short wave magazine

Staines

You're Just Not A Serious Listener Without SWM

Filter Special

John Wilson on Filters in Receivers

MFJ-784B Digital Signal Processing Filter Reviewed

Build a Signal Processor

Sony ICF-SW1000T Reviewed

COMPETITION - WIN an AOR AR7030 Communications Receiver

April 1996 £2.50 ISSN 0037 - 4261

pwp
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UBC860XLT

A stylish designer base-station scanner which offers 100 memory channels and a 12 band coverage including 800MHz. Features Uniden's patented TWIN TURBO scan and search facility. The BC860XLT represents the best value for money in the home base scanner market - covering all of the most popular bands including the Amateur VHF and UHF bands, Civilian Airband, Marine & PMR, plus the high UHF 800MHz band.

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PRICE £139.00

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PRICE £95.95

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A new 500 channel base station model covering 25MHz to 1.3GHz in two continuous bands (25-550MHz and 760-1300MHz). Featuring Twin Turbo scan & search modes with 10 user definable priority channels. Easy to read large LCD display and manual tuner together with direct frequency keypad make up a very professional front panel. User selectable modes covering AM, FM and Wide FM modes. Selectable receiver attenuator, delay and data options are available direct from the keyboard. For unattended operation the 9000XLT has an automatic tape recorder ON/OFF and tape output feature! Accessories included: AC mains power adapter, telescopic antenna and owners manual

ALL UNIDEN MODELS ARE CE APPROVED

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A new compact designed handheld featuring Twin Turbo Scan & Search, and a pre-programmed SVC (service) search facility which allows you to toggle the aircraft, marine and other service bands in search mode.

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Frequency coverage: 66-88, 108-174, 406-512MHz

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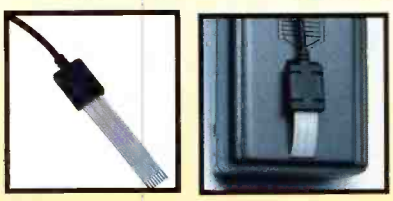

•Using the optional SAC8000 is a snap-Just plug and play. SAC8000 includes cable, back panel with slot, and velcro attachments.

Scout® Reaction Tune® brings you all the action. Whether it is police, fire, commercial or just everyday communications monitoring, the Scout will bring you closer to the action. The Scout will not only capture the frequency, but it automatically tunes the receiver to that frequency at the same time; (*see receivers appl. below*). Let the Scout Reaction Tune your way into the world of communications.

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- Records up to 255 hits on each frequency in memory.
- 10MHz - 1.4GHz single frequency range.
- 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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Sensitivity: 1mV 30MHz - 900MHz
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pwpub.demon.co.uk
Simply add the forename of the person you wish to contact. For example:
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Cover Subject

Filters, filters, filters .....

Photo: Tex Swann

CONTENTS

Regular Columns

SWM SERVICES

Subscriptions

Subscriptions are available at £25 per annum to UK addresses, £28 in Europe and £30 overseas. Subscription copies are despatched by accelerated Surface Post outside Europe. Airmail rates for overseas subscriptions can be quoted on request. Joint subscriptions to both *Short Wave Magazine* and *Practical Wireless* are available at £42(UK) £47 (Europe) and £51 (rest of world).

Components for SWM Projects

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

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

Photocopies and Back Issues

We have a selection of back issues, covering the past three years of SWM. If you are looking for an article or review, or whatever that you missed first time around, we can help. If we don't have the whole issue we can always supply a photocopy of the article. Back issues are **£2.60** 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

Waveguide

The BBC World Service announced recently that their long-running and popular *Waveguide* programme was to finish at the end of March this year after a run of 16 years. This will leave the BBC as the only major international broadcaster without a regular programme for the DXer. One of the reasons given for the decision was the lack of any ten minute slots in the new broadcasting schedules.

World Service has announced that there will be an eight-part series giving basic listening advice to be aired in the coming autumn. Informed sources have indicated that it is hoped to give airtime to a new media programme from April next year, but this is not yet certain.

A lot of disappointed listeners have already expressed their reactions to World Service. If you, also, feel strongly about this ill-conceived decision, write to World Service to express your views. Address your letters to: Audience Correspondence, BBC World Service, Bush House, London WC2B 4PH.

Translating Manuals

While reading the instruction manual for the Sony ICF-SW1000T, reviewed by Peter Shore in this issue, my eyes alighted upon an intriguing section headed '**To fall asleep while listening to the desired broadcast - Sleep timer**'. I find that I don't need a 'sleep timer' to get this effect - what I really need is something that will keep me awake! An 'Awake timer', perhaps? I wonder if the other language translations from the original Japanese manual offer such gems?

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

Dear Sir

Whilst I look forward to your excellent magazine every month, I was wondering why you have never run an article on the maintenance and restoration of the Racal RA17. I have often seen these sets at radio rallies and some are working and some do not and I have been very tempted to purchase one, but as my knowledge of electronics is limited, I am quite wary about doing so.

Would it be too much for me to hope that you could run an article on this most excellent set which is idea for those starting out as short wave listeners as you did for the AR88 and the R1155?

Alan Dry
Bransholme
Hull

*Alan, we rely, for this type of restoration article, upon authors who have undertaken a restoration of these increasingly rare receivers and documented and photographed the process. We would consider publishing such an article if one were available. Perhaps one of our readers is in a position to help here, by producing such an article based on their restoration experiences. - **KN**.*

Dear Sir

I refer to the letter from G. Fry of Freshwater, Isle of Wight (Feb. issue) regarding leaking batteries as I, too, have experienced the same problem on two occasions. He asks why they wished to examine/repair his sets - I will tell him.

The defective batteries leak an alkaline electrolyte which is highly corrosive and while the set may be working fine now, he may find that at some time in the future they will fail due to corrosion caused by the leaking electrolyte finding its way into the innards of his sets.

I can vouch for the corrosive nature of this electrolyte from the damage caused to my slate chimney breast and polished wood gas fire. Repairs cost £175, which amount was paid by the battery manufacturers promptly and without demur and the defective batteries were replaced threefold.

J. A. Senior G7RXS
Enderby
Leicester

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*.

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.

LETTERS

Dear Sir

I was recently fortunate enough to have been given an Amiga 500 computer together with hard-drive, monitor, colour printer etc. Prior to this, I purchased an AR3000A communications receiver, which as you will be aware, is computer controllable. Following a telephone conversation with AOR (UK) Ltd., it became apparent that there is no 'commercially available' software compatible with the Amiga 500 or any other Amiga for that matter.

As a regular reader of *SWM*, I have noticed that computer related articles have been causing quite a stir during the closing months of 1995 and although I am by no means 'computer orientated' I would cherish the thought of being able to combine technology with excellence, or convenience with pleasure.

May I request through your magazine for owners or previous owners of the AR3000A who have used this receiver in conjunction with the Amiga to pass on the relevant information which would enable others like myself to enjoy this hobby to its fullest.

May I also point out that I have written to you previously on the subject of 'musical discones' and to my bewilderment the response was overwhelming as I recall, prompting a reply from New Zealand, which I noted several issues later.

Now, let me take this opportunity to wish you and all the staff at *SWM* best wishes and say that I am continually looking forward to yet another issue of *SWM*.

A. S. Webb
Risca
Gwent

*This is the sort of problem that the new 'ShackWare' column will be addressing - **Ed.***

To: dick@pwpub.demon.co.uk
Subject: Letters

Whilst recently browsing around a large Radio Specialist Store, I overheard a lady and gentleman discussing the merits of a short wave radio. The gentleman was trying to explain why he wished to purchase the dearer of the two units he was looking at, and his wife was trying to understand the benefits of the dearer receiver.

The gentleman explained that the radio he wished to purchase could be operated by computer control, to which she replied "but you have not got a computer". I know from experience at this point the gentleman wanted to say "no, but I am going to get one", but he let the moment pass. His wife then came back on him with "what will the computer do for you?", His reply I can only hope was to cut short a full explanation of computer benefits in the store, as he shot himself in the foot stating that "All of the controls on the Radio can be operated from the computer".

The reply came as I would have expected from my wife "Oh I see, you want the dearer radio which is computer controlled, but you have not got a computer to control it, and when you get a computer all it will do is press the buttons on the dearer radio which you could do on the cheaper one with your finger". Needless to say, she helped carry out all of the packages including the computer operated radio.

Dave Lloyd...via the 'net

Dear Sir

My interest in radio started during World War II when I was a WOp/Air in the Royal Air Force using the T1154 and the R1155. I am now in my 70s and retired and so I have more time to enjoy radio as a hobby and it was with great interest I followed the correspondence on the pros and cons of having a computer column in *SWM*.

Unlike today's youngsters who are taught all about computers at school, I have very little knowledge of what they are capable of doing and was delighted to read your editorial in the February *SWM* that you have decided to include in *SWM* a new 'ShackWare' column. Having read Jerry Glenwright's article 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.

However, I am disappointed in one respect. In your editorial you stated that 'ShackWare' will only be one page every third issue. For people of my generation to only have four pages of information a 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 articles accordingly.

Thank you for your consideration in this matter.

Roy K. Woodman
West Malling
Kent

*A very delicate matter this. As I stated when introducing the new column, I have no plans to increase space given to 'ShackWare'. - **Ed.***

Dear Sir

I have been taking *SWM* regularly since last summer and being a beginner, have found the articles both enlightening and riveting! Brian Oddy's LM&S is, for me, compulsive reading whatever some other readers think!

I've corresponded with Brian several times and the help he has given has been invaluable in pointing me in the right direction. Being an ex-BBC World Service engineer for many years, Brian is my 'professor'!

I'm, no doubt, one of your many devoted readers out here who use portable RXs. Mine is a Sangean ATS 803A + 30m long wire. Are there are fellow 803A owners who'd be interesting in meeting, say, twice a year, to exchange hints and tips? Venue to be agreed (e.g. Union Jack Club in London).

Any 803A owners are invited to contact me either by 'phone or letter and we can take it from there. After getting a compact/portable receiver, the next stage, I've found, is to tweak it to improve reception. How about some articles on a.t.u.s and baluns, comparative tests of the various makes and performance ratings *a la Passport To World Band Radio* (e.g. Shenzi, Global, Howes).

The worst thing about *SWM* is having to wait a month for the next issue! Meanwhile, my sincere appreciation for a really terrific publication. Congratulations and happy listening.

Stan Watkins
7 Carlisle Road
Brondesbury
London NW6 6TL
Tel: 0181- 723 5781

WINNERS WINNERS WINNERS

We are pleased to announce the results of the Christmas competition.

The main prize of a Sangean ATS 818 portable short wave receiver kindly donated by Nevada Communications is winging its way to Martin Tiller of Bristol.

The three runners-up who receive a years subscription to *SWM* are, A. J. Budd of Southport, R. Bliss of Poole and D. Kirman of Greenford. Congratulations to the successful entrants.

If you want to try your luck again, don't miss the competition to win an AOR AR7030 starting in this issue.

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

***March 31:** The Magnum Radio & Computer Rally will be held at the Magnum Leisure Centre, Harbourside, Irvine, open to the public from 11am. Organised by Cunninghame & District Amateur Radio Club, this will be the 8th Magnum Rally, which attracts over 1000 people from all over the UK. For more information, contact **Robbie Vennard GM0SEI** on Tel/FAX: **(01294) 215457**.

March 31: Thames Valley Electronics Rally is to be held at Kempton Park Racecourse, Staines Road East, Sunbury On Thames, Middlesex. Doors open 10.30am to 4.30pm. There will be refreshments and a bar available. Admission is £1.50 for adults, OAPs £1 and children up to 14 years old free. The entire event is on one level. There will be retailers, accessory suppliers, antenna suppliers, a Bring & Buy stall, etc. More information can be obtained from **HD Promotions** on **(01494) 450504**.

April 5: The Bangor & District Amateur Radio Society will be hosting a talk by Rob Mannion G3XFD, Editor of *Practical Wireless* in the Winston Hotel, Bangor, Co. Down. It will commence at 8pm and all are welcome. The hotel lies along the seafront opposite the marina. Refreshments will be available and there is ample car parking available, opposite the venue. Further information from **Terry GI3USS** on **(01247) 473948**.

April 7: The Feltham and Hounslow Sea Cadets are holding their Computer and Radio Rally at Feltham and Hounslow Sea Cadet Corps, 2 Popular Way, Feltham, Middlesex TW13 7AB. Doors open at 10am and entrance fee is £1, children under 14 accompanied by an adult go free. Refreshments will be available. Talk-in on S22. **Allan** on **(01784) 456486**.

April 14: The Cambridgeshire Repeater Group annual rally will take place again this year at the Philips Telecom Catering Centre, St Andrews Road, Cambridge. The event will feature an auction sale, trade stands, Bring & Buy and a car boot trading area. More information can be obtained from **Paul Dyke G0LUC** on **(01920) 821536**.

April 14: Bury Radio Society Annual Rally will be held at the Castle Leisure Centre, Bolton St., Bury. Doors open at 11am and 10.30am for disabled visitors. The Bring & Buy will be run by members of the Rochdale ARS. Refreshments and a licensed bar will be available. Facilities for the disabled. The Leisure Centre is next to East Lancs Railway (steam preservation line), so why not bring all the family and have an enjoyable day out. **Laurence G4KLT** on **0161-762 9308**.

April 14: Lincolnshire AMS '96 - Computer & Electronics Show, Springfields Exhibition Centre, Springfields Gardens, Camelgate, Spalding, Lincolnshire. Entrance fee for adults is £2.50, OAPs £2.30 and children under 14 free. There will be a wide range of new and second user goods, accessories, electronic components, multimedia, CDs, software, upgrades, consumables, etc., there will also be a Bring & Buy. **Sharward Promotions, Upland Centre, 2 Upland Road, Ipswich, Suffolk IP4 5BT. Tel: (01473) 741533.**

April 14: The Swansea Amateur Radio Society are holding their Amateur Radio & Computer Show at the Swansea Leisure Centre. Doors open 10.30am to 5pm. Entrance fee is £1 for adults and 50p for children. There will be trade stands, Bring & Buy, local repeater groups, special interest groups, as operational h.f./v.h.f. station, s.s.b. and packet. Talk-in on S22. There will be full catering and a licensed bar. The Leisure Centre is located near the City Centre on the A4067 Swansea - Mumbles coast road. Further details from **Roger GW4HSH** on **(01792) 404422**.

April 14: The Launceston 10th Amateur Radio Rally is being held at the Launceston College. There will be well-known traders, Bring & Buy, Morse test on demand (bring two passport photos) and hot snacks. Talk-in on S22. Ample parking. **Roy G0IKC** on **(01409) 221624** or **Paul G0UFV** on **(01566) 776108**.

April 21: Lough Erne Amateur Radio Club will be holding their 15th rally at the Killyhelvin Hotel, Enniskillen at 12 noon. Attractions will include Icom & Alinco trade stands, the usual Bring & Buy, etc. Contact **Kieran** on **(01365) 327133** (evenings) for more details.

April 21: The White Rose Amateur Radio Society (PO Box 73, Leeds LS1 5AR) are holding their 29th Annual Radio, Electronics & Computer Rally at the Leeds University Sports & Leisure Centre (new venue). Doors open at 11am (10.15am for disabled visitors). Free parking for over 1000 vehicles, usual reliable traders, bar/cafeteria, Bring & Buy stall, RSGB in attendance. Trader enquiries to **Allen G7ELS** on **(0973) 189276**.

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

Editor

AVON

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

South Bristol ARC: Wednesdays. 7.30pm. Whitchurch Folkhouse Assoc., Bridge Farm House, East Dundry Rd, Whitchurch. April 3 - 1-GHz activity evening, 10th - Computer activity, 17th - Club quiz night, 24th - History of WD & HO Wills (continued). For more information ring (0127) 834282 on a Wednesday evening.

BUCKINGHAMSHIRE

Aylesbury Vale RS: Wednesday evenings. 8pm. Hardwick Village Hall, (Hardwick is situated off the A413 between Aylesbury and Buckingham). April 3 - Operating techniques by Ivan Eamus G3KLT. 17th - The PC in the shack by Alan Ralph G8XLH. Ivan Eamus G3KLT. (01296) 437720.

CLWYD

Conwy Valley ARC: 1st Wednesdays. The Studio, Penrhos Road, Colwyn Bay. Clwyd. April 3 - An evening of members' past and present construction efforts. 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. April 4 - Committee meeting. F. P. Russell on (01752) 563222.

Torbay ARS: Fridays. 7.30pm. ECC Social Club, Highweek, Newton Abbot. April 19 - 90/10 surplus equipment sale. Peter G4UTO. (01803) 864528.

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. March 28 - Inter club quiz, April 4 - HF operating evening, 11 - Natter night, 18th - Visit by Tom Menzies GM1GEQ, RSGB Zone G Representative, 25th - HF operating evening. 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. March 28 - Radio on the air, London Amateur Radio Show debrief. April 11 - The surplus equipment sale. 25th - Radio on the air. M. E. Viney G0AXN. (01707) 850146.

HAMPSHIRE

Horndean & DARC: 1st & 4th Tuesdays. 7.30pm. Lovedean Village Hall, Lovedean Lane, Lovedean, Hants. April 2 - Natter night, 23rd - The history of public and domestic electricity supplies by Dr. Mike Pope. 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. April 9 - In practice from *RadCom*, 23rd - Talk on DX cluster. Barry Taylor. (01527) 542266.

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

HERTFORDSHIRE

Harpenden ARC: 1st Thursday of the month from September to May, at Aldwickbury School, Harpenden. April 4- Satellite or ATV talk. Further details from Peter 2E1BDB on (01727) 860631 or John G4JOV on (01582) 765821.

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.

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. March 28 - General discussion evening, April 11 - Quiz night on radio topics, 25th - General discussion evening. 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. April 3 - AGM, 10th - Informal. night on the air/construction, 17th - Formal, surplus equipment sale, 24th - Informal. night on the air/construction. Mike G4EOL. (01603) 789792.

NORTHANTS

Kettering & DARS: Tuesdays, 7.30pm for 8pm. The Isle Lodge Community Centre, St Vincents Avenue. 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. April 1 - Richard Hillier of AOR Ltd. will be demonstrating and talking about the new radio receivers. 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.

SHROPSHIRE

Salop ARS: Thursdays, 8pm. Oak Hotel, Shrewsbury. Thursdays. March 28 - Quiz night at Newtown with Powys & Dolgellau Clubs, an international event. April 11 - Construction competition, bring those projects along and prove it a lively club, 25th - Talk by Shrewsbury & District Model Society. Ian Davies G7SBD, QTHR. (01743) 463711.

SOMERSET

Yeovil ARC: Thursdays, 7.30pm. The Red Cross Centre, 72 Grove Avenue, Yeovil. April 4 - Adjudication of the annual constructors contest. 11th - HF DXing, 18th - 50th AGM. 25th - Club station on the air and committee meeting. Cedric White, QTHR. (01258) 473845.

TAYSIDE

Dundee ARC: Tuesdays, 7pm. Dundee College, Graham Street, Dundee. April 16 - Packet radio. 23rd - Construction eveing. Allan Martin GM7ONJ, 11 Langlee Place, Broughty Ferry, Dundee, Tayside DD5 3RP.

WARWICKSHIRE

Stratford-upon-Avon & DRS: 2nd & 4th Mondays. 7.30pm. Home Guard Club, Main Street, Tiddington, Stratford-upon-Avon. April 8 - AGM, 22nd - The first century of sound recording by Brian Hayward G8VXQ. Martin Rhodes G3XZO. (01789) 740073.

WEST YORKSHIRE

Wakefield & DRS: Tuesdays, 8pm. The Ossett Community Centre, Prospect Road, Ossett. April 2 - Quiz, 9th - On the air, 16th - Vintage v.h.f. air communications, 23rd - AGM. Bob 0113-282 5519 or G3WWF@GB7WRG.

WILTSHIRE

Trowbridge & DARC: 1st & 3rd Wednesdays, 8pm. The Southwick Village Hall, Southwick, Trowbridge. April 3 - Whys and wherefores of the cubical quad antenna by Dave Buik G0DAB. Ian G0GRI on (01225) 864698.

JUNIOR LISTENER

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

Have you ever fancied being a radio presenter? Well, I've heard of an unusual opportunity with a radio station called Splash FM. Between May 4 and 27, Splash FM will be on the air from the Bedford River Festival, with all proceeds going towards vital equipment for Hospital Radio Bedford. The frequency to keep an ear out on is 107MHz f.m. The station is looking for presenters, fund raisers and advertisers, so if you are interested contact: **Splash FM, c/o Hospital Radio Bedford, Bedford Hospital South Wing, Kempston Road, Bedford MK42 9DJ. Tel: (01234) 792272**. Let me know if you hear the station broadcasting.

RCI Fights On

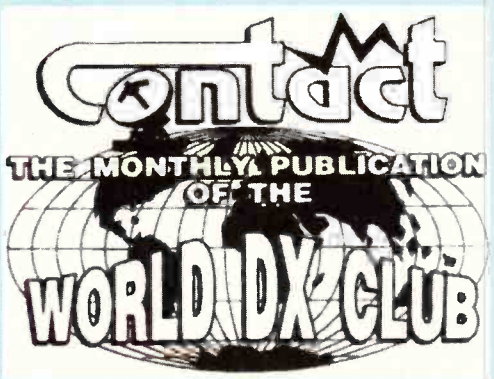
Radio Canada International (or RCI) is a very popular station with newcomers. Usually easy to receive, they have a wide range of programmes on offer and have sent out many attractive QSL cards over the years. Like many large international broadcasters, they have been under threat of closure due to financial pressure from their government. RCI are still fighting to prevent the station closing and have said how helpful the response from listeners has been. With a new Heritage Minister, the 'Coalition to Restore Full RCI Funding' group hope that renewed pressure from listeners will aid their cause further. They want listeners to continue writing saying how much they enjoy RCI programmes, how effective their voice is internationally or how much you've learned about Canada from the programmes you've heard. If you would like to add your voice to those who've already written, then you can address your letter to either **The Right Hon. Jean Chretien, Prime Minister of Canada** or **The Hon. Sheila Copps, Heritage Minister**. The address for both is **Ottawa, Canada, K1A 0A6**. It would be a huge shame if such an important international broadcaster were closed down just to save a government some money. Who knows how many other stations would follow?

Marine Radio Book

Listening to the radio traffic going on around the coast of the UK is very popular with short wave listeners. If you live near the coast, or have the opportunity to take your radio with you when visiting the coast then you can listen to a whole range of different signals - if you know where to look. I've been loaned a copy of *Ship to Shore Radio Frequencies* by Ken Davies to read and although it is written for the boating enthusiast as a radio guide book it has got possibilities for the listener too. Unless you are likely to take your boat out into the coastal waters, then knowing the Southampton telephone number for weather forecasts won't be of much use to the listener. But the v.h.f. channel numbers for the Portland and Solent Coastguard is. So are the frequencies for Niton Radio - 2.628MHz as its working channel, and the channel numbers for things like the Lymington Marina (Ch. 80M). There are tables at the end of the book that tell you the frequencies for the various channel numbers (Ch. 80 is 161.625MHz from the Marina and 157.825MHz from the ship). The coastline is divided up into sectors and each sector is dealt with separately with all the relevant information kept together. Despite all the extra information on things like Coastguard telephone numbers, telephone weather forecast services and 'phone numbers for the various harbours, the other bits of information could be useful if you make a habit of listening to the marine bands. You can waste a lot of valuable listening time if you are searching around trying to find out which channels you should be listening on and when that station is likely to be transmitting. The book costs £5.99, which compares well with the cost of many specialist frequency listening guides these days and is available from the *SWM* Book Store.

Newsletters

This seems to be Newsletter month, as I've received four different radio newsletters - some of which I haven't seen before. The first to arrive was *Budapest International No. 2 1996*, obviously from Radio Budapest in Hungary. The small eight-page newsletter had an article about the US Navy Construction Troops in the area of Kaposvar, details about the annual Budapest Spring Festival, Their February schedule and a request form. There was also something called the Butterfly effect. Imagine a butterfly in a forest. It flies a couple of centimetres to a nearby flower. Does it matter? Would the weather be any different in six months time if the butterfly had stayed where it was? A special branch of mathematics called chaos theory has been erected around this question, and the answer appears to be 'yes'. There is a programme about this on Radio Budapest in February, or you can see all about it on Internet. The Butterfly Effect Exhibition has a site at: **http://www.datanet.hu/index.html** You will find Radio Budapest broadcasting to Europe between 2000 and 2030 on 3.975, 5.970, 7.250 and 9.835MHz as well as 2200-2230 on 3.975, 5.935, 7.250 and 9.835MHz. Lawrence Mason passed on a copy of *Contact*, the Newsletter for the World DX Club, a club that caters entirely for the broadcast listener. Starting with Albania and ending with Zimbabwe it gave more than three A4 sides to snippets of information about the broadcasting in that country - where a station has changed frequency, which stations have reactivated and so on. Then came pages and pages of short wave station reported by members in the previous month. As it is a club newsletter, they don't have the lead times that international magazines like *SWM* have, so they can tell readers about changes in the broadcast world very quickly. The rest of the newsletter was taken up with medium wave listings, articles and news stories as well as the usual adverts. Excellent reading for the broadcast listener. *Wavelengths* is a Shortwave Newsletter for Women, edited by **Nina Allen, PO Box 381766, Cambridge, MA 02238-1766, USA**. The eight-pages contained details of broadcasts on subjects that involve the international plight of women. Also it contained a book review on *Deep Sea 'Sparks'*: A Canadian Girl in the Norwegian Merchant Navy, several letters from members and an Editorial. Finally, I received the January copy of *Monitor* from the International Short Wave League. This contain the usual mix of amateur and broadcast band reports, award details, contest results and interesting articles. **ISWL, 3 Bromyard Drive, Chellaston, Derby DE73 1PF**. It's been a good month for reading material, something for just about everyone. But if you regularly receive a radio newsletter I haven't mentioned, drop me a line and let me known the ones I haven't read yet.



COMMUNIQUÉ

Solar Storms Linked To Disruptions On Earth

New findings, beneficial to the telecommunications and power industries in preparing for huge geomagnetic storms, were the topic of a press briefing held February 15, 1996, at NASA's Jet Propulsion Laboratory (JPL), Pasadena, CA. The briefing was carried live on NASA TV, with two-way question-and-answer capability from participating NASA Centres.

The findings are the result of data from the Japan/U.S. Soft X-Ray Telescope on board the Yohkoh spacecraft and studies from the power industry. The findings presented at an international gathering of solar physicists, power and utilities representatives and members of the Department of Energy national laboratories, at JPL and sponsored by the American Geophysical Union and the National Science Foundation.

Participants in the briefing were Hugh Hudson, University of Hawaii; John Kappenman, Minnesota Power; Douglas Hamilton, University of Maryland. Bruce Tsurutani, JPL, moderated.

Among the significant results reported:

* Scientists using data from the Yohkoh satellite have been able to draw a direct link between a dimming process occurring in the Sun's corona which results in huge flares causing electrified particles to wash over Earth. Scientists predict they can now provide as much as 50 to 70 hours advance warning of these solar storms. That warning can give industries time to prepare vulnerable systems for the solar storm.

* The power industry has been able to directly link major geomagnetic storms with severe disruptions at power plants from Maine to California. This correlation could allow the industry to monitor the beginnings of storms on the Sun and prepare transmitters and power grids for the onset of these storms on Earth.

* Ionised oxygen is the culprit in creating huge energised rings in Earth's ionosphere just before the onslaught of a geomagnetic storm. Knowing the composition of these highly energised rings is allowing scientists to better understand when they occur in the 11-year solar cycle and to anticipate periods of high energy activity.

* Understanding the nature of very high energy electrons will allow engineers to safeguard future spacecraft in high radiation environments with better protective shielding.

NASA is also a participant in the International Solar-Terrestrial Physics (ISTP) programme, involving a number of satellites which will help scientists better understand the Sun, leading to the ability to predict and provide advance warning of solar storms affecting the Earth. A launch in the series is NASA's Polar spacecraft was scheduled for February 22.

PRO-60 Arrives

The latest of many recent new models from Realistic. The receiver features triple conversion architecture in an attempt to eliminate i.f. image spurii problems. The frequency coverage is 30-512 and 760-999.9875MHz. Modes available are a.m., n.b.f.m. and w.b.f.m., switchable on and frequency. Scan and search rates are a healthy 25 and 50 steps per second respectively.

A battery concious power save mode is incorporated, and the scanner can be powered by dry cells, NiCads, an external 9V supply or from a 12V vehicle supply.

The PRO-60 is supplied with antenna, belt clip, and manual. Retailing at £269.99 it and the rest of the Realistic range are available from **Link Electronics, 216 Lincoln Road, Peterborough PE1 2NE. Tel: (01733) 345731, FAX: (01733) 346770.**

Radio and TVDX News

The French 'AB Channel 1' now downlinking on Eutelsat II F1 @ 13°E offers a family entertainment format and will during Spring 1996 enter the digital compression domain with at least ten more specialist channels intended for domestic reception (DTH). The Canal Satellite (Canal Plus) and TF1/France TV (HyperTV) programme packages will both be on-air during 1996 using Eutelsat capacity. Luxembourg's CLT have backed away from entering the French digital DTH market on their own behalf and are considering joining the Canal Satellite package.

MPEG compression is now used by Sweden's SVT-2 on the Tele X 5 East satellite, having now ceased analogue transmission - and the 0.6 West TV SAT blew two (out of five) of it's onboard transponders. TV+Norge moved to 12.055GHz left hand circular and Denmark's Kanal 6 has moved onto the more stable Intelsat 702 @ 1°W 11.678GHz horizontal.

The EU has loosened its grip on home produced TV material, previously 50% of channel content was European produced, now the directive has been rephrased to encourage use of home grown material wherever possible - enter more US made programmes!

America's ABC is linking with NBC and News Corporation (Rupert Murdoch) to launch their own 24 hour international news channel, based in New York and to rival the CNNI news channel. ABC argue that CNNI is moving 'to the left' where-as the new channel will be 'truly objective'. Rupert has recently gained permission to downlink his own satellite programming into mainland China. The ABC news group hope to be on-air late 1996 - the estimated running costs will be $65 million annually.

Cologne based RTL intends opening an unscrambled German language 24 hour news channel Summer 1996 in conjunction with other German national broadcasters, using RTL's own public affairs/ news unit.

Rupert Murdoch's Star TV operation via the new AsiaSat-2 bird reckon to be on-air with digital programming from early April onwards building up to a 36 digital channel package. Star also open a Philippino biased channel package - the first being Viva Cinema! A Japanese language Star programme opens April 1st (!) called Star Plus including music, sports and general entertainment. July sees a 24 hour Bahasa language movie channel open intended for Indonesia. Other regional channels to open are Star Chinese Taiwan (March) and a Hong Kong (Cantonese) channel (May), subject to local authority approval.

The Serbo-Croat transponder lease on Eutelsat II F4 @ 7°E (11.178Ghz Hor.) is being sublet to the UK's Global Access Telecommunications Services (GATS) for two years offering give GATS pan-European capacity for EBU contribution, news and outside broadcast feeds. GATS also book time on both PanAmSat and Orion, the former accessing the new PAS-4 68°E bird via the BTI Martlesham site into the GATS Singapore office.

The Malaysian MEASAT-1 is now testing from the 91°E slot having launched successfully January 9 via Ariane. A 20 channel package will open mid July including Star TV, HBO, Discovery, CNNI and several as yet un-named Malaysian channels - transmissions will be in C-Band via 12 transponders and five Ku-Band spot beams centred onto Malaysia for digital transmissions using 500mm dishes. The Ku beams can be reconfigured to focus into India and the Philippines. MeaSat-2 launches Autumn 1996 and will act as backup to MeaSat-1, loaded with six C-Band and ten Ku-Band spot beams transponders, these capable of alignment onto Vietnam, Indonesia and Queensland.

A new satellite pay-TV sports channel opens September 1, a partnership between Danish Radio (DR); the commercial channel TV-2 and Tele Danmark. Exclusive rights have been signed for national soccer and European Cup matches. Intelsat 1°W will downlink the service via Nordic Satellite Distribution (NSD) who also provide subscriber management services.

A new arrival to Eutelsat's 13°E Hotbird 1 is the Italian 3rd national channel RAI-3 transmitting full time in the clear at 11.530GHz vertical, joining the established RAI-1 and RAI-2 services.

A press release from Intelsat advises that the launch of Intelsat 708 failed seconds after lift-off from the China Great Wall Industry launch site February 14. The satellite, rocket and launch was fully insured. An investigation will attempt to discover the cause of failure - the first major failure for Intelsat in ten years. One report suggests that the Long March rocket launched sideways!

COMMUNIQUÉ

National Transmitter Scene

Television Stations

January 8 Tummel Bridge and Carie, Perthshire, two new television stations opened after a period of test transmissions.

Provided jointly by the BBC and NTL on behalf of the ITC, the relays are designed to bring good television including teletext to about 555 people in Tummel Bridge, Kinloch Rannoch and the eastern most part of Loch Rannoch.

The relay broadcasts with vertical polarisation towards Cheese Bay, but with Horizontal polarisation to other areas.

Station Details

Tummel Bridge

Channels:	BBC1 (Scotland)	39
	BBC2	45
	ITV (Grampian)	49
	Channel 4	42
Antenna Group:	B	
Polarisation:	Vertical	
ERP:	100W	

Carrie

Channels:	BBC1 (Scotland)	21
	BBC2	27
	ITV (Grampian)	24
	Channel 4	31
Antenna Group:	A	
Polarisation:	Vertical	
ERP:	100W	

December 21 Lochmaddy, North Uist, a new television station was open after a period of test transmissions.

Provided jointly by the BBC and NTL on behalf of the ITC, the relay is located on a mast about 1km north east of Lockportain. It is designed to bring good television and teletext to an additional 470 people in Lochmaddy, Lochportain, Blashaval and Cheese Bay on North Uist; and to Borve and Bays Loch areas of Berneray.

The relay broadcasts with vertical polarisation towards Cheese Bay, but with Horizontal polarisation to other areas.

Station Details

Channels:	BBC1 (Scotland)	22
	BBC2	28
	ITV (Grampian)	25
	Channel 4	32
Polarisation:	Horizontal and Vertical	
Antenna Group:	A	
ERP:	40W H	
	4W V	

November 28 Nantyglo, Gwent, a new television station was opened after a period of test transmissions.

The station has been built jointly by NTL on behalf of the ITC and the BBC, the relay is designed to bring the possibility of improved reception to an about 300 people in a small area around the recreation ground in Nantyglo.

To take advantage of the new station views will need good quality antennas directed towards the relay which is located close to Waun Ebbw Road. Existing antennas aligned on other stations may be the wrong group, if so they should not be used.

Views wishing to use this new relay should consult a local TV dealer. Reception advice is also available from Edward Trickett, Information Engineer Wales or ITC Engineering.

Engineering Information Officer Wales
BBC Broadcasting House
Llandaff
Cardiff CF5 2YQ.

Station Details

Channels:	BBC1 (Wales on 1)	57
	BBC2 (Wales on 2)	63
	HTV Wales	60
	S4C	53
Polarisation:	Horizontal	
Antenna Group:	C/D	
ERP:	125mW	

December 6 Moss bank, St. Helens, Merseyside, a new television station was opened.

Provided jointly by the NTL on behalf of the ITC and the BBC , the relay is located on a 17m mast about 600m south west of the centre of Moss Bank. It is designed to bring good television, NICAM and teletext reception to an additional 1000 people in Moss Bank. This includes parts of Scafell Road, Moss Bank Road, Victoria Avenue, Queensway, Kingsway, Africander Road, Bassenthait Avenue, Lorton Avenue, Hillbrea Avenue, Sivverdale Grove, Devoke Avenue, Fell Grove, Buttermere Avenue, Windermere Place, Windermere Avenue, Rydal Grove and Coniston Grove.

Station Details

Channels:	BBC1 (North West)	21
	BBC2	27
	ITV (Granada)	24
	Channel 4	31
Polarisation:	Vertical	
Antenna Group:	A	
ERP:	1.25W	

January 12 Whaley Bridge, Derbyshire, a new television station was opened.

Provided jointly by the BBC and NTL on behalf of the ITC, the relay is located on a mast about 100m north of Whaley Bridge. It is designed to bring good television and teletext to an additional 250 people in Canal Street, Bingswood Road, Bridge Street, George Street and Woodbrook areas of Whaley Bridge.

Station Details

Channels:	BBC1 (North West)	39
	BBC2 (North West)	45
	ITV (Granada)	49
	Channel 4	52
Polarisation:	Vertical	
Antenna Group:	B	
ERP:	1W	

January 18 Blackburn, Rotherham, a new television station was opened.

Provided jointly by the BBC and NTL on behalf of the ITC, the relay is located on a mast near Droppingwell Road, Blackburn, Rotherham. It is designed to bring good television and teletext to an additional 340 people in Blackburn, including Barber Wood Road, Kirkstead Road, Thundercliffe Road and Baring Road.

Station Details

Channels:	BBC1 (North West)	57
	BBC2 (North West)	63
	ITV (Granada)	60
	Channel 4	53
Polarisation:	Vertical	
Antenna Group:	C/D	
ERP:	2W	

February 15 Widecombe in the Moor, Devon, a new television station was opened.

Provided jointly by NTL on behalf of the ITC and the BBC , the relay is located on a mast about one mile south east of the centre of Widecombe in the Moor. It is designed to bring good television and teletext to an additional 210 people in the village.

Station Details

Channels:	BBC1 (South West)	40
	BBC2	46
	ITV (Westcountry)	43
	Channel 4	50
Polarisation:	Horizontal	
Antenna Group:	B	
ERP:	10W	

New BBC FM Transmitters

February 15 Penaligon Downs, Cornwall, a new station now brings good f.m. radio reception including stereo, to an extra 5900 people in Bodmin, Wadebridge and surrounding area over a radius of about 8km

The station is located about 4km west of Bodmin, it entered full service after a period of test transmissions.

The antenna is vertically polarised and radiates 200W e.r.p. Frequencies are: Radio 1 98.4MHz, Radio 2 88.8MHz, Radio 3 91.0MHz and Radio 4 93.2MHz.

Hoka Appoints New Distributor

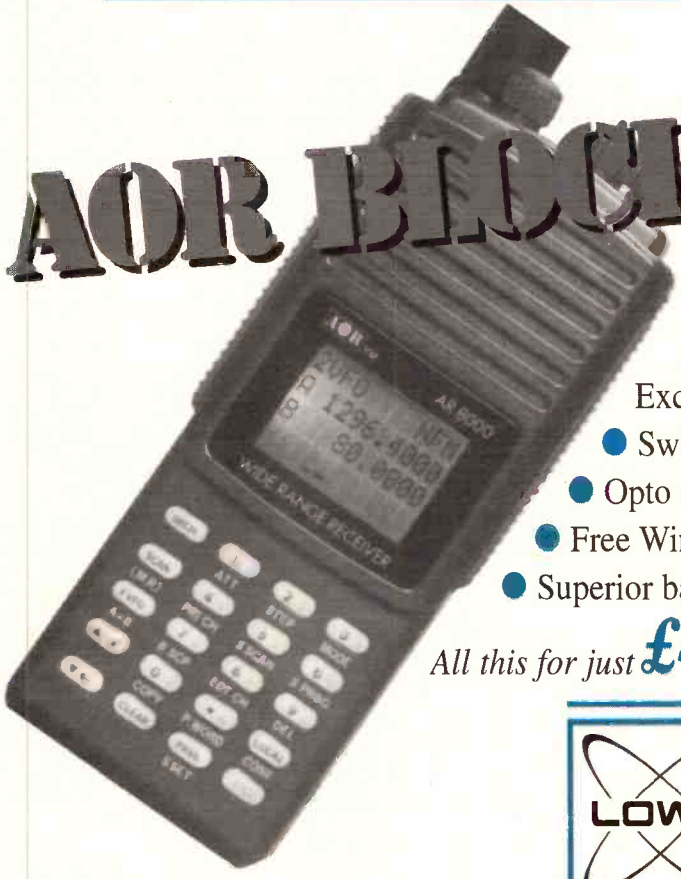
Hoka Electronics, the leading European datamode decoder specialist, are pleased to announce that Multicom 2000 have been appointed as distributers for the newly expanded range of decoders.

Hoka are expanding the sales network for their range due to the demand for the newly announced 'Code3 Gold' product - aimed at both the v.h.f. and h.f. datamode enthusiasts.

Multicom 2000 the St. Neots based company commented, "we are very please to include the Hoka range in our portfolio. We see the introduction of the Code3 Gold as a very significant move in the high performance decoder market."

Multicom 2000 can be contacted at **Radio House, 37 Cunningham Way, Eaton Socon, St. Neots, Huntingdon, Cambridgeshire PE19 3NJ. Tel:/FAX: (01480) 406770.**

Lowe Elect



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LSA1300 Discone 25-1300MHz	**£59.95**
LSA1500 Vertical, 25-1500MHz	**£37.95**

SCANNER BOOKS

UK Scanning Directory	**£17.50**
Scanning Secrets	**£16.95**
Airband Radio Guide by G Duke	**£5.99**
Scanners 3	**£10.95**
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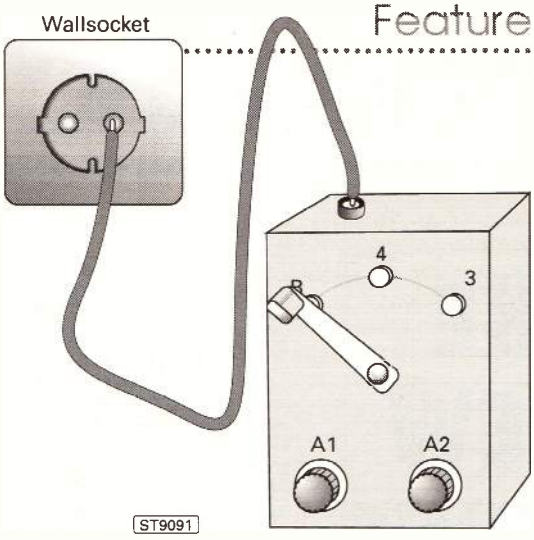


High cost miraculous cures are nothing new for antenna problems. Jürgen F. Hemme HB9ANR takes a look at a 1943 solution that cost him dearly.

Our old Mende receiver (a tuned radio frequency, model E38G), wasn't much of a radio. Even a new output valve, (RES164, 1.1W), and the separate, concert-type loudspeaker, where you adjusted the position of the cone and its magnet with a knurled brass knob, didn't help.

There must have been an antenna once, before my time. A painted over piece of wire between window and radio was all that was left - and that probably just wasn't enough.

My father did not think much of these new-fangled gadgets. Being a bank manager, he stuck to his newspaper and the pages of economics rather than maltreating his ears with feedback howls and whistles. However, we had a working telephone, which was used in the manner of those times, that is rarely, almost reluctantly and for brief messages only.

I loved to open our radio by flapping out the chromium-plated levers on both sides, then pulling up the top. Three bright radio valves dominated the scene. A coil in a large copper cylinder, a wire-wound dropping resistor for the filament and, above all, a penetrating Bakelite smell gave this model a particular aura.

Humming & Snapping Noises

When the mains plug in the wall outlet - polarity marker on top (d.c. mains!) - and the hefty toggle switch on the front panel set in position 'EIN', very soon this apparatus would soon start humming and the speaker would make a snapping noise when the feedback control ('reaction') was turned up.

As for the hum, the local power system was responsible, my father had been told. As for me, I wanted the set to work properly and I was keen on receiving distant stations. Thus, I was always on the lookout for anything to do with radio.

I spotted an advertisement in my mother's *Illustrated Journal*: "Satisfied Radio Listeners rely on our Little Wonder Mains Aerial. Also, you can enjoy radio programmes from far away - without a costly outdoor aerial! Only RM 17.50 by mail order, W. Wunderlich, Berlin W.57. Patents pending."

A tiny parcel from Berlin on the kitchen table awaited me on my return home from school. Contents: a match-box sized grey apparatus with a three position lever switch, a terminal for the connection to the radio's antenna input and a flimsy wire to be plugged into the power line output.

Deep Disappointment

Flushed with excitement, in no time I had the magic box connected up. Then, joyful expectation turned into deep disappointment. I only recall that: nearby Radio Hamburg was all I could hear - and that was weak. All my plugging and switching did not help.

Help came from Hähnchen, my school mate, whose parents owned fishponds with carp and kept chairs and tables in their garden for weekend excursionists on bicycles who loved the two-cottage village of Pieperhöfen.

"Why don't you ask Dietrich G., he knows everything", Hähnchen advised. And this was how I got to my first teacher. (But that is another story).

An air-cored coil, scramble-wound and a shabby paper-capacitor was all that was to be found in my Little Wonder box. Dietrich, the expert, had carefully lifted the carton cover glued onto the rear, while murmuring about the pressed camel dung.

Latest Creation

Along the way I learned that a power line was neither antenna nor ground, nor both properly. He mentioned the term 'counter poise' and the hazard of fumbling with the mains' 'phase'. I listened to all his words with great respect.

Looking out of the window of his spacious study, a lofty pear tree stood out with an antenna wire tied to its uppermost branch and leading directly onto Dietrich's workbench. The master, now wearing a white laboratory coat, demonstrated his latest creation. A superheterodyne receiver using 'red' valves (1.26W filament power, Philips/Tungsram low-power design).

Came To Life

The set came to life suddenly, station after station tuned in like beads on a string after he had connected his antenna to the radio. With the 'Little Wonder' in my pocket, I cycled home deep in thought. I must have tried it again several times. Illusions die hard!

Even much later, spectacular antennas have never quite worked as well as expected. But, hope always revives, in spite of painful experiences with that mains antenna. ■

News Extra

Two New HF Receivers from AKD

Filter and accessory manufacturer AKD have announced that they are developing two new h.f. communications receivers ready for an autumn launch.

The first of these is a fully synthesised receiver with a phase lock loop v.c.o. to give stable and accurate signal reception. The frequency coverage will be continuous over the range 30kHz to 30MHz with u.s.b., l.s.b. and a.m. modes. Two filters will be provided - 6kHz and 4kHz and a quasi synchronous demodulator will be used. The ex-works target price is £160 including VAT.

The second set is aimed at the more discerning listener and, although based on the lower priced model, has some interesting extras. For a start it will be already to accept the optional AKD computer interface to enable the receiver to be controlled from a PC. Other extra features include 100 user programmable memories and a data output socket on the rear panel for FAX, RTTY, etc. The ex-works target price for this version is £210 including VAT.

Short Wave Magazine is looking forward to reviewing both of these receivers just as soon as AKD can let us have samples.

In the meantime, further information can be obtained from:
AKD, Unit 5,
Parsons Green Estate,
Boulton Road, Stevenage,
Herts SG1 4QG.
Tel: (01438) 351710. ■

COMING THIS YEAR

You can look forward to the following special themed issues with your favourite radio read.

Antennas
We would be stuck without them. Not everyone has space for them. What is the ultimate? Read this issue and discover more!

Airband
Godfrey Manning takes a looks at interesting matters airborne, airfield and Navaid.

Broadcast
In this issue we concentrate on the world's short wave entertainment and information media.

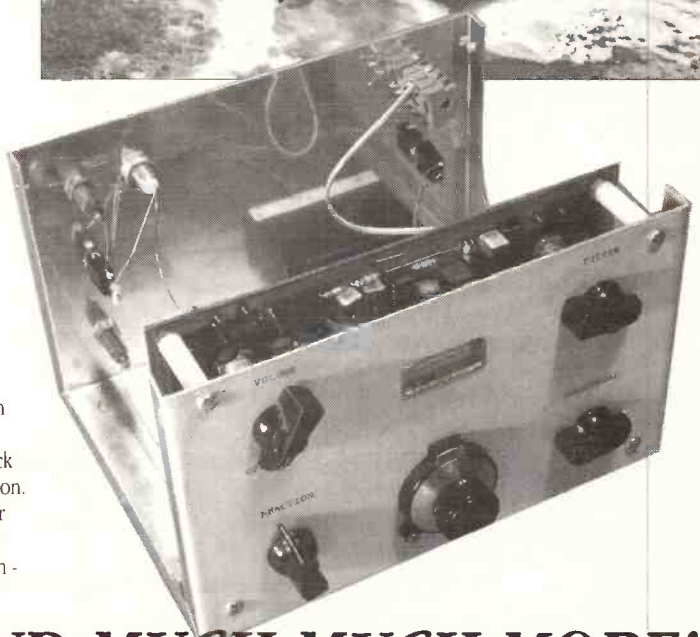
Utilities
Military comms, FAX and RTTY are the flavour of this special.

Numbers Stations
Spy station around the globe, who runs them, what function do they perform, how do they work? Find out more in *SWM*.

WXSATs
There are many WXSATs orbiting our blue planet. Lawrence Harris takes a look at the fascinating pictures available space.

Projects and Kits
Thought about building one yourself? It can be much more rewarding than just buying a ready made piece of kit. Look no further for inspiration and guidance.

The above is a bit of fortune telling and as we are not Mystic Meg it may well change.



Next Month our May Issue brings you

- British Radio History revisited with The Colossus Rebuild Project
- George Wheatley take GPS further.
- John Wilson concludes his Filters in Receivers.
- The Scanning Alternative - Ben Nock looks at an easy on the pocket option.
- Part 2 of the Audio Signal Processor Project by Robert Penfold
- Second part of our star competition - WIN an AR7030

Contents subject to change.

..... AND MUCH MUCH MORE!

HAYDON COMMUNICATIONS

OPTOELECTRONICS

NEW OPTO SCOUT 3.1-Mk2

Latest mini frequency finder from Optoelectronics. It will capture and memorise up to 400 frequencies that can be recalled directly into the AR-8000. Supplied with ant, nicads and fast charger. This month we are giving away a free DB-32 ant and case worth £46

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SPECIAL OFFER £719

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The Cub is ideal for communication, surveillance and recreational monitoring applications. From 10MHz-2.8GHz. The Cub has maximised sensitivity for detecting RF in the near field and displaying the frequency detected. The cub features a digital filter that reduces false counts and random noise, digital auto capture that acts like an intelligent hold button allowing any frequency captured to remain displayed as long as needed.

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NEW DB-32

A Minature Wideband Antenna. Receives 30 - 1200 MHz. Transmits 2m/70cm, BNC fitting only 1.5" long its superb

RRP **£29.95** P&P £1

OPTO-SCOUT VIDEO

SEE BEFORE YOU BUY. SEND US £10 + £2 P&P AND WE'LL SEND YOU A SIX MINUTE VIDEO OF THE SCOUT IN ACTION. RETURN THE VIDEO AND WE'LL RETURN YOUR £10 OR ORDER THE SCOUNT AND **WE'LL DEDUCT £10 FROM THE PRICE**

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AOR PRICES SLASHED

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OUR PRICE **£349.95**

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Mobile holder for H/helds **£9.99**

P&P £2

QS-200 .....Air vent holder.....**£9.99**
QS-300 .....Desk Stand.....**£19.95**

TSA-6201

Superb quality ext speaker with volume control **£14.99** P&P £1

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Ideal for portable scanners. Swivel clip attaches to collar or lapel whilst carrying your portable on a belt clip.

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Boost reception of your scanner with this pre-amp. 25-1500MHz, variable gain, band pass filters.

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Fax: 0181-951 5782 ★ OPEN:- MON-FRI 10-6PM SAT 10-5PM ★

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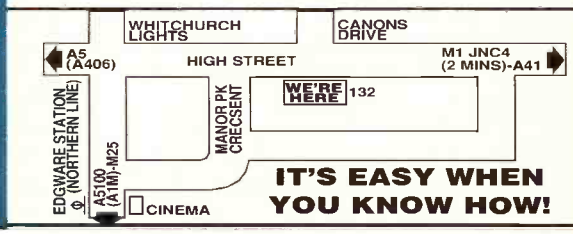

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~~RRP £699~~

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KENWOOD R-5000

~~RRP £1059~~

OUR PRICE **£929.95**

AOR AR-7030

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OUR PRICE **£749.95**

DIGITAL AUDIO FILTERS

TIMEWAVE DSP-59+

As recently reviewed, this is far the best "DSP Audio Filter" available. We've sold hundreds and have had nothing but good reports. Isn't it about time you cleaned up your shack?

RRP £299 OUR PRICE **£275**

DSP-9+ RRP £239.95 ..... OUR PRICE **£225.95**

Datong FL-3 ..... OUR PRICE **£149.95**

MFJ-784B ..... OUR PRICE **£239.95**

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This is a superb self contained antenna system for inside the house/flat. for better results you can even connect a longwire antenna to the rear. Don't miss out! Add one of these to your Rx (built in preselector) RRP **£79.95** P&P £4

Sony AN-1 active antenna complete system ..... **£64.95** P&P £6

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~~RRP £399~~

OUR PRICE **£349.95**

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Award winning minature SW receiver.

RRP £219.95

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ICF-7600G .... RRP £199 ..... **OUR PRICE £169.95**

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AT-2000 ATU with Q selector ..... **£95** P&P £5

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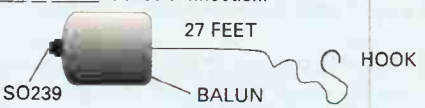
Passive (non-powered) desk or wall mount shortwave antenna. (0-30MHz) with a built in magnetic balun. OUR PRICE **£44.95** P&P £4

NEW SP-1 SPYWIRE

Ideal fo any receiver. Receives all short wave bands. All mode, no ATU required. Built in balun. SO239 connection.



OUR PRICE £24.95 P&P £3

SONY AN-71

Pull out and clip on compact short wave antenna. Boost the performance of your portable with one of these. **RRP £9.99** P&P £1

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SW receiver + airband.

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OPTO-SCOUT 3.1 Mk2

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HF-225	As new	£399.95	SW-7600	Immaculate	£139.95	MVT-7000	As new £229.95
FRG-100	Immaculate	£399.95	R-808	As new	£89.95	AR-1500EX	VGC £249.95
FRG-7	VGC	£189.95	SW-7600E	As new	£149.95	AR-1000	As new £199.95
FRG-7700	VGC	£299.95	SW-55	Immaculate	£229.95	HP-200	VGC £199.95
FRG-8800	VGC	£349.95	SAT-700	As new	£229.95	DJ-X1	As new £199.95
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R-5000	As new	£799.95	AR-2500	Scanner with SSB	£349.95	IC-R7000	Base station £749.95
R-71E	VGC	£599.95	PRO-2035	As new	£299.95	PRO-32	VGC £89.95
R-2000	As new	£399.95	PRO-2032	As new	£189.95	VT-225	Airband Rx £199.95
			Shinwa Scanner, mobile		£249.95	SW-100E	SW portable £169.95

Tape Aids For the DXer

A combination of a domestic timer plus a tape recorder can be a painless way of obtaining hard to get stations without straining marital relations. Dick Moon explains all.

We are living in an electronic age, which can be both a blessing or a curse. Our daily lives are governed by various types of timing devices which chime, beep or buzz at odd times of the day and night, dictating and controlling our progress throughout each 24 hours.

These digital clocks can be friendly when they turn on the coffee percolator or switch off you lights, or they can be terrorising when they go off at an unearthly hour on a cold winter's morning, as a reminder that another day at the office is imminent! There is, however, one friendly use which can be of great benefit to the s.w.l.

Timing Devices

Most VCRs have timing devices, which allow the recording or programs either in the early hours of the morning when you are in the land of dreams, or during periods away from home. Kitchen stoves can be set to switch on or off at predetermined times, ensuring that the roast is cooked to perfection! However, the DX enthusiast generally does not have these facilities.

With a little ingenuity and no expertise, this problem can be easily overcome by the use of an ordinary domestic timing switch. The type which switches on and off the lights when you are out, plus a tape deck or portable tape recorder.

Recording Material

Short wave propagation conditions vary continuously. Fading is very common on the m.w. band and the tropical bands are frequently subject to snap, crackle and pop, particularly during the summer months.

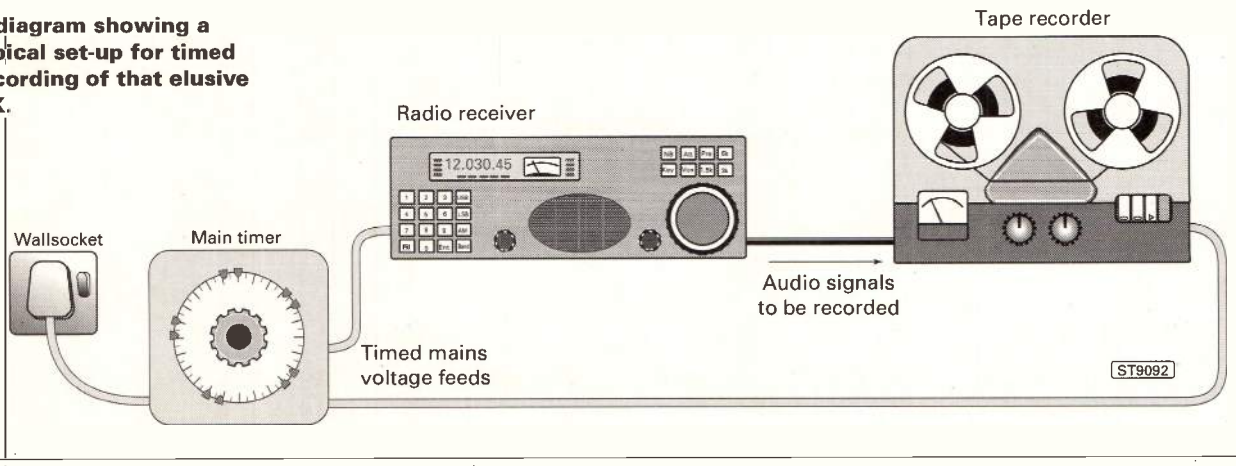
There is also an immutable law which states that all IDs, no matter when they are transmitted, must be accompanied by either fading or QRM. To overcome these little problem, many DXers already use a tape recorder to record the material. By replacing the tape several times, it is often possible to defeat this evil law and decipher the information required.

Recorders are often useful when two interesting programmes overlap. A simple solution being to record one while listening to the other. These methods, however, generally require the listener to be at the controls until the programme has finished.

Early Hours

Most DXers are well aware that too many hours spent in front of the receiver is a sure way of creating domestic disharmony and any way of preventing marital discord will be a great plus factor in the listeners favour. It is an unfortunate fact of DX life that most of the interesting and hard to catch stations are heard at their best during the early hours of the morning and to make matters worse, only during the winter months.

It is an enthusiastic listener indeed who is prepared to emerge from under the blankets in the middle of a cold and frosty night to try and identify Radio 'Whatsit' transmitting with a power of 1kW between 2300 and 0300UTC. This is where the introduction of one of the 'friendly' timing devices comes to the rescue, enabling programmes to be recorded and played back automatically at more favourable times. ■



A diagram showing a typical set-up for timed recording of that elusive DX.

The Barlow Wadley XCR-30 Receiver

Ben Nock continues his look at some of the older receivers that you may well find at rallies and junk sales up and down the country. This month the rather different Barlow Wadley XCR-30 is the subject of his ramblings.

The Barlow Wadley XCR-30 Mk II receiver, showing the set tuned to 14.300MHz. Note the f.m. unit on top with the frequency chart also being displayed.

The Barlow Wadley XCR-30 at first sight looks like a domestic transistorised portable, indeed, the Mk II version with its f.m. unit resembles one even more so. This first impression, though, belies the fact that the XCR-30 is quite a good communications receiver, small, light weight and even good enough so that it could be used with a transmitter for QRP operation for instance.

The XCR-30 tunes between 0 and 30MHz, though in practice, 1 - 30MHz is a better statement. The Mk II version has an added v.h.f. tuner, 87 to 108MHz, which sits on top of the set under the carrying handle.

The receiver has switched modes, u.s.b., a.m., l.s.b., has a 'clarifier' control and has an antenna peak control and a.f. gain control. A switch on the v.h.f. tuner connects to a.f. output of the v.h.f. tuner to the receiver audio stages whilst disconnecting the h.f. set.

The built-in 760mm telescopic whip antenna is quite effective for most listening and it is quite surprising just how many signals can be heard on it. It is fully tilt and adjustable for f.m. use as well. Although there is provision for plugging in an external antenna to the set, this does degrade the performance on some frequencies due to excessively strong signals.

Receiver Operation

The receiver has the same sort of tuning as the Racal RA17 type receiver, in fact the basic operation of the set is the same as the RA17. Two tuning controls are provided, with one knob tuning in 1MHz steps, the other knob then providing the tuning between 0 and 1000kHz. In this way the entire spectrum between 0 and 30MHz is covered.

The nice thing with this form of tuning is that the tuning ratio, that's the amount of frequency covered for one turn of the tuning control, is the same for all frequencies. The more usual tuning methods usually have one band covering perhaps 1.5 to 4MHz, a coverage of 3.5MHz for the full tuning range and another band, say 14 to 30MHz, now some 16MHz for the full tuning range. This means that the tuning of the higher bands, 20, 18, 15 and 10 is usually very sharp. No such problem with the Barlow Wadley.

The tuning is quite accurate and drift free. The main principal of operation was devised by Dr Trevor Wadley, a South African who during the war worked at the TRE Malvern (later known as RSRE and then DRA), the system being known as the Wadley Loop.

The principal of the Wadley Loop is complicated but a basic description is that a crystal oscillator is used to provide an accurate reference signal. This signal is used to produce harmonics. A free running

Continued on page 20

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DSP-9 PLUS - VER. 3.03E

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- **NOISE REDUCTION** - The noise reduction functions of the DSP-9+ operate by examining a characteristic of signals & noise called correlation, & dynamically filtering out the undesired noise. The degree of correlation is relative. Random noise such as white noise or static is uncorrelated. Speech is moderately correlated. Pure tones such as heterodynes are highly correlated. The DSP9+ measures correlation & automatically filters out noise that is outside its correlation thresholds.
- **BANDPASS FILTERS** - Data signals like CW, RTTY, AMTOR, PACTOR and HF Packet require bandpass filters with steep skirts and linear phase response. Linear phase response maximises the usable signaling rate for a given bandwidth, and minimises ringing often heard on other types of extremely sharp filters. The filter skirts on the data filters are so steep that a signal literally falls off the edge of the passband as you tune through a data signal. Both data and SSB signals often have a high signal-to-noise ratio but have interference from other signals that overlap the desired signal. The steep skirts of the bandpass filters allow the interference to be eliminated with minimal impact on the desired signal.

~~£239~~ **£199**

- **EASY OPERATION** - Front panel pushbutton switches enable quick, independent selection of all the functions on the DSP-9+. In the voice mode, the operator can simultaneously select a bandpass filter, the tone notch filter and the random noise reduction filter. This means you can reduce QRN, filter adjacent channel QRM and eliminate heterodynes at the same time! In the CW mode, simultaneous selection of both the random noise reduction filter and a bandpass filter reduces background hiss as well as adjacent-channel signals. AGC (Automatic Gain Control) is selectable in all modes.

TIMEWAVE

DSP-59 PLUS - VER. 3.04

ALL TIMEWAVE ARE NOW CE APPROVED

- **DELUXE DIGITAL FILTER**
- **555 FILTERS COMBINATIONS**
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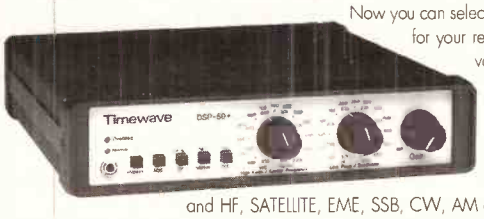

Now you can select precisely the best combination for your reception needs. With 555 filter variations, the unique DSP-59 has filters for all operation modes the amateur may encounter including all the usual data modes such as RTTY, SSTV, AMTOR, PACTOR and HF, SATELLITE, EME, SSB, CW, AM and weak signal VHF DX. The easy turning filter control knobs allow continuous coverage of all combinations. Voice filters cover ranges from 200hz to 3.4khz, 13 CW centre frequencies and CW bandwidths from 25hz to 600hz, together with a CW marker to spot the centre of narrow filters. This filter is a must for any serious operator.

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The most powerful noise and QRM filter in amateur radio

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- Wideband for AM and FM
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- Hyperspeed DSP - 27 ns. fast!
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- Visible Memories™ - instant recall
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We have so many new features with the DSP-599zx advanced hardware platform and LCD alphanumeric display, you'll need to call or visit to get all the details.

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ICOM R71E	NICE EXAMPLE	£595
ICOM R72E - INC FM/FILTER	INT/BAT PACK	£755
ICOM R7000	ALWAYS IN DEMAND!!!	£599
JRC-525 - INC/FILTERS	EXCELLENT RX	£725
JRC-515	+ MEM UNIT CLASSIC	£499
KENWOOD R-1000	GOOD STARTER RX	£325
KENWOOD R-2000	+ VHF CHOICE FROM	£425
KENWOOD R-5000	INC/FILTER(SSB)	£725
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YAESU FRG7700	PLENTY IN STOCK FROM	£299
YAESU FRG-8800	+ VHF	£525
YAESU FRG-100	+ KEYPAD + I/FACE	£499

SCANNERS

ALINCO DJ-X1	NICE CONDX BOXED	£275
AOR AR2700	EX/DEMO	£245
AOR AR1000	BOXED	£175
AOR 1500EX	GOOD VALUE	£185
AOR AR3000	WIDE COVERAGE	£595
AOR AR3000A	NICE EXAMPLE	£655
AOR AR2002	MINT CONDX	£195
BEARCAT BC220XLT	NEW MODEL	£159
BEARCAT 220	BASE - CHEAPIE	£85
BEARCAT 580XLT	MOBILE	£125
BEARCAT 200XLT	200 MEMS	£135
BEARCAT 890XLT	BASE - AS NEW	£215
FAIRMATE HP100E		£169
FAIRMATE HP2000	GOOD COVERAGE	£185
JAGUAR III	WORKS WELL	£135
REALISTIC PRO-37		£125
REALISTIC PRO-2032	BASE	£179
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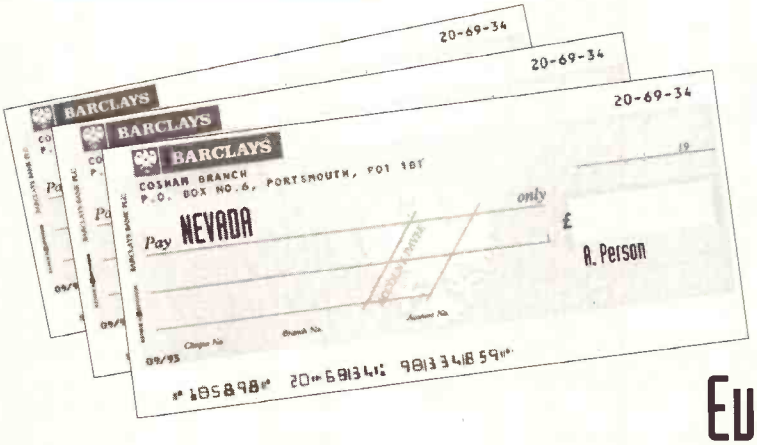

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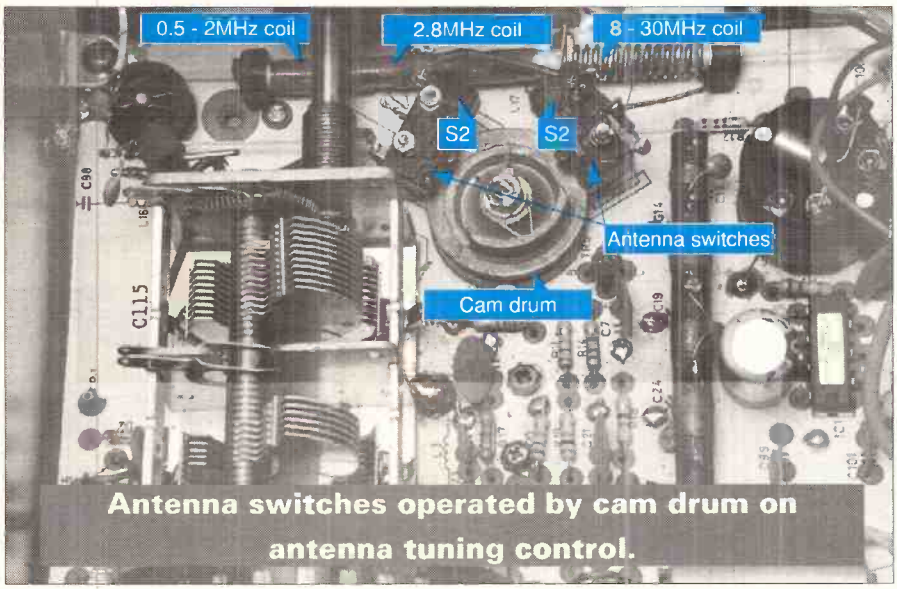


Antenna switches operated by cam drum on antenna tuning control.

Fig 1: The cam and switches used in the r.f. stage

oscillator is mixed with the antenna signal to give a high (45MHz) first i.f. This free running v.f.o. is also mixed with the harmonics from the crystal oscillator, filtered and then mixed for the second time with the now high i.f.

This gives a much lower second i.f. A second v.f.o. now mixes yet again with the 2nd i.f. to give the final 3rd i.f. with is then demodulated and the audio recovered - I told you it was a complicated system.

The First v.f.o., the 1st and 2nd mixers, the crystal oscillator and harmonics, all go towards producing 1MHz slices of the spectrum. Those 1MHz slices are then tuned by the 2nd v.f.o. which produces the standard 455kHz i.f. for further processing.

The way the first v.f.o., running around 40 to 60MHz, is used means that it need not be super stable. In fact a high limit of plus or minus over 100kHz is acceptable and has no effect on the received signal stability.

One note of interest from the 60s period is the story that Eddystone, along with other major receiver builders of the time, turned down the Barlow Wadley loop principal when offered it. The only company to pursue the design was Racal, and we all know the outcome of that wise decision.

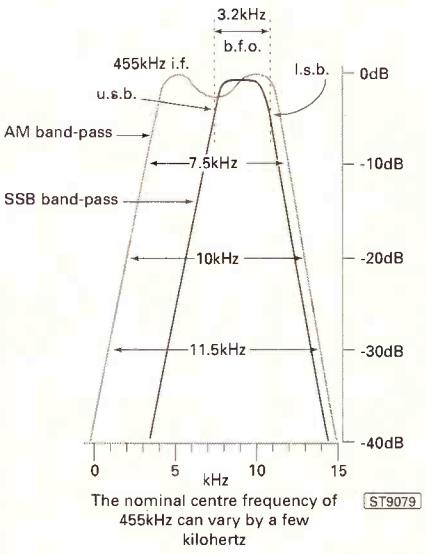
The r.f. amplifier stage has the novel feature that as the tuning control is rotated, not only does this slide a core within the antenna coils using a pulley system but, at preset positions, it switches between the different coils, three in all, using a small cam operating on microswitches.

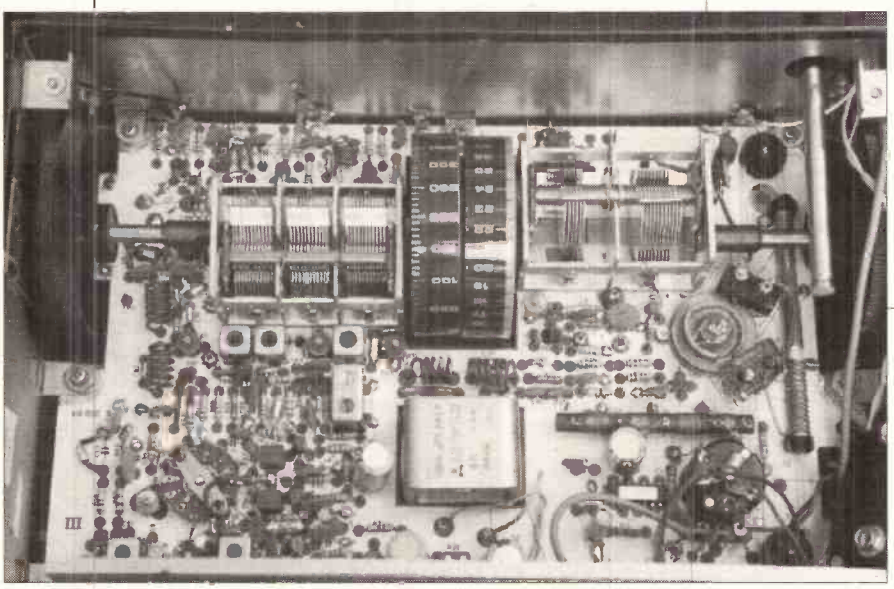
In the field

The set is powered by internal batteries, six 'D-cells', though an external supply can be used. As I mentioned, the set has a built-in whip and the case houses a single round loudspeaker.

Tuning around the bands is quite easy. The large thumbwheel type tuning knobs are a bit different to the usual style but are no more difficult to operate. The preset u.s.b. and l.s.b. positions on the mode switch make for easy tuning of single sideband

Fig 2: The i.f. filter characteristics of the XCR-30 showing both a.m. and s.s.b. curves.





Inside the XCR-30, r.f. tuning on the right, v.f.o./mixer/i.f. tuning on the left, a.f. output bottom right. The batteries are carried in a holder on the back cover (lifted away in this shot).

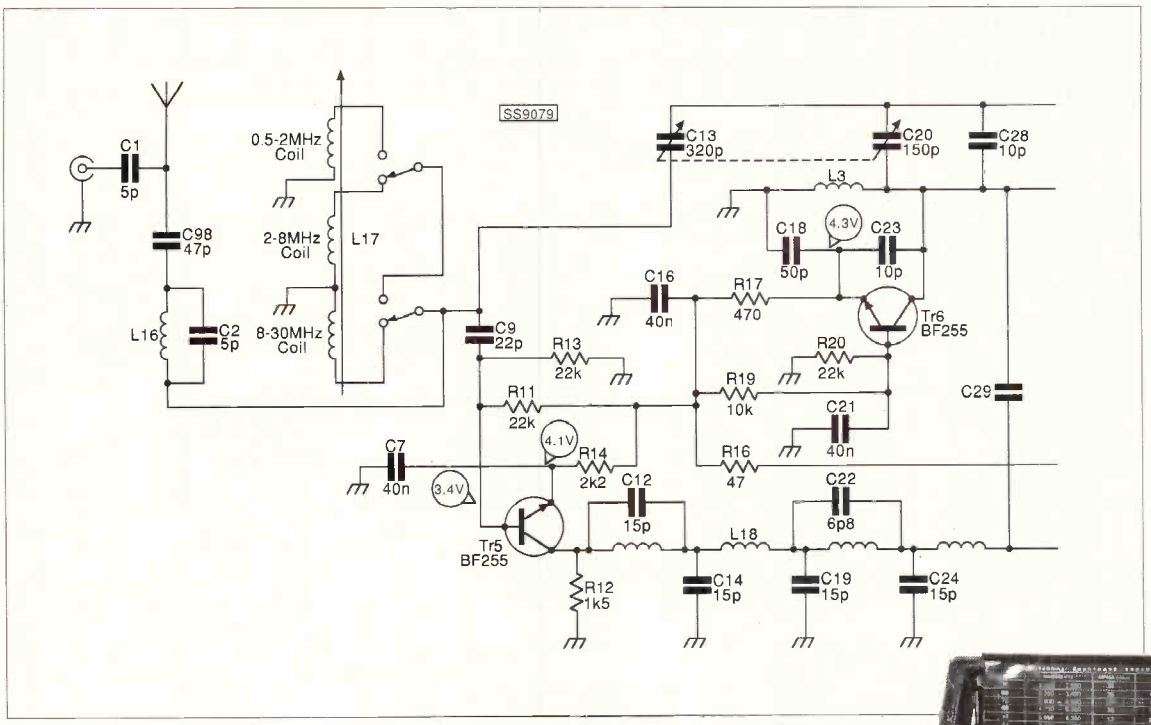


Fig 3: A portion of the circuit diagram showing the antenna switch details.

stations, always assuming you switch to the right one for the appropriate band that is!

The small 'S meter' is quite lively, and is useful for peaking the antenna tuning, though a small light, both in the meter and the main dial, would have been nice for late night tuning around.

Add-on f.m. for the Mk II

As stated earlier, the Mk II version of the XCR-30 has a built-in mono f.m. tuner. The tuner is self-contained with the exception that the main battery p.s.u. is still used and that the a.f. output is passed to the XCR- 30 main output stage. Controls are a single push button on the f.m. unit switching between the h.f. set and the tuner and a separate tuning knob is also provided.

The single telescopic whip is also used to provide signal pick up for the f.m. unit and can be tilted and rotated to give best reception. An external f.m. dipole can be connected to the tuner to improve reception.

On top of the f.m. unit, under the carrying handle, sits a chart detailing the various commercial short wave and amateur bands, their wavelengths and frequencies. This is a useful *aid memoir* for those new to short wave listening. In all, this set is a very handy little receiver, ideal for taking on holiday to keep in touch with the bands. A small QRP transmitter would make an ideal accessory, creating a very useful holiday station. ■

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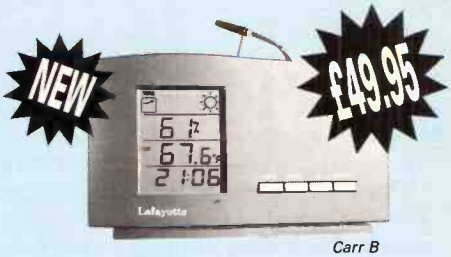

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Or

Filters in Receivers

I make no apology for often referring to the early history of radio, because it is only by getting back to the source material that many misconceptions can be corrected, leading hopefully to a proper understanding of the subject.

That way we should see an end to such printed statements as "*The discone aerial, originally from Japan...*" Really?, or "*Some radios have their sensitivity reduced in this part of the spectrum (Medium Wave) to help improve the blocking performance at higher frequencies*" - total nonsense founded firmly on ignorance, quoted from a recent publication (not by *Short Wave Magazine*, I hasten to add). In the certain knowledge that I will also transgress, I mention from time to time the FOUL Club, which is an invention of my own consisting of an informal group of those like myself (**F**ew **O**f **U**s **L**eft) who derive as much pleasure from reading and understanding circuit detail as we might from reading a good book. I rely on FOUL members to both keep me in line with the truth and provide snippets of information which I can include in future articles. There is no formal application procedure to join the Club, because those who qualify for membership know within themselves that they are kindred spirits and therefore self-qualifying.

Crystal filters come in a variety of shapes and sizes.

Here beginneth another of John Wilson's lessons, explaining, in simple terms to relative newcomers to the hobby of short wave listening, some of those topics which are commonly used, but often misunderstood.

A filter, by its very definition, is a means of separation: the classic school chemistry separation of solids from muddy water is carried out by filter paper - that is, something which will allow one constituent to pass whilst preventing another from doing so. A set of traffic lights with a filter arrow allows some vehicles to filter to where they want to go whilst restricting the flow of 'unwanted' traffic. In radio receiver terms, the spectrum of signals spreading all the way from a few kilohertz to tens of megahertz (since my observations stop at 30MHz - my acronym for my own attitude is NATTY - Nothing Above Thirty Thank You) can be compared to that mass of traffic approaching the lights, or for those of you who read my article on preselectors, the herd of buffalo approaching across the open plains. The object of filtering is to pick out the signal (or car, or buffalo) that you want and reject all the others, and in the earliest days of radio all the filtering was done at the frequency of the incoming signal.

The original crystal detector was wide open to anything which came down the antenna at any frequency, but since the only signal you were likely to hear was the local broadcast station it didn't much matter

about preselection (filtering). However, with the advent of the valve, which increased the sensitivity of the receiver and the increase in the number of stations broadcasting, some form of filtering one station from another became necessary, and this took the form of one or more tuned circuits between the antenna and the receiver.

As selectivity became more necessary and receivers became more complex, extra amplifying stages were added to the simple one valve t.r.f. (tuned radio frequency) receiver, all tuned to the frequency of the station you wanted to hear, in attempts to increase both sensitivity and selectivity at the same time. The main difficulty of this approach was that in order to obtain best performance it was necessary to have all the resonant circuits involved tuned exactly to the same frequency which meant that the user had several tuning controls to peak up every time the listening frequency was changed, or a multi-section variable capacitor had to be used which brought design problems in tracking all the tuned circuits over the frequency ranges involved.

A second problem was that if you had a multi-stage receiver with lots of gain, you also had, potentially, a very good power oscillator, and the slightest hint of electrical feedback from output to input caused the whole receiver to go into fierce oscillation at the frequency to which it was tuned.

Incidentally, unwanted electrical coupling along the shaft of a multi-section variable capacitor was often a prime cause of such instability, which is why such care was taken in providing multiple earthing 'fingers' along the shaft: go on, get a capacitor and take a look.

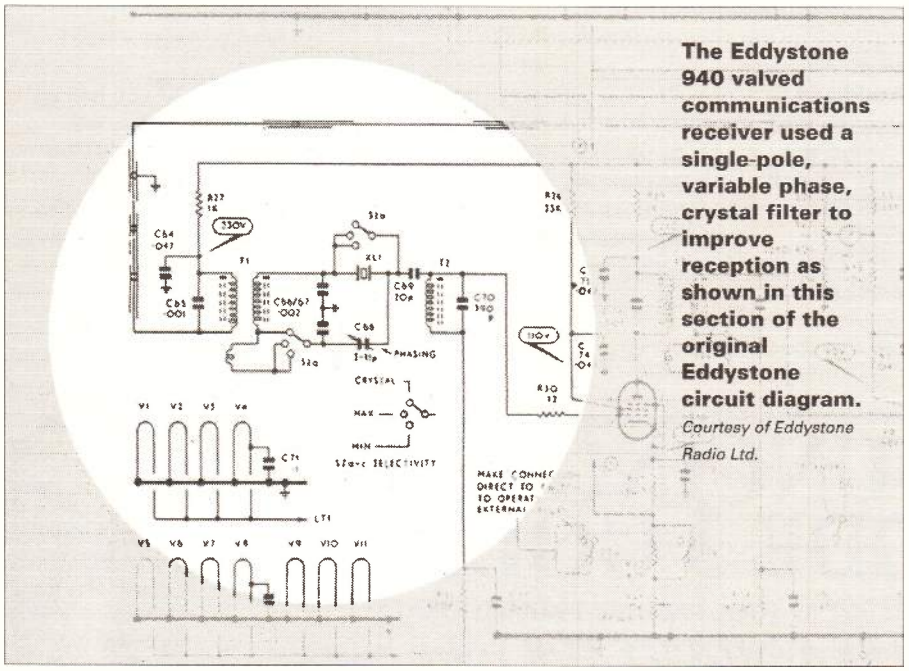
A third and more difficult problem was that tuning a receiver with a variable capacitor resulted in a change in the L/C ratio of the tuned circuits involved which meant that the actual selectivity of the receiver changed with frequency. This was serious enough when receivers were tuning lower frequencies in the medium and long wave bands, but was a major headache as wavelengths shortened, and a way had to be found to solve the problems.

Supersonic - and not a Concorde in sight

The solution was the invention of the superhet (a contraction of supersonic heterodyne) principle by an American, Major E.H. Armstrong. The term 'supersonic heterodyne' describes the method by which an incoming signal can be 'heterodyned' or mixed down (or up) to a fixed intermediate frequency (i.f.) at which all the selectivity can be achieved at a single frequency. References in the early 1920s (*Wireless Weekly*, November 28th, 1923, for example) described this '*desirable*' development and how it resolved the problems of providing selectivity between stations by having all the selective components operating at a fixed frequency. Members of the FOUL Club will be reminding each other that the superhet, whilst solving problems of selectivity also introduced other problems that still plague the receiver designer - but these can be covered as a separate topic. Someone will surely mention the direct conversion receiver, which is effectively a superhet with a zero frequency i.f.....makes your brain hurt doesn't it?

Intermediate frequency selectivity was initially obtained - and still can be - by tuned circuits, usually also providing inter-stage d.c. isolation in the form of i.f. transformers. As a simple rule, the more tuned circuits used the better the selectivity, and the higher the *Q* of each tuned element, the sharper the 'nose' of the selectivity peak. For narrow bandwidths all tuned circuits had to be aligned at exactly the same frequency, whilst broadening the selectivity could be achieved by 'stagger' tuning each element to a slightly different frequency around the nominal i.f. centre.

Many ingenious methods have been used to achieve variable bandwidth ranging from the electrical, such as 'pulling' the resonant frequency of each tuned circuit or electrically varying the coupling between them, to the mechanical as best exemplified by the Eddystone variable coupling i.f. transformers used for years and years in their receivers. However, selectivity derived from the use of tuned circuits tended to be limited by the attainable *Q* of the tuned elements and as early as the 1930s, receiver users, particularly radio amateurs were seeking better and better selectivity for their receivers. A landmark in design technique came with the publication in 1932 of articles by James Lamb, the technical editor of *QST* magazine in which he described (amongst many other things) the use of a crystal filter to achieve 'single signal' characteristics in the i.f. stages of a superhet receiver.



The Eddystone 940 valved communications receiver used a single-pole, variable phase, crystal filter to improve reception as shown in this section of the original Eddystone circuit diagram. *Courtesy of Eddystone Radio Ltd.*

"Worthy is the Lamb"

For you newer fellows, the crystal filter Lamb described, and which was incorporated into every serious communications receiver right up to the 1960s, was not

a little metal box containing multiple crystal elements labelled with a German or Japanese name, but a single quartz crystal effectively in series with the i.f. signal and made to have very narrow, but variable, passband characteristics by clever use of the pole and zero of the crystal in conjunction with a 'phasing' control sometimes brought out to the front panel - classically in the HRO receiver. This allowed a skilled operator to peak wanted signals (usually c.w.) whilst rejecting other unwanted signals alongside, and if you can watch such an expert at work, you will be astonished at how well the single crystal filter can make a signal stand out from all the noise and interference ... but not everyone is an expert, and many people simply don't want to be bothered to learn the techniques. I am indebted to a correspondent member of FOUL from Northampton for reminding me of lost skills.

Many receivers which incorporated a 'Lamb' filter did not have the phasing controls brought out to the panel but, instead, had a series of fixed components giving different bandwidths selected by positions on the bandwidth switch. A receiver of this type considered contemporary to the HRO (although its design was considerably later than the HRO) was the AR-88 in which the two broader i.f. bandwidths were achieved by changes to transformer coupling and the three narrowest bandwidths by inclusion of a single crystal filter. The operators of the AR-88, therefore, did not have to display the skills necessary to 'drive' the HRO, but neither did they achieve the ultimate performance from the filter. Perhaps the best late example of the single crystal filter was in the Hammarlund SP-600 which combined preset bandwidths on a switch selection, but retained the operator adjustable crystal phasing control on the front panel.

As Sophie Tucker might have said "Shape ain't everythin' Baby"

Even wringing the last drop of performance out of the single crystal filter could not cope with the demands of an increasingly crowded spectrum, and the main failing of this type of filter was that although it could provide narrow bandwidths at the 'nose', its ability to reject adjacent signals was not outstanding. As an example, the SP-600 has an i.f. bandwidth (using the crystal filter) of 3kHz at the 6dB points of the i.f. response but at 60dB, if the published curves are correct, this widens to 18kHz. In today's terms, this is quite

poor because there are many adjacent signals which could bounce through at the skirts of such a filter and cause serious interference to a wanted signal.

Shape Factor

The commonly used method of denoting a filter's performance is 'Shape Factor', which is simply the ratio between the bandwidth measured at the 60dB and 6dB points on a filter passband. Thus the SP-600 would have a shape factor of 18:3 or 6:1. By comparison a modern crystal filter could have a shape factor of 1.2:1 which tells you that its bandwidth at 60dB down on a 3kHz passband would be only 3.6kHz; quite a difference in the ability of a receiver to reject adjacent channel interference. Before you gallop off and choose a receiver by assuming that a lower shape factor is always better, just remember I've said before that every silver lining has a cloud, and simple quotation of shape factors may not make the receiver audio any more pleasant - but that's a more advanced story and not yet for the telling, although I'll give you a little hint by asking you why the audio from the Drake R-8A sounds so nice even though not a crystal filter is in sight and the quoted shape factors are about 2.2:1?

Seemingly with the appearance of s.s.b. on the amateur radio scene in the 1950s, receiver users began to look for the 'ideal' rectangular i.f. bandwidth implying a shape factor of as close to 1:1 as possible, and the Collins company devoted great research efforts to laying down an 'ideal' specification for communications channels, finally settling on a bandwidth of 2.1kHz. This figure has since been treated as though engraved on stone tablets and carried down from the mountain by Moses, but in fact Collins were only concerned with specifying a bandwidth for communications speech using s.s.b., and a 2.1kHz bandwidth corresponding to an audio bandwidth from 300Hz to 2400Hz proves quite unsatisfactory for other modes still in use today. Just try listening to Radio Nederland through a steep sided 2.1kHz filter and you will understand what I mean. It makes Jonathan Marks sound like he's talking from the inside of a very woolly teddy bear.

Bit Removed

As an historical aside, don't think that s.s.b. was new in the 1950s; J.R. Carson lodged a British Patent in 1915 for a method of eliminating the carrier and selecting one sideband of an a.m. signal (and remember that s.s.b. is actually a.m. with bits removed, rather like my favourite tomcat who vaguely remembers having both sidebands present), and s.s.b. came into regular commercial transatlantic use in 1927. Amateur radio s.s.b. tests were carried out between Britain and America in 1933 and 1934, so you can see that it didn't all start with Collins or Yaesu Musen!!

Ye tak' the high road, an I'll tak' the low

Be that as it may, the search for better, or should I say more closely defined filtering carried on and went down different paths. The original single crystal filter expanded to use two crystal elements in what became known as the 'Half Lattice' filter, and four crystal elements as the 'Full Lattice', and it is true to say that amateur radio experimenters played a significant part in the development of practical filters in the 1950s, although the basic principles had been laid down in the mid 1930s. Further development of large multi-element crystal filters was carried out by well known commercial companies such as Marconi for use in their professional radio communication systems, and many commercial multi channel telephony systems which use 'stacked' s.s.b. channels employed crystal filters.

In the wider hobby field, the German company KVG began to produce low cost crystal filters with a variety of bandwidths, and these are still available today. Modern crystal filters are usually made using multiple quartz resonators or what is known as the 'monolithic' approach in which a single slab of quartz has several conductive elements deposited on to its surface producing multiple resonators within the slab, but the technique is limited in the number of elements that can be used, and the high performance quartz filters still use the separate resonator approach. This is one reason why there is such a price difference between the good performance 8.83MHz i.f. filters in some Kenwood equipment (monolithic construction) and the superb performance 455kHz filters in the same set (multi-element construction). It has become commonplace for h.f. receivers to incorporate crystal filters for i.f. selectivity, - but I said there were other paths.

Collins (again) developed in the late 1940s and early 1950s a new type of filter which used mechanical resonance of pieces of metal as the selective mechanism rather than the mechanical resonance of quartz crystals. In these filters, a series of metal elements resonant at the frequencies to be passed, are coupled together and driven by a transducer which converts the incoming electrical signal (the i.f.) into mechanical movement. At the output end of the filter the movement is translated back to an electrical signal by a similar transducer.

Byword

I could devote pages of text to the mechanical filter, but there isn't space available and in any case the whole subject has been written up by people infinitely better qualified than I. Let's just say that the Collins mechanical filter became a byword for ease of use, guaranteed repeatable performance without alignment, and quite outstanding shape factor. The only major restriction on its application is that being dependent upon mechanical action, it is limited by production techniques to being used only at relatively low frequencies, whereas the multi element quartz filter can be produced for much higher frequencies - 9MHz being a common filter frequency in use. Although Collins protected the design by patents, the Japanese firm Kokusai began producing mechanical filters in the 1960s and I am told that the way in which the patent was circumvented was by use of a piezo electric transducer rather than the magnetostrictive driver used by Collins - but this may be utter rubbish, and I am relying on hearsay rather than original source information.

A further more recent development in i.f. filter technology employs piezo electric ceramic filter elements as an alternative to quartz, and the most often met name among manufacturers of this type of filter is Murata. Production techniques have been refined to the point where piezo electric ceramic filters (usually referred to as simply

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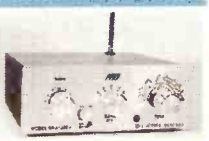

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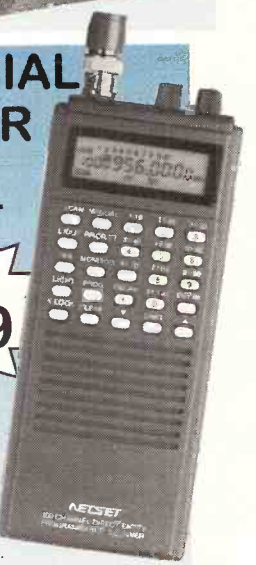

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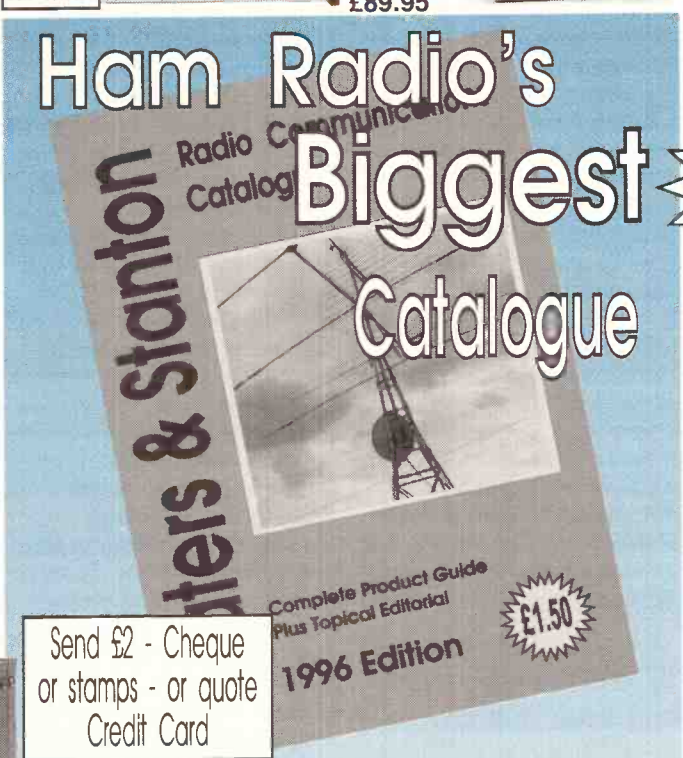

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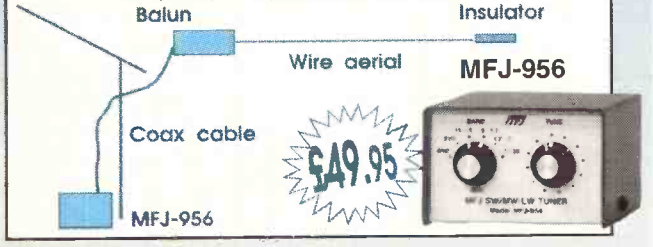

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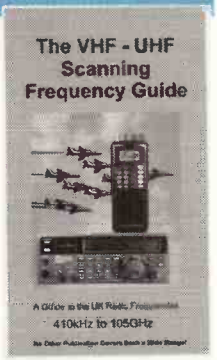

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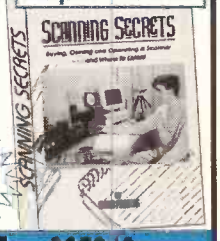

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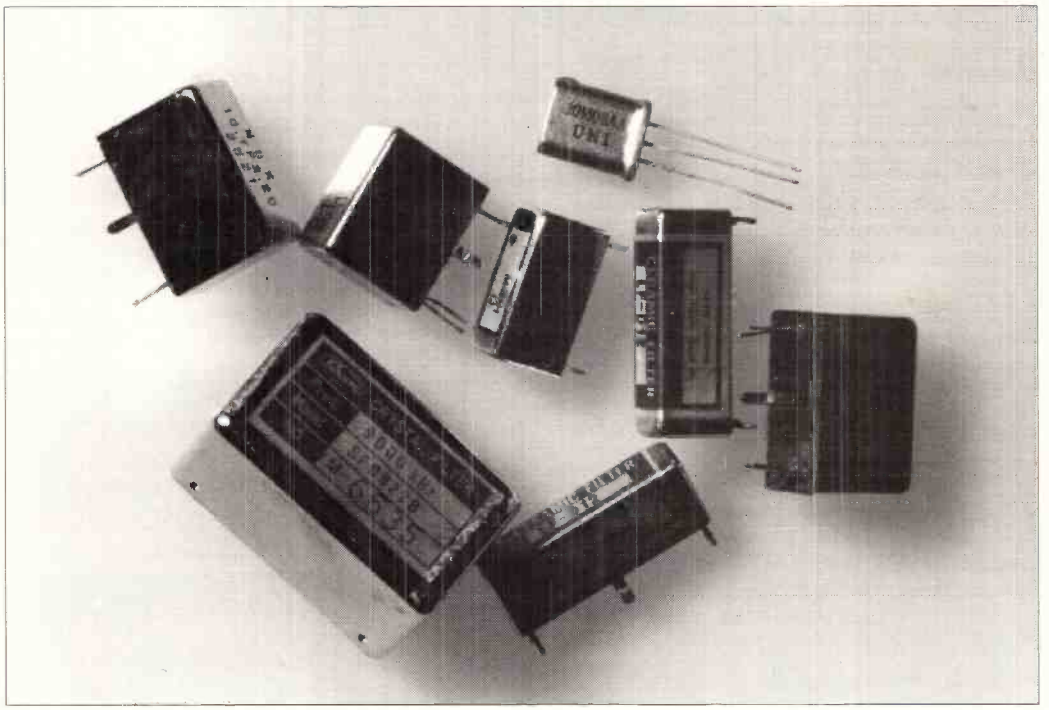
CONTINUED FROM PAGE 27

'ceramic') can be very cost effective and there is scarcely a receiver produced today which does not include one or more ceramic filters. Although shape factors do not approach those of the best mechanical filters, they are very close, and the ceramic filter has characteristics which often make it a better choice for the hobby listener than the apparently superior mechanical or quartz crystal filter. I'll explain in a follow up article.



And so to bed...

Let's try and summarise what I have written so far. The ability to select wanted and reject unwanted signals on nearby frequencies in a receiver is called selectivity. In the early days of radio, selectivity was obtained at the signal frequency itself, but with the invention of the superhet principle it was possible to concentrate the selective elements at a single frequency, commonly known as the Intermediate Frequency (i.f.). Originally the selective element was the tuned circuit, and a succession of tuned circuits could be used to provide high performance, albeit at a cost in complexity and component count. Later developments using quartz crystals, mechanical resonators and piezo electric resonators meant that the selectivity could be determined in what was in effect a single magic box, which led to overall simplification of i.f. section design.

Conveniently ignoring more recent developments in digital signal processing, we see today in most receivers likely to be used by readers of this magazine one or more of the four types of filtering mentioned above, and each has particular advantages and disadvantages depending on the intended use of the receiver. When judging a receiver's published performance specification, always bear in mind that the designers have made the best compromises they could in making their pride and joy fit the widest possible market, and those with very special listening demands should realise that what may seem essential to them may make a receiver virtually unusable for someone else.

I had a friend in Pontefract (hello Brian) who was so devoted to 40m c.w. that he made his own receiver that only tuned the bottom 10kHz of the band and had an i.f. selectivity about 20Hz wide. Although perfect for his own use, that receiver would have been totally worthless to a general listener. In the same way, the selection of a particular type of i.f. filter will be affected by what you are going to do with the receiver in everyday use. ■

My next article will explain my cryptic comments about the selection of filter types for different requirements and also delve deeper into topics such as variable bandwidth systems and pass band tuning. Those of you who own a Kenwood R-820 will then appreciate why I consider that particular receiver to be one of the design landmarks of recent times - actually not so recent now that I think of it!

Build an Audio Signal Processor Part 1

Many receivers do not quite 'shape-up' to listeners' expectations. Robert Penfold has designed this home-build audio signal processor to sharpen up your receiver's performance. In part 1 he explains the operation of the unit.

In an ideal world I suppose that there would be no need to bother with audio signal processing. The built-in intermediate frequency filtering of communications receivers would provide the best possible audio output signal under the prevailing conditions, making any further filtering superfluous. Some modern receivers, plus a few 'golden oldies', have top quality built-in filtering which limits the possibilities of producing improved results using add-on external filtering. However, there are a great many receivers, ancient and modern, which do not quite 'shape-up' to expectations.

These days a wide range of audio processes can be used in an attempt to reduce various types of interference. These range from simple tone controls to complex digital signal processors (DSPs). Apart from digital processors, which attempt to reduce background 'hiss' while leaving everything else intact, the function of all these signal processors is to provide some form of frequency selective filtering. This form of filtering is intended to counteract various forms of QRM, and is not effective at reducing background 'hiss'.

This audio processor provides three types of frequency selective filtering. Firstly, a low-pass filter can be used to reduce the high frequency response, which helps to combat s.s.b. 'monkey-chatter' and general adjacent channel interference. Secondly, a high-pass filter can be used to reduce the low frequency response. For s.s.b. reception this combats interference from signals close to the carrier frequency, where the i.f. filtering often provides a relatively limited amount of attenuation. This low frequency interference tends to be less noticeable than the high frequency variety, but you certainly notice it once it has gone! The third type of filtering is a tunable notch which can be used to attenuate a narrow band of frequencies. This is useful for reducing interference from carrier heterodynes, c.w. signals, RTTY signals, etc.

Adjustable Cut-off

Audio filters which provide high-pass and low-pass filtering often furnish a relatively limited improvement in performance. One reason for this is that simple audio filters offer attenuation rates which are quite modest in comparison to the effective rates of even mediocre i.f. filtering. The high-pass filter used in this design provides an attenuation rate of 48dB per octave, and the low-pass filter has a roll-off rate of 60dB per octave. While these roll-off rates are something less than phenomenal, they are high enough to give a very worthwhile level of performance.

Performance is improved still further by having the cut-off frequencies of both filters adjustable. The bandwidth of normal filtering, whether audio or intermediate frequency, has to be something of a compromise. The frequencies in a voice signal cover a wide range of frequencies, but the highest and lowest frequencies can be removed without significantly reducing intelligibility. Using a very narrow bandwidth at the receiver is obviously desirable, as it reduces problems with adjacent channel interference and general QRM. On the other hand, making the bandwidth too narrow will impair the intelligibility of the signal.

Although the impression is often given that there is an 'ideal' bandwidth that will always give optimum results, this is not really the case. The frequency content of individual voices varies considerably, as does the importance of each component to the overall intelligibility of the signal. In most voice communications systems frequencies below about 200Hz and above 3kHz are attenuated, although the modern trend seems to be to use a slightly narrower bandwidth than this. Whatever frequency limits are chosen, a fixed bandwidth will always be something of a compromise. The ideal limits depend on the particular voice being processed.

The ideal frequency limits also depend on the interference, if any, present on the input signal. Take the example of **Fig. 1.1(a)** where the solid lines represent the frequency components in a voice signal, and the broken lines represent the components of an interfering signal. The voice signal will have had its bandwidth restricted at the transmitter, and in the normal way of things the receiver will provide a bandwidth that is just sufficient to accommodate all the frequencies in the signal. This leaves an audio output signal that contains strong high frequency components produced by the interfering signal.

With adjustable cut-off frequencies it is possible to reduce the high frequency response, as in **Fig. 1.1(b)**, so that the interference is greatly reduced. Clearly this will also remove high frequency components from the voice signal, but this will not necessarily reduce intelligibility to a significant degree. The effectiveness of the reduced bandwidth obviously depends on factors such as the characteristics of the voice signal, and the strength of the interference. Practical experience with this audio processor suggests that in many cases the reduction in bandwidth will have only a marginal affect on intelligibility, while the reduction in interference will make the signal much easier to copy. Copying a signal through strong interference is often

Continued on page 33

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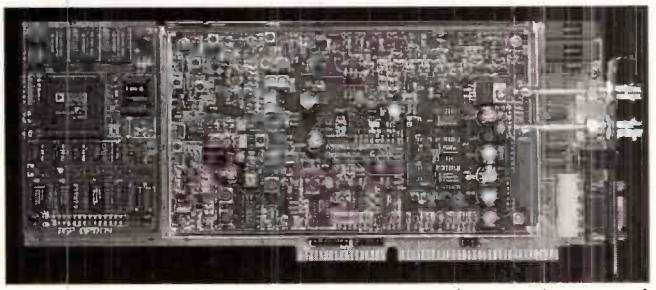

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possible, but very fatiguing. Reduced bandwidth with a much lower level of interference seems to make it very much easier to copy signals for long periods.

The cut-off frequency of the high-pass filter is adjustable from approximately 200 to 550Hz, and that of the low-pass filter can be varied from about 1.25 to 3.5kHz. With the controls set for maximum bandwidth the filter behaves as a conventional audio band-pass filter, and it will then provide a worthwhile improvement in performance with many receivers. When the going gets tough the bandwidth can be reduced at high or low frequencies (or both), and the unit should then provide a significant improvement with any receiver. The notch filter is tunable from about just below 300Hz to a little over 2.8kHz, and it can be switched out when it is not required. A *Q* control permits the bandwidth of the notch filter to be varied. Normally a very narrow notch is best, as it has a minimal affect on the voice signal. A slightly wider notch can be better when combatting a signal that covers a small range of frequencies, rather than the single frequency of a simple heterodyne.

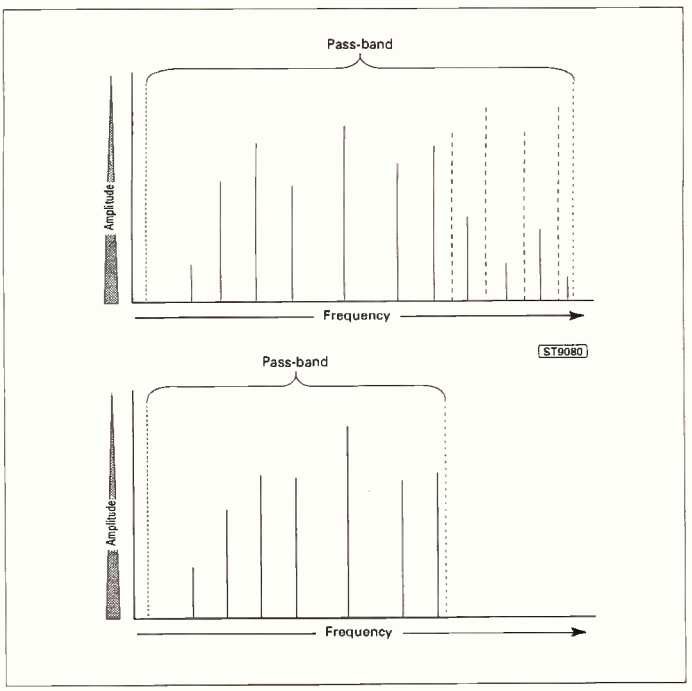

Fig. 1.1: The interference on the signal in (a) is removed by the reduced bandwidth in (b).

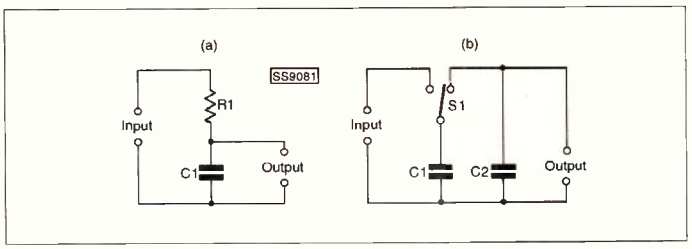

Fig. 1.2: (a) A conventional CR low-pass filter and (b) a switched capacitor low-pass filter.

Switched Capacitor Filters

Achieving fairly high roll-off rates using conventional active filter circuits is not difficult, but only if a fixed cut-off frequency is required. An active *CR* filter having an adjustable cut-off frequency is by no means impossible, but it is impractical where high attenuation rates are involved. For example, a 60dB per octave roll-off rate would require the use of a ten-gang potentiometer. Using an integrated circuit switched capacitor filter is a more practical approach. This type of filter has similarities to a conventional *CR* filter, such as the basic low-pass type of **Fig. 1.2(a)**. The resistor is replaced with a small capacitor and a switch, as in **Fig. 1.2(b)**. In a practical filter the switch is invariably an electronic type which is controlled by a clock oscillator.

If we first consider the operation of the *CR* filter, R1 limits the rate at which C1 can be charged and discharged by the input signal. At low frequencies the input voltage changes so slowly that the current flow through R1 is sufficient to maintain a charge on C1 that is virtually equal to the input voltage. If the input frequency is steadily increased, a point will be reached where C1 can no longer charge and discharge at a fast enough rate to accurately track the input signal. This results in a phase lag through the circuit, plus a drop in the signal level. The higher the input frequency is taken, the greater the losses through the circuit. The increase in attenuation is quite gradual at first, but the attenuation rate ultimately reaches 6dB per octave. In other words, every doubling of the input frequency results in the losses through the circuit being doubled.

In **Fig. 1.2(b)** C1 and S1 replace the resistor, and C1 is the normal filter capacitor. Like the resistor of **Fig. 1.2(a)**, S1 and C1 provide a means of coupling the input signal through to the output. Remember that S1 is continuously switched from one position to the other at a high rate. If the input voltage increases, C1 first charges to this new voltage, and then discharges into C2. In this way C2 is charged up to virtually the same potential as the input signal, but as the value of C1 is low in comparison to that of C2, it takes several clock cycles for the circuit to respond to large changes at the input. A fall in the input level results in C1 charging from C2, and then discharging into the signal source. This gives a reduction in the output voltage, but again, it takes a number of cycles for the circuit to respond to large changes.

The output will accurately track the input signal provided the input signal is at a very much lower frequency than the clock signal. With the input frequency at a higher frequency, but still well below the clock rate, the switch and capacitor will not provide a high enough current flow from the input to the output. As was the case for the *CR* filter, this results in a phase lag and losses through the circuit. Also like a *CR* filter, the initial roll-off is very gradual, with an ultimate rate of 6dB per octave.

The cut-off frequency of a *CR* filter is controlled by the values of R1 and C1. The cut-off frequency of a switched capacitor filter is governed by the values of C1 and C2, and the clock frequency. The higher the clock frequency, the faster a change in input voltage can be passed through to the output, and the higher the filter's cut-off frequency. It the ability to vary the cut-off frequency via the clock rate that makes switched capacitor filters an attractive proposition where a variable cut-off frequency is required. Varying the frequency of a clock signal is clearly much simpler than varying the values of numerous capacitive or resistive filter elements.

Practical switched capacitor filters are usually designed to have the cut-off frequency at one fiftieth or one hundredth of the clock frequency. 'Real world' switched capacitor filters almost invariably have several filter stages connected in an active filter configuration. This gives a much better response, with a more abrupt introduction of the roll-off, and a higher ultimate attenuation rate. Filters having a variable cut-off frequency and as many as ten stages are a practical proposition.

System Operation

The block diagram of **Fig. 1.3** shows the general arrangement used in this signal processor. A buffer stage at the input ensures that the subsequent stage, a low-pass filter, is fed from a suitably low source impedance. This filter improves the performance of the processor at higher audio frequencies, but this is not its

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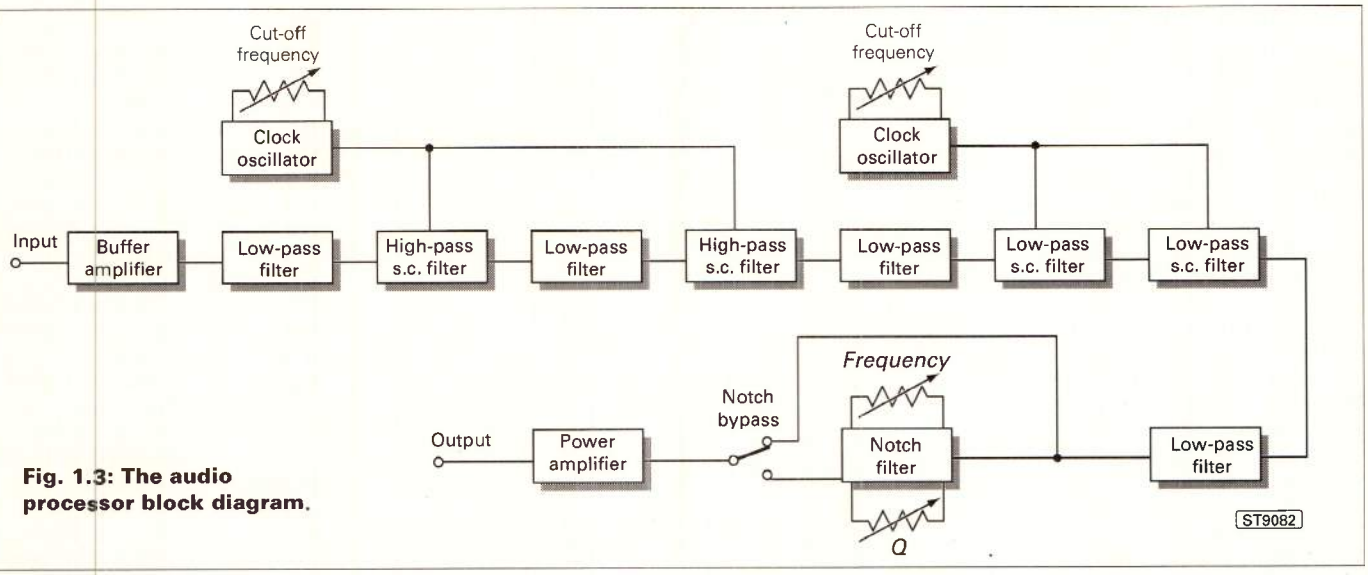

Fig. 1.3: The audio processor block diagram.

main purpose. It ensures that any high frequency components on the input signal are not allowed to pass through to the switched capacitor filters where they could heterodyne with the clock signal to produce audio tones at the output.

The output of this low-pass filter is coupled to the first of the two switched capacitor filters. The first filter provides the high pass filtering. This filter is a two-stage type in that it is based on two integrated circuits, but each device contains two filters, and each of these is a two-stage type having an attenuation rate of 12dB per octave. Overall this gives an 8-pole filter having an attenuation rate of 48dB per octave.

Originally the four filter blocks were simply wired in series, but there seemed to be an interaction between the filters that resulted in a rather low maximum attenuation. A low-pass filter between blocks two and three avoids this interaction, and ensures that a very high degree of attenuation is achieved on signals well below the cut-off frequency. All eight poles of the high-pass filter are controlled by a single variable frequency clock oscillator which is used to set the desired cut-off frequency.

Another low-pass filter is used at the output of the high-pass filter. One purpose of this filter is to remove any residual clock signal which manages to break through to the output of the filter. Another is to smooth out the steps in the output waveform. The output does not vary continuously, but jumps to a new level each time an input sample is connected through to the output. This gives a sort of pseudo-digitised output signal, which is modulated by the clock signal. The low-pass filter removes traces of the clock signal so that they can not produce problems with heterodynes in the second switched capacitor filter.

This second switched capacitor filter provides the low-pass filtering, and like the high-pass type it is based on two integrated circuits. Each of these contains a single filter block, but it is a five-pole type. Overall this gives ten stages of filtering, and a roll-off rate of 60dB per octave. Once again, all the filter stages are controlled by a single variable frequency clock oscillator which enables the cut-off frequency to be adjusted. An ordinary low-pass filter smooths the output signal and removes any clock breakthrough.

The notch filter is basically just a conventional state variable filter, but only the notch output is utilised in this case. The timing resistors are provided by a dual gang potentiometer which enables the filter to be tuned over the frequency range stated previously. A *Q* control enables the bandwidth of the notch to be varied, and a bypass switch enables the notch filtering to be switched out when it is not required. A power amplifier at the output of the circuit enables any normal type of headphones or earphone to be driven at good volume. The circuit can easily be modified to drive an eight ohm loudspeaker if preferred.

High-pass Filter

The circuit diagram for the input buffer and high-pass filter stages of the processor is shown in **Fig. 1.4**. IC1 is used as the basis of the input buffer amplifier. It does actually have a small amount of voltage gain (about five times), which helps to give an improved signal-to-noise ratio by ensuring that the filter circuits are driven a suitably high level. Some receivers have relatively high audio output levels from their headphone sockets, and with receivers of this type it would probably be best to omit R4 and C3. This reduces IC1 to a straightforward non-inverting buffer stage. The input filter is a conventional three-stage type based on IC2, and having its cut-off frequency at approximately 4kHz.

The high-pass filter is based on two MF10CN switched capacitor filters (IC3 and IC6). These each contain a pair of two-stage filters, with each two pole filter connected into a form of state variable filter. Several state variable configurations can be used, but most of these do not provide the required high-pass action. All four filter blocks are used in what the MF10CN data sheet calls 'mode 3', which is the only one that provides the required high-pass filter action without the aid of a discrete operational amplifier. One slight problem with this configuration is that it provides slight *Q* enhancement, which gives a small peak just above the cut-off frequency. Fortunately, this 'hump' in the response, even for all four filters in series, is not very great at about 2dB or so, and it does not significantly detract from results obtained using the filter.

Resistors R12, R13 and capacitor C7 provide a half supply voltage bias for IC3 and IC6. The MF10CN has several control inputs which must be connected to the positive supply, negative supply, or mid-supply bias voltage in order to set the appropriate internal connections. In this case the device is set for operation in 'mode 3' with a clock signal at CMOS signal voltages and for operation with the clock frequency at 100 times the cut-off frequency. The alternative clock to cut-off frequency ratio is 50 to 1, but with a 200Hz cut-off frequency this would bring the clock frequency down to just 10kHz, which is uncomfortably close to the maximum signal frequency.

The clock signal is provided by IC4 which is a CMOS 4046BE 'micro-power' phase locked loop. In this circuit only the voltage controlled oscillator is used, and no connections are made to the

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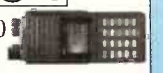

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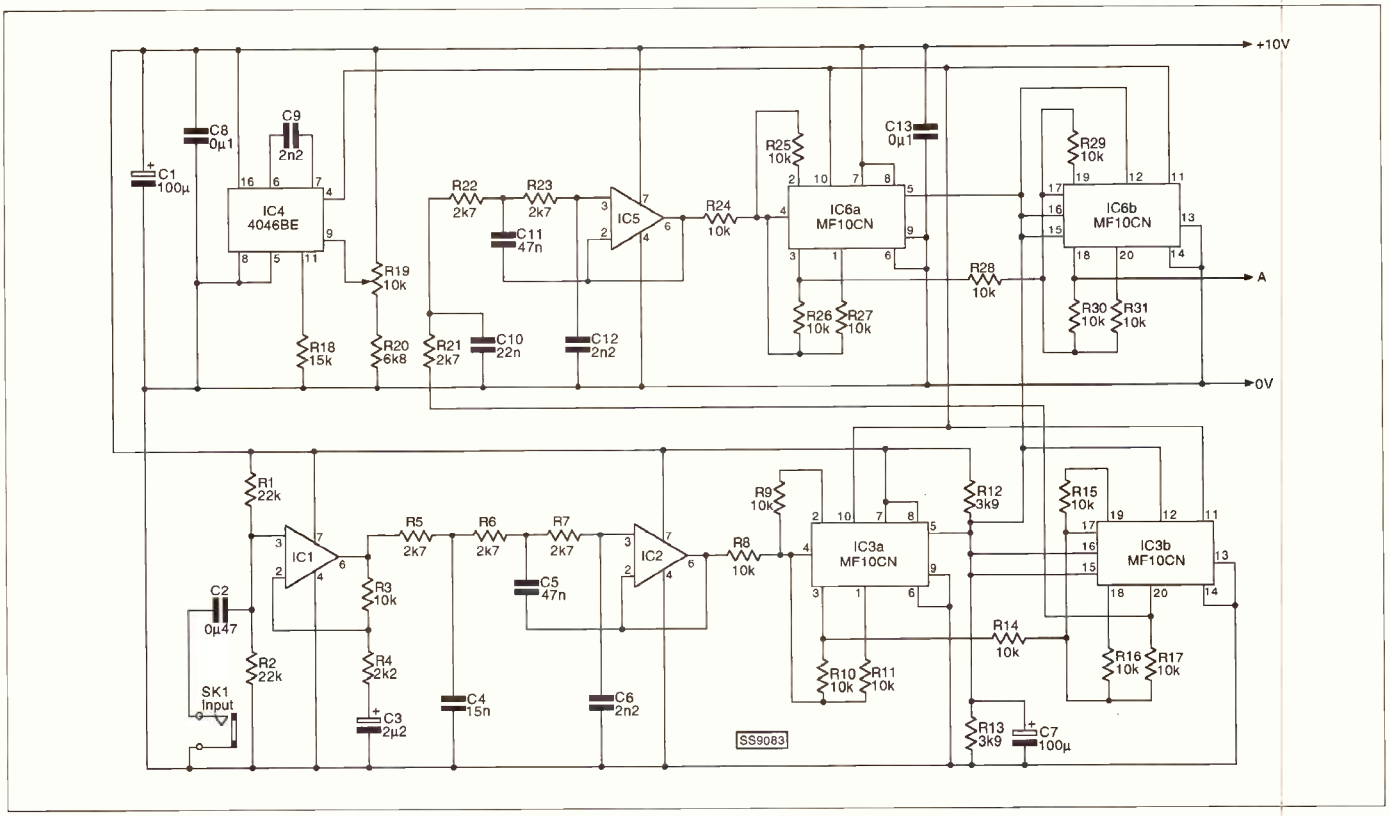

other sections of IC4. Capacitor C9 and R18 are the timing components, and a variable control voltage is provided by R19 and R20. Resistor R19 provides an operating frequency range of about 20kHz to 55kHz. IC5 is used in a third order low-pass filter connected between stages two and three of the high-pass filter.

Low-pass Filter

Fig. 1.5 shows the circuit diagram for the low-pass filter, together with its input and output filters. The latter are based on IC7 and IC10, and are three-stage filters that are identical to the filter used ahead of the high-pass filter. The filter between the two high-pass filters is essentially the same as the other three low-pass filters, but it has a slightly lower *Q*. This gives a slightly flatter overall frequency response.

The switched capacitor low-pass filter is based on IC8 and IC9, which are both LTC1063CN8 five pole filters. Unlike the MF10CN, this device is primarily designed for use as a low-pass filter, and can only be used for other types of filtering with the aid of external active circuitry. Of course, in this case it is low-pass filtering that is required, and few discrete components are therefore needed.

The response of each filter block is a close approximation to that of a five-stage Butterworth low-pass filter. This type of filter has low losses below the cut-off frequency, plus a rapid introduction of the full attenuation rate. This makes it possible to connect two filters in series without seriously compromising performance at frequencies just below the cut-off frequency.

Fig. 1.4: Circuit of the input stages and high-pass filter.

Resistors R37, R38 together with capacitors C20, and C22 provide a half supply bias voltage for IC7 and IC8. The LT1063CN8 is primarily designed for use with dual

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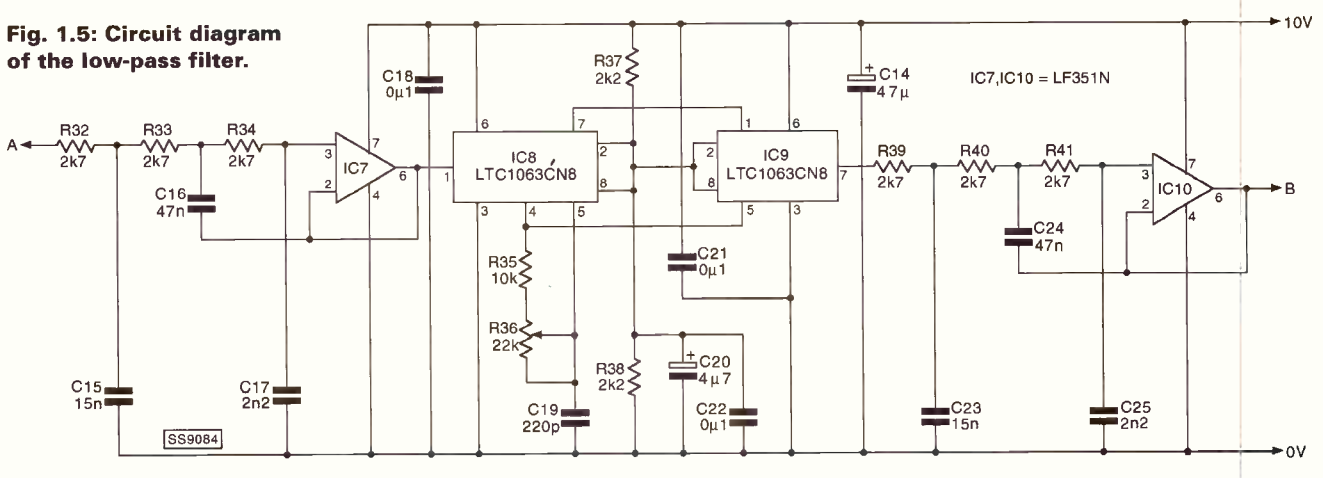
Fig. 1.5: Circuit diagram of the low-pass filter.



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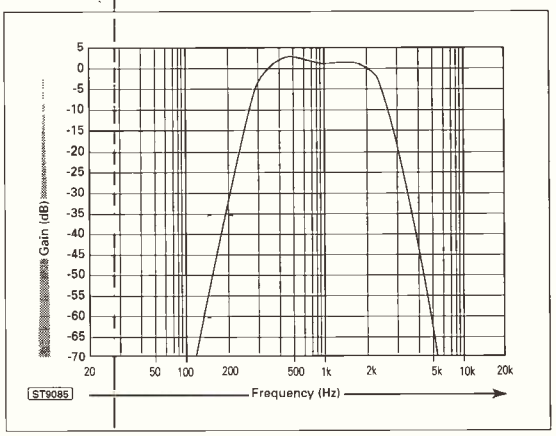

Fig. 1.6: Approximate frequency response for the high-pass and low-pass filters with -6dB points at 300Hz and 2.5kHz.

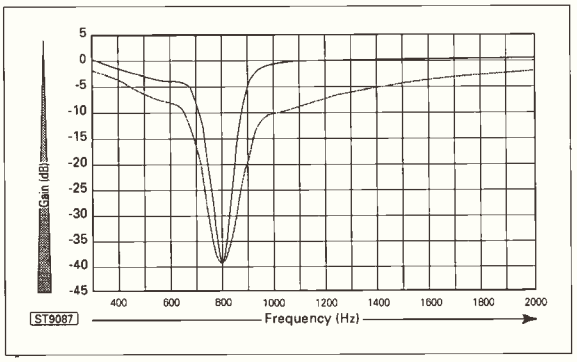

Fig. 1.8: The notch filter responses with high and low Q settings and an 800Hz centre frequency.

balanced supplies, but it works well with the ground terminal (pin 2) connected to a simple bias circuit. Pin 8 of LTC1063CN8 is also biased to mid-supply. This pin can be used to introduce an offset voltage at the output, or to trim out an unwanted offset voltage, but this facility is only needed in some d.c. applications, and is of no value in this case.

The LTC1063CN8 has a built-in clock oscillator which is usable where clock frequencies of no more than about 500kHz are required. The cut-off frequency is one hundredth of the clock frequency, which means that the clock frequency must be adjustable from 125 to 350kHz. This is comfortably within the 500kHz limit, and the built-in clock generator is therefore utilised in this circuit. The clock circuit in IC8 is used for both filters. Its timing components are R35, R36, and C19.

Fig. 1.6 shows the approximate frequency response for the high-pass and low-pass filters with the -6dB points at 300Hz and 2.5kHz respectively. Apart from the slight peak produced by the high-pass filter, the response is free from any irregularities, and the full attenuation rate of both filters is introduce quite rapidly.

Notch Filter

The circuit diagram for the notch filter and output stage appears in **Fig. 1.7**. The notch filter is based on IC11 and IC12, which are used in a conventional state variable filter. In this case it is only the notch output at pin 7 of IC12 that is utilised. Ganged potentiometers R49 and R53 form the tuning control, and R56 is the balance control. The latter is adjusted to optimise the attenuation at the centre of the notch, and around 40dB to 60dB of attenuation can be achieved.

The resistor R52 enables the *Q* of the filter to be varied. A high *Q* value gives a relatively narrow notch, with little attenuation well away from the notch frequency. This type of response is best for dealing with heterodyne tones, as it enables the tone to be dealt with effectively while leaving the wanted signal largely intact. A low *Q* gives a somewhat wider notch, and also tends to give significant losses well away from the notch frequency. This obviously has a more detrimental affect on the main signal, but it is more effective at combatting interference that covers a small range of frequencies (such as an RTTY signal with a shift of 170Hz). **Fig. 1.8** shows example frequency responses with maximum and minimum *Q* at a centre frequency of 800Hz.

Switch S1 enables the notch filter to be bypassed when it is not required. From S1 the signal is coupled to an attenuator and then to the output amplifier. This amplifier is based on an LM386N-1, which requires few discrete components. In this case it is operated at minimum gain, and the only discrete components required are a d.c. blocking capacitor at the output (C32) and a supply decoupling capacitor (C33). Resistor R59 is used to reduce the maximum drive current to a level that suits most headphones. For sensitive headphones a higher value of about 390Ω will give better results. If the unit is used with insensitive headphones, or to drive a loudspeaker having an impedance of 8Ω or more, R59 should be replaced with a shorting link.

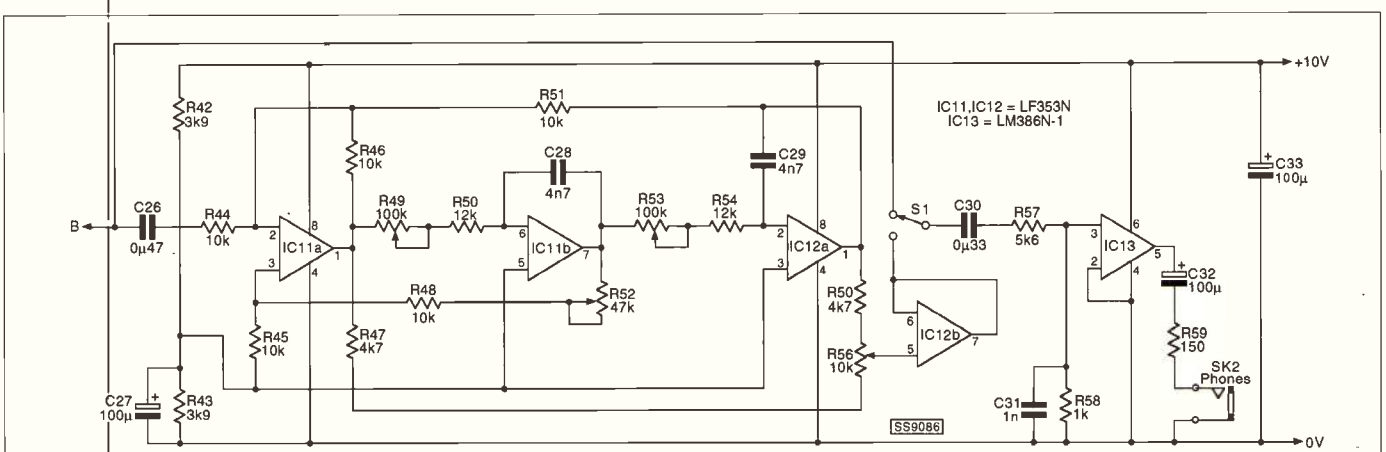

Fig. 1.7: Circuit diagram of the notch filter and output stage.

In Part 2 we will cover the power supply and construction of the unit.

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Review
MFJ-784B Tuneable DSP Filter

When it comes to audio filtering, DSP technology represents the state-of-the-art. In this review, Mike Richards takes a close look at the top range filter from MFJ.

A look through the Waters and Stanton catalogue will soon reveal that MFJ manufacture a very wide range of products designed to make life a little easier for the radio enthusiast.

One of their latest offerings is the MFJ-784B Tuneable DSP Filter. This is a very comprehensive audio filtering system that's been designed specifically for processing audio signals from communications receivers. As such, its operation is limited to the 300-3400Hz frequency band. However, within this narrow range of frequencies lies a vast range of signals from voice communications through to all manner of digital and utility modes.

By employing sophisticated DSP technology, MFJ have been able to create a filter that is not only extremely versatile but is able to remember and recall up to ten filter settings. This makes the MFJ-784B a formidable tool in the hands of novice and experienced operators.

DSP Outline

Before I go on to describe the filter's features and performance, it might be useful to give an insight into Digital Signal Processing (DSP). In simplest terms all that happens is the incoming audio signal is converted into digital format, i.e. numbers these numbers are worked-on by a micro-processor and the output converted back into an audio signal.

Let's now look at each stage in a little more detail. The conversion of the audio signal in to a series of numbers is done by what's known as an analogue to digital converter (A-D) or Coder/Decoder (CODEC). This special device measures the signal voltage and converts the result to a number. In order to create a realistic representation of the signal, this measurement has to be taken at least twice as frequently as the highest frequency you want to convert. So, if you want to convert a communications audio signal with a top frequency of 3kHz the A-D converter would have to take measurements 6000 times per second!

Having created our digital signal, a special microprocessor analyses the numbers and can work out all the important features of the signal. The software running on the microcomputer can then be set to pass or exclude certain ranges of frequencies. The routines to achieve all this are based on complex mathematical formula, in fact the DSP revolution has effectively opened-up a new branch of mathematics. As all this has to happen in real time, the processor has to run very quickly indeed.

The MFJ unit uses the ADSP-2105 specialist DSP microprocessor from Analog Devices. In addition to operating on 16-bit data at 12MHz this device has a specialised instruction set that simplifies the program code for DSP work. Once all the processing is complete, the resultant digital output is passed to a second A-D unit for conversion back to an audio signal. I suppose one of the most impressive aspects is that all this is completed with a time delay from input to output of just 23ms!

So, what's so special about digital signal processing. There are two main advantages, flexibility and performance. Whereas conventional analogue filters require sophisticated circuitry that's hard to change and adapt, the DSP filter's parameters are completely controlled by the software. So by changing the programs or parameters, just about every type of filter can be produced. From a performance point of view, a good DSP filter has a very flat pass-band and the response plummets like a stone to very high rejection outside the pass-band. This type of performance is almost impossible from conventional filtering techniques. The MFJ-784B reviewed here is a classic example of how DSP technology can be adapted to our hobby.

Ins & Outs

To use the MFJ-784B with a receiver or transceiver it needs to intercept the audio signal. As to where you place the filter, this rather depends on the type of listening you do. For most, the easiest place to intercept the audio is via the external speaker jack. In most cases, inserting a jack in this socket automatically disconnects any internal speaker and passes the audio to the external unit. You then need a straightforward 3.5mm jack to phono lead to make the connection to the audio input of the MFJ filter.

To hear the filtered output (essential) you can connect an external speaker to the filter via a standard 3.5mm jack on the rear panel. The MFJ-784B's audio stages are able to deliver around 2.5W in a 6Ω load - plenty enough for most external speaker systems. There's a separate volume control on the front panel so once the main input level has been set, you can use the filter's volume adjustment to set the best listening levels. You can also monitor using headphones via the 6.3mm jack also on the rear panel.

A second option for connecting the filter would

be to use the line or tape output socket on your receiver. This feeds a fairly constant level signal that's unaffected by the receiver's volume control setting. The only limitation here is likely to be the lack of drive from the receiver. The MFJ-784B requires a fairly high output level of approximately 2.8V p-p which is somewhat higher than some receivers can deliver.

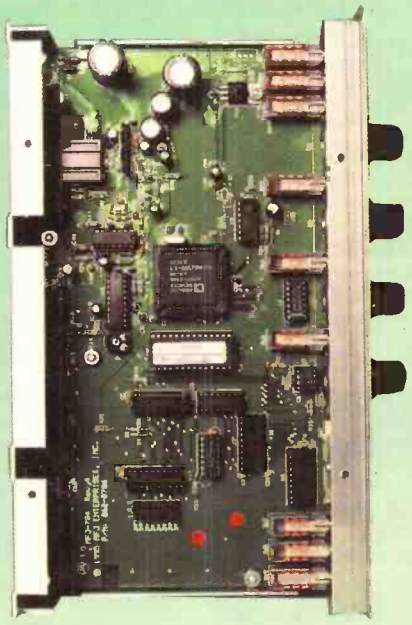
One of the advantages of using the receiver's line output is that you can perform an easy comparison between filtered and unfiltered audio simply by turning-up the receiver's volume control. Getting the signal level right is helped by a simple dual colour l.e.d. arrangement on the front. This l.e.d. glows green when the input signal is within the range of the filter. If the level is too low it goes out, too high and it turns red. Very simple but extremely effective.

If you find that the output from your receiver is too high for the filter there's a pre-set adjustment on the rear panel that can be used to adjust the receiver's sensitivity. If you want to make recordings of received signals or maybe connect some decoding equipment, the MFJ-784B features a low level filtered audio output phono socket on the rear panel. This provides around 1.5V p-p into 600Ω so should suit just about every decoding system on the market. If the drive level is too high, there's an adjustment point available via a hole in the rear panel.

Should you happen to be using one of the popular data controller's such as the PK-232, or MFJ range the 5-pin DIN sockets on the rear panel of the filter carry all the necessary interconnections for full transceive operation. With all the audio sorted-out, the only thing left is the power connection which is made using a standard coaxial socket on the rear panel. The power requirements are just 10-16V d.c. at up to 500mA.

Operation

As you can see from the photos, the front panel of the MFJ-784B is extremely busy. There's no need to be daunted as all the controls are well marked. However, if you've not used an audio filter system before, you do need to approach with caution as it's very easy to over-filter and make the signal worse than with no filter at all! Whilst operating the filter you can check the amount of improvement simply by releasing the DSP button. This switches the audio straight through with no added processing. The controls and actions of the MFJ-784B can be divided up into three distinct areas, frequency filters, noise reduction and notch filters.



The frequency filters are the heart of the MFJ-784B and basically let the operator choose which band or bands of frequencies are to be passed. Selection of the type of filter to use is determined by the ten-way switch. Of the ten options the first five are tuneable filters whilst the remainder are specialist filters set-up for particular receive modes. The first manual mode is called LR/HR which means low reject and high reject. This lets you set the lowest and highest frequencies that the filter will pass. The two settings are independently adjustable using the two uncalibrated tuning knobs on the front panel. A typical example of where this filter would be useful is to reduce interference from an adjacent station. If, for example, you were suffering a lot of high frequency splatter you could gradually wind-in the high frequency rejection to get the best compromise between signal readability and interference rejection.

The next filter was a straightforward band-pass filter. In this case one of the tuning knobs was used the set the centre frequency whilst the other set the bandwidth. The adjustment range was extremely wide with bandwidths from 40Hz to 2.1kHz and a centre frequency from 300Hz through to 3.4kHz. This filter was further enhanced by a pair of band-pass filters that interacted with the single band-pass filter. To use this feature you first set the required bandwidth with the ordinary band-pass filter. Once set you then switch to 2BP and used the two tuning knobs to set the centre frequencies of the two filters. The bandwidth setting have been remembered from that last used by the band-pass filter - ingenious!

Next comes the first specialist filter, which in this case has been optimised for c.w. signals. This is much the same as the BP filter except the centre frequency range is restricted to 300 to 1kHz thus making adjustment of the centre frequency very much easier. Operation is further simplified by the inclusion of what MFJ call a c.w. spotting tone. This is activated by pressing and holding the PROGRAM button and injects an audio tone that matches the centre frequency of the band-pass filter. All you have to do is either adjust your receiver or the filter centre frequency for a zero beat and the filter is accurately aligned. I thought this was a great idea and certainly made c.w. operation very easy. Single sideband (s.s.b.) was also very well catered for through a customised BP filter with a centre frequency range of 600 to 1700Hz and bandwidth adjustable between 1 and 2.5kHz. The settings are chosen so that the best starting point is likely to be with both controls centred.

Pre-set Specialist Filters

The next set of filters have pre-set characteristics optimised to suit specialist data modes. These filters were essentially band-pass filters with the pass-bands chosen for the following trans-missions and speeds. RTTY 45 baud 170Hz shift, h.f. packet 300 baud 170Hz shift, AMTOR 100 baud 170Hz shift and PACTOR 200 baud 170Hz shift. Each of these modes was also pre-set to use the

Continued on page 44

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QUALITY GOES THE DISTANCE

Spotlight on Staff

Steve Jelly G0WSJ (ex G6URJ)

This months feature is on Steve Jelly, the person in charge of Data Comms. Steve joined me almost a year ago and unlike Chris Taylor has far more hair. (In fact he's got more hair than all of us put together). The mind blowing world of Data is expertly handled by Steve who offers free advice relating to Packet, PC's and most things that require the use of a computer. The RSGB are just publishing his first book entitled "My first packet station" which will be available soon. Want to set up a packet station? Call Steve now.

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AS REVIEWED BY MR. BOB TOMALSKI

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Continued from page 41

US high tone set of 2125-2295Hz. However, this could be changed through a special programming sequence that I'll cover later.

The final pre-set filter was marked SSTV/FAX/WEFAX which was a little surprising as the filter requirements of these modes are quite different. Despite the panel markings the filter was actually set-up for SSTV. The arrangement was two band-pass filters, the first of which passed 1050-1350Hz for the sync. tone and vertical interval signal (VIS) tones. The second filter passed the picture information between 1450-2350Hz.

Although the pre-set filters were well thought-out for radio amateurs the RTTY filter needs to be set for 50 or 75 baud at 400Hz shift for utility use. This could be done changing the factory defaults. This was a bit of an involved process but quite straightforward once you've read the manual a couple of times. To carry-out this programming you have to remove the filter's cover and utilise a number of miniature jumper settings. Instead of using the jumpers as the only setting they are used to communicate the desired options to the microprocessor's memory. A table of all the options is found in the manual. To reset a pre-set memory you just select that memory, move the jumper settings to the required option and press and hold the program button. As if all this wasn't enough the MFJ-784B can be set to relay the filter settings in c.w. through the speaker - you even have a choice of c.w. speed! If you're uncertain about the default programming sequence you could always asked the dealer to set it up for you.

Noise Reduction

In addition to noise reduction from good filtering the MFJ-784B incorporates a DSP denoiser. This is one of the specialities of DSP and uses the power of the microprocessor to tackle random or white noise. It does this by analysing the incoming signal to identify coherent signals such as speech or data. It then creates sets of constantly varying band-pass filters specifically designed to pass only the coherent components. This narrow, specialised, filtering provides rejection of the random noise components. In the MFJ implementation a front panel control is provided to vary the degree of reduction. Under ideal conditions the denoiser can provide up to 20dB of random noise reduction.

Notch Filters

One of the most irritating forms of interference are whistles that are to be found on the h.f. bands. With the MFJ-894B, up to four such tones can be automatically removed with a single button press! This automatic attenuation of multiple tones is a speciality of DSP filters and is extremely effective. In this case tones are automatically tracked and the notch depth is an impressive 50dB. As part of the default programming the aggressiveness or response speed of the auto notch can be adjusted through four levels. To supplement the automatic notch there was a manual notch facility. This lets the operator place two notch filters anywhere in the pass-band. This can be particularly useful for taking-out an interfering data signal.

Specification

Filter	Left Control	Right Control	Attenuation
LR/HR:	200-2200Hz	1400-3400Hz	57dB @ 75Hz
BP:	f_c 300-3400Hz	bw 30-2100Hz	47dB @ 60Hz
2BP:	300-3400Hz	300-3400Hz	47dB @ 60Hz
CW:	f_c 300-1000Hz	bw 30-700Hz	47dB @ 60Hz
SSB:	f_c 600-1700Hz	bw 1000-2500Hz	57dB @75Hz
Man notch:	150-3400Hz	150-3400Hz	45dB @ 95Hz
Man notch (c.w.):	300-1000Hz	300-1000Hz	40dB @105Hz
Auto notch:	up to 50dB rejection of four tones		
Noise reduction:	up to 20dB		
Power:	10-16V d.c. at 500mA peak		
Audio out:	1.5V p-p into 600Ω		
Speaker output:	2.5W into 6Ω		

Programmable Filters

Just to conclude an impressive array of features, the MFJ-784B has ten programmable filter memories. This is an extremely powerful feature that lets you store up to ten filters settings for later recall. You can, therefore, use the MFJ-784B's filter controls to build custom responses and store them in one of the ten memories for later use.

Performance

Quite simply this is one of the very best DSP unit I've encountered. MFJ have taken all the advantages of a conventional analogue filter unit and brought it right up-to-date through the clever use of DSP technology. When first used it's very easy to get in a mess and you really do need to spend a little time to familiarise yourself with the filter's controls. To help with this the manual contained a very handy beginner's section that guided you through the basic settings for c.w. or s.s.b. reception.

One of the notable points about this DSP filter is the lack of audio distortion. Some of the earlier filters caused quite severe distortion of the filtered audio that made it sound rather like a cheap speech synthesiser. The MFJ filter exhibited no such problem, even with quite severe filter settings.

Throughout my tests, I was impressed by the very steep sides of the filter responses. A check of the specification shows that the rejection was 47dB or at 60Hz away from the filter edge that is really quite staggering performance. What's also impressive is the very flat response within the pass-band which was generally within 0.5dB! These sorts of performance figures were totally unattainable on the amateur market just a few years ago.

Other than the factory defaults using the US high tones I had a job to find any complaints. The golden rule, as with all filter systems, is not to over-filter

Summary

What more can I say - The MFJ-784B is a very capable audio filter with staggering technical performance. The filter responses were near theoretical perfection and the convenience features such as c.w. spot tone and filter memories just make the whole unit a pleasure to use.

Although not specifically designed for broadcast use, the filter will prove invaluable for broadcast DXers as you will be able to pull signals out from the mush. I can confidently recommend the MFJ-784B as an excellent state-of-the art filter. I wonder if I could persuade Santa to come early this year! The MFJ-784B costs £259.00 and is available from **Waters & Stanton, 22 Main Road, Hockley, Essex SS5 4QS. Tel: (01702) 206835. Fax: (01702) 205843**.

My thanks to Waters & Stanton for the loan of the review model.

■

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short wave magazine

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To register your interest and guarantee your place, please write, FAX, E-mail or 'phone and we will send you an information pack as soon as details are available.

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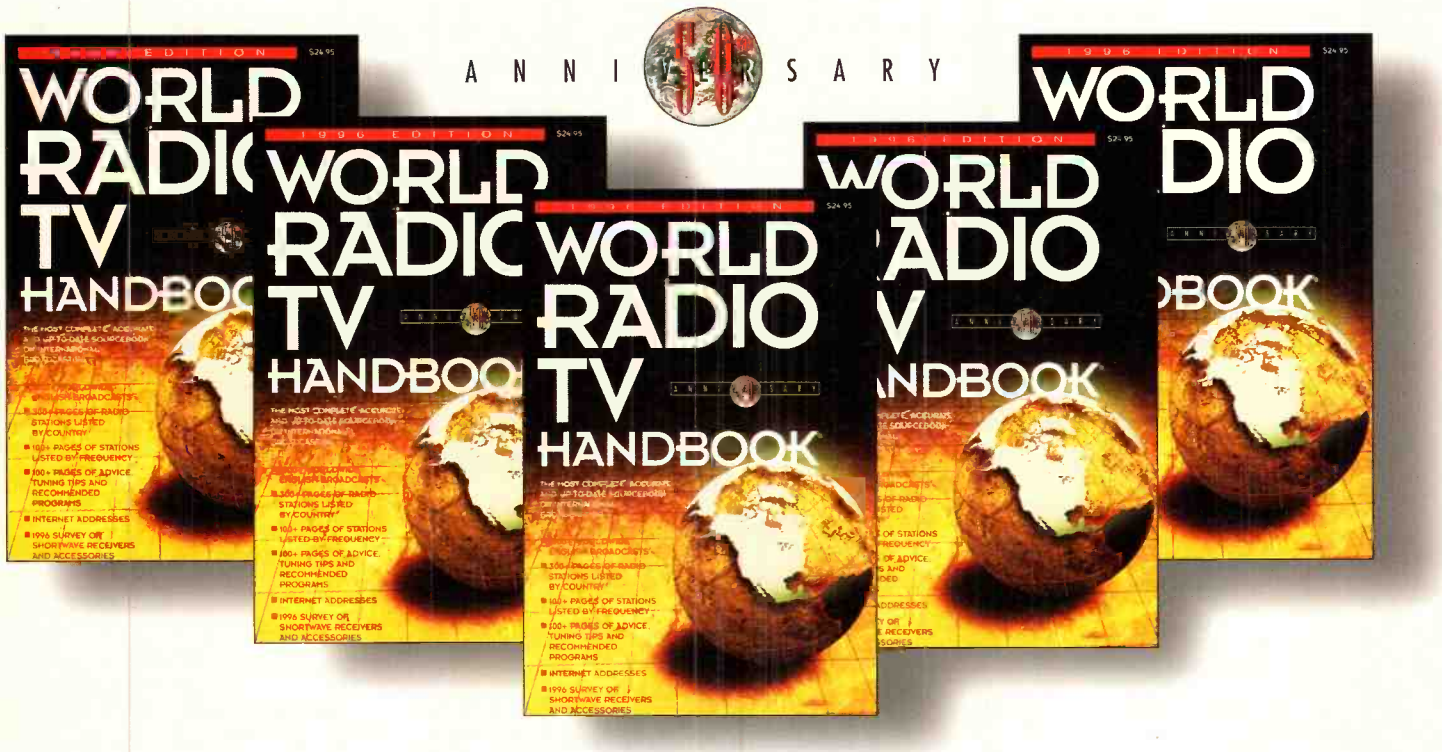

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Sony ICF-SW1000T World Band Receiver With Stereo Cassette Recorder

If you are a regular radio listener, then at one time or another you have probably wished that there was an audio equivalent of the video recorder to tape your favourite programmes. Help could be at hand with the launch of Sony's new ICF-SW1000T, a radio that thinks it's a cassette recorder. Or is it a cassette recorder that thinks it's a radio? Peter Shore has been trying to find out.

At first glance the ICF-SW1000T, the latest Sony digital short wave receiver, looks similar to the family of radio sets that has borne the name '7600' over the past few years. It is about the size of a small paperback book, has a loudspeaker on the left hand side of the front, and the liquid crystal display and most of the control buttons to the right.

Take a closer look, though, and you will find some controls that are not found on other Sony models. The give-away is the switch marked MODE: RADIO/REC. Those clever people at Sony's design department have managed to combine a world band radio with a cassette recorder. But where on earth is the cassette? Turn over the set to where you might normally find the battery compartment and a stand, and you'll see a cassette window. Slide along a button above the window, and it opens to reveal the capstans and recording head, neatly attached to the base of the window.

Unique selling point?

If you have followed the short wave radio market for a number of years, you will know that attempts to incorporate cassette recorders into short wave radios have been few and far between. Sony have produced a couple, including the most recent WA-8000 (which can still be found in some retailers). Sangean still make a table-top radio cassette - recently restyled - marketed in Britain under the Roberts name, and in Germany as Siemens.

So what stops manufacturers producing radios that record? Nothing, it seems, except the public's reluctance to part with cash to buy such a beast. There are plenty of combination stereo systems that offer a cassette player along with a tuner, but few record directly from radio, and none have short wave bands worth anyone's while. Speak to keen radio listeners, and you'll find many people who want to record *The Archers* in order to listen at a more convenient time. Maybe the manufacturers need to be prodded.

Through its paces

Meanwhile, back at the new Sony product, let's look at what it can do. Essentially, it seems to be a hybrid of the ICF-7600G and the tiny ICF-SW100 (reviewed in the May '94 issue of *SWM*). The radio offers the standard continuous coverage from the very bottom of long wave, at 150kHz, to the top of the short wave, at 29.999MHz. There is also f.m., running from 76 to 108MHz. Tuning steps are 1kHz on long, medium and short wave, plus 9kHz on both long and medium wave and 5kHz on short wave. The medium wave steps can be switched to 10kHz to take account of channel spacing in the Americas. Rather than hiding a tiny step control switch away in the battery compartment, step change is conveniently achieved using the keypad.

Stations can be tuned by entering the frequency. The set uses the standard Sony convention of a single press of the DIRECT key, followed by the frequency in kilohertz on the calculator-like keypad and then a single press of the ENTER key. Alternatively you can tune up and down the bands by means of the four up and down keys. The outer buttons change frequency in the larger steps, the inner in the 1kHz steps. The user can also step through the broadcast bands by holding the AM BAND button and simultaneously pressing either one of the up or down keys.

Like all radios with clocks, this set has a sleep function to turn it off automatically after a pre-determined time. You can choose a switch-off time in ten minute steps between 90 and ten minutes and the display shows the duration chosen. This sleep facility has been cunningly designed also to control part of the recording function.

Continued on page 49

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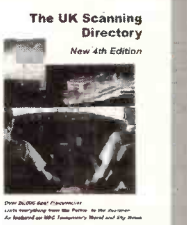

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DX V1300 Discone

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Mail Order: SRP Trading, Unit 20, Nash Works, Forge Lane Belbroughton,Nr. Stourbridge, Worcs, Tel: (01562) 730672. Fax: (01562) 731002

VISA

Shop: SRP Radio Centre, 1686 Bristol Road South, Rednall, Birmingham B45 9TZ. Tel: 0121-460 1581/0121-457 7788

Synchronicity rules, OK?

The ICF-SW1000T provides standard a.m. reception, although disappointingly the bandwidth cannot be switched between wide and narrow. In addition, signals transmitted in single sideband can be resolved using the selectable upper and lower sideband control. The now ubiquitous synchronous detection mode is also included in this Sony digital. If the short wave broadcast you are listening to has another station on a neighbouring frequency causing interference, you can select the synchronous detector and the set will lock on to whichever of the two sideband components of the broadcast signal that carry the audio unaffected by the interfering station. Reception can often be greatly improved using this facility.

Synchronous detection can also help to counter the deep fading effects which can mar short wave reception. It does this by generating a pure carrier that is synchronised with the broadcast signal's carrier. This compensates for the distortion problems caused by fading of the original transmitted carrier signal as it travels through the ether.

What's on display?

The frequency that the receiver is tuned to is displayed in megahertz in the liquid crystal display; the figures are clear and easy to read. The display can be illuminated by pressing a button on the right hand edge of the front face. To save battery power, it switches itself off after around 20 seconds. On the test model, the light faded gently instead of switching off suddenly. In the top left of the display is a rudimentary signal strength meter - if the word TUNE is shown, the set believes that it is locked to a strong signal. If that part of the display is blank, the signal is very weak or non-existent.

The other radio-related information in the display concerns memory functions. Up to 30 frequencies can be stored in three pages of ten memories each. Programming the memory is simple: call up the frequency and press ENTER and the number of the memory you want to assign that station to. Switching through the three pages is done using a simple toggle switch marked PAGE. To aid rapid selection of stations at home and abroad, you might want to save local f.m. stations in page one, favourite international broadcasters on page two and BBC World Service on page three. In addition to frequency, the memory presets also store reception mode (standard a.m., synchronous detection or one of the sidebands).

Recording

Let's flip the set over and see how the cassette recorder works. Slide the release key to open the cassette window, and slip in a cassette. Gently close the unit (bear in mind that the window itself houses part of the cassette mechanism - I wonder how robust this arrangement is?) and press the play button on the top of the set. The cassette motor comes on, and the display changes from clock or frequency to show the word PLAY, and an arrow provides information on the direction the tape is travelling as this is an auto-reverse system. Tapping the play button again changes the direction of tape travel.

Recording a programme can be manual or automatic in operation. If you are listening to a radio station and want to record it, the procedure is identical to any other cassette machine: just slide the record button and the recorder starts to work. You can choose which side of the cassette you want to record using a combination of buttons.

If you want to set the machine to record at a later time, the procedure is more complicated, but can be mastered quite quickly, and it works on the same principle as setting the radio to wake you up. There are two 'standby memories' which can be programmed with a frequency and wake-up or start time in addition to the 30 conventional presets and either one or both of these can be chosen to start the record (or wake-up) function. The digital display confirms your choice with the word STANDBY followed by 'a' or 'b'. Once you have selected the time, it is necessary to choose the record duration using the sleep facility. A single press of the sleep button, immediately beneath the radio on/off switch, selects 60 minutes, then further presses switch through 10 minute intervals down to ten minutes, then back up to 90 minutes. This seems confusing on first examination, but it has probably been chosen by the Sony engineers as a C-60 cassette is the preferred recording medium, and an hour is probably the length of programmes most often recorded by listeners.

The final step to ensure that record mode is selected is switching the MODE knob on the front panel from RADIO (use this for a radio alarm function) to REC. While the display indicates that the standby mode is selected, there is no visual confirmation that the recording function is set to operate except for a tiny little window alongside the MODE knob which changes to a red colour when RECORD is chosen.

Sony have included a tiny stereo microphone that can be clipped to clothing and this provides good audio for recording speech. Note, however, that the Sony microphone is 'phantom-powered' from the set's battery and therefore other microphones may not be suitable for connection to the ICF-SW1000T.

How well does it work?

On short wave, the ICF-SW1000T is good, and in some cases better than other

Continued on page 50

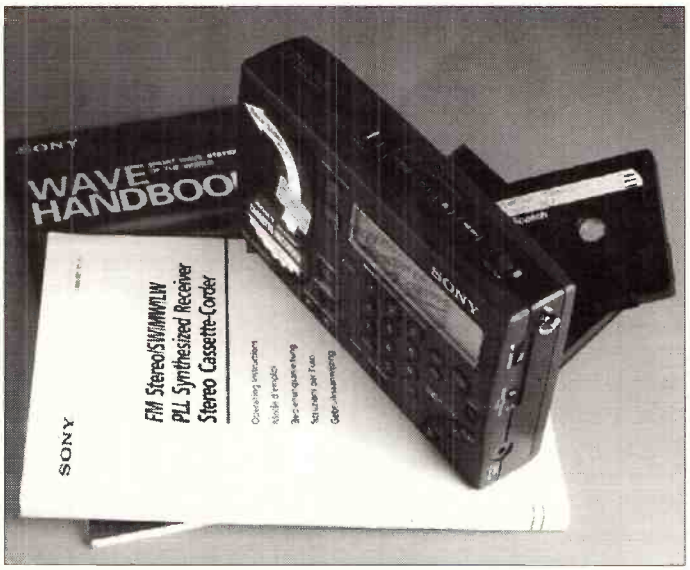
receivers made by Sony. It seems to have consistently good sensitivity on all parts of the broadcast bands. On long wave and medium wave the sensitivity is only fair. Reception on f.m. is going to be most troublesome as the set overloads when presented with strong signals. There is a sensitivity control on the set and if you live in an area where there are a number of local high power f.m. transmitters you will need to switch this to LOCAL, but remember to change it back to DX when listening to a.m. signals. An external antenna can be connected for a.m. listening and the handbook suggests connecting Sony's AN-100A active antenna, but in practise I do not believe that this is needed for listening in Europe.

Selectivity on short wave is very good, and use of the synchronous detection facility makes listening on this receiver quite pleasurable except in the most extreme conditions. However, the filter has clearly been optimised for short wave reception, and is perhaps too narrow to allow good audio on medium and long wave stations.

On f.m. selectivity is, as in all Sony portables, too wide to cope with the large number of stations closely spaced in metropolitan - and increasingly in rural - areas. This is disappointing, especially in a set aimed at radio enthusiasts who may well want to DX the f.m. bands.

Conclusions

Overall, this new radio cassette recorder performs well on short wave, and offers reasonable reception on other bands. It is well designed, and once the comprehensive handbook has been digested (there are some interesting translations from the original Japanese into English), easy to operate. Incredibly, just three AA-size batteries are needed to run this machine, and just one of those powers the cassette section. In practice you can expect around 18 hours listening and up to five hours of cassette operation on one set of batteries. An external 3V d.c. adapter (not supplied) can be connected to save battery consumption.



The audio quality is high even though the loudspeaker is not enormous, and recording using the stereo microphone supplied is high quality. Stereo mini-headphones come with the set, and offer excellent reproduction. Surprisingly no noise reduction has been included in the cassette.

I had a minor niggle about the cassette window opening knob: it is very small and is located too close to the upper opening edge of the window. Consequently I found that my fingers prevented the window from swinging open. I am also doubtful about the concept of incorporating the expensive parts of the cassette recorder in the opening window. Some engineers I showed the set to expressed reservations about the ruggedness of the arrangement. The watchwords are: treat it gently!

Having said all that, I found the ICF-SW1000T a pleasure to use, and was impressed with its capability on short wave and the flexibility of its recorder. Audio quality is good, too.

Specifications

Radio Section

Frequency range:

LW	150 - 529kHz
MW	530 - 1620kHz
SW	1.621 - 29.999MHz
VHF	76 - 108MHz

Modes: a.m., s.s.b., c.w., f.m. stereo

Audio output: 250mW (10% t.h.d.) mono.

Cassette-Corder Section

System: Compact cassette stereo

Frequency response:

Playback	20Hz - 18kHz
Record/Playback	70Hz - 8kHz

Power: 3 x AA batteries (two for radio, one for cassette)
3V d.c. external

Size: 176 x 105 x 40mm

Weight: 593g with batteries and a cassette

Sockets: Microphone, earphones, 3V d.c. power, external antenna

Accessories:
Stereo lapel microphone
Stereo mini-headphones
'Washing-line' antenna
Carrying case and strap

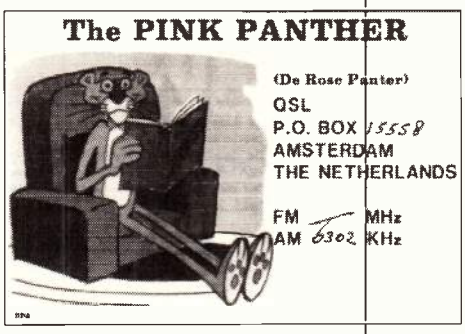
Options: Mains adapter
Active antenna

Who's it for?

If you asked me who I think would be the prime customers for this set, I would say anyone who wants a convenient, pocket-sized receiver with built-in cassette function. And that means a huge number of people who enjoy radio but complain that there is no sensible radio equivalent to the video recorder. But I have to say that when I first learnt the retail price of this piece of kit, I was amazed. The UK retail price is £429.99, which is more than a wide range of sophisticated NICAM stereo video recorders. The advantage is clearly the size, and miniaturisation of components costs money. So does it offer good value for money? I'm not entirely certain, but if you have spare cash and are in the market for something that has this many functions, go for it! My thanks to **Sony UK** and **Waters & Stanton Electronics, 22 Main Road, Hockley, Essex SS5 4QS. Tel: (01702) 206835** for supplying the sets for review.

Andy Cadier, 28 Romney Avenue, Folkstone, Kent CT20 3QJ

Off The Record



Well, Christmas has come and gone and fortunately so has the pirate radio silly season too. Reports regularly arrive here with suggestions new Radio Caroline ships are being prepared to do battle with the DTI. Another seemingly unlikely story was the equipping of a former lightship in Portsmouth harbour for use as a pirate station off Israel. The Israeli government have legislated against offshore stations and are establishing licensed commercial radio, the business potential of any offshore broadcaster would be seriously reduced. As light vessels don't have their own motive power I would suggest the towing charges would have exceeded the value of the entire project and the surrounding publicity an enticement to the DTI to do something.

Caroline Haunts Agency

Colin Clark kindly sent me a copy of *DTI News*, this is the in-house newspaper of the Department of Trade and Industry. The Radiocommunications Agency moved into their new offices at SouthQuay 3 during October to find Radio Caroline's *Ross Revenge* docked almost outside their front door. The director of the Radio Investigation Service, Barry Maxwell is pictured standing by the *Ross* after having exchanged memories with the crew. It was officers from his department that, in August 1989, were involved in raid on the *Ross Revenge* in which they systematically stripped the entire vessel of all its broadcasting equipment while in international waters. In a by-gone age pirates treated their adversaries of this magnitude to a delicately assisted invitation to walk the plank, perhaps some sort of atonement is in the air?

As I write this on February 9, details of a terrorist bomb explosion at South Quay are dominating the evening news, for once words fail me.

East Coast Commercial

There will be few short wave pirate listeners that will have failed to notice the absence of East Coast Commercial. Sadly Norman Nelson the station operator died of a brain tumour on 22 November 1995, he was 49. He will be remembered for his popular first Sunday in the month DX Programmes and his enthusiastic efforts towards providing information and entertainment for minority tastes by small s.w. stations. It is by no small coincidence that the logs provided by the Free Radio Monitoring Service are now a thing of the past.

Feedback

Horizon Sales have announced a change in name. For years John and Jenny Knight have sold Radio Caroline merchandise from their home near Ramsgate. Now, to establish a fresh corporate image and clearer indication of where their revenue goes, Horizon has become Radio Caroline Sales.

The radio trade magazine *Playback* has amalgamated with *Marketing News*. This merger has increased the size of the publication to include employment opportunities for broadcasting staff.

The anticipated surge of community radio licences, to replace the urban f.m. pirates, seems now to be on hold. Some proposed mini-stations have suggested using volunteers to staff their stations, at least at off peak hours. While others may pay token wages to part time employees so their salaries can be topped up by social security benefits. This could undermine the wages in the broadcasting industry and also give a new meaning to the words Free Radio!

Short Wave Radio Switzerland is now relaying former pirates over the 10kW transmitters of the Italian Radio Relay Service (IRRS) in Milan. The big attraction is that it is totally legal with Europe-wide coverage and a choice of two different frequencies. Charges are priced in US dollars and are approximately £50 per hour. A rate card can be obtained from SWR Switzerland, PO Box 35, CH-6027 Romerswil, Switzerland.

RPA AMSTERDAM

This actually stands for Rose Panter Amsterdam, which I presume, in English, is Pink Panther Amsterdam. This station started in December 1994 and broadcasts on occasional Sundays in the 48 metre band. Using just 25W RPA has regular listeners throughout Europe, identification is given in English. Operator Piet says he likes to experiment with home-built transmitters and commercial free programming. He also says that *SWM* is available in Amsterdam at the English Book Shop.

Britain Radio

Otherwise known as BRI, Britain Radio was first heard on air during June 1980, the normal format includes top forty, oldies and album tracks, mixed with radio news and special features. Their transmitters run at between 20 and 120W, depending on the operating circumstances, normally feeding an inverted vee antenna. A typical line up is Jayne, who doubles as station secretary, Roger Davis, who is station manager, Guest DJ, and Solid Gold Rock Sunday. Programmes have been curtailed a little due to the lack of sunspot activity.

Reception

I received two letters about pirate radio reception, which is clearly much the same as receiving any other station. **Andrew Cooper** of North Walsham, Norfolk says he uses a cheap s.w. receiver with an inaccurate dial. Tell me about it! I have a Sony ghetto blaster in my kitchen with a 24 metre wire antenna attached to a summer house at the bottom of the garden. I am able to listen to the stronger pirates while cooking Sunday lunch, you don't need an expensive radio to listen to s.w. pirates. However the better the radio the more you will hear, as you have more control over the incoming signal.

Graham Smith of Ealing in London says he receives f.m. pirates well in his car but has difficulty at home even though he has a roof antenna. I would suspect the antenna to be of the wrong polarisation, or a directional Yagi that is facing the wrong way. Pirates and RSLs use vertical polarisation, so horizontal antennas are not very effective with these stations. Most larger transmitters have dual polarity to avoid this difficulty. A possible solution could be to try a vertical dipole and see if reception improves.

Underground Music

Living in Folkestone I frequently get asked about radio in the Channel Tunnel. Clearly reception is impossible underground, however, the Shuttle trains that carry cars and light vehicles are equipped with two on-board f.m. stations. One is in French, the other English, the frequencies are advertised in the carriages and programmes are recorded by a French company. Other information is provided on an illuminated moving message display in each compartment.

The UK terminal has an eight year RSL 'Channel Travel Radio' on 107.6MHz (mono) that comes from the Eurotunnel control building. The information includes departure times, currency exchange rates, duty free offers and both pop and classical music. Presentation is mostly live, running 24 hours a day with staff on air approximately eight hours each shift. Future plans include low power roadside relay stations along the M20 towards Maidstone. One does wonder about the vulnerability of these repeaters to vandalism or theft. The address for Channel Travel Radio is PO Box 2000, Folkestone, Kent CT18 8XY.

Angel Nicked?

A communique received from Angel FM says that they informed the Radio Investigation Service of their intended final broadcast on Sunday 14 January 1996. This last programme was interrupted halfway through by the RIS who decided to attended this final celebration, they triumphantly departed with almost £4000 worth of confiscated equipment. Angel hope to secure a community radio licence for the Portsmouth area, however, persons convicted of pirate broadcasting offences face an automatic five year ban on any involvement in legal radio. Short wave listeners will remember that the Angel Radio relays carried by WNKR and Radio Zodiac on Sundays.

Short Wave Pirates

Station	Monitors
Brigitte	A,B
Britain	A,B,C,F
Crazy Wave	B,C
Delta	B
Doctor Tim	A,B
Dublin	A,E,F
Gemini	A
Good Music	A,D,F
IRRS (relays)	B,E,F
Jolly Roger	C,E,F
Laser Hot Hits	C,D,E,F
London (RFL)	B,D
Marabu	B
Mariquita	B
Mirage	A,D,F
Moonlight	B
Ozone	D,E,F
Pamela	B,D,F
Pandora	A,D,E,F
Panther (RPA)	B,D
Subterranean	A,D,E
Transatlantic	C
UK Radio	A,C,D,E,F
Weekend Music	A,F
Wonderful	D,E
WNKR (via JRR)	A,B,C
Zodiac	A,E

Monitors

A: Bob Marsh, Bexleyheath, Kent.
B: Bruno Pecolatto, Pont Canavese, Italy.
C: David Williams,Southampton, Hampshire.
D: Jack Diamond, Folkestone, Kent.
E: Rab O'Fokel, Sunderland, Tyne & Wear.
F: Sean Cooper, Wells-next-the-Sea, Norfolk.

Peter Shore, c/o SWM Editorial Offices, Broadstone

Bandscan

Europe

Every state in Europe, from Portugal in the west to Russia in the east, and from Spain in the south to Norway in the north, has an international radio station and consequently the continent has the highest concentration of international broadcasters compared with any other region of the world. But European countries, like almost every other area of the world, are having to tighten their belts when it comes to public expenditure and the budgets of state-funded broadcasters are feeling the pinch.

Budget cuts

Britain's BBC World Service has been told by the government that it's budget is to be cut in the next three years by up to £20 million. Capital expenditure - that's the money spent on buildings, transmitters, tape recorders and computers, for example - is to be reduced and the BBC will have to use the Public Finance Initiative to fund the rebuilding of its transmitting station in Oman. In addition, the revenue budget - the money that goes on staff salaries, travel, paper and recording tape - is to be cut.

This news incensed many MPs across all parties and in January the Labour Opposition called a debate that protested against the planned cutbacks which, it said, could reduce the station's effectiveness globally. The debate caused the Foreign Office that administers the World Service budget to give an assurance that if actual programmes were affected by the cuts, it would re-examine the situation.

Meanwhile in February, BBC World Service announced that its audience had reached a new peak. 140 million people now tune to BBC World Service at least once a week in English or one of the other 41 languages that are broadcast from Bush House.

Deutche Welle

In order to trim costs, many stations are rationalising their use of energy-hungry short wave transmitters. Deutsche Welle has operated a relay station on the Mediterranean island of Malta for the past 20 years, but during January transmissions from Cyclops ended as DW's contract, which ended at the end of December 1995, was not renewed.

The reason? DW has over-capacity in terms of short wave transmitting at its own sites in Germany. The Jülich station near Cologne (where DW's headquarters are located) will close during 1997, and the Voice of America has stopped using the Wertachtal station. It will probably lease out spare time on its domestic short wave facilities, and investigate the hire of medium wave transmitters on the European mainland to distribute some of its programmes.

As if to prove the point, Radio Vilnius began relays from DW transmitters at the beginning of January, replacing the relay from Russian facilities. The North American service at 0000UTC is carried from Germany on 5.91MHz. The first 30 minutes is in Lithuanian, followed by English.

Global Expansion

The story across Europe is not entirely one of gloom, however. The budget of Radio France Internationale is being increased by the French media authorities, drawing on an increased portion of the domestic TV licence fee. And Italy is in the throes of a major global expansion of state broadcaster RAI in radio and television. A new short wave transmitting station is to be built to improve reception of international radio services around the world. Regular readers will recall that RAI is beaming Italian language programmes to South America from the BBC's Atlantic Relay Station on Ascension Island; that arrangement has now been supplemented by transmissions from the Far Eastern Relay Station in Singapore.
You can tune to RAI in English at:

0425-0445 on 5.99 and 7.2750MHz
1935-1955 on 6.03 and 7.2350MHz
2025-2045 on 5.99, 7.110 and 9.710MHz

RAI still uses the old Radio Luxembourg medium wave transmitter (208 metres and 1440kHz) for Italian at 2000 daily.

Also in Italy is Nexus-International Broadcasting Association that relays programmes of a number of radio stations. The station is on the air from a 10kW transmitter:
0600-0830 on 3.985MHz (closes 0630 Monday to Friday)
0830-1430 on 7.125MHz
1430-2100 on 3.985MHz
2100-2300 on 3.98MHz (Friday, Saturday and Sunday)

Radio Portugal International is on the air from Lisbon with English on weekdays only:
1430-1500 on 21.515MHz to India
2000-2030 on 6.13, 9.78 and 9.815MHz to Europe and 15.515MHz to Africa.
0230-0300 on 6.095 and 9.57MHz to North America.
Listeners in Europe who want to practise their Portuguese language skills can tune in Monday to Friday:
0600-1300 on 9.780MHz.
1700-2000 on 6.130, 9.780 and 9.815MHz.

Takeover Bid?

It could be said that Americans are trying to take over Europe. BBC World Service launched a co-production, one hour long news programme in January with WGBH, the public radio station in Boston (which is also a TV station - you may have seen the call letters on the closing credits of TV programmes including many of the BBC's natural history productions).

The programme, called *The World*, is aired on a small number of public radio stations in the US at present, and will expand in the Spring.

It aims to bring a different perspective on global news to that usually heard in the US, even on the less tabloid public radio stations, and is produced by a team split between Bush House in London and the WGBH studios in Boston. Listeners in Europe have the chance to listen via the World Radio Network satellite channel on Astra.

And WRN is now carrying America One throughout the day on Astra's transponder 22 at the audio subcarrier on 7.740MHz. Programmes come from National Public Radio (famous for *All Things Considered*, the drive-time equivalent to Radio 4's *PM* that could be heard on short wave via AFRTS until a few years ago) and Public Radio International. The launch of the new service means that WRN's schedule has altered a little (it's also on Astra transponder 22, but uses the audio subcarrier on 7.380MHz). NPR has moved from the 1900-2100 slot, replaced by the Voice of America, then YLE Radio Finland and Deutsche Welle.

For full information about America One, contact the station at **Bernt-Notke-Weg 2, 81927 Munich, Germany**. World Radio Network is at **Wyvil Court, 10 Wyvil Road, London SW8 2TG, UK**.

That's just about all for this time, except to note that it seems public service broadcasting still has a place in Europe. Rupert Murdoch put forward a bid for television coverage of the Olympic Games to the year 2008, but was beaten by a negotiating team from the European Broadcasting Union who offered less money but guaranteed more viewers, as EBU members are the national terrestrial broadcasters in each European country. Maybe that means there is hope for everyone who believes that commercially run stations are not the be all and end all of broadcasting.

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

DX Television

The long-awaited Quadrantids meteor-shower activity in early January was masked by some Sporadic-E reception! Openings occurred on January 3 and 4 with signals from central and south-east Europe, notably from Germany on Channels E2 and E3, Slovenia E3, Serbia E3 and Croatia E4. On the 7th there were signals on Channel R2 from Hungary (MTV-1) and possibly Moldova, while on the 8th the Danish PM5534 test card made a brief appearance on Channel E3. Serbian TV was identified on the 9th and 14th on Channel E3. To round off the month, a short Sporadic-E opening from the east materialised on Channel R1 around mid-morning on the 31st.

An unusual short-lived tropospheric opening also occurred on the 4th from the Netherlands at around 1740 with NED-1 on Channels E4, E6 and E7 and NED-3 on Channel E30. By 1815, the signals had completely disappeared!

Reception Reports

On January 4, **Paul Logan** (County Fermanagh) noted strong Sporadic-E signals from Eastern Europe between 1230 and 1315. A nature programme from TVP-1 (Poland) on Channel R2 was present with colour and sound being resolved for most of the time. At around 1330, ARD-1 (Germany) put in a brief appearance on Channel E2. TV Nova (Czech Republic) was present on Channel R1 with *Married With Children* and possibly *Cheers*. Paul comments, "I wonder what the Czech audience make of these programmes!" It seems that TV Nova shows mostly American programmes. They also have a Czech version of *Spitting Image* complete with a latex puppet of Vatslav Havel!

Stephen Michie (Bristol) logged different signals to Paul during the opening on the 4th. At 1340, RAIUNO (Italy) was present on Channel IA, while on E2 only weak line syncs were present; pictures could not be resolved. Text pages from Slovenia were seen on Channel E3, identified by the SLO-1 logo and Teletext page headers. By mid-afternoon, German widescreen programmes had appeared on Channels E2 and E4 and at 1513 an episode of *Star Trek* was seen via Austrian TV on E4 from the ORF-1 Patscherkofel transmitter.

Slovenia was later noticed superimposing their own SLO-1 logo over Austria's ORF-1 logo during a basketball game. Around 1525 HRT-1 programmes from Croatia were resolved on Channel E4 from the Psunj transmitter. Slovenia and Croatia were identified again on the 7th during a midday opening to the south-east.

Tom Crane (Hawkwell, Essex) used a scanner to monitor Sporadic-E signals late in the afternoon on the 7th. Channels R1, R2, E3 and E4 were particularly active between 1630 and 1750. Channel R2 signals came up to 'TV level' and at 1630, Tom noticed a logo in the top-left corner of the screen resembling the TV Moldova 'RM' logo. The scanner frequency read 59.239MHz.

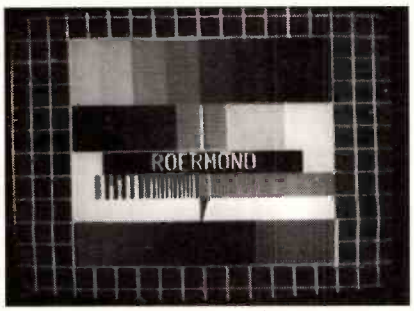
Peter Barber (Coventry) has submitted an excellent log for January 4, 7 and 9 with entries resembling most DXers' summer logs! On the 4th, signals were received between 1512 and 2156, although the later reception was due to Nederland-1 signals from Lopik that are present for most of the time. Peter identified RAIUNO at around 1500 on Channel IA and German sound from ARD-1 on E2 at 1530. A Sporadic-E opening on the 7th between 1238 and 1615 brought in Slovenia on E3 with subtitled programmes. By 1320, the E3 signals were coming from Serbia, identified by the PTCb1 logo in the top-left of the screen (the shape of a satellite dish is part of the logo). German ARD-1 signals on Channel E2 were also identified. A late-morning opening on the 9th also produced Channel E3 signals from the south-east, notably from Slovenia and Serbia; the latter was showing a dog listening to a choir.

Since retiring from work, Peter is into TV DXing in a big way and is able to devote plenty of time to monitoring signals with his TV sets and a scanner. Apart from keeping a traditional log, a graph of real-time (between 0500 and midnight) against days of the year is carefully plotted with a fine-tip pen to enable the incidents of reception and their duration to be seen at a glance. This type of useful information is difficult to deduce from a normal written log.

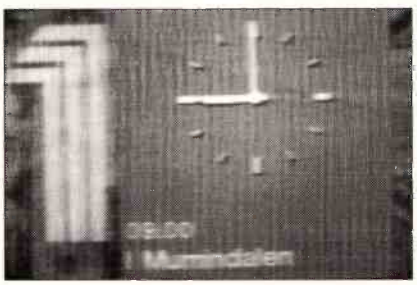
Examining a copy of the graph that Peter has submitted, it clearly shows that Sporadic-E openings suddenly increased in intensity and duration during the last few day of May 1995 with sustained activity throughout June and July but with a drop-off around mid-August. This type of chart also shows that several openings can occur on any particular day. Of course, channel details cannot easily be shown unless a separate chart is produced for each Band I channel.

News From France

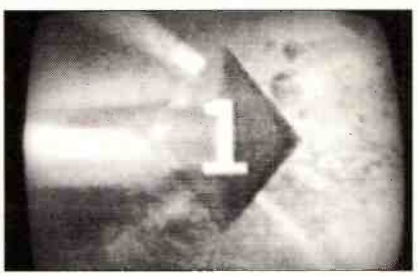
Lionel Michelland (La Rochette, France) has supplied some information about the current TV scene in France. A possible merger between 'La Cinquieme' and 'Arte' may take place in three years' time,



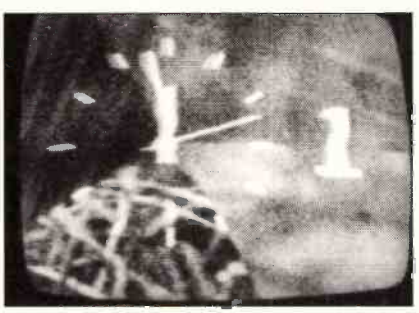
The FuBK test card radiated by Dutch outlets incorporating the transmitter's location. Received by Tim Tebbs in New Romney, Kent.



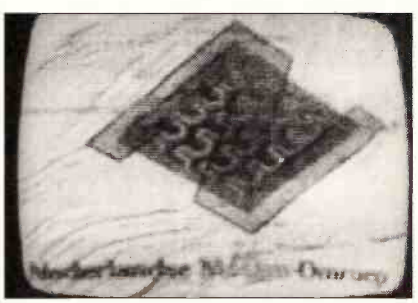
Swedish clock caption for the 1st network showing the name of the following programme. Received on Channel E3 during a Sporadic-E opening.



Part of the identification graphics for Nederland-1. Received by Stephen Michie in Bristol on Channel E29 from



Nederland-1 clock caption at closedown.



Nederland-1 with part of the identification sequence.

A distinctive test card used until the early seventies by Canadian TV. The callsign and channel number were included in the centre. This example was radiated in the Edmonton area. The transmitter had an e.r.p. of 318kW.

producing a network called 'France 5'. At the moment 'La Cinquieme' is available from 1500-2300UTC in the Paris area (also Epinal and Cannes via cable) while 'Arte' broadcasts between 1800-0100UTC.

The regional TV service '8 Mont Blanc' that serves the Savoie Haute region, located to the east of Geneva, frequently exchanges programmes with the Swiss TSR network. There are also plans to launch a joint Swiss/French TV regional service in the Lac Leman/Geneva area, that includes the Swiss cities of Geneva and Lausanne and the French resort of Annecy. The station will be called 'Tala Leman' and may be based in Lyon. The decision has still to be made as to whether the French system L (SECAM) or the Swiss system B/G (PAL) will be adopted.

Digital terrestrial TV tests will take place in September 1996 in Nantes and an evaluation committee has suggested that a 7th terrestrial TV service may be feasible in some French cities, depending upon the availability of spare terrestrial channels.

A microwave-distributed TV service (MMDS) has commenced in the south of France with Taladiffusion de France (TDF) offering 12 programmes. Frequencies in the range 3.6 - 3.8GHz have been chosen for the transmissions rather than the more common 2.5 - 2.7GHz range used by MMDS in other countries.

The Pay-TV service 'Canal Plus' now has four million subscribers in France. Meanwhile in New Caledonia the former 'Canal Caledonie' TV service has been renamed 'Canal Plus Caledonie'. Similarly in Polynesia the 'Canal Polynesie' service is now known as 'Canal Plus Polynesie'. Service name changes have also taken place in Quebec, Canada, where the French-language network has changed from 'Radio Quebec' to 'Tala Quebec'.

Benelux Test Transmissions

Stephen Michie (Bristol) has noted the following about Belgian and Dutch TV channels:

Belgium: RTBF-1 (French-language service) shows various text pages throughout the night plus programme schedules in the 16:9 widescreen format; programme trailers are frequently shown during the daytime.

BRTN-1 (Flemish language service) shows a widescreen PM5544 through the night with text pages after 0900. Last December, BRTN-2 were seen transmitting a widescreen PM5544 during the late afternoon on Channel E52.

Netherlands: During the transmission closedown sequence, Nederland-1 uses a blank clock and the standard PM5544 test card switching to the FuBK test card with the appropriate transmitter location name.

Nederland-2 radiates a clock caption with '2 Einde' superimposed. This is followed by the widescreen PM5544, then the FuBK test card with the transmitter name. A 'Pauze 2' caption is sometimes aired during the day.

Nederland-3 usually radiates sample pages of text throughout the night, but sometimes a stylised caption is transmitted.

Stephen also advises that Breakfast TV is now shown via the Nederland-3 network and not Nederland-2.

Keep 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.

Win an AOR AR7030

First of a three part competition with the star prize of the superb top flight AR7030 communications receiver.

This incredible new receiver from the AOR stable was reviewed by John Wilson in last months *SWM*. AOR (UK) have kindly donated a brand new receiver, worth **£799**, for a lucky *SWM* reader to WIN.

To enter the competition you must correctly answer three questions. The first can be found below, the second will be featured next month and the final question the month following.

You will need to complete the form below with the answers to all three questions, affix the competition corner flashes from the May and June issues and return your completed entry to AR7030 Competition, *Short Wave Magazine*, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.

Only fully completed entries on the form below can be accepted.

Closing date for this competition is 26 June 1996 and the draw will take place 27 June 1996 the winner will be announced in the August issue of *SWM*.

Question 1:

Does John tell us that the basic AR7030 comes with three, four, or five i.f. filters as standard?

Name .....

Address .....

.....

.....

Telephone .....

Answer 1: .....

Answer 2: .....

Answer 3 .....

If you do not wish to receive further information regarding AOR products please tick this box ☐

If you missed the March issue of *SWM* which contained the review, don't worry, you can get a back issue from the *SWM* Book Store, see page 78 for details.

AOR

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

(pictures by John Locker, Wirral and Roger Bunny)

Satellite TV News

Heavenly Sightings.....

Thursday February 15 saw the *Sea Empress* run onto rocks at St. Annes Head, Milford Haven in South Wales. One of the largest tugs in the world, a Chinese crewed vessel lay nearby in Milford Haven harbour. But having scoured the local Chinese restaurants for a Cantonese speaking interpreter to help with communications, refloating failed after several hours of radio talkthrough - the tug remained at rest!

The media, aware of the impending disaster, were soon on the cliffs at St. Annes Head. SNG van UKI-149 appeared February 18 with early morning live inserts into Sky News using the 12.536GHz vertical transponder on Eutelsat II F3 at 16°E. UKI-149 stayed atop the cliffs for several days reporting progress of the refloating attempts. Gale force winds seemed to move the uplink dish from correct boresight as sudden short-lived fades were apparent from time to time. Mid-afternoon of the 18th the ident 'TSG95' appeared and the 19th at 0745 both 'TSG95 and UKI 149 TANKER' were carried on colour bars (TSG95 ident is at the moment unknown).

ITN were intermittently using UKI 31 on a spot lease via Eutelsat 13°E for the early evening refloats (20th) on the high tides, BBC-Wales meanwhile were taking time on Orion Atlantic 37°W, the 21st both national inserts and for local BBC-Wales (including Welsh). The *Sea Empress* was eventually refloated evening of the 21st leaving oil slicks, an oil nightmare in local bird reserves and answers awaited on a disastrous shambles.

Canary Wharf will go into the history books as the day the IRA resumed their terror offensive in a most dramatic and devastating fashion. In the early evening of February 9, a large lorry bomb exploded, wrecking nearby buildings and killing two shop workers. By 1950hrs pictures were being fed via Eutelsat II F4 (10.965GHz hor at 7°E) showing the general scene of wreckage, later followed by the BBC's UKI 118 on Telecom 2C (12.606GHz hor at 3°E) using Sound in Syncs (SIS). In turn Walshy's (facility house) appeared with *News at Ten* inserts (II F4 11.003GHz hor) and more on Eutelsat II F3 at 16°E - 12.545GHz vert and 11.161GHz hor - and II F4 11.093GHz horizontal for live network inserts. These listings thanks to **Roy Carmen** (Lake, Isle of Wight) using his recently installed tracking system.

Late Sunday night February 18 and another IRA bomb, this time on a double decker bus in Wellington Street, Strand, Central London. The nature and location of this later explosion meant that news teams were taking camera footage directly to nearby studio insert points for network playouts and no SNG feeds were seen.

Much more gentle, though with discomfort for some, were the snow feeds early February, when blizzards and heavy snow falls closed down whole chunks of the UK. The veteran UKI 49 was first seen in the evening of the 7th with an early evening news insert (Sky) from Powys 'on top of the Brecons' featuring snow blockaded villagers, snow drifts and more snow. The next morning UKI 49 was again busy for the 0800 Sky News from a layby in a pine forest, more snow and a camera zoom in to a caption propped on an engineer's feet '3 day old wet feet'!

Odd to see a card held up for a camera white balance in an area where 95% was virgin white untrodden snow! And UKI 49 on the 9th has motored North and appeared in a Dumfries street, snow piled up several feet and fears of flooding from thawing snows and a nearby river. Eutelsat II F3 12.536GHz vertical worked overtime during this period.

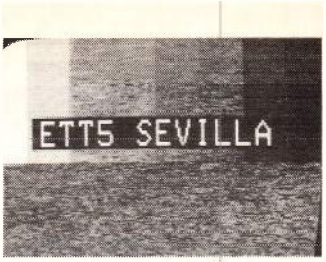
Good to hear from **Alan Smith,** our Thailand contact, who reports on AsiaSat-2 at 100°E and the new channels now available. RTP-Portugal runs at 3.98GHz and a scrambled Cantonese channel 3.76GHz. An Australian letter advises that a Russian satellite is also co-slotted at 100°E transmitting the Russian 1st programme that may cause interference problems once AsiaSat-2 is fully loaded. Alan is also receiving good signals (C Band) from PAS-4 at 68°E, two Indian channels (Doordarshan and Jain) and posibly CCTV-4 (or CETV-4) Taiwan (or China).

Unusual to hear from Brazil but **Paulo M Raymundo** (Bahia) lives 8 floors up in a shoreside high rise apartment block and still is able to satellite DX using a tracking 870mm dish (made by DH) for Ku band with an SWM 0.8dB noise KU LNB + 18K Drake LNB C Band LNB feeding Echostar LT-530 receivers. Paulo watches Intelsat K 21°W with many programme/feed sources familiar to UK zappers, in C Band on the 870mm dish he views BrasilSat B1 and watches 16 unscrambled using threshold extension, in addition though invisible on B1 are 12 scrambled digital channels and five scrambled analogue channels. Previously Paulo had a 2 metre C Band dish but removed it from the balcony as it was becoming 'too crowded'!

John Locker (Wirral) has now received signals from the recently launched PAS-3R slotted at 43°W (in position 18 days after launch) though as yet only S Band beacons have been monitored. Both John and myself have watched with interest the Russian Express satellite at 11°W that in recent times during early Ramadan has been downlinking Saudi TV at 11.525GHz circular. Ramadan has - as ever - been carried extensively by the Arabic stations, ART on Eutelsat 16°E featured live daily Saudi TV outside broadcasts with both English and Arabic commentaries.

Did anyone watch the later afternoon Ramadan 'programming'? Shots of the temple area showed the evening sky, yet within a matter of a few minutes the sun had set and the sky was completely black, a very rapid sunset which is (I'm told) a feature of those regions near to the Equator? Ramadan continues into February, ending typically mid-month.

Good to see the famous Eurovision logo recently when an ORF-Austrian outside broadcast unit covered Snowboarding at Leinz January 28, this the FIS World Cup. The Eurovision March music was played out and the programme ran with on-site commentary and links, this on Eutelsat II F3 11.638GHz horizontal at lunchtime. It was good once more seeing a traditional outside broadcast programme rather than the usual pictures with commentary fed into a broadcaster for packaging/presentation at a main studio base. TV as it used to be!

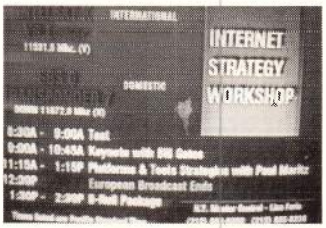


A gritty low level uplink signal from a Spanish outside broadcast site on Eutelsat II F2 at 10°E.

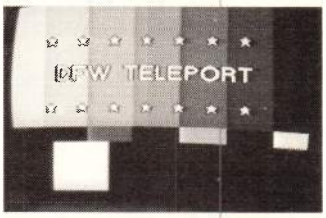
The AB-1 programme logo via the Hot Bird 1 at 13°E.

A sparklie free clean identification signal ex Baghdad - Eutelsat 16°E.

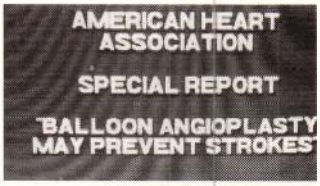
Intelsat K 21°W carried a programme package recently from Haiti.



Intelsat K also carries computer seminars into Europe whilst the event is simulcast across the US on the SBS-6 domsat.



An Orion 1 Atlantic teleport identification slide (37°W).

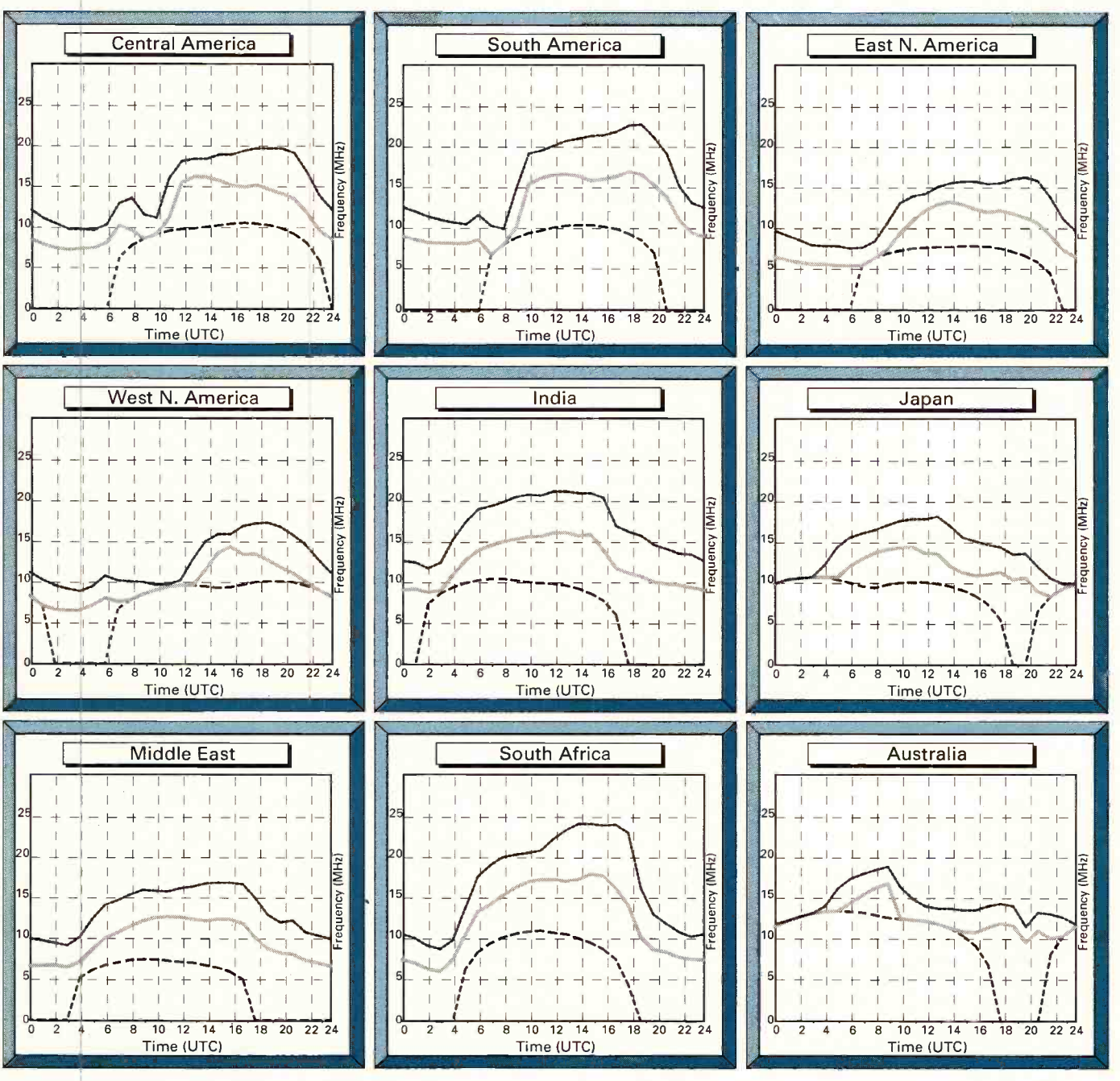


Another of the varied offerings via Intelsat K.

Jacques d'Avignon VE3VIA

World Propagation Forecasts April

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 January 1995, **Fig. 2** covers February 1996. In future each chart will cover one calendar month.

Fig. 1: Barometric pressure chart for December 1995 taken by Ron Ham at Storrington, E. Sussex.

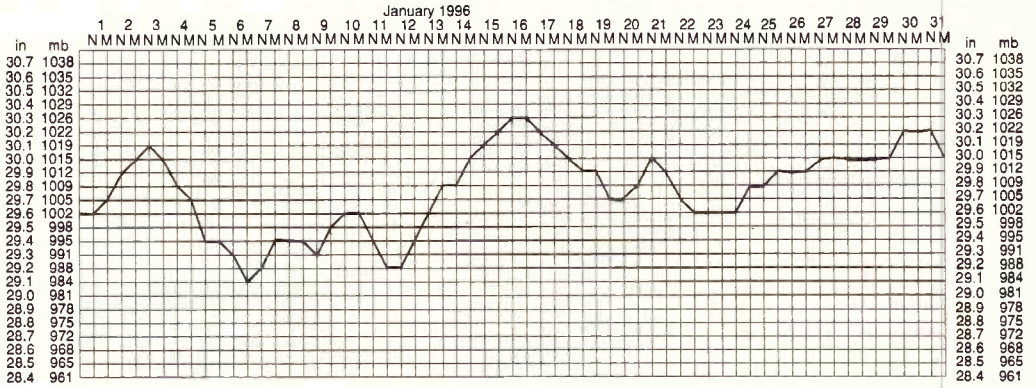
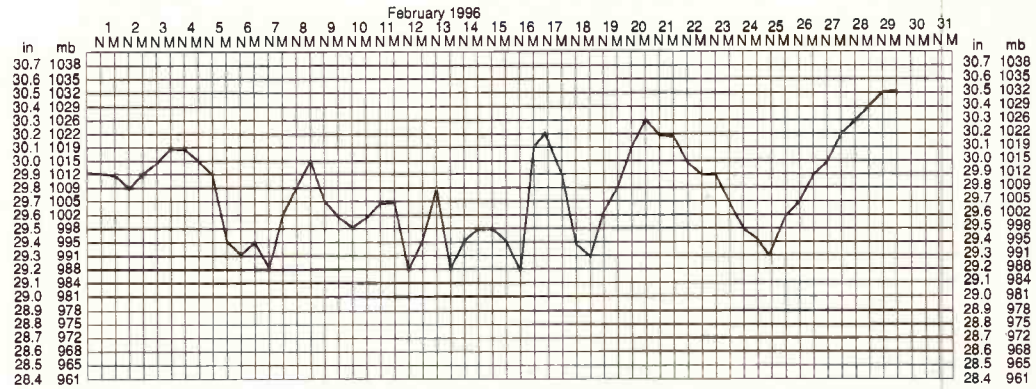


Fig. 2: Barometric pressure chart for January 1996 taken by Ron Ham at Storrington, E. Sussex.



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

Amateur Bands Round-up

Listening to the Amateurs

A copy of *Practical Wireless*, arrived a couple of days ago, and an article in it was remarking how much more sensitive a solid-state receiver was than a valved equivalent.

"So what?" I ask. It was known as far back as the thirties that a receiver could be made more sensitive than could be justified, at least in the range between medium wave and around 20MHz. This was simply because the natural background noise level, due to such things as static, was far higher than the receiver sensitivity. That ignored man-made noise, of course; nowadays, man-made pollution is rampant up to 200MHz or more. An attenuator is more to the point, as any proper s.w.l. knows! Anyway, measured sensitivities haven't changed much since 1930 in the up-to-30MHz region. If you happen to live in a pad where your nearest neighbour is a mile away, your nearest electricity distribution line several miles away and not a thermostat or a computer in the place, maybe the noise picture might be different...and I would be envious!

Letters

An interesting point arises in the letter from **Karl Drage** who lives near Kettering. Karl remarks on how he can pick out DX on 7MHz even though the noise level is above S9. This is where we find that steadily winding down the r.f. gain (and so desensitising the receiver) will at some point cause the noise to drop considerably and leave many previously inaudible signals clearly readable! Karl notes four new countries on Top Band, 16 on 3.7MHz, 13 on 7MHz but alas none on 14MHz, and asks why he hasn't copied me. Apart from the PARC nets on Sundays at 1100 on around 3.795, and Top Band on Tuesdays 1900 around 1.937, most activity is either c.w. or on v.h.f. f.m. on the GB3PW. Mainly, of course, listening rather than operating. As to my own score, I've long since lost count. All current ones have been logged as a listener.

A strong silent chap is **Geoff Wallis** from Chippenham; a log but no letter. On 14MHz we find a lone VK7CW, but 7MHz seems to have been given a thorough going-over, to result in 9Y4GR, 3V8BI, VE8RCS, KP4AT, 8P6ER, PT7MBA, HR1CW, 4N7CCP, VK3AMR, ZS6GPW, VP9AN, KP2J, HC2BN, W9LMT, YV7TN, PT7WA, EA8TB, 9L1GG, a questionable YE2IN (could it have been an Indonesian 'special'?), KQ4AV, JAs, 7X4AN, ND6L, AD4AI, HL5OC, TA3D, W3AM, PJ9JT, KP4FU, AL7AN/4S7, 8P6ER, VK3APN, 9S1GP for a possible Zairean special prefix, HP7HOA, 4Z1JS, W2LAI, AP2MC, CO2HT, AC6KD, YV4DTV, HP7FK, KC3UE, KN4AL, HK7/SM5HV, ZB2FK, 4S7CF plus the Europeans. Just goes to show what a new world opens up when you learn to copy Morse well!

After struggling with the amateur bands for years, **Tom Parrotte** in Weston-super-Mare has lashed out on a FRG-100 receiver and at the time of writing had this buckled to around twenty metres of wire from the roof down to the gate. First trials showed 3.5MHz to contains SV1DP, YL1ANO, EI6AH; on 7MHz ZS6AW under a pile-up, and on 14MHz Z31FK, EA9IE, 1B1AD (another of the pirates on north Cyprus), OX5WBY, 4Z4UR and W3AFW in QSO, JA4KFA and a gaggle of Europeans.

Two Challenges!

Sixty years ago, Jim Baccus, founded the HAC (Hear All Continents) Company, says **Ron Pearce** in Bungay, and to commemorate this, Ron has built a modified version of the old HAC one-valve kit, just to show the press-button ops what can be done; the 'lost arts' of soldering, tin-bashing, drilling holes and winding coils. On completion of his replica, Ron had a spin round the dial over Christmas, and on 14MHz snagged 9K2ZD, 5Z4SS, VY2RO, 9H4CM, VO1FB and KV4FZ plus lots and lots of W, K, A, N, VE stations. The next lists will show how the HAC copes on the lower bands. In conclusion, Ron offers a challenge to readers; build yourself a one-valve receiver and report results. To me he adds a second challenge; provide a separate section for those reports. I'm game, given I receive enough input. Over to you, readers!

D. J. Miller lives in Dawlish where he has about 12 metres of wire buckled to his FRG-100 receiver through a balun and antenna tuner. Top Band produced IK4MTK, LA3PU, OH3ES, OZ1AXS, SM5EDX, SP3CB, T77C, UT0MY, 4X4DK and 9A2NY; for 3.5MHz the scalps include A41KD, A92BE, CM8JY, HH7PV, JY4MB, KP4VP, TA3BN, VK2EW, XE8VK, YB5QZ, ZL1IU, 3V8BB, 4X4JP, 9J2FR and 9V1XQ. Up again to 7MHz to find A71BY, DS5NM, FG5HR, FM5DP, HJ4TTF (probably a Colombian 'special'), LU5FAO, VK4FML, YV5IVI, ZP5ALI, 5N0T and 9J2HN. At 18MHz A22CT, PJ8JD, VK6WL ZS6RI and 9G5BG were netted, while on 21MHz we see ZS5XA, 5B4ES and 9G1YR.

Next it's time to turn to **Colin Dea** in Barnsley, who stuck to the lower frequencies; Top Band produced SU2MT, while on Eighty the crop included A71DX, A92BE, A92FZ, C6AMP, EX0V, EY8AM, EZ6DK, RG5FU, HL7IUA, JX9ZP, J69MV, KG4MN, KP2AD, OD5SB, OY9JD, SU2MT, TA3BN, KB9FIG/AM over Iceland, TK5BF, UK8GK, UN9LM, VP2VF, VP5/KV1Y, V21AK, V44NK, W6/7, WP4JTB, YB0CN, ZA7AJ, ZA5B, 3V8BB, 4F2BP (=DU), 4L4KK, 7J6CCU, 9K2MU and 9Y4NW. At 7MHz Colin logged FP4CJ, FS/DJ6YC, JA7IXL/7, TR8XX, UK9AA, ZS6P, 5A1A and 5N9LGP. Once upon a time, **Jon Baker** in Leatherhead had G1PGH but he let it lapse; this was because of losing interest while studies took their toll. Now, at 27, Jon is seriously thinking about his Morse test. On the listening side, Jon says he will only log a signal after he has heard the operator himself give his callsign - none too easy at times when a DX pile-up is going on and the chap is only giving his own call at infrequent intervals! On a different line, Jon wonders about the ex-USSR countries lying in Asia. UA9 and UA0 and the variants sporting 9 or 0; Azerbaijan was UD is now 4J4K; Georgia was UF is now 4L1; Kyrghzystan was UM is now EX2-6-7-8-0; Tadjikistan was UJ is now EY4-5-6-7-8-9; Turkmenistan was UH, now EZ3-4-5-6-7-8; Kazakhstan was UL, now seems to be UN2. That represents the state of play as I know it; I'm not entirely convinced it's all in tablets of stone!

Sheerness in the Isle of Sheppey is home to **E. H. Trowell** and his antenna farm. Ted got on Top band around 0600 for PI4CC, TK2C, TF3EJ, OY9JD, ZB2X, K1ZM, K3ANS, OH0MEP and EA6CC. Around the same time 3.5MHz produced K0ARS, P40J, W4BQF, EA9PB and 8P9HT. 7MHz was worked over; at 0600 ZL4AU, PR7PO, 3V8AS, then around 1600 JA0KM and 4Z5BZ, and 1900 for VK6VZ, 3DA0NX, JH5FXP, VK2KM, EA9EU, TA4ZM, ZA1AJ. At 2000 Ted noted VU2PAI and VK3MR, at 2100 PY7XC, YA9XL, KP2J, and at 2200 the day was rounded off by FG5GH and VS6WO. 14MHz was investigated around 1600 to find 9H4AC, W6THN, S79JD, D68SE, WA7DNB, EA9PY, TU/N7BG, FY5YE and W0IAK; around the same time 18MHz yielded CO1CL, N0TM, TR8DF, 6Y5AL, DL1GKO/HI3, DL2GGH/HI3, G3XAQ/6Y5, HK0/DL4MEH and 8P9HT. Finally 21MHz and here operations around noon put a few in the log, like:J28JA, P40W, SU2MT, ZS6NW, TA3D, 9Q5MRC, VP5FOC, PY0FF, 3DA0NX, TA4ZM, 7Z5OO, ZA1AJ; at 1500 LU5GPL, CO8LY, 4M5X, ZW5B, HK0/DL4MEH, VP9NND, EA8/ON5UM, W6XR, TI4SU/HI, ZF2RF and CO2DC. All on c.w.

Top Band

Our anonymous contributor popped up again, to ask about Top Band in suburbia. The gear, of course, is no problem; a receiver that covers the band. On the antenna side most of us just do the best we can. Some things we can do to help. First, if we are proposing a system involving a ground connection, bear in mind that 'earth' isn't a spike a couple of feet into the deck, and also that modern waterpipes have a nasty habit of being made from plastics!

Basically, you need either lots of buried radials and/or some quarter-wave above-ground radials. Buried ones, any length but lots of 'em; above-ground ones possibly bent around the property but resonant on the band. As for the part up above, bear in mind that the useful work is done by the high-current portions. Now, this portion is about a quarter-wave - say forty metres - back from the far end; so now you know which bit of the wire should be up in the clear. Add whatever is needed to get the thing to your tuner; use the latter to bring to resonance as a system. Always remember that with these 'funny' antenna systems you are trying to reduce the **losses**. Finally, the 'noises off'; thermostats can usually be suppressed, and most of the line time-base noise seems to be amenable to mains lead.

Fine so far. Now remember that the DX on this band is, in the main, to be found late at night through until morning, implying a path that is all in darkness. Tune everything up in the daytime when it won't upset anyone, then use it at night. The majority of DX is on c.w. of course, around 1.825MHz.

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

SSB Utility Listening

A Royal Navy 'Rescue' Sea King helicopter. It is painted grey and red with white lettering.

Photo Graham Tanner

At the end of January 1996, another part of the UK Search and Rescue (SAR) system passed into history. For many years, there has been two Rescue Control Centres (RCCs), one covering the northern half of the British Isles, and another for the southern half. These were at Mount Wise near Plymouth ('Plymouth Rescue'), and at Pitreavie Castle near Edinburgh ('Edinburgh Rescue').

With effect from midday on the 31st January 1996, the northern RCC moved to RAF Kinloss in Morayshire, and the old site was closed down. Some of you may have seen the TV news items regarding the closure (and subsequent 'for sale' signs) of RAF Pitreavie Castle.

The new site at Kinloss also has a new name to go with its new responsibility - Air Rescue Coordination Centre Kinloss (ARCCK), but they will answer on h.f. to the callsign 'Kinloss Rescue'.

To act as a reminder of what the 'Rescue' helicopters look like, on this page is a photograph of a Royal Navy Sea King from RNAS Culdrose; these use the callsigns in the range 'Rescue 190' to '197' when on SAR missions.

Twin Receivers

Another few letters have been received giving details of the various methods and equipment available to connect two receivers to a single antenna.

Guy Denman writes enclosing a copy of a price list and advertisement from the Shenzi company in North Yorkshire. They manufacture a 'HF antenna splitter/ combiner'. The advert mentions that their device can be used in either direction - running two receivers from a single antenna, or connecting one receiver to two antennas. Guy says that it is difficult to do a review on a small *abs* plastics box fitted with SO-239 sockets, but he does add that his unit works extremely well. Guy mentions that he asked for a small modification to the standard unit, so that it can be used with two receivers and two antennas, and says that Shenzi only added a few pounds to the standard price.

In a similar vein, **Caspar Hauser** writes from the Netherlands about a device manufactured by RF Systems. Their 'SP-1 Antenna Splitter' offers more that 30dB of isolation between connected receivers, and the unit covers the range 50kHz to 35MHz. Caspar bought his unit on the continent, but says that he has seen that Lowe are the UK importers of equipment from 'RF Systems', so they should be able to get the SP-1. (*We have checked and they are normally ex-stock from Lowe Electronics - KN).*

CCF

Late last year I mentioned the Combined Cadet Force (CCF), and their 'Winter Wine' contest held in early December. Well, the competition was held on the dates I mentioned in the December issue of *SWM*, although it seemed to have a slow start, and the bad propagation meant that the signals were not too easy to hear.

The results of the contest were announced on Christmas Day at midday on 5.328MHz. On those occasion, this frequency was 'BA'. In fact, the Net Control Stations were chatting about general CCF matters for over 30 minutes.

The 'Winter Wine' contest was won by station '29C', and one station commented that they had won all three contests in 1995, and maybe should be excluded from contests during 1996. I was only aware of two contests, but a while later one station mentioned their 'Sore Ears' contest to be held at Easter.

If this contest follows the pattern of the other contests, it will run from 15.00 on the Saturday, and finish 24 hours later. The objective is for each CCF station to 'work' as many other CCF stations as possible, on as many CCF frequencies as possible.

Since this issue of *SWM* is due out a few weeks before that date, maybe you can try to log some of the stations in this contest.

On Christmas day, station '88B' sent 'greetings to all listeners, from the snowy north' - if he ever gets to read this, somebody was listening!

Magic

The callsign 'Magic' is used by E-3 AWACS aircraft operated by NATO and the RAF. They are heard frequently on h.f., usually working their ground station (DHN66) at Geilenkirchen in Germany. What is not generally known, is that the aircraft use two callsigns - one for the pilots flying the aircraft, and another for the radar operators and other crew in the body of the aircraft. The 'NATO' callsign is used by the flight-crew, and the 'Magic' callsign is the radar operators.

Brian Heath reports hearing 'Magic 52' working 'DHN66' on 8.980MHz, requesting a weather forecast for various airfields; the data was transmitted by RTTY a few moments later. Another 'unlisted' frequency used regularly by 'Magic/NATO' aircraft is 6.754MHz. They usually contact station 'J4P', which sometimes answers as 'Magic Command', but they often pass messages in code. They always refer to airfields by their 4-letter ICAO codes (e.g., LGPZ is Preveza in Greece, and ETNG is Geilenkirchen), and they always refer to frequencies by 2-letter codes. The most often quoted listing of frequencies and codes is as follows:

Code	Frequency (MHz)
AA	6.700
AB	11.228
KD	6.760
KF	6.695
NC	3.225
NE	4.542
NF	4.720
NG	4.756
NH	4.758
NI	6.7625
NJ	8.965
NK	11.2705
NL	15.050
NM	17.9965

Brian reports hearing 'Magic 57' working 'Magic Command', requesting that they QSY to 'XE'. Does anyone know which frequency this is?

Questions

I have almost run out of readers questions, so now is the time to write-in if you have any burning questions that you want answered concerning h.f. s.s.b. comms.

The questions covered in the past few years have been very wide-ranging, so don't worry if you think that 'your' question is too simple or obscure. If I don't know the answer (which is most likely), one of the readers is bound to know!

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

5.3085	(25/12/95, 12.38) Two unknown French stations, C20 and C69, passing messages to each other in slow spoken French.
5.532	(22/12/95, 20.27) Aircraft 'GC' working Czech LDOC in Prague, including counts from 1 to 10 in Czech. This should be Czech Airlines Boeing 737 OK-XGC.
5.652	(2/12/95, 23.51) Niamey ATC (part of the AFI-2 network) working Springbok 235, Speedbird 56 & 57, and Nigerian 807. Also heard were Algiers ATC and N'Djamena ATC.
6.876	(2/1/96, 20.23) an unidentified German aircraft trying unsuccessfully to get a phone-patch through Stockholm LDOC. Stockholm requested that they try again later, and offered to call the aircraft back on selcall; the pilot said his selcall was AJ-BR (= Condor Boeing 757 D-ABNH). (2/1/96, 20.41) Air Europa flight AE744 working Stockholm LDOC with a phone-patch to Italy. An odd frequency for Stockholm to use?
8.924	(14/12/95, 11.30) BWIA901 flight working an unknown LDOC in the Caribbean, passing their e.t.a. to Antigua as 18.05z, and asking for 'todays news headlines'. The ground station said they would get the data and call them back on selcall.
8.933	(4/12/95, 21.59) an unknown flight working Lufthansa LDOC in German, estimating EDDM (Munich) at 23.30. They said that they would call again at 23.00.
8.948	(14/12/95, 02.30) Indian domestic h.f. network, including Bombay and Bhopal ATC's, and aircraft 'VVE' requesting a weather report for Nagpur.
8.970	(14/12/95, 02.18) Kuwait Airlines flight KAC302 calling Kuwaiti Ops, but getting no reply.
9.003	(13/12/95, 22.53) Jordanian flight RJA053 working Amman, reporting that they had 40 tonnes of cargo on board; the rest was in Arabic.
17.977	(24/12/95, 12.24) Safair aircraft ZS-JJA calling Safair Ops in Johannesburg; 'JJA said they were 'on the ground at Las Palmas'. A few minutes earlier I caught the end of a phone-patch between the pilot of another Safair aircraft and his family.

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

Airband

Roger Preston shows Godfrey the yellow 1944 Piper Cub G-HEWI, of which he is part owner
Christine Mlynek

BN2 Islander. Christine Mlynek

Bölkow Junior Christine Mlynek

I still haven't discovered the routes flown by, and purposes of, the various military helicopters seen over Aylesbury (where Chris, our photographer, lives). There are often Chinooks that possibly originate at Odiham. The other weekend we saw a flight of Lynx east-to-west (prior to the airshow season). Who can tell us more?

One I do know is the new yellow-and-black helicopter jointly operated by Thames Valley, Bedfordshire and Hertfordshire Police. It will perform casualty evacuation as well as law enforcement duties, and is based at Luton. If I see it over Aylesbury, I'll tell you more. They previously had an MBB-105 of the Police Air Service, you can tell this company's fleet by the registrations in the G-PAS series.

On the Air (and In It, Too!)

Tim Pilling (Ashton-under-Lyne) is one of many who are interested in ACARS data transmission between aircraft and ground. Certainly, 131.725 and 131.525 carry these short, noisy bursts of data but 131.55MHz might also (in some countries). Now, I don't have access to this data myself so I'll have to ask if someone working in this field can answer: do airports have their own identifiers on ACARS? If so, what form do they take?

What is the format of the data (bits, parity, baud rate, etc.)? **I.R. Burkinshaw** (Basingstoke) can't find this in any publication. You could write direct to ARINC, 2551 Riva Road, Annapolis, MD 21401, USA, enclosing an international reply coupon - and tell us the result. IRB still uses a Sinclair QL and if he succeeds in writing ACARS software for it, perhaps others would like to obtain a copy? Let me know how you get on. All replies to readers' letters are via this column.

While flying by Caledonian Tristar, Tim had a look at the ACARS 40-column thermal printer on the centre console between the pilots. At that time, the crew did not have the facility to transmit but apparently have since started fuller use of the system. Tim hopes to hear the pilot and controller talking when flying by B.777 as one of the passengers' entertainment channels is linked to the radio. But, which one? There are probably two v.h.f. and at least one h.f. set! Some earlier aircraft already offer this facility.

Anonymous (postmark Doncaster) saw a report in *Newsweek* (8/1/96 page 45) about the crash of American flight 965. I, too, was confused about 'releasing airbrakes' but I think they mean 'retracting the spoilers' because the Americans call them 'speed brakes'. The article shows that a navigational mistake is a plausible theory, and there's a clear diagram to back this up. Here's the theory. The aircraft passed abeam (instead of overflying) a radio beacon while descending along a valley between mountains. When trying to correct the error, the aircraft was turned back towards the beacon - the circumference of the turn being enough to bring the B.757 too close to the surrounding high terrain.

Receiver Hardware

A tip from Tim about the way scanners work. If you want to cycle through just a few frequencies repeatedly, you could place them in sequence throughout the memories. For example, Memory 1 = Frequency A, Memory 2 = Frequency B. Then you'd start again: Memory 3 = Frequency A, 4 = B, and so-on. Some scanners delay when they jump from the highest-numbered memory back to the lowest. Tim's technique reduces the number of times the jump has to be made.

I'm not so sure about making antennas from coat-hanger wire, although it worked for Tim. If the material contains iron (can be attracted to a magnet) then radio-frequencies will be attenuated. Copper is best! How about varnishing some microbore central heating pipe?

You Fly

Mrs. B. (Isle of Man) tried to predict the route when a friend of hers visited South Africa. Although slightly too far east, it was a good guess. Her computer simulations helped, but now she hopes to try the real thing; let us know how you get on with the Private Pilot's Licence course in the USA.

In Port Elizabeth, RSA (now also famed for its cricket!) **J.B. Chamen** enjoyed the International Military Airshow at Waterkloof (10/95), celebrating 75 years of the country's Air Force. Also, one of JBC's neighbours is retired from the Army and has just celebrated 50 years of marriage to a lady who, during the War, was one of Winston Churchill's personal secretaries!

As you can see from the photos, taken by **Christine Mlynek**, I met **Roger Preston**, a reader from Rickmansworth. He proudly showed me his yellow 1944 Piper Cub G-HEWI (various previous identities prior to 1987). Having started life in the US Army, the aircraft is now owned by a consortium at Denham.

Roger recently spent a flying holiday in the French Alps. The 'altiport' was at 5600ft, circuits flown at just 400ft above this! Aircraft was again a Super Cub. Circuits are unconventional, taking off down-slope and landing up-slope (touching down on a short level threshold prior to running uphill). No brakes - skis! Having landed, a full-stop is enforced. The aircraft can't climb away steeply enough to get over the runway's slope!

Roger had difficulty on the radio. Chris and I are just beginning to understand French air-traffic control jargon, holidaying as we do in Brittany. This year I hope to attend the Air Meet at Quiberon, hopefully on one of the first two weekends of August. If any reader will also be there, write to me in advance.

Information Sources

Roger announces the continuing meeting programme for the London Society of Air-Britain. Doors open at 1900 on the second Wednesday of most months, at The Victory Club, 63-79 Seymour Street, London, W2 and there is a £4 entrance fee for non-members of the Society. For more details, send a stamped, addressed envelope to Charles Oman, Orchards, Mill Lane, Balcombe, West Sussex, RH17 6NP.

R. Frost (Felixstowe) wants a list of aircraft transiting Stansted, Heathrow, Gatwick... Sorry, not here! This would fill more space than I'm given each month. But, Air-Britain will tell you much of this. They have nationally-published magazines and there are also local branches (including one at Stansted). You'll find the London Society address in the previous paragraph, so I suggest you start by writing to Charles Oman (enclose a stamped, addressed envelope) and see what he suggests.

In March I suggested that the map of the new COWLY and WELIN sectors (*AIC* 112/1995) would be clearer than my written description, so readers will be pleased that you can now obtain individual copies of *AICs* from: Aeronautical Information Services, NATS, Room 163, Control Tower Building, London Heathrow Airport, Hounslow, Middlesex TW6 1JJ. You must provide a stamped, addressed A4 envelope. Most *AICs* weigh less than 60g.

Also in March, I told you about a list of n.d.b.s from Robert

Connolly GI7IVX (21 Eleastan Park, Kilkeel, Co. Down, N. Ireland, BT34 4DA). *Non Directional Beacons of Europe (Arctic to N. Africa)* costs £3.50 plus 50p UK postage for the second edition, but a new edition is due and I don't yet know the price.

Thanks, Robert, for the review copy. Now, the introductory text was disappointing so I'll get the whinges out of the way before I cheer you up with the rest of the review. For a widely-available publication, the sub-editing is poor and this even reverses the intended sense in places (e.g. page 3 tells you that the book "...must be used for navigation..." when it means must NOT be used for this purpose!). I also think that Robert should put his text through a spell-check program, as he clearly uses some form of software publishing. There's a correction that turns perfectly satisfactory lat/long co-ordinates into a mistake and I'm sorry to see the incorrect format used throughout the rest of the book. You also need three digits for longitude degrees, Robert.

There's a misconception about propagation. Robert talks about the effect of high pressure weather that does indeed enhance v.h.f., etc. wavelengths - but not the frequencies of the beacons in this book. In fact, time of day is the important factor as the absorbing ionospheric D-layer disappears at night, hence enhancing the propagation - but also the interfering signals!

Pleased to see that the 'LW Maritime Radio Beacons' column in this magazine gets a mention. The basic tables look sound, and that's really what you'd buy the book for. It's a shame that lat/long are missed altogether from the aero (but, fortunately, not the marine) beacons. Due to the size of the text, I can't check the tables for accuracy but our recent foray into identifying beacons shows that the book does seem to do its job. Like so many recent references, I recommend keeping this book for its primary purpose - the beacon tables, in this case - and don't worry about the introductory text.

A database of flights to/from the UK is being compiled for IBM compatibles by **Len Woolley** and you can have the latest copy by sending £1, a formatted 3.5in 720Kb disk and a stamped/addressed envelope to him at 3 Furze Gardens, Morwenstow, Bude, Cornwall, EX23 9SX. Information on the disk includes flight numbers, day/time and some frequencies.

Frequency and Operational News

The CAA publish some changes in *GASIL* 1 of 1996. Perth is operating its Approach again on 122.3MHz, limited service. Scampton has officially disappeared, its ATZ and Military ATZ having been withdrawn. Non-directional beacons, now; Glasgow (GLG, 350kHz) and Wick (WIK, 344kHz) have had their power reduced, should be a challenge to the propagation-spotters amongst you. Stansted's SAN (359kHz) has been withdrawn altogether.

There's a new Royal Flight callsign: Leopard means that the Duke of York is at the controls, as *AIC* 7/1996 explains.

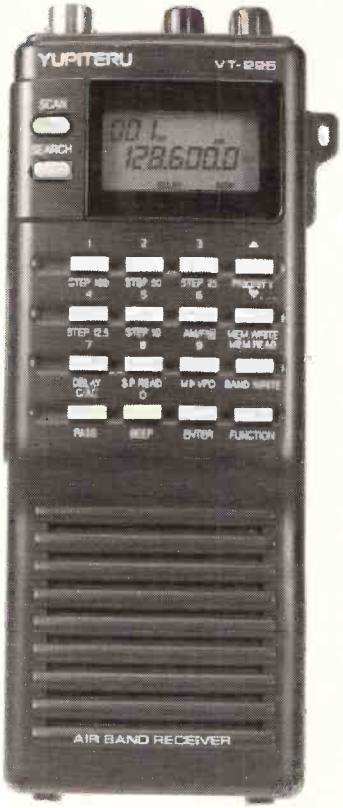
I haven't had room to answer all your letters, but will keep working on them in forthcoming issues. I've also held back the next 'In the Cockpit' feature. The next three deadlines (for topical information) are April 12, May 17 and June 14. Replies always appear in this column and it is regretted that no direct correspondence is possible. Genuinely urgent information/enquiries: 0181-958 5113 (before 2130 local please).

Abbreviations

ACARS	Aircraft Communications Addressing And Reporting System
AIC	Aeronautical Information Circular
ATZ	Aerodrome Traffic Zone
B.	Boeing
CAA	Civil Aviation Authority
ft	feet
g	grams
GASIL	General Aviation Safety Information Leaflet
h.f.	high frequency
kHz	kilohertz
MBB	Messerschmitt-Bölkow-Blohm
MHz	megahertz
NATS	National Air Traffic Service
n.d.b.	non-directional beacon
v.h.f.	very high frequency

John Griffiths, c/o 22 Ffordd Beibio, Holyhead, Gwynedd, North Wales

Scanning



In a previous column I mentioned Mr David Savage and an organisation known as The Federation of Communication Services. Information now to hand reveals the gentleman in question is, in reality, the Chairman of this group. What's more, he is also Managing Director of Astec - a Vodaphone group cellular provider - and a well-known figure in the cellular world. Surprise, surprise! I can now see a motive behind the not very factual and certainly half-knowledgeable attack on scanner owners during the programme aired on BBC Radio 4 sometime back and mentioned in this column.

The type of equipment I think Mr Savage was after is a far more sophisticated piece of kit that makes even an all singin', all dancin' high tech radio scanner look like a baby's 'phone! The cloning scanner is connected to a computer system to obtain the off-air data that allows mobile 'phones to be cloned. This is a huge business and if Mr Savage had stated that it is this area he was interested in then fair enough. However, he did launch a major attack on a group who - minor Wireless Telegraphy Act infringements aside - enjoy their sets and the hobby that it is. Fair enough. Cloning loses people like Astec money on a tremendous basis - but this isn't through any fault of the average scanner owner. It's a bit like saying because one dog's bitten, all dogs should be put down. It's positively ludicrous.

However, I would just reiterate that this may well cause some furore amongst our Lords and Masters - many of whom have an 'outside interest' in the private domain and therefore a vested interest in the debate - so be aware, be careful and stay low profile. I am indebted to **JM S-H** for the background to this issue.

Air to Air

Onto other matters! **Oxford Ears** - who does more monitoring than GCHQ! - reports air to air heard on 242.5MHz, in this case Harriers on CAPS and using 'Brown' callsigns. Also, a three ship 'Mallard' formation of Hercules aircraft spotted over the Abingdon area and using Lyneham Approach on 359.5MHz. OE always informs me if anything interesting is in the area but, on this occasion, I was unable to catch the contacts he listed.

Further military news concerns the U-2s out of RAF Fairford - or rather the news that they will no longer be heard as the squadron rotated to France amidst great secrecy during the Christmas and New Year period. All three aircraft are now based on French soil, so this is a loss for those of us in this area who regularly monitored them. Fairford, it seems, will be host to the odd B-52 and the usual annual tattoo - and that's it. Have to look elsewhere for my catches now.

Good News

More good news for mil airband monitors. A letter from **Andy Chetwyn** of Derby informs me of a new attempt to collate information for sharing has just taken off. With the loss of *Intercept* and *Signet*, and also *Logbook* - all journals of the BCAG and Intercept aviation groups - military and civil airband info got sucked into a big black hole. Andy has, with some of those responsible for putting together *Logbook*, begun a new venture entitled *The Monitor* for those interested in aviation communications. Having seen the issue I can report that it more than adequately fills in the loss of information and is well produced and informative. There is no membership subscription but - and I stress this but - to join you must send in a log book sheet concerned with communications in this area plus a £1 remittance to cover costs and postage. This is an important point that needs to be stressed!

Information can only come from monitors and, by self-perpetuating, the journal could well prove to be a winner. It does need your help, though! If you are serious about airband and want to keep up with what's happening, then get a log and with the all important £1 off to:

Andy Chetwyn, 9 Gleadmoss Lane, Oakwood, Derby DE21 2BP.

If you are interested - and who isn't - then support this group and, by doing so, support your interest in the hobby likewise.

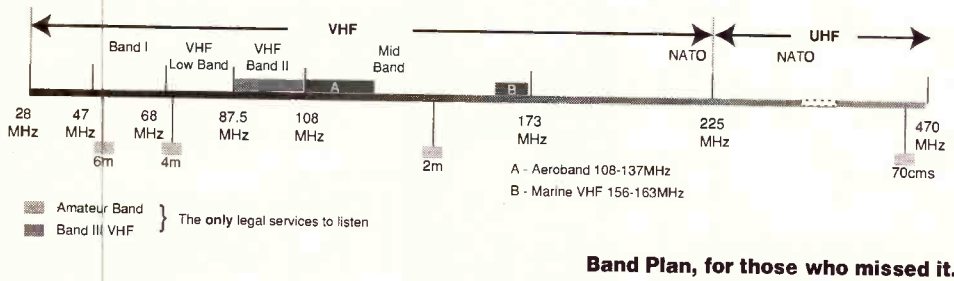
More Military news from **'Anonymous Scotland'** now who sent in a TADS list from that area covering Buchan, Lechers, Boulder and Neatishead. However, I cannot publish the TADS list due to official infringements of military communications and can only say that it is comprehensive! Dilemma! How can I get around that one? Possibly by saying that I'll work on it for a future issue! Thanks to 'Anonymous Scotland' for the list and also the other gen regarding ENIGMA and my other passion of numbers stations.

Consternation

A frequency heard in Charlbury by **Mike Dodds** - 379.125MHz via Brize Radar - caused a bit of consternation here as no publication I had listed it. In this case, F-15s were being routed to a training area in Wales. The frequency was also noted by OE and myself, but with RAF aircraft. Perhaps this is a local TADS/STUD? Whatever, it shows up now and again and is usually very interesting. I believe it is a stand-by used when work is being carried out on the main Brize Radar frequency. Anyone else any ideas?

Antennas

David Brigham - and others - request information regarding the best type of antenna to use



Band Plan, for those who missed it.

for civ/mil airband monitoring. I use both a 'Scanmaster' base and an Air-33 for my sets here and can honestly say the 33 knocks the other into the proverbial cocked hat. Then again, it should do. The Scanmaster is a broadband antenna designed to perform anywhere between short wave at the lower end and u.h.f. to 1300MHz. The Air-33 is an airband antenna cut for optimum performance on the air bands. It follows that the 33 will be sharper and more tuned than the other. I can recommend this antenna by the way. It's not often that I will put my head on the block for a particular manufacturer but, in this case, I will. Go for it!

Help

Can anyone help me and the aforementioned OE on the identification of the two following frequencies that tend to lock in to our VT-225s now and again? They are 277.125 and 262.975MHz and appear to be satellite channels. Both of us have heard what sounds like soft porn on here and wonder whether neighbours, dishes have anything to do with it. Any help would be appreciated - and no, neither OE or myself spend hours in our shacks trying to filter out the mush for better quality audio!

Craig Guthrie requires more pinpoint info on the following frequencies heard in the Glasgow area. 161.325,161.855,165.350,80.785 .81.075MHz. I have sent Craig a short list, but the IDs are general. Someone specific in Glasgow or surrounds may be able to pinpoint the users with more accuracy. Craig also asks if there are any clubs in the Glasgow/Prestwick/Cumbernauld areas concerned with aviation radio listeners? All replies to here, please.

Internet

News for Tech Heads next. If you are wired to the Internet - and I am not - then the next bit could interest you. There is a page on the 'net concerned with bugging frequencies - yes, you heard that right - and I am indebted to **anonymous** for the following gen. Apparently - and I have a print out before me - this is of US origin. It covers such juicy areas of activity as 'Tactical Bugs' (e.g. 30-500MHz Tactical repeaters) as Spread spectrum/hopping bugging frequencies (902-928MHz very popular ISM Band A). As Law Enforcement bugging frequencies (37-952MHz). Surveillance Satellites (e.g. 1.7-1.9GHz ' very active on 1.76 and 1.84GHz'). And so on. Those Tech Heads who would like to know more can point their browsers at: **http://www.tscm.com/bugfreq.html** and go. Alternatively, you can E-Mail on **jmatk@tscm.com** Lesser mortals can write to: James M. Atkinson, TSCM.COM, 127 Eastern Avenue 291, Gloucester, MA 01931-8008, USA.

As for me....what can I say but that I'll stick to cheap and cheerful h.f. with all of its whistles and crackles and the magnetic voices of the likes of 'The Lincolnshire Poacher' and her mob!

Operating Standards

That about wraps it up for another month! I may get into the local RAE in May if I can find the time - I'm on placement with college when the RAE comes up so it could prove difficult to get to an examination centre and I did want to have a bash - but am having second thoughts due to the childish standards effected by some 144MHz ops in this area and the use of the band as a sort of glorified CB. I can pick up a CB at Tandy for £60, a license from the PO in the village and be able to do the same as the majority of amateur ops in this area do. To think that there is a lobby protesting about lowering of standards as well! Takes all sorts, I suppose!
Take care - be good and be aware! Catch you all again next month.

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

Info In Orbit

For people reading this column for the first time, it reflects events in the WXSAT world. Listening to the 137MHz band (see frequency list at end), we monitor American (NOAA) and Russian/CIS (METEOR) craft. It is welcome to see the enormous interest in WXSATs, the Shuttle and satellites in general, as reflected in my postbag. Doors continue to open ever wider into the world of the CIS WXSATs, as Russian scientists make available to the global community, data on the operations of their WXSATs. This edition of 'Info' includes more details about the OKEAN and SICH oceanographic satellites, as well as letters of general interest. For those unable to connect to the CIS GOMS satellite homepage address on the Internet, given last month, the correct address is: **http://smis.iki.rssi.ru/goms_2.htm** (not html).

Current WXSATs

The CIS satellite METEOR 2-21 was switched on for only a few weeks from February 1, while METEOR 3-5, which performs rather better, went through its own period of low solar illumination. The latter was re-activated on February 21. Satellites NOAAs-12 and 14 continued nominal operations on 137.50 and 137.62MHz respectively. OKEAN-4 and SICH-1 continue transmissions on 137.40MHz, following a schedule now available via this column - see later.

Satellite Instrument Status on the NOAAs

Although only NOAAs-12 and 14 are transmitting a.p.t., some of the other satellites in the group remain active. Here is the latest summary of the status of the constellation:

NOAA-9 was launched on 12 December 1984 and some of its instrumentation is still functioning - the HIRS, SSU, DCS, and SARR - a previous edition gave further details of these instruments. Officially it is in semi-standby; consequently, we can sometimes receive TIP (Telemetry Information Processor) data from its 137.77MHz beacon.

NOAA-10 was launched on 17 September 1987; several of its systems continue to function, but there is no a.p.t. available, and I have not heard its beacon for some time. It is in standby mode.

NOAA-11 was launched on 24 September 1988 and, like NOAA-10, its AVHRR is non-operational. It is also in standby mode; some sub-systems function properly and the Control Centre takes one pass per week to check its health.

NOAA-12 was launched on 14 May 1991 and operates normally, providing us with a.p.t. (images) on 137.50MHz. Some on-board systems exhibit problems occasionally.

NOAA-14 is the most recently launched polar WXSAT, which celebrated its first birthday on 30 December 1995. Most of its systems operate normally.

NOAA-K Readiness

The next NOAA WXSAT in the series - NOAA-K - continues to be tested and modified. The flight-worthiness of the stainless steel propulsion system fittings currently on NOAA-K has not yet been fully resolved. NASA Flight Safety has insisted on an additional test on at least one fitting from the same lot of material as used on NOAA-K. Flight Safety is concerned about the possibility of a catastrophic failure of these possibly suspect fittings. The impact of needing to change-out the system (again), now, would mean a delay of many months. My thanks to NOAA for providing this update.

OKEAN & SICH Secrets Revealed!

Perhaps as a sign of the improving flow of information coming out of the Commonwealth of Independent States, much detailed information about the oceanographic satellites of the OKEAN and SICH series has been provided by **Alex Ivanov** via the Internet. As well as a detailed description of the satellites' onboard equipment, he now provides a weekly transmission schedule, as intimated in last month's column - see later.

I am grateful for the opportunity to publish more details about the craft, kindly provided by Alex, who works partly with RPA (Research and Production Association) PLANETA, a state institution responsible for planning the work of Russian weather and environmental satellites, processing and distribution of the satellites data - something like NOAA/NESDIS (the American equivalent). Alex is also involved with RD Center SCAN, basically a private firm producing a.p.t., h.r.p.t. and WEFAX ground stations.

In the last two years SCAN developed some instrumentation and software for PLANETA, including a demodulator and digital terminal for an OKEAN f.m. receiver (operating at 465MHz). Alex participated in the work, and is involved in the primary data processing. Like me and a number of other people, Alex subscribes to the Internet's WXSAT mailing list, and was inspired to send his information because of the recent discussions about OKEAN and SICH. PLANETA's departmental heads plan to put current information about accessible satellites like OKEAN, METEOR and GOMS on the net.

OKEAN and SICH are sister ships differing only with a flag on the hull (OKEAN - Russian, SICH - Ukranian). They carry the following sensors:

MSUM - a 4-channel (Multi-Spectral) scanning radiometer operating in portions of the 0.5 to 1.0 micron band. Resolution at 650km altitude is 1.0km, at the ground below the satellite. MSUM images are reduced in cross-track resolution to 1.5km for transmission on 137MHz.

SLR - an X-band, Side-Looking Radar, with carrier frequency of 9.52GHz, and physical spatial resolution - 1.3km (cross-track), and 2.5km (along-track), with swath width - 450km.

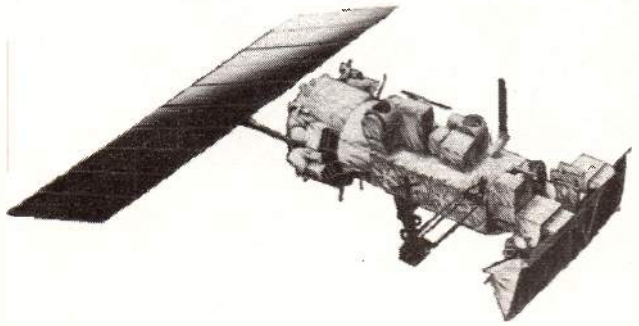
RM08 - a Microwave Radiometer operating at 36.5 - 36.8GHz with physical spatial resolution - 25 to 25km, and swath width - 550 km.

Two Frequencies for Data

Satellite data can be transmitted in two formats:

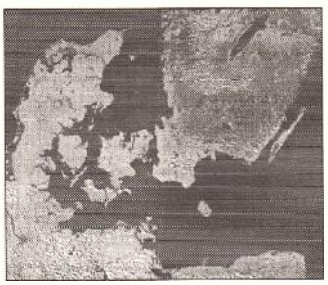
- a.p.t.-like AM/FM, 240l.p.m., 137.40MHz (so-called metre-band, MB),
- f.m. 465MHz (decimetre-band, DMB).

About a dozen modes (combinations of the sensors) are possible for each of the formats. Naturally, DMB carries more data. On 137MHz, one of MSUM channels, or SLR, or RM, or any pair of them, or maximum - one of MSUM with SLR and RM, can be dropped down. In the latter case SLR and RM images are overlaid on the part of MSUM image. This is

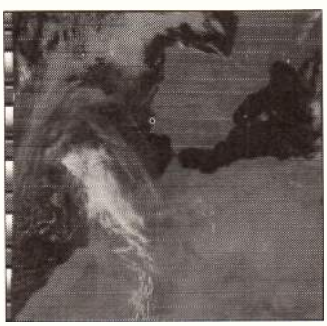


NOAA WXSAT - current generation.

Peter Bartlett's Shuttle Retransmissions QSL 'certificate' from WA3NAN.



NOAA 14 HRPT - Ch2 - Visible light, taken on 18 August 1995. Peter Schoen.



NOAA picture from Antonio Frattesi of Roma (Italy).

NOAA image taken on 19 April 1995, showing Britain under almost clear skies. George Newport.

Weather Satellite Book

By the time this column appears, I anticipate the publication of my first book - *Satellite Projects Handbook* - should have just occurred. Although mainly about WXSATs, it includes material about other satellites as well. The flood of new information on CIS satellites and the next generation of NOAA WXSATs, together with information on GOMS meant that two or three late modifications were made to incorporate the latest released data.

the effect that people monitoring OKEAN/SICH transmissions see when changes occur in the picture content.

OKEAN/SICH Transmission Schedules

A schedule for OKEAN transmissions is created in PLANETA, and for SICH - in Ukranian PLANETA's counterpart (ORBITA). Alex converts this to the transmission schedule that he now issues weekly. Typically, the latest one (February 22) includes those passes utilising 'live' data, and those when a playback of previously recorded data is planned. The format of the transmission to be expected is given; that is, what combination of radar, microwave or visible-light data, is scheduled for transmission.

This list is of great interest to many WXSAT monitors so I have been considering the best way for me to make it available for *SWM* readers. I shall produce a copy of the weekly list, containing not only the schedule but also a summary of the systems producing the various image components. This can be obtained by sending an s.a.e. plus one extra stamp (or 20p coin). Few readers are likely to want every week's schedule so I shall wait to see what the response is.

Short transmission intervals are due to system design features. He quotes: 'MSUS permanent operation time must not exceed 30 minutes, with the following pause not less than 70 minutes. SLR permanent operation time must not exceed 15 minutes, with the following pause not less than 30 minutes....' and so on.

Applications for OKEAN/SICH Data

The satellites were designed for internal use in the USSR meteorological service (ice cover in polar regions being the main scope). Any Russian organisation may order a transmission and/or processed data via a certain bureaucratic procedure. PLANETA deputy director Dr. Zhupanov said that there were few transmissions over North America in a framework of demonstrative joint projects in the past and something like that may happen in the future - it will depend on NESDIS initiatives.

Except for OKEAN and METEOR there are no Russian satellites working on 137 or 1700MHz now. GOMS is being prepared now to transmit its own WEFAX and re-transmit that from METEOSAT. Some tests were made a couple of weeks ago.

My thanks to Alex for this valuable information - a copy of this article is being forwarded to him. Much of the above forms extracts from his e-mails. Minor changes were made by me to reflect language translation.

Letters

Steve Reed G7DZX has returned to satellite reception after a gap of some years. He tells me that he set up a system back in 1969 while at school. That system was based on a *Wireless World* article, in which a modified v.h.f. receiver was used to feed a circuit that was coupled to an oscilloscope. By modulating the brightness level of the beam, a picture was slowly built up on the screen. In 1969 I was doing exactly the same thing, with colleagues at the Radio and Space Research Station in Slough! I did the v.h.f. mods and my colleague set up the antenna and oscilloscope. The real problem was knowing when the satellites were coming over. We had access to a mainframe computer, but no suitable predictions software was to hand for an ICL 1904! Ah - those were the days, Steven.

As a newcomer to the hobby of WXSAT monitoring **Peter Best** of Bognor Regis, like others in this position, has experienced the problem of updating Kepler elements for those satellites that he monitors. When joining my Kepler listings groups (see end) he asked about the variation between two-line elements and conventional Kepler listings. In fact, the lists contain the same data but in different formats. NASA's two-line elements consist of sequences of numbers that are the normal parameters - epoch, orbit, inclination, etc. - positioned in two separate lines. My printouts are obtained from a large file containing elements for over 4000 satellites, in two-line format. I obtained a program that strips out selections of these satellites, formats the numbers, then prints out the WXSAT group with the full parameter details for easy interpretation.

Robert Wyeth of Swanley is a retired Communications Officer studying for the RAE exams. He monitors WXSAT images via his h.f. receiver, from a network, apparently operated by Brian G3GSI, using 3.780MHz. Robert uses a Yaesu FRG-100 h.f. receiver fed by a long wire and noise blanker, and decoded on his 486SX using JVFAX. I understand that this h.f. network is used for WXSAT image dissemination.

Shuttle Monitoring

Peter Bartlett of Pinner became interested in listening to satellite communications during Helen Sharman's mission on MIR, the manned Russian space station. He recorded most of her transmissions by using his Kenwood 5000 receiver and external 2m vertical antenna, tuned to 145.550MHz, fed by a 20m longwire and a.t.u. Tracking of MIR was done using an earlier version of PCTrack. Since then, Peter has monitored Shuttle re-transmissions from WA3NAN, using mostly 14.295 and 21.395MHz, according to propagation conditions.

Peter kindly enclosed his QSL cards, one being a special certificate for monitoring the Tenth Anniversary Transmission Event from WA3NAN. Peter's latest venture involves monitoring MIR on 145.550MHz, using the packet receiving software PKTMON12. He has also heard the licensed cosmonauts speaking on the amateur radio frequency 145.550MHz, in English. I understand from Peter's information that QSL cards acknowledging WA3NAN monitoring can be obtained from the QSL manager at WA3NAN at Box 86, Greenbelt, Maryland, USA 20770.

The entire manifest schedule to 2003, together with the frequencies used for both direct and re-transmissions of Shuttle audio and telemetry is available as a 'Shuttle Pack'. A section about obtaining passes to watch launches is included amongst the eight sides of A4. Please enclose 50p and an s.a.e.

Peter Schoen sent several prints obtained from his setup in Germany. Peter has both a.p.t. and h.r.p.t. equipment and sent images of each type, from which I have included **Fig. 3**, a NOAA-14 high resolution image from channel 2 (visible-light), obtained last August. Detail is crisp and the ground shadows of individual clouds can be seen, amongst other features.

Antonio Frattesi of Roma (Italy) sent two images on disk, one from a METEOR, the other a NOAA picture - see **Fig. 4**. Antonio uses a 486 PC running a program called Fontana, to produce his pictures. His antennas include a quarter-wave ground plane for 144MHz. Antonio also monitors METEOSAT.

George Newport of Canterbury sent a set of very high quality prints from his a.p.t. station. Each print is quite immaculate and has been laminated as well. Spoilt for choice, I selected **Fig. 5**, a NOAA image from last April, showing Britain under almost clear skies, with shower clouds over much of the northern Atlantic.

Finally, I received a request from a student attending Cork Regional Technical College and asking for addresses where information on Remote Earth Imaging could be obtained for use in course-work. There are several professional organisations involved in this field, so it is a case of contacting one and finding further relevant information. The Meteorological Office would probably be a good starting place; write to: **The Met. Office, Data Licensing, Room 706, London Road, BRACKNELL, Berks RG12 2SZ.**

Please remember to enclose an s.a.e. when sending me enquiries. I will donate the time, but I cannot afford the cost.

STS-Plus New Version 9607

For those using the satellite tracking program STS-Plus, the new version has just been released and I have copies available; please enclose 50p and an s.a.e. together with your disk. This program is widely used by the American space industry, and does almost everything that one can imagine. Very attractive display options.

Kepler Elements - MIR and 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. This data originates from NASA and is totally up-to-date.

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: You can have a computer disk file containing recent elements for the WXSATs, and a large ASCII file holding elements for thousands of satellites. A print-out is included, identifying NASA catalogue numbers, ideal for automatic updating of your tracking software. Please enclose £1 with your PC-formatted disk and stamped envelope.

Next Month

A special, illustrated feature on Russia's own weather satellite monitoring system is planned for next month's 'Info'.

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 uses 137.85MHz; OKEAN-4 and SICH-1 use 137.40MHz for scheduled transmissions and METEOSAT WEFAX is on 1691 and 1694.5MHz.

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

Decode

All the Data Modes

Please note that I now have a new Internet E-mail address. As you can see I've signed-up with Pipex to provide my service. The decision was based on their very good network reliability over the past year (Pipex provided the network for the BBC club) combined with a good deal for ex-BBC Networking Club members. Another attraction was the offer the keep my old E-mail address active until November '96 - so I shouldn't lose any messages.

High-Low Tones

Just recently I've had a number of letters asking what is meant by high tones and low tones when dealing with data decoders. The letters reminded me that this is an important topic that I've not covered for quite some time. So what's it all about? You will all, no doubt, be aware that to receive the data modes the transmission is first converted into an audio signal by the receiver.

Now most h.f. utility transmissions use either frequency shift keying or frequency modulation. Both systems are very similar for our purposes and mean that the transmitter changes frequency in line with the data it's transmitting. In the case of a RTTY press broadcast, the transmitter would alternate between two frequencies spaced just 400Hz apart. At the receiver, use of the s.s.b. mode would demodulate the signal as a pair of audio tones still spaced just 400Hz apart. The actual frequency of the tones will vary as you tune the receiver across the signal, depending on whether you start above or below, the tones will probably first be audible at around 300-400Hz and rise in frequency until they disappear at around 2.5-3.0kHz. If you want to try it, just set your receiver to s.s.b. and tune to 4.489MHz you should hear the Bracknell Met 75 baud RTTY transmission.

When it comes to connecting your decoder you will find it needs to see specific tones from the receiver and can't usually handle a very wide spread. This is why most decoders have some form of tuning indicator. This is to ensure the correct tones are presented to the decoder which, in turn, can only be done with the correct receiver tuning. To help receiver and decoder designers make equipment that will work together successfully, some form of standard is required. Just to keep life interesting, there are two such standards for the decoding tones! In the UK and most of Europe it is common to use what have become known as low tones whilst the Americans and Japanese favour high tones. The exact tones used depends on the required shift but for the common 170Hz shift the respective tones are 1275 and 1445Hz for low tones and 2125 and 2295Hz for high tones.

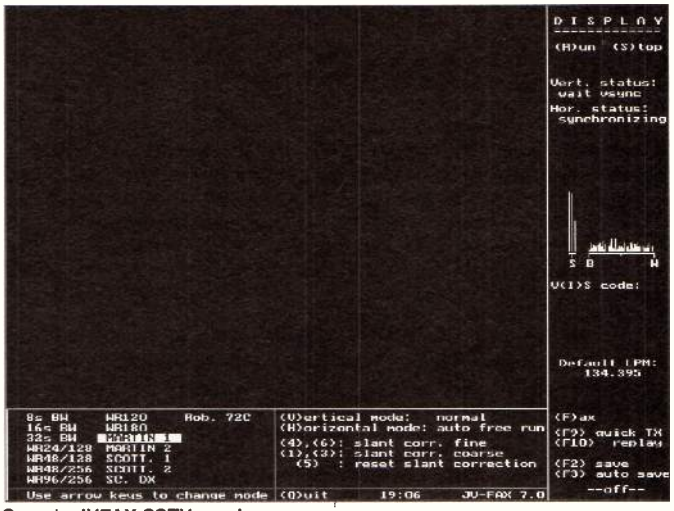
So why make a fuss? My personal preference is to use low tones simply because they sit more comfortably within the audio filtering of most communications receivers - they're kinder on the ears too! The low tones also gives plenty of scope for making good use of any built-in filtering options such as pass-band tuning or the narrow 2.1kHz filters that are available for s.s.b. on some receivers.

IRM Medical Rome

A few months ago I asked if anyone could explain the role played by the Rome Medical station IRM. **Peter** from Crewe sent me an E-mail explaining that the IRM is part of a network of services that are available to mariners. Their main role is to provide medical advice and support to ships at sea. A typical example would be where a crew member is taken ill and the ships master has to take emergency action. IRM would help him decide what to do and guide him through 'till the patient could be brought ashore. This is a clearly a vital role - thanks Peter.

SSTV Introduction

Although SSTV is essentially an amateur radio mode, so many listeners' have written asking how to receive SSTV, that it warrants some column space. One of the main reasons for the increased interest is the popularity of decoding systems such as JVFAX that include a good range of SSTV facilities. To make sure I cover most of the key points, I used a particularly



Sample JVFAX SSTV receive screen

comprehensive letter and series of questions from **John Meakin** of North Allerton Before I go roaring into the technicalities, let's have a look at the origins.

The early amateur work on sending TV images over the h.f. bands occurred back in 1958. As with most new systems, it was the availability of appropriate technology that spurred the development. For SSTV, the problem was to find a way to send a picture that would normally need several megahertz of bandwidth in the 3kHz or so available on h.f. The early solution centred around the use of long persistence radar display units. With these displays, a dot will remain on the screen for several seconds after the signal has been removed. By using this feature, it became possible to send enough information to create a 120 line picture using the limited bandwidth in just 8 seconds. The long persistence of the display tube meant that the image from the first line was still visible as the final line was sent - 8 seconds later. Having just managed to receive a picture, it promptly disappeared as the display's persistence exhausted. The only way to keep a record of the transmission was to photograph the screen!

Sending the picture information for this early SSTV system relied on the use of audio tones between 1500 and 2300Hz to represent black, white and the shades of grey in between. The picture was still sent in lines and a short 1200Hz tone was used to mark the start of each scan with a longer burst used to signal the beginning of a new picture. The next step was to experiment with colour transmission. This was initially done by sending a picture three times, each time cycling between red, blue and green filtered pictures. At the receiving end a long exposure photograph was made through the appropriate coloured filter to capture the colour picture.

Although it was possible to send a picture using this system, it was very cumbersome and time consuming. The real breakthrough for SSTV came with the development of solid state memory and affordable colour television. This meant that the three primary colour images could be stored and displayed on the colour TV as they're received. Although this made the system very much more usable, there were still lots of problems. Particularly troublesome was interference, that could ruin one of the colour frames and spoil the registration of the whole picture. To overcome this

Table 1 - JVFAX SSTV Modes

Name	Frame Time (sec)	Type	Lines	Notes
8s	8	b/w	120	original system
16s	16	b/w	240	
WR24/128	24	rgb	128	
WR48/128	48	rgb	128	
WR48/256	48	rgb	256	
WR96/256	96	rgb	256	
WR120	120			
WR180	180			
M1	114	rgb	256	Europe's most popular
M2	58	rgb	256	
Scott1	110	rgb	256	USA's most popular
Scott2	71	rgb	256	
Scott DX	269	rgb	256	
Rob72C	72	y+c	240	

shortcoming, the line sequential system was developed. With this system, instead of sending three primary colour pictures (known as frame sequential) each picture line is made up from three separately filtered scans carrying red, green and blue picture information. With this transmission system, pictures could be seen building-up in full colour - a great improvement on the earlier methods.

The main short coming of this method occurred when tuning-in to one of these SSTV signals. There was no way the receiving decoder could work out which of the colour scans was being received so the first image was likely to be corrupted. The next significant step came with the concept of separate chrominance (colour) and luminance (brightness) signals. In the early Robot systems, the first half of each scan line contained luminance information whilst the latter half carried the chrominance data. An important advantage with this system was the facility to receive a black & white picture by just gathering the luminance information and ignoring the end of each scan. This compatibility was particularly important in the early days when not everyone could afford expensive colour receiving equipment. Despite its undoubted popularity in the 70-80s, the quest for better image quality caused a return to the RGB encoding systems with a separate scan for each colour. The most common modern examples of full colour line sequential modes are the Martin and Scotties systems developed by Martin Emmerson G3OQD and Eddie Murphy GM3BSC respectively. One of the important features of the modern modes is the inclusion of vertical interval signalling codes (VIS). This is rather like automatic picture reception in FAX as this code is used by the receiver to select the appropriate receive mode. The VIS code is sent during the vertical synchronisation pulse at the beginning of each complete frame and comprises eight bits of data. If this introduction has tempted you to have a go at receiving SSTV, here's a few practical tips to get you started. Before you can get going you need to find a suitable signal. One of the most reliable places to look is on the 14MHz amateur band at around 14.23MHz. By far the busiest time is Sunday morning, but you can find signals at just about any time of day or night. SSTV signals have a very characteristic musical sound that's very easy to spot in amongst the s.s.b. signals. It's also worth listening to a few of the s.s.b. signals around that frequency as amateurs often chat in between sending SSTV pictures.

The next thing you need to do is run-up your SSTV program and select the appropriate mode. The best starting point is Martin M1 for listeners based in Europe or Scottie S1 in the USA. Both of these modes are very similar - there's just a timing difference. The only other modes you may encounter are Robot 36 and 72, but these are mainly used by Japanese stations. If you're using JVFAX, select S for SSTV from the main menu and you will be presented with the SSTV main screen. This shows all the available modes and usually defaults to Martin 1. If you manage to catch the start of a transmission, picture reception will start automatically otherwise you will have to press R to start the picture reception manually.

Next comes that tuning indicator with two displays that confuses so many! If you recall earlier in this feature, I explained that the black through to white elements of the picture was carried by 1500-2300Hz tone whilst the sync. pulse was a 1200Hz tone. The JVFAX display has been separated to show these different frequency bands. To tune an already running SSTV signal just adjust your receiver so that the JVFAX display ranges equally from B through to W. There are a few other adjustments that can be used as you become more familiar with this mode. JVFAX has three vertical sync. modes. In the NORMAL setting the program will monitor the incoming signal and start receiving when a valid sync. pulse is received. On completion of the picture it will revert to its standby mode ready for the next sync. pulse. The auto stop modes is the same, except the program stops after the first picture has been received.

The final, free run, mode is exactly that and the program attempts to display all received signals valid or otherwise. This latter mode can be useful when tuning around or just to confirm that the system's doing something! The horizontal sync. modes are a little more subtle and can be used to improve reception quality. Although the initial pulses are required to get things going, the accurate timing in a modern PC means that the later sync. pulses can be ignored. This can be helpful if the picture is suffering fading or interference. The auto free-run mode attempts to do just that by evaluating the received signal and choosing to ignore the sync. pulses if they're sufficiently accurate. There is also a free run mode that can again be useful for testing. If you should have any timing errors, your picture will tend to slant just like a timing problem with a FAX image. Because the transmitting stations may not be using accurate timing themselves, JVFAX includes temporary slant correction through use of the numeric keys 4, 6, 1 and 3 with 5 used to restore the default timing. That just about concludes this quick run-through on SSTV. If I've missed anything significant just drop me a note or E-mail and I'll see what I can do in a later column.

Frequency List

The frequency list for this month comes with thanks from a number of readers including **Day Watson**, **Lee Williams** and **Geoff Allgood**. Please keep those logs rolling in. Remember, they don't have to be full of rare DX - I'm particularly looking for reliable stations that can be received under the prevailing propagation conditions.

Freq.	Mode	Speed	Shift	Call	Time	Comments
134.2kHz	FAX	120	576	DCF 54	-	OFFENBACH METEO
2.5505	ARQ-E	96	170	-	2242	UNID
4.307	FAX	120	576	GYA	-	RN LONDON
4.6015	SITOR-A	100	170	-	0832	IRISH NAVY NET
4.610	FAX	120	576	GFA 22	-	BRACKNELL METEO
5.3550	FAX	90	576	RND77	1920	MOSCOW MET
5.8502	FAX	120	576	OXT	0943	COPENHAGEN METEO
6.4525	FAX	120	576	GYA	0230	RN LONDON
6.9185	FAX	120	576	ECA 7	-	MADRID METEO
7.470	FAX	120	576	VLM	-	CASEY METEO
7.6930	RTTY	75	850	3BT3	0018	VACOAS MET
7.880	FAX	120	576	DDK 3	-	HAMBURG METEO
7.9160	FEC-A	96	400	DGG91L2	0643	PIAB BONN
8.040	FAX	120	576	GFA 23	-	BRACKNELL METEO
8.0799	FAX	120	576	NAA	2025	USN CUTLER
8.530	FAX	120	576	SVJ 4	0845	ATHENS RADIO
9.0819	TWINPLEX	100	-	-	0800	MFA OSLO
9.340	FAX	90	576	RCH72	1623	TASHKENT MET
10.1178	FAX	120	576	BAF 4	-	BEIJING METEO
10.9937	COQ-8	13.3	-	-	2102	ALGERIAN EMB HAVANA
11.063	RTTY	50	500	LZU2	0730	SOFIA MET
11.450	RTTY	50	1000	RDD77	1638	MOSCOW MET
11.4852	FAX	120	576	AOK	0600	USN ROTA
13.510	FAX	120	576	CFH	1418	CF HALIFAX
13.541	SITOR-A	100	170	NN0MDM	1403	MARS
13.5974	FAX	120	576	IMB	-	ROME METEO
14.367	FAX	120	576	BAF 8	-	BEIJING METEO
14.575	FEC-A	192	400	RFGW	0918	MFA PARIS
16.332	FEC-ROU	164.5	400	V5G	1110	MFA BUCHAREST
18.1735	RTTY	50	400	STK	1415	KHARTOUM AIR
19.3629	FAX	120	576	NRR	1520	USN ROOSEVELT ROADS

Readers' Special Offers

Here's the latest list of reader's 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 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 CodeFP4).
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!).

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

LM&S

Long, Medium and Short Waves

When British Summer Time (BST) commences on March 31 clocks throughout the UK will be one hour ahead of Universal Time Co-ordinated (UTC), which is quoted in broadcast schedules and the data herein.

To compensate for seasonal changes in propagation some short wave broadcasters may alter their schedules soon after this issue is published.

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 January.

The sky waves from the Radiotelevisione Italiana (RAI) 10kW outlet at Caltanisseta, Italy on 189kHz were rated SIO222 at night by **Kenneth Buck** (Edinburgh) in December but propagation from that area was less favourable in January. He did hear a transmission on 189 but at best it was SIO121 so he could not establish that it was Caltanisseta.

After dark, R.Mayak, Russia was heard under BBC R-4 on 198 by **Paul Bowery** in Burnham-on-Crouch. It was logged at 2102 by **Eddie McKeown** (Newry) as 21321 and by **Simom Hockenhull** (E.Bristol) as 33433 at 0135.

Medium Wave Reports

The conditions at night during January were sometimes favourable for the reception of m.w. transmissions over transatlantic paths. During the early hours of the 6th **Robert Connolly** (Kilkeel, Co.Down) picked up the broadcasts from VOCM, CJYQ & CKVO in Newfoundland. Nothing was heard by Paul Bowery until the 10th, when CFRB in Toronto, ON on 1010 was logged as 14322 at 0244. On the 12th he heard for the first time CKNB in Campbellton, NB on 950. An interesting list was compiled by **David Edwardson** (Wallsend) during the nights of the 6/7, 7/8, 13/14, 19/20 & 24/25. Up in Shetland, **John Slater** (Scalloway) found the nights of January 3, 24 & 25 rewarding. The 25th proved exciting for **Tony Stickells** (Thornton Heath) because at 0105 he heard a m.w. transatlantic broadcast for the very first time! It came from WTOP in Washington, DC on 1500. Later, he picked up the broadcasts from three more stations - the clearest came from WNRB in Boston, MA on 1510. On the 28th he added four more stations to his list!

The broadcasts from some remarkably distant stations in other areas also reached our shores after dark. All India Radio via Nagpur (1000kW) on 1566 was heard at 1730 by **Gerry Haynes** while in Talgarth and at 2340 by **Richard Reynolds** in Guildford. Potent sky waves from the BSKSA stations at Dammam on 1440 (1600kW) and Duba on 1521 (2000kW) were received around 0020 by **Andrew Stokes** in Leicester. The UAE Dubai 1500kW outlet on 1476 was heard at 1723 on the 19th by Paul Bowery. On the 21st Eddie McKeown logged Ahwaz, Iran on 1386 (400kW) as 25222 at 0111.

Short Wave Reports

Due to the sunspot minimum just now the conditions in **25MHz (11m)** band are unsuitable for broadcasting.

Although the conditions in the **21MHz (13m)** band are very unreliable some broadcasters are still taking advantage of them! When favourable, it has been possible to receive R.Australia's broadcast to Asia via Darwin on 21.725 (Eng 0630-1100) in the UK. It was noted as 'just audible' at 0859 by **Rhoderick Illman** in Oxted; 33323 at 0935 by **Bernard Curtis** in Stalbridge; 33333 at 1015 by **Thomas Williams** in Truro; 35333 at 1030 in E.Bristol.

Some broadcasts from other areas have also been received here. The Voice of Russia 21.860 (Eng WS) was rated 34323 at 0940 by **Sheila Hughes** in Morden; DW via Julich 21.560 (Ger to Asia 1000-1200) 33333 at 1025 by **George Tebbitts** in Penmaenmawr; UAER, Dubai 21.605 (Eng to Eur 1030-1055) 44444 at 1047 by **Ron Damp** in E.Worthing; BSKSA Riyadh, Saudi Arabia 21.665 (Ind to S.E.Asia 1000-1200) 22222 at 1137 in Penmaenmawr; BBC via Limassol, Cyprus 21.470 (Eng to E.Africa 1300-1700) 25332 at 1340 by **Eric Shaw** in Chester; RFI via Montsinery, Fr.Guiana 21.645 (Sp, Fr to C.America 1400-1600) 23222 at 1400 in Kilkeel; RFI via Issoudun 21.620 (Fr to E.Africa 0700?-1555) 45243 at 1406 in Newry; HCJB Quito, Ecuador 21.455 (Eng, u.s.b. + p.c.) SIO222 at 1414 by **John Eaton** in Woking; R.Portugal via Sines 21.515 (Port, Eng to India, M.East 1400-1600 Mon-Fri) 35233 at 1440 in Newry; Monitor R.Int via WSHB 21.640 (Eng to E.Africa 1600-1800?) 34332 at 1605 by **Stan Evans** in Herstmonceux; BBC via Ascension Is 21.660 (Eng to W/E/S.Africa 1100-1700) 35232 at 1627 by Gerry Haynes in Bushey Heath; WYFR Okeechobee, USA 21.745 (Eng to Eur 1600-1700) 33333 at 1630 by **Fred Pallant** in Storrington.

The propagation conditions in the **17MHz (16m)** band are also unreliable. Sometimes R.Australia's broadcast to Asia, Pacific via Carnarvon 17.715 (Eng 0200-0900) has been received here. It was rated 35333 at 0722 in Bushey Heath. Also noted during the morning were China Nat.Radio 17.605 (Chin [CNR-1] 0000-1230), rated 55544 at 0856 in Guildford; DW via Sri Lanka 17.820 (Eng to Australia, S.E.Asia 0900-0950) 14432 at 0936 by **Ted Harris** in Manchester; R.Pakistan via Karachi 17.895 (Ur to Eur 0900-1100) 33333 at 0940 in Stalbridge; BBC via Skelton, UK 17.705 (Eng to Eur 0900-1615) 35333 at 1023 in E.Worthing; Africa No.1, Gabon 17.630 (Fr to W.Africa 0700-1600) 33334 at 0952 by **Charles Beanland** in Gibraltar and 35544 at 1024 in Storrington; R.Vlaanderen Int, Belgium 17.595 (Eng to Africa 1000-1030) 24232 at 1020 in Oxted; AIR Delhi 17.387 (Eng to Pacific areas 1000-1100) 44333 at 1045 in Scalloway; R.Tunisia Int via Sfax 17.500 (Ar 0600-1700) 34533 at 1058 by **Darren Beasley** in Bridgwater; R.Pakistan via Karachi 17.895 (Eng to Eur 1100-1120) 54544 at 1115 in Herstmonceux; DW via Rwanda? 17.800 (Eng to W.Africa 1100-1150) 55444 at 1130 by **Clare Pinder** in Appleby.

After mid-day, Israel R, Jerusalem 17.545 (Heb [Home Sce rly] to W.Eur, N.America 0700-1425) was 45344 at 1300 in Newry; R.Prague, Czech Rep 17.485 (Eng to E.Africa 1400-1430) 32222 at 1400 by **Chris Shorten** in Norwich; RFI via Moyabi, Gabon 17.560 (Eng to M.East 1400-1500) 25443 at 1415 in Chester; RFI via Allouis? 17.620 (Fr to Africa 1000-1700) 34343 at 1443 in Woking; RCI via Sackville, Canada 17.820 (Fr to Eur, Africa 1500-1600) 45434 at 1520 by **Tony Hall** in Freshwater Bay, IoW; DW via Antigua, W.Indies 17.765 (Ger to S.America 1200-1700) 33333 at 1540 in Penmaenmawr; BBC via Antigua, W.Indies 17.840 (Eng to N/C.America 1400-1715) 25222 at 1549 in Burnham-on-Crouch; BBC via Ascension Is 17.830 (Eng to W/C.Africa 0730-2100) SIO343 at 1615 by **Philip Rambaut** in Macclesfield; WYFR Okeechobee 17.760 (Eng to Eur, Africa 1700-1945) SIO444 at 1700 by **Tom Smyth** in Co.Fermanagh.

Unreliable conditions have also been evident in the **15MHz (19m)** band but the broadcasts from many areas have reached the UK. During the morning R.Australia via Darwin 15.245 (Eng to Asia, Pacific 0200-0727) was 15232 at 0724 in Bushey Heath; R.Africa 2, Eq.Guinea 15.190 (Eng to Africa 0800-1000 Mon-Fri) 43343 at 0800 in Scalloway; R.Pakistan, Islamabad 15.470 (Eng to Eur 0800-0848) 54444 at 0800 in Norwich; KTWR Agana, Guam 15.200 (Eng to Far East 0755-0915) 33333 at 0845 in Morden; AIR via Aligarh? 15.050 (Eng to N.E.Asia 1000-1100) 33333 at 0940 in Stalbridge; AWR via Slovakia 15.620 (Eng to Africa 0900-1000) 45344 at 0940 in Newry; Voice of Armenia, Yerevan 15.270 (Eng to Europe 0930-1000 Sun) 54444 at 0950 by **Michael Griffin** in Ross-on-Wye; BBC via Masirah Is, Oman 15.310 (Eng to S.Asia 1000-1500) 24222 at 1018 in E.Worthing; UAER, Dubai 15.395 (Eng to Eur 1030-1055) 45544 at 1030 by **Ross Lockley** in Galashiels; R.Australia via Darwin 15.530 (Eng to Asia, Pacific 1100-1300) 43433 at 1115 by **Stan Watkins** in NW.London.

During the afternoon RFI via Allouis? 15.155 (Eng to Eur 1200-1300) was rated 24332 at 1209 by **Tim Allison** in Middlesbrough; R.Denmark via RNI 15.605 (Da [Eng 1st Sun of month] to Eur, Asia, E.USA 1330-1400) 34433 at 1344 in Bridgwater; VOA via Kavala? 15.205 (Eng to S.Asia, M.East 1400-1800) 44444 at 1415 in Kilkeel; WWCR Nashville, USA 15.685 (Eng to Eur 1100-2100) SIO222 at 1415 by **Ted Walden-Vincent** in Gt.Yarmouth; BBC via Limassol, Cyprus 15.575 (Eng to M.East, W.Asia 0930-1500) 32323 at 1427 in Penmaenmawr; BBC via Ascension Is 15.400 (Eng to Africa 1430-2100) 44233 at 1435 by **Peter Pollard** in Rugby; R.Nederlands via Madagascar 15.150 (Eng to S.Asia. M.East 1330-1625) 44333 at 1538 in Freshwater Bay; Channel Africa via Meyerton 15.240 (Eng to C/W Africa 1600-1700) 43333 at 1610 in Herstmonceux; WRNO New Orleans, USA 15.420 (Eng to E.USA, Eur 1500-2300) 23333 at 1616 in Burnham-on-Crouch; WEWN Vandiver, USA 15.340 (Eng to Eur 1600-1800) SIO444 at 1623 in Macclesfield; BBC via Woofferton & Skelton, UK 15.070 (Eng to Eur, M.East, N/C.Africa 0500-2130) 44555 at 1645 in

Long Wave Chart

Freq (kHz)	Station	Country	Power (kW)	Listner
153	Bechar	Algeria	1000	K*,P*
153	Donebach	Germany	500	A,B*,C,E,F,G,I*,J,K,N,O
153	Bod	Romania	1200	C
162	Allouis	France	2000	A,B*,C,E,G,H*,I*,J,K,M,N,O,P*
171	Nador Medi-1	Morocco	2000	A,J*,K*,O
171	B'shakovo etc	Russia	1200	A,C,E,G*,I*,J,K,M,N,O*
177	Oranienburg	Germany	750	A,B*,C,E,F*,G*,I,J,K,O*
183	Saarlouis	Germany	2000	A,B,C,E,G*,H*,I*,J,K,M,N,O,P*
189	Caltanissetta	Italy	10	C*
198	BBC R-4 via ?	UK	?	A,C,E,F*,G,H*,I*,J,N,O,P*
198	R.Mayak via?	Russia	?	A*,F*,I*
207	Munich	Germany	500	A,B*,C*,E,F,G*,I*,J,K,N,O*
207	Kiev	Ukraine	500	J*
216	Roumoules RMC	S.France	1400	A,B*,C,E,F,G*,H*,I,J,K,M,N,O,P*
225	Raszyn Resv	Poland	?	A,C*,E,F*,G*,I*,J,K,M,N,O*,P*
234	Beidweiler	Luxembourg	2000	A,C,E,G*,H*,I*,J,K,N,O,P*
234	Grigoriopol	Moldova	1000	A*,H*
234	St Petersburg	Russia	1000	C
243	Kalundborg	Denmark	300	A,B,C,E,FG*,I*,J,K,L*,N,O
252	Tipaza	Algeria	1500	A,G*,J*,K*,O*
252	Atlantic 252	S.Ireland	500	A,B,C,O*,E,G*,H*,I,J,K,M,N,O,P*
261	Burg(R.Ropa)	Germany	200	A,C,E,F*,J,K,N,O,P*
261	Taldom Moscow	Russia	2000	A*,B,C,G*,O*
270	Topolna	Czech Rep	1500	A,C,E,G*,I,J,K,O*,P*
279	Minsk	Belarus	500	A,C*,G*,I*,J*,K*,O*,P*

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) Kenneth Buck, Edinburgh.
(D) Robert Frost, Felixstowe.
(E) Ted Harris, Manchester.
(F) Simon Hockenhull, E.Bristol.
(G) Sheila Hughes, Morden.
(H) Stephen Jones, Oswestry.
(I) Eddie McKeown, Newry.
(J) George Millmore, Wootton, IoW.
(K) Fred Pallant, Storrington.
(L) Roy Patrick, Derby.
(M) Tom Smyth, Co.Fermanagh.
(N) Tony Stickells, Thornton Heath.
(O) Andrew Stokes, Leicester.
(P) Norman Thompson, Oadby.

Medium Wave Chart

Freq (kHz)	Station	Country	Power (kW)	Listener
520	Hof-Saale (BR)	Germany	0.2	K*
531	Ain Beida	Algeria	600	B*,L*,Q*,R*
531	Leipzig	Germany	100	A*,B*,C*,F,J*,K*,LR*
531	RNE5 via ?	Spain	?	B*,K*
531	Beromunster	Switzerland	500	F,L
540	Wavre	Belgium	150/50	B*,C,F,K*,L,Q,R,S*
540	Solt	Hungary	2000	C*
540	Sidi Bennour	Morocco	600	B*,L*,R*
540	Vitoria(EI)	Spain	10	B*,K*
549	Les Trembles	Algeria	600	B*,C*,K*,L*,Q*,R*
549	Thurnau (DLF)	Germany	200	A*,B*,C,F,K*,L,Q,R
558	Espoo	Finland	100	B*,PR*,S*
558	Rostock(NDR)	Germany	20	K*
558	RNE5 via ?	Spain	?	B*,K*,L*
567	Berlin	Germany	100	K*,L*,R*
567	Tullamore(RTE1)	Ireland (S)	500	B*,C,E*,F,H,L,P,Q,R,S*
567	RNE5 via ?	Spain	?	B*,R*
576	Vidin	Bulgaria	100	C*
576	Muhlacker(SDR)	Germany	500	B*,C,F,K*,L*,Q,R*
576	Riga	Latvia	500	C,L*
576	Barcelona(RNE5)	Spain	50	B*,K*,L*,R*
585	Paris(FIP)	France	8	B*,C,L,P,Q,R*
585	Madrid(RNE1)	Spain	200	B*,C,K*,L*,Q*,R*,S*
585	Dumfries(BBCScot)	UK	2	A,K*
594	Frankfurt(HR)	Germany	1000/400	B*,C,F,K*,L,Q,R*,S*
594	Oujda-1	Morocco	100	B*,R*
594	Muge	Portugal	100	B*,K*,L*,R*
603	Lyon	France	300	F,K*,L,Q*,S*
603	Sevilla(RNE5)	Spain	50	B*,J*,K*,R*
612	Athlone(RTE2)	Ireland (S)	100	B*,C,F,L,P,Q,R*,S*
612	Sebaa Aioun	Morocco	300	I*,L*
612	RNE1 via ?	Spain	10	B*,R*
621	Wavre	Belgium	80	B*,C,F,K*,L,Q,R
621	Barcelona(OCR)	Spain	50	B*,K*,L*,R*
630	Dannenberg(NDR)	Germany	100	F
630	Vigra	Norway	100	B*,C,K*,L*,Q*,R*
630	Tunis-Djedeida	Tunisia	600	B*,C*,J*,K*,L*,Q*,R*
639	Praha(Liblice)	Czech	1500	B*,C,K*,L*,Q*,S*
639	RNE1 via ?	Spain	?	B*,K*,L*,Q*,R*
648	RNE1 via ?	Spain	10	B*,K*,L*
648	Orfordness(BBC)	UK	500	C,F,L*,Q,R*
657	Neubrandenburg(NDR)	Germany	250	K*
657	Napoli	Italy	120	B*,C,L*,R*
657	Madrid(RNE5)	Spain	20	B*,L*,Q*,R*
657	Wrexham(BBCWales)	UK	2	C,F,J*,K*,R
666	MesskirchRohrd(SWF)	Germany	300/180	B*,F*,K*,R*
666	Sitkunai(R.Vilnius)	Lithuania	500	C*,F*,K*
666	Lisboa	Portugal	135	B*,C*,K*,L*,R
675	Marseille	France	600	B*,J*,K*,L*,R*,S*
675	Lopic(R10 Gold)	Holland	120	A*,B*,C,F,H,J*,K*,L,Q,R
684	Sevilla(RNE1)	Spain	500	B*,C,I*,K*,L*,Q*,R*
684	Avala(Beograd-1)	Yugoslavia	2000	B*,C,I*,K*,L*,Q,R*,S*
693	Potenza	Italy	20	C*
693	Tortosa(RNE1)	Spain	2	K*
693	Droitwich(BBC5)	UK	150	C,F,L,P,Q,R,S*
702	Flensburg(NDR)	Germany	5	B*,C,F,I*,K*,L*,R*
702	Monte Carlo	Monaco	40	C,I*
702	Banska	Slovak Rep.	200	C*
702	Slovensko 1 via ?	Slovak Rep.	?	Q*
702	Zamora(RNE1)	Spain	10	B*,K*,L*,Q*,R*
711	Rennes 1	France	300	C,F,H,K*,L*,Q,R
711	Heidelberg	Germany	5	B*,C*,F,K*,R*
711	Laayoune	Morocco	600	B*,L*
711	Murcia(COPE)	Spain	5	B*
720	Langenberg	Germany	200	C,F
720	Lisnagarvey(BBC4)	Ireland (N)	10	L*,P
720	Norte	Portugal	100	B*,C*,K*,L*
720	Lots Rd,Ldn(BBC4)	UK	0.5	C,F,J*,L,Q,R
729	Cork(RTE1)	Ireland (S)	10	B*,E*,F,K*,L,P,R
729	RNE1 via ?	Spain	?	B*,K*,L*,Q*,R*
738	Paris	France	4	B*,C,L
738	Poznan	Poland	300	B*,C*,K*,Q*,R*
738	Barcelona(RNE1)	Spain	500	B*,K*,L*,Q*,R*
747	Flevo(Hilv2)	Holland	400	B*,C,D*,F,K*,L,Q,R
747	Cadiz(RNE5)	Spain	10	B*
756	Braunschweig(DLF)	Germany	800/200	B*,C,D,F,K*,L*,Q,R*,S*
756	Bilbao(EI)	Spain	5	B*,L*,R*
756	Redruth(BBC)	UK	2	K*,L,P
765	Sottens	Switzerland	500	B*,F*,K*,L*,R*
774	Sofia	Bulgaria	50	B*
774	Enniskillen(BBC)	Ireland (N)	1	F,G,P
774	RNE1 via ?	Spain	?	B*,K*,L*,Q*,R*
783	Burg	Germany	1000	B*,C,D*,F,K*,L*,R*,S*
783	Miramar(R.Porto)	Portugal	100	B*
783	Dammam	Saudi Arabia	100	L*,R*
783	Zagreb-Buje	Yugoslavia	10	Q
792	Prague(Zbraslav)	Czech Rep.	40	G*
792	Limoges	France	300	C,K*,Q,S*
792	Lingen(NDR)	Germany	5	B*,D,L*
792	Sevilla(SER)	Spain	20	B*,K*,L*,Q*
801	Munchen-Ismaning	Germany	300	B*,C*,F,K*,L*,Q,R*,S*
801	RNE1 via ?	Spain	?	B*,K*,L*,Q*,R*
810	Madrid(SER)	Spain	20	B*,K*,L*,Q*,R*
810	Westerglen(BBCScot)	UK	100	C,F,H*,L,P,Q,R
819	Batra	Egypt	450	B*,C*,L*,S*
819	Toulouse	France	50	K*,L,R
819	Trieste	Italy	25	B*,C*
819	Warsaw	Poland	300	B*,C*,K*,R*
828	Hannover(NDR)	Germany	100/5	B*,K*,R*
828	Rotterdam	Holland	5	C,R
828	Oujda-2	Morocco	100	B*
828	Barcelona(SER)	Spain	50	B*,K*
837	Nancy	France	200	B*,K*,L,P*,Q
837	Shiraz	Iran	400	C
837	COPE via ?	Spain	?	B*,K*,L*
846	Rome	Italy	540	B*,C,K*,L*,Q*,R*
855	Berlin	Germany	100	K*,L*
855	RNE1 via ?	Spain	?	B*,I,K*,L*,P,Q*,R*
864	Santah	Egypt	500	L*,S*
864	Paris	France	300	B*,C,F,K*,L,Q,R
864	Socuellamos(RNE1)	Spain	2	B*,L*
873	Frankfurt(AFN)	Germany	150A	*B*,D*,F,K*,L*,Q*,R*,T*
873	Zaragoza(SER)	Spain	20	B*,K*,L*,Q*,R*
873	Enniskillen(R.UI)	UK	1	A*
882	COPE via ?	Spain	?	B*,K*,L*,Q*,R*
882	Washford(BBCWales)	UK	100	C,F,L,Q,R
891	Algiers	Algeria	600/300	B*,C*,I*,K*,L*,Q*,R*,S*
891	Huisberg	Netherlands	20	C,K*,L*,Q*,R*
900	Brno(CRo2)	Czech Rep	25	K*,L*
900	Milan	Italy	600	B*,C*,K*,R*
900	COPE via ?	Spain	?	B*,L*,R*
900	Qurayyat	Saudi Arabia	1000	C*
909	B'mans Pk(BBC5)	UK	140	C,F,J*,L,P,Q,R
918	Plesivec(Sloven'nR)	Slovenia	600/100	B*,L*,R*
918	Madrid(R.Int)	Spain	20	B*,K*,L*,R*
927	Wolvertem	Belgium	300	B*,C,F,K*,L,Q,R
936	Bremen	Germany	100	B*,C,F,K*,L,Q,R
936	Venezia	Italy	20	C*,L*,Q*
936	RNE5 via ?	Spain	?	B*,L*
936	Lvov	Ukraine	500	C
945	Toulouse	France	300	C,K*,L,Q,R*
954	Brno (CRo2)	Czech Rep.	200	B*,C*,K*,Q
954	Madrid(CI)	Spain	20	B*,C,K*,L*,Q,R*
963	Pori	Finland	600	A*,B*,C,F,H,K*,L*,P*,R*,U*
963	Paris	France	8	C*
963	Tir Chonaill	Ireland (S)	10	L*
963	Tunis-Djedeida	Tunisia	200	B*,L*
972	Hamburg(NDR)	Germany	300	B*,C,F,K*,L*,Q,R*
972	RNE1 via ?	Spain	?	B*,K*
981	Alger	Algeria	600/300	B*,C,F,I*,K*,L*,Q*,R*
990	Berlin	Germany	300	B*,C*,F,K*,L*,Q*,R*
990	R.Bilbao(SER)	Spain	10	B*,L*,R*
999	Schwerin (RIAS)	Germany	20	K*
999	Torino	Italy	20	B*,C*
999	Madrid(COPE)	Spain	50	B*,C,K*,Q*
1008	Las Palmas(SER)	Gran Canaria	10	B*,L*,R*
1008	Flevo(Hilv-5)	Holland	400	B*,C,F,K*,L,Q,R
1017	Rheinsender(SWF)	Germany	600	B*,C*,F*,K*,L*,Q*,R*
1017	RNE5 via ?	Spain	?	B*,L*
1026	SER via ?	Spain	?	B*,F,K*,L*,R*
1035	Tallinn	Estonia	500	L*
1035	RAI via ?	Italy	?	C*,R*
1035	Lisbon(Prog3)	Portugal	120	B*,K*
1044	Dresden	Germany	250	B*,C*,F*,K*,L*,R*
1044	Sebaa-Aioun	Morocco	300	B*
1044	SER via ?	Spain	?	K*
1044	S.Sebastian(SER)	Spain	10	B*,L*,R*
1053	Zarogoza(COPE)	Spain	10	B*,K*,R*
1053	Talk R.UK via ?	UK	?	C,F,J*,L,P,Q,R
1053	Droitwich(Talk)	UK	100	H
1062	Kalundborg	Denmark	250	B*,C,F,K*,L*,M*,Q*,R*
1062	R.Uno via ?	Italy	?	B*,R*
1071	Brest	France	20	L
1071	France-Inter via ?	France	?	K*,Q
1071	Lille	France	40	B*,C
1071	Riga	Latvia	50	L*
1071	Bilbao(EI)	Spain	5	B*,Q*,R*
1071	Talk Radio UK via ?	UK	?	F,Q,R
1080	Katowice	Poland	1500	B*,C*,L*,Q*,R*
1080	SER via ?	Spain	?	B*,K*,L*,R*
1089	Durres	Albania	150	C*
1089	Krasnodar	Russia	300	K*,R*
1089	Talk Radio UK via ?	UK	?	C,F,H,L,P,Q,R
1098	Nitra(Jarok)	Slovakia	1500	B*,C,K*,L*,Q*,R*
1098	RNE5 via ?	Spain	?	B*,K*,R*
1107	AFN via ?	Germany	10	B*,C,H*,K*,Q*,R*
1107	RNE5 via ?	Spain	?	B*,R*
1107	Talk R.UK via ?	UK	?	C,F,L,P,Q,R
1116	Bari	Italy	150	B*,C*,L*,Q*
1116	Pontevedra(SER)	Spain	5	R*
1125	La Louviere	Belgium	20	B*,C,K*,L
1125	Deanovec	Croatia	100	C*
1125	RNE5 via ?	Spain	?	B*,K*,L*,R*
1134	COPE via ?	Spain	2	B*,K*,L*,Q*,R*
1134	Zadar(Croatian R)	Yugoslavia	600/1200	B*,C*,K*,L*,R*
1143	AFN via ?	Germany	1	A*,Q*
1143	Stuttgart(AFN)	Germany	10	B*,C,K*,L*,R*,T*
1143	Bolshakovo(Mayak)	Russia	150	C*,Q*
1143	COPE via ?	Spain	2	B*,K*,Q*,R*
1152	RNE5 via ?	Spain	10	B*
1161	Strasbourg(Flnt)	France	200	B*,C*,K*,L*,P*,R*
1170	Vila Real	Portugal	10	D
1170	Beli Kriz	Slovenia	300	C*
1179	SER via ?	Spain	?	B*,R*
1179	Solvesborg	Sweden	600	B*,C,F,H,J*,K*,L*,N*,P*,Q,R*,U*
1188	Kuurne	Belgium	5	B*,C,K*,L*,R*
1188	Reichenbach(MDR)	Germany	5	B*,R*
1188	Szolnok	Hungary	135	C*,K*,L*,Q*
1197	Munich(VOA)	Germany	300	C*,K*,T*
1197	Virgin via ?	UK	?	C,F,L,P,Q,R
1206	Bordeaux	France	100	B*,C*,F,H*,K*,R*
1206	Wroclaw	Poland	200	C*,K*,L*,Q*
1215	Virgin via ?	UK	?	C,F,L,P,Q,R
1215	Washford(V)	UK	50	H
1224	Vidin	Bulgaria	500	L*
1224	Lelystad	Holland	25	B*,C,K*,Q,R
1224	Manningtree(V)	UK	0.5	L
1233	Liege	Belgium	5	K*
1233	Virgin via ?	UK	?	C,Q,R
1233	Swindon(V)	UK	0.16	H
1242	Marseille	France	150	B*,C*,K*,P*,Q*,R*
1242	Virgin via ?	UK	?	F,Q*,R
1251	Marcali	Hungary	500	B*,C,K*,Q*,R*
1251	Huisberg	Netherlands	10	B*,K*,L*,R*
1260	SER via ?	Spain	?	B*,K*
1260	Guildford (V)	UK	0.5	C,L,Q,R*
1269	Neumunster(DLF)	Germany	600	A*,B*,C,D*,F,K*,L,Q,R*
1269	COPE via ?	Spain	?	B*
1278	Strasbourg	France	300	C
1278	Dublin/Cork(RTE2)	Ireland (S)	10	A*,B*,C*,F,L*,P,Q,R*
1287	RFE via ?	Czech Rep.	400	B*,C,F,K*,L*,Q,R*
1287	Lerida(SER)	Spain	10	B*,K*,L*,R*
1296	Kardzali	Bulgaria	150	Q
1296	Valencia(COPE)	Spain	10	B*,K*,Q*
1296	Orfordness(BBC)	UK	500	R*
1305	Rzeszow	Poland	100	B*,C*,K*,L*,R*
1305	RNE5 via ?	Spain	?	K*,L*
1314	Kvitsoy	Norway	1200	B*,C,F,K*,L,Q*,R,U
1323	W'brunn (V.Russia)	Germany	1000/150	A,B*,C,F,K*,Q,R
1332	Rome	Italy	300	B*,C*,K*,L*
1341	Lakihegy	Hungary	300	B*,Q*,R*
1341	Lisnagarvey(BBC)	Ireland (N)	100	C,F,L*,P,Q,R
1341	Tarrasa(SER)	Spain	2	B*
1350	Nancy/Nice	France	100	B*,C*,F,K*,L*,Q,R*
1350	Cesvaine/Kuldiga	Latvia	50	C,L*
1359	Arganda (RNE-FS)	Spain	600	B*,L*,Q*,R*
1368	Foxdale(Manx R)	I.O.M.	20	A*,B*,F,L*,P,R*
1368	Krakow	Poland	60	C*
1377	Lille	France	300	C,F,K*,L,Q,R
1386	Ahwaz	Iran	400	K*,R*
1386	R.Ned via B'shakovo	Russia	2500	B*,F,H*,K*,L*,Q*,R*
1395	Lushnje(Tirana)	Albania	1000	B*,K*,L*,R*
1395	TWR via Lushnje	Albania	500	M*
1395	Lopic?	Netherlands	?	B*,C,K*,L,M*,Q,R
1404	Brest	France	20	B*,C*,K*,L,Q,R*
1413	RNE5 via ?	Spain	?	B*,K*,R*
1422	Heusweiler(DLF)	Germany	1200/600	A*,B*,C,D,F,K*,L*,Q,R
1422	Valmiera	Latvia	50	C
1440	Marnach(RTL)	Luxembourg	1200	B*,C,F,I,K,L*,Q,R
1440	Damman	Saudi Arabia	1600	B*,C*,I*,K*,L*,R*
1449	Squinzano	Italy	50	B*,C*,L*
1449	Redmoss(BBC)	UK	2	K*,P,Q*
1458	Lushnje(Tirana)	Albania	500	B*,M*
1467	Chisinau	Moldova	50	Q*
1467	Monte Carlo(TWR)	Monaco	1000/400	A*,B*,C,K*,L*,Q
1476	Dubai	UAE	1500	C*
1485	AFN via ?	Germany	1	R*
1485	SER via ?	Spain	?	B*,Q*,R*
1494	Clermont-Ferrand	France	20	C,F,Q,R
1494	St.Petersburg	Russia	1000	B*,C*,F,H*,K*,L*,Q*
1503	Stargard	Poland	300	B*
1503	RNE5 via ?	Spain	?	B*,R*
1512	Wolvertem	Belgium	600	A*,B*,C,F,K*,L*,P,Q,U*
1512	Jeddah	Saudi Arabia	1000	B*,R*
1521	Kosice(Cizatice)	Slovakia	600	B*,K*,L*
1521	Duba	Saudi Arabia	2000	B*,C*,L*,R*
1521	Kazan (R.Moscow)	Russia	20	G*
1530	Vatican R	Italy	150/450	B*,C*,K*,L*,P,Q*,R*,S
1539	Cesvaine	Latvia	7	G*
1539	SER via ?	Spain	?	R*
1539	R.Elche-Elx(SER)	Spain	2	G*
1539	Valladolid(SER)	Spain	5	K*,L*
1557	Nice	France	300	B*,C
1566	Mjadzel	Belarus	10	C*,G*
1566	Nagpur	India	1000	B*,G*,O*
1566	Sfax	Tunisia	1200	B*,G*,K*,P*
1575	Genova	Italy	50	B*,C*,D,K*
1575	SER via ?	Spain	5	B*,L*,R*
1584	SER via ?	Spain	2	B*,L*,R*
1593	Holzkirchen(VOA)	Germany	150	B*,C*,H*,K*,L*
1593	Miercurea,Ciuc	Romania	14	G*
1602	SER via ?	Spain	?	B*,L*,Q*
1602	Vitoria(EI)	Spain	10	A*,B*,L*,Q*,R*
1611	Vatican R	Italy	15	R*

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.
(O) Vera Brindley, Woodhall Spa.
(E) Robert Frost, Felixstowe.
(F) Ted Harris, Manchester.
(G) Gerry Haynes, while in Talgarth, Powys.
(H) Simon Hockenhull, E.Bristol.
(I) Sheila Hughes, Morden.
(J) Stephen Jones, Oswestry.
(K) Eddie McKeown, Newry.
(L) George Millmore, Wootton IoW.
(M) Roy Patrick, Derby.
(N) Clare Pinder, while in Appleby.
(O) Richard Reynolds, Guildford.
(P) Tom Smyth, Co.Fermanagh
(Q) Tony Stickells, Thornton Heath.
(R) Andrew Stokes, Leicester.
(S) Norman Thompson, Oadby.
(T) Ted Walden-Vincent, Gt.Yarmouth.
(U) Thomas Williams, Truro.

Gibraltar; WYFR via Okeechobee 15.566 (Eng to Eur 1600-1855) 44333 at 1649 in Oxted.

Later, VOA via Botswana 15.445 (Eng to Africa 1630-1800) was SIO323 at 1700 in Co.Fermanagh; RNB Brazil 15.265 (Eng, Ger to Eur 1800-2020) heard at 1800 by **Tom Hambly** in Hove; R.Nederlands via Bonaire 15.315 (Eng to S/E/W.Africa 1830-2025) 35433 at 1930 in Chester; RAE Buenos Aires, Argentina 15.345 (Sp, Eng, It, Fr, Ger to Eur, Africa 1800-2300) 24333 at 1955 in Storrington; VOA via Morocco 15.410 (Eng to Africa 1600-2200) SIO433 at 2019 in Woking; RAE Buenos Aires 15.345 (Sp to S.America 0000-0100) 34543 at 0025 in Wallsend.

Broadcasts from several continents can usually be heard in the **13MHz (22m)** band. Noted before noon were SRI via Sottens? 13.685 (It, Eng, Fr, Ger, Port to Australia, S.Pacific 0830-1100), rated SIO333 at 0900 in Co.Fermanagh; Monitor R via KHBI Saipan, N.Mariana Is 13.615 (Eng to Oceania 0800-1000 Tue-Sun) SIO222 at 0926 in Macclesfield; UAER, Dubai 13.675 (Eng to Eur 1030-1055) 54433 at 1035 in Herstmonceux; R.Austria Int via Moosbrunn 13.730 (Ger, Eng, Fr, Sp to

Local Radio Chart

Freq (kHz)	Station	ILR BBC	e.m.r.p (kW)	Listener
558	Spectrum, London	I	0.80	A,B,C,D,G,I
585	R.Solway	B	2.00	A,C,D
603	Boss 603,Cheltenham	I	0.10	D,G,J
603	InvictaSG,Litt'brne	I	0.10	B,D*,G,I
630	R.Bedfordshire(3CR)	B	0.20	A,B,C,D,E*,G,I,J
630	R.Cornwall	B	2.00	D,G
657	R.Clwyd	B	2.00	C,D,G,I
657	R.Cornwall	B	0.50	D,G
666	Gemini AM, Exeter	I	0.34	D,G,I
666	R.York	B	0.80	C,D
729	BBC Essex	B	0.20	B,C,D,E,G,I,J
738	Hereford/Worcester	B	0.037	D,E,G,I,J
756	R.Cumbria	B	1.00	D
756	R.Maldwyn, Powys	I	0.63	C,D,G
765	BBC Essex	B	0.50	B,C,D,E,G,I,J
774	R.Kent	B	0.70	B,D,G,I
774	R.Leeds	B	0.50	C,D,J
774	3 Counties SG, Glos	I	0.14	D,G,J
792	Chiltern SG,Bedford	I	0.27	B,D,G,I,J
792	R.Foyle	B	1.00	D,H
801	R.Devon & Dorset	B	2.00	D,G,I
828	Chiltern SG, Luton	I	0.20	B,D,I,J
828	Magic 828, Leeds	I	0.12	D
828	R.WM	B	0.20	D
828	2CR CG, Bournemouth	I	0.27	D,G,I
837	R.Cumbria/Furness	B	1.50	A,D
837	R.Leicester	B	0.45	B,C,D,E,G,I,J
855	R Devon & Dorset	B	1.00	D,G
855	R.Lancashire	B	1.50	A,D
855	R.Norfolk	B	1.50	B,D,E,I
855	Sunshine 855,Ludlow	I	0.15	B,D,G,I,J
873	R.Norfolk	B	0.30	B,D,G,I,J
936	Brunel CG, W.Wilts	I	0.18	D,G,I
945	Derby (Gem AM)	I	0.20	B,C,D,G,I,J
954	Gemini AM, Torquay	I	0.32	D,G
954	Wyvern, Hereford	I	0.16	D,H
963	Viva, Southall	I	1.00	B,D,G,I,J
990	R.Aberdeen	B	1.00	D
990	R.Devon & Dorset	B	1.00	D,G
990	Gt.Yks G, Doncaster	I	0.25	C,D,J
990	WABC, Wolverhampton	I	0.09	D,J
999	Gem AM, Nottingham	I	0.25	B,C,D,I,J
999	Red Rose G, Preston	I	0.80	A,D
999	R.Solent	B	1.00	B*,D,G,I
1017	WABC, Shrewsbury	I	0.70	C,D,F*,G
1026	R.Cambridgeshire	B	0.50	B,C,D,E,J
1026	Downtown, Belfast	I	1.70	D,H
1026	R.Jersey	B	1.00	B*,D,G
1035	Country 1035,London	I	1.00	B,D,G,I,H
1035	R.Sheffield	B	1.00	C,D,J
1035	N.Sound, Aberdeen	I	0.78	A,D
1035	W.Sound, Ayr	I	0.32	D
1107	Moray Fth,Inverness	I	1.50	C,D,H
1116	R.Derby	B	1.20	C,D,I,J
1116	R.Guernsey	B	0.50	B*,D,G,I
1152	Amber, Norwich	I	0.83	B,D*
1152	Clyde 2, Glasgow	I	3.06	D
1152	GNR, Newcastle	I	1.80	C,D
1152	Lon.Newstalk,London	I	23.50	B,D*,G,I
1152	Pic'ly G,Manchester	I	1.50	D
1152	PlymSnd AM,Plymouth	I	0.32	D
1152	Xtra-AM, Birmingham	I	3.00	D,J
1161	R.Bedfordshire(3CR)	B	0.10	B,C,D,I,J
1161	Brunel CG, Swindon	I	0.16	D,G
1161	Gt.Yks, Hull	I	0.35	D
1161	Southern Counties R	B	1.00	B,D,G,I,J
1161	Tay AM, Dundee	I	1.40	D
1170	Amber SGR, Ipswich	I	0.28	B,D*
1170	GNR, Stockton	I	0.32	D*
1170	SCR, Portsmouth	I	0.12	D,G
1170	Signal G,Stoke-on-T	I	0.20	C,D,J
1170	Swansea Snd,Swansea	I	0.58	D
1170	1170AM,High Wycombe	I	0.25	D,E,I
1242	InvictaSG,Maidstone	I	0.32	B,D,I
1242	IoW Radio, Wootton	I	0.50	D,G
1251	Amber SGR,Bury StEd	I	0.76	B,D,I
1260	Brunel CG, Bristol	I	1.60	D,G
1260	Marcher G, Wrexham	I	0.64	D
1260	SabrasSnd,Leicester	I	0.29	D,J
1260	R.York	B	0.50	D
1278	Gt.Yks G, Bradford	I	0.43	D,I
1296	Radio XL,Birmingham	I	5.00	A*,B,C,D,G,J
1305	Gt.Yks G, Barnsley	I	0.15	C,D*
1305	Premier via ?	I	0.50	B,D,G,I
1305	Touch AM, Newport	I	0.20	D,G
1323	S.Coast R, Brighton	I	0.50	B,G,I
1332	Premier, Battersea	I	1.00	B,D,I
1332	WGMS CG, Peterboro'	I	0.60	B,D,J
1332	Wiltshire Sound	B	0.30	D,G
1359	BreezeAM,Chelmsford	I	0.28	B,D,E,I
1359	Mercia CG, Coventry	I	0.27	C,D,J
1359	R.Solent	B	0.85	D,G
1359	Touch AM, Cardiff	I	0.20	D
1368	R.Lincolnshire	B	2.00	A,C,D,J
1368	Southern Counties R	B	0.50	B,D,G,I
1368	Wiltshire Sound	B	0.10	D,G
1413	Premier via ?	I	0.50	B,D,G,I
1431	Breeze AM, Southend	I	0.35	A*,B,D,E,I
1431	210 CG, Reading	I	0.14	D,E,161
1449	R.Peterboro/Cambs	B	0.15	B,C,D,J
1458	R.Cumbria	B	0.50	D
1458	R.Devon & Dorset	B	2.00	D,G
1458	Fortune, Manchester	I	5.00	D
1458	R.Newcastle	B	2.00	D
1458	Sunrise, London	I	50.00	B,D,G,I,J
1458	Radio WM	B	5.00	C,D
1476	CountySnd,Guildford	I	0.50	A*,B,C,D,G,I,J
1485	R.Humberside (Hull)	B	1.00	A,B*,C,D
1485	R.Merseyside	B	1.20	B*,D,H,J
1485	Southern Counties R	B	1.00	B,D,G,I
1503	R.Stoke-on-Trent	B	1.00	B*,C,D,E,G*,J
1521	MercuryXtra,Reigate	I	0.64	B,C,D*,G,I
1530	R.Essex	B	0.15	B,D,E,G,I
1530	Gt.Yks G,Huddersf'd	I	0.74	D
1530	Wyvern, Worcester	I	0.52	D,G,J
1548	R.Bristol	B	5.00	D,G
1548	Capital G, London	I	97.50	B,D*,G,I,J
1548	City G, Liverpool	I	4.40	B*,D,H
1548	Gt.Yks G, Sheffield	I	0.74	C,D
1548	Max AM, Edinburgh	I	2.20	D*
1557	R.Lancashire	B	0.25	D*
1557	Mellow, Clacton	I	0.125	B,D*,I
1557	Northants SG	I	0.76	D*,J
1557	Stn Coast R, So'ton	I	0.50	A*,D*,G,I
1584	KCBC, Kettering	I	0.04	D,J
1584	London Turkish R	I	?	B,D*,G,I
1584	R.Nottingham	B	1.00	C,D,J
1584	R.Shropshire	B	0.50	D
1584	Tay, Perth	I	0.21	D
1602	R.Kent	B	0.25	B,D,G,I

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

Listeners:-
(A) Tim Allison, Middlesbrough.
(B) Paul Bowery, Burnham-on-Crouch.
(C) Noel Carrington, Sutton-in-Ashfield.
(D) Gerry Haynes, while in Talgarth, Powys.
(E) Sheila Hughes, Morden.
(F) Stephen Jones, Oswestry.
(G) George Millmore, Wootton, IoW.
(H) Tom Smyth, Co.Fermanagh.
(I) Tony Stickells, Thornton Heath.
(J) Andrew Stokes, Leicester.

Transatlantic DX Chart

Freq kHz	Station	Location	Time (UTC)	DXer
		USA		
660	WFAN	New York, NY	2359	C
770	WABC	New York, NY	0031	C
880	WCBS	New York, NY	0058	C
1010	WINS	New York, NY	0233	F
1130	WBBR	New York	0830	E
1500	WTOP	Washington, D.C.	2332	C,E,F
1510	WNRB	Boston, MA	0128	A,C,E,F
1520	WWKB	Buffalo, NY	2345	C,E
1560	WQEW	New York	0038	C,F
		CANADA		
590	VOCM	St.John's, NF	0210	B,C,D,F
650	CKGA	Gander,NF	2100	C
710	CKVO	Clarenville, NF	0220	B
920	CJCH	Halifax, NS	0141	E,F
930	CJYQ	St.John's, NF	0122	A,B,C,E,F
940	CBM	Montreal, PQ	0101	A,F
950	CKNB	Cambellton, NB	0130	A
1010	CFRB	Toronto, ON	0244	A,C
CO	CFDA	Victoriaville, PQ	0152	F

Dxers:-
(A) Paul Bowery, Burnham-on Crouch.
(B) Robert Connolly, Kilkeel.
(C) David Edwardson, Wallsend.
(D) Richard Reynolds, Guildford.
(E) John Slater, Scalloway.
(F) Tony Stickells, Thornton Heath

Eur 0400-1800) 45444 at 1030 in Truro; Israel R, Jerusalem 13.755 (Heb [Home Sce relay] to W.Eur, N.America 0700-1425) 34333 at 1035 in Oxted; R.Kuwait via Kabd 13.620 (Ar to Eur, N.America 0930-1605) 43333 at 1050 in Penmaenmawr; R.Australia via Darwin on 13.605 (Eng, Chin to Asia 0900-1200) 23322 at 1121 in E.Worthing.

Later, WYFR via Okeechobee 13.695 (Eng to N.America 1300-1400) was 45344 at 1304 in Newry; Croatian R, Zargreb 13.830 (Cr, Eng to Eur 24hrs) 55555 at 1304 in Bridgwater; R.Prague, Czech Rep 13.580 (Eng to E.Africa, N.America 1400-1427) 55555 at 1420 in Norwich; WWCR Nashville 13.845 (Eng to E.USA 1400-0100) 34323 at 1430 in Burnham-on-Crouch; WHRI South Bend, USA 13.760 (Eng to E.USA, Eur 1500-2200) 44333 at 1540 in Freshwater Bay; UAER, Dubai 13.675 (Eng to Eur 1600-1640) 44444 at 1614 in Rugby; WJCR via Millerstown, USA 13.595 (Eng 12hrs, Chin 12hrs) 25232 at 1625 in Bushey Heath; VOA via Botswana 13.710 (Eng to Africa 1630-2200) 44444 at 1845 in Kilkeel; RCI via Sackville 13.650 (Fr, Eng to Eur, Africa 1945-2200) 24232 at 1955 in Chester.

An increasing number of broadcasters are using the **11MHz (25m)** band. During the morning R.Japan via Yamata 11.850 (Eng, Jap to Oceania 0700-0900) was 43333 at 0730 in Bushey Heath; Slovak R.Int, via Velke Kostolany 11.990 (Eng to Australia 0830-0857) SIO444 at 0846 by **Francis Hearne** in N.Bristol; KTWR (TWR) Agana, Guam 11.830 (Eng to S.Pacific 0855-1000) 43333 at 0900 in Morden; Voice of Turkey, Ankara 11.925 (Tur to Asia 0500-1000) 34232 at 0934 in Oxted; R.Finland via Pori 11.755 (Fin, Sw, Russ, Fr, Ger to Eur 0700-2030?) 33333 at 1130 in Truro; HCJB Quito 12.005 (Eng to Caribbean 1100-1500) 43434 at 1200 in Penmaenmawr.

In the afternoon China R.Int, Beijing 11.445 (Fil/Eng to E.Asia 1200-1227) was rated 33543 at 1225 by **John Parry** in Larnaca, Cyprus; VOIRI Tehran 11.930 (Eng to M.East, Asia 1130-1230) 22222 at 1228 in Rugby; R.Bulgaria via Plovdiv 11.605 (Eng to Asia 1230-1330) 54444 at 1320 in Norwich; Voice of Vietnam, Hanoi 12.020 (Eng to F.East 1330-1400) 32432 at 1333 in Newry; R.Japan via Sri Lanka 11.895 (Eng to S.Asia 1400-1500) 35333 at 1400 by **Roy Patrick** in Derby; WWCR Nashville 12.160 (Eng to Eur 1400-2300) 33333 at 1400 in Stalbridge; RS Makedonias, Thessaloniki 11.595 (Gr to Eur 0600-2255) SIO332 at 1412 in Gt.Yarmouth; BBC via Skelton, UK 12.095 (Eng to Eur, N/W.Africa 0400-2215) 44454 at 1419 in Woking; R.Australia via Carnarvon 11.660 (Eng to S.Asia 1430-2057) 45444 at 1500 in Galashiels; FEBC Bocaue, Philippines 11.995 (Eng to India, S.E.Asia 1300-1600) 32342 at 1555 in Bridgwater.

Later, R.Japan via Sri Lanka 11.930 (Eng to M.East, N.Africa 1700-1800) SIO322 at 1700 in Co.Fermanagh and 33333 at 1712 in Gibraltar; R.Kuwait via Kabd 11.990 (Eng to Eur, N.America 1800-2100) SIO333 at 1834 in Macclesfield; HCJB Quito 11.960 (Eng to Eur 1900-2200) 45444 at 1945 in Ross-on-Wye; BBC via Ascension Is 11.835 (Eng to W.Africa 2000-2315) 34344 at 2000 by **Bill Griffith** in SW.London; BBC via Ascension Is 11.750 (Eng to S.America 2000-0200) 25443 at 2005 in Chester; R.Globo, Rio de Janeiro, Brazil 11.805 (Port 0900-0330) 34533 at 2049 in Guildford; AIR via Bangalore 11.620 (Eng, Hi to Eur 1745-2230) 22222 at 2100 by **Norman Thompson** in Oadby; R.Australia via Carnarvon 11.855 (Eng to Asia, Pacific 2200?-0000) 25333 at 2355 in Burnham-on-Crouch; R.Bandeirantes, Sao Paulo, Brazil 11.925 (Port 24hrs) 35553 at 0135 in Wallsend.

Good reception from many areas has been noted in the **9MHz (31m)** band. During the morning R.New Zealand Int 9.700 (Eng to Pacific 0715-1206) was 34332 at 0820 in E.Bristol and 32222 at 0900 in Appleby; SRI via Fr.Guiana 9.885 (It, Eng, Fr, Ger, Port to Australia. S.Pacific 0830-1100) 44434 at 0929 in Rugby; VOA via Greenville, USA 9.590 (Eng to Caribbean 1000-1200) 32222 at 1026 by **Martin Dale** in Stockport; R.Australia via Darwin 9.615 (Eng to Pacific 1100-1755) 33323 at 1100 in Morden; AWR (KSDA) Agat, Guam 9.370 (Chin to China 1100?-1200) SIO111 at 1145 in Macclesfield.

After mid-day the Voice of Vietnam, Hanoi 9.840 (Eng to Far East 1330-1400) was heard at 1330 in Hove; BBC via Kranji, Singapore 9.740 (Eng to Far East 0500-1615) SIO222 at 1339 in Gt.Yarmouth; Channel Africa, Meyerton 9.530 (Eng to Africa 1600-1700) 34443 at 1625 in Wallsend; Monitor R via WSHB 9.370 (Eng to Eur 1800?-1958) 43333 at 1800 in Stalbridge; BBC via Skelton, UK 9.410 (Eng to Eur, N/C.Africa 0300-2300) SIO444 at 1800 in Co.Fermanagh; R.Nederlands via Madagascar 9.605 (Eng to Africa 1730-2025) 44333 at 1845 in Ross-on-Wye; R.Vilnius, Lithuania 9.710 (Eng to Eur 2000-2029) 44433 at 2000 in Manchester; Voice of Indonesia 9.525 (Eng to Eur 2000-2030) 33333 at 2020 in Truro; VOA via Botswana? 9.815 (Fr to Africa 1830-2030) 34333 at 2028 in Middlesbrough; VOA via Gloria, Portugal 9.760 (Eng to M.East 1700?-2200) SIO222 at 2048 in N.Bristol; RCI via Sackville 9.805 (Eng to Eur, Africa 2100-2230) 33233 at 2110 in NW.London; R.Record, Sao Paulo, Brazil 9.505 (Port 0900-0000) 33533 at 2106 in Guildford; Africa No.1, Gabon 9.580 (Fr to C.Africa 0500-2300) 45444 at 2141 in Storrington; R.Bulgaria, Sofia 9.700 (Eng to Eur 2200-2300) 44343 at 2200 in Oadby; AIR via Delhi? 9.950 (Eng to W.Eur 2045-2230) 43333 at 2211 in Norwich; R.Thailand via Udon Thani 9.680 (Eng to S.Africa, Asia 0000-0030) 44444 at 0010 in Galashiels.

In the congested **7MHz (41m)** band R.Japan via Skelton, UK 7.230 (Eng to E.Eur 0700-0800) was 43443 at 0750 in Herstmonceux; Monitor R.Int via WSHB 7.535 (Eng [Various Sat/Sun] to Eur 0400-0955) 43333 at 0805 in NW.London; RFPI Costa Rica 7.385 (Eng 24hrs) 23222 at 0928 in E.Worthing; WEWN Vandiver 7.465 (Eng to Eur 1000-1200) 44444 at 1005 in Rugby; Sudwestfunk via Rohrdorf 7.265 (Ger to Eur 24hrs) 54444 at 1047 in Manchester; Polish R, Warsaw 7.285 (Eng to Eur 1800-1855) SIO222 at 1800 in Co.Fermanagh; AIR via Aligarh? 7.410 (Hi, Eng to Eur 1745-2230) 43443 at 1900 in Chester; R.Thailand via Udon Thani 7.295 (Eng to Eur 1900-2000) 53443 at 1911 in Bushey Heath; R.Nederlands via Flevo 7.300 (Eng to Africa 1830-2125) 21421 at 1930 in Oxted; R.Budapest, Hungary 7.250 (Eng to Eur 2000-2030) 44444 at

Tropical Bands Chart

Freq (MHz)	Station	Country	UTC	DXer
2.310	ABC Alice Springs	Australia	2035	F,H
2.325	ABC Tennant Creek	Australia	1927	F,H,M
2.485	ABC Katherine	Australia	1927	F,H,M
2.850	KCBS Pyongyang	N.Korea	2016	E,T
3.200	V of the Strait 2	China	1440	T
3.200	TWR Manzini	Swaziland	1713	F
3.220	CPBS 1, Beijing	China	1405	F,R,T
3.220	R.HCJB Quito	Ecuador	2250	C
3.220	R.Kara, Lome	Togo	2143	C,F,H,M,R,T
3.223	AIR Simla	India	1730	F,H,R
3.225	RRI Tanjung Pinang	Indonesia	2245	C
3.230	R.Sol de Los Andes	Peru	0235	L
3.230	SABC Meyerton	S.Africa	1903	C,F,H,L,R,T
3.235	AIR Guwahati	India	1520	T
3.240	TWR Shona	Swaziland	1759	F,H
3.245	AIR Lucknow	India	1731	F,H
3.250	R.Pyongyang	N.Korea	1633	F,T
3.255	BBC via Maseru	Lesotho	2124	F,G,H,L,M,R,T
3.265	RRI Bengkulu	Indonesia	1536	F
3.270	SWABC 1, Namibia	S.W.Africa	2124	C,F,H,I,L,M,R,T
3.277	AIR Srinagar	India	1539	H
3.290	Namibian BC,Windhoek	S.W.Africa	1808	C,F,H,I,K,L,R,T
3.300	R.Cultural	Guatemala	0052	L,R
3.306	ZBC Prog 2	Zimbabwe	2124	E,F,H,L,M,R,T
3.310	Jilin PBS, Changchun	China	2239	R
3.315	AIR Bhopal	India	1701	F,H,M,T,V
3.316	SLBS Goderich	Sierra Leone	2143	F,M,O,Q,R,T,W
3.320	Pyongyang	N.Korea	1634	F,H,T
3.320	R.S.Afrika	S.Africa	1912	M
3.320	SABC Meyerton	S.Africa	1802	C,F,H,R
3.325	RRI Tanjung Pinang	Indonesia	2245	C
3.325	FRCN Lagos	Nigeria	2144	C,L,M,P,R,T
3.335	CBS Taipei	Taiwan	2117	F,H,M,R,T
3.345	AIR Jaipur	India	0056	R,V
3.345	AIR Jammu	India	1701	F,H,M
3.345	Channel Africa	S.Africa	1859	F,H,L
3.356	R.Botswana	Gabarone	1933	F,H,L,M,R,T
3.365	GBC R-2	Ghana	2145	C,H,I,L,M,R,T
3.365	AIR Delhi	India	1723	F,H,T
3.375	R.Nacional S.Gabriel	Brazil	2345	C
3.377	R.Nacional, Mulenvos	Angola	1856	F,M,V
3.380	NBC Blantyre	Malawi	2300	H,L
3.390	R.Candip Bunia	Zaire	2049	T
3.395	RRI Tanjung Karang	Indonesia	2250	C
3.900	Hulunbei'er, Hailar	China	1510	T
3.905	RRI Merauke	Indonesia	2255	C
3.915	BBC via Kranji	Singapore	1703	B,C,F,H,L,M,R,Y
3.925	NSB (R.Tampa)	Japan	2305	C,T
3.930	KBS Seoul	Korea	2310	C
3.940	PBS Hubei Wuhan	China	1415	C,E,F,H,R,T
3.945	AIR Gorakhpur	India	1537	F,H,T
3.950	Qinghai PBS, Xining	China	2300	C,D,E,F,I,T,V
3.955	BBC via Skelton	England	2300	A,C,J,L,U
3.955	R.Budapest	Hungary	2210	L
3.960	Xinjiang PBS, Urumqi	China	1410	F,T
3.965	RFI Paris	France	2301	A,C,J,K,L,V
3.970	R.Korea via Skelton	England	2134	H,L
3.970	RFE Biblis	Germany	0121	L
3.975	R.Budapest	Hungary	2200	H,J,K,L,P,S
3.985	IRRS	Italy	1530	H,J,K,L
3.985	China R via SRI	Switzerland	2200	L,P,S,U,W,X
3.985	SRI Beromunster	Switzerland	1825	C
3.990	Xinjiang BS, Urumqi	China	1425	F,H,T
3.990	BBC via Limassol	Cyprus	1604	K
3.995	DW via Julich	Germany	2300	A,C,J,K,L,V,W
4.003	RRI Padang	Indonesia	1603	F
4.012	R.Frecuencia Rioja	Peru	0032	V
4.035	Xizang PBS, Lhasa	Tibet	1517	C,F,O,T
4.190	CPBS Minority Sce	China	1549	F
4.330	Xinjiang BS, Urumqi	China	1342	F,H,T
4.460	CPBS 1, Beijing	China	1334	F,T
4.500	Xinjiang BS, Urumqi	China	1337	E,F,H,L,T
4.725	R.Myanmar, Yangon	Burma	1255	T
4.735	Xinjiang, Urumqi	China	1426	E,F,H,L,T,V
4.750	Xizang BS, Lhasa	Tibet	1344	C,F,H,L,R
4.755	R.Educ CP Grande	Brazil	0109	R,T
4.760	Yunnan PBS,Kunming	China	2315	C,D,E,F,J,T
4.760	AIR Port Blair	India	1535	F,H,T
4.760	ELWA Monrovia	Liberia	2104	F,H,L,M,P,R,T,V
4.765	R.Integracao	Brazil	2335	C
4.765	R.Rural, Santarem	Brazil	0117	H
4.765	Brazzaville	Pep.Rep.Congo	2305	L,R
4.765	RRI Medan	Indonesia	1627	H
4.770	Centinela del Sur	Ecuador	2320	C,H
4.770	FRCN Kaduna	Nigeria	1928	G,H,L,M,R,T
4.775	AIR Guwahati	India	1411	F,H,R,T
4.783	RTM Bamako	Mali	1933	C,H,L,M,R,T
4.790	Azad Kashmir R.	Pakistan	1529	F,H,R,T
4.795	R.Douala	Cameroon	0034	V
4.800	CPBS 2 Beijing	China	1406	F,H,R,T
4.800	AIR Hyderabad	India	1734	F,H,R,T
4.800	LNBS Lesotho	Maseru	1933	F,H,L,M,R,T
4.805	R.Nac.Amazonas	Brazil	2321	C,R
4.815	R.Difusora, Londrina	Brazil	0115	H
4.815	R.diff TV Burkina	Ouagadougou	2150	C,L,M,R,T
4.815	R.Pakistan Karachi	Pakistan	1524	H
4.820	La Voz Evangelica	Honduras	0037	V
4.820	AIR Calcutta	India	1435	F,H,R
4.820	Xizang, Lhasa	Tibet	1519	F,H,R,T
4.825	R.Cancao Nova	Brazil	0115	H,T
4.828	ZBC R-4	Zimbabwe	2103	F,H,M,R,T
4.830	R.Botswana, Gaborone	Botswana	1936	L,M,R
4.830	R.Bangkok	Thailand	1418	F,T
4.830	R.Tachira	Venezuela	2335	C,E,H
4.832	R.Reloj	Costa Rica	0114	H,T
4.833	R.Buenaventura	Colombia	0114	R
4.835	R.Tezulutlan, Coban	Guatemala	0113	H
4.835	RTM Kuching, Sarawak	Malaysia	1105	T
4.835	RTM Bamako	Mali	2310	C,H,J,L,M,R,T
4.840	Heilongjiang, Harbin	China	2321	D,E,H,R,T
4.840	AIR Bombay	India	1546	F,K,L,M,R,T
4.840	R.Andahuaylas	Peru	0015	C
4.845	RTM Kuala Lumpur	Malaysia	1526	F,H,T
4.845	ORTM Nouakchott	Mauritania	2105	C,H,L,M,R,T,V
4.850	AIR Kohima	India	0500	L,T
4.850	Ulan Bator 1	Mongolia	1527	H,T,V
4.860	AIR Kingsway(Feeder)	India	1859	B,F,H,K,M,O,R,T,V
4.865	R.Alvorada, Londrina	Brazil	0008	I
4.865	PBS Lanzhou	China	1455	C,E,F,H,J,L,R,T,V
4.865	R.Mozambique	Mozambique	0633	R
4.870	R.Cotonou	Benin	2057	H,M,R,T
4.870	Voz del Upano	Ecuador	2340	C
4.875	R.La Cruz del Sur	Bolivia	0112	H
4.875	R.Roraima, Boa Vista	Brazil	0910	T
4.879	R.Bangladesh	Bangladesh	1507	F,H,R
4.880	R. Difusora Acreana	Brazil	2335	C
4.880	AIR Lucknow	India	1602	H,T
4.885	R.Clube do Para	Brazil	2330	C,D,H,T
4.885	KBC East Sce Nairobi	Kenya	1655	F,H,L,R,T
4.890	RFI Paris	via Gabon	0358	L
4.890	R.Port Moresby	New Guinea	2012	F,M
4.890	ORTS Dakar	Senegal	1818	H,T
4.895	Voz del Rio Arauca	Colombia	0010	C,H,I,T,V
4.895	AIR Kurseong	India	0110	F,H,R
4.895	Pakistan BC	Pakistan	1716	E,F,H,M,R,T
4.900	V. of the Strait 2	China	1543	E,F,H,M,R,T
4.900	SLBC Colombo	Sri Lanka	1717	C,F,H,M
4.905	R.Relogio, Rio	Brazil	0109	H
4.905	R.Nat.N'djamena	Chad	2154	B,E,H,M,R,T
4.905	CPBS 1, Beijing	China	2207	R
4.910	RTG Conakry	Guinea	2315	C
4.910	AIR Jaipur	India	1332	F,T
4.910	RRI Bukittinggi	Indonesia	1707	H
4.910	R.Zambia, Lusaka	Zambia	1903	H,T
4.915	R.Anhanguera	Brazil	0755	T
4.915	PBS Guangxi, Nanning	China	1403	C,F,H,T
4.915	GBC-1, Accra	Ghana	2153	C,H,I,J,L,M,R,T
4.915	KBC Cent Sce Niarobi	Kenya	1916	H,M
4.920	R.Quito	Ecuador	0800	E,H,R,T
4.920	AIR Madras	India	1706	F,H,L,M,O,R,T
4.925	R.Difusora, Taubate	Brazil	0915	T
4.927	RRI Jambi	Indonesia	1348	F,T
4.935	R.Difusora, Jatai	Brazil	0005	C
4.935	KBC Gen Sce Nairobi	Kenya	1935	F,H,L,M,R,T
4.940	V of Strait, Fuzhou	China	2340	H,R
4.940	AIR Guwahati	India	1355	F,R,T
4.940	R.Abidjan	Ivory Coast	2325	C
4.945	R.Illimani, La Paz	Bolivia	0105	H
4.945	R.Difusora	Brazil	2306	D
4.950	R.Nacional, Mulenvos	Angola	1816	F,R,T
4.950	V. of Fujiang	China	1210	T
4.950	AIR Jammu	India	1720	F,H
4.950	R.Madre de Dios	Peru	0050	R
4.955	R.Marajoara, Belem	Brazil	0244	L
4.955	R.Nac. de Colombia	Colombia	0107	H,T
4.960	Mulenvos	Angola	2110	M
4.960	AIR Delhi	India	1525	T
4.960	Hanoi 2	Vietnam	1436	F
4.965	R.Alvorada	Brazil	2141	H,T
4.965	Christian Voice	Zambia	1937	F,H,L,M,N,R,T
4.970	PBS Xinjiang	China	1343	E,F,H,L,T
4.970	R.Rumbos, Caracas	Venezuela	0037	V
4.975	R.Timbre, Sao Luiz	Brazil	0106	H
4.975	Fujian 1, Fuzhou	China	1438	F
4.975	R.Uganda, Kampala	Uganda	2036	B,F,H,L,M,R,T
4.980	PBS Xinjiang, Urumqi	China	1348	B,C,F,H,T
4.980	Ecos del Torbes	Venezuela	2154	C,D,E,H,J,M,O,R,T,W
4.985	R.Brazil Central	Brazil	0005	C,R,T
4.990	Hunan 1, Changsha	China	1449	C,F,R,T
4.990	AIR Ext.Service	India	0043	L,T
4.990	FRCN Lagos	Nigeria	2101	C,H,L,R,T
4.990	R.Ancash, Huaraz	Peru	2332	H,R
4.995	R.Andina, Huancayo	Peru	0102	H
5.005	R.Nacional, Bata	Eq.Guinea	2118	F,M,R,T
5.005	R.Nepal, Kathmandu	Nepal	1443	B,F,H,T
5.009	R.TV Malagasy	Madagascar	1800	H,T
5.010	R.Garoua	Cameroon	1942	F,M,R,T
5.010	Guangxi 2, Nanning	China	2340	C
5.010	AIR Thiru'puram	India	0108	L,R
5.014	R.Pioneira, Teresina	Brazil	0826	R
5.020	PBS-Jiangxi Nanchang	China	1543	C,D,F,H,J,M,R,T
5.020	La V du Sahel,Niamey	Niger	2040	F,H,M,R,T
5.020	SLBC Tamil Home Sce.	Sri Lanka	1604	F
5.025	R.Parakou	Benin	2025	H,M,R,T
5.025	R.d'Transamazonica	Brazil	2302	O
5.025	R.Rebelde, Habana	Cuba	0100	H
5.025	R.Uganda, Kampala	Uganda	2046	F,H,M,R,T
5.030	AWR Latin America	Costa Rica	2320	D,H,O,R
5.035	R.Aparecida	Brazil	2345	C,T
5.035	R.Bangui	C.Africa	0435	T
5.040	PBS Fujian, Fuzhou	China	1435	F,H,T
5.040	L.V. de Yopal	Colombia	2227	D,L,T
5.040	Voz del Upano, Macas	Ecuador	0058	H
5.045	R.Cultura do Para	Brazil	0010	C,H
5.047	R.Togo, Lome	Togo	2107	C,G,H,L,M,O,R,T
5.050	Guangxi FBS, Nanning	China	1401	C,F,T
5.050	Haixia 1	China	2158	B,C,D,H,M
5.050	R.Tanzania	Tanzania	1906	E,H,L,Q,R,T
5.055	RFO Cayenne(Matoury)	French Guiana	0745	H,R,T
5.055	TWR Manzini	Swaziland	1915	H
5.060	PBS Xinjiang, Urumqi	China	1349	B,E,F,H,T
5.060	Sist d'Em Progreso	Ecuador	0038	L,V
5.065	R.Candip, Bunia	Zaire	1820	F,H
5.075	Caracol Bogata	Colombia	2355	C,G,L,O,R
5.090	Taiwan 2 Sce,Beijing	China	1200	T
5.097	R.Eco, Iquitos	Peru	0005	C
5.125	Taiwan 1 Sce,Beijing	China	1912	H,T
5.163	CPBS 2, Beijing	China	1537	H

DXers:-

(A) Charles Beanland, Gibraltar.
(B) Paul Bowery, Burnham-on-Crouch.
(C) Robert Connolly, Kilkeel.
(D) John Eaton, Woking.
(E) David Edwardson, Wallsend.
(F) P.Gordon Smith, Kingston, Moray.
(G) Bill Griffith, S.W.London.
(H) Gerry Haynes, Bushey Heath.
(I) Simon Hockenhull, E.Bristol.
(J) Sheila Hughes, Morden.
(K) Rhoderick Illman, Oxted.
(L) Eddie McKeown, Newry.
(M) Fred Pallant, Storrington.
(N) John Parry, Larnaca, Cyprus.
(O) Roy Patrick, Derby.
(P) Clare Pinder, while in Appleby.
(Q) Peter Pollard, Rugby.
(R) Richard Reynolds, Guildford.
(S) Chris Shorten, Norwich.
(T) John Slater, Scalloway.
(U) Tom Smyth, Co.Fermanagh.
(V) Andrew Stokes, Leicester.
(W) Ted Walden-Vincent, Gt.Yarmouth.
(X) Stan Watkins, N.W.London.
(Y) Thomas Williams, Truro.

Quarterly List of Equipment Used

LM&S for $ February, $ March, * April '96

$* Tim Allison, Middlesborough: Lowe HF225 + r.w.
Richard Bealey, Exeter: Trio R2000 + r.w.
* Charles Beanland, Gibraltar: Sangean ATS803 + a.t.u. + 6m wire or AA2.
$# Darren Beasley, Bridgwater: Yaesu FRG100 + a.t.u. + 15m wire.
$# Paul Bowery, Burnham-on-Crouch: Sangean ATS803A + 40m wire.
* Vera Brindley, Woodhall Spa: Sangean ATS803A, Saisho SW3000 + r.w.
$# Kenneth Buck, Edinburgh: Lowe HF225 + loop or r.w. Panasonic portable.
* Noel Carrington, Sutton-in-Ashfield: Lowe HF225 + r.w.
$# Robert Connolly, Kilkeel: JRC NRD525 + Datong AD370.
$# Bernard Curtis, Stalbridge: Tatung TMR7602 + r.w. or rod or loop.
#* Martin Date, Stockport: Sangean ATS803A + Howes a.t.u. + 23m wire.
* Ron Damp, Worthing: Racal RA17 + Mag Balun + 14m wire or two band Windom.
$ Eric Duncan, St.Andrews: Lowe HF150 + a.t.u. + 60m wire or 1m sq loop.
$# John Eaton, Woking: Lowe HF225 + Datong AD270 or a.t.u. + r.w.
$# Jim Edwards, Wigan: JRC NRD535 + 30m wire.
$# David Edwardson, Wallsend: Trio R600 + Balun + invert V trap dipole or spiral loop.
$# Stan Evans, Herstmonceux: Kenwood R2000 + Balun + 11m wire in loft.
$* Robert Frost, Felixstowe: Not stated.
$# Peter Gordon-Smith, Kingston, Moray: Icom R72 + a.t.u. + inverted V dipole.
$* Michael Griffin, Ross-on-Wye: Lowe HF225 + a.t.u. + 45m wire.
* Bill Griffith, S.W.London: JRC NRD535 + 25m wire.
$* Tony Hall, Freshwater Bay, IoW. Yaesu FRG-7 + r.w. or RF.B45
* Tom Hambly, Hove: Not stated
$# Ted Harris, Manchester: Roberts RC818
$# Gerry Haynes, Bushey Heath: Kenwood R5000 + Mag Balun + 40m wire.
$* Gerry Haynes, while in Talgarth: Kenwood R5000 + Kiwa loop.
$# Francis Hearne, N.Bristol: Sharp WQT370 + r.w.
$ Francis Hearne, while in S.W.London: Uni-com multiband portable.
$# Simon Hockenhull, E.Bristol: Roberts R817 or Bush TR130.
$# Sheila Hughes, Morden: Sony ICF7600DS; Panasonic DR48 + 15m invert L.
$# Rhoderick Illman, Oxted: Kenwood R5000 + AN-1 or Mag Balun + r.w.
#* Stephen Jones, Oswestry: Sanyo DCX W7 Hi-fi + r.w.
Tim Joy, Weston-super-Mare: Not Stated.
$# Ross Lockley, Galashiels: Realistic DX-300 + a.t.u. + 20m wire or Sangean ATS803A
Laurence Mason, Hassocks: Roberts 801 or Grundig Yacht Boy 400 + 4m wire.
$# Eddie McKeown, Newry: Tatung TMR 7602.
$# George Millmore, Wootton, I.O.W. Racal RA17L or Sangean ATS803A + loop.
Denis Mulkeen, Co.Mayo: Sangean ATS803A + 10m wire.
$# Fred Pallant, Storrington: Trio R2000 + Howes CTU8 a.t.u. + r.w.
$# John Parry, Larnaca, Cyprus: Realistic DX-400 + r.w.
$* Roy Patrick, Derby: Lowe HF125 + 22m wire.
$# Clair Pinder, while in Appleby: JRC NRD525 + Yaesu FRT 7700 + 16m wire.
Clare Pinder, Glasgow: Sony ICF2001 + r.w.
$# Peter Pollard, Rugby: Sony ICF2001D + r.w.
$# Philip Rambaut, Macclesfield: Int.Marine Radio R.700M + r.w.
$# Richard Reynolds, Guildford: Sangean ATS803A + a.t.u. + 10m 'T'.
$ Harry Richards, Barton-on-Humber: Grundig Satellit 700 + AD270 or r.w. or Grundig Yacht Boy or Matsui MR4099.
$ Alan Roberts, Quebec, Canada: Lowe Europa + 11m wire or vertical dipole.
$# Eric Shaw, Chester: Lowe HF225 + 7m wire.
$# Chris Shorten, Norwich: Matsui MR4099 + 10m wire.
$# John Slater, Scalloway, Shetland: Lowe HF150 + a.t.u. + 20m wire.
$# Tom Smyth, Co.Fermanagh: Sangean ATS803A or Morphy Richards R191.
$ John Stevens, Largs: Hammarlund HQ180 or Icom R-70 + r.w.
* Tony Stickells, Thornton Heath: Yaesu FRG7700 + 25m wire.
$# Andrew Stokes, Leicester: Lowe HF150 + 15m wire or Sony Walkman.
$# George Tebbitts, Penmaenmawr: Lowe HF225 + r.w.
$# Norman Thompson, Oadby: Matsui MR4099 + 20m wire in loft.
Phil Townsend, London: Lowe HF225 + preselector or a.t.u. + r.w. or loop.
Peter Utting, Lowestoft: Trio 9R-59.
$* Ted Walden-Vincent, Gt.Yarmouth: Sangean ATS803A.
* Stan Watkins, N.W.London: Sangean ATS803A + 30m wire.
# Stan Watkins, while in S.W.London: Sangean ATS803A + built-in whip.
$# Thomas Williams, Truro: Sharp 5454 or Gundig Yacht Boy 206.

2000 in Morden; Israel R, Jerusalem 7.415 (Eng to Eur, N.America 2000-2030) SIO333 at 2025 in N.Bristol; R.Australia via Carnarvon 7.260 (Eng to S.Asia 1430-2100) 32222 at 2030 in Truro; R.Romania Int, Bucharest 7.195 (Eng to Europe 2100-2156) 32222 at 2100 in Appleby; CPBS China 7.504 (Chin [CNR-1] 2000-1735) heard at 2138 in Guildford; WEWN Vandiver 7.425 (Eng to N.America 2000-1400) 32532 at 2144 in Bridgwater; R.Africa, Eq.Guinea 7.190 (Eng 1650-2300) SIO333 at 2222 in Gt.Yarmouth; Croatian R via Deanovec 7.370 (Eng [News] to USA 2300-2305) 45333 at 2303 in Ross-on-Wye; Monitor R via WSHB 7.510 (Eng to Eur, Africa 2000-0000) 55434 at 2320 in Freshwater Bay; R.Prague, Czech Rep 7.345 (Eng to N.America 0000-0027) 33333 at 0015 in Kilkeel; R.Yugoslavia, Belgrade 7.115 (Eng to E.USA 0100-0130) 55545 at 0100 in E.Bristol.

In the **6MHz (49m)** band R.Nigeria, Ibadan 6.050 (Eng, Yor, Edo, Iga, Urh 0430-2305) was 32222 at 0600 in Scalloway; WHRI South Bend 5.760 (Eng to USA? 0400-1000) 44333 at 0645 in Morden; HCJB Quito 6.050 (Eng to Eur 0700-0830) 33333 at 0740 in NW.London; HCJB Quito 5.900 (Eng to S.Pacific 0700-1130) 43333 at 0750 in Norwich; R.Cancao Nova, Brazil 6.105 (Port 24hrs) 54433 at 0818 in Guildford; WEWN Vandiver 5.825 (Eng to Eur 2100-1000) SIO433 at 0937 in Macclesfield; R.Australia via Shepparton 6.090 (Eng to Asia 1430-1900) 12431 at 1739 in Manchester; R.Pyongyang, Korea 6.576 (Eng, Fr to Eur, M.East, Africa 2000-2150) 33322 at 2037 in Bridgwater; VOFC Taiwan via WYFR Okeechobee, USA 5.810 (Eng to Eur 2200-2300) 33333 at 2200 in Appleby; WEWN Vandiver 5.825 (Eng to Eur 2100-1000) 44334 at 2215 in Rugby; BBC via Antigua 5.975 (Eng to C/S.America 2100-0600) 32432 at 2254 in Woking; WHRI Noblesville 5.745 (Eng to E.USA 2200-1500) 45334 at 2300 in Freshwater Bay; XEQM Merida, Mexico 6.105 (Sp 1200-0600) SIO223 at 0411 in Gt.Yarmouth.

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Derek Stephenson
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NEW
John Breeds
This book deals almost exclusively with television broadcast satellites and is a comprehensive collection of chapters on topics, each written by a expert in that field. It appears to be aimed at the professional satellite system installer, for whom it is invaluable, but it will be appreciated by a much wider audience - anyone interested in satellite technology. 280 pages. £32

SATELLITE EXPERIMENTER'S HANDBOOK 2nd Edition
Martin Davidoff K2UBC
The book is divided into four main sections - History, Getting Started, Technical Topics and Appendices. It provides information on spacecraft built by, and for, radio amateurs. In addition, it discusses weather, TV-broadcast and other satellites of interest to amateurs. 313 pages. £14.50

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Peter Pearson
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Edited by Erwin David G4LQI
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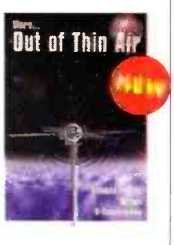

More Out of Thin Air has been revised, rewritten and updated from the original *Out of Thin Air*. This new edition is a compendium of antenna theory, design and construction and contains plenty for the antenna enthusiast to enjoy. Articles included are: Slim Jim Vertical Antenna for 144MHz, A five-element Beam Antenna for 70MHz, Antenna Ideas for the Novice and G2BCX 16-element Beam Antenna to name a few.
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John Heys G3BDQ
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John Heys G3BDQ
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Joe Carr
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W1FB'S ANTENNA NOTEBOOK (ARRL)

Doug DeMaw W1FB
This book provides lots of designs, in simple and easy to read terms, for simple wire and tubing antennas. All drawings are large and clear making construction much easier. There is no high-level mathematics in this book, just simple equations only when necessary to calculate the length of an antenna element or its matching section.
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YAGI ANTENNA DESIGN

Dr James L. Lawson W2PV
This book is a polished and expanded version of a series of articles first published in Ham Radio following on from a series of lectures by the author, who was well-known as the expert on Yagi design. Chapters include simple Yagi antennas, loop antennas, effect of ground, stacking and practical antenna design.
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Beginners (inc RAE)

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Victor Brand G3JNB
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I. D. Poole
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Clive Smith G4FZH and George Benbow G3HB
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NEW

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Ian Poole G3YWX
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Ray Petri G0OAT

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RAE REVISION NOTES (RSGB)

G.L.Benbow G3HB

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REVISION QUESTIONS FOR THE NOVICE RAE (RSGB)

Esde Tyler G0AEC

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60 pages. £5.00

THE NOVICE LICENCE STUDENT'S NOTEBOOK

John Case GW4HWR

This is the recommended course book for anyone taking the Novice Licence. Covering all aspects of amateur radio and electronics it would be useful to anyone starting out in amateur radio. Every left hand page is for your own notes of explanation. 124 pages. £5.99

SHORTWAVE RADIO LISTENING FOR BEGINNERS

Anita Louise McCormick KA8KGI

This book provides all the hands-on information you need to get off to a quick start in short wave listening. An excellent introductory guide, it describes in easy-to-understand non-technical terms how short wave radio works, available equipment and where to find it, what stations can be heard and how to become a licensed radio amateur. 176 pages. £9.95

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EMC

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Edited by Hugo Gernsback

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Pat Hawker G3VA

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For the first time the *ARRL Handbook* includes a disk of software which should prove useful and practical to all amateurs. The disk contains a Windows database, TISFIND which is a list of parts suppliers and addresses. Also included on the disk are software applications for Pi Network Design, SSTV, active filter design and a shortened dipole design, etc. 1200 pages. £25

ARRL OPERATING MANUAL

Another very useful ARRL book. Although written for the American amateur, this book will also be of use and interest to the UK amateur. Topics covered range from short wave listening through operating awards to repeaters, operating and satellites.
684 pages. £14.50

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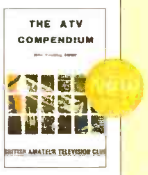

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6th Edition

Dick Biddulph G8PDS

This long awaited new edition has been extensively up-dated and is full of diagrams and photographs. This book is a complete handbook/reference work and project book all rolled into one. The final innovation is that the necessary p.c.b. templates for the featured projects are provided at the end of the book making them much easier to work from when making your own p.c.b.s. 750 pages. £20.00.

SETTING UP AN AMATEUR RADIO STATION BP300

I. D. Poole

Ian Poole G3YWX provides a helpful guide for anyone setting up an amateur radio station and covers: station design, construction, antenna, equipment, lay-out and the construction and use of basic test equipment, and helpful 'on the air' operating hints. 81 pages. £3.95

Packet

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Mike Mansfield G6AWD NEW EDITION

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Stan Horzepa WA1LOU

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YOUR PACKET COMPANION

Steve Ford WB8IMY

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J.G. Lee

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QRP

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2nd Edition. Doug De Maw W1FB

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John Case GW4HWR

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TEST EQUIPMENT FOR THE RADIO AMATEUR

Clive Smith G4FZH

In its 3rd edition, this book provides many up-dated test equipment project designs for the radio amateur, complete with p.c.b. template (in the rear of the book). Areas covered include: current and voltage measurements, oscilloscopes, frequency, r.f., antenna and transmission line measurements. 170 pages £9.00

VHF

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W. I. Orr W6SAI

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TEST EQUIPMENT CONSTRUCTION BP248. R.A.Penfold

Describes, in detail, how to construct some simple and inexpensive, but extremely useful, pieces of test equipment. Stripboard layouts are provided for all designs, together with wiring diagrams where appropriate, plus notes on their construction and use.

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W1FB's DESIGN NOTEBOOK (ARRL)

Doug DeMAW W1FB

This book is aimed at the non-technical amateur who wants to build simple projects and obtain a basic understanding of amateur electronics. Your workshop does not need to be equipped like an engineering lab to be successful as an experimenter. Don't let a lack of test equipment keep you from enjoying the thrills of experimentation. 195 pages. £8.50

Data

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Doug DeMaw W1FB

Back by popular demand, completely revised and expanded, this is a handy reference book for the r.f. designer, technician, amateur and experimenter. Topics include components and materials, inductors and transformers, networks & filters, digital basics and antennas and transmission lines. 260 pages. £8.95

ELECTRON TUBE LOCATOR

George H. Fathauer

Published by Antique Electronic Supply (Arizona)

A spirally bound (opening flat) style book, this should prove to be of great interest to valve collectors, historians and anyone trying to identify particular valves. The author provides a comprehensive list of American and British Service valves and 'civilian' equivalents and the valve base details are provided, with description of valve type and although there's no comprehensive valve characteristic information, the filament voltages and currents are given in a clear and precise style. Ideal for the researcher and collector.

350 pages. £19.95.

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(Original Publishers General Electric)

Re-published by Antique Electronic Supply (Arizona)

This stiff covered, novel-sized paperback facsimile book is printed on good paper and is packed throughout with information, and connection details (base pin charts) on receiving valves, special purpose valves, cathode ray tubes, thyratrons, vidicons and many others (including semiconductors). Highly recommended as a valve reference book. 475 pages. £9.95.

FURTHER PRACTICAL ELECTRONICS CALCULATIONS & FORMULAE BP144

F. A. Wilson.450 pages. £4.95

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F. A. Wilson

Written as a workshop manual for the electronics enthusiast, there is a strong practical bias and higher mathematics have been avoided where possible.

249 pages. £3.95

PRACTICAL ELECTRONIC DESIGN DATA BP316

Owen Bishop

In essence this book is a helpful collection of designer's 'building block' circuits, information, connection data and back-up information complete with an index.

327 pages. £4.95

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Steve Money

This is a unique collection of useful and intriguing data for both the traditional and modern radio amateur as well as the high-tech listener. Familiar radio topics are covered - abbreviations and codes, symbols, formulæ and frequencies - while the newer features of the hobby radio world - decoding, airband, maritime, packet, slow scan TV, etc. are also dealt with. 240 pages. O/S

RCA RECEIVING TUBE MANUAL

(Original Publishers Radio Corporation Of America)

Re-published by Antique Electronic Supply (Arizona)

This novel-sized stiff covered paperback book is absolutely fascinating for anyone interested in valves! In reality it's a designers handbook with potted details, characteristic curves, information and descriptions of typical applications for each valve listed. It's even got a section showing receiver circuits and applications. Excellent reading and reference. 384 pages. £10.50

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(Original Publisher Radio Corporation of America)

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This is a stiff covered paperbacked novel-sized book. And if you've got an interest in transmitting with valves...this is a useful reference source for valves up to 4kW Input. The RCA authors have included some interesting practical circuits using their valves, including some for s.s.b., v.h.f. and others. Highly recommended reference source. 318 pages. £9.95.

TRANSISTOR DATA TABLES (BP401)

NEW

This book gives data on over 50 transistors per page of this 170+ page book. Data is organised by device number, physical and electrical parameters and manufacturer. A useful point is an additional cross referencing of many of the types.

178 pages. £5.95

Projects

COIL DESIGN AND CONSTRUCTION MANUAL BP160

B.B. Babani. 106 pages. £3.95

HOW TO DESIGN AND MAKE YOUR OWN PCBs BP121

R. A. Penfold

The purpose of this book is to familiarise the reader with both simple and more sophisticated methods of producing p.c.b.s. The emphasis of the book is very much on the practical aspects of p.c.b. design and construction. 66 pages. £2.50

MORE ADVANCED POWER SUPPLY PROJECTS BP192

R. A. Penfold

The practical and theoretical aspects of the circuits are covered in some detail. Topics include switched mode power supplies, precision regulators, dual tracking regulators and computer controlled power supplies, etc. 92 pages. £2.95

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R. A. Penfold

This small book covers the construction and use of radio frequency and intermediate frequency projects, and audio frequency projects. Under the first heading ideas include a crystal calibrator, an antenna tuning unit, a wave trap, a b.f.o. and other useful projects. On the audio side projects include a bandpass filter, a by-pass switch, a c.w./RTTY decoder and many other practical ideas and suggestions for the home constructor. 92 pages. £3.95.

SHORT WAVE SUPERHET RECEIVER CONSTRUCTION BP276

R.A. Penfold

A general purpose receiver to build, from antenna to audio, described in understandable English. 80 pages. £2.95

SIMPLE SHORT WAVE RECEIVER CONSTRUCTION BP275

R. A. Penfold

Before discussing projects and techniques, the author provides essential information on theory, propagation, receiver designs and techniques. Finally, the author provides design for and describes the construction of practical receivers.

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Past Reviews PART 1

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 first half of the directory, next month's *SWM* will include the second part. 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.

AEA FAXIII	Jul 95
AEA PK232MBX Data Controller	Feb 95
Alinco DJ-X1 Scanning Receiver	Oct 92
Altron QM1 Aerial Mounting	May 82
Altron SM30 Aerial Mast	May 82
Ambit International FETDIP Oscillator Kit	Aug 82
AOR AR1500EX	Nov 93
AOR AR2700	Jun 95
AOR AR3000 Scanning Receiver	Jan 90
AOR AR3030 Receiver Preview	Jan 94
AOR AR3030 Full Review	Sep 94
AOR AR8000 Wide Band Receiver	Sep 94
AOR LA320 Active Antenna	Oct 93
AOR SDU5000 Spectrum Display Unit	Jan 95
AOR WX2000 FAX Decoder	Jul 92
Bearcat 800XLT Scanner	Mar 89
Bearcat BC-950XLT Scanner	July 89
Black Jaguar BJ200-MkIV Pocket Scanner	Nov 93
Black Jaguar BJ2000 MkIII Hand-Held Scanner	Nov 90
Black Star Meteor 600 Digital Freq. Counter	Nov 83
BNOS Electronics LPM70/10/100 linear amp	Jan 86
BOSCAD Morse Master v1.0	Jul 91
C M Howes ASL5 Audio Filter Kit	Apr 87
CapCo Magnetic Loop	Jun 90
Cirkit Satellite Receiver Kit	Jul 90
Cirkit Weather Satellite System	May 89
Cobra SR-925 Scanning Receiver	April 90
Code3 Data Decoder	Nov 90
CSC Mini Max Counter	Apr 87
CT30 ATU Kit	Sep 92
D270 Active Antenna	Aug 87
Datong D70 Morse Tutor	Nov 79
Datong DC144/28 144MHz Converter	Nov 81
Datong FL-3 Audio Filter	Nov 87
Datong FL2 Audio Filter	Oct 80
Datong Model MK Morse Keyboard	Apr 82
Datong Multi-mode Filter Model FL3	Dec 82
Datong PC1 General Coverage Converter	Nov 81
Datong SRB2 Auto woodpecker blanker	Sep 83
DeeComm SWL Antena Tuning Unit	Jun 93
Dewsbury Easy Reader DM1000	Apr 92
Drake R4C Receiver Part 1	Apr 89
Drake R4C Receiver Part 2	May 89
Drake R8E Communications Receiver	Dec 95
Drake R8E Communications Receiver	Feb 92
Drake SW8 Portable Communications Receiver	May 94
Dressler ARA 2000 Active Antenna	Sept 94
ERA Microreader	May 89
Fairmate HP-100E Hand-Held Scanning Receiver	Feb 90
Fox Security Wireless Home Burglar Alarm	Sep 94
Garex Tunable Aerial Filter	May 94
Garex v.h.f. Airband Pre-Amplifier	May 94
Grundig Cosmopolit Receiver	Jun 91
Grundig Satellit 500 Receiver	Mar 90
Grundig Satellit 650 Receiver	Apr 89
Grundig Satellit 700 Receiver	Dec 92
Grundig Satellit 700 Receiver	Dec 92
Grundig Satellit International 400 Receiver	Feb 89
Grundig WKC 4870RDS Car Radio	Oct 91
Grundig Yacht Boy 215 Receiver	Jan 89
Grundig Yacht Boy 220 Receiver	Aug 90
Grundig Yacht Boy 400 Receiver	Jun 94
Grundig Yacht Boy 500 World Receiver	Apr 94
Haydon XSS-1300 Scanning Antenna	Dec 94
Howes AA2 Active Antenna Kit	Mar 90
Howes AA4 Active Scanning Antenna Kit	Nov 90
Howes AB118 Active Airband Antenna Kit	Mar 94
Howes CTU8 ATU	Dec 94
Howes TRF-3 Receiver Kit	Jan 88
HS Publications D-400 TVDX Tuner	Jun 93
ICD ANT-1 Active Antenna	Mar 89
Icom IC R71E Communications Receiver	Jan 92
Icom IC-730 Transceiver	Feb 82
Icom IC-R72 Communications Receiver	May 93
Icom ICR-7000 HF Scanner	Dec 89
Icom R-9000 Receiver	Apr 89
ICS FAX Software	Mar 91
ICS FAX-1	Oct 87
ICS FAX-2 FAX Decoder	May 92
ICS Synop III	Apr 94
ICS-FAX Software	Mar 91
ITC R-610 World Receiver	Oct 89
Jandek Direct Conversion Receiver Kit 1	Sep 89
Jandek Direct Conversion Receiver Kit 2	Oct 89
JPS ANC-4	May 95
JRC NRD-535 Communications Receiver	Nov 91
KDK FM-2030 2m Transceiver	Oct 82
Kent Key	Dec 85
Kenwood R-5000 Receiver	Jun 87
Kenwood RZ-1 Scanning Receiver	Apr 88
Kiwa Medium Wave Loop Antenna	Aug 95
Lake Electronics Carlton Receiver Kit	Sep 94
Lake Electronics TI1 Mk2 ATU Kit	Nov 89
Lake TU3 Antenna Tuning Unit	Feb 95
Lar Antenna Noise Bridge	Jul 82
Lar Modules HF Omni-match	Jun 82
Lar Modules SWL OMNI-Match	Feb 84
Liniplex F2 Receiver	Aug 89
Liniplex Loop Antenna	Nov 90
Loewe ART-21 Multi-Standard TV	Jun 92
Lowe HF-150 Communications Receiver	Jan 93
Lowe HF-225 Europa	Sep 94
Lowe HF-225 HF Receiver	June 89
Lowe HF-250 Communications Receiver	Sep 95
Lowe Modemaster	Nov 93
Lowe PR-150 Preselector	Aug 94
Lowe SRX-50 4-Band World Receiver	Feb 93
Martelec JVF1	Dec 94
Maruhama RT-618 Wide Band Scanning Receiver	Nov 94
Matsui MR-4099 Receiver	Sep 87
Met 144-6x crossed Yagi 2M antenna	Oct 83
Meteosat Receiving System	Feb 88
MFJ-8400K 144MHz Receiver Kit	Mar 95
Micowave Modules 50MHz MMC50/28-S	Apr 85
Microwave Modules 144MHz lin Amps MML144/30ls	Mar83
Microwave Modules HMS-1 Morse Talker	Mar 82
MLB Antenna Mk-1	Sep 92
Momentum MCL-1100 Easyreader	May 94
MUTEK SLNA 144S Pre-Amp	May 82
Netset PRO-46	Nov 93
Nevada MS-1000 Scanner	May 91
NIR-10	Sep 94
Nordmende Galaxy 25 Multi-Band Colour TV	Jun 92
NTR-1 Digital Signal Procesing	Jul 94

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short wave magazine

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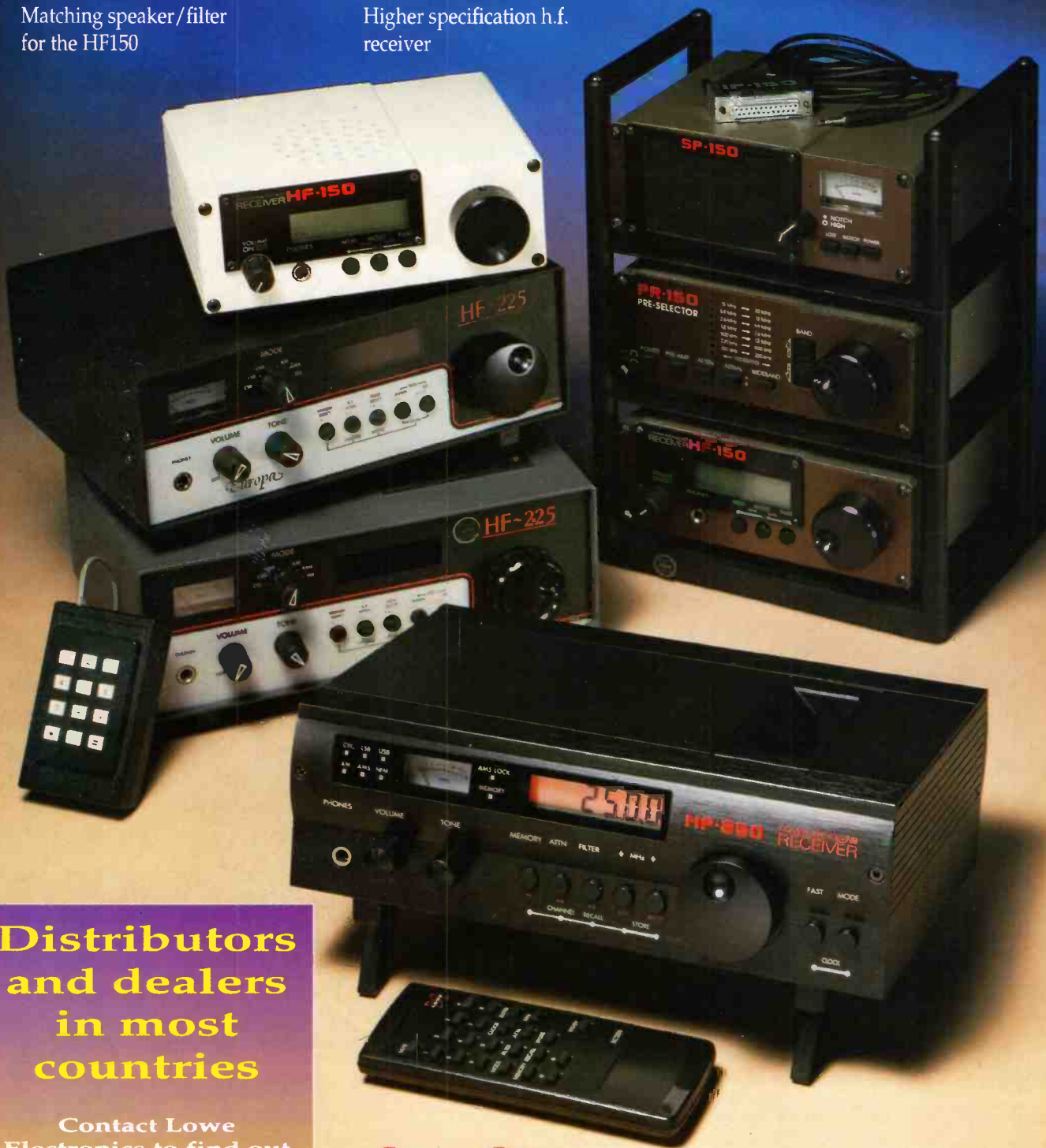

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