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short wave magazine

May 1996 £2.50 ISSN 0037 - 4261

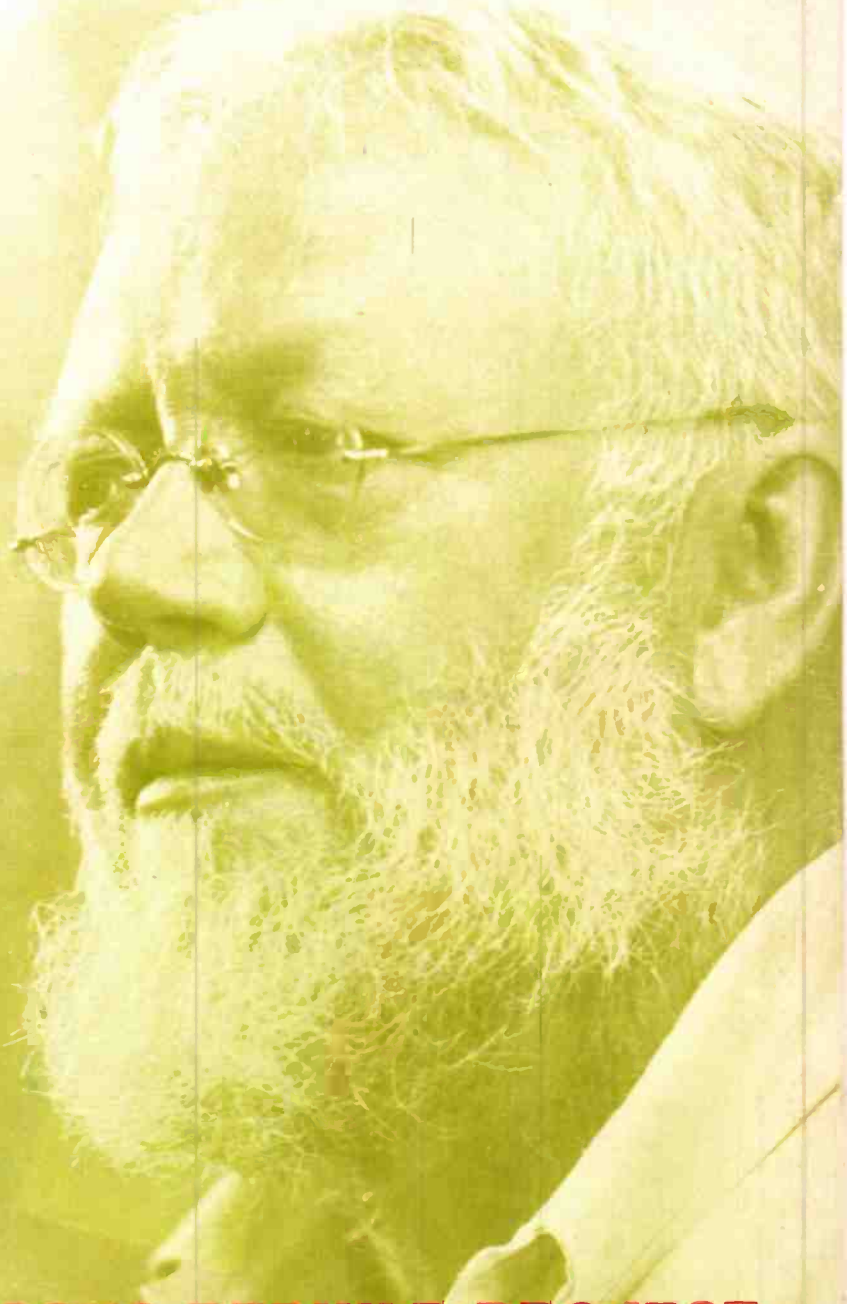
PART 2 AR7030 COMPETITION

WiNRADiO
A Radio Inside Your PC!

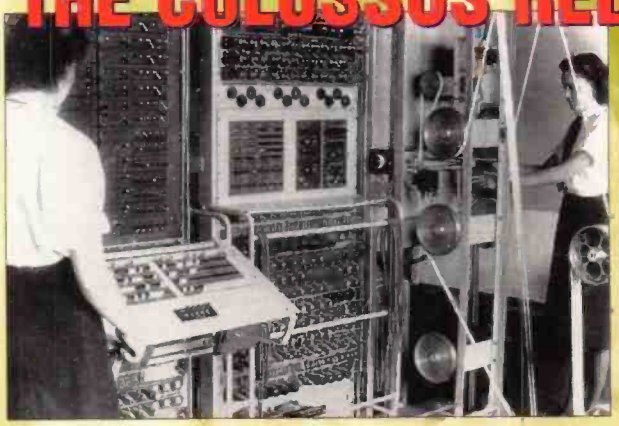
Radio Pioneer
R. A. Fessenden profiled

Win the Latest HF Receiver
Our AOR AR7030 COMPETITION Part 2

John Wilson
Filters for Receivers - 2



THE COLOSSUS REBUILD PROJECT
WWII Computer Resurrected



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- case
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PRICE £325.00

UBC220XLT

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- Records frequencies automatically with Patented Digital Auto Filter & Digital Auto Capture.
- Reaction Tune the AOR AR8000, AR2700, ICOM R7000, R7100, R9000, Radio Shack Pro 2005/2006 with OS456 installed, and the Radio Shack Pro 2035/2042 with OS535 installed.
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Cover Subject

Canadian wireless pioneer, Reginald Fessenden was a man well ahead of his time. Also ahead of the field was Colossus, the world's first electronic computer, built during WW II at Bletchley Park to decode the German Enigma messages.

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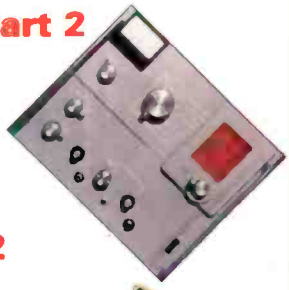


Regular Columns

Good Listening

SWM SERVICES

Subscriptions

Subscriptions are available at £25 per annum to UK addresses, £30 in Europe and £32 (Airsaver), £37 (Airmail) overseas. Subscription copies are despatched by accelerated Surface Post outside Europe. Airmail rates for overseas subscriptions can be quoted on request. Joint subscriptions to both *Short Wave Magazine* and *Practical Wireless* are available at £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 £2.60 each, photocopies are also £2.60 per article, plus £1.00 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.

Orders for back numbers, binders and items from our Book Service should be sent to: **PW Publishing Ltd., FREEPOST, Post Sales Department, Arrowsmith Court, Station Approach, Broadstone Dorset BH18 8PW,** with details of your credit card or a cheque or postal order payable to PW Publishing Ltd. Cheques with overseas orders must be drawn on a London Clearing Bank and in Sterling.

Credit card orders (Access, Mastercard, Eurocard or Visa) are also welcome by telephone to Broadstone (01202) 659930. An answering machine will accept your order out of office hours and during busy periods in the office. You can also FAX an order, giving full details to Poole (01202) 659950.

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

Reviews

Receiver reviews have been in the limelight over the last month or so following the review in these pages of the new AOR receiver by John Wilson, and by other well-known expert reviewers elsewhere. I do not intend to fuel the controversy here, but it would appear that this receiver is so good that in some instances it is testing the test equipment rather than being tested itself! Just as in Formula One, when one manufacturer makes a quantum leap in performance, it is not long before the rest try to catch up. It will be very interesting to see how, and when, the other receiver manufacturers make their moves.

Wood Norton

The **Wood Norton Radio Weekend** is a new idea - at least in the hobby radio field in the UK. Well established in the model railway world - I have personally been involved with a residential modellers' weekend for over 25 years - the Wood Norton Radio Weekend offers the listening enthusiast the opportunity to soak up advice and information on a wide range of 'listening' topics covered in *SWM* by attending lectures given by acknowledged experts, talking to other like-minded listeners, seeing what the manufacturers have on offer and getting in some hands-on experience in the listening room on a wide range of different equipment. Participants will also be able to try their hand at making a radio programme in professional studios under expert tutors.

From my own experiences, I can recommend this form of personal 'battery re-charging' - you can find out more from page 83. The BBC World Service, Lowe Electronics and *SWM* look forward to welcoming you at the first Wood Norton Radio Weekend - reserve your place now.

Dick Ganderton G8VFH

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

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.

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

As a newcomer to short wave radio, I congratulate you on producing such an excellent source of information for the many facets of the hobby.

Having been unable to decide which receiver to purchase, I finally parted company with some money in return for the excellent Lowe HF-225. If nothing else, I seem to have intrigued the neighbours with my 5m high, 20m long wire antennas. I see them staring intently at it, demonstrably puzzled, trying to work out what my 'mother of all washing lines' has over their more orthodox examples!

I enjoy reading your regular monthly articles, but one criticism, why doesn't the pirate page 'Off The Record' appear more frequently? As an avid follower of free radio broadcasts, I eagerly await the latest news, especially given the quickly changing scene due to the illicit nature of such stations.

Finally, I do not seem to be able to receive two international broadcasters which I am interested in hearing - Radio Iraq International and Radio Habana Cuba (the European broadcast). Can you help, please?

Lee Dobson
Derbyshire

*Anyone in the Derbyshire are who could, perhaps, help Lee with his problems? **Ed.***

Computers

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

Just a line or two about the use of computers in our hobby.

I used to be one of the real 'anti' brigade then I bought my own Pentium PC. I have found that Databases, Internet, E-mail and decoding (RTTY, c.w., SSTV, etc.) software have added greatly to my enjoyment of radio. I would recommend any s.w.l. to invest in a computer as soon as possible.

To those who say that computers are not part of our illustrious hobby, I would suggest that the same thing was said about a.m. and s.s.b. at their beginnings. Remember that eventually all broadcast stations will turn digital. Anyway, if you have a modern RX or scanner in the shack then you already own a computer.

LETTERS

Advice

Dear Sir

First I would like to congratulate you on your magazine. I am on my fifth edition, so as you can see, I am a newcomer to short wave radio. I own a Sony PRO-80. I had it for a wee while when I discovered it was a scanner! So much for sales advice from my local Sony centre!

My problem is I am pretty sure that I am not getting the best from it. My main area of interest is short wave. What about some articles on basic technique in using a scanner for the Novice.

Secondly, is there a club in my area. I went to a club for Hams, but they were the least friendly bunch I have ever met. I was a member of the Scottish Sub Aqua Club and new members were made welcome. I would be willing to set-up a group myself.

R. Birnie
Aberdeen (01224) 898336.

Dear Sir

I have been interested in short wave radio for a few years now. I have a Saisho SW3000 multi-band radio. I would like to improve my radio, but I need some advice on which radio to go for. I have three radios in mind, these are: Grundig YB-400, YB-500 and Roberts R82".

Could you please advise me on which radio to choose or would you suggest another radio in my price range of £200.

Ian K. Begbie
Kennoway
Fife

The best advice that we can give you is to go along to a friendly dealer who will let you try out those models you think might satisfy your needs. Buying a radio is rather like buying a car. You need to be comfortable with your new acquisition - not only with its performance but also with how easy you find it to operate. Are the knobs too small, or too stiff, or awkwardly placed. Only the equivalent of a test drive will tell you what you need to know. Also, you have not given enough information on what sort of signals you want to listen to. A radio suitable for just listening to s.w. broadcast stations will probably not be suitable for listening to some of the data modes, for instance. ***Ed.***

Receiver Reviews

Dear Sir

In his very informative review of the AOR AR7030, John Wilson refers to information, given by Lawrence Magne in his white paper *How to interpret receiver specifications*, regarding dynamic/third order intercept point.

In addition to testing at 20kHz separation, Lawrence Magne recommends testing also at 5kHz separation and records test results at both separation levels (R-5000, NRD-535) in R.D.I receiver tests.

Tests at 5kHz separation are of particular help and importance to those interested in the crowded h.f. 'Ham' bands.

To parallel the impressive results given at 20kHz separation, could John Wilson give his test results also for 5kHz separation in addition to **Table 1** of the review?

F. G. Hampshire
Brighstone
Isle of Wight

We asked John Wilson to reply to your query and here it is.

Put simply, the measured 3rd order intercept point for the AR7030 at 5kHz tone spacing comes out at +15dBm and the IFDR (Dynamic Range) at 92dB. To put that into context, the NRD-535 figures were -20/-35dBm and 65/75dB (there was a measured imbalance between upper and lower pass-bands), the R-5000 was -34dBm and 65dB, the HF-225 was -24dBm and 70dB and the HF-150 - 23dBm and 69dB. I include the HF-225 and HF-150 because, like the AR7030, they were designed by John Thorpe, but there is little doubt that the AR7030 is miles ahead of any previous design. Receiver performance of this order begins to exceed the limits of the test equipment used in measuring the parameters and even with very high quality test equipment it is possible for measurement errors to be made. A recent review from Radio Netherlands clearly showed errors in the test procedures and instead of the test equipment measuring the receiver, the receiver was measuring the test equipment. One reviewer (Chris Lorek in Ham Radio Today*) has stated that he was unable to check the ultimate limits of the AR7030 because the performance of the receiver exceeded the performance of his test equipment. To say that the AR7030 is impressive is an understatement. -* ***JW.***

Dear Sir

I am in my 70s and my interest in radio started during the Second World War when I was a Wop/Air in the Royal Air Force using the T1154 transmitter and the R1155 receiver, as a result of which after the war I purchased my first copy of *Short Wave Magazine* round about 194". It was then of course devoted entirely to transmitting topics and if my memory serves me right, the offices and bookshop was at 50 or 55 Victoria Street, London SW1 and the Editor was Austin Forsythe G6FO.

Nearly fifty years has passed since then and I currently have three receivers, one of which is an unmodified R1155, although it does not get a lot of use these days I would never for nostalgic reasons part with it as I can still remember the thrill of making my early air to ground contacts as my introduction to the joys of radio.

To get to the point of writing, people of my age group did not have the advantage that many of today's youngsters have of being taught about computers at school and so we have very little knowledge of what they are capable of doing. I was delighted to read your editorial in the February *SWM* that you had decided to include a new 'ShackWare' column and having read Jerry Glenwright's offering, I was very impressed with his approach to the subject and felt sure that his articles would be of great help in enabling me to increase my enjoyment of radio by being able to understand and use a computer in radio.

I, like Dennis Woodward (letters March *SWM*), feel very disappointed that in your February editorial you stated that 'ShackWare' would only be one page every third issue. For those of my generation, to only have four pages of information per year on what to us is a new subject is not very much. I feel sure that many of your readers are in the same situation as myself and would welcome the amount of articles per year to be increased. Could you not ask for their views and if the demand is there, increase the number of article accordingly.

Thank you for your consideration in this matter.

Roy K. Woodman
West Malling
Kent

As Editor I have to try to balance each issue of the magazine so as to please as many readers as possible. 'ShackWare' was introduced on a quarterly basis to try to satisfy a demand from readers. It also happened that there was a suitable 'slot' for the column when 'Watching Brief' finished. However, as with any topic covered by the magazine, I listen to what the readers have to say. If, as a result of this reply I am inundated with request for more 'ShackWare' I will try to respond. Of course, I could be swamped by the opposite camp! ***Ed.***

Dear Sir

I would be most obliged if you can help. I wish to enlist the help, via *SWM*, of any readers who were Radio Operators in the RAF during the Second World War.

I wish to obtain some photographs of the following receivers. R1155, Rediffon R50 and Collins 75A.

I also wish to thank all the staff at *SWM* for the excellent job they are doing with the magazine. I feel that every branch of the hobby is well catered for. It was a brilliant move to change the style and format of the magazine

James Reilly
9 Churchill Crescent
Bally Macconnell
Bangor
Co. Down BT20 5RN

Thank you for the kind compliments James, and good luck with finding the photographs you require **- KN.**

GRASSROOTS

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.

* Short Wave Magazine & Practical Wireless in attendance

rallies

April 28: The Marske-by-the-Sea Radio Rally is being held in the Marske Leisure Centre, High Street, Marske-by-the-Sea, near Redcar. Doors open at 11am. There will be all the usual traders, Bring & Buy and refreshments, plus a talk-in on S22. **Alistair G4OLK on (01642) 475671.**

April 28: The British Amateur Television Club's Rally '96 will be held at the Sports Connexion, Coventry. As always, there will be plenty of traders, special ATV displays and clubs, outside broadcast displays, Bring & Buy and an outside boot fair/flea market. The rally opens at 9.30am for disabled visitors and 10am for the general public and will close around 5pm. Admission will be £1 for adults and 50p for OAPs and under 14s. **Michael Wooding G6IQM on (01788) 890365 or FAX: (01788) 891883.**

May 6: The Dartmoor Radio Rally is to be held at Yelverton Memorial Village Hall, Meavy Lane, Yelverton, Devon. There is enough parking for 600 cars and there is access for disabled visitors and a playground for children. Trade stands, Bring & Buy, refreshments and talk-in on S22. **Ron G7LLG on (01822) 852586.**

May 12: The Drayton Manor Radio & Computer Rally will be held at Drayton Manor Park, near Tamworth. Trade stands, Bring & Buy, flea market, local clubs and special interest exhibits, licensed bar and a fun day for all the family. **Peter Haylor G6DRN on 0121-443 1189, mobile (0860) 657468 evenings please.**

***May 17/19:** The Dayton HamVention, the largest amateur radio show in the world, is taking place at the Hara Convention Centre in Ohio. Doors open at 12pm on the 17th and the event runs until early afternoon on the 19th. For the early risers, the Flea Market is open from 6am on the 17th. You will be able to visit many trade stands, attend lectures and meet amateurs from all over the world. **(PW Publishing are again organising a trip to the HamVention, for more details contact Donna Vincent G7TZB on (01202) 659910).**

May 18: Ipswich Computer Show, Willis Corroon Sports & Social Club, The Street, Rushmere St Andrew, Ipswich. Doors open 10am to 4pm. **Sherward Promotions, Upland Centre, 2 Upland Road, Ipswich, Suffolk IP4 5BT. Tel: (01473) 272002.**

May 18/19: The Yeovil Club's Amateur Radio Convention Weekend. **Note! This year it's at a new venue in Sherborne, Dorset.** Saturday 18th is amateur and family activity day and convention dinner and Sunday 19th is the 12th QRP Convention at the Digby Hall, Sherbourne. Talks, competitions, displays, selected traders, food, etc. Open 9am to 5pm. Admission/prize draw is £2. Talk-in on S22. For full details contact **G3CQR, QTHR** or telephone on **(01935) 813054.**

May 19: Trafford Rally (The Great Northern Rally), new venue, The George H. Carnall Leisure Centre, off Lostock Road, Urmston, Manchester (junction 4, M63). There will be the usual traders and attractions, ground floor location, refreshments, catering and licensed bar. Admission is £1.50, OAPs £1 and under 12s free. Free parking for up to 300 cars. Doors open 10.30a, till 5pm. Talk-in on 2m S22 via GX1TRC. **Graham G1IJK on 0161-748 9804.**

May 19: Dunstable Downs Radio Club present the 13th Annual National Amateur Radio Car Boot Sale at the Stockwood Country Park, Luton, near junction 10 M1. Open from 10am until 5pm. Talk-in on S22. Free entry to the Mossman Collection of horse-drawn vehicles and craft museum. Plot details on **(01582) 613899,** pre-bookings for plots until May 14th. Plots can be purchased on the day.

May 26: The 20th annual East Suffolk Wireless Revival will be held at The Maidenhall Sports Centre, Stoke Park High School, Ipswich, Suffolk. Admission is £1.50 which includes car parking. Talk-in on S22 GB4SWR. There will be a Bring & Buy, car boot sale, vintage radio display, Novice stall, rig clinic, antenna test, RAIBC, BYLARA and RAYNET stands with lots, lots more. **(01394) 271257.**

June 2: The Ripon & District Amateur Radio Society are holding their 39th Northern Mobile Rally at a new venue - Ripon Racecourse. There will be all the usual traders, Bring & Buy and bar/refreshments, etc. Doors open at 11am (10.30am for disabled visitors). Access - follow signs to racecourse from A61 Ripon by-pass. More details from the Rally Manager **Gerald Brady G0UFI on (01765) 640229.**

June 9: The Aldershot Amateur Radio Rally will be held at the Badshot Lea Sea Cadets HQ, Lower Weybourne Lane, Badshot Lea, near Aldershot. Varied selection of traders with most aspects of the hobby covered. Local club stands, on site catering at low prices and ample car parking. Doors open 10am, entrance fee £1, which includes free raffle entry ticket. **Roland Brade G3VIR on (01252) 837860.**

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.

RSGB City of Bristol Group: last Tuesdays, 7pm. New Friends Hall, Purdown, Bell Hill, Stapleton, Bristol BS16 1BG. April 30 - Past president RSGB by Clive Trotman. Dave Bailey G4NKT. 0117-967 2124.

South Bristol ARC: Wednesdays, 7.30pm. Whitchurch Folkhouse Assoc., Bridge Farm House, East Dundry Rd, Whitchurch. May 1 - 20m activity evening/committee evening. 8th - Building computers tech. upgrade. 15th - How to adjust and calibrate an h.f. rig. For more information ring (0127) 834282 on a Wednesday evening.

BEDFORDSHIRE

Dunstable Downs RC: Fridays 8pm. Chews House, High Street South, Dunstable, Bedfordshire. New members and visitors welcome, just drop in or call Paul G7TSJ on (01582) 861936.

BUCKINGHAMSHIRE

Aylesbury Vale RS: Wednesday evenings, 8pm. Hardwick Village Hall, (Hardwick is situated off the A413 between Aylesbury and Buckingham). May 1 - Digital TV by Nigel Pritchard G8AYM, 15th - Night on the air and c.w. session. Ivan Eamus G3KLT. (01296) 437720.

CLWYD

Conwy Valley ARC: 1st Wednesdays, The Studio, Penrhos Road, Colwyn Bay, Clwyd. May 1 - PCB manufacturing, like you have NEVER seen it before by Frank Muraca GW0VUP. R. W. Evans GW6PMC (01745) 855068.

CORNWALL

St Austell ARC: 1st & 3rd Monday Skywave, 47 Trevarthian Rd, St Austell or Poltair School, Trevarthian Rd (in term time). Reg G4TRV (01726) 72951.

DEVON

Plymouth RC: Tuesdays, 7.30pm. The Royal Fleet Club, Devonport, Plymouth. May 14 - Selection of rally jobs F P Russell on (01752) 563222.

Exmouth ARC: Alternate Wednesdays at Scout Hut, Marlpool Hill. May 8 - Club night, 22nd - May Internet. David Fox G0NRR on (01395) 277140.

FIFE

Dunfermline & DARC: Thursdays, 7.30pm. The former RAF radio station, Outh Muir, located by the A823 Dunfermline to Crief Road, one mile from the Knockhill Racing Circuit. May 2 - Natter night, 9th - VHF operating evening, 16th - HF operating evening, 23rd - 2m DF hunt - come along and have a fun evening - organised by James GM4WZP. Adrian Donaldson GM0SRD on (01383) 735967.

GREATER LONDON

Southgate ARC: 2nd & 3rd Thursdays, 7.30pm. The Pavilion, Winchmore Hill Cricket Club, Firs Lane, Winchmore Hill, London N21 3ER. April 25 - Radio on the air, May 9 - Lecture from Mr Stan Wood, 23rd - Radio on the air. M. E. Viney G0ANS. (01707) 850146.

HAMPSHIRE

Horndean & DARC: 1st & 4th Tuesdays, 7.30pm. Lovedean Village Hall, Lovedean Lane, Lovedean, Hants. May 7 - Natter night. S. Swain (01705) 472846.

Southampton ARC: Mondays, 7pm. This club is now up-and-running after some years of inactivity. New members welcome. Harold McIntyre on (01703) 737715.

HEREFORD & WORCESTER

Bromsgrove ARS: 2nd & 4th Tuesdays. Lickey End Social Club, Alcester Road, Burcot, Bromsgrove. May 14 - DF hunt (on foot). Barry Taylor. (0152?) 542266.

Malvern Hills RAC: 2nd Tuesdays. Red Lion, St Annes Rd. Jim Davis G0OWS. (01684) 576538.

ISLE of MAN

Isle of Man ARS. 1st Mondays, 8pm Transport House, Fort St, Douglas. Other Mondays, 8.30pm, Royal Naval Assoc, Regent St, Douglas. Every Thursday, The Manx Legion, Peel, 9pm for an informal get together. Chris Wood GD6TWF, 2 Lyndale Avenue, Peel, Isle of Man.

KENT

Bromley & DARS: 3rd Tuesdays, 7.30pm. The Victory Social Club, Kechill Gardens, Hayes. May 21 - Thames Tideway Rescue. A. Messenger G0TLK. 0181-777 0420

Medway AR & TS: Fridays, 7.30pm. Tunbury Hall, Catkin Close, Tunbury Avenue, Walderslade, Chatham, Kent. May 17 - AGM. G3VUN, 40 Linwood Avenue, Strood, Rochester, Kent ME2 3TR. (01634) 710023.

LANCASHIRE

Wigan Douglas Valley ARS: 1st & 3rd Thursdays. Wigan Sea Cadet HQ, Training Ship Sceptre, Brookhouse Terrace, off Warrington Lane, Wigan. D. Snape G4GWG on (01942) 211397.

Preston ARS: Thursdays, 8pm. The Lonsdale Sports & Social Club, Fulwood Hall Lane, Fulwood, Preston. April 25 - General discussion evening. Natter night + G3KUE on the air. May 9 - Auction evening - a sale of members surplus equipment. May 23 - General discussion evening. Natter night + G3KUE on the air. Eric Eastwood G1WCQ. (01772) 686708.

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. May 1 - Videos of members shacks, 8th - Night on air construction, 15th - 'Science for all' by Arnold G3PTB, 22nd - Night on air construction. Mike G4EOL (01603) 789792.

NORTHANTS

Kettering & DARS: Tuesdays, 7.30pm for 8pm. The Isle Lodge Community Centre, St Vincents Avenue. May 7 - AGM, 14th - Final planning for 'Castles on the air'. L. J. L. Davies G0RDV on (01536) 514544.

NOTTINGHAMSHIRE

Mansfield ARS: 2nd Mondays, 7.30pm. The Polish Catholic Club, off Windmill Lane, Woodhouse Road, Mansfield. May 13 - AGM followed by a junk sale (surplus equipment). Mick G0UYQ, QTHR on (01623) 792243 or Howard G1JGY, QTHR, (01623) 423697.

South Notts ARC: Wednesdays, 7pm. Meetings held (in term time) at Fairham Community College, Farnborough Road, Clifton Estate, Nottingham. Julie Brown G0SOU. (01509) 672734.

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.

SHROPSHIRE

Salop ARS: Thursdays, 8pm. The Telesports Club, Abbery Foregate, Shrewsbury. April 25 - Talk by Shrewsbury & District Model Society. May 9 - Junk sale, haggle for goodies and acquire something to stop the shack blowing away!. 16th - Telford rally group preparation talk - find out how the rally is shaping up and say what you want to see at the Telford rally. 23rd - Fox hunt, 7pm at the Oak. Fine G0RVE and get a good start in the points league. Ian Davies G7SBD, QTHR. (01743) 463711.

SOMERSET

Yeovil ARC: Thursdays, 7.30pm. The Red Cross Centre, 72 Grove Avenue, Yeovil. April 25 - Club station on the air and committee meeting. May 2 - The Novice Licence by G3ICO County Senior Novice Instructor. 9th - VHF amplifiers by G7SDD. 16th - Preparation for the QRP convention and a fox hunt. 23rd - VHF DF hunt, G3KSK is the fox. Cedric White, QTHR. (01258) 473845

WARWICKSHIRE

Stratford-upon-Avon & DRS: 2nd & 4th Mondays, 7.30pm. Home Guard Club, Main Street, Tiddington, Stratford-upon-Avon. May 13 - Astronomy, 20th - Visit to the Nickelodeon, Ashorne. Martin Rhodes G3XZO (01789) 740073.

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 YORKSHIRE

Denby Dale ARS: Wednesdays, 8.30pm. Pie Hall, Wakefield Road, Denby Dale, West Yorkshire. 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 Malcom McKenzie G8RWN, 9 Broomhouse Close, Denby Dale, Huddersfield, W. Yorkshire HD8 8UX or (01484) 861782 for club activities.

Wakefield & DRS: Tuesdays, 8pm. The Ossett Community Centre, Prospect Road, Ossett. April 30 - On the air. Bob 0113-282 5519 or G3WWF@GB7WRG.

JUNIOR LISTENER

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

I've had a couple of letters on Radio Australia this month. The first is from Jim Murphy In Bradford, he has been using his new HF-150 to listen to lots of the broadcasts from Radio Australia. The only time he hasn't been able to track down a programme is between 2100 and 0030. There's a good reason for this, Radio Australia don't broadcast to Europe in that slot and that will make it much harder to find their broadcasts - though not impossible. In fact, they stop the broadcasts to North America, the Caribbean and North Africa as well at 2100. As you can never say definitely whether a broadcast for another area will reach you or not, here's who they transmit their programmes to:

2100-2200 to south-east Asia on 11.695MHz
2100-2300 to south-east Asia on 9.645MHz
2100-0000 to the Pacific on 9.660MHz
2100-0000 to the Pacific and east Asia on 11.66MHz in the summer and 11.855MHz in the winter
2130-0000 to the Pacific on 15.365 and 17.860MHz
2200-0000 to south-east Asia on 9.610MHz in the winter and 11.855MHz in the summer
2200-0000 to the Pacific on 13.755 and 17.795MHz
2300-0000 to south-east Asia on 11.695MHz
2330-0000 to south east Asia on 9.645, 9.850MHz and 15.240MHz
2330-0000 to east Asia on 13.605MHz

Because propagation is such an odd thing, you could hear some of these transmissions even though they aren't meant for your area. It may take a few weeks, but as the various things like sun spots, and the lighter evenings change the effectiveness of broadcast signals, you could find one of these signals. It's worth a try if you want to give yourself a challenge, let me know how you get on finding any of these other broadcasts.

The second letter is from Alan Burnett-Provan in Solihull. He's not had much luck QSLing Radio Australia and wonders if the schedules and stickers I received were because of the column. I don't think so, because I don't mention the column when I send to stations, but I usually ask for a station schedule just to keep up-to-date with the latest frequencies. Another puzzle was that Alan's QSL came via Harrow in Middlesex. Well, Radio Australia does have a non-technical London Bureau at 54 Portland Place, London W1N 4DY. I wonder if it depends who was on 'QSL duty' the day a request arrives, perhaps some are more 'generous' than others. If anyone has any ideas as to why different people get different information, let me know.

New Publications

Two listeners' clubs have produced new booklets recently. As they are published by the groups themselves, they are very up-to-date and inexpensive, so are great value for money.

The first one that arrived was from the British DX Club, and it's their *1996 Radio Stations in the United Kingdom*. This is an A5 booklet with about 43 pages in it, and its quite small printing packs it with information. It starts with medium wave transmitters and lists them in ascending frequency order, with such details (where known) as their power, parallel frequencies and like services relayed overnight.

So, for example, on 801kHz using 2kW is BBC Radio Devon from Barnstable, with parallel frequencies of 990, 855 and 1458kHz and at night, the World Service is relayed from about midnight to 6am.

The next section is on v.h.f./f.m. transmitters with the same kind of information plus polarisation details. Page 30 brings you to the postal addresses and frequency guide. This gives you the stations name and address and their transmitting frequencies as well as telephone and FAX numbers.

Finally there are small sections on subjects like, the BBC, Independent radio, pirates, reception reports and DAB.

The booklet costs £2.50 and this includes surface mail world-wide and you should send to: **The British DX Club, 126 Bargery Road, Catford, London SE6 2LR.**

The second booklet is from the International Short Wave League, and is called the *Official ISWL/DXCC Country and Prefix Lists combined with ISWL Contest Country and Prefix Lists*. This A4 publication has nine pages both in the ISWL/DXCC Country list by country and by callsign, then the second section of the book has 11 pages for the Contest Country List and 13 for the Contest Prefix List.

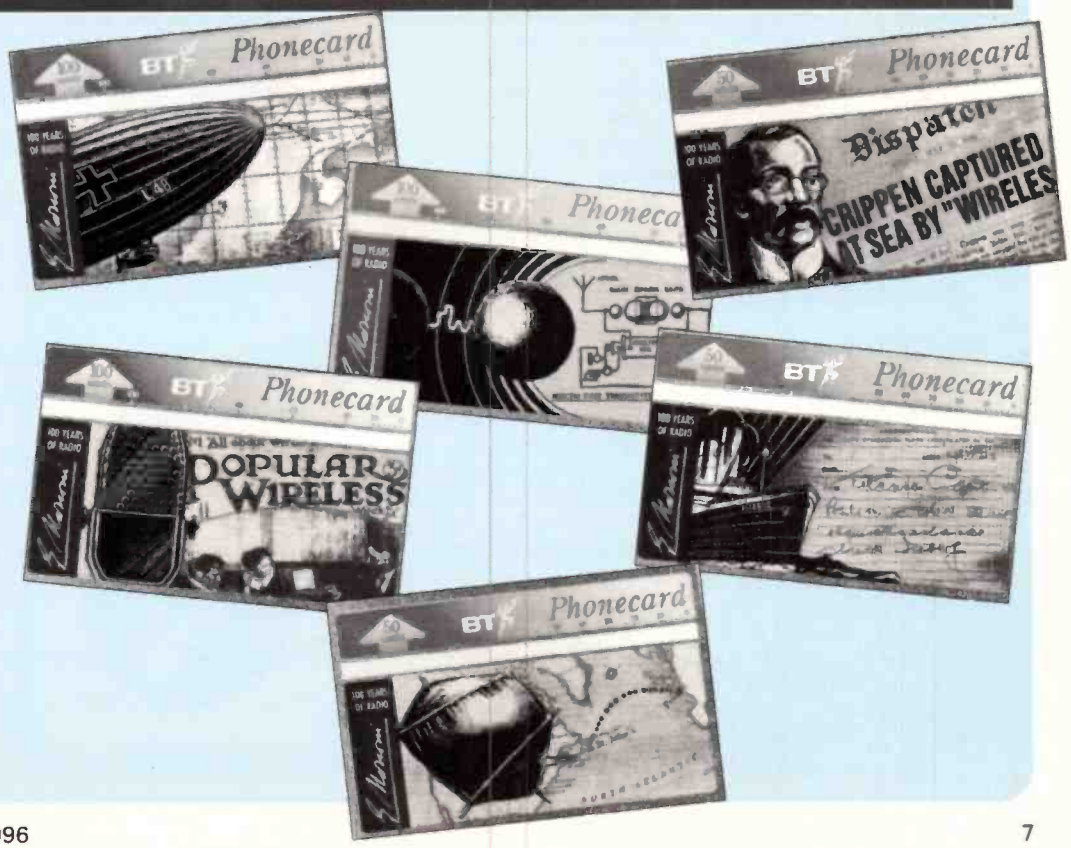
Personally, with the kind of listening I get to do, the most useful bit is the Official ISWL/DXCC Prefix List. To have an up-to-date prefix list is so useful with so many different callsigns appearing you don't know whether you have found something unusual of not. By looking the prefix up in the list you can quickly and easily see if the station you've found is unusual or not, either way I always prefer knowing which country I've found.

The booklet costs £2.50 and is available from ISWL HQ, 3 Bromyard Drive, Chellaston, Derby DE73 1PF.

Phonecards

Every so often a country issues a set of postage stamps with a radio theme, many years ago there were cigarette cards with a radio theme. Well, this time BT have issued a set of phonecards celebrating 100 years of radio. The six phonecards show different events or objects connected with wireless. There's one for November 1916 when German Zeppelin raids were plotted by Marconi d.f. stations, another with a diagram of Marconi's first transmitter, then when Crippen was captured (*SWM* told this story a few years ago), another with a microphone and a copy of *Popular Wireless* weekly on it, the fifth shows a kite antenna and the final one shows the *Titanic* and her distress message.

If you are a collector of these cards, then there is a limited edition collector's pack available and this includes an extra one-off design. Call BT Phonecard Direct on (0345) 697721. Otherwise, individual cards are on sale from the usual places.



COMMUNIQUÉ

Kulpsville SWLFest

Ask a travel agent to reserve you a room at a Kulpsville, Pennsylvania hotel in mid-March, and the first question will be "Where is Kulpsville?" The second question is: "Why go to Kulpsville?"

The first question is easy to answer: Kulpsville is found just north of Philadelphia and is easily accessible by car or plane. To the non-initiated, the second question is more difficult to answer. Kulpsville is the site of a two-day family reunion of short wave listeners from every corner of North America and in some instances from overseas: UK and Italy for instance this year. The history of this reunion is most interesting. Back in 1988 a group of about forty short wave listeners congregated to a small town in Pennsylvania to hold a weekend of talk about the hobby and exchange ideas. Many stories abound about this first Winter SWLFest, like the colours of the meeting room: pink and purple; the shootout in the dining room! Legends consist of this!

Report by Jacques d'Avignon

Since 1989, this annual event, loosely organised by: Kris Field, Harold Cones (Dr. DX) and Bob Brown, is now held at a Kulpsville motel where 150 to 200 short wave enthusiasts meet to talk about many aspects of the hobby, to exchange ideas and to listen to various expert speakers. During their stay the ideas on the hobby permeate all discussions from early morning till early morning the next day. We can see many small groups and heard discussing antennae, amplifiers, the latest receivers and any other topic that are of interest. This year on subject discussed by many was the possible demise and last minute rumoured salvation of Radio Canada International. Matter of fact, this subject was the theme of the after dinner presentation at the Saturday night banquet. The speaker was none other than Ian McFarlane, well-known short wave figure who worked for many years for RCI and then for Radio Japan.

The sessions at this family reunion are not as structured as you would expect them to be, but this is a trademark of this reunion, one other trademark is that none of the invited speakers are receiving any payments, not even a free room or meal. Everything is done for the love of the hobby.

This year more than 150 participants had the opportunity to attend non-concurrent sessions and listen to experts on one of the following topics: "The Zen of DXpeditioning" Rich D'Angelo and Chuck Rippel, "Termination of Beverage Antennas" Steve Byan, "Computing in the Radio Hobby" Ralph Brandi. One session by George Zeller and Andy Yoder on "Unlicensed Broadcast DX-ing" was very well attended! Matter of fact it is rumoured that two stations, one on a.m. and one on f.m. were operating from the confines of the hotel, "we heard special" programmes at various times during the weekend, but the station(s) remained impossible to locate...

If we use the enthusiasm of the participants to the Ninth Annual Winter SWLFest as an indication of the health of the hobby, short wave listening is alive and well!

Opto - Universal Interface

Optoelectronics recently announce their latest offering in the computer/radio interface field. The OPTOLINX is a universal interface that adapts a wide variety of radios, scanners, decoders, frequency counters, GPS receivers and other devices for connection to an RS-232C PC serial port. Software is used to switch between the half duplex and full duplex devices, both of which may be connected simultaneously

The OPTOLINX incorporates provision for connecting the popular AR8000 and AR2700 receivers to a PC for full featured computer controlled scanning. The interface also allows the user to control several radios at once, with the provision to switch between them all.

Features offered by the interface are:

- Computer control of the AR2700 and AR8000, IC-R7000, IC-R7100 and IC-R9000 using supplied cables.
- Download 'Scout' frequencies to a PC and compare against the FCC database using Spectrum 'Scout' CD-Rom.
- NMEA-0183 interface for GPS or LORAN receivers.
- Interface the AOR AR3000A to the Opto DC440 for tone decoding.
- Audio input with 'Data Slicer Circuitry' to demodulate f.s.k. data with suitable software.
- Interface 'M1' frequency counter for datalogging with *Optolog* software.
- Switch between full and half duplex radios using a remote or external switch.
- Single cable custom radio connection, via a 9-pin mini DIN connector.
- Interface multiple radios in a star network configuration.
- Exclusive built-in squelch status input for the higher scanning speeds of AR8000 and IC-R7000.
- Optional NiCad battery pack for portable operation.

The OPTOLINX is available from the following approved dealers, **Haydon Communications, Tel: 0181-951 5781/2; Nevada Communications Tel: (01705) 662145 and Waters & Stanton Electronics, Tel: (01702) 206835.**

Asia TELECOM 97 Venue Announced

After receiving invitations from several countries in the region the International Telecommunications Union - the ITU - organiser of the event has announced that Singapore's World Trade Centre will host Asia TELECOM 97.

The World Trade Centre is ideally located and offers advanced exhibition and forum facilities.

After consultation and negotiation and consideration of factors such as infrastructure, accommodation, transportation and conference and exhibition facilities, the Secretary-General of the ITU, Dr Pekka Tarjanne accepted the offer of the Telecommunications Authority of Singapore (TAS) to be host of the event.

Asia TELECOM 97 will be the eighteenth TELECOM event since World Telecom was first held in Geneva in 1971. The regional events which include Americas, Asia and Africa TELECOMS were introduced in 1985 in order to address the more specific concerns of the individual regions. Since then these events have grown in size and prestige and have become the most respected and authoritative in the world.

The world and regional events are now held in four year cycles in order to ensure adequate global coverage across all 184 member countries of the ITU. Each subsequent regional event have shown a huge growth over its predecessors.

Samuel Morse 205th Birthday

The Morse Enthusiasts Group Scotland will be holding a party to celebrate the 205th anniversary of the birth of Samuel Morse.

There will be a Special Event Station with the appropriate callsign of GB2SAM. The station will be operating on the 3.5, 7 and 14MHz bands. Join the celebrations and indulge in coffee and Birthday cake. If you're licensed, then take your favourite Morse key.

The party is to be held at; **Greater Glasgow Scout Group Activity Centre, Auchengillan Scout Camp, Blanefield G63 9AU.** The venue is courtesy of the Greater Scout Group and the West of Scotland ARS. The site is located some 14km from Glasgow. The party will take place 10.00-20.00 Saturday 27 April 1996.

COMMUNIQUÉ

Reprieve for RCI?

With only a matter of days to go before Radio Canada International was to be axed the Canadian governments have found some temporary funding. This will allow a one year reprieve and keeps Canada's short wave voice alive.

"The enormous outpouring of support for RCI, both within Canada and around the word, has persuaded us that this a is a vital voice that we must maintain", said Deputy Prime Minister Sheila Copps, who as Heritage Minister is responsible for RCI.

The 'Coalition to Restore Full RCI Funding', although happy with this decision, feel that it is coloured by the realisation that Canada's federal politicians still do not understand the importance of the service. Canada's government has not guaranteed any long term funding, has not authorised a separate budget nor has it committed Canada to having a permanent international radio service.

The 'Coalition' wants a clear statement from the Canadian government. They feel that the RCI service should be restored to at least the 1990-1991 levels, ie. bringing back language sections such as the German and Japanese services, and restoring the targeted English and French programming for different geographic areas such a Europe, Africa, Asia etc. The present funding package will not allow this.

The 'Coalition to Restore Full RCI Funding' urge anyone with an interest in seeing RCI continue to write to either, **The Right Hon. Jean Chretien, Prime Minister of Canada**, or **The Hon. Sheila Copps, Minister of Canadian Heritage**, and say why Canada needs an effective, strong voice on the international arena. They suggest that you should tell the Canadian government how RCI has helped you, your family, friends and business associates. The two politicians can be contacted at: Ottawa, Canada K1A 0A6. Alternatively **FAX: (613) 957 5556** for **Jean Chretien** and **(613) 992 2727** for **Sheila Copps**.

RCI RADIO CANADA INTERNATIONAL

50

1945 - 1995

ICS for FAX-4

The new FAX-4 weather facsimile decoder makes high quality weather FAX reception affordable - without using a computer.

The FAX-4 connects between a good quality communications receiver and one of a range of high resolution ink-jet and laser printers. No computer is required and the image quality is claimed to far exceed that which is currently available from other systems.

The unit provides automatic reception of IOC of 288 and 576 transmissions at 60, 90 120 and 240r.p.m. at a printed resolution of 300 or 360d.p.i. dependant on printer type used.

Once the receiver is tuned to the correct frequency, the operation is automatic. If a chart is tuned part way through, a manual start/stop button can be used.

The FAX-4 is able to share a printer with a computer, automatic printer switching is provide by the FAX-4. Therefore no lead switching is required.

The printer interface supports the following Centronics interface protocols; HP laser or ink-jet printers supporting PCL2 or later at 300d.p.i. eg. Deskjet 340 etc. Printer which support Epson LQ mode at 360d.p.i. and Canon printers supporting BJ-10 mode eg. BJ-30 and BJ-200ex

ICS say that the total system costs around 40% less than comparable professional systems combined with print quality never before seen in a low cost system. The FAX-4 is claimed to offer a total breakthrough.

For more information contact, **ICS Electronics Ltd., Unit V Rudford Industrial Estate, Ford, Arundel, West Sussex BN18 0BD. Tel: (01903) 731101, FAX: (01903) 731105**.

World's Smallest Scanner?

Waters & Stanton Electronics have just announced that they will be importing what must be the smallest scanner on the market. The Weltz WS1000E.

There is only preliminary information available at the moment. You can, however, look forward to a complete *SWM* review feature in the near future.

The frequency coverage of this truly pocket sized wide-band receiver is 500kHz to 1300MHz continuous. Modes available are a.m., n.b.f.m. and w.b.f.m. Search and scan facilities are provided with 400 scan memories provided.

This extremely compact receiver is powered by two AA size cells.

Priced at **£349**, further details of this interesting new scanner can be obtained from **Waters & Stanton Electronics, 22 Main Road, Hockley, Essex SS5 4QS. Tel: (01702) 206835, FAX: (01702) 205843**.

Castle Electronics

Castle Electronics are celebrating the opening of their new showroom by opening their doors on 4 & 5 May between 0900 and 1700.

You can have a Free Radio Check, visit their Service Department and enter the Free Raffle (First prize is a dual band, hand-held radio).

The Editor of *Short Wave Magazine* will be in attendance on both days - with Brown Owl, of course! So come along and introduce yourself.

Castle Electronics, Unit 3, Baird House, Dudley Innovation Centre, Pensnett Trading Estate, Kingswinford, West Midlands DY6 8XZ. Tel: (01384) 298616.

MW and LW DXers Win With TU3-LF

Lake Electronics have just released an extended frequency range version of their popular TU3 a.t.u.

The new TU3-LF has been produced in response to requests from many l.f. enthusiasts. The lower frequency limit of the new a.t.u. is 200kHz. The upper limit remains as the original TU3, ie. 30MHz.

Available now, the TU3-LF is priced at £64 plus £4P&P ready built, or in kit form £52 plus £4P&P. **Lake Electronics** are located at **7 Middleton Close, Nuthall, Nottingham NG16 1BX. Tel: 0115-938 2509**.

LOWE ELEC

Shortwave, Airband and Scanner Superstore

Lowe Electronics are the country's leading distributors and retailers of Scanners and Short Wave products. We supply everything from the mains plug to the amateur and everything else in between!

We are the recognised leaders in the world of short wave radio, both by our customers and competitors - we certainly sell more short wave receivers than many other dealers combined! Our own Lowe short wave receivers are internationally regarded as being market leaders in terms of performance and value and are sold all over the world. In addition, we are distributors for high quality receivers for Japan Radio Co. and Watkins Johnson from the USA and the excellent short wave antenna systems from RF Systems in the Netherlands. Our range of short wave related computer products includes advanced control and decoding software for weather-fax, Morse code and RTTY signals. Just ask for our Short Wave Pack or Decode pack for full information.

On the scanning front we are AOR and Yupiteru main distributors and offer a complete range of add-ons from wideband discone antennas to advanced computer control software and interfaces. We are specialists in the field of airband radio and even produce our own software product for decoding ACARS signals transmitted by aircraft allowing the aircraft enthusiast to collect tail numbers, callsigns and other flight data. Our bumper airband pack has full details. We've just been appointed distributors for WINRADIO - the exciting new PC card scanner that fits in your computer - that's going to change the way we look at radio!

Our accessory range is growing all the time and something a lot of our customers are latching onto is GPS systems - get our GPS information pack and you'll never be lost again!

We,ve got the worlds best radio accessories for all bands, from simple low-cost antenna systems to sophisticated computer controllable DSP audio filters that will tweak the last vestage of recoverable audio from signals swamped in interference and noise.

Whatever your needs in Short Wave, Airband and Scanning, you can rely on Lowe for the very best in customer support. Our 30 year experience allows us to give you the best advice on equipment and accessories before you buy together with the peace of mind that can only come from a dedicated workshop team for those moments when things go wrong.

THIS MONTH'S SUPERDEAL

JUST £249.00

For this month only the MVT7000 is just £249.00. This is still one of the most popular scanners basically because it has everything the scanner user needs.

- Covers 500kHz to 1300kHz - no gaps
- 200 memory channels
- 10 search banks
- AM FM WFM modes

Ideal for monitoring airband and marine traffic and anything else that's of interest!

It comes complete with antenna, nicad batteries, mains charger, and cigar lead and of course the famous Lowe warranty which you can't buy anywhere else!

Introducing...The JETSTREAM!

A great new entry level receiver made just for the airband listener, the JETSTREAM is a true AM receiver designed for civil airband monitoring. It even has medium wave coverage so is doubly useful at the larger airshows where the commentary Is broadcast on a local medium wave transmitter.

Super value at just £19.95 plus carriage

Just imagine - the power of your PC behind a multimode wideband scanning receiver

WINRADIO Multimedia should just about be in stock as you read this but we've been building up many orders over the last few months so get in quick!

Super value - Just £409.00 plus carriage

To receive any of our information packs, send four first class stamps for each pack requested to:

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Matlock, Derbyshire
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Telephone 01629 580800
Fax 01629 580020

Email info@lowe.co.uk or check out our site on the World Wide Web - URL http://www.lowe.co.uk/

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Everything for the serious hobby radio enthusiast

NRD535D

The NRD535D comes complete with factory fitted CMF78 ECSS board, CFL243W Bandwidth Control Unit and CFL233 1kHz narrow filter. Fitted with these options, this receiver would normally cost over £2700.00. The bandwidth control unit gives you a continuously variable IF bandwidth right down to 500Hz and used in conjunction with the pass band tuning control gives you an amazingly powerful system for eliminating interference.

A special purchase of the NRD535D allows us to offer this advanced performance receiver at a considerable saving. Pay just **£2499.00** AND we will include our famous IF/AF mod, a saving of nearly £325.00.

JRC

LOWE HF250

Despite new offerings in this price range, certain performance criteria of the HF250 are yet to be beaten, and by all accounts it's a darned sight easier to use!
£799.00 or **£160.00** deposit and 12 monthly payments of **£53.25**
0% Finance

LOWE HF150

Still the worlds most popular communications receiver, the HF150 offers quality and performance unequalled in its class and price range.
£419.00 or **£89.00** deposit and 12 monthly payments of **£27.50. 0% Finance**

GREAT FINANCE DEALS!

8 BRANCHES NATIONWIDE

FULL SERVICE BACKUP

NEXT DAY DELIVERY

Kill that noise!

Bothered by interference? Do you keep missing those weak DX stations drowned in noise? If so you need the JPS ANC4. This is probably one of the best accessories you will ever buy. Very simply, it combines the locally received interference signal with the main signal and the two are mixed together out of phase and the interference nulled out. The ANC4 works exceedingly well and will probably be the best £189.00 you spend this year!

RING NOW FOR A FREE COPY OF THE RADIO NETHERLANDS AR7030 TESTS AND READ WHAT A TRULY INDEPENDENT REVIEWER HAS TO SAY

Branches at:
Bristol - 0117 931 5263
Leeds - 0113 232 8400
Cambridge 01223 311230
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Newbury - 01635 522122
West Sussex - 01444 400786

TWO OF OUR BRANCHES ARE MOVING

Apologies to our customers in the **North East** once more as yet again we relocate our Northern outpost. We're back near the airport again, hopefully this time in a more permanent home. You'll find us just off the airport roundabout off the A1. The full address is:
Unit 18B Airport Industrial Estate, Newcastle upon Tyne, NE3 2EF
Telephone 0191 214 5424

Our **Newbury** branch has also moved to a new home. The address is:
108 Bartholomew Street, Newbury, Berkshire
Telephone 01635 522122

Robert Penfold concludes this useful project with a description of the power supply and full constructional information.

Build an Audio Signal Processor Part 2

Mains PSU

The circuit diagram for the mains power supply unit is shown in **Fig. 2.1**. The circuit requires a supply potential of about 10 to 11V. Under quiescent conditions the supply current is well under 100mA, but it can reach 150mA or so if the unit is used at high volume levels into a loudspeaker or insensitive headphones. The power supply circuit has full-wave rectification provided by D1 and D2, and conventional smoothing provided by C34. A three-terminal adjustable voltage regulator IC14 provides electronic smoothing and a stabilised output potential of about 10V (typically 10.8V).

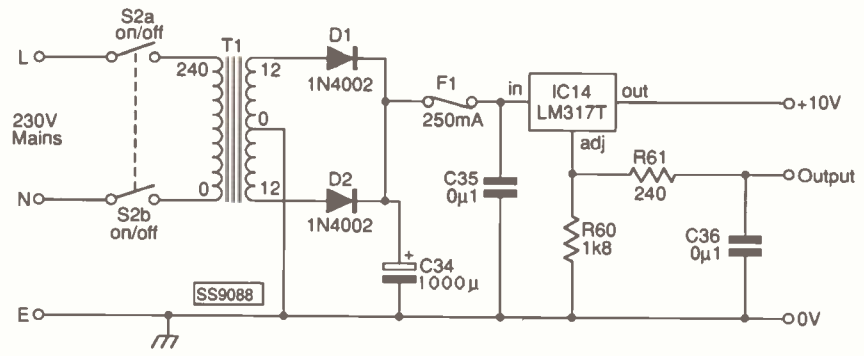


Fig. 2.1: The circuit diagram of the mains power supply.

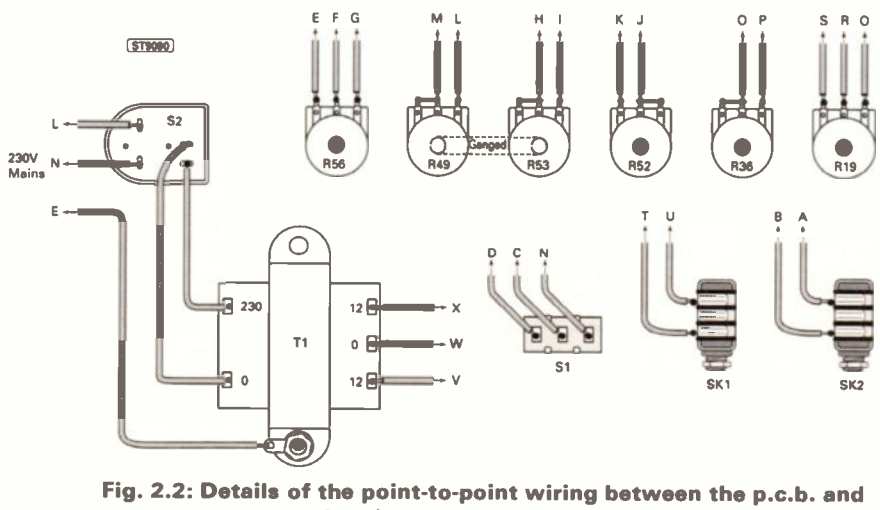
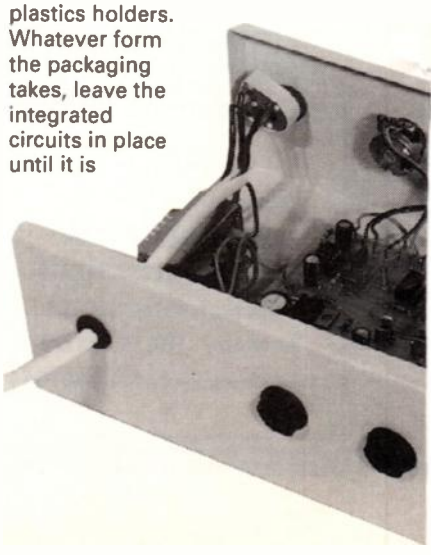


Fig. 2.2: Details of the point-to-point wiring between the p.c.b. and chassis mounted components.

Construction

Except for the controls, sockets, and mains transformer, all the components fit onto the printed circuit board. **Fig. 2.3** shows the component overlay and **Fig. 2.4** provides the actual size foil pattern (copper track side view). The MF10CN and LTC1063CN8 chips are static-sensitive, and are also relatively expensive. It is therefore essential to rigidly observe the normal anti-static handling precautions when dealing with these devices. They should be supplied in some form of anti-static packaging, which in the case of the LTC1063CN8s will probably be conductive plastics holders. Whatever form the packaging takes, leave the integrated circuits in place until it is

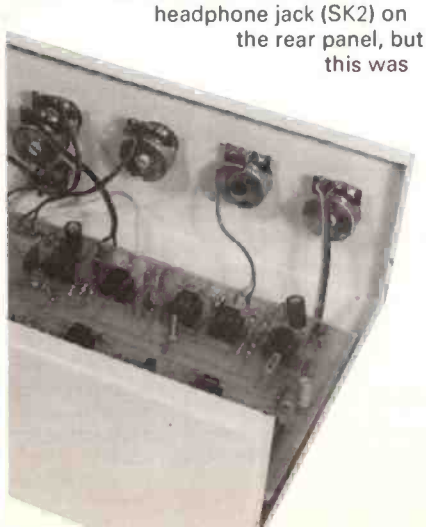


time to fit them onto the board. They must be fitted into d.i.l. holders, and not soldered directly onto the board. Do not fit them into their holders until the board and all the wiring has been completed.

In most respects construction of the board proceeds along normal lines. However, note that the top and bottom rows of integrated circuits have the opposite orientation, and do not overlook the six link wires. The regulator chip (IC14) does not require a heatsink, but it would probably be as well to fit it with a small aluminium heat fin if the unit is used to drive a loudspeaker. Fuse F1 is a normal 'quick-blow' fuse, fitted onto the board via a pair of 20mm fuse-clips (Maplin 'Type 1' or similar).

If the electrolytic capacitors are to fit easily into this layout they should be of the small radial (p.c.b.) type and the polyester capacitors should be printed circuit mounting types having 7.5mm (0.3in) lead spacing. Make quite sure that D1 and D2 are connected with the correct polarity, as a mistake here could cause a lot of expensive damage. Fit single-sided solder pins to the board at the numerous points where connections to the off-board components will be made.

The unit is housed in a metal instrument case, and a fairly large type is needed to accommodate everything. The general layout of the unit is not too critical, but try to choose one that avoids too much long and criss-crossed wiring. Also, try to keep the mains transformer and the mains wiring reasonably well separated from the rest of the unit, at one end of the case. The rear of the case is probably the most convenient place for the input socket (SK1). I also fitted the headphone jack (SK2) on the rear panel, but this was simply due to a lack of space on the front panel. A hole for the mains lead must be drilled in the rear panel, close to T1, and fitted with a strain relief grommet to protect the mains cable.



Details of the point-to-point wiring are provided in **Fig. 2.2**. This should be used in conjunction with **Fig. 2.4** (e.g. point 'A' in **Fig. 2.2** connects to point 'A' in **Fig. 2.4**, point 'B' in **Fig. 2.2** connects to point 'B' in **Fig. 2.4**, and so on). The best choice of cable for this wiring is probably two and three way strips peeled from a piece of 7/0.2 ribbon cable. It is not necessary to use screened cable for any of this wiring.

Be especially careful to get the wiring correct when dealing with the leads which connect to S1 and T1. A solder tag mounted on one of T1's mounting bolts provides a chassis connection point for the mains earth lead. For reasons of safety it is essential that the case is reliably earthed to the mains earth lead. T1 is

Continued on page 16

You Will Need

Resistors

Carbon film, 5%, 0.25W

150Ω	1	R59
240Ω	1	R61
1kΩ	1	R58
1.8kΩ	1	R60
2.2kΩ	3	R4, R37, R38
2.7kΩ	12	R5, R6, R7, R21, R22, R23, R32, R33, R34, R39, R40, R41
3.9kΩ	4	R12, R13, R42, R43
4.7kΩ	2	R47, R55
5.6kΩ	1	R57
6.8kΩ	1	R20
10kΩ	23	R3, R8, R9, R10, R11, R14, R15, R16, R17, R24, R25, R26, R27, R28, R29, R30, R31, R35, R44, R45, R46, R48, R51
12kΩ	2	R50, R54
15kΩ	1	R18
22kΩ	2	R1, R2

Potentiometers

Carbon track, linear, 1/4in spindle

10kΩ	2	R19, R56
22kΩ	1	R36
47kΩ	1	R52

Carbon track, linear, dual gang, 1/4in spindle

100kΩ	1	R49, R53

Capacitors

Polystyrene, 5%

220pF	1	C19

Polyester layer

1nF	1	C31
2.2nF	5	C6, C9, C12, C17, C25
4.7nF	2	C28, C29
15nF	3	C4, C15, C23
22nF	1	C10
47nF	4	C5, C11, C16, C24
330nF	1	C30
470nF	2	C2, C26

Disc ceramic, 50V

0.1µF	7	C8, C13, C18, C21, C22, C35, C36

Electrolytic, 16V, sub-min. radial

47µF	1	C14
100µF	5	C1, C7, C27, C32, C33

Electrolytic, 50V, sub-min. radial

2.2µF	1	C3
4.7µF	1	C20

Semiconductors

Diodes

1N4002	2	D1, D2

Integrated circuits

4046BE	1	IC4
LF351N	2	IC1, IC2, IC5, IC7, IC10
LF353N	2	IC11, IC12
LM317T	1	IC14
LM386N-1	1	IC13
LTC1063CN8	2	IC8, IC9
MF10CN	2	IC3, IC6

Miscellaneous

Min. toggle switch, s.p.d.t. (S1); Rotary mains switch (S2); Mains transformer 12-0-12V, 250mA (Maplin YN16S); Fuse 20mm, 250mA 'quick-blow'; Fuse clips, 20mm Type 1 (Maplin WH49D) (2); Standard 6.3mm, jack socket (Maplin HF92A) (2), Printed circuit board; Case, 250 x 150 x 75mm (Maplin XY48C); DIL i.c. holders 8-pin (9), 16-pin (1), 20-pin (2); Knob (6), Mains lead with moulded plug (Maplin CY32K), Veropins, Wire, etc.

The LTC1063CN8 filter i.c. used for IC8 & 9 are available as stock number 311-956 from **Electromail, PO Box 33, Corby, Northants NN17 9EL. Tel: (01536) 204555.** or as order code LTC1063CN8 from **Farnell Electronic Components Ltd., Canal Road, Leeds LS12 2TU. Tel: 0113-263 6311.** Both these companies deal with private customers on a strictly cash with order basis.

The p.c.b. is available from ***SWM* PCB Service, Badger Boards, 80 Clarence Road, Erdington, Birmingham B23 6AR. Tel: 0121-384 2473.**

Other components can be obtained from **Maplin Electronics, PO Box 3, Rayleigh, Essex SS6 8LR. Tel: (01702) 554161.**

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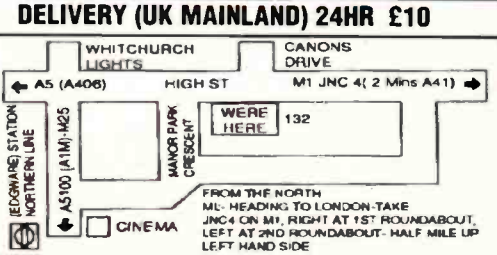

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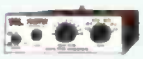

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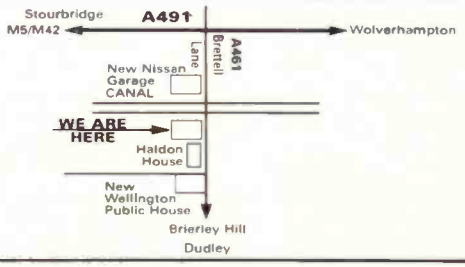

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shown as a 12-0-12V type in **Fig. 2.2**, but a component having two 12V 500mA secondary windings can also be used. First connect together a '0V' tag and a '12V' tag from opposite windings. These act as the 0V centre tap. The remaining '0V' and '12V' tags then act as the '12V' outputs.

Testing And Use

Due to the large amount of signal processing the unit is far from noiseless. Therefore, with the headphones connected to SK2, and no input signal present, a certain amount of background noise should be heard when the processor switched on. The noise is a mixture of standard 'hiss', plus heterodynes caused by stray coupling between the two clock signals. The noise should be well into the background though, and should not be apparent in normal use. If the noise level seems excessive, this is probably due to the headphones having a high sensitivity. Making R59 a little higher in value (say 390Ω or 470Ω) should give an improvement.

The input socket of the processor is connected to the headphone socket of the receiver via a standard screened jack lead. These are available ready-made as 'guitar' leads, if you do not wish to make one up yourself. The roll-off rates of the high-pass and low-pass filters are so high that their effect should be pretty obvious on practically any input signal. The easiest way to test the notch filter is to tune to an a.m. station with the receiver set for s.s.b. reception. Set the receiver's tuning control to produce a heterodyne tone at a middle audio frequency, and then adjust the notch and balance controls for optimum attenuation.

It can be difficult to adjust the tuning control precisely enough to obtain a very deep 'notch'. The best technique is to adjust the tuning control for a moderate amount of attenuation, and to then carefully adjust the balance control for the deepest 'notch'. However, avoid getting the balance control well off centre, as this will cause a lopsided response with different gains on each side of the 'notch.' In use it is just a matter of adjusting the high-pass and low-pass frequency controls for the settings that are judged to give the best results.

In normal use the *Q* control is set for maximum *Q* (R52 at maximum resistance). A lower *Q* and a broader 'notch' are used where a range of frequencies rather than a single tone must be attenuated. Try tuning to a amateur RTTY station, and then attempt to null it with R52 set first for maximum *Q*, and then for minimum *Q*. Better attenuation should be provided by the broader response obtained using the lower *Q* setting. The drawback of using a lower *Q* setting is that it removes more of the wanted signal, but it should not seriously impair the intelligibility of a speech signal.

Although the unit is primarily intended for use with

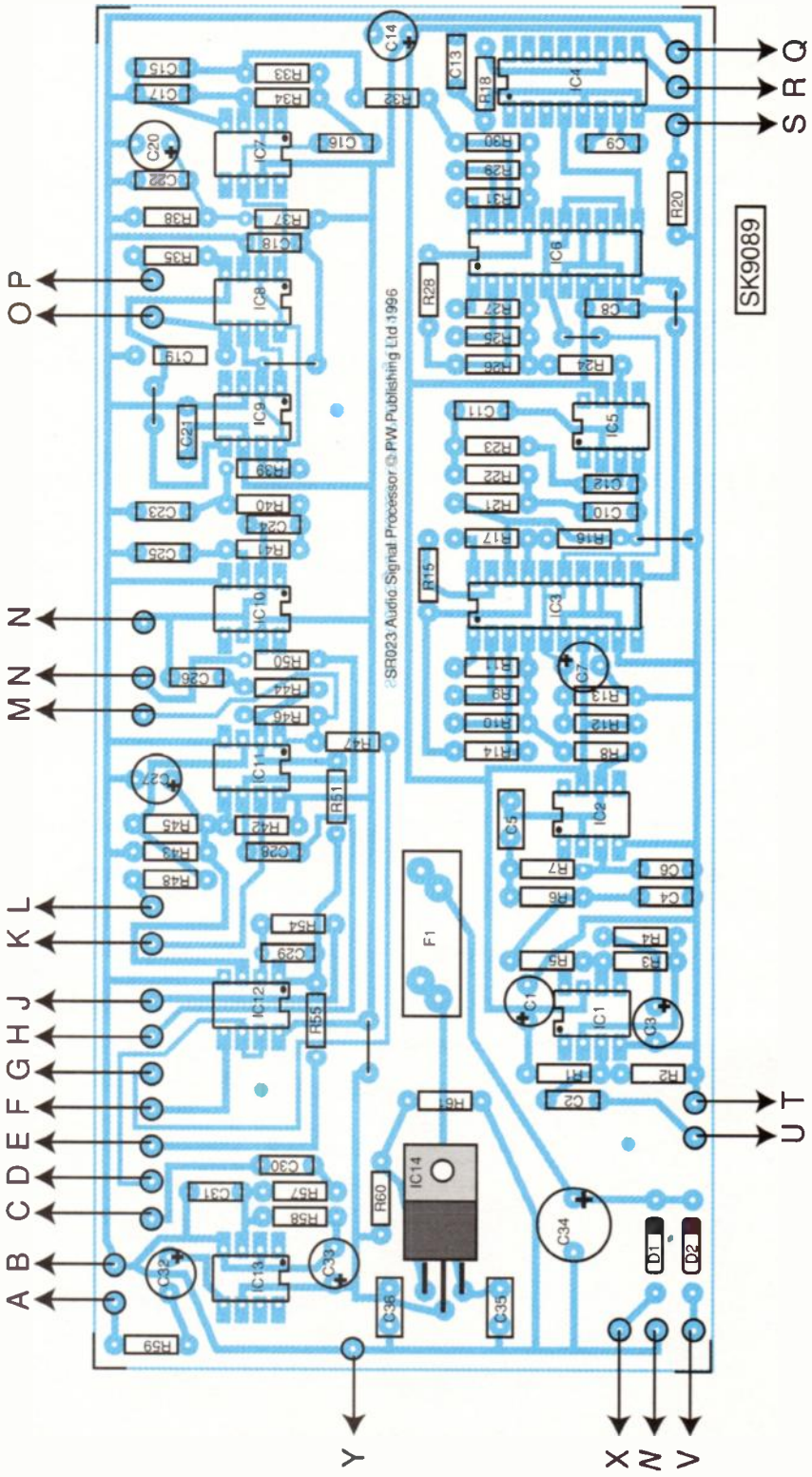


Fig. 2.3: The full size component overlay for the printed circuit board. The upper case letters denote the equivalent leads in Fig. 2.4.

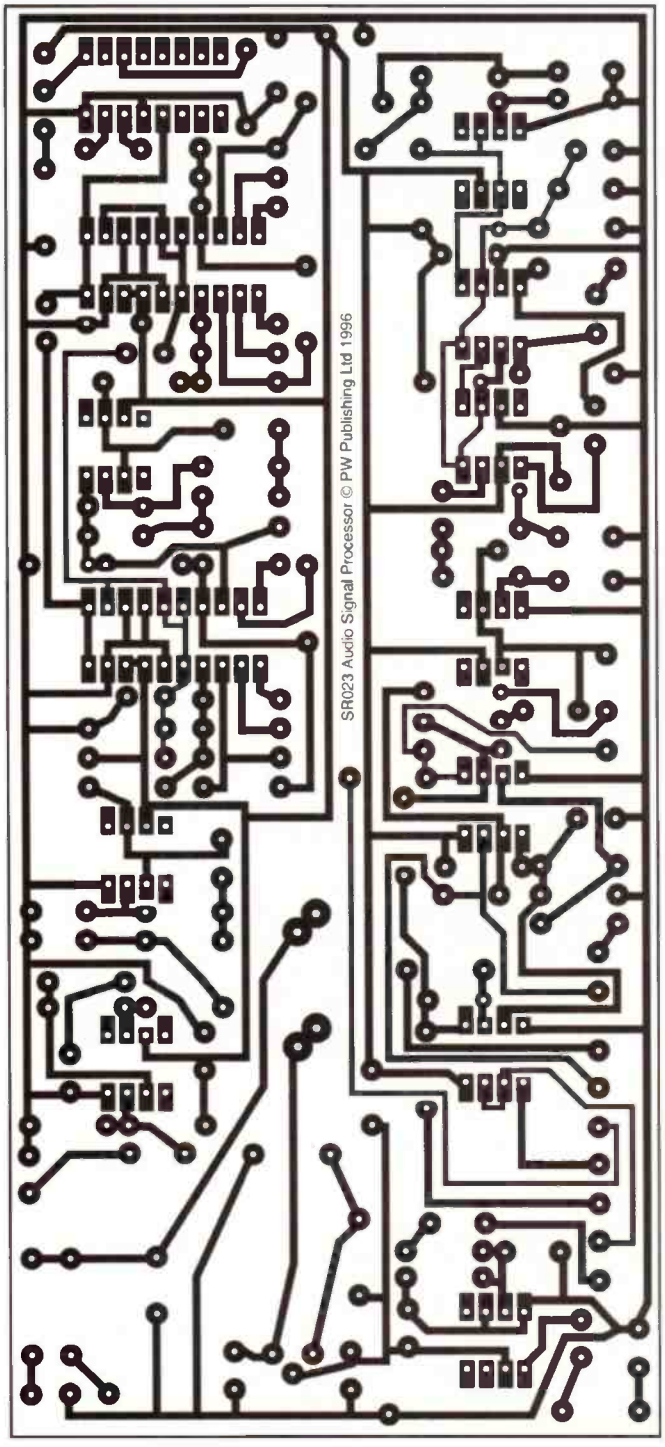
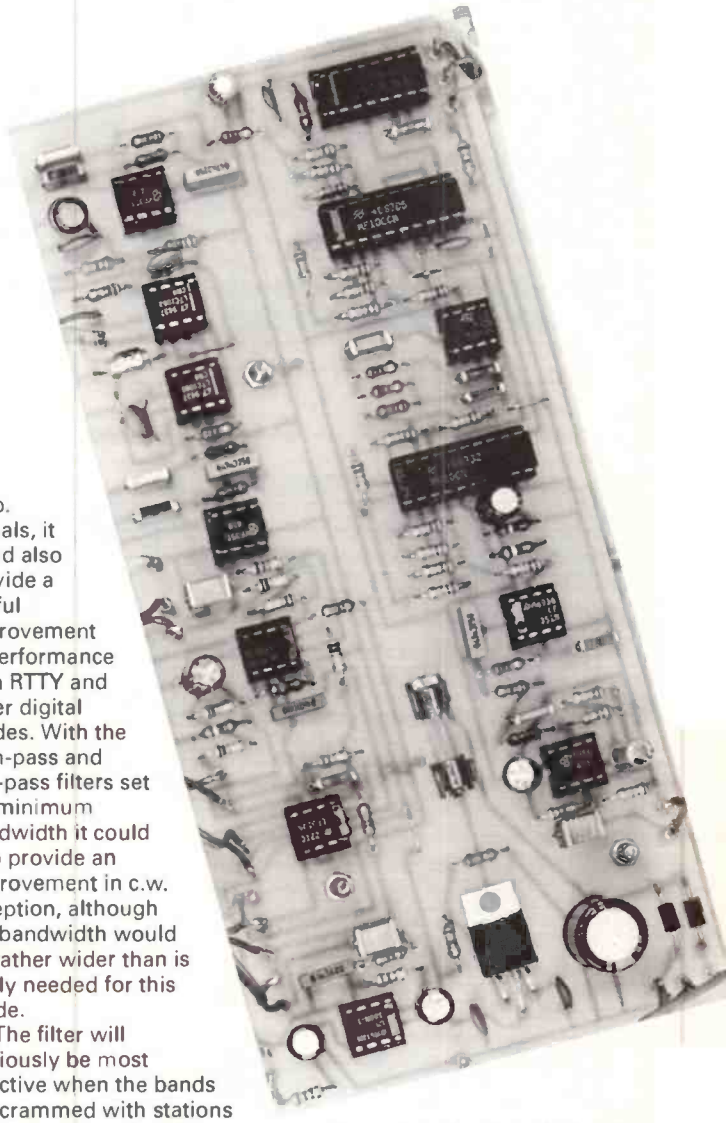


Fig. 2.4: The printed circuit board copper track pattern shown actual size.



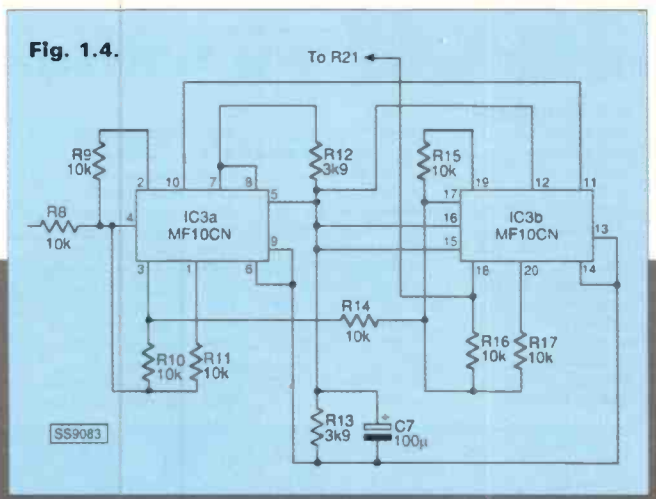
Completed printed circuit board.

s.s.b. signals, it could also provide a useful improvement in performance with RTTY and other digital modes. With the high-pass and low-pass filters set for minimum bandwidth it could also provide an improvement in c.w. reception, although the bandwidth would be rather wider than is really needed for this mode.

The filter will obviously be most effective when the bands are crammed with stations and there is an abundance of QRM, and least effective when stations are few and far between. In practical tests I found that the unit was most useful on the low frequency bands, and it has proved particularly effective during evening sessions on 80 metres. However, it can also be useful on the 20 metre band when the going gets tough, and will presumably be equally effective on the other high frequency bands when they 'return to life.'

■

Fig. 1.4.



Errata

An couple of errors crept into Part 1 of this project. In **Fig. 1.4**, resistor R21 (2.7kΩ) should be connected to IC3b pin 18, not pin 20 as shown. In **Fig. 1.5**, the resistor connected to IC12a pin 1 and labelled R50 (4.7kΩ) should be R55.

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WiNRADiO

Mike Richards takes a look at the very latest integration of receiver and computer - WiNRADiO. Is this the solution to all our radio dreams?

With computers playing a greater part in our lives, I suppose it was only a matter of time before someone produced a receiver that fitted inside the computer itself. Computer control of conventional receivers has been available for some time now. It has been getting ever more comprehensive, with sophisticated scanning and spectrum display facilities on offer. Therefore it seems a sensible next step to fully integrate the receiver with the computer.

The WiNRADiO integration is complete, there's just two sockets on the unit - antenna in and audio out! There are no manual controls, so the computer control is extended to computer **dependence**, as the receiver can **only** be operated whilst installed in a computer. WiNRADiO features continuous coverage from 500kHz right through to 1.3GHz and can receive a.m., n.b.f.m., w.b.f.m. and s.s.b. The comprehensive coverage is supported by comprehensive and powerful memory and scanning facilities.

Installation

The computer system requirements are dependant on whether you wish to use WiNRADiO under Windows, or just DOS. Any DOS only users will need a modest 286 processor with 640Kb of RAM, any type of text display, 12Kb of disk space and MSDOS 3.0 or later. For Windows operation the requirements are understandably more demanding. You will need at least a 386 processor, 1Mb of RAM, VGA display, 1Mb of disk space plus Windows 3.1 or later.

As the WiNRADiO receiver mounts inside the PC, you will also need at least one spare 16-bit expansion slot. Although I haven't tried it, WiNRADiO should also work fine under Windows 95. Installation of the software was very straightforward and used a special Install program to automatically decompress and copy all the system files. The DOS version was a very crude implementation and only required the copying of two files to the hard disk.

With the software set-up, the next stage is to install the WiNRADiO receiver unit. This was in the form of a standard expansion card. There is only one jumper setting to deal with and that is the base address of the card. The default setting of $180h should prove fine for most computers, but if you do have a problem, there are seven other settings to choose from.

It was whilst attempting to fit the receiver that I hit my first problem. The WiNRADiO expansion card is physically large and may not fit in all types of PC case. My DAN for Windows desktop computer proved to be a problem. With WiNRADiO installed, the screened lid of the receiver touched the component leads of the adjacent board and I had to fit some insulating material to prevent short circuits. The ideal solution here would be to make sure that the adjacent slot is kept vacant and, to be fair, the manual suggested just this. The more serious problem was the height of the receiver which stood some 116mm above the top of the expansion socket.

This excessive height made it impossible to fit the case on my PC so it was effectively unusable. Its suitability for other PCs will be dependant on the amount of room available above the expansion slot. As a rough indicator you will need at least 120mm between the top of the expansion socket and the lid of the case. For PCs that mount expansion cards horizontally, the critical distance will be between the top of the socket and the PCB runner.

The user manual offered very little advice in this area, other than suggesting that you should choose an expansion slot with an empty slot immediately to the right. With the hardware and software installed, the next step is to connect a suitable antenna system. The system supplied with WiNRADiO comprised a 2.5m length of coaxial cable that was wire-ended with a 2.5m length of stranded wire. This can only really be considered a token gesture of an antenna and it's only really suitable for the strongest of signals. With a frequency coverage of 500kHz to 1.3GHz you will need at least a random wire antenna for h.f. and a wideband discone for v.h.f./u.h.f. One point to note here is that the manual actually recommends restricting any h.f. antenna to a maximum of 5m. This is a damage limitation exercise to minimise front-end overload from strong h.f. signals.

Operation

With no manual controls, WiNRADiO has to be operated via the keyboard and mouse. As you can see from the screen shot, the receiver controls are presented rather like a photograph of a conventional receiver. This certainly gives the receiver a friendly face and makes most operations self evident.

Let's start with mouse control as this, at least to begin with, seems the most obvious choice. Your mouse actually becomes an extension of your hand and can be used to operate any of the front panel buttons. When it comes to tuning with the mouse, WiNRADiO has a couple of interesting tricks. As the mouse pointer encounters the main tuning control it changes to a curved double arrow that turns the tuning knob as the mouse button is pressed. When placed at the top of the knob, the frequency increases and vice-versa at the bottom. You can also place the mouse pointer on any of the front panel's numeric displays and enter data directly from the keyboard. Although the function of most of the front panel controls was obvious, there were automatic bubble prompts to explain the function in a little more detail.

Despite the obvious convenience of mouse operation, by far the quickest way to operate WiNRADiO is via the keyboard short cuts. These are listed in the manual and can be recalled using the standard Windows help system by pressing F1 from within WiNRADiO.

Most of the operations can be controlled with a single key press. As an example of this selection of the receive modes used B for s.s.b., A for a.m., N for n.b.f.m. and W for w.b.f.m. Frequency entry and general tuning is also well thought-out. If you know the frequency you want, the easiest way is simply to type it from the keyboard. You can enter the frequency in MHz, kHz or GHz - you just indicate the multiplier by pressing M, k or G after the digits. Once a frequency has been selected, you can tune around using the page-up and down keys to move in pre-set steps. The up and down arrows are used for fine tuning. The tuning steps could be adjusted to any value between 1kHz and 1MHz in 1kHz steps. This is a particularly useful feature as you

can set the tuning steps to match the channel spacing of the services being monitored. The selection of the appropriate steps to suit the band being tuned can be automated through the auto-stepping screen. In this screen you specify the frequency range, mode and step size for any number of bands.

Once set-up, WiNRADiO will automatically use those settings as you tune around. You can of course still change the mode or steps to suit any special requirements.

Extensive Memories

It came as no surprise to find that this computer based receiver boasts a comprehensive range of memory recall facilities. Although extensive frequency memories are extremely useful, what's more important is the way the memories are organised. Operating a receiver with poor memory management is rather like trying to use an encyclopaedia without an index!

To give maximum flexibility, WiNRADiO uses memory files to store frequency and mode information. Within each file, specific stored frequencies can be assigned to any of sixteen groups. This is great for assigning frequencies to particular interest groups. Just to add the icing on the cake, you can store the station's callsign and add further information in a comments field. You can even assign up to eleven stored frequencies to the function keys F2 to F12 for instant recall. This is a particularly neat and effective way to access your most popular stations.

This excellent flexibility is further extended as you can have as many of these memory files as you have disk space on your machine. This makes the memory storage capacity virtually unlimited. Recalling memories is a simple button press away which pulls-up a special dialogue box where you can see the contents of nine memories at a time. This screen also features filter and search facilities as a bonus. With this you can choose to display certain groups, modes or even

enter a search string. You are also able to edit memories through a special edit screen that allows amendment of any of the memory parameters.

Scanning

To compliment the comprehensive memory storage facilities, WiNRADiO includes some powerful search and scanning facilities. At any point whilst tuning manually you can start an automatic search up or down from the current frequency. Invoking this function causes the WiNRADiO to step the frequency up or down using the currently selected frequency steps. An unusual point here was the use of an independent squelch setting for the search. This meant you could open the receiver's squelch and listen during the search without having to continually restart it. To supplement the immediate search, there is also a user programmable frequency range scan. This feature has been very well thought-out to act as a powerful tool to identify and store active frequencies. Using this screen allows you to scan multiple bands and choose to store active frequencies in a memory range of your choice. In addition to all this, WiNRADiO has a conventional memory scan facility. Included within this is a set-up screen where you can decide the actions the receiver will take when it encounters a signal that exceeds the pre-set squelch threshold.

Slick Navigation

WiNRADiO was very much a mixed bag in this area. The combination of keyboard short-cuts and direct frequency entry provided very slick navigation around the bands the like of which you won't find in a conventional receiver. The search and scanning options were also well put together and make a powerful combination for checking out activity on the v.h.f./u.h.f. bands.

The main weakness of the scan and search was the suppression of all other activities. This meant that you couldn't alter the volume or anything else for that matter without stopping the scan. Whilst WiNRADiO's interference rejection was remarkably good, you need to be extremely careful with connecting leads and antenna positioning to avoid compromising the performance. The supplied antenna was little more than a joke, with just 2.5m of screened cable followed by the same again of stranded wire. Operating a wide range receiver with such a short antenna just 2.5m away from modern multi-scan monitors and switched mode power supplies is totally unrealistic!

Now those of you with an interest in s.s.b. listening will no doubt have spotted that WiNRADiO's 1kHz minimum tuning steps are not a lot of use for s.s.b. reception. The solution offered is to use a b.f.o. that can be tuned in 5Hz increments up to 3kHz above or below the tuned frequency. Whilst this overcomes the tuning resolution problem, it is a very cumbersome way to tune an s.s.b. signal. In practice, you have to tune around using your preferred tuning method and then changeover to b.f.o. tuning when you're close to an s.s.b. signal. Whilst a little familiarity eases this operation it's very much a second rate system when compared to conventional s.s.b. tuning systems. A more satisfactory solution would be to reduce the minimum tuning steps to 100Hz or less and then just use the b.f.o. for fine adjustment.

On the plus side, running the radio within a Windows multi-tasking environment meant that you could leave the receiver running and still use other applications on the PC. The only exception being utility decoding software as there are few that can operate successfully in a Windows multi-tasking environment. This limitation virtually writes-off WiNRADiO as a receiver for utility enthusiasts, unless you have a stand-alone decoder -unlikely if you own a PC!

I was surprised to find that WiNRADiO relied entirely on its internal audio output stages, with no options to make use of the PC's sound card. With just 200mW of audio available, some extra power would be useful at times. There are few receivers that can achieve a 500kHz to 1.3GHz frequency range comfortably and there are a number design compromises that limit performance. In the case of WiNRADiO, the weakest area is its h.f. capabilities. Whilst the sensitivity is good, the poor overload ability significantly downgrades the overall performance. This is a very common problem with wide coverage receivers and there is little that can be done to recover the situation. The common solution is to limit the powerful signals by avoiding long external antennas and using the attenuator - particularly at night.

continued on page 22

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Programming Options

If you have a few computer programming skills, WiNRADiO will have a very special appeal. This is because WiNRADiO incorporates a full DDE (dynamic data exchange) interface. This means that you can very easily write you own control programs using virtually any Windows programming environment, from Microsoft Word through to Borland's Delphi. To get you started, the manual contained a number of example programs, plus specifications of all the DDE commands.

Summary

Whilst WiNRADiO is certainly innovative, it offers a range of both features and limitations that need careful consideration. Integrating the receiver with the PC certainly makes for a very neat station, but it also make the two items inseparable. A more versatile alternative could be to computer control a more conventional scanning receiver. You also need to check that you have room for the receiver inside your PC. Computer generated interference has long been a problem for listeners and integrating the receiver inside the PC increases the risk of this. However, it's normally the peripheral devices such as monitor and printer that are the prime offenders. However, one of the best ways to overcome this is to use a good quality - but not too long - external antenna with a coaxial feed to the receiver.

At the end of the day you will have to make up your own mind, but for more details WiNRADiO is available from **Lowe Electronics, Chesterfield Road, Matlock, Derbyshire DE4 5LE. Tel: (01629) 580800** and costs **£399**. My thanks to Lowe Electronics for the loan of the review model.

Specification

Receiver:	PLL-synthesised, triple conversion superhetrodyne
Frequency Range:	500kHz to 1.3GHz
Tuning Steps:	1kHz to 1000kHz
Modes:	a.m., s.s.b., n.b.f.m., w.b.f.m.
Sensitivity:	<1.0µV nominal, typically 0.5µV
Audio Output:	0.2W into 8Ω
Antenna:	50Ω BNC
Dimensions:	294 x 121 x 20mm

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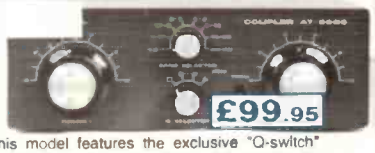

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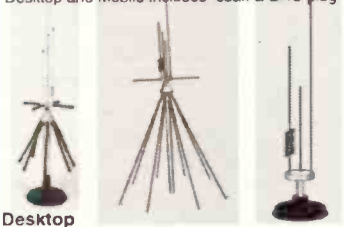

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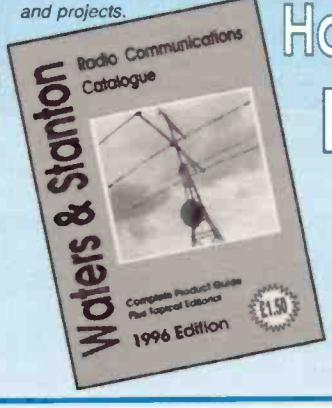

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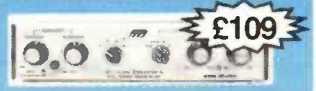

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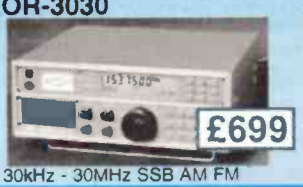

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"As painfully to pore upon a book, to seek the light of Truth" Shakespeare

or

Filters in Receivers, Part 2

Before launching off into the second part of his dissertation on receiver filters, John Wilson runs through a few of the terms commonly used by filter manufacturers to describe the performance of their products and tries to explain what they mean.

Filter pass-band. Well, that's an easy start because this refers to the band of frequencies the filter is designed to pass. The frequency limits are normally defined at the 6dB points; that is the point at which the signal passing through the filter has dropped by 6dB from the level in the middle of the pass-band.

Stop-band. Again self explanatory in that this is the range of frequencies which the filter will not pass. Normally we would refer to 'stop-band attenuation' which is quoted in dB down relative to the pass band. However, the theoretical stop-band attenuation may well be given for the filter installed in a low loss well screened test jig, and the stop-band performance in a real receiver can often be compromised by leakage around the filter due to stray capacitance. Manufacturers of receivers can sometimes be a bit vague on whether they are quoting figures in a test jig or in the receiver - be aware.

Pass band ripple. Not a new variety of Walls Ice Cream but the amount by which the filter attenuation varies across the pass band. Quoted in dB with typical figures for a good filter of 2dB or so (but see my later comments on the Collins mechanical filter). However, (I use lots of 'Howevers') even a 2dB pass band ripple can have a dramatic effect on the quality of an a.m. signal, particularly now that most broadcasters are using compression techniques to increase the average depth of modulation. Gone are the halcyon days when receivers were measured with an a.m. signal of 30% modulation. Nowadays the average broadcast signal is modulated to something like 90% and even beyond, with deliberately asymmetric modulating waveforms to exceed 100% modulation on positive peaks, with clipping at the other end to stop carrier reductions to zero. 'Orrible, but true. Get to the point: with a heavily modulated a.m. signal, if you happen to drop the received carrier into a 2dB dip in a filter pass-band, the sideband to carrier ratio will be disturbed and cause overmodulation, which equals distortion, so you may find that slight variations in tuning will cause the received signal to be distorted or not distorted. And you thought receiver design was easy?

Spurious responses. This refers to those frequencies within the stop-band of the filter at which the filter rejection is less than the quoted stop-band. Depending on the type of filter used, the spurious response can be close in to the pass-band or further away, and **Fig. 1** shows the theoretical response of a two section half lattice filter clearly indicating that on either side of the filter pass-band are areas where the stop-band attenuation having dropped to -60dB or less rises to only -40dB. This means in practice that if you tune a receiver using such a filter you will hear not only the signal within the pass-band but also signals on each side of the pass-band, particularly if the wanted signal is weak and the spurious signal much stronger. For typical ceramic filters, as found in much imported equipment, the stop-band rejection can degrade to as little as 30dB in cheap filters, but as in most things in life you get what you pay for, and the best filters have excellent performance. On this subject you should be aware that quoting a filter pass-band in advertising literature "Fitted with a 6kHz ceramic filter" is not the whole story.

Shape Factor. I mentioned this in the first part of my article and it is simply a method of indicating the steepness of the sides of the filter response on each side of the pass-band. Normally expressed as a ratio between the bandwidth at the 60dB and 6dB points on the slope of the filter, and often misunderstood by receiver users as being the be-all and end-all of filter specification. The shape factor will certainly indicate how steep the filter response is falling, but will not highlight any shortcomings in, for example, stop-band spurious responses. Also, depending on the use to which the receiver will be put, a vertical sided response may actually be undesirable. This may sound odd, but I'll try to explain further along in the text.

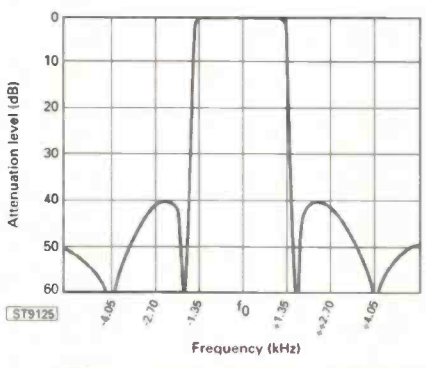

Fig. 1: Theoretical response of a two-section half-lattice crystal filter.

Advantages and Disadvantages

There are many other characteristics quoted in filter specifications, and discussion of all of them would need a full quorum meeting of the FOUL Club, so let me go on to expand on my first article statement that there are basically four types of filter in common receiver use. Each type of filter has its own advantages and disadvantages, and their suitability for use in a particular receiver depends to a large extent on the receiver user's own requirements.

Intermediate frequency filters based on LC tuned circuits can be quite effective despite their apparent poor shape factors. They perform better at lower frequencies, and manufacturers such as Hallicrafters and Drake habitually used intermediate frequencies of around 50kHz. Eddystone used 465kHz in many receivers, but in their EA12 used a final i.f. of 100kHz, as did Racal in the RA-17 series. It is worth

noting that Drake still use LC filtering at 50kHz in their latest R-8A and the results are excellent, so don't assume that you need the latest leading edge filter technology to get good selectivity. The figures in **Table 1** should give you an idea of what can be achieved.

vouch for the fact that the YG-455C-1 is made this way 'cos I took one to bits to check....

Mechanical Filters

The mechanical filter, invented by Collins, seemed to be the answer to a maiden's prayer when it first appeared, and even today derivatives of the mechanical filter are used in many areas of communications, including receivers such as the AOR AR7030. The mechanical filter offers well defined, repeatable characteristics, excellent shape factor, low pass-band ripple, and good performance in stop-band rejection. A properly installed and terminated mechanical filter can show a pass-band ripple of 0.1dB, a shape factor of 1.6:1 and a stop-band attenuation of -80dB - that's one heck of a filter by any standards - and yet there are occasions and uses where the mechanical filter may not be the right choice for the enthusiast short wave listener. More on this a little later.

Table 1

Model (year)	IF (kHz)	Bandwidth	Shape factor
Hallicrafters SX-111 (1960)	50.75	500Hz 2kHz 5kHz	7:1 5:1 3:1
Eddystone EA-12 (1964)	100	1.3kHz 3kHz	4:1 3:1
Drake R8-A (1995)	50	1.8kHz 2.3kHz 4kHz 6kHz	All better than 2.2:1

Notice how in the earlier receivers the shape factor gets better with increasing 6dB bandwidth whilst in the latest Drake receiver, thanks to better understanding of filter techniques and design, the shape factor remains constant on all bandwidths. Just shows that even old ideas can be improved on, but the best features of the LC filters are their symmetry and their lack of spurious responses in the close in filter stop-band.

The crystal filter has rather dominated the high end receiver design scene because it offers stable characteristics and requires no alignment after installation. In the first part of this article I mentioned the performance differences between monolithic high frequency crystal filters and the multi-element, lower frequency filter, and **Table 2**, taken from Kenwood data, will illustrate what I mean.

Table 2

Filter type	Centre frequency	6dB bandwidth	60dB bandwidth	Shape factor
YK-88C-1	8.830MHz	500Hz	1.5kHz	3:1
YG-455C-1	455kHz	500Hz	820Hz	1.64:1

You can clearly see the improvement in shape factor between the 8.8MHz monolithic filter and the 455kHz filter made up from individual crystals, and I can

Ceramic Filters

Finally the low frequency piezo-electric (ceramic) filter, which for the hobby listener in many ways combines the best of all characteristics. Ceramic filters are made in a wide range of shapes, sizes and specifications but the ones most likely to be found in the main selectivity determining stages of short wave receivers will have bandwidths of around 2.4kHz for s.s.b. and from around 4 to 10kHz for a.m. broadcast listening. As a general rule, the cheaper the radio, the cheaper and hence less good will be the filter(s) fitted. And the lower cost filters, although having pass-band widths which seem respectable (and often quoted in advertising), will have rather poor stop-band performance.

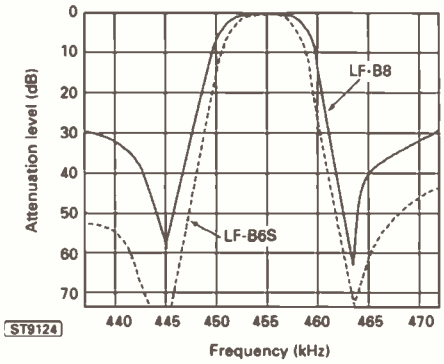

Fig. 2: Typical low-cost ceramic filter.

As an example, take a filter from the 'CFU 455' series which has a 4kHz bandwidth at -6dB but which widens to 15kHz only 35dB down, and close in spurious response can rise to only 30dB below the pass-band. Well, it's better than an i.f. transformer and it needs no alignment, but it's not going to do much for you when you are trying to separate stations in the 41 metre band. By comparison, and to show how wide the available performance range can be, the CFJ 455 K5 filter has a pass-band of 2.4kHz (perfect for s.s.b.) at 6dB which only increases to 4.5kHz at an impressive 80dB (not 60dB) down. Equally impressive is the quoted stop-band attenuation of -95dB and very good spurious response characteristics which make this a perfect choice for a short wave receiver. The pass-band ripple is 2dB which is good, although not in the same class as a mechanical filter. So what's the bottom line, as once trendy accountants used to say? The CFJ filter I have mentioned costs about eight times as much as the CFU example, and when a manufacturer is costing out a total receiver project these things really do matter. Take it from me, despite what the importer might say, you will not find CFJ filters in your £39.95 Chinese radio - even if it does have digital readout!

'Orses for Courses

I am fairly certain that the majority of readers of this magazine are interested in a wide range of listening activities, foremost among them being a.m. broadcast stations and the so-called 'utilities' which employ s.s.b., such as h.f. aircraft links, ship to shore R/T and so on. This implies that at least two i.f. bandwidths would be needed, and preferably up to four to cater for all listening conditions, but what filters would be ideal? On the face of it the mechanical filter takes a clear lead, but in fact when listening to broadcast a.m. the sharp transition at the edges of the mechanical filter pass-band can have an uncomfortable effect on a.m. signals, particularly if you are 'rocking' the tuning control to get rid of adjacent channel noise. There is no doubt that the mechanical filter is a good choice for c.w. or s.s.b. listening, but for a.m., and particularly with the levels of modulation currently being used on broadcast signals, the smoother roll off exhibited by the ceramic or LC filter makes the received signal much kinder on the listener's ear. When reviewing the Drake R-8A I noted that in side by side comparisons with my own 'benchmark' Collins receiver (using of course Collins mechanical filters), the Drake produced a much more comfortable sound, and this was probably a direct result of the Drake low frequency LC filtering.

Excellent Choice

The ceramic filter sits between the superb s.s.b. performance of the mechanical filter and the easy on the ear a.m. characteristics of the LC filters, and is therefore an excellent choice for the all-round listener. In an ideal receiver one could have the facility for having all types of filter available depending on the listener's requirements, and it is worth noting that even in early amateur radio receivers such as the Yaesu FR-400, the s.s.b. mode was fitted with a mechanical filter whilst a.m. came with an LC filter as standard, with optional filters available according to the user's preferences. Perhaps digital signal processing may lead the way to providing endless bandwidth options for the receiver user, but I'm reserving my own position on this until I hear a d.s.p. system which sounds as pleasing as the R-8A. My initial, albeit brief, session with a Watkins Johnson HF-1000 left me with a tinge of doubt, although a recent reviewer of the Kenwood TS-870S transceiver which uses d.s.p. said "The i.f. selectivity measurements were a revelation. The 6/60dB shape factors are superior to any crystal filters measured to date, and the pass-band response was absolutely flat....." (*Radio Communication*, April 1996).

So What About the R-820?

I said in last month's article that the Kenwood R-820 was a landmark design, and I think this is because of the range of facilities it provided relating to the i.f. filtering system, including pass-band shift and variable bandwidth. How did it do this using fixed frequency crystal filters; indeed, how do designers manage to vary the characteristics of fixed filters? First let's look at pass-band shift. This is a function which allows the operator to slide the filter around across the incoming signal so as to move interference out of the filter pass-band and push it off the edge of the cliff down the sides of the filter response. Since you can't move the actual filter frequency, what the designer has to do is move the receiver tuning, at the same time moving a later conversion frequency (the carrier reinsertion oscillator or b.f.o. in s.s.b. modes) by the same amount. To the operator the receiver tuning has not changed, but the i.f. filter has moved - it can all be proved by simple but lengthy sums, but for now you will have to believe me. Needless to say, it was Collins who first introduced this system in the 75A-4 receiver by an exceedingly clever mechanical arrangement linking together the main v.f.o. and the b.f.o., but nowadays with electronic tuning of most oscillators it is possible to achieve the same thing without being a mechanical wizard. No serious receiver should exclude this feature, and it has certainly been included in most amateur radio receivers and transceivers since the R-820 was introduced.

Impossible

The next feature seems to be impossible: how to alter the bandwidth of a filter which has fixed characteristics. The R-820 did it, and so have receivers since then, but how? Well, consider that if you can use pass-band shift to effectively move a fixed filter around, if you have two identical filters in a receiver and leave one fixed whilst moving the other around, the two pass-bands will overlap and change the effective bandwidth of the combination. Take out a couple of table forks from the cutlery drawer and put them together, one on top of the other so that you can see the gaps through the prongs. Imagine that the gaps are a filter pass-band and now move the top fork sideways and see how the gap narrows - that's all a variable bandwidth system does, but it's not as easy as the two fork trick would indicate. The matching of the filter shapes is critical, as is the placement of the filters within the i.f. chain, and there is another characteristic which not many people are aware of.

Another trick - by now any onlookers will definitely brand you as crazy. Go into the drawing room and grab the curtains. Imagine that the window is the combined i.f. pass-band and now draw the left hand curtain across it. The effect is that of sliding one of the two filters across the other, and the remaining window is the narrowed bandwidth. Now open the left hand curtain and draw the right hand one. The same effect of narrowing bandwidth is demonstrated - **but** - there's a problem in that the bandwidth narrowing is not symmetrical, and if the centre of the window represents the spot where your wanted signal is sitting, eventually as you narrow the bandwidth (draw the curtain), the wanted signal will be rejected as the bandwidth narrows across the centre frequency. Now go back to both curtains fully open and draw them together at the same rate from both sides. Notice how the bandwidth narrows symmetrically about the centre, and if your wanted signal is still sitting in the middle of the window (pass-band), it no longer vanishes from view as the pass-band is narrowed.

Ironic Twist

To put this all back into receiver terms, although several manufacturers have claimed to provide variable bandwidth in their receivers, they are not necessarily all the same. Kenwood did it properly (symmetrically) in the R-820 and subsequent transceivers, whilst Icom (amongst others) used what is known as a 'mix-up/mix-down' system to give variable bandwidth control which was asymmetric. A little ironic twist to this tale came when the patent for the 'mix-up/mix-down' system proved to belong to someone else, possibly Rohde & Schwarz, and the variable bandwidth feature had to be removed from receivers using it. There are, as a result, two versions of the Icom R-71 receiver; one has variable bandwidth and one has not.... Mind you, Kenwood did not include variable bandwidth as a feature of the R-5000, although I don't think that this was anything to do with the patent problem, as they used a totally different system from the 'mix-up/mix-down' method, but it does make the R-820 in my eyes a better receiver in this particular context.

My Perfect Receiver

People have asked me for a specification for my perfect receiver, but everyone has differing requirements and my ideal may not suit everyone. However, as far as i.f. filtering is concerned I would settle for a 2.4kHz mechanical filter for s.s.b., with a matching 500Hz mechanical for c.w. and a selection of top quality ceramic filters from 3 to 8kHz for a.m. - on the other hand, I did really like the Drake R-8A filtering. I would require pass-band shift without a doubt, but with a decent selection of filters perhaps the fully variable bandwidth could be sacrificed. I definitely **would** include an i.f. notch filter for getting rid of heterodyne interference, but this facility can be provided these days by the excellent outboard audio filters using digital signal processing. I notice incidentally a very low key announcement that SEM have introduced the W9GR DSP-3 filter, and having used an early version of the W9GR filter built by a FOUL club honorary member (he will know who I mean) I look forward to possibly reviewing this unit on your behalf, because it was most impressive at the time. What about it Paul?

Machiavellian Intrigues

Once more I am running out of space and it is clear that trying to cram 40 years of knowledge into a few pages is impossible. However, I hope that what I have explained in my articles to date has been helpful and informative. I'm certainly enjoying the freedom and independence which retirement from active involvement with any company has given me. Happy listening. ■

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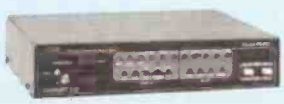

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Short wave column

Many folk associated with short wave listening will know Bob Ellis who has been actively writing on the subject of where to listen and what you can expect to find for a number of years, his often ***'tongue in cheek'*** *articles and writing style are well known. This is the first in a series of related articles. It is presented very much in the same way as our tip of the month column which has proved very popular, it breaks from the standard pages of advertisements and regular features and you won't know what you might miss unless you have a peek at the page!*

Music on Short-Wave?

- By Bob Ellis

Picture this. The DX session has gone on through dawn and you are sitting there in the early bright with a well-earned cup of coffee. The logbook needs updating and you must QSL that Peruvian rare DX who was running three watts into a dummy load when you heard him...

Can you find a little light music for background to the task? The idea of listening to music on short-wave with it's fade and phase is not such a good idea. Or is it? The new generation of synchronous detectors in the AOR AR7030 not only tune the radio for you but cancel out the worst effects of the ionosphere. What you hear is what was transmitted.

Out of Morocco, try Medi One on 9575 where East meets West in a blend of Eurotrash and Moroccan Roll. Germany gives us SWF 3 on 7265 during the day. Listen for the RDS pulses that switch a million car radios to SWF for traffic updates in a mix of music we don't get over here. Out of Africa, test the north-south path around midday with Africa #1 from Gabon on 17630. Another interesting propagation indicator is All India Radio. Evenings on 7410, daytime on 11620 and check if the 10MHz Ham Band is open by checking for the Domestic Service on 10330. Listen for the evening ragas - long improvised sitar pieces. I can't afford a full-size instrument, mine's a baby sitar... © Bob Ellis

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If you are serious about short wave listening, take a long hard look at the AR7030...

AOR AR7030 - *High dynamic range short wave receiver*

Volume production of this stunning new short wave receiver has commenced and dealers are reporting great excitement as first stocks are shipping. The first few reviews have appeared resulting in discussion and interest being even heightened if that's at all possible!

If you would like to receive full details including full technical specification with filter plots, AGC plots etc, just give us a ring, drop a line, e-mail us with your address to **info@aor.co.uk** or visit our WEB site which is still under construction but carries full details of the AR7030 **http://www.demon.co.uk/aor**

The set is supplied with a low noise regulated power supply, infrared hand control, all modes fitted as standard USB, LSB, CW, AM, Synchronous AM, NFM and Data, built-in whip amplifier, standard TCXO, Pass Band Shift, display resolution to 10Hz with tuning rates down to around 2.7Hz, in-depth fully illustrated operating manual and much more. **Designed and built in the UK.**

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Short Wave Magazine, March'96 - John Wilson

"JT has wiped the slate clean on receivers as we know them and has rendered virtually everything else obsolete"
"...the appearance is stunning, the finish on every part is of the highest standard..."
"If you can't get sensible audio out of even a rotten signal with the AR7030 then nothing will do it"
"...there is a very good synchronous a.m. system which has the unique feature of being auto tuned"
"...I was simply amazed when I came to explore the i.f. filtering arrangements..."
We don't want to spoil the conclusions of the review, there is **much** more to read so if you haven't read this review already, pick up a back copy.

Ham Radio Today, May'96 - Chris Lorek

"...rather stylish and extremely well-made cabinet"
"...I immediately thought how 'clean' the signals sounded"
"Regarding the RF performance of the set, my measured results say it all. If you're not technically minded just read these as superb. The blocking performance was so good that I found it was simply noise limited by the signal source..."
Full test lab figures are quoted and are well worth a read.

Monitoring Times April'96 & Radio Japan - Larry Magne

"All bandwidths have excellent shape factors. Image rejection is superb, as is IF rejection. Blocking and phase noise measurements are both excellent. Dynamic range is excellent at both 5 and 20 kHz separation points, and third order intercept measurements at 5 and 20kHz separation points are superb"
"...arguably the best receiver on the market, regardless of price..."
"...overall audio distortion is good-to-excellent... it becomes excellent-to-superb when the synchronous detector is used, and in the SSB mode is nearly nil"

AWR broadcaster and contributor to the medium wave DX circle and many other DX newsletters - Gordon Bennett

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DSWCI short wave news Feb'96 - Don Phillips

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"The AR7030 gives the illusion that it is able to trap any signal that hits the antenna and demodulate it almost at FM quality"
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Independent German reviewer (Funk etc) - Nils Schiffhauer

"Clear advantage to AOR thanks to its perfect synchro detector"
"AOR wins thanks to its fine AGC"
"AOR wins thanks to its considerably calmer background"

Radio Netherlands Media News, March'96 - Jonathan Marks

Even this rather strange broadcast review had good points!
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A Man Well Ahead Of His Time

Reginald Aubrey Fessenden. Pioneering radio scientist 1866-1932.

John Cave takes the first of a two-part look at the pioneering activities of Canadian Reginald Fessenden during the late 19th Century.

At the turn of the century, three things happened which were to alter the course of the civilised world. Orville and Wilbur Wright coaxed their aeroplanes into flight, John Philip Holland devised the modern submarine and Reginald Fessenden began to develop an entirely new principle of wireless telegraphy.

With the exception of Sir Oliver Lodge and Ferdinand Braun in Germany, few scientists had shown interest in Hertzian waves for signalling purposes and it was left to develop in an empirical fashion. Very few observations had been made and little research undertaken.

Transmitters, detectors and antennas were chosen not by any scientific analysis, but because they seemed to work. It was mostly expedients and improvisations.

The varying methods by which wireless waves were transmitted and received were known as systems and the Marconi system had become an accepted standard with its adherents, practitioners and performance criteria. Because no other way of generating electromagnetic waves was known, wireless telegraphy was always thought of in terms of spark.

Damped Wavetrains

All the early spark systems depended upon the oscillatory current that occurred when a capacitor was discharged across a spark gap. By connecting the capacitor to a continuous source, such as an induction coil, the discharges followed one another in rapid succession whenever the voltage across the spark gap grew large enough to break down the resistance of the air in the gap. The resulting radiation was a series of 'damped' wavetrains, each one dying away well before the next had started.

For several years, advances in transmitting apparatus did not progress much from the established spark system and it remained that way until Reginald Aubrey Fessenden, a Canadian, amongst the first to recognise the limitation of such systems, suggested that undamped, or persistent oscillations as they were then called, could be the key to overcoming the serious defects from which the spark system suffered. "Until those defects were overcome," Fessenden predicted, "wireless telegraphy would never achieve its full potential."

Early in his career, Fessenden had developed a deep admiration for Thomas Eddison, the great inventor who had anticipated the thermionic valve. As early as 1890, four years before Oliver Lodge was to deliver the lecture that had so inspired Jackson, Marconi and the others, Eddison, knowing his capabilities, had suggested that Fessenden should "take up work on the lines of Hertz's experiments".

Unfortunately, the financial situation changed and despite his fascination with Hertzian waves, Fessenden was obliged to put aside experimental work for the time being.

Tremendous Influence

The next few years were to have tremendous influence over his later work, as for the first time he became deeply involved with both the theory and design of alternating current machines, a subject which was quite new at the time. It was during this time that his concept of Hertzian waves as high frequency alternating currents became firmly established in his mind as the logical alternative to the spark system.

Consequently, he found himself set apart from those

who thought only in terms of damped waves and spark discharges and it became increasingly difficult for him to understand their intransigent thinking, although later, as if to justify their caution, he remarked that, "It was an entirely new method, characterised by a return to first principles, the abandonment of previously used methods, in almost every respect their antithesis."

Towards the end of 1892, Fessenden accepted an offer from Pittsburgh University, and for the next eight years he was to teach electrical engineering, regularly lecturing on Hertzian waves and experimenting with them in his laboratory.

With his academic reasoning, it was essential that the strength of signals and other observations should be capable of being measured, almost an impossibility with the coherer, which was not only a very insensitive detecting device, but operated on the peak of the signal, in the manner of an on-off switch. Under the best conditions it detected the mark and space signals of the Morse code at only a very slow rate because of the necessity to 'tap back' the metallic filings after every operation, in readiness for the next wave.

Before any such observations could be made a radical approach to the design of a detecting device was needed. It required a detector which was capable of allowing quantitative measurements, what Fessenden called "a continuously receptive receiver".

Electrolytic Detector

During his stay at Pittsburgh he had devised several likely devices, but his first real success came when he turned to what was known as the thermal electric detector. His initial version was made up with a short length of silver coated platinum wire, drawn to extraordinary fine limits and bent into a loop. The tip of the loop was immersed in nitric acid to dissolve the silver and then sealed into a glass envelope resembling a small electric light bulb.

Fessenden at Brant Rock, Massachusetts with one of his operators. It is not recorded who the third person is.

With this simple, insignificant device, wireless waves, by producing heat in the platinum wire, altered its resistance. The variations of resistance followed the strength of the applied signal, and could then be reproduced as sound waves in a headset, the great advantage being its ability to detect undulations of the human voice, a discovery that became of ever more significance as his experiments towards wireless telephony progressed. He called this first version the 'hot wire barretter', using the French expression for 'exchanger' since it changed alternating current into direct current.

Quite by accident he noticed among a bunch of barretters being de-silvered in a bath of nitric acid one that was particularly active and frantically responding to signals being generated by a high frequency machine running in the vicinity. A brief examination showed that among all the others being processed this was the only one with a broken filament. More extensive testing revealed that it was by far the most sensitive and reliable device than anything he had yet produced.

So far, the barretters that had been made were laboratory models, unsuitable for use on board ship, or in the field. The movement of the nitric acid was both hazardous and inconvenient and the fragile device needed great care in setting up.

Fessenden was well aware of these problems and devised suitable variations that became widely used in the roughest conditions. He used the platinum wire in a fine glass tube, the end of which was then ground flat, permitting only the very smallest amount of platinum to be exposed.

The ground off tip was then rested on a layer of absorbent material that had been saturated with a nitric solution. His improved version became immensely popular and most American ships, officially or otherwise, usually had one of these in the wireless room.

Never a great man for publicity, he simply called his latest model the 'liquid barretter', but among the wireless fraternity it became known as the electrolytic detector. For many years it was in general use throughout Continental Europe and the Americas where it became a standard of sensitivity, only to be replaced by the thermionic valve in about 1913.

Set On Wireless Telephony

The years that Fessenden spent at Pittsburgh served to strengthen and develop his conception of Hertzian waves as high frequency alternating currents and he became more and more than even convinced that others had "taken a wrong turn" in restricting their allegiance to the spark as a means of wireless signalling. Although spark systems were being widely promoted and exploited, he could plainly see that it would be only a matter of time before they would be overtaken by the continuous wave.

His sights were already set on wireless telephony, and for this these waves would become mandatory. The real problem was in finding a way to generate the high frequencies that he required. In 1900 there were three methods that had been considered as possibilities.

A method used to speed up the eight discharges per second of the fixed spark gap, by inserting an interrupter in the primary of the induction coil, had been tried and abandoned. Fessenden had suggested that if the speed of the spark discharges could be raised above the audio limits of about 25kHz telephony might just be possible. The interrupter came nowhere near this.

Another method was to use the oscillating arc. In 1900 William Duddell conceived a musical arc by shunting a resonant circuit across a carbon arc. Although the discharge frequency was greatly increased, the method was not good enough for wireless telephony, but used in a wireless telegraph mode

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it was regarded as a great improvement on the rough note of the conventional spark transmitter.

The third, and most likely method was to take a rotating machine used for producing power frequencies an alternator and adapt it for use at high frequencies. Fessenden tested all three methods to find out their limitations and possibilities. Each in its own way was an improvement on the other, but all were still far away from the true continuous wave he required.

At the conclusion of a lecture he had given on *The Possibilities of Wireless Telegraphy* in 1899, one of his colleagues in the audience, Michael Pupin, a mathematical physicist who himself had devised a form of electrolytic detector, left no doubts as to the many problems that lay ahead, if wireless telegraphy was to have any great success.

Supporting Fessenden in the inadequacies of the spark system, he suggested that if an antenna wire could be excited with oscillations with means other than that of a spark gap, the result would be very close to undamped waves. He didn't say how this could be achieved, however, but also remarked that if a transmitter originated highly damped waves, where the oscillations rapidly decreased in amplitude, no appreciable resonance could be anticipated.

In justifying his reasoning Pupin explained that a spark did not produce a simple wave, but a conglomeration of waves. That was why tuning was so difficult, there was no single wave to tune to.

Perfectly Simple

It must have been a remarkable meeting. Fessenden's own feeling and theories which had previously been doubted by many were now being confirmed. Yet none of the other scientists present questioned the belief, generally held at the time, that Hertzian waves were not like any other waves, but very special and needed a spark discharge to cause them to radiate.

Pupin must have appeared almost irrelevant as he described the waves used in wireless telegraphy as being perfectly simple, and could be made to obey the same rules as any other electrical wave. The statement was of immense importance at the time, but the scientific world were to think otherwise for almost a decade.

Fessenden had suggested that for wireless telegraphy to be successful it was necessary to generate continuous waves in the radio frequency range, so that the output of the alternator could be coupled directly to the antenna.

William Duddell had made such a machine, capable of producing frequencies as high as 120kHz, but the output had been infinitesimal. Tesla, by using a single disc-shaped armature, had achieved a frequency of 15kHz, but the extraordinary fine clearances that were necessary had required such skilful balancing to avoid dangerous vibrations that this was thought to be the maximum frequency that could be achieved with any sort of reasonable output, by mechanical means.

By 1900, Fessenden was becoming known for his achievements in the new science and was approached by the United States Weather Bureau to develop a network of wireless stations for transmitting meteorological information along the American eastern seaboard, while at the same time to continue his research.

He accepted the contract and it was thus that he found himself at Cobb Island, Maryland, where he was soon to demonstrate improvements he had made by regularly communicating across more than 80km of the well wooded local countryside.

Continuing his research and quantitative experiments he erected two masts, 15m high, and exactly one mile apart. Then, using the hot-wire barretter, he began what must have been some of the earliest propagation measurements that even today would be considered well advanced.

He later described the programme by saying, "The exact method of transmission of the waves was experimentally determined by using ladders placed at varying distances from the antennas. The course of the waves in the air was fully mapped out up to distances of several hundred metres from and to the antennas, and by burying the receivers at different depths in the ground and immersing them in different depths in sea water, the rate of decay below the surface and the strength of the currents flowing in the surface was accurately measured."

The two masts were also to have another use. For some time he had been anxious to continue his work on wireless telephony that had been started while still at Pittsburgh and to test the high speed interrupter he had devised in the hope that this would give him an approximation to continuous waves.

Modulated

Using a crude microphone connected in the antenna circuit he found that the wavetrain could be modulated and although, as he later admitted, the speech character had not been good, it had been legibly transmitted by electromagnetic waves for the first time ever between two stations in December 1900. The voice had been accompanied by the loud, unpleasant machine gun like noise of the spark, and he realised that this method had two severe limitations.

The spark frequency was far too low and the spark discharges were still too sharply damped. For distortion free wireless telephony, he finally concluded there was no alternative to continuous sine waves.

The alternator was the only known way to generate continuous waves in 1900, but no machine capable of generating such high frequencies at the power necessary had yet been devised. Despite dire predictions of generating alternating currents at such great mechanical speeds, and the genuine concern about exceeding what was considered to be a 'mechanical ceiling', Fessenden became stubbornly determined to prove his deep rooted conviction.

It was one of his lesser known creative achievements that he set himself to designing such a generator. His big problem came when it was time to find a manufacturer.

During this time he continued to expand the range of his tests for the Bureau and accomplished overland distances of up to 400km. He also made several improvements to his electrolytic detector, and an official observer at the time remarked that "The receiver is positive in action and entirely and absolutely reliable.

It is entirely different in nature from the cohere and gives no false signals like the latter does. I could hear every dot and dash made by Hattera with the utmost clearness.

It is possible for any telegrapher to receive by it as fast as the key can be handled." All this was a tremendous advantage, as a serious drawback to wireless telegraphy at the same time was the slow transmission, partially due to the 'tapping back' required after the input of every wave.

To be concluded

Past Reviews PART 2

If you are thinking about buying an item of second-hand equpment from 'Trading Post' or from one of the dealers advertising in *SWM*, this page is for you. This month we provide you with the final part of the directory. The list catalogues the various reviews that we have featured over the past decade or so. If you would like a copy of any of the reviews then follow the instructions at the the bottomof the page.

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Please note that copies of all the reviews listed here are available from PW Publishing Ltd., Post Sales Dept., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.

Reviews published before 1991 are available as photocopies, reviews published after 1991 are available as back issues all priced at £2.60 each including P&P.

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Why buy a lemon when you can have the real thing?

This amazing little unit is a full blown scanning receiver capable of covering everything from 500kHz to 1300MHz with no gaps. Not only is it the smallest scanner you've ever seen, it's the lightest too. Closer in size to a box of matches rather than a pack of cigarettes, the new WS-1000 from Welz-Diamond is technology in its extreme. Take a scanner with you where you wouldn't have bothered before.

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specification:

- 500kHz-1300MHz
- AM/NBFM/WBFM
- 1/5/6.25/9/10/12.5/15/20/25/30/50/100kHz steps
- 400 memories
- Skip search
- Power voltage from only 2.2-3.5V DC
- Dimentions in mm: 58(w) x 97(h) x 24(d)
- 16mA power save 1 sec.
- Weight: 200 grams incl. batteries & antenna

"it's small, light and very easy to carry around, with no performance compromise" ...Chris Lorek

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GPS - More On The Mobile

George Wheatley MRIN G4HNJ has been looking at further uses for the Garmin GP45 GPS navigator, which he reviewed in the March issue.

Since writing the article on the Global Positioning System (GPS), which appeared in the March 1996 issue of *Short Wave Magazine*, several readers have asked for some details on the adaptation of the system for use in a vehicle. In this article I will describe the system in sufficient detail to allow a practically minded radio/computer enthusiast to have a go.

GPS

Firstly, I will reiterate the bare bones of the GPS for those readers who may be unfamiliar with the system. The US developed and funded satellite navigation system has now reached full operational status with a constellation of 24 Block II satellites in sun-synchronous orbits giving whole world coverage 24 hours a day. The system was developed by the US military for missile guidance, with the solution of other navigational problems as a spin-off. Receivers and the wherewithal to decode and display the signals have been in limited use for some years - the early sets were bulky and expensive and it is probably only military operations, such as the Gulf War, that has encouraged big production runs, miniaturisation and the decimation of prices.

At the present time the US Military will not allow us mere mortals the full use of the system, which can give positional accuracy of a metre or so. A random error is inserted to degrade the accuracy to about 100 metres. It is possible, however, to add a Differential Beacon Receiver to improve the accuracy to 5 - 10 metres. This is expensive compared with the lower end of the GPS range and would probably only interest specialist users of the system. That's a brief overview of the system, so let's have a look at what it can do for us.

The requirement for safe navigation whether in the air, at sea or on the ground is to be able to conduct the user to his destination safely. To achieve this the basic need is to know your present position.

The GPS does just this. It will display the current position by Latitude and Longitude, by Grid Reference or relative to a known position. The navigators will accept the entry of waypoints and routes. They also give very accurate time.

State of the Art Mobile System

As was mentioned in the earlier article, a system is in the advanced stages of development which works splendidly in a vehicle. This system has been developed in the UK by Robin Lovelock of Sunninghill Systems and I was privileged to be given a fascinating demonstration of his working set-up.

The in-vehicle hardware consists of a top of the range laptop PC equipped with a microphone and speaker. The system is intended to be operated by the driver while under way, so there is no keyboard or v.d.u. for obvious safety reasons. The special cable needed to connect the GPS unit to the computer is available from Garmin distributors.

The computer, operating in Windows 3.1 or higher and fitted with a sound card, needs GPSS software installed. This is available from various sources, including shareware. The free demonstration package contains the program, and some sample maps and sounds. If at this stage a GPS unit is not available, a simulation is included to give a rolling demonstration and also to give hands on experience of using the system with a mouse instead of the GPS unit to provide the input. This is an excellent demonstration and well worth any time spent examining its facilities. The licence permits alterations for personal use to customise the software for experimentation. In our demonstration run the actual Garmin GPS45 navigator I reviewed in *SWM* March '96 was used, together with a mobile roof mounted antenna.

The second item of software required is a voice recognition program, in this case IN3 was used and I will say more about this later.

Dramatic

The mobile demonstration gave a dramatic insight into the power of the program and we were astonished to be given an almost continuous running commentary on our route through Sunninghill - telling us about local pubs and eating houses as we approached them. There was also information about filling stations and places of interest. When we asked the computer for the nearest filling station it told us that there was one a hundred yards ahead of us - and so there was!

Experimental Version

No laptop computer was available for our own trials and the only spare computer available was a 386DX with Windows 95, a VDU and a keyboard. At this stage we did not want to alter any internal parts of the computer. We had a microphone left over from a previous experiment which was pressed into service. Power was obtained from an inverter, also left over from another past experiment, which ran from a second car-type battery and provided the necessary 240V a.c. for the computer. We decided to mount the lot in the boot of my car.

Voice Control

We had to obtain Voice Control software as a starting point. A call to Robin Lovelock elicited the information that we should have a look for IN3 on the Internet. This was quickly accomplished, the software downloaded, and registration fee paid by FAX. This produced a very rapid reply from IN3 in the United States with the unique code to allow us to use the full version of the program. This was installed with no problems and we were over the first hurdle. Trials showed that the signal from our microphone was a bit weak for the sound card in the PC, so a simple audio amplifier was put in the line. This cured the problem.

Maps

The maps that come with the shareware version of GPSS were not relevant to our area and local maps were loaded using

imagination and ingenuity. No more needs to be said! These are added to the GPSS program as an image file in .BMP format. The filename is added to the list of maps using any available text editor. The next time GPSS is started, the program detects that there is a new map and prompts you for two reference points to fix the map in the correct position. We followed the prompts, restarted GPSS and the job was done.

Next it is necessary to add the Voice Recognition element. GPSS allocates keystroke letters for the list of commands used by the software. The IN3 software allocates a voice command to augment the keystroke command.

Handbook

A full handbook is included in the GPSS software containing all the details needed for customising the program. An important part of this procedure is to input possible destinations by adding the Grid Reference and a name in the appropriate file. It will be necessary to search for, and locate, the files to make the changes. These files are given carefully selected names to make their location an easy matter. Careful study of the handbook and the inevitable trial and error are the order of the day.

Our system was installed in the car and securely strapped down. The GPS used was the Garmin GPS 45 with the normal removable antenna simply taped to the roof-rack and connected with a short coaxial cable extension. This cable requires a BNC connector at each end. If you haven't put these connectors on before, try to get some assistance - they can be tricky.

Our basic GPSS system worked well with the few commands we had entered and we intend to expand it to cover a larger area for more extensive trials in due course. The system proved itself by guiding us to a destination using the bearing and distance method. Just how it knew which was my favourite pub will remain a mystery!

It is worth noting that the demo version of the program contains a list of all the 'Little Chef' establishments in the British Isles together with thousands of filling stations.

It is reported that the system has been adapted to locate and recover recalcitrant falcons and for radio direction finding by enthusiastic Radio Amateurs. Systems are in the pipeline for the control of vehicle fleets and for use in the air - hot air ballooning as a first stage. Robin Lovelock would welcome information for use in the air program - his address is at the end of this article.

We are indebted to **Waters & Stanton Ltd., 22 Main Road, Hockley, Essex SS5 4QS. Tel: (01702) 206835** for the loan of the Garmin navigator units. We are also most grateful to **Robin Lovelock of Sunninghill Systems, 22 Armitage Court, Sunninghill, Berks SL5 9TA. Tel & FAX: (01344) 20775** for his co-operation and assistance with the vehicle navigation trials. Further details of the IN3 voice recognition software used can be obtained from **In Cube, Command Corp. Inc., PO Box 956099, Duluth GA 30136, USA. Tel: + 1 (770) 813-8030, FAX: + 1 (770) 813-0113.**

Psion Users

A similar system is available for the Psion Series 3a. Although no opportunity has arisen to try this product, reports are very favourable. Contact **Steve Lichfield (Mapper and Cable) - Tel: (01734) 265081.**

Batteries - A Word Of Caution

Any prudent GPS 38 user will have a spare set of batteries available. We tried to economise by carrying a set of non-alkaline batteries. These nearly provoked a disaster as they proved to be marginally larger in diameter than the recommended alkaline variety and hence a very tight fit in the battery compartment. A bit of a struggle to get them in, but almost impossible to get them out! Lesson learnt.

The New Baby Garmin

A new, low-cost, hand-held navigator has been received from **Waters & Stanton Ltd.** The GPS 38 is also made by Garmin and is a small lightweight hand-held version with a built-in antenna. There are some noteworthy additions to the facilities offered by the two units recently reviewed in *SWM*. For the radio amateur, locations can now be designated by the use of the Maidenhead Locator - avoiding the need to use other conversion methods. The GPS 38 also provides a TracBack feature to allow you to retrace your steps without having to re-enter the waypoints.

The third new feature is the inclusion of a trip odometer to keep track of your distance travelled. This is particularly useful because the previous method of finding the distance run was to measure the distance between waypoints, which gives the direct 'as-the-crow-flies' distance and not the actual ground covered.

The GPS 38 suffers from the disadvantage of having a built-in antenna, which means that it needs to be held in the clear for continuous readings. This may prove tedious for the user who ison foot. The handbook is well written and time spent studying it will be time well spent.

One small, but significant, niggle is that if the wrist strap is attached to the small bracket on the top of the unit as shown in the Owner's Handbook, it is impossible to operate the keys with one hand. Attach the wrist strap to the battery compartment locking ring and one-handed use is easy.

The new Garmin GPS 38 is a remarkable unit, good value for money at under £250 and a joy to use.

Brief Specifications

Navigation Features	
Waypoints:	250 total 9 (automatic) nearest
Routes:	20 reversible up to 30 waypoints each MOB and TracBack modes.
Backtrack:	Automatic track log navigation.
Map datums:	Over 100
Co-ordinates:	Lat/Long, UTM/UPS, plus 7 grids including Maidenhead.
Performance	
Receiver:	Differential-ready MultiTrac8™ continuous tracking of up to 8 satellites.
Acquisition Times:	Warm: 20s approx. Cold: 2 mins approx. AutoLocate™: 7.5 mins approx.
Update rate:	1/s continuous.
Accuracy:	Position: 15m r.m.s. Velocity: 0.1 knot r.m.s. steady state. 90 knots max.
Interfaces:	NMEA 180, 182, 183 and RS-232 DGPS corrections.
Antenna:	Internal.
Size:	156 x 51 x 31mm
Weight:	255g with batteries.
Display:	56 x 38mm high contrast LCD. Electro luminescent backlight.
Power:	4 x AA batteries or 5 - 8V d.c.
Battery Life:	12h normal. 20h battery saver.

uniden

It was the Uniden Bearcat Range that introduced the world to scanners, back in the seventies. They've been making high grade scanners ever since, just take a look at their current product range:

UBC 3000XLT

If all scanners were manufactured to this level of build quality, life in our workshops would be a lot quieter!

- 400 channels
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- Modes: AM/NBFM/WBFM (both FM modes on upper bands only)
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- Offered complete with HD carry case, removable nicad & charger

ONLY £245.95

BC 9000XLT

Recently supplied to a government department, the new base scanner from Uniden is a professional tool offering serious performance at an affordable price.

- 500 memories
- 25-1300MHz (550-760MHz TV video band blocked)
- Keypad entry
- VFO tuning knob for frequency control
- "Turbo scan" - 300 steps per second
- 100 channels per second
- Selectable modes: AM/NBFM/WBFM
- Line output - ideal for "off air" recording
- Selectable attenuator
- Alpha numeric display
- CTCSS available as option

ONLY £319.95

UBC 220XLT

An ideal introduction to scanning, the new 22 is easy to use, covers all the "interesting bits" and is supplied with case, nicads, charger and id very, very LOW in price!

- 66-88, 108-174, 406-512, 806-956MHz
- Scanning 100 channels per second
- Backlit display

ONLY £199.95

uniden Bearcat

QUALITY GOES THE DISTANCE

Welz WS-1000

NEW

This amazing little unit is a full blown scanning receiver capable of covering everything from 500kHz to 1300MHz with no gaps. Not only is it the smallest scanner you've ever seen, it's the lightest too. Closer in size to a box of matches rather than a pack of cigarettes, the new WS-1000 from Welz-Diamond is technology in its extreme. Take a scanner with you where you wouldn't have bothered before.

specification

- 500kHz-1300MHz
- AM/NBFM/WBFM
- 1/5/6.25/9/10/12.5/15/20/25/30/50/100kHz steps
- 400 memories ▶ Skip search
- Power voltage from only 2.2-3.5V DC
- Dimentions in mm: 58(w) x 97(h) x 24(d)
- 16mA power save 1 sec.
- Weight: 200 grams Incl. batteries & antenna

Price: £349.95 incl. VAT & FREE postage
Available on FREE FINANCE: £49.95 deposit & 12 payments of £33.33

Lowe HF-150

We sell as many to commercial users as we do to enthusiasts. The best built, best performing receiver under £500.

RRP: £419. Deposit £59, 12 payments of only £30, ZERO APR.
why not add a keypad for fast frequency access? only £44.95.

Lowe PR-150

Matching the HF-150, a preselector can greatly enhance reception of weaker signals, that would otherwise be lost in the noise caused by stronger signals. They really do work. Suitable for most other receiver. Ask for details.

NEW LOW PRICE: £199.

AR-8000 UK

The best scanner on the market. Don't argue. My scanner man Graeme said so. To find out why, give him a call. Even if he does spell his name rather strangely.
RRP: £410.
ML PRICE: £399.
Super low finance

The New AOR AR-7030

Probably the best engineered receiver in the world. Now available from the end of March, including a full FIVE YEAR WARRANTY, only available from MARTIN LYNCH.
RRP: £799. Five year warranty: £84, Total: £883.
Deposit £83. 12 payments of only £66.66. ZERO APR.

Yaesu FRG-100

Retailing at £599, the new receiver from Yaesu takes some beating. At £499, its an even better buy!
RRP: £599.
NEW LOWER ML price CASH/SWITCH £469. Super low cost finance available from only £36.66 p/m!

Opto Electronics Scout

The most innovative product for scanners of 1995? Connect this little frequency counter up to your AR-8000 and see it make the scanner jump onto a frequency that its literally just "sniffed" out of the air! Termed "Reaction Tune", it has many uses both for the hobbiest and commercial user.
RRP: £449. ML Price: £369 Super low cost finance available from only £27.50 p/m!

Drake R-8A

One of our best selling shortwave receivers and one that you do not have to spend hundreds of pounds on additional filters. It has them all fitted!
RRP £1295. Deposit £296, 12 payments of £83.25, ZERO APR.

The New AOR AR-5000

For those who take the entire radio spectrum very seriously. The AR-5000 covers 10kHz through to a staggering 2600MHz! All mode base receiver, setting new standards in all band performance.

RRP: £1749. Five year warranty: £114, Total £1863.
Deposit £363.00. 12 payments of only £125.00 ZERO APR

Global AT-2000

A superbly built SWL antenna tuner for improved receive performance. Built in Q selector. **£95.**

ERA Microreader

Decodes RTTY, Amtor, Sitor, FEC & CW, built in display and Morse tutor.
All this for only £189.

Noise reduction?

Suffering from power line noise? Got a noisy street lamp or thermostat clicking away? Slip in line the ANC-4 and see it disappear. If not send it back and get a refund! **RRP £195 incl. p&p.**

Spotlight on Staff

Brian Greenaway G3THQ

This months feature is on Brian Greenaway, my Customer Liason Engineer. Brian has been with me for over three years and works with his team-mate Andy in the Customers Service area. It's Brian's responsibility to liase with customers and our engineers on all aspects of repairs, spares ordering and technical queries. He also checks all repaired equipment from the workshop, before despatch. Call Brian or Andy on the Customer Care Line direct: 0181 - 566 0 566.

140 - 142, NORTHFIELD AVEN

AOR AR-2700

A great starter into the world of scanning. 500kHz-1300MHz, NBFM,WBFM & AM, no gaps, supplied with nicads & charger - ready to go!

RRP: £269. Deposit £69. Six payments of only £33.33. ZERO APR.

AOR AR-3000A

Lots of different versions being offered, but make sure you are buying one sourced through the U.K. distributor. We only sell this model supplied by AOR U.K. Ask before you buy elsewhere! **RRP: £949. Deposit £149, twelve payments of only £66.66, ZERO APR. Also available the "PLUS" version. Please add £46.**

Lowe HF-250

Beautifully built and obvious choice for the "premium grade" receiver user.

RRP £799. Deposit £99, 12 payments of only £58.33, ZERO APR.

MVT-7200

The alternative to the AR-8000. If you liked the old MVT-7100, this new enhanced version should fit the bill.

RRP: £449. ML PRICE: £399 and FREE FINANCE! deposit £99, 12 payments of only £25, ZERO APR.

Icom ICR-7100HF

The ONLY company who can offer you an ICOM UK approved HF modification, enabling the receiver to cover 500kHz to 2GHz, with no gaps!

RRP: £1549. Deposit £349, 18 payments of £72.22, ZERO APR.

Kenwood R-5000

Still our top selling Shortwave receiver. Also the very best in "investment value". BUY DURING THIS ISSUE AND CLAIM YOUR FREE SSB NARROW FILTER **WORTH £69! RRP: £1059. Deposit £159, twelve payments of only £75, ZERO APR.**

Timewave & MFJ DSP Filters

DSP 9+ • DSP 59 • DSP 599zx • MFJ-784B

NEW LOW PRICES

Digital Signal Processing will enhance any receiver performance by removing one main ingredient - NOISE! If you haven't heard a DSP unit work, then call into the London Showroom for a demo. Alternatively, order by mail order and if it doesn't impress you, return it for a full refund of the purchase price. How's that for confidence?

MFJ-784B All mode Tunable DSP £229

DSP 9+ All mode DSP at only £189

DSP 59+ As above but more features £249

DSP 599zx NEW! Hyper speed processor, alpha display and more £349

BayGen "Freeplay" Wind-up Radio

No this is no wind-up! Invented by an Englishman, Trevor Baylis, this new AM/FM & SW receiver needs NO BATTERIES or External power! Wind the cranking handle and sit back and enjoy up to 40 minutes of listening, without lining the pockets of your local battery provider! When its run out, simply wind the handle up again.

Exclusive to Martin Lynch £79.95. p&p £10

Police look-alike Lapel speaker

Suitable for most scanners on the market.
Only £11.50 incl. delivery.

Police look alike Earpiece

MyDEL P-300

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).
ONLY £9.95 p&p FREE!

Opto Electronics Cub

For those of you that do not require the reaction tune of the scout, the new CUB frequency counter is the ideal scanner companion.

In stock now at only £139.

Garmin GPS-45

Due to an overwhelming demand, we've decided to stock this important device. Locate your latitude/longitude national grid to within an amazing 49ft accuracy! Lots more besides, **only £289.**

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WiN Radio

NEW PRODUCTS

Designed and built by Rosetta Labs in Germany, the WinRadio PC card is a complete scanning receiver which actually fits inside your PC!

- Covering 500kHz - 1300MHz
- All-mode including SSB
- Tuning steps 500Hz - 1Mhz (fine tune with b.f.o.)
- Supplied with Windows software, with impressive graphics and on-line help

AS REVIEWED BY MR. BOB TOMALSKI

System Requirements: PC with minimum 386 processor, DOS 3.3 or higher, Windows 3.1, 640k of RAM, (4MB for Windows).

ONLY £409.00 including VAT & Carriage

MARTIN LYNCH WEB SITE
http://www.martin-lynch.co.uk
E-mail address: sales@martin-lynch.co.uk

MyDel Optima ACARS receiver

Designed exclusively for Martin Lynch, this new receiver releases your expensive scanner from monitoring1 frequency for reception of ACARS. All that is required is 12 volts DC input, and an external antenna. The Optima will then give you audio direct into either ACARS decoding software, or our Universal M-400/M-1200 decoder. It's that simple! **RRP: £129.95**

AEA FAX 111

Why wait for the weather reports?
AEA FAX 111 is a package containing a small demodulator & DOS computer software that lets you receive grey scale HF weather FAX images, (which you can later colour). It also decodes CW, RTTY & NavTex. All you need is an SSB receiver and an IBM compatible PC. **RRP: £119.95.**

Datong Active antennas

AD-370/270 The pair of Active Aerials were originally designed for the Royal Navy several years ago and to date, no other manufacturer has been able to offer such performance from a compact design.

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The Scanning Alternative

Ben Nock has always felt that he had been missing important little snippets of information whenever he used a channelised scanning receiver.

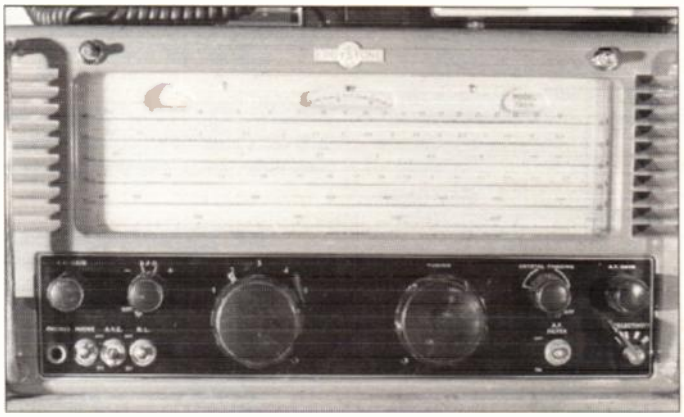
That feeling has always been there - if one had a hundred channels punched into a scanner, which then scanned, the chance of missing something on channel 1, whilst the set ploughed through channels 2 to 99, must be high, thus defeating the object. Another objection I had, though perhaps overcome in some modern scanners, was that many of them jumped, or scanned, in 25kHz steps. In reality though, any receiver misses something whilst your listening to something else, but the much nicer alternative I offer is to actually tune your way through the spectrum, to 'short wave' listen, but with that additional zero after the frequency readout. The additional advantage of using a tuneable receiver over a channelised one, is that it can serve the multi-role function as a piece of test equipment, such as a spectrum analyser, as well. A tuneable v.h.f./u.h.f. set can be used to tune for harmonics, spurious emissions, birdies and the like, whilst still being able to receive Classic FM. Being able to tune fully also gives the listener the opportunity of hearing signals that may be un-resolvable on a scanner as they might not drop exactly in the centre of the scanners channel pass-band.

The Eddystone Option

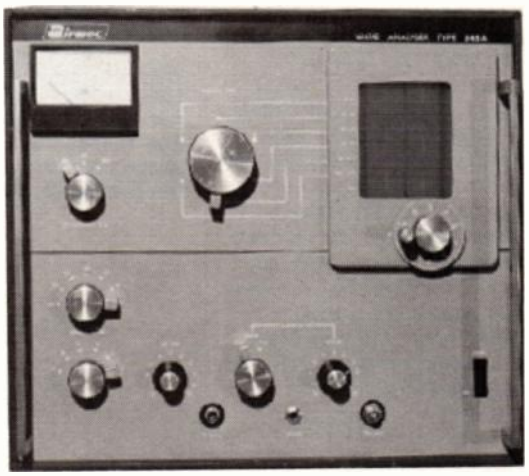
The Eddystone company produced several tuneable v.h.f./u.h.f. sets. From the mid 50s onwards there were a string of '7 Series' sets, for instance, the famous 770R covering 19 to 165MHz, the 770U covering 150 to 500MHz, and the 770S tuning 500 to 1000MHz. There was also, apparently, though never seen by myself, a rare 760 model covering 19 to 300MHz and the 770M covering 19 to 230MHz. A later 990 series of sets in the 70s, transistorised, covers 30 to 850MHz between them. A more recent addition, mid 80s, designated the 1990 series also covers v.h.f./u.h.f. frequencies being digital solid state sets. The 770U is the u.h.f. version as stated, covering 150 to 500MHz and capable of resolving a.m., f.m., and with the b.f.o. c.w. and s.s.b. This set measures nearly 229 x 432 x 380mm and weighs in at around 120kg. Compared to the many plastics cased, block of chocolate sized scanners available today, this set is big and heavy. But, it certainly will not crack into a hundred pieces if dropped. Many of these sets can be found at rallies and from traders though the prices can be high. For the money, though, these sets are at the better end of the market, they are sturdy and robust, and once aligned correctly, can produce very good results.

Alternative, Cheaper, Options

If one keeps one's eyes open at rallies and the like, alternatives to the costly Eddystone can be found. Airmec, a UK manufacturer of test gear and receivers, produced a range of various boxs, some that look like receivers but were meant for other applications. The model shown in the photograph, a Type 248A, picked up at a recent rally, is termed a Wave Analyser. Presumably it was designed as a 'poor man's spectrum analyser',



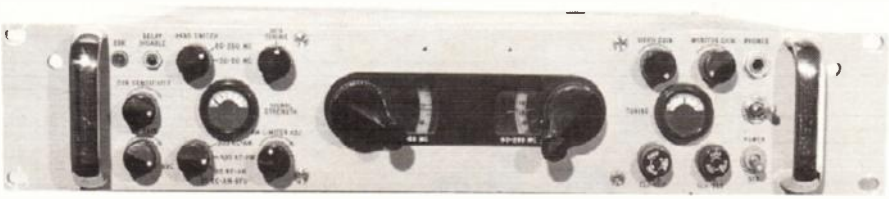
The familiar Eddystone layout with its large, easy to read, dial scale. Whilst this set is the 730/4 h.f. set, the layout is identical to the 770 series v.h.f. and u.h.f.receivers.



The Airmec 248A Wave Analyser, tuning 5 to 300MHz in six bands, a.m./f.m., With large 'S' meter top left, input socket lower right.

manually tuning through the spectrum, noting any signals, whilst plotting them on a piece of graph paper. The set does have an elaborate attenuation system which, along with a large easy to read meter, could be used to give accurate measurements of signal strengths.

This particular model tunes 5 to 300MHz and by plugging an antenna into the input socket, marked 75Ω by the way, allows the set to act like a receiver. It has facilities to resolve a.m. or f.m., no b.f.o. being provided, with a variable selectivity of 10



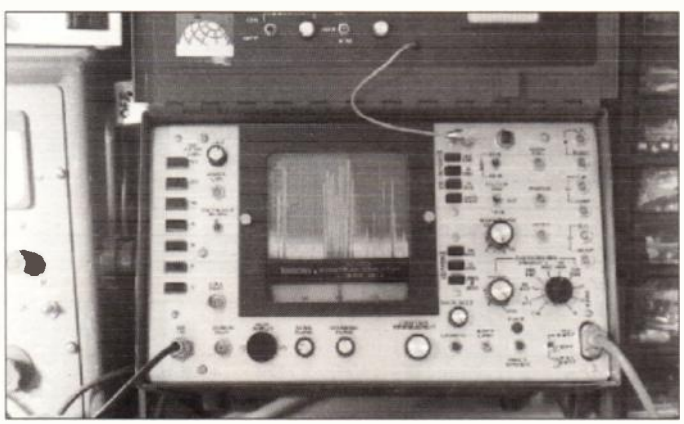
The Vitro 1907 RX, tuning 30 to 260MHz, a.m./f.m./s.s.b., Signal strength meter to the left, f.m. centre tuning meter to the right, separate tuners and tuning knobs for the two bands.

to 500kHz wide! Plugged into the discone antenna on the house roof, the set produces a myriad of signals, not all resolvable as either a.m. or f.m., lots of data transmissions, bleeps and whistles of paging systems, and all the usual inhabitants of that part of the spectrum. Signals in the 6, 4 and 2m amateur bands are quite good but a wide-band pre amp might improve all round performance as would a tuned antenna. The set does have the advantage, over a standard scanner, in that it can be used to find the harmonics of an oscillator chain and allow the user to peak the tuned circuits whist observing the large meter. In fact, the set is a most useful tool for any serious v.h.f./u.h.f. constructor.

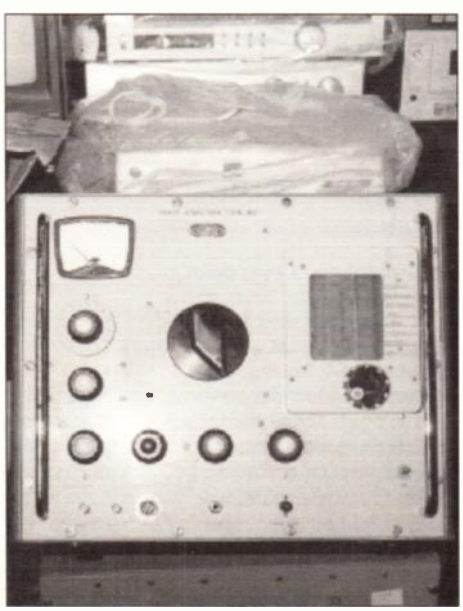
Another recent purchase, this time from a fellow collector though, was a Vitro Electronics Special Purpose Receiver, model 1907. The Vitro company, unheard of by me before, appears to be based in Silver Spring, Maryland, USA. This receiver tunes 30 to 260MHz in two bands and resolves a.m., f.m. and s.s.b./c.w. as it has a b.f.o. fitted. This receiver has provision for switching either 20kHz or 300kHz a.m. or 300kHz f.m. selectivity. It has a signal strength meter and a centre zero meter for f.m. tuning. A variable noise limiter and tuneable b.f.o. are also provided. The set has a sensitivity of around 2µV and has outputs for audio, wide base band video and a spectrum display. Again, this type of set, whilst being a proper receiver in the true sense of the word, is most useful as a tuning and alignment tool in v.h.f./u.h.f. constructional work.

In addition to covering the 6, 4 and 2m bands, it covers commercial f.m., ideal for DXing and propagation forecasting, and the air band as well. Many similar sets can be obtained at rallies, though sometimes the box does not look at first sight like a receiver and may be dismissed at the first glance. If one is interested in obtaining this sort of set it pays to look more closely under the tables at rallies, examine the box and

The Vitro 1907 internal view, 30 to 60MHz tuner to the centre left, 60 to 260MHz tuner to the centre right, i.f. strip along right wall with p.s.u. section on the left.



The Texscan Spectrum Analyser AL-51A displaying the received signals present on a discone antenna between 50 and 150MHz, the central cluster being the v.h.f. f.m. commercial band.



Another Airmec 'receiver', this is the Type 853, tuning the h.f. frequencies though, 30kHz to 30MHz.

look for things like 'input' sockets marked 75 or 50Ω. This may give a clue as to the uses the set can be pressed into. It may well be that the box is a signal generator rather than a signal receiver, but look for things like 'a.f. gain' - it might be a volume control, 'r.f. gain' as opposed to 'r.f. output', the meter, if fitted, marked in some manner that suggests reception rather than generation.

The 'Ultimate' Receiver?

Perhaps the best 'tool' to have on the bench for those interested in scanning and construction alike is a Spectrum Analyser proper. At many rallies recently there have been a number of stands selling off high tech test equipment including analysers. Initially the price does look high, over £1000 can be paid for one, but you must consider what you are getting for your money. You get a wide-band receiver, anything from zero to 1GHz being typical, a receiver with a variable width front end that actually displays on a TV screen all the signals it can hear. Some analysers will be able to 'tune' into individual signals and produce recovered audio. It is probably unlikely that s.s.b. signals will be resolvable but a.m. and f.m. reception is common.

Whilst stand alone analysers are expensive you can get adapters that convert a standard oscilloscope into a scanning analyser. Browsing through some US amateur radio magazines recently revealed that this option is quite a popular one over there.

In Conclusion

The options available to 'scan' the upper frequencies without the need for a 'scanner' are many and varied. I am sure that anyone who has not yet tried the delights of a tunable v.h.f./u.h.f. receiver would find them most worth while given the opportunity. ■

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73 from Dave G4KQH, Technical Manager.

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Colossus Will Live Again!

Tony Sale, Director and Constructor of Colossus.

David White G3ZPA explains the rebuilding of the world's first computer, Colossus.

It is now generally well-known that the world's first ever electronic computer was used to break the codes of the German Enigma secret encoding machine, which was used by them throughout the Second World War. It was installed at Bletchley Park, just before Christmas 1943. In February 1944, it was in full operation and along with another nine of these computers, helped to ensure that the war was shortened by at least one and a half years.

After the war was over in 1945, Winston Churchill ordered all of them to be dismantled and the information on them was lost. Within the last 15 years, when GCHQ released a very few photos of Colossus, the story of how it assisted the Allies was finally released after a gap of total secrecy lasting 30 years.

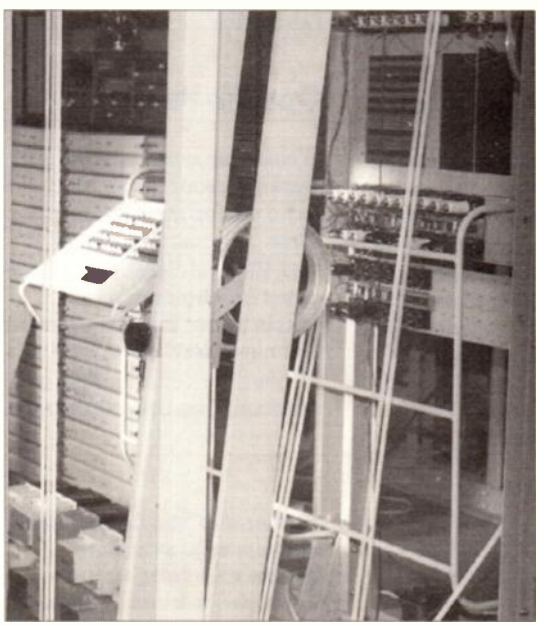
Bletchley Park at last disclosed that here was the start of the world's computer industry that we see today with a personal computer in practically every home as well as the workplace. In fact, it's hard to see now how we could ever cope without them!

Months Of Research

Well, now at last it can be revealed that Colossus will live again. It all started in 1989 when Tony Sale was working at the Science Museum in London restoring some early computers. In order to speed up his knowledge of them, he did three months of research on these early computers and came across the brief story of Colossus and also the Manchester University computer called the SSEM (small scale experimental machine) which had been built in 1948 by Tom Kilburn.

Tony then realised that most of these early machines were not very large and the idea was born into him that it might be possible to try and reconstruct one. However, the idea remained dormant for a while until Tony got involved in the fight to save Bletchley Park in 1991 and prevent the government selling off this 50 acre site of historic national importance to developers who wanted to make it a huge housing estate.

It just cannot be imagined now how many lives were saved by the work of the thousands of codebreakers at Bletchley Park and the location and the type of work that went on there at this top secret site - the secret was never found out by the Germans. Even the British public knew nothing until it was revealed in a book in the late 1970s.


Colossus - this picture was taken exactly 52 years after it was first put to work on breaking German codes.

Computer Rebuild

Several people started a fund to save Station X, as Bletchley Park was known, becoming known as the Bletchley Park Trust Ltd. in 1992. The trust was allowed to move on to the park in late 1993 and at last Tony was given the chance to bring into effect his idea of rebuilding the world's first computer.

In the late autumn of 1993 he

started to assemble the parts needed to rebuild it and the information on how to do it. The information available was very sparse, so Tony built a prototype of circuits to actually prove that they would work and this was completed in November 1993.

The next task was to do the technical drawings with a computer aided design program and this was based on the very few photographs that were taken of Colossus and which were still in existence. For the next six months, all the parts were slowly collected and assembled.

Two types of communication receiver used to receive the coded signals that were fed into Colossus.

Most of the parts were originally used in post office telephone exchanges and as these were all now being scrapped they were eagerly snapped up. When all of the parts were collected, it was found that Colossus would be 90% authentically original when it was finally rebuilt.

Royal Visit

On 18 July 1994, his royal highness the Duke of Kent visited Bletchley Park and officially inaugurated the 'Colossus Re-Build Project' which was started by assembling and putting into operation the Optical Tape Reader. This was in full working order by Christmas 1994.

The original inventor of Colossus was a clever technical post office engineer named Tommy Flowers who worked at the Post Office research station at Dollis Hill in north west London and it was here that it was first constructed in late 1943.

Tom, who is in his late eighties, visited Bletchley Park a few times in 1994 and '95 to cast a critical eye over the machine he so carefully nurtured over 50 years earlier. The next step was the obtaining and assembly of the main frame and when this was installed, the power supply units were assembled at one end of the frame.

Once these were operating satisfactorily, then the first of many decade counters were built and installed using EF36 valves and this was followed shortly after by the Bit Stream Generator.

Open To Public

When Colossus is in full working order it has 2500 radio valves installed and these are mainly of 1930s and 1940s vintage. Of course it has proved difficult to obtain them, but so far, over 500 have been obtained from all over the country. A large number have been donated by short wave listeners and radio amateurs, for which Tony is extremely grateful, but another 2000 will be needed to complete the project.

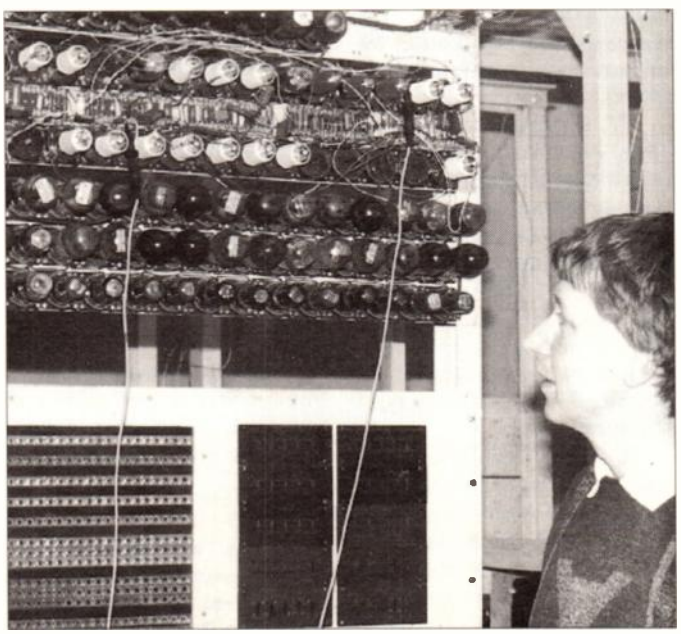
At the present stage of the rebuild, Colossus is actually working and can do some small calculations and will crack a simple code. Since this mammoth task was undertaken, Tony has gratefully accepted the offer of assistance, since the summer of 1995, from a small team of volunteers and they are helping to speed the project along.

As Bletchley Park is now open to the public every other weekend throughout the year, they will actually be able to see the world's first electronic computer working once again after a gap of over 50 years and it stands in the very room of the same wartime building where it was operational during the Second World War.

Cliff Horrocks, Colossus re-build assistant.

Can You Help?

If any reader can assist us with a few valves of the following types, then the museum would be extremely grateful: EF36, 6J5, GT1C, 6V6 and 807. If you are interested and require more information, then write to **Tony Sale, The Mansion, Bletchley Park, Milton Keynes, Bucks.** ■



Just one of the valve panels of Colossus. Standing beside it is John Pether, Colossus re-build assistant.

Gerry Dexter, c/o SWM Editorial Offices, Broadstone

Bandscan

LeSea Broadcasting's KWHR in Hawaii issues this very attractive QSL card.

America

The appearance of a new short wave broadcaster from South America is hardly an unusual event. In fact, it seems to be a near weekly occurrence, happening most frequently in the Andean regions. And more than a few of these new arrivals are quite challenging as DX targets.

Now and again the new stations are of a more substantial nature. Such is the case with two of the latest arrivals in the 60 metre band: Radio Amazonas in Venezuelas and Ecos del Orinoco in Colombia. Not only did they come on the air within a few weeks of each other, it turns out that they are relatively close together geographically.

Only about 80km separates the two. Radio Amazonas is located in Puerto Ayachuco while Ecos del Oriente is in Puerto Carreno. The latter station operates on 4.905, Amazonas is on 4.940MHz so they are fairly close together on the short wave dial as well!

New DX Show

An excellent new entry in the field of programmes for the short wave listener and DXer is *DXing With Cumbre*, which is a service of *Cumbre DX*, an on-line short wave news group. The programme presents a tremendous amount of information in each show (you'll want to have a tape recorder running!).

It's hosted by well-known American DXer Marie Lamb. I'd classify it in the 'don't miss' category if you want to stay current on short wave news. It is currently scheduled Fridays at 2330 on 5.745, Saturdays at 0600 on 5.760 and 7.315, Sundays at 0430 on 5.760 and 1930 on 13.760MHz.

Ecuador

HCJB's upper sideband transmissions on 21.455MHz have been running at 30kW for some months while the 1.5kW transmitter was undergoing repairs. Now the lower power unit is back in service, but only running 500W for the time being. HCJB issues a special QSL card for correct reports on the sideband broadcasts on this frequency.

Little-known Radio Interoceania in Santa Rosa de Ouijos has been absent from short wave for more than a year now. The station is asking its parent organisation, the Swedish Covenant Church, for the necessary funds to buy a 2kW transmitter.

A new Ecuadorian is La Voz de Chinchiupe in Zumba, operating on variable 3.570MHz. The station is located near the border with Peru and is on a very limited schedule: 1130 to 1215 and 2348 to 0100!

Another interesting Ecuadorian is Radio El Buen Pastor on 4.830MHz with one kilowatt from Saragura. Unfortunately, this little station must do battle with the more powerful Radio Tachira in Venezuela. That's why they're trying to get permission to move to another frequency in the 60m band. Broadcasts are in Quechua from 2100-0000 and 1100-1400, and Spanish between 1400-1500 and 0000-0100.

Radio Baha'i is using t3kW on 4.950MHz (slightly variable), but they hope to increase this to 5kW. They broadcast in Quechua from 0900 to 1200 and Spanish from 1200 to 1900.

Surinam

If you happen to pick up signals from Radio Apinte on 4.991MHz slightly variable you'll be be interested in knowing that, rather than the listed 350W, the station is currently running on just 50! This may be a quite temporary affair, however. The station's current schedule takes it to 0400 sign off.

Antarctica

Still further south, I now have definite word that the Armed Forces Antarctica Network station at McMurdo is, indeed, off the air and has been so for quite a long time. Further, it would seem this is going to be a permanent situation since the transmitter is said to have been shipped back the US. AFAN-McMurdo now uses only very low power f.m. stations.

Central America

Radio Miskut in Nicaragua has added a morning transmission that is being noted around 1215. European DXers won't manage to hear it at that hour, of course. Try an hour or so before sign off, that comes around 2335. The frequency is 5.770MHz.

Costa Rica

It appears that Radio Exterior de Espana's relay station here is using the 90m band frequency of 3.225 to pump a high powered signal to the Americas. We already have one of the US religious broadcasters operating in the 90m band (3.315). Let's hope things don't get any worse than they already have.

Radio Universidad on 6.105 is being heard quite often, running to sign off around 0400.

Not often heard is Radio Casino in Puerto Limon. It operates on 5.954 from 1030 to 0600 but has trouble making it through all the congestion in this area. Radio Casino is celebrating its 50th birthday this year.

Uruguay

Here' s a situational report on short wave from this country:

6.045	Radio Libertad Sport operates very irregularly.
6.075	La Voz de Artigas irregular, and then only weekends.
6.125	SODRE 1000-0400 with relays.
6.140	Radio Monte Carlo/Radio Oriental 1000-1630.
9.595	Radio Monte/Carlo/Radio Oriental 2300-0300.
9.620	SODRE inactive.
11.735	Radio Monte Carlo/Radio Oriental 1630-2300
11.835	Radio El Espectador inactive, perhaps permanently.
15.270	SODRE inactive temporarily. This frequency is used to beam to Uruguay's base in Antarctica.

WGTG in Tennesee hasn't been on the air all that long but is already readying a second 100kW transmitter.

Caribbean

The Caribbean Beacon is reportedly all set to begin broadcasting from the island of Anguilla. The transmitter and antenna are installed and ready. All they need now is permission.

A Canadian journalist who spent a year working at Radio Havana Cuba says the station sometimes had its operating schedule cut back so the government could use the transmitters to jam anti-Castro broadcasts!

Canada

Canada is reported to be broadcasting its Canadian Forces Network programme to Europe, the Middle East and Africa Monday through Fridays at 0500 to 0530 on 6.050, 7.295, 15.430 and 17.840MHz. Reports to: CFN, 1055 Rene Levesque Blvd, East, Montreal H2L 4F5.

Radio Canada International produces a 'forces' programme, currently scheduled in French from 1800-1859 and English 1859-1958 on 15.275 and 17.725MHz.

Medium Wave Note

The first US station to begin operating in the expanded medium wave band is WJDM, Elizabeth, New Jersey, using 1660kHz. The power at night is just 1kW. Reports have been received Europe and the US west coast. The station runs a children's programme format called *Radio Oz*, that is programmed from Radio Oz headquarters in Minneapolis, Minnesota.

That covers things for now. Until three months later, hence - good listening!

Roger Bunny, 33 Cherville Street, Romsey, Hants SO51 8F8

(pictures by John Locker, Wirral and Roger Bunny)

Satellite TV News

Heavenly Sightings.....

American religion on television can be regarded as something of an entertainment, certainly when compared to the English approach. The American way certainly draws the crowds, as is seen each week in the *Hour of Power* service from the Glass Cathedral, California. High gloss, highly rehearsed, a choir upon high and the sun streaming through vast heights of glass windows, a glimpse of heaven, perhaps, but your $50 donations are still welcome.

In recent weeks 'World Harvest Television, Europe' has appeared nightly on Intelsat K at 21°W (check out 12.711GHz vertical) with a whole package of services, meetings and revival experiences. Most are sourced from the States and carry commercials, often trailing tours and nightly stands by various clergy and theological presenters across the US. Over several evenings monitoring, the mid-evening presentations ranged from the peaceful 'soft sell' to the 'hell fire and damnation' approach with a radio mic'ed 'theologists' shouting his thoughts and message from various parts of the auditorium. How this Berlin-based programme packaging will be accepted in traditional Europe is uncertain, I anticipate few will take up cable carriage and 'WHT-EUROPE' will eventually reduce its programming scale.

I'd hoped to watch the Bruno v Tyson match via the Orion feed ex Las Vegas into Sky Sports for free on March 16 when Sky introduced their first Pay-Per-View (PPV) transmission to the UK. From the afternoon onwards, both Orion and Intelsat K had been sending one-way reports and two-way interviews into Osterley (in the clear) but the Orion main feed early evening went into hard encryption with both video and audio and with it my free view!

Many Arabic countries are now transmitting their own main TV service across Europe from either the 13 or 16°E Eutelsats, a new offering is Saudi TV that is available via the Russian Express/Gorizont at 11°W using the predictable 11.525GHz right-hand circular downlink. Signal strength isn't wonderful though a 1m dish should produce adequate picture results using plane polarised feed equipment. Sound quality is less than wonderful at times, which seems to be studio output, check out the 7.02/7.42MHz subcarriers. Using the UK norm of either vertical or horizontal (plane) polarisation produces little change in picture quality on this signal, it being of circular right hand polarisation. A correct circular depolariser in the feed system will give at least 3dB increase in signal level though such devices are rare, only Swedish Microwave offer Ku Band circular feed equipment (I think).

After the *Sea Empress* fiasco and resultant oil pollution, the ship was towed into Milford Haven and emptied, Sky's UKI 149 contract SNG van followed the ship into dock and established an uplink for oil salvaging interviews and packages. Two days later, on February 29, UKI 149 was stuck in the road outside Kensington Palace early a.m. awaiting any movement by Princess Di's entourage as the continuing saga of her divorce rumbles on - and on! A sharp contrast for UKI 149 as on March 1 the van arrived in woodland at Newbury to witness the ongoing antics of the 'tree people' and those vested to move them on.

If your daytime satellite pictures looked rather poor during the February 29-March 4 period then worry not. The twice annual solar outage occurred over this period, the sun's track across the sky is co-incident with the Clarke Belt - where all the satellites are parked in geostationary orbit. Progressively during the day the sun passes behind each satellite - as viewed from the receiving site - and your dish then receives both the wanted satellite signal and the unwanted solar noise - result is interference. **John Locker** calculated that the sun took out PAS-4 68°E at 0736 hours, Astra 19°E 1046; Intelsat 701 1°W 1212; Intelsat 601 27°W 1414 and PAS-1 45°W 1525 hours. Several main satellite operators captioned various downlinks advising of solar outage, it won't happen again until the autumn.

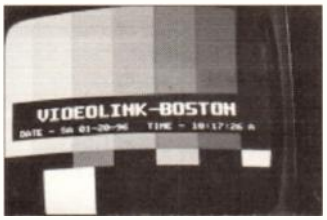
Good to hear from **Edmund Spicer**, an 18 year old student in French/Spanish attending Worthing 6th Form College, West Sussex where thanks to the initiative of the languages department, the motorised dish is used to benefit students with direct input of numerous foreign language TV services. Edmund is now 'in charge' of the motorised system and has reprogrammed the system for other satellite programmes - purely for educational use of course! Edmund confirms the recent 'ETB-1' caption is from the (Spanish) Basque region but the language, though sounding like Spanish, is completely different.

I recall that Shredded Wheat (of Nabisco fame) came from Welwyn Garden City, Herts, one of the first 'new towns' north of London. **Ken Suddes,** a satellite enthusiast, also comes from Welwyn and is fully equipped with a Pace receiver, MAC decoder, positioner and Lenson Heath 800mm dish - and good news to me is the additional manual receiver, a Best Galaxy 2022L low threshold modified with a 2GHz tuner. A very long reception list is also included with his letter - he suggests checking Hispasat 30°W for OB and news feeds (I rarely do!) and recent downlinks have been 11.138; 11.171; 11.007 and 10.972GHz all vertical.

In the post from Montreux, Switzerland **Jean-Louis Dubler** asks about 'Sunrise TV' that apparently is due anytime now on Eutelsat (13°E?), as of the writing time I've seen nothing nore has the media press mentioned this new station. Jean-Louis mentions that Canal Plus has now delayed moving onto Astra with digital transmissions, they have only 1000 digital decoders available as of late February! And Fance 3 that was due to appear on Telecom 2B 5°W hasn't appeared as yet, instead they may opt for Hot Bird 13°E in 'clear' MPEG digital compression.

Finally there is upcoming a satellite receiver that may be the answer to the satellite enthusiasts dream and replace the favoured manual tuner. A Far Eastern sourced receiver is shortly to hit UK shores and a prototype hopefully will be in my hands as you read this. The brief spec is of a 'reasonably priced' i.r. controlled receiver with threshold extension, variable i.f. bandwidths (video and audio), slow and fast scan tuning, decoder + A/V looping (via two SKARTs) and a direct readout of frequency on the receiver's l.c.d. panel and a switchable inlaid readout on the TV screen itself. The receiver is designed for Middle East/Eastern European operation where C and Ku band signal levels are low in a smaller dish situation. The promise of other useful features and options of an inboard dish controller make for perhaps the answer to the DX receiver. More details when known!

Intelsat K feed ex-Iowa concerning US Primaries election activity.



Orion Atlantic at 37°W with a Boston, Mass. news package into London.

A reminder of the Sea Empress tanker grounding off St. Annes Head Pembroke and the resultant sea pollution.

Though Newsforce is noted for digital SNG work, this is a relay via an EBU leased transponder on Eutelsat II F4 at 7°E.

One of the low power transponders from Hispasat at 30°W.

An unusal appearance of a Yugoslavian channel via Orion Atlantic at 37°W.

Kieth Hammer & Garry Smith, 17 Collingham Gardens, Derby DE22 4FS, England.

DX Television

February was a relatively quiet month for Continental reception, apart from an isolated Sporadic-E opening to Spain on the 5th between 1241 and 1315UTC. Signals were from the TVE-1 Madrid transmitter on Channel E2. By now there should be signs of a build-up to the start of the 1996 Sporadic-E season. There are often a few isolated openings towards the end of April before the main season commences around mid-May.

Reception Reports

John Wood (Redditch) has received French tropospheric signals on a newly acquired Grundig multi-system TV receiver. Good-quality colour and Teletext reception occurred on January 31 from the Caen transmitter (northern France) on Channels L22 (tf1), L25 (France 2) and L28 (France-3). He also noted Boulogne on Channels L34 (France 2) and L37 (France-3). John comments: "So far this winter, I have been rather disappointed with the lack of 'real' DX!" John, some winters are worse than this!

George Garden (Edinburgh) regularly watches the long-range weather forecasts on BBC-1 around midday on Sundays. By keeping a close watch on rising atmospheric pressure he can predict with reasonable accuracy the onset of tropospheric reception. Such an event occurred on the evening of February 14 and into the following morning when a reception path was established to the 500kW Tyne Tees TV transmitter at Bilsdale West Moor- a distance of approximately 170km. For TV DXing, George uses a rotatable XG14-type u.h.f. antenna, with amplifier, that feeds a JVC receiver. For f.m. DXing, a portable Sony receiver with RDS is used to enable accurate station identification.

John Woodcock (Basingstoke) is well equipped for the coming Sporadic-E season. He is using a 100mm TC-930 Chinese-made monochrome receiver covering Bands I, II and III for general DXing but for weak-signal reception a D-100 converter with reduced-bandwidth i.f. strip is used, fed into a 310mm Ferguson monochrome portable. Loft antennas comprise two Band I dipoles orientated horizontally at right-angles for east-west and north-south Sporadic-E reception, while for tropospheric DXing a six-element Band III array and u.h.f. Yagi have been installed, both facing east. John's QTH is in the town centre at a height of 80 metres above sea-level, surrounded by office blocks covered with all sorts of antennas, so there is plenty of potential interference from taxi radios, paging terminals, etc. Despite all this, signals do manage to filter through.

Mystery Solved

Roger Bunney (Romsey) has solved the mystery surrounding the 'Nottingham TV NSC' colour bars seen by Tim Bucknall, as reported in the March column. The colour bars originated at the Nottingham TV National Switching Centre (NSC) but it's still a mystery why they were present with the Winter Hill signal, although a switching, or mixing, error could account for this. Also, has anyone noticed very faint colour bars present on plain backgrounds during certain BBC and ITV programmes? This has been going on for years.

DX-TV Books

Glyn Cadwalador (Gwynedd) has been a keen short wave listener for many years and enjoys the hobby very much, using Realistic DX200, Yaesu 7700 and Yupiteru 7100 scanners. An interest in DX-TV reception is emerging and like many other potential newcomers Glyn wonders if there are any publications on the subject. The only ones currently available are *DX-TV For Beginners* by the late Simon Hamer and *Guide To DX-TV* compiled by HS Publications.

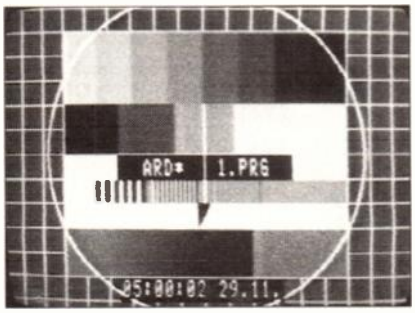
The former booklet provides lots of practical advice regarding equipment and antennas, propagation, Continental channel allocations and, perhaps more importantly, what to expect from the hobby. The second publication is intended for the more experienced enthusiast and includes topics such as ways of curing interference and hints on how to choose the right type of antenna and amplifier when upgrading a basic DXing system.

Both publications are now available via the *SWM* Book Store. Full details can be found at the back of this magazine.

Interference Sources

Over the past decade or so there has been a considerable rise in the number of electronic devices that emit some form of r.f. radiation. Computer radiation has been a headache for many DXers and its presence is easily spotted when tuning through an otherwise empty Band I. Recently there has been a tightening of the e.m.c. laws with the intention that radiation from electronic equipment should be reduced to a much lower level. Unfortunately, the number of new devices marketed seems to grow, thus creating new sources of interference.

Tony Healless (Blackburn) has alerted us about a potential interference source in and I and Band II involving a



A German test card radiated by ARD and noted on u.h.f. by Tim Tebbs (New Romney).

George Garden's DXing installation comprising an XG14-type u.h.f. array with a 4-element f.m. array below.

Tyne Tees TV on Channel 29 from Bilsdale West Moor received at a distance of 170km by George Garden.

A German programme preview caption radiated by SAT.1 and received on Channel E52 by Stephen Michie (Bristol) during a recent tropospheric lift. The SAT.1 on-screen logo is a highly-coloured beach ball that rotates during programme trails.

A caption following a programme radiated by WDR in Germany on Channel E32, received by Stephen Michie.

Japanese TV caption incorporating the new NHK 'egg' logo design.

low-energy light bulb - in this case a Mazda 21W, Model 6L. After installing it, Tony noticed S-shaped patterns at various points in Band I. Meanwhile, there is another potential interference threat at 49.8MHz, namely, wireless loudspeakers in which a radio transmitter is connected to a hi-fi, etc., to enable the receiver loudspeakers to be used anywhere around the house or garden.

Meanwhile, **Paul Logan** (Co. Fermanagh) was horrified to discover that his new JVC TV set for domestic use radiates like crazy in Band I.

Peter Barber (Coventry) has noticed that certain scanners can cause patterning over the local u.h.f. TV channels. The interference originates from the scanner's v.f.o. (variable frequency oscillator), that cannot be cured. The radiation only affects his local TV channel group 40, 43, 46 and 50 when the scanner is operated below 125MHz. Possible cures such as altering its location, disconnecting its antenna, placing it within a double-walled box and adding filters to the mains lead, etc, were all ineffective.

Extra ITV Regions

Martin Dale (Stockport) hopes to receive extra ITV regions on a regular basis and asks how far a TV signal travels under normal conditions. Well, depending upon the terrain, favourable reception from high-power u.h.f. transmitters can be obtained up to a distance of around 80km. Detectable signals (at noise-level) are possible at distances of 200km or more, but it is unlikely that watchable-quality signals would be obtained unless assisted by favourable weather conditions.

Apart from terrain limitations, it should be noted that there may be a local relay operating on the same group of channels, so it is advisable to obtain a station list from the BBC or ITV to assess which channels may be favourable. It should also be noted that an efficient outdoor antenna is essential. A well positioned indoor antenna is never as good as a badly sited outdoor one!

TV Memorabilia

Richard Bell (Melton Mowbray) is building up a collection of ITV memorabilia that involves video tape swaps with other enthusiasts around the country. The early days of ITV are of particular interest to many collectors, especially photographs of identification captions, clocks and even local announcers. Richard comments that some of the old ITV 'classic' programmes released on video often feature the original ITV programme contractor's symbol at the beginning and at the end. Some of these tapes can be acquired cheaply via the second-hand market such as car-boot sales, etc.

TV Graphics

M. Burfield (Braintree) is interested in TV graphics, particularly those of Central TV, and wonders if anyone out there is interested in swapping video recordings. If so, please write in and we'll pass on your letter. One problem with electronic graphics is the ability to quickly change continuity sequences or logos to suit a particular event. For instance, on St. Valentine's Day the circular Central TV logo was filled with red roses!

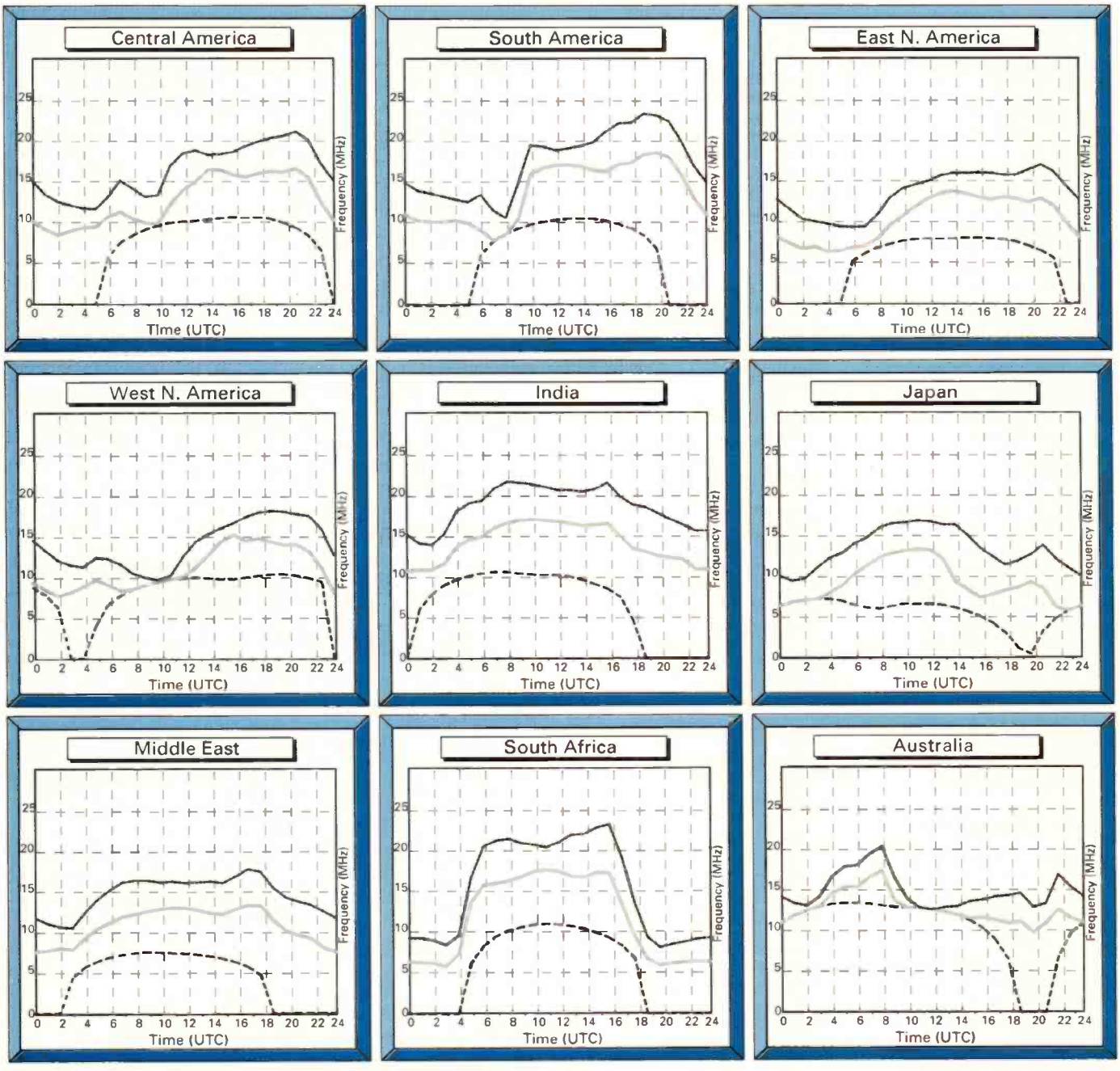
Keep On Writing!

Please send DX-TV reception reports, equipment news, off-screen photographs and general information as soon as possible to: Garry Smith, 17 Collingham Gardens, Derby DE22 4FS, England.

Jacques d'Avignon VE3VIA

World Propagation Forecasts May

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.

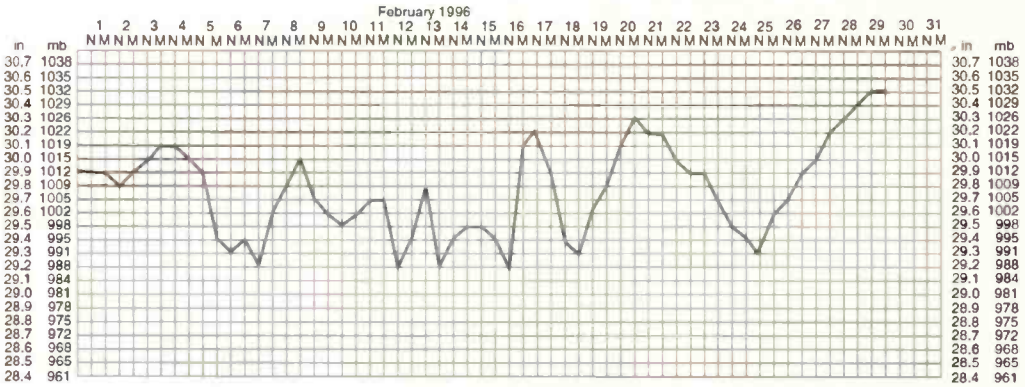
Dick Ganderton, c/o *SWM* Editorial Offices, Broadstone

Propagation Extra

I believe that it is still essential that those readers who have an ongoing interest in propagation still have access to the various pieces of information collated by Ron Ham. I have asked Ron to continue to provide his monthly barometric pressure charts in the same format as before. In the meantime I am trying to arrange for a regular supply of sunspot charts and other similar information. If there are any readers who would be prepared to provide such information **on a regular basis**, please get in touch with me at the Editorial Offices, Broadstone.

Ron has provided two barometric pressure charts for this issue, **Fig. 1** covers the month of February 1996, **Fig. 2** covers March 1996. In future each chart will cover one calendar month.

Fig. 1: Barometric pressure chart for February 1996 taken by Ron Ham at Storrington, E. Sussex.



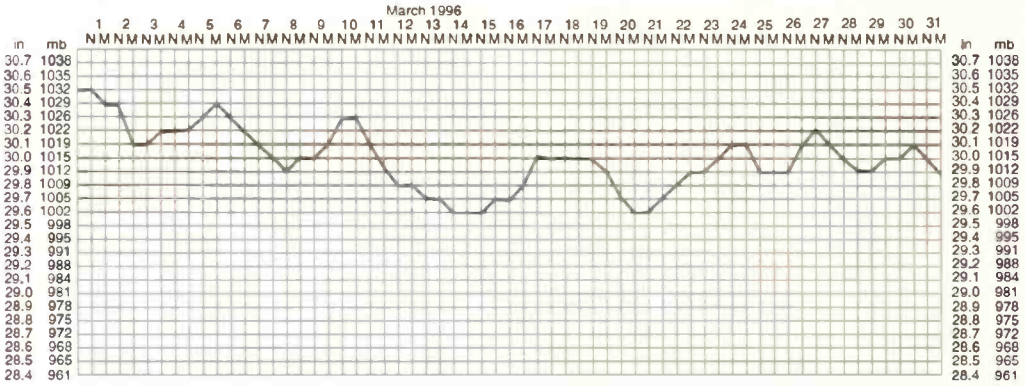


Fig. 2: Barometric pressure chart for March 1996 taken by Ron Ham at Storrington, E. Sussex.

Paul Essery GW3KFE, PO Box 4, Newtown, Powys SY16 1ZZ

Amateur Bands Round-up

Listening to the Amateurs

Let's have all your news and comments, sent as usual for the start of the month.

We are now very near the bottom of the sunspot cycle. It is often loosely said to be an 'eleven-year' thing but in fact the time seems to vary quite widely. Of course, individual sunspots actually occur at random, and the 'sunspot cycle' is no more than an expression of a trend. Normally, one sees a fairly sharp rise from the bottom to a peak, followed by a slower fall back to the bottom again. As individual spots appear at random, and spots from a new cycle overlap those of the old, we must 'smooth' the daily counts over a period, this giving us a 'smoothed sunspot number' or SSN. Because of this smoothing, we won't know for sure that we are back on the upward trend until several months after it has happened.

Intruders

By this I mean unauthorised non-amateur stations in the amateur bands. In November 1995, some 199 frequencies were noted as having intruders of non-telephony nature; and 132 frequencies with telephony intruders! If any of you can give time, date, frequency, and an identification, let's have them and I'll pass the info on. If you can't identify for sure, still pass the details on as corroborative evidence.

Input

Occasionally I am asked how I prefer your lists to be laid out. I much prefer letters sent to the Box, but as to what goes in them, or how the information is laid out, you do your own thing and I untangle the result so long as it's readable! That's the easy way. If you just send a copy of your log straight off the computer, please highlight the signals you would like to see mentioned. For the moment I can't except disks.

What I would like is extra information if you come across an 'oddball' call; by collating your various inputs one can usually get a bit nearer the true answer. And, please, write legibly. Sometimes I have to leave out something interesting 'cos I can't decipher it!

Letters

The two previous paragraphs were inspired by a letter from **D. J. Miller** in Dawlish who added some other questions and included a s.a.e. for a direct answer - thanks!

An interesting question arises in the letter from **Ian Whiteford**. It concerns the number(s) in an amateur callsign. Any amateur radio callsign normally contains one or more numbers. At first, the 'prefix' part (that indicates nationality) was of such a form as 'GW3'. The '3' has no significance geographically. In some countries we saw the number indicating a location; W6s for example in California and, say, a W1 on the East coast. More recently W6 merely implies that the licence was first issued in California. Either way, the letters are all you need to determine nationality - W, or GW . Next came callsigns of the form '5Z4'; here all three characters are part of the prefix of nationality. Closer still to the present, we find such prefixes as 'A41' where, once again, the three characters indicate the nationality of the station. Thus, for example, at the head of a listing of Chinese mainland station we will find BY - simply because the number is not part of the prefix. At the same time, the Kenyan listing will be headed '5Z4' because that is the prefix. 'Special-event' calls in country 'X' are taken from the prefix letters allocated to that country by the ITU. The RSGB Prefix Guide is the best reference currently available. As for Ian's listing the pick of the crop just has to be A35RA, using 14.198MHz at 1500 on January 23.

A bit of an improvement in conditions this time, avers **Ted Trowell** on the Isle of Sheppey. Everything was on c.w. On Top Band, Ted copied K1IK, N2RM, K1AR, W1KM, VE1ZZ, K1ZM, K1KI, K8AZ, KY3N, TI1IK, N6BV, YI9CW and VK6VZ. Up to 3.5MHz and VP2EN, VP2EWW, W2MEL, N3RS, KT3Y, W1MK and W1FV; while 7MHz saw off OY1R, K1ZZ, N3RS, K2SX, K1AR, WD8LLD, K8MFO and VP5/K0KX. K8XF/MM was off Port Said when Ted copied him on 10MHz, and on 14MHz VQ9DX, 3B8GA, ZF2NE, TI4CF, K6KM, N7TT, 7X2CR, YI9CW, VE7NH and VK9CR on Cocos-Keeling Is were logged. For 18MHz the haul comprised TA2ZP, FG5XJ, 9J2BO, TA2ZY, W4NXE/DU2, VP2EWW, 8P6DU, OD5/SP7LSE and 5N0/OK1MU. Finally, on 21MHz there were J28JA, TU2XZ, TU5A, VU2BK, A45ZN, VO1SA, 4K6GF and FS/N0BGH (St Martin).

'I'm an extremely casual short wave listener' says **Paul Hetherington G7TLB** who lives in Cambridge. Recently though, Paul took his Lowe HF-225 to Cornwall; he says he was within two miles of the sea in two directions, 12 in a third; and up at 750 feet a.s.l., that seems to place the holiday cottage fairly accurately! The antenna was some 20 metres of wire strung around inside the cottage. 21MHz around lunch-time produced 9G1YR, DL4SCZ, a PT station whose call couldn't be pulled out of the QRM and 9A2AA; at teatime, ZP5AZL, S58WW, ZY3CYJ, and a couple of relatively local signals. 18MHz was a bit more forthcoming by way of W3FX, CT1BWT, IT9VPT, 9H4CM and N2GMY; after an hour (1400-1500) of this, it was down to 14MHz for S58WW, KE1BE, YO3ARJ, WA9QNU, UR5TET, LY1DS, KA9ABC, I3CGV, KM4PE, OD5RY, WB4NFO, N4LZL, VA3PF, OK2BEW, RN1NR, LZ1UF and AA3MA. 1900-2200Z were spent on 7MHz among the Europeans, but 8P6JB, 8P6HG, an A4 station and a 3A, followed by PT7BR and UA9IDX. Finally, the odd look at 3.5MHz produced C31SD, 9H1BT, 9H1EU and CU3FQ. All were s.s.b.

Now we go to **Colin Dean** in Barnsley who likes 3.5MHz sideband, particularly when it yields paydirt like DU9RG, EK0TG, EX8VK, EY8AM, FP5AC, HI8ACJ, JAs, JX9ZP, JY4MB, KP2BH, OD5PI, OI0RJ (a special?), SV9CVJ, S92YL, TA2BK, UN9LM, VKs, VP2MBR, VP2VF, VP5/JA1MZL, V3IDE, V47HP, WP4Q, XE1REM, YB5QZ, ZA5B, ZC4HA, ZL1RS, 4J3P, 4L4KK, 4S7EA, 5N3/SP5XAR, 8P6ET and 9Y4SO. On 7MHz we find A41LD, ET3TI, FP5AC, PJ8AD, PY0TI (Trindade Is), TT8BP, XQ7IDM, 5N4KST and 9J2SZ.

A first letter comes to hand from **Paul Fineman**, in Orpington who runs a Sangean ATS-818 and ten metres of wire 'up aloft'. The log is kept by computer, that gives a monthly print-out. This time, 7MHz stumped up with YN1AX, and 18MHz 9G1BS. Turning to 14MHz, this, as ever, is where the DX goes at the bottom of a cycle; Paul found ZB2JO, LU1TCH, JX9SP, YA9ANH, 7Z1NS, OD5LS, VK3CR and VK4UA.

Now to **Karl Drage** who lives near Kettering, and who has a computer that spits out an **enormous** listing for this month, thanks to the big contests; and what a pleasure to receive a log with c.w. mode being used! Karl has a couple of queries; first the VK9CR was operating from Cocos-Keeling Is. The D68 whose call Karl couldn't copy was heard on 7.054MHz, around 1940 on February 4. I think probably D68SE or D68RH; but if anyone can confirm please let me know. Karl has Europeans on Top Band phone, and on Eighty we see c.w. from VK9XY, plus 4S7EA, 4Z5JE, 5N9NJM, 7X2BK, 9G1YR, 9H1EU, 9K2MU, assorted Yanks, AP2TM, DU6BG, FP8CJ, FS/WX9E, HI8HCJ, JAs, OD5s, TA1FA, TI4CF, VEs, VKs, VOFG, VO1HQ, VP8CSA, YB5QZ, YS1JSG, YV4BMV, ZA5B, ZC4HA and ZK1DI. Turning to 7MHz, again lots of K, A, N and W Americans all using c.w., JAs, 3V8BB, 4X6DK, 8R1Z, A41LD, AP2EH, FG5KD, FM5DN, PT7BR, LUs, TI2ADS, TI4CF, TR8SF, YC9WGA, YV5EUX and a ZL1DLQ logged as being in Mexico City! On now to 14MHz c.w. and a great crop of the Statesider, VEs, VA3NR, and on down to Z350GB. Turning to sideband3V8BB heads, 4X6UO, 5Z4LL, 7Q7RM, 7X2DG, 8R1s, 9G1NS, 9H4M, several 9K2s and 9L1s, A71BY, pages of Yanks, AP2JZB, CN8FB, CO6AP, D44AB, FG5FC, FH5CY, FM5GN, FP5AC, HK4CYR, J52AK, JX4CJA, JY, a couple of pages of K and N calls, OD5RY, OX3NUZ and OX3KV,PYs, PZ1DR, Canadians aplenty, VKs, VOs, and yet more Ws, ZLs, ZP5MAL, ZSs. On 18MHz we see 5N0/OK1MDU, C6AGN, Ws, PT7BZ and ZL4DJ. Finally, 21MHz was scoured for 9G1YR, 9U/F5FHI, EA8/DL7LA, IT9DQC, SU1CS, TR8SF and V51C.

Operatability

Regardless of what equipment you happen to use, if you aren't comfortable, or things are badly laid out, or ventilation isn't adequate, then you won't get the maximum fun out of your rig. Piling boxes one atop the other, for example, looks impressive, but because of heat from the various items, there's a good chance the receiver drift may increase. Again, if you are right-handed, you normally want to log with your right hand, and tune the band with your left, the heel of your wrist resting on the operating bench for finer control. If the receiver is too high, the wrist support disappears and fatigue appears stage left. Ideally too, your eyes should look as directly as possible at the read-out. A look at your own set-up, and I'll take odds you could make an improvement somewhere.

Jerry Glenwright, 23 Downland Avenue, Southwick, West Sussex BN42 4RF

ShackWare

Well, I didn't expect it, but thanks for a fantastic response! Since the last column, hardly a day has gone by without the postman popping complimentary mail and requests for help through my letterbox. Many of you are surprised but pleased that ShackWare supports 'obsolete' computers and it seems that I've pitched it just about right. Do keep the letters coming but please, if you want a personal reply, enclose an s.a.e. with your missive. I'll certainly answer all that I receive, but give me a week or two to get around to yours.

Pickett's Lock

Did you go to the show? There were lots of computer bargains for those prepared to rummage. I saw one stall selling off 286 machines for just £5 each, another with 100Mb ESDI hard drives for £12, yet another with dinky nine-inch mono VGA screens for £14, modems at knockdown prices, and dozens of expansion cards for hundreds of uses at a couple of quid each.

Among other bargains, I bought an ageing but complete satellite decode station comprising Timestep's 12-channel receiver (does anyone have a manual I could photostat?), satellite interface v3.0 and framestore, an active crossed dipole, BBC B, Opus drive and Cub colour monitor for a remarkable £75 - I drove all the way home grinning from ear to ear! I also bought a Sony SW100E from Haydon Communications - more later.

Mail

Even before I'd seen the first column in print, mail began to arrive with enough questions to keep an army of columnists busy! I've answered all letters already but here's a selection...

From furthest afield – Pittsburgh USA – came a lengthy and interesting missive from **R. R. Dailey** who says that he read my column with anticipated dread, fearing "...nerdy terminology, and endless praise for the internet!". However, as a non-computer type he managed both to understand and, he says, enjoy it. Thanks.

Ross Workman lives just minutes away from me in Shoreham and uses almost identical equipment to similar purpose. Ross retired recently and finds s.w.l.ing "a most enjoyable way to pass the time" – a sentiment I wish my wife would agree with! Ross uses a BBC and RX-8 for data decoding and is interested in swapping software with other readers. I'll pass on all letters.

Richard Reynolds of Guildford has just splashed out on his first shack computer, an all-singing 486 PC. He plans to drive it with his Sangean ATS803A, and wonders how mine performs. Perfectly, is the simple answer. I've connected the ATS803A to my Mac, PC, and Atari 8-bit at one time or another and have decoded all the simple data modes with ease. A steady hand tuning with the b.f.o. between the receiver's 1kHz steps is required, but otherwise the radio performs exceptionally and is an excellent introduction or (relatively) cheap option.

Amiga owners interested in software exchange would do well to contact **J. Stevens** of Dyfed, South Wales. Mr Stevens has collected over 30 disks of radio software and is interested in acquiring SSTV software. He would also like C64 contacts. I'll forward all letters.

All those who want Spectrum software (including **Michael Lycett** of Sheffield) could do worse than contact J & P Electronics (01562 753893), a regular *SWM* advertiser which supports the machine. It'll pay to keep an eye on 'Trading Post' in the back of *SWM* too, and possibly even place an ad in the wanted section.

Chris Holland of Sidmouth tunes the bands with a Racal RA117E and an Eddystone 840A and says his C64 is a "very versatile computer and was one of the best in its heyday". Never a truer word spoken Chris. He would also like to find software but need look no further than the same J & P Electronics.

Philip Northmore of London owns an ST - so does Carl Hender - send me a conventional address Carl so I can reply! - and uses it with public domain c.w. tutors and his Sangean ATS803A. He also bought an Oric Atmos recently and wonders if there's any radio software available. Not as far as I know, though a few years ago a correspondent to Lawrence Harris's 'Info In Orbit' column said he'd written APT decode software for the Oric (among others), which I'd love to see.

Thanks to everyone who wrote to me. Oh, and a special thanks to one correspondent who identifies himself (or herself) only as Pat, who sent me a large and fascinating parcel which, when opened, revealed most of a Dragon 32 nestling within! The Dragon is interesting in that it uses (along with the Tandy Co-Co) a 6809 CPU. The Dragon 64 with disk drives ran a version of the once-popular OS/9 operating system – exotic and sophisticated in its day.

Miniature technology could make a fantastic pocket station.

Pocket Station

It seems the trend in both radio and computing has always been towards miniaturisation - witness the praise which met hardware such as the Icom ICR1, Sony SW100E, AOR AR8000, and the Atari Portfolio/Poquet PC and Psion Series 3. Couple say, the SW100E with the Atari Portfolio and a microcassette recorder, and you could build a portable listening station that will receive, log and decode everything from broadcast stations to h.f. FAX.

However, it seems there's very little information describing how to mate miniature technology to produce pocketable stations with which to trawl the ether. So is it possible?

Well one problem with using the Portfolio for example, would be capacity. An otherwise perfect companion for a miniature s.s.b. set such as the SW100E, the Port is (to some extent) a PC compatible machine, but shipped as standard with just 128Kb of RAM, and some of that is set aside as a RAM disk.

JVFAX7 requires several hundred kilobytes just to get up off the disk and try hooking even one complete FAX transmission from the airwaves, and the resulting file can be almost 3Mb - there's a hefty demand in resources if you want the superior resolution of current software packages.

By contrast, FAX decode software, written in 6502 machine code and running on an Atari 8-bit machine requires less than 3Kb and produces picture files 32Kb maximum. Resolution is low but the results are more than acceptable, especially if similar results could be had 'on the move'.

A possible solution might be to search out software dating from the days when a 'cutting edge' PC meant 8088/6, 512Kb and a 5.25in disk drive. Amateurs and s.w.l.s have used personal computers since they first appeared, so it seems likely that radio-oriented software to support machines with that kind of spec is still around somewhere.

Perhaps I'm alone in wanting to carry around a pocket station - or do you know differently?

ShackWare On-line?

Further to my suggestion for a software exchange (which has caught the imagination of many correspondents), I'm considering setting up a bulletin board which readers can contact to upload and download radio software. The difference between this BBS and others would be its devotion to all formats – the Atari 8-bits, Dragons, Orics, Spectrums, C64s and BBCs still to be found in many readers' shacks, as well as the more widespread Amiga, ST, PC and Mac.

Those who contact the board could ask for help, solve problems and generally expand on themes explored within the column. The board would be on-line 24 hours and offer free access to all s.w.l.s interested in using computers in their shacks. I have a computer set aside for the purpose so it only remains to have BT install a second line at my QTH - if enough readers want it. Does it sound useful? Write and let me know.

That's it for this quarter - good listening!

Graham Tanner, 64 Attlee Road, Hayes, Middlesex UB4 9JE. Internet: gmt@delphi.com

SSB Utility Listening

VOLMET

It seems only a few months ago that I last wrote about the Royal Air Force voice weather broadcast, and the way that they had been changing their frequencies. For many decades, they had been using 4.722 and 11.200MHz u.s.b. for a continuous broadcast of weather observations at various airfields in the UK and Germany. Over the years, as airfields were closed, they were removed from the broadcast, and others were added as required, such as during the Gulf War.

In the past few years they have changed frequency several times. Not only were most listeners caught out, but so were many RAF aircraft! Many flights, upon contacting the RAF 'Architect' service, were heard to comment that they could not find the VOLMET broadcasts. They first changed to 4.739/11.178MHz, and then to 4.739/11.193MHz. After the last change, I remarked that I expected them to change frequency once more, as one frequency (11.193MHz) was already used - by the Russians, no less.

Well, just as we'd got used to them using 4.739 and 11.193MHz, they have changed yet again. During the middle of February 1996, the VOLMET broadcasts changed to 4.715 and 11.253MHz. One evening, while listening to Lajes GHFS on 6.739MHz, I 'discovered' a short transmission of the RAF VOLMET service on 6.740MHz. This prompted me to check the 'current' frequencies, but they were both quiet. I set about searching for their new frequencies, and soon found them on 4.715 and 11.253MHz. Within 10 minutes, I was back on 6.740MHz, but that VOLMET transmission had ceased!

I have checked the latest *Ferrell's Confidential Frequency List*, to see if there are any other regular users of 11.253MHz. The most likely 'other users' are the US Navy from Jacksonville, Florida, and NASA - both on 11.252MHz. I have not seen either of these users reported active on this frequency for several years, so I would expect that the RAF VOLMET service will remain here for quite some time. I have noticed some 'bubble-type' jamming/interference near this frequency, and sometimes the signal from Architect is blocked by this signal, so only time will tell if Architect remains on this frequency or moves yet again.

Telephones

Michael Powell from West London writes to say that he is starting to compile a list of DSN numbers. For those of you who are not familiar with these, they are telephone numbers in a private US forces network known as the 'Defense Switching Network', and was formerly known as 'Autovon'. This may seem a strange thing to be compiling, and you may wonder what it has to do with s.s.b. listening.

One of the problems with listening to the US forces is that they attempt to disguise what they are doing, where they are coming from, and where they are going to, by using various codes and abbreviations. The codes and abbreviations are well documented, but there are many times when they are not used. Aircraft and ships (yes, they also use the GHFS frequencies) frequently make phone-patches to various places to announce all sorts of things relating to their journey; usually you have no idea where they going to, or who they are talking to. This is where a DSN list comes in handy.

By making notes about the DSN numbers and who answers the 'phone call, you can easily build up a partial listing. After a while, this will look just like a telephone directory (... and probably be about as interesting as one, too!). Then, next time you hear somebody request a phone-patch to a number on your list, you know where the call is going to.

Over the years, I have seen several lists, but I have also noted a lot of conflicting information between the lists. Just like the STD codes in the UK telephone system indicate what area of the country is being dialed, the first three digits of a DSN number usually indicate which location is being contacted. As an example, DSN numbers beginning with '858' are at Andrews Air Force Base in Washington DC, and those starting with '238' are at RAF Mildenhall in Suffolk.

Another method of compiling a DSN listing is to acquire a copy of the *USAF/US DoD FLIP* (Flight Information handbook). This is the US forces equivalent of the RAF's *En-Route* Supplement, and hidden amongst each airfields entry can usually be found one or two DSN numbers. I am not aware of any publicly available listing of DSN numbers, probably because it is a private network.

Michael sent me a print out of his list, and a copy on a computer disk. Unfortunately, the latter was in a format which I cannot read. If anyone else has compiled a similar list, or knows of a good source of the information, maybe they can write in, and I'll pass your letters on to Michael.

Virgin Balloon

By now, you will all know that Richard Branson's attempt to fly a balloon around the world has been delayed until later this year, or early in 1997. As you may know, they planned to launch from Marrakech in Morocco, but suffered badly from bad weather when they tried to launch their balloon. They planned on launching from North Africa, as the weather should have been much better than the UK weather in January and February.

Around the time of the planned launch, **T. Trenfield** managed to copy an RTTY transmission on 13.366MHz from Nairobi which included a traffic warning about the flight. The balloon was expected to fly east from Morocco, over Algeria, Libya and Egypt, then continuing eastwards climbing to 30000ft. Lets hope that they have more success next time round.

Questions

Dennis D. from Yorkshire writes to ask about the callsign 'DCF54', and wants to know who or what it is. The answer can be found in any *Klingenfuss Utility Guide*; DCF54 is Offenbach Meteo, transmitting FAX pictures and diagrams on 134.2kHz.

'Norfolk Ears' has been trying out a new CM Howes AA2 active antenna and CTU8 tuning unit on his AOR AR3000A. He reports hearing Incirlik GHFS and Croughton GHFS with similar 'Skyking' messages, just one minute apart. He wants to know all about what he heard, and who 'Skyking' might be. Rather than repeat large parts of text that appeared last year, I'll just refer 'Ears' to this column during the summer and latter part of last year.

Traffic Log (all freqs in MHz u.s.b., all times in UTC)

2.649	(7/2/96, 23.08) Haifa Radio, Israel 4XO with a navigation warning broadcast for the eastern end of the Med.
4.387	(29/1/96, 12.14) New York Ocean Gate Radio with a traffic list transmission, indicating that they had messages for ships ELR8, C6CM4, C6TV, 59MWO and ELSJ2.
5.089	'Bandbox' radar station controlling and directing several fighters, paying particular attention to civilian airliner targets. This should be the Netherlands Air Force.
5.330	CCF (Combined Cadet Force) exercise/training net, including stations 14B, 22C, 0C, 20A, 43A, 29C and 30B.
5.680	(8/2/96, 07.57) 'Yankee 64' working Sweden Air Rescue (Gothenburg), reporting they were airborne for a 1.5hr local sortie.
5.691	'C253' working '0A'; both Irish military stations. 'C253' is the Irish Air Corps Casa 212 Maritime Patrol aircraft.
5.693	(8/2/96, 07.50) 'ME Radio' calling 'Biscay Radio' several times, but getting no reply. Has anyone heard of these stations on other frequencies?
6.731	(18/1/96, 19.25) 'Freebird 36' working Andrews VIP with phone-patches to Zagreb and Brussels. '36 is a C-20 Gulfstream III aircraft based at Ramstein in Germany.
7.535	(5/3/96, 19.30) Norfolk SESEF working LCC-20/USS Mount Whitney, performing radio-checks in u.s.b./l.s.b. and RATT (RTTY) on all ships radios - this took several hours to complete.
8.803	(12/1/96, 16.11) Helsinki Radio working ships with callsigns ERJP and EMNW.
8.992	(17/1/96, 12.24) 'Beanbag' working MacDill GHFS, requesting the current working frequencies for 'Nightwatch'. MacDill replied with S301 as Primary and X209 as Secondary.
11.117	(9/1/96, 17.13) Unidentified aircraft 'MB' calling 'something' Operations in French language, possibly 'Corsair Operations' in Paris.

Godfrey Manning G4GLM, c/o The Godfrey Manning Aircraft Museum, 63 The Drive, Edgware, Middlesex HA8 8PS

Airband


A poor DC-3 at North Weald. Christine Mlynek.


Gazelle. Christine Mlynek.

Evans VP2. Christine Mlynek.

A quick advert. Wanted (for my Museum): a borescope. This is a flexible fibre-optic instrument that can 'worm' its way inside engines, etc. The operator is afforded a view of the inside of the machinery - without having to dismantle anything. Obviously, I can't afford new equipment. Where do these items go to at the end of their lives? Are there any second-hand ones? If you can help with any information, or a source of supply, I'd be grateful if you would let me know.

Christmas Quiz

I'm disappointed to have received only three entries this year. Now, I know it took us two attempts to get the photo right - but I did extend the deadline. What worries me is that this was a photo of a basic aeronautical object (see February's 'Airband'). Readers of this column will have heard countless references to it. I'm sure that so many of you visit aerodromes and attend airshows that you must also have seen one!

It's a holding point on a taxiway. When a controller says, "Hold at Alpha" this is the marking painted across the width of the taxiway at that point. The markings are yellow. Approaching the runway, the markings consists of two parallel solid lines across the width of the taxiway and (on the runway side) two broken parallel lines, all equally spaced. I wonder if readers are making full use of this column? It's as much yours as mine! There must be lots of technical questions puzzling you. If so, this is the place to write to! If I don't know the answer myself, I throw the question open to the collective knowledge of the readership.

An important detail is that this is the final hold. Cross it - and you're on the runway. Some aerodromes have i.l.s. equipped for low-visibility (including autoland). Higher than normal accuracy is required, so big chunks of metal (e.g. aeroplanes) aren't allowed near the i.l.s. transmitter antennas when a flight is on the approach. Such metal objects would distort the transmitted beam. Under these conditions, another set of holding points come into effect. These are Cat II/III holds and are further from the runway than the final hold. They look like a ladder painted across the taxiway; two parallel lines, with lots of short 'rungs' joining them. None of the entrants appreciated this fine detail.

So to the results. **Richard Mason** (Charminster) mistook the markings for the 'zebra-crossing' seen at the runway threshold. This pattern is also referred to as 'piano keys' as they are black and white (but a different shape to a real piano's keys!). Thresholds are not associated with taxiways.

Correct answers were from **Geoff Partington** (Liverpool), the runner-up; and the winner, **Michael J. Marsh G4GGC** (Sudbury), who supplied more detail than Geoff. The prize, a 'radio compass' (similar to a radio-magnetic indicator) is on its way to Michael.

Follow-Ups

No-one has yet translated 'Brogel' for me (see March 'Airband'), but **Robert Taylor G4KTI** (Colchester) tells me that Kleine Brogel is a military airfield near Brussels on the Belgian side of the Dutch border.

Robert was thinking about Leicester's runway changes (also March). I agree that most re-numbering is to compensate for magnetic drift. Magnetic north is presently slightly west of true, but the gap is closing by about 9 minutes a year. Heathrow's parallel runways were constructed due east/west true. Once 10/28, they became 09/27 a few years ago - magnetic. So, 16/34 becoming 15/33 at Leicester is possibly due to magnetic drift, but 06/24 becoming 04/22 is too great a jump. Good thing that magnetic and true north are close. When choosing the best runway (magnetic heading), did you know that all weather reports give the wind direction as a true heading?

Information Sources

Airtime Publishing again produce the latest editions of their *Airport Timetables* series. As well as a Frankfurt & Dusseldorf volume, the UK edition covers all British airlines at Heathrow. For more detail, the separate Heathrow & Gatwick volume will now come out three times a year. For the latest prices, send a reply envelope to them at 13 The Hollows, Long Eaton, Nottinghamshire NG10 2ES.

Yet another reader would benefit from my *Airband Factsheet*, free of charge from the Editorial Office at Broadstone (not from me!) if you send a reply envelope with postage for one A4 page. **Steven Munro** (Caithness) would find a copy of the Aerad *NAT 1/NAT 2* chart interesting. Aerad's address is, of course, on the Factsheet and they sell to the public by mail order.

Meanwhile, I'll help Steven by locating some reporting points on the FIR boundary north of Scotland. Running east to west, all are on the N61 00.0 line of latitude and they are: MATIK (on airway UN615, W008 04.0); SIDER (on airway G11 between the Akraberg and Sumburgh beacons, W005 08.2); and LIRKI (on airway UH71, W001 51.0).

Greatly improved is the third edition of *Non Directional Beacons of Europe* by **R. A. Connolly GI7IVX, (21 Eleastan Park, Kilkeel, Co. Down, N. Ireland BT34 4DA).** More beacons are listed and the reverse look-up table indicates if they're aero or marine. The binding is now lay-flat comb. Also gratifying is that the introductory text has been re-written to eliminate all the grumbles I aired in the April 'Airband'.

The presentation of lat/long is still confusing, perhaps this could be corrected in the next edition? For example, radio-navigation charts show North Foreland (NF) at N51 22.5 whereas the book insists on 51.2249N which muddles minutes and decimal minutes together (the chart rounds the decimal minutes to one place). The cover price is £4.75 direct from the author, but I don't know if that includes postage.

Weather broadcasts (e.g. Heathrow's a.t.i.s., now on 123.9MHz) can help with the study of local conditions. **Roy Dent** (Harrow) finds the temperature at his local aerodromes agree with his own observations and are slightly lower than those quoted in the media that apply to Central London. Perhaps Roy would like a free copy of the *Get Met* booklet, that lists sources of aeronautical weather information? The book is smaller than 150 x 110mm and weighs 16g; send a reply envelope to CAA Safety Promotion Section, Aviation House, Gatwick Airport, West Sussex RH6 0YR. If anyone wants an explanation of the shipping forecasts on Radio 4, see my article on page 77 of the *1996 radio listeners' guide* (available from the *SWM* Book Service).

Roy has a purely mechanical model of the weather called a Temeraire. This device has rotating discs for setting wind and pressure and gives surprisingly good results! You don't say where to obtain one, though, Roy; if you write in with details, I'll print them here. I'd rather like to try one myself!

Receiver Hardware

Discone, or dedicated (limited frequency coverage) antenna? That is the question - from **D. Stewart** (Newton Aycliffe). Certainly, the frequency-specific Air-33 from Haydon Communications (see adverts in this Magazine) gets good reports from readers. Wider coverage requires a discone. The trade-off, I've found, is poorer signals from the discone at higher frequencies. It's down to individual requirements in the end. Whatever

you do, mount it high but safely (clear of overhead cables); feed it with best quality coaxial cable (not the thin stuff they use for TV!); and earth it when not in use (in case of lightning).

Frequency and Operational News

Don't forget the PFA Rally, that is at Cranfield again this year (over the weekend of July 6 and 7). Frequencies are the same as last year, Arrival a.t.i.s. 130.675, Departure a.t.i.s. 121.875, Control (on Cranfield's own frequencies) hard runway 122.85, grass runway 123.2MHz. Full procedures are in *AIC* 21/1996 and you can get a copy if you provide a stamped, addressed envelope to: Aeronautical Information Services, NATS, Room 163, Control Tower Building, London Heathrow Airport, Hounslow, Middlesex TW6 1JJ. A4 sized, it weighs 30g.

I feel despondent about my attempts to cover the rapid changes to the LATCC airways frequencies. I don't seem to get full information on them; then, when I think I've got the latest situation, it changes at short notice! In essence, pilots only know which frequency to select because the controller on the preceding sector tells them. I can't make my information more up-to-date as this magazine has almost six weeks lead-time (could have been longer, were it not for improved publishing technology). I could make it more accurate if I had access to *NOTAM*s on the subject (including AIP amendments). I can't afford to subscribe myself. So, can anyone out there, with access to this information, copy it to me?

Updating February's 'Airband,' **A. Harrison** (Chester-le-Street), with confirmation by **Pat Martindale** (Bridlington), tells me that 128.05 or 135.575MHz - both are listed in Aerad - (vicinity of A25 north of REXAM) have variously been used while they try to sort out an interference problem. **Duncan Pettett GM1BVT** (Clackmannanshire) even reports 134.425MHz covering this sector. Likewise, 131.05 (vicinity of A1 north of Stafford) might be retained instead of its temporary replacement by 136.2MHz. Confused? Trying to be practical, I suggest that old 'replaced' frequencies should not be forgotten; they seem to get new leases of life!

Quick summary of Heathrow's current frequencies with help from **Ian Kirby** (Edgware). Arrivals: No. 1 Director 119.725 (North) or 134.975 (South) or 135.125 (Standby); then No. 2 Director 120.4 (also possible is 127.525, previously used was 135.125); finally, Tower 118.7MHz then Ground (see below). Departures: Clearance Delivery 121.7 or 121.975; then Ground 121.7 or 121.9; then Tower 118.5MHz. Why do they change? Could it be due to interference problems again? My comments previously about airways frequency changes also apply.

Further information on military helicopters in the London zone (see December); **Scorpio** (Manchester) notes that Northolt Approach 344.975MHz sometimes handles these. As helicopter routes H9 and H10 are close to (or overfly) Northolt, it is standard procedure for flights to work this aerodrome at the appropriate time; civil machines on v.h.f. of course. Scorpio obviously follows the military, telling us the U2s that went missing in my February column have re-appeared at Istres, France. So, who's on 337.85MHz, Scorpio asks? The Javiation *Airband Frequency Guide* (I reviewed it in March) tells me it's Lowtar Area A, presumably a training area. Any better offers?

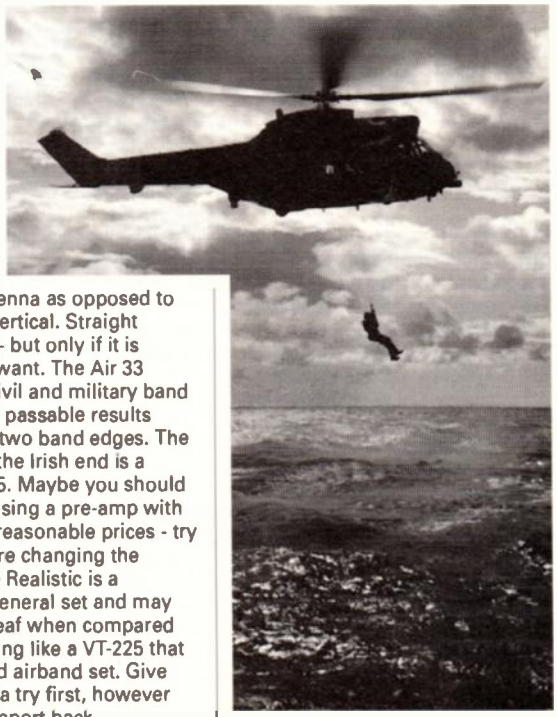
Once again, space precludes a new 'In the Cockpit' topic, so I've held it over for another time. The next three deadlines (for topical information) are May 17, June 14 and July 12. Replies always appear in this column and it is regretted that no direct correspondence is possible. Genuinely urgent information/enquiries: 0181-958 5113 (before 2130 local please).

Abbreviations

AIC	Aeronautical Information Circular
AIP	Aeronautical Information Publication
a.t.i.s.	automatic terminal information service
CAA	Civil Aviation Authority
cm	centimetres
FIR	Flight Information Region
g	grams
i.l.s.	instrument landing system
LATCC	London Area & Terminal Control Centre
MHz	megahertz
NOTAM	NOTice to AirMen (includes AirWomen)
v.h.f	very high frequency

John Griffiths, c/o 22 Ffordd Beibio, Holyhead, Gwynedd, North Wales LL65 2EH.

Scanning



A Puma helicopter with a crewman on the winch rope is silhoueted against a cloudy sky.

Photo John Griffiths.

Once again, summer is here - or not, depends on your point of view I guess! This is, of course, the aircraft season when displays a-plenty will be up and running including - as many enthusiasts will know - the Fairford IAT. Currently, this will take place on the 20th/21 July but, as many of you will know, **it's best to check first,** whatever the event you want to go to. In the meantime, the U-2s that operated from Fairford have, since January, moved to their new base at Istres le Tube, Southern France, that is the home of the *Centre D'Essais en vol.* The U-2Rs fly in support of 'Operation Joint Endeavour'. This shift was kept pretty close to official chests and I only found out about it in March when **Oxford Ears** and I decided something was missing as we hadn't heard the Monday evening U2 return flight in ages!

There is a promise that B-52 detachments may come in to Fairford now and again (Buzz control suggests this month) although, earlier this year, a most observant Oxford Ears heard 'Talon' Callsigns buzzing to and fro between Fairford and Brize. These were Talon 07 and 81 that, if my gen is correct, are MC-130 variants E/H and could be from either the 16 SOW (8 SOS) or 352 SOG (7 SOS) of AFSOC. Abbreviations mean:

SOW -	Special Operations Wing
SOS -	Special Operations Squadron.
SOG -	Special Operations Group.
AFSOC -	Air Force Special Operations Command.

Given the extremely secret nature of U-2Rs and their jobs, it doesn't surprise me that the 'special' callsigns were in use. Then again, Talon calls are used by AKG-51 Tornados of the Luftwaffe and CH-124s of the Canadian Armed Forces! OE does report they were US aircraft (definitely 'Fat Alberts') that makes me speculate that they were moving kit from Fairford to Mildenhall, and also using Brize, that would probably have been shipped out later, to France, to re-join the Squadron. OE also reports hearing DVP 2 way secure comms on 261.8, that I have no ID for, but which he suspects were U-2Rs. This heard in Abingdon, by the way. Speculation maybe, but could the DVP been from the MC-130s? Just a thought....! Also, lots of activity around the same time on 337.535MHz, Fairford area again. ID unknown as it is not listed. Anyone help?

In June, observant listeners should listen out for milair activity under the name **Exercise Central Enterprise.** This will use, I hope, the aforementioned B-52s and others out of Fairford. The exercise is provisionally booked for June. Whilst on this subject, some low-level frequencies that may turn up trumps for you if you are in, or near, a low flying area are:

337.850, 288.400, 306.650, 358.475, 369.050, 364.975 & 340.300MHz.

Some May/June activity can also be heard around the following locations:

May: RAF Benson (60 Sqn anniversary) - North Weald Fighter Meet 96 - RAF Marham families day - RAF Coltishall families day - Mildenhall Air Fete - Southend Seafront - RAF Odiham Families day.

June: Cranfield 50th Anniversary - RAF Cottesmore Community Day - BAe Dunsfold families day - RAF Leeming Photocall - Middle Wallop Airshow - Biggin Hill Air Fair - RAF Cosford Airshow - RAF Halton Airshow - RAF Marham Canberra Reunion - Woodford RAFA Airshow - RAF Lyneham Families Day - RAF Waddington Air Show.

Please note that some of these will be **Private** and for service personnel and their families **only**. If in doubt, check the popular aviation press for further details.

More Mil news, and again concerning the RAF, is that RAF Benson is to become home to 33 Sqn (currently flying Pumas out of Odiham), and that the Wessex flight will be disbanded, being replaced by the EH 101. This should be in place around April of next year and is an absorbtion move to 'soak' up personnel from RAF Germany. I would also hazard a guess that it would be a part of the re-rationalisation of the RAF under the new so-called 'peace initiatives'. Whatever, Benson area listeners will certainly get a boost out of their listening!

Straight Answer

Now, details required for an Irish listener, nameless, who wishes to find out if he can improve his listening of airband by putting up an Air 33 antenna as opposed to his uniscan vertical. Straight answer? Yes - but only if it is airband you want. The Air 33 serves as a civil and military band antenna with passable results between the two band edges. The set in use at the Irish end is a Realistic-2035. Maybe you should think about using a pre-amp with the set first (reasonable prices - try Maplin) before changing the antenna. The Realistic is a broadband general set and may be slightly deaf when compared with something like a VT-225 that is a dedicated airband set. Give the pre-amp a try first, however and maybe report back.

I mooted the idea not so long back concerning area frequencies and a reader from Tamworth in Staffs has sent in a short excerpt from his area. Here goes for Tamworth, then!

70.600 a.m. Warwickshire Fire C/S 'YS'.
85.062 n.f.m. Community Ambulance B'ham.
140.456 n.f.m. British Gas Tamworth Depot.
169.812 n.f.m. Aston Villa FC Stewards.
450.625 n.f.m. Helicopter C/S 'Air 1'.
455.475 n.f.m. B'ham airport ground staff.

I can't, of course, give every frequency I get but would choose the spread through a typical scanning range and chuck in what I would consider to be the most interesting ones - or ones that certainly warrant closer inspection! My sincere thanks to **TT** for those.

A while back, I received a letter from **Graham Rankin** who posed the question about the legality of breathalysers and the fact that US experiments have shown them to be faulty when near to the r.f. output of a typical TX/RX set. That time, Graham informed me that some cases were kicked out of court as there was evidence to suggest that police radios were switched off during a breathalyser test - though the police would not comment on the reason why!

Squashed

Graham now sends me a cutting from *Monitoring Times* that states that an Ohio resident had his drink-driving charge squashed because the breathalyser equipment had not been checked for radio interference! State regs are clear in that a breath test **must be conducted 30 feet clear of a radio antenna.** Graham asks, again, if anyone knows the case for UK breathalysers. Please try and respond on this issue. When Graham wrote in last time and I asked for help all we got was silence....and someone must know something?

PC of Manchester wants to know where Piccadilly Radio's 'Eye in the sky' has gone to from 455.1625MHz. PC wants to know what the new frequency is and also why do stations move channels? Pretty comprehensive answers expected on that one, mate! PC also gives us a lot of radio frequencies available in Manchester concerned with the ILR and BBC sectors. See **Table 1.**

Cheap Ploy

R. P. Gosnell writes in with a cheap ploy for all loggers to enhance your listening pleasure.

Table 1.

69.8375	BBC Outside broadcast.
69.8975	BBC Studio.
78.225	BBC News OB engineers.
141.031	Signal Radio Studio.
141.056	Red Rose Rock FM/Piccadilly Gold Studios.
141.081	Piccadilly Gold studio.
141.131	Signal Radio Cheshire Studio.
141.180	Piccadilly Gold Studio.
141.375	BBC TV OB and studio.
141.462	BBC TV Leeds.
446.737	Radio GMR OB.
447.131	Piccadilly Gold Studio.
447.187	Signal Cheshire Studio.

Buy a sheet of graph paper - metric scale and size 700 x 1000mm. Band length is 25 to 88MHz for example. Make a total of about 14 columns 50mm wide in which to log frequency and short commentaries. Each column should be about 1m long. The scale becomes 5mm on the graph to about 25kHz of radio spectrum, so you can squeeze in 12.5kHz entries. All that's needed now is to rule up the paper and write in whole numbers for MHz as a guide - you now have a graph to ensure activity is logged and channels recorded. Cheaper than buying purpose made log sheets and cheaper than a computer - go for it!

Richard also mentions a log periodic antenna that Waters & Stanton sell for £199.95 and says he's interested as this sort of antenna would bring signals romping in! Add a rotator and a device to tilt the antenna so that you can get best polarisation and you're in with a winner! Richard says he'll write in if he gets tempted!

Yawn!

My view on the Prince Philip Cell-phone scandal? Sorry! The listener got what he deserved and rightly so for trying to make money out of what was an offence. What do I think of it all? Yawn!

'X' files

Now a request from me to you, die-hard listeners of the air waves. As an *'X' files* fan - and who wouldn't be? - I'm now intrigued in as to how many of you airband monitors have heard 'odd' transmissions and thought nothing of it? For example, a few years back RAF Coltishall scrambled two Jaguars after Prestwick ATC reported an unidentified object on their screens travelling at approx. **5500m.p.h.** (time of report 2017). It then turned south, tracking for the Pennines and was also noted by NATO AEWS. Gatwick also reported the objects at 20.37 - altitude FL10 (10000 feet) and speed 250m.p.h. At 2040, Gatwick, and others, it is reported, lost track of the object as it flew west. This was on Monday 19 April 1993.

Another report now, from 6 Jan 1995. An *Airmiss report No. 2/95* was filed by the crew of a BA B737 *en route* to Manchester. Aircraft in position 8/9 nautical miles south east of Manchester at 4000 feet and was being vectored in by radar for approach.(Dayne to ILS for RW 24) Airspeed 180/210 knots on a northerly heading. Visibility over 10km with fairly strong n.w. wind. Both pilot and co-pilot reported seeing an object - lighted - that passed down the right hand side of the aircraft leaving no wake or turbulence. Ground later reported **no** aircraft in area and **no** radar targets.

Debunk time. Hang-gliders, gliders and paralights all dismissed as it was night. Radar coverage of that area is high, so no chance of craft not being seen. Also, both pilots were respected aviators, knew aircraft types and were not fatigued. Afterwards, an enquiry claimed it was 'Unassessable' - and without it being subject to ridicule or uninformed speculation.

So, come on then! If you have heard - and have on tape - anything which sounds a bit out of the ordinary, unusual or paranormal then feel free to get in touch with me. I am not going to make this something to be laughed at, I am quite serious and I do have both an open and an analytical mind. What's stopping you coming forward with the gen? Anonymity will be respected and confidentiality, at all times. There must have been some times when you've heard stuff and thought "Bloomin' 'eck, that's a bit odd!" - but dismissed it anyway, only to have it return to you later on. That's what I'm interested in. Even if you've noted strange arial goings-on around areas such as Menwith Hill in Yorkshire (NSA Listening Post) or about airfields - drop me a line. It's as is often said on the *'X' Files* - "The Truth Is Out There".

Let's see if we can find a bit of it! So, all tapes and experiences to me at the home QTHR. I'll return those you don't want kept by me and, in fact, anything unusual you've heard or are hearing - then please log as much info as you can and drop me a line about it.

That about wraps it up for another month so, until next time, good listening and be sensible! Oh, and watch the skies!

Lawrence Harris, 5 Burnham Park Road, Peverell, Plymouth, Devon PL3 5QB

Info In Orbit

This month I have compiled a second feature on the background support for the weather satellites operated by the Commonwealth of Independent States (CIS), formerly Russia. I am extremely grateful to several CIS scientists and other professionals, mentioned as applicable, for freely given co-operation in making so much information about their satellites available for this column. In particular, I have been given a comprehensive description of all the equipment onboard the METEOR craft (series two and three), that supplements a publication sent to me a few years ago. Full descriptions of OKEAN, GOMS and RESURS satellites have also been provided, enabling me to include more details in future editions of this column. It seems that the former difficulty in getting timely information about the Russian WXSATs, as experienced by many people, has ended.

Current WXSATs

For those with access to the Internet, I keep a web page with a list of currently active WXSATs, together with the dates for future changeovers of the METEORs, when this is known. The address is:

http://homepages.enterprise.net/lawrenceh

Recent weeks have seen the improvement in picture quality from the WXSATs that results from the sun rising higher over the northern hemisphere each day. The mid-day NOAA-14 (137.62MHz) pass reveals so much more detail than those of mid-winter. I kept a set of images obtained during the solstices and equinoxes and never fail to be cheered by the improving illumination. The evening pass of NOAA-12 (on 137.50MHz) starts with the infra-red channels being transmitted, but its approach to the north polar regions sees the switchover to visible imagery occur. This seasonal effect heralds the approach of summer.

NOAA Twilight Channel Changes

Everyone is familiar with the switchover that occurs when METEOR or NOAA WXSATs approach twilight (terminator). METEORs switch-on when entering sunlight, and switch-off when entering darkness. NOAAs operate differently; they transmit two channels throughout the orbit; in daylight the channels are infra-red and visible-light side-by-side; at night the channels are both infra-red, but from slightly different sections of the infra-red part of the spectrum, that is much wider than the visible part.

The METEOR change-over sequence is apparently triggered by the changing level of illumination - that can be seen within the picture. Contrastingly, the NOAA switch is programmed in advance by a regular command sequence transmitted from a ground station. The i.r. and visible channel changes on the a.p.t. of all NOAA polar WXSATs, is triggered by stored commands in the spacecraft stored command table. These are timed events that take place when the spacecraft crosses the terminator. When the visible channel can no longer produce usable image data, the command is activated to substitute an i.r. image in its place.

In late January there were minor command problems at the ground station while loading the daily command table, and this apparently caused premature switching from visible to infra-red. The problem was later corrected. My thanks to **Wayne Winston** and **Steven Ross** of the Satellite Information Team at NESDIS, for this insight into real-life operations.

Russian/CIS WXSAT Operations

Everyone who uses a receiver and monitors the CIS/Russian satellites has probably heard METEOR 3-5 and METEOR 2-21 transmitting a.p.t. (picture telemetry) on 137.85MHz. Similarly, OKEAN-4 and SICH-1 can be heard occasionally, transmitting on 137.40MHz; a few UK-based people might be able to monitor what I understand are non-continuous WEFAX transmissions on 1691.0MHz from the geostationary GOMS WXSAT (located at 76° east).

Transmission schedules for OKEAN and SICH are now published weekly by Alex Ivanov, who works with PLANETA, and RD Center SCAN, producing a.p.t./h.r.p.t./WEFAX ground stations. Copies of this schedule can be obtained from me, and I understand that the scientists plan to make regular GOMS images available via the Internet - watch this column for more information.

My travels around the virtual world of the Internet, searching for contacts amongst the staff who are involved in controlling the WXSATs of the CIS, started with the Space Monitoring Information Support (SMIS) Laboratory:

This laboratory provides a considerable amount of imagery and information, mostly concerning current images of the weather over continental Europe. Dr. Michael Zakharov of the Space Research Institute at Profsoyuznaya 84/32, Moscow, has kindly given permission for publication of some images from the SMIS Laboratory.

These pictures are from the NOAA craft, monitored using computer-controlled dishes for receiving h.r.p.t., and have been processed and artificially coloured at the SMIS laboratory (Keldysh Space Research Institute - IKI) at Keldysh Square in Moscow.

Not speaking a word of Russian, I was pleased to contact Igor Lissov, the Deputy Chief Editor of *Novosti Kosmonavtiki*, who has very kindly provided me with his translation of an article by Konstantin Lantratov, of Novosti Kosmonavtiki, VideoCosmos Co., published in *volume 9, issue 21 of Novosti Kosmonavtiki*, dated October 1995. Excerpts from his article, called *The Russian Low Orbit Meteo Satellites*, are reproduced here.

"Russia uses two weather satellite systems now: a geostationary ELEKTRO metsat and a group of low-orbit satellites of METEOR 2 and METEOR 3 types. Also, the RESURS O1 satellites are used for weather reconnaisance, while they don't provide such detailed information as METEORs. At the end of September 1995, the low orbit group included two METEOR 2s (No.24 and 25), two METEOR 3s (No.5 and 7) and one RESURS O1 (No.3).

"Chief of the METEOR 2/3 Analysis Laboratory (at the Military Space Forces Control Center for Scientific and Applications Spacecrafts) Lt. Col. Ramzel' Idiatullin, told me that the METEOR 2 system is operational, while the METEOR 3 system is being tested and is not considered operational, at least officially.

"The METEOR satellites are used for obtaining information of cloud patterns and surface in visible light at the sun side; cloud patterns and surface in i.r. spectrum; spectral brightness of earth and atmosphere in i.r. spectrum for altitude profiles of temperature and humidity and total ozone contents; radiation environment in near-earth space. The METEOR system also provides information of cloud patterns and surface in visible light in real time.

"METEOR 2s were developed in the All-Union Science Research Institute for Electromechanics (VNII Elektromekhaniki). The Control Center for Scientific and Applications Spacecrafts officers say that these spacecrafts are very reliable and long-living ones. Recently, there was an experimental communications session with one of the old METEOR 2s that was not contacted for 10 years. But, to a great surprise for specialists, the thermal and energy regime of the spacecraft were found normal. The proved construction of METEOR 2 platform was used in METEOR 3 and RESURS O1 projects.

"But the reliability of METEOR's applications complex developed by the St. Petersburg Science Research Institute for Television (NII Televideniya) is poor. Lt.Col. Idiatullin says that as a rule, the i.r. experiments are down 6 months into the flight, the multi-channel spectrometer lives for 12 months and after that, "we have only the TV picture, as in the Stone Age". He says that the applications complex for METEOR 3Ms is planned to be ordered to the Russian Science Research Institute for Space Devices (RNII Kosmicheskogo Priborostroeniya).

"Television complex, spectrometers, radiometric experiments are in use at both METEOR 2s No.25 and 26 now. These two spacecrafts provide 30% of detail information. METEOR 2 No.25 is now operated beyond the expected lifetime.

"The rest of detailed information is being provided by METEOR 3s No.5 and 7 and RESURS O1 No.3. The RESURS service and applications systems are now in good condition (there were some problems after launch) and Russian and foreign users' requests are being serviced in space of one week.

"Each METEOR 3 has an advanced resolution scanning radiometer IKR (10.5-12.5

micrometers); a multi-channel scanning radiometer SKR (10 bands in 9.65-18.70 micrometers region); a TV complex, and a radiometric control experiment. METEOR 3s have also ozone study experiments onboard. There was a Soviet SFM device on first spacecrafts and NASA's TOMS at METEOR 3 No.5."

The Future of APT

The signals that we receive from the polar orbiting WXSATs are described as having the a.p.t. format - automatic picture telemetry. This format has survived since the early sixties, despite huge advances in electronics and the availability of higher capacity technology. However, this is set to change - as mentioned in a previous 'Info'. Under discussion at the present time, is the specification for an advanced telemetry format to be called LRPT (Low Rate Picture Transmission).

The final details of this specification have not been defined. At the present time, the US plans to continue using a.p.t. (an analogue signal format) through NOAA-N and N', that takes us into the 2006-2008 time frame. Europe's METOP-1 will fly digital LRPT, and that is expected to launch in 2001. Consequently, there will be quite a few years of overlap, and we shall have two NOAA operational satellites flying with a.p.t., and a METOP (and maybe a METOP-2) with digital, before all operational satellites go digital LRPT.

Landsat Reception Anyone?

I receive occasional enquiries concerning the possibility of reception of advanced imaging satellites such as Landsat. The Special Edition included some information on this constellation (satellite group), and Stephen McNeill of the Image Processing Team at Landcare Research, New Zealand, has provided information on the type of hardware required. Although amateurs cannot normally assemble such advanced hardware, this description is of interest.

The S-band downlink is 2287.5MHz (2.287GHz), with an X-band downlink on 8212.5MHz. The standard size of antenna used to be 10m, but recently this figure has been going down remarkably quickly as front ends (pre-amps) get cooler and processing closer to optimal. The logistics of swinging a 7m dish around the sky makes h.r.p.t seem quite pedestrian!

Letters And Pictures

This month, **Fig. 4,** is another h.r.p.t. (high resolution picture telemetry) image from NOAA-14 sent by **D. George James** of Elgin in Scotland. He sent a selection of such images on disk. This data is transmitted on 1698.0, 1707.0 or 1702.5MHz, depending on which satellite is being monitored. Data comprises five channels of imagery in different wavebands (visible and infra-red).

Immediately below the satellite, the resolution is about 1.1km. Lower resolution a.p.t. is derived by simply discarding some of the h.r.p.t. data, and is then transmitted on 137.62 (or 137.50)MHz, to a.p.t. users. Channel 2 senses the 0.725 to 1.10 microns - the visible to near infra-red part of the spectrum.

During recent years, **Roger Ray** of Telford has sent in selections of pictures taken using his set-up. Roger has recently upgraded his computer to a 486DX4-100MHz and changed his software. Roger sent **Fig. 5**, a METEOSAT-5 CTOT image, the mid-day whole disc of the earth in visible-light. His original is a full colour picture printed on an Epson Stylus Colour II printer.

Many years ago I bought a downconverter to allow me to receive METEOSAT images, but I did not immediately realise that WEFAX images were transmitted on both channels - 1691.0 and 1694.5MHz. Studying the literature from WeatherWatch-UK, I then noticed the CTOT, DTOT and others that were then transmitted on 1691.0MHz (before METEOSAT's channels were re-aligned). After checking my downconverter I noticed that it did have a channel switch, but it did not work. After having the manufacturer check it out, the second channel was found to have a faulty oscillator. When the unit was returned I was delighted to see those early whole-disc images.

Andrew Morley of Redhill uses a Cirkit receiver fed from a loft-mounted crossed-dipole antenna. Andrew recorded the signals on video tape for later decoding, and comments that pager interference usually prevents him geting METEOR pictures. This is probably the result of two factors. METEOR transmissions (on 137.85MHz) are very close to pager frequencies, and his Cirkit receiver has probably not been fitted with adequate filtering. Andrew produced **Fig. 6** from a METEOR transmission - replayed from his video tape! Although no date is available, the icy waters of the Gulf of Bothnia suggest a fairly recent image.

New Products

A review of the Martelec 'virtual' WXSAT receiver has been submitted. This is a computer controlled receiver that works with almost any decoding system. I tested it with my somewhat outdated software, and also using JVFAX (version 7.1). For the latter test I used the new Martelec JVF2 Interface. Further details can be obtained from Martelec Communications Systems on (01420) 82752.

Shuttle Monitoring

The most common question I am asked about Shuttle reception is 'how does one know which flights cross the UK?' The answer lies in the orbital inclination, a parameter known in advance for many flights. Those with inclinations of 51° (usually for MIR rendezvous) cross Britain (that starts near latitude 50°).

A writer from Cornwall expresses the frustration probably felt by many people who have scanners but have not yet heard voice transmissions from the Shuttle. In order to provide help, I list those frequencies successfully reported by others. The easiest monitoring is almost certainly that from WA3NAN, as described in the Shuttle Pack. **Tony Gutorski** of Preston told me that he uses his Sangean ATS-803A with an a.t.u. and long wire, and tunes to WA3NAN on 14.295MHz, which he has found to be effective in Shuttle monitoring. Tony asked me about the availability of satellite tracking programs for the Amiga 1200. Any helpers?

Kepler Elements - MIR & Shuttle

Different options are available:

1: For a print-out of the latest WXSAT elements, the Shuttle and MIR, send an s.a.e. and 20p coin or separate, extra stamp. Transmission frequencies are given when operating. Shuttle elements are released within 14 days of the scheduled launch and I can always supply the latest set. 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.

3: A computer disk file containing recent elements for the WXSATs is available, together with a large ASCII file holding elements for thousands of satellites. A print-out is included, identifying NASA catalogue numbers (for the WXSATs, Amateur Radio satellites, and others of general interest), ideal for automatic updating of your tracking software. Please enclose £1 with your PC-formatted disk and stamped envelope.

At the time of writing, my first book on WXSATs is set to appear now. Perhaps I shall see the first copy before *SWM* hits the stalls! The next 'Info' will include an amazing picture from SICH-1 sent by Rossana and Enrico Fioretto, received in Italy.

Frequencies

NOAA 14 a.p.t. on 137.62MHz; NOAA 12 a.p.t. on 137.50MHz; NOAA beacons on 136.77 and 137.77MHz; METEOR 3-5 on 137.85MHz and OKEAN-4 and SICH-1 use 137.40MHz occasionally.

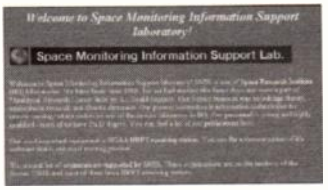


Fig.1

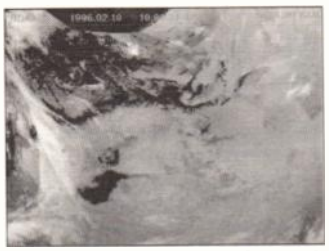


Fig.2: NOAA-14 image from 10 February

Fig.3: NOAA-14 image from 16 March.

Fig.4: channel 2; 2 August 1995 from D. George James.

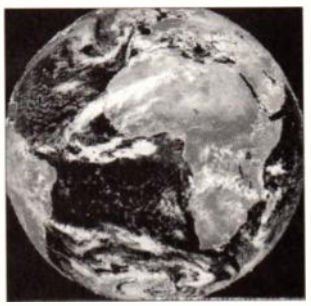


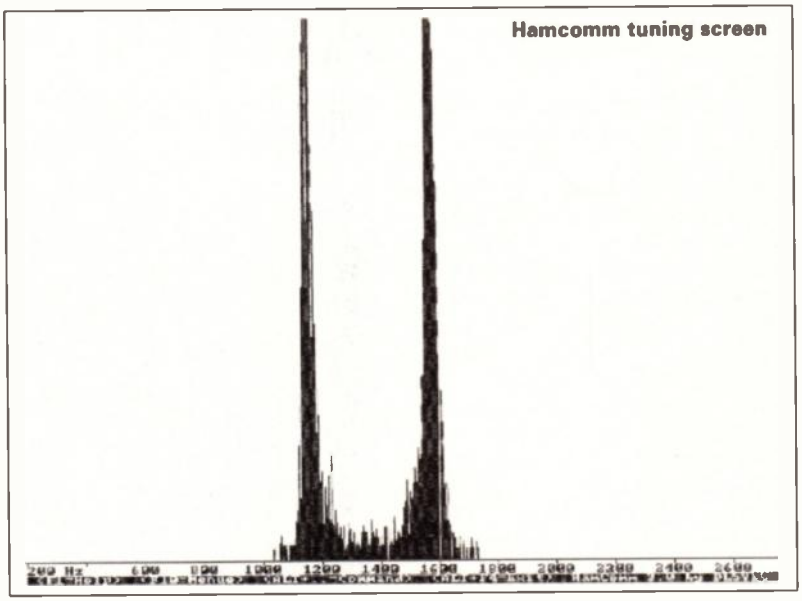
Fig.5: CTOT 9 March 1996 from Roger Ray.

Fig.6: Picture by Andrew Morley

Mike Richards G4WNC, PO Box 1863, Ringwood, Hants BH24 3XD. Compuserve: 100411,3444: Internet: mike.richards@dial.pipex.com

Decode

All the Data Modes



Hamcomm tuning screen

Chris Last has sent me an E-mail asking if its possible to use the AOR AR-8000 scanning receiver for utility reception. Yes it is, but you may need a decoder with either automatic frequency control or manual centre frequency adjustment. I say this because I'm pretty sure the AOR uses 100Hz minimum tuning steps for s.s.b. reception. Whilst this is OK for voice signals, reliable reception of data signals often requires more accurate tuning. By choosing a decoder with the afore mentioned options you can overcome the crude tuning steps by fine tuning the decoder.

Another E-mail comes from **Nick Sunderland**. He runs a 486 PC with one of the popular SoundBlaster audio cards. As these cards contain quite sophisticated processing power he asks if there's any decoding software available. The answer is yes. A program called WXMan has been around for a few years and enables the reception of FAX pictures by feeding the audio of the receiver into the SoundBlaster microphone input. The program is widely available from most shareware sources including the Internet. The current filename is WXMAN220.zip.

RTTY - Beginner's Tips

Last month's Getting Started feature has caused quite a stir in my post bag and it's clear that many new listeners have some difficulty finding and resolving their first RTTY signal. So here's a few tips to help you on your way.

First essential advice - don't panic!! The most common failing of new listeners is not using a logical, step-by-step approach when decoding a new signal. Time and time again I've heard, and seen, people flick almost at random between speed shift and polarity to resolve a signal. If you don't use a logical approach, Murphy's Law will guarantee that you won't hit the right combination!

So, where to start? Let's first briefly cover the essential characteristics of a RTTY signal. As you will recall from previous articles, RTTY signals are sent by using two, closely spaced, high frequency signals to represent the digital elements of the data.

Now the spacing between these two frequencies is known as the **shift**. So a shift of 400Hz means that one of the transmission frequencies is 400Hz higher than the other. As these frequencies are used to represent a mark and space respectively, it's important that we get them the right way around. This is where the **signal polarity setting** comes to play. Because of the way some receivers process the incoming signal, the two tones sometimes end up the wrong way round. To overcome this, all decoders and decoding programs have a polarity control that can be set to normal/erect or reversed/inverted.

There's no hard and fast rule for this you just have to experiment to find the right setting for your combination of receiver and decoder. Once set you will find that most signals are receivable without further adjustment. However, you do need to remember this setting if you're having a problem.

The final important parameter is the baud rate. This defines the rate at which text is transmitted. By far the most common speed for commercial transmissions is 50 baud, though an increasing number of stations are changing over to the faster 75 baud. The other speed in most common use is 100 baud. Although the higher speeds provide a much faster flow of data there's also an increased risk of corruption, so you will often find that you see more errors when receiving these high speed signals.

To get you started I suggest you set your decoder for the most common type of RTTY signal that is 400Hz shift, 50 baud and polarity set to reversed/inverted if using upper side-band. If you use lower sideband then set the polarity to normal/erect.

The best way to check that you've got the basics right is to tune to a signal of known quality. Whilst Bracknell Met on 4.489kHz always used to be my favourite for this, the signal is not reliable enough for everyone so try Hamburg Met on 7.646MHz. This signal uses 400Hz shift, 50 baud so set your decoder options accordingly and switch between normal and reversed polarity until you start receiving 5-digit groups of numbers. If your decoder has UnShift on space (HAMCOMM keying menu) then set this to off or you'll receive groups of five letters! If you receive something other than five digit groups try changing the polarity setting.

Once the groups are coming in okay you can test your decoder's ability to translate Synop signals such as this. If you're using HAMCOMM go to the Text menu and select Weather. You should then start to see the number translated to plain text weather reports. There are odd occasions when the station sends data that cannot be translated by amateur decoding systems, so you may have to be patient.

When you've achieved success with a signal of known parameters you're ready to strike out and find a few stations of your own. Before you go rushing off, you need to make sure you tackle any new signals in a logical manner. I'll use HAMCOMM as an example, but the techniques apply to most systems. The most important tool is your ears so make sure you're familiar with the sound of RTTY as this will save you a lot of time. Once you've found your signal, fire-up HAMCOMM's spectrum analyser to check-out the shift. You do this by pressing Alt M followed by P.

This spectrum analyser is an extremely powerful tool as you should see the two tones of your RTTY signal along with two thin vertical lines that show the existing shift setting. The simple objective is to get the two thin vertical lines to bisect the RTTY signal. The RTTY signal can be moved across the spectrum analyser display using the receiver's tuning whilst HAMCOMM's shift can be alter via the keying option. Once the signal and shift are aligned you can revert to RTTY reception by pressing Alt M followed by B. If the signal is not making sense try changing the polarity using the Keying menu. If that fails, change to an alternative speed and try both polarities. Use this process to move through all the available speeds. But remember, the most common speeds are 45.5, 50, 75 and 100 baud there are very few other speeds in use.

If all this fails you're probably not tuned into a RTTY signal at all. There are lots of signals on h.f. that sound for all the world like RTTY but are actually complex military modes. There's nothing you can do except find another signal.

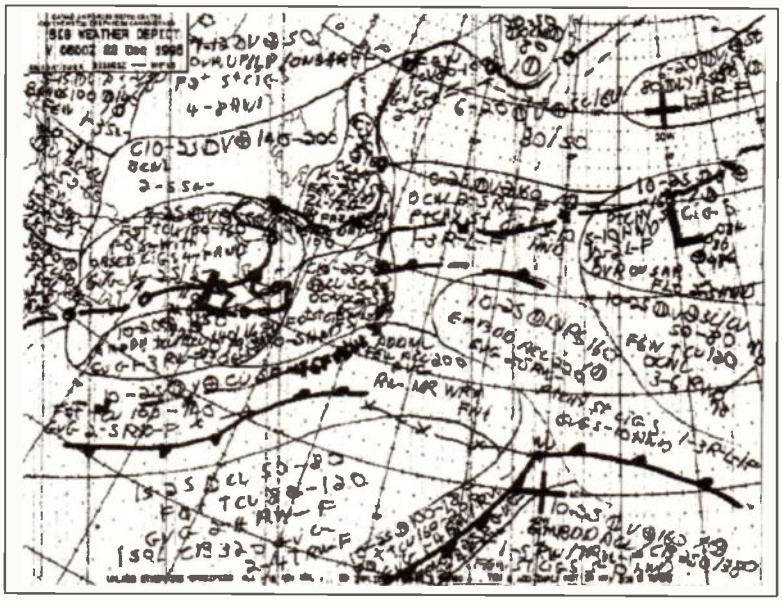
If you'd like me to run you through another utility mode please write and let me know - good luck!

More Interference

With computers taking such a prominent role in utility listening it's no surprise to find that my postbag always has a selection of questions on the topic of interference. A case in point comes from **Jim Murray** of Bradford. He's just getting set-up for the digital modes and is planning to use the Lowe Modemaster software with his new HF-150 receiver. Jim is very pleased with the HF-150 but is concerned that introducing a computer into the shack may cause a few problems and degrade his reception.

He initially asks if he should keep the computer and receiver apart and if so, by how much. Whilst it's logical to assume that the computer is the main cause of interference this is not generally the case. Most modern computers are very well screened in order to meet the stringent American FCC emission regulations. Another significant factor to keeping interference low is the very high clock speeds used by modern PCs.

In my experience, the worst offender is the video monitor. Not only do these units contain high power low frequency interference sources that are high in harmonics, but they usually have



Detailed weather chart from George Newport.

a plastics case. Other devices such as printers or scanners can also cause interference problems, but the video monitor usually stands-out as the worst offender. So what can you do? The need for separation between the receiver and monitor depends very much on the type of receiver you're using.

If you have a desktop communications receiver such as the HF-150 you will find that it's internal screening is very efficient and the receiver can be mounted close to the computer or monitor with very little if any degradation. In my shack I use an HF-150 that is located right next to the computer with no problems. If you're using one of the many portable receivers that feature s.s.b. reception, you may well have a significant interference problem. This is because these receivers often use an internal telescopic antenna for h.f. that cannot be disabled. In these circumstances you may well have to keep the computer and receiver apart.

Whilst on the subject of video monitors, a Portugese listener has written asking if he could use a standard colour TV receiver with his Momentum decoding system. Whilst I believe that Momentum can supply the decoder with a suitable composite video output it's not really a good idea. I say this because colour TVs are notorious for causing serious interference on the h.f. bands. The use of colour is also overkill as the Momentum decoder only delivers a monochrome output. If you're contemplating a Momentum system I would strongly recommend buying their own monochrome monitor as it's very good value, neat and produces minimal interference.

One of the most neglected items is the choice of antenna and more importantly the lead-in. The simplest and most popular type of antenna for general h.f. listening is the random wire. This is simply a random length of wire that's mounted as high and straight as possible. The ideal length is around 50 or 60m but many listeners have great results with significantly shorter lengths. The most important point about this antenna is to keep it as high as possible and well clear of any sources of interference. By this I mean keep away from TV antennas, power lines and out-buildings containing washing machines, driers, etc. It's also very important to provide a well screened lead-in to the receiver.

In its crudest form you can just connect the end of the wire antenna to the centre conductor of some good quality coaxial cable and use that to bring the antenna into the shack. A more sophisticated solution is to use a special longwire balun transformer to provide an improved match between the antenna and the feeder. There are many types available but the CT-400 available from Alan Lake at £6.75 each or £13 for two plus £1 P&P represents particulary good value. For ordering details contact Alan on 0115-938 2509.

Another tip for reducing computer interference in the shack is to make sure that you use good quality screened interconnecting leads between devices connected to the serial and parallel ports. However, I would keep this more as a last resort as the leads can be quite expensive. If you can make it to one of the radio rallies you will often find much better prices on offer than your local computer store.

If you need some more in-depth information to help cure your interference problems see FactPack 1 in my Reader's Offers section.

New HF Mode

Fred Miller has written with details of a brand new h.f. data mode. The new mode is a h.f. data link transmission that's being used by commercial airlines on the North Atlantic routes. The mode is curently supported by three stations located in Newfoundland, Iceland and Sweden. The mode came into full commercial use in late 1995 following an extensive test program that started back in 1992. There are a wide range of aircraft using the the h.f. link system, but Delta and United Airlines are the most involved. The system has been developed to provide a long range equivalent of the v.h.f. ACARS system of automated data communications with aircraft.

The transmissions are likely to be heard in the 4.654, 5.529, 8.921, 17.961 and 21.940MHz bands with recorded observations on 6.646, 10.027 and 13.339MHz. The data link transmission system uses phase shift keying (p.s.k.) based on a 1440Hz tone. There are a number of data rates available including 300, 600, 1200 and 1800 bits per second and I assume the data rate is automatically chosen to suit the prevailing link quality. The transmissions are similar to ACARS as they start with a short burst of tone followed by a rasping data burst for around 2 to 3 seconds. In order to overcome the problems of data collissions when two stations transmit at the same time, it appears aircraft operate to pre-allocated time slots.

Fred also reports that more details of the transmission system are available through the Internet. Having checked this out myself, the web page to head for is: **http://www.arinc.com/Ind_Govt_Srv/AEEC/draft_docs.html**

Once there you need document: 96-049/HFDL03 - ARINC Characteristic 753, HF Data Link System.

IRM Update

Yet more readers have responded with information about this interesting medical station. The full title of the station is International Radio Medical Centre or CIRM and the prime operating mode is c.w. In order to provide support to as wide a range of ships as possible, the station keeps a continuous listening watch over a number of ship calling bands. The latest information shows the following active frequencies:

4.342MHz	when necessary
6.365MHz	when necessary
8.685MHz	24hrs
12.748MHz	24hrs (uses 8.685MHz when this channel is busy)
12.76MHz	when necessary
17.105MHz	24hrs summer, daytime only in winter
22.525MHz	0700-1900hrs

The station also sends medical traffic lists on all active frequencies at 0200, 0800, 1400 and 2000UTC.

When ships are unable to contact CIRM directly or through Roma (IAR), messages can be relayed through a wide range of coastal radio stations. There's even a facility to transmit ECG reading from suitably equipped ships. The only remaining mystery is who owns and pays for this valuable service. If you have any more information please drop me a line.

Readers' Special Offers

Here's the latest list of reader' special offers. Whilst I do my best to return orders promptly, please allow up to two weeks for delivery.
IBM PC Software(1.44Mb disks):

Disk A (Order Code DKA) - JVFAX 7.0, HAMCOMM 3.0 and WXFAX 3.2.
Disk B (Order Code DKB) - DSP Starter plus Texas device selection software.
Disk C (Order Code DKC) - NuMorse 1.3.
Disk D (Order Code DKD) - UltraPak 4.0.
Disk E (Order Code DKE) - 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 *JVFAX and HAMCOMM Primer* (Order Code FP4).
FactPack 5 *On the Air with JVFAX 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, £3.00 for 4 or £3.75 for all 5) and a self addressed sticky label (don't forget I provide the disk!).

short wave magazine

Next Month

June 1996

ANTENNA SPECIAL

Using Scanners and Longwire Antennas
Peter Rayer takes a look

Construction **- Inexpensive Passive Pre-selector**
Dr F. Crossley discusses his solution

Build **-A Remote Tuned Loop**
by Andrew Howlett

Making Connections
an in depth look with Joe Carr

A Ferrite Loop Converter
by Richard Q. Marris

Billboard
a novel v.h.f. scanning antenna

Reviews and Reviewers
or
I Did It My Way
John Wilson tells all

MISS IT IF YOU DARE

* Contents may vary

Brian Oddy G3FEX, Three Corners, Merryfield Way, Storrington, West Sussex RH20 4NS

LM&S

Long, Medium and Short Waves

Most of the energy which reaches the Earth from the Sun is in the form of light, heat and ultra-violet radiation. The latter ionises the gases in the upper layers of our atmosphere to form the Ionosphere, which can return h.f. radio waves back to earth.

The intensity of ionisation is greatest when large numbers of sunspots are present because they emit hugh amounts of ultra-violet radiation. Very few, if any, are evident just now because we are at the minimum period of the 11 year sunspot cycle. When present in large quantities reception is better in the higher frequencies, conversely lower frequencies are best during the minimum period as the reports herein show.

Long Wave Reports

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

Following my comments in the March issue on reception in the UK of Polski R-1 on 225kHz, which is at present carried by a 150kW reserve transmitter at Raszyn, some interesting reports were sent to me. During daylight the transmission was rated SINPO 13432 at 0941UTC by **Ted Harris** in Manchester; 34333 at 1053 by **Tony Stickells** in Thornton Heath and SIO 333 by **George Millmore** in Wootton, IoW. During the evening **Sheila Hughes** (Morden) has found the signal to be fairly consistent - typically 43333. It was rated 24343 at 2035 by **Simon Hockenhull** in E.Bristol and SIO444 at 2223 by **Andrew Stokes** in Leicester. Up in Scotland John Stevens (Largs) can sometimes receive a very unsatisfactory signal around 2100, otherwise there is no trace of it. Over in Co.Down **Eddie McKeown** (Newry) logged it as 24222 at 0447.

There was only one report of the sky waves from the Radiotelevisione Italiana (RAI) 10kW outlet at Caltanisseta, Italy on 189kHz reaching the UK after dark. It came from **Paul Bowery** in Burnham-on-Crouch.

Medium Wave Reports

Favourable conditions for the reception of m.w. transmissions over transatlantic paths were noted during the night of February 4th by Paul Bowery; the 4th, 6th, 8th, 9th, 20th & 26th by **John Sadler** (Scalloway, Shetland); the 10th by **Ron Damp** (E.Worthing); the 5th & 11th by **Robert Connolly** (Kilkeel); the 11th & 22nd by Tony Stickells; the 19/20, 20/21, 23/24 & 27/28 by **David Edwardson** (Wallsend). Up in Troon, **Paul Crankshaw** tried listening after sunrise (0740UTC) on February 15, 16, 18, 19, 20 & 21. He found that some stations were clearly audible up to 0840UTC!

The sky waves from stations in other areas also reached our shores after dark - see chart. A broadcast in Arabic from Jordan Radio via their 2000kW outlet at Ajlun on 801 was picked up by Paul Bowery at 2143. He was able to identify the station by tuning to a parallel in the 31m band on 11.740MHz.

Listeners to R.Nederlands popular 'Media Network' programme may have heard them mention that from April their English programme at 2130 will be relayed via Luxembourg on 1440.

A change to the local radio scene in Dorset was reported by **Bernard Curtis** (Stalbridge). Since its inception BBC R.Dorset has been linked to BBC R.Devon but from April it will come under BBC R.Solent. The Bournemouth transmitter on 1359 will carry the Dorset service, which will include more local programmes and local news throughout the day.

Short Wave Reports

Due to the solar sunspot minimum the **25MHz (11m)** band is unlikely to be used for broadcasting in 1996.

Propagation in the **21MHz (13m)** band varies from day to day. Sometimes R.Australia's broadcast to Asia via Darwin on 21.725 (Eng 0630-1100) has reached the UK. It was rated SIO222 at 0900 by **Tom Smyth** in Co.Fermanagh; 25332 at 1000 by **Eric Shaw** in Chester; 24432 at 1038 in Manchester; 33333 at 1050 in Stalbridge. In Gibraltar it was logged by **Charles Beanland** as 22322 at 1043. Also received here before noon were UAER, Dubai 21.605 (Ar to Eur 0615-1030), rated 34332 at 0918 by **Rhoderick Illman** in Oxted; RFI via Issoudun 21.620 (Fr to E.Africa 0700?-1555) 34222 at 1027 in Newry; UAER, Dubai 21.605 (Eng to Eur 1030-1055) 45444 at 1030 in E.Bristol; BSKSA Riyadh 21.665 (Ind to S.E.Asia 1000-1200) 35433 at 1130 by **Darren Beasley** in Bridgwater.

Later, DW via Rwanda 21.705 (Fr to W.Africa 1200-1300) was noted as 35443 at 1244 in Thornton Heath; UAER, Dubai 21.605 (Eng to Eur 1330-1355) 35444 at 1341 by **Fred Pallant** in Storrington; BBC via Ascension Is 21.490 (Eng to E.Africa 1400-1430) 43333 at 1409 by **George Tebbitts** in Penmaenmawr; BBC via Limassol, Cyprus 21.470 (Eng to E.Africa 1300-1700) 25532 at 1417 in Wallsend; HCJB Quito, Ecuador 21.455 (Eng, u.s.b. + p ¢) SIO243 at 1430 by **Kenneth Buck** in Edinburgh; R.Portugal via Sines 21.515 (Port, Eng to India, M.East 1400-1600 Mon-Fri) 25232 at 1450 in Newry; BBC via Ascension Is 21.660 (Eng to W/E/S.Africa 1100-1700) 34333 at 1555 by **Stan Evans** in Herstmonceux; RAI Rome 21.520 (Tt to Africa [Home Svce relay] 1410-1700, Sun only) 32222 at 1648 by **Peter Pollard** in Rugby; Monitor R.Int via WSHB 21.640 (Eng to E.Africa 1600-1800?) 33233 at 1750 by **Thomas Williams** in Truro.

Daily variations in propagation also occur in the **17MHz (16m)** band. During the morning it may be possible to receive the BBC via Masirah Is, Oman 17.790 (Eng to India, S.Asia 0600-0830, 1000-1130), rated 44554 at 0605 by **John Parry** in Larnaca, Cyprus and 25542 at 1015 in Wallsend; R.Australia via Carnarvon 17.715 (Eng to Asia, Pacific 0200-0900) SIO333 at 0808 by **John Eaton** in Woking; DW via Rwanda 17.800 (Eng to E.Africa 0900-0950) 45544 at 0900 by **Ross Lockley** in Galashiels; DW via Sri Lanka 17.820 (Eng to Australia, S.E.Asia 0900-0950) 32333 at 0938 by **Martin Dale** in Stockport; DW via Meyerton? 17.800 (Eng to S/E.Africa 0900?-0950?) 24333 at 0933 in Oxted; BBC via Cyprus 17.705 (Eng to Eur 0900-1200)) 25332 at 1015 in Chester; VOA via Philippines 17.865 (Eng to E.Asia 0900-1100) 33333 at 1020 in Kilkeel; AIR via Bangalore 17.387 (Eng to Pacific areas 1000-1100) 34333 at 1035 in Herstsmonceux; R.Pakistan via Karachi 17.895 (Eng to Eur 1100-1120) 45433 at 1113 by **Tim Allison** in Middlesbrough; BBC via Ascension Is 17.830 (Eng to W/C.Africa 0730-2100) 23222 at 1132 by **Norman Thompson** in Oadby; Africa No.1, Gabon 17.630 (Fr to W.Africa 0700-1600) 45444 at 1157 in Burnham-on-Crouch.

After mid-day, try Israel R, Jerusalem 17.545 (Heb [Home Sce rly] to W.Eur, N.America 0700-1425), rated 44444 at 1212 in Gibraltar and 45355 at 1355 in Storrington; R.Cairo via Abis 17.595 (Eng to S.Asia 1215-1330) 55333 at 1250 in Thornton Heath; R.Romania Int, Bucharest 17.745 (Eng to Eur 1300-1355) 44444 at 1340 in Morden; RFI via Moyabi, Gabon 17.560 (Eng to M.East 1400-1500) 22222 at 1415 in Truro; R.Prague, Czech Rep 17.485 (Eng to E.Africa 1400-1430) 43343 at 1425 by **Chris Shorten** in Norwich; BBC via Antigua, W.Indies 17.840 (Eng to N/C.America 1400-1900) 43333 at 1500 in Penmaenmawr; VOA via Tangier, Morocco 17.895 (Eng to Africa 1630-1800) 32232 at 1704 in Rugby; R.Nederlands via Bonaire 17.605 (Eng to S/E/W.Africa 1830-2025) 34332 at 1918 in Oxted; WYFR Okeechobee, USA 17.760 (Eng to Eur, Africa 1700-1945) 35433 at 1924 in Bridgwater.

Despite varying conditions there is much to interest the listener in the **15MHz (19m)** band. During the morning BSKSA Riyadh 15.060 (Tur to Turkey 0400-0600) was 45554 at 0535 in Larnaca; R.Japan via Moyabi, Gabon 15.165 (Eng to Eur, M.East, Africa 0700-0800) 43333 at 0700 by **Clare Pinder** in Appleby; Voice of Malaysia, Kajang 15.295 (Eng to S.Asia 0555-0825) 32232 at 0820 in Scalloway; R.Pakistan, Islamabad 15.470 (Eng to Eur 0800-0848) SIO433 at 0831 by **Francis Hearne** in N.Bristol; China R.Int via Russia 15.440 (Eng to Pacific 0900-1055) 43333 at 1020 in Kilkeel; UAER, Dubai 15.395 (Eng to Eur 1030-1055) 55544 at 1030 in Galashiels; AIR via Aligarh? 15.050 (Eng to N.E.Asia 1000-1100) 22222

Long Wave Chart

Freq (kHz)	Station	Country	Power (kW)	Listner
153	Bechar	Algeria	1000	E*,J*,K*
153	Donebach	Germany	500	A,B,C,E,F,G*,H*,I,J,K,L,M,N
153	Bod	Romania	1200	A*
162	Allouis	France	2000	A,B*,E,G,H*,I,J,K,L,M,N,O*
171	Nador Medi-1	Morocco	2000	A*,D*,J,O*
171	B'shakovo etc	Russia	1200	A,B*,E,F*,G,H*,I,J,K*,L,M,N
177	Oranienburg	Germany	750	A,E,H*,I,J,K,M,N*,O*
183	Saarlouis	Germany	2000	A,B,E,G*,H*,I,J,K,L,M,N,O*
189	Caltanissetta	Italy	10	A*
198	Droitwich BBC	UK	500	A,C,E,G,H*,I,K,L,M,N,O*
198	R.Mayak via?	Russia	150	A*
207	Munich	Germany	500	A,B,E,F*,G*,H*,I,J,K,M,N*
207	Azilal	Morocco	800	A*,J,M
216	Roumoules RMC	S.France	1400	A,B*,C,E,F*,G,H*,I,J,K,L,M,N,O*
225	Raszyn Resv	Poland	?	A,C,E,F*,G*,H*,I,J,K,L,M,N*
234	Beidweiler	Luxembourg	2000	A,C,E,G,H*,I,J,K,M,N
234	Ark'gelsk etc	Russia	500	A*,H*,K*,M
243	Kalundborg	Denmark	300	A,B,E,F*,G,H*,I,J,K,M,N
252	Tipaza	Algeria	1500	A,G*,H*,I*,J*,N*
252	Atlantic 252	S.Ireland	500	A,B*,C,E,G*,H*,I,J,K,L,M,N,O*
261	Burg(R.Ropa)	Germany	200	A,B,E,F*,G*,H*,I,J,K,M,N
261	Taldom Moscow	Russia	2000	G*,J*,K*
270	Topolna	Czech Rep	1500	A,B*,E,F*,G*,I,J,K,N
279	Minsk	Belarus	500	A,C,E,F*,G*,H*,I*,K,M,N*

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) Vera Brindley, Woodhall Spa.
(C) Noel Carrington, Sutton in Ashfield.
(D) John Eaton, Woking.
(E) Ted Harris, Manchester.
(F) Simon Hockenhull, E Bristol
(G) Sheila Hughes, Morden.
(H) Eddie McKeown, Newry.
(I) George Millmore, Wootton, IoW.
(J) Fred Pallant, Storrington.
(K) Harry Richards, Barton-on-Humber.
(L) Tom Smyth, Co.Fermanagh.
(M)Tony Stickells, Thornton Heath.
(N) Andrew Stokes, Leicester.
(O) Norman Thompson, Oadby.

Medium Wave Chart

Freq (kHz)	Station	Country	Power (kW)	Listener
520	Hof-Saale (BR)	Germany	0.2	C*,F*,M*,Q*
531	Ain Beida	Algeria	600	C*,G,R*,T*
531	Torshavn	Faeroe Is.	100	Q
531	Leipzig	Germany	100	G,K,M*,N*
531	RNE5 via ?	Spain	?	M*,N*,P*
531	Beromunster	Switzerland	500	C*,G,I*,N
540	Wavre	Belgium	150/50	C,E,G,K,M*,N,R
540	Solt	Hungary	2000	C*,R,T*
540	Sidi Bennour	Morocco	600	B*,N*,R*
540	Vitoria(EI)	Spain	10	M*
549	Les Trembles	Algeria	600	B*,K,M*,N*,R,T*
549	Thurnau (DLF)	Germany	200	C,D*,G,M*,N,R
558	Espoo	Finland	100	M*,Q
558	Rostock(NDR)	Germany	20	M*
558	Targu Jiu	Romania	200	N*
558	RNE5 via ?	Spain	?	G*,M*,N*
567	Tullamore(RTE1)	Ireland (S)	500	A*,C,E,G,I*,J*,K,N,P,R,S,T*
567	RNE5 via ?	Spain	?	B*,M*,R*,S*
576	Muhlacker(SDR)	Germany	500	B*,C,D,G,K,M*,N*,R,S*,T*
576	Riga	Latvia	500	N*
576	Barcelona(RNE5)	Spain	50	E,K,M*,N*,R*,S*
585	Paris(FIP)	France	8	C,M*,N,R,S*
585	Madrid(RNE1)	Spain	200	C*,G*,K,M*,N*,R,S*,T*
585	Gafsa	Tunisia	350	C*,N*
585	Dumfries(BBCScot)	UK	2	A,C*,Q
594	Frankfurt(HR)	Germany	1000/400	C,G,K,M*,N,P,R*,S*,T*
594	Oujda-1	Morocco	100	B*,C*
594	Muge	Portugal	100	M*,N*,S*
603	Lyon	France	300	G*,N,R
603	Sevilla(RNE5)	Spain	50	M*,N*
603	Newcastle(BBC)	UK	2	E,I*,P,Q
612	Athlone(RTE2)	Ireland (S)	100	C,E,G,J*,N,R,S*
612	Sebaa Aioun	Morocco	300	B*,C*,N*,R,S*
612	RNE1 via ?	Spain	10	S*
621	Wavre	Belgium	80	C,D,E,G,K,M*,N,R,S,T*
621	RNE1 via ?	Spain	10	B*,R,S*
621	Barcelona(OCR)	Spain	50	M*,N*
630	Dannenberg(NDR)	Germany	100	G
630	Vigra	Norway	100	C*,M*,N*,R*,S*
630	Tunis-Djedeida	Tunisia	600	F*,M*,N*,T*
639	Praha(Liblice)	Czech	1500	C*,E,G,M*,N*,P,R*,S*,T*
639	RNE1 via ?	Spain	?	B*,K,M*,N*,R*,S*
648	RNE1 via ?	Spain	10	M*
648	Orfordness(BBC)	UK	500	C,E,G,I*,J*,N*,R,S*,T*
657	Neubrandenburg(NDR)	Germany	250	C*,M*,N,R*,S*
657	Napoli	Italy	120	C*,N*,R*
657	Madrid(RNE5)	Spain	20	B*,M*,N*,R*,S*
657	Wrexham(BBCWales)	UK	2	C,E,G,I,M*,R*,S
666	Messkirch-Rohrd(SWF)	Germany	300/180	C*,G,M*,R*,S*,T*
666	Sitkunai(R.Vilnius)	Lithuania	500	C*,M*,R
666	Lisboa	Portugal	135	C*,M*,N*,S*
666	Barcelona(COPE)	Spain	10	R*
675	Marseille	France	600	C*,J,M*,N*,R,S*,T*
675	Lopik(R10 Gold)	Holland	120	A*,C,G,J,K,M*,N,P*,R,S
684	Sevilla(RNE1)	Spain	500	C*,G*,I*,K,M*,N*,R*,S*
684	Avala(Beograd-1)	Yugoslavia	2000	C*,M*,N*,R,T*
693	Potenza	Italy	20	C*
693	Tortosa(RNE1)	Spain	2	B*,M*
693	Droitwich(BBC5)	UK	150	C,G,N*,P,Q,R,S,T*
702	Flensburg(NDR)	Germany	5	C,G,M*,N*,R*
702	Monte Carlo	Monaco	40	C*,N*
702	TWR via Monte Carlo	Monaco	300	R
702	Banska	Slovak Rep.	200	C*,R*
702	Zamora(RNE1)	Spain	10	M*,R*,S*
711	Rennes 1	France	300	C,G,I,N,P,R,S*
711	Heidelberg	Germany	5	C*,G*,M*,R
711	Laayoune	Morocco	600	B*,N*
711	Murcia(COPE)	Spain	5	C*
720	Langenberg	Germany	200	C,G,N*,R
720	Lisnagarvey(BBC4)	Ireland (N)	10	I*,N,Q
720	Norte	Portugal	100	C*,M*
720	Lots Rd.Ldn(BBC4)	UK	0.5	C,G,N,P,R,S*
729	Putbus/Bergen(NDR)	Germany	10	S*
729	Cork(RTE1)	Ireland (S).	10	C*,G*,J*,M*,N*,P*,Q,R*,S*
729	RNE1 via ?	Spain	?	B*,G*,J*,M*,N*,R*,S*
738	Paris	France	4	C,K,N
738	Poznan	Poland	300	C*,M*,N*,R
738	Barcelona(RNE1)	Spain	500	C*,G*,M*,N*,R*,S*
747	Flevo(Hilv2)	Holland	400	A*,C,G,M*,N,P,R,S,T*
747	Cadiz(RNE5)	Spain	10	B*,N*
756	Braunschweig(DLF)	Germany	800/200	C,G,M*,N,R,S*,T*
756	Lugoj	Romania	400	C*
756	Bilbao(EI)	Spain	5	N*,R*
756	Redruth(BBC)	UK	2	S*
765	Sottens	Switzerland	500	A*,C*,G,M*,N*,R,S*,T*
774	Sofia	Bulgaria	50	N*
774	Enniskillen(BBC)	Ireland (N)	1	G,M*,Q
774	RNE1 via ?	Spain	?	B*,G*,M*,N*,R*,S*
783	Burg	Germany	1000	C*,G,M*,N,R*,S*,T*
783	Miramar(R.Porto)	Portugal	100	M*
783	Dammam	Saudi Arabia	100	N*
792	Limoges	France	300	M*,N,P,R,T*
792	Lingen(NDR)	Germany	5	G*,M*,R
792	Kavala(VOA)	Greece	500	C*
792	Sevilla(SER)	Spain	20	C*,N*,R*,S*
801	Munchen-Ismaning	Germany	300	C*,D,G,K,M*,N*,P*,R,S*
801	Ajlun	Jordan	2000	C*
801	RNE1 via ?	Spain	?	M*,N*,R*,S*
810	Volgograd	Russia	150	N*,T*
810	Madrid(SER)	Spain	20	C*,M*,N*,R*,S*
810	Westergien(BBCScot)	UK	100	C*,G*,I*,N,P,R,S*
810	Skopje(MacedonianR)	Yugoslavia	1000	C*
819	Batra	Egypt	450	N*,S*
819	Toulouse	France	50	C*,M*,N*
819	Trieste	Italy	25	C*,R*
819	Warsaw	Poland	300	C*,M*,N*,R
828	Hannover(NDR)	Germany	100/5	G*
828	Rotterdam	Holland	5	C,S*
828	Barcelona(SER)	Spain	50	C*,M*,N*,S*
837	Nancy	France	200	C,K,N,P,R*
837	COPE via ?	Spain	?	M*,N*
846	Rome	Italy	540	B*,C*,M*,N*,R*,S*,T*
855	Berlin	Germany	100	M*,N*
855	R.Bucharest	Roumania	750	C*
855	RNE1 via ?	Spain	?	M*,N*,Q,R*,S*
864	Santah	Egypt	500	C*,N*,S*
864	Paris	France	300	C,G,M*,N,Q,R
864	Socuellamos(RNE1)	Spain	2	C*,N*
873	Frankfurt(AFN)	Germany	150	A*,C,G,M*,N*,Q,R*,S*,T*
873	Zaragoza(SER)	Spain	20	C*,M*,N*,R*,S*
882	COPE via ?	Spain	?	M*,R*
882	Washford(BBCWales)	UK	100	C,G,H*,K,N,R,S
891	Algiers	Algeria	600/300	C*,F*,G*,I*M*,N*,R*,S*
891	Huisberg	Netherlands	20	C,M*,N*,R*
900	Brno(CRo2)	Czech Rep.	25	M*,N*
900	Milan	Italy	600	C*,I*,M*,N*,R*,S*,T*
900	COPE via ?	Spain	?	M*
900	Qurayyat	Saudi Arabia	1000	C*,M*
909	B'mans Pld(BBC5)	UK	140	C,G,N,P*,R,S,T*
918	Plesivec(Sloven'nR)	Slovenia	600/100	C*,D*,M*,N*,R*,S*
918	Madrid(R.Int)	Spain	20	C*,M*,N*,R*,S*
927	Wolvertem	Belgium	300	C,G,K,M*,N,P*,R,S,T*
927	Velke Kostolany	Slovakia	40	M*
936	Bremen	Germany	100	C,G,M*,N,P,R*,S*,T*
936	Venezia	Italy	20	C*,N*,R*
936	RNE5 via ?	Spain	?	R*
945	Toulouse	France	300	C,N,R,T*
954	Brno (CRo2)	Czech Rep.	200	C*,N*,R*
954	Madrid(CI)	Spain	20	G*,M*,N*,R*,S*
963	Pori	Finland	600	G*,M*,N*,P,S*,T*
963	Paris	France	8	C
963	Tir Chonaill	Ireland (S)	10	N*
972	Hamburg(NDR)	Germany	300	C,G,M,N*,R*,S*,T*
972	RNE1 via ?	Spain	?	R*
981	Aiger	Algeria	600/300	N*,R*,S*
981	Megara	Greece	200	S*
990	Berlin	Germany	300	C*,G,M*,N*,R*,S*
990	Potenza	Italy	10	C*,R*
990	R.Bilbao(SER)	Spain	10	N*,R*,S*
990	Redmoss(BBC)	UK	1	M
999	Torino	Italy	20	C*,S*
999	Madrid(COPE)	Spain	50	M*,R*
1008	SER via ?	Canaries/Spain	?	R*,S*
1008	Flevo(Hilv-5)	Holland	400	C,G,M*,N,P,R,S,T*
1017	Rheinsender(SWF)	Germany	600	C*,G,M,N*,R,S*
1017	RNE5 via ?	Spain	?	N*,S*
1026	SER via ?	Spain	?	C*,N*,S*
1035	Tallinn	Estonia	500	N*
1035	Milan	Italy	50	C*
1035	Lisbon(Prog3)	Portugal	120	M,N*,S*
1044	Dresden	Germany	250	C*,G,M*,N*,S*
1044	Sebaa Aioun	Morocco	300	N*,S*
1044	SER via ?	Spain	?	N*,R*
1053	Zaragoza(COPE)	Spain	10	M*,S*
1053	Talk R.UK via ?	UK	?	C,E,G,N,P,R,S
1062	Kalundborg	Denmark	250	C,G,I*,M*,N*,R,S,T*
1062	R.Uno via ?	Italy	?	C*,S*
1071	R.France via ?	France	?	C,M*,N,P,R,S*,T*
1071	Bilbao(EI)	Spain	5	M*,R*
1071	Talk Radio UK via ?	UK	?	G,R,S
1080	Katowice	Poland	1500	C*,M*,N*,P,R
1080	SER via ?	Spain	?	N*,R*,S*
1089	Krasnodar	Russia	300	M*
1089	Talk Radio UK via ?	UK	?	C,G,N*,R,S
1098	Nitra(Jarok)	Slovakia	1500	C*,G*,M*,N*,R*,S*,T*
1098	RNE5 via ?	Spain	?	N*
1107	AFN via ?	Germany	10	A*,C*,M*,R*,S*
1107	RNE5 via ?	Spain	?	R*
1107	Talk R.UK via ?	UK	?	C,G,N,R,S
1116	Bloemendaal	Holland	0.5	C
1116	Bari	Italy	150	C*,N*,R*
1125	La Louviere	Belgium	20	C,M*,N*
1125	RNE5 via ?	Spain	?	N*,R*,S*
1134	COPE via ?	Spain	2	R
1134	Zadar(Croatian R)	Yugoslavia	600/1200	J,M*,N*,R,S*,T*
1143	Stuttgart(AFN)	Germany	10	A*,C*,M*,R*,S*
1143	COPE via ?	Spain	2	N*,S*
1152	Cluj	Roumania	950	C*
1152	RNE5 via ?	Spain	10	S*
1161	Strasbourg(Flnt)	France	200	C*,M,N*,P*,R,S*
1179	Bacau	Romania	200	C*
1179	SER via ?	Spain	?	R,S*
1179	Solvesborg	Sweden	600	C,G*,J*,M,N*,R*,S*,U*
1188	Kuurne	Belgium	5	C,G*,M*,N,S*
1188	Reichenbach(MDR)	Germany	5	C*,S*
1188	Szolnok	Hungary	135	C*,M*,N*,R*
1197	Munich(VOA)	Germany	300	C*,M*,R
1197	Virgin via ?	UK	?	C,G,I,N*,R,S
1206	Bordeaux	France	100	I*,M,N,R,S*
1206	Wroclaw	Poland	200	C*,M,N*,R*
1215	Virgin via ?	UK	?	C,G,N,R,S
1224	Vidin	Bulgaria	500	N*
1224	Lelystad	Holland	25	C,D,M*,R,S
1233	Liege	Belgium	5	M,S*
1233	Virgin via ?	UK	?	C,I,R,S
1242	Marseille	France	150	C*,M*,R*,S*
1242	Virgin via ?	UK	?	G,R,S
1251	Marcali	Hungary	500	C*,M*,R*,S*
1251	Huisberg	Netherlands	10	M*,R*
1260	Szczecin	Poland	160	C*
1260	SER via ?	Spain	?	M*
1260	Guildford (V)	UK	0.5	C,R
1269	Neumunster(DLF)	Germany	600	C,G,M,N*,R,S*
1269	CDPR via ?	Spain	?	C*,R
1278	Dublin/Cork(RTE2)	Ireland (S)	10	C*,G,J*,N*,R,S*
1287	RFE via ?	Czech Rep.	400	C*,M*,N*,R*,S*
1287	Lerida(SER)	Spain	10	N*,R*,S*
1296	Kardzali	Bulgaria	150	R
1296	Valencia(COPE)	Spain	10	C*,M*,R
1296	Orfordness(BBC)	UK	500	C*,R*
1305	Rzeszow	Poland	100	C*,M*
1305	RNE5 via ?	Spain	?	M*,N*,S*
1314	R.Due via ?	Italy	?	C*
1314	Kvitsoy	Norway	1200	C,G,I*,M,N,Q,R,S
1323	Zyvi(BBC)	Cyprus	200	R*
1323	W'brunn (V.Russia)	Germany	1000/150	A,C*,G,M,R*,S*
1332	Rome	Italy	300	C*,D*,M*,R*,S*
1341	Lakihegy	Hungary	300	C*,R*
1341	Lisnagarvey(BBC)	Ireland (N)	100	A*,C*,D,G,I*,N*,P,R,S*
1341	Tarrasa(SER)	Spain	2	S*
1350	Nancy/Nice	France	100	C*,M,N*,R,S*
1350	Cesvaine/Kuldiga	Latvia	50	C*,M*,N*
1359	Arganda (RNE-FS)	Spain	600	C*,G*,M*,N*,R*,S*
1368	Foxdale(Manx R)	I.O.M.	20	C*,G,I*,N*,P,Q
1377	Lille	France	300	C,G,M,N,R,S
1377	Ukraine	Ukraine	50	C*,M*
1386	Boishakovo	Russia	2500	G*,N*
1386	R.Ned via Kal'grad	Russia	2500	I*,M*,R,S*
1395	Lushnje(Tirana)	Albania	1000	N*,S*
1395	TWR via Lushnje	Albania	500	M*
1395	Lopic?	Netherlands	?	C,G,K,M,N*,R,S
1404	Brest	France	20	C*,M*,N,R,S
1404	Ukraine(UR2) via ?	Ukraine	?	C*,M*
1413	RNE5 via ?	Spain	?	C*,N*,S*
1422	Heusweiler(DLF)	Germany	1200/600	C*,G,M,N*,R,S
1422	Valmiera	Latvia	50	S*
1431	Kopani	Ukraine	500	M*
1440	Marnach(RTL)	Luxembourg	1200	C,G,J,M*,N,R,S
1440	Damman	Saudi Arabia	1600	F*,I*,M*,N*,R*
1449	Squinzano	Italy	50	C*,N*
1449	Redmoss(BBC)	UK	2	C*,V
1458	Lushnje(Tirana)	Albania	500	S*
1467	Monte Carlo(TWR)	Monaco	1000/400	C*,M*,N*,R,S
1485	AFN via ?	Germany	1	C*,R*,S*
1485	SER via ?	Spain	?	C*,P*,S*
1494	Clermont-Ferrand	France	20	J,N,R
1494	St.Petersburg	Russia	1000	C*,I*,J,M,N*,R*,S
1503	Ardabil	Iran	50	R*
1503	Stargard	Poland	300	N*
1503	RNE5 via ?	Spain	?	C*,R*
1512	Wolvertem	Belgium	600	A*,C,G,J*,M*,N*,O,P*,R,S*,U*
1512	Jeddah	Saudi Arabia	1000	R*
1521	Kosice(Cizatice)	Slovakia	600	M*,S*
1521	Duba	Saudi Arabia	2000	C*,M*,N*,S*
1530	Vatican R	Italy	150/450	C*,I*,J*,M*,N*,R*,S
1539	SER via ?	Spain	?	N*,R*,S
1557	Nice	France	300	R
1566	Mjadzel	Belarus	10	C*
1566	Sarnen	Switzerland	300	N*
1566	Sfax	Tunisia	1200	S*
1575	Genova	Italy	50	C*,M*,R*
1575	SER via ?	Spain	5	C*,N*,R,S*
1584	SER via ?	Spain	2	C*
1593	Holzkirchen(VOA)	Germany	150	C*,I*,M*,N*,R,S*
1602	SER via ?	Spain	?	N*,R*,S
1602	Vitoria(EI)	Spain	10	A*,N*,P*,Q
1611	Vatican R	Italy	15	C*,R*,S*

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

Listeners:-

(A) Tim Allison, Middlesbrough.
(B) Charles Beanland, Gibraltar.
(C) Paul Bowery, Burnham-on-Crouch.
(D) Vera Brindley, Woodhall Spa.
(E) Noel Carrington, Sutton-in-Ashfield.
(F) John Eaton, Woking.
(G) Ted Harris, Manchester.
(H) Francis Hearne, N.Bristol.
(I) Simon Hockenhull, E.Bristol.
(J) Sheila Hughes, Morden.
(K) Rhoderick Illman, Oxted.
(L) Brian Keyte, Bookham.
(M) Eddie McKeown, Newry.
(N) George Millmore, Wootton IoW.
(O) Clare Pinder, while in Appleby.
(P) Tom Smyth, Co.Fermanagh
(Q) John Stevens, Largs.
(R) Tony Stickells, Thornton Heath.
(S) Andrew Stokes, Leicester.
(T) Norman Thompson, Oadby.
(U) Thomas Williams, Truro.
(V) Julian Wood, while in Granada.

at 1057 in Truro; LJB via Sabrata, Libya 15.415 (Ar to Eur, N.Africa, M.East 1115-1315) 54544 at 1159 in Bridgwater.

After mid-day R.Australia via Darwin 15.530 (Eng to Asia, Pacific 1100-1300) was noted as 43444 at 1215 by **Stan Watkins** in NW.London; BBC via Antigua, W.Indies 15.220 (Eng to C/S.America 1200-1400) 34222 at 1245 in Burnham-on-Crouch; BBC via Limassol, Cyprus 15.575 (Eng to M.East, W.Asia 0930-1500) 45444 at 1422 in Woking; RCI via Sines, Portugal 15.325 (Fr, Eng to Eur, M.East, Africa 1430-1600) SIO555 at 1450 in Edinburgh; VOA via Kavala? 15.205 (Eng to M.East 1400-1800) SIO444 at 1500 in

Local Radio Chart

Freq (kHz)	Station	ILR BBC	e.m.r.p (kW)	Listener
558	Spectrum, London	I	0.80	A,B,C,D,F,H*,N,O,R,S,U
585	R.Solway	B	2.00	E,O
603	Boss 603,Cheltenham	I	0.10	B,D,E,L,N,O,S,U
603	InvictaSG,Lit'borne	I	0.10	C,H*,L,N,R,U
630	R.Bedfordshire(3CR)	B	0.20	A,B,C,D,F,G,I,K,N,O,R,S,T*,U
630	R.Cornwall	B	2.00	B,E,N,P*
657	R.Clwyd	B	2.00	B,D,E,N,O,P*,R,U
657	R.Cornwall	B	0.50	B,E
666	Gemini AM, Exeter	I	0.34	B,G,I,J,N,R,U
666	R.York	B	0.80	D,E,F,J,L,O,S,U
729	BBC Essex	B	0.20	B,C,D,N,O,R,S,U
738	Hereford/Worcester	B	0.037	B,D,E,F,L,O,R,S,U
756	R.Cumbria	B	1.00	E,O
756	R.Maldwyn, Powys	I	0.63	B,D,F,L,R,U
765	BBC Essex	B	0.50	B,C,E,F,N,O,R,S,U
774	R.Kent	B	0.70	C,N,R,U
774	R.Leeds	B	0.50	D,E,L,O
774	3 Counties SG, Glos	I	0.14	B,E,G*,N,S
792	Chiltern SG,Bedford	I	0.27	B,C,D,H*,O,R,S,T*,U
801	R.Devon & Dorset	B	2.00	B,E,F,I,J,K,L,N,R,U
828	Chiltern SG, Luton	I	0.20	B,C,R,S,U
828	Magic 828, Leeds	I	0.12	A,D,F,O
828	2CR CG, Bournemouth	I	0.27	B,N,R
837	R.Cumbria/Furness	B	1.50	E,O
837	R.Leicester	B	0.45	B,C,D,E,F,L,N,O,R,S,T*,U
855	R.Devon & Dorset	B	1.00	B,N
855	R.Lancashire	B	1.50	O,E,F,O
855	R.Norfolk	B	1.50	C,J,K,L,O,R,S,U
855	Sunshine 855,Ludlow	I	0.15	B,C,L,R,S,U
873	R.Norfolk	B	0.30	B,C,D,F,J,K,L,N,O,Q,R,S,U
936	Brunel CG, W.Wilts	I	0.18	B,E,K,L,N,R,T*,U
945	Derby (Gem AM)	I	0.20	B,C,D,E,F,L,O,R,S,T*,U
954	Gemini AM, Torquay	I	0.32	B,N,U
954	Wyvern, Hereford	I	0.15	B,F,N,O,U
963	Viva, Southall	I	1.00	B,C,N,O,R,S,T*,U
990	R.Devon & Dorset	B	1.00	B,E,J,N,U
990	Gt.Yks G, Doncaster	I	0.25	F,O,U
990	WABC, Wolverhampton	I	0.09	D,F,L,S,U
999	Gem AM, Nottingham	I	0.25	C,D,F,L,O,R,S,U
999	Red Rose G, Preston	I	0.80	A*,E,F,M*
999	R.Solent	B	1.00	B,C,K,N,R,U
1017	WABC, Shrewsbury	I	0.70	B,D,E,F,J,L,N,O,P,S,T*,U
1026	R.Cambridgeshire	B	0.50	A*,B,C,D,F,J,L,O,S,U
1026	Downtown, Belfast	I	1.70	E,P
1026	R.Jersey	B	1.00	B,I*,N,U
1035	Country 1035,London	I	1.00	A*,B,C,M*,N,R,S,U
1035	R.Sheffield	B	1.00	D,E,F,O,S,T*
1035	N.Sound, Aberdeen	I	0.78	A*,M
1107	Moray Fth,Inverness	I	1.50	M,V
1116	R.Derby	B	1.20	A*,B,C,D,E,F,L,O,R,S,T*,U
1116	R.Guernsey	B	0.50	B,K,L,N,R,U
1152	Amber, Norwich	I	0.83	C,T*,U
1152	Clyde 2, Glasgow	I	3.06	M,P
1152	Lon.Newstalk,London	I	23.50	C,N,R,U
1152	Pic'ly G,Manchester	I	1.50	E,F
1152	PlymSnd AM,Plymouth	I	0.32	B
1152	Xtra-AM, Birmingham	I	3.00	B,D,G,S,T*
1161	R.Bedfordshire(3CR)	B	0.10	C,E,R,S,U
1161	Brunel CG, Swindon	I	0.16	B,E
1161	Gt.Yks, Hull	I	0.35	D,F,O
1161	Southern Counties R	B	1.00	B,C,J,K,N,R,U
1161	Tay AM, Dundee	I	1.40	M
1170	Amber SGR, Ipswich	I	0.28	C,M*
1170	GNR, Stockton	I	0.32	M
1170	SCR, Portsmouth	I	0.12	B,N,U
1170	Signal G,Stoke-on-T	I	0.20	D,F,S
1170	Swansea Snd,Swansea	I	0.58	B,E
1170	1170AM,High Wycombe	I	0.25	C,R,U
1242	InvictaSG,Maidstone	I	0.32	C,L,R,U
1242	IoW Radio, Wootton	I	0.50	B,N,U
1251	Amber SGR,Bury StEd	I	0.76	C,K,O,R,S,U
1260	Brunel CG, Bristol	I	1.60	B,N
1260	Marcher G, Wrexham	I	0.64	F
1260	SabrasSnd,Leicester	I	0.29	B,D,O,S,T*
1260	R.York	B	0.50	E,O
1278	Gt.Yks G, Bradford	I	0.43	O,R,T*
1296	Radio XL,Birmingham	I	5.00	B,C,D,I,K,L,N,O,R,S,T*,U
1305	Gt.Yks G, Barnsley	I	0.15	D,E,F,O
1305	Premier via ?	I	0.50	C,N,R,U
1305	Touch AM, Newport	I	0.20	B,N
1323	S.Coast R, Brighton	I	0.50	C,N,R,U
1323	SomersetSnd,Bristol	B	0.63	B,E,U
1332	Premier, Battersea	I	1.00	C,H*,N,R,U
1332	WGMS CG, Peterboro'	I	0.60	C,F,M*,O,S,U
1332	Wiltshire Sound	B	0.30	B,N
1359	BreezeAM,Chelmsford	I	0.28	C,L,R,U
1359	Mercia CG, Coventry	I	0.27	S,T*
1359	R.Solent	B	0.85	B,N,Q,U
1359	Touch AM, Cardiff	I	0.20	B
1368	R.Lincolnshire	B	2.00	A,D,O,S,U
1368	Southern Counties R	B	0.50	B,C,J,K,N,R,U
1368	Wiltshire Sound	B	0.10	B,N
1413	Premier via ?	I	0.50	B,K,N,O,P,R,U
1431	Breeze AM, Southend	I	0.35	C,E,L,R,U
1431	210 CG, Reading	I	0.14	A*,B,N,R,U
1449	R.Peterboro/Cambs	B	0.15	B,C,E,N,O,R,S,T*,U
1458	R.Cumbria	B	0.50	E,M
1458	R.Devon & Dorset	B	2.00	B,M,N,U
1458	Fortune, Manchester	I	5.00	F
1458	R.Newcastle	B	2.00	M
1458	Sunrise, London	I	50.00	B,C,F*,N,O,R,U
1458	Radio WM	B	5.00	B,S
1476	CountySnd,Guildford	I	0.50	B,C,E,M*,N,R,U
1485	R.Humberside (Hull)	B	1.00	A,C*,J,O,S
1485	R.Merseyside	B	1.20	E,F,P,Q
1485	Southern Counties R	B	1.00	B,C,J,K,N,R,U
1503	R.Stoke-on-Trent	B	1.00	B,C*,D,E,F,J,N*,O,R,S
1521	MercuryXtra,Reigate	I	0.64	B,C,E,M*,N,R,U
1530	R.Essex	B	0.15	J*,K,N,R,U
1530	Gt.Yks G,Huddersf'd	I	0.74	A,F,O
1530	Wyvern, Worcester	I	0.52	B,E,N,S
1548	R.Bristol	B	5.00	B,N
1548	Capital G, London	I	97.50	B,C,D,N,R,S,U
1548	City G, Liverpool	I	4.40	E,F,P
1548	Gt.Yks G, Sheffield	I	0.74	O
1548	Max AM, Edinburgh	I	2.20	M,Q
1557	R.Lancashire	B	0.25	E,F,M
1557	Mellow, Clacton	I	0.125	C,L,R,U
1557	Northants SG	I	0.76	M*,O,S
1557	Sth Coast R, So'ton	I	0.50	A*,B,F*,N,R,U
1584	KCBC, Kettering	I	0.04	L,S
1584	London Turkish R	I	?	C,J*,K,N,R,U
1584	R.Nottingham	B	1.00	D,F,J,L,O,R,S,T*
1584	R.Shropshire	B	0.50	B,N*
1584	Tay, Perth	I	0.21	J*,M,Q
1602	R.Kent	B	0.25	C,M,N,Q,R,U

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

Listeners:-

(A) Tim Allison, Middlesbrough
(B) Darren Beasley, Bridgwater
(C) Paul Bowery, Burnham-on-Crouch
(D) Noel Carrington, Sutton-in-Ashfield
(E) Robert Connolly, Kilkeel.
(F) Martin Dale, Stockport.
(G) Francis Hearne, N.Bristol
(H) Francis Hearne, while in S.W.London
(I) Simon Hockenhull, E.Bristol
(J) Sheila Hughes, Morden.
(K) Rhodenck Illman, Oxted.
(L) Brian Keyte, Bookham.
(M) Ross Lockley, Galashiels.
(N) George Millmore, Wootton, IoW.
(O) Harry Richards, Barton-upon-Humber.
(P) Tom Smyth, Co.Fermanagh
(Q) John Stevens, Largs
(R) Tony Stickells, Thornton Heath.
(S) Andrew Stokes, Leicester
(T) Norman Thompson, Oadby.
(U) John Wells, East Grinstead.
(V) Julian Wood, Elgin.

Transatlantic DX Chart

Freq kHz	Station	Location	Time (UTC)	DXer
		USA		
660	WFAN	New York, NY	0318	E,G
770	WABC	New York, NY	0103	G
850	WEEI	Boston, MA	0004	E,G
880	WCBS	New York, NY	0305	E
1010	WINS	New York, NY	0115	B,G
1130	WBBR	New York	0400	A,C,E,F,G
1500	WTOP	Washington, D.C.	0130	B,C,F,G
1510	WNRB	Boston, MA	0200	A,C,E,F,G
1520	WWKB	Buffalo, NY	0440	C,F
1560	WQEW	New York	0105	C,E,G
		CANADA		
560	CHVO	Carbonear, NF	0347	E
580	CJFX	Antigonish, NS	0325	E
590	VOCM	St.John's, NF	0043	B,E,G
650	CKGA	Gander,NF	2354	E
710	CKVO	Clarenville, NF	0105	B
820	CHAM	Hamilton, ON	0115	B
860	CJBC	Toronto, ON	0104	G
920	CJCH	Halifax, NS	2359	E,F
930	CJYQ	St.John's, NF	0001	C,D,E,F,G
940	CBM	Montreal, PQ	0020	G
950	CHER	Sydney, NS	0810	C
980	CBV	Quebec, PQ	0112	G
1375	RFO	St.Pierre/Miquelon	0450	F

Co.Fermanagh; WWCR Nashville, USA 15.685 (Eng to Eur 1100-2100) 55555 at 1525 in Pnemaenmawr; R.Nederlands via Talata Volon, Madagascar 15.150 (Eng to S.Asia. M.East 1330-1625) SIO322 at 1545 by **Philip Rambaut** in Macclesfield; Channel Africa via Meyerton 15.240 (Eng to C/W Africa 1600-1700) 54544 at 1600 in Oadby and 43344 at 1621 in Gibraltar; UAER, Dubai 15.395 (Eng to Eur 1600-1640) 54444 at 1615 in Norwich.

Later, Africa No.1, Gabon 15.475 (Fr to W.Africa 1600-1900) was 44444 at 1645 in Chester; WYFR via Okeechobee, USA 15.566 (Eng to Eur 1600-1855) was 35423 at 1702 in Thornton Heath; WHRI South Bend, USA 15.105 (Eng to C/S.America 1300-1800) 33433 at 1736 by **Tony Hall** in Freshwater Bay, IoW; RNB Brazil 15.265 (Eng, Ger to Eur 1800-2020) 35343 at 1805 by **Vera Brindley** in Woodhall Sp; R.Nederlands via Bonaire 15.315 (Eng to S/E/W.Africa 1830-2025) 35434 at 1850 in Middlesbrough; BBC via Ascension Is 15.105 (Hausa to W.Africa 1915-1945) 25333 at 1923 in Storrington; RAE Buenos Aires, Argentina 15.345 (Sp, Eng, It, Fr, Ger to Eur, Africa 1800-2300) 35553 at 2008 in Wallsend; VOA via Greenville

DXers -

(A) Paul Bowery, Burnham-on-Crouch.
(B) Robert Connolly, Kilkeel.
(C) Paul Crankshaw, Troon
(D) Ron Damp, Worthing.
(E) David Edwardson, Wallsend.
(F) John Slater, Scalloway.
(G) Tony Stickells, Thornton Heath

15.580 (Eng to Africa 1800-2200) 43333 at 2015 in Rugby; BBC via Ascension Is 15.400 (Eng to Africa 1430-2100) 24231 at 2058 in Oxted.

Noted in the **13MHz (22m)** band before noon were Monitor R.Int via KHBI Saipan, N.Mariana Is 13.615 (Eng to Oceania 0800-1000 Tue-Sun) rated 45444 at 0834 in Burnham-on-Crouch; SRI via Sottens? 13.685 (It, Eng, Fr, Ger, Port to Australia, S.Pacific 0830-1100), rated 24333 at 0904 in Middlesbrough; R.Sweden 13.625 (Sw to Eur, Africa 0800-1000 Sun) 33333 at 1000 in Truro; UAER, Dubai 13.675 (Eng to Eur 1030-1055) SIO344 at 1030 in Edinburgh; R.Austria Int via Moosbrunn 13.730 (Ger, Eng, Fr, Sp to Eur 0400-1800) 45444 at 1054 in Bridgwater.

During the afternoon Croatian R, Zargreb 13.830 (Cr, Eng to Eur 24hrs) was 45555 at 1246 in Manchester; WYFR via Okeechobee 13.695 (Eng to N.America 1300-1400) SIO222 at 1300 in Co.Fermanagh; R.Nederlands via Flevo 13.700 (Eng to S.Asia, M.East 1330-1525) 34333 at 1414 in Newry; R.Kuwait via Kabd 13.620 (Ar to Eur, N.America 0930-1605) 55555 at 1438 in Thornton Heath; SRI via Sottens? 13.635 (Eng, Fr, It, Ger to S/S.E.Asia 1300-1500) 54444 at 1300 in Appleby; SRI via Sottens? 13.635 (Eng, Fr, Ger, It to S/C.Asia 1500-1700) 44444 at 1510 in Penmaenmawr; WJCR via Millerstown, USA 13.595 (Eng 12hrs, Chin 12hrs) heard at 1600 in Macclesfield; R.Pakistan, Islamabad 13.590 (Eng to M.East 1600-1630) SIO342 at 1605 in Woking; UAER, Dubai 13.675 (Eng to Eur 1600-1640) 55555 at 1615 in Norwich.

Later, WHRI South Bend, USA 13.760 (Eng to E.USA, Eur 1500-2200) was 44434 at 1736 in Freshwater Bay; WWCR Nashville, USA 13.845 (Eng to E.USA 1400-0100) 25432 at 1640 in Chester and 32233 at 1828 in Gibraltar; VOA via Selebi-Phikwe, Botswana 13.710 (Eng to Africa 1630-2200) 44444 at 1845 in Herstmonceux; WEWN Birmingham, USA 13.695 (Eng to Eur 1900-2057) 44444 at 2028 in Rugby; RCI via Sackville 13.650 (Fr, Eng to Eur, Africa 1945-2200) 33333 at 2115 in Stalbridge; RCI via Sackville 13.690 (Eng, Fr to Eur, Africa 2000-2300) 24333 at 2042 in Oxted.

In the **11MHz (25m)** band R.New Zealand's broadcast to Pacific areas on 11.900 (Eng 0458-0715 [ends 0758 Sat/Sun]) was 22222 at 0750 in Stockport. Also received during the morning were R.Nederlands via Bonaire 11.895 (Eng to Pacific 0730-0825), logged as 15321 at 0756 in Burnham-on-Crouch; R.Bandeirantes, Sao Paulo, Brazil 11.925 (Port 24hrs) 43533 at 0849 by **Richard Reynolds** in Guildford; R.Japan via Yamata 11.850 (Jap, Eng to Oceania 0600-1000) 33232 at 0910 in NW.London; R.Norway Int, Oslo 11.850 (Norw to America 1000-1030) 33333 at 1010 in Truro; VOIRI Tehran 11.930 (Eng to M.East, Asia 1130-1230) 34343 at 1137 in Newry.

Later, R.Bulgaria via Plovdiv 11.605 (Eng to Asia 1230-1330) was 44444 at 1230 in Scalloway; R.Finland via Pori 11.735 (Eng to N.America 1230-1300 & 1330-1400) 53544 at 1230 in Galashiels and SIO333 at 1330 in Co.Fermanagh; AIR via ? 11.585 (Sind to Pakistan 1230-1500) SIO333 at 1235 in Macclesfield; Polish R, Warsaw 11.815 (Eng to Eur 1300-1355) 55545 at 1340 by **Harry Richards** in Barton-on-Humber; RCI via Sines, Portugal 11.915 (Eng, Fr to Eur, Africa 1430-1600) SIO332 at 1437 by **Ted Walden-Vincent** in Gt.Yarmouth; WWCR Nashville, USA 12.160 (Eng to Eur? 1400-2300) 35333 at 1503 in Woodhall Spa and 32222 at 2100 in Appleby; R.Australia via Carnarvon 11.660 (Eng to S.Asia 1430-2057) SIO333 at 1525 in Largs; R.Japan via Sri Lanka 11.930 (Eng to M.East, N.Africa 1700-1800) 23222 at 1730 in Morden; R.Kuwait via Kabd 11.990 (Eng to Eur, N.America 1800-2100) SIO444 at 1830 in Edinburgh; BBC via Ascension Is 11.835 (Eng to W.Africa 2000-2315) 45554 at 2000 in Wallsend.

Broadcasts from many areas may be received in the **9MHz (31m)** band. During the morning R.Australia via Shepparton 9.860 (Eng to Pacific, Asia 0600-1200) was SIO332 at 0814 in Woking; R.Australia via Carnarvon 9.510 (Eng, Chin to E.Asia 0800-1230?) 24222 at 0900 in Galashiels; R.Nederlands via Bonaire, Ned.Antilles 9.720 (Eng to Australia, NZ 0730-1025) 32222 at 0910 in Rugby; R.New Zealand Int 9.700 (Eng to Pacific areas 0715-1206) 44444 at 0910 in Herstmonceux, 32332 at 1015 in Kilkeel and 22332 at 1047 in Freshwater Bay; R.Prague via Litomysl 9.505 (Eng to Eur 1100-1157) SIO444 at 1145 in Macclesfield.

Tropical Bands Chart

Freq (MHz)	Station	Country	UTC	DXer
2.310	ABC Alice Springs	Australia	1850	C,F,G,K
2.325	ABC Tennant Creek	Australia	1900	C,F,G,K
2.485	ABC Katherine	Australia	1921	F,G,K
2.850	KCBS Pyongyang	N.Korea	1623	F,G
3.200	TWR Manzini	Swaziland	1815	G
3.220	CPBS 1, Beijing	China	2318	G,N
3.220	Channel Africa	S.Africa	1845	G
3.220	R.Kara, Lome	Togo	2107	C,G,K,N
3.223	AIR Simla	India	1536	C,G,P
3.230	R.Sol de Los Andes	Peru	0133	E,J
3.230	SABC Meyerton	S.Africa	1900	C,G,J,N
3.240	TWR Shona	Swaziland	1829	G
3.245	AIR Lucknow	India	1535	G
3.250	R.Pyongyang	N.Korea	1612	G
3.255	BBC via Maseru	Lesotho	2133	C,G,J,K,N,R
3.260	Guizhou 1	China	2330	E
3.270	SWABC 1, Namibia	S.W.Africa	2058	C,G,J,K,N,P,R
3.290	R.Centro, Ambato	Ecuador	2330	E
3.290	Namibian BC,Windhoek	S.W.Africa	2340	C,G,J,N,P
3.300	R.Cultural	Guatemala	0120	C,J
3.306	ZBC Prog 2	Zimbabwe	2112	C,G,J,K,P,R
3.315	AIR Bhopal	India	0135	C,G,P
3.316	SLBS Goderich	Sierra Leone	2126	C,F,G,K,N,R,S
3.320	Pyongyang	N.Korea	1613	E,G
3.320	SABC Meyerton	S.Africa	2131	C,G,K,N
3.325	FRCN Lagos	Nigeria	2131	C,E,J,K,M,P,R,S
3.335	CBS Taipei	Taiwan	1950	G,K
3.345	AIR Jaipur	India	0054	J,S
3.345	AIR Jammu	India	1531	G,K,P
3.345	Channel Africa	S.Africa	1858	G
3.356	R.Botswana	Gabarone	2130	E,G,J,K,P
3.365	GBC R-2	Ghana	2206	B,C,D,E,F,J,K, M,N,P,R
3.365	AIR Delhi	India	1751	G,P
3.375	R.Nacional S.Gabriel	Brazil	0136	E,J
3.377	R.Nacional, Mulenvos	Angola	2157	E,G,K,S
3.380	R.Chortis	Guatemala	2057	E
3.380	NBC Blantyre	Malawi	2200	C,E,G,J,K
3.385	RFO Cayenne	Guiana	1920	C
3.390	BBC via Meyerton	S.Africa	2034	G
3.815	Taiwan 1 Sc, Beijing	China	1606	E,G
3.900	Hulunbei'er, Hailar	China	1624	P
3.905	RRI Banda Aceh	Indonesia	1601	G
3.915	BBC via Kranji	Singapore	2118	B,E,G,J,K,N,R
3.940	PBS Hubei Wuhan	China	1524	G
3.945	AIR Gorakhpur	India	1506	C,G
3.950	Qinghai PBS, Xining	China	0019	C,E,G,H,N
3.950	R.France Int	France	2200	O
3.955	BBC via Skelton	England	1950	C,E,J,Q,R,S
3.960	Xinjiang PBS, Urumqi	China	1524	C,G,P
3.960	R.Budapest	Hungary	0416	J
3.965	R.France Int	France	1905	C,J,R,S
3.970	R.Korea via Skelton	England	2000	I,J,L,R
3.975	R.Budapest	Hungary	2000	C,H,J,J,L,Q
3.975	RRI Surabaya	Indonesia	1545	G
3.980	VOA via Munich	Germany	2244	S
3.985	IRRS	Italy	2254	S
3.985	China R via SRI	Switzerland	2123	E,I,R,S,T
3.985	SRI Beromunster	Switzerland	1920	C
3.990	Xinjiang BS, Urumqi	China	1518	G,N
3.990	BBC via Limassol	Cyprus	1608	G,O
3.995	DW via Julich	Germany	2125	C,E,J,R,S
4.003	RRI Padang	Indonesia	2256	S
4.005	Vatican R.	Italy	2200	A,O,R
4.035	Xizang PBS, Lhasa	Tibet	1501	E,G,I
4.190	CPBS Minority Sce	China	1637	G
4.330	Xinjiang BS, Urumqi	China	0058	G,S
4.450	R.Frontera, Cobija	Bolivia	2257	E
4.460	CPBS 1, Beijing	China	2103	E,G
4.500	Xinjiang BS, Urumqi	China	2312	E,F,G,J,P
4.735	Xinjiang, Urumqi	China	2350	C,E,F,G,J,N,P
4.750	Xizang BS, Lhasa	Tibet	0010	C,E,G,J
4.753	RRI Ujung, Padang	Indonesia	2045	G,K
4.754	R.Maranhao	Brazil	2356	N
4.755	R.Educ CP Grande	Brazil	2354	C,E,J,N
4.760	Yunnan PBS,Kunming	China	1552	E,G,J,N
4.760	AIR Port Blair	India	1630	G,P
4.760	ELWA Monrovia	Liberia	2045	B,C,F,G,K,L,P
4.760	TWR Manzini	Swaziland	0325	J
4.765	R.Integracao	Brazil	2327	C,J,N
4.765	R.Rural, Santarem	Brazil	2225	N
4.765	Brazzaville	Pep.Rep.Congo	2135	E,K
4.770	Centinela del Sur	Ecuador	0055	C
4.770	FRCN Kaduna	Nigeria	2209	C,E,J,K,M,N,P,R,S
4.775	AIR Guwahati	India	0140	C,G,N,P
4.777	R.Gabon, Libreville	Gabon	1920	C
4.783	RTM Bamako	Mali	2130	B,E,K,N,P,R,S
4.785	Zhejiang PBS,H'gzhou	China	0150	C
4.790	Azad Kashmir R.	Pakistan	1557	C,G,K,N,P
4.800	CPBS 2 Beijing	China	1340	G,N
4.800	AIR Hyderabad	India	1710	G,K,P
4.800	LNBS Lesotho	Maseru	2129	C,G,J,N
4.805	R.Nac.Amazonas	Brazil	2255	C,R
4.815	R.Pakistan Karachi	Pakistan	0140	C
4.820	La Voz Evangelica	Honduras	2300	E,P,S
4.820	AIR Calcutta	India	1507	C,G
4.820	Xizang, Lhasa	Tibet	1508	E,G
4.828	ZBC R-4	Zimbabwe	2037	G,K
4.830	R.Botswana, Gaborone	Botswana	2048	E,K
4.830	China Huayi BC	China	1554	G,S
4.830	R.Bangkok	Thailand	1446	G
4.830	R.Tachira	Venezuela	2328	C,E,F,J,N
4.832	R.Reloj	Costa Rica	2323	E
4.835	R.Tezulutlan, Coban	Guatemala	2317	C,E
4.835	RTM Bamako	Mali	2210	B,C,E,J,K,N,P,R
4.840	Heilongjiang, Harbin	China	1328	G
4.840	AIR Bombay	India	1605	G,K,N,P
4.845	R.Fides, La Paz	Bolivia	0135	C
4.845	RTM Kuala Lumpur	Malaysia	1621	G,N
4.845	ORTM Nouakchott	Mauritania	2137	C,J,K,N
4.850	AIR Kohima	India	0050	C,E,P,S
4.860	AIR Kingsway(Feeder)	India	1710	C,G,K,P,S
4.865	PBS Lanzhou	China	2148	E,G,I,F,J,K,N,P,R
4.870	R.Cotonou	Benin	2116	J,K,N,P,R
4.875	R.Roraima, Boa Vista	Brazil	2318	C,F
4.879	R.Bangladesh	Bangladesh	1614	C,E,G,N,P
4.880	AIR Lucknow	India	0210	C,S
4.885	R.Clube do Para	Brazil	2217	C,E,J,K,N,S
4.885	R.Difusora Acreana	Brazil	0115	C
4.885	KBC East Sce Nairobi	Kenya	1822	C,G,K
4.890	R.Port Moresby	New Guinea	1934	K
4.890	ORTS Dakar	Senegal	0418	P
4.895	R.IPB AM C'po Grande	Brazil	0506	N
4.895	Voz del Rio Arauca	Colombia	0321	J
4.895	AIR Kurseong	India	0145	C,G
4.895	Pakistan BC	Pakistan	1616	K,N,P,S
4.900	Haixia 2	China	1535	G,P
4.900	SLBC Colombo	Sri Lanka	1706	G,K,P
4.905	R.Relogio, Rio	Brazil	2336	N
4.905	R.Nat.N'djamena	Chad	2026	C,F,J,K,M,N,P,R
4.905	R. La Oroya	Peru	0150	C
4.910	Tennant Creek	Australia	2137	K
4.910	AIR Jaipur	India	1408	G
4.915	R.Anhanguera	Brazil	2248	N,P
4.915	R.Difusora, Macapa	Brazil	0205	C
4.915	PBS Guangxi, Nanning	China	1438	G
4.915	GBC-1, Accra	Ghana	2218	C,I,J,K,N,P,R
4.920	R.Quito	Ecuador	0508	F,I,N,P,S
4.920	AIR Madras	India	1622	G,N,P
4.925	R.S.Miguel,Riberalta	Bolivia	2223	N
4.931	R.Internacional	Honduras	0150	C
4.935	R.Capixaba, Vitoria	Brazil	0512	N
4.935	KBC Gen Sce Nairobi	Kenya	1922	G,K
4.940	AIR Guwahati	India	0040	C,G,P
4.950	R.Nacional, Mulenvos	Angola	2025	G,N,P
4.950	AIR Jammu	India	1512	G,P
4.950	R.Madre de Dios	Peru	2227	N
4.955	R.Marajoara, Belem	Brazil	0440	J
4.955	R.Nac. de Colombia	Colombia	0150	C,E,P,S
4.960	Hanoi 2	Vietnam	1416	G,K
4.965	R.Alvorada	Brazil	2304	S
4.965	Christian Voice	Zambia	1923	C,G,J,K,N
4.970	PBS Xinjiang	China	0016	C,G,J
4.970	R.Rumbos, Caracas	Venezuela	0052	E
4.975	Fujian 1, Fuzhou	China	1535	G
4.975	R.Uganda, Kampala	Uganda	2052	C,G,K,P
4.980	PBS Xinjiang, Urumqi	China	1540	C,G,J,P
4.980	Ecos del Torbes	Venezuela	2217	C,F,J,K,N,P,S
4.985	R.Brazil Central	Brazil	2310	F,N
4.990	Hunan 1, Changsha	China	1512	C,G
4.990	AIR Ext.Service	India	0020	J,P
4.990	FRCN Lagos	Nigeria	2100	C,K,N
5.005	R.Nacional, Bata	Eq.Guinea	2034	G,J,K,N,P,S
5.005	R.Nepal, Kathmandu	Nepal	1542	C,G,N,P
5.010	R.Garoua	Cameroon	1718	G,K,N
5.010	Guangxi 2, Nanning	China	0024	J
5.010	AIR Thiru'puram	India	0035	C,E,P
5.020	PBS-Jiangxi Nanchang	China	1545	C,G,I,P
5.020	La V du Sahel,Niamey	Niger	1922	C,G,I,J,K,N,P
5.020	SLBC Tamil Home Sce.	Sri-Lanka	1618	E,G
5.025	ABC Katherine	Australia	2142	K
5.025	R.Parakou	Benin	2053	C,F,J,K,N,P
5.025	R.Uganda, Kampala	Uganda	1936	G,K
5.030	AWR Latin America	Costa Rica	2300	P
5.035	R.Aparecida	Brazil	0005	E
5.035	R.Bangui	C.Africa	0505	P
5.040	PBS Fujian, Fuzhou	China	1450	G
5.045	RRI Yogyakarta, Java	Indonesia	1620	P
5.047	R.Togo, Lome	Togo	2053	C,E,F,J,K,N,P,S
5.050	Guangxi FBS, Nanning	China	1548	G,P
5.050	Haixia 1	China	2255	N
5.050	R.Tanzania	Tanzania	1724	J,K,N
5.055	Faro del Caribe	Costa Rica	2331	E
5.055	RFO Cayenne(Matoury)	French Guiana	0837	C,N,P
5.060	PBS Xinjiang, Urumqi	China	1550	C,E,G,J,P,S
5.065	R.Candip, Bunia	Zaire	1824	G,S
5.075	Caracol Bogata	Colombia	0317	C,J,P,S
5.090	Taiwan 2 Sce,Beijing	China	1403	G
5.125	Taiwan 1 Sce,Beijing	China	1455	G
5.163	CPBS 2, Beijing	China	2355	E

DXers:-
(A) Tim Allison, Middlesbrough.
(B) Paul Bowery, Burnham-on-Crouch.
(C) Robert Connolly, Kilkeel.
(D) Ron Damp, Worthing.
(E) John Eaton, Woking.
(F) David Edwardson, Wallsend.
(G) P.Gordon Smith, Kingston, Moray.
(H) Simon Hockenhull, E.Bristol.
(I) Sheila Hughes, Morden.
(J) Eddie McKeown, Newry.
(K) Fred Palliant, Storrington.
(L) Clare Pinder, while in Appleby.
(M) Peter Pollard, Rugby.
(N) Richard Reynolds, Guildford.
(O) Alan Roberts, Quebec, Canada.
(P) John Slater, Scalloway.
(Q) Tom Smyth, Co.Fermanagh.
(R) Tony Stickells, Thornton Heath.
(S) Andrew Stokes, Leicester.
(T) Stan Watkins, N.W.London.

After mid-day the Voice of Turkey, Ankara 9.445 (Eng to Eur, Asia 1330-1430) was 44444 at 1330 in Scalloway; Polish R, Warsaw 9.525 (Eng to Eur 1300-1350) 45444 at 1345 in Barton-on-Humber; BBC via Kranji, Singapore 9.740 (Eng to Far East 0500-1615) 34444 at 1500 in Chester; R.Kuwait via Kabd 9.880 (Ar to N.Africa 1315-2130) SIO332 at 1511 in Gt.Yarmouth; R.Australia via Darwin 9.615 (Eng to Pacific 1100-1755) 44444 at 1552 in Woodhall Spa; Africa No.1, Gabon 9.580 (Fr to C.Africa 0500-2300) 33333 at 1726 in Gibraltar.

Later, VOA via Gloria, Portugal 9.760 (Eng to M.East 1700?-2200) was 54555 at 1930 in Oadby; AIR via Delhi? 9.950 (Eng to W/N.Africa, M.East 1745-1945) was 35343 at 1936 in Newry: R.Nederlands via Madagascar 9.605 (Eng to Africa 1730-2025) 54444 at 1950 in Appleby; Voice of Indonesia 9.525 (Eng to Eur 2000-2030) 45433 at 2000 in Middlesbrough; Voice of Turkey, Ankara 9.445 (Eng, Fr to Eur 1930-2130) SIO455 at 2000 in Edinburgh; RCI via Sackville 9.805 (Fr, Eng to Eur, Africa 2000-2230) 44433 at 2042 in Oxted; VOFC Taiwan via WYFR USA 9.985 (Chin, Fr, Ger, Eng to Europe 1900-2300) 33333 at 2115 in Stalbridge; China R.Int, Beijing 9.920 (Eng to Eur 2000-2157) 43343 at 2145 in Norwich; R.Cairo via Abis 9.900 (Eng to Eur 2115-2245) 44344 at 2152 in E.Worthing; UAER, Abu Dhabi 9.605 (Eng to N.America 2200-0000) 33333 at 2228 in NW.London; R.Bulgaria, Sofia 9.700 (Eng to Eur 2200-2300) 44444 at 2245 in Morden; CBC Montreal 9.625 (Eng, Fr, Inuk, Cree, Attik to N.Canada 1155-0610) 53544 at 0003 in Guildford; VOA via ? 9.740 (Eng to S.Asia 0100-0300) SIO444 at 0236 in N.Bristol.

The occupants of the **7MHz (41m)** band include R.Norway Int 7.180 (Norw to Eur, W.Africa 0700-0730) rated 44444 at 0710 in NW.London; R.Japan via Skelton, UK 7.230 (Eng to E.Eur 0700-0800) 44444 at 0715 in Norwich; WEWN Vandiver, USA 7.425 (Eng to N.America 2200-0900) 55444 at 0803 in Burnham-on-Crouch; TWR Monte Carlo, Monaco 7.115 (Eng to Eur 0740-0920) SIO444 at 0900 in Co.Fermanagh; WJCR Upton, USA 7.490 (Eng to E.USA 24hrs) 24432 at 0910 in Galashiels; Monitor R.Int via WSHB 7.535 (Eng [Various Sat/Sun] to Eur 0400-0955) 22222 at 0932 in Truro; RFPI Costa Rica 7.385 (Eng 24hrs) 23222 at 1015 in Morden; WEWN Birmingham, USA 7.465 (Eng to Eur 1000-1200) SIO555 at 1035 in Macclesfield; AWR (KSDA) Agat, Guam 7.455 (Chin [Eng ident] 1200-1600) 24432 at 1230 in Bridgwater; Polish R, Warsaw 7.145 (Eng to Eur 1300-1355) 54333 at 1350 in Barton-on-Humber; R.Sweden 7.240 (Eng to Eur, M.East,Africa 1830-1900) 33333 at 1853 in Rugby; R.Thailand via Udon Thani 7.295 (Eng to Eur 1900-2000) 34553 at 1906 in Wallsend; Israel R, Jerusalem 7.465 (Eng to Eur, N.America 2000-2030) 54444 at 2000 in Appleby; R.Australia via Carnarvon 7.260 (Eng to Asia, Pacific 1800-2100) 32222 at 2030 in Stalbridge; R.Tunisia Int via Sfax 7.475 (Ar [Rly of Nat.Network] 0400-0600, 1700-0000) 54444 at 2130 in Chester; AIR via Aligarh? 7.410 (Eng to W.Eur 2045-2230) 54444 at 2145 in E.Worthing; R.Moldova Int via Galbeni, Romania 7.500 (Eng to Eur 2300-2325) 33222 at 2310 in Scalloway; WRNO New Orleans, USA 7.355 (Eng to E.USA 2300-0300) 44434 at 2335 in Penmaenmawr; R.Yugoslavia, Belgrade 7.115 (Eng to W.USA 0200-0230) SIO222 at 0227 in N.Bristol.

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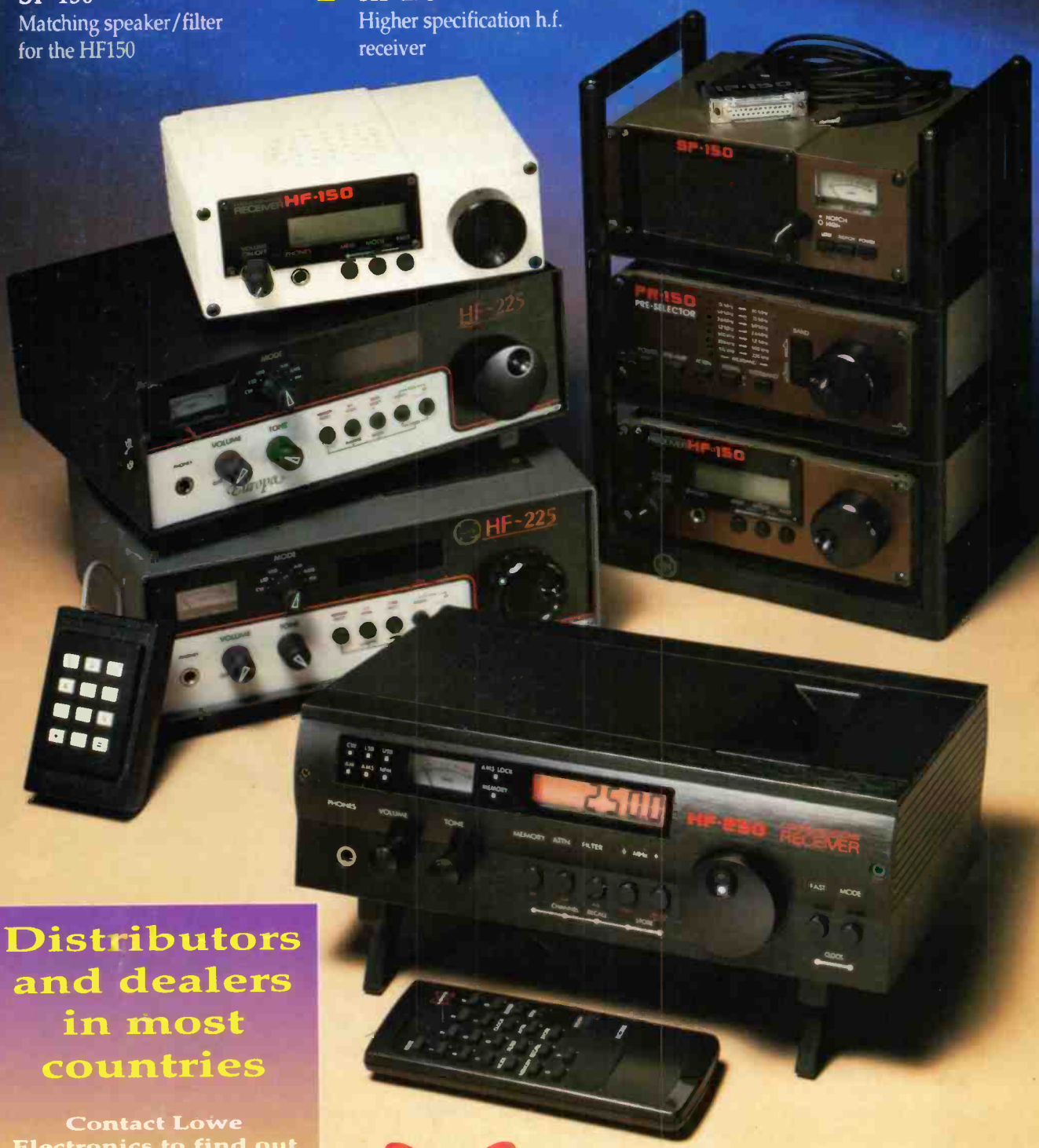

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