Video-difusion' is the Spanish organisation responsible for performance and distribution rights. The organisation recently stated that at least 250 of over 500 local TV stations now operating in Spain are unlicensed and avoid paying transmission rights.

Many small towns have their own 'pirate' TV station operating in excess of three hours daily without paying any programme fees - often obtaining films from local video shops! Algeciras is claimed to have a pirate station that's been on the air for two years.

From the local Gib. paper scepticism follows the recent suggestion of a GBC-2 service (Gibraltar Broadcasting Corporation) with comments that currently the existing GBC can only offer under one hour daily of locally sourced programming, this inserted between the ongoing BBC World satellite feed. 'GBC should show they can make a success of what they have before engaging in grandiose schemes which will cost money to the body of taxpayers at a time when money is in short supply'.

Non-licensed (pirate) TV is under pressure in Greece where new government legislation is being passed to replace the 1989 broadcasting bill. The '89 bill broke the government's monopoly of the air waves and currently 200 private broadcasters are now active. The new law will restrict private broadcasters to five national networks with more financial regulation including a 'charge' for using the air waves.

Singapore's 4th national terrestrial TV network is to be launched September 1995. The state owned 'TV12' will be free to air and offer English language programming including sports, education and other cultural items. Commercial free TV12 is Singapore's only public service channel.

KBA in Nairobi, Kenya, have just opened a 2nd TV channel. The entertainment PAY-TV channel operates in conjunction with Multichoice and KBC, a home decoder and special antenna is required for the MMDS service. MMDS too in Senegal where a new system was recently demonstrated in Dakar that is low cost, easy to set-up and offers a coverage of 15km radius using 2.5GHz.

Not so happy in the Congo where the TV service has closed on orders of President Lissouba, the picture quality "was too poor". Repairs and upgrading are now in progress and normal service will soon be restored.....

BBC Radios 1-5 which are now aired via DAB across London have an additional signal, that of an experimental live service covering Parliamentary activities and sporting events during MPs' down time. This will be multiplexed into the DAB main BBC network feeds. At the time of writing there are no commercial receivers available!

For those cell-zappers who listen in to analogue cellular conversations and hack software, look out as Vodafone have introduced new anti fraud software called 'Authentication'. The new software transmits a 3rd quasi-ESN number together with the 'phone's contact number and an actual ESN number

The 3rd quasi-ESN number changes each time the 'phone is used thus if a criminal intercepts the calls for cloning purpose. Provided the cellphone makes another call (and a new 3rd quasi-ESN number is therefore generated by that call) the original attempted clone is redundant as a new ESN number has been produced.

Vodafone comment that this will discourage most illegal clones though isn't foolproof. The new anti-clone technique will be progressively introduced on analogue phones late 1995 though will not work with pre-1991 cellphones, (info from Mobile and Cellular, 8/95).

Reader 'Stan' advises in his letter that Warsaw's TVP-2 operates on ch.R27 and that the TVP-2 outlet in the same town on ch.R2 has closed down. TVP-1 is transmitted ch.R11 with regional programme 'WOT' on ch.R51.

Other local Warsaw services currently are Polsat R51; Canal Plus Polska R36 and TV Ostankino R41. Ostankino still transmits in SECAM, all the others use PAL. (that's bad news about the ch.R2 TVP-2, a good DX catch in the old days)

Early 1995 should see the Swedish government inviting applications for a new 4th TV network. The 'M4' network will be based around regional studios and transmitters carrying educational programming during the daytime, reverting to a national commercial entertainment network during the evenings. Several publishing companies, the TV4 and SBS TV groups are showing an interest in bidding for the franchise.

Malaysia has just opened a 4th TV network - 'Metrovision' - which transmits across Kuala Lumpur and the Klang valley to a radius of 50kms. The owners intend to extend the service to the whole country. Programming comprises mainly English language material from the UK, USA and Australasia.

MGM Gold will hit the satellite waves as an encrypted TV service during early 1996 downlinking into Asia from Indonesia's Palapa B2P bird. It's unlikely that programmes will be dubbed, relying instead on subtitling.

The Sporadic E event of July 7 produced TV signals into the UK from Canada on chs. A2, 3, 4 and just touched ch.A5. At the same time, the Amateur 50MHz band was open and reports indicate conditions were maintained for trans-Atlantic Sporadic E for nearly 12 hours!

At least two DAB (digital audio broadcasts) transmitters are on the air in Berlin. Scholzplatz now tests in ch.E8 (199.5-201.0MHz). The RTV Radio/TV exhibition also gave reason for another test transmitter from the Alexanderplatz/Schaferberg.

Maximum powers for the test transmissions is 1kW. Dutch TVDXers are not too happy as a ch.E7 DAB transmitter is now airing in Rotterdam.

## Radiocommunications Agency Achievements

The Radiocommunications Agency has taken significant steps in securing access to the radio spectrum for a wide range of services, promoting wealth creation, extending competition, improving choice and boosting competitiveness for UK business.

Launching the Agency's *Annual Report and Business Review*, Chief Executive Jim Norton announced a record of achievements and initiatives that enhance customer service and commercial opportunity. He said, 'The Agency aims to maximise the contribution radio makes to the economy as a whole. Spectrum management plays a key role in unlocking the economic benefits of radio'.

The publication of the first spectrum strategy document is to provide a sound basis for users', service providers' and manufacturers' long term planning was hailed as a success by Mr Norton. He said that radio users are already finding it an invaluable tool to enhance competitiveness. It will be updated annually.

The Agency's strategy focuses on extending competition and improving choice. For example, during the past year, frequencies have been made available for the new Channel 5 television service with wide coverage and for the use of radio to bring new telecommunications services to customers without the need for wires or cable. Digital broadcasting, which the Agency is helping to promote, will play a key role in freeing spectrum for more services.

### A Strategy for the Use of the Radio Spectrum



## European Low Power Weekend

Over the weekend of September 29 to October 1 the Europe QRP Weekend 1995 will take place. The event will run from 1600 hours on the 29th until 2359 hours on the 1st. The rules are as follows:

### Modes & Frequencies

c.w. only on 3560, 7030, 14060, 21060 and 28060MHz, all  $\pm 10$ kHz.

### Power

No more than 5W r.f. output.

Stations unable to measure their output take half d.c. input power to p.a. i.e. 10W d.c. = 5W r.f.

### Stations Eligible

Any licensed amateur.

### Call

CW EU QRP.

### Contest Exchange

RST, power output and name of operator.

### Scoring

Only QRP/QRP QSOs count. Contacts with own country don't count. European stations score one point for each European QSO and three points for each QSO outside Europe. Stations outside Europe score five points with each contact with Europe. The final score is the sum of the points obtained on each band.

### Logs

Separate log sheets for each band showing for each QSO, date, time, call, exchanges (RST, power, name) sent and received. Logs to: **P. Doudera OK1CZ, U1. batterie 1, 16200 Praha 6, Czech Republic.**

The three leading stations in each continent will receive a certificate. The decision of the organisers will be final.

## Amateur Radio Software

The G0LOV/G4LUE Amateur Radio Software company of Barnsley have recently updated their *UK Callbook on Disc* to version 3, using the latest data from the Radiocommunications Agency up to August 1 1995.

The G0LOV/G4LUE callbook includes details of 62000 UK amateurs and Novices, WAB information,

European repeaters, beacons, mailboxes and nodes. A copy of version 3 of the G0LOV/G4LUE callbook will cost you £12.50 plus £1.50 P&P for new users or £9.95 inclusive of P&P for registered users.

For more information contact **Ernie Bailey** on (0836) 748958 or **Nigel Horne** on (01226) 247753. E-mail: **njh@smsltd.demon.co.uk**

# SRP

# TRADING

New Carry Case for  
 PRO-44 COM 204  
 PRO-43 COM 203  
 PRO-39 COM 202  
 £14.99 +£1 p&p

## NEW

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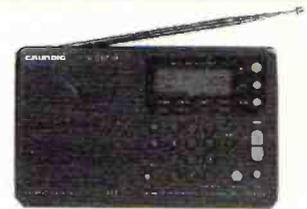
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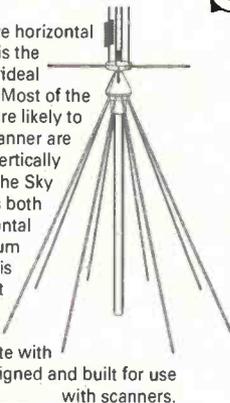


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# Will The Real Short Wave Listener Stand Up, Please

*It is quite clear to John Wilson G3PCY, who has been reading through the pages of Short Wave Magazine, that there are so many aspects of the hobby of 'listening' that there can be no such thing as an average listener.*

The person who is keenly interested in medium wave DX may be so dedicated that he or she has no interest in listening to the 20 metre amateur band, and I have met those for whom h.f. s.s.b. utility listening is the only pastime worth pursuing. Although all of us have a general background interest in the hobby, inevitably a specialist interest takes up most of our listening time, but of course the interests change over the years, or are modified by events such as the Gulf War, when all over the world short wave listeners turned on their receivers to catch the latest news from Kuwait or to hear the air to ground communications of the aircraft carrying troops and supplies to the Middle East.

As it is with the listeners, so with their equipment, and although there are many excellent general purpose receivers, I would venture to suggest that each area of listening will be best served by a particular receiver. As an example; I use and enjoy a Sony ICF-2001D for listening to Jonathan Marks on Radio Netherlands, but I couldn't possibly use it for catching up with 'the boys' on the 80 metre band on Sunday

mornings; the a.g.c. system of the Sony just can't cope with strong adjacent signals apart from anything else, but it's still one of my favourite radios because of its ability to listen to the v.h.f. air band as well.

amateur band only receivers in a future article, but suffice to say that the R-820 has such an array of operator's controls that it is possible to 'tailor' the performance to suit almost any type of listening. However, the drawback is that only a skilled operator would get the best out of such a receiver, so for really general purpose listening the R-820 would not be suitable, not least because it does not tune the whole short wave spectrum - quite a problem if you are primarily a broadcast listener, and totally useless if you are keen on medium and long wave listening since there is no coverage below 1.5MHz.

No, the R-820 is not the only receiver around, so don't go galloping off to trade in

drawn to short wave listening, but stumbling across strange transmissions on a domestic receiver used to be the introduction. These days, many portable radios include coverage of some short wave bands and perhaps this is still the way in for some. It's relatively easy to hear strong short wave broadcast stations, and it can be refreshing to hear points of view which are not those peddled by your local propaganda outlets. Once hooked, it's never easy to get out of the listening habit, and at least you generally have something to say about world affairs when approached by the vicar at the church garden party and can quote the latest from Bosnia as broadcast by Radio Krczksyi (*that's not*

*interference Fred, it's the announcer's name*) or whatever it may be called.

## Bill

The first category is that of "Broadly Interested in Leisurely Listening" or BILL. Bill will be very happy with almost any receiver covering the major short wave broadcast bands, and this could range from a modern low cost portable from Taiwan or Hong Kong costing £25 upwards to golden oldies like an Eddystone EC-10 or (may the force be with you) a Trio 9R-59DS, or even (may the hernia specialist be with you) an AR-88D. Receivers to beware of in this

category are those advertised in the Sunday newspapers promising that you can listen to everything in the world (*even transmissions we dare not mention*) for £9.95. You may well be able to listen to everything in the world, but you may not want to hear it all at the same time. Scouring the



*...may the hernia specialist be with you...*

(Makes you wonder why Sony ever discontinued it.)

What I **would** use for amateur radio listening is probably a dedicated amateur band receiver such as the Kenwood R-820, which to my mind was one of the all time classics of the 1980s. I intend to discuss the pros and cons of

your R-4C or even your ancient FR-100B. Read what else I have to say, and let's first take a look at the different classes of listener and try to define them.

## Hooked

No one can define the point at which a person becomes

private ads at the back of *Short Wave Magazine* will often reveal excellent bargains: for example, from my latest copy I see a Sangean ATS 803A for £90; a Sony 2001 for £65; a Panasonic R-3000 for £45; another Sony ICF-2001 for £50, and even an EC-10 for £60. Any of these would be excellent for Bill, and the EC-10 would introduce him to the almost sensual feel of a flywheel weighted tuning control, even though you need to sandpaper your fingertips when attempting any fine tuning on the higher frequencies. I should also remind those who don't know, that the Sony ICF-2001 is not the same animal as the ICF-2001D. That simple 'D' suffix actually 'D'notes a completely 'D'ifferent radio that will cost you more like £200 second-hand. Ask your dealer for an explanation.

## Better Performers

Although we have all become accustomed to having digital-readout of everything, even the temperature of the washing machine, digital frequency readout is not essential to a listener like Bill, because the short wave broadcast bands stand out by their crowded nature and high signal levels, and there is usually a strong transmission in every band which can act as a marker. Quite often the older receivers are better r.f. performers than the whizzy newer radios, and you will find that many skilled listeners prefer older valved receivers because of their performance advantages. (I'll explain all that in a later article).

## Brian

Our Bill is unlikely even to notice the spaces between the broadcast bands, because his interest in news, views, and current affairs is catered for by the big transmissions from Radio Moscow, Radio Netherlands, Voice of America, Deutsche Welle, the BBC and so on. However, if he tunes

between the cracks in the spectrum he will certainly find noises which are obviously speech, but are not intelligible. He's discovered single sideband (s.s.b.), and at this point he moves into another category and becomes a BRIAN (**Better Receiver Is Actually Needed**)

Listening to s.s.b. transmissions means that the horizons broaden considerably, so Brian is going to find out about long distance aircraft traffic, ship to shore radio, amateur radio of course, and many other fascinating transmissions. If his interest in broadcast stations has extended to winking out weak station IDs, the use of s.s.b. to receive a.m. stations is a useful

radio to enable s.s.b. to be resolved.

## Change

Family and friends will notice a change in Brian; gone are the days of casual listening to strong broadcast stations, to be replaced by hunched shoulders and permanent marks around the ears caused by wearing headphones. Gone too the use of a telescopic whip antenna on the radio; now there are lengths of wire across the garden and careful perusal of the often fanciful claims made by the suppliers of 'magic' antennas which will pull in signals from the wide world even though the antenna is actually a length of wire wound

believe), then the first of the really good short wave receivers was probably the Kenwood R-1000 which appeared in early 1980, followed about one year later by the Yaesu FRG-7700. Both of these receivers represent what Brian needs; accurate digital frequency read-out, slow tuning rate, full coverage of the l.f./m.f./h.f. spectrum with no gaps, good stability due to the use of synthesiser techniques, reception of a.m. and selectable u.s.b./l.s.b. with a selection of i.f. filters to suit; in other words a real receiver for the enthusiastic listener. Fifteen years on, the R-1000 and FRG-7700 (and the later FRG-8800) are much sought after, and if you survey the advertising

columns you will not often see one for sale, and if you do it's a fair bet that it has been sold by the time you ring up to ask about it.

## Big Three

So far I have only mentioned second-hand receivers, but of course design and development have not stood still and there are many excellent radios around today which any listener would be pleased to own. Although the amateur radio world has tended to be dominated by the 'Big Three' Japanese manufacturers; Icom, Kenwood

and Yaesu Musen, several smaller companies have been able to enter the receiver market with excellent designs, such as AOR with the AR-3030, and a blast from the past with Drake re-appearing not so long ago with their R-8 and SW-8 receivers, both of which have had an excellent reception (*I know it's not much of a pun but I've been at the red wine again*). However, when it comes to parting with hard earned cash - or in these days hard won redundancy



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technique, and gives the facility for listening to either of the sidebands to choose the one which carries less interference from adjacent stations. Brian is now therefore the owner of a good general purpose, general coverage radio, but the disadvantage is that his radio is going to be more expensive than those used by Bill because the inclusion of s.s.b. calls for better stability, slower tuning rates and probably a better frequency read-out than the simpler radios. There is also the matter of the extra components needed within the

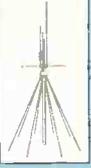
on a broom handle, or a 2m length of wire in a fancy plastics tube. (*Know wot I mean 'arry*).

Brian probably represents the large majority of short wave listeners, and the range of equipment used by them is absolutely enormous. Given the basic requirements of good stability, accurate frequency read-out which usually necessitates a digital display, slower tuning rates and of course reasonable sensitivity (although this is not as important as many manufacturers would have you

CONTINUED ON PAGE 14 ►



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## ► CONTINUED FROM PAGE 12

payments, the cost of new receivers may be a little daunting, hence my recommendations for the second-hand units. And so to the next grouping of short wave enthusiasts, who are at the esoteric fringes of the hobby. These are the folk who really know one end of a receiver from the other and can drive them like Michael Schumacher drives a Formula One car; at the limits of performance with the ability to know exactly what every control is for, and capable of extracting everything the receiver has to give.

### Peter

This then is PETER, Professionally Expert and Technically Experienced in Receivers, and I chose this acronym in tribute to the late Peter Gambles G4GI who had the best pair of selective ears I ever encountered. I recall Peter asking me to confirm that his TS-950S suffered from distortion on very weak s.s.b. signals, and although none of my experienced staff could hear it, and measurements showed no fault at all, I finally discovered that when the received signal was just disappearing into the noise, it did in fact become distorted - and we cured it. The importance of this phenomenon was that these were the signal levels at which he conducted his amateur radio contest work, and there are many short wave listeners in this 'expert' category who demand the same level of performance to pursue the listening hobby.

### Technical Detail

It would take a longer text than this to describe and define all the requirements of a 'Peter' class listener, but at this level the user knows quite a lot of technical detail and is fully aware of what is happening within the receiver when a control is operated. Not that a proliferation of controls is the answer, because when you look at some designs and note how the controls are scattered around the front panel with no apparent thought given to the

operator who has to use them, it's amazing how the receiver managed to get into production in the first place. One of my own pet hates is the use of dual concentric rotary controls on which you find it almost impossible to adjust the rear knob or lever without at the same time moving the front control, and yes, I know that the R-820 previously mentioned uses some dual controls.

### Complexity

The front panels of receivers for the expert listener vary from classic simplicity to nightmarish complexity, and it's interesting to compare the design approaches taken. Examples of operational simplicity have to include the AR-88 despite its age and size, and progress through most of the Collins range and the RA-XXX series from Racal to the present day. The common feature among these receivers is that they were all designed for professional installations, where the customer demanded ease of use with good performance, rather than the 'feature' laden designs for the consumer market. I am reluctant to give examples of over complex design because that would imply that such receivers are 'bad', when they are not, but for the 'hands-on' user, any receiver which has controls not intended to be used by human hand, such as the use of UP/DOWN membrane keypads for r.f. gain rather than a rotary control may prove to be frustrating to use and far from instinctive when you want to change modes in a hurry and can't find the right knob (or keypad). If you happen to have a photographic memory and the dexterity of a car assembly robot, then by all means go for complexity.

Once again I have mentioned second-hand receivers, because few listeners could afford to pay the original purchase price for a Collins 51-S1 or any of the Racal products, so are there any receivers in the current market which would satisfy the expert? Yes there are, and I would particularly pick out the JRC NRD-535 (*an interesting consideration of the design*

*team was that they were determined NOT to use dual controls*); the Kenwood R-5000 which despite its design age is holding up well; the Drake R-8 and the soon to be announced R-8A, and the Icom R-71 which is from a long and successful line of receivers. The Yaesu FRG-100 has the difficult task of straddling the line between the 'Brian' and the 'Peter' listeners, and whilst lacking some of the detailed needs of the expert, is nevertheless a very good unit and easy to use. The AOR AR-3030 is worthy of a class of its own, because it comes closest to being a modern replacement for the classic 'communications receiver', and is very competitively priced considering its specification (*It's half the price of an NRD-535*).

### Other Types

There are of course many other types of listener specialising in subjects such as data transmissions, ranging from RTTY to Piccolo; or the monitoring of i.f. NDBs (low frequency non-directional beacons); and I do know someone who listens to transmissions from automatic ionospheric swept frequency sounders, but nearly all of these can be catered for by the middle ground of receivers which have sufficient stability and provision for fitting alternative i.f. filters, or the second hand ex-professional equipment.

### Sheer Satisfaction

One final category however is the person who actually likes owning and using classic receivers because of the sheer satisfaction of having something which embodies fine engineering with tactile pleasure. It's rather akin to having a classic Harley - Davidson rather than the newest Kawasaki; wearing an Omega or Rolex watch rather than the latest 'quartz controlled, digital readout, built-in world time zones and fifty memories for telephone numbers' type of wrist piece, or preferring to use a 35 year old Collins R-390A rather than the lightweight toys which move across the table when

you try to turn the tuning knob. If you go to a radio gathering, just watch the delight on the faces of the people spinning the knobs on any older Eddystone receiver - that is the pleasure of owning such a radio, and one blessing of the hobby of short wave listening is that it's the **listening** which is the hobby, not the specification battle that seems to have overtaken the amateur radio transceiver market; you know the type of thing - "My rig has 500 memories whilst yours has only 200" (*so what! Why not use a pencil and paper?*); "My transceiver has a sensitivity of better than 0.1µV" (*so what! You can't possibly use such sensitivity on h.f. and it may actually be a disadvantage*). However, there is a suggestion of specification chasing in the Watkins - Johnson HF-1000 reviewed in the June 1994 issue of *Short Wave Magazine* that mentions the 58 i.f. bandwidths available! Still, I suppose you expect a lot when you spend £5000 (\$3995 in the USA) on a receiver, even one as advanced as the HF-1000, but perhaps this is taking a hobby to unreasonable lengths.

### Ideal World

In an ideal world I envisage a receiver which can change character to suit every type of listener, and the HF-1000 is a step in that direction, but equally in my ideal world I wouldn't have to pay quite so much money for the pleasure (*as the Bishop said to the actress*).

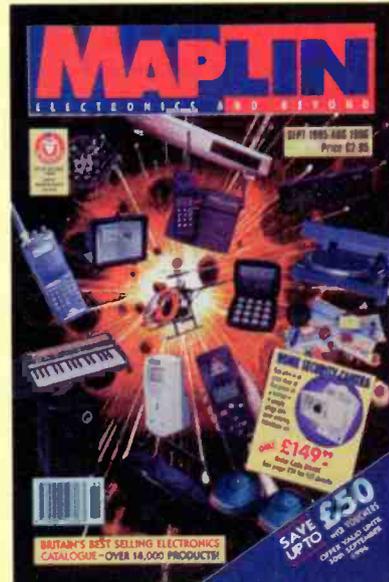
It would be possible to fill a book with a complete analysis of short wave listeners and their equipment, and perhaps one day I might write it. For now, my separation of listeners into four categories may help you to recognise yourself and clarify what receiver type would best suit you. I have mentioned only a few actual receivers from the many on the market, but if you need any advice on the subject, or have any comments to make, please write to me c/o *Short Wave Magazine* and I will be pleased to reply. After all, that is what I have been doing for almost 40 years in the business, and it's what I enjoy most of all.

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# How The Wartime Y Stations Operated

This month we take a look at more radio secrets of the war with David White.

In early 1939, when it was realised that war in Europe was inevitable, the War Office and the various ministries of the RAF, Army and Navy decided that the intelligence system in Britain would be of great importance and the radio branch of the intelligence network, which was known as the Y Service, was therefore greatly expanded.

These Y Service stations would be responsible for intercepting all forms of enemy radio transmissions. The Government Code & Cipher School (GC&CS) were busy building up their system at Bletchley Park in north Buckinghamshire, and this was where all the intercepted transmissions would be sent to by the Y Stations.

The handing over of an early Enigma code enciphering machine in the spring of 1939 to the British Government by the Polish authorities was a coup indeed, and enabled the British to read movements of the German Wermacht and Luftwaffe. Accordingly, service chiefs decided to increase the size of their Y Units and Stations like Beaumanor Park in Leicestershire, which was an army Y Station and was ultimately staffed mainly by the Auxillary Territorial Service women (ATS).

However, it was not until June 1941 that any success was achieved in reading the German Kriegsmarine codes and ciphers and this only came about by two fortunate encounters at sea. On May 7 1941, the German weather ship *Muenchen* operating near Iceland was captured so quickly by two Royal Navy warships that Enigma code settings were collected before the vessel was scuttled.

A mere two days later on May 9, the German submarine

U110 was depth charged and when forced to the surface, was quickly boarded and its Enigma machine and all the code books and settings removed before it sank. This made the Y Stations very important indeed, as now they could read a lot of the German military traffic from the Wermacht, Luftwaffe and Kriegsmarine without much delay.

## Types Of Signal Interception

Let us take an example of interception by a typical Y Station, the layout of which is shown in the diagram. The first line of interception is the specialised communications receivers, which were fitted in all the Y Stations.

These were mainly the American National HRO for all

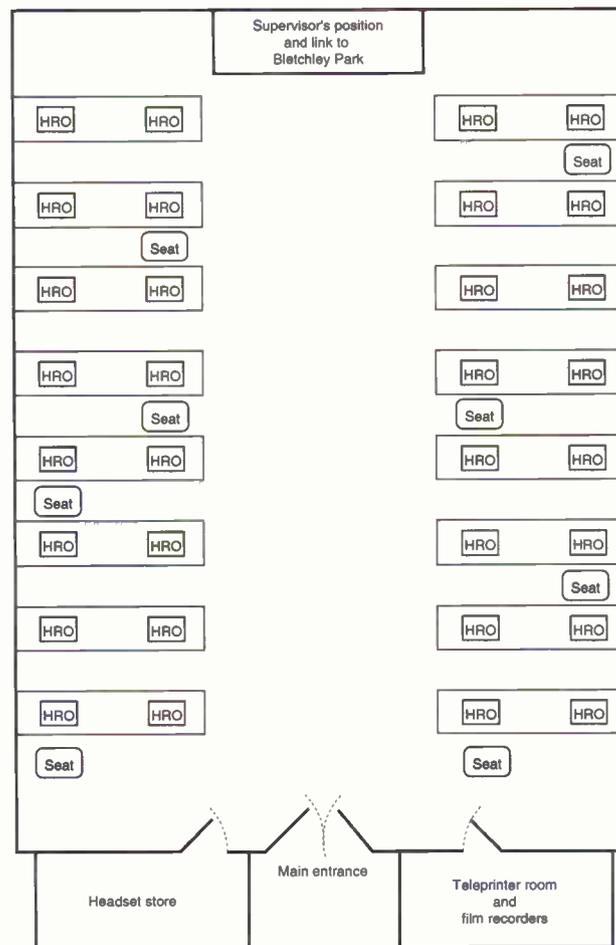
three British services and these were supplied in large numbers right from the beginning. From 1943 onwards, these were supplemented by the American RCA AR88. Again huge numbers of these were delivered.

The Hallicrafters S27 v.h.f. sets were mainly supplied to coastal Y Stations in order to listen to German aircraft and E-boat transmissions and also to monitor the X and Y German bomber navigation beam systems. The antennas in use were a system of caged dipoles, 'inverted L' end-fed wires and directional 'V beams' and rhombics.

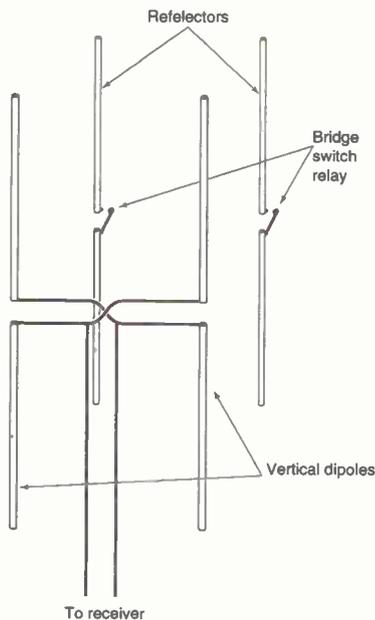
Each W/T position in the radio room would be staffed by a highly trained operator, skilled in reading Morse code at up to 35 words per minute and able to operate the communications receivers most capably. The position was fitted with two of these receivers. One of these would be set to a known frequency so as to be able to detect the enemy station as soon as it came on the air. In the meantime, the second receiver would be used to search up and down a certain allocated segment of the h.f. spectrum with the operator constantly switching between different omni-directional and directional antennas.

Selector switches on a small panel below the receivers enabled the operator to listen on their headphones to either receiver, or both together. The sergeant supervising assistant sitting at the antenna distribution panel could also switch other antennas into that position as required.

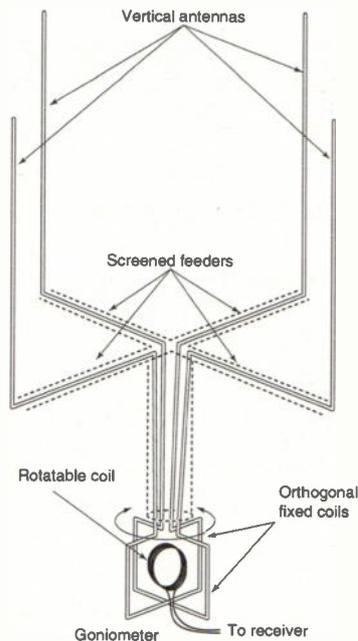
Any signals suddenly appearing on the air were thus nearly always detected, but if a signal did not appear when it



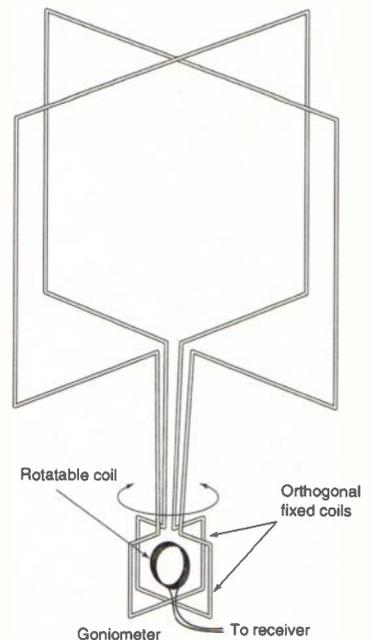
**The layout of operators receiving positions for wireless telegraphy at Kedleston manor near Derby in 1944. Total staff complement 200. Average pay 18/- (90p) per week.**



**VHF 61 Homer.**



**Adcock.**



**Bellini Tosi.**

was supposed to, then one of the other Y Stations would be asked if they could hear it and frequently the supervisor would call out, 'OK, RAF Chicksands can hear it and is covering'. As soon as an unidentified signal came on the air, the Y Station's own Direction Finding unit was called up to locate its compass bearing and position.

The d.f. unit was located not too far away from the main receiving site and mainly used the Adcock system of four vertical antennas with the feeders buried in the ground for screening purposes. These then fed into two crossed loops, which were also usually located underground with a third search loop being rotated by the operator until he could read off the electromagnetic bearing directly. This was called 'Radio Goniometry'.

If a signal was still unable to be read or identified, then another section was used to keep tabs on it and this was known as RFP or Radio Finger Printing, and which attempted to identify the operator by analysing his style of sending, ie. sending longer dashes than usual or a habit of running certain letters together or

sending odd characters now and again.

This assisted in knowing where the transmissions were coming from. The tape recorder had not yet been invented, so wire recorders were used to replay the signal repeatedly until it could be compared with previous transmissions.

There was also a transmitter information analysis department, which listened to the peculiarities of the unidentified radio transmitter and any noises on it such as squeaks, chirps and any hum which would assist in identifying it. For example, the Naval Y Station at Flowerdown near Winchester was able to identify not only the operator, but also the transmitter of the German battleship *Bismarck* and the position of it was located by the navy direction finding station at Scarborough.

There was also a traffic analysis section which studied communications networks, radio procedures and call signs used. All these snippets of information helped in building up an overall picture of what the Y Stations were listening to, which included enemy aircraft, army, Gestapo, government ministries, intelligence

gathering networks, radar, navigation beacons, teleprinters, shipping and the enemy Y Service.

The British Army Y Stations relied exclusively on high frequency wireless telegraphy and cryptically analysis. The RAF Y Stations had to listen to low and medium frequencies for navigation beacons using Morse code and which were regularly changing call signs and frequencies to try and outwit us.

Also monitored was h.f. for W/T and R/T and v.h.f. for R/T and bomber guidance beams. The Naval Y Stations naturally were used for listening to all kinds of shipping and used Direction Finding facilities extensively to locate these constantly moving targets.

When the Germans switched the Luftwaffe to night time bombing, they mainly used three letter call signs in Morse code and this was monitored at the very large Y Station Nr. 61 Wireless Unit at Cheadle, near Stafford. Everything heard was written down by the operator and given immediately to the Registry via the message scrutineers and then passed to the teleprinter room.

Here, the operator would immediately send it on the secure landlines to station X at Bletchley Park. There were 100 teleprinter lines running into it. There, the message was quickly distributed to the relevant code breaking hut for decryption and analysis.

The logs of each days activities at all Y Stations were also sent by despatch rider to station X where they were subject to the minutest scrutiny. Some of the Y Stations were really huge such as the one at Forest Moor near Harrogate. It had up to five separate very large rooms in large buildings each containing many operating positions, each fitted with an HRO receiver.

But even the smaller ones such as Keddleston Hall near Derby has 32 HROs, each manned by an ATS girl and as there were four different shifts that made a total of 128 operators all billeted in wooden huts located nearby. The training period was usually for a period of six months at Trowbridge in Wiltshire before being posted to the main Y Stations around Britain.

CONTINUED ON PAGE 20 ►

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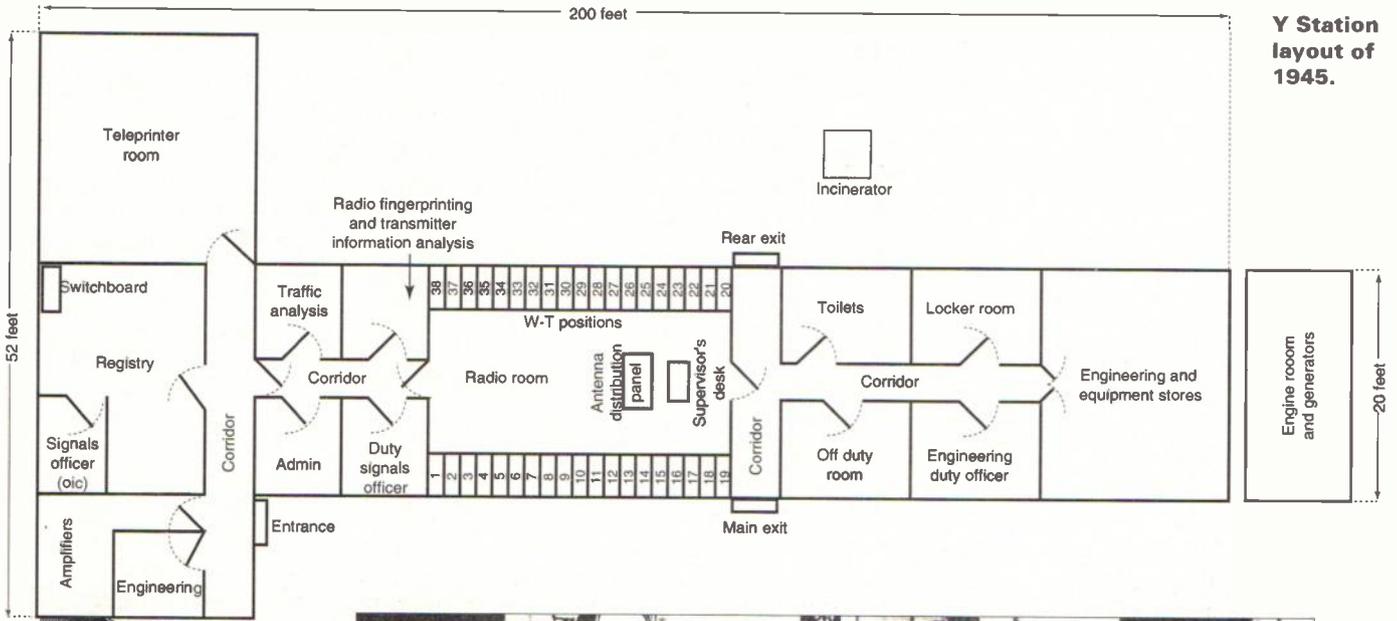
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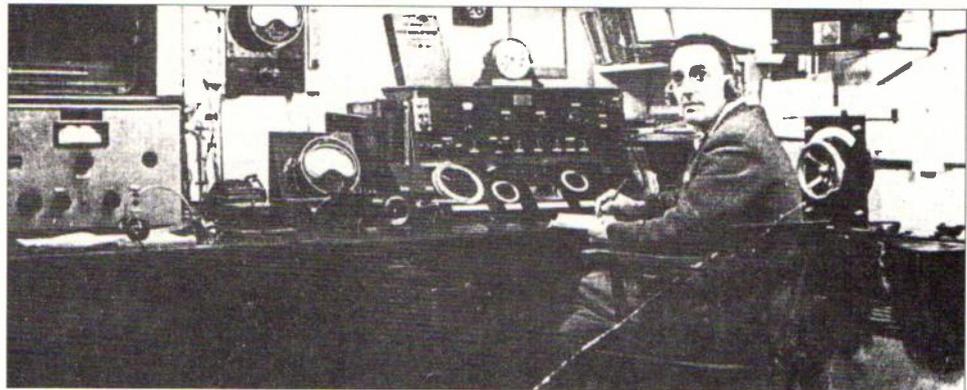
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Y Station layout of 1945.



Radio goniometry d.f. station of 1944. Operator William Alfred Jenkins.

▶ CONTINUED FROM PAGE 18

## The Radio Direction Finding Stations

An essential requirement for every Y Station were the signal Direction Finding (d.f.) units attached to it which were vital in establishing the whereabouts of enemy shipping, aircraft and navigation beacons, etc. A system of tracking these radio signals had been devised as early as 1907 by Bellini and Tosi using crossed loops, but it was the first world war that stimulated research into this method of radio location and resulted in the Adcock system of vertical antennas.

By the beginning of the Second World War, the Bellini Tosi system was being slowly phased out. Let us examine the different types of Direction Finding antennas used throughout the duration of the Second World War.

At the start of hostilities, most signals were l.f. and m.f. for navigation beacons, and m.f. and h.f. for bomber communication to their base stations, but aircraft communication was found to be v.h.f. radiotelephony.

The Bellini Tosi system of two crossed loops at right angles to each other was ideal for l.f. and m.f. ground wave signals during the day, but it was found to be very inaccurate at night time due to the D layer disappearing and signals being reflected from the ionosphere causing phase difference problems in the loop.

The Adcock system of four vertical antennas needed a large area of real estate for listening to m.f. and h.f. signals but was accurate for both sky and ground wave signals. As both systems were too large to be rotated, they each needed a Goniometer, which was a secondary system

of small fixed crossed loops, located below the main antenna and with a third rotating search loop inside them and to which was affixed a directly read compass bearing dial and pointer graduated in degrees.

A third system for v.h.f. was called the type 61 homer and was small enough for the whole antenna system to be physically rotated and which consisted of four vertical dipoles, two of which acted as reflectors. These reflectors had an electric bridging switch between the two halves of the dipole elements which could be opened and closed by an electric relay.

This then was the system in the United Kingdom, but as the enemy began to retreat, then more and more Y units fixed and mobile were sent abroad to north Africa and the Middle East, but that would be a separate story in itself.

# second post

Dear Sir

I thought the readers of *SWM* might be interested in hearing a success story regarding interference as hopefully it will spur other interference sufferers to persist in getting to the bottom of their practice problem.

My trouble started in June 1994. In fact, it was the weekend of the WAB Lifeboat Event. I had been active throughout the Saturday afternoon and had managed to work the required number of stations for the award.

On the Sunday I decided that, as I was at a loose end, I would try and work the remaining few. I switched on my TS-940S and was confronted with '20dB over 9' of loud buzz! At first, I assumed that someone in the neighbourhood was operating some sort of power tool and so, as I had already worked the required number of stations for the award, I went QRT.

In the evening, I had a quick listen, the racket had gone and so all was well, or so I thought..... Not so! The following day it was back with a vengeance, it remained on until the early part of the evening, when, it once again disappeared.

This pattern of events continued and by the time it had entered the second week I was getting particularly frustrated. After some investigation I found that it not only manifested itself on h.f. but also on v.h.f. and u.h.f. plus f.m.!

Therefore, whatever was

causing the problem was either very big, very near, or both. Using a pocket receiver I went out for a walk, which eventually took me to a small farm that abuts the housing estate in which my QTH is situated. Looking across the fields, I noticed an 11kV power line mounted on wooden poles trailing towards me from Alvaston, which terminated in a rather makeshift manner by the farm.

At my end of line there was an old transformer arrangement mounted on a pole being fed by three loose wires from an 'H' shaped wooden structure, which supported the terminations for the conductors. I noticed that the interference increased and decreased as the wind blew the lines.

So, taking my life in my hands, I decided to give the support pole a hefty kick. To my delight, the noise stopped for a few seconds and then began again as another gust of wind blew the line. I now know where the interference was coming from, so I quickly noted the pole and transformer serial numbers and the following day I reported my findings to the EMEB (East Midlands Electricity Board).

After a couple of days, I received a telephone call from the EMEB saying that they had examined the line and as there was no visible fault, no action would be taken. Meanwhile, I'd still got a mass of interference.

Several telephone calls and heated exchanges, resulted in a visit from an EMEB

representative who agreed to take a walk out to the line, with a receiver, and allow me to demonstrate my findings. Having surveyed the area for a while, he decided that there was probably a fault with a pole mounted switch that was near to the transformer and that he would make arrangements for work to be carried out, even though I had insisted that the problem was at the transformer.

A few weeks later the work was carried out and for a while the interference ceased. As Christmas approached the winds returned. The interference returned. I found that if I kicked the pole hard enough I could make the interference disappear for a few days, depending on the weather.

So, throughout the Christmas period I made several 45 minute trips to the pole and several telephone calls to the EMEB. Each time I called I was told in no uncertain terms NOT to move or kick the pole as this could endanger my life, but as there was no VISIBLE problem with the terminations, nothing could be done.

I was at the end of my tether! Everyone agreed that the cause of the problem was at my end of the line, everyone agreed that the cause of the problem was at the terminations, everyone agreed that when I moved the pole the interference stopped but that moving the line was very dangerous and still no one would do anything about it.

As 1995 continued, it became more and more difficult to make the interference stop, unless the pole was literally rocked back and forth. During May, after having the whole weekend

wiped out by the interference, I rang a fellow radio amateur who, I'd just discovered, worked for the EMEB, and explained my plight. He agreed to talk to someone on my behalf and a few days later I received another call telling me that my problem would be investigated again and I was not to move the pole again, regardless!!

Finally, In June, one year after the fault was first reported, I got another call from the EMEB telling me that there was some work scheduled for the far end of the line and that they would also instruct work for my end at the same time. This work has now been done and there is now a single structure standing where the makeshift one stood.

There is a brand new transformer mounted on the pole and all of the old terminations have been renewed. I can, at last, operate as and when I choose with no interference, so it just goes to show that in the end, persistence can sometimes pay off.

**Chris Carrington G0IYZ  
Chellaston  
Derby**

*Well Chris, patience is a virtue, and you seem to have had your's well and truly tested. I do wonder how many similar cases there are which have not been identified. By the way it most certainly is a very risky pastime comming into contact with the National Grid, I must advise that no readers should attempt to repeat the above mentioned 'tests' - KN.*

**SWM October**

**For all our readers**

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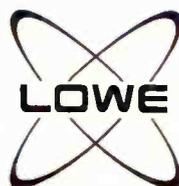
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# SONY

## CRF-V21

### Communications Receiver

#### Satisfy Your Curiosity

The CRF-V21 communications receiver is a piece of equipment that can satisfy the curiosity of someone who wants to discover what use others make of the short

wave bands. Like the rest of Sony's world band receivers, there is a keypad for direct entry of frequencies, in either kHz or MHz, and 52 buttons and knobs on the front panel which operate the receiver. But there the similarities end, for this is the largest set which Sony produce, measuring some 412 x 285 x 169mm and weighing 9.5kg. It has the widest frequency coverage, too - from 9kHz, way below the bottom of the long wave band, up to the top of short wave at 29.999MHz, as well as v.h.f. Band II from 87.5-108 MHz. Power is supplied either from the mains through a bulky and heavy adapter, or via a rechargeable NiCad battery pack. You also need two AA cells for the clock and memory backup. There is no built-in antenna, as is the case with a majority of communications receivers, but Sony supply an active telescopic antenna which is on a separate unit with a long lead to allow it to be used outdoors. For permanent external mounting, a special wall bracket is also supplied. Conveniently, there is a space to store the telescopic antenna

and its portable base when not in use, or when travelling with the receiver. The aerial connector is a standard BNC which means coupling it to an existing external aerial is very easy. The CRF-V21 has a large liquid crystal display which, combined with seven 'soft-keys' immediately beneath it, allows easy operation even when switching on the set without having studied the manual which runs to nearly 200 pages. Beneath the l.c.d. is a row of buttons to control some of the reception modes, and the printer. "Printer?", I hear you say. Yes, the CRF-V21 has an built-in thermal printer which allows hard copy output of FAX and RTTY transmissions, and of some of the displays produced on the l.c.d.

#### Receiving A FAX

Let me take you through the steps to getting a FAX printed out. First switch on the power (there are separate ON and OFF buttons, rather than a single power switch), then tune to a frequency carrying a FAX transmission. Helpfully, Sony provide a short guide to FAX reception which includes a list of frequencies for FAX weather charts. Although this was printed in 1987, checking the data with a current edition of *Ferrell's Confidential Frequency List* shows that few, if any, of the channels have been changed. Key in the frequency, maybe 10.250MHz for a weather chart from Spain, or 134.2kHz for a German one (*that's Offenbach, Peter - Ed*). Then press the FAX button above the printer output. The

display shows the frequency that the receiver has tuned to and confirms that FAX mode is selected while a signal strength meter provides an indication of how well - or badly - the signal is being received. Meanwhile a dynamic bar chart displays the FAX data being received, divided into three types: white, halftones and black. It is possible to adjust which parts of the signal are printed, and to store your own settings in the receiver's memory. The display shows the functions which have been allocated to the seven 'soft keys' immediately below the l.c.d., and F7 is in this case the print function. Press F7 and the l.c.d. responds by highlighting the word PRINT, and a separate line in the display shows that the printer condition has altered from standby to active. Almost immediately the thermal printer whirrs into action, first printing a header line giving the date, time and frequency for later reference. Anyone who uses a FAX machine at work will know that a page of A4 type is transmitted quite rapidly, but if you have ever tried to send pictures by FAX, then you will know it takes much longer. This applies to weather FAXes received via this set, too. It can take between 10 and 20 minutes to receive a complete chart. An example of a chart received from Germany appears in **Fig. 1**. - this took about 13 minutes to be printed, providing a suitable pause to go and make a cup of tea and a sandwich! Because the printer is relatively small, FAXes can be quite tiny when output, but the designers have overcome this problem by incorporating

By Peter Shore

As someone who spends most of his time tuning to the short wave broadcast bands, I find it easy to forget that the high frequency bands carry a great deal more than international, regional and national radio programmes. All those strange whistles, rapid pulses and other noises which a broadcast listener quickly whizzes past when tuning to international radio provide services to other users of the radio spectrum. But, unless you have the equipment to decipher the codes which are on the air, they are all rather meaningless. If you have the right kit, though, a door opens to a different world. Seven years ago, Sony introduced their Executive Visual World Band receiver.

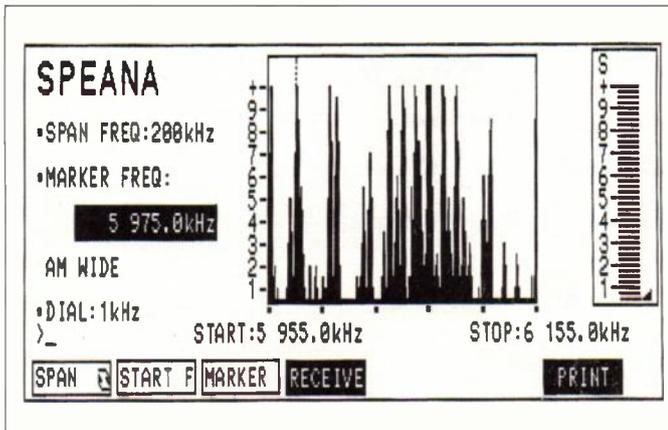


Fig. 1.

sophisticated software which allows the received FAX to be doubled in size. Using the soft keys, you can choose the enlargement area - the centre, left, or right-hand portions can be blown-up, which means that reading the data on the charts is much easier. There is an optional satellite antenna and frequency down-converter which enables images from meteorological satellites to be received, and the separate FAX handbook supplied with the set provides some interesting examples of what can be received. Unfortunately the satellite option was not supplied with my review sample.

## Tuning The Set

As I mentioned, there is a calculator-type keypad for direct entry of frequencies. There is also a large rotary knob - it measures 63mm across - which allows manual tuning. This can be set for 10Hz or 1kHz steps on short wave, allowing very precise tuning of signals with the knob 'clicking' at every step. The only disadvantage is that the frequency display resolves to only 100Hz, but in practise I found this made little difference. The tuning knob has a very positive feel when tuning, and is a good size for an adult hand. There are 350 memories available in the CRF-V21, divided into 50 pages of seven frequencies. This was the first foray by Sony into pages of memories, and clearly spawned the system now used on portable Sony receivers like the ICF-SW77 and ICF-SW100. The memories store not only the frequencies,

but also the reception mode (a.m. wide or narrow, l.s.b., u.s.b. and so on). This means that once programmed, tuning to favourite frequencies is extremely rapid and straightforward. In addition, you can allocate a name to each memory location, which means you do not have to remember which memory in which page you have stored Bracknell weather FAX frequencies, for example. Instead, simply look out for 'Brack' in the display. As well as assigning a name to individual memories, each page can be named. For example, you might call several pages 'BC', some 'WX', others 'MARINE' and so on, to define the station types for each group of pages. To rapidly scan through the memories, all that is necessary is to hold the PAGE FEED button, and turn the tuning knob. Should you want a permanent note of what is stored in the memories, the printer will provide one for you.

## Broadcast Listening

The CRF-V21 is excellent for listening to broadcast stations. It has synchronous detection which can significantly improve 'listenability' of signals which suffer from adjacent channel interference by locking on to one of the two sidebands. There are also wide and narrow filters for all reception conditions. Listening to signals from far and wide proved easy: the set is extremely sensitive. The active antenna supplied, which I used throughout my time with the receiver, afforded good results

when positioned outside (the coaxial lead is amply long enough for this). Audio quality is surprisingly high, despite the small size of the built-in loudspeaker. If you prefer, you can connect headphones for personal listening, or an external speaker. There is also the provision to hook-up a cassette recorder, and the set's in-built timer can switch the recorder on and off at predetermined times. If you want to record FAX transmissions and print them out later, this, too, is possible.

## Spectrum Analyser

I think that my favourite gadget on this receiver is the spectrum analyser. Using this

you can select a section of any band and the set will scan across all the frequencies and display a graphic representation of signals it receives with their strength. This enables you to see at a glance what the occupancy of a group of frequencies is, and then choose to move directly to an occupied channel. The operation is straightforward: press the F4 soft key (the display shows SPEANA) and a chart is immediately displayed, with the left hand and lowest frequency being the one the set is currently tuned to. Then you can select the frequency span, inputting the lowest

frequency either using the tuning knob or the direct entry keys, and then the span which can be either 200kHz or 5MHz. The set will analyse the selected span constantly, redrawing the 'mountain range' in which each 'peak' is a received signal. You can then tune in any of the signals received in the span by pressing the F4 soft key which has now become the RECEIVE function, and then rotating the tuning knob until the hashed vertical line on the graph is aligned with the highest part of a 'peak', and thus the

strongest part of the signal. If you want a hard copy of the analysis, all that is needed is a press of the HARD COPY button just above the printer, and out it comes. An example of the printed output of an analysis of part of the 49m broadcast band is shown in Fig. 2.

## Scanning

You can program the CRF-V21 to scan the bands in a number of ways. You can scan through the 350 memory channels by page name, such as AERO; you can find signals that are equal to or above a certain field strength that you choose; or you can define a range of frequencies to scan. Different

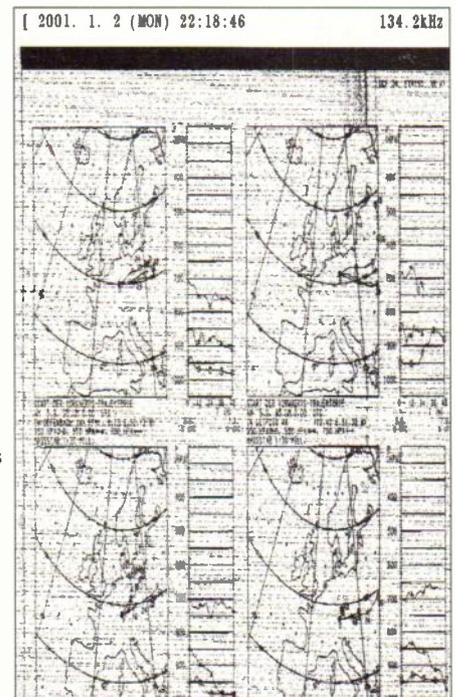


Fig. 2.

users may find one method more useful than another and it is unusual to have so much flexibility incorporated in a receiver.

## RTTY Reception

A further novelty as far as I was concerned was the set's ability to decode radio teletype transmissions. RTTY signals carry letters and numbers and are used for sending large amounts of data rapidly

CONTINUED ON PAGE 28 ►

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Mounts on air vent grills on the car dashboard. Allows easy and safe operation of most handhelds.....£9.95

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Stainless steel high quality.....£49.95

Scanmaster Mobile .....100 - 1000 MHz

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Scanmaster on Glass .....25 - 1300 MHz

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### Vectronics AT100

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## Quality Base Antennas

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• 12dB gain

• 20 elements

• 1.4 mtr boom

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- Price** ..... **£799**

### Kenwood R5000



- 100 kHz - 30 MHz + optional VHF
  - Competition class receiver
  - All made with optional filters
- Price** ..... **£995**

### Drake SW8



- 500kHz - 30MHz + 87-108, 118-137 MHz
  - AM/FM/SSB
  - 240V AC adaptor included
- Price** ..... **£599**

### AR 3000A Plus



- Customised version
  - Narrow AM filter/tape relay
  - SDU 5000 ready
- Special offer** ..... £1099 **£995**

### Sangean ATS 818



- Excellent new Short wave RX with SSB
- 150 kHz - 30 MHz plus VHF
  - Supplied c/w Mains adaptor
- Price** ..... **£159.95 + £4.75 p&p**

### Yaesu FRG 100



- Special Deal FRG 100 plus:
- Free Short wave antenna ..... worth **£59.95**
  - Free 240V AC mains adaptor ..... worth **£12.95**
- Price** ..... **£549.95**

### Drake R8A



- New World class receiver
- 100 kHz - 30 MHz wide coverage
  - AM, LSB, USB, CW, RTTY & FM
- Price** ..... **£1295**

### SDU 5000



- Spectrum display unit  
For use with AR3000A, Icom R7100 & Icom R7000.
- Price** ..... **£799**

### Sangean ATS 803A



- Our most popular Short wave portable with SSB reception.
- 150 kHz - 30 MHz plus LW/MW
- Price** ..... **£119.95**

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- Decodes RTTY/AMTOR/CW/SITOR/FEC
  - Includes CWV tutor mode
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  - IC-R7100 DC. 25 - 2000 MHz ..£1225.00
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- RC827 .....Multi band radio .....£159.99
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- Complete UK Amateur call book on disk including BBS Callsign with full Sysop details and QRA. Runs within Windows. ....£19.95
- Skyview ICRX**
- Control your Icom via your PC with this software package. Requires minimum 286 + Colour monitor .....£44.95
- OPTO Scan 456**
- Computer controlled interface for Realistic Pro 2005/6 series scanner .....£249.95
- OPTO Scan 535**
- Computer controlled interface for Realistic Pro 2035 .....£249.95
- CX12AR**
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## OPTO Interceptors

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  - Deviation check facility
  - Fully automatic
  - Earphone supplied
  - Signal strength bargraph display
  - c/w antenna, NiCads & Charger
- Price** ..... **£369.95**
- R20 - AM**
- Interceptor/Bug detector
  - 500 kHz - 3000 MHz
  - AM monitoring w/earphone
  - FM detection
  - Field strength indicator
  - 9V battery operation.....£129.95
- DC440 Decoder**
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  - AOR AR3000 .....Super W/Band .....£695
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  - Bearcat 2500 XLT .....ex display .....£249
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  - Realistic Pro-32 .....Handie .....£110
  - Realistic Pro 39 .....Average Cond. ....£150
  - Realistic Pro-50 .....Clean .....£75
  - Trident TR-2400 .....£275
  - Yupiteru MVT3100 ..H/held .....£185
  - Yupiteru MVT7100 .....£265
  - Yupiteru VT-225 .....Boxed.....£195
- Shortwave Receivers**
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  - Drake SW8 .....Portable RX .....£549
  - Kenwood R1000 .....£325
  - Kenwood R2000 .....Gen.Cov.....£375
  - Sangean ATS 803 .....Portable RX .....£95
  - Sony SW1S .....Pocket Receiver .....£130
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## Specification

<b>Frequency range:</b>	9kHz to 29.999MHz; 87.5 to 108MHz		
<b>Reception modes:</b>	a.m. (wide or narrow); Synchronous detection (u.s.b. and l.s.b.); u.s.b.; l.s.b.; c.w.; f.m.		
<b>Sensitivity:</b>	9-49.99kHz	a.m. wide	30dBµV (30µV) (S/N=6dB)
	50kHz-1.99999MHz	a.m. wide	20dBµV (10µV) S/N=6dB
	2-29.999MHz	a.m. wide	0dBµV (1µV)-15dBµV (0.17µV) s.s.b. S/N=6dB
	87.5-108.09998MHz	f.m.	10dBµV (3µV) S/N=30dB
<b>Selectivity:</b>	a.m. wide:	-6dB ±3kHz, -50dB ±7kHz	
	a.m. narrow:	-6dB ±1.35kHz, -50dB ±3kHz	
	s.s.b.:	-6dB ±1.35kHz, -50dB ±3kHz	
	FAX/RTTY:	-6dB ±1.75kHz, -50dB ±3.6kHz	
	f.m.:	-6dB ±7kHz, -50dB ±12.5kHz	
<b>Image rejection:</b>	>70dB		
<b>FAX drum speed:</b>	60, 90, 120, 240r.p.m.		
<b>IOC:</b>	576, 288		
<b>RTTY speed:</b>	60, 66, 75, 100 baud		
<b>ASCII:</b>	110, 200, 300, 600b.p.s.		
<b>Dimensions:</b>	412 x 285 x 169mm		
<b>Weight:</b>	9.5kg		

► CONTINUED FROM PAGE 25

around the world. Usually to resolve the signals, you need a separate piece of equipment in addition to a communications receiver. This set does everything for itself. Switch to RTTY mode using the button immediately above the printer, and tune in a radio teletype transmission (thousands of possible frequencies are listed in Ferrell's), and you will find the l.c.d. displays the letters and numbers as they are received. Quite often it is unintelligible, as there are many scrambled military transmissions on the air, but sometimes you can find news agencies transmitting stories which are readable (although perhaps in a language other than English!). And the printer allows you to have a hard copy of what's being transmitted.

## Performance

I was not able to have laboratory tests carried out on this set, but personal experience tells me that the CRF-V21 is a highly sensitive and very selective receiver. It picks up weak signals without problem, and separates the signals you want from those either side. Back in January 1991, Mike Richards carried out extensive tests on this receiver, and found that it was at least

equal to, and in some cases better than, the performance figures published by Sony in the handbook. I am including Mike's performance figures in the specification table with this review. Selectable bandwidth for broadcast listening is essential, and the narrow and wide positions provided seem to suit this type of reception admirably, while synchronous detection, pioneered by Sony and now available on just about all top-of-the-range digital short wave portables, works very well. The display is excellent, but while the small, separate clock l.c.d. has a back-light, the main display does not which disappointed me. There is a novel, adjustable strip light mounted on the top of the set which can be adjusted to shine on the operating controls and the printer output, but in practise this does not illuminate the display effectively. A further aspect which I was unable to assess during the time I had the set was the ability to control the receiver by a PC using an RS-232 data link. With suitable software, this receiver could be extremely useful, allowing the FAX and RTTY signals to be displayed on the PC screen and then pasted into word processing packages, for example. ■

# SUMMARY

## Overall Assessment

The CRF-V21 from Sony is a beautifully engineered piece of equipment, with excellent performance across all the frequencies it receives. Its specification is first-class, and there are many features which make it unique in the communications receiver class. I enjoyed a very brief time with the receiver finding my way around parts of the bands which before had proved of limited interest. In terms of broadening one's outlook on life, this set is certainly first rate. The problem is that all this excellent technology does not come cheaply - in Britain the set originally retailed at around **£3000**, which puts it into the top of the semi-professional range of communications sets. Sony have a limited quantity at the reduced price of £999.99. What has to be remembered is that this receiver has extra facilities which would have to be purchased separately and then hooked together if you want to receive RTTY and FAX transmissions. Here is a neat unit that does everything for you. Combined with the satellite reception option, I think it may be unbeatable. Thanks to Sony UK Ltd. for the loan of the set.

## Marconi Mail Stamps

The achievements of Guglielmo Marconi, who developed the first effective radio transmissions, are honoured on two special stamps issued by the Royal Mail on September 5. The stamps are part of a set on 'communications' which also features Rowland Hill 'inventor' of the postage stamp.

Two portraits of Marconi are shown on the 41p and 60p stamps. On the 41p, Marconi is shown with some of his early wireless equipment. Marconi's later life, following the founding of his famous company in 1900, is illustrated on the 60p stamp, which depicts the importance of his work for marine safety and navigation.

Rowland Hill's portrait is shown on the other two stamps in the set, the 19p and 25p values.



## Savoy News

**Savoy Hill Publications**, based in North Devon, supply the UK's largest collection of technical, service and workshop manuals for valve and early radio, television, hi-fi, telegraph, electrical, cinema sound and electrical domestic equipment. Some of the latest lists currently available are: *Valve Manuals & Valve Data*, *Vintage Hi-Fi & Audio Service Manual and Data Listing*, *Manuals & Data of Military & Communications Radio Equipment and Service Data & Manuals for Vintage Radio, Television, Domestic & Cinema Equipment*.

Readers of *Short Wave Magazine* can obtain copies of these lists FREE by writing to **Savoy Hill Publications, Seven Ash Cottage, Seven Ash, Easter Close Cross, Near Combe Martin, North Devon EX34 0PA**.

## Optoelectronics Converter Unit

Just available from Optoelectronics of Florida is the new CB-AR converter unit for use with early Scout Frequency Finders (versions 1.0, 2.0 and 3.0) to enable reaction tuning with AOR-8000 and 2700 scanners. The unit is connected by means of jack plugs between the Scout and scanner so that full functions are available.

Although the CB-AR converter unit has a list price of £49, as an introductory offer, Waters & Stanton are

offering these at £25 plus £1 P&P. Full illustrated instructions are included.

Also in the Optoelectronics range is the latest version of the Scout (version 3.1) with dual language capability (C1-V and AOR), which is now reduced in price to £399, due to bulk purchasing.

All the above are available from **Waters & Stanton Electronics, 22 Main Road, Hockley, Essex SS5 4QS**.

## On-Frequency Repeater Facilities

Business users of radio could enjoy improved reception in radio 'dead spots' following the development of a new technical standard by the Radiocommunications Agency (RA). Now, users with their own channels will have the opportunity to improve their communications in areas of poor radio coverage caused by tunnels, embankments, hills, etc., thanks to the On-Frequency Repeater Station (OFRS) facilities being made available by the RA.

The RA has developed a technical standard and is now permitting On-Frequency

Repeaters for Private Mobile Radio (p.m.r.) users with their own channels, to extend choice in p.m.r. system design. Users with p.m.r. (standard) and p.m.r. Road Construction licences will benefit.

An On-Frequency Repeater Station (OFRS) receives a radio signal and re-transmits it on the same frequency into a radio 'dead spot', without any significant delay. An OFR can be used to enhance the coverage of radio services in some of the areas where it is currently necessary to employ a new base station transmitter.

## Network Production Moves To UK

Production of Feba Radio's pioneering *Network* programme has been transferred from the Seychelles to Worthing. Ram Gioodooal, one of the leading Asian Christians in the UK, formally opened the new studio, which will enable Feba, for the first time, to produce programmes in-house in the UK. Local supporters and contributors to Feba's programmes form many parts of Britain gathered for the service of dedication which occurred on Wednesday 26 July 1995.

The studio was designed and built under the supervision of Charles Randall, Feba's International Audio Consultant. It is comprehensively equipped, including for example, mini-disc players.

Much of the professional equipment has been donated or obtained at considerably reduced prices through supporters. Some equipment was even obtained in exchange for petrol vouchers!

*Network* is a lively hour-



**Members of the Network team who have relocated from Seychelles to Worthing, (L to R front) Dinpuii Chhangte, Julie Anson, (back) Gerry O'Connell and Philip Athyal.**

long magazine programme, which is broadcast in English six nights each week from Feba's powerful short wave transmitters in the Seychelles.

The programme talks about everyday issues of interest to the audience and gently introduces simple Christian truths. Feba missionaries from the UK and India, who were serving in the Seychelles to produce *Network*, have moved to Worthing and tapes of the programmes recorded in the UK are now being airmailed to the Seychelles for broadcasting a few days later.

While there will be a loss of immediacy (*Network* was broadcast live from the Seychelles), 'there will be definite gains', says *Network* team leader Philip Athyal. 'Living and working in the UK provides us with greater opportunities for obtaining interesting material for the programmes'.



**Ram Gioodooal gets the feel of things at Feba Radio's new Worthing studio. Demonstrating its features is its designer, Charles Randall.**

## New CD-ROM From PDSL

Public Domain and Shareware Library of Crowborough have recently taken delivery of the new QRZ CD ROM from Walnut Creek. Volume 5, dated July 1995, contains an up-to-date international list of callsigns including the UK.

With 935 764 entries it will be hard to beat. Callsign search and retrieval software is easy to use and runs under Windows, DOS and OS/2 and Linux.

The CD also contains over 7000 files covering all facets of amateur radio, including radio and scanner MODs, satellite tracking programs, Morse code training software, programs for antenna design, circuit design and computer radio control, to name just a few.

QRZ Volume 5 is available from PDSL priced at £18 by mail order or telephone order to:

**PDSL, Winscombe House, Beacon Road, Crowborough, Sussex TN6 1UL. Tel: (01892) 663298.**

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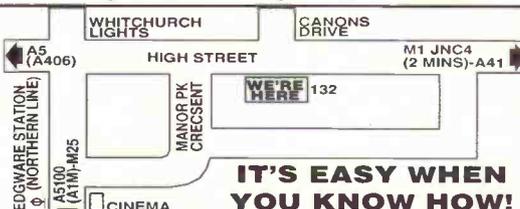
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**IT'S EASY WHEN YOU KNOW HOW!**

# The Easy Dipole

*Unhappy with the performance of commercially available antennas, Paul Beamont went about building his alternative. He came up with the Easy Dipole.*

The advent of the sensitive v.h.f. receiver has to some degree suppressed the aged idea that the receiver is as good as its antenna. High gain front-ends and other i.c. borne stages allow the listener to listen to apparently strength nine signals using only a simple telescopic antenna. This facility is of course due more to the inherent gain of the receiver stages than the efficiency of a tuned antenna.

Antennas of varying shapes, sizes, appearance and design can be purchased to cover extremely wide ranges of frequencies. Having purchased a commercially manufactured antenna, I was most disappointed with the total performance across the stated range of 25 to 550MHz.

The 2m amateur band was heard under the mush, including the GB3SL repeater on R2 (145.650MHz) which is situated approximately 150m from my QTH. Worse was realised! The Banstead repeater GB3NS on RB10 (433.250MHz) could not be heard at all.

At this point it was decided that something easy, simple and above all, efficient was necessary. Collinear and 'five eighths' vertical antennas were assessed. Whilst both could have been easily constructed, both have the same negative points against their use.

Both types would be cut for one band only and both types would exhibit an **unnecessary** gain factor. Increases in gain can be problematical with modern front-ends leading to overloading and instability. These problems would necessitate the introduction of an outboard attenuator and unnecessary expense in the case of my equipment.

A dipole was therefore seen to be the simplest approach. No coils or gain and easily configured for any desired frequency. To enable the dipole to cover more than one frequency, the lengths of the elements can be added or subtracted using a nut and bolt approach.

I identified a supply of aluminium tubes 1.2m long with a 3/8in BSF thread set in one end and a p.v.c. sealing cap, on the other. Totally different from conventional antenna rods, the longitudinal seams are sealed, this provides a barrier against moisture ingress.

The aluminium tubes form the basis of the easy dipole. The prototype consisted of two aluminium tubes at the maximum length of 1.2m.

The final working frequency was 60MHz. Connecting the dipole to the receiver enabled the author to monitor the despatchers in the USA on the 33MHz band

during recent lift. conditions. Other previously unheard signals were also copied around the frequency of resonance.

Packet transmissions were also copied in the 6m band. The equation for cutting the elements of a dipole is generally  $150 \times 0.95$  divided by the frequency f. for metric lengths, or,  $5905 \times 0.95$  divided by the frequency f. for imperial lengths (inches). In both cases, f is stated in MHz.

To allow coverage of the band in interest, the centre frequency should be stated as f. (for the two metre band, 144-146MHz, 145MHz would be the centre frequency).

In calculation of the length of the elements, the diameter of the tubes (19.3mm or 3/4in) users should be taken into account as diameter against wavelength. I felt that the variation from the stated 0.95 as a constant is so small that adjustment of this figure is unnecessary. Anyone wishing to include this variation will find references at the end of the article.

## Cutting The Elements

Suppose the antenna would be required to cover four metres and the two metre band. The following dimensions are calculated:

Half wave for four metres:

$$70.025 \text{ to } 70.5\text{MHz centre frequency. } 70.26\text{MHz} \\ 150 \times 0.95/70.26 = 2.028\text{m}$$

Half wave for two metres:

$$150 \times 0.95/145 = 0.983\text{m}$$

The gap between the elements within the central support is 25mm. 12.5mm therefore has to be removed from the elements for the highest frequency covered. These elements, in this case, 145MHz acts as the base for the elements that dictate a lower frequency, this example uses four metres.

Metric calculations have been used here and to afford some accuracy, the metre lengths should be converted to millimetres by multiplying the metric length by 1000. Each tube is 1.2 metres long, converting to millimetres we have 1200mm.

The length for the two metre dipole is for an unbroken half wave. To adjust for the space between the element is simple:  $983$  was divided by  $2 = 491.5$  minus  $12.5 = 479\text{mm}$ .

The length of 479mm is the length for each element and fitting them into the central support as described later will result in the final length being that previously calculated viz 983mm.

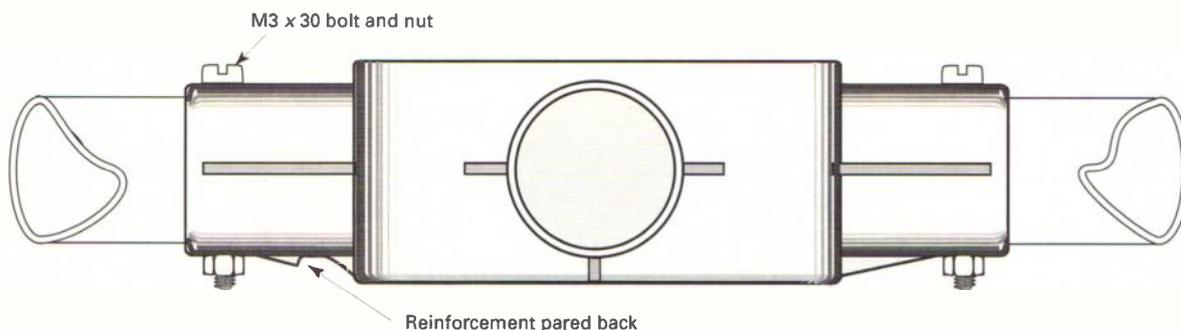
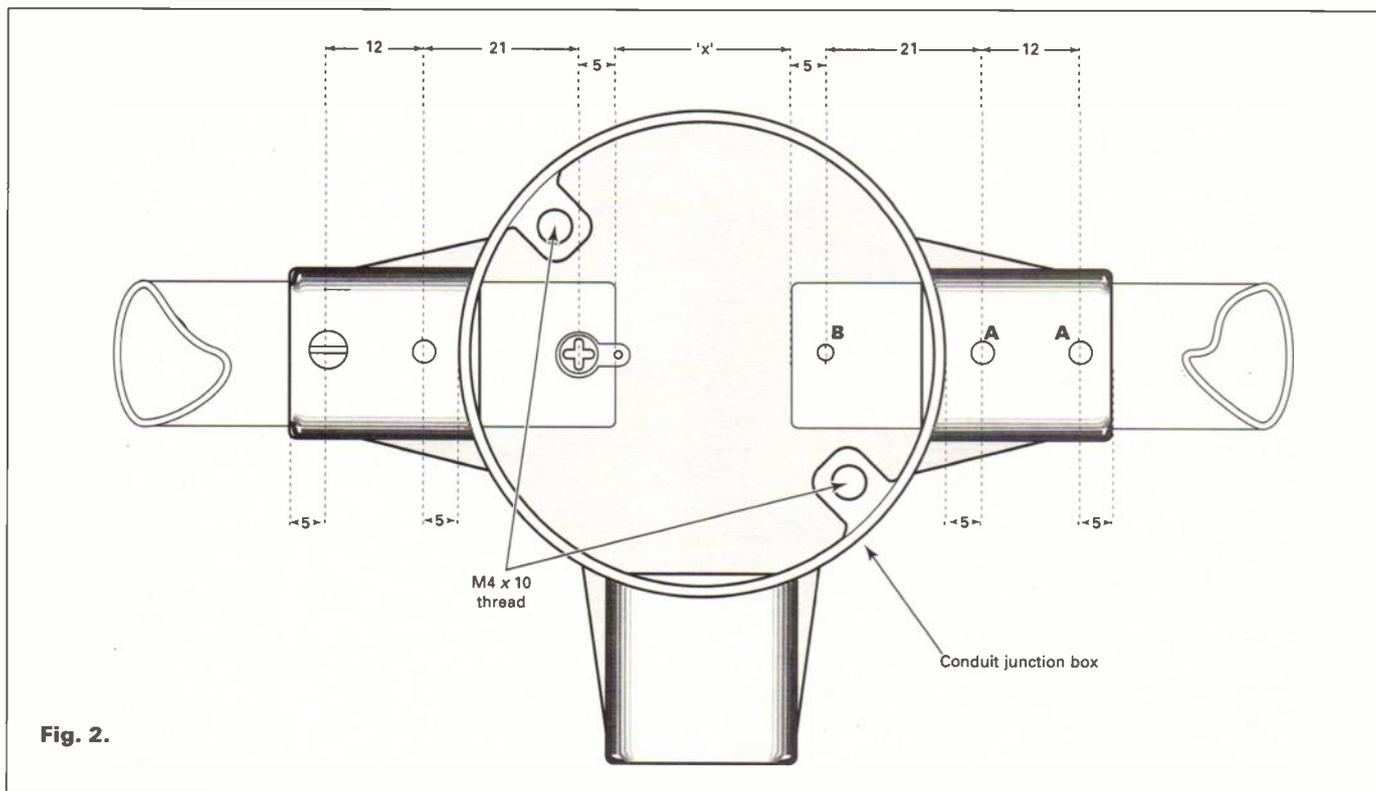


Fig. 1.



To configure the easy dipole to cover the other stated frequency as well as two metres necessitates the use of the 3/8in BSF threads available at each end of the elements.

Suppose that the elements have been drilled and fitted for two metres and that all has fitted together accurately and the tip to tip measurement is 983mm.

We have previously calculated the tip to tip measurement for four metres to be 2028mm or 1014mm for each element.

The extension length for each element is as follows: 2028 minus 983 = 1045 divided by 2 = 522.5mm.

It is not necessary to adjust the length to allow for the gap between the elements as this was previously done on the higher frequency rods. Screwing the rods into the existing dipole would extend its frequency coverage down to four metres. Removal would revert coverage back to the higher frequency band.

By having a suitable number of rods, it is obvious that with careful planning, the dipole will cover a multitude of frequencies.

All that has to be remembered, is that the highest frequency dictates the base length. The p.v.c. end caps

mentioned would protect the threaded ends when not in use and the open ends of the additional tubes fitted to lower the range.

### Construction

The central support is based on a p.v.c.-U Tee-box. The inlets to the Tee-box form the shape of a 'T'. It is the horizontal that forms the top of the T which will hold the dipole elements in place. The inlet on the downstroke would be used for the support.

The material of the box is moulded to form a lip within the inlets to stop the p.v.c. conduit from entering the space within the box when in use for its intended application. At this point, consult Fig. 2.

Remove the end caps from the aluminium tubes and place them in a safe place. Push one of the tubes into the inlets used for the dipole elements and, pushing hard, rotate the tube to leave a black mark on the offending lip. Using this mark as a guide, pare off the excess material to allow the passage of the tube into the main part of the box.

Repeatedly check the tightness of the tube, as doing so will result in strong final support at the final assembly. Having pared the unwanted

materials away from the inlets, gently centre-punch two points on the inlets for Hole A as shown in diagram B.

Drill a 3.3mm hole through both sides of the inlets, taking care to keep the drill bit vertical to the face. Reference to Fig. 1. and 2. illustrates the principal. You will find drilling a 2mm pilot hole will greatly assist accuracy of this task.

Having drilled the required holes some 8mm of the reinforcement splines on the rear of the dipole inlets must be removed to allow the proper seating of the nuts onto the surface of the inlets. Again, Fig. 1. will illustrate the task.

The method of termination of the coaxial feed to the elements is totally up to you, however, I used a BNC connector which is seen to pass through the material at point W in Fig. 2. That completes the preparation of the support.

### Preparation Of The Elements

Having calculated the length of the required highest frequency and having made the adjustment to allow for the gap within the Tee-box, carefully mark and cut (at the open end) to the chosen length ensuring that the cut ends remain square.

Centre punch points on each rod at the points shown in Fig. 3. As with the drilling operation for the central support, start the holes with a 2mm bit. Hole A passes through both sides of the tubes whilst hole B is cut on one surface only. Remove surface swarf with a 6mm bit.

### Assembly Of The Finished Unit

Now it is a simple matter to push fit the elements into the central support and if all goes well, the holes will line up allowing the free passing of an M3 x 30mm bolt. Fit and tighten all nuts, bolts and washers to hold the elements into the support. Any excess length of the bolts can be cut away with a small hacksaw.

Fit the 3mm solder tags to the elements using a No. 6 x 1/4in self-tapping screws and shake proof washers. At this time, attach the coaxial terminations to the solder tags leaving a sufficient length to enable connection to your receiver.

Having carried out the last task, the only thing left to do is

CONTINUED ON PAGE 37 ▶

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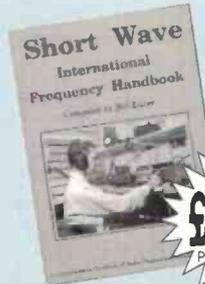
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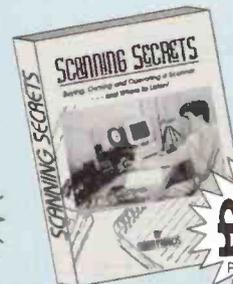
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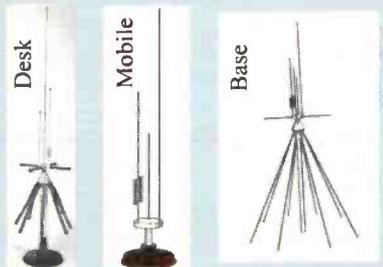
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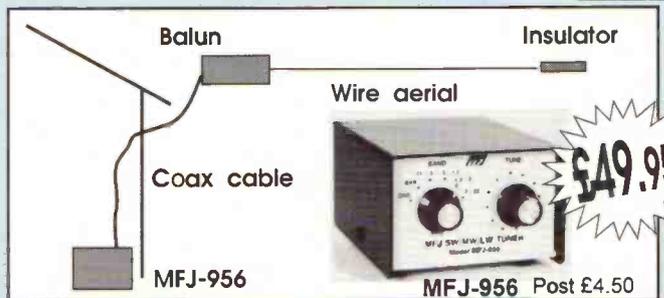
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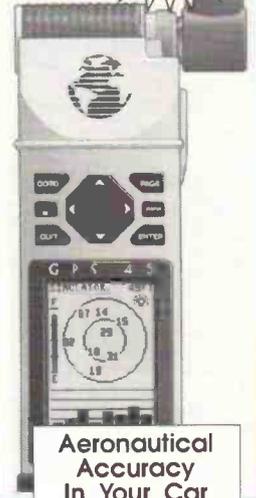
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# Victory Airshow at RAF Fairford



**An RAF VC-10 tanker refuels two Jaguars in flight.** Crown Copyright.

*Ailsa Turbett G7TJC has always had a fascination for all aeroplanes, new and old, so she just had to get up early enough to go the Victory Airshow.*

The RAF Fairford Victory Airshow was a spectacle not to be missed, especially after the disappointment of missing the VE-Day celebrations in London. We - I took my Mum in case my map reading failed - left home at 7.00am - an ungodly hour, at which time this SWM member of staff only functions after at least eight cups of tea - armed with sunscreen, sunglasses, lots of water and a forecast of temperatures in the high eighties.

A Hawker Hind flew over just as we arrived at the show. This was part of a display entitled 'Attacking the Fort' by Gloucester Gladiator and also included an Avro 504K, Avro Tutor, SE5A and a Fairey Flycatcher.

I decided to look around the static display first, as the air displays I most wanted to see were scheduled for later in the day. Although, with over 200 aircraft 'parked up' I couldn't have seen them all if I'd spent both days just looking at them!

We were parked directly in front of the US Air Force B-1B and the B-52H, both of which we watched flying later in the

day. As majestic and awe-inspiring on the ground as in the air.

Another American aircraft to catch my eye was the U2 - the plane not the rock group! This sleek, state-of-the-art bird was, to my surprise not new, but actually originated from a design by Clarence 'Kelly' Johnson at the top secret 'Skunk Works' in 1954.

Designed for long-range flights with the ability to fly at an altitude of over 70000ft, the U2 has been invaluable not only in war situations - the U2 took the pictures of active missile sites in Cuba, during the Cuban Missile Crisis - but it has also made vast contributions to environmental concerns, such as the depletion of the ozone layer, earthquake and flood damage. The U2 is still invaluable for long-range reconnaissance and will remain so for the foreseeable future.

Whilst I was looking at the U2, the Duke of Kent was being shown the cockpit surrounded by US 'security' men, who had obviously spent more time on their hair than I had on mine!

Of course, while we were walking around, the air display

was continuing overhead. The Cadbury's Crunchie Circus, with their gravity-defying wing walkers - a long held aspiration of mine - performing on the tops of two Boeing Stearmans, a Bristol Blenheim from Duxford Aerodrome and the Royal Jordanian Historic Flight from Bournemouth Airport, under the flight path of which are the SWM offices, were all airborne.

## Tiger Moths

One unique display, probably never to be seen again, was a flypast by twelve Tiger Moths, brought together for the finale of the show.

Creating an unusual display were five Lockheed C130K Hercules from RAF Lyneham, all flying with their airborne refuelling gear trailing behind them. This was a section of the display entitled 'Skytanker' in which we also saw a Lockheed Tristar KC1, a BAC VC-10C1K and a BAC VC-10KC3/4.

One aircraft that I was most interested in seeing was the much talked about Eurofighter. This is the jet fighter aircraft built to take the UK, Germany, Italy and Spain into the 21st

century, well ahead of its competitors. To give it unmatched manoeuvrability, the Eurofighter is intentionally designed to be aerodynamically unstable and is only able to fly because of its onboard computer controlling the flight surfaces.

Another state-of-the-art feature fitted is known as Direct Voice Input (DVI), which allows the pilot to activate certain controls and monitoring systems with his voice alone. With many leading edge technologies from across Europe, the Eurofighter project carries a lot of futures on its rather angular wing tips.

## Aerobatic Displays

There were aerobatic displays throughout the day from the six Casa C101EB Aviojets of the Patrulla Aguila of the Spanish Air Force Display Team, the nine BAe Hawk T1As of the Red Arrows, Royal Air Force Aerobatic Team, the six Northrup F-5Es of the Patrouille Suisse, Swiss Air Force Display Team, the five Sukhoi Su-22 Fitter Ks of the Team Duha, Czech Air Force Aerobatic Team, the nine Dassault Alpha Jets of the Patrouille de France, French Air Force Aerobatic Team and the four Sud Alouette IIIs of the Grasshoppers, Royal Netherlands Air Force Helicopter Demonstration Team.

All the teams were very impressive, especially the Spanish and Swiss, but when you have grown up watching the Red Arrows you tend to expect perfection from all display teams. You then become critical of a jet falling behind or wobbling slightly, not taking into consideration

the speeds they are doing or the risks they are taking for your entertainment, but you just can't help it when the Red Arrows outshine them all - well, I think so!

## The Finale

We headed back to the car, which was right next to the runway, for the finale. The twelve Tiger Moths that I mentioned previously, flew in, bringing twelve veterans, representing all sections of the armed forces, to witness the tribute.

The RAF were represented by a fly-past by an Avro Lancaster, Hurricane and Spitfire from the Battle of Britain Flight and a deHavilland Mosquito (*one of my uncles was a skilled woodworker on the team that built the first Mossie, Ed*). The part the US played in the airborne conflict was symbolised by a Boeing B-17 Flying Fortress, a Lockheed

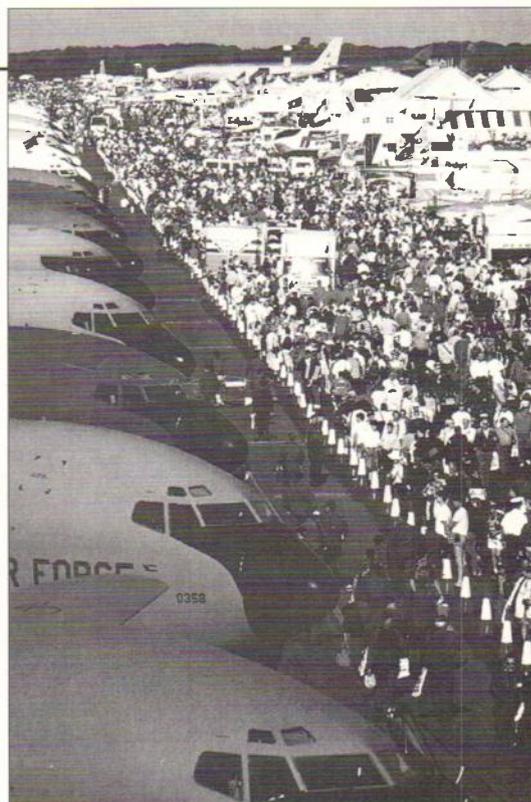
P-38 Lightning, a North American P-51 Mustang and a Republic P-47 Thunderbolt.

Representing the current relationships between the former enemies there was then a flypast by four Luftwaffe Tornados and four RAF Hawks.

Following them a display that caused many a damp eye, one plane from each formation pulled up in what is called the 'missing man formation', to honour all the men and women lost in the war. Then a Spitfire, a P-51 Mustang and an ME-109 broke over the grandstand from where the twelve veterans were watching the display, followed by the Red Arrows Synchro Pair drawing a V in red smoke in the sky above them.

A one minute silence followed in remembrance of all the people who gave and lost so much in the war. I've never before been in a place with so many people and heard nothing but the odd cry of a

child and the hum of the helicopters hovering in salute to the veterans in the stand. I wasn't alone in wondering what was going through their minds at that time and I also know I wasn't alone in hoping that I never have any memories like those on the faces of some of the veterans facing the empty airfield.



Ailsa's probably somewhere in the crowd at Fairford!

## The Easy Dipole

### ► CONTINUED FROM PAGE 33

to waterproof the unit. This can be done in a variety of ways. On the prototype unit, I used bath sealant, which was layered into the space within the central support over the course of three hours to ensure a good set. Once the lid was fitted into place using M4 x 10mm screws. Sealant was also squeezed into the space around the point of entry around the elements.

### Use

The prototype and subsequent working model have been vertically polarised. To change the frequency a 3/8" BSF thread is screwed into the threaded end of one rod and the extension merely screwed on. Apart from two metres, the author has successfully configured the easy dipole for 70 cm, the air band and 6m. Should each element length exceed 1.75m, additional support must be added. The author used two lengths of Perspex and longer fixing bolts at hole A.

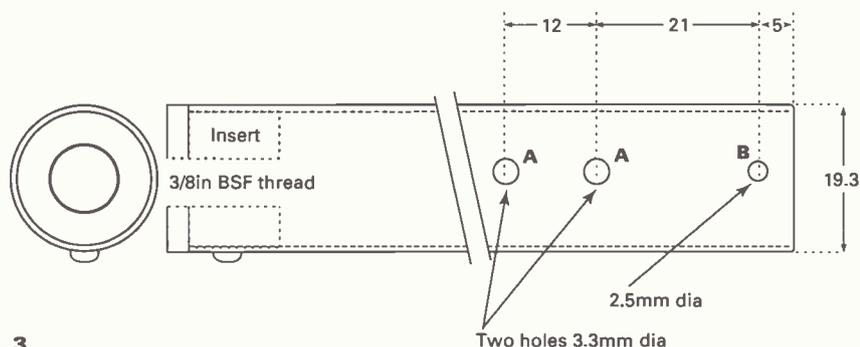


Fig. 3.

### Further Developments

The aluminium rods in connection with a 4-way/back outlet box can easily be configured for use with satellites. These versatile rods have also been used with great effect on the 'Valved Active Antenna' featured in *Practical Wireless*, February 1993. ■

### References

*Handbook of Wireless Telegraphy Vol 2 1938*  
*ARRL Radio Amateur's Handbook 1974*  
*ARRL Handbook for the Radio Amateur 1990*  
*Short Wave Magazine* December 1989  
*Practical Wireless* February 1993

### You Will Need

Description	Quantity
M3 x 30mm plated bolts	4
M3 washers	6
M3 plated nuts	4
No. 6 x 1/4" self tapping screws	2
M3 solder tags	2
Rods ** (Cat No: RA2779)	2
(Two rods are required for each frequency combination desired).	
1 off Support Tee Box (available from source of rods)	
Bath sealant, RTV, Araldite and the like	
BNC connector if required	
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<b>Irwin - Desman Ltd.,</b>	
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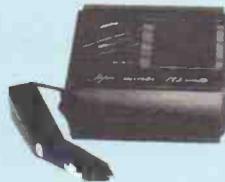
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# Saisho R700D Modifications

*Wishing to improve the performance of his budget portable Peter Julian really got stuck in. He was more than pleased with the improvment. Read on and you will discover just what he did.*



The Saisho R700D is a budget 4-band portable, made in the Far East, which was available from Currys and Dixons. Its attraction is its phase locked

conversion set (eg. poor image rejection), I was quite well satisfied with its performance, but there were a few areas which I thought might be possible to improve. I wasn't

too happy with the results when a long wire was clipped to the telescopic antenna and the attenuator was far too severe on short wave.

Selectivity could also be improved. Rather than spending time trying to work out the circuit from looking at the board, I decided to invest in a manual which is available from Partmaster at a cost of £4.50

including handling. A glance at the circuit diagram showed me what I had suspected. The antenna was connected to the hot side of the antenna coil and the attenuator literally short circuited the antenna when switched in!

The original front-end circuit is shown in Fig. 1 and Fig. 2 shows the modification. The input transistor Tr2 is an f.e.t., which is a high impedance device and didn't appear too well matched to the antenna tuned circuit with its connection to the extra winding through the 100Ω resistor. By connecting the gate as in Fig. 2 a high impedance match is provided and the extra winding is free for use as an antenna connection.

The modification is

relatively simple to carry out. First of all the case has to be opened. There are three screws at the back holding the case together, two either side and one in the battery compartment. Prior to opening the case, the top of the key lock switch must be gently prised off. This is located under the set.

Once opened, the clock board has to be unscrewed and then the three screws holding the radio board can be removed. Before this board is lifted out, the wire from the internal telescopic antenna should be unsoldered so that the board can be turned over and the extensions to the wave change and attenuator

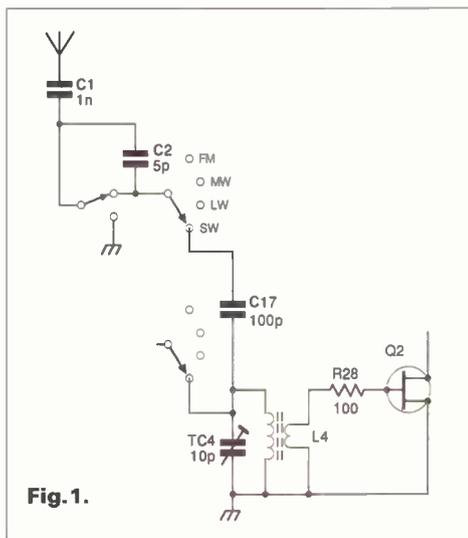


Fig. 1.

loop circuitry with a digital frequency display, making it possible to accurately spot tune broadcast stations with no drift. Each band has five preset memories. On l.w. it tunes in 1kHz steps, on m.w. in 9kHz steps and on s.w. the steps are 5kHz. The set is fairly compact and, besides the two AAA clock cells, it takes four AA cells for the radio. Mains power is possible from a 6V adapter, not provided. The clock and alarm feature also makes it ideal as a radio to take on holiday, at home and abroad.

Bearing in mind the limitations of a single

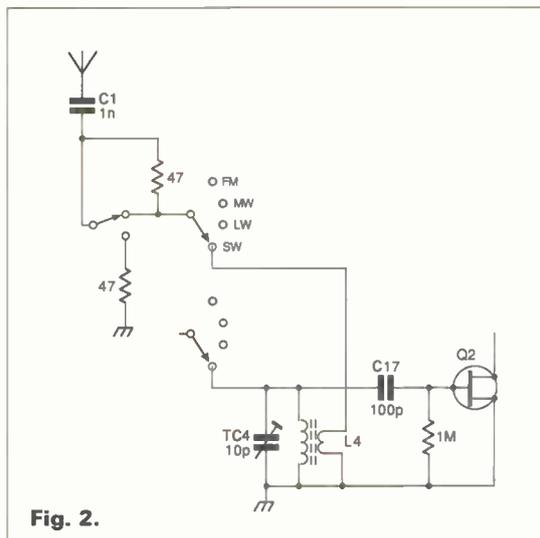


Fig. 2.

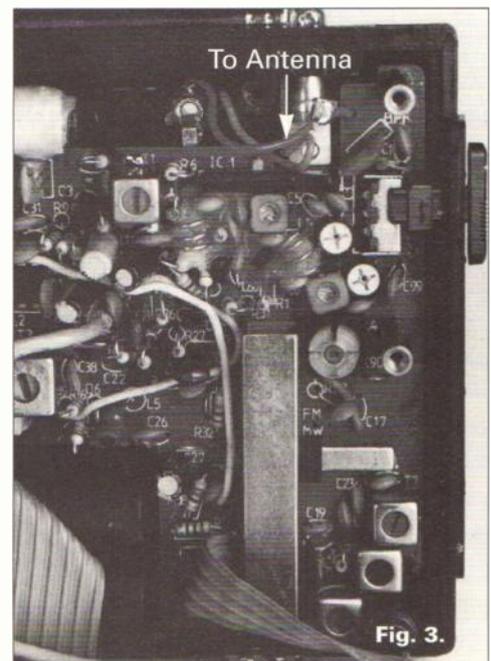
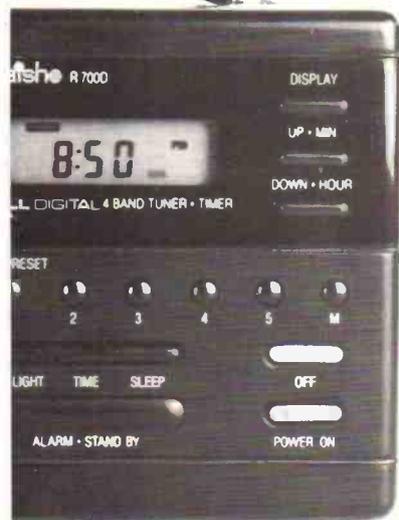


Fig. 3.



switches carefully removed.

The main component layout of the right hand end of the board is shown in **Fig. 3**. The 100Ω resistor, R28, has to be removed and the wave change end of the 100pF capacitor, C17, then lifted and fitted through the connection vacated by R28 to the gate of Tr2. A short piece of wire can next be soldered between the vacated coil side connection of R28 and the vacated wave change switch connection of C17. This alteration is shown in **Fig. 4**. A 1MΩ resistor should then be soldered under the board, as in **Fig. 5**, between the repositioned leg of C17 and ground. No re-alignment should be necessary.

The attenuator is reconfigured as in **Fig. 2**. Capacitor C2 is removed and placed by a 47Ω resistor. However, if more attenuation is required, then the value of this resistor can be increased. The ground end of the switch must be disconnected by cutting the p.c.b. track and another 47Ω resistor fitted across the cut. This is also shown in **Fig. 5**.

You might like to fit a socket so that an antenna tuner can be used with the radio. A 2.5 or 3.5mm jack type will do nicely. There is enough space on the back of the case, between the telescopic antenna and the ferrite rod to accommodate the socket.

**Fig. 6** shows the wiring of the antenna socket. Pushing in a plug disconnects the telescopic antenna. However, an untuned wideband antenna amplifier should not be used, since this would severely aggravate image problems.

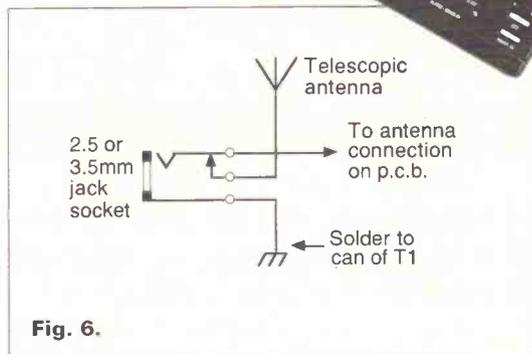
I had hoped to be able to upgrade the ceramic i.f. filter and had expected to be able to choose from the wide range of 455kHz filters available from companies such as Cirkit. Unfortunately, the i.f. is 450kHz, **Fig. 7**, and at the time of writing, I have not been able to locate either a 450kHz filter or a ceramic resonator. However, should you be able to find a 450kHz resonator, it can be

fitted across R17, the 820Ω emitter resistor. In theory, this resonator should bypass R17 at resonance and increase amplification only at 450kHz, but I have not yet been able to test this. Without major surgery to include some form of Q multiplier, I have not so far come upon a simple solution to improving selectivity.

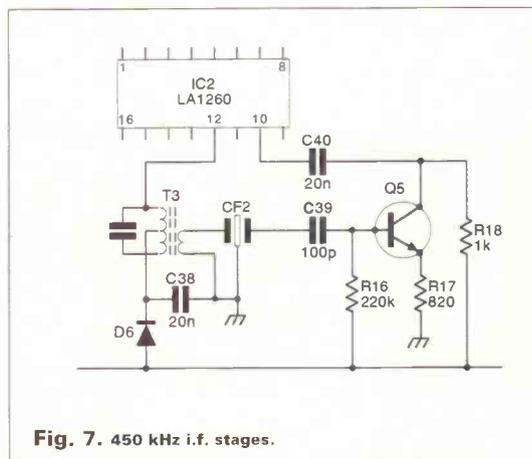
Before re-assembling the set, make sure that no wires from the speaker or battery compartment have come loose and also check that no dirt or dust has collected on the i.c.d. display or inside the window. Although the R7000 has now been discontinued, the board is quite likely to turn up in other

models. I strongly suspect that the Grundig Ocean Boy is one such set, so you may discover others which could also benefit from this slight modification.

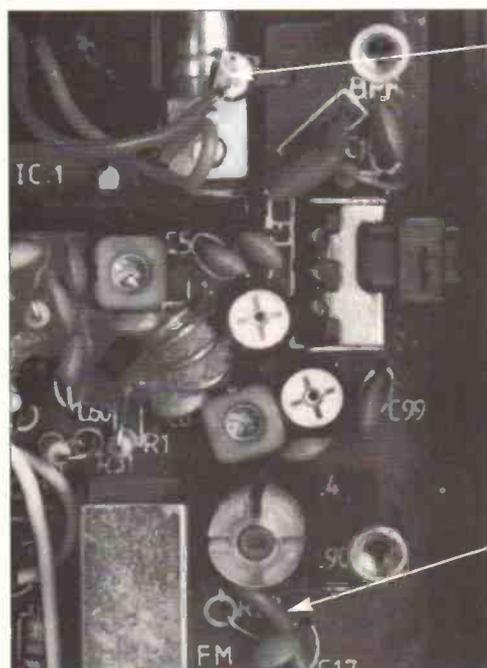
Partmaster can be contacted at PO Box 60, Hemel Hempstead, Herts HP2 7TZ. Tel: Hotline (01442) 888444.



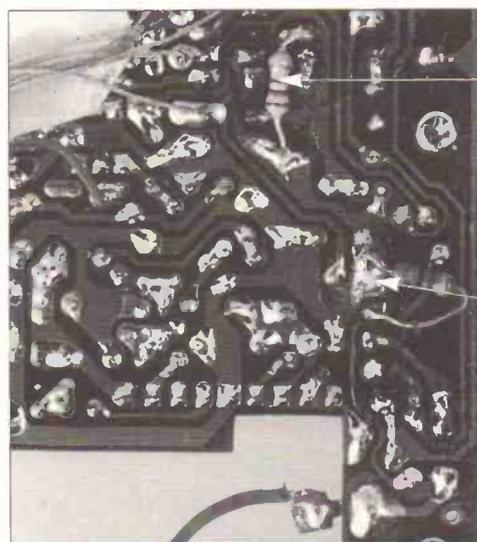
**Fig. 6.**



**Fig. 7. 450 kHz i.f. stages.**



**Fig. 4.**  
To Antenna.



**Fig. 5.**  
1MΩ resistor.  
Cut track, 47Ω resistor fitted across break.

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Kenwood UK are 'Co-Hosting' this year will be on hand all day Saturday. Top Alinco will also be in attendance, including their excellent range of books. In event of 1995 - MARTIN LYNCH will be for all the FREE food and drink available.

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The best selling "u easy to use has 20 few gaps), clear dis including access

### NEW PRODUCT NEWS

#### New AR-5000

Due end '95, the AOR 5000 is a base/mobile high performance all mode scanner covering 30khz to 2.6GHz. Aimed at the professional user, the new receiver has all modes, full computer control and will cause a real riot when stocks arrive during December. Price around £1975. Watch the next Martin Lynch Advert for more details.

#### New AOR Shortwave Receiver

A joint venture between AOR UK and Japan, the new receiver is aimed at the middle price band market, competing with the HF-150 and FRG-100. 30KHZ thru to 30MHZ, strong signal handling and easy to use, this is the first time AOR have presented their buyers with a receiver designed and built in the UK. Watch this space!

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tually forking out with Kenwood UK  
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### SKYCOM ICR-X

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As used by many government establishments throughout the world, the new MyDEL P-300 easy to wear "over the ear" earpiece is available now, including FREE P&P. (State which scanner the P-300 is for when ordering).

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## MyDEL Optima ACARS Receiver

Specifically built and designed for MARTIN LYNCH, this small self contained receiver is the only answer for those wishing to decode ACARS and not tie up their main receiver. Supply required is 12 volts, a simple antenna, connect to your ACARS decoding software via your PC, (or use the Universal M-400 stand alone ACARS decoder) and you have an excellent ACARS system. Introductory price of £179.95.

The **LOWE AIRMASTER ACARS software** is available at **£89.95.**



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**Keypad included. ZERO APR**

### ★★★★ LOWE HF-250 ★★★★★

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### ★★★★ AOR 3030 ★★★★★

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### ★ ICOM ICR-7100HF GT ★

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### ★★★★ DRAKE R8A ★★★★★

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Covers 25 to 1300MHz. Broad-band performance in a neat, compact package. Just over 16 inches long. Excellent performance in a small space!  
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Optimised for long distance reception on 118 to 137MHz air-band. Tuned antenna with pre-amp & band-pass filter. Hear ground stations you've never heard before!  
AB118 Kit: £18.80 Assembled PCB modules: £25.90

### MB156 MARINE ACTIVE ANTENNA

A super new VHF marine band antenna based on the same concept as the very popular AB118 airband version. Optimised for long range reception on 156 to 162MHz with low noise pre-amp, end fed half wave antenna, switched attenuator and band-pass filter. Don't miss out on the action on your summer holidays!

MB156 Kit: £18.50 Assembled PCB modules: £25.60

## HOWES KITS - Great Holiday Projects!



### MW & SW Listener ATU

The HOWES CTU8 SWL ATU covers 500kHz to 30MHz. Increases wanted signals by providing impedance matching, and at the same time reduces spurious signals and interference with "front end" selectivity for the receiver. Kit contains case with smart printed front panel and all parts. Reviewed in the December issue of SWM. It only weighs about 350gms so it's great for portable and holiday use as well as the home station. Great performance and value!  
**Factory Built: £49.90 Kit: £29.90**

## RECEIVER KITS

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**MW1** Medium wave + 160M Beginners' Receiver Kit. Easy to build, complete kit package with hardware only **£29.90!** (plus P&P)

PLEASE ADD £4.00 P&P, or £1.50 P&P for electronics only kits.

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

73 from Dave G4KQH, Technical Manager.

# OCTOBER ISSUE

Don't miss our Receiving Special issue, packed with projects, design ideas and techniques aimed at helping you to get the best received signal.

Build: The PW Daventry Receiver, designed by Dave Howes.

Ian Poole G3WYX looks at the aspects of receiver design.

Classic Receivers - The AR-88D Communications Receiver.

Reviewed - The IC-Z1E and IC-W31E hand-held transceivers.

Broadcast Round-Up: Peter Shore tells you where to tune to receive all your favourite broadcast stations.

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#### REVIEWED:

- The Yaesu FT-10R hand-held transceiver.
- The Yaesu FT-8500 hand-held transceiver.

#### FEATURES:

- Leicester Amateur Radio Show Guide.
- DXpertise With Devereux - Mike G3SED shares his world-wide travels with the Camel Trophy DXpeditions.

- Breaking The 100 Barrier - Chris Page G4BUE describes how to get your name on to the coveted 'Honor Roll'.

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# 2-Valve VHF Receiver Part 2



Brian Adkinson concludes his 2-valve super-regenerative receiver with constructional details and hints on how to use it.

## Construction

With any v.h.f. receiver the importance of adhering to the specified components, layout and general constructional details cannot be over emphasised. Over the years the v.h.f. 'super-regen' detector has 'enjoyed' a fairly mixed response from those attempting to design constructional articles around it - in particular those utilising valves rather than transistors. Whilst a few have defended this type of circuit as 'quite tame and manageable provided certain rules are followed' the main opinion seems to be that in all probability it is likely to be quite the opposite! Having lived with the 2-valve v.h.f. receiver 'day and night', for over a week during its design, I have to say I'm forced to agree with the latter appraisal. It is also notable that very few commercial designs have reached the market over the years, even though closely controlled manufacturing techniques should ensure much better repeatability than a home constructed receiver built from a magazine article!

I'm not trying to put off any prospective constructors, only re-emphasising the importance of 'sticking to the rule book' when building this receiver. Provided that it is built exactly as described, with particular attention being paid to the critical areas outlined, there is no reason why good results should not be obtained. OK, lecture over!

## Metal Work

Some metal work is needed to build the receiver but this has been kept to an absolute

minimum. If I can do it anyone can! I bring a whole new meaning to the expression 'cack-handed'. Most of the metal work involved is in drilling and filing out the holes for the valve bases in the sub-chassis. Years ago the average constructor would have had as standard a set of hole punches for just this purpose, but there is little call for them today. Therefore, like me you'll probably have to put up with the gutty task of 'drilling, filing and cursing' until the holes are the correct diameter, (21mm for the specified valve bases).

As well as V1 and V2 most of the small components are mounted on this small sub-chassis which is screwed to the bottom of the case immediately to the right of C6, (see Fig. 1.2 in the August '95 issue). The sub-chassis is made from one half of a small aluminium box. The half used is the one that has a 'lip' around its' outer edges. The lips at the bottom of the chassis should each have a 2mm hole drilled in the centre of them. With the chassis pushed right up against the front of the case and tucked tightly against the right side of C6, mark up and drill out two 3mm holes in the bottom of the case to line up with the two smaller holes in the sub-chassis. The two screws supplied with this small box can be used to fix the chassis into place after all the components have been fitted and the wiring completed. It is important that this chassis is fitted as close as possible to C6 in order to keep the wire between the bottom of C6 and pin 6 of V1 short. Note that this piece of wire passes through a hole drilled in the chassis just adjacent to pin 6 of V1. After

completion of all of the wiring under the chassis solder a two inch piece of enamelled copper wire to the anode pin of V1b.

Once the chassis has been screwed in position cut this wire so that it is just long enough to reach C6. During final positioning of this piece of wire make sure it cannot touch and hence chafe against the edge of the hole in the chassis. This hole should ideally be 4mm or more in diameter.

## Valve Bases

The valve bases, tag strip and all components should be mounted exactly as shown in Fig. 2.1. Note the orientation of the valve bases. This is important particularly for V1 as the wiring to C6 must be kept as short as possible.

The components relating to the two valves must be earthed separately to their respective earth points as shown. Pin 2 of V1 and pin 3 of V2 can be folded over and soldered directly to the centre 'earth' pin of each valve base. On V1 this earth connection is continued across to pin 7 and finally to the chassis earth tag whilst on V2 the centre pin of the base is linked directly to the chassis earth tag adjacent to pin 7.

Mount the two chassis earth tags as close as possible to the bases of the two valves and keep the earth link wires as short and direct as possible, particularly on V1.

The specified tag strip needs a simple alteration so that it is suitable for use under the sub-chassis. As received it contains 14 tags - every third one being an earthing tag. These tags are easily removeable and transposable.

Using a pair of wire cutters they can be removed by closing the fixing 'wings' on the rear of each tag. To refix a tag in a different position the wings are splayed out again using first a screwdriver and then a pair of long-nose pliers to flatten them against the Paxolin. These mods will create a custom made tagstrip for the sub-chassis and power supply as well as leaving two earthing tags over for use next to V1 and V2 as described above.

To make these tagstrips first cut off a section five tags from the right hand end. This will be the tagstrip for the power supply components. From the remaining piece cut off the two left-hand tags leaving a 7-way tagstrip.

As previously described transpose the end tags to finish with a tagstrip that has one centre earth tag and three isolated tags on each side of it. You will now be left with the two spare earth tags. Cut these approximately in half before screwing them securely to the chassis next to V1 and V2.

Note that C4 and C5 are joined in 'mid-air'. This was necessary as low value, high voltage capacitors were needed and the best that could be found were the specified silva mica components - the lowest value available being 4.7pF, which is too high. Cut the leads to these capacitors no more than 2mm or so from the body before soldering and make sure they are well clear of the valve base and other components. Also bear in mind that when the sub-chassis is fitted they could touch the bottom of the case so some compromise is

CONTINUED ON PAGE 48 ►



# WORLD RADIO CENTRE

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## END OF LINE AOR PRODUCTS AVAILABLE AT BARGAIN PRICES... WHILE STOCKS LAST

### WX1000 WEFAX decoder / printer £99

The AOR WX1000 is a combined facsimile decoder & printer featuring a high quality thermal 6 dots per mm printer. Connect audio from a suitable receiver (shortwave / VHF or MeteorSat AM/FM) & 12V power supply and away you go.



The WX1000 provides the following drum rates: 60, 90, 120, 180 & 240 rpm with IOC of 288 & 576. Audio input may be either FM 1900Hz  $\pm$  400Hz 150mV or AM 2400Hz 0~300mV. The unit is powered from a nominal 13.8V supply @ 15W (not supplied). One roll of thermal paper is supplied as standard. Originally this unit was around £600 and its successor the WX2000 is currently over £1000. This is new stock, boxed & complete. Tested & working but no guarantee for a very special price of **£99 inc VAT** (Carriage & insurance is an additional £7.50)

### AOR AR2000 hand held receiver £189

Little need be said about this well known AR2000 receiver which has only recently been superseded by the AR2700. These units are boxed, complete and new. Frequency coverage is 500 kHz - 1300 MHz (reduced sensitivity below 2 MHz) AM, NFM & WFM with 1000 memory channels. **There are 5 only of this model so first come first serve!** Tested and supplied with a 12 month warranty **£189 inc VAT**. (Carriage & insurance is an additional £7.50)

### AOR AR950 base / mobile receiver £129

The AOR AR950 is a well known base / mobile receiver offering reception of AM and NFM. There are 100 memory channels and 5 search banks. The frequency coverage indicated at the time of press is 60 - 90 MHz, 108 - 135 MHz, 137 - 174 MHz, 405 - 470 MHz, 471 - 512 MHz & 830 - 950 MHz. Sensitivity is better than 0.3uV for 12dB @ 156MHz NFM.



Of course the strong signal handling can not be as good as that of the current AR3000A but the price is nowhere near as high! Supplied with mains power supply, aerial & mobile mount. Tested and supplied with a 12 months warranty **£129 inc VAT** (Carriage & insurance is an additional £7.50)

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### AOR AR880 NFM h/h receiver £79

The AOR AR880 was not originally sold in the UK but may well be of interest to the VHF MARINE listener who also listens to the 2m amateur band. The receive mode is NFM *only* with a frequency coverage indicated at the time of press as 30 - 49.995 MHz, 138 - 174 MHz, 436 - 512 MHz & 830 - 950 MHz. There are 20 memory channels; the cabinet is almost identical to the popular AR900 receiver. These units powered by "AAA" dry batteries (not NiCads). They are tested and have a nominal 3 month warranty **£79 inc VAT** (Carriage & insurance is an additional £7.50)



## TIP OF THE MONTH

*Unlocking the AOR AR1000, AR2000, AR1500, AR2800 plus Fairmate HP100, HP200, HP2000 and similar models*

Have you managed to "lock out" certain memory and search banks only to find that you can't release them again... perhaps for this reason you have one of the above models sitting in the bottom draw of your wardrobe or have given it to your Grandchild to play with - after all, they can't make it worse! Well take another look... unlocking it is really not all that difficult.

In cases where the set does not appear to operate correctly, try these few ideas... it is usually simple finger trouble.

### SCAN

1. Memory banks which contain NO DATA WILL NOT BE SCANNED, this sometimes happens when channels have been deleted by the user (or following a microprocessor reset in the workshop). Enter data into at least one channel of each bank and try again.

i.e. MANUAL 1 3 3 . 7 ENTER  
PROG 000 PROG 100 PROG 200 PROG 300 etc

2. Ensure that ALL banks are listed for scan.

To reinstate all memory banks  
SCAN BANK PROG 0 LIMIT 9 ENTER

### SEARCH

1. Ensure that ALL banks are listed for search.

To reinstate all search banks  
SEARCH BANK PROG 0 LIMIT 9 ENTER  
(On the AR1500 SEARCH BANK PROG 0 LIMIT 8 ENTER as bank 9 is reserved for automatic memory store).

2. Ensure that data is correctly stored in the search parameter settings.

SEARCH PROG 150 LIMIT 160 ENTER 25  
ENTER FM ENTER "X" ENTER SEARCH  
Where "X" is the bank which you wish to reprogramme (i.e. 1, 2, 3, etc).

3. Check that the first frequency of a search bank is not locked out, this is how the receiver decides whether the search bank is locked out.

SEARCH BANK PROG LOCKOUT  
The first locked out frequency will appear on the display, to release it press LOCKOUT or to move on to the next frequency press ENTER  
"Hunt" for the FIRST frequency of each search bank to ensure that they are not locked out and release them by pressing LOCKOUT.

Alternatively simply unlock every frequency in the lockout list - but this may take some time as there could be as many as 1000.

When the last frequency is unlocked, the receiver will start searching. Don't go too quickly or you may start LOCKING OUT new frequencies rather than unlocking old ones... this may be the case if all the frequencies suddenly appear in numeric ascending order!! If so just start point (3) over again.

If the above does not help then the receiver may have suffered a POWER TRANSIENT or STATIC DISCHARGE and now requires the microprocessor to be reset. If a glitch / crash has occurred, the set may display "FR.ERR" or the [DIAL] may be inoperative. If you are very familiar with modern PCB work then a reset service sheet is available... please forward two first class stamps and we will be happy to put a copy in the post BUT YOU MUST STATE THE MODEL AS THE PROCEDURE IS A LITTLE DIFFERENT BETWEEN SETS.

If you are still having problems then feel free to call for assistance - BUT WE WILL NOT WISH TO WASTE TIME BY SIMPLY "TALKING THROUGH" THE ABOVE, WE EXPECT YOU TO TRY IT FIRST... THANKS.

*If you find this column useful please let us know and we will keep it as a regular feature.*

## Software control for AOR receivers

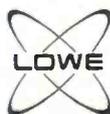
**AR8000 (& AR2700) - PC-MANAGER** is an optional DOS utility for memory & search bank management. The software (which works in conjunction with the optional CU8232 interface) permits upload, download, editing, renumbering, saving of data, editing of auto-mode bandplan data plus a built-in terminal driver. It is planned to add support for the AR2700 during the summer (the AR2700 may also require the optional IF-ADP lead). A WINDOWS based package is also under development and should become available during the summer months. Full features will be provided including scanning, searching, spectrum display, recording to disk etc. **CU8232 interface £99 + £3 P&P PC-MANAGER £49 + £3 P&P**

**AR3000A & AR3000 SEARCHLIGHT** is a PC WINDOWS based software package enabling control of frequency, mode, attenuator, scanning, searching, upload, download, spectrum analysis, recording to disk. **AORSC** is a PC DOS based control package with bandplan data and integrated logbook. **SEARCHLIGHT £99 + £3 P&P AORSC £75 + £3 P&P**

**AR3030 CONCERTO** is a PC WINDOWS based software package adding further versatility. Duplex frequencies may be held in software memories along with text comments for easy identification. Control of frequency, mode, attenuator, filter selection etc are available along with a spectrum display. **CONCERTO £49 + £3 P&P**



**AR8000** receiver - hand held all mode receiver with twin frequency display, alphanumeric text comments and optional computer control. **£425**



**AR2700** receiver - hand held receiver with optional voice record module and computer control. **£285**

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**AR3000A PLUS** receiver - enhanced version of the AR3000A with WEFAX, narrow AM filter, SDU



"ready" etc. **£1039**

**AR3030** receiver - all mode short wave receiver. **£665**

*Many accessories available from stock.*



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YAESU FRG7700 gen cov RX. No box .....	£249
AOR AR2700 hand held receiver with 500 memories. Ex-demo .....	£249
AOR AR8000 hand held all mode receiver .....	£349

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**FREE UK CARRIAGE ON MAIN ITEMS...**



**01629 825926**

► CONTINUED FROM PAGE 45

needed here. Note also that L2 and R2/C3 as well as the heater wire from T1 to L5 are joined in mid-air. Ensure all these junctions are kept well away from the other components and metalwork - there should be plenty of room. In general, wiring around V1 should be kept short and neat and all components spaced well apart from each other and away from the chassis. Resistor R3 should be soldered to the tagstrip so that the adjustment on it is accessible from the right side of the sub-chassis when this is in place. (Use a flat-bladed screwdriver with an insulated handle when adjusting R3).

Apart from the short wire to C6 and the longer wire to L3/C9, which both pass through holes in the chassis, all the other wiring comes directly out from underneath. The heater wires from T1 must be twisted together throughout their length and kept well clear of the chassis and all other wiring. Under no circumstances should L4 and L5 be omitted. Keep L4 away from the chassis and dress its lead as far away as

possible from the wire that goes between V1 pin 6 to C6. The wire from R6 which passes through the chassis and goes to L3/C9 is not critical in length but dress it well away from the glass envelope of V1.

## Mechanical Stability

The coil L1 consists of one and a half turns of 18s.w.g. or 20s.w.g. (about 1mm dia.) solid copper wire, closewound on a pencil. A suitable piece of wire cut to a length of 70mm will be long enough for the turns with enough lead left at each end to solder to C6 and C9. Note that the earthy end of L3 (actually at the top as viewed from the rear) does not go directly to the earthed (top) tag of C6 but to one end of C9. The wire from the junction of R5/R6 is also soldered to this point. The coil L3 is, therefore, at h.t. potential (d.c.) but grounded at r.f. The other end of C4 is soldered to this tag on C6. Cut the leads of C9 fairly short to improve the mechanical stability of L3. When filing or sanding the enamel off the ends of L3 ready for soldering to C6 it's a good idea to file the rear right hand

'tag' of C6 as well. This was found to be rather difficult to solder to and therefore a good clean contact, plus a nice hot iron is recommended.

T1 and T2 should be mounted close to the front of the case in order to allow room for the power supply tagstrip and 'dressing' of the heater wiring.

The left hand ground tag of the volume control R11 must be soldered directly to the body of R11. Do not run a separate earth wire from this control to anywhere else. The same goes for the power supply earth, which must only be earthed via the tagstrip. The antenna coupling capacitor C1 is soldered directly to the bottom of the telescopic antenna after first scraping off the plating. The other end of C1 is connected to a short piece of wire running under the sub-chassis to V1 pin 3.

The tuning capacitor C6 is fitted to the case and held in place with the nut provided. I put a couple of spacers, amounting to about 5mm, behind the front panel as the shaft of the capacitor stuck a little too far out. Alternatively,

the shaft can be cut down by a similar amount. Variable capacitor C6 is mounted through an 8mm hole drilled 40mm from the bottom of the case and located centrally with respect to the sides. Its positioning is important as it must sit close to the sub-chassis next to it.

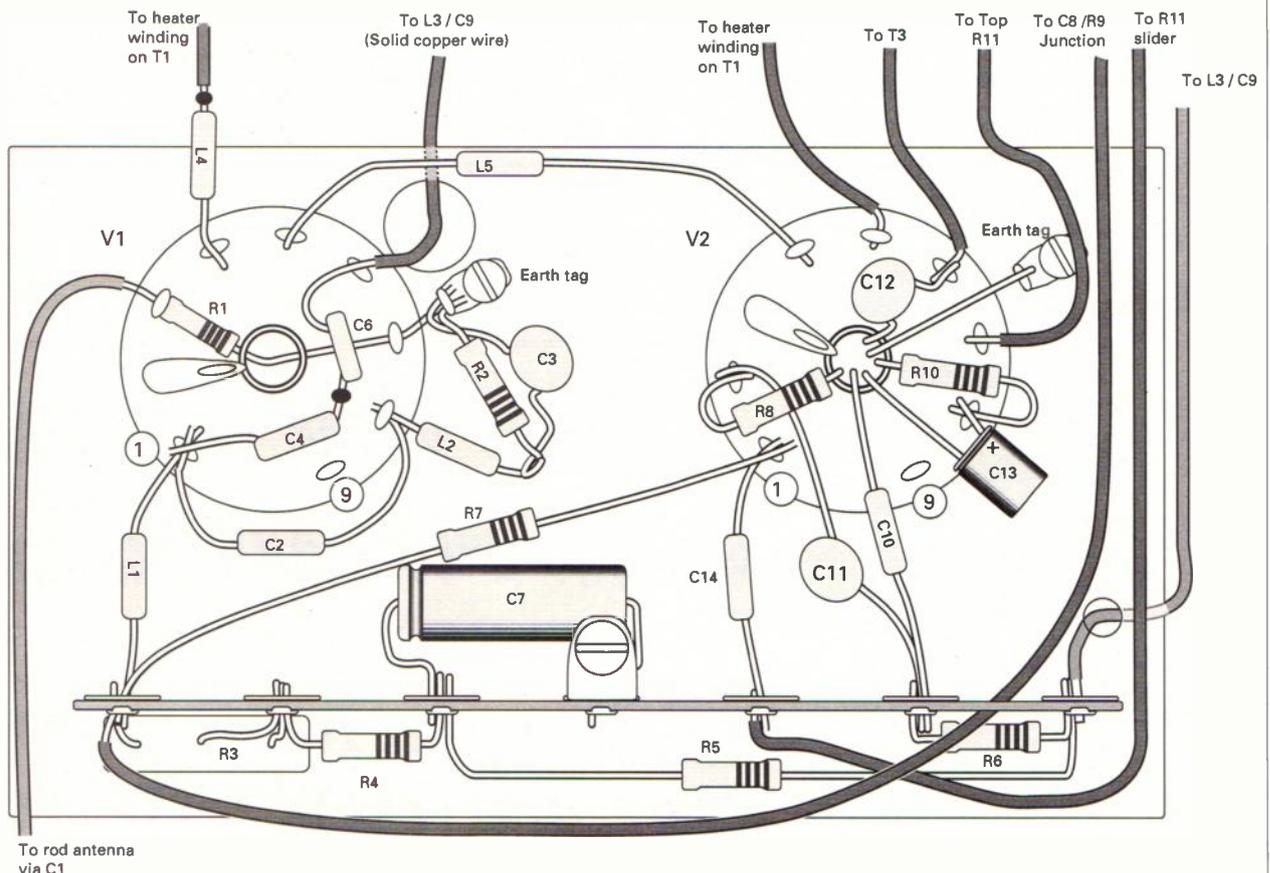
The loudspeaker is mounted in the rear half of the case on the right hand side about half way up (as viewed from the front). As it is small and light it can be glued in place using impact adhesive.

## Rod Antenna

The rod antenna is fixed to the bottom of the case but insulated from it. I used a Nylon bolt and washer that was to hand. Any suitable insulated fixing may be used. The top of the antenna passes through a rubber grommet.

The specified tuning pointer is a fraction too long and needs a few millimetres cut off the end. This item could be home-made and cut from a plastics box or similar. It can then be 'Superglued' to the underside of the tuning knob. A small

Fig. 2.1: The under-chassis layout of the wiring. This is with an ECC88 for V2.



hole was drilled through the pointer near the tip so that the dial 'arc' could be accurately marked. For this I used a fine tipped permanent marker pen. The dial itself was made from a plastics A4 binder divider sheet cut to size and glued to the case front. The Antenna Workshop feature in the August '95 issue of our sister magazine *Practical Wireless* offered some other ideas for pointers.

The input to T1 should be fused (see parts list) and for safety the fuseholder should be enclosed in a rubber boot and all live tags on T1 and the mains switch covered with heat shrink tubing or similar.

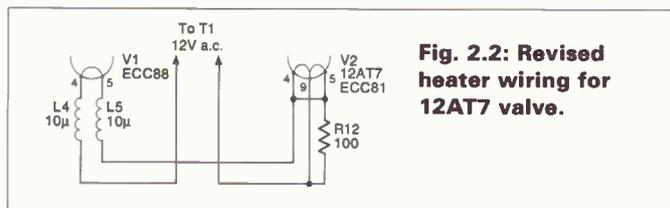
Note that the sub-chassis only just fits into the case. Two samples checked were not quite square and bending the ends of the box inwards until they were allowed the back of the case to fit flush. Also, in order to clear the sub-chassis and a few other bits such as the rod antenna etc. the lips on the rear section of the case will need cutting down to allow the back to fit on. This can easily be done by marking out the areas that are likely to foul - cut back to the 'bend' in the case using a hacksaw and then simply grip that section with a large pair of pliers and repeatedly bend it until it breaks off.

## Testing and Faultfinding

The resistor R3 adjusts the amount of h.t. supplied to V1b. If the h.t. is too low the valve may fail to oscillate. Also, with low voltage difficulty may be experienced over just part of the tuning range. This can produce excessive hum or a tendency to howl. Therefore, when setting up R3 check that reliable results are obtained across the whole band before leaving it in its final position. It may be found that maximum h.t. is needed to get satisfactory results - this does not necessarily imply a fault. The prototype worked best with R3 at nearly 'full throttle'.

If no results are obtained after completion of the receiver re-check all wiring and connections. The voltage chart may be of assistance when faultfinding.

If the audio stage appears to be lively, but there is not the characteristic hiss that a super-regen produces in the absence of a signal, the following



points should be checked: First adjust R3 for maximum h.t. (fully anti-clockwise). Make sure the vanes of C6 have not become bent with handling and are shorting. Ensure L3 is not positioned too close to the vanes of C6 (the coil should be soldered directly to C6 but then bent away from it). Check that the heater wiring and chokes L4, L5 are dressed well away from the chassis and other wiring. Double check all wiring to and from V1b and confirm that it closely follows the recommended layout and finally, check that both earth tags next to V1 and V2 bases are securely fitted and that the sub-chassis is screwed tightly to the bottom of the case with both screws (front and rear).

Most of the above potential problem areas can also be responsible for hum in a working receiver. This may only occur over parts of the band. The main causes being weak oscillation of V1, poor earthing and layout in the r.f. section and badly sited heater wiring. The prototype was cured of all hum by careful attention to these details. If all else fails, the 'bass' response can be reduced by allowing more negative feedback at low frequencies. Try reducing the value of C13 to 4.7µF or an even lower value. The overall intelligibility of speech will be largely unaffected by this change.

## Calibration And Use

Before calibration of the dial check that the vanes of C6 are

fully meshed when the pointer is at 9 o'clock and fully open at 3 o'clock. As the tuning is quite broad only a rough indication is needed initially to calibrate the dial. If wound correctly the coil should give near identical coverage to that of the prototype and therefore the photograph of the receiver should give a good indication of where to find most areas of activity. The airband is usually an easy one to start with as the transmitting antennas are frequently quite high! If the receiver tunes to aircraft at a point on the dial significantly higher (clockwise) than that indicated in the photograph it means the inductance of L3 is slightly too high. To reduce the inductance of L3, gently prise the turns apart.

Of course, the air band is nearly 20MHz wide, so unless the received aircraft is transmitting on a frequency precisely in the middle of the band calibration could still be somewhat inaccurate. Try tuning over a small area to get a feel for the band edges. As the receiver should tune a fair bit beyond the 115 - 185MHz specified, exact placement of this 'reference' band is not too critical.

Due to the potential for interference from this type of receiver I would strongly advise against the use of an outside antenna. In any case, in most areas reception from the built-in telescopic antenna should prove adequate.

No ventilation holes were considered necessary in view of the relatively low power

consumption of the circuitry. The case will become quite warm after a period of use but this temperature rise will not be detrimental to the valves or any of the components as all are operating well within their maximum ratings.

If desired some holes could be drilled in the rear of the case but keep them small to avoid the possibility of shock should any 'inquisitive fingers' be in the vicinity.

## Improved Audio Output

Brian Adkinson has been continuing his quest for better performance from this design and has found that using a 12AT7, otherwise known as an ECC81, in place of the second ECC88 offers more audio volume for less h.t. current. However, it is not essential to use a 12AT7 in place of the ECC88 originally specified. The valves in the 12A7 family of double triodes have been around for over 40 years. Each type offers different characteristics - the 12AT7/ECC81 is described as a 'high frequency' double triode, the 12AU7/ECC82 is a 'medium-mu' valve, whilst the 12AX7/ECC83 is a 'high-mu' version. The 12AT7 has 12.6V a.c. heaters, centre tapped to give two 6.3V sections.

To replace the ECC88 with a 12AT7 requires some changes to the heater wiring for V2. Disconnect L5 from pin 4, but leave the wire from the heater winding on T1 in place on pin 5. Connect pins 4 & 5 together and solder L5 to pin 9 as shown in Fig. 2.2. Resistor R12 (100Ω, 0.25W) is needed across the heaters of V2 to match the heater current to that of V1 and ensure that both valves get 6V across their heaters.

## Voltage Readings

All taken with a digital voltmeter with 10MΩ input impedance. Variations of ±20% do not necessarily indicate a fault.

HT Off-load (Valve heaters disconnected) at the junction of C7/R9	210V
HT On-load (Valves warmed up) at junction of R9/T3	145V
HT On-load (Valves warmed up) at the junction of C7/R9	135V

**Table 1**

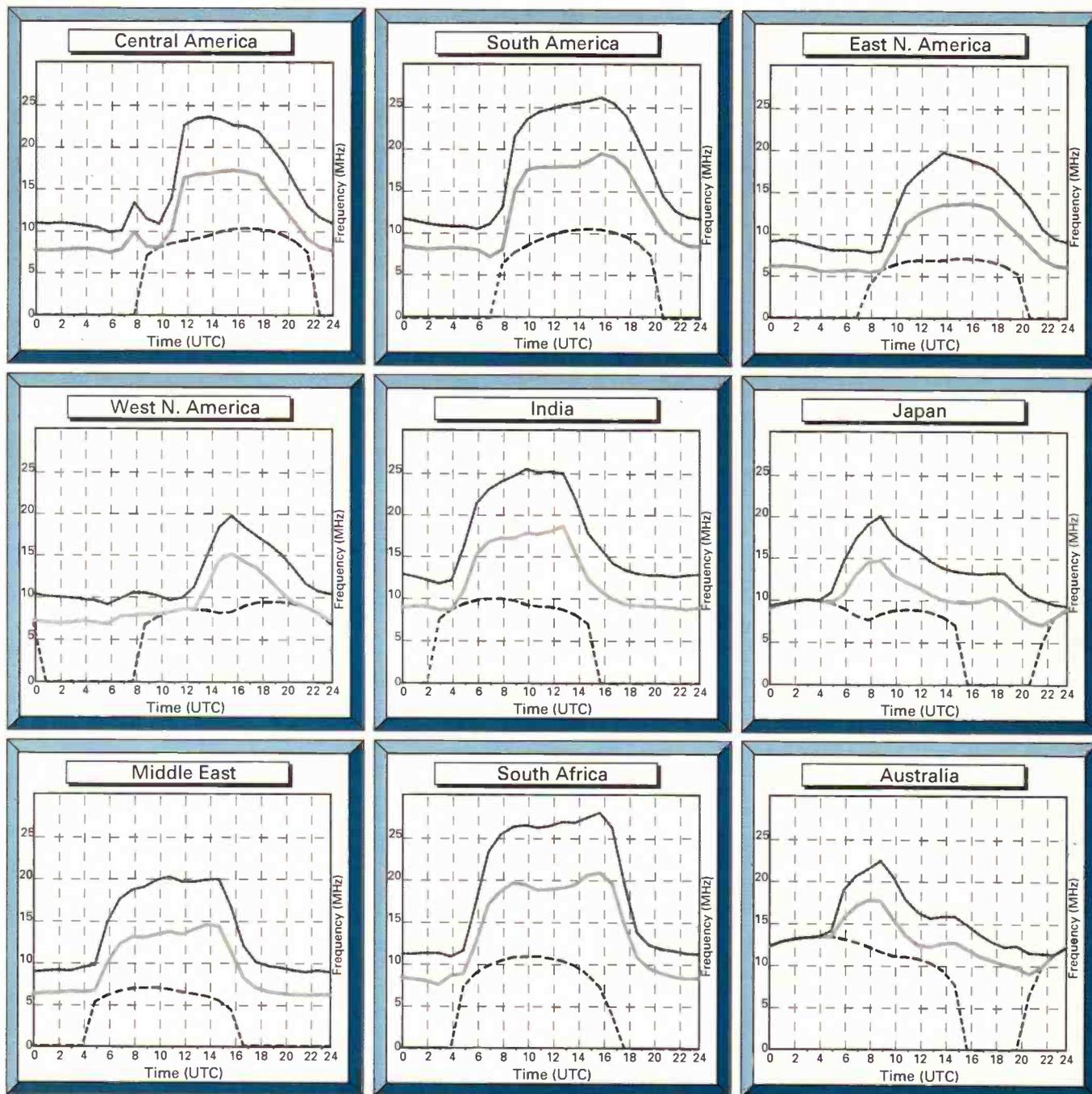
	V1a	V1b	V2a	V2b
Anode	133V	60V*	106V	145V
Cathode	4.6V	2.8V*	0V	2.6V
Grid	0V	0V	-0.6V	-0.1V

Voltages marked with an asterisk can vary according to the setting of R3.



# World Propagation Forecasts October

Circuits to London



### 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.

Fig. 1.

# Reflections

In June, **Ron Livesey** (Edinburgh), using a 2.5in refractor telescope with a 4.0in projection screen for his daily observations, located one active area on the solar disc on days 6 and 20-27 and two on the 7th. From his observatory in Selsey, **Patrick Moore** kindly sent a drawing of the sunspots as they appeared on his projection screen at 0615 on June 22, **Fig. 1**. He found the sun's disk clear during his morning observations on June 28, 29 and 30 and then a single spot appeared on his screen on July 1.

## Aurora

Ron Livesey, the auroral co-ordinator for the British Astronomical Association, received reports of auroral activity for the overnight period on June 2/3, 17/18, 18/19, 19/20 and 30/01, from an observer in North Dakota.

## Magnetic

The magnetometers used by **Tony Hopwood** (Upton-on-Severn), **Karl Lewis** (Saltash), **Ron Livesey**, **David Pettitt** (Carlisle), **Tom Rackham** (Goostrey) and **Tony Rickwood** (Gillingham), between them, recorded strong disturbances to the earth's magnetic field on June 19 and 30 and lesser events on days 1, 2, 3, 6, 16, 18, 20, 25, 26 and 28.

## Sporadic-E

"June was a very impressive month DX wise," wrote **Richard Wood** from Redditch. During the Sporadic-E openings that Richard observed on days 2-7, 9, 10, 12-14, 16, 18-21, 23 and 28, he logged pictures, in Band I, from stations in Austria (ORF1, Ch.E2A, 49.75MHz), CIS (TN lower left, Ch.R2, 59.25MHz), Germany

(ARD1, Ch.E2, 48.25MHz), Hungary (MTV1, Ch.R1, 49.75MHz), Italy (RAI UNO, Chs. 1a & 1b, 53.75 & 62.25MHz respectively), Norway (HEMNES regional test card, Ch.E3, 55.25MHz), Portugal (RTP1, Ch.E3), Spain (TVE1, Chs.E2, E3 & E4, 62.25MHz) and Sweden (KANAL 1 SVERIGE, Ch.E2).

Results were similar for **Paul Logan** in Co. Fermanagh, Northern Ireland. Paul used a Huanyu portable and, while the various disturbances were in progress, received pictures in Band I from stations in Austria, Denmark (DRTV, Chs. E3 & E4) Czechoslovakia (TV NOVA), Germany (ARD1), Iceland (RUV, Chs. E3 & E4), Italy (RAI), Norway (NRK1, Ch.E2), Poland (TVP1, Ch.R1), Portugal (RTP1), Spain (TVE1 & 2), Sweden (SVT1) and Switzerland (SF-DRS).

For Band II, Paul uses an AKAI ATM-400 tuner with a wire antenna and despite strong 'local' signals in the band from Northern and Southern Ireland he still found some DX. This was spread over the Sporadic-E events on June 4, 9, 13, 14, 21 and July 1 when he identified programmes from Czechoslovakia, France, Germany, Italy, Portugal and Spain.

"There was a lot of foreign DX on the 22nd," wrote **Arthur Grainger** (Carstairs Junction) who received RDS identifications from Danubius (103.5MHz), LIFE (91.6MHz), ORE (97.1MHz), RVB\*99 (100.6MHz), Radio Norbo (104.9MHz) and Radio 9 (102.2MHz).

## Troposphere

The high pressure and generally fine and warm weather in June caused a number of tropospheric events to occur. During the month, **Richard Wood**, Logged BBC Radio Solent,

Hilversum 2 (Holland), RTE 2FM (Ireland), Melody FM, Power FM, Trent FM and Virgin FM in Band II and, on the 26th, pictures from Belgium (RTBF, Ch.E8) and Holland (NED1, Ch.E7) in Band III. Also on the 26th he watched programmes from Anglia TV on Ch.E59 and BBC1 South-West on Ch.E33 in the u.h.f. bands.

During these good conditions, on June 26 and 27, **Leo Barr** (Sunderland) had a good haul of DX in Band II. He was able to listen to f.m. programmes, often in good stereo, from BBC Radio 1 FM from Fenham (Newcastle), Radio 4 from Durris (Scotland), Lincs FM and various stations in Germany, Holland, Norway and Sweden. Leo recently purchased a Roadstar portable TV receiver on which, at 2020 on the 29th, he received his first DXTV signal from Denmark's TV2 in the u.h.f. band. The programmes he watched included adverts, news, sport and episodes of *M.A.S.H.* and *Taggart* with Danish subtitles.

Also during the period June 25 to 27, **George Garden** (Edinburgh), using a Grundig receiver with a roof-top antenna, watched programmes and some Teletext, on the u.h.f. bands from stations in Denmark, Norway, Sweden plus Tyne Tees and ITV North East from the UK. One interesting catch was on Ch.51 where he saw motor racing and in the top right of the screen was TSV KANAL 1.

While staying in a Devon hotel, some 1300ft a.s.l., **S.M. Hockenhill** (Bristol) found that the front end of his portable receiver was swamped by the nearby powerful transmitter at North Hessory Tor. Not being put off by this, he tuned Band II on July 6 and, just using the set's telescopic rod antenna, he logged Gemini FM from Beacon Hill on 96.4MHz, Radio Cornwall and French f.m. broadcast stations from Brest on 89.4 and 95.4MHz, Caen on 91.5 and 95.6MHz and Rennes on 93.5 and 98.3MHz. "The strongest signals,



Fig. 2.

fading in and out and jostling for space, were those from Brest on 95.4MHz and Caen on 95.5MHz," said S.M.

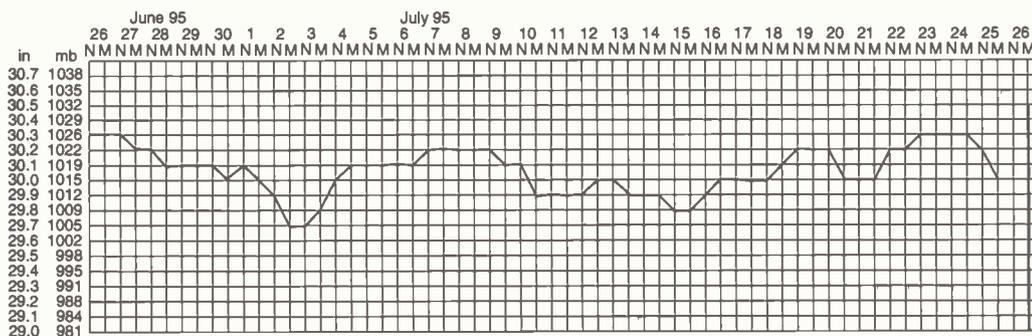
"Good DX this month. Lots of tropospheric openings," wrote **Arthur Grainger**, whose biggest surprise was receiving 2CR FM from Bournemouth on 102.3MHz. Among his first time catches were Radio Sheffield (104.1MHz) and Signal One from Stoke-on-Trent (104.1MHz).

## Local Entertainment

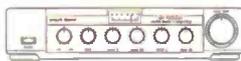
It's always good to see local radio stations taking part in community events and providing the visitors with some fine entertainment. Radio Mercury's stand at the very well attended Horsham fair on July 8 and 9 can be seen in **Fig. 2**.

Continued on Page 55

Fig. 3.



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Short Wave Magazine, October 1995

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# Satellite TV News

## Orbital Sightings

It was a 'phone call from **John Locker** late on August 9 that alerted me to a special short notice satellite TV presentation organised by Chaparral, Teasug, a Dutch satellite equipment supplier and other personalities. The programme was to run some 50 hours through to Saturday night based around informal discussion, demonstration, films and other interesting fare about satellite communication starting at 1600 hours on the August 10. Check out the former 'TV Gold 10' transponder on Orion 37°W - they've now gone digital!

Unfortunately most readers - like me - have to earn the proverbial crust of bread and it wasn't 'til 1900 on the 10th that I was able to first view the 'Netherlands Satellite Festival' on 11.495GHz horizontal. A video played out a trip round the Californian Chaparral factory, stopping at various stages of LNB and receiver manufacture, testing and packaging. Fascinating stuff. Then back to the Dutch satellite shop for live 'fax-ins' (live 'phone-ins were not possible other than leaving messages, a pity) with questions just about anything satellite to Eric Wiltsher and others. Eric was a personality in his own right and kept the show buzzing along, one fax suggested this was the nearest yet to interactive TV! Vintage footage of Goonhilly under construction, the first Telstar links and a trip round Radio Caroline were also shown.

Late in the evening live CMT radio with requests and yet a further bonus - a selection of high quality pirate radio sig music - Caroline, RNI, Radio London, etc. all good stuff from the 60s. Saturday also saw the similar frequency via the Goonhilly uplink on Intelsat 601 at 27°W feeding video of Orion's downlink and cutting into the Goonhilly Earth Station video itself with visitors in reception and touring the site (if you're holiday-making in West Cornwall it's well worth a visit!).

The 'Netherlands Satellite Festival' being organised in part by Chaparral obviously highlighted

their own equipment, it would be interesting in a future presentation to carry out comparative tests against other receivers.....if there is a repeat performance - a vague suggestion of an October event was heard - perhaps live 'phone-in facilities could be included as most viewers will not have home fax machines. I dipped into the 50 hour spectacular over the two days and was greatly entertained both by the content and personalities, thank you.

Reduction in power is now obvious on Maxat's transponder, Eutelsat II F1 at 13°E, from early August - particularly those with smaller dishes. Careful tuning of skew is necessary to optimise picture quality and minimal sparklies. The caption reads 'Maxat Teleport, London. E2 F1 Transponder 41. If encountering reception difficulties please ensure you are using a 27MHz filter and tune to 12565.910MHz'.

From a reader signed as 'Stan' (I think) details TV Polonia via the Hot Bird 13°E Eutelsat as carrying on audio subcarriers:

7.38MHz Polish Radio 1; 7.56MHz Polish Radio International Service; 7.74MHz Polish Radio 3; 7.92MHz Polish Radio Bis. The 16 East Eutelsat TV Polonia programme closed down July 1.

Going back two months with an unknown caption 'CPT CARAJEGO' received May 29 on Eutelsat II F4 at 7°E, the query as to source has now been answered thanks to Mr. C. R. Stephens, Uckfield. Assuming that the original caption intention was to caption in Russian Cyrillic letters, 'CPT CARA' is English for SRT SARA but JEGPO doesn't equate to JEVO in Russian. Our reader suggests that the caption was completed by an engineer unfamiliar with the language and that the signal source was Sarajevo.

**Roy Carmen** witnessed an Intelsat K 21°W signal feed out of Geneva for a Japanese network, a scene of total confusion with two reporters - one male and one female trying to use the same camera. The cameraman favoured the female reporter which in turn upset and wound up the male journalist into reacting quite aggressively against his companion! The interest of the Japanese in

Switzerland follows a US Trade Agreement with the respective ministers from both countries present in Geneva at that time.

For our Arabic readers **Colin Paton** (Greenock) advises the Arabic Radio and Television (ART) testing recently on the 13°E Hot Bird 11.534GHz vertical is the ART-5 service relayed from Arabsat between 1800-0600UTC - an Arabic version of MTV and differs from the ART service carried on on Eutelsat II F3 at 16°E. And an interesting story from **Barry Gunstone** (Stockholm) concerning the large petrol company 'Stateoil'. To boost forecourt sales 'Stateoil' had been selling cheap 'Swedish Packets', a basic PAL receiver, 600mm dish and no means of decoder connection. Now, of course, TV3, TV6 and ZTV are going from clear to D2MAC transmission on Sirius 5.2°E and the 100 000 units that have been sold will be useless! Garage forecourts now carry a placard advising that Kinnevik and Stateoil are working a deal to resolve who will pay, supply, replace non-working equipment. With other additional sales from mail order, high street shops there are problems ahead in Scandinavia! Interesting to note that mid-August the ZTV, TV6 and Kinnevik channels were using MPEG-2 compression on Sirius.

**John Locker** in the Wirral received a 'Challenger Satellites Television' caption on Intelsat 602 at 63°E early August, a rather weak signal requiring threshold extension to lock the picture onto the TV screen. John



2) Nicholas Earley, Victoria, Australia recently had installed a local MMDS service, this is the 2.5GHz antenna and head downconverter.



3) Test pattern prior to golf play at Hartford, USA via Intelsat.



4) An impressive caption seen via Eutelsat II F3 at 16°E.



5) In the war zone there's no time to make the conventional video slate ident or clock, this via Kopernikus at 23°E.



1) Aidan Murphy snapped this impressive photograph of RTE's Donnybrook mast at Dublin.

cameraman favoured the female reporter which in turn upset and wound up the male journalist into reacting quite aggressively against his companion! The interest of the Japanese in

telephoned a number on that caption and received a fax in explanation. Challenger installs uplink stations in both C and Ku bands for Telespazio Space Division, Italy. A transmission/reception stability test was in progress via the 602 transponder which is a reserved lease for Telespazio.

A mysterious audio signal has been monitored by **Julian Redwood** (Christchurch) when he checked out the Nickelodeon transponder (11.156GHz) at 2200 hours on the 7.935MHz audio subcarrier - he has been monitoring over a period of days a scrambled inverted sound feed not unlike horse racing. Can anyone explain this signal please?

**Bob French** (Warks) is breathing a sigh of relief, the recent hot weather spell set light to nearby fields, the flames at one time reaching the height of 30m high oak trees! He and neighbours armed with domestic hoses damped things down until the professional firefighters arrived, the flames reached to within 10m of his 3 metre C/Ku band dish! He comments that the SSVC Forces TV service feed has now arrived on TDRS at 41°W and will soon go digital, the present SSVC Intelsat 27°W feed will possibly then close.

## Orbital News

Both TV1000 and TV3 are to close down their Astra operation end 1995 and move to Sirius at 5.2°E adopting D2MAC along with other present

broadcasters. Eventually Sirius 2 will be co-sited offering 32 Ku band transponders for spotting both Scandinavia and general European coverage. This will be the Scandinavian version of Astra! Norway is also considering an advertisement free programme channel - NRK-2 - to be carried via satellite for European coverage.

Rupert Murdoch has seen the light apparently as 'The Christian Channel Europe' will descend across Europe from October 1 via the shared Sky Sports 2/Travel/soap transponder. The Pentecostal gospel will be in the clear and funded from advertisements and sponsorship (!), initially on-air 0600-0800 and eventually plans a 24-hour service.

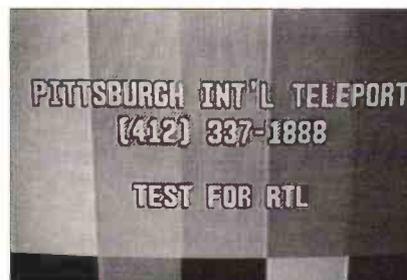
Walt Disney has recently opened a TV studio operation in Singapore to source programming for a 24 hour pan-Asian channel to distribute via the PAS-4 satellite. Both English and various Asian languages will be carried and coverage is hoped to reach into Australia, China and into India and the Middle East. The project is in conjunction with the Indian Modi Enterprises group, part of their agreement is to offer two Disney TV channels across India.



6) Cattle Auctions are now carried out by satellite as this caption for Agvision Ltd. shows via Eutelsat II F3 at 16°E.



7) Recent bombings on the Paris Subway and a news feed into the UK for Associated Press TV on Eutelsat II F1 at 13°E.



8) Orion 1 Atlantic at 37°W has provided many sightings of previously unseen American teleports.

Pictures 3-8 courtesy JohnLocker, Wirral.

## Continued from Page 52

### Weather

In July I recorded 1.63in of rain compared to a mere 0.8in for the same period last year. A bit up on July 1994, but it still leaves the South very dry. Most of the rain fell on the

3rd and 26th with amounts of 0.80in and 0.50in respectively. The rest was in small amounts on the 2nd, 13th and 15th. Generally speaking the month was hot and 'sticky' with temperatures often in the mid. 80s. Around 0900 on the 26th there was a thunder storm to the west of us recognised by a very black sky with frequent flashes of lightning and rumbles of thunder. However, during the event I saw a spectacular 'thick' band of lightning go straight from a point high in the sky to the ground. Soon after, we learnt that Bognor railway station was one of the storm's victims. It had been struck by lightning and set on fire. "We did not have the heatwave that was enjoyed by the rest of the country at the

end of the month," wrote Arthur Grainger who also reported "a lot of thunderstorms" with heavy storms on the 11th, 14th and 15th and that for most of the month the air was clammy and warm.

The daily variations in atmospheric pressure from June 26 to July 25, Fig. 3 (Page 52), were taken at noon and midnight from my own barograph here is Sussex.

### SSTV

"My home-brew computer now has, in total, four COM ports," said **John Scott** (Glasgow) after fitting an addition card to his system. This has given him more space and saves him unplugging cables. Good move John, I too dislike plugging and unplugging cables, because, apart from having to move the equipment, I feel that it's placing unnecessary strain on the tiny pins at each end of the lead. Although my single RS232 port is

mainly used for a trackball I installed a 'T' switch so that I can periodically use this port for transferring data between my Packard Bell desktop and my Tandy WP2 portable word processor. Because Computers now play such a major role in slow scan television work such adaptations for using extra equipment must be considered.

In July, John received SSTV captions, around 14.230MHz, from stations in Germany, Fig. 4, Italy, Spain, Fig. 5 and Sweden, Fig. 6 and exchanged pictures with several operators, on the 144MHz, band in Scotland. John sent me a 3.5in floppy disc so that I could see the pictures he copied in colour and, believe me readers, they really are good.

### Plaque

While in Windsor on July 28, Joan and I saw the commemorative plaque to the late Sir Sydney Camm. Briefly, this adorned the house in Alma Road where Sydney and his younger brother Fred were born. Sydney was an aircraft designer and among his many achievements was the Hawker Hurricane, shown on the plaque, and the Harrier. Fred became a famous author and editor popularly known to many people, especially in the magazine world, as F.J. Camm. Fred was the first editor of our sister magazine *Practical Wireless* and, had he lived, he would have celebrated his 100th birthday in October this year.

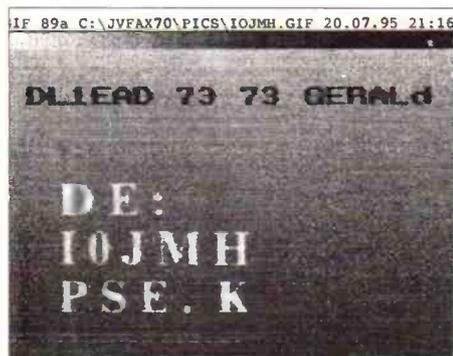


Fig. 4.



Fig. 5.



Fig. 6.

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\*\*\*\*\*MESSAGE NUMBER 700\*\*\*\*\*

SYNOPTIC REPORT AT MAIN HOURS FROM FINLAND COMPILED BY HELSINKI (MET INSTITUTE)  
SYNOPTIC REPORT FROM LAND STATION DAY 16  
WIND MEASUREMENTS: TAKEN BY ANEMOMETER FROM STATION AT: SODANKYLA (02836) IN FINLAND STATION TYPE: MANNED - WITH WEATHER REPORT.

\*\*\*\*\*MESSAGE NUMBER 873\*\*\*\*\*

DEUTSCHE LUFTHANSA FLIGHT NO: 470  
POSITION: 57N 0-20W TIME: 16:04 UTC  
AIR TEMPERATURE: -57C WIND 100 KNOTS  
AMERICAN AIRWAYS FLIGHT NO: 109  
POSITION: 55N 0-30W TIME: 16:04 UTC  
AIR TEMPERATURE: -46C WIND 74 KNOTS

\*\*\*\*\*MESSAGE NUMBER 704\*\*\*\*\*

BUOY REPORT FROM SHIP (MOBILE)  
COMPILED BY TOULOUSE (MET CENTRE) IN FRANCE  
DATA FOR REGIONAL EXCHANGE FOLLOWS:  
MINIMUM TEMPERATURE: 17.9C  
CLOUD INFORMATION - LOWEST CLOUD LEVELS  
CUMULUS AND STRATOCUMULUS LEVELS  
ALTOSTRATUS MAINLY SEEN IN THE FORM OF  
CIRRUS IN THE FORM OF  
DATA FOR REGIONAL EXCHANGE FOLLOWS:-  
MAXIMUM TEMPERATURE  
MINIMUM TEMPERATURE

For all MCL-1100/DM-1000's  
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ACTUAL REPORTS

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# SKY NEWS

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AEA Log Windows .....	£67.00	(limited stock) .....
PacComm Tiny Mk2 .....	£119.00	
Kantronics KPC-3 .....	£113.00	Skyview Synop Version
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# Amateur Bands Round-up

## Listening to the Amateurs

**A**s this starts to be written, we are in a hot thundery spell. The question must arise of what to do when the storm shows evidence of coming near.

All the books talk learnedly about earthing antennas, switching off the rig, pulling out the mains plug and so forth, but none seem to go any further.

The average receiver front-end includes inductance connected between antenna pin and chassis ground. Similarly, most (but not all) antenna tuners have a coil between antenna and earth terminals. Where such a d.c. path exists, static electricity cannot build-up on the antenna. Some tuners though are based on 'pi' 'T' or 'L' networks where the capacitor arm lies between antenna and earth. With the 'pi' or the L, a d.c. path may go from antenna through the tuner to the receiver, through the receiver front-end and down to 'deck'. However, examination of the 'T' configuration tuner circuit will show that unless the manufacturer has made specific provision, there is no d.c. path to earth from the antenna terminal. In this case, a static build-up on the antenna has nowhere to go until the voltage becomes high enough to break something down or to flash over. Watching sparks jumping the variable C in a tuner is fascinating - but dangerous!

In practical terms it means a rethink on what (and how) should be done. If a far-distant roll of thunder is heard, or static noise warns you, you can disconnect and earth your antennas in good time. Next, you can disconnect the receiver from the a.t.u., and finally - yes, finally! - switch off and unplug at the mains outlet; this keeps the mains earth connected until the last moment. Try to ensure there are several feet between the mains plug and cable and any mains wiring, piping, radiators or anything in the house that may be earthed. If your bench has several mains outlets unplug them too.

However, what do you do if the first crack of lightning is close by? First, pray nothing has been damaged! Secondly, earth an end-fed antenna with a link, starting from the earth point and clipping on the antenna second. Once the antenna is known to be at earth, you can disconnect from the tuner.

If it's a real bonzer storm, pull out the mains plugs (the one on the wall last, to keep earth to the last moment) and just check all your insurances while sitting as far away as you can from anything earthed or

metallic.

If you have a dipole of around 50Ω impedance, you can shunt it with a very high resistance - say 1MΩ or higher - up aloft, so any static build-up drains through the resistor to the braid and so down to ground.

The thunderstorm that did the damage here was in fact a distant one. I totally lost mains power about four times in succession, with some intervals of decidedly low (about 180V) voltage. The TV had been switched off hours earlier by the remote control, but in checking round when the failure began I didn't notice this. Exit one voltage regulator i.c. and a couple of resistors in the television sets.

Like the Boy Scouts - Be Prepared!

## Letters!

I'll give **Mark Malone** of Great Harwood first go this time; Mark notes that all the times in his log are UTC - what I used to call GMT. On 18MHz VP2MR, Z21CS and 4X4FR were booked in. As for 14MHz we see A71EA, A92BE, AP2AMM, CX6AM, D44AB, FS5PL, HK6DOS, JA1LSP, K2QAU, KC4CFA/MM off the Azores, KG4HE, KP4DKE, N6BFN, PY5ZB, VP8CPC, VU2BIX, W1BFA, ZD7DP, ZP5KO 4X6LD, 5N7YZC, 7X5JF, 9G1BJ, 9K2ZC and 9L1PG. All Mark's listening was in the evening period.

Next we look at **Ted Trowell** in the Isle of Sheppey who seems to have beaten his word processor into submission. Ted listened only to c.w. this time; on 7MHz around 0600UTC Ted had VK2DD, W6DP, J43AFA, 8P6DY, ZL2AGY, VK2ZV, 5A1A, VK3MR - Snowy at 86 and still going strong on the band, VK3FC, W6GO, WP4M, CO1RH, XE3ARV, VK3RP, OH0/DL1RNW, 3V8AS, LX1MU and ES6Y/O (Saarema Is). Around the same time, 14MHz gave J28JA, 7P8SR, VE7SR, while at 1100-ish we find OY2H, around 1500 JA6BDB, JH4JNG, 5A1A, JA5PL, 3V8BB, at 1600 RF1FJZ/FJL, at 1800 PT7WX, C53HG and 1900OH1NOA/OD5. 1100 was the chosen time for 5A1A on 18MHz, while a look at 1500 turned up LU5VC, W0IAK in Minnesota, J28JA, OZ/DL2SWW (Laeso Is), CP6T, OY1CT, 9Q5MRC, W6YA, and 1800 was the time for VE3XD, 9H1AL and WA7LNU in Arizona.

On 21MHz Ted looked in at 1500 for EL2NB, X5JHI in Bosnia, and at 1600 A92Q, ZA/OK5DX, W1AW (HQ station of ARRL) and 4Z4SZ. As for 24MHz Ted noted SP2UKB and

9A3GU. Finally 28MHz where EA8AF, EA6ADG, TK/F6AUS, EA6/G3UOF, OK1EE/OD5, Y19CW, S51CA and 9A2WK were all logged. It is interesting to note that the Six-Ten Reporting Club late July issue notes some nine Transatlantic openings on 28MHz.

A first report now, from **Colin Dean** in Barnsley, who writes on ISWL headed paper. Colin tackled 3.5MHz sideband to find CM2HI, FM5DP, XJ2CWI and ZD8WD; a sniff on 7MHz produced signals from AA4VK/CY9 (St Paul Is) and as one would expect 14MHz did most of the work by way of A92EV, BV2KI, BV5GU, KW2P/CY9, DU7RAA, DU7SSR, EX0V, IG9/K8AUC, JT1BG, OD5PI, RA0FA/MM Reg 1, VR1FJL for Franz Josef Land, SU2MT, TJ1AG, TU2DP, T53LB, UN0P, VU2AVG, VK5LR, V51MB, XT2CH, YB50RI, 4K7DWZ, 4K0DE, 4L5OM, 4S7NB, 5A1A, 5N0GC, 9G1NS, 9K2TA, 9L1PG, 9M2IY and 9N1RHM. The antenna is 20 metres, end-fed, at 12 metres up, while the shack contains a JRC NRD-525 a Drake R7A and a Racal Selector.

An anonymous correspondent enquires just what GW3KFE uses? There is gear for 1.8-28, 70, 144 and 432MHz. Outside, a tribander on a tilt-over mast and an end-fed wire fed through a home-brew or a much-modified commercial antenna tuner in the shack. Antennas for the v.h.f./u.h.f. bands are, in essence, made of softwood and wire coat hangers. As for the kit in the shack, none of it is current production, and some of it dates back to the 'fifties. Some of my prized testgear even goes back to pre-WWII!

Another new correspondent is **Ian Whiteford** of Irvine, Ayrshire who asks about the best time of day for hearing Japan or Australia. If you look at a Great Circle map centred on England, you will see VK/JA/ZL are, more or less, on the opposite side of the globe, a bit south of west for the long path, a bit north of east for the short. Thus, their evening is our morning. Now, the European bedlam of evenings largely disappears if you get up in the mornings, and so you can hope for long-path openings on 14MHz from, say 0600-0800UTC, then a break, followed by the short-path opening in mid-morning. 7MHz is the spot for a night-owl after Australia, like 0400 for instance. That is what we see near the bottom of the sunspot cycle, but of course if we are near the peak things are a bit different; the computer for example says that 14MHz propagation to VK is almost round the clock given a sunspot

number around 100 plus and low A or K indices.

Roughly speaking, exploration around similar times will locate the ZL and JA signals. In the evenings, they are about but weakly, and usually buried beneath the Red Army Choir and the Italian Tenors! Ian used 7MHz for SM5BPF and PY2OCG, but on 14MHz his ears were in operation on a brace of TA2s, 9K2MU, 8R1WD, ZA1B, VP2E, WB3ZN in Denver, K4JYO (Alabama), WA4QJM in Virginia, 7W5J with 7X5F, VP2VF, V31DE, KP4DBR, P43RR, YV3FIX, T17DBS and VE7BKY.

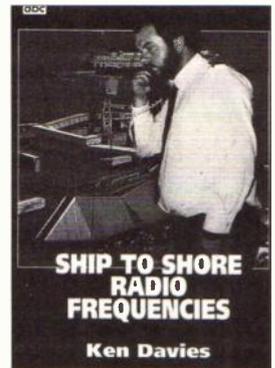
It may be recalled that Dennis Sheppard in Earl Shilton was playing around with a KW2000-series rig; this netted a letter from **John Barrinton Gray** who lives at 132 Lincoln Way Corby, Northants NN19 9HW; John has an AVO Valve Tester and he says he would be pleased to test any valves free, **provided enough stamps are included to enable him to cover the return postage/packing costs.** John also has quite a load of valves available that he will sell at fair prices to help out anyone having difficulty. What is perhaps even more useful is that John has many manuals and circuits; for example, HRO, AR77, AR88D, CR100, CR150, B40, Eddystone, Pye and so on, that he is prepared to photocopy. Seemingly John was in the trade, still has his heart there, and has kept these useful things. I would simply add that if you ship valves for test, **do be very careful in packing them** so that John can return 'em equally well packed, and do write and ask a price before you ask for a photocopy of a manual.

Still on that, **P. Hardy** of 1 Warwick Crescent Charlton Kings, Cheltenham GL52 6YZ writes to say he has five 12AT7s in his box if Dennis cares to drop him a line.

Yet another offer is from **H. Lundie G3XTU** of 10 Northampton Road, Bromham, Beds MK48 8PE who has DK96, DA96, 3S4, 6CH6, 12AT7, UAF42, UY47, and a brace of 6HF5s. The latter were used in earlier KW Vespa Mk 2 transmitters and various other rigs.

I never cease to be amazed at the way in which amateurs and short wave listeners can (and do) help each other.

# SSB Utility Listening



This month I have news of a new book which has just appeared; I found this book, quite by chance, while browsing in a local bookshop. The book is titled *Ship to Shore Radio Frequencies* by Ken Davies, it is part of the Ian Allan ABC Series, and costs £5.99. This 95 page book is aimed at mariners, but it also a very useful reference book for listeners. It is a quick and easy-to-use directory of the communications facilities available to the UK coastal sailor (and listener).

The book divides the UK coastline into 10 sectors, starting at Lands End and working anti-clockwise back to the Bristol Channel; one of the sectors covers the River Thames from its source (in Gloucestershire) to its mouth (in the North Sea). It covers both the h.f. radio spectrum and the v.h.f. 'marine band' frequencies.

Each sector follows a similar format. Listed first are the HM Coastguard stations with their main v.h.f. channels, followed by details of how to get weather information for the sector over the 'phone. Next are details of the British Telecom MF Coast Stations (to use their proper title) in the sector. Each section has its own ship and shore h.f. frequencies, as well as the channel letters. Also given is the start time of the four-hourly traffic broadcasts, so you can easily work out when the next transmission is due.

After that comes the v.h.f. coast stations (with their assigned 'marine band' channels), and finally an extensive listing of ports, harbours and marinas. At the back of the book are complete lists for the BT MF Coast Radio station frequencies and the v.h.f. Marine Band frequencies.

All in all, this is a very useful pocket book for the mariner, and just the thing for those who are interested in monitoring marine traffic around the UK.

## EAMS

Those of you who enjoy spending countless hours listening to the USAF GHFS frequencies cannot fail to have noticed the frequent transmissions of long strings of numbers and letters. These transmissions occur at all times of the day and night, some are quite short and others are very long - one has been heard with over 400 characters. They originate from several GHFS stations, and they are usually repeated by other GHFS stations a few minutes later. The

transmission takes the form of a six character preamble spoken phonetically and repeated three times (e.g., DKE3C7, DKE3C7, DKE3C7, message follows), followed by the full message starting with the preamble again. Some stations announce their location at the start of the transmission (e.g., Offutt), while others only give their location at the very end. After the message has been read-through once, it is always repeated again (e.g., ... I say again...)

Once the first transmission has finished, another GHFS station will pop-up and repeat the same message. The six character preamble is the give-away that it is a repeated transmission.

These transmissions are known as Emergency Action Messages (EAMs), and are generally considered to be coded messages to the US strategic forces of B-52 bombers, Naval ship and nuclear submarines.

As mentioned above, the six character preamble is followed by the coded message. At times, this has been over 400 characters long, but the most common ones are those known as 20- and 26-character messages - the preamble is followed by either 14 or 20 characters.

Over the past year, somebody in the USA has detected a sequence to these EAM transmissions. I first read about this discovery earlier this year, and since then I have noticed the pattern myself. The American listener concerned, Jeff Haverlah in Texas, began to 'notice' that the six character preamble started with the same two characters for a few weeks, then changed to another pair which stayed constant for the next few weeks. By patiently recording the dates and times of each transmission, the preamble and the message, and the transmitting station, he discovered that each '2-character' set lasted for between 14 and 26 days in use. As time went by and more and more listeners reported details of what they heard, it became possible to identify when the changeover occurred. In one particular instance, the difference between one pair ('IO') and the next ('EP') was only 12 minutes.

So, what do all these coded messages mean? Well, that's the hard part, and I don't expect that anyone has ever managed to break the codes. Since the transmissions are thought to be destined for the US nuclear forces, it is thought that they are 'Go codes'. At an airshow earlier this year I spoke with the

crew of a B-52 bomber. I asked them a few simple questions about the aircraft, to put them at their ease; then I started to ask about EAMs, what they did when they heard one, and how they knew if it was for them. They were very reluctant to answer my questions after that. When I mentioned that the current sequence (at the time) started with 'HB' and the previous set was 'J4' they looked very uncomfortable indeed. As a test, I told them that I had cracked the codes and the next set would begin with 'NK' (I was wrong, it was '6E'), they refused to talk with me any more! Maybe I was getting too close to the truth, who knows!

Although it is very unlikely that anyone has ever broken the codes, it makes a very interesting diversion noting the details of the transmissions. What should you do when you hear one of these messages? - take notes of course. What you'll need to take note of, are the start time, the transmitting station, the 6-character preamble,

and the rest of the message. Don't forget that the message is repeated by the same station, so you will get a second chance to record the message if you miss any characters. Also, note which other stations re-broadcasts the sequence in the following few minutes. Soon, you'll notice that the repeated broadcasts by other stations usually follow a set sequence themselves.

Over longer periods of time, you'll notice when the sequence changes, days when very few EAMs are transmitted, and days when many dozens can be heard. Over a period of a few months, it becomes easier to notice the changes, especially if you keep a separate log of these broadcasts.

Next month, a look at some of the other EAM and coded messages that you can hear from the USAF.

## Traffic Log

(all frequencies in MHz, all times UTC)

- |        |                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3.939  | (10/5, 07.00-08.00) Buchan working stations G7X and 9QE, both of which appeared to be Naval ships. Lots of messages were passed concerning tracking and training, with a few PCS checks (Position, Course, Speed) where the details were all encoded. The Ops Officer on G7X passed a message to Buchan, to be sent to Eindhoven in the Netherlands, concerning a training exercise that afternoon.   |
| 5.181  | (22/6, 21.02) Station 0B working I30 and A10. Probably a British Army or TAVR communications network; stations starting with '0' are very typical of the Army.                                                                                                                                                                                                                                        |
| 6.688  | (12/5, 08.00-08.40) K85 working K87, both stations carrying-out ground-radio checks (therefore are probably aircraft or helicopters). I1E working Portland (Portland Naval Base in Dorset), reporting that they were 'in Portsmouth'.                                                                                                                                                                 |
| 6.739  | (28/6, 13.35) Station Sawmill working Architect, requesting to pass a message to Sawmill Boss. Architect requested that they QSY to 8.190MHz (a rarely used Architect frequency).                                                                                                                                                                                                                     |
| 6.993  | (29/7, 09.05) Spar 65 working Andy (having moved here from 11.175), reporting the estimated time of departure from ETAR (Ramstein AB, Germany) at 09.30, and their e.t.a. to HECW (Cairo West, Egypt) at 13.05. At 09.40 Spar 65 requested a phone patch to the US Naval Observatory for a 'time hack' (a time-check, just like TIM in the UK); the recorded voice said '05:40:15 EDT, 09:40:20 UTC'. |
| 8.190  | (28/6, 13.37) Sawmill working Architect, but suffering from interference from a loud whine. Both QSY'ed to 9.031MHz.                                                                                                                                                                                                                                                                                  |
| 9.031  | (28/6, 13.38) Sawmill working Architect with a message to Sawmill Boss. Sawmill wanted to arrange some air-conditioning repairs when the arrived in port the following day (therefore, Sawmill is a ship of some sort).                                                                                                                                                                               |
| 11.175 | (29/7, 09.00) Spar 65 (a USAF C-20 Gulfstream aircraft) working Croughton for a phone-patch to Andrews VIP ('Andy'). '65 asked for some working frequencies, and was told to try F117 (6.993MHz) and F823 (11.229MHz).                                                                                                                                                                                |
| 11.175 | (29/7, 21.36) Albrook GHFS working Hickam GHFS (inaudible in the UK). Hickam wanted Albrook to put out a call for 'Marlin 01' Albrook called three times, but there was no response.                                                                                                                                                                                                                  |

# Bandscan

## Europe

Germany's international broadcaster, Deutsche Welle, unveiled a new corporate image at the Berlin consumer electronics fair, the two-yearly Funkausstellung, in August. Out is the globe and the strange-shaped man who has decorated DW's schedules and promotional material for the past few years; in comes a clean cut logo which seems to lean neither towards television, into which DW is now investing heavily, nor to radio, where the station is pruning its resources.

RadioRopaInfo, the German commercial broadcaster which is part of the conglomerate which owns the successful TechniSat satellite antenna and receiver manufacturer, has resumed broadcasting on long wave. The transmitter on 261kHz, formerly used for Radio Volga programmes for Soviet forces in East Germany, was off the air from November of last year.

The reintroduced long wave service is in parallel with the station's short wave frequency of 5.980MHz and appears to be operational between 0400 and 2100UTC. Meanwhile, RadioRopa has announced that it plans to change from analogue to digital sound on its Astra satellite service. The station has a commercial interest in this switch, since it is one of only a handful of companies which build receivers for the new Astra Digital Radio (ADR) system currently being introduced.

### Banned Satellite Dishes

Pity residents of the city of Courcouronnes in France, who may not be able to benefit from the introduction of digital services on European satellites. The mayor in the town has banned satellite dishes from houses, apparently for safety and aesthetic reasons.

Only one communal antenna will be permitted on apartment blocks, and owners of houses will not be allowed to have dishes which are visible from the street. Residents of the town have six months to comply with the ruling, or face forcible removal of their satellite antennas.

### Radio Netherlands

Radio Netherlands is now running two audio sub-carriers on Astra 1C, one principally for its Dutch service, the other mainly for English. Tune to RTL 5 television on 10.963GHz, and the audio subcarrier at 7.74MHz for English at 0030, 0430, 1830 and

2030 and the subcarrier at 7.92MHz for English at 0430, 0730, 1930 and 2330UTC. Relays of the station via World Radio Network on Astra in Europe and Galaxy in North America are to continue, says Jonathan Marks, Director of Programmes at Radio Netherlands.

### Hot Line

The Voice of America started a Refugee Hot-Line in mid-August to help people displaced in the countries of the former Yugoslavia, and to send messages to families and friends. Refugees can telephone a 24 hour-a-day 'phone number and record a message of up to one minute length.

The messages are carried in VoA's regular Serbian and Croatian programmes, but the station has undertaken to start special programmes if demand for this new service increases. The 31st August edition of the New York Times reported that VoA is seeking alternative funding for its broadcasts directed towards Europe.

This follows the cut of US\$54 million from the \$395 million budget allocated to VoA's parent organisation. Bill Torrey, the acting director of VoA's Europe Network which runs VoA Europe (transmitted via many cable systems in the continent and on medium wave 1197kHz out of Munich), said he is looking for a commercial company to finance the production costs of his music and entertainment programmes. The news and information segments would come, as now, from Washington, and not be affected by the need to find commercial backing.

### New Internet Address

Radio Sweden (try 6.065MHz short wave, 1179kHz medium wave for English at 1615, 1730, 2030 and 2130UTC) has a new Internet address: [info@rs.sr.se](mailto:info@rs.sr.se) The station also has a new World Wide Web site at: <http://www.sr.se>

The English pages are expanding under George Wood's leadership and by the time this article appears in print should be fairly active. Meanwhile, the station's Astra transponder has changed: tune to ZDF television on transponder 33 at 10.964GHz, and the audio sub-carrier at 7.38MHz.

### Programmes Affected

The BBC World Service Burmese language programmes started to be affected by jamming in August,

shortly after a speech by recently-released opposition leader Aung San Suu Kyi was interviewed on the service. Reports from Burma suggest that the jamming is not very effective, and at least one frequency is completely unaffected.

Speaking on the World Service media programme *Waveguide*, Elizabeth Wright, head of the BBC's Asia Pacific programmes division, said that the jamming had been noticed at the BBC Monitoring Service, and via direction finding traced to the region around Burma. Protests were being lodged with the authorities about this illegal activity which contravened international radio regulations.

The jamming also affected the Democratic Voice of Burma, transmitted from Norway. The BBC's Chinese service has been jammed for some years, but generally ineffectively in most metropolitan areas.

### Lithuania Back

Lithuania is back on short wave after an absence caused by financial constraints. The country's First Programme is carried on 9.71MHz from a Lithuanian transmitter and on medium wave 666kHz.

The international service, Radio Vilnius, is on the air daily with English to Europe at 1900-1930, 2100-2105, 2130-2200 on 9.71MHz, in parallel with the medium wave channels of 1557, 666 and 612kHz. The North American service is back on a Russian transmitter at 2300 Monday to Friday on 7.36MHz, and at weekends at 2300 on the same frequency.

### Centenary Year

Last month was the 100th anniversary of the first long distance radio transmissions by Guglielmo Marconi, and to help celebrate, a special Morse code signal was transmitted at 0900 on 6 September from Grimeton in southern Sweden. The signal, on the very low frequency of 17.2kHz, well below the very bottom of the lowest broadcast band, long wave, was received at the BBC's receiving station that picks-up all the signals needed by the Corporation's Monitoring Service.

New, professional receivers made by Watkins-Johnson installed recently at Crowsley Park were able to tune to this unusual frequency and transmission - it emanated from the oldest Alexanderson generator in the



The Voice of America started a Refugee Hot Line in mid-August to send messages to families and friends.

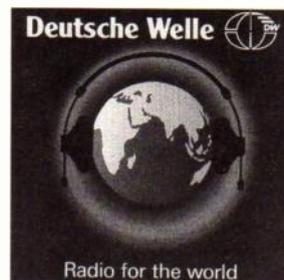
world - and relays it to a special conference, organised by the Institution of Electrical Engineers.

### Mother of Battles

Finally, I thought that you might be interested to learn that Mother of Battles Radio started up again in August, according to the BBC's *Waveguide* programme. This station was heard during the Gulf War (remember that the war itself was called the Mother of All Battles by Saddam), so does this mean that more trouble is brewing in the Middle East?

If you have followed the press over the past weeks, then you will know that there have been defections from Iraq by members of Saddam's extended ruling family, and many observers thought this might presage a coup against him. At the time of writing, nothing has happened, but keep tuned to those short wave bands in case something does develop!

Until the next Bandscan Europe in January's edition, good listening!



Deutsche Welle unveiled a new corporate image at the Berlin consumer electronics fair back in August.

# Scanning

Firstly, many thanks to those who wrote in on the IDs required for frequencies given by both Paul Wey and myself - it's nice to know that you're monitoring regularly! I'll deal with Paul's request first (Table 1). My thank's to G.P. Jones of Bedworth for that. My own list is answered in Table 2. My sincere thank's to Roy Dent for those - and, to answer your query Roy, I do stray into airband now and again as a matter of course - scanning is allied to airband monitoring - but the Editor does, I'm sure, wield a big blue pencil if he thinks I'm standing on other columnists toes! Roy also goes on to answer Paul Wey's queries on the following:

441.1500, 453.1250, 453.9250, 456.5250MHz - Birmingham, East Midland, Stanstead and Gatwick respectively and all ground handling services. Thanks.

## Wierd Letter

Now on to a pretty disturbing letter I received through the post from a gentleman who I'll refer to only as 'GA' and who calls himself a (sic) 'sensitive employee and hobbyest of radio'. Mr. 'GA' informs me we all break the law by listening to sensitive frequencies but states that, as a sensitive employee 'our organisation' is aware of this. As long as people are sensitive the eyes go blind....'

Mr. 'GA' presumes that I should see him as a part of the Radiocommunications Organisation, and hints his rôle is in detection of scanner users. He also states that sensitive licenses should be issued to people who can help the 'organisation' by reporting those who use scanners for purposes 'outside the law' to the RA. To add weight to this, he goes on to say that a recent 'incident' involved a young lady who was listening on her PRO-2006, MVT-7100 and AR-3000 and who was asked to 'de-program' her memory banks in the presence of Mr. "GA". She was then thanked, and told (quote) 'we don't care what you do with them'.

Come on here! What is this? Firstly, the RA - or its staff - would most certainly not consider writing to me on a sheet of lined paper torn out of an exercise book and written, badly, in Biro with loads of crossing out. Secondly, if you were indeed a sensitive employee - mentioned some nine times - then you have just committed a cardinal sin by informing me of what you do, and how you do it. Thirdly, the idea of a

sensitive license is a real no-no. You, as an employee of 'The Organisation' should be quite aware of the components of the *Wireless Telegraphy Act, The Interception of Communications Act* and so on *ad infinitum*. Issuing licenses to scanner users? I think not!

I suspect that you are a small time scanner user - possibly ex-CB and illegal 27MHz a.m. and s.s.b. (with linear amp) operator at that - who sits in on sensitive frequencies and then follows them up. You most probably have this fantasy that you are one of the Moral Minority - you know, unpaid, unasked but sticking up for rights and stuff like that. If anyone has done any reporting, then the chances are it is most probably you who reported someone for having a hand-held out in the garden - to draw fire from your own activities. Well, Mr. 'GA', have I got news for you! If the RA employ you then they should trawl through their records and have you fired. What you propose, and what you hint at, is nothing short of dangerous. Scanning is enjoyed by thousands of people of all backgrounds, many of whom stay low key and just have their own enjoyment out of it. In the midst of all of this are a small core of blatant fools who go out of their way to bring the hobby into disrepute, who encourage the RA to look more

closely at the hobby as a whole and who also write in with suggestions that are well off the wall. Are you wired to the moon by any chance? One thing is for certain - you cannot be serious.

I have filed the letter anyway. I did not recommend a 'Scout' by the way. Perhaps you have me mixed up with someone else? I never recommend any kit to anyone - that's a part of my being neutral and unbiased on the issue of what is, and what isn't, good choice. As for a 'Scout' being harmless. You're what? In the 'organisation'? Tell me, how long do you think I'd last if I sat outside somewhere like HMGCC Signal Hill at Poundon with a 'Scout'? Ten minutes? Less, I think! I really do hope that people like you - who have this semi-knowledge of the law regarding scanning which is enough to fill the back of a business card - are stamped upon very heavily by the RA. Scanning gets a pretty bad press as it is. You only add to it.

## The Things You Get in the Post!

Yet some more info from the aforementioned R. Dent and this time concerned with helio ops and, in particular, G-HEMS. This for

## D. Rile back in August.

132.700	Thames Radar
119.900	Heathrow Radar
130.350	Northolt Radar
124.975	Northolt Tower
118.075	London City Tower
122.900	Battersea Heliport

You should be able to hear G-HEMS on these, and follow up from there. However, Roy does suggest these are 'office hours' frequencies Monday through to Friday with limited service, if at all, on weekends. G-HEMS, it appears, operates daylight hours only. Buckinghamshire had a service on 122.950 and Kent on 132.650 but this cannot be confirmed. The gloves down then - can anyone?!

Alan Burnett-Provan asks for some help in putting an ID on a c.w. signal he heard on 113.650. Help required on this one. Alan lives in Solihull and I can't find any reference to anything that may be of help apart from it may have been a call-sign used in navigation.

I carried some stuff about inter-service working some time ago and a letter from someone in Gwynedd who wishes to remain nameless - due to his job - informs me that Gwynedd Fire Service has Channel 69 - 450.275 - available for inter-working with NW 1 (Police 29). He goes on to state that North Wales Ambulance do have a marine band radio fitted in their mobile control unit, based at Caermarfon. I have been involved in a search when I was on the lifeboat where the North Wales police helio called us briefly....which came as a shock to us, as we didn't know it was fitted with marine v.h.f.! However, it makes sense - and would, possibly, prove extremely useful.

Now, an addendum to my 're-charging NiCads' advice given. A letter from N.D. Atkins G3EXG states quite clearly that this isn't on! Gas build-up would possibly result in an explosion so an alternative is to discharge a high value capacitor - observing correct polarity and say 470µF charged to 30V - across the cell. This will 'zap' any whiskers though it may take several charge / discharge cycles to effect complete recovery. Always glad of advice, Mr. Atkins - and it is taken in the spirit intended.

G. Barnes writes in with some interesting stuff heard whilst on holiday in the Scilly Isles. Using an MVT-800, Geoff was able to hear the following:

Table 1

166.2625	Nuneaton and Bedworth Council
169.825	The Watch Security, Leamington Spa
453.050	Carparks Security, Coventry
453.175	Courtaulds Security, Coventry
453.700	Dunlop Security, Coventry
455.2375	George Eliot Crash Paggers
455.7375	Coventry Airport Ground Control
456.525	Birmingham Airport UNID operator
456.625	Warwick University Security
456.650	Retail Security Link, Nuneaton
456.775	George Eliot Hospital Porters / Security Nuneaton

Table 2

456.850	Community Nurses, Coventry
119.900	RAF Brize Norton SRE Brize Zone.
123.200	Cranfield Tower. Poss A-G Old Sarum.
123.300	RAF Brize Norton talkdown.
129.950	Luton Approach.
315.750	RAF Benson SRE

- 130.70 Lands End (St. Just) Tower.
- 123.15 St. Mary's Tower.
- 157.80 St. Mary's Boatmans Association.

Geoff goes on to say there appears to be a lot of scanning going on, judging by the number of discones up on roofs! I have yet to hear anything from anyone living there, Geoff, so I'll take that as read.

### Low Band VHF

Now a letter from **Tim Anderson G0GTF**. Tim, as regular readers will know, monitors low band v.h.f. stuff. He wrote to me enclosing some unusual happenings and for which I'm indebted. Tim reports he heard the following by either Es or whilst on holiday in Menorca (**Table 3**). While interesting, the most exciting part for me was the reception of a Hungarian numbers Station - confirmed for Tim by Hans Otto DL0KAC on amateur packet - on the v.h.f. frequency of 47.170. I've since passed this information on to ENIGMA but would welcome back any reports from any reader who has heard numbers traffic on v.h.f. I have heard a rumour that numbers

35.025	f.m.	French Repeater with tones.
36.325	f.m.	Carrier, probably Romanian.
39.390	f.m.	Music - STL? During Es to Italy and Africa.
45.105	f.m.	Italian Telephones.
45.450	f.m.	Italian Telephones.
46.160	f.m.	Italian Telephones.
47.875	f.m.	Italian Private TV and Video, non-standard channel.
53.375	f.m.	Italian Private TV and Video, non-standard channel.
54.650	w.b.f.m.	Italian STL.
56.260	w.b.f.m.	Italian STL.
75.900	w.b.f.m.	STL Menorca.
82.850	f.m.	Telephone Menorca.
403.150	w.b.f.m.	Meteorological Sondes.

traffic was carried on v.h.f. in the Middle East - can anyone confirm? Lastly, a request on the 'net from **Michael Kenyon** regarding scanning antennas. The simple answer to your quandary as to what to buy - discone, double discone or vertical - is really down to you. I use vertical - a Scanmaster Base - and it is durable, unobtrusive and sensible.

Discones are very much the same so it's a matter of horses for courses, Michael. Sorry about the delay in getting back but I do not have access to the 'net, and the request was sent on from the office. It's wise to request that any internet queries addressed to me will not be speedily answered as the home QTHR does not appear. Besides, an s.s.a.e. is a

far better bet - providing you give me time to get back to you!

That wraps it up for this month. Have some pity on me struggling with Law this term, with trying to manage a job at weekends and running the old faithful Clubman of mine - on top of which....!

Late hello to **GW0KPV** and **Sylvia** - told you I'd do it, didn't I?

Best 73s and keep scanning.



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# Airband

Several of you have written in with information and queries on the use of various frequencies. I'll try to put it in some sort of order. Letters are from **Patrick Benham** (Langport), **Norman Locke** (Peterborough), **Ray Loveland G2ARU** (Arundel) and **Keith Walton** (Stoke-on-Trent). I'm sure that some readers out there have the required local (or inside!) knowledge to answer the questions.

## London Military

Strange things do happen. Why would a British Airways B.737 be equipped to talk to London Mil ATCC on u.h.f.? Has there been a change to London Mil South, Daventry Sector? I still have it listed as 291.8MHz.

## Manchester Sub-Centre

This item expands on August's 'Frequency and Operational News.' The Sub-Centre works 124.2 and, if busy, 134.925MHz (which might be non-standard). Northbound departures from Birmingham, East Midlands, Leeds/Bradford and Liverpool will contact the Sub-Centre. Manchester Southbound departures are also worked and then handed off to London Airways on 129.2 or 131.125 or, non-standard, 120.025MHz.

Arrivals come in via the Sub-Centre's airspace before handing off to the usual Approach Radar frequencies at each of the above-mentioned terminals.

## Air-to-Air

Pilots should not talk to each other on 123.45MHz; it's officially allocated in some places! Over the North Atlantic, 131.8MHz has been officially provided for the purpose but not much will be heard inland as the transmissions are generally too far away. North Atlantic traffic also monitors 121.5MHz so as to relay emergency messages; there are so many airliners up there, someone's bound to hear.

In the case of display teams, some have their own frequency to co-ordinate their displays such as the Red Arrows (243.45 usually, 242.2MHz if not). Others, such as the Russian Sukhoi fighters, simply remain on the tower frequency wherever they are.

## Across the Channel

Many light aircraft pilots fancy a trip across the Channel for Sunday lunch (I'm told that Le Touquet is especially recommended, the restaurant being set up to handle the influx of Brits!). Most of the common continental aerodromes are listed in the *En-Route Supplements* (Calais, Deauville, Dieppe, Le Touquet, Lille, Orly, and Ostend) but I couldn't find Abbeville (123.5MHz), is it new?

Now for a question. What French aerodromes are on 124.425, 125.375, 125.45, 129.775, 130.45 and 131.375MHz? Thanks to all those mentioned above for contributing to this frequency mini-feature.

Section, Aviation House, Gatwick Airport South, West Sussex RH6 0YR. The booklet fits in 150 x 110mm and weighs just less than 20g (that's 19 or 25p in the UK).

Javiation, Carlton Works, Carlton Street, Bradford, West Yorkshire BD7 1DA, Tel: (01274) 732146, have come up with their latest *VHF/UHF Frequency Listing*. In fact there are two versions; I recommend the full version at £11.50 plus postage (it weighs almost 350g) as distinct from the *Frequency Only Guide* that costs £7.50 including UK postage.

Now, at that price (more than the usual *En-Route Supplements* that I always recommend) there must be something extra. The full (expensive) version contains something that you're always asking me about: a callsign directory. Compare that with the price of the official callsign publication and it's suddenly good value!

What else is on offer in the spiral-bound 232-page book? As you can tell from the title, civil and military are covered (but I'm unable to check the data for accuracy as it's too extensive). On the military side, stud channel numbers are elucidated, range control and air-to-air refuelling frequencies are given. Under aerodrome listings you'll often find extra information such as ground vehicles and company operations frequencies. Some of the more well-known display teams are here with the channels they use while displaying. I must also commend the reverse frequency look-up table, from which you can find the allocated aerodrome once the frequency is known. The LATCC repeaters are detailed. I'm sure that many readers will be willing to pay the price to have their questions answered and it's not too early to drop hints about the desired contents of your Christmas stocking!

The routine information (*En-Route Supplements*, radio-navigation charts, etc.) is always available to the public by post from the usual official suppliers. It's worth remembering that this is the same information that pilots use! The addresses of the various suppliers is on the Airband Factsheet that's available from the Broadstone editorial office (not from me!) if you send a pre-paid reply envelope. It's a single A4 sheet.

## Perplexing Propagation & Other Problems

Certainly, the active antenna at the station of **Ken Capewell** (Claverdon) is helping to pull-in v.h.f. signals. In

addition, weather helps; stable summer high pressure systems (anti-cyclones) seem to favour longer-distance v.h.f. ducting. This can be too much of a good thing when distant co-channel television transmitters interfere with your evening's viewing! At least it's a guide to propagation conditions.

Ken's flown in the Goodyear airship *Europa* as part of his work (that'll cause reader envy!). I also recommend Ken to get the Airband Factsheet and to consider buying some of the frequency information sources listed above.

## Follow-Ups

In my August column ('Book Reviews') I over-simplified the difference between controlled and uncontrolled airspace. As **Martin Sutton** (Arundel) points out, all airspace is subject to the Rules of the Air and is therefore regulated. Not all is controlled, though, and there is now a complicated classification of airspace types. This came into being at the end of 1991, the result of ICAO trying to get all states to agree to the same airspace rules. There are seven classes of airspace, one of which is unallocated in the UK, and in fact the UK has decided not to comply fully anyway! If you really want to know then you'll need the chart from the CAA (*Printing and Publications is listed on the Airband Factsheet*).

For most purposes, you either need to do as a controller says or you don't. Even if outside controlled airspace, you can still ask for a radar controller's help and advice. This gave rise to the confusing term 'Air Traffic Services Outside Regulated Airspace' and Martin is right in questioning this description.

Again, if you want the full details, Martin lists the exact conditions for Special VFR. These are non-IFR flights: in Class A controlled airspace, in any controlled airspace at night, or in controlled airspace that is subject to instrument meteorological conditions. So, they're not VFR (Visual Flight Rules), not IFR (Instrument Flight Rules) - but something in between!

## Frequency and Operational News

From the CAA comes *GASIL 4* of 1995 with the following information. At Full Sutton, Yorkshire, is a new ATZ with air/ground on 132.325MHz. The Oxford d.m.e. replies on 1.211GHz, callsign OX, and seems to be a recent installation. Great Yarmouth's

## Information Sources

The Meteorological Office publish a new booklet called *Get Met*. This lists all those expensive dial-up telephone weather services for aviation - some of which require a FAX machine. Also included are the VOLMETs (but the h.f. frequencies seem to be the old ones). At least it tells you which aerodrome is covered by which broadcast. If you'd like a free copy (of course you would!) send a pre-paid reply envelope to CAA Safety Promotion

### Abbreviations

ATCC	Air Traffic Control Centre
ATZ	Aerodrome Traffic Zone B.Boeing
CAA	Civil Aviation Authority
d.m.e.	distance measuring equipment
g	grams
GASIL	General Aviation Safety Information Leaflet
GHz	gigahertz
h.f.	high frequency
ICAO	International Civil Aviation Organisation
kHz	kilohertz
LATCC	London Area & Terminal Control Centre
mb	millibars
MHz	megahertz
Mil	Military
mm	millimetres
n.d.b.	non-directional beacon
nm	nautical miles
QFE	altimeter pressure setting, reads zero when on aerodrome
QNH	altimeter pressure setting, reads height above sea level
u.h.f.	ultra high frequency
v.h.f.	very high frequency
VOLMET	VOLume METeorological report



Stinson

Christine Mlynek



Robin Regent

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Aeronca 15AC Sedan

Christine Mlynek

n.d.b. (ident ND) changes slightly to 396 (was 397kHz) but power is reduced for a 10nm range. New lower airspace radar service units are at Humberstone (124.675), Plymouth (121.25) and West Freugh (130.05MHz).

Another new ATZ is the heliport at Walton Wood, near Pontefract. Isn't Yorkshire doing well this month?

### In the Cockpit

I've been explaining about Secondary Surveillance Radar (SSR) following on from the photo of a transponder controller in the August 'Airband.' Now, what are the different modes of operation? The big knob (bottom left of August's photo) is marked Off, Stby (short for standby), A, B, C (to which the switch is set in the photo), and D. One of the modes A to D are selected for the transponder to actually operate. When changing squawk code, standby is required. This prevents inadvertent transmission of an emergency code whilst knob-twiddling.

The mode determines what information the transponder sends. In practice, mode A is selected for simply transmitting the squawk; mode C, on the other hand, is set when the squawk plus the flight level is to be transmitted. Pilots talk about 'squawking mode Charlie' or not having mode C when referring to this facility. The altitude readout that is transmitted is as if the altimeter sub-

scale were fixed at 1013mb (regardless of the actual QNH or QFE setting).

One more mode doesn't appear on older equipment and is not universally available. Mode S provides the facility for extra two-way data to be exchanged between the ground and the aircraft. This will doubtless become increasingly important in the future.

Where does that leave 'Squawk Ident?' In the centre of the leftmost squawk adjuster knobs (under the window displaying 70 in the photo) is a press-button. When instructed by the air traffic controller, the pilot presses this and thus causes an extra information code to reach the radar set. This has the effect of making the target image flash on the screen for a few seconds and so confirms that the correct aircraft is being tracked. If there's space next month, I'll explain how SSR is going to become even more helpful in preventing mid-air collisions.

The next three deadlines (for topical information) are October 13, November 10 and December 8. Replies always appear in this column and it is regretted that no direct correspondence is possible. Genuinely urgent information/enquiries: 0181-958 5113 (before 2130 local please).

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# Info In Orbit

A column featuring news about WXSATS has to have some input from those national organisations that control this type of satellite. As a token of my gratitude to the National Oceanic and Atmospheric Administration, and to the CIS/Russian organisation Space Monitoring Information Support, whose staff have kindly provided information about their operations, I propose to incorporate their logos in this column in future. Each logo was downloaded from the relevant server computer on the Internet. The Russian scientists have expressed an interest in 'seeing' this column, so I have agreed to send extracts in E-mail form, after publication.

## Limited Life

No satellite lasts forever. Equipment failure - specifically, power failure - silenced NOAA-9 (that was launched 12 December 1984) on August 3 at 2220UTC when its Power Management System apparently overloaded. The Space Operations Control Centre (SOCC) re-established contact with the satellite and collected TIP data (Tros Information Processor) that is transmitted on 137.77MHz in the beacon. The problem had been an ongoing one, finally resulting in failure.

NOAA-9 has a 29 minute eclipse with the sun, and NOAA has been trying to dissipate the heat build-up, that in turn affects power distribution. They tried re-positioning the solar array in order to block some instruments, but there is only so much one can do for an old satellite. The anticipated life span of NOAA-9 was two years, but we got much more than that!

NOAA-9 was put into a 'safe-state' configuration, with most instruments powered down into a survival state. While the fault was analysed, different options were considered. If a battery had failed it could be possible to reactivate systems and instruments using the other two batteries, with careful management of power loads during the eclipse part of the orbit.

Although ten and a half years old, NOAA-9 continued to provide global operational support for the search and rescue (SARSAT) mission, ozone retrieval, and earth radiation budget missions. It also supports

real time 1 and 4km imagery transmissions. This is in addition to the primary mission data provided by NOAA-14 and NOAA-12.

A few days after failure, the NOAA-9 power system was stabilised, but only two of three batteries remain. Operations cannot resume until a determination that long term energy balance can be maintained on two batteries.

If operations are resumed the imagery and global search and rescue will no longer be possible, due to a failure in the Manipulative Information Rate Processor (MIRP); this is a box that formats all data to recorders and transmitters. It failed as a result of the power system upset.

Work continues in an effort to re-establish the Ozone and Earth Radiation Experiment data. Recovery operations on any polar WXSAT put all other polar WXSATS in the group at risk. NOAA only has the capability of commanding one spacecraft per Command and Data Acquisition Station at a time. Dual Pass operations allow for the recovery of satellite telemetry from two satellites simultaneously, but do not allow for commanding and recovery of mission data simultaneously. In this case access to NOAA-9 passes are limited to 4 per day, due to conflicts with the operational WXSATS NOAA-12 and 14. To get more command time on NOAA-9 would require giving up NOAA-12 or 14 mission data and command capability, putting these spacecraft at risk and losing critical operational mission data.

My thanks to Tom Wrublewski of the NOAA Polar Satellite Acquisition Office, and Mark Mantz and Charlie Vance for providing further details about this problem.

## Meanwhile - the Other NOAAs...

If you were wondering (as I was) about NOAAs 10 and 11, neither of which have been heard for many months, it is interesting to know that both are regularly monitored. NOAA-10 is in 'standby' mode. The SOCC takes one pass each week to monitor its health and safety. NOAA-11 is also in 'standby' mode, though with some onboard instrumentation in operation.

NOAA-12 is operating

'nominally', as is NOAA-14. The AVHRR (advanced very high resolution radiometers) visible channels are periodically calibrated by comparing them with simultaneous aircraft imaging.

## ...And METEORS

As expected from a prior announcement, METEOR 2-21 was switched off on August 9, and METEOR 3-5 switched back on, still using 137.85MHz.

OKEAN-4 (or 1-7), continues to transmit occasional multi-spectral images during about one pass per day. As has always been the case with the OKEAN spacecraft, most transmissions last for a few minutes, rarely more than six, but sometimes last for longer. From my location on the west of the UK, hidden by neighbours' houses from the easterly horizon, I can only monitor passes which rise above 7°. A number of readers have kindly sent me their OKEAN images, including Derrick Darlow of Eastington, who received Fig. 1 on June 12, showing Sweden and Finland.

Wispy clouds can be in the right-hand (visible) spectral image. The middle portion is a radar image, that sees straight through the clouds. The far-left section is from the microwave sounder. On the right-edge of the picture, sets of numbers show the status of the onboard systems, and the elapsed time since the previous midnight in Moscow.

Jim and Hilda Richardson managed to shake off three weeks of summer 'flu in time to catch this OKEAN-4 image in late June. They use the TH2SAT package that does not include a formal 'OKEAN' option, so they use the METEOR visual mode. The image shows a small portion of the microwave image near the top left, where the coast of Norway can just be seen. As has been happening more recently, a generous helping of Britain is included. Until OKEAN-4, the inclusion of any of the UK was almost unheard of.

Finally, to round off the OKEAN scene, Fig. 3 is my own picture from July 1, showing almost the whole of Britain! A few weeks ago I asked one of the scientists who has contacts amongst the ground controllers, whether they could give

Fig. 1.



Fig. 2.

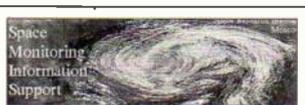
us a transmission that included the whole of the UK. Perhaps this was just coincidence?

## GOES-8 Operations

From the western side of Britain we can monitor WEFAX telemetry from GOES-8. Should anyone want one, I have a (multi-page) transmission schedule available for a 20p coin and s.a.e. A letter from Ian Church of Daventry suggested that I mention that GOES-8 does not transmit Primary Data. This contrasts with METEOSAT-3, that was the operational GOES-east satellite until the end of May. Following the successful completion of GOES-8 tests, it replaced METEOSAT-3 at 75° west longitude. There may be further changes to the schedule in due course.

## GOES-9 Tests Continue

What a pity we cannot receive direct telemetry from GOES-9, the new American geostationary WXSAT that, as around mid-August, is located at 90° west. I understand from the NOAA GOES Product Manager, Jamie Hawkins that they are running test imager schedules for two months. These included full discs every 30 minutes, until August 18, from which time they are scanning in the 'Routine' mode for ground processing checkout of product systems for the National Weather Service. System Performance Operational Testing (SPOT) began on July 24, and should continue until mid October. There has not yet been any decision taken on the location of GOES-9 after checkout. All the early indications are that the GOES-9 imager is yielding excellent quality images, certainly judging from those that I have seen. Navigation and registration characterisation is now underway.



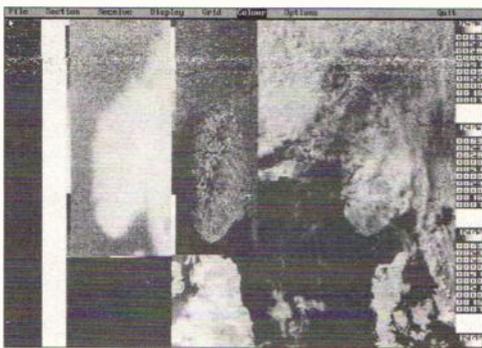


Fig. 3.

## Future Launches

September 21 STS-73 *Columbia*,  
September 28 *Milstar 1-2 Titan 4*,  
and *FAISAT-2 Cosmos* launches,  
September 29 *SWAS XL Pegasus*  
launch and October 26 *STS-74*  
*Shuttle-MIR*.

## Beginners' Section

More on antenna, cables and pre-amps. I previously described one type of antenna - the right-circular polarised crossed dipole - that can receive WXSAT signals. This is the most common type, but there are others that can be used successfully. Yagis can operate well at 137MHz,

made antenna construction, based on a design given in the *Satellite Experimenters Handbook*. He mounted his phased, crossed-dipoles in the loft space, where of course the antenna is safe from the weather, and is easily adjusted.

Andy comments on his major concern, which was the prevailing weather at Bude. He used large diameter tube for the dipoles, and this has the effect of increasing the receivable bandwidth, and finds that it receives the 143MHz MIR downlink very well.

Alan Jarvis also uses an indoor WXSAT antenna and comments that he has not noticed further deterioration in the signal when the roof is wet. He suggests that any loss of signal during its passage through the lined, slate roof may be counter-balanced by the lack of corrosion and weathering of the rods, harness and down-leads. These are valuable points for consideration by any WXSAT enthusiast contemplating setting up a receiving system.

## Kepler Elements and Shuttle Info

Different options are available:

- 1: For a print-out of the latest WXSAT elements and MIR, send an s.a.e. and 20p coin or separate, extra stamp. Transmission frequencies are given where appropriate. This data originates from NASA.
- 2: I also send monthly Kepler print-outs to many people. To join the list please send a 'subscription' of £1 (plus four self-addressed, stamped envelopes) for four editions.
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though such a design is rather large. Reports are heard occasionally from people who have built their own versions of such less well-known types as the Lindenblad.

As expected, some letters have arrived from readers able to provide further experienced comment on some of the problems faced by beginners.

A letter from **Andy Cawthorne G3TJD** of Bude told me of his home-

## Cable Quality

If you have a 137MHz antenna mounted high, with a feeder of good quality - by that I mean that a properly matched cable of suitable impedance is used - a run from roof-top to ground floor level is likely to be within 20m. My first cable installation - many years ago - was done without the benefit of

experienced advice. I had been told to use H100 cable (that has a large cross-section), to fit it with N-type plugs, and lead it down to the receiver. Yes, this feeder worked fine, but what problems there are when you work with H100-sized cable!

This high quality cable is designed for high voltage applications at high frequencies (above 200MHz); with hindsight and considerable experience, I believe that this was unnecessary.

Another manufacturer later offered to let me try his low cross-section cable. I did so and was favourably surprised with the results. Using a much longer length of cable, and easily-constructed BNC connectors, the resultant signal was no different from the original feeder.

## Connectors

Peoples' views differ! In my view, experience has shown that the WXSAT band at 137MHz does not require N-type connectors. When I install new cables, I go for BNC fittings. I find u.h.f. connectors are satisfactory up to about 200MHz - way above the 137MHz band.

My conclusion was that narrow cable of suitable quality (including a matched impedance of 50Ω), with properly fitted connectors, could be used for runs up to, if not more than approximately 20m.

## To Amplify Or Not?

Antenna units may be supplied with a 137MHz pre-amp. By all means try this out, but, at least in the UK, the pre-amp may well amplify interfering signals, such as pager units, that may swamp the desired WXSAT signal. Frequencies around 138.0MHz have been allocated to pager transmitters, and it is an unusual pre-amp that can distinguish between a WXSAT signal at 137.85MHz and a pager signal a few kHz distant. The moral is - don't use a pre-amp unless it is absolutely necessary - and then test the combination (antenna and pre-amp) first, before final installation. If a pre-amp is to be used, select one that provides the minimum necessary gain to just counteract feeder losses. Neither my roof-mounted antenna nor my back-up antenna on the top of the clothes-line use a pre-amp.

## Frequencies

NOAA 14 a.p.t. on 137.62MHz  
NOAA 12 on 137.50MHz

NOAA beacons on 136.77 and 137.77MHz

METEOR 3-5 uses 137.85MHz

OKEAN-4 may use 137.40MHz occasionally.

Finally, remember to thoroughly test the antenna at ground level, before installing it on an external mount. My apologies to those expecting the feature on receiver specifications this month; it seemed worth passing on further input about antennas.

Almost all the letters received for this column are answered immediately, so those who have written should normally receive a response within a few days. Some

letters are of the, "how do I set up a WXSAT receiving station starting with no equipment and no money?" variety! Curiously, these are often the ones without an s.a.e.

## Internet WXSAT Site

Some readers have asked me where on the Internet, weather-related information can be found. Some magazines carry information on various aspects of the Internet so I shall restrict my notes to those topics concerned with WXSATs.

'WeatherNet' is the American-based source of a massive set of weather 'links', and is operated by Michael MacDonald as part of the 'Weather Underground' at the university of Michigan.

The web site URL is <http://cirrus.sprl.umich.wxnet>

The emphasis of this site is on American-based information and includes links to satellite photographs, surface and forecast maps, and servers of all types - telnet, ftp, gopher, etc. Current imagery is available if the correct links are followed. Specialist software is also available for those who want to make animated image sequences of tropical storms.

If you have a spare year and free access, have a look around!

## Hurricane Names

The Hurricane centre near Miami in Florida, keeps a constant watch on Oceanic storm-breeding areas for tropical disturbances that may herald the formation of a hurricane. If a disturbance intensifies into a tropical storm with rotary circulation and speeds above 39m.p.h., the centre gives the storm a name from one of six lists. A separate set is used each year beginning with the first name in the set. The letters Q, U, X, Y, and Z are not included because of the scarcity of names beginning with those letters.

The next sequence of names (after Felix) is Gabrielle, Humberto, Iris, Jerry, Karen and Luis, etc.

## STOP PRESS New CIS satellite

The National Space Agency of Ukraine (NKAU) has launched its first satellite, *Sich-Sich-1* is based on the Okean remote sensing satellites built by the Ukrainian company NPO Yuzhnoe for the USSR and subsequently the Russian Space Agency. The new satellite was launched on 31 August. Brian Dudman of Harrow was one of the first to receive signals just a few hours later when he heard it transmitting on 137.40MHz in the manner of OKEAN-4, and immediately contacted me. It has been heard on those easterly passes while within range of the Ukraine. Those on the mailing list received elements during the month. My thanks to Jonathan McDowell for providing this information.



Fig. 4.

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# Decode

## All the Data Modes

**J**eff Hall has written with a common problem facing users of wide range scanners. Like many scanner owners he has a keen interest in aviation and wants to supplement his v.h.f. listening by receiving a few of the flight plans that are transmitted using RTTY on the h.f. bands. His station comprises a Sony 2001D and a Yupiter MVT-7100 scanner. He also has a long wire antenna MFJ active antenna tuner and a Universal M-1200 PC based decoding system. But, despite all his best efforts, he's yet to receive any recognisable data.

Whilst it's difficult, if not impossible to completely cure this problem from a distance, there are a few steps that can be taken to simplify the problem. My first concern would be the antenna system. Although many scanners boast coverage of the h.f. bands this is always a compromise and most are very susceptible to overload from the very strong signals found on the h.f. bands. This overload gives the impression that the bands are very lively and there are lots of signals, But, when you try to resolve them you find that they are not real signals but spurious heterodynes. In extreme cases, these spurious signals can become so strong that they obliterate all but the strongest real signals.

The solution is to reduce the signal getting to the receiver. Yes I know this sounds daft, but it really is the simplest cure. You can reduce the signal either by inserting an attenuator (20-30dB should do) in the antenna lead or by reducing the length of the external antenna. By the way, don't be tempted to use an active antenna unit with a long wire antenna as this will only make matters worse.

Having reduced the signal level try tuning to a well known strong RTTY signal. I generally recommend using Bracknell Met on 4.610MHz as it's very strong and active 24hours a day. When tuning this signal using s.s.b. make sure the signal actually sounds good - you should hear a very clear strong warbling sound. You now need to use your decoder's tuning indicator to get the tuning spot-on.

One problem you might hit at this point is the coarse (100Hz) tuning steps used by most scanners. When tuning with these coarse steps you may find that you can't get the tuning spot-on and you will have to accept the best compromise. An alternative is to use the automatic tuning option of your decoder (if available). In automatic mode the decoder alters the centre frequency of its

demodulator to match the frequencies being presented by the receiver. This compensates for any mis-tuning on the receiver.

Having succeeded with basic RTTY reception you can then checkout the Decode frequency list for aeronautical stations.

### DSP Update

I'm still looking for comments on the use of Johan Ferrer's PSA DSP software with the SoundBlaster AWE-32 board. If you've managed to make this work or know the definitive reason why it won't, please drop me a line (E-mail would be best). Judging by the latest files I've seen from Johan he seems to be moving on to the Motorola d.s.p. development kits. However, I'll bring you further news when I have more information.

### Decode Clinic

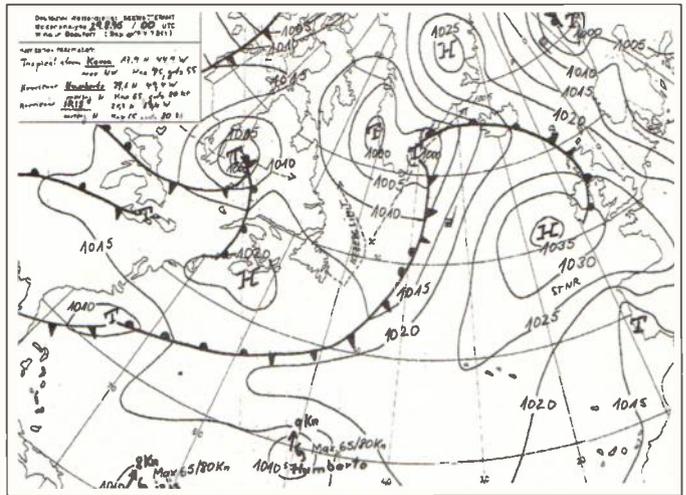
Yes, they're letting me loose again on the *SWM* stand at the Leicester Amateur Radio Show on October 20/21. We have an even bigger stand for this year, so hopefully I'll be able to spread out a bit! If you're visiting the show please make the time to drop by for a chat. I hope to have a stock of *FactPacks* and disks with me so you can pick-up all the latest information. If you've not been to a rally before Leicester is a good one to start with as there's always a few new products being launched and most of the dealers have special show offers on new items.

A rally is also a very good way to try before you buy as you'll find most of the utility decoding systems set-up and working. finally, if you want to try some home construction rallies are a great place to get a good stock of components. This is particularly true if you're interested in making your own antennas as you'll find wire, coaxial cable and insulators in abundance.

### WXFAX v3.0

**Jan Nieuwenhuis** has recently updated his weather FAX program for the IBM PC and developed a new shareware version for those wanting to try before they buy. The really good news is that Jan has given me the OK to include the latest version in my Readers' Offers. To give you an idea of the features of this useful little package, here's a short review.

The basic purpose of the program is to provide the user with details of h.f. FAX transmissions and associated information in a number of different formats. The package is



HF FAX chart showing hurricane Humberto.

### FAX Schedules

This month I've received a couple of FAX schedules from regular Decode readers, **Day Watson** and **Les Crossan**. The first is for Northwood that is one of the most popular transmissions judging by the pictures that are sent to me. Northwood Met - Effective from 1 August 1995. All times are UTC:

0230	Schedule
0320 -0000	Surface Analysis
0400 -1800	SIG SU Wind & WX Prog
0440	Satellite Pictures
0540 -0000	Selected Upper Air Ascents
0600	Gale Summary
0620	NAC TAFS
0650	Repeat 0320
0730	Repeat 0400
0950 -0600	Surface Analysis
1040	Satellite Pictures
1130	Gale Summary
1150 -0600	SIG SU Wind & WX Prog
1210	Repeat 0950
1230 -0000	Sea & Swell Prog
1300	Sea Surface Temp Analysis
1330	Satellite Pictures
1350	Special/OC Data Chart
1425	NAC TAFS
1500 -1200	Surface Analysis
1530	Schedule
1640	Gale Summary
1710 -1200	Selected Upper Air Ascents
1730	Satellite Pictures
1800	Repeat 1500
1950	Gale Summary
2025	Repeat 1150
2050	Repeat 1230
2120 -1800	Surface Analysis
2320	Repeat 2120

The following frequencies all operate continuously: 3.652, 4.307, 6.4525, 8.3315MHz. It's interesting to note that Northwood appear to have dropped 2.374, 12.8445 & 16.912MHz. The QSL address for Northwood is Royal Navy Communications Centre, Chief Radio Supervisor, Old Admiralty Building, Spring Gardens, Whitehall London SW1A 2BE.

The second schedule is for the US coastguard National Weather Service (WWBG):

0230	Test Pattern
0233 -0000	Prelim SFC Analysis
0243	Schedule Part 1
0254	Schedule Part 2
0305	Req For Comments

0315	Product Notice Bulletin
0325 -0000	SFC analysis Part 1
0338 -0000	SFC Analysis Part 2
0351	Satellite Picture
0402	Retransmit of 0325
0415	Re-transmit of 0338
0428 -0000	500mb Analysis
0438	End transmission
0800	Test Pattern
0805 -0600	Prelim SFC Analysis
0815	24hr SFC VT 0000
0825	24hr Wind/WV VT 0000
0835	36hr SFC VT 1200
0845	36hr Wind/WV VT 0000
0855	48hr SFC VT 0000
0905	48hr Sea VT 0000
0915	48hr 500mb VT 0000
0925 -0600	SFC Analysis Part 1
0938 -0600	SFC Analysis Part 2
0951	Satellite Picture
1003	Re-transmit of 0825
1015	Re-transmit 0938
1028	End Transmission
1430	Test Pattern
1433 -1200	Prelim SFC Analysis
1443	96hr 500mb VT 0000
1453	96hr SFC VT 0000
1503	Satellite Picture
1515 -1200	Sea State Analysis
1525 -1200	SFC Analysis Part 1
1538 -1200	SFC Analysis Part 2
1551	End Transmission
1720	Test Pattern
1723	Re-transmit 1515
1736	Re-transmit 1538
1749 -1200	500mb Analysis
1759	End Transmission
1900	Test Pattern
1903	Schedule Part 1
1914	Schedule Part 2
1925	Req for Comments
1935	Gulf Stream Analysis
1945	Gulf Stream Analysis
1955	Gulf Stream Analysis
2005 -1800	Preliminary SFC Analysis
2015	24hr SFC VT 1200
2025	24hr Wind/WV VT 1200
2035	36hr SFC VT 0000
2045	36hr Wind/WV VT 0000
2055	48hr SFC VT 1200
2105	48hr Sea VT 1200
2115	48hr 500mb VT 1200
2125 -1800	SFC Analysis Part 1
2138 -1800	SFC Analysis Part 2
2151	Satellite Picture
2202	Re-transmit 2125
2215	Re-transmit 2138
2228	End Transmission

Frequencies used are 6.3405 and 12.75MHz and the QSL address is USCG Commanding Officer, 900 - Ferry Street, Marshfield, MA02050 - USA



T. McClelland's Dublin Utility Station.

DOS based so makes modest demands on the computer hardware. All that's required is a 286 or better IBM compatible with MSDOS 3.3 or higher, 640K RAM and a VGA

options as for the display option. In addition you can obtain prints of ITU country/station, addresses, transmission info and a weather map identification list. The weather map identification list was particularly interesting as it provided all the information you need to find the originating station from the chart identification number.

Those new to FAX reception will also find the general FAX information to be very helpful with a good selection of basic data.

Overall then WXFAX v3.0 - looks to be a very useful package for all involved in h.f. FAX reception. The shareware version is now available via my special offers and this contains full details of how to obtain your full registered version. My thanks to Jan for kindly supply the review copy of the program.

connection not the software it did leave their service at a distinct disadvantage when compared with other rivals like CompuServe.

Just to prove they can compete with the best the US has to offer Demon have introduced a brand new Windows interface. The new software contains all the standard application such as FTP, mail, news and the Netscape WWW browser. Operation is made very simple through the use of a front-end window with 3D push-buttons to take you to all the applications. I've yet to use the new software but it certainly looks very good indeed.

Demon have also introduced a new glossy magazine for all its customers. The new magazine looks to be published quarterly and is packed with useful data on the Internet as well as many details specific to Demon users. For more details contact Demon at Gateway House, 322 Regents Park Road, Finchley, London N3 2QQ. Tel: 0181-371 1234 or E-mail: [internet@demon.net](mailto:internet@demon.net)

## Apologies

Unfortunately my summer holiday for this year clashed with the magazine's publishing date. The end result being that we were inundated with requests for special offers on our return. Just to further complicate matters the response to the column and in particular the special offers was higher than usual. Not only did this result in delays to requests for special offers, but all other post was also delayed - I'll have to change my holidays for next year!

## Multiscan

I've at last found space to give mention to a new IBM PC based decoding system from AMDAT of Bristol. The program is called MSCAN and is available in versions 1.3 and 2.0. As an added bonus the programs are also available in shareware format for those that want to try the system before registering. You will also note from the special offers that AMDAT have kindly given me permission to include the shareware versions in my reader's special offers.

Starting with MCSAN 1.3, this is designed to operate on a standard IBM PC using a 286 or later

processor with a minimum of VGA graphics. Like most decoding programs, MSCAN is DOS based, but it does have a very good screen layout with well labelled on-screen push buttons. These controls can either be operated by function keys or by a standard PC mouse.

The receiver connection is dependant on which version of the program you're using. The Microscan version uses a simple comparator interface and will work with the standard HAMCOMM/JVFAX units. For a more sophisticated decoder the Multiscan interface is available from AMDAT. This uses phase locked loop principles and employs the well proven XR2211 decoder chip.

MSCAN 1.3 featured a good range of facilities including a fully automatic receive mode for FAX pictures. This was a particularly good implementation with the program looking after the start and stop tone detection and automatically allocating file names to the stored images. If you're interested in FAX transmission the program has some very useful tools to help with the preparation of transmitted images. However, you should note that the transmit option is only available in the fully registered version of MSCAN 1.3.

As you would expect, MSCAN includes facilities to store and recall images from disk. This is supplemented by a useful multi-load option. This shows a thumbnail print of all the images in the current directory.

In addition to the very good FAX facilities, MSCAN 1.3 is able to receive RTTY, AMTOR (ARQ) and NAVTEX (FEC) transmissions. MSCAN 2.0 - is basically an improved version of 1.3 but without the AMTOR, NAVTEX and RTTY receive options. MSCAN 2.0 - has an improved interface but also demands a 386 or better processor and VGA or preferably S-VGA graphics.

If you'd like to try a copy of either of these programs see my readers special offers. For more information and latest prices on the full Multiscan package contact AMDAT at 4 Northville Road, Bristol BS7 0RG. My thanks to AMDAT for the loan of the review model.

## Frequency List

This month's frequency list come courtesy of many readers. I seem to be running a bit short on logs lately, so I would appreciate a few more. The ideal is to send the logs via E-mail, but paper copies are also much appreciated. (all frequencies MHz, except where stated)

117.4kHz	FAX	120	576	DCF37	0854	OFFENBACH MET
134.2kHz	FAX	120	576	DCF54	0857	OFFENBACH MET
2.6185	FAX	120	576	GFE25	1847	BRACKNELL MET
3.2985	c.w.	-	-	UNID.	2243	Figs in slow hand Morse
4.307	FAX	120	576	GVA	1505	RN LONDON
5.796	RTTY	50	170	UNID.	1840	Tfc in ATU80 - Arabic
5.850	FAX	120	576	OXT	0943	COPENHAGEN MET
7.801	RTTY	50	400	9BC22	1655	IRNA Tehran
7.880	FAX	120	576	DDK3	0550	HAMBURG MET 500mb analysis
10.480	ARQ/E	184.6	400	RFFXQA	1330	FF SAREJEVO
11.0469	ARQ-SWE	100	400	-	0644	MFA STOCKHOLM
11.0632	RTTY	48	386	LZU2	1646	Sofia Met
11.190	RTTY	50	400	-	1325	Air Messages
12.748	c.w.	-	-	IRM	0655	CIRM ROME
12.750	FAX	120	576	NMF	1900	USCG BOSTON
12.7995	c.w.	-	-	PCH51	0826	SCHEVENINGEN RADIO
13.5099	FAX	120	576	CFH	1829	CF HALIFAX 850mb 12hr fcast.
13.9664	PACT	-	-	-	1017	ICRC GENEVA English News
14.367	RTTY	75	400	BZP54	0717	XINHUA BEIJING English press.
16.0739	TWINPLEX	100	-	-	0720	MFA OSLO
18.221	RTTY	75	400	CNM76X9	0952	MAP Rabat
18.7572	COQ/8	-	-	?	0634	ALGERIAN EMB HANOI
18.872	RTTY	75	400	BZR88	0713	XINHUA BEIJING English press.
19.027	RTTY	75	860	PWX33	1946	BN BRASILIA

display adaptor. It's also extremely useful to have a printer available to get hard copy of the program's output.

Like most modern programs, WXFAX is menu driven and you are presented with the main menu after initial start-up. This menu gives you options to display, print or copy to a file the main listings. In addition there are sample weather pictures and other general information. The display listings menu gives you the facility to show the information in a number of different formats. The lists can be sorted by frequency, station, callsign or country. Once the selection has been made the display shows 13 stations at a time. Against each station name is shown the country, callsign, frequency, transmit times, r.f. power and the most common format. Scrolling through the display used all the normal controls, i.e. up and down arrows or page-up and page-down keys.

When it comes to printing information from WXFAX there are a good range of options available. For the main frequency listing you can obtain print-outs with the same sort

## Demon Internet

Demon Internet Limited of Finchley have been at the forefront of low cost public access to the Internet for many years offering full access for just £10 - per month. However, one of the most common criticisms of the service was the cumbersome software package offered to IBM PC users. Whilst Demon quite rightly claim that they are offering the

## Readers' Special Offers

This month I've made some changes to the way I distribute software. The present system is proving very time consuming as I have to custom build each disk with the required software. I've also had problems with reader's supplying faulty or unformatted disks or just not enough disks. So, I've put together a set of four disks with the most popular software combinations. To speed things up, I will now supply the disks! Please allow up to two weeks for delivery.

### IBM PC Software (1.44Mb disks):

- Disk 1 (Order Code DK1) - JVFX 7.0, HAMCOMM 3.0 - and WEFAX 3.0
- Disk 2 (Order Code DK2) - DSP Starter plus Texas device selection software.
- Disk 3 (Order Code DK3) - Ultrapak 2.1 and NuMorse
- Disk 4 (Order Code DK4) - Mscan 1.3 and 2.0

### Printed Literature:

- Beginners Utility Frequency List (Order Code BL)
  - Complex Signals Utility Frequency List (Order Code AL)
  - Decode Utility Frequency List (Order Code DL)
  - FactPack 1 Solving Computer Interference Problems (Order Code FP1)
  - FactPack 2 Decoding Accessories (Order Code FP2)
  - FactPack 3 Starting Utility Decoding (Order Code FP3)
  - FactPack 4 JVFX and HAMCOMM Primer (Order Code FP4)
  - FactPack 5 On the Air with JVFX and HAMCOMM (Order Code FP5)
  - FactPack 6 Internet Starter (Order Code FP6)
- For the printed literature just send a self-addressed sticky label plus 50p per item (£1.50 - for four, £2.50 - for 7 and £3.00 - for 9). For software send £1.00 - per disk (£1.75 for 2, £2.50 - for 3 or £3.00 - for all 4) and a self-addressed sticky label (don't forget I provide the disk!).

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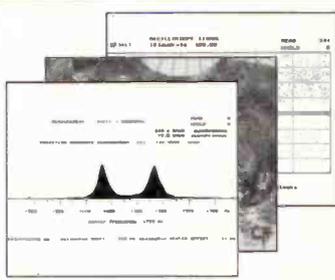


# HOKA CODE-3 UK Version

"...the standard against which all future decoders will be compared..."

Monitoring Times - December 1994 (page 103)

If you monitor Short Wave RTTY you will already know all about Baudot, AmTOR, Packet and CW. You may have already had success with decoding ARO-M & M4, ARO-E/E3, ARO-S, ARO-S, SWED-ARO, FEC-A, FEC-S, Pactor etc., but what about all the other signals that are still undecodable with your present 'sophisticated' setup. Perhaps you have even tried to get a sensible analysis of the signal and found it too difficult. Well, Hoka Electronics have the answer! There are some well known (and expensive) RTTY decoders which still have limited facilities and difficult upgrade methods, but then there is CODE-3 from Hoka Electronics! It's up to you to make the choice but it will be easy once you know more about CODE-3. CODE-3 works on any IBM-compatible computer with MS-DOS 2.0 or later and having at least 512k of free DOS memory, a CGA monitor and a serial port. The CODE-3 hardware includes its own digital FSK Converter unit with built-in VDE safety approved 230V AC power supply and RS232 cable, ready to use. CODE-3 now includes two new exciting hardware and software developments - a fully automatic software tuned audio bandpass filter and a new 'all-in-one' automatic classification system. Press one key and CODE-3 will measure baud speed (to 0.0001 resolution) and shift (to 1Hz) then analyse the bitstream and (if it is a recognised system) drop straight into decoding the signal within seconds of tuning in. CODE-3 decodes more systems than any other commercially available decoder - in fact most more expensive decoders have no means of even identifying ANY received signal! Why spend more money on FEWER features? CODE-3 is the most sophisticated decoder available and the best news of all is that the latest version of this now famous Dutch decoder is available now. Just look at the list of features (ALL FEC systems are decoded with error correction fully implemented - unlike other more expensive decoders than they do so!)



- |                                                                    |                                                               |                                                       |                                                                                           |
|--------------------------------------------------------------------|---------------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------------------------------------------|
| <b>SYSTEMS:</b>                                                    | • Morse - Manual/Auto speed follow. On screen WPM indicator   | • ARO-M - ARO1000 Duplex variant                      | <b>ANALYSIS:</b>                                                                          |
| • RTTY/Baudot/Murray/TAZ/CCITT2 plus all bit inversions            | • SBR/S-CBRS FEC, NAVTEX etc.                                 | • ARO-E3 - CCIR 518 variant                           | • Shift & Baudspeed to 0.0001 Baud                                                        |
| • A235 Flex with selective channel monitoring 300 Baud             | • Falcotels, all RPA/MOC (up to 16 shades at 1024/768 pixels) | • POL-ARO - 100 baud Duplex ARO                       | • Automatic system identification                                                         |
| • AutoSpec - Mk's 1 and II with all known (near)waves (aka SPREAD) | • DUP-ARO Arris 128-125/250 Baud Simplex ARO                  | • TD342/ARO-242 - CCIR 242 with 1/24 channel          | • Call/Response (frequency v. time)                                                       |
| • Temples - 100 Baud F78CN Simplex ARO                             | • ASCII - CCITT 8, variable character transparency            | • TD342/ARO-424 - CCIR 342 with 1/24 channels         | • Color - CCIR 625K/74K ARO                                                               |
| • ARO-90/98 - 200 Baud Simplex ARO                                 | • SI-ARO/ARO-S - ARO1000 simplex                              | • FEC-A - FEC1000 Simplex                             | <b>OPTIONS:</b>                                                                           |
| • SWED-ARO/SWE - CCIR 918 variant                                  | • ARO-E-ARO1000 Duplex                                        | • Hetero/Decoder - Synch/Asynch                       | • GMDSS-OSQ - Latest maritime system                                                      |
|                                                                    |                                                               | • Sio: RAW (Normal Stop but without synchronization)  | • SPECIALS: Picooco, Coquelicot 8 & 13, TORIG1011, ROU-FEC (aka RUM-FEC), HC-ARO, HNG-FEC |
|                                                                    |                                                               | • ARO-670                                             | • SYNOP: Decodes AARX & BBXX memo                                                         |
|                                                                    |                                                               | • Baudot F78BN                                        |                                                                                           |
|                                                                    |                                                               | • Pactor - Ametelur (and special commercial variants) |                                                                                           |

All systems are preset with most commonly seen settings but all can be changed at will. Baud speed to any value between 25-500 Baud, shift from 20 to 1000 Hz. Multi-channel systems display ALL channels on screen at the same time. Split screen with one window continually displaying channel control signal status e.g. Idr Alpha/Beta/RQA etc., along with all system parameter settings e.g. Unshift on space, Shift on Space, (great for Morse), multiple carriage returns inhibit, auto receiver drift compensation, printer on, system sub-mode.

**PRICES (all include VAT at 17.5%):**  
Standard CODE-3 (now includes 'Scope', 'ASCII Save to Disc' and 'Auto Classify') £499 (was £519)  
Option 'Specials' £150 (was £205), Option 'SYNOP' £65, Option GMDSS £ 75,  
Modifications to existing LF3 interface and upgrade of software to v5.0 £125.  
Royal Mail 1st Class Post and packing (including full transit insurance) £10.

Call or write for more information - there's just not enough room here to tell you everything about CODE-3!

## NTech Communications

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## 1995/96 GUIDE TO FAX RADIO STATIONS

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1995 / 1996

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# LM&S

## Long, Medium and Short Waves

To compensate for seasonal changes in propagation some international broadcasters may alter their transmission schedules on September 24. Some of the information herein may therefore be no longer applicable when this issue arrives on the bookshelves.

Schedule changes often result in difficulty for the listeners because their favourite programmes may have been moved to a different time slot, onto a new frequency, or both. In this modern age of very high power transmitters and high gain beam antennas they may well wonder why such changes are necessary.

### 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 the four week period ending July 29.

Whilst on holiday in Albuferia, Portugal **Andrew Stokes** (Leicester) used a Sony Walkman and a Sony portable to explore the band. He found that the ground waves from several stations in N. Africa could be received during the day - the most potent came from Bechar, Algeria (1000kW) on 153kHz, which rated SIO555. In contrast, those from Allouis, France (2000kW) on 162 were SIO322.

After dark he could find no trace of the BBC R-4/World Service transmissions on 198 from Droitwich (500kW), Burghhead (50kW) and Westerglen (50kW). He used the directional properties of the antenna in his portable to 'null-out' the potent signal from Tipaza, Algeria on 252 and receive the sky waves from Atlantic 252 in Clarkestown, S. Ireland which rated SIO322 at 2237.

### Medium Wave Reports

As expected, there were no reports of m.w. transatlantic signals reaching the UK in July, but the sky waves from some stations in the Middle East and N. Africa were received here after dark.

Broadcasts from the high power outlets in Saudi Arabia at Qurayyat on 900 (1000kW) and Dubai 1521 (2000kW) were received after dark by **Paul Bowery** in Burnham-on-Crouch. Over in Co. Down **Eddie McKeown** (Newry) logged the sky waves from Dammam on 1440 (1600kW) as SINPO 25322 at 2204; also Jeddah on 1512 (1000kW) as 21421 at 2207. Reception at night from N. Africa was reported as 'fair' and there were a number of entries in the logs - see chart.

Whilst in Portugal **Andrew Stokes** also checked this band. He was surprised to find it fairly empty during daylight - all of the locals are crammed

into the v.h.f. band. However, at dusk the band was quickly swamped by the sky waves from Spanish stations. They were present through the night but disappeared around dawn. The sky waves from stations in a number of other areas also arrived after dark. One night he received Talk Radio UK on 1089 and Virgin 1215, but the multiple transmitters which they employ on those frequencies resulted in phase distortion.

The latest reports indicate that Premier Radio, the new London Christian station, is reaching many areas of the UK. Their transmission on 1413 was noted in S. Humber side by **Harry Richards** (Barton-on-Humber) as 24222 at 0925.

The broadcasts from Viva 963 have also been received over a wide area. While in Talgarth, Powys **Gerry Haynes** logged them as 24232 at 1817. Over on the Isle of Wight **George Millmore** (Wootton) has observed that their ground waves rate SIO444 during daylight, but there is a fair amount of co-channel interference when the sky waves from Pori (Finland) arrive after dark. Up in Lanarkshire **Arthur Grainger** (Carstairs Junction) rated the sky waves from Viva as 22222 at 2134.

While searching for local radio DX during the morning of July 25 **John Wells** (East Grinstead) found the conditions to be unstable - even fairly local stations were showing some fading. However, this proved to be helpful. Having used his loop to 'null-out' R. Norfolk on 855, so as to get co-channel Sunshine Radio, he found that R. Devon and Sunshine R. were fading in and out alternately. He was therefore able to add R. Devon to his list!

### Short Wave Reports

The propagation conditions in the 25MHz (11m) band are so unpredictable that all international broadcasters have ceased using it.

Daily variations in propagation have been evident in the 21MHz (13m) band. When favourable, R. Australia's broadcast to Asia via Darwin on 21.725 (Eng 0630-1100) has reached the UK. It was logged as 25432 at 0849 by **Darren Beasley** in Bridgwater and SIO322 at 1030 by **David Green** in Doncaster.

Also noted during the morning were R. Norway Int, Oslo 21.705 (Norw to ? 0800-0830) was noted as 22222 at 0805 by **Thomas Williams** in Truro; UAER, Dubai 21.605 (Ar to Europe 0615-1030) 15434 at 0854 by **Fred Pallant** in Storrington; DW via Julich? 21.680 (Eng to S.E. Asia 0900-0950) 33333 at 0910 by **Chris Shorten** in Norwich; UAER, Dubai 21.605 (Eng to Europe 1030-1055) 22222 at 1047 by **Simon Hockenull**

### Long Wave Chart

Freq (kHz)	Station	Country	Power (kW)	Listener
153	Bechar	Algeria	1000	J.K.*
153	Donebach	Germany	500	A,B,C,E*,F*,G,H
162	Allouis	France	2000	A,B*,E*,F*,G,H,I,J,K
171	Nador Medi-1	Morocco	2000	D*,E*,J
171	Kaliningrad	Russia	1000	A,B*,G,K
177	Oranienburg	Germany	750	A,B*,G,H
183	Saarouis	Germany	2000	A,B*,E*,F*,G,H,I,K
198	Ouargla	Algeria	1000	J*
198	Droitwich BBC	UK	50	A,B,E*,F*,G,I,K
198	Burghhead BBC	UK	50	C*
198	WesterglenBBC	UK	50	C*
198	St.Petersburg	Russia	150	C*,F*
207	Munich	Germany	500	A,B*,C*,D*,E*,F*,G,H,K
207	Azilal	Morocco	800	D*,J*
216	Roumoules RMC	S.France	1400	A,B,C*,F*,G,H,I,K*
225	Raszyn Resv	Poland	?	A,B*,E*,F*,G,J*
234	Beidweiler	Luxembourg	2000	A,B*,F*,G,H,I,J,K*
243	Kalundborg	Denmark	300	A,B,C,G,H
252	Tipaza	Algeria	1500	A*,B*,E*,G*,J*,K*
252	Atlantic 252	S.Ireland	500	A,B,C,E*,G,H,I,J*,K*,L*
261	Burg(R.Ropa)	Germany	200	A,H
261	Taldom Moscow	Russia	2000	G
270	Topolna	Czech Rep	1500	A*,B*,E*,G*,K*
279	Minsk	Belarus	500	A*,E*,G*

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

#### Listeners

- |                                         |                                                  |
|-----------------------------------------|--------------------------------------------------|
| (A) Paul Bowery, Burnham-on-Crouch.     | (G) George Millmore, Wootton, IoW.               |
| (B) Martin Dale, Stockport.             | (H) Fred Pallant, Storrington.                   |
| (C) Simon Hockenull, E.Bristol.         | (I) Tom Smyth, Co.Fermanagh.                     |
| (D) Simon Hockenull, while on Dartmoor. | (J) Andrew Stokes, while in Albuferia, Portugal. |
| (E) Sheila Hughes, Morden.              | (K) Norman Thompson, Gadby.                      |
| (F) Eddie McKeown, Newry.               | (L) Thomas Williams, Truro.                      |

in E.Bristol; BSKSA Saudi Arabia 21.495 (Ar [Holy Quran] to S.E.Asia 0900-1200) 23332 at 1048 by **Martin Dale** in Stockport; DW via Wertachtal 21.600 (Eng to W.Africa 1100-1150) 55444 at 1130 by **John Slater** in Scalloway; Vatican R, Italy 21.850 (Port, Sp, It to C/S. America 1100-1215) 32232 at 1130 by **Norman Thompson** in Oadby.

After mid-day, R.Ukraine Int 21.800 (UK WS 0900-1255) was rated SIO352 at 1205 by **Rhoderick Illman** in Oxted; RFI via Issoudun 21.620 (Fr to E.Africa 0700-1555) 24232 at 1214 in Newry; R.Portugal Int via Sines 21.655 (Port to S.America 1200-1900? Sat/Sun) 33333 at 1220 by **Robert Connolly** in Kilkeel; RCI via Sines, Portugal 21.455 (Eng to Europe, M.East, Africa 1330-1400) 55444 at 1330 by **Michael Griffin** in Ross-on-Wye; BBC via Limassol, Cyprus 21.470 (Eng to E.Africa 1300-1700) 43434 at 1600 by **George Tebbitts** in Penmaenmawr; WYFR via Okeechobee, USA 21.745 (Eng to Europe 1600-2145) 34323 at 1600 by **Sheila Hughes** in Morden; UAER, Dubai 21.605 (Eng to Europe 1600-1640) 45554 at 1631 by **David Edwardson** in Wallsend; BBC via Ascension Is 21.660 (Eng to W/E/S.Africa 1100-1700) 44444 at 1650 in Burnham-on-Crouch; WYFR via Okeechobee, USA 21.500 (Eng, Ger to Europe, Africa 1700-2000) 15431 at 1730 by **John Eaton** in Woking; VOFC Taiwan via Okeechobee, USA 21.720 (Eng to Europe, Africa 2200-2300) SIO444 at 2200 by **Tom Smyth** in Co.Fermanagh.

The propagation conditions in the 17MHz (16m) band have also varied daily. During the morning R.Australia via Camarvon 17.715 (Eng [Sports Sat/Sun 0100-0630] to Asia, Pacific 0100-0900) was 24533 at 0610 in Wallsend; R.Pakistan, Islamabad 17.900 (Eng to Europe 0800-0845) 34444 at 0837 by **Chris Lawton** in Stoke-on-Trent; Israel R, Jerusalem 17.545 (Heb [Home Sce rly] to Europe, N.America 0800-1700) 44434 at 0935 in Oxted; BBC via

Ascension Is 17.830 (Eng to W/C.Africa 0730-2100) SIO233 at 1040 by **Phillip Rambaut** in Macclesfield; Voice of Russia, Moscow 17.870 (Eng WS) SIO323 at 1100 in Co.Fermanagh; R.Pakistan, Islamabad 17.900 (Eng to Europe 1100-1120) 44333 at 1100 in Morden; SRI via Schwarzenburg? 17.515 (Eng, Fr, Ger, It to Far East, S.E.Asia 1100-1300) SIO333 at 1109 in Doncaster.

After mid-day, R.Tunisia Int via Sfax 17.500 (Ar, Fr to ? 0700-1800) was SIO322 at 1230 in Woking; BBC via Woofferton, UK 17.640 (Eng to Europe 0800-1500) 33333 at 1235 by **Peter Pollard** in Rugby; Africa No.1, Gabon 17.630 (Fr to W.Africa 0700-1600) 44444 at 1250 in Kilkeel; RCI via Sackville, Canada 17.820 (Eng, Fr, Russ? to Europe, M.East, Africa 1330-1500?) 33333 at 1350 by **Bernard Curtis** in Stalbridge; RTM Tanger, Morocco 17.595 (Eng, Fr to M.East, N. Africa 1400-1700) 43444 at 1400 in Scalloway; RFI via Moyabi, Gabon 17.560 (Eng to M.East 1400-1500) 32322 at 1405 in Stockport; VOA via Tangier, Morocco 17.895 (Eng to Africa 1600-1800?) SIO333 at 1730 by **Tony King** in Swindon; Monitor R.Int via WSHB 17.510 (Eng to Africa 1600-2000) 54444 at 1835 in Norwich; R.Netherlands via Bonaire 17.605 (Eng to S/E/W.Africa 1830-2025) 25333 at 1949 in Bridgwater; WYFR via Okeechobee, USA 17.845 (Eng to Africa 2000-2300) 34333 at 2101 in Burnham-on-Crouch; VOFC via Okeechobee, USA 17.750 (Eng to Europe, Africa 2200-2300) 45243 at 2202 in Newry; RCI via Sackville, Canada 17.820 (Fr, Eng to Europe, M.East, Africa 2000?-2230?) 44444 at 2210 in Penmaenmawr; R.Australia via Shepparton 17.860 (Eng to Asia, Pacific 2200-0000) 25342 at 2257 in Ross-on-Wye.

Reception in the 15MHz (19m) band has been quite good from some areas. In the early morning R.Australia was noted on 15.245 from Darwin (Eng to Asia, Pacific 0200-0900 [Sports Sce 0100-0630 Sat]) as 34543 at 0558 in Wallsend; also on 15.530 from Camarvon (Eng

# Medium Wave Chart

Freq (kHz)	Station	Country	Power (kW)	Listener	Freq (kHz)	Station	Country	Power	Listener	Freq (kHz)	Station	Country	Power	Listener
531	Ain Beida	Algeria	600	A*,G*,J	900	Qurayyat	Saudi Arabia	1000	A*	1413	RNE5 via ?	Spain	?	G*,J*
531	Laipzig	Germany	100	A*,B*,F*,G	909	R'mans Pk(BBC5)	UK	140	A,G,H*	1422	Heusweiler(DLF)	Germany	1200/600	A*,B*,F*,G*
531	RNE5 via ?	Spain	?	F*,G	918	Plesivec(Sloven nR)	Slovenia	600/100	A*,F*,G*	1431	Nikolayev	Ukraine	400	F*
540	Wavre	Belgium	150/50	A,B*,F*,G,H*,J	918	Madrid(RInt)	Spain	20	A*,B*,G*,J*	1440	Mamach(RTL)	Luxembourg	1200	A,B,G
540	Sidi Bennour	Morocco	600	B*,F*,G*,J	927	Volvertem	Belgium	300	A*,B*,F*,G*,J*	1440	Dammam	Saudi Arabia	1600	F*,J*
540	Vitoria(EI)	Spain	10	I*	936	Bremen	Germany	100	A*,B*,F*,G*	1449	Squinzano	Italy	50	A*,G*
549	Les Trembles	Algeria	600	A*,B*,G*,J*	936	Venezia	Italy	20	A*	1449	Redmoss(BBC)	UK	2	F*,H*
549	Thurnau (DLF)	Germany	200	A,B*,F*,G*	936	RNE5 via ?	Spain	?	G*,J*	1467	Monte Carlo(TWR)	Monaco	1000/400	B*,F*
549	St.Petersburg	Russia	1000	F*	945	Toulouse	France	300	B*,F*,G*	1476	Wien-Bisamberg	Austria	600	B*
558	Espoo	Finland	100	B*,F*	945	Brno (CRo2)	Czech Rep.	200	A*,F*,G*	1485	SER via ?	Spain	5	I*
558	Rostock(NDR)	Germany	20	F*	954	Madrid(Cl)	Spain	20	A*,B*,F*,G*,J*	1494	Clermont-Ferrand	France	20	B*
558	RNE5 via ?	Spain	?	G*,J,J	963	Pori	Finland	600	A*,B*,F*,G*	1494	St.Petersburg	Russia	1000	A*,C*,F*
558	Valencia(RNE5)	Spain	20	B*	963	Paris	France	8	F*	1503	Stargard	Poland	300	B*
567	Berlin	Germany	100	F*	963	Tir Chonaill	Ireland (S)	10	B*	1503	RNE5 via ?	Spain	?	I*
567	Tullamore(RTE1)	Ireland (S)	500	A,B,D,G,H	963	Tunis-Djedeida	Tunisia	200	G*	1512	Wolvertem	Belgium	600	A,B*,E*,F*,H
576	RNE5 via ?	Spain	?	G*,J*	972	Hamburg(NDR)	Germany	300	A*,B*,E*,F*,G*	1512	Jeddah	Saudi Arabia	1000	F*,J*
576	Munlacker(SDR)	Germany	500	A*,B*,F*,G*	972	RNE1 via ?	Spain	?	I*	1521	Kosice(Cizatice)	Slovakia	600	B*,F*,G*
576	Barcelona(RNE5)	Spain	50	B*,F*,G*,J*	981	Alger	Algeria	600/300	B*,G*,J*,J*	1521	Duba	Saudi Arabia	2000	A*,J*
585	Paris(FIP)	France	8	A*,B*,G	981	Coimbra	Portugal	10	A*	1530	Vatican R	Italy	150/450	A*,B*,F*,G*,J*
585	Madrid(RNE1)	Spain	200	B*,F*,G*,H*,J*	981	Berlin	Germany	300	B*,F*	1539	Mainflingen(DLF)	Germany	700	B*
594	Frankfurt(HR)	Germany	1000/400	A,B*,F*,G*,H*	990	R.Bilbao(SER)	Spain	10	B*,F*,G*,J	1539	Valladolid(SER)	Spain	5	I*
594	Oujda-1	Morocco	100	G*,J*	999	Schwerin (RIAS)	Germany	20	B*	1566	Sfax	Tunisia	1200	A*,F*,J*
594	Muge	Portugal	100	A*,B*,G*	999	Madrid(COPE)	Spain	50	B*,F*,J*,J*	1575	Genova	Italy	500	A*,G*
603	Lyon	France	300	F*	1008	Rheinhilf-5)	Holland	400	A,B*,E*,F*,G*,J*	1575	SER via ?	Spain	5	I*
603	Sevilla(RNE5)	Spain	50	B*,F*,G*,J*,J	1017	Rhinsender(SWF)	Germany	600	B*,F*,G*	1584	SER via ?	Spain	2	I*
612	Athlone(RTE2)	Ireland (S)	100	A*,B,D,G,H	1017	RNE5 via ?	Spain	?	F*,J*	1602	Vitoria(EI)	Spain	10	G*,J*
612	Sebaa Aioun	Morocco	300	I	1026	SER via ?	Spain	?	G*,H*,J	1611	Vatican R	Italy	15	F*
612	RNE1 via ?	Spain	10	G*	1035	RAI via ?	Italy	?	A*					
621	Wavre	Belgium	80	A,B*,F*,G,J	1035	Lisbon(Prog3)	Portugal	120	B*,F*					
621	Barcelona(DCR)	Spain	50	F*,G*,J*	1044	Dresden	Germany	250	B*,F*					
630	Dannenberg(NDR)	Germany	100	B*	1044	Sebaa-Aioun	Morocco	300	H*,J					
630	Vigra	Norway	100	B.F.G*	1044	S.Sebastian(SER)	Spain	10	B*					
630	Tunis-Djedeida	Tunisia	600	A*,B*,G*	1053	Tanger	Morocco	600	I					
639	Praha(Liblice)	Czech	1500	A*,B*,H*,J	1053	Zagoraz(COPE)	Spain	10	F*,J*					
639	RNE1 via ?	Spain	?	B*,F*,G*,J*	1053	Talk Radio UK via ?	UK	?	A,B*,E*,G*					
648	RNE1 via ?	Spain	10	B*,J*	1062	Kalundborg	Denmark	250	A,B*,F*,G*					
648	Drfordness(BBC)	UK	500	A,B,G	1062	Cagliari	Italy	25	A*					
657	Neubrandenburg(NDR)	Germany	250	A*,F*,G*	1062	R.Luno via ?	Italy	?	I*					
657	Napoli	Italy	120	A*	1071	Brest	France	20	D,G					
657	Madrid(RNE5)	Spain	20	B*,E*,F*,G*,J*,J	1071	France-Inter via ?	France	?	B*,F*					
657	Wrexham(BBCWales)	UK	2	A,B,C,E*,H,J	1071	Lille	France	40	A*					
666	Messkirch(Rohrd(SWF))	Germany	300/180	A*,B*,F*,G*	1071	Riga	Latvia	50	G*					
666	Lisboa	Portugal	135	A*,F*,G*,J	1071	Bilbao(EI)	Spain	5	B*,F*,G*,J*					
666	Barcelona(COPE)	Spain	10	B*	1080	Casablanca	Morocco	1	I					
675	Marseille	France	600	A*,G*,J	1080	Katowice	Poland	1500	A*,B*,F*,G*					
675	Lopic(R10 Gold)	Holland	120	A,B*,C,E*,F,G	1080	SER via ?	Spain	?	G*,J*					
684	Sevilla(RNE1)	Spain	500	A*,B*,F*,G*,J*	1089	Talk Radio UK via ?	UK	?	A,B,G,H,I*					
684	Avata(Beograd-1)	Yugoslavia	2000	A*,B*,F*	1098	Nitra(Jarok)	Slovakia	1500	B*,F*,G*,J*					
693	Droitwich(BBC5)	UK	150	A,B,G,H	1098	RNE5 via ?	Spain	?	F*,G*,J*					
702	Flensburg(NDR)	Germany	5	A,B*,F*,G*	1107	AFN via ?	Germany	10	A*,B*,E*,F*					
702	Zamorá(RNE1)	Spain	10	A*,B*,G*,J*	1107	RNE5 via ?	Spain	?	I*					
711	Rennes 1	France	300	A,C,D,G	1107	Talk R.UK via ?	UK	?	A,B,E*,G					
711	Heidelberg	Germany	5	A*,F*	1116	Bari	Italy	150	A*,G*					
711	Laayoune	Morocco	600	G*,J*	1125	La Louviere	Belgium	20	A*,F*,G*					
711	Murcia(COPE)	Spain	5	B*	1125	Deanovec	Croatia	100	A*					
720	Lisnagarvey(BBC4)	Ireland (N)	10	G*,H	1125	RNE5 via ?	Spain	?	G*					
720	Norte	Portugal	100	A*,F*,J	1134	COPE via ?	Spain	2	B*,F*,G*,J*					
720	Lots Rd.Ldn(BBC4)	UK	0.5	A,B,G	1134	Zadar(Croatian R)	Yugoslavia	600/1200	A*,B*,F*,G*,J*					
729	Cork(RTE1)	Ireland (S)	10	A*,G,H*	1143	Stuttgart(AFN)	Germany	10	A*,F*,G*					
729	RNE1 via ?	Spain	?	A*,B*,F*,G*,J*	1143	Bolshakov(Mayak)	Russia	150	A*					
738	Paris	France	4	A,G	1143	COPE via ?	Spain	2	F*,G*,J*					
738	Poznan	Poland	300	F*,G*	1152	RNE5 via ?	Spain	10	B*,G*,J*					
738	Barcelona(RNE1)	Spain	500	A*,B*,F*,G*,H*,I*,J*	1161	Strasbourg(Fint)	France	200	B*,F*					
747	Flevo(Hilv2)	Holland	400	A*,B*,C,E*,F*,G, H*,J*	1170	Vila Real	Portugal	10	F*					
747	Cadiz(RNE5)	Spain	10	F*,G*	1179	SER via ?	Spain	10	I*					
756	Braunschweig(DLF)	Germany	800/200	A*,B*,F*,G*,H*	1179	Solweborg	Sweden	600	B*,F*,G*,H*,J*,K*					
756	Bilbao(EI)	Spain	5	A*,G*	1188	Kuurne	Belgium	5	A*,F*,G*					
756	Redruth(BBC)	UK	2	G	1188	Szolnok	Hungary	135	F*					
765	Sottens	Switzerland	500	B*,F*,G*,J*	1197	Munich(VOA)	Germany	300	F*					
774	Enniskillen(BBC)	Ireland (N)	1	H	1197	Virgin via ?	UK	?	A,B*,G					
774	RNE1 via ?	Spain	?	A*,B*,F*,G*,J*	1206	Bordeaux	France	100	F*					
783	Burg	Germany	1000	A*,B*,F*,G*,H*	1206	Wroclaw	Poland	200	A*,G*					
783	Miramar(R.Porto)	Portugal	100	A*,F*,G*	1215	COPE via ?	Spain	?	I*					
783	Dammam	Saudi Arabia	100	I*	1215	Virgin via ?	UK	125	A					
792	Limoges	France	300	B*,G	1224	COPE via ?	Spain	?	I*					
792	Sevilla(SER)	Spain	20	A*,B*,G*,J	1224	Virgin via ?	UK	?	G,H					
792	Londonderry(BBC)	UK	1	F*	1233	Nitra	Slovakia	40	F*					
801	Munchen-Ismaning	Germany	300	A*,B*,F*	1233	Virgin via ?	UK	?	A,B*,G					
801	RNE1 via ?	Spain	?	B*,F*,G*,J*	1242	Marseille	France	150	I*,F*					
810	Madrid(SER)	Spain	20	A*,B*,F*,G*,J*	1242	Virgin via ?	UK	?	H					
810	Westerglen(BBC Scot)	UK	100	A*,B*,G*,H	1251	Marcali	Hungary	500	A*,F*					
819	Batra	Egypt	450	A*	1251	Huisberg	Netherlands	10	A*,F*,G*					
819	Toulouse	France	50	F*	1260	SER via ?	Spain	?	B*,F*,J*					
819	Rabat	Morocco	25	I	1260	Guildford (V)	UK	?	A,G					
819	Warsaw	Poland	300	A*,B*,G*	1269	Neumunster(DLF)	Germany	600	A*,B*,F*,G*,K*					
828	Hannover(NDR)	Germany	100/5	F*	1269	COPE via ?	Spain	?	I*					
828	Oujda-2	Morocco	100	G*	1278	Dublin/Cork(RTE2)	Ireland (S)	10	A*,B,G,H					
828	Barcelona(SER)	Spain	50	B*	1287	RFE via ?	Czech Rep.	400	B*,G*					
837	Nancy	France	200	B*,F*,G*,J*	1287	Lerida(SER)	Spain	10	F*,J*					
837	COPE via ?	Spain	?	A*,B*,F*,G*,J*	1296	Valencia(COPE)	Spain	10	I*					
846	Rome	Italy	540	A*,B*,F*	1296	Drfordness(BBC)	UK	500	A					
855	Berlin	Germany	100	A*,B*,F*	1305	Rzeszow	Poland	100	A*,F*,G*					
855	RNE1 via ?	Spain	?	A*,B*,F*,G*,J*	1305	RNE5 via ?	Spain	?	I*					
864	Santah	Egypt	500	A*,G*	1314	Kvitsoy	Norway	1200	A,B*,F*,G*,I*					
864	Paris	France	300	A*,B*,F*,G*	1314	RNE5 via ?	Spain	?	I*					
864	Socuellamos(RNE1)	Spain	2	A*,J*	1323	Wachenbrunn(RMWS)	Germany	1000/150	B*,F*					
873	Frankfurt(AFN)	Germany	150	A*,B*,F*,G*	1332	Rome	Italy	300	A*,F*,G*					
873	Zagoraz(SER)	Spain	20	A*,B*,F*,G*	1341	Lakihegy	Hungary	300	A*					
882	COPE via ?	Spain	?	A*,E*,F*	1341	Lisnagarvey(BBC)	Ireland (N)	100	B,E*,G*,H					
882	Washford(BBCWales)	UK	100	A,B,D,E*,G	1351	Tarrasa(SER)	Spain	2	I*					
891	Algiers	Algeria	600/300	A*,B*,C*,F*,G*,J*	1350	Nancy/Nice	France	100	B*,F*,G*,H,I*					
891	Vila Moura	Netherlands	20	A*,F*,G	1359	Arganda (RNE-FS)	Spain	600	F*,G*,J*					
891	Ernod(CRo2)	Czech Rep	25	G*	1368	Foxdale(Manx R)	I.O.M.	20	B,E*,G*,H					
900	Milan	Italy	600	A*,B*,F*,G*	1377	Lille	France	300	A,B*,F*,G*					
900	COPE via ?	Spain	?	F*,G*,H,I*	1386	Bolshakovo	Russia	2500	A*,B*,F*,G*,H*,J*					
					1395	Lushnjë(Tirana)	Albania	1000	B*,F*,G*					
					1404	Brest	France	20	B*,D*,F*,G					

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

### Listeners

- (A) Paul Bowery, Burnham-on-Crouch.
- (B) Martin Dale, Stockport.
- (C) Simon Hockenhill, E.Bristol.
- (D) Simon Hockenhill, while on Dartmoor.
- (E) Sheila Hughes, Morden.
- (F) Eddie McKeown, Newry.
- (G) George Millmore, Wootton loW.
- (H) Tom Smyth, Co.Fermanagh.
- (I) Andrew Stokes, while in Albuferia, Portugal.
- (J) Norman Thompson, Dadby.
- (K) Thomas Williams, Truro.

to Asia, Pacific 0500-0900) as 25332 at 0859 in Bridgwater. Also logged during the morning were R.Vlaanderen Int, Belgium 15.545 (Eng to Europe 0900-0925) 33333 at 0915 in Norwich; AWR via Slovakia 15.620 (Eng to Africa 0900-1000) 44444 at 0939 by Vera Brindley in Woodhall Spa; AIR via Aligarh? 15.050 (Eng to N.E.Asia 1000-1100) SIO222 at 1033 in Macclesfield; R.Jordan via Al Karanah 15.170 (Eng to W.Europe, N.America 1100-1200) SIO333 at 1100 by Francis Hearne in N.Bristol; R.Japan via Yamata? 15.350 (Eng, Jap to S.E.Asia 1100-1300) 32232 at 1100 in Oadby.

# Local Radio Chart

Freq (kHz)	Station	ILR	e.m.r.p (kW)	Listener	Freq (kHz)	Station	ILR	e.m.r.p (kW)	Listener
558	Spectrum R	I	0.80	A.C.F.H.L.M.O.*P	1170	GNR Teeside	I	0.32	E.F
585	R.Solway	B	2.00	E.F.K.M.O*	1170	Hi Wycombe 1170AM	I	?	F.J.P
603	Cheltenham(CD603)	I	0.10	C.F.L.O.*P	1170	Portsmouth(SCR)	I	0.12	F.L.P
603	Invicta SG (Coast)	I	0.10	A.F.J*.L.M.O.*P	1170	R.Orwell(SGR)	I	0.28	A.F
630	R.Bedfordshire(3CR)	B	2.00	A.C.F.H.L.M.O.P	1170	Signal R(S.Gold)	I	0.20	C.E*
630	R.Cornwall	B	2.00	F.I.L.P	1170	Swansea Sound	I	0.58	F.I
657	R.Chwyd	B	2.00	E.F.L.M.N*.O.*P	1242	Invicta Snd(Coast)	I	0.32	F.O.P
657	R.Cornwall	B	0.50	F.I.L	1242	Isle of Wight R	I	0.50	A.F.L.P
666	Gemini AM	I	0.34	F.H.L.P	1251	Saxon R(SGR)	I	0.76	A.F.M.P
666	R.York	B	0.80	C.E.F.M.P	1260	Brunel R(CI.Gold)	I	1.60	F.I.L.N.O*
729	BBC Essex	B	0.20	A.F.L.M.P	1260	Marcher Snd(Gold)	I	0.64	C.E.F
738	Hereford/Worcester	B	0.037	C.F.M.O.*P	1260	Sunrise R, Midlands	I	0.29	F.M
756	R.Cumbria	B	1.00	E.F.K.M	1260	R.York	B	0.50	M
756	R.Maldwyn	I	0.63	C.F.L.P	1278	Bradford(Gt.Yks)	I	0.43	F.*M.N
765	BBC Essex	B	0.50	A.C.F.K.L*.M.O.*P	1296	Birmingham(R.XL)	I	?	F.L.M.O.*P
774	Gloucester(3CSG)	I	0.14	F.L.O	1305	Barnsley(Gt.Yks)	I	0.15	C.E.F.*M
774	R.Kent	B	0.70	A.F.L.O.*P	1305	Premier R (London?)	I	?	A.D.F.K*.L.P
774	R.Leeds	B	0.50	F.M	1305	Touch R	I	0.20	E.F.L.P
792	Chiltern(S.Gold)	I	0.27	A.F.L.M.O.*P	1323	R.Bristol(Som.Snd)	B	0.63	F.I.P
792	R.Foyle	B	1.00	E.F.N*	1323	Brighton(SCR)	I	0.50	A.F.*L.P
801	R.Devon & Dorset	B	2.00	C.F.H.I.K*.L.P	1332	Hereward R(WGMS)	I	0.60	A.F.M
828	Chiltern(S.Gold)	I	0.20	F.P	1332	Premier R (London?)	I	?	A.D.F.L.P
828	R.Airel(Magic828)	I	0.12	C.F.M	1332	Wiltshire Sound	B	0.30	F.L
828	R.WM	B	0.20	F	1359	Essex R(BreezeAM)	I	0.28	A.F.*P
828	ZCR(CI.Gold)	I	0.27	A.F.L	1359	Mercia Snd(Xtra-AM)	I	0.27	F
837	R.Cumbria/Furness	B	1.50	E.F.M	1359	Red Dragon(Touch R)	I	0.20	F
837	R.Leicester	B	0.45	A*.C.F.G*.L.M.P	1359	R.Solent	B	0.85	F.L
855	R.Devon & Dorset	B	1.00	F.L.P	1368	R.Lincolnshire	B	2.00	F.M.O.P
855	R.Lancashire	B	1.50	C.E.F.M	1368	Southern Counties R	B	0.50	A.F.L.P
855	R.Norfolk	B	1.50	A.J.M.P	1368	Wiltshire Sound	B	0.10	F.L
855	Sunshine R	I	0.15	F.J.P	1413	Premier R (London?)	I	?	A.B.D.E*.F.K*.L.M.P
873	R.Norfolk	B	0.30	A.C.F.J.L.M.P	1431	Essex R(BreezeAM)	I	0.35	A.C*.F.P
936	Brunel R(CI.Gold)	I	0.18	F.P	1431	R 210(CI.Gold)	I	0.14	F.L.M.P
945	R.Trent(Gem AM)	I	0.20	C.F.G*.J*.L.M.P	1449	R.Peterboro/Camb	B	0.15	A.E*.F.L.M.P
954	Gemini AM	I	0.32	F.L.P	1458	Fortune	I	5.00	C.E.F.K*.N
954	R.Wyvern(WYVN)	I	0.16	C.F.M.O.*P	1458	R.Cumbria	B	0.50	E.F.K*
963	Viva 963	I	?	A.E*.F.L.P	1458	R.Devon & Dorset	B	2.00	F.L.P
990	WABC(Nice & Easy)	I	0.09	C.F.P	1458	R.Newcastle	B	2.00	F
990	R.Devon & Dorset	B	1.00	F.L.P	1458	Radio WM	B	5.00	F.G
990	Hallam R(Gt.Yks)	I	0.25	C.M.P	1458	Sunrise R	I	50.00	A.C.E.F.L.M.P
999	R.Solent	B	1.00	A.F.L.P	1476	Guildford(M.Xtra)	I	0.50	A.E*.F.L.P
999	R.Trent(Gem AM)	I	0.25	C.F.G*.M.O.P	1485	R.Humberside (Hull)	B	1.00	E.F.K*.M
999	Red Ross(Gold)	I	0.80	C.E.F.K	1485	R.Merseyside	B	1.20	C.F.K*.N
1017	Beacon R(WABC)	I	0.70	C.E.F.L.M.O.P	1485	Southern Counties R	B	1.00	A.F.L.P
1026	Downtown R	I	1.70	E.F.N.O*	1503	R.Stoke-on-Trent	B	1.00	C.E*.F.K*.L.M.P
1026	R.Cambridgeshire	B	0.50	A.C.F.J.M.O.P	1521	Reigate(M.Xtra)	I	0.64	A.C*.E*.F.L.P
1026	R.Jersey	B	1.00	F.L.P	1530	Huddersfld(Gt.Yks)	I	0.74	C.E.F.G.M
1035	Country 1035	I	?	A.C*.E*.F.L.N*.P	1530	R.Essex	B	0.15	A.F.L.P
1035	NorthSound Two	I	0.78	F.M	1530	R.Wyvern(WYVN)	I	0.52	E*.F.L.D*.P
1035	R.Sheffield	B	1.00	C.M	1548	Capital R(Cap G)	I	97.50	A.F.L.P
1035	West Sound AM	I	0.32	E.F.K	1548	R.Bristol	B	5.00	F.I
1107	Moray Firth R	I	1.50	E.F.K	1548	Liverpool(City G)	I	4.40	C.E*.F
1116	R.Derby	B	1.20	C.E*.F.G*.J.M.O.P	1548	R.Forth(Max AM)	I	2.20	E.F
1116	R.Guernsey	B	0.50	F.J.L.P	1548	Sheffield(Gt.Yks)	I	0.74	F*.M
1152	BRM(B.Xtra-AM)	I	3.00	O	1557	Northants R(S.Gold)	I	0.76	E*.F.K*.M
1152	Great North R(GNR)	I	1.80	E.F	1557	Southampton(SCR)	I	0.50	C*.E*.F.L.P
1152	LBC(LondonNewstalk)	I	23.50	A.L.P	1557	R.Lancashire	B	0.25	C.F.K*
1152	Piccadilly R(Gold)	I	1.50	C.F	1557	Tendingr(Mellow)	I	0.125	A.F*.O*.P
1152	Plymouth Snd(CI.G)	I	0.32	F	1584	Kettering(KCBC)	I	0.04	E*.F*.P
1152	R.Broadland	I	0.83	A.C*.K*.P	1584	R.Nottingham	B	1.00	C.E.F.G*.J*.M.O.P
1152	R.Clyde(Clyde 2)	I	0.06	E	1594	R.Shropshire	B	0.50	C*.F.L.P
1161	Brunel R(CI.Gold)	I	0.16	F.L.P	1584	R.Tay	I	0.21	F.J*
1161	R.Bedfordshire(3CR)	B	0.10	A.F.D.P	1602	R.Kent	B	0.25	A.E*.F.L.P
1161	Southern Counties R	B	1.00	A.F.L.P					
1161	Tay AM	I	1.40	E.F.N*					
1161	Humberside(Gt.Yks)	I	0.35	C.F.M					

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

## Listeners

- (A) Paul Bowery, Burnham-on-Crouch.
- (B) Bernard Curtis, Stalbridge.
- (C) Martin Dale, Stockport.
- (D) John Eaton, Woking.
- (E) Arthur Grainger, Carstairs Junction.
- (F) Gerry Haynes, while in Talgarth, Powys.
- (G) Francis Hearne, while in Derby
- (H) Simon Hockenhuil, E.Bristol.
- (I) Simon Hockenhuil, while on Dartmoor.
- (J) Sheila Hughes, Morden.
- (K) Eddie McKeown, Newry.
- (L) George Millmore, Wootton, IOW.
- (M) Harry Richards, Barton-upon-Humber.
- (N) Tom Smyth, Co.Fermanagh.
- (O) Norman Thompson, Oadby.
- (P) John Wells, East Grinstead.

1909 in Doncaster; R.Kuwait via Kabd 11.990 (Eng to Europe, N.America 1800-2100) 43433 at 1913 in Oxted; R.Dniester Int via Russia? 11.750 (Eng 2030-2100) 44444 at 2045 in Scalloway; WWCR Nashville, USA 12.160 (Eng 1400-2300) 43333 at 2045 in Stalbridge; AIR via Bangalore 11.620 (Eng, Hi to Europe 1745-2230) 22122 at 2130 in Oadby; R.Damascus via Adra 12.085 (Eng to America, Pacific 2110-2210) 32222 at 2145 in Penmaenmawr; R.Bulgaria, Sofia 11.720 (Eng to Europe 2100-2200) 43333 at 2150 in Rugby; Voice of Russia 11.750 (Eng [WS]) 55545 at 2200 in E.Bristol; Voice of Turkey, Ankara 11.710 (Eng to USA? 2200-2300) SIO322 at 2200 in Co.Fermanagh; BBC via Shepparton, Australia 11.695 (Eng to S.E.Asia 2200-2300) SIO222 at 2200 in Swindon; WEWN Birmingham, USA 11.820 (Eng to Europe 2200-0000?) 44444 at 2238 in Woodhall Spa; UAER, Abu Dhabi 11.885 (Eng to USA 2200-0000) SIO333 at 2315 in N.Bristol.

Good reception from many areas was noted in the 9MHz (31m) band. During the early morning R.Havana, Cuba 9.820 (Eng to N.America 0500-0700) was 33333 at 0525 in Kilkeel; SRI via Schwarzenburg? 9.885 (Eng, Fr, It, Ger to Africa 0600-0800) 44444 at 0625 in Stalbridge; R.Nederlands via Bonaire, Ned.Antilles 9.700 (Eng to Pacific areas [u.s.b. + p.c.] 0730-0825) SIO332 at 0730 in N.Bristol.

After mid-day R.Norway Int, Oslo 9.590 (Norw [Eng Sun] to Europe 1300-1330) was 55555 at 1300 in Appleby; VOA via ? 9.700 (Eng to S.Asia 1500-1800) 22222 at 1530 in Oadby; R.Tirana, Albania 9.760 (Eng to Europe 1600-1615) 44434 at 1608 in Penmaenmawr; R.Australia via Darwin 9.615 (Eng to Asia 1100-1755) 34543 at 1621 in Wallsend; KHBN Medom, Palau 9.965 (Eng to S.Asia) 34333 at 1749 in Scalloway; Voice of Vietnam, Hanoi 9.840 (Eng to Europe 1800-1830) was 44444 at 1806 in Stoke-on-Trent; R.Nederlands via Flevo 9.895 (Eng to S/E.W.Africa 1830-2125) 44444 at 1836 in Oxted; AIR via Delhi? 9.950 (Eng to N. Africa, M.East 1745-1945) SIO333 at 1900 in Swindon; R.Finland via Pori 9.730 (Eng to Europe 1900-1930) SIO544 at 1910 in Doncaster; R.Bulgaria, Sofia 9.700 (Eng to Europe 1900-2000) 42223 at 1915 in Stockport; RAI Rome, Italy 9.575 (Eng to Europe 1935-1955) 42552 at 1935 in Bridgewater; VOIRI Tehran, Iran 9.022 (Eng to Europe 1930-2027) 55444 at 1955 in Burnham-on-Crouch.

Later, R.Thailand, Bangkok 9.555 (Eng to Europe? 2030-2045) was

Darwin 13.605 (Eng, Chin to Asia 0900-1100) 24532 at 0905 in Wallsend; R.Denmark via RNI 13.800 (Da to Europe? 1030-1100) SIO555 at 1038 in Macclesfield; R.Austria Int via Moosbrunn 13.730 (Ger, Eng, Fr, Sp to Europe 0400-1800) SIO433 at 1040 in Doncaster.

After mid-day R.Vlaanderen Int, Belgium 13.670 (Eng to Europe, N.America 1230-1255 Sun only) was 44333 at 1230 in Appleby; R.Kuwait via Kabd 13.620 (Ar to Europe, N.America 1315-1600) 44544 at 1403 in Woking; AWR via Slovakia 13.595 (Eng to S.Asia 1400-1500) 44344 at 1407 in Woodhall Spa; SRI via Sottens? 13.635 (Eng, Fr, It, Ger to S/C.Asia 1500-1700) SIO444 at 1500 in Co.Fermanagh; R.Pyongyang, Korea 13.785 (Eng to Europe, M.East 1500-1550) 24232 at 1528 in Bridgewater; UAER, Dubai 13.675 (Eng to Europe 1600-1640) 44444 at 1600 in Morden; WHRI South Bend, USA 13.760 (Eng to E.U.S.A, Europe 1520?-2200) 33333 at 1615 in Stockport; R.Pyongyang, Korea 13.785 (Eng to Europe, M.East 1700-1750) 54444 at 1700 in Norwich.

Later, VOA via Selebi-Phikwe, Botswana 13.710 (Eng to Africa 1630-1900) was SIO333 at 1800 in Swindon; R.Nederlands via Flevo 13.700 (Eng to S/E.W.Africa 1830-1925) 44333 at 1830 in Truro; DW via Julich? 13.790 (Eng to W.Africa 1900-1950) 44333 at 1927 in Oxted; RCI via Sackville 13.650 (Eng to Europe, M.East, Africa 2000-2130) 45444 at 2002 in Burnham-on-Crouch; RCI via Sackville 13.670 (Eng to Caribbean, S.America 2200-0000) 33333 at 2200 in Rugby; UAER, Abu Dhabi 13.605 (Eng to USA 2200-0000) 44434 at 2222 in Newry; WWCR Nashville, USA 13.845 (Eng to E.U.S.A 1200-0100) 55555 at 2237 in Penmaenmawr; AWR Costa Rica 13.750 (Eng to America 2300-0100) 45444 at 2315 in Ross-on-Wye; Monitor R.Int via WSHB 13.770 (Eng to S.Europe, N. Africa 2200-0000) 43333 at 2330 in Stalbridge.

There is plenty to interest the listener in the 11MHz (25m) band. During the morning WYFR Okeechobee, USA 11.580 (Eng to Europe, Africa 0500-0600) was 44444 at 0535 in Kilkeel; Vatican R,

Italy 11.625 (Eng Africa 0630-0700) 44444 at 0630 in Morden; Voice of Greece, Athens 11.645 (Gr, Eng? to Europe 0600-0800) 33333 at 0750 in Truro; HCJB Quito 11.615 (Eng to Europe 0700-0830) 55555 at 0755 in Norwich; R.Korea Int via Sackville, Canada 11.715 (Sp, Eng to S.America 1000-1100) 55555 at 1030 in Appleby; VOIRI Tehran 11.930 (Eng to Asia 1130-1230) 24222 at 1130 in Newry.

After mid-day R.Romania Int, Bucharest 11.940 (Eng to Europe 1300-1400) was 55444 at 1327 in Ross-on-Wye; Voice of the Mediterranean via Cyclops, Malta 11.925 (Eng, Ar to N. Africa 1400-1600) 42333 at 1411 in Stockport; R.Australia via Shepparton 11.695 (Eng to Pacific areas 1430-1700) 45444 at 1507 in Woking; R.Australia via Camarvon 11.660 (Eng to S.Asia 1430-2100) 25232 at 1510 in Bridgewater; R.Cairo via Abis 12.050 (Ar [Home Sce Relay]) SIO444 at 1510 in Macclesfield.

Later, Israel R, Jerusalem 11.603 (Eng to Europe? 1900-1930?) was 45544 at 1900 in Wallsend; also 11.685 (Eng to ? 1900-?) SIO533 at

# Tropical Bands Chart

Freq (MHz)	Station	Country	UTC	DXer	Freq (MHz)	Station	Country	UTC	DXer
2.310	ABC Alice Springs	Australia	2049	D,I	4.990	AIR Ext.Service	India	0015	A,J
2.325	ABC Tennant Creek	Australia	2110	D	4.990	FRCN Lagos	Nigeria	2115	A,J,P
2.485	ABC Katherine	Australia	2140	D	5.005	R.Nacional, Bata	Eq.Guinea	2016	D
3.200	TWR Manzini	Swaziland	1844	D,P	5.005	R.Nepal, Kathmandu	Nepal	1705	D,P
3.210	Em.Nacional, Maputo	Mozambique	0355	A	5.009	R.Madagasikara	Madagascar	1740	D
3.220	Channel Africa	S.Africa	0320	A,O,P	5.020	La V du Sahel, Niamey	Niger	1940	A,K,N,P
3.220	R.Kara, Lome	Togo	2045	A,N	5.020	SLBC Tamil Home Sce.	Sri-Lanka	1724	D
3.230	R.Sol de Los Andes	Peru	0040	J	5.025	R.Parakou	Benin	2211	J,N,P
3.220	SABC Meyerton	S.Africa	2020	A,N	5.025	R.Rebeld, Habana	Cuba	0130	A,J,P
3.240	TWR Shona	Swaziland	1841	D,I	5.025	R.Uganda, Kampala	Uganda	1930	P
3.255	BBC via Maseru	Lesotho	2000	A,D,J,K,M,N,P	5.030	AWR Latin America	Costa Rica	0400	A,P
3.270	SWABC 1, Namibia	S.W.Africa	2000	A,D,G,J,K,P	5.035	R.Bangui	C.Africa	2217	A,G,J,N,P
3.290	R.Centro, Ambato	Ecuador	1930	B	5.040	R.Voz del Upano, Macas	Ecuador	0050	J
3.290	SWABC 2, Namibia	S.W.Africa	2302	A,D,J,P	5.047	R.Togo, Lome	Togo	2010	A,I,K,N,P
3.300	R.Cultural	Guatemala	0405	A,P	5.050	R.Tanzania	Tanzania	1941	C,J,K,N,P
3.305	R.Western, Daru	Pap.N.Guinea	2035	A	5.055	RFO Cayenne(Matoury)	French Guiana	0415	A,P
3.306	ZBC Prog 2	Zimbabwe	1956	D,J,K,N,P	5.075	Caracol Bogota	Colombia	0130	A,C,G,J,P
3.315	AIR Bhopal	India	1723	D,I					
3.320	R.France Int. via ?	France?	0250	J					
3.320	SABC Meyerton	S.Africa	1936	A,D,J,K,N,P					
3.325	FRCN Lagos	Nigeria	1937	K,N,P					
3.335	CBS Taipei	Taiwan	1940	D,K					
3.345	AIR Jammu	India	1733	D					
3.345	Channel Africa	S.Africa	1859	D					
3.345	ZBS Lusaka	Zambia	0415	A					
3.355	R.Nac.Luanda	Angola	2030	A					
3.356	R.Botswana	Gaborone	2002	A,D,J,K,P					
3.365	GBC R-2	Ghana	1937	A,B,G,J,K,N,P					
3.365	AIR Delhi	India	1821	D					
3.370	R.Beira	Mozambique	1939	D,N					
3.377	R.Nacional, Mulenvos	Angola	2013	D					
3.380	R.Chortis	Guatemala	0050	A					
3.380	NBC Blantyre	Malawi	2020	A,D,J,P					
3.395	ZBC Gweru	Zimbabwe	0345	P					
3.915	BBC via Kranji	Singapore	2100	B,D,F,J,M,N					
3.955	BBC via Skelton	England	0410	A					
3.955	R.Budapest	Hungary	2100	A,G,J,L,O					
3.965	RFI Paris	France	2105	A,B,J,M					
3.975	R.Budapest	Hungary	0415	A					
3.980	VOA via Munich	Germany	2040	A					
3.985	China R via SRI	Switzerland	2104	J,M					
3.985	SRI Beromunster	Switzerland	2035	A					
3.995	OW via Julich	Germany	2104	A,J,M					
3.995	DW via Meyerton	S.Africa	2233	E					
4.500	Xinjiang BS, Urumqi	China	2347	C					
4.735	Xinjiang, Urumqi	China	2347	C					
4.750	Xizang BS, Lhasa	Tibet	0015	A					
4.760	Yunnan PBS, Kunming	China	2205	B,G					
4.760	ELVA Monrovia	Liberia	1955	D,J,K,P					
4.765	Brazzaville	Pep.Rep.Congo	1936	A					
4.770	FRCN Kaduna	Nigeria	2006	A,C,F,G,J,K,L,N,P					
4.775	AIR Guwahati	India	1656	D					
4.777	R.Gabon, Libreville	Gabon	2006	A,D,J,K,N,P					
4.783	RTM Bamako	Mali	2057	A,B,D,K,N,P					
4.790	Azad Kashmir R.	Pakistan	1701	D,P					
4.790	R.Attantida	Peru	0330	P					
4.800	AIR Hyderabad	India	1700	D,P					
4.800	NBS Lesotho	Maseru	1953	A,D,J,K,P					
4.805	R.Nac Amazonas	Brazil	0005	A					
4.805	R.Villa Rica	Peru	2200	B,N					
4.810	SABC Meyerton	S.Africa	2156	N					
4.815	R.diff TV Burkina	Ouagadougou	2007	A,J,K,P					
4.820	La Voz Evangelica	Honduras	0230	J,N,P					
4.820	AIR Calcutta	India	1658	D,P					
4.828	ZBC R-4	Zimbabwe	1957	D,G,K,P					
4.830	R.Botswana, Gaborone	Botswana	1858	N					
4.830	R.Tachira	Venezuela	0043	J					
4.832	R.Reioj	Costa Rica	0315	C,P					
4.835	R.Tezulutlan, Coban	Guatemala	0231	J					
4.835	RTM Bamako	Mali	2007	A,C,D,F,G,J,K,N,P					
4.840	AIR Bombay	India	1712	A,D					
4.845	RTM Kuala Lumpur	Malaysia	1649	A,D					
4.845	ORTM Nouakchott	Mauritania	2030	A,N,P					
4.850	Prov.Uige	Angola	2106	N					
4.850	R.Yaounde	Cameroon	2213	A,B,J					
4.850	AIR Kohima	India	0025	A,B					
4.855	R.Sana Yemem	Yemen	1954	P					
4.860	AIR Kingsway(Feeder)	India	1930	D,K,P					
4.865	PBS Lanzhou	China	2205	B,G,N					
4.865	L.V. del Cinaruco	Colombia	0415	P					
4.870	R.Cotonou	Benin	1954	A,B,G,J,K,P					
4.885	R.Difusora Acreana	Brazil	0010	A					
4.885	KBC East Sce Nairobi	Kenya	2007	A,D,J					
4.890	RFI Paris	via Gabon	0410	A,J					
4.890	ORTS Dakar	Senegal	0405	P					
4.895	Pakistan BC	Pakistan	1707	D,K,P					
4.900	SLBC Colombo	Sri Lanka	1712	D					
4.905	R.Nat. N'djamena	Chad	1954	A,G,K,N,P					
4.910	R.Zambia, Lusaka	Zambia	1940	A,D,K,P					
4.915	GBC-1, Accra	Ghana	2030	A,B,F,G,H,K,N,P					
4.915	KBC Cent Sce Nairobi	Kenya	1940	K					
4.915	R.Pakistan	Pakistan	0115	A					
4.915	R.Cora, Lima	Peru	0310	P					
4.920	R.Quito	Ecuador	0428	C,I					
4.920	AIR Madras	India	1705	A,D,P					
4.931	R.Internacional	Honduras	0300	P					
4.935	KBC Gen Sce Nairobi	Kenya	2008	D,K,N,P					
4.940	R.Abigjan	Ivory Coast	0400	P					
4.950	R.Nacional, Mulenvos	Angola	2012	A,C,D,K,P					
4.950	AIR Jammu	India	1709	D					
4.955	R.Cultura, Campos	Brazil	0120	A					
4.955	R.Marajoara, Belem	Brazil	0234	J					
4.955	R.Nac. de Colombia	Colombia	0130	C,P					
4.960	Mulenvos	Angola	2025	K					
4.965	R.Zambia, Lusaka	Zambia	2000	D,P					
4.970	R.Rumbos, Caracas	Venezuela	0125	A					
4.975	R.Uganda, Kampala	Uganda	1945	G,P					
4.980	Ecos del Torbes	Venezuela	0010	A,C,G,J,N,P					

In the congested 7MHz (41m) band RFPI Costa Rica 7.385 (Eng 24hrs) was 43333 at 0505 in Kilkeel; Monitor R.Int via WSHB 7.535 (Eng [Various Sat/Sun] to Europe 0400-0955) 44444 at 0601 in Woking; RTV Congolaise, Brazzaville 7.105 (Fr 0700-1100) 34333 at 0611 in Burnham-on-Crouch; KTBN via Salt Lake City 7.510 (Eng to N.America 0000-1600) 32222 at 0620 in Stalbridge; R.Japan via Skelton, UK 7.230 (Jap, Eng to E.Europe 0400-0800) 33333 at 0723 in Norwich; WWCR Nashville, USA 7.345 (Eng 0000-1100) 33322 at 0800 in Truro; Croatian R. via Deanovec 7.370 (News in Eng 0905) 45554 at 0905 in Wallsend; IRRS Milan 7.125 (Eng, Fr, Sp, Russ, Ger [u.s.b. + p.c.] to Europe, N. Africa, M.East) 44344 at 1200 in Morden; Polish R, Warsaw 7.270 (Eng to Europe 1200-1255) SIO222 at 1215 in N.Bristol; R.Budapest, Hungary 7.130 (Eng to Europe 1900-1930) 43443 at 1900 in Ross-on-Wye; RCI via Skelton, UK 7.235 (Eng, Fr to Europe, M.East, Africa 1800-2200) 43444 at 1908 in Oxted; R.Thailand, Bangkok 7.200 (Eng to Europe? 1900-2000) 33343 at 1930 in Scalloway; Polish R, Warsaw 7.285 (Eng to Europe 1930-2025) 43543 at 1950 in Bridgwater; AIR via Aligarh? 7.412 (Hi, Eng to Europe 1745-2230) 33232 at 2127 in Newry; Voice of Turkey, Ankara 7.185 (Eng to M.East 2200-2300) SIO533 at 2236 in Doncaster; R.Prague, Czech Rep 7.345 (Eng to N.America 0000-0027) SIO444 at 0000 in Swindon.

Many of the broadcasts to Europe in the 6MHz (49m) band were detailed in the reports. Also noted were R.Australia via Shepparton? 6.090 (Eng to Asia 1530-1900) SIO222 at 1700 in Co.Fermanagh and 32233 at 1850 in Stalbridge; also via Carnarvon 6.150 (Eng to Asia 1900-2100) 21321 at 1937 in Newry; PBS China 6.750 (Chin [CNR-1] 2000-0100), rated 23322 at 2049 in Burnham-on-Crouch; BBC via Antigua, W.Indies 5.975 (Eng to C/S.America 2100-0600) 43444 at 2257 in Woking; Channel Africa via Meyerton 5.955 (Eng to E/C.S.Africa 0300-0500) 44444 at 0327 in Norwich; VOFC Taiwan via WYFR Okeechobee, USA 5.950 (Eng to USA 0200-0400) 44444 at 0330 in Scalloway; WWCR Nashville, USA 5.935 (Eng to USA 0100-1200) 43333 at 0435 in Kilkeel; VOA via Greenville, USA (Eng to Africa 0300-0630 [ends 0700 Sat/Sun]) SIO533 at 0648 in Doncaster.

- DXers  
 (A) Robert Connolly, Kilkeel.  
 (B) John Eaton, Woking.  
 (C) David Edwardson, Wallsend.  
 (D) PGordon Smith, Kingston, Moray.  
 (E) David Green, Doncaster.  
 (F) Simon Hockenhuill, E.Bristol.  
 (G) Sheila Hughes, Morden.  
 (H) Tony King, Swindon.  
 (I) Chris Lawton, Stoke-on-Trent.  
 (J) Eddie McKeown, Newry.  
 (K) Fred Pallant, Storrington.  
 (L) Clare Pinder, while in Appleby.  
 (M) Peter Pollard, Rugby.  
 (N) Richard Reynolds, Guildford.  
 (O) Chris Shorten, Norwich.  
 (P) John Slater, Scalloway.

33222 at 2030 in Truro; R.Budapest, Hungary 9.835 (Eng? to Europe 2100-2130) 54444 at 2111 in Norwich; R.Finland via Pori 9.730 (Eng to Europe 2130?-2157) 44444 at 2135 in Rugby; Voice of Turkey, Ankara 9.445 (Eng to USA 2200-2250) was 35443 at 2200 in Newry; R.Nac del Paraguay 9.735 (Sp 0800-0400) 24333 at 2200 by Richard Reynolds in Guildford; China R.Int via Russia 9.880 (Eng to Europe 2200-2300) SIO433 at 2200 in Co.Fermanagh; Voice of Russia, Moscow 9.530 (Eng [WS] 2200-2300?) 44334 at 2210 in E.Bristol; RCI via Sackville 9.755 (Eng [CBC progs] to USA 2200-0000 Mon-Fri, 2300-0000 Sat/Sun) 33333 at 2235 in Woodhall Spa; R.Austria Int via Moosbrunn 9.870 (Ger, Sp, Eng to S.America 2200-0200) 45454 at 2308 in Woking.

## Quarterly list of equipment used

LM&S for \$August, #September, \*October'95.

- \$ Tim Allison, Middlesborough: Lowe HF-225 + r.w.
- # Charles Beanland, Gibraltar: Sangean ATS-803 + a.t.u. + 6m wire or Howes AA2.
- #\$ Darren Beasley, Bndgwater: Yaesu FRG-100 + a.t.u. + 15m wire.
- #\$ Paul Bowery, Burnham-on-Crouch: Sangean ATS-803A + 40m wire.
- #\$ Vera Brindley, Woodhall Spa: Sangean ATS-803A or Sangean SW60 + r.w.
- #\$ Kenneth Buck, Edinburgh: Lowe HF-225 + r.w. in loft or s.w. loop.
- \$ Noel Carrington, Sutton-In-Ashfield: Lowe HF-225 + r.w.
- \$ Frederic Collin, Tokyo, Japan: Sony ICF-SW55 + AN-1.
- #\$ Robert Connolly, Kilkeel: JRC NRD-525 + Datong AD370.
- \$ Bernard Curlls, Stalbridge: Tatung TMR 7602 + r.w. in loft or loop.
- #\$ Martin Dale, Stockport: Sangean ATS-803A + Howes a.t.u. + 23m wire.
- #\$ John Eaton, Woking: Lowe HF-225 + Datong AD270 or a.t.u. + 23m wire.
- #\$ David Edwardson, Wallsend: Trio R-600 + Balun + invert V trap dipole.
- #\$ Peter Gordon-Smith, Kingston, Moray: Icom R-72 + a.t.u. + inverted V dipole.
- #\$ Arthur Grainger, Carstairs Junction: Pioneer F-502RDS tuner + loop; Sangean RF-H66; Lowe HF-225.
- # David Green, Doncaster: Grundig Yacht Boy 400 + 6m wire in loft.
- #\$ Michael Griffin, Ross-on-Wye: Lowe HF-225 + a.t.u. + 45m wire.
- \$ Bill Griffith, W.London: JRC NRD 535 + 25m wire.
- \$ Gerry Haynes, Bushey Heath: Kenwood R-5000 + Mag Balun + 40m Wire.
- \* Gerry Haynes, while in Talgarth: Kenwood R-5000 + Kiwa loop.
- #\$ Francis Hearne, N.Bristol: Sharp WQT370 + r.w.
- \* Francis Hearne, while in Derby: Uni-Corn portable.
- \* Simon Hockenhuill, E.Bristol: Bush TR130 or Roberts R-817.
- \* Simon Hockenhuill, while on Dartmoor: ITT Colt.
- #\$ Sheila Hughes, Morden: Sony ICF-7600DS + loop; Panasonic DR48 + 15m invert L.
- #\$ Rhodence Illman, Oxted: Kenwood R-5000 + AN-1 or Mag Balun + r.w.

- # Stephen Jones, Oswestry: Matsui HI-fi.
- \* Tony King, Swindon: Panasonic DR-49 + r.w. or CB antenna in loft.
- \$\* Chris Lawton, Stoke-on-Trent: Drake SW8 + vertical wire.
- #\$ Ross Lockley, while in Broxbourne: Realistic DX-300 + a.t.u. + 20m wire or Sangean ATS 803A.
- #\$\* Eddie McKeown, Newry: Tatung TMR 7602.
- #\$\* George Millmore, Wootton, I.O.W.: Sangean ATS-803A + loop or Racal RA17L + v.l.f. converter + loop.
- # Wallace Moodie, Port Seton: Kenwood R-5000 + Howes CTU8 a.t.u. + 33m wire.
- #\$\* Fred Pallant, Storrington: Trio R-2000 + Howes CTU8 a.t.u. + r.w.
- \$ John Parry, Lamaca, Cyprus: Realistic DX-400 + r.w.
- #\$ Roy Patrick, Derby: Lowe HF-125 + 20m wire.
- #\$\* Clair Pinder, while in Appleby: JRC NRD 525 + Yaesu FRT-7700 + 16m wire.
- \$ Peter Pollard, Rugby: Sony ICF-2001D + r.w.
- #\$ Martin Price, Shrewsbury: Lowe HF-150 + r.w.
- \$ Martin Price, while near Orpington: Lowe HF-150 + r.w.
- #\$\* Philip Rambaut, Macclesfield: Int.Marine Radio R-700M + r.w.
- #\$\* Richard Reynolds, Guildford: Sangean ATS-803A + a.t.u. + 10m TT.
- #\$\* Harry Richards, Barton-on-Humber: Grundig Satellit 700 + AD270 or r.w. or Grundig Yacht Boy or Matsui MR 4099.
- # Alan Roberts, Quebec, Canada: Lowe HF-225 + 49m dipole or 11m vertical dipole.
- \$ Chris Shorten, Norwich: Matsui MR 4099 + 10m wire.
- #\$\* John Slater, Scalloway, Shetland: Lowe HF-150 + a.t.u. + 20m wire.
- #\$\* Tom Smyth, Co.Fermanagh: Sangean ATS-803A or Morphy Richards R191.
- \$ John Stevens, Largs: Hammarlund HQ 180 or Icom R-70 + loop or r.w.
- #\$ Andrew Stokes, Leicester: Lowe HF-150 + 15m wire.
- \* Andrew Stokes, while in Albufeira, Portugal: Sony Walkman.
- #\$\* George Tebbitts, Penmaenmawr: Lowe HF-225 + r.w.
- #\$\* Norman Thompson, Oadby: Matsui MR 4099 + 20m wire in loft.
- # Phil Townsend, London: Lowe HF-225 + preselector + r.w. or loop.
- #\$\* John Wells, E.Grinstead: RCA AR88D + Loop.
- #\$\* Thomas Williams, Truro: Sharp 5454 or Grundig Yacht Boy 206.
- \$ Julian Wood, Elgin: Kenwood R-2000 + Yaesu FRT-7700 a.t.u. + 5m wire.

# Off the Record

## Short Wave Pirates Chart

Station	Monitors
Reflections Europe	A, B, D, F, G, H
Moonlight	A, B, G, H, I
Jolly Roger	A, D, G, I
Armadillo	A
King	A
(ABC) Dublin	A, B, D, G, H
Ozone	A, B, C, D, E, F, G, I
Laser Hot Hits	A, B, C, D, E, F, G, I
Level One	A, B, C, D, E, F, G
Britain Radio	A, B, G, H
Meteoor	A, B, C, D, E, F, I
Argus	A, H
East Coast Commercial	B, G, I
Britain (BBMS)	C, G
Easy International	D
Pamela	E, H
Transatlantic	F, G
Strike	F, H
Weekend Music	D, F, I
Mariquita	H
Alpen Adria	H
Speedwing	H

### MONITORS

- A: Free Radio Monitoring, Halesowen, W. Midlands.
- B: Bob Marsh, Bexleyheath, Kent.
- C: Mike Talisman, Middlesborough, Cleveland.
- D: Sean Cooper, Wells-next-the-Sea, Norfolk.
- E: Steven Lloyd, Wadebridge, Cornwall.
- F: David Williams, Southampton, Hampshire.
- G: Ian Turner, Deal, Kent.
- H: Bruno Pecolatto, Pont Canavese, Italy.
- I: Jack Diamond, Folkestone, Kent.

With an increasing number of radio stations being available on satellite, via vacant TV audio channels, there comes the need to make these signals more portable. It is clearly inconvenient to be restricted to the room which houses your satellite receiver and it is not always possible to wire up your entire house for stereo sound. Likewise, it would be an advantage for many of us to be able to tune our DX receiver to a certain h.f. frequency and then be able to monitor it while elsewhere in the house. The possible answer to these problems is to use an Audiosender, this is a small device that receives the output of a satellite receiver or communications radio and re-transmits the signal at very low power on various frequencies in the f.m. broadcast band. These usually have stereo capability and have a range of about 100m. Audiosenders would seem harmless enough, particularly if a designated frequency was provided for them. They emit about the same power as licence exempt baby alarms and children's toy walkie-talkies, but are technically illegal to use in Britain.

The television version of this has been around for about ten years and is known as a Videosender, these will radiate the output of your video recorder, satellite receiver or games machine on the u.h.f. TV band. These too are illegal to use, but must account for the fairly regular reports of people receiving their neighbours video or satellite signals. One wonders if the Radiocommunications Agency will eventually grant the legal use of these devices, as they did following the persistent illicit use of imported CB radios and cordless telephones?

### Spy Ship

The numbers station group Enigma, in their recent newsletter are seeking information on an alleged numbers station that they say was located aboard the pirate radio vessel *Mebo 2*. Radio North Sea International had five transmitters aboard the ship, 1 X 1kW v.h.f. f.m., 1 X 105kW m.w., 2 X 10kW s.w., and an amateur radio transceiver. The latter was run by the station engineers and for very obvious reasons used a false Panamanian maritime mobile callsign.

The accusations relating to suspected espionage activities surfaced in 1971 following a dispute with a rival station called Radio Veronica. On the 21st September

1971 five people, including a Radio Veronica director, were sentenced to one year imprisonment for conducting a fire bomb attack on the *Mebo 2*. Although the stern of the ship was badly damaged broadcasting continued while repairs were carried out. RNI eventually closed down on 30th August 1974 but the ship was detained in Holland until being sold to Libya in 1977.

### Over To You...

A letter describing the thrill of tuning into the pirates during the 1960s came from Andy Howlett of Dukinfield, Cheshire. He goes on to say that he was 11 years old at the time and has a recording of DJ "Ugly" Ray Terret" giving a description of the broadcasting facilities on Radio Caroline North. He also asks if it is true that former Caroline North and Manx Radio presenter Don Allen had died? Sadly the answer is yes, he suffered a heart attack on the 13 May at his home in Ireland. Broadcaster Kenny Tosh, a close friend of Don's, produced an excellent six hour tribute following his eventful and successful radio career that spanned three decades. Many of Don Allen's former colleagues, from the stations he worked for, added their thoughts and their memories to this most touching programme which was broadcast on Radio 3, Co. Offaly in Ireland. Two ex-offshore radio DJ's, namely Mike Kerlake and Steve (Alphasound) England have informed me of their new publishing venture called *Playback Magazine*. This is distributed monthly and is primarily intended for those in the radio industry, however for us hobbyists it does provide a window into how the broadcasting industry is developing and expanding. Playback can be contacted at 42 Larch Hill, Handsworth, Sheffield S9 4AJ. **Harry Richards** writes on the subject of poor m.w. reception with local stations being obliterated by foreign heavyweight transmitters in what should be their primary reception areas. In a similar vein I tuned into what I presumed was my local Supergold station and ended up with the Cyprus Broadcasting Corporation, such is the uncertainty of radio reception. Bruno Pecolatto sent me details of his pirate reception plus a copy of *Radiorama*. This magazine is published in Italian, Bruno writes the pirate radio section which includes details of some of the short wave pirates we receive here in the UK. Sean Cooper writes saying that the

Irish Government were looking into the possibilities of licensing a s.w. station, interested parties are said to include Peter Moore of Radio Caroline and Trevor Brook, a director of Radiofax. This information came from a news line run by John Burch who for many years ran a supporters club called the Caroline Movement.

### The "Ross" in London?

Radio Caroline completed a 28 day RSL off Clacton in Essex during August using 1503kHz. They now are seeking a mooring for the *Ross Revenge* in the London docks area to enable further temporary, broadcasts to be made from there. It has always been a part of the Caroline dream to be allowed to sail down the Thames and broadcast to the Capital. Another group, Celtic Rose Radio, have been given permission to run an international long wave station from the Isle of Man. Tynwald, the Manx Parliament, does not have the authority to issue broadcasting licences so the final decision rests with the authorities in London. Celtic Rose Radio suggests they should be given the l.w. frequency of 225kHz, which was allocated to the UK in 1975 for Radio 4 in Scotland, however the BBC chose not to use it and reinforced their 198kHz signal instead.

### Bogus Stations

Traders in the Midlands are being warned against giving cash to radio advertising sales representatives without verifying their identity first. In Walsall, Staffordshire a man in his 30s is reported to have taken deposits on advertising packages for a station called Freak FM. Apparently no station or advertisements materialised and the contact telephone numbers left were unobtainable. The police said that broadcasts from Freak FM in Dudley had ceased last January. To check the credentials of pirate operators is virtually impossible and if you do run into difficulties you can hardly seek

assistance from the police as it illegal to buy or sell advertising from pirates. A similar problem exists with the legal (RSL) temporary licensed stations. Many of these sell advertising once their application has been granted, which can be several weeks before the licence is issued and the station is on air. To verify the authenticity of their sales teams, usually volunteers, is not easily accomplished either. Radio advertising can be very cost effective, but do take care who you buy it from.

### Medium Wave Pirates

With the days beginning to get shorter the early evening sunset is the ideal time to start logging some of the Dutch m.w. pirates that can usually be received here in the UK after dark. Radio Barones, one of my favourites has been inactive recently but there are many others worth listening to. An updated monthly list of active Dutch m.w. pirates is available from Derek Taylor, 12 Dorman Road, Preston, Lancashire PR2 6AS. Please send 2 IRCs, or 50p if you are a UK resident, to cover postage.

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**Callbook - N. American 1994**, v.g.c., £11. **RSGB Callbook 1994**, v.g.c., £5. **WRTH 1993**, v.g.c., £7. **Admiralty Books of Radio Signals**, 1976-78, offers. Also a selection of valves in v.g.c. Tel: Hawick Scottish Borders (01450) 370937.

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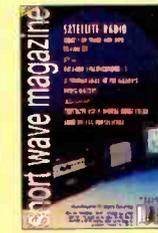
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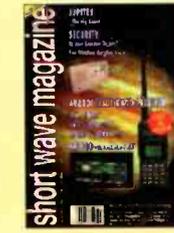
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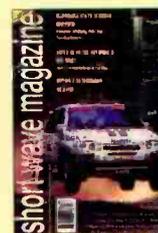
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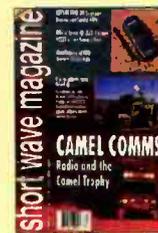
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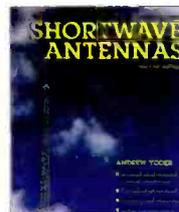
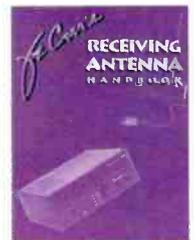
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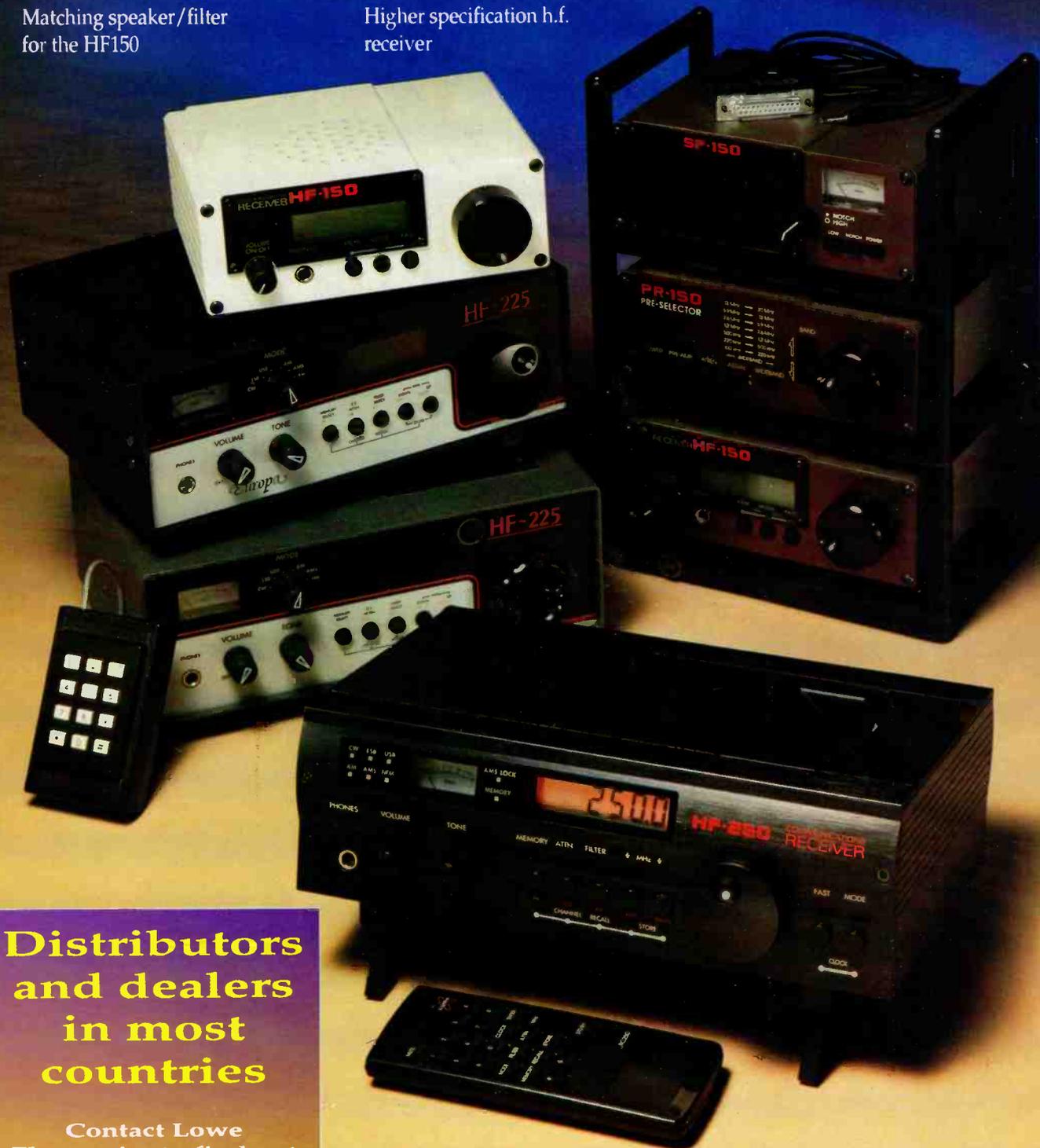
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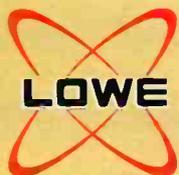
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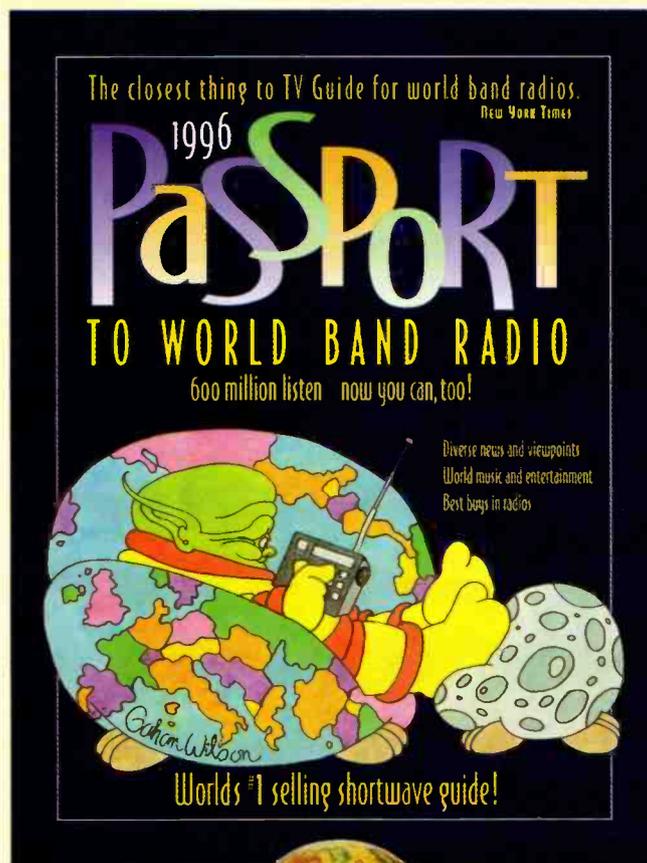
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It's a world where the old image of boring programmes heard through crackly, fading, distorted short-wave, is rapidly becoming a thing of the past. Broadcasters have pepped up the style and the technical quality of their transmissions, and radio manufacturers are putting high-quality components and easy-to-use microchip controls into their products. Satellites have revolutionised the links between countries, and the "jamming" of transmissions by countries wishing, perhaps, to be economical with the truth has almost entirely disappeared.

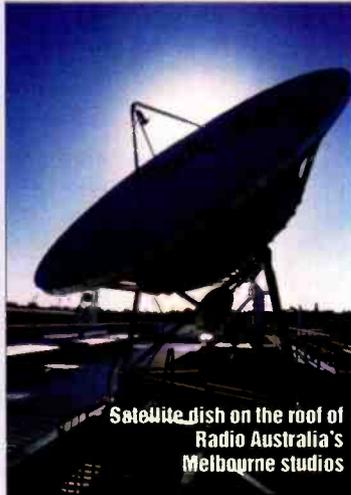
In fact satellites may soon produce a quantum leap in the technical quality of international broadcasting. DAB (Digital Audio Broadcasting) will have revolutionised domestic broadcasting by the turn of the century, and if plans for international satellite-delivered digital radio are realised, it will become possible also to receive broadcasts from other countries in perfect quality. Meanwhile digital technology will have ensured that the entire broadcasting chain from studio to satellite has undergone a technical improvement that will make the poor quality reception of just a few Telecoms ago seem like a relic from the far distant past.

International radio will be part of that same digital revolution that is sweeping the whole world of telecommunications. Admirable though this is, the digital upheaval is also producing unprecedented rapidity of change. No sooner has one item of new technology been rushed into service, than another is competing to take its place.

The whole basis of international broadcasting is now challenged by the extraordinary rise to fame of the Internet (the "Information Superhighway"). Computer technology can now send mixtures of video, audio and data extremely cheaply across the world. Before long it will be possible to send television and radio programmes along the same route. A whole new type of electronic programming is emerging, as imaginative users of the Internet find ways of creating spectacular "multi-media" output that can be picked up thousands of kilometres away on a home computer.

This is an example of **convergence**, one of the big themes of Telecom 95; meaning that the older techniques of telecommunications have given way to forms which are becoming so alike as to be indistinguishable.

The other big theme, which international radio illustrates to perfection, is how to **connect**. Nation is connected to nation, people to people, across frontiers and around the world. International radio is instant, and universally available, a powerful medium for knowledge, understanding and peace. International radio can reach into the depths of affluent cities, and into the poorest and most remote regions. The benefits to humanity of this simple yet powerful system of human communication are obvious - so why not join the **Association for International Broadcasting** at the International Radio Pavilion at Telecom 95.



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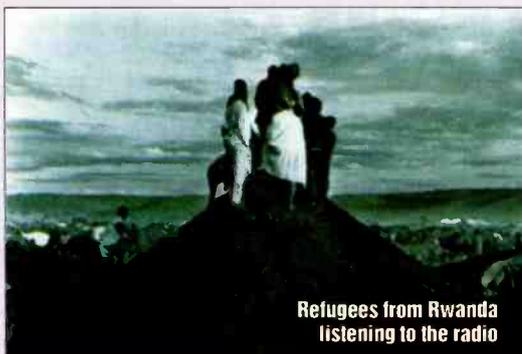
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Refugees from Rwanda listening to the radio



# THE AIB CON

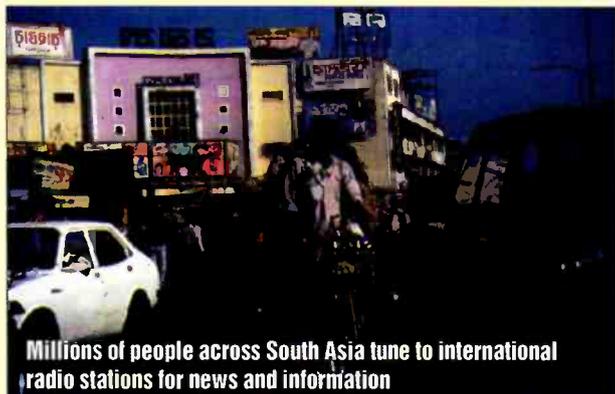
*“Everyone shall have the right to freedom of expression; this right shall include freedom to seek, receive and impart information of all kinds, regardless of frontiers, either orally, in writing or in print, in the form of art, or through any other media of his choice.”*

That is a quotation from the International Convention on Civil and Political Rights, unanimously adopted in 1966 by the UN General Assembly. The Convention is that part of the UN's proclamations on human rights which covers International Broadcasting - broadcasting intentionally from one country to another. The Convention clearly states that it is every person's right to receive information about any subject; and that anyone who wants to broadcast information may do so, provided that they do not threaten any other human rights in the process.

Today, as you see at the International Radio Pavilion at Telecom 95, run by the **Association for International Broadcasting**, there is a great deal of international radio broadcasting going on. International radio got a huge boost during the Second World War, when many more countries got in on the act, putting their points of view, and interpreting world events from their national standpoints. After the end of hostilities, the radio “Cold War” set in, reflecting the epic political stand-off of those days.

The human rights principles of the UN, were generally adhered to, and international broadcasting, although sometimes going too far in the spreading of propaganda, began to show its strengths - conveying information, entertaining, and generally bringing people together rather than keeping them apart. Distributing knowledge easily and quite cheaply across frontiers by means of radio became commonplace.

For the ITU, as a branch of the UN, this presented a big problem - because according to the basic tenets of the United Nations, every broadcaster who wanted to transmit to another country had to be given the possibility of doing so, whether they wanted to broadcast in 40 different languages or in just one. This meant that nearly every broadcaster had to use short-wave, resulting in severe overcrowding. But answers were found, and international broadcasting began to



Millions of people across South Asia tune to international radio stations for news and information



Terry Waite, who listened to international radio broadcasts in his cell when held hostage in Beirut

flourish. Today, transmission systems have been improved, radios have been made more sophisticated and easy to use; there is sharing of transmission

facilities; and rebroadcasting via satellite to local transmission systems or to cable is on the increase. Listening to international radio stations is becoming much easier.

But, how many people know or care about all this? In spite of the broadcasters' efforts and technical improvements, listening to international radio is still a minority interest. This is puzzling, because in these uncertain times a free exchange of information is more vital than ever. The international broadcasters deserve to find bigger audiences, and more people need to be aware of what's on offer.

Which is where the **Association for International Broadcasting** comes in. The AIB has been formed to promote international broadcasting - to help achieve the recognition it has long merited. The Association will encourage co-operation between international broadcasters. With travel and communications getting easier all the time, there is much more sense in working together than in wearing each other down with opposing points of view. The massive confrontations of the Cold War are, it is to be hoped, a thing of the past.

The AIB aims to find ways in which international broadcasters can work together. For instance - by developing programmes that will attract bigger audiences; by looking at ways of finding more money to support international broadcasts; by exploring new ways of studying audience reaction; and by encouraging the wider use of high-quality technical equipment.

Currently, one of the Association's foremost projects is to bring together broadcasters and radio manufacturers, so that the sophisticated resources of modern telecommunications can be focused on making listening even easier. Much has already been accomplished in design and computer control, but there is still a lot to be done to enable the listener to pick up the country of his or her choice at the push of a button.

International broadcasting by television is now rapidly on the increase, especially in countries where there is a degree of affluence. The AIB will get involved in this area too, providing opportunities for interaction between broadcasters, equipment makers and the viewing public.

Above all, the AIB will be bringing together all the elements of the international broadcasting industry, ultimately to inform people around the world about the radio and television programmes that are on offer every day of the week. Exhibitions, advertising, press



# CONNECTS TO YOU

articles, even pages on the Internet, offer great publicity opportunities.

We believe that international broadcasting, by television, by radio, or by whatever means of mass communication that is just over the electronic horizon, has a vital role to play in the world of today. Whatever developments telecommunications makes possible, **The Association for International Broadcasting** will be actively involved.

One of the Association's key objectives is to assist in making information available electronically, to whoever wants it, whenever they want it, and wherever they live in the world.

Television and radio, like all telecommunications resources, should be universally available. Access to information should not depend on economic privilege. Whether rich or poor, urban or remote, populations should all be able to receive the electronic media, which can leap so easily across national boundaries.

International broadcasting has the opportunity to orchestrate a resurgence of interest in the industry. **The Association for International Broadcasting**

will be seizing that opportunity, helping to ensure that there is a continued free flow of information across man-made boundaries.

Join us as we help move global radio and television successfully into the coming millennium.



One of the latest easy-to-operate digital radio sets

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## The latest news on the broadcasting industry from the BBC

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# BBC MONITORING



# CONNECTING TO EDUCATE

The basic tenets of broadcasting - to inform, educate and entertain - apply as much to international radio as they do to national and local radio and TV. News usually forms the backbone of international radio services while entertainment, ranging from classical music to literature, theatre to art, pop music to comedy, is often seen as the filling in the current affairs sandwich. One area where international radio can play an unrivalled role is education.

A large number of radio stations have for many years run language courses as a way of spreading knowledge of a country's mother tongue to a global audience at extremely low cost. Particularly well known are the English language radio teaching programmes broadcast by the BBC World Service, Radio Australia and the Voice of America, or the successful German language courses put out on Deutsche Welle and the former Deutschlandfunk. Followers of international radio may also recall *Russian by Radio*, *Let's Learn Korean*, *Dutch by Radio* and *Chinese for Beginners*.

As a language teaching classroom, the international airwaves cannot be rivalled. Programmes reach all parts of the world, and listeners are keen to learn from the lessons that they hear. Governments, who are generally the paymasters of international radio stations, are pleased that they can spread their nation's culture in this cost-effective way.

But this is only one way in which international radio can play an educational role. In North America some pioneering geography teachers have found that using short wave radio can help motivate

their students and enliven what could otherwise be a somewhat dull subject. Myles Mustoe, a teacher in the US state of Washington, has described bringing a radio into the classroom as giving his students an instant electronic field trip. Tuning to radio programmes from the very countries which the class is being taught about brings them to life, says Mustoe, and stimulates interest among pupils.

David Turnbull, Professor at Seneca College of Applied Arts in Ontario, Canada, and avid radio listener, has included short wave listening in his *Media Analysis* course. Students have to monitor English language programmes from stations in a particular geographic region, such as Eastern Europe or South America, and compare the radio programmes with what the Canadian, US and West European press says about that area. Joe Vaira, a student in Turnbull's class, comments that using international radio enables students to examine the way different stations - and thus often governments - tailor a news report to suit their own agenda. Comparing the news of radio reports, direct from the country concerned, with the international press, allows the students to critically analyse and evaluate.

Radio has the flexibility and immediacy to react to situations that develop anywhere in the world. Years of Soviet occupation and intense civil war have left Afghanistan in a terrible state. The country's basic infrastructure has collapsed, with no central or local government, no education system, no health care, and an extremely limited, and for much of the time non-existent broadcasting system. But the war's effects go deeper.

Tens of thousands of land mines were left by Soviet troops and Afghan resistance fighters, but few if any records exist of the whereabouts of those mines. There have been countless cases where children playing with these deadly devices were either killed or horribly maimed - simply because they had no idea what they were playing with. Similarly, farmers returning to their fields have been unaware of the mines, and have been injured or killed while sowing or reaping their crops.

To try and improve awareness of this situation, the BBC World Service's Pashto language programmes, in conjunction with the World Health Organisation, have been broadcasting a regular soap opera called *Village Voice*. Using local actors in a way which appeals to the huge audiences which the Pashto service has throughout Afghanistan and the refugee camps in Pakistan, the programme has highlighted what the mines look like, how dangerous they are and what to do if someone is injured by one. In countries not ravaged by a war waged for half a



The war-torn main street of the Afghan capital Kabul

generation, it is all too easy to forget that without an education system, even basic first aid cannot be taught.

It is impossible to quantify the wide-ranging benefits of such programmes. It is likely that without them, many more would have been killed or injured.

Other issues that have been tackled in *Village Voice* and soap operas broadcast to other areas of the world include Aids, water-borne disease and contraception.

One problem facing listeners in the developing world is that of finding batteries to power radio receivers on which to listen to programmes, whether educational or entertaining. In many countries in sub-Saharan Africa, for example, batteries are extremely costly, often of poor quality and in many places difficult to come by. Mains electricity supplies, where such things exist, are erratic.

But there is a possible solution

to this problem on the horizon, for a British inventor has devised a radio receiver that is powered not by mains electricity or by batteries, but by an energy source more often found in children's toys - the clockwork mechanism. Trevor Bayliss had seen a television programme on the spread of Aids. Radio, said the programme, could provide the right means of telling people in the poorest, most remote parts of Africa of the dangers, and educating them in simple but effective prevention techniques. The problem was that radio batteries were either too expensive or not available in these regions. Bayliss was inspired and set about finding a way to help solve the problem. He discovered that it is possible to build a radio set which offers the user the choice of medium wave, FM and short wave but is powered for up to 20 minutes by a number of turns of a handle which winds a specially designed spring which can then release sufficient energy to drive a tiny generator and power a radio.

The clockwork radio set is now being manufactured and sold in South Africa under the name *Baygen* and the new company established to market the receiver hopes to see sales across the continent, and into other parts of the world that face similar problems.

Aid agencies and audiences have reacted positively to this novel way of bringing radio to the least affluent areas of the world. Similarly, these non-governmental organisations have enthusiastically supported the world's

international radio stations in their educational programmes. But what do those who pay for the world's leading international broadcasters think? They are keen that their country's international radio service should be seen carrying out this altruistic work, but seem less keen to fund them adequately. In almost every western country the budgets of radio stations are being cut, and it is up to the station's producers to seek additional funding from international aid agencies and other benevolent institutions to carry on with the more imaginative and beneficial uses of the medium. The cost is minute, yet the benefits brought to society are all but immeasurable. Luckily funding is often found, but might it not be time for governments to reappraise what uses international radio can be put to for the good of mankind?





# HOW TO CON

**T**he image that most people have of tuning to international radio might well consist of someone struggling to hear a fluttery voice fading in and out of crackles and pops on a monolithic wooden radio set that would look most at home on the set of a 1950s television soap opera. That image could not be further from the truth. Developments in technology mean that listening to an international station can be as easy as tuning to a local radio station.

International radio stations use the short wave radio bands - also known as the high frequency bands - to beam their signals around the world. Short wave signals leave the transmitter and travel up to part of the atmosphere known as the ionosphere which bounces them back to earth, rather like a tennis ball in play. These signals can bounce several times, carrying thousands of kilometres on each occasion, which means a radio station located in Europe can easily be heard in Asia.

The miniaturisation of consumer electronics has hit the short wave radio market just as it has revolutionised the world personal hi-fi with the now ubiquitous Walkman and CD player. Today you can buy a short wave radio set that is little bigger than an audio cassette pack, and

yet will bring you radio programmes from the other side of the planet.

To help you into the global world of radio listening, we have selected three examples of radio sets in the compact and table top categories and two in what might be called the semi-professional range. Of course, this is not an exhaustive survey of the market, but should help to point you in the direction of what is available and how much you might have to pay to buy a short wave radio set which will serve you well over the coming years.



The transmitting aerials of Belgium's International broadcaster, Radio Vlaanderen International

## COMPACT

There are two kinds of compact receivers available for international listening, the traditional "dial and pointer" (or analogue) sets, or digitally tuned radios. For the best results, we recommend digital sets as you can call up a station instantly, provided you know what frequency it is on. Most of this type allow you to hold regularly used frequencies in the set's electronic memory.

### Grundig Yacht Boy 400

A nicely styled portable receiver, about the size of a paperback book (but much smaller than airport blockbuster novels!). The set has long wave and FM, as well as all the frequencies from the bottom end of medium wave to the very top of the short wave band. Finding a station is straight forward using the keypad to enter a frequency, or you can search all the frequencies the radio receives using the "up" and "down" buttons which have replaced the traditional round tuning knob on most digital sets. There is a large liquid crystal display (LCD) which shows the frequency the set is tuned to, as well as displaying the time; it has two separate clocks.

At £120 (about SFr 220) this set offers very good short wave reception, and the ability to change bandwidth (in effect homing in on a frequency) helps to cut down on interference from neighbouring stations.

### Siemens RK 759

(in some markets Sangean ATS 606 or Roberts R617)

A compact, digitally-tuned travel portable with all the short wave bands used by international radio stations. There is a two time zone clock with a wake-up facility. Frequencies can be entered directly by pressing the calculator-type keypad, or you can tune through either medium wave, long wave, FM and short wave using manual tuning. There are 45 memories to store favourite frequencies, and travellers benefit from a novel automatic tuning system, or ATS. If you arrive in a strange city and want to find local stations, simply hold the FM, LW or MW button

for a couple of seconds and the set will check up and down the band, memorising the 9 strongest stations on that band.

The set retails at around £130 (SFr 240) and offers average reception on short wave, along with stereo for local FM stations.



### Sony ICF-SW100

Perhaps the ultimate compact radio set for international listening, the Sony ICF-SW100 is about the same size as an audio cassette box and has the most unusual design in its class. It opens up, just like a notebook computer, to reveal the LCD, loudspeaker and operating buttons. There are ten blocks or pages of five memories, and some of these have been programmed by Sony with main frequencies of broadcasters like Voice of America and BBC World Service. To help find your way around the memories, the display shows the station's name as well as the frequency.

There is a truly world clock which allows you to switch from the time in Singapore to Moscow with the press of a couple of buttons. Excellent short wave reception is aided by a technique called synchronous detection - a term guaranteed to baffle all but the most hardened short wave listener - that helps to sort the station you want to hear from those on either side. This is usually only found on much larger sets.

The SW100 retails at around £200 in the UK (SFr 360) and is probably the ultimate portable radio for international listening.





# INECT

## A guide to international listening

### TABLE TOP SETS

#### ROBERTS RC818 (In some markets Siemens RK670 or Sangean ATS-818CS)

A radio set that is unique in the international listening market as it has a cassette recorder built in. This radio measures 303mm x 188mm x 67mm and weighs 2.5kg, so is more suited to the home than globe trotting. The sound quality is pleasant from the large loudspeaker mounted alongside the ubiquitous digital display and calculator type keypad, and when headphones are plugged in, FM stations can be heard in stereo.

There is a clock with an alarm, and this can also control the cassette recorder's starting time if you want to record a programme from a station on FM, long, medium or short wave. All frequencies are covered so there is real international reception. Stations are well received in almost all situations with switchable wide and narrow settings for short wave listening.

The retail price is around £200 (SFr 360).



#### Sony ICF-SW77

A set that has been designed with the concept of making listening to international radio easier, although in practice the 39 buttons on the front panel may deter some people from choosing this receiver. There is a large liquid crystal display which shows frequency and time and station name when listening to a station on one of the frequencies preset by the Sony engineers. The frequencies and names of a staggering 26 international radio stations have been programmed in to some of the 177 memory channels in the SW77 which are divided into pages just like the tiny SW100 from the same manufacturer, and each pre-programmed frequency shows the length of time it is on the air.

A number of extra facilities make international reception easier, including synchronous detection and switchable bandwidths. Performance is fairly good on short wave and tends to be improved by the addition of an outdoor aerial.

The set costs around £400 (SFr 720).

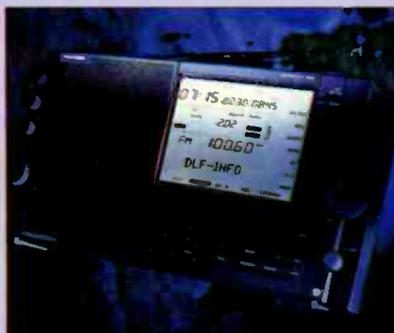


#### Grundig Satellit 900

A brand new radio set, due on the market this winter. It is the replacement for the much praised Satellit 700 from the German manufacturer which offered the European Radio Data System [RDS] visual station identification on FM stations and had a total memory capacity of well over 2,000 frequencies.

The new set boasts the largest liquid crystal display on any piece of consumer electronics, and covers all frequencies from the bottom of long wave to the top end of short wave. Frequencies of the main international radio stations have been set in the factory, and there is provision for the user to add his or her own favourite channels into the memory which, like its predecessor, can be expanded by the addition of extra ROM chips. Synchronous detection and single sideband come as standard, and the audio is improved by means of a double amplifier system when listening to mono stations, like international broadcasters.

The set will cost around £370 (SFr 670); its predecessor, the Satellit 700 which is currently on the market, retails at £350 (SFr 630).



### COMMUNICATIONS RECEIVERS

#### Drake SW8

A well designed radio set with operational simplicity included as standard. Only 20 or so buttons are needed to

operate this set (compared with more than 50 on some communications receivers) and a large digital display allows you to see at a glance what frequency the radio is tuned to. All wavebands are included, with the exception of long wave (which shows its origin - the Drake is built in the United States where there are no broadcasts at all on long wave), but with the addition of what is known as the Air Band used for communications between commercial aircraft and the ground.

Reception on short wave is excellent whether listening to major international stations or to far-off signals from national broadcasters thousands of kilometres away, and 70 memory channels allow all favourite stations to be stored for rapid recall.

The set costs about £600 (SFr 1090) and is a good choice for listeners who want a top range radio to be able to connect with the world.



#### LOWE HF-225 EUROPA

A high-performance set designed with ease of operation in mind, with no sacrifices in terms of its ability to pull in the most distant signals. The British manufacturer says that the Europa is a turbo-charged version of its standard HF-225, and it does indeed outperform many sets which are comparably priced.

The frequency range runs from well below the



lowest long wave channel to the very top of the short wave band and the model's features include 30 memory channels, different filters to alter the bandwidth, synchronous detection and different operational modes for listening to different types of signals (like radio amateur transmissions). It performs superbly and comes highly recommended by experts in the field who note the no-frills design and easy to use controls.

At £700 (SFr 1260) this set offers good reception in all conditions but the relatively small number of memories may be a drawback for some listeners.

# Simply the best



**ONCE  
AGAIN  
THE BEST  
IS BRITISH!**

The Low HF250 is set to become the new world standard for mid-priced communications receivers. Building on from the world-wide success of our HF225 and HF150 models, the new HF250 combines Lowe's traditional high standards of performance and quality of construction together with the advanced facilities and control features required by today's discerning listener.

**FEATURES** ● Continuous coverage 30kHz to 30MHz ● All long, medium and shortwave bands

- All-mode operation AM, LSB, USB, CW ● Suitable for broadcast, fax, ham radio and utility reception
- 255 memory channels ● Computer control via built-in RS232 port ● Clock with 2 independent timers ● Back-lit display
- Tape recorder switching output ● Fixed level output for fax decoding or recording ● Ultra fine tuning
- Narrow AM filters to eliminate interference

**OPTIONS** ● Infra red remote commander ● Synchronous detector ● Whip Amplifier  
● DC lead ● RS232 computer control lead

All in all, the HF250 is an amazing receiver, and is guaranteed to satisfy the genuine listening enthusiast who will appreciate its uncompromising performance. Call in at the better shortwave radio dealers, and try the HF250 out for yourself. You will not be disappointed.

You can now contact Lowe Electronics via the Internet – our E-mail address is [info@lowe.demon.co.uk](mailto:info@lowe.demon.co.uk) or look at our Virtual Radio Store™ pages on the World Wide Web – <http://www.demon.co.uk/lowe/index.html>

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## THE ALTERNATIVE TO SHORT WAVE

Gone are the days when short wave was the only way to hear programmes from other countries. Today, satellite reception is becoming common as more international radio stations hire time on communications satellites orbiting the earth. The greatest concentration of satellite programmes is beamed to audiences in Europe, but Asia, the Middle East and North America are quickly catching up.

To listen to programmes from space you will need a satellite receiving antenna - commonly known as a dish because of its parabola shape - probably fixed to a wall or free standing in the garden. It will need to face the south if you live in the northern hemisphere or the north if you live south of the equator. It is important that there are no obstructions between your dish and the satellite in the sky - if you are surrounded by high rise buildings, or live in the middle of a forest, reception is going to prove difficult.

The antenna will have to be connected to a satellite receiver, and then to your television and hi-fi unit. Radio stations ride on the back of TV signals; for example, to listen to Deutsche Welle radio in English on Europe's Astra satellite, you will have to switch your satellite receiver to RTL-2 television, and select what is known as the "audio subcarrier" for DW radio on a frequency of 7.92 MHz. This might sound a little complicated, but most people soon get used to the procedure.



The artistic future of satellite reception?

If you have connected your satellite receiver to your hi-fi system, you can switch off the television and listen to the radio in perfect quality. Pure bliss!

A couple of words of advice - for maximum flexibility, and to "future-proof" your satellite equipment, choose a motorised system which can see different satellites in the sky. As new satellites are launched you will be able to tune in and listen to whatever becomes available. Do not try to install a system yourself unless you are very confident that you can get it working satisfactorily. And shop around for several quotations from different suppliers to make sure that you are not overcharged.

If you are listening to programmes from overseas at home, there is a choice today

between short wave or satellite reception. For travellers, short wave is still the only option at the moment, but maybe by Telecom 99 there will be something new on offer, such as digital broadcasts delivered by satellite to hand-held receivers everywhere in the world. The technology is there - all that's needed are some entrepreneurs to help international radio take its next evolutionary steps.

## IMPROVING RECEPTION

Despite the huge improvement that today's radio receivers represent over those of just a few years ago, listeners still need to help those long distance radio programmes into their homes. You probably would not think about watching television without connecting an aerial on your roof to your set, but few people who listen to international radio bother to use an outside antenna. Yet radio programmes from overseas travel far further than a TV signal.

So a simple outside aerial can make all the difference to getting good reception. All that is needed is a length of copper wire, maybe 10 metres long, running from your house to a tree, or to a neighbouring building, which at one end is connected to your short wave radio, either using the external aerial socket which is provided on many sets, or by wrapping the end of the wire around the base of the set's telescopic aerial. Make sure that outside the wire cannot come into contact with electric cables.

Do not use your radio near electrical equipment that can cause interference, like computers, television sets, refrigerators or other motorised devices.

Place your radio near an outside wall, particularly if you are staying in a modern hotel - the building's steel frame can reduce a signal that is loud and clear in the street outside to a mere trickle indoors.

And make sure that you try all the frequencies that a broadcaster is using to find the best one. Because the ionosphere changes throughout the day, it will reflect short wave signals in different ways at different times. That is why many radio stations transmit their programmes simultaneously on a number of frequencies.

All these suggestions are simple, and if you follow them you should enjoy good listening on short wave.

## AID FROM THE AIB

The Association for International Broadcasting exists to help you make the connections.

For professionals in the international radio industry, we are a centralised source of information on the latest developments in programming and equipment. We bring together the different branches of the industry - broadcasters, equipment suppliers and radio manufacturers - to help create the best possible output. We bring to the listening public information about station schedules and programmes, and also advice on radios and listening.

The AIB is here to help you - whatever your interest in international radio broadcasting, and whatever your needs may be.

### So why not join us?

We have a corporate membership scheme for stations and companies; professional membership for individuals working in the industry; and personal membership for listeners. We circulate news of world-wide developments, we arrange conferences and exhibitions, and encourage wider knowledge and appreciation of international radio.

For membership details, write now to:  
The Association for International Broadcasting  
PO Box 990  
LONDON SE3 9XL, England



# CONNECTING WITH THE WORLD



**T**he world is at your fingertips, twenty-four hours a day, every day of the year, via international radio. Here, to help you connect with voices from all over the planet, are profiles of just a handful of the world's international radio stations.

**AMERICA ONE** is a joint venture of the two most well-known and respected names in non-commercial broadcasting in the United States: National Public Radio (NPR based in Washington DC) and Public Radio International (PRI in Minneapolis, Minnesota). America One currently brings 10 hours of the finest American public radio programming to all of Europe each day. For the European listener, these programmes are a window on America, providing a profound view of US politics and society with all its assets, blemishes and complexities. *All Things Considered* and *Morning Edition* from NPR, and *Monitor Radio* and *Marketplace* from PRI are just a few of the better known radio programmes on the America One line-up.

*To hear America One tune to the WRN feed on Astra 1B. Switch to VH-1 television, and the audio subcarrier of 7.38 MHz. Programmes are heard Monday to Saturday at 0430-0600, 0700-0900, 1300-1500, 2000-2200, 2300-0100 Central European Time.*

*America One, Bernt-Notke-Weg 2, 81927 Munich, Germany.*

**RADIO AUSTRALIA** is the international arm of the Australian Broadcasting Corporation and aims to develop regional and international awareness of Australia, and an understanding of Australian attitudes towards regional and world affairs. The station broadcasts every day in Indonesian, Cantonese, Mandarin, Thai, French, Tok Pisin, Khmer, Vietnamese and English.

The English service, running 24 hours-a-day, broadcasts World News every hour, and there are five bulletins of Australian News throughout the day. Reports from around the Pacific and features about life in the region also form an important part of the station's schedule.

There are also programmes which cover the environment, science, politics, business and economics, the arts, technology, and Australian music.

*To hear Radio Australia, tune to these short wave frequencies: 15510kHz (0300-0400, 0600-0700GMT), 21725kHz (0800-1100GMT), 15530kHz (1100-1300GMT), 11660kHz (1430-1800GMT), 7260kHz*



**Presenters of Radio Australia's Mandarin service**

**Voice of America is one of the world's largest international broadcasters**

*(1800-2100GMT), or via World Radio Network on Astra in Europe and Galaxy 5 in North America.*

*Radio Australia, GPO Box 428G, Melbourne, Victoria 3001, Australia*

**RADIO AUSTRIA** is part of ORF, Austria's public service broadcaster, and reports comprehensively and objectively on the latest political and economic events in the central European country, as well as providing coverage of the arts, sport and human interest stories. Music is an important ingredient of the broadcasts which can be heard in German, Arabic, Spanish, French and English, with Esperanto on Sundays for listeners in Europe.

*ORF Radio Austria broadcasts on short wave between 0400 and 2300GMT on 6155kHz, and 0400 to 1800 on 13730kHz, and 1800 to 2300 on 5945kHz.*

*Radio Austria International, A-1136 Vienna, Austria*

**BBC WORLD SERVICE** is the world's most trusted international radio broadcaster, with programmes in 41 languages heard by a regular audience of more than 133 million people world-wide. News forms the cornerstone of BBC World Service output, with a news bulletin on the hour, every hour, in the 24 hour-a-day English service. There is also extensive coverage of business and economics, sport and regional politics, together with feature programmes which examine the way we live today.

*BBC World Service operates on short wave for listeners around the world, and can be heard on satellite in Asia, the Middle East, Europe and North America.*

*BBC World Service, Bush House, Strand, London WC2B 4PH, UK*

**CHANNEL AFRICA** is the external service of the South African Broadcasting Corporation. It beams programmes in English, Chichewa, French, Kiswahili, Portuguese, Silozi and Tsonga to the whole of sub-Saharan Africa, where radio remains the most popular form of mass communication.

Channel Africa reports comprehensively about events throughout Africa and in the new South Africa, with news, politics, economics and business, sport, health and the environment from across the continent.

*Listen to Channel Africa on short wave 0300-0500GMT on 5955 and 3220kHz, 0500-0600GMT on 9695 and 5955kHz, 1500-1800GMT on 3220 and 7240kHz, 1600-1700GMT on 9695kHz.*

*Channel Africa, PO Box 91313, Auckland Park 2006, South Africa*



**Kachana Kachana of Channel Africa's Silozi service**

**YLE RADIO FINLAND** is part of the Finnish Broadcasting Corporation. It has programmes in French, German, Russian, Finnish, English - and Latin. The station reports from the Nordic region and provides a northern European viewpoint on regional and international affairs. And the Latin? That can be heard at weekends when a professor comes into YLE's Helsinki studios to translate and broadcast a summary of the week's Nordic news in the classical language.

*YLE Radio Finland is on the air on short wave to Europe on 6120, 9730 and 11755kHz, and on 963 and 558kHz medium wave, and via the World Radio Network.*

*YLE Radio Finland, PO Box 78, 00024 Helsinki, Finland*

**VOICE OF GREECE** is the 5th network of Hellenic Radio ERA which has been broadcasting around the world for 48 years. The station traces its current form back to 1975 when a 24 hour-a-day service was started. Today the Voice of Greece broadcasts in Greek, Albanian, Arabic, Bulgarian, French, German, Spanish, Italian, Polish, Portuguese, Romanian, Russian, Swedish, Serbo-Croatian, Turkish and English.

The station forms part of Greek public broadcasting, providing a permanent link with home for some 5 million Greeks living abroad, with the latest political, economic and cultural news as well as the country's music. It is also an instant live source of information for over 70,000 workers in the Greek maritime industry.

*The Voice of Greece is on the air in English at 0740GMT on 9425, 11645 and 15650kHz, 1440GMT on 15650 and 17520kHz, 1900 on 7450 and 9380kHz.*

*Voice of Greece, PO Box 60019, 15310 Aghia Paraskevi, Athens, Greece*

**VOICE OF RUSSIA**, known as Radio Moscow World Service until 1994, broadcasts programmes in 31 languages for 77 hours a day to an audience it estimates at almost 100 million.

Voice of Russia brings the whole range of views and opinions to its listeners while doing its best to avoid one-sided coverage of events and the promotion of any particular political ideas. In this sense, Voice of Russia sees itself as a mirror reflecting the complex and controversial developments unfolding in Russia, a country with a population of around 150 million people.

As a state-run broadcaster, Voice of Russia represents the government's viewpoint and upholds the interests of the Russian Federation. The station's main priority, however, is to tell listeners more about Russia and to aid better understanding of the country. It is no longer trying, as it did in the past, to paint a picture of the country as a "shining house on the hill" but instead seeks to provide a more realistic and recognisable image of Russia and its place in the world.

*Voice of Russia broadcasts on short wave from an extensive network of high power transmitters across the republics of the former Soviet Union. The English service is on the air 24 hours-a-day.*

*Voice of Russia, Moscow, Russia*

## The World's International Radio Stations

<p>Africa No 1 All India Radio BBC World Service Broadcasting Service of the Kingdom of Saudi Arabia Channell Africa China Radio International Deutsche Welle Far East Broadcasting Association La Voz de los Andes Monitor Radio International NHK Radio Japan Polish Radio Warsaw Radio Albania Radio Algiers Radio Alma Ata Radio Australia Radio Austria International Radio Baku Radio Bangladesh Radio Belarus Radio Bras Radio Budapest Radio Bulgaria Radio Cairo Radio Canada International Radio Ethiopia Radio Exterior de España Radio France Internationale Radio Habana Cuba Radio Iraq International Radio Korea Radio Kuwait Radio Latvia Radio Moldova International Radio Netherlands Radio New Zealand International Radio Norway International Radio Pakistan Radio Portugal Radio Prague Radio Romania International</p>	<p>Radio Singapore International Radio Slovakia International Radio Sweden Radio Tashkent Radio Thailand Radio Ukraine International Radio Vilnius Radio Vlaanderen International Radio Yerevan Radio Yugoslavia Radiodifusion Argentina al Exterior RAI Sri Lanka Broadcasting Corporation Swiss Radio International Syrian Arab Republic Broadcasting Service Trans World Radio United Arab Emirates Radio Vatican Radio Voice of America Voice of Greece Voice of Indonesia Voice of Islamic Republic of Iran Voice of Israel Voice of Malaysia Voice of Nigeria Voice of Russia Voice of Turkey Voice of Turkmen Voice of Vietnam YLE Radio Finland</p>
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Information about all these international radio stations can be obtained through **The Association for International Broadcasting**, PO Box 990, London SE3 9XL, England.

**SWISS RADIO INTERNATIONAL** is the international service of the Swiss Broadcasting Corporation, and Switzerland's broadcasting law defines SRI's role as enabling Swiss citizens abroad to maintain contact with home, contributing towards the process of communication and understanding between peoples and promoting Switzerland's image abroad.

One of the station's main aims is to bring impartial, accurate and timely news to listeners in regions where access to information is difficult, such as developing countries and areas in conflict. SRI's audience varies between 6 and 12 million regular listeners to its short wave services.

English, French, Italian, German, Spanish and Arabic programmes are broadcast on short wave, while two 24 hour-a-day satellite channels offer round-the-clock programmes in English and French, with German and Italian satellite services planned for 1996.

*Listen to Swiss Radio International in Europe on short wave between 0600 and 2150GMT on 6165kHz, 0600-0900 and 1200-1500 on 9535kHz, 1900-2045 on 9905kHz, and via the Astra satellite in English and Eutelsat II-F1 in French.*

*Swiss Radio International, Giacommettistrasse 1, 3000 Berne 15, Switzerland.*



**BBC**  
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The BBC World Service Shop at Bush House in London's Strand opens up a whole world of classic radio and television programmes from the BBC. The best of the BBC's comedy, drama, poetry and children's radio programmes are available on audio tapes while a wide range of BBC videos allows you to build a library of your favourite television programmes from cookery to natural history, sports to comedy classics.

*Also available are the latest short wave radios, BBC World Service souvenirs, books about radio and television production and a range of BBC magazines and books.*

**Bush House, Strand, London WC2B 4PH** (Underground: Holborn or Temple)

Telephone: +44 (0)171 257 2576 Fax: +44 (0)171 240 4811

**OPEN: Weekdays 0930 to 1730 (Wednesday 1000 to 1800) and Saturday 1000 to 1700.**



**HOW**

*Wiggly Lines*

**TURNED  
BACK INTO ONS  
AND OFFS**

**Y**ou might say that the early pioneers such as Edison and Marconi got it wrong. They had the answer in their hands more than a century ago. The first electrical telecommunication device - the telegraph - worked by sending a sequence of electrical pulses, "ons" and "offs" down a wire, often using Mr Morse's famous Code.

Of course it is not fair to blame the pioneers. Their work was difficult and represented huge achievements. But the early simplicity was soon swept away by the marvellous invention of the microphone. Voices, music and other sounds could now also be sent down a wire, but this meant that the "signal" - the translation of sounds into electrical impulses became much more complex.

Wonderful! Now singers, speakers, musicians could all be first of all recorded and then have their efforts sent all around the world by the further marvel of short-wave radio.

The trouble was that the signal was now so complex that it got horribly distorted. In the case of short-wave radio, a certain amount got lost on the way to the transmitter, dreadful things happened to it during short-wave transmission, and still more on the final link to the loud-speaker in the listeners' radios. Domestic radio, with interference from nearby stations, wasn't much better. Gramophones produced what were by today's standards very poor sounds. But so miraculous was it all, and so useful, that radios and gramophones flourished in a golden age of sound. The Second World War saw a huge leap forward in the ways in which sound was used, with many countries developing domestic and external broadcasting on a large scale.

However, in the background the inventors' minds were working on the problems.

Three vital inventions were made - the computer, the microchip, and the satellite.

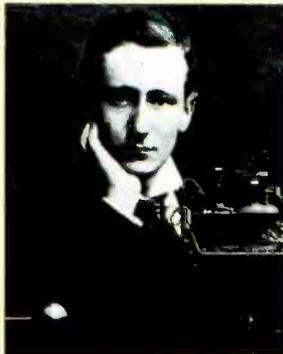
The computer worked on the old telegraph principle of ons-and-offs, but now the offs and ons could be recorded and dealt with at very high speed. In fact the principle was even simpler than Morse Code. There were no longs and shorts, no dots and dashes, just ons and offs. With the creation of a few codes, complicated data could now be manipulated, stored and transmitted.

Meanwhile, visionaries such as Arthur C. Clarke had seen how rocket technology could put satellite receiver/transmitters into orbit, and deliver interference-free sound to anywhere in the world. The old hazards of short wave and medium wave transmission could, in theory, soon be forgotten.

Then came the microchip. Almost at a stroke the monstrous early computers could be shrunk and could work at much higher speeds.

Data - written figures and words - could now be turned into on-and-off computer code. The ancient miracle of the 78 rpm disk, which had turned into the miracle of the long-playing record, both worked by engraving wiggly lines in the disks. Surface noise, scratches, greasy marks, and just plain wear and tear: all conspired to corrupt the miracles. And then the combination of microchips and lasers created the compact disc. After a century, ons-and-offs, played at incredibly high speed, had produced a medium of near-perfect quality that was almost indestructible.

Satellites started flying in great flocks. Data, sound, and now video could all be turned into ons-and-offs, the process now being known as "digital"



technology. Computer, chip and satellite had transformed the world of telecommunications.

This new revolution is being called "convergence", one of the big themes of Telecom 95. All telecommunication, indeed almost any kind of human communication, can now be turned into a fantastically fast stream of digital ons-and-offs. This is not confined to data, sounds and pictures. Images and written text can be "scanned" and transmitted, in a modern version of the lumbering older technology of teletype. Newspapers, books, whole encyclopaedias, can be put onto computer disk, or compact disc.

Family photographs can be played off compact disc. The magneto-optical disk is now making its appearance, easily and cheaply recording in digital form. Video-tapes are commonplace in the home.

Radios can display visual information about programmes, as well as about traffic conditions; televisions that are also personal computers are available for home use; personal computers can be used to pick up radio programmes.

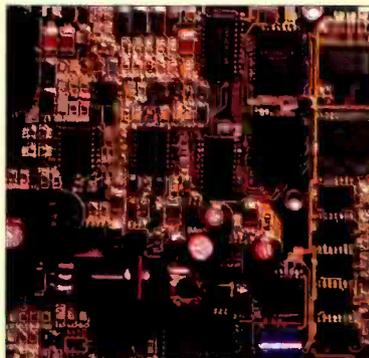
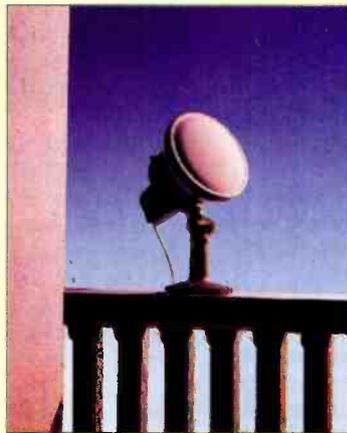
The whole radio industry is in the throes of the digital revolution. Digital sound is virtually free from interference and distortion. Perfect sound out of the studio, up to a satellite, back down via earth station and cable, with perfect results arriving at the other side of the globe. Although it is costly, engineers are investing in digital sound reproduction, and using digital and computer technology in areas like switching and other kinds of control, replacing the fallible mechanical systems.

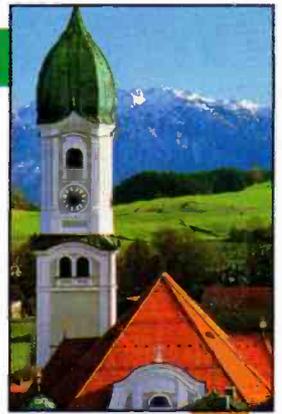
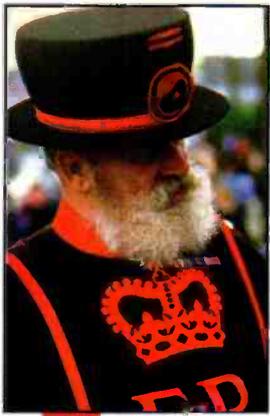
New transmission systems are in the offing. Portable digital satellite gear is now frequently in use. There is a big move towards "Digital Audio Broadcasting" (DAB). Radio stations using DAB will be permanently hooked-in to satellite links, listeners will buy special receivers, and lo and behold, perfect radio reception at last! And if today's visionaries, and hard headed engineers, have their way, DAB will be commonplace in much of the world in the next few years. International broadcasting in particular could benefit greatly from this, with short-wave transmission finally being consigned to that famous dustbin of history.

Of course, reality, especially financial reality, has a way of bringing broadcasters down from the skies with a nasty bump. DAB will be very expensive, for listeners as well as broadcasters. But active experiments and practical plans are well under way.

Focused on digital methods, all telecommunication is tending to "converge", to use digital techniques. Perhaps this is best seen in the world of personal computers. On home computers now, the buzz-word is "multi-media", with sound, moving colour pictures, text, graphics, you name it, all on one screen at the same time. Using another magic digital box called a "modem", and the computer-user is plugged in, via an ordinary telephone socket, to the famous "Information Superhighway" - the Internet. Multi-media communication is now possible from a home computer, with sites all around the world, often just for the price of a local phone call.

"Convergence" is the name of the game. Where it is leading is hard to say. Is the future with the "information superhighway"; will we all have satellite receivers in a few years? Possibly, for the affluent part of the world. But the ITU wants to see telecommunications available for all, and many international broadcasters believe in radio reception being made available in high quality for everyone, wherever they may live, whatever their economic status. Older technologies may still have to be retained for quite a long while yet. But the future offers exciting possibilities for us all.





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- Upper/Lower Sideband
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- Programmable Sleep Timer

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Weight: 4 lbs

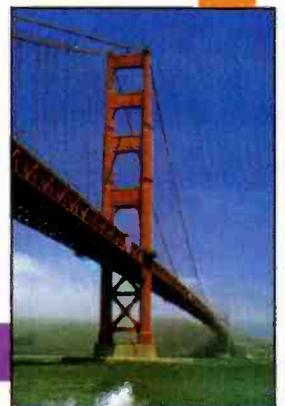
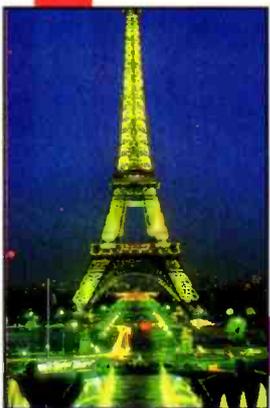


Once again, Grundig revolutionizes the art of radio technology! Introducing the newest and most advanced shortwave radio available today. If you are serious about shortwave radio, the Satellit 900 is for you!

Years of experience and technology were brought together to create the Satellit 900. Although it is technically advanced, featuring a PC interface, synchronous detection and RDS radio text, the Satellit 900 is one of the easiest-to-use products on the market today!

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