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short wave magazine

June 1996 £2.50 ISSN 0037 - 4261

ANTENNA Special

Joe Carr Shows You How To Connect Antennas To Your Receiver

Build the Billboard Log Periodic Antenna

A Remote Tuned Loop

An Inexpensive Passive Preselector

A Ferrite Loop Converter

AOR AR5000 Wide-Band, All-Mode Receiver Reviewed

WIN TICKETS TO THE INTERNATIONAL AIR TATTOO 1996

The Latest HF Receiver AOR AR7030 COMPETITION Final Part

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.

Features include manual keyboard entry with auto track tuning and a unique data skip option for bypassing unwanted data transmissions. It also helps to reduce birdies!

- Full frequency LCD display
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- 10 priority channels
- Automatic squelch
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- Channel lock-out and priority
- Frequency coverage 66-88, 108-174, 40[illegible]12, 806-956MHz
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NEW! High Quality Scanners . . . . at prices you can afford

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UBC 3000XLT

A superior 400 channel handheld from the Uniden stable, offering a near continuous coverage from 25-550MHz and 760-1300MHz. Reception modes include AM, FM and Wide FM, user selectable (FM & WFM only on the upper bands). Automatic search, priority channel and selective scan delay. Turbo scan/search facility offers 300 channels per second in search mode and 100 channels per second in normal mode. With a switchable delay of approximately 2 seconds. Backlight LCD display and fully functional keypad for direct frequency entry.

Accessories included:

- belt-clip
- earphone
- case
- flexible antenna together with 240V AC adapter/charger.

PRICE £249.95

UBC65XLT

The new UBC 65 XLT offers outstanding value for money with 10 memory channels and wide frequency coverage. It will prove especially popular for Amateur radio, Ship to Shore, Land Mobile and Public Service coverage. Features 10 channels, 8 band coverage, 2 digit LCD display, memory backup, keyboard lock switch and channel lockout and battery low indicator. Accessories included are charger and earphone. Frequency coverage: 66 - 88, 137 - 174, 406 - 512 MHz. Scan speed: 10 channels per second. Required: 5 x AA Nicads or 12 VDC adaptor

PRICE £95.95

Available from Nevada dealers throughout the UK or direct from:

NEVADA

UBC9000XLT

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

PRICE **£325.00**

UBC220XLT

The UBC 220 XLT is an easy to use scanner with 200 memory channels. Includes 10 band coverage, automatic search, priority channel and selective scan delay. Display light, automatic lockout and direct channel access. Also includes Belt clip, earphone case and flexible antenna accessories. Frequency coverage: 66 - 88, 108 - 174, 406 - 512, 806 - 956 MHz. Scan speed 100 channels per second scanning and 25 frequencies per second in search mode.

PRICE **£189.95**

UBC120XLT

Handheld

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.

For maximum convenience in monitoring, the 120XLT has 100 memories arranged in 10 banks plus 10 priority channels enabling you to keep track of your favourite frequencies. Channel lock-out and unique data skip facility are also included. Full frequency LCD display with direct frequency entry keyboard. Complete with NiCad battery and charger, belt clip, earpiece and rubber duck antenna.

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

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MULTIPLE RADIOS, MULTIPLE FUNCTIONS

Multiple uses; featuring the latest breakthrough from Optoelectronics, the ***OPTOLINX*** universal interface. The ***OPTOLINX*** adapts for use with a wide variety of Radios, Scanners, Decoders, Frequency Counters, and GPS Receivers. Both full and half duplex devices can be connected simultaneously and switched between them under software control.

Multiple Radios; the ***OPTOLINX*** is the only interface that allows full duplex receivers, like the AOR AR8000 and AR3000A, to be connected with half duplex receivers, like the ICOM R7000, R7100 and R9000, for multiple radio computer controlled scanning, allowing complete versatility that no other interface can match.

Multiple Functions; the ***OPTOLINX*** interfaces the Optoelectronics' DC440 decoder with any ***OPTOLINX*** compatible receiver for CTCSS, DCS, and DTMF decoding under computer control. The ***OPTOLINX*** also connects the Optoelectronics **M1** frequency counter to a PC for real time datalogging using **Optolog** software.

The ***OPTOLINX*** also incorporates additional features such as the software controlled tape recorder output, 9 pin mini DIN connector for single cable custom radio connection, and the ALL EXCLUSIVE NMEA-0183 interface for GPS or LORAN receivers.

•*Future Software Development by Software Design Companies will allow Real-Time position mapping.*

FEATURES

- •Computer control AR2700 and AR8000 using supplied FFC cable
- •Computer control ICOM R7000, R7100 and R9000
- •Download Scout frequencies to the PC
- •NMEA-0183 interface for GPS and LORAN receivers
- •Interface AR3000A with **DC440** for decoding CTCSS, DCS, and DTMF data under computer control
- •Interface **M1** frequency counter for datalogging with **Optolog** software
- •Switch between full and half duplex radios using remote or external switch
- •9 pin mini DIN connector for single cable custom radio connection
- •Interface multiple radios in a star network configuration

•Built in NMEA-0183 Interface for GPS interface. OPTOLINX shown with Trimble GPS, and AOR AR8000 Scanner.

OPTOELECTRONICS

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Simply add the forename of the person you wish to contact. For example:
dick@pwpub.demon.co.uk

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Cover Subject

Cover Subject
The new wide band base station receiver from AOR, the AR5000, is put through its paces by Alan Gardner in this issue.

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Good Listening

SWM SERVICES

Subscriptions

Subscriptions are available at £25 per annum to UK addresses, £30 in Europe and £32 (Airsaver), £37 (Airmail) overseas. Subscription copies are despatched by accelerated Surface Post outside Europe. Airmail rates for overseas subscriptions can be quoted on request. Joint subscriptions to both *Short Wave Magazine* and *Practical Wireless* are available at £42(UK) £47 (Europe) and £51 (rest of world).

Components for SWM Projects

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

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

Photocopies and Back Issues

We have a selection of back issues, covering the past three years of SWM. If you are looking for an article or review, or whatever that you missed first time around, we can help. If we don't have the whole issue we can always supply a photocopy of the article. Back issues are **£2.60** each, photocopies are also **£2.60** per article, plus **£1.00** for subsequent parts of serial articles.

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

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

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

Technical Help

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

EDITORIAL

Antennas are always popular with *SWM* readers. For a minimal outlay it is possible to experiment with something that might just make all the difference to the performance of your receiver. In our Antenna Special this month you will find several ideas for antennas and accessories that you can build and try out. Have Fun!

Win!

In this issue you will find the final part of our competition to win one of the very best h.f. receivers available - the AOR AR7030. You will need the special answer coupons from the previous two issues to be able to enter, so if you have missed either of these just contact our Post Sales Department on (01202) 659930 with your credit card number and they will post you a copy.

While on the competition theme make sure that you enter our special 'Spot the Difference' competition to win tickets to the International Air Tattoo 1996 at Fairford. This should be a veritable feast for the many aircraft enthusiasts among *SWM* readers.

Good luck!

Dick Ganderton G8VFH

LETTERS

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

Is there something you want to get off your chest? Do you have a problem fellow readers can solve? If so then drop a line to the Editor.

Dear Sir

I've just recently purchased the March issue of *SWM* in the US and am enjoying it very much. In your 'Communique' section on page 9 there's a brief on a new set of BT Phonecards to be issued commemorating radio history. A 'phone number is provided for purchase information, but not an address.

I'd appreciate it if you would either forward my interest in purchasing a set of cards, or provide me with an address to contact.

Katie McGee
Chicago
USA

Katie, we have contacted BT on your behalf, the address you require is; ***BT Phonecard Direct, PPO5 A25, Delta Point, 35 Wellesley Road, Croydon, Surrey CR9 2YZ*** *-* **KN.**

Dear Sir

I own a Realistic DX-300 h.f. receiver. On receipt of a new MVT-7100 scanner, was put out to grass in my loft, which over winter has probably a damp environment. Having decided that putting it out to grass was an error, I reinstated its use only to suffer, after 15 minutes, the loss of my digital frequency read-out. The receiver works perfectly, except I obviously do not know what frequency it is tuned to.

I wonder if anyone has had a similar problem and knows the cause or has a circuit diagram of this model. Thanks to *SWM* over the last few years for a lot of enjoyable reading and tips.

Bob Ashton
Wroughton
Swindon

If you can help Bob, then write to him via the Editorial Offices - ***KN.***

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.*

LETTERS

Dear Sir
Regarding the query raised by Alan Fry (April issue) in respect of restoration of the RA17, may I suggest that anyone with a limited knowledge of electronics may meet problems unless one is obtained in good working order.

The RA17, unlike the AR88, R1155, etc., uses the Wadley-loop principle and reference to your review of the Barlow Wadley XCR-30 in the April *SWM* will give an insight in what is involved compared with a 'straight' superhet. The RA17 contains bandpass filters, harmonic filters and an extensive crystal/LC 100kHz i.f. filter all requiring fairly sophisticated equipment for re-alignment if they are interfered with.

However, having said this, I have used RA17s professionally since they appeared in the late 1950s, and currently have one for amateur use but have rarely found bad problems with them. A completely 'dead' receiver follows normal practice in that it might be a fuse, faulty p.s.u., audio valve or audio output transformer which has a number of windings supplying speaker, phones and 600Ω line outputs. A receiver still 'alive' usually points to a valve replacement and substitution normally solves this problem.

Occasionally a resistor gives up the ghost and a check on voltages on valve electrodes is required, but remember, these components and the associated capacitors may be up to 40 years old and may have changed in value. It is often difficult to obtain high voltage (240V d.c. h.t. is used) rated components. Most major components are specialised and I am not aware of a source for them. Lastly, the kilocycles (yes, not kHz) tuning scale and system requires a diploma in engineering to replace it. If you can get one!

The brighter side is that most of the RA17s have been used by the Services, were regularly serviced and should be in a fair to good physical condition with a free running tuning system, so either buy from a reliable source (*SWM* Trading Post adverts sometimes offers them), take a friend, if possible,one who has RA17 experience, ask to hear it working, obtain the handbook (you need one to understand the principle and get the best out of it) and get a watertight guarantee if obtained from a rally source, although we know how difficult that may be from some traders.

The best buy is the RA17L which has an a.g.c. controlled r.f. stage superseding the non-a.g.c. RA17 MkI and MkII. Current prices around £125/175 should get one in good order. Buy a spare set of new RA17 valves, which appear at some rallies in sealed MOD boxes, at around £25. Do not buy a receiver which looks as if it has been lifted off a scrapheap unless you want to pay a few pounds for one for spares, although the r.f. section and i.f. filters are not interchangeable between the early and RA17L models.

I use the RA17L with added home-brew p.l.l. f.m. discriminator and s.s.b. adapter connected to the 100kHz i.f. output plus a valved v.h.f. tuner and, like John Wilson, still find great satisfaction with these golden oldies compared with the £1000+ black boxes.

N. L. Smith
Stoke-On-Trent, Staffs

Dear Sir
The AR7030 review in the March issue - very many thanks to John Wilson and yourselves at *SWM* for the additional test information given in the May issue, please thank John Wilson for his help.

As you say in your editorial paragraph, it will indeed be interesting to see the response of other receiver manufacturers.

F. G. Hampshire
Brightstone, Isle of Wight

To: dick@pwpub.demon.co.uk
Subject: letters page
For quite some time now I have noticed that your letters page has become difficult to read because of the faint print which is worsened by printing on a coloured background.

My evesight is fairly good, and I have no problem reading the rest of your magazine. Would it be possible to use the same print that is used in the rest of the magazine, as I am sure that I'm not the only one whose enjoyment is spoiled by having difficulty reading this page.

Mac McClelland...via the 'Net

To: dick@pwpub.demon.co.uk
Subject: Yatesbury Association
Having taken the *SWM* for the last three years, I believe that many short wave enthusiasts owe their interest to being wireless ops. in the services. May I through your magazine advise of a new Association being formed to reunite personnel who trained or served at **Yatesbury** (Wilts) at anytime from its opening during the First World War.

The inaugural meeting will be on August 18th.1996

Anyone who served at Yatesbury is invited initially to contact as soon as possible:- **Eddie Brown, 8 Hobbes Close, Malmesbury, Wilts SN16 0DA.**

John Bennett...via the 'Net

THE GREAT SHACKWARE DEBATE

To: dick@pwpub.demon.co.uk
Subject: The great Shackware debate
Just a quick E-mail to ask for the 'Shackware' column to be a monthly feature instead of a quarterly one. Jerry seems the ideal person to write this column as he not only owns the infamous PC but also other makes and models of computers. Some people would have you believe that the only computers around are PCs running DOS/Windows but there are much easier and user-friendly machines out there that are ideal for the s.w.l.

I use an Atari STFM computer for c.w., RTTY and AMTOR with better results on these data modes than using Hamcomm on my very expensive PC.

By the way, February's issue is proving to be a good read even without Shackware. Well done!

Carl Hender...via the 'Net

*You don't need to convince me that a DOS/Windows machine is unfriendly - I am an avid Mac user - **Ed**. (He's got a PC as well though! - **KN**).*

To: dick@pwpub.demon.co.uk
Subject: Shackware & Computers
I realise that purists think that the use of computers is heresy, but most now accept that computers are a communication medium and is a complementary technology.

As a long standing s.w.l., I have found that computers have revolutionised the art of decoding. I am taking the RAE in May and I will using packet radio a.s.a.p !

More "Shackware" please !!!

Graham Jefferies...via the 'Net

Dear Sir
I am writing this letter to you to ask your advice. I have a Realistic scanner PRO-43 and would like to listen to civil and military airband, but find on civial air I can only hear the pilot, not the ground stations (London control 126-075). If I drive five miles down the road, I pick up pilots and ground stations.

At present I use a home-made dipole cut for airband. What antenna would you recommend for civ/mil air, also what antenna would you advise for h.f. to u.h.f. coverage.

P. Tresiddo
Cornwall

*This is a perenial question, antennas for scanning and wide band receivers are a constant source of enquiry from our readers. To give a full reply to this question would require many pages, indeed many books! My best advice to anyone with a bit of practical nouse, is to invest in some of the books featured in our 'Book Store' - pages 79-83 of this issue - and try your hand at building some examples. If you are unable, or unwilling, to persue this path then talk to the dealers who advertise in SWM. Regarding not receiving ground stations, v.h.f. and u.h.f. signals are greatly attenuated by objects such as buildings on the ground. The ability to have a clear line-of-sight between the receiving antenna and the station you are attempting to hear is essential - **KN**.*

GRASSROOTS

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

* Short Wave Magazine & Practical Wireless in attendance

rallies

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

June 2: The Spalding & District Amateur Radio Society are holding their Amateur Radio & Computer Fair at Springfields Exhibition Centre, Spalding. Doors open 10am to 5pm. There will be refreshments in 100-seater restaurant, licensed bar, 5 acre parking space on site, trade stands in large hall, outside car pitches. Admission is £1.50 (under 14s free) includes entry to Springfields Gardens complex. Further details on **(01775) 722940** or **(01995) 750382.**

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

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

***June 9:** The 27th Elvaston Castle National Radio Rally is being held at the usual venue, which is the showground of the Elvaston Castle Country Park. **Keith Ellis G1ZLQ** on **(01332) 662896.**

June 16: The Newbury & District Amateur Radio Society are holding their 9th Annual Radio Boot Sale at the Recreation ground, Cold Ash, Newbury, Berkshire. The site is just under two miles from the A4/A34 road junction and is well signposted. Admission and parking free for buyers and a generous plot will be available at £8 to those selling. Access allowed to the site for setting up from 8am. Refreshments/toilets/disabled parking and children's playground on site. Talk-in with GB4NBS on S22. Further information from **George** on **(01488) 682814.**

***June 30:** The 39th Longleat Amateur Radio and Electronics Rally, organised by the Bristol Group of the Radio Society of Great Britain will be held at Longleat Park, near Warminster, Wiltshire. A major feature of the rally will be the Bring & Buy section. There are also all the other usual Longleat facilities such as the Safari Park, House and beautiful lake and grounds. **Gordon G0KGL** on **0117-940 2950.**

***July 13:** Cornish Radio Rally. More information from **Ken G0FIC** on **(01209) 821073.**

July 14: The 16th Sussex Amateur Radio & Computer Fair is being held at the Brighton Race Course from 10am to 4pm. There will be over 100 trade stands, free parking and admission is only £1.50. The rally is one of the largest in the South of England. Refreshments and bars at reasonable prices. A rally not to be missed! **(01273) 501100.**

July 21: The 13th McMichael Mobile Rally and Car Boot Sale will take place at the Haymill Youth and Community Centre, Burnham Lane, Slough, near Burnham Railway station. Talk-in on S22. Doors open at 10am and admission is £1.50. Car boot sale £7 per pitch on the day (no advance bookings). For trade bookings, contact **Chris G0MZN** on **(01734) 874870.** Other details from **Dave G3SET** on **(01628) 486554.**

July 28: The Rugby ATS 8th Annual Radio Rally will be held at the BP Truckstop on the A5, three miles east of Rugby and just 2.5 miles North west from junction 18 of the M1 motorway. Doors open from 10am and admission is £1 per car and facilities include a good cafeteria and toilets. Talk-in on S22 by GB8RRR. Further details from **Peter** on **(01455) 552449** or **Steve** (for bookings) on **(01788) 824214.**

***July 28:** The Scarborough Amateur Radio Society Amateur Radio, Electronics and Computer Fair will be held at The Spa, South Foreshore, Scarborough. More details can be obtained from **Ross Neilson G4ZNZ** on **(01377) 257074.**

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 Black Horse Public House, West Street, Old Market, Bristol. All visitors are welcome. The club has been formed so that all radio enthusiasts, whether they be Licensed Amateurs, s.w.l.s or CBers can get together and have a good natter and do things that you do in radio clubs. PO Box 28, Bristol BS99 1GL.

RSGB City of Bristol Group: last Tuesdays, 7pm, New Friends Hall, Purdown, Bell Hill, Stapleton, Bristol BS16 1BG. May 28 - Direct conversion RX. June 25 - Mobile antennas. Dave Bailey G4NKT. 0117-967 2124.

South Bristol ARC: Wednesdays, 7.30pm. Whitchurch Folkhouse Assoc., Bridge Farm House, East Dundry Rd, Whitchurch. May 29 - Fox hunt club annual event. June 5 - 80m activity evening. 12th - Aircraft video night. 19th - Preparation for VHF NFD operators. 22nd - Saturday-Sunday VHF national field days. 26th - Preparation for Longleat. For more information ring (0127) 834282 on a Wednesday evening.

BEDFORDSHIRE

Dunstable Downs RC: Fridays 8pm. Chews House, High Street South, Dunstable, Bedfordshire. May 24 - Informal meeting. 31st - Informal meeting. June 7 - Quiz night (book night). 14th - Informal meeting. 21st - DDRC Grand Prix, Scalextric racing. New members and visitors welcome, just drop in or call Paul G7TSJ on (01582) 861936.

BUCHINGAMSHIRE

Aylesbury Vale RS: Wednesday evenings, 8pm. Hardwick Village Hall, (Hardwick is situated off the A413 between Aylesbury and Buckingham). June 5 - Images from outer space by G4OAV. Ivan Eamus G3KLT. (01296) 437720.

CLWYD

Conwy Valley ARC: 1st Wednesdays. The Studio, Penrhos Road, Colwyn Bay, Clwyd. June 5 - AGM. R. W. Evans GW6PMC (01745) 855068.

CORNWALL

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

DEVON

Plymouth RC: Tuesdays, 7.30pm. The Royal Fleet Club, Devonport, Plymouth. May 25/26 - Plymouth Radio Club Rally. F. P. Russell on (01752) 563222.

FIFE

Dunfermline & DARC: Thursdays, 7.30pm. The former RAF radio station, Outh Muir, located by the A823 Dunfermline to Crief Road, one mile from the Knockhill Racing Circuit. May 23 - 2m DF Hunt - Come along and have a fun evening. 30th - Natter night. June 6 - HF operating evening. 13th - Natter night. 16th - PW 2m QRP Contest. 20th - HF operating evening. 27th - Natter night. 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. May 25 - 60th anniversary dinner to be held at Enfield Grammar School, June 27 - Radio on the air. M. E. Viney G0ANX. (01707) 850146.

HAMPSHIRE

Horndean & DARC: 1st & 4th Tuesdays, 7.30pm. Lovedean Village Hall, Lovedean Lane, Lovedean, Hants. June 4 - Natter night. 8/9th - Club h.f./v.h.f. station at Clanfield Carnival. 25th - Broadband ISDN by Nigel G7CAW. S. Swain (01705) 472846.

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

HEREFORD & WORCESTER

Bromsgrove ARS: 2nd & 4th Tuesdays, Lickey End Social Club, Alcester Road, Burcot, Bromsgrove. May 28 - AGM. Barry Taylor, (0152?) 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. Further details from Peter 2E1BDB on (01727) 860631 or John G4JOV on (01582) 765821.

Hoddesdon RC: Alternate Thursdays, 8pm, Conservative Club, Rye Road, Hoddesdon. June 6 - Visit of Chris Taylor from Martin Lynch. 20th - BBQ at Tolmers Scout Camp, Cuffley, Herts. Don G3JNJ on 0181-292 3678.

ISLE OF MAN

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

KENT

Bromley & DARS: 3rd Tuesdays, 7.30pm. The Victory Social Club, Kechill Gardens, Haves. June 18 - Direction finding hunt by Graham G4NPD & Alan G0TLK. A. Messenger G0TLK. 0181-777 0420

Medway AR & TS: Fridays, 7.30pm. Tunbury Hall, Catkin Close, Tunbury Avenue, Walderslade, Chatham, Kent. May 31 - Knots & Splices - instruction by Jim G0HHQ to groups of about eight - please bring some rope if you can. June 14 - SSTV - talk and demonstration by John G6IVP. 21st - Annual BBQ. G3VLN, 40 Linwood Avenue, Strood, Rochester, Kent ME2 3TR (01634) 710023.

LANCASHIRE

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

Preston ARS: Thursdays, 8pm. The Lonsdale Sports & Social Club, Fulwood Hall Lane, Fulwood, Preston. May 23 - General discussion evening. June 6 - RSGB video. 20th - 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. May 29 - Formal NFD final briefing. Mike G4EOL. (01603) 789792.

NOTTINGHAMSHIRE

Mansfield ARS: 2nd Mondays, 7.30pm. The Polish Catholic Club, off Windmill Lane, Woodhouse Road, Mansfield. June 10 - The club callsigns G1GQC and G3GQC take to the air. Mick G0UYQ, QTHR on (01623) 792243 or Howard G1JGY, QTHR, (01623) 423697.

SHROPSHIRE

Salop ARS: Thursdays, 8pm. The Telesports Club, Abbery Foregate, Shrewsbury. May 23 - Fox hunt 7pm at the Oak, find G0RVE and get a good start in the points league. June 6th - Talk on DXTV by G4FBZ - an opportunity to see how its really done!. 13th - Open evening and on air night, all welcome, v.h.f., u.h.f., h.f. and data modes, also a practical construction demonstration, (see it built and on the air), 20th - Fox hunt 7pm at the Oak, find G7LGK, build up your lead or see the Shropshire countryside. 27th - National field day preparations, check we did bring all the gear back last time! Ian Davies G7SBD, QTHR. (01743) 463711.

SOMERSET

Yeovil ARC: Thursdays, 7.30pm. The Red Cross Centre, 72 Grove Avenue, Yeovil. May 23 - VHF DF evening. G3KSK is the fox, 30th - Club station on air and committee meeting, June 6 - A talk on cycle 23 by G3MYM, 13th - Morse techniques by G3KSK. 20th - Preparation for s.s.b. field day event by G7WAL. 27th - Club station on the air and committee meeting. Cedric White, QTHR. (01258) 473845.

WARWICKSHIRE

Mid Warwickshire ARS: 2nd & 4th Tuesdays, 8pm. St Johns HQ, Warwick Div., 61 Emscote Road, Warwick. June 11 - Fox hunt, 25th - W.A.B. Don on (01926) 424465.

Stratford-upon-Avon & DRS: 2nd & 4th Mondays, 7.30pm. Home Guard Club, Main Street, Tiddington, Stratford-upon-Avon. May 27 - Bank Holiday/Open evening. June 10 - 2m direction finding contest. 24th - Repeater management group - chairman Geof Dover G4AFJ. Martin Rhodes G3XZO. (01789) 7400?3.

WEST YORKSHIRE

Wakefield & DRS: Tuesdays, 8pm. The Ossett Community Centre, Prospect Road, Ossett. June 4 - 2m d.f. tuition. 11th - on the air. 18th - 2m fox hunt. 25th - Coax traps without a GDO. Bob 0113-282 5519 or G3WWF@GB7WRG.

WILTSHIRE

Trowbridge & DARC: 1st & 3rd Wednesdays, 8pm. The Southwick Village Hall, Southwick, Trowbridge. June 5 - 144MHz direction finding event. Ian G0GRI on (01225) 864698.

JUNIOR LISTENER

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

Emma Robertson from Edinburgh has written a good letter full of all sorts of questions. I'll try and answer a few of them this month. She first asks what is the best portable short wave receiver on the market? There isn't really a straightforward answer to that one. A lot depends on what you want to use the radio for. Emma is looking in the price range up to £350, which is a lot of money to be able to spend, especially if it's your first radio. For a first radio I would not spend too much money, in case you don't find the hobby to your liking, but once you're sure this is the one for you then a better radio is a good idea.

If you are mainly interested in general broadcast listening, then you need to decide whether you want a portable or a table-top receiver. If you are likely to be travelling around with your radio make sure you are going to be able to power it easily. It's no good if you have to carry a separate power supply everywhere you go. Once you've decided what type of radio you need, a list (or booklet) of all the current radios around on the market, how they work, whether or not they were any good, how much do they cost and other similar bits of information. I know of two sources of this information, the most comprehensive is a book from the publishers of the *World Radio TV Handbook*, called *WRTH Equipment Buyers Guide*. This book gives full reviews of just about every receiver you will come across as well as lots of other useful information on antennas, computer software, etc. A good place to find a copy of this is your local reference library, mine's dated 1993, but still contains lots of useful information.

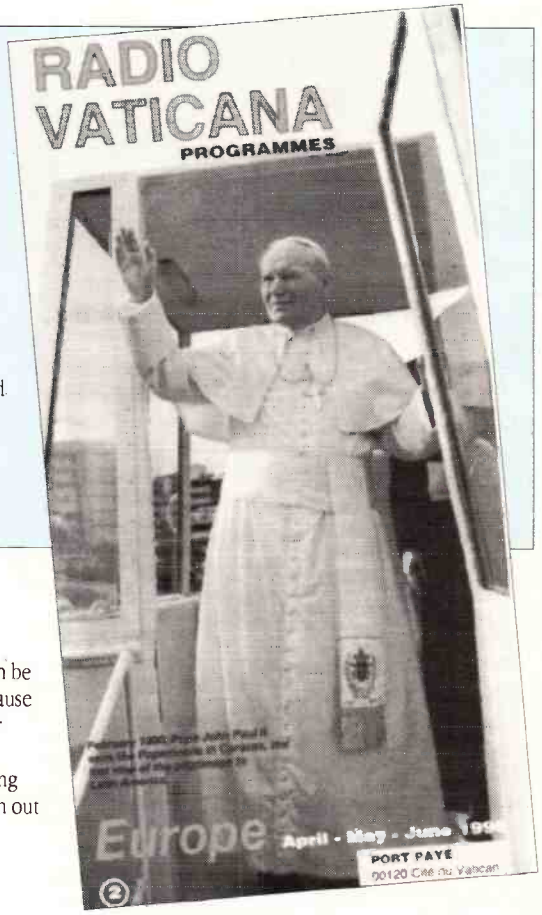
Another source for this information is Radio Netherlands. They produce a free booklet called *Receiver Shopping List* that covers short wave radios, military surplus radios, discontinued radios and vintage radio societies. There aren't full reviews of the radios but they tell you enough to give you an idea of what the radio is like. Radio Netherlands can be contacted at **Box 222, 1200JG Hilversum, The Netherlands**.

Just for the record, my two choices for my shack are the Lowe HF-150 and the Sangean ATS-80A.

Schedules

It has been a good month for receiving frequency schedules from broadcast stations. I received a total of nine different schedules or newsletters, although there haven't been many QSL cards this month. I haven't heard from Radio Vatican for quite some time now, so it was good to receive their schedule. They target to UK several times throughout the day mainly in English, but also in French, Latin (Mass) and Italian. Try 0440 and 0500UTC on 5.88MHz, 0500, 0530 and 0600UTC on 7.250, 1000 and 1200UTC on 11.740MHz, 1500 & 1600UTC on 7.250 and 9.645MHz, 1840 on 9.645MHz and 1900-1950UTC on 5.880MHz.

Their contact address is **Radio Vaticana, 00120 Vatican City, Italy**.



Radio New Zealand

Emma also asks about Radio New Zealand. Hearing them can be a problem, especially during our summer period, this is because Radio New Zealand don't broadcast to Europe at all. All their broadcasts are aimed at the South Pacific Islands. They are received regularly in Europe, but your best chances are during the winter time here. Still, there's no harm in trying, so listen out on:

Daily 0458 - 1206UTC on 9.570MHz
Monday - Friday 0716 - 1206UTC on 6.10MHz
Saturday & Sunday 0758 - 1206UTC on 6.10MHz
Monday - Friday from 1650UTC on 6.145MHz
Sunday - Friday from 1851UTC on 9.810MHz
Saturday from 1858UTC on 9.810MHz
Sunday - Thursday from 1951UTC on 11.736MHz
Friday from 2008UTC on 11.735MHz
Saturday from 1958UTC on 11.735MHz
Sunday - Thursday from 2306UTC on 15.115MHz
Friday & Saturday from 2258UTC on 15.115MHz

If you plan to send them a reception report, it must contain detailed programme information and be accompanied by three IRCs if you want to receive a QSL card. Please don't send them cassette recording of their programmes. If you want a copy of their frequency and programme schedule, then you can request this either by post or on the Internet.

The address you need is: **Radio New Zealand International, PO Box 123, Wellington, New Zealand.**

The Geoff Watts (Memorial) Award

The International Short Wave League have brought out a new award in memory of Geoff Watts. If you've been reading *Short Wave Magazine* for any length of time you will probably seen Paul Essery in his 'Amateur Bands' column mention the countries list that Geoff published. It was just about the definitive list of which callsign is used by which country, island, sand bar.....!

Geoff Watts was the first short wave listener to be honoured with the *CQ Magazine* DX Hall of Fame Award with distinction. He was also the first British s.w.l. to have 40 Zones and 300 DXCC countries confirmed. He even founded the Islands of the Air Award.

The Islands of the Air Award is open to **all** short wave listeners as well as radio amateurs and is not an unachievable target to aim for. You must have verified contacts, either heard if you are a s.w.l. or worked if you are an amateur with the following islands:

Greenland, Europa Island, Orkney Islands, Falkland Islands, Faroe Island, Wake Island, Ascension Island, Taiwan, Trinidad and St. Lucia Island. You can look back through your log books as the qualifying date is from 1 January 1995. There are special claim forms that you must use and these, as well as a full set of the rules, are available from: **ISWL Awards & Contests Manager, Herbert Yeldham, Wade Reach, Walton-on-the-Naze, Essex CO14 8RG.**

Some of the best chances you will have of hearing some of the more unusual locations is to listen during some of the big world-wide contests. This is when you will hear some big stations going on the air from some unusual locations, usually running lots of power into huge antennas. As these are DXpeditions you have a better than average chance of getting a reply to your report. It is always worth mentioning to the station that you need verified reports for an award, hopefully they will look favourably on your request.

COMMUNIQUÉ

muTek on the WEB

You can now obtain the latest information, a catalogue of products and prices of muTek products via the 'Net. The company are pleased to announce their WWW site on the Internet. To take a look, load their URL: **http//ourworld.compuserve.com/homepages/mutek** in your browser.

Alternativley use the **Royal Mail, PO Box 24, Long Eaton, Nottingham NG10 4NQ. Tel/FAX: 0115-972 9467.**

Radio and TV DX News

News on the proposed Gibraltar GBC-2 programme service for the Costa del Sol is still vague but the nearby Spanish town of La Linea has been transmitting a Phillips PM5544 test card with identification 'Campo' top and 'Gibraltar' bottom. No programmes are radiated and it's solely a political irritation by Spain against the colony.

NICAM stereo sound is spreading in France and the present state of play is...transmitters with only TF-1 stereo - Maubeuge; Caen; Mortain; Brest; Rennes; Mulhouse; Macon; Montpellier; Lesparre; St. Flour; Privas; Mt. Vial; Ales; Utelle; Tarascon sur Ariege; Riems.

Transmitters with TF-1 + France 2 stereo - Lille; Rouen; Chartres; Dyon; Tours; Bourges: Nantes; Niort; Pic du Midi; Toulouse; Marseille; Bordeaux; Cl. Ferrand; Lyon; St, Raphael.

Transmitters with TF-1; France 2; ARTE; La 5e - Paris Dutch TV intends opening a satellite channel May/June 1996 with a fourth TV programme called 'Nederland-4' comprising the best of the offerings from the Ned. 1,2,3 networks intended for the Dutch overseas.

By end 1996 all Slovak ch. R4, 5 TV transmitters will be closed down and moved to u.h.f. with the present v.h.f. - f.m. radio services now in the OIRT 67-73MHz band gradually transferring to the 88-108MHz band.

BBC World Service is to build a £30 million transmission centre in the Oman to improve radio coverage across the Middle East and Central Asia. Government supported private funding (rather than central funding) will be used with the savings used for programme services and content.

GEC-Marconi have been awarded a £1 million contract to supply and construct a 500kW short wave transmitter for Egyptian Radio/TV at Abis, near to Alexandria.

A Finnish language radio service will open in 1998 based at Vaesteras, North of Stockholm and will transmit in Finnish and a range of Finnish dialects. Transmissions will use DAB - Digital Audio Broadcasting.

Plans for DAB across Europe are still being finalised though the frequencies to be used are - 12 blocks VHF Band 1 47-68MHz; 12 blocks Band 2 87-108MHz; 38 blocks v.h.f. Band 3 174-240MHz; 23 blocks L Band 1452-1492MHz. Denmark has opted for two v.h.f. blocks 225-230 and 235-240MHz and in L-Band 1452-1467.5MHz; Germany for ch.E12 and L-Band; Switzerland ch.E12 and L-Band and the UK upper part of Band 3.

Isle of Wight Radio (1242kHz) is now being supplied with news from the Meridian newsroom in Southampton. Meridian sourced bulletins are hourly 0700-1800 weekdays and weekend mornings. Meridian TV are now using a VJ for news on the Island - a Video Journalist sources, writes, presents and records his own pictures and sound. VJs are frequently used with cable operations such as London's Channel One.

A Swedish TV channel is being opened in Estonia, a partnership between Kinnevik and Estonian JTV station EVTV and will be called TV-3, concentrating on news and current affairs.

Roger Bunney

Open Day at SMC

SMC, after an absence from the open day circuit have desided to reinstate such an event. This year's offering will take place Saturday 17 August 1996. Doors open at 0900 and close at 1700. The open day will be held at the SMC HQ in Chandlers Ford.

Many attractions are planned, including a free draw, rig checks, local BBS and Packet cluster demonstrations, American licence walk-in testing, special offer on new u.h.f. p.m.r. radios for Packet use. Plus all the usual SMC product lines.

For more information contact:

South Midlands Communications Ltd, S M House, Chandlers Ford Industrial Estate, Eastleigh, Hampshire, SO53 4BY. Tel: (01703) 255111, FAX: (01703) 263507, E-mail: smc@tcp.co.uk

Old Leopard – New Spots

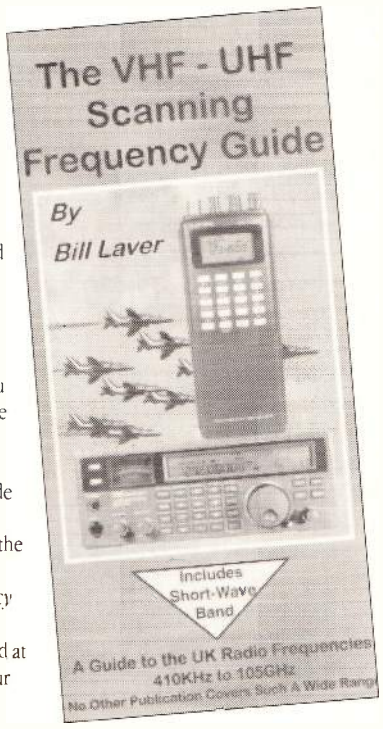
The VHF - UHF Scanning Frequency Guide from Spa Publishing, is back in print. It has a changed format and claims to 'include short wave bands'.

The new issue now comes in the form of a spirally bound reporter's pad, measuring 110 x 240mm, a very convienient presentation compared with the previous A4 presentation, allowing the guide to be easily slipped into a pocket along with a scanner

The short wave sections are in the form of bandplan information, with a listing of frequencies used by international broadcast stations. If you are looking for a comprehensive guide to h.f. frequencies only this is not the book for you.

The v.h.f. and u.h.f. sections provide detail between 30MHz and 24GHz beyond this frequency up to 105GHz the information reverts to bandplan style.

The VHF - UHF Scanning Frequency Guide is available from the *SWM* Bookstore, has 196 pages and is priced at £12.95 plus £1 P&P(UK). To order your copy 'phone: (01202) 659930.



10MW Long Wave Station

Broadcast radio station 'Delta 171' is set to provide pan-European radio, following the granting of a licence for high power operation, by the Dutch government.

After seven years of campaigning for a licence. The permit was finally awarded in late April.

The station is said to have an e.r.p. of 10MW planned, and will use an array of four antennas to beam the signal all over Europe. The transmitters for Delta 171 are already under construction in France by THOMCAST.

The station is due to commence service in early 1997 on 171kHz. Programme format will be an international mixture of chart music from various countries, presenters will use various languages.

As of yet it is unclear whether planning permission has been granted for the very significant antenna structure required.

In the light of the very high levels of r.f. that would be produced by such an installation there have already been enviromental concerns expressed.

LF Frequency Band for UK Amateurs

The RA has just announced that a new amateur radio frequency allocation is now available for Class A licence holders. The band of 71.6-74.4kHz has been assigned following request from the amateur radio community, specifically from those who wish to investigate propagation through the ground by transmission from underground caves. Note that is not the common European l.f. allocation around 147kHz.

The allocation will be available to any holder of a Class A licence who wishes to investigate l.f. propagation. Maximum e.r.p. permissable is 0dBW (1W). All modes except FSTV are allowed, but radiated energy must not spread out side of the band edges - the whole allocation is 2.8kHz wide!

Use of this band will require a variation of the individual's licence. Applications should be made to the RSGB at the following address; **LF Allocation, The Chairman, RSGB HF Committee, Radio Society of Great Britain, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE.**

COMMUNIQUÉ

DX Tests on 690kHz From HCJB

HCJB is currently airing monthly DX tests on 690kHz. Each test is 15 minutes in length (maybe a minute longer) and includes plenty of Morse Code and other unique items.

All tests have to be aired sometime between 0504UTC and 0820UTC, when there is no regular HCJB programming going out on 690kHz.

The tests take place Sunday in order to give DXers a chance to set up a long wire on Saturday.

Correct reports for these tests are verified with a beautiful special 690kHz QSL card depicting Quito at night. In order that QSLs retain their value, The station will be very stringent about report details. Specific audio items heard should be reported to the second, if possible. Tape recordings are welcome but tapes can not be returned.

Over the past few months, HCJB have received a number of great reports from as far as Scotland and New Zealand. They say that they have also been sent some amazing fabrications, one that went as far as to include 'paragraphs' of English language identifications and HCJB historical material, none of which was aired! There has also been the possibility of one or more pirate HCJB DX tests originating in the US, making accurate reporting all the more important. The pirate operators could never guess what is aired, however, making the bogus transmissions easy to spot.

Included in the tests are unlikely code words and sound effects and songs that one probably wouldn't expect to hear on an HCJB DX test.

Reports (with one IRC or first class postage in US or Canadian stamps) to: **690 DX Test, c/o Richard McVicar, HCJB, Casilla 17-17-691, Quito, Ecuador.**

All times and dates are in UTC.
Complete Test Schedule as follows:

May 5	0545-0600
June 2	0600-0615
July 7	0800-0815
August 4	0600-0615
September 1	0515-0530

SMC Buy Siskin

South Midlands Communications have just announced the acquisition of Siskin Electronics, supplier of data mode radio equipment and transmission equipment. The driving force behind Siskin, Phil Bridges G6DLJ, has moved the complete company operation to a dedicated facility at SMC's HQ in Chandlers Ford.

When quized about the takeover, Phil Bridges stated, "This has got to be great news for Siskin's customers, old and new. We now have far better demonstration facilities, direct internal access to SMC's systems development and EMC department and the additional bonus that Siskin products and know-how will be available at all SMC branches including ARE Communications (London), SMC Leeds and Reg Ward in the West Country. I am very flattered to be part of this already successful team with a proven track record."

SMC's Retail General Manager, Graham Taylor, comments "Siskin's approach to a plug-and-play solution with all the radio/computer being cables ready-made and bundled with software has got to be the answer for today's busy radio enthusiast. As Siskin and SMC were both already Official Factory Appointed AEA distributors it made sense to team up and offer our customers a complete solution to what can often be a very bewildering first step into the unknown. All existing Siskin products such as PacComm, Kantronics, BayCom, Buckmaster's HamCall worldwide CD Callbook and the Siskin Multi-CAT, will also be introduced into SMC branches making one-stop shopping for the radio enthusiast a reality at last. We also intend to apply Phil's expertise to many of our commercial radio projects."

For further information please contact: Mr Graham Taylor (Retail General Manager) at **South Midlands Communications Ltd., S M House, Chandlers Ford Industrial Estate, Eastleigh, Hampshire SO53 4BY. Tel: (01703) 255111, FAX: (01703) 263507, E-mail: smc@tcp.co.uk** (Siskin's 'phone, FAX and E-mail currently remains unchanged with an additional amateur radio data hotline Tel: (01703) 254507). Other amateur radio hotline enquiries Tel: (01703) 251549.

Lisa Read and Ronnie Allwright winding coils at the reborn Denco.

Denco Maxi-Q Coils Are Back!

Those of us who were building receivers in the '50s and '60s will be familiar with Denco coils. They formed the basis of many a receiver design, with their colourful polystyrene formers and air-tight metal cans, until they went the way of the other British coil manufacturers.

Well, now they are back in limited supply. Ronnie Allwright was offered the opportunity to acquire the name, stock and winding machines of the company made famous by his father. Nostalgia got the better of him and he has re-established Denco (Clacton) Ltd., equipping an outbuilding at his hardware shop - itself a trip into the past - with the original wave winding machines, test gear, etc. to allow him to indulge his dream of producing the original coils.

Copies of five of the original Denco Technical Bulletins - DTB1 *Maxi-Q Coils*, DTB2 *Coil Turrets*, DTB4 *Transistor and Miniature Dual-purpose* Coils, DTB8 *FM Tuner Units* and DTB9 *Coil Packs* - are available priced at £3.00 each plus £1.00 P&P.

Unfortunately, all the coil formers Ronnie has are of one colour and it would be uneconomic to have more moulded in the varied colours of the original range. So, instead of the well-known green, blue and red ranges you will have to make do with coloured sticky labels! When Ronnie worked with his father, back in the late '50s, a dual purpose coil cost 1s.11d - or just under 10p. Now he has to charge £5.40 for the same coil.

So, if you want to resurrect one of the many old designs using Denco coils, you can now do so. *SWM* will be offering you the original Denco one-valve s.w. receiver design in the coming autumn, linking it to a listeners' competition.

You can get more information from **Denco (Clacton) Ltd., 259/265 Old Road, Clacton-on-Sea, Essex CO15 3LU. Tel: (01255) 422213.**

Catch It All With The Xplorer

After their huge success with the Scout, Optoelectronics have done it again. Just released is the Xplorer test receiver. A multi-function nearfield communications test receiver with optimised sensitivity - offering it's claimed, greater distance reception than any other nearfield product previously manufactured!

The Xplorer sweeps the range 30MHz to 2.0GHz in less than one second automatically locking on to any active frequency and demodulating the f.m. audio for monitoring via the internal speaker.

Frequencies are both displayed and captured to memory. A CI-V interface compliant with both TTL and RS-232C is provided.

The Xplorer is a hand-held unit measuring only 140 x 76 x 41mm. Charging of the internal NiCad battery only takes less than one hour.

Recommended retail price for the Xplorer is £699. Contact: **Haydon Communications, 132 High Street, Edgware, Middlesex HA8 7EL. Tel: 0181-951 5781, FAX: 0181-951 5782.**

LOWE ELEC

Shortwave, Airband and Scanner Superstore

THIS MONTH'S SCANNER SUPERDEALS

MVT7100EX

Now with CE Approval!

Customers will have noticed that the range of available scanners has been drying up over the last few weeks, basically because various importers seem to be dragging their heels over this vital issue.

We are pleased to announce the MVT7100EX is the ONLY scanner with SSB to pass the tests so far!

They are now available from stock right away but do get in quick as we expect demand to be very high!

JUST £349.00

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

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

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

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

JUST £249.00

OOPS!

We goofed a bit last month. The new JETSTREAM airband receiver is just £14.95 not £19.95! Sorry!

OPTO SCOUT JUST £399.00!

STOP PRESS!

ATTENTION AIRMASTER USERS! VERSION 3 AVAILABLE NOW!

Much smoother in operation and with enhanced data capture and filter features, Airmaster 3.0 will keep you up to date with digital airband communications. Find out who and what is flying where! Ideal for collecting tail numbers and flight IDs.

Still the same price of £89.95
Airmaster 2 owners can upgrade for just £29.95

ANOTHER LOWE BARGAIN BOOK!

POOLEY'S FLIGHT GUIDE '95

We've become famous for our "end of year" Pooley's Flight Guides and we now have the 1995 edition in stock.

It's over 3cm thick and has over 550 pages crammed full of useful info for the dedicated airband enthusiast.

Quantities this year are very limited, so don't hang about - order today!

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NRD535D

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

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

JRC

LOWE HF225 EUROPA

The HF225 Europa drew on the strengths of the original HF225 and with the low noise front end and narrower AM filters, the Europa became the choice of the serious Broadcast Band DXer. With the inclusion of the synchronous detector and keypad, the Europa offers terrific specification.

Things just keep getting better here at Lowes and for a limited period, we are pleased to offer the Europa for just £599 - a saving of £100 off the normal list price but you'll need to be very quick to take up this offer!

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Newbury - 01635 522122
West Sussex - 01444 400786

NEWCASTLE BRANCH OFFICIAL OPENING DAY

29th June, 1996

is the date of the North East's premier radio event at

Unit 18B Airport Industrial Estate, Newcastle upon Tyne, NE3 2EF

We've got a lot happening that day including representatives from Kenwood and Yaesu and we'll have some great special offers just for that day only, plus our free entry draw with some excellent prizes just waiting to be won!

Telephone 0191 214 5424

AOR AR5000

I am sure most readers will be aware that I have been a fan of AOR products (with one or two notable exceptions) since the groundbreaking AR2001 was first offered for sale. At the time it was a major innovation to have continuous coverage from 25-550MHz and good receive performance.

This was followed by the AR2002 and AR3000 series, each of which added innovative new features based on the original concept. I think it is safe to say that as soon as a new model is released, rumours about a successor begin circulating. It was about a month after I had bought my original AR3000 that I first heard whispers about a new higher specification model being developed, but it is only now, several years later that the AR5000 has appeared.

REVIEW

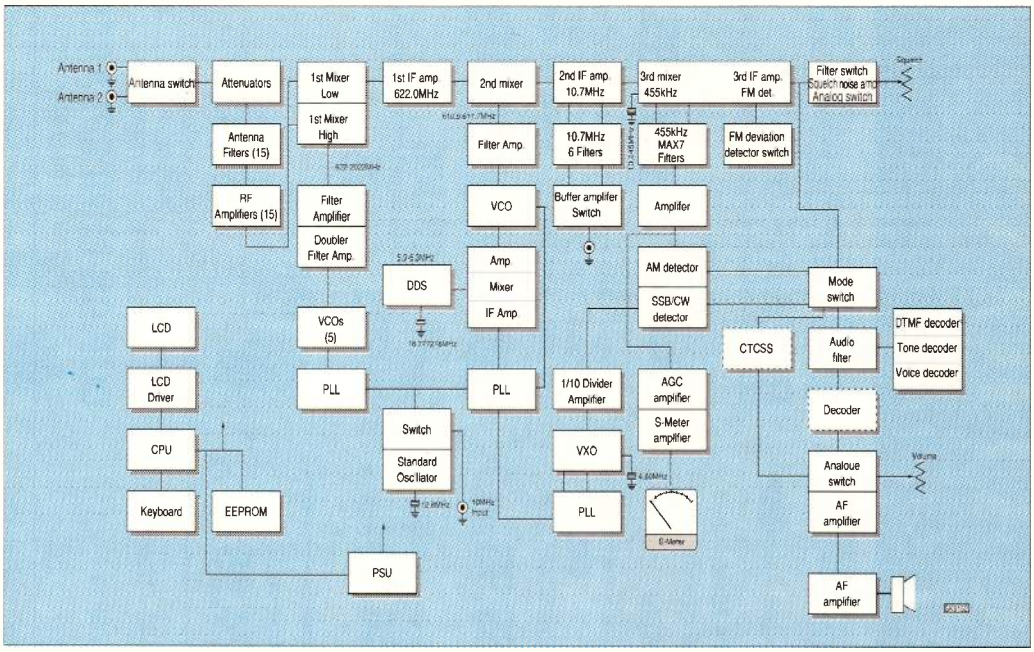
Alan Gardener reflects that it seems that new receivers are a bit like buses, you wait a long time for a manufacturer to produce a new design, and when they do, two or three tend to come along at once. AOR are proving the theory - first there was the AR7030 h.f. receiver (see March SWM), this time it is the turn of their flagship AR5000, 10kHz - 2.6GHz, all mode receiver.

Bells & Whistles

What can I say about the receiver that hasn't already been included in the advertisements? It has a very wide frequency coverage, all mode reception, extensive Search and Scan facilities, 1000 memory channels, RS-232 computer control port, and - yes you've guessed it - I was very keen to try one.

With any complex receiver it is always very difficult to know what to include in a review. The draft instruction manual available at the time of writing, ran to 50 A4 sized pages and only gave brief descriptions of the main operating modes. For this reason I don't want to spell out every last detail of its facilities, but I hope to illustrate how well the unit performed and which of the features are the most likely to persuade a potential user to take out a second mortgage in order to buy one.

AR5000 receiver block diagram.



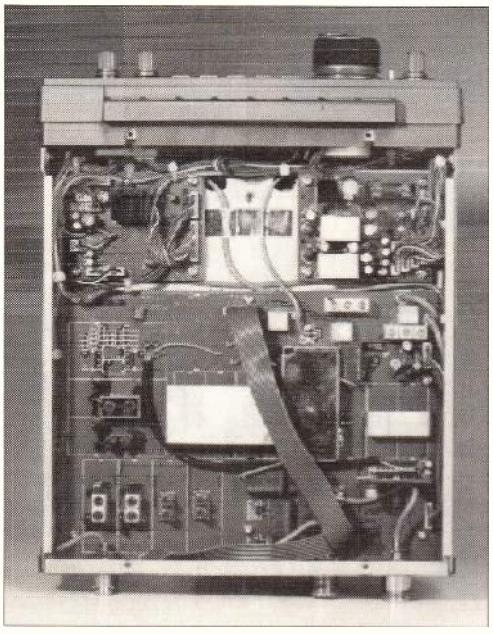
First Impressions

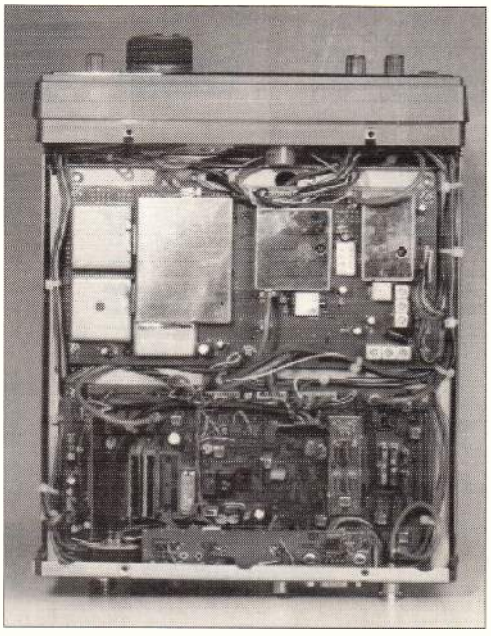
On opening the packing the first thing that struck me was the size and weight of the unit. The basic cabinet measures approximately 217 x 260 x 85mm with the feet and loudspeaker port extending the height by a further 40mm. The weight is in the region of 3.5kg which combined with the metal case gives the unit a professional 'feel' and stops it sliding across the table as soon as you touch the tuning dial.

The front panel has all the usual controls you would expect but is dominated by the large liquid crystal main display, mechanical 'S-meter' and tuning knob. The display is illuminated with a soft green back light which makes the l.c.d. look very attractive, but unfortunately it doesn't do much for the red portion of the 'S-meter' scale and pointer. The majority of the push button controls are clustered together in the centre of the front panel with a small click stop rotary dial positioned towards the right edge of the front panel adjacent to the main dial. The volume, squelch, headphone and accessory connector are placed towards the left edge of the front panel.

The rear panel has two antenna ports, a 10.7MHz i.f. output, 10MHz external frequency reference input, remote RS-232 connector, mute control socket, external speaker jack, accessory connector and d.c. input socket. The latter is required to power the unit either from an external 12V power unit provided with the receiver or from a 13.5V car supply.

Internally the standard of construction is good and utilises a lot of integrated components. A glance at the block diagram gives a good idea of what is going on inside the unit, and in order to save space I don't intend to describe the circuit in any more detail, but I will concentrate on operational aspects of the design.





Wide coverage

The frequency range of the receiver is specified as being from 5kHz (yes five kilohertz) to 2600MHz (2.6GHz). This is an amazing span and unlike most other wide band receivers it uses separate Varicap tuned r.f. stages to provide important front end pre-selection for a large proportion of this range. This is particularly important in conjunction with a good dynamic range and a low noise synthesised local oscillator in order to minimise unwanted intermodulation products. Unlike older models most current receivers don't tend to suffer from a lack of receive sensitivity as modern semiconductors are capable of providing extremely low noise, high gain performance over a very large frequency range. However there is always a trade-off between receive sensitivity and strong signal handling performance. Many designers go for receive sensitivity as they anticipate small antennas will be used by the majority

Continued on page 16

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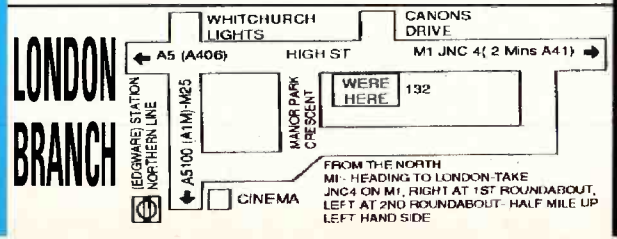

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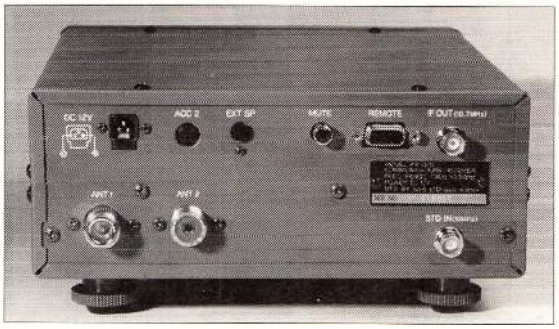


Neat but boring - the rear panel.

of owners, with a subsequent reduction in the likelihood of strong signals causing problems. Unfortunately this is not always the case, especially in urban environments, where many strong local signals can cause broadband amplifier stages to overload and produce unwanted spurious signals.

RF Performance

In practice, the AR5000 does seems to be fairly resistant to intermodulation problems the third order intercept point at 100kHz signal spacing was found to be in the region of -15dBm with the pre-amp on, and 0dBm with it off, which is good for a v.h.f./u.h.f. receiver. I achieved significantly better figures at around 6-10MHz with the pre-amp switched off. This gave good performance during the evening on the 40m amateur band where other receivers I have used in the past have suffered from the very strong broadcast band signals present on adjacent frequencies. Receive sensitivity was very good and tended to remain fairly constant throughout the range of the receiver measuring on average -130dBm on u.s.b. for 10dB S/N with a 3kHz i.f. bandwidth or -122dBm on f.m. for 12dB SINAD with a 6kHz i.f. bandwidth.

Listening to signals on the short wave bands was a pleasure and the smooth tuning offered by the 1Hz step size and the Numerically Controlled Oscillator made it seem as if a conventional analogue Variable Frequency Oscillator was being used (without the frequency drift normally associated with such designs). As an indication of the receiver's frequency stability I tuned to BBC Radio 4 on 198kHz and by selecting u.s.b. produced very slow beat signal which remained at a pretty constant rate over a period of several hours. Whilst tuning around the 5-100kHz frequency range I was surprised at just how many signals were audible. This included various low speed data signals, the 60kHz MSF frequency standard, an f.m. mains subcarrier baby monitor, low frequency LORAN pulse type navigation systems as well as the more usual morse beacons. In fact this proved to be more of an eye opener than the v.h.f./u.h.f. range. In fact the only features I missed compared to my dedicated h.f. receiver were the pass-band tuning, i.f. notch filter and noise blanker. The latter would have been particularly useful for mobile operation.

"...suitable for professional as well as top of the range hobbyist use..."

Manual Operation

If we ignore the automatic tuning options for the moment, the main tuning dial step size is selectable from 1Hz to 999.999999kHz which makes it very easy to set a suitable tuning rate for the current mode of operation. Five different v.f.o.s are available, all of which can be personalised to a certain extent, which makes it easy to swap between h.f. and v.h.f./u.h.f. operation. The small rotary sub dial, which has 'click' positions can also be used in conjunction with the main tuning dial. I found it particularly useful to set this to tune at normal channel spacing on v.h.f./u.h.f. and the main dial to tune in-between. I would like to have been able to programme the sub-dial step size directly but it is currently only possible to use either pre-defined step sizes or 10 times the main dial rate. In order to prevent the receiver being inadvertently knocked off frequency during operation a small lever is provided to increase the amount of friction on the main tuning dial. I'm not too sure if I liked this feature, it worked very well, but I wonder if it would have been better to use the lever to select a mechanical 'click' on the main dial to provide a channelised tuning option.

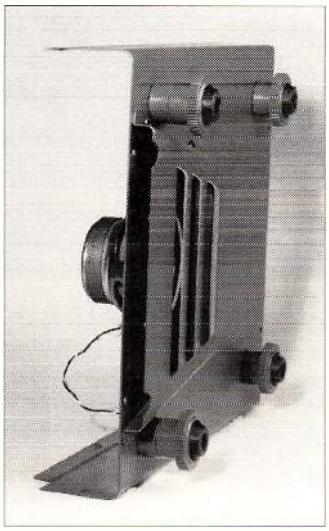
Six different i.f. filter bandwidths of 220, 110, 30, 15, 6 & 3kHz are provided as standard (500Hz for c.w. is an extra option). These can be either manually or automatically selected depending on the mode in use. I found this very useful especially on the v.h.f./u.h.f. ranges where the 6 or 15kHz filters accommodated 12.5 or 25kHz channel spacing, the 110kHz filter allowed me to listen to f.m. broadcast stations tucked between stronger local ones and the 30kHz filter was almost ideal for weather satellites, although some form of a.f.c. would have put 'icing on the cake' as far as orbiting satellites were concerned. My only other slight criticism would be that I would have preferred the manual selection of i.f. bandwidth to have been made available as a first function on a control rather than having to initially press a second function key.

Too many second functions?

Unfortunately this highlights one of the main problems associated with complex equipment and small control panels - the need for second function keys and sub-menus. It would be ideal if every function had a separate control knob or key, but in the case of the AR5000 this would quite easily run into more than a hundred or so. Obviously the manufacturer has to compromise somewhere along the line but it is nice from an operational point of view if all the main functions are immediately accessible rather than via a series of different button presses.

The most serious gripe about the operating system on the review AR5000 was the method of manual mode selection. A separate mode button is provided and one quick press puts the receiver into automatic mode selection. When this is in operation the exact mode is determined by an internally stored bandplan which resets the mode, tuning step size and i.f. filter bandwidth as the dial frequency changes. In order to manually change just the mode you have to press the mode button and hold it in

The loudspeaker port arrangement.



for longer than a second. This brings up a sub menu on the l.c.d. display which you scroll though by means of the rotary dial or Up/Down keys. The correct mode is then confirmed by pressing the Enter key.

I would have preferred to be able to quickly press the mode button and toggle through to the next mode on each press rather than having to mess about with three separate buttons. A long press on the mode button would select the automatic mode.

The current method of operation is particularly frustrating because if you accidentally select the automatic mode it also resets the i.f. bandwidth and Step size, each of which takes two or three button presses to restore to the previous value. This tends to be more of a problem on the h.f. bands where u.s.b., l.s.b., c.w. and a.m. signals are mixed within the frequency bands defined in the automatic mode.

Special facilities

Okay, that's the moan over - now on to some of the better bits hidden amongst the sub menus. One unusual feature is the DTMF display function, this allows the receiver to decode DTMF tone signals and display them as a series of digits. A CTCSS decode function is also available as an option but the De-scramble function is not.

Another unusual facility is the 'Tone' eliminator this allows the squelch circuit to ignore signals with constant frequency tones on them. The frequency range is tuneable from 400Hz to 4.4kHz and rumour has it that it was included to prevent the search or scan functions stopping on trunk signalling channels used on Japanese railway systems. One use I found for it was to mute the audio on certain v.h.f. transmissions which carry supervisory signalling tones. It would have been nice if it could also have been used as an audio notch filter on the h.f. bands.

The audio bandwidth, pre-emphasis time constants and a.g.c. rate is also adjustable and I found that this made a big difference to the intelligibility of weak signals especially when using s.s.b. or c.w. In addition the squelch control can be set to operate as an r.f. gain control which also makes h.f. reception that bit more enjoyable.

The front-end r.f. pre-selector stages can be manually tuned using a sub-menu option. I found that adjusting this control didn't make much improvement to weak signals, as the automatic tuning always seemed to be spot on. However I did find a use for it on the 2m amateur band, where I found could off-tune it in order make use of the r.f. band-pass characteristic in order to stop a very strong local packet station from blocking the receiver whilst I was listening to the output of a repeater. This proved to be much more effective than turning off the pre-amp or switching the attenuator on.

I was not able to try the RS-232 remote control option during the review period, but it does support 19200 baud rate which should speed up any external computer controlled scanning functions. The command list is huge and should allow you to programme and retrieve just about every function or display available on the receiver, including tea, coffee, milk, sugar, etc. (Just kidding! but I'm sure it will be on the next model).

Search and Scan

Turning to some of the search and scan features I was interested to find that it was possible to link various search ranges by means of a separate sub-menu. This gave the option of setting up and storing up to ten different sets of linked search bands, along with characteristics such as delay times, level and voice sensitive squelch operation and the automatic storage of active frequencies found during a search. This effectively allows the operator to set up different 'personalities' for the search function - the only problem is remembering which one is in operation, as the display won't tell you.

Contents of memories and search bands can be identified with short alpha-numeric titles of up to seven characters and this is a great memory jogger if you have a lot of channels programmed in. The search and scan speeds can be increased upto 45 channels per second by selecting the 'Cyber-Scan' option. This replaces the frequency display with the word 'Cyber Scan' whilst the search is running, and only displays the frequency or alpha-numeric title once an active frequency has been found. This can be a bit inconvenient if the search doesn't stop, as you are not really too sure what is happening. It would be nice to have the moving frequency display for reassurance that a search is running correctly. ■

Summary

I found the r.f. performance of the receiver to be very good, making it suitable for professional as well as top of the range hobbyist use. Any criticisms should be judged against the large number of facilities on offer, as I believe most people could think of at least one feature on their favourite piece of equipment that they would change given the opportunity.

I thought the way some of the controls and sub-menus operated were a bit inconsistent, and it took some time to get used to them. However, I'm sure that if I could afford to buy an AR5000, I would be able to adjust my operating habits to suit - all I need is £1749 inc. VAT.

My thanks to **AOR (UK) Ltd., 4E East Mill, Bridgefoot, Belper, Derbyshire DE56 2UA. Tel: (01773) 880788,** for supplying the review model and providing additional technical support during the review period.

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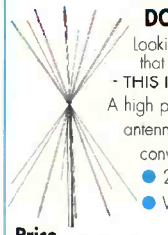

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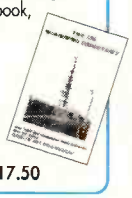

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Inexpensive Passive Preselector

Modern low-end synthesised short wave receivers tend to have less than ideal arrangments for 'front-end' tuning. Normally an arrangement of coarse step, band pass filters are switched by the contol electronics of the receiver. Dr. Francis J. Crossley offers the solution that they all cry out for, an inexpensive and simple passive preselector.

This article explains why a device to improve the selectivity of a short wave receiver is necessary and suggests how one might be built using easily obtainable and inexpensive components. The device is called a passive preselector because it contains no transistors or other active devices and provides some preselection of the radio stations being tuned in.

If you to connect a better antenna to your receiver you will probably find that it sounds as if all the broadcast stations have decided to transmit on the same frequency! The reason for this is that in order to give continuous tuning there are no tuned circuits before the frequency changer and overloading, harmonics and a few other circuit design short cuts conspire to produce extra signals you were not expecting.

The Solution

One solution to this problem is to weaken the signal using an attenuator, sometimes the wanted signal can be isolated. A more elegant solution is to put a tuned circuit between the antenna and the radio to select the signal you want, or at least a narrow band of frequencies, thus removing many of the **unwanted** signals.

A tuned circuit is made from an inductor and a capacitor. If the capacitor can be varied we can easily select the frequencies we want to hear.

How do we know what size of inductor and capacitor we need? How do we make an inductor? Where do I find a capacitor? This article will attempt to answer these questions.

Making the tuned circuit

A simple formula allows us to calculate the inductance if we know the frequency and the capacitance.

$$L = \frac{255330}{C f^2}$$

where L is the inductance in μH, C is the capacitance in pF and f is the desired frequency in MHz. As an example suppose we want to select a frequency of 10MHz and the tuning capacity will be 50pF, substituting in the formula:

$$L = \frac{255330}{50 \times 10 \times 10}$$

How do I turn this inductance into a coil of wire? Again there is a formula:

$$n = \sqrt{\frac{(9A+10B)L}{A^2}}$$

where N is the number of turns, A is the radius of the coil in inches, B is the length of the coil in inches and L is the inductance in μH. As an example let us find the number of turns needed to make the inductor above. Let the radius of the coil former be a quarter of an inch and the length of the winding be 1in, putting in the numbers we get:

$$n = \sqrt{\frac{(9 \times 0.25 + 10 \times 1) \times 5}{0.25^2}}$$

$$n = \sqrt{\frac{12.25 \times 5}{0.0625}}$$

$$n = \sqrt{980}$$

This is near enough 30 turns. The wire diameter must be chosen so that 30 turns can be fitted into a length of 1in. If the wire is too fat the value of B can be changed and the new number of turns calculated but the new number of turns might be roughly the same as the old one so it is not worth the bother of recalculating. The wire should be insulated and enamelled wire is easy to buy at the mail order shops like Maplin. If the wire needed is very thin it is permissible to wind the coil in several layers. This will change the inductance slightly, but not enough to worry us. To reduce the self capacity you should make sure that the beginning and end are at opposite ends of the coil.

What can this coil be wound on? The coil former must be an insulator, for short wave, practically anything can be used. Cardboard or plastics tubes, felt tip pens etc. I have used round wood dowel from an airing rack. Some means must be found for fastening the ends of the wire, so with my wooden formers I drilled small holes at right angles to the curved surface and pressed in some metal pins I had which could be soldered, stout copper wire could be used instead or even panel pins, if well cleaned. It will be seen later that it is necessary to wind a second coil and some extra pins can be put into place before the main coil is wound.

Where do I find the tuning capacitor?

A good source of tuning capacitors is the simple domestic radio. All the cheap analogue models use a tuning capacitor consisting of a pair of capacitors of suitable values, and if the radio also covers the f.m. band there will be a second pair of much smaller value. Modern tuning capacitors are in plastics cases but the older types have large aluminium vanes and are equally suitable and it is also much easier to see where to make connections. Past articles in *SWM* have described using these modern capacitors for various purposes and need not be enlarged upon here. As stated in these articles it is necessary to turn the small trimmer capacitors to their minimum value. This is done so that the maximum tuning range is obtained.

Connecting the components

If the whole of the short wave band is to be covered by the preselector several coils will be needed and a multi-way switch will be needed to select the appropriate coil. The circuit diagram shows how the coils, switch and tuning capacitor are connected for a three range unit. I advocate using a BNC connector for the connection to the radio and sockets for the antenna and earth wires.

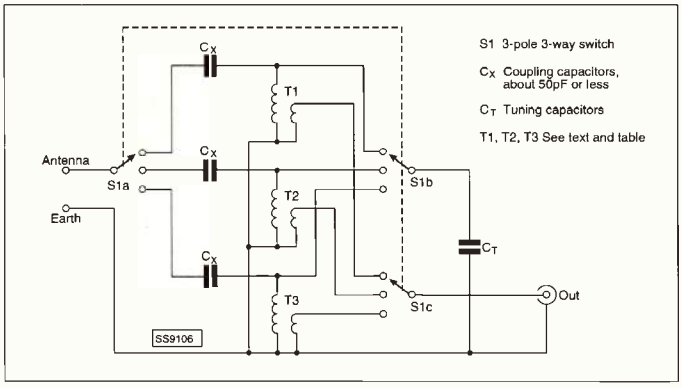
There are several ways of

connecting the antenna to the preselector. Ideally all the electromagnetic energy collected by the antenna should be transfered to the preselector and radio but for reception the penalty for doing things the easy way is usually small. To connect the antenna to the preselector I favour the use of a small coupling capacitor. The best value is not critical but if too small the signal strength suffers and if too large the tuning becomes too broad, 50pF is a suitable starting point. This value can be changed, preferably downwards, until the best compromise is obtained. A suitable capacitor might even be present in the radio you canibalise for the tuning capacitor.

I prefer to build extra units for my radio in a metal box to reduce interference although plastics ones can be used. Most mail order suppliers offer a good range of suitable boxes. Aluminium ones are easy to drill, the diecast boxes are stronger and more expensive.

Testing and Use of the Preselector

To test the preselector tune in a weak station with a frequency in the range of the preselector using the radio's whip antenna. Now connect the preselector between your better antenna and the radio and turn the tuning control until the signal becomes loudest. If the increase is only small try tuning a station nearer the higher frequency end of the range on both the radio and preselector, the improvement is usually better at the h.f. end. Perhaps the range of the preselector is not quite what you expected so tune around to different bands to see where it works best. If all else fails try changing the coupling capacitor or the number of turns on the coupling coil, increasing either should strengthen the signal. Always try the tuner with a weak station since a strong one will not show a large increase in strength.



To connect the radio to the tuned circuit I use an extra small coil having about 20% of the turns of the main coil. The same criteria apply to this coil as apply to the coupling capacitor, the fewer turns the better. The coupling coil is wound at the earthy end of the tuning coil in between the other turns.

When you have decided on the best values of the coupling capacitor and coil you will need to calibrate the preselector so that you can tune quickly to the right position. This is easily done by marking the box with the frequency where you get the maximum signal in the radio. The tuning is unlikely to be very sharp and over one broadcast band no retuning is needed. If the station is very strong with the radios own antenna the preselector will not make much difference but it will still reduce the strength of all the other signals on other frequencies.

As an example of the effectiveness of a preselector, listening to Shannon Volmet on 8.957MHz with the whip antenna one night I found that the signal was about one unit above the noise level. With my 'long wire' antenna and the preselector the signal was six to seven 'S units' above the noise. Without the preselector the noise rose to seven units although Shannon could still be heard. My radio is a Sony 2001D.

The table gives the range of frequencies which are theoretically tuned with a capacitor having maximum and minimum capacitance of 150 and 20pF respectively. The number of turns applies to a coil of half inch diameter and winding length of 1in. A suggested number of turns for the coupling coil is also given.

Range (MHz)	Tuning coil (turns)	Coupling coil (turns)	Inductance (µH)
30 - 11	17	4	1.4
13 - 4.7	41	8	7.5
6 - 2.2	90	18	35

The circuit diagram is for a tuner having three ranges, if more are required the switch must be changed to one having more 'ways'. The capacitors C_x are the antenna coupling capacitors and might need to be selected as described. T1, T2 and T3 are transformers consisting of the tuning and coupling coils. The tuning coil is of course connected to the tuning capacitor! ■

Conclusion

This article has explained how an inexpensive, passive preselector can be built. The device is very effective as shown by my own system.

Is radio frequency amplification necessary? Considering my own radio, the Sony 2001D, with a long wire (48m) I can peak the tuning in the absence of a signal on the atmospheric noise, suggesting that the receiver is quite sensitive enough without any extra amplifiers. This implies that extra amplification is not needed and unless very carefully designed an amplifier might produce unwanted signals via cross modulation and overloading of the original radio. Signals which are barely audible using the built in whip are easily copied using the long wire and preselector.

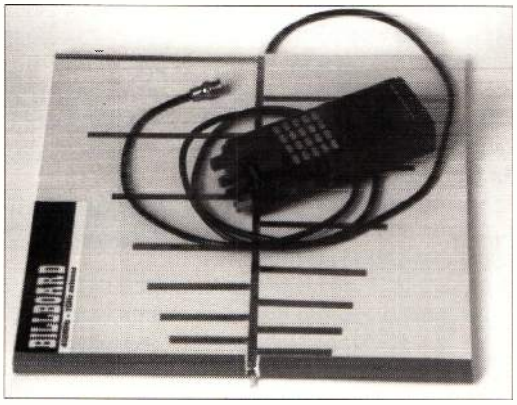
Finally a **warning**, disconnect the long wire antenna when not in use particularly in thundery weather to avoid damaging any transistors at the input to your radio. If you have not tried constructing anything, try this preselector, if necessary build it for one range at first. If you are having difficulties please send me a letter with a stamped addressed envelope and I will try to help. My address is **Dr. F. J. Crossley, 156 Holmes Chapel Road, Congleton, Cheshire CW12 4QB.**

Billboard

ANTENNA Special

A Wide Band UHF Antenna For Your Scanner

The project described in this article was designed by the late Bill Wilson as a quick and easy 400 - 1000MHz wide band antenna for use with his scanner.



The logarithmic-periodic array (log-periodic for short) antenna is an extremely useful one, being inherently wide band over a large span of frequencies, and you'll often see rotatable h.f. versions on embassy roof tops and in military and commercial communications centres.

At v.h.f. and u.h.f. they are, like the discone, capable of wide band coverage, only the discone is omni-directional, while the log periodic is highly directional like a Yagi, particularly if it is split and the halves angled about 30° apart.

Outdoor log periodics are quite a problem to construct and mount. However, for an indoor version, using foam-core display board and self-adhesive copper tape, the concept becomes almost ridiculously easy to translate into hardware.

The other way is to etch the antenna onto a couple of slabs of p.c.b., but this takes time and effort - anathema to the author!

First, a word about the materials required

The board (Cappa-board or Fome COR are two makes that spring to mind) consists of two sheets of thin card bonded to a foamed polystyrene core, making a very light, rigid board, either 5 or 10mm thick, which can be cut easily with a sharp blade or craft knife. Sadly, it is only sold in vast sheets measuring approximately 1.5 x 1m. Rather too much for our needs, but probably your friendly local design studio or framers will be happy to supply a couple of offcuts about 350mm square.

The self-adhesive copper tape is available in various widths (you'll need 5 - 10mm wide) from any craft shop that supplies materials for the amateur terrarium maker. I seem also to remember that a similar tape was available from electronics suppliers at one time (possibly still is) to make your own circuit board tracks.

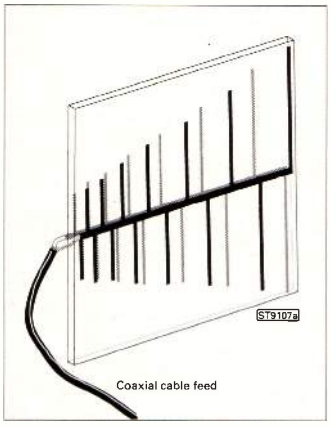


Fig. 1: The elements can be assembled on both sides of a single sheet of board.

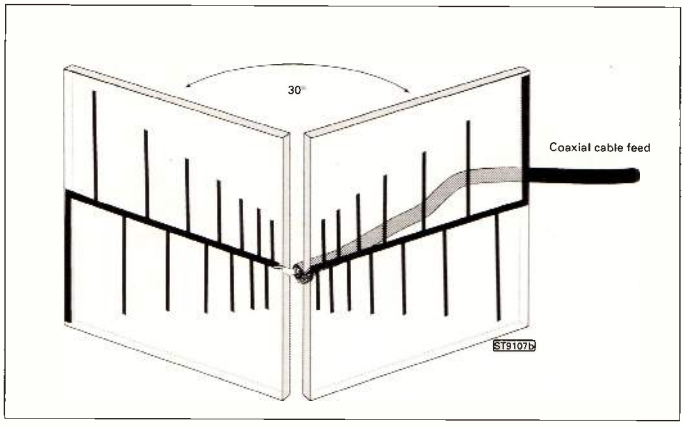


Fig. 2: Two separate single sided boards can be opened out at 30°.

Construction

Armed with the board and tape, a snap-off type craft knife and some self-adhesive fabric tape from your local upholstery or d.i.y. store, we're all set to begin!

The antenna can be assembled with each element on either side of a single piece of board, **Fig. 1** or two pieces of board can be used to give a 30° angle of separation between the two, **Fig. 2**. The latter is preferable. On each board (or each side of one board) mark off with a pencil the measurements in **Fig. 3**, remembering that the two elements are not identical, but are **vertically** displaced mirror images of each other. Over these marks, lay down the adhesive copper tape, making sure that there is some overlap at the joins. Because the adhesive acts as an insulator, it is now necessary to lightly solder each overlap to make an electrically continuous structure.

The two antenna sections can now be taped together at the 'short' end to make a hinge. The ends of the coaxial feeder cable are then soldered to each element and the cable then terminated with coaxial connector to suit your receiver. Ideally the cable should be run back along the length of the 'earthy' element. The cable can be tapped down firmly to the board or holes made for cable ties to keep the cable in place. 'V' channels can be cut in the reverse sides of the board to accommodate the cable, allowing the two boards to lie flat together for storage.

The antenna can, of course, be extended to cover higher and/or lower frequencies by adding more strips (logarithmically) at the ends, depending on the size of board you can tolerate.

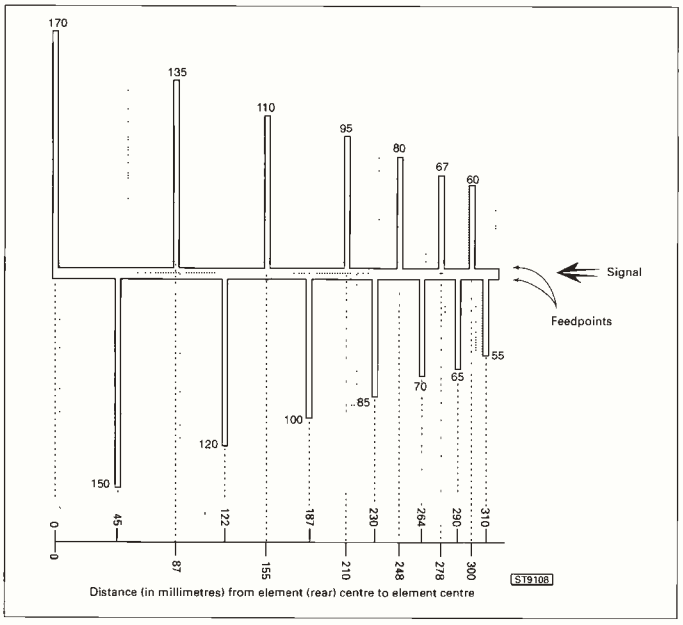


Fig. 3: The basic dimensions of the elements.

This method of using copper tape is an excellent way of quickly experimenting with v.h.f./u.h.f. antennas. For example, if you are a lazy amateur, a very efficient 433 or 1296MHz umpteen element beam can be assembled on a length of board in a few minutes. ■

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Short wave column

Antennas - By Bob Ellis

Above me, I can see thirteen aerial reference books, most of them unread. The reason for this is practicality. The man who designs the estate has decreed that the smallest distance between two houses will be called "the garden" and a long-wire aerial stretched to that distance will not resonate at any frequency you want to listen to. That's life.

In the end you put up piece of wire as long, as high and as neighbour-compatible as possible. You push the wire into the centre of the SO239 aerial socket and hope to hear something. You will, but it can be better.

Our AR7030 will take on the range of impedances and signal levels presented by the average garden long-wire and provide a much better match than using the SO 239, a co-ax connector strictly for 50 ohm resonant aerials. We use a carefully designed input transformer to get that match and provide a reassuring measure of static protection.

Long wires work best with a good earth connection. Traditionally, this was made to the rising water main but as so many repairs are now made with plastic fittings, it's just not reliable any more. Try Dracula impressions by banging a metal stake into the garden and connecting to the radio ground point with the shortest possible length of heavy-duty wire. Tidy the mains lead to the radio by winding as much of it as possible around a ferrite ring. This should raise the impedance enough to leave the mains noise behind and leave a clear path from aerial to earth. Evenings on 7410, daytime on 11620 and check if the 10MHz Ham Band is open by checking for the Domestic Service on 10330. Listen for the evening ragas - long improvised sitar pieces. I can't afford a full-size instrument, mine's a baby sitar... **© Bob Ellis**

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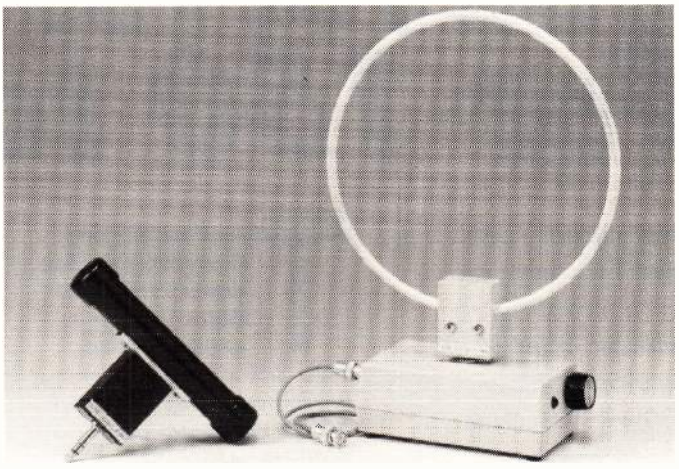
As reviewed in this issue of SWM

AOR LA320 short wave loop aerial

The LA320 ultra-compact active loop aerial has been specifically designed to provide reception when located indoors and is the ideal companion to the AR7030, AR3030 and other short wave receivers. Coverage is from **1.6 - 15 MHz** with **optional elements available for 0.2 - 0.54 MHz and 0.54 - 1.6 MHz**. It is recommended that either a whip aerial or short length of wire be connected directly to your receiver for monitoring frequencies above 15 MHz.



The aerial elements may be rotated in order to achieve maximum receive signal strength while minimising (nulling out) the effects of unwanted interfering local terrestrial signals. The vari-cap tuning featured in the LA320 also adds valuable selectivity to any receiver's front-end stages.

The directional characteristics when listening to distant sky-wave signals will not be as pronounced as local ground-wave propagation, however you can easily assess the optimum direction when the background noise level is minimal.

Supplied:

LA320	*Base unit*
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320H	*Element 5.0 - 15.0 MHz*
BNC-BNC	*Coaxial patch lead*
Battery	*006P 9V dry battery*

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A Ferrite Loop Converter For 150 to 500kHz

Over recent years there has been an ever increasing renewed interest in the world below 500kHz, which is where wireless communications originally got started. These days, enthusiasts are investigating from 500kHz right down through v.l.f. to e.l.f. Richard Q. Marris describes a combined directional antenna and up-converter to cover this lower part of the spectrum.

The Ferrite Loop Converter design covers from 150 - 500kHz with a small overlap. This includes the long wave band plus that part of the spectrum up to 500kHz, which lies between the l.w. and m.w. broadcast bands.

To seriously explore this spectrum requires a good communications type receiver with an r.f. gain control and with b.f.o., u.s.b., l.s.b., optional a.g.c. and noise limiter facilities. With such a receiver, c.w. traffic can often be heard between 500 and 450kHz.

In the range of 150 to 500kHz there are many Aero and Marine beacons and the public information and other stations on a world-wide basis. The USA Amateur Experimental transmissions between 160 and 190kHz plus, of course, the long wave a.m. broadcast stations located in Europe and immediately surrounding countries.

The lowest frequency l.w. a.m. broadcast station is believed to be Bechar (Algeria) on 153kHz and the highest frequency station being Minsk (Russia) on 279kHz. Occasionally, at night, unidentified music transmissions have been heard up to about 330kHz. Man made noise and QRN can be a great problem, which will often be exasperated if a long external long wire antenna is used, especially in built up areas where much man-made noise is generated.

The benifits of the directional capablities of the converter can be easily appreciated.

Description

The elements of this Ferrite Loop Converter consist of an NE602N and a directional narrow band ferrite loop antenna plus, of course, a good communications receiver.

The Philips product specification sheets describe the NE602N as "a low power v.h.f. monolithic double-balanced mixer with input amplifier, on-board oscillator and voltage regulator". It also states the mixer is a "Gilbert cell multiplier configuration which typically provides 18dB of gain at 45MHz".

The oscillator will operate at 200MHz, with input frequencies up to 600MHz. However, it is also clear that the NE602N will operate at lower frequencies as an 'up' or 'down' converter, using

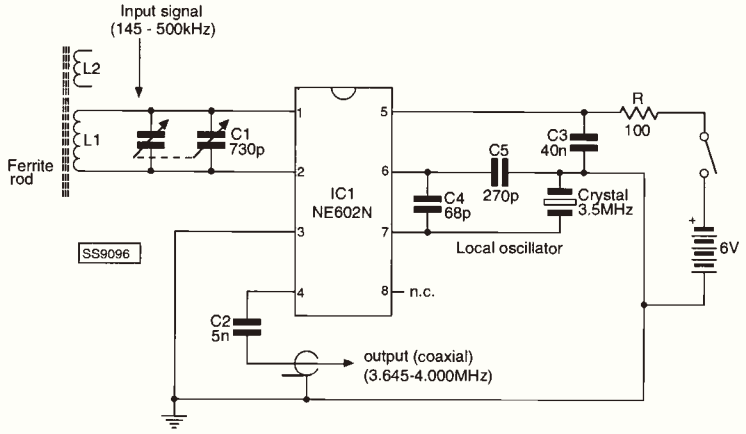

Fig. 1: Converter circuit diagram.

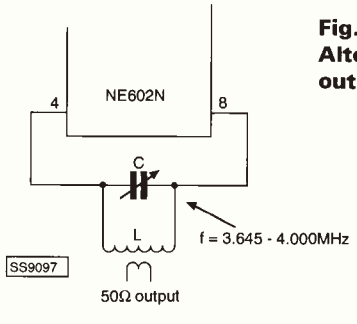

Fig. 2: Alternative i.f. output circuit.

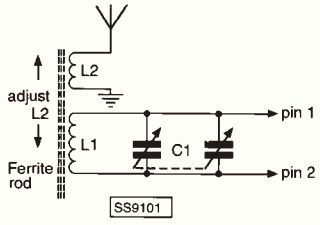

Fig. 3: Connection details for 'end fed antenna'.

quite simple circuitry with a few external components. The pin configuration of the NE602N is shown in the circuit diagram **Fig. 1**.

This converter design uses a ferrite rod antenna input tuned with C1 over the range 150-500kHz, with overlaps at the ends. A crystal controlled 3.5MHz fixed oscillator provides an 'up' converted output into a good communication receiver tuning 3.650 to 4.000MHz. Provision is made, in **Fig. 3**, for the attachment of an external long wire antenna if or when required.

The output from the NE602N is connected via the shortest possible length of coaxial cable to the antenna input of a high gain communications receiver.

An alternative output circuit to the receiver is in **Fig. 2.** This has the advantage of a little more output, with the disadvantage that an extra tuning control (C in **Fig. 3**) would be needed, and thus should only be used if the receiver does not have high r.f. gain.

The Ferrite Loop

The Ferrite Loop input circuit (L1, C1, L2) consists of an 200mm long x 9mm diameter ferrite rod fitted with long wave and medium wave coils. The l.w. coil will be approximately 4.1mH and the m.w. coil 370µH. The inductance of these coils increases as they are moved to the centre of the rod and decrease towards the rod ends.

Such l.w. and m.w. ferrite rods can often be salvaged from old radios or purchased new from suppliers.

L1 is the l.w. coil, which is wavewound with litz wire and should be moved to the exact centre of the rod and held in position with a spot of hot candlewax. It is resonated by variable tuning 730pF capacitor C1 (a two gang x 365pF wired in parallel). L2 is the solenoid wound original medium wave coil modified by removing 20% of the wire turns. L2 is used if/when a long external end fed long wire antenna is connected, the coupling being adjusted by sliding L2 along the ferrite rod for maximum signal strength.

Great care should be taken when handling ferrite rods. Apart from the fact that a sharp tap on the rod may cause it to fracture. It is possible, also to destabilise the magnetic material, thus altering the characteristics, this may also occur if the rod is placed in a strong magnetic field, such as, near a loudspeaker. The rod and coil assembly should, for best performance, be kept well away from metal parts such as p.c.b.s, panels and chassis.

The ferrite loop has a figure-of-eight polar diagram configuration, see **Fig. 5.** The sharp nulls appear at the rod ends and the final unit assembly must ensure that the coaxial cable and power lead exit at the null, as must the control rod and knob.

Construction

The layout is not critical and can be to individual preference except that the ferrite/rod coil assembly must be mounted in such a way that is mechanically protected against damage and is well clear of surrounding items to ensure maximum performance.

The simple test-bed layout of the prototype is shown in **Fig. 4.** A chassis base is made of a piece of 0.1in Matrix plain s.r.b.p. board (100 x 200mm) mounted on a simple 18mm high wood frame. At either end of the back is a vertical wood ferrite rod support 100 high x 30mm wide. The rod/coil assembly is mounted on these verticals with two Nylon 'P' cable clips.

The variable capacitor C1 is a 2-gang x 365pF per section metal frame receiving type, wired in parallel (730pF total). It must be noted that C1 is mounted on the plain matrix board and is not grounded. An insulated extension shaft is taken out, parallel with the ferrite rod to the control knob. A simple bracket with panel bush, supports the rod near the knob.

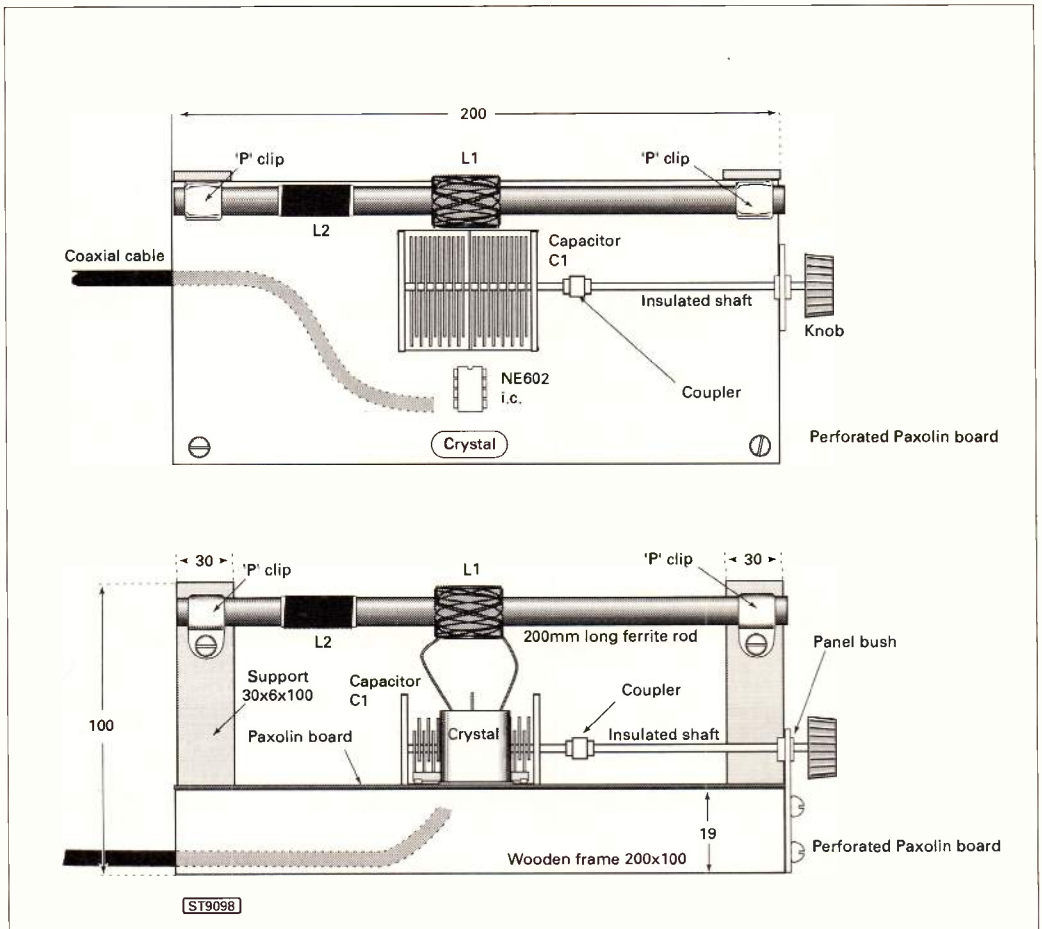

Fig. 4: Prototype layout.

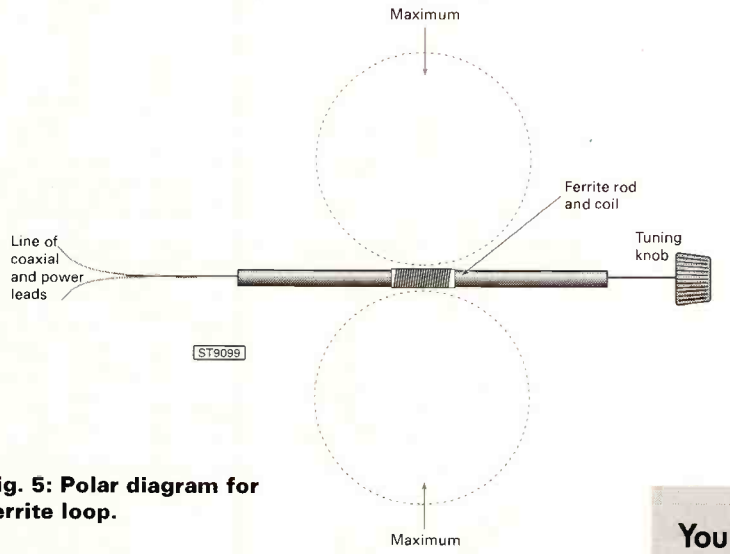

Fig. 5: Polar diagram for ferrite loop.

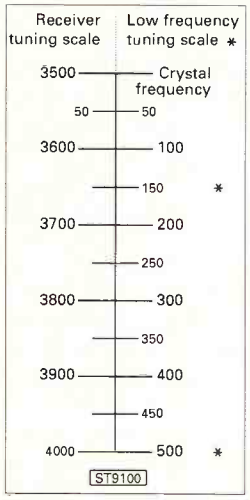

Fig. 6: Tuning scale.

The holder for the NE602N and the crystal are mounted on the matrix board in front on C1 and the very few remaining components are hardwired under the chassis. The coaxial output cable is also taken out parallel with the ferrite rod along with the 6V battery power lead (**Figs. 4 & 5**). Alternatively, there is space to put a small battery under the chassis. All connections must be securely and rigidly soldered.

The size of the whole unit is dictated by the rod length, coil clearance and rod protection against damage. The whole project could, of course, be put into a suitable non-metal box.

Operation

The output of the unit is connected to the i.f. receiver antenna input using the shortest possible length of coaxial cable. The d.c. supply voltage is 6V, with the nominal operating current of just under 3mA.

Tune the receiver to 3.5MHz where the crystal oscillator should be heard. Then using the tuning scales in **Fig. 6**, tune the receiver to 500kHz (4MHz on the i.f. receiver dial). Rotate C1 to near minimum capacity where the ferrite rod/coil should come to resonance. Next tune the receiver to 150kHz which is 3650kHz on the receiver dial and resonate C1. On the prototype the unit tuned from 500 to 145kHz.

The unit was, of course, designed for use with the in-built ferrite loop antenna. However, it was possible to try a good external long wire end fed antenna and good ground, both connected to L2 (the original m.w. coil with 20% turns removed). The antenna coupling can be adjusted by moving L2 along the rod, for maximum signal strength. It is worth trying reversing the connections to L2.

In a town or city this external antenna may well be disappointing due to the large amount of man-made interference and noise being generated locally. In more rural areas the external antenna may be an advantage. ■

Having trouble obtaining the ferrite rod assembly?

Then you can use the readily available 125 long x 9mm dia l.w./m.w. coil assemblies. A 75mm length of ferrite rod can be adhered - end to end with the 125mm rod using Superglue or quick setting epoxy adhesive. The l.w. coil (L1) can then be moved to the centre of the resulting 100mm rod. One of the readily available 125mm l.w./m.w. rod/coil assembly is Maplin (LB12N) and the extra 75mm rod can be cut, using a hacksaw, from a Maplin 125mm rod (YG22Y).

You Will Need

Resistors

Carbon film, 5%, 0.25W

100Ω	1	R1

Capacitors

Silver mica

68pF	1	C4
270pF	1	C5

Polystyrene, 5%

5nF	1	C2
40nF	1	C3

2-gang metal frame variable

365 + 365pF (Jackson 5250 or similar)	1	C1

Semiconductors

Integrated Circuits

NE602N	1	IC1

Crystal

HC-18U or similar

3.5MHz	1	XL1

Miscellaneous

Shaft coupler; Insulated extension shaft; Knob for C1; d.i.l. socket, 8-pin ; l.w.-m.w. ferrite rod antenna, 200mm long x 9mm dia., (salvage from old radio or purchased from a supplier see below); Matrix board 100 x 200mm; Nylon 'P' cable clip, 9mm; s.p.s.t. switch (S1); Coaxial cable (RG-58); Wire; etc.

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AR-7030	£799	£739.00

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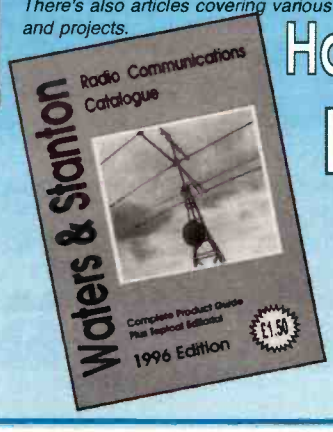

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A Remote Tuned Loop

ANTENNA Special

Watch out, it's another loop design! But here's one with a difference from Andrew Howlett G1HBE. You install it outdoors or in the loft, away from all that computer QRM, and tune it from a simple control box next to your receiver.

Most remote loop tuning systems rely on a motor-driven tuning capacitor, which obviously needs an extra pair of wires to power the motor; if some kind of positional feedback to the tuning indicator is required, the system grows more wires. And they call it wireless!

How about tuning the loop with a Varicap diode? There are several types of high capacity diodes available today, so why not simply replace the mechanical tuning capacitor with a Varicap and feed the tuning voltage up a separate wire (**Fig. 1.**)? Not bad, but we still need an extra wire. Now look at **Fig. 2**. Gone are the coupling winding, the d.c. blocking capacitor and the third wire, the tuning bias for the diode being fed up the coaxial feeder. As the circuit is now series tuned it can look directly into the 50Ω downlead.

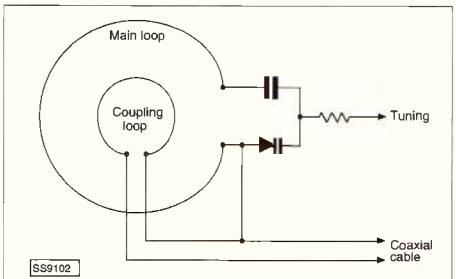


Fig. 1: The 'extra wire' method.

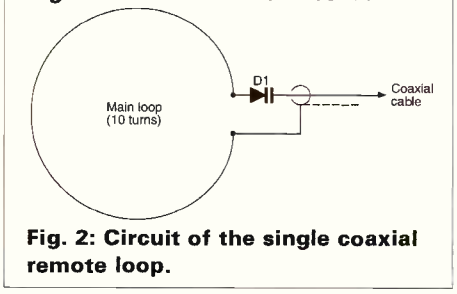


Fig. 2: Circuit of the single coaxial remote loop.

We'll need a control unit of course, but first let's take a look at the loop itself. I'm sure we've all seen enough loop designs in *SWM* over the years to be quite familiar with their construction. Either the traditional 'wooden cross' or 'plastics hoop' may be used, the only critical part being that it should measure about 600mm across and should be fitted with a 3-way tagstrip for the anchoring of the wire ends and the diode. The wire for the loop should be enamelled copper wire of about 28s.w.g. Wind ten turns neatly side by side (do not cross the turns) leaving one wire's width between each turn. This helps to keep stray capacity down, aiding the tuning at the high frequency end of the band. Anchor the ends of the winding to the tagstrip, fit the Varicap diode and the coaxial cable as shown in **Fig. 3**. Note that the diode is actually two diodes in one package, sharing a common cathode. By connecting the two anodes together, we end up with one big diode which has a maximum capacitance of 600pF at zero volts. Varicap diodes work only when they are reverse biased, so the cathode must go to the inner of the coaxial feeder.

The Interface

At the receiver, some way of introducing the tuning bias onto the coaxial cable is required, along with a d.c. blocking capacitor (C1) to ensure that this bias is not diverted to earth via the receiver's input circuitry. **Fig. 4.** shows the circuit for the interface. It should be built into an aluminium project box about 100 x 75 x 38mm deep, with input and output sockets of your choice to take the coaxial feeder from the loop and receiver. Nothing about its construction is critical, just remember that the tuning voltage goes via R2 to the loop socket, not the receiver.

The unit is powered by a 9V PP3 battery, which should last for ages, the current consumption through the 100kΩ pot being negligable. For this reason, no power switch is fitted. Once you have finished the interface, apply the battery and check with your meter that a variable voltage appears between earth (negative) and the inner (positive) of the 'loop' socket, and that turning R1 anti-clockwise reduces this voltage to zero. If the voltage goes the 'wrong way', reverse the two outer connections to R1. When you're satisfied that the wiring is correct, connect everything up as shown in **Fig. 5**, with the loop positioned well away from metallic objects. Tune your receiver to a station at the low frequency (500kHz) end of the m.w. band and adjust R1 for a peak. Now do the same at the 1600kHz end. If there is plenty of range at the l.f. end but no peak at h.f., remove one turn from the loop. If it's the other way around, an extra turn should be added. Once the tuning range is correct, the top surface of the box may be calibrated in kilohertz.

That's the loop finished - now, how do we rotate it? ■

You Will Need

Resistors
Carbon film, 5% 0.125W

100kΩ	1	2

Potentiometers

100kΩ *lin.*	1	R1

Capacitors
Polyester

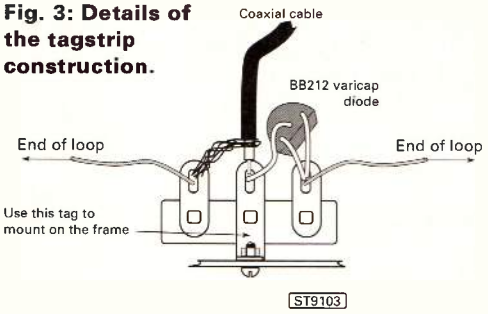
10nF	1	C1

Semiconductors
Diodes

BB212	1	D1

Miscellaneous
28s.w.g. enamelled copper wire; tagstrip; aluminium box; Coaxial sockets (2); RG-58 coaxial cable; 9V PP3 battery and connector; Pointer knob.

Fig. 3: Details of the tagstrip construction.



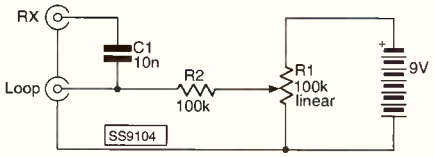


Fig. 4: Circuit of the interface box.

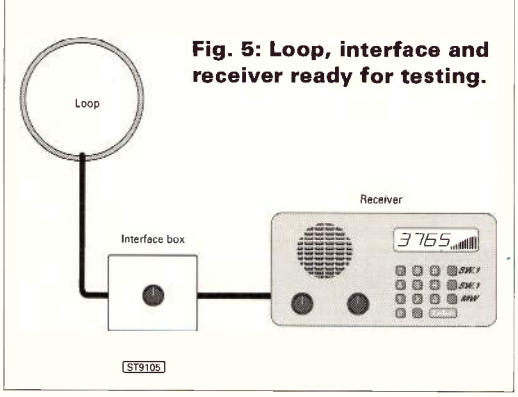


Fig. 5: Loop, interface and receiver ready for testing.

ANTENNA Special

Making Connections

You've discovered, to your chagrin, that the best short wave receivers don't work at all without an external antenna, and even portables often work better with an external antenna. Joseph J. Carr K4IPV takes a look at some of the basics of connecting the antenna to the receiver.

The chunk of wire that runs between the antenna and the receiver is called the feeder, down lead, or transmission line. The simplest form of down lead is a single piece of insulated 16s.w.g.or 14a.w.g. wire soldered at one end to one end of the antenna, and at the other end fastened to the antenna input of the receiver. Other forms of transmission line are a little more complex. One form is 300Ω twin-lead (Fig. 1a), such as the line used for some types of v.h.f. receiver antenna. This type of transmission line is often used with antennas such as the folded dipole; it consists of two insulated conductors, about 10mm apart, moulded in a plastics or rubber-like material that keeps the two conductors separated by a constant distance.

A close cousin of 300Ω line is the 450Ω twin-lead shown in **Fig. 1.1b**. It can be identified by the fact that it is about twice the width of 300Ω line, and usually has sections cut out of the insulation to reduce losses at u.h.f. This type of line is often used with antennas such as the G5RV, or other antennas with a high impedance balanced feed. It is also used occasionally with 600Ω feedpoint antennas because the v.s.w.r. produced (600/450 = 1.33:1) by the mismatch is quite moderate.

Less popular, but none the less useful (when needed) is the parallel open-feeder transmission line in **Fig. 1.1c**. This line consists of two conductors separated by insulating spreaders. The spreaders are made of ceramic, plastics, Nylon or some other insulating material. When purchased commercially, this line is usually called 'ladder line', and is available in characteristic impedances from about 400 to 800Ω, with 600Ω being the most common.

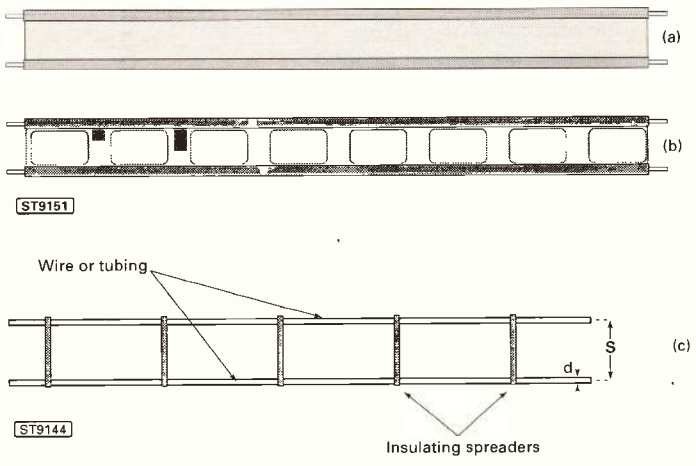


Fig. 1.1: a). 300Ω twin-lead; b). 450Ω twin-lead; c). parallel open line.

By far the most commonly used transmission line is coaxial cable (**Fig. 1.2**). It consists of two conductors that share a common axis (hence 'coaxial'). This means that there is a central conductor that is at the centre of a tubular outer conductor, usually called the 'shield'. An insulating material separates the two conductors (polyethylene, polyfoam and Teflon are used). An outer insulating sheath is also provided, and serves to protect the shield both electrically and from the elements.

Connectors for Connections

There are several different forms of connection that might be used on a radio receiver, and which to use depends partially on the type of transmission line used and partially on the configuration of the receiver antenna input. Two popular antenna connection schemes found on the rear panels of short wave receivers are shown in **Fig. 1.3**. In **Fig. 1.3a**, the antenna connection consists of either two or three screws (two for unbalanced feedlines,three for balanced feedlines), one of which is for the ground connection. The receiver in **Fig. 1.3b** uses a coaxial connector for the antenna. It also has a thumb screw or pan-head screw for connection to a grounding wire.

The receiver in **Fig. 1.4** uses both types of connection. The 50Ω connection is for coaxial cable, while the HI-Z terminal to the right of the coaxial connector is for a high impedance feed line, which is a fancy way of saying a single wire down lead. The ground terminal is also seen in **Fig. 1.4**. The LOCAL-DX switch is used to connect a resistance in series with the antenna lead in order to reduce the strength of overloading local stations.

The cable end connectors needed for these different forms of receiver depend in part on the type of down lead or transmission line used. In fact, the 'on-the-cheap' method is to not use a connector at all. If a single wire downlead is used with a receiver that has screw terminals, then some people just scrap about 10mm of insulation away from the copper wire, and then wrap the wire around the screw

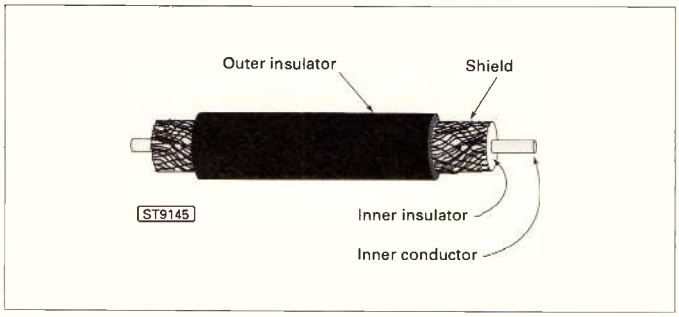


Fig. 1.2: Coaxial cable.

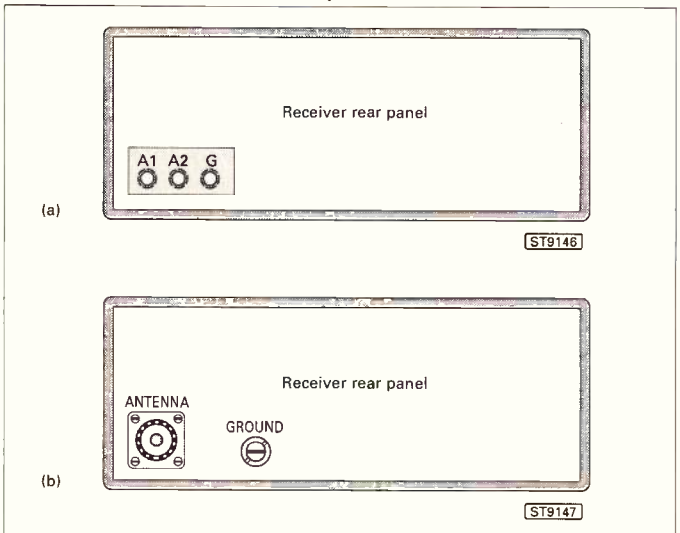


Fig. 1.3: Rear panel of typical receivers: a) screw-terminal type; b) coaxial cable type.

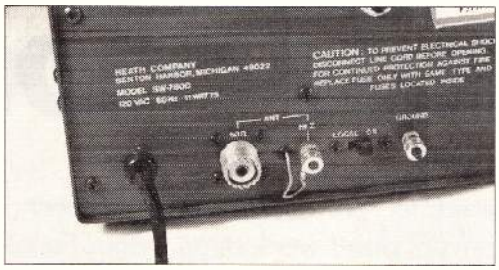


Fig. 1.4: Rear panel of a receiver showing both forms of connection.

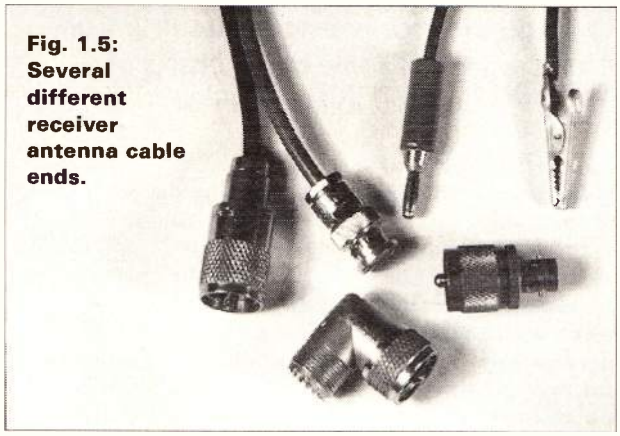


Fig. 1.5: Several different receiver antenna cable ends.

and tighten down. Others will use a two-prong 'spade lug' at the end of the single wire down lead.

Several variations of the cable-end theme can be seen in **Fig. 1.5**. On upper right are an alligator clip and a banana plug. The alligator clip is certainly not recommended for a permanent installation (it'll come loose), but the banana plug is often so used. The small coaxial connector to the left of the banana plug is called a BNC-type connector. The larger coaxial connector is called by either the type number (PL-259) or the term 'UHF connector'. The 'UHF' part doesn't imply that you cannot use it at any frequency, however. The PL-259 UHF connector is probably the most common form of coaxial connector on receivers, but at least a few use the BNC form. Some will also use the RCA phonoplug (not shown) that is normally used on audio equipment.

Two and Three-Terminal Antenna Inputs

Shows three schemes for connecting the antenna feedline to screw-type input receivers are shown in **Fig. 1.6**. In **Fig. 1.6a**, the receiver has only two antenna terminals, one for the antenna (A1) and the other for the ground or earth (G). If a single wire downlead isused, then it is connected directly to the A1 terminal. Either scrapping the end, or use of a spade lug, as described above, is sufficient. The ground wire is connected between the 'G' terminal and what is usually

→36

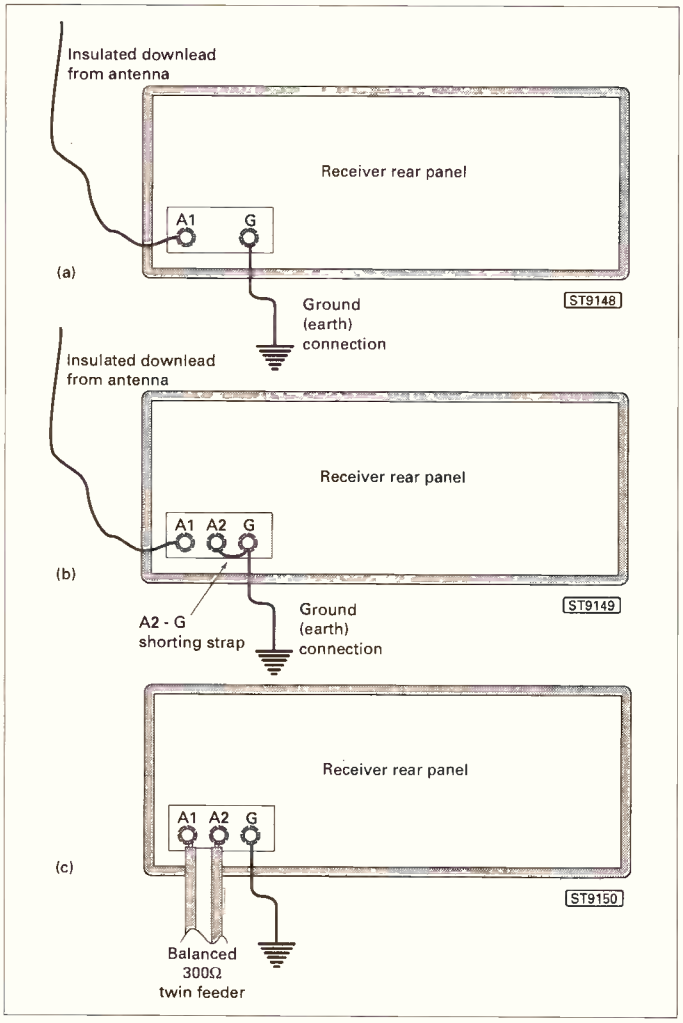


Fig. 1.6: Connections to screw-terminal receivers: a) Two-terminal, unbalanced style; b) three-terminal unbalanced style; and c) balanced three-terminal style.

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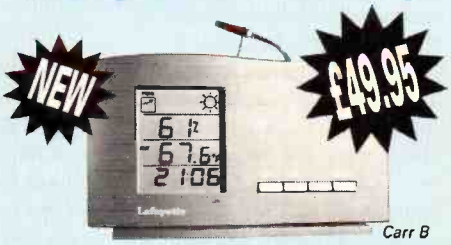

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called a 'good ground' connection.

So what is a 'good ground'? In most instruction booklets of yesteryear they said "hook it to a cold water pipe". There are two problems with that advice. First, it isn't always easy to identify the cold water pipe, especially if there is a natural gas service to the house. A hot water pipe is usually easy to identify because it's hot, but the cold water pipe and the gas pipe may look alike. Normally, steel pipe is used for gas and copper for water, but that distinction cannot be depended on. In the USA, the gas pipe is supposed to be colour coded, but I've lived in a house when they all looked alike. **Under no circumstances connect to the gas pipe**. Second, in houses built in the recent past, or tomorrow, the cold water pipe is not an electrical conductor - it's made of pvc. For most people a good earth is a 2 to 2.5m copper or copper-clad steel rod driven into the soil outside the window. Earths can be enhanced, but that's a topic for another day.

In the case where the receiver has a balanced antenna input,and you wish to use a single wire down lead (**Fig. 1.6b**), then the connection is made to 'A1' in the same manner as before. Similarly, the 'G' terminal is grounded as before. What'sdifferent is the fact that the 'A2' terminal is strapped to the 'G' terminal with a short piece of hook-up wire (some receivers use a small metal link that must be removed before a balanced antenna is used).

And speaking of balanced antennas, **Fig. 1.6c** shows the scheme for connecting a balanced transmision line, such as 300Ω twin-lead to the receiver. One conductor of the line goes to 'A1' while the other conductor goes to 'A2'. The ground connection is as before.

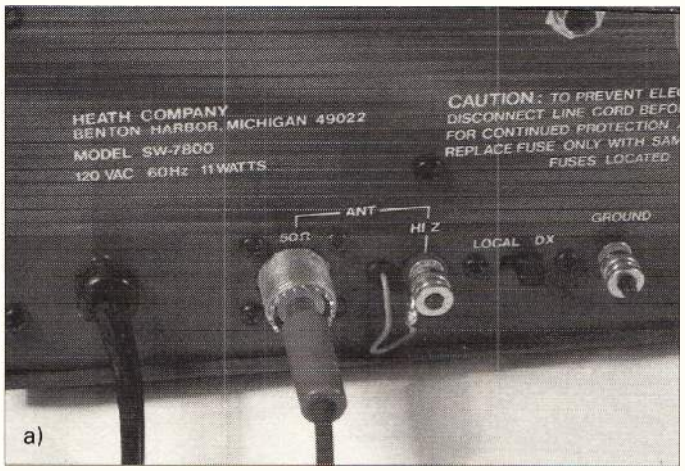

Fig. 1.7: a) Connecting a single-wire downlead to a coaxial connector; b) Connecting a single wire to a coaxial cable - not recommended, but it works.

In some cases, you will have a receiver as shown in **Fig. 1.6**, but want to use coaxial cable. One way to do this is to simply split the end of the coaxial feeder, carefully separating the inner conductor and shield, and then connecting them to the screw terminals. The inner conductor goes to 'A1', while the shield goes to either 'G' or the shorted pair 'A2-G'. Not very elegant,and certainly not recommended, but it works. A more elegant solution is to use a BALUN transformer, with either 1:1 or 4:1 impedance transformation, depending on the line type.

Connecting to Coaxial Inputs

Most high-end and middle market receivers today are equipped with coaxial connectors for the antenna input. The task is to connect either a single wire downlead, coaxial cable or twin-lead to the coaxial input of the receiver. **Fig. 1.7a** shows one method for connecting a single wire downlead to a coaxial connector (please overlook the fact that this particular receiver has a single-wire antenna input as well!) The cable end for the downlead is a banana plug. It turns out that the standard banana plug has a spring-like construction with a diameter that makes it a snug, but easy, fit in the SO-239 UHF coaxial connector (i.e. the mate to the PL-259). The opposite problem is seen in **Fig. 1.7b**. How to connect a coaxial down lead to a receiver that has a single-wire input: use an alligator clip for **temporary** connections. I use this method on my lab bench to take advantage of one of my antennas when working on a project. Again, it works, but is not good practice.

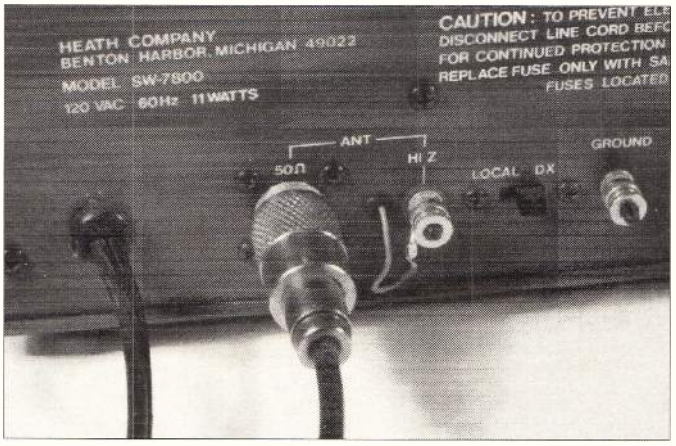

Fig. 1.8: Coaxial cable to coaxial connector.

The ideal situation is shown in **Fig. 1.8**. A coaxial input receiver is mated with a coaxial cable from the antenna lead. The PL-259 connector used as a cable end for the coaxial cable is a direct mate with the SO-239 on the receiver rear panel.

In Part 2 we will continue with connecting the feeder to the antenna.

Longwires and Scanners

ANTENNA Special

Following the debate conducted on the SWM Letters Pages last year, dedicated monitor, Peter G. Rayer G-13038, has been investigating some solutions posed by Peter Waters of Waters and Stanton. All may not be lost for all you scanner owners with h.f. coverage on your set.

I have owned AOR AR3000 and AR3000A scanners since their first appearance on the UK market. The tests that I have carried out on v.h.f. and u.h.f. proved conclusively that in my own location, these receivers outperformed both the Icom R7000 and R7100. The antenna utilised during testing was a Diamond V2000 tri-bander at about 11m a.g.l.

However, I never had a great deal of success on the h.f. frequencies with either scanner. I am a great lover of the Datong AD-370 active antenna and when used with my Kenwood R-5000 and JRC NRD-535, I could hear the world on all the h.f. bands, when conditions allowed.

But, when connected to the '3000 or '3000A - with the internal h.f. pre-amp 'off' - I got very little, except noise and the odd weak signal. I resigned myself to the fact that the scanners would be used for v.h.f. and u.h.f. listening and the Kenwood and JRC would be useful for all the h.f. listening.

When I saw Peter's letter - See March 1995 *SWM* I mused that this may be a clever plot to sell lots of MLBs and Global AT-2000 tuners. But knowing that Peter has been very helpful to me in the past and is well respected by those of us who deal with him on behalf of the RAIBC, I gave him a ring to discuss the 'test conditions' mentioned in his letter. Peter did confirm that his tests has been carried out on hand-held sets and not on base scanners.

A Weekend Testing

I have spent a whole weekend experimenting with an AR3000A (with h.f. pre-amp off), a Global AT-1000, a 24.6m long wire, running north to south connected to the receiver via an RF systems MLB, a Datong AD-370 and CobWebb antenna, (all 9m above the ground). In addition, I used an r.f. systems SP2 antenna splitter, so that I could have the same antenna going into the NRD-535 as a reference set. My diagram, **Fig. 1.** will give you a rough idea (I hope).

Once everything was connected, I tuned the NRD-535 through the bands from 500kHz to 29MHz. Signals were tuned in using the AT-1000 to 'peak' the 'S' meter. The same signal was acquired on the AR3000A using the other AT-1000 in the same way.

The AD-370 and 'longwire' were used below 14MHz and the CobWebb above this frequency. I was amazed at what was coming out of the scanner I had previously written-off as 'useless below 25MHz'.

There is no way that the scanner was performing as well as the dedicated NRD-535, it lacks the filtering and refinements that I require for sustained listening (bearing in mind that I am in this shack for up to 90 hours per week). But the stations were pouring in right across the h.f. spectrum. On average, only about two 'S' points below the '535, but with a coarser signal, although it is fair to say, that AOR do not claim that scanners are anything other than 'wideband scanners'.

I found that the AT-1000 was not really doing the job of an a.t.u. This was because the SP-2 splitter and the MLB connected to the long wire were already matching the 50Ω antenna input of the radio. It did, however, improve the front-end tuning, giving a marked improvement in reception.

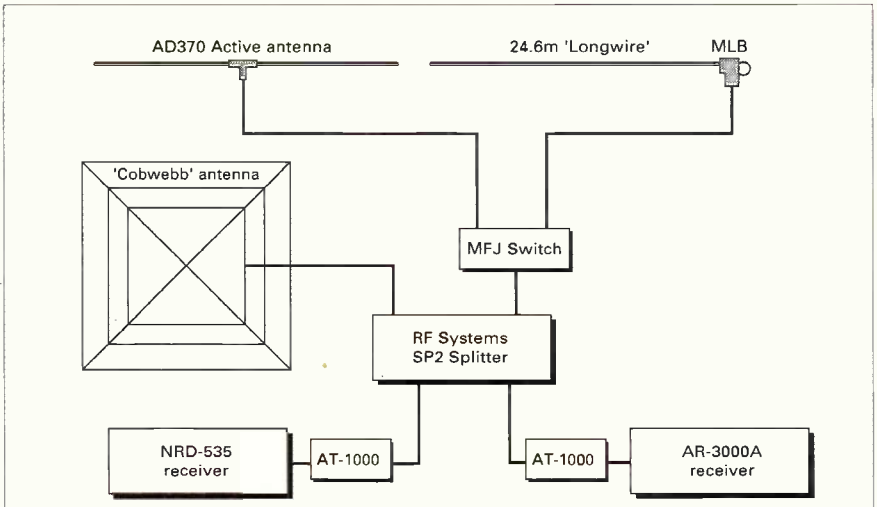

Fig. 1: Peter Rayer's set-up for his weekend of testing.

Confirmed My Findings

In order to confirm my findings I used all three antennas directly into the AR3000A. The 'longwire' performed almost as well, bearing in mind that the magnetic balun was still connected at the top of the mast. The CobWebb was alright, but did not seem to be as sharp as before and the AD-370, which performs very well on all the other sets in the shack, did not want to perform, when connected straight into the back of the scanner.

I think Peter has stumbled across a way of improving h.f. reception on scanners. I will now look at my AR3000A in a new light as far as reception below 30MHz is concerned. ■

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220 XLT
£169.99

Uniden
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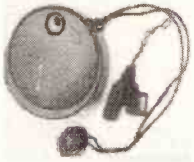
£69.99



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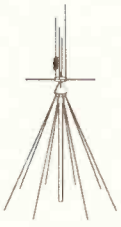

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I Did it My Way!

A recent, but on-going, incident involving a short wave 'personality' and a review in SWM, coupled with a letter from a Short Wave Magazine reader, prompted John Wilson to expand and explain his own views concerning reviews and reviewers of short wave equipment.*

My own approach to equipment reviews comes as a direct result of spending many years 'on the other side of the counter' as a partner in the firm of Lowe Electronics (until we sold the company in 1990). During the 25 or so enjoyable years spent with Bill Lowe, I had sole responsibility for all technical matters, which meant that I was

appraising equipment to determine whether or not it would fit into our sales range, and also monitoring the reliability and performance of everything we sold to ensure that it continued to satisfy the needs of our customers. Whatever the company bought and sold passed through my eager twitching hands and I was given a unique opportunity to get to know just about every receiver anyone had ever produced; from second-hand AR-88s to the latest goodies from National, Hallicrafters, Drake, Collins, Yaesu Musen, Trio (Kenwood) and Icom: I evaluated them all.

From the early 1970s I took on the marketing and advertising functions of the company in addition to my engineering responsibilities and during these years I submitted many items of radio equipment to reviewers. The results of the reviews were sometimes startling, and occasionally inexplicable, so when the Editor of *Short Wave Magazine* asked me to interrupt my life of contented idleness and write for his magazine I was happy to respond and write equipment reviews of the type I believed that the average short wave listener would appreciate.

Expert Assessment

As I see it, the reviewer's function is to provide an expert assessment of something, be it a book, play, radio programme, bottle of wine, car, washing machine, short wave radio, whatever, and give the potential reader, viewer or user an analysis of the product based on the reviewer's knowledge and experience in their particular area of expertise. The potential user should be able to read a review and get a good idea of the worth of the product for their own particular needs before purchasing anything, attending a performance or pulling a cork (funny how wine always intrudes on my thinking). That's the simple idea behind reviewing, but life is never simple and there are many pitfalls for the would be reviewer. The first is that of expertise and its application to the task in hand.

Balance

There is a difference between expertise and experience, and it is the balance between them which the reviewer has to consider most carefully. Expertise can lead to a narrowing of vision and a distillation of knowledge focussed on a single subject or aspect of a subject. The real expert may be such a specialist that he or she, whilst being intensely knowledgeable, cannot widen their thinking to include those who are less expert, and become so sophisticated in their tastes as to ignore the needs of lesser mortals.

Experience on the other hand should lead to a broadening of vision and a better understanding of the wide range of the readers' own knowledge or lack of it. The strange but reassuring thing about experience is that it can only be gained by time and application, and once gained can never be taken away. I recall meeting an entertaining man by the name of Fil Galluppi, who was the president of Venus Scientific Corp. (slow scan television). He once gave me a quotation - he said it was Kipling, but I can't locate it - which became a favourite of mine; some of you will have heard it from me before, but it perfectly describes the value of experience:

"They stole everything I had,
But they couldn't steal my mind,
So I left them sweating and stealing,
A year and a half behind."

But on to more practical matters: there are experts who have followed specialisation to the point where they would make rotten reviewers because their only yardstick (or is there a European decree that I should say 'metrestick') is how a receiver performs in their own particular field of interest, and for a reviewer it's often hard to keep in mind that one's own specialist interests have to be suppressed in order to express the wider view. If you have become an expert on strawberry jam it's worth recalling that there are those who prefer marmalade.

Flattering

It's very flattering to be asked to act as a reviewer because it implies that your knowledge is valued and your opinions respected. However, it's all too easy to get a feeling of self importance and begin to criticise equipment in order to show how clever you are at finding things that the manufacturer wanted to hide. There have been reviewers who have gone out of their way to find 'design faults' without once asking themselves "Do I really know more about this subject than the designer?" As someone who in the past suffered at the receiving end of such comments, I try to approach each review with sufficient humility to respect the abilities and integrity of the designer and manufacturer of the item which they have generously allowed me to test on your behalf.

There are many differences in style and content of reviews depending on what is being studied, and for radio equipment this can range from a simple description of general features to a very detailed text almost completely concerned with

technical specification and containing little actual 'feel' for the operational subtleties. In the field of amateur radio for example, the definitive reviews are those by Peter Hart published in *RadCom*, which are very detailed in their measurement content and exemplars of their type. I personally enjoy reading the Hart reviews, which seem ideal for a hobby market that has become somewhat obsessed with performance figures, even though some of the participants may not fully understand what the figures mean. At the other end of the review spectrum are the tables comparing short wave receivers by the number of stars awarded for sensitivity, selectivity and so on. If each parameter has a possible range of up to five stars it doesn't convey a lot of information to the person who wants to know "How good is this receiver?"

Let's Get Personal

I said at the start of this article that I write reviews which I think are relevant to the average reader of *Short Wave Magazine*, and my basic self-imposed rule is this:

I try to use my knowledge and experience to put myself in the place of the potential user of the equipment, and, as a user ask "How does this receiver suit my requirements, bearing in mind its price and intended position in the market?"

I take the view, expressed before in these columns, that no manufacturer deliberately sets out to make a bad product, so no reviewer should make unflattering comments about a lower priced receiver just because it lacks features or ultimate performance found in higher priced units. The designer of a receiver, or of any consumer product, has to include a retail target price in the list of design aims; in fact the price point is often the first design consideration.

The situation is different if the design is intended for military or defence use, because in such cases the specification is laid down, seemingly, without any consideration of price. Rather like the comparison between the design of a small family car and that of a Formula 1 race car, and yet I've seen TV programmes where the reviewer has compared handling characteristics between a Ford and a Ferrari.....This is hardly fair, nor indeed fulfilling the needs of the viewer or reader.

On the other hand, if a reviewer finds a feature of a product which is outstandingly better ***than the price and position in the market would indicate***, there can be no harm in pointing this out. If, when using a receiver, I find something that seems odd, I always contact the manufacturer or their representatives to query my findings. In this way I hope to avoid making silly mistakes and looking a complete fool by publishing something which is nonsense. In effect, what I am really doing is placing myself in the user's shoes and asking the questions he or she may require answering.

An example of this approach came in my review of the Drake R-8A when I was checking how to enter alpha-numeric information into the memory channels. Although I could see that station names could be entered from a remote computer terminal, I couldn't understand why the facility had not been included in the receiver itself - so I contacted Drake and had a red face when they pointed out that buried in the *User Manual* was a section describing the very function I thought was missing. If I had gone ahead and printed my original text, in the spirit of 'reviewer's purity', not only would I have misled the reader, I would also have discredited myself as a reviewer. But, sooner or later, I will trip up, at which time you may chastise me accordingly.

Stand Back

Still on the theme of manufacturers, I like to believe that no respectable company would publish specifications which were intentionally incorrect, and so I expect test results to comply more or less with the published figures. If they don't, I employ a technique which was taught to me in the dim and distant past (by G2FMU), and which I passed on to the young engineers I taught myself: If the results seem odd, the first thing to do is stand back, keep your hands in your pockets, take a close look at what you are doing and have a jolly good think.

Whatever you do, don't jump to conclusions based on the assumption that the results are correct, because you could be embarrassingly wrong! It could be that the measurement technique is incorrect, or even that the test equipment is faulty or not suitable for the measurements in hand, but it's a wise reviewer who double checks everything before launching erroneous conclusions onto the open market. Just because the light goes out doesn't mean that terrorists have blown up the power station - it could simply be that the lamp filament has failed. As a *caveat* on the subject of manufacturers' published figures, however, one should always remember that it is possible to tell the truth but not the whole truth, and the reader of a review has to depend on the reviewer to properly interpret what the manufacturer has printed.

For example, the concept of 'Third Order Intercept Point' is currently the fashionable parameter to boast about: "My dad's intercept point is bigger than your dad's intercept point", but if a brochure simply says "The DX Magna Special has an intercept point of +20dBm" without also stating if it is second or third order and giving the spacing between the two test signals used, then that brochure is not telling the whole story and the reviewer should spot it and tell you. He should also indicate the relative importance of the measurement in terms that the average person can understand, and this is sometimes quite tricky to achieve.

Unconnected, but true - I'm sitting here on Easter Monday in peaceful North Devon and the most beautiful butterfly has landed on my desk in the sunshine - certainly puts third order intercept well down the scale of importance to mankind. I think I'll go and weed the vines for an hour and resume later.

Later.....

I'm back, and I've been thinking about measurements of equipment performance and why it is important for a review to keep them in their proper place. I needed a bicycle to go out riding with my 15 year old son, so as an engineer I was intrigued to learn of a machine which would ideally suit my old knees and lung capacity. This bike weighed only a few pounds and could be propelled easily to quite high speeds. Everything about the performance measurements indicated that this was the machine for me to keep up with my son - unfortunately it was made by Lotus and required me to wear a special hat looking like a half sucked acid drop and adopt a riding position which would seriously compromise my ability to father any more children. It was made for the

50 ▶

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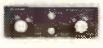
Global AT-2000



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AS REVIEWED BY MR BOB TOMALSKI

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A Man Well Ahead Of His Time

Part 2

John Cave concludes his look at the pioneering activities of Canadian father of the hetrodyne, Reginald Fessenden during the late 19th Century.

Reginald Aubrey Fessenden. Pioneering radio scientist 1866-1932.

To better finance his experiments the National Electric Signalling Company was formed and buildings were leased on the Atlantic coast of Massachusetts, at Brant Rock, just south of Boston and also at Plymouth, 18km away, where a small experimental building was erected on the shore. Of necessity, his rotary spark machine was still used for local experiments, but this only encouraged him to double his efforts with his high frequency alternator.

It was the golden age of the spark and to receive ordinary damped spark telegraphy there was not difficulty, but to receive the continuous wave signals for which he was striving, which had no modulation, and would be heard only as insignificant 'clicks' in the headphones, a special receiver would be needed.

A receiver that would allow waves oscillating at radio frequencies to move the diaphragm of the headset earpiece. If he had done nothing else, the way Fessenden overcame this problem would certainly have assured him of a place in the annals of wireless history.

He turned his mind to audio frequencies and the blending of chords, an ancient art known to the likes of bellringers for centuries and it caused him to wonder if this could not be applied to radio frequencies. It seemed so simple and yet nobody else had thought out it. This was the principle of the heterodyne, which has remained fundamental to wireless ever since, and so named by Fessenden because it meant the mixing of two frequencies.

Originally he suggested transmitting the Morse signals simultaneously on two continuous waves that differed slightly in frequency. The two incoming signals were then picked up, each by its own tuned antenna and these two currents were made to flow through two coils which had been wound on a common core.

Beating for a Tone

'Beating' of the two oscillatory magnetic fields would occur, with the result that an audio tone would be heard from a diaphragm placed near the end of the core. However, it soon occurred to him that there was no need to transmit two signals, and that one of them could be replaced by a locally generated oscillation.

The heterodyne was a brilliant conception, another of Fessenden's bold strokes, in which he so often departed from the established methods used by others. Like many of his other inventions they were years ahead of their time, quite often before there was suitable equipment with which to use them.

It was unfortunate that as spark reigned supreme there was little, if any, call for his heterodyne system, but he was not dismayed. His objective was for a system of continuous wireless waves and that system would need an appropriate receiving system.

It was to be years later, after the oscillatory valve circuit had been devised in 1913, that the heterodyne circuit came into its own and was proved to be one of the most important innovations in the field of wireless. Upon it Armstrong was to build his superheterodyne principle.

On the night of 11 December 1905, Brant Rock Station went into operation for the first time. Fessenden, while awaiting the high frequency alternator, had no choice but to rely on his synchronous rotary spark transmitter for the first year at Brant Rock.

Even so, the results were astonishing. Loud and clear signals were being reported from all along the American eastern seaboard and especially so by the Naval authorities at San Juan, Puerto Rico, over 2000km away, who began to ask what sort of equipment he was using.

Even in the heat of summer, when atmospherics were at their highest, San Juan reported that the Morse signals had come through clearly, when other stations were being cut off by the static interference.

Despite this encouragement, Fessenden still impatiently awaited the arrival of an alternator that would generate constant continuous waves that could be interrupted to send Morse code and modulated to carry the human voice. Eventually, the machine for which he had so long been seeking was installed.

It was a small inductor type

device, built basically to his design with a nominal frequency of 100kHz. The rotor was only 300mm in diameter, but this was the basic prototype of large machines that were to follow.

Much new and valuable information was gained during its construction and development and serious mechanical problems of resonance and vibration as the rotor passed through critical speeds were overcome. Indeed, the engineers were so aware of the risks involved in testing such a novel design at great speeds that they installed the machine in a pit, surrounded by sandbags.

Nevertheless, the air gap between the discs and armature had to be adjusted while the machine was running at speed, sometimes to tolerances as close as one in one thousand. In the event, it did not disintegrate and no one was injured, although both eventualities had been anticipated.

Alternator Commissioned

By August of 1906 commissioning tests had been completed. Although a frequency of only 76kHz had been achieved, due to slippage of the belt drive, Fessenden was completely happy. To him it was a major victory and had proved what advocates of the spark system had said was impossible. The problem of generating continuous waves had been solved.

At Brant Rock, Fessenden began to lift his sights. It became important to show the world what his system was capable of doing. It also provided an opportunity to test his 100kW synchronous rotary spark transmitter, which had been a compromise between his long term goal of the continuous wave and delivery of the new radio frequency alternator.

By 1904 it had been decided to attempt the 4800km haul across the North Atlantic, between Massachusetts and Britain. It was a tough proposition. Previously, Fessenden had only tackled limited distances, but once started on the undertaking, his mind was completely devoted to its accomplishment.

Considerable thought was given to the location of the British station. Eventually, in May 1905, a six acre sight was leased at Machrihanish, on the western side of the Mull of Kintyre.

Until the beam system appeared in 1924, long distance wireless working called for a multiplicity of tall masts to support the enormous antennas considered necessary for this new technology and those that had so far been erected in Britain and America had all suffered severely from the gales of the North Atlantic. Fessenden approached the problem in a logical but distinctly different fashion from what had become the accepted pattern and was itself a feat of radio engineering at the time.

At Machrihanish and Brant Rock he installed two identical cylindrical steel towers, both 122m high, made up by bolting 2.4m sections together, the base of each tower being mounted on a ball and socket device set on an insulated pad. Every 30.5m four sets of insulated guywires were attached and at the top, reached by an internal steel ladder, four 15m spar sections containing his patterned 'Umbrella Capacity' were mounted.

A form of counterpoise earth system was also installed as readers of the local *Campbeltown Courier* learnt at the time. The whole ground within the boundaries is covered with a network of wires, laid grid fashion, in trenches, and covered only with some earth and the ends of the wires are led into a deep trench along the shore at sea level.

While waiting for the high frequency alternator, Machrihanish was fitted with Fessenden's version of the synchronous rotary transmitter, similar to the one at Brant Rock that produced the clear, distinctive musical note which was so easily distinguished from the rough and ragged signals of the day. It was these transmitters, energised by 135kVA alternators, driven by 40hp steam engines, that were about to span the Atlantic.

In the meantime a programme of receiving tests had been worked out. Brant Rock was to transmit on three different wavelengths and by sending the letter 'D' for a certain length of time, followed by any messages, before switching to the next wavelength and continuing in a similar manner, the nightly transmission would be spread over three hours. In this way Fessenden hoped to avoid any serious fading.

They're Getting Us

On 3 January 1906, two days after Brant Rock had started sending the wireless test messages, an encoded cable arrived from Machrihanish. Fessenden began to decode the message. Suddenly he threw the book in the air and shouted excitedly, "They're getting us." The engineers continued to send their daily test signals and every day the signal strength continued to improve so much that Machrihanish reported the signals could be read with the headsets still on the bench.

For Fessenden, much had yet to be done, but after weeks of calculations and worrying, this achievement was the realisation of his hopes. The North Atlantic no longer held the same terrors for him.

Machrihanish engineers completed their installation by 10 January 1906 and cabled to Fessenden that they were ready to transmit. That night, in Brant Rock, after the usual sending period had ended, engineers anxiously bent over their barretter detectors, ears straining, to listen for the first signals from Scotland.

Suddenly, amongst the atmospherics they heard that clear, unmistakable note. The interference continued to increase and only one message came through well that first night, but they had successfully bridged the Atlantic both ways.

Regular Nightly Exchanges

By mid-January, Machrihanish was sending scheduled messages and for some time there were regular nightly exchanges between the two stations. Occasionally atmospheric conditions made communication difficult and as the short summer nights of that northern latitude approached the interchanges became almost impossible.

Nevertheless, establishing telegraphic communication between the Mull of Kintyre and Massachusetts, a distance of well over 4800km was a brilliant, but virtually unheard of technical success that was soon to be thwarted.

During those first few months the signals, which were being transmitted on wavelengths between 5000 and 6000m, varied dramatically on different nights. At times they were so poor as to be almost unreadable, while at other times, usually after nightfall, they would rapidly rise to several hundred times their previous strength.

During the next few months much valuable information was gained about the behaviour of the ionised layer above the earth that Oliver Heaviside had recently predicted. Undoubtedly, Fessenden had discussed this phenomenon with his friend Arthur Kennelly, who was soon to confirm Heaviside's findings and help solve the mystery of wireless signals following the curvature of the earth, for he had asked his operators to be especially alert and to notice if they heard an echo of their signals one-fifth of a second later. If they did, he said, it would mean that their transmissions had travelled around the world.

In November of 1906 a startling letter arrived by registered post for Fessenden from one of the operators at the Scottish station. He wrote confidentially, to say that while listening to Brant Rock he had heard, and recognised, the voice of an engineer giving instructions about the operation of a dynamo.

Without others being aware, Fessenden carefully checked the radio log for the day that the operator had mentioned and found that a senior engineer had indeed been giving instructions by radiotelephone to the Plymouth station, eleven miles away!

It transpired that a series of 49 ▶

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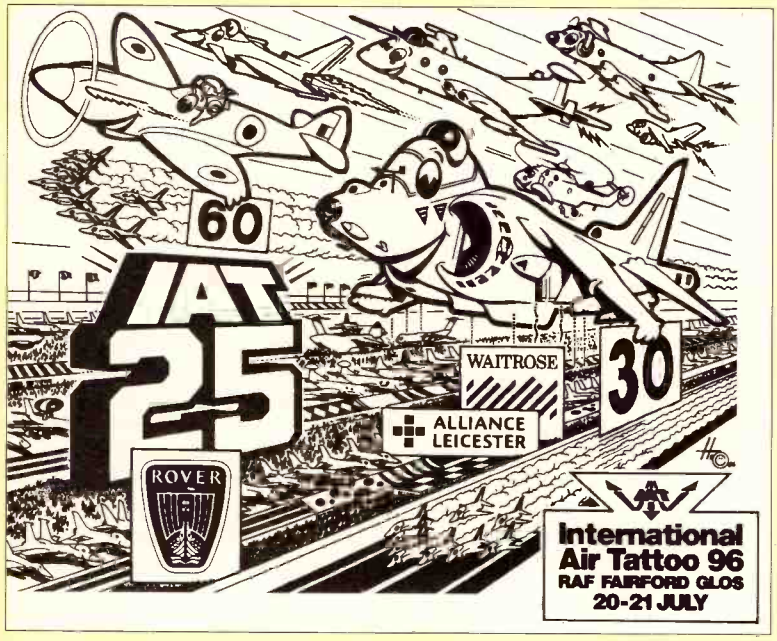

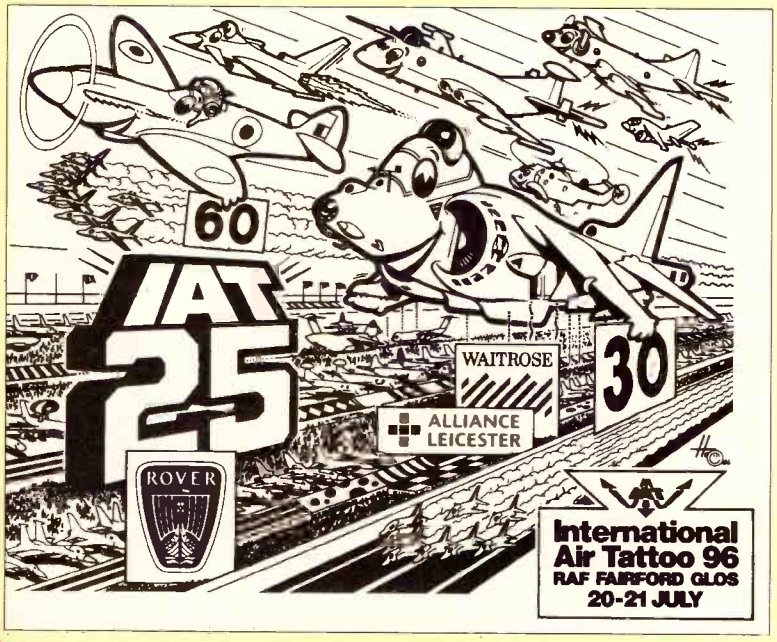

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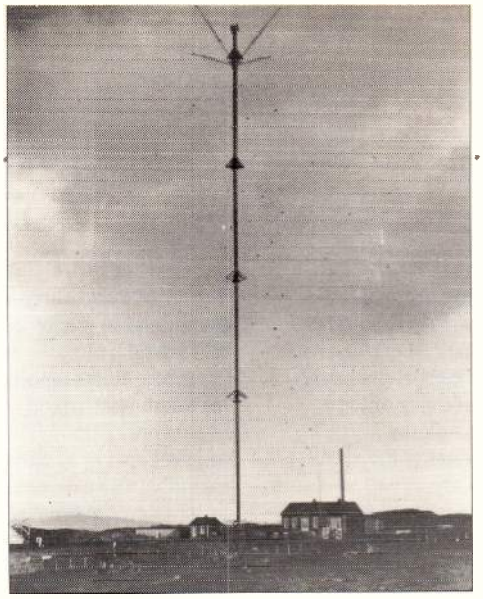

Machrihanish 122m tower and station showing the 'Umbrella Capacity' shrouds, insulated guywires, and ball and socket base.

radiotelephone tests using the new continuous wave generator had recently begun, the first of which were with a small fishing schooner twelve miles off-shore and which had been highly successful. This had then been followed by transmissions to the Plymouth outstation, which was similarly equipped and it was on one of these occasions, when the rotary spark transmitter had been closed down for overhaul that the engineer had used the main tower.

No changes had been made in the antenna circuit so the frequency was the same as that used for the Machrihanish radiotelegraph tests. It was all the more amazing that the voice transmission between Brant Rock and Plymouth should have been heard in Scotland, over 4800km away, since the estimated power in the antenna was no more than 12W.

Dashed Hopes

Fessenden was well aware that the new continuous wave alternator was only capable of producing low power and that only very exceptional propagation conditions could account for this. Intending to make further tests, he did not conceive this as public news at the time. There had been no neutral observers present and nothing was to be gained by exposing himself to the inevitable scepticism that would surely ensue.

Tragically, any hope that he may have fostered of establishing trans-Atlantic wireless telegraphy or telephony were dashed on the morning of 6 December 1906. A cable from Machrihanish told of a guywire parting at a faulty joint and the 122m tower crashing to the ground during one of the worst gales of that season. The tower was never re-built and only a few fragments of concrete remain to mark the spot where trans-Atlantic radiotelephony was first heard.

During that autumn Fessenden had given several practical demonstrations of wireless telephony from the Brant Rock transmitter to the small field laboratory on the beach at Plymouth, eleven miles away. From here his assistants would carry out regular wireless telephone conversations with Brant Rock and it was during such tests that Fessenden realised the use of wireless telephony would be greatly reduced unless it could operate over telephone landlines and he used special relays of his own design to demonstrate the feasibility of such an application. The results were so successful that quality of speech over the radio link was said to be an improvement over that of the landline and it was decided to give a public demonstration.

Despite the set-back he had experienced a few days previously, a limited number of witnesses were invited to Fessenden's wireless telephone demonstrations on 11 December 1906. Among those who attended were Dr. Kennelly, of atmospheric fame and Professor Elihu Thomson.

The tests were made up of speech over landline to the Brant Rock Station, which relayed it automatically through the special relay to the transmitter and by wireless to Plymouth, where the same speech was re-transmitted simultaneously by wireless and over telephone landlines. Talking was interspersed with musical items and an article confirming the success of the demonstrations appeared in the *Telephone Journal* at the time.

At that time, Fessenden was placing his microphone directly in the antenna circuit, a position that was also favoured by other early experimenters when valve transmitters first appeared several years later. To cope with the heavy currents he devised a water cooled affair, that was capable of carrying 15A before the carbon granules began to 'pack'.

The carbon grains were held in a small chamber hollowed out of a disc or steatite. Two platinum electrodes at the back and front of the chamber were cooled by water and a small rod passed through a fine hole in the front water cooling jacket, connecting a diaphragm to the plunger in the centre of the chamber which was loosely filled with carbon granules.

Despite being water cooled there must still have been a great amount of heat generated because at this time the young son of Fessenden's lawyer visited the station and as a privilege he was allowed to speak into the crude microphone. Much later he recalled that his lips had been scorched by getting too close to the asbestos covered aperture that he had been told to speak into.

Neutral Observers

There was no need for an 'neutral observers' when Fessenden next demonstrated his technical achievement with wireless telephony in December 1906. By wireless telegraphy he invited all ship's operators on the American eastern seaboard, the majority of whom possessed the liquid barretter to especially listen on Christmas Eve, when the first wireless broadcast would be made.

He promised them that there would be talking, music and singing from Brant Rock station, a quite remarkable statement at the time, and no doubt there were many that disbelieved it.

Later, Fessenden described the performance. "First there was a short speech by me, saying what we were going to do. Then some gramophone music. The music on the gramophone was Handel's *Largo*. Then came a violin solo by me.... and finally we wound up by wishing them a Merry Christmas and then saying that we proposed to broadcast again on New Year's Eve." The broadcast on New Year's Eve was the same as before, except that the music was changed and someone else did the singing.

By the second performance, word had spread, and the audience had grown. It was not surprising that the programmes were so widely heard. By that time the liquid barretter had become so popular a detector, that outside the ships officially equipped with Fessenden apparatus practically everybody was infringing his patent and nearly every ship on that coast was able to receive the broadcast.

Out of Sight

Fessenden, in his diffident way, quietly remarked that he had "got word on reception of the Christmas programme as far down as Norfolk, Virginia (800km) and on the New Year's programme we got word from some places down in the West Indies". Some 2700km.

During his lifetime he had more than 500 patents to his credit, most of them connected with the art of wireless or electronics. Although his business life was a troubled one, it was he who insisted against every recognised authority, that what we now call 'radio'. was worked by 'continuous waves' and then went on to prove that this system, in conjunction with his heterodyne method would hold the prime place as the world-wide communication system of the future.

Fessenden was always so far ahead that he was often out of sight. ■

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Olympic cycling champion - not for idle rides in the country - **but the measurements suggested it was perfect.** You may see this as an extreme example, but I can tell you of receivers that gave excellent performance on a test bench, but which were truly awful to use, both from an ergonomic and 'listenability' standpoint. I see it as a duty *in loco auditor* to keep a correct balance between all the features of a receiver, with measurements of performance being only one part of the whole picture.

Advice or Guidance

What should a reviewer review? Almost anything which is within his own field of competence and about which a prospective purchaser or user may need advice or guidance. I enjoy reading about equipment which I could never aspire to own, and from comments received, I think that many listeners would feel it worthwhile if I were to tackle an Eddystone professional receiver or take a second look at a Watkins-Johnson HF-1000. I have even been asked to review receivers which are no longer available, but appear on the used equipment market.

At the other end of the scale, there are many accessory items which, whilst not costing large amounts of money, are still of interest and worthy of inspection. I would not, however, presume to offer my opinions on packet radio terminals or advanced data modes, because I don't have the expertise to do a good review. In any case, these are perfectly well covered by other contributors to the magazine and this helps to keep that all important balanced presentation to the readership.

'Head-to-Head' Reviews

And so to the letter from David Cripps (*SWM* February '96) in which he asked for 'head-to-head' reviews of equipment so that the reader can directly compare two or more receivers within the same text. It's a valid point for some products, and the car magazines regularly carry out 'Giant Mega Tests' of half a dozen cars in the same category. But that's not too difficult when all the darned things look exactly the same anyway and are aimed at precisely the same closely targeted customer group.

However, even *Top Gear* would find it difficult to do a 'Giant Test' involving a Reliant Robin, a BMW 325i and a Williams Renault. But that is the equivalent of the short wave receiver market, where it is unusual to find two or more receivers aimed at the same customers at similar prices. Even when that rare occasion arises, and I suppose the Lowe HF-250 and AR7030 with the same retail price could be said to be direct competitors, the reviewer is faced with an impossible task because, by stating that one receiver is 'better' he automatically makes the other receiver 'worse' and there is no way to keep a balance for the reader to consider. It's demonstrably true that the AR7030's r.f. performance is uncompromisingly better than the HF-250, but that's probably because the AR7030 was designed in 1995/6 whereas the HF-250's r.f. section is still basically that of the HF-225 designed in 1988. So, is this a fair comparison? Restoring the balance somewhat, there are no doubt users of the HF-250 who prefer its simple control system to the comprehensive facilities of the AR7030, but all a reviewer can do is present each receiver as a stand-alone report project and let the user decide ***which is best for them***.

The question for David Cripps is this: In a head-to-head review, who decides on the list of features to compare? Because careful choice of items in the list can affect the outcome. I wouldn't like to be the judge.

Sed Quis Custodiet Ipsos Custodes?

"But who shall guard the guards?" Equally applicable to my last paragraph as my next. The short wave personality mentioned in the introduction to this article was none other than Jonathan Marks who broadcasts for Radio Netherland, and who in a recent radio review of a new receiver said that, although its manufacturer claimed a third order intercept point of +30dBm, his own measurements showed a different figure. Let me quote directly from the Radio Netherlands bulletin: "Our measurements show that when there is no attenuation switched in, without the preamp, the third order intercept point is 0dBm or +2dBm on the two examples we tested."

Foot in Mouth

I consider this to be a clear case of not stopping to think, and bearing in mind what I have said about manufacturers' published performance figures, is it likely that a receiver which has a published third order intercept point of +30dBm would produce test results of 0dBm? (A difference of 32 times!) Hardly; but the tragedy of all this is that the comments were put out on the Radio Netherlands broadcast, apparently without anyone even thinking to consult the manufacturer. Oh dear; talk about foot in mouth time, because the same receivers were being reviewed all over the world and all the other well known reviewers, among them Larry Magne, Nils Schiffhauer, Gordon Bennett, Chris Lorek and myself were reporting results right in line with the manufacturer, and I find it difficult to believe that everyone else was wrong. In one ill considered moment, a reviewer put his own hard earned reputation in jeopardy by simply not thinking things through.

Balance

The answer to the Latin question "But who guards the guards?" is, therefore, "You, dear readers" and I hope that what I have said in this somewhat convoluted article will enable you to understand my own approach to reviewing and the reasons why I try to balance expertise and experience on your behalf.

"The Time Has Come, The Walrus Said, To Talk Of Other Things."

Members of the FOUL Club (**F**ew **O**f **U**s **L**eft)are keeping me on my toes; **JHCW** reminds me that when, in my filter article I said that the AR-88 didn't have a front panel crystal phasing control, I had obviously overlooked the CR-88 version which did indeed have just such a control - anyone out there got a CR-88? **DAW** from Harrogate brought up the subject of "Amateur band receivers are always better than general coverage receivers." Yes, I used to say this myself, but recent advances in receiver techniques have reversed the situation and it was with some interest that I read in *RadCom* (April 1996) that second order intermodulation has raised its head in top of the range transceivers, with the advice being to use front end filtering, i.e. a pre-selector, to cure it.

Personally I don't have any problems of this nature because I do my amateur band listening using a Collins KWM-2A, vintage 1961, and the Collins has - guess what - a pre-selector in the form of high *Q* tuned r.f. circuits. Thirty five years on and they still never learn!

It is also worth taking a look at the performance of the receiver sections of the FT-1000MP and IC-775DSP in the January *RadCom*. Whilst acknowledging that there is a great deal of electrickery in a transceiver to justify the £3000 price tags, to find that the receivers are not as good as, dare I say it, the AR7030 is quite a surprise.

Finally, a welcome to no less than Paul Essery, who rightly claims membership of FOUL and requests that *Short Wave Magazine* allow me to keep the term 'aerial' rather than editing it to 'antenna' whenever I use it....Careful, Paul, I shall begin on the 'all pervading luminiferous æther' before long!

Happy listening

* John Wilson has no connection with any radio-related company. He writes about h.f. receiving equipment exclusively for *Short Wave Magazine*, in between running his wine business in North Devon.

Jacques d'Avignon VE3VIA

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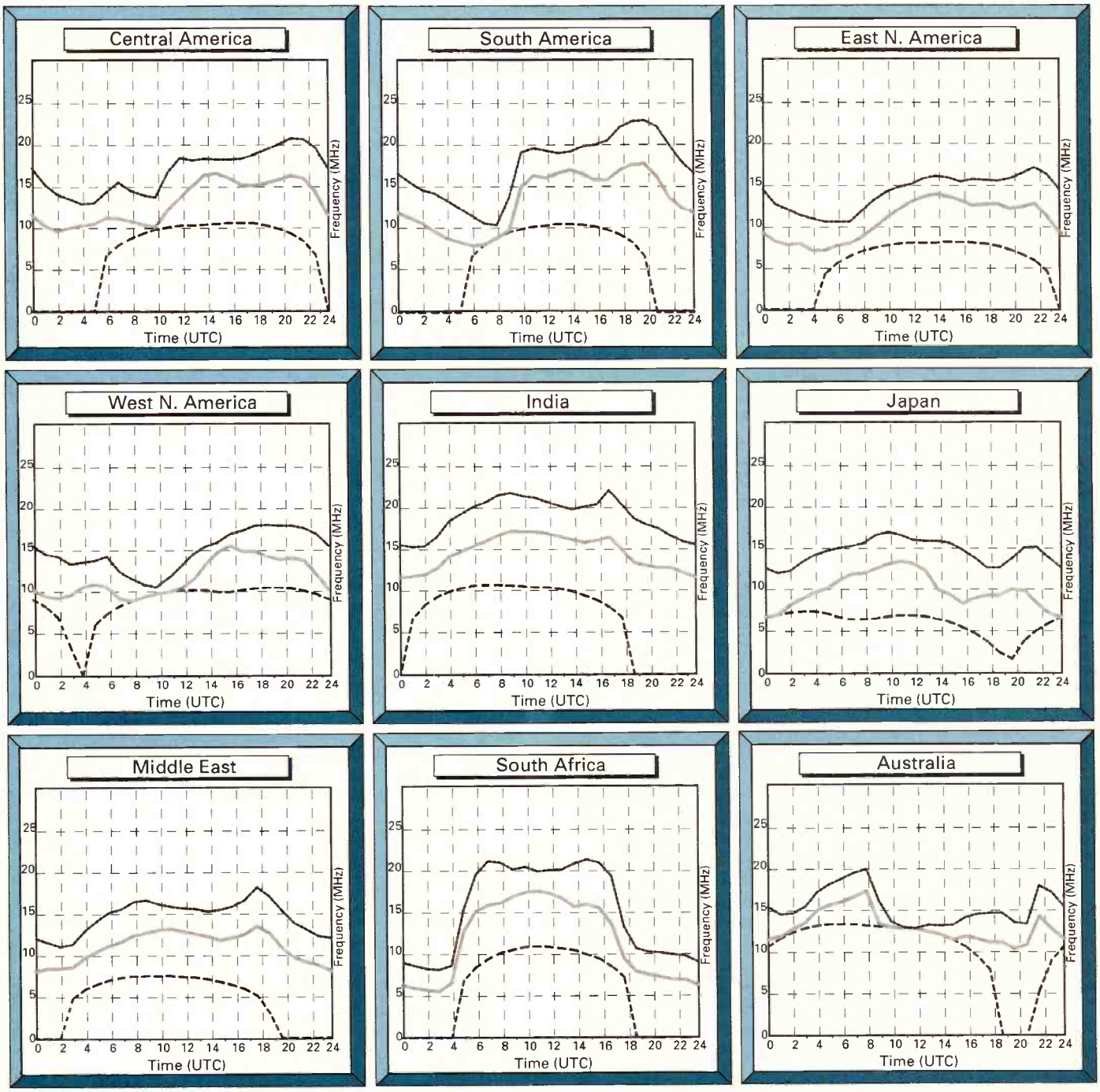


How to use the Propagation Charts.

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.

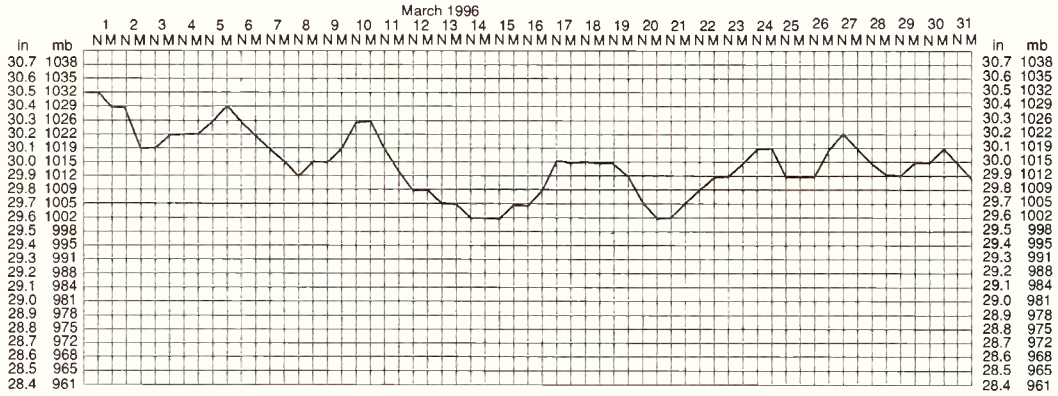
Good luck and happy listening.

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 March 1996, **Fig. 2** covers April 1996.

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



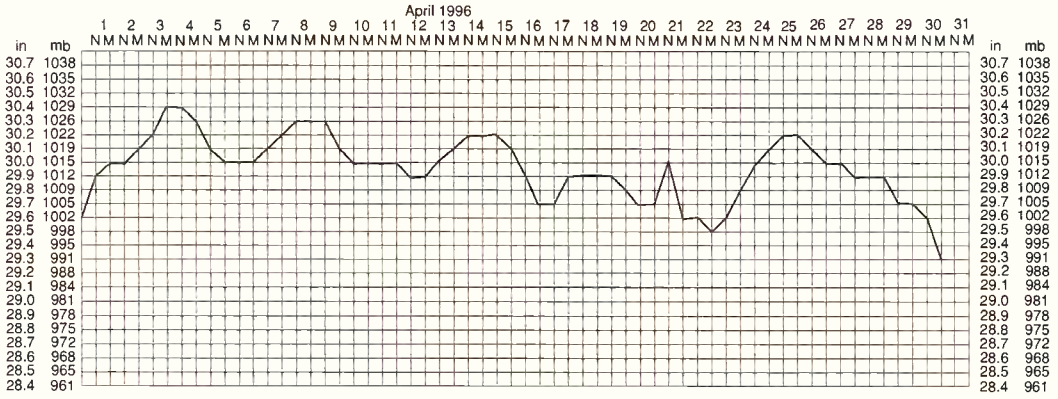


Fig. 2: Barometric pressure chart for April 1996 taken by Ron Ham at Storrington, E. Sussex.

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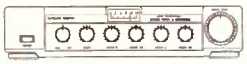

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DX Television

March can be summed up as a complete disaster as far as DX reception was concerned. Hopefully we've reached the depths of ionospheric inactivity! A hint of tropospheric activity occurred on the 27th according to **Stephen Michie** (Bristol), when he logged French Canal Plus transmissions from Lille (Channel L5) and Caen (L9).

Elsewhere, atmospheric conditions have created a few exciting surprises. Via **Roger Bunney** (Romsey) comes the news that a transatlantic Sporadic-E opening took place on December 27 when several European Channel E2 signals were resolved by three US amateurs between 1830 and 2111UTC. In South Africa, Australian Channel A0 signals were resolved, but the date is not known. Sporadic-E reception in Australia (it occurs between November and March in the southern hemisphere) has been excellent at times with the period January 17-20 providing exotics such as 525-line signals from Samoa and Channel E3 signals from Thailand. Other distant transmissions originated from places such as Malaysia, China and even Russia (Vladivostok).

Reception Reports

Tim Bucknall (Congleton) has translated the Czech Republic transmitter announcement shown in the March column. It is apologising to viewers of 'Nova TV' from the Bukova Hora transmitter on Channel 12. The caption reads: "Due to technical problems, programmes will be suspended from 0800 to 1700 between June 21st and June 30th". Tim also mentions that a private TV station called 'TV NG' is operating in the west of Eire.
J. Marsh (Helston) has recently tried DXing from a high spot in Cornwall. Perfect colour reception of the Irish RTE-1 and Network-2 transmissions was possible using an l.c.d. (liquid crystal display) receiver.

Peter Barker (Coventry) has also used an l.c.d. receiver for DXing but there are drawbacks. One is the short battery life and another is poor sync locking with impaired definition on fast moving objects, unless the signal quality is perfect. Peter points out that the miniature fluorescent tube which provides the back lighting has a limited life and replacement can be relatively costly.
Tim Tebbs (New Romney) experiences local-quality reception from Continental transmitters even under relatively minor tropospheric lifts. Two examples, from Belgian TV, are shown in **Fig. 1** and **Fig. 2**.
David Small (Cannock) has visited the Netherlands and reports that television reception from neighbouring countries, including Denmark and the UK, is available via cable. A photograph of the Dutch test card is shown in **Fig. 4**. Regional programme opt-outs are expected to commence via the Nederland-2 network this summer.

Getting Into TV DXing

The Sporadic-E season should be underway by the time you read this column, hopefully compensating for the dismal winter conditions we've all experienced. Remember the old saying 'there's no time like the present'? Well, if you want to experience Sporadic-E reception now is the time to start. Activity is always plentiful throughout the summer but as periods of reception are unpredictable, especially in terms of duration, you should make the most of all the opportunities while you can!

Sporadic-E Ionisation

Under normal reception conditions, the range of a signal emitted from a high-power transmitter is limited to approximately 100km, although a sea-path can extend this range considerably. Certain atmospheric effects can extend the transmission range even further, albeit only temporarily.

There are several types of propagation that can produce signals from distant transmitters but the most spectacular is a phenomenon known as 'Sporadic-E' that allows the reception of terrestrial television signals in Band I from transmitters located at distances sometimes in excess of 2000km.
In the northern hemisphere, Sporadic-E activity is present between early May and mid-September (November to March in the southern hemisphere) and it occurs when the E-layer becomes highly ionised by the sun. Disturbances within the E-layer, located some 120km above the earth, can result in signals being reflected, or more accurately refracted, back to earth; these signals would normally continue into outer space. Sporadic-E reception can also occur during the winter, but on a much reduced scale.

The unstable nature of the E-layer means that this type of propagation is completely random in terms of direction, distance, duration and signal strength. Reception can last all day, or for only a few minutes but what surprises many newcomers to the hobby is the high field strength of many of the signals and the simplicity of the antenna required. Remember, lots of patience is required, so check the band as often as you can.

Since the signals are returned to earth, a skip-distance is involved that is typically 850-2000km. Occasionally, longer range reception is possible from the Middle East, Africa and North America but

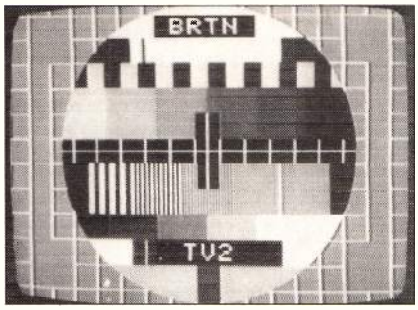


Fig. 1: Belgian PM5544 test card used by the TV2 network and received by Tim Tebbs (New Romney).

Fig. 2: Programme schedule for the BRTN TV2 network.

Fig. 3: Sample Teletext page from Icelandic TV (RUV) on Channel E4, received by Bob Brooks (South Wirral).

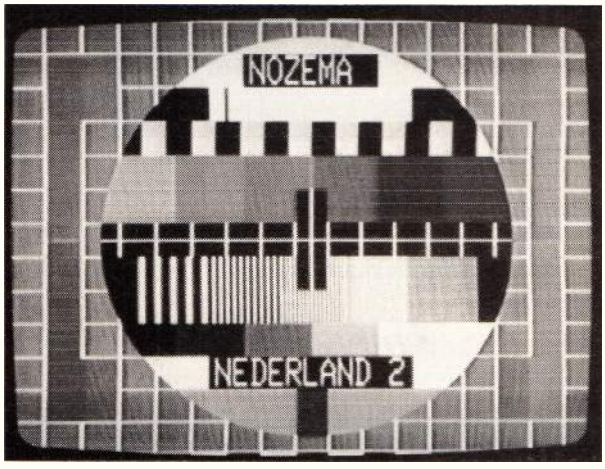


Fig. 4: The Dutch second network PM5544 snapped by David Small (Cannock), while on holiday in Holland.

Fig. 5: A regional TV identification caption from Poland, seen by Stephen Michie (Bristol) during a Sporadic-E opening.

transmitters closer than 300km are seldom received via this mode of propagation.

Suitable Receivers

Sporadic-E ionisation allows TV and f.m. radio signals to be received in v.h.f. Bands I and II between 40 and 100MHz. These frequencies are no longer used for TV transmission in the United Kingdom, so a typical TV set for the home market will only cover ultra high frequencies between 470-860MHz.

Some of the High Street 'catalogue' shops sell inexpensive small-screen monochrome portables with v.h.f. tuning facilities as standard. Check to see if v.h.f. channel numbers 2-4 and 5-12 are present on the tuning dial. Note that most of these receivers will only respond to the UK's 6.0MHz sound system. Retuning to the Continental 5.5MHz standard is possible but don't attempt this unless you know exactly what you are doing. At the other end of the price scale there are multi-system colour sets with Teletext.

Dedicated converter systems are available (for example, the D-100) in which the i.f. bandwidth can be reduced to dramatically improve weak-signal reception threshold. This type of system feeds an f.m. radio and u.h.f. TV for matching the appropriate sound channel to the picture.

Antennas for Sporadic-E Reception

The height of the antenna is not too important because Sporadic-E signals arrive at a slight angle. However, a minimum height of 5m is recommended. A simple antenna known as a 'dipole' can be used with an overall length of 2.6m. Aluminium tubing can be used to form the elements, although ordinary wire can be used if the antenna is used indoors.

Larger antennas, featuring a reflector and directors, provide considerable improvement in terms of directivity and gain. Some method of rotation is advisable, either manually or electrically, so that the antenna can be positioned for maximum signal strength.

So that's Sporadic-E DXing in a nutshell, but the publication *DX-TV For Beginners* covers the practicalities of the hobby in greater depth. It is available via the *SWM* Bookstore.

Keep On Writing!

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

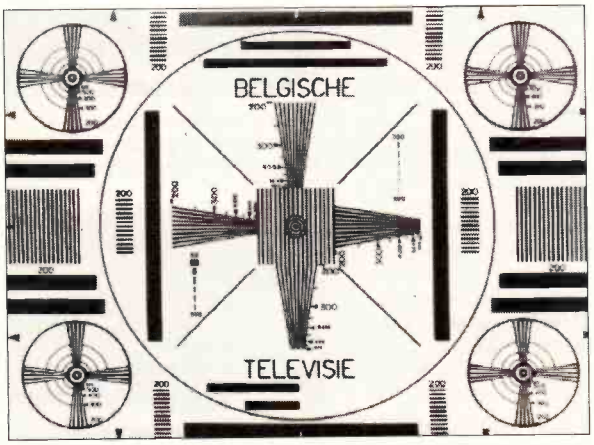


Fig. 6: A golden oldie! A Belgian test card transmitted in the Sixties (RTB network).

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

(pictures by John Locker, Wirral)

Satellite TV News

Heavenly Sightings.....

The annual 'Cable and Satellite' show at Earls Court mid April was well attended by the 'trade' with attendance figures exceeding those of 1995. Digital TV was perhaps the talking subject at this year's show, albeit with few actual MPEG-2 transmissions available in Europe other than on a test basis. Receivers currently are expensive and available generally to order only, the cheapest I was quoted at under £600 was an impressive National Panasonic DVB/MPEG-2 unit with an inbuilt Irdeto decoder (for the South African Multichoice service). The IRD 520D can be supplied for European compatibility, the demo model worked well on the available Astra and Italian signals.

A nearby Strong SRT-300-D cost £700ish (to order). All the models on display were menu driven, you tapped in the required signal frequency, digital parameters and the receiver then looked for your requirement, if your specs matched the signal present up came a picture, if the incoming signal mismatched your typed in specifications the menu told you so and refused to display anything. Gone are the days with a screen full of snow and tuning until you find a signal!

I was impressed with Unicorn Satellite Systems Ltd., Farnham (01252) 318821, who offered silent horizon to horizon tracking systems for pole or wall mounting. Often wall mounted systems conduct motor noise into the building structure causing bitter complaints from neighbours in semis or terrace houses. Unicorn have modified the tracking motor gearing and added sound absorption traps onto the dish and mount to minimise air and support structure sound transmission. They are also happy to talk and react to specified customer problems on a one-off basis. A welcome response to the present commercial world that generally prefers to sell unopened boxes rather than servicing speficic problems and needs.

This past month has seen a relatively quiet period of satellite reception activity. I missed the Billy Graham Worldwide gathering via satellite April 14 and it was only from about the same date that the Israel/Lebonan action fired up once more with numerous feeds incoming to the UK via Eutelsat II F3 at 16°E Telecom band. The Yugoslavian region has at long last tempered action and with the few feeds seen usually covering peace talks - such as the 'CBS UKI-85 Dubrovnik - blue kit' April 4 again via the 16°E CBS lease.

Perhaps more depressing has been the on-going BSE cattle problem with countless outside broadcast and news inserts from all over the UK, mainly for Sky News and GMTV, check out 16°E and Intelsat K respectively for these signal sources. GMTV ran the cattle problem for several days including supermarkets and down on the farm. The absence of cattle transactions brought the 'AGVISION' cattle auctions to a close due to 'uncertain trading conditions' and the 0800hrs caption on 16°E (11.571GHz vertical on Thursday) indicated the sorry state of the UK cattle industry.

With so many news feeds/services now going digital (look at 13°E now!) it is pleasing to note that Libya has been testing at 11.076GHz horizontal on a few afternoons in March/April prior to a service starting at a future unspecifed date. Test programming has been seen though with poor picture quality, I've only seen colour bars with an inlaid 'LIB TR1 002 TV TEST' caption.

Roy Carman (Lake, IW) checked out the German elections night of March 24 and counted no less that 32 different OB feeds into Germany between 1800-1900 local time carried on satellites from 28°E to 37°W! One of our (nameless) readers advises to check out several new BBC SNG trucks that have been issued into BBC UK regional operation - the local BBC South truck ranges from Southampton eastwards past Brighton and certainly another operates out of Cardiff. I anticipated that the 3°E Telecom 2 bird would have a cheap occassional user lease negotiated but the first real BBC regional feed was sent over Orion Atlantic 37°W - in analogue!

Good news from **Bandula Gunasekera** (Sri Lanka) who is safe following a bomb blast outside a central Colombo bank. Bandula, a bank worker was showered with glass and unhurt though the death roll reached over 50 souls. He is equipping for Ku band reception now that PAS-4 at 68°E has actioned several Ku band downlinks including ART-3; ART-Europe and NHK Television (ART = Arabic Radio and TV). C-Band offerings from PAS-4 include Discovery and BBC World, the former currently is also carried via Intelsat 704 at 66°E.

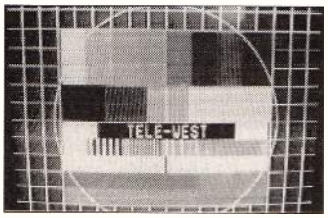
Ian Waller (Lincoln) is also active in C-Band (3.7-4.2GHz) and has found PAS-3R at 43°E with the Chinese CCTV-4 service (for Africa) at 4.18GHz vertical. CCTV are expanding to offer an eventual world-wide TV service and the PAS-3R is the first regular CCTV signal available in Europe. PAS-3R has been relatively quiet until early April when Ian reported it in full output with feeds of the Brazilian Grand Prix at 12.705GHz vertical and more recently with the Jason VII project, this at 12.733GHz.

John Locker (Wirral) rang to advise that the 1996 Jason VII project April 17 onwards was in operation, wonderful live surface and undersea shots of the warm blue Caribbean feeding into a grey cold Europe with return signal routing via the Liverpool Maritime Museum (main centre) and receive only terminals in Southampton and Mildenhall. Jason VII is an educational project offering interactive participation from the USA and Europe, an annual event that takes the viewer to volcanos, jungles and this year under the sea. What was particularly welcome related to the European feed, usually digitally compressed this year was in analogue and transmitted via PAS-3R at 12.733GHz again. I can only just receive PAS-1 at 45°W due to building screening and 43°W is somethat cleaner - Orion Atlantic 1 at 37°W is perfect.

Intelsat 603 is still operational at 34°W! This bird was a favoured feed point for the Yugoslavian/Sarajevo output in the early stages of their civil war and in recent times the craft has been very quiet. **Ken Suddes** (Welwyn Garden City) has recently logged this elusive bird at 11.009GHz vertical with an unknown sourced feed 'MTA International', can anyone help on this one please ? Muslim TV has also been seen early April using this transponder. Ken also queries the 'high pitched whining and rapid cross-cross lines' on Astra 12.038GHz horizontal and advises the Italian horse racing service 'Diretta Sports' has ceased output on Eutelsat II F3 at 16°E.

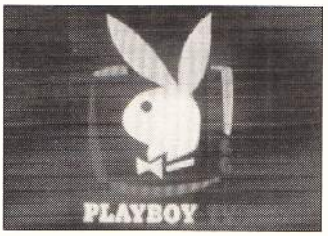
Eutelsat 1 F4 at 25°E is an inclined orbit bird requiring continuous tracking to maintain signal quality. Cheap to hire it's a useful option for SNG operators with dish tracking capability. Usually seen (when visible) with UK afternoon horse racing feeds.

PanAmSat - PAS-1 at 45°W.



A German Tele-West card via Kokpernikus DFS-3 at 28°E, 12.725GHz horizontal.

The recent Taiwan elections produced a flurry of exotic signals, primarily on Intelsat K at 21°W.



All one night recently Playboy TV was seen 'in the clear' on Eutelsat II F3 at 16°E.

Can anyone advise where (or what) 'Doral' is, captured by John Locker on 16°E.

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

Scanning

Before we move into what is another month's piece, I'm going to deal with the mail concerning other aspects of the hobby.

First off, two letters - opposing stories - concerned with the behaviour of amateurs as heard on the 144MHz band. Against: '**Abingdon Oldie**' who wrote me a letter decrying my treatment of amateurs and saying I'm not qualified to talk about the conduct of amateurs on the air. I beg to differ, Sir, and strongly! I hold a DTp Restricted Radio Certificate and was often heard on marine channels. I also used, as part of my job, military u.h.f. and v.h.f. - so please don't tell me I am not qualified to talk about practise on the air! Yes, marine channels would have had the odd idiot on the air but only in about 10% of all cases. From my occasional monitoring of the 144MHz band I'd say the average is about 20%. Hardly 'professional'! Anyway, this is not going to run and run. Most amateurs are dedicated to the hobby, respecting their colleagues on the air. Some aren't. End of story.

From all the others who wrote, and agreed, mention must be made of **Rod** - a licensed amateur who enclosed his name and address and did not hide behind a pseudonym. (Psychologically speaking there is something quite stupid about hiding behind a nickname....) Rod said that he migrated to s.s.b. and to the 430MHz band as well. Case in point regards Moel-y-Parc reduced to 1W e.r.p. and reception attenuated by some 60dB. Why? Repeater abuse....

So, there's my case. I don't want mail coming in from 'Incensed of Invergordon' or 'Highly Qualified Amateur from Amersham'. It happens, I heard it, I carried an observation on it. That's it!

Answers to Craig Guthrie who requested info on the following. These are from **Jim Mason** of Glasgow.

165.350MHz - Private hire taxi firm Erskine area.
81.075MHz - Transmission relay of **465.650**. ID a bit delicate! They could be associated with 'Taggart'....
81.785MHz - Possibly likewise.
161.325 and **161.855MHz** - UNID. Anyone any ideas?

Jim gives some advice in that an article by Alan Gardner in June 1988 *SWM* helped. Maybe Craig should try this end?

Military Airband News!

First, the column last time around spoke of the magical TADS that I said I had. Well, sure enough, I know the source of these TADS would object to me mentioning him but he knows where he is and that we've corresponded on quite a few occasions. If he gets in touch again, with a complete TADS list for that area, I will photocopy them and get them sorted out. So, to **J.H. Robeson,** and **Dr. E.G. Duncan,** a wait is in order until I get the list through and then it will be yours. That's a promise. So, if my TADS correspondent is reading - please please get in touch - the queue's growing!

That old reprobate **Oxford Ears** writes in with something interesting. He tells me that he was in the bedroom late one evening with his scanner on the bedside table wired up to an extension speaker. The scanner was off. He then heard radio traffic coming through the speaker from the local constabulary and - somewhat amazed - switches the scanner on again and it was where he'd left it. On Airband. Mystified, he switches off again....

....to hear the two-way traffic again!

This poses some interesting questions in that there was probably a transmitter very near - two houses away in fact. That the speaker was acting as a crystal set in some respects and that the connections from scanner to speaker were acting as an antenna. It's unusual, but plausible. The intriguing part is that what would the RA make of it if they caught you listening to the local constabulary on such a set-up - that was not powered up? Or - and it has happened - your false teeth started to speak to you? Anyone with legal knowledge do please get in touch.

Anyone with an electrical explanation also, please, get in touch and explain how we can build one of these marvellous - free - little sets!

Oh, and again, where do you stand if you are able to hear police communications through the open window of a police car....? Thanks to Oxford Ears for - once again - posing the unusual sort of questions!

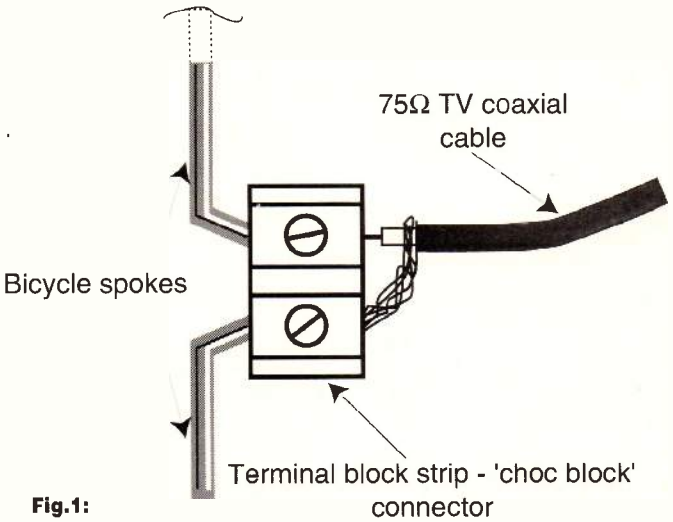


Fig.1:

Other news now - although again from the mailbag - **Richard Parker** of Colchester has problems with his PC and scanner. Living in a flat he also has space problems. Compounding this is the problem that he cannot have an exterior antenna and long cable runs are out....so, what to do? If you have had similar problems, can you please contact Richard at: 40 Darnel Way, Colchester, Essex CO3 5PN.

Any advice would be appreciated.

An interesting letter from **Mr J. Marsh** prompts another unusual request! He asks that if we connect a satellite antenna to a scanner, and tune into a harmonic, is it not theoretically possible to get good audio through? Hmm, scratch head time for me on that, mate! He goes on to say that even standing under a satellite dish with a scanner should produce results.

He also suggests that the simple half-wave dipole antenna shows what can be achieved with a multi-way connector (also called a chocolate block) and two bicycle spokes cut to length using the values given by the simple formula:

Overall length of dipole in metres = 300/2f (MHz)

Mr. Marsh informs me this works brilliantly with his MVT-7100 and using 75Ω TV cable....! Experimenters get cracking and let me know. Having said that, Oxford Ears - ever ready for a bargain and as tight as a drum - uses a similar set up and has quite often got me raging when he gets good results!

MilAir Now - At Last!

A letter from **JHR** in Scotland throws up the following heard while monitoring on his MVT-7100/AR8000.

299.500MHz Lakenheath Ops.
244.675MHz Air-Air Tornados at Spadeadam range.
369.900MHz Coningsby Ops.
249.675MHz Scottish Mil Low-Fly.
284.600MHz Newcastle Approach.
300.550MHz Boulmer Radar.
233.725MHz Poss Scot/Mil? ID Req.
372.250MHz Buchan Radar.
268.500/292.475/249.475/259.775/134.475/369.150/381.150 MHz - all various but all heard during 'handshakes' - that is air-air refuelling. Could be worth watching.

Some short stuff from **Pete J.** is as follows:
275.350/357.220/277.120/292.520/262.970/285.170/291.800/283.520/278.020/275.470 - all Lon. Mil with most used being **277.120/292.520/283.520.**

Also some studs as follows:
Brize Norton Approach - **342.450** is **Stud 3.**
Lyneham Approach - **259.500** is **Stud 5.**
Lyneham Tower - **386.825** is reported as **Stud 4** but positive ID requested. **379.125** is reported to have been used but so far, Pete reports, he's heard nothing.

Pete recommends *Air-Ground Radio Frequencies* by Ian Allen at £4.99 ISBN 071102320.4 Have to look that one up.

That about wraps it up for another month. I hope my TADS correspondent gets back to me and to those awaiting news, I will return what I get. Please, please don't inundate the column with requests for this list! If I get it I will broadsheet it and collate it and let you know - a small charge for photocopying may be payable as will an s.s.a.e. However, we'll see as we go on.

Good listening - and be careful! Catch you down the log soon.

Greg Baker, PO Box 208, Braidwood, NSW 2622 Australia. E-mail: greg@pcug.org.au

Bandscan

Australia

The last few months I have been busy with Internet matters and have had less time for hands-on radio listening. Apart from getting the first edition of my own home page up and running and a swag of stuff for my local volunteer bush fire brigade I have been heavily involved in getting the Australian Parliamentary Research Service (PRS) Internet web site up and running in Canberra.

SWM readers interested in checking any of this material can find my home page at **http://pcug.org.au/~greg** my local bush fire brigade at **http://pcug.org.au/~greg/home.htm** and the PRS at **http://library.aph.gov.au/prs/index.htm**

News and information this time includes the possible effects of the recent federal election on the Australian Broadcasting Corporation (ABC), more relevant Internet sites to visit and some high frequencies to try out.

Australian Broadcasting Corporation

There has been a federal election and a change of government since my last column. After thirteen years on the opposition benches the Liberal and National Party coalition has won a decisive election victory over the Labor Party.

As was predictable - at least in the Australian context - the incoming government took little time in telling the electorate that federal government financial affairs were far worse than they had been led to believe. The upshot of this was that they would have to find $A8000 million (about £4200 million) of additional budget savings.

It seems that one of the new government's targets for budget cuts is the ABC. As readers of this column will be aware, the ABC was constantly pruned under the previous government. This has already left a shortfall in existing funding so that there are great fears among ABC personnel of possible staff and program cuts.

So that they are prepared, the ABC management is preparing contingency plans in advance of bad budgetary news. One mooted cut is the Radio National (RN) network that as far as I can tell is Australia's version of BBC 4. RN has 800 000 listeners weekly and is a long term producer of specialist programmes. RN staff are concerned that their distinctive programming will be swallowed up into ABC metropolitan and regional radio services.

Nothing is clear yet however and may not be until the August budget. This may mean that definite news may not be available until the end of the year via this medium. If Radio Australia (RA) is affected no doubt *SWM* listeners will find out well before then.

Amateur Radio Operators

Although Australia's Spectrum Management Agency (SMA) licences amateur radio operators, they do not publish statistics on the numbers of operators or licences on issue. Information on amateur operators who do not wish their details to remain confidential are passed by the SMA to the Wireless Institute of Australia (WIA) who publish the *Australian Call Book*.

The latest figures available show the number of licences on issue to be 435 in VK1; 5024 in VK2; 4534 in VK3; 3,185 in VK4; 1968 in VK5; 1,605 in VK6; and 622 in VK7. VK1 covers the Australian Capital Territory, VK2 New South Wales, VK3 Victoria, VK4 Queensland, VK5 South Australia, VK6 Western Australia and VK7 Tasmania. Of these 17 373 licensees 4476 are members of the WIA.

Internet

In *SWM* for March this year, Kevin Nice listed a large number of Internet sites connected with radio. As I noted last time and as Kevin lists, one way to get into world radio sites is via **http://www.mit.edu.edu:8001/activities/wmbr/otherstations.html**. For those interested in Australian sites the way in is probably better via **http://wmbr.mit.edu/stations/au.html**. This lists a large number of sites that I list here. Note that some of these sites are still under construction.

Frequencies

Since I last wrote I have had more frequency reports. Over the two day period January 22-23 this year, **T. Trenfield** of Tamworth Staffordshire has heard Sydney Volmet on 6.676MHz at 1400 and 1700UTC and 11.387MHz at 1400UTC. Both transmissions were on u.s.b. He says that he was getting very clear weather reports for Adelaide, Melbourne, Perth and Townsville on 6.676MHz and that although 11.387MHz was weak it was still readable.

R. Thornewell from Watford in Hertfortshire and **Richard Gosnell** from Swindon in Wiltshire has also been successful with Sydney Volmet. R. Thornewell heard it at 0800UTC on February 26 on 6.676MHz. His receiver is a Sangean ATS-803A with a Sony AN-71 compact antenna. Richard Gosnell heard Sydney Volmet on 6.676MHz at 1640UTC on November 18 and 1735UTC on December 4.

He says that 11.387MHz came in at 0900UTC on November 22. Richard has also been successful with Bangkok Volmet and also with Hong Kong Volmet on 6.679MHz.

T. Trenfield also asks for some other high frequencies to try. My suggestions in random order are 3.023MHz, 5.680MHz, 7.658MHz and 13.207MHz for aerial search and rescue operations; 4.687MHz, 6.526MHz, 6.637MHz, 8.921MHz, 10.078MHz, 13.342MHz, 13.345MHz, 17.922MHz and 21.970MHz for Qantas; 27.505MHz, 27.595MHz and 27.615MHz for theMaritime Services Board in New South Wales; and 2.628MHz, 5.100MHz, 5.755MHz, 7.535MHz, 10.555MHz, 11.030MHz, 13.920MHz, 15.615MHz, 18.060MHz and 20.469MHz for the Bureau of Meteorology.

Finally, the Royal Flying Doctor Service is on 5.300MHz and 6.945 through VJB in Derby Western Australia (WA); 2.280MHz, 4.030MHz and 6.960MHz VKL Port Hedland WA; 2.280MHz, 4.045MHz and 6.890MHz VJT Carnarvon WA; 2.280MHz, 4.010MHz and 6.880MHz VKJ Meekatharra WA; 2.656MHz, 5.360MHz and 6.880MHz VJQ Kalgoorlie WA; 2.020MHz, 4.350MHz, 5.410MHz and 6.950MHz VJD Alice Springs Northern Territory; 2.020MHz, 4.010MHz, 6.890MHz and 8.165MHz VNZ Port Augusta South Australia (SA); 2.020MHz, 4.055MHz and 6.920MHz VJC Broken Hill New South Wales; 2.020MHz, 4.980MHz and 6.845MHz VJJ Charleville Queensland (Qld); 2.020MHz, 5.110MHz and 6.965MHz VJI Mount Isa Qld; and 2.020MHz, 2.260MHz, 5.145MHz and 7.465MHz VJN Cairns Qld.

I would be interested to hear of how successful readers are with these frequencies.

Richard Gosnell was also interested to know whether RA intended to resume transmitting Mike Bird's popular solar and propagation data. The answer from RA is in the negative. Although I did not hear these programmes myself, Richard tells me that they were very useful and sadly missed when they stopped a couple of years ago. He also asks for the meaning of METAFOR. Canberra Airport air traffic control had not heard of METAFOR but believe - as does Richard Gosnell - that it means the same as TAF Terminal Aerodrome Forecast.

I have had several other requests including one for details of the locations of short wave stations in Australia and the other for programming details for Australia's pay television stations. I will bring more information on these next time.

I welcome any news and comments. In particular I am interested in any s.w.l. information on Australian stations heard by *SWM* readers so I can chase up more details and interesting snippets from this end. My address is PO Box 208, Braidwood, NSW 2622, Australia. For personal replies please send two IRCs. Those with an Internet connection can get me at the URL at the head of the column.

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

SSB Utility Listening

A few months back, I mentioned that the RAF and NATO E-3 AWACS aircraft always use either the full name or abbreviated ICAO codes when referring to airfields. **Robert McKnight** E-mailed me to ask if I knew of a book which listed all the airfield codes and names. This subject and question is another one which crops up regularly. **Brian Heath** is another reader with an interest in these codes; he wants to know how the codes are made up, and by whom. The proper title for these codes is 'Location Indicators', but almost everybody refers to them as 'ICAO airfield codes'.

In fact, it is not just airfields that have such codes, they are also allocated to Centres in charge of various flight information regions (FIRs). Location indicators are assigned by the various State and Government bodies around the world (the CAA - Civil Aviation Authority - in the UK), but they are checked for conformity with the ICAO standards by the ICAO themselves.

Each ICAO code comprises four letters. The whole of the world is divided into areas, each area is allocated a single letter of the alphabet, which becomes the first letter of all ICAO codes within that area. Europe has two 'first letter' codes - 'E' in northern Europe, and 'L' in southern Europe bordering the Mediterranean. The second letter is generally used to indicate individual countries within each region, so all UK airfields start with 'EG', and those in France with 'LF'. The third and fourth letters in the code are allocated however each country sees fit to allocate them. In many cases, the codes are arranged to suit particular needs, and in some cases they are very close to the individual airfield names.

In the UK, the major international airports nearly all have the same 'last two' letters, such as 'EGLL' (Heathrow) or 'EGKK' (Gatwick). As you can imagine, when countries split up (such as Yugoslavia), the 'new' countries are given new codes, within their allocated ranges. As an example, consider Yugoslavia. Until the recent war, all airfield codes were in the range 'LYxx'. Now that the countries are separate, they are 'LQxx', 'LDxx' (Croatia) and 'LYxx' (Bosnia). However, when countries combine, some airfields have their codes re-allocated, and it is not unknown for a whole country to re-allocate every code. Consider Germany, which used to have 'ED' codes for West Germany, and 'ET' for East Germany.

Once combined, all German airfields were combined into the 'ED' series, and in 1994 they changed again so that military airfields were all transferred to the 'ET' range. I know that this all sounds confusing, but pilots are still confused today, nearly two years after the change. So, having explained about the codes themselves, how can you get a list of all the codes? Well, there is an easy method and a hard method.

The hard way is to buy a copy of the official ICAO *Location Indicators* book. My copy is now seven years old, but says that copies are available from the CAA. I have no idea of the price, but the book does contain a decode and encode for all airfields, as well as a map showing the way that the world is divided-up.

The easier method is to get a copy of the Klingenfuss *Air & Meteo Guide*, which is available from the *SWM* Book Store. This book contains a small map of the world with the area divisions, and a decode list of ICAO codes. It does not contain an encode listing for ICAO codes, but it does contain a vast amount of other useful information. The Klingenfuss book does contain some strange entries though - if you have a copy already, check the airfield names for codes GLCO, GLCP, OKPR, OKPK, OKPL, LIPT, LFTK and LFTL.

RFDS

A few months back, I received a request for a list of frequencies used by the Australian RFDS (Royal Flying Doctor Service). I managed to loose the letter from the person who asked for these frequencies, so please excuse me for not giving his name. I found a listing of frequencies on the Internet, and they are presented elsewhere on this page.

Each entry lists the callsign, location and frequencies (in MHz). I would imagine that these frequencies would be most active during the local day - which is night-time in Europe, so these stations are probably best heard during the evening in Europe. I'm not too sure on how successful European listeners will be listening to these stations, as our position in the current sunspot cycle will probably make these frequencies unusable at the distances involved. If anyone has any success with these, please write in and let me know what you hear.

Australian Royal Flying Doctor Service

VKL/Port Headland	2.280, 4.030, 6.960 [primary 4.030MHz]
VJT/Camaroon	2.280, 4.045, 6.890 [primary 4.045MHz]
VKJ/Meekathara	2.280, 4.010, 6.890 [primary 4.010MHz]
VJQ/Kalgoolie	2.656, 5.360, 6.880 [primary 5.360MHz]
VJD/Alice Springs	2.020, 4.350, 5.410, 6.950 [primary 5.410MHz]
VNZ/Port Augusta	2.020, 4.010, 6.890, 8.165 [primary 4.010MHz]
VJC/Broken Hill	2.020, 4.055, 6.920 [primary 4.055MHz]
VJJ/Charleville	2.020, 4.980, 6.845 [primary 4.980MHz]
VJI/Mount Isa	2.020, 5.110, 6.965 [primary 5.110MHz]
VJN/Cairns	2.020, 2.260, 5.145, 7.665 [primary 5.165MHz]

SESEF

I have been asked to mention more marine subjects and traffic, but since I receive so little news and/or information on these kind of transmissions, it is very difficult to mention this particular area. However, I do have some information about a US Naval transmission which may qualify, as it does involve boats and ships of various sizes. SESEF is the 'Ship Electronic Systems Evaluation Facility', and it is used to check all the radios and other communications equipment on US naval vessels. This usually happens when a vessel has just completed re-fitting work and is about to commence sea-trials. Also, when a ship is brand-new, it also goes through the same tests, as part of its acceptance by the US Navy.

The station that performs the tests is known as 'SESEF Norfolk', and it operates around the area of the Norfolk Naval dockyard in Virginia, USA. The actual location is at Fort Story in Virginia. The tests are quite lengthy, and involve checking each ship's radio in each mode (u.s.b., l.s.b., RTTY, c.w., etc.), so a series of tests usually lasts several hours. This gives you plenty of time to listen and log these transmissions. By far, the most active frequency is 7.535MHz, and since most of the test take place during local daylight hours, they are heard in Europe during the evening.

With tests lasting several hours, you can afford to sit on this frequency, and wait for the signals to appear. They will come and go as the propagation changes, so they are very easy to hear with a little patience. During the tests, the ship uses its name as its callsign. New ships, or ships being accepted back into service, do not use the 'USS' as part of their callsign, while 'active' ships always use the 'USS' prefix. An example of this could be a vessel using the name/callsign *Shortwave*. Once it gets accepted by the US Navy, it becomes *USS Shortwave*. SESEF can also be heard on the following frequencies (but most traffic is on 7.535MHz): 4.040, 7.535, 10.711 and 12.315MHz.

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

4.742	(30/3/96, 20.00) Ascot 4364 working Architect with a 'phone patch, to report their e.t.a. to LIBV (Gioia Del Colle, Italy) as 21.10z, carrying four pallets of bombs (!); the pilot even had to spell the word 'B...O...M...B...S'.
5.712	(24/3/96, 08.56) Bookshelf working Bullfighter 81, Ravel and Longbow. The Bookshelf station had QSYed here from 11.175 after being told to 'Push 114'.
6.748	(25/3/96, 22.32) Canadian warship HMCS Nipigon working an unknown station, announcing their e.t.a. as '18.30 local'.
6.754	(22/2/96, 14.29) Gauntlet 69 working MPD, testing comms equipment. This lasted for at least 20 minutes. At 14.33, Gauntlet 69 reported that they had just taken-off. Gauntlet 69 is the RAF/Met. Research Flight Hercules based at Boscombe Down, and MPD is their ground station at the same airfield.
6.754	(22/2/96, 14.50) NATO AWACS 'Magic 70' calling DHN66 'on HP'. DHN 66 asked '70 to QSY to frequency 'XD' - this may have been 8.980MHz. Note that neither 'HP' or 'XD' appear in the frequency listing printed two months ago.
6.997	(16/3/96, 15.58) Two unidentified stations passing messages to each other, possibly Italian. One message was targeting information for an aircraft - position 38°54'N 009°26'E, heading 348°, speed 400kt, altitude 31000ft.
11.175	(6/3/96, 20.30) AUTOGRAPH working Andrews GHFS, requesting the primary and secondary frequencies for station NIGHTWATCH. Andrews replied 'X903 and S310', and the station was 'down right now, and will be up in five minutes'. X903 is 6.730MHz and S310 is 11.220MHz.

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

LW Maritime Radiobeacons

Searching the band at night for the sky waves from distant maritime radiobeacons proved to be a rewarding experience for quite a few listeners during January, February and March. Extensive logs were compiled by some of them and beacons at considerable distances from the UK were noted therein.

One of the most distant was Monte Verde, Cape Verde Is (VE) on 308.0kHz, which **Peter Rycraft** (Wickham Market) received at 0200UTC. The Canary Is beacons at La Isleta (LT) and Punta Lantailla (NA), which share 291.9kHz, were heard at night by **Robert Connolly** (Kilkeel) and **Ross Workman** in Shoreham-by-Sea.

The Prinz Christian Sund beacon (OZN) in Greenland on 372.0 was received at night by **Steve Cann** (Southampton), Robert Connolly, **John Eaton** (Woking) and **Albert Moore** in Douglas IoM. DXers should note that **Kenneth Buck** (Edinburgh) and **John Wells** (E.Grinstead) have heard an aircraft beacon (ODR) in Norway on that frequency, which could be confusing.

Reporting from Switzerland, **Fritz Nusser** (Arbon) says "Many of the signals are very weak indeed here and require a lot of patience. However, I learnt much trying for hours and hours."

Up in Scotland **John Stevens** (Largs) found he could no longer receive some beacons. They include those at Flamborough Head Lt (FB) on 303.0 and Girdleness Lt (GD) on 311.0. The Lizard Lt beacon (LZ) on 284.5 was almost inaudible due to co-channel interference from Cabo Machicharo (MA) in Spain. Down in Worcestershire, **Graeme Wormald** (Bewdley) noticed that some of the beacons he could receive during daylight were inaudible after dark. He compiled an interesting first list for the chart which included some distant beacons received via sky wave paths after dark.

To avoid line timebase interference from local TV sets **Andrew Tett** (Hove) took his Lowe HF-150 receiver to the top of the nearby Devil's Dyke. At around 1300UTC he picked up the ground waves from some distant beacons - see chart.

A completely revised and up-dated third edition of Robert Connolly's popular guide to the beacons is now available - if you would like an information sheet about it please write to him via me enclosing an s.a.e.

Long Wave Maritime Radiobeacon Chart

Freq (kHz)	C/S	Station Name	Location	DXer
284.5	LZ	Lizard Lt	S.Cornwall	A,B,C,D,E,G,I,J,L,N*,P*,R,S,T,V*,W,X
284.5	MA	Cabo Machichaco	N.Spain	B,C,E*,J*,K*,N*,O*,P*,R,V,X*,Y*
285.0	NO	Cabo de la Nao Lt	S.Spain	E*,N*,V*,X*
286.0	TR	Tuskar Rock Lt	S.Ireland	A,B,C,E,I,J,L,N*,O*,P*,R,T,V*,W,X
286.5	AL	Almagrundet Lt	Sweden	E*,N*,P*
286.5	BY	#Baily Lt	S.Ireland	E,J,R
286.5	DG	Riga Lt	Latvia	P*
286.5	FE	Cap Frehel Lt	France	R
286.5	FI	Cala Figuera	Majorca	E*,J,K*,N*,P*,X*
286.5	FT	Cap Ferret Lt	W.France	A,C,E*,G,N*,O*,P*,V*,W*,X
286.5	NK	Inchkeith Lt	F of Forth	B,O*
286.5	PZ	Cozzo Spadaro	Sicily	E*
287.3	BT	Bjargtangar Lt	Iceland	E*
287.3	IB	I.Berlenga	Portugal	E*
287.3	JA	Jarosiawiec	Poland	J*
287.3	MD	Cabo Mondego	Portugal	J*,P*
287.5	DD	Rosedo Lt	France	E*,P*
287.5	FR	Faerder Lt	Norway	E*,O*,P*
287.5	MD	Cabo Mondego	Portugal	E*
287.5	SE	Sete Mt St Clair	S.France	E*
288.0	HH	Hoek van Holland	Holland	E*,L,P*,Q,V
288.0	KL	Sklinna Lt	Norway	E*,O*,P*
288.0	OH	Old Hd of Kinsale	S.Ireland	A,C,J,R
288.5	CT	Pt de Combrit Lt	France	N*
288.5	FI	Cabo Finisterre Lt	N.W.Spain	C*,E,J,L*,O*,P*,R,V*,X
288.5	YM	Ijmuiden Lt	Holland	H,P*,T
289.0	BL	Butt of Lewis Lt	Is of Lewis	C*,O*
289.0	BY	Baily Lt	S.Ireland	A,B,C,E,J,P*,Q
289.5	KY	Oksoy Lt	Norway	O*
289.5	LO	Landsort S Lt	Sweden	E*,O*,Q
289.5	MN	Hammerodde	Oenmark	E*,J*,P*,Q*
289.5	NP	Punta Carena	Italy	K*,X*
289.5	SN	Ile de Sein NW Lt	France	A,E*,I,J*,L,P*,T,X
289.5	TR	Tor Olifid Ekofisk	Norway	K*
290.0	AV	Aveiro	Portugal	E*
290.0	FD	Fidra Lt	F of Forth	B,E*,O*,R
290.0	MR	Montedor	Portugal	E*
290.5	DY	Duncansby Hd Lt	NE.Scotland	E*,D*
290.5	LL	Hallo Lt	Sweden	E*,O*,P*
290.5	SB	S.Bishop Lt	Pembroke	A,B,C*,E,G,H,I,J,N*,P*,R,S,T,V*,X,Y
290.5	VI	Cabo Villano Lt	N.Spain	E*,G*,J,K*,L*,M*,N*,O*,P*,Q*,R,T*,U,V*,X,Y*
291.0	CF	Capo Ferro	Sardinia	K*
291.0	OR	Orskar Lt	Sweden	E*
291.0	SN	Cabo San Sebastian	S.Spain	E*,X*
291.5	SU	South Rock LV	Co.Down	A,B,C*,D,E,G,H*,J,N*,O*,P*,Q,R,T,V*,X,Y*
291.9	AV	Aveiro	Portugal	P*
291.9	LC	Leca	Portugal	P*
291.9	LT	La Isiera	Canaries	E*
291.9	NA	Punta Lantailla	Canaries	E*,X*
292.0	LK	Pt de la Coubre Lt	France	P*
292.0	MH	Mahon, Minorca	Balearic Is	E*,K*,X*
292.0	SJ	Souter Lt	Sunderland	B,C,D,E,H,J,M*,N*,O*,P*,R,T,V
292.5	SM	Pt St.Mathieu Lt	France	A,D,E,G*,H*,I,J,L,N*,O*,P*,S,T*,V*,W,X
293.0	CP	St.Catherine's Lt	I.o.W.	A,C*,F*,G*,H*,I,J*,L*,N*,P*,S,T,U,V*,W,X,Y
293.0	RN	Rhinns of Islay Lt	Is of Islay	B,E,J,N*,O*,Q,R
293.0	SY	Svinoy Lt	Norway	E*,O*
293.5	RO	Cabo Silleiro Lt	N.Spain	E*,P*
294.0	KU	Kullen High Lt	Sweden	E*
294.0	PH	Cap d'Alprech	France	A,B*,C*,E*,F*,G,H*,I,J,L,N*,O*,P*,S,T,U,V*,W,X,Y
294.5	PS	#Pt Lynas Lt	Anglesey	B*,E,J,N*,Q
294.5	PT	#Souter Lt	Durham	B
294.5	UK	Sunk Lt V	Off Essex	F*,G*,L,P*,S,T*,U*,V*,X
295.0	SN	Sletnes Lt	Norway	E*,P*
295.5	CB	La Corbiere Lt	Jersey C.I.	A,C,E*,I,J*,T,V*,X
295.5	RE	La Rochelle	France	E,P*
296.0	BH	Blavandshuk Lt	Denmark	B,C*,E*,J,N*,O*,P*
296.0	GR	Goeree Lt	Holland	P*,Q*,V
296.0	KN	Skrova Lt	Norway	E*,O*,T
297.0	B	Cabo Trafalgar	SW.Spain	P*
297.0	FG	Pt de Barfleur Lt	France	A,C*,E*,F*,G*,H,I,J,L,N*,O*,P*,S,T,U*,V*,W,X
297.5	MA	Mantyluoto	Finland	E*,O*
297.5	PS	Cabo Penas Lt	N.Spain	E*,K*,O*,P*,Q,X*
298.0	EL	Elbe Lt F	?	P*
298.0	GX	Ile de Groix	France	C*,E*,J*,L,N*,P*,T,V*,W*,X
298.0	TA	Cabo Gata	S.Spain	E*
298.5	RR	Round Is Lt	Is Scilly	A,B,C*,E,F*,H*,I,J,K*,L,N*,O*,P*,Q,R,S,T,V*,W,X,Y
298.5	SW	Skagen	Denmark	E
298.8	HO	Hornbjarg	Iceland	E*
299.0	AD	Ameland Lt	Holland	B,E,J,N*,O*,P*,T,V*
299.0	BN	Les Baleines	W.France	E*,J*,P*,V*
299.0	UN	Understen Lt	Sweden	E*
299.5	NP	Nash Pt Lt	S.Wales	A,C*,E,H,I,J,N*,P*,S,T,V*,W,X,Y
299.5	SK	Skomvaer Lt, Rost	Norway	E*,O*
299.5	VR	Utvaer Lt	Norway	B,E*,J,K*,M*,O*,P*

Freq (kHz)	C/S	Station Name	Location	DXer
300.0	MZ	Mizen Head	S.Ireland	A,E,H*,J*,P*,R,V*
300.0	TI	Cap d'Antifer Lt	N.France	A,C*,G,I,L,P*,S,T,V*,W,X
300.5	DU	Dungeness Lt	Kent	E*,F*,G*,H,I,L,N*,P*,S,T,U,V*,W,X
300.5	LA	Lista	Norway	B,C*,E*,J,N*,O*,P*,V*
301.0	CA	Pt de Creach	France	E,J,V
301.0	ER	Eierland Lt	Holland	E*,P*
301.1	RG	Raufarhoefn	Iceland	B*,E*,Q,T
301.5	KD	Kinnards Hd Lt	NE.Scotland	B,E*,K*,O*
301.5	L	Torre de Hercules	N.Spain	E*,J*,R,X*
301.5	OB	Hoburg	Sweden	J*,P*
302.0	RB	Cherbourg Ft W Lt	France	A,C*,E,F*,G,H,I,J,L,N*,P*,S,T,V*,W,X,Y
303.0	D	Rota	SW.Spain	G*
303.0	FB	Flamborough Hd Lt	Yorkshire	A,B,C*,E,G,H*,N*,O*,P*,S,T,U*,V*,X,Y
303.0	FV	Falsterborev Lt	Sweden	B,E*,J*,O*,P*
303.0	MY	Myggenaes Lt	Faeroes	N*
303.0	YE	Ile d'Yeu Main Lt	France	A,E,I,J*,L,P*,R,V*,X
303.5	BJ	Bjornsund Lt	Norway	B,E*,G*,J*,N*,O*,P*,V*,Y*
303.5	FN	Feistein Lt	Norway	B,N*,P*
303.5	IA	Llanes Lt	N.Spain	C*,E*,J*,M*,V,X*
303.5	OR	Punta de Llobregat	S.Spain	X*
303.5	VL	Vlieland Lt	Holland	C,E*,G,J,P*,Q,,S,T
304.0	ME	Punta D.Maestra	Italy	K*
304.0	PS	Pt Lynas Lt	Anglesey	A,B,C*,E,H*,J,N*,O*,P*,Q,R,T,V*,Y
304.0	SB	Sumburgh Hd Lt	Shetland Is	C*,N*,O*
304.5	MY	Cabo Mayor Lt	N.Spain	C*,E*,G*,K*,L,N*,O*,P*,V*,X
305.0	BA	Estaca de Bares	N.W.Spain	N*,P*,Q,X
305.0	FP	Fife Ness Lt	SE.Scotland	B,C*,E,J*,O*,R,T,V*
305.0	GL	Ile de Giraglia Lt	Corsica	P*,Q
305.5	AL	Pt d'Ailly Lt	France	A,C*,E,F*,G,H*,J,J,L,N*,O*,P*,S,T,U,V*,W*,X,Y
305.7	DA	Dalatangi Lt	Iceland	C*,E*,O*
306.0	EC	Elizabeth Castle	Jersey	A,I,Q,V*,X
306.0	FN	Walney Is Lt	Off Lancs	B,C*,E,G,H*,J,N*,O*,P*,R,T,V*,W,Y
306.0	TN	Thyboron	Denmark	B,O*
306.5	GJ	Le Grand Jardin Lt	France	V*,X
306.5	KR	Kubassaar	Estonia	E*
306.5	RS	Ristna	Estonia	C*,E*,J,O*
306.5	SY	Sorve	Estonia	E*
306.5	UT	Utsira	Norway	B,C*,E*,G*,J,N*,O*,P*,Q,R,T,X*,Y*
307.0	GL	Eagle Is Lt	Ireland	B,C*,E,J,O*,P*,Q,R,V*
308.0	RC	Cabo Roca	Portugal	E,R
308.0	RD	Roches Douvres Lt	France	A,E,J,P*,X
308.0	SN	Cabo de Sines Lt	Portugal	X*
308.0	VE	Monte Verde	Cape Verde	P*
308.5	NZ	St Nazaire	France	E*,O*,P*,V*,X,Y*
309.3	BA	Punta Estaca Bares	N.Spain	E*,I,J,K*,O*,P*,R,X*
309.5	FH	Fruholmen Lt	Norway	E*,O*
309.5	MA	Marstein Lt	Norway	B,C*,E*,J*,O*,P*,V*
309.5	PB	Portland Bill Lt	Dorset	A,C*,E,F*,G*,H*,I,J*,N*,P*,S,T,V*,X,Y
310.0	ER	Pt de Ver Lt	N.France	A,C*,E,G*,I,L,P*,S,T,V*,W,X
310.5	BO	Bokfjord Lt	Norway	B*,E*
310.5	HL	Hel Lt	Poland	P*
310.5	SG	Skaellands N Lt	Denmark	E*,O*
311.0	GD	Girdle Ness Lt	NE.Scotland	B,E,J,O*
311.0	NF	N.Foreland Lt	Kent	A,C*,F*,G*,H*,I,L,N*,P*,S,T,U,V*,W,X,Y
311.5	LP	Loop Hd Lt	S.Ireland	A,C*,E,Q,R
312.0	HO	Tennholmen Lt	Norway	O*
312.0	OE	Oostende	Belgium	G,J,P*,S,T,V*,X
312.0	UH	Eckmuhl Lt	France	C*,E*,J*,P*
312.5	AK	Akmenrags	Latvia	E*,P*
312.5	BK	Baltiysk	Russia	K*,O*
312.5	BT	Mys Taran Lt	Russia	E*,K*,O*
312.5	CS	Calais Main Lt	France	E*,G,P*,Q,T,U*
312.5	KA	Klaipeda Rear Lt	Lithuania	E*,O*
312.5	LB	Liepaja	Latvia	O*
312.5	SR	Skardsfjara	Iceland	E*,N*
312.5	VS	Cabo Estay Lt	N.Spain	F*,H*,N*,P*
312,6	SR	Skardhsfjara Lt	Iceland	O*
313.0	HA	Halten Lt	Norway	8*,E*,O*,P*
313.0	PA	Cabo de Palos Lt	S.Spain	E*,G*,J*,K*,N*,X
313.0	TY	Tory Is Lt	N.Ireland	B,E,J,D*,Q,R
313.5	BR	Cap Bear Lt	S.France	E*,J*,K*,P*,X*
313.5	CM	Cromer Lt	Norfolk	A,B,C*,F*,G,H,J,L,N*,O*,P*,S,T,U,V*,W,X,Y
313.5	OG	Olands Sodra Grund	Sweden	E*
314.0	HK	Hekkingen Lt	Norway	O*
314.0	PQ	Porquerolles	S.France	E,K*,P*
314.0	VG	Ile Vierge Lt	France	AB*C*E*F*G*H*I,J,K*,L,N*,O*P*,R,S,T,V*,W,X,Y*
314.5	SK	Strandhofn	Iceland	E*
314.5	TL	Punta D.Penna	Italy	E*,K*,X*
316.0	IN	Ingolfshofdhi Lt	Iceland	B*,C*,E*,O*
319.0	LEC	Stavanger	Norway	A,B,C*,E,G,H*,I,J,N*,O*,P*,Q,R,S,T,U,V*,W,X*,Y
372.0	OZN	Prins Chris's Sund	Greenland	C*,E*,G*,J*
381.0	AB	Akraberg	Faeroe Is	B*,C*,E*,G*,J*,K*,N*,P*,R,W*,X*,
404.0	NL	Noslo	Faeroe Is	B*,C*,J*,K*,N*,P*,W*,X*

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

DXers:-
(A) Darren Beasley, Bridgwater.
(B) Kenneth Buck, Edinburgh.
(C) Steve Cann, Southampton.
(D) Noel Carrington, Sutton-in-Ashfield.
(E) Robert Connolly, Kilkeel.
(F) Ron Damp, Worthing.
(G) John Eaton, Woking.
(H) Brian Heath, Stapleton.
(I) George Millmore, Wootton, IoW.
(J) Albert Moore, Douglas, IoM.
(K) Fritz Nusser, Arbon, Switzerland.
(L) Fred Pallant, Storrington.
(M) Clare Pinder, while in Appleby.
(N) Peter Pollard, Rugby.
(O) Peter Polson, St.Andrews.
(P) Peter Rycraft, Wickham Market.
(Q) Tom Smyth, Co.Fermanagh.
(R) John Stevens, Largs.
(S) Andrew Tett, while at Devil's Dyke.
(T) Philip Townsend, E.London.
(U) Eric Tubman, Whitstable.
(V) John Wells, E.Grinstead.
(W) John Woodcock, Basingstoke.
(X) Ross Workman, Shoreham-by-Sea.
(Y) Graeme Wormald, Bewdley.

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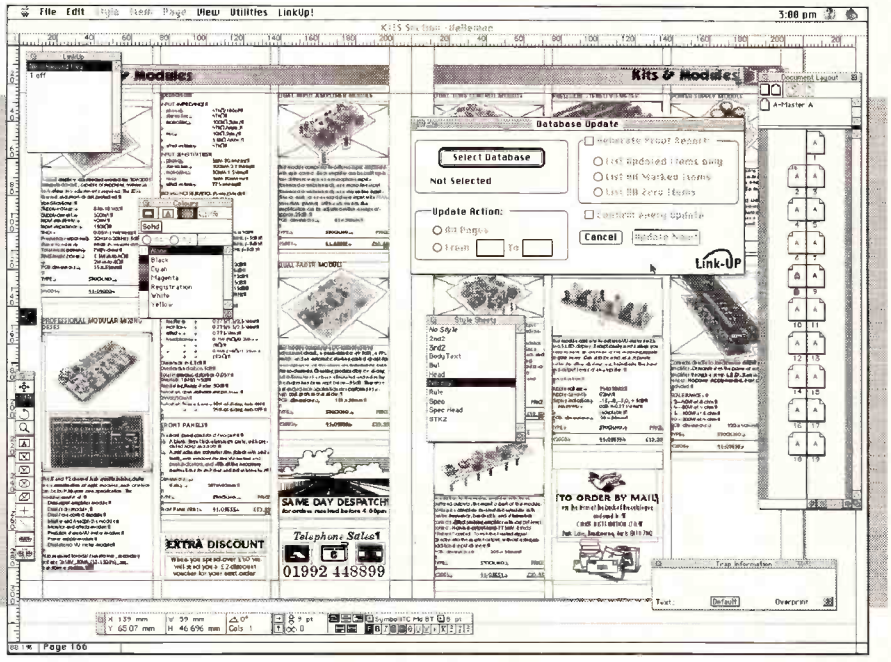

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73 from Dave G4KQH, Technical Manager.

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

Airband


Max Holste Broussard Christine Mlynek.


Piaggio 149 Christine Mlynek.


Cessna Caravan Christine Mlynek.

A disappointed **Colin Pritchard** 'phoned from South Wales with the late news that the RAF St. Athan airshow seems to have been cancelled. The same applies to RAF Halton (according to local press reports). All part of the defence cutbacks, I suppose. With all those recently in-service types fast becoming past history (*Buccaneer, Lightning, Shackleton, Vulcan*) I suppose there's less to show anyway. RAF Halton cite the administrative complexity of organising a show. As the base is now a training establishment for administrators, one could have been forgiven for thinking that this might have been a useful exercise for them!

In the Air

I'm often asked about G-HEMS, the Dauphin that operates off the roof of the Royal London Hospital. A pity. Its funding might be withdrawn next year, then I'll have less to write about. Latest enquirer is **John O'Toole** (East London). The helicopter operates during all daylight hours and I've seen it fly over in some fairly marginal visibility conditions. Being twin-engined it is not required to avoid the Specified Area over the East End. It often works Heathrow's Special VFR (radar, 119.9 or 119.725 out-of-hours) or Thames Radar 132.7; operations (link to the hospital) are on 122.95MHz.

What if aircraft needed no windows? If the pilot's view of the outside world was by a sort of 'virtual reality', consisting of a picture built up by sensors, this would be possible. Sensors include visible-light and infra-red cameras as well as microwave radar. As the picture seen is of the actual outside world, I suppose it should be called 'synthetic reality'. Trouble is, if the equipment (or its power supply) failed then, as Brian Trubshaw said (when asked what would happen if Concorde's nose stuck in the up position and you couldn't see to land), "You'd get two marks for a nice try". That's why they added forward-facing windows to Concorde's nose!

Well, **Roy Dent** is hopeful and saw a press release on synthetic vision. I think the prediction of Mach 2.4, 5000nm range, 300 pax and all for just 20% fare increase compared to subsonic aircraft, is rather optimistic. They made great claims for Concorde. The lone voice of Mary Goldring, the aviation economist, was ignored - but she was correct. So I ask: can we really justify the development costs, is it safe, and can supersonic costs really be cut drastically just by doing away with forward-facing windows? Interesting that a BAC One-Eleven was one of the aircraft involved in the American trials. Our Defence Research Agency has also found this type to be a useful experimental airframe.

Mrs. B. (Isle of Man) had to fly to Liverpool by (Manx?) ATP. Being a 'total aviation person', her friends get her to prepare estimated flight plans whenever they go on holiday! Local news from Man: July 12 should be the Schneider Trophy Race, sponsored by Manx. The 30min Man/Liverpool flight is just £49 return, if anyone's interested. Do tell me if you get to meet Spencer Flack, Mrs. B; I think he once kept a Spitfire up the road at Elstree. Is he still racing the Baron?

Hardware

Where are the CAA's ground stations? **John Morrison** (Glasgow) will find primary and secondary radar heads at Ash, Burrington, Claxby, Clee Hill, Debden, Gatwick, Great Dunfell, Heathrow, Lowther Hill, Pease Pottage, St. Annes and Tiree. At Ventnor and Mount Gabriel (Eire) there are secondary radars. Aberdeen, Edinburgh, Glasgow and Prestwick have primary radars as do a number of aerodromes that are not directly operated by the CAA (often with superimposed CAA-provided secondary images). For example, Lower Airspace Radar is provided from Boscombe Down, Bristol, Brize Norton, Cardiff, Coltishall, Coningsby, Cottesmore, Culdrose, Dunsfold, Exeter, Farnborough, Filton, Finningley, Humberside, Isle of Man, Leeming, Leuchars, Linton-on-Ouse, Lossiemouth, Luton, Manston, Marham, Newcastle, Plymouth, Portland, Shawbury, Southend, St. Mawgan, Valley, Waddington, Warton, West Freugh and Yeovilton. When you ask about 'altitude' radar, John, I think you mean secondary surveillance radar; see August 1995 'Airband' if you're not sure.

Communications radio relays are at Birdlip, Chedburgh, Clee Hill, Daventry, Davidstow Moor, Grantham, Great Dunfell, Greenford, Kelsall, Preston, Snaefell, Swingfield, Trimmingham, Ventnor, Warlingham and Winstone. I'm sorry that the CAA don't publish transmitter powers.

When talking to the controller, how can the pilot avoid cockpit noise from making transmissions unintelligible? Some modern cockpits are so quiet that you don't even need an intercom in order for the pilots to communicate with each other. If noise is a problem, the pilots wear headsets (with intercom) that might include noise-cancelling microphones. Here, ambient noise is picked up from a microphone facing away from the pilot's mouth and is mixed in anti-phase with the signal from another mic facing towards the mouth. The balance has to be correct or else too much anti-phase noise is transmitted. Just keeping the mic close to the lips helps reduce noise. In severe cases, a throat mic can be worn (I can demonstrate one in my Museum). This doesn't pick up noise at all, but only receives vibrations by direct contact with the outside of the larynx. Some pilots wear noise-excluding ear-cups on their headsets and there is even a question that a flying career can eventually reduce hearing acuity.

Cockpit noise does get picked up, pilot's speech often being punctuated by alarms going off (e.g. altitude alert). Some older aircraft are plagued by the 400Hz frequency of the electrical supply modulating the transmission as a high-pitched whine. On one flight, I wanted to take pictures with a TV camera. I stuck a small external microphone inside my headset with Blu-Tack and the resulting soundtrack was quite good! All this information should help **L. J. Moverley** (London).

Information Sources

Going to Paris? Jean-Paul Dardé of the Musée de l'air et de l'espace (Air and Space Museum) at Le Bourget has sent details of what's on offer. There are over 200 aircraft, satellites and rockets as well as the usual facilities. Contact Jean-Paul at Aéroport du Bourget, BP 173-93352 Le Bourget Cedex, France, telephone: 00 33 49 92 70 38. The Museum issues teach-yourself workbooks to make your tour more interesting. *Bon chance pour votre travaille*, Jean-Paul. If in London, come and see my Museum.

How can **T. M. Thomson** (Kilmarnock) find the routes connecting North Atlantic entry points to terminals in southern England? First, send to the Broadstone Editorial Office (NOT to me!) for Airband Factsheet Issue 4. All you need is a stamped, addressed reply envelope to hold one A4 sheet. Remember that the price of postage is due to go up soon (July?). Then, enquire of Aerad for the latest prices and finally send off for chart H201/H202 and the *En-Route Supplement Europe and Middle East*. When you know which tracks have been assigned for the day, you can see from the chart which airways connect to the entry points. The Supplement will tell you the frequencies for those airways. From this information, it should be possible to work out the traffic pattern. Remember that routes and frequencies keep changing so I can't lay down hard and fast rules.

Follow-Ups

Information was wanted (in April) by R. Frost (Felixstowe) pertaining to movements at certain British airports. Now, I took this request to be for a list of actual day-to-day movements and pointed RF in the direction of Air-Britain. Meanwhile, **J. Stevens** (Newmarket) wonders if RF really wants airport timetables. If so, look in last month's 'Airband' where I mentioned *Airport Timetables UK Summer 1996*. I suspect that RF will find BOTH sources of benefit.

Also in April, I suggested copper central heating pipe for making antennas. **Alan Burnette-Provan** (Wootton Wawen) found that this works, the large-diameter pipe giving coverage of greater bandwidth. I recommend varnishing the outside so as to prevent corrosion. Radio waves only travel in the outermost 'skin' of the copper material, so you don't want high-resistance copper oxides and salts (green deposits) building up on the antenna.

ACARS also came up in April. **Norfolk Ears** (Norfolk coast) runs the Lowe Airmaster decoder into a PC-compatible computer. The computer's port is set at 4800 baud, 8 bits, no parity, 2 stop bits, no flow control (so what happens when the buffer's full, is data lost?). This might not apply to the data entering the Airmaster from the ACARS transmission, though. Has anyone thought of asking Lowe Electronics for more details about this?

Meanwhile, **Bob Taylor G1WEX/G-20686** tried ARINC in the USA. They claim that federal law prevents their divulging any information. I didn't realise that USA laws applied in the UK, but you can't force them to release the information.

Frequency and Operational News

GASIL 2 of 1996 from the CAA tells us that RAF Machrihanish has been sold privately and renamed Campbeltown; its only frequency is now AFIS 133.05MHz, but the Aerodrome Traffic Zone has apparently been withdrawn. Chichester/Goodwood has had many frequencies cut back, leaving just Air/Ground 122.45MHz. Old Sarum has changed from 123.2 to 125.95MHz. The a.t.i.s. at East Shetland Basin, serving North Sea oil rigs, has been withdrawn (was 119.0MHz). Southend's new Lower Airspace Radar Service should be operational on 128.95MHz by the time you read this.

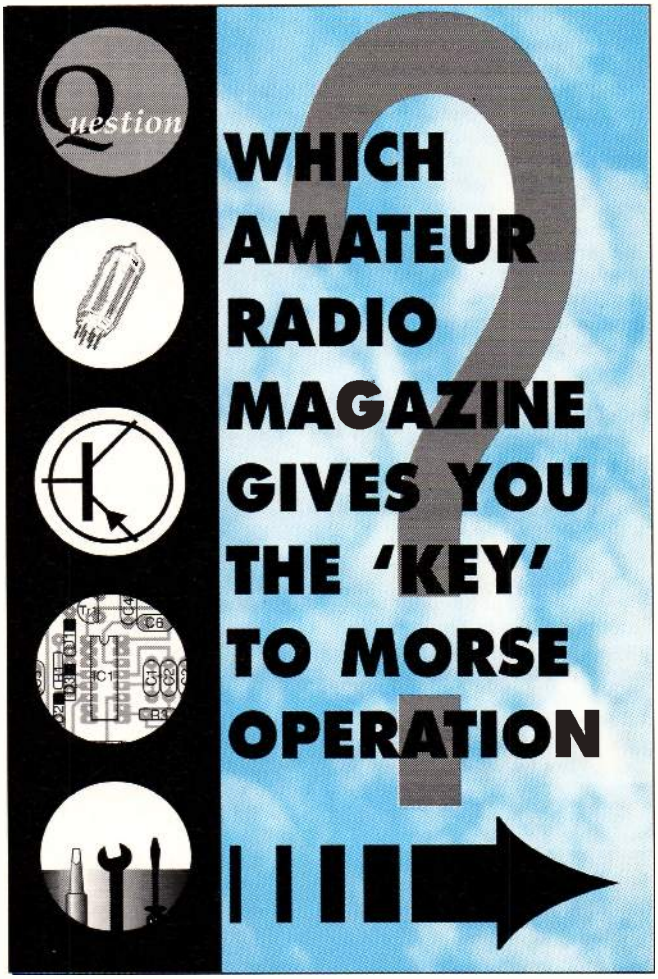
Navigation: the Hawarden d.m.e. has been renamed I-HDN, paired with 110.35 (was 109.85MHz), giving a reply frequency of 1127MHz (channel 40Y). I assume this means the installation of i.l.s. as 109.85 is not an i.l.s. channel.

Carl Hender (Ipswich) asks about callsign Metman. Modified Hercules 'Snoopy' operates out of Farnborough on special weather observation tasks, although Carl wonders if it has relocated to Boscombe Down. The identifier EGQK is Kinloss, Carl. Also, Carl found information about TAFs on the Internet. Actually, it stands for Terminal Area Forecast (i.e. it's not tactical) and they're valid for varying periods between 9 and 24 hours (not 4 hours). Just shows you can't trust everything you see on the 'Net! The other weather information, to a similar format, is METAR that provides actual weather reports for aerodromes. Both are decoded in the booklet *Get Met* (150 x 110mm, <20g) that is free of charge from CAA Safety Promotion Section, Aviation House, Gatwick Airport, West Sussex RH6 0YR, if you send a stamped reply envelope.

I haven't forgotten the promised 'In the Cockpit' feature, but it'll have to wait for space. The next three deadlines (for topical information) are June 14, July 12 and August 16. 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
AFIS	Aerodrome Flight Information Service
ARINC a.t.i.s.	Aeronautical Radio Incorporated automatic terminal information service
ATP	Advanced TurboProp
BAC	British Aircraft Corporation
CAA	Civil Aviation Authority
d.m.e.	distance measuring equipment
g	grams
GASIL	General Aviation Safety Information Leaflet
Hz	hertz
i.l.s.	instrument landing system
MHz	megahertz
min	minutes
nm	nautical miles
VFR	Visual Flight Rules



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

Amateur Bands Round-up

Listening to the Amateurs

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

The latest suggestion for the sunspot minimum to occur, put out as recently as March 4, gives us the period April-June '96. The same source says spring of the year 2000 for the next peak, which is predicted to be somewhat lower than last time. Fine; I give the news for what it's worth, but don't expect either prediction to come up 'on the button' just like that!

Letters

Quite a pile this time, with a starter from **John Mathews** in London SE25. The answer to John's query is that one ought to get hold of a copy of the *RSGB Prefix Guide*, edited by John Forward G3HTA; this is the modernised version of the famous Geoff Watts Prefix-Country Zone Lists. Almost all the prefixes appear there-in, but if something a bit odd turns up, you can search through the ITU allocations and get your answer there; for example, a 'special' from Italy will take as its first two letters anything between IAA-IZZ, always leading with the I. Even those 'unofficial' ones with leading digit 1 such as 1S are included even though their legality is open to doubt.

Incidentally, if anyone requires a personal reply, or acknowledgement of receipt of their letter, please recall two things: first that this is a cost to me personally, and secondly that I clear the box monthly, so you may wait a while for reply, especially if I've been on holiday!

That letter from Ron Pearce in Bungay produced comments from a couple of owners of early HAC receivers, notably listeners **Ames** and **Thomas**; these I felt sure were of direct interest to Ron, so I have passed them on to him. Doubtless Ron will tell us what the outcome is.

In Barnsley, **Colin Dean** writes to say he was on 3.5MHz sideband for A71AN, A92FZ, C31SD, JA6BJT, OD5RAK, TA1FA, T77WI, UN8PO, VK4SJP, ZC4HA, 3V8BB, 9K2MU, EK0TG, EX0M, EY8AM and EZ8DK. 7MHz s.s.b. resulted in loggings of AP2AR, AP2N, A41LS, CN8TW, C56DX, EA8/DJ9HD, SU2MT, UN5G, VK7GK, Z36IR, 3B8/DK1RP, 5N0MVE, 7X5JF, 8Q7XE and 9K2MU. Finally, giving 14MHz a whirl, Colin collected up A61AN, A92GD, KL7XD, SU1SK, TJ1GB, TT8AB, VQ9DX, YI7EE, ZA1BJ, ZF2LB, 3DA0MA, 5V7MD and 6W6JX.

Now we come to **Paul Fineman** in Orpington, who is puzzled by the amateur radio status of what we once knew as Yugoslavia. All the various parts of ex-YU retain amateur radio as an activity. I suggest that the best answer is to get hold of a copy of the *RSGB Prefix Guide*. (RSGB, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE. Tel (01707) 659015). There are YU and YT calls around, plus: Croatia 9A; Macedonia Z3; Bosnia/Herzegovina T9; and Slovenia S5. However, by the time this comes to you, all may have changed again!

Other calls Paul noted included 4L7AA, VU2PPAL, a brace of 4X stations, FG5BG in Guadeloupe, DU1SAN, HK3FT, VE1GBD, VE3YT, FM6AJ, AB4QI, CN8SN, 9H4CM, OD5NJ, GD4PTV, W1RZH and K4ISV.

From Dawlish, **Dennis Miller** mentions 'TO1A' calling himself the 'Principality of Seborga' that is a little bit of Italy that has a tradition of independence. That being said, The Vatican and the Sovereign Military Order of Malta are the only ones that fit any of the DXCC country criteria. Dennis looked at Top Band for DL6HWF and VE2RP, before going to 3.5MHz for A71AN, FM5CD, P43DJ, TI5KD, TL8CK, VE2ZV, 4S7EA and 5X4F. 7MHz saw loggings of FG5HR, FP5AC, FS5PL, HB0/G0WND (Liechtenstein), HI5JRI, PY4OY, the previously mentioned TO1A, ZP9BBA, 3A2MD, 5N4NT and 7X2BK. At 14MHz we see mention of AP2JZB, C56DX, DU2ZN, ET3AA, FM5FJ, JA7LMZ, XT2JF, YV3EMO, 4J3M and 5A1A. Up again to 18MHz, where D44BC, H44MS, HZ1AB, JA8XWY, KO4IX, PY2XB, R1FJZ (Franz Josef Land), TA3BN, VK2CLB, ZL4DJ, ZS6AVM, 4L7AA, 5N0PYL and 5R8EN were booked in; and finally 21MHz for C94AI, ZS1YC, 7P8MA, 9J2FB and 9Q5TR.

That bit in the *Daily Telegraph* about the Search for Extra- terrestrial Intelligence (SETI) caught the eye of **Harry Richards** in Barton-upon-Humber, and he asks if I will take part. Alas, Harry, I don't have the gear at the frequencies to be monitored for one thing, nor indeed the very long playing tapes that would be needed to keep a record. As a footnote Harry suggests we might have a QSO with UF0OH.....!

All sorts of interesting comments in the letter from **Ted Trowell** on the Isle of Sheppey. On the bands, Ted stuck entirely to c.w. as usual; Top Band at 0600UTC gave K4VT and YS1ZV, while on 3.5MHz at the same time VE3EJ came in. Again at 0600Z, 7MHz stumped up with ZB2AZ, ZL3RG, ZL4AU, PJ2AM, YV6AZC/3, VK3RG, VK3FC, ZL2AGY, C56CW, VK3MR, ZL2REX, while another visit around 1700Z 5B4/DL8KWS, W7SW/MM off the Greek Coast, and at 2200Z a third foray produced AK1L, TA2ZW, TK5MP, PY2XU, PJ9JT and VK6VZ. 14MHz at 1100 saw Ted attending to J45FRE/4 (Rhodes), K8GL, TA2ZY; at 1600Z K7GE, 9K2MU, 9V1WW, VE9AA, W6OV, WX7M, CO6DE, VQ9DX, W9KNI/6, 9H1BM, 6W6/K3IPK, 9H4AJ, TA2ZP; and a final visit at 2100Z sealed the fate of HK7/SM5HV and 9K2/KD4ZDP. Continuing up in frequency, Ted looked at 18MHz around 1100Z and found 9J2BO, 6W6/K3IPK, RA1PC/1 (Novaya Zemlya) while at 1500Z I note YV6ACZ/3, ZS4XJ, TA2BJ, TR8BAR, C56CW, KP4GL, HK7AAG, YI9CW, and R1FJZ in Franz Josef Land. Around noon, Ted looked hopefully at 21MHz to find UA9MX, VU2BK, PY2VRS, C56CW; at 1500Z ET3BN, CE6BCR, PY2TN, 9L1PG, 9H1AL, ZS6ME, 9J2SZ, FS/N0BSH, ZF1JT, P49V, PY0TI (Trindade Is) and CE3FIP. Skipping 24MHz, Ted tried 28MHz where he tangled with 9J2BO again.

QSL Addresses

Again Ted Trowell has some for us. 9J2SZ goes to SP8DIP; R1FJZ to DF7RX; C56CW to DL7DF; RA1PC to RK1PWA; ZF1JT to G3PJT; P49V to AI6V; and TA2ZP goes to JA2BDR.

Top Band News

This is published by G3RBP/VA3YJ and G3XTJ/NK1G and is only available to 'really-truly' Top Band enthusiasts, being distributed in the same sort of way as used to be done years ago by Stew Perry W1BB of hallowed Top Band memory. Extracting bits from it, I notice that people are now getting well over the 200 countries mark, and SP5EWY mentions what a help it is to him to be able to check Topband Reflector on Internet, run by AA6TT, each day when he gets to work.

On the antenna side, it is earthing that counts unless you have a VERY good site; for example N6SS has an 80 foot (Yanks don't go much on Mickey Mouse measurements!) vertical, top-loaded and given a spoked top hat, with some 190 ground radials, in all some 30000 yards of wire! (*I'll let you get away with the Imperial measurements just this once, Paul.* ***Ed.***) Reception is on Beverage antennas, plus a W1WCR f.e.t. box for noise cancellation. On a different tack, WB9YXY's Top Band from Jordan exercise was negated when he arrived to find a newly-built hospital on the other side of the street, while the vacant lot next door had become a car park, that left Bob nowhere to hang up the pre-made Top Band antenna he took with him.

Some you win - some you lose.

Next we have **Jon Baker** in Leatherhead, who mentions 14MHz signals from TU2DP, TK5KP from Corsica in a contest, FP5AC, 5A1A, KL7XD, 5V7MD, TT8BP, 4U1ITU, 9H4Q, A71BY, DU1KT, YI1RS; and on 18MHz Jon noted IC8DVV in Capri, FS5PL, 9Y4NW, CT3/PA3GIO/M, and, very next time, PA3DIO/M.

Hyde in Cheshire is our next stop, where **Frank Lennon** has his shack. Frank asks how the contestants go on in a world-wide contest. A big one, such as the ARRL DX or CQWW runs for 48 hours, 0001UTC Saturday to 2359 on Sunday; multi-operator stations use the full 48 hours, but single-operators station must usually use any 36 of the 48 hours with breaks taken in a specified manner and shown in the logs. No doubt about it, a winning contest operator not only has a good station but does know how to use it, though some of them ride roughshod over the non-contest types.

On a different tack, switching antennas, Frank notes the use of a Tandy device intended to connect one of three TVs to one antenna; yes it does use TV connectors, but a decent TV connector is better than an SO239 anyway!

To the log: 3.5MHz yielded K2QB, 9K2MU, A92BE and AA2WN. At 14MHz we see JAs, VE7GMX, YQ7B (Venezuela), HK4CZE, W7NBG (Arizona), VP8CPM, ZP6SK, VQ9DX, TT/G4BQF, TR8IG, TJ1JB, Z22JE, ZD7WRG (St Helena), A41KDAP2JTB, VKs, 5Z4LL and much smaller fry. Leaving there for 18MHz 9Q5TR, 9K2HW, 9U/F5FHI, C56DX, 5N0PYL, 4X4FR, K5MS, TU2ZR. Finally 21MHz accounted for TT8FT 3B8FG, an unidentified Russian station in Mozambique and a WH6 in Hawaii who wasn't fully copied.

Odd earth effects are noted by **Peter Townsend** in London E17. At some frequencies his 'counterpoise' earth is very effective, but at others not at all. Basically, a 'counterpoise' is at it's best when it is quarter-wave resonant, and less so at other frequencies; the earthing function is diverted to other paths, like the mains safety earth for instance! Transmitting stations keep this in mind; if at some frequency you find 'r.f. in the shack' problems, you can negate them by hanging a quarter-wave of wire on the earth terminal, and then 'losing' it, for example under a carpet.

Geoff Wallis comes in next, from Chippenham; he hasn't been very active due to a move of home. However, a portable radio and 7MHz in conjunction with 'a bit of wet string' managed to find the YE special-event station again, plus Easter Island and Fiji, all on c.w. of course. Geoff reckons he would be highly dis-chuffed could he not read the Morse, having been an RAF Tel in his time. When the new station does get into action it'll be a Yaesu FG100 and a half-sized G5RV - always provided the power lines at the end of the garden aren't too much of a problem.

Finally in the way of letters, **Brian Mortimer** comes from Whitby who has a Yaesu FR-101S and a Datong FL2 in the shack, with a 3.5MHz loop at 9 metres, and a 7MHz dipole, both accurately tuned up by an antenna analyser. Activity is between 0600-0700 and later in the day 1800-2030. 3.5MHz produced K6NA, VK3OZH, VK5MS, OD5NJ, 7X2LS, 5N3/SP5XAR, VU2PAI, TT8BP, JA5AUX, JA6BJT, DU9RG, 9Y1YR, D44BC, HP2CWB, 4X6EE, W6CCP, YC6CBR, TI4CF, VP5/JJ3QEH, VK2FFH, 9K2MU, 4S7EA, HL2/JA0BYS, YS1JRG, YC0LYO, VK4SJP, YB4VH, CN8TW, 9Y4NZ, YS1JRJ, ZP5MGR, SU2MT, A92FZ, A71BY, ZL1BOQ, 3V8BB, JA1JRK, 7X2BQ, PU2LS, XE1IAX, WB8YZL on S. Padre Island, DU1KT, HL2KPT, AP2TH, 5W1MN, ZL1AU, PZ5JR, 9Y4RM, FM5ON, IN2GNW/KH8, TI2LLH, YS1RRD, VP5/K0XX, FP5CJ, HZ1MM, NP4AT, A61AN, LU8EEH, HH7PV, J37K, V29AD, VP8MKN, YV5LIX and 8P6DU. When he wrote, the 7MHz dipole had only been up a day, so it had not been evaluated seriously, though it had produced CN8SN, BV5BG, and PR8OL.

Finale

That's it for another month; please get your letters to me as always for the beginning of the month.

'Bye now!

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Info In Orbit

Back in the sixties, the government laboratory where I worked (the Radio and Space Research Station at Slough) was permanently connected to the NASA network, amongst other agencies. During the course of the seventies, this network expanded and underwent name changes. We now call it the Internet (inter-connecting network), and I re-joined it quite some time ago. A number of readers have already spotted my comments in Usenet (the Internet's discussion forum), so I have included my E-mail address above. The only reason for not having included it previously was that I was not happy with previous service providers and anticipated changing. Enterprise seem to be making a determined effort to stay up front in a competitive race, so perhaps this may become permanent.

Current WXSATs

WXSAT images from mid spring to early autumn are invariably amongst the best of the year due to the improved solar illumination. Several readers have sent spectacular images showing just what the satellites are capable of. METEOR 3-5 has remained the operational CIS WXSAT, and **Frank Slater** of Spalding sent an image collected at 1500UTC on March 8 - see **Fig. 1**.

Frank comments that ice was late forming in the Gulf of Bothnia this year, and points out the crack clearly visible in this image. Ice sheets can be seen covering the northern and eastern waters, and many smaller icebergs can be identified. Frank used his Dartcom receiver and Timestep's PROsat software running on an Amstrad 286 computer to produce the image.

When METEOR 3-5 reaches the terminator we may find that METEOR 2-21 resumes operations. When I receive advance notice of this (it is published in an electronic document issued fortnightly) I include it in the Kepler printouts referred to near the end of the column. Meanwhile the American NOAAs (normally 12 and 14) have continued without problems (at least on the a.p.t. side), and transmissions from OKEAN-4 (a.k.a. 1-7) and SICH-1 on 137.40MHz have almost become routine. These two oceanographic satellites have onboard recorders, so we sometimes see transmitted images that were obtained some hours previously. **Brian Dudman** of Harrow recorded one such image, see later.

NOAA Beacons

As indicated in the frequencies section at the end of this column, NOAAs 12 and 14 have beacons transmitting on 136.77 and 137.77MHz respectively. Regular WXSAT watchers may recall that NOAAs 9, 10 and 11 also used these frequencies, but the latter no longer transmit a.p.t. After periods of careful monitoring, I logged the beacon on NOAA-9 as still being occasionally active, so I contacted Wayne Winston of the Satellite Information Team at NOAA/NESDIS, who confirmed that NOAA-9 is still semi-operational. Data is being collected from some on-board instrumentation (the SBUV, ERBE and SSU - mentioned in previous months), which is TIP data (i.e. for transmission by the beacon). The SBUV is to be discontinued shortly. NOAAs-10 and -11 are both in stand-by mode with no instrument data being taken; i.e., no beacon. The SAR (Search and Rescue) package on NOAA-11 remains 'on' for users.

NOAA Symposium in June - USA

For those visiting the USA in mid-June, the Fourth International Satellite Direct Broadcast Services Symposium for NOAA Polar-orbiting Observational Environmental Satellites (POES) is being held between 10-12 June 1996 at Annapolis, Maryland USA. The main theme is discussion on the changes occurring with NOAA's new series of polar-orbiting satellites - NOAA K, L and M, and the changes to direct broadcast systems in the NOAA KLM era. This column will carry the highlights after the conference.

Letters

A larger than usual number of OKEAN/SICH images have arrived during recent weeks, possibly because the satellites have been transmitting rather more frequently than some months back. Additionally, the spacecraft operators (of the CIS) now issue a weekly transmissions schedule. **Pete Arnold**, the software writer at Timestep, sent **Fig. 2**, an OKEAN image received live, using their new PROsat for Windows card and software. Beginners to the monitoring of OKEAN/SICH transmissions, may have noticed that images from these oceanographic satellites are not identical in content.

This image shows three separate parts: radar, microwave and visible imagery. The right-hand section and lower centre portion are from the visible light sensors, known as the MSUM (multi-spectral 4-channel scanning radiometer) that operate around the 0.6µm region. At the altitude of the OKEAN and SICH satellites - about 650km - the physical spatial resolution is between 1.0 (across the track) and 1.7km (along the track), with a swath width of about 1900km. The upper left section is from the microwave radiometer, that uses the 36.5 to 36.8GHz band (8mm) and has a physical spatial resolution of 25km and swath width of 550km. As can be seen from the images, the microwave sounder is offset from the visible image.

The upper-centre inset is from the X-band, side-looking radar (SLR) instrument. Using a carrier frequency of 9.52GHz, this has a fairly high resolution - 1.3km across the track and 2.5km along it. The swath width is 450km and the instrument is also offset from the nadir (the point immediately below the satellite). MSUM images are also reduced in resolution (across-track) to 1.5km for transmission on 137 MHz. It all adds to the interest! The weekly schedule is available from me; please include an s.a.e. and 20p (or extra stamp) with your request.

As promised last month, here is an image from SICH-1 (**Fig. 3**)obtained by **Rossana** and **Enrico Fioretto** of Masera di Padova in Italy. This was a realtime image obtained at 1636UTC on March 14 on 137.40MHz. The image shows the eastern end of the Black Sea, and land to the east of Turkey, an area not seen from my westerly location in Devon. The Caucuses Mountains are seen crossing the upper half of the image.

In bonny Fife, **Jim** and **Hilda Richardson** recently acquired a second computer - a 486. No prizes for guessing who gets the 386! The increasing microprocessor speed of computers can show up unexpected bugs, as Jim discovered with his software when the predictions program went into fast forward! This happened with the TH2 program, but I understand that an update has been issued to correct this. Further details from **TH2 Imaging, Tel: (01843) 223831**.

Another OKEAN image (**Fig. 4**) showing areas that I had not seen before, came from **Kurt Feller**. The image shows the Sea of Azov, the north-eastern section of the Black Sea, transmitted on December 8. Kurt uses a crossed dipole fitted with chips on each dipole (perhaps Kurt does not have pager transmissions to cope with where he lives). His software is JVFAX running on a 486DX4 computer. The picture also shows a microwave image of rather lower resolution.

For the last image in this OKEAN/SICH mini-special, I thank **Brian Dudman** who sent in a number of images received at all hours of the night/morning. Brian received **Fig. 5** at 0603UTC on March 24 from SICH-1. The satellite had recorded the image at 2220UTC the previous evening, while traversing Cape Breton Island and Newfoundland, Canada.

INSAT - Indian Communications Satellite

Some months ago *Short Wave Magazine* published a series of articles of mine, about weather and other imaging satellites. I have followed up my original enquiries and have been most fortunate in being able to 'talk' to Kjell Magnussen, who was the system engineer for the development of the INSAT-2 processing system for the India Meteorology Department, and therefore closely involved with the satellite. He has provided me with comprehensive, first-hand information.

INSAT is not part of the World Weather Watch programme, nor of the World Meteorological Organisation's WXSAT constellations (that is, the GOMS, METEOSAT and GOES WXSATs) and India has not (yet) granted access to its image data to other countries. INSAT is primarily a domestic communications satellite, so the standard

communications band is used; INSAT's nominal r.f. is approximately 4.5GHz.

The satellite's antenna is a parabolic dish, between 1 and 2m diameter, so the antenna pattern on the ground is a spot covering India, and not much outside. The power transmitted (e.i.r.p.) is approximately 10dB below that of GOES. The data stream has a bit rate of approximately 500Kbps (for INSAT-2), which is higher than INSAT-1. Given the transmitted power, the ground station antenna has to be at least twice as big as is needed for GOES, and much larger if you are on the fringe of the transmit beam pattern. Like GOES & GMS, the data is scrambled, but not encrypted.

There are two imaging bands - visible (0.55 to 0.75µm) and infra red (10.5 to 12.5µm). Resolution is 2 by 2km in visible, and 8 by 8km in i.r. The sensor is a VHRR (very high resolution radiometer), designed and built in India. The INSAT-1 VHRR was built by ITT, and was the 'ancestor' of the GOES GVAR sensor. Like the current GOES WXSAT, the satellite is three-axis stabilised, so the sensor does the scanning (left to right, and top to bottom).

Kjell describes the image quality as, "Good, a bit of degradation because the left/right scan servo error readout is bad, so small servo position errors cannot be corrected for". Calibration is only done on the i.r. on-board, and is very similar to the TIROS-N AVHRR.

Kjell believes that both satellites (INSAT-2a & 2b) are still operating. INSAT-2c & 2d do not have the meteorological imager payload. INSAT-2e will add another IR channel. The satellites can be 'parked' anywhere between 70°E and 110°E. The satellite is rotated around pitch (the NS axis) to adjust the pointing of the communication antennas, and the VHRR E/W scan window can be adjusted by ±3.2° to compensate for the satellite rotation.

My grateful thanks to Kjell for supplying this definitive information.

Future Launches

Shuttle STS-77 is currently scheduled for a May 16 launch, and STS-78 for a June 20 launch. Full details are included in the Shuttle Pack.

NOAA-K scheduled on August 1.

New Products

A second version of the Martelec JVF2 JVFAX interface was released recently. For those new to WXSAT monitoring, this unit can take the a.p.t. signal from a WXSAT receiver (that contains image information - the grey-scale levels - super-imposed on a 2.4kHz subcarrier), extract and convert this to a computer-compatible format and present it to the computer's serial port (normally COM2). It is one alternative to fitting a decoding card inside the computer. As indicated by the name JVF2, it is optimised to work with the JVFAX software program written by Eberhard Backeshoff, the German writer who has done so much to provide hobbyists with a low-cost entry to monitoring WXSAT and FAX transmissions. He has issued his software (current version 7.1) free, and requests only that users should provide feedback and a contribution if they continue to use it.

This module provides extra features beyond those of the JVF1 unit. New firmware is included to allow control of the Martelec MSR50 WXSAT receiver. Some extra filtering is included and an additional input/output port for controlling a compatible receiver - such as the MSR50. Physically, it is similar in appearance to the earlier version, and includes two columns of l.e.d.s to show status and signal levels. This proved particularly useful during the setting-up process. Cabling is included and even if you are unfamiliar with this type of set up, the instructions are comprehensive so you can expect to be operational within an hour or so. I initially tested the interface using tape recorded a.p.t. telemetry and version 7.1 of JVFAX. The JVF2 manual includes instructions for setting up JVFAX so uncertainties were few. My only problem occurred when I overloaded the a.p.t. input to the interface, causing it to lock. Removal of the signal and careful adjustment of the variables (output receiver level, input JVF2 level, and gain) corrected the problem.

Careful study of the vertical edges shows the improvement in picture quality compared with the earlier version (JVF1), presumably due to the extra filtering, so this unit continues to enhance the JVFAX software as an excellent means for low-cost, good quality WXSAT monitoring.

Most readers will be aware that JVFAX caters for both WXSAT and FAX transmissions, and each is independently controlled by the program. The interface naturally caters for both. My thanks to Chris Pretty of Martelec Communications Systems for the loan of both interface and receiver for review. Martelec can be contacted on (01420) 82752 or by writing to **Martelec Communications Systems, The Acorns, Wyck Lane, East Worldham, Alton GU34 3AW**. Interface price is £94.50 inc. VAT and carriage. RIG members get a discount.

Software

I keep the latest versions of virtually all non-commercial software available for 'Info' readers. This enables anyone with a suitable computer to be up and running at minimal cost. For beginners, a satellite tracking program is a must, and suitable ones are sometimes issued with commercial products. The latest versions of PCTrack, STS-Plus and Winorb28 are currently available, and with each tracking program I include a copy of the latest Kepler elements, so anyone sending a request need not request these. Software is always issued in its original form - this is a condition of distribution. For all requests, please enclose 50p per program (this can be secured with sticky tape - on some occasions I have received envelopes with holes in them) to a maximum of £1.50 for three or more programs.

A number of people have commented that Comar Electronics no longer support the American GOES/WEFAX programme. I became aware of this some months ago during E-mail exchanges with American companies. The availability of excellent tracking and decoding software, as regularly referred to in this column, overcomes any apparent lack of options.

Because of the number of requests for non-PC format software, I am making enquiries! I have found a source of Mac satellite tracking software (available on PC-formatted disks). I shall continue my searches for other formats.

Shuttle Pack

This collection includes the entire manifest - all planned launches - together with a comprehensive frequency listing, and monitoring guide based on reception reports. Please include a secure 50p coin and stamped s.a.e.

Kepler Elements - MIR and Shuttle

Different options are available:
1: For a print-out of the latest WXSAT elements, MIR, and the Shuttle (when launch is imminent or in progress), 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. During Shuttle operations I send Kepler elements for the orbiter by return-of-post to those requesting them. If requested, I can forward the first active set available. In all cases please enclose 20p coin.

2: I also send monthly Kepler print-outs to many people. To join the list please send a 'subscription' of £1 (plus four self-addressed, stamped envelopes) for four editions.

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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 occasionally and METEOSAT WEFAX is on 1691 and 1694.5MHz.

By the way, my Web page is at **http://homepages.enterprise.net/lawrenceh**

Fig. 1: From Frank Slater.

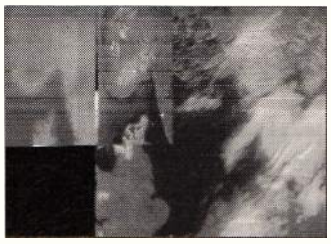


Fig. 2: From Pete Arnold.

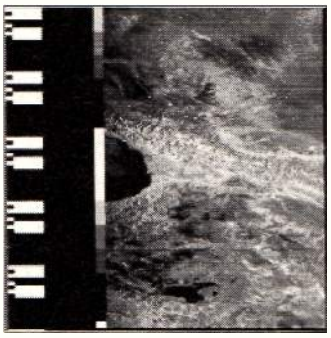


Fig. 3: SICH-1 14 March from Rossana and Enrico Fioretto.

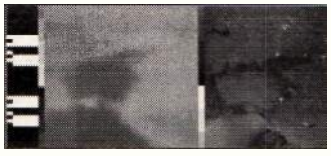


Fig. 4: From Kurt Feller.

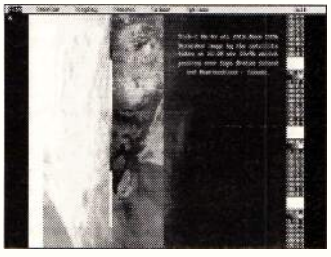
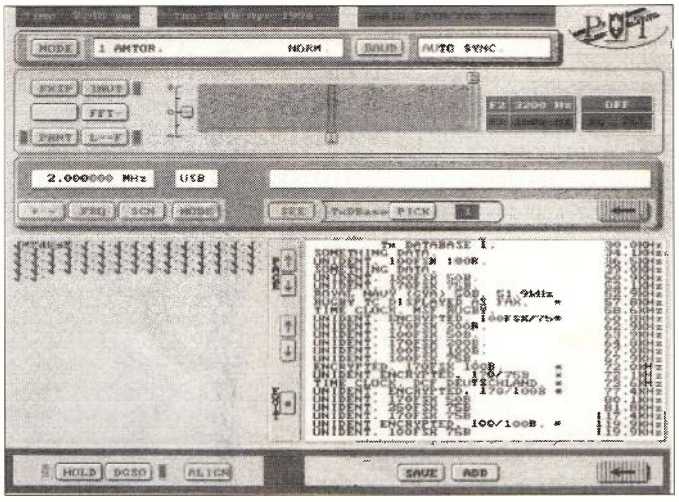


Fig. 5: SICH-1 recorded transmission.

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

Decode

All the Data Modes



Peter Thompson's home-brew decoder

Howard Gent of Redcar has become fascinated by the power and potential of digital signal processing. He would very much like to dabble in this aspect of the hobby and asks if there's any d.s.p. software available for the Atari 520STE computer. I'm not aware of any software, but would be pleased to hear from anyone who can offer help.

Orpington-based **Richard Moon** runs Icom IC-R72 and R-7100 receivers with a Compaq 520 computer for his monitoring. Having just got interested in data modes he wonders if HAMCOMM and JVFAX run successfully under Windows '95. Although I've answered this before, it's such a common question that a repeat's justified.

The simple answer is that neither program will operate reliably under a multi-tasking environment such as Windows. This is because the programs rely on direct and exclusive access to the computer's hardware - in particular the timers. Of the software available through my Readers' Offers, the only exception to this rule is Johan Forrer's PSATOR and PACTOR on the DSP starter disk. These programs will work under Windows because the critical elements of the decoding process are handled by the DSP card, so freeing the PC to do other tasks. The only other type of decoders that will generally operate successfully under Windows are those with their own processing hardware such as the Universal 1200.

Pete Glanville works as a Remotely Operated Vehicle pilot for Sub Sea International and has the pleasure of living in near permanent summer! He manages to achieve this by spending the northern hemisphere summer based in Aberdeen followed by a move to his New Zealand home town of Mosgiel when our winter arrives. Other than the travelling (I'm not a good sailor) it sounds an idyllic lifestyle. His home station is very comprehensive with a pair of Kenwood R5000s, KW R1000, pristine NRD-515, Eddystone 680X and a Heathkit 717 for high frequency work! A similarly impressive set-up exists for v.h.f./u.h.f. and decoding centres around a trusty AEA PK-232. Pete obviously has plenty of space at home as he runs a selection of long wires, G5RV, 10/15/20m beam, 80/10m whip and an assortment of v.h.f./u.h.f. antennas.

Whilst travelling Pete uses a more modest set-up with a Sony SW55 for h.f. and a Yupiteru 7100 for v.h.f./u.h.f.

Another maritime listener is **George** from *The Surprise*. He runs JVFAX with a Sony ICF-SW55 and receives good quality pictures. One of his favourite and most reliable stations is Northwood on 3.652MHz. Although he uses HAMCOMM, so far he's only been able to decode Bracknell on 4.489MHz and NAVTEX of 518kHz - at least that proves the system is basically functional.

Michael Lodge of Kedington is just getting into decoding and is proposing to use an IBM PC with a Sony ICF-2001D receiver. He is quite rightly concerned that he may run into a few problems with computer interference getting into the receiver. The trick is to make sure you use an external antenna that's mounted well away from any interference sources such as mains wiring and TV antennas.

It's also important to note that the monitor is usually the most prolific source of interference. When using external antennas with portable receivers you also need to be careful not to cause overload problems. This makes the receiver sound as though there's lots of signals, but when you try to tune-in to a known signal you will find it masked by all manner of spurious whistles and whines. The only way to fix this is to reduce the incoming signal from the antenna or add a preselector.

Reducing the signal can be done either by shortening the antenna, or by introducing an attenuator. Attenuators are available in various forms, but the easiest to use are the coaxial types that fit in the antenna lead itself. I would recommend getting hold of a 10dB and 20dB attenuator as a good starting point. This effectively gives adjustment from 10 to 30dB in 10dB steps. Let me just explain how to do this. Obviously 10dB comes from using the 10dB attenuator on its own, the same applies for 20dB. In order to get 30dB you just connect the attenuators back to back, so adding together the attenuation of each unit. In my experience this adjustment range is more than adequate to cope with most receiver/antenna combinations.

The preselector alternative is technically a much better solution, but it is also much more expensive. The concept behind a preselector is that it adds some good quality r.f. filtering ahead of the receiver. This filtering is used to reduce the level of all out-of-band signals, whilst letting the wanted signal pass unhindered. In this way the overload effects of strong broadcast stations are minimised. You will also find that preselectors often include a switchable attenuator so giving you the flexibility to choose the best of both overload reduction systems.

Satellite Monitoring

Over recent years there's been a number of claims that the interception of voice and data signals from satellite systems is a straightforward operation. A recent anonymous letter reinforced this viewpoint. The only problem is that it's not true! All the claims I've seen are based on being able to receive analogue f.d.m. (frequency division multiplex) carrier systems running on old satellites in the C band. The technology is very similar to that used for land line communication links that are based on a 12-channel system operating over the frequency range 60 to 108kHz with each channel allocated a 4kHz bandwidth.

These networks were the foundation of intercity trunk routes in the 60s and 70s but have now been almost completely replaced by digital systems. Demodulating f.d.m. signals from satellites was actually quite simple as the modulation system for each channel is conventional s.s.b. All you had to do was tune your satellite receiver to an appropriate satellite channel and tune across the external video output of the receiver to find the individual voice channels. In addition to carrying voice, the links could easily be used for RTTY signals in much the same way as on h.f.

Whilst I believe some of these transmissions systems are still actively used by third world countries, I've been unable to find anyone whose monitored any from Europe. If you know different, please let me know.

Whilst there are many communications satellites active in the Northern Hemisphere, they use sophisticated digital transmission systems that cannot be decoded by any systems available on the amateur market. The end result is that communication satellites are basically a dead loss as far as utility enthusiasts are concerned. If any of you have any more detail on the systems used please drop me a line with the details.

FAX and RTTY Weather Reports

The author of this handy reference, **Philip Mitchell**, has just sent me the latest version for review. This version is a big improvement over previous editions with much improved print quality. There's also a forward and hearty recommendation by the BBC weather forecaster Bill Giles OBE. The book is presented in A4 format and comprises some 62 pages in total.

The first chapters deal primarily with FAX charts and tables and provides comprehensive detail on the range of charts available. One of the things that sets this book apart, is the way in which Philip provides information on what all the charts and symbols are used for. There are also lots of tips on how to interpret the chart and make your own weather predictions. The FAX sections include extensive coverage of surface analysis and pressure charts along with other miscellaneous maps and charts.

The RTTY section provides good background information on the wide variety of coded weather transmissions that are to be found on the h.f. bands. You will still need

Complex Frequency List

A change for this month as I've concentrated on complex mode frequencies for this months list. I'm indebted to **Day Watson** for supplying the data for this list.

Freq.	Mode	Speed	Shift	ID	Time
3.6672	ARQ/E	46.1	170	UNID.	0057
3.8610	ARQ/E	85.7	170	UNID.	0736
5.0231	ARQ/E	96	85	LKA MUNICH [BY]	1512
5.0248	ARQ/E	96	85	LKA STUTTGART [BW]	1607
5.1440	PACT	100	170	ICRC BOSNIA	1615
5.1600	ARQ/342	96	400	NIAMEY AIR (5UA)	0009
5.3710	FEC/A	96	170	TUNISIAN NAT GUARD NET	1538
5.3977	ARQ/342	200	400	FF PARIS [RFFP]	1810
7.3507	COQ/8	26.6	-	MFA ALGIERS	1358
7.5240	ARQ/342	96	400	COTONOU AIR (TYE)	2256
7.5960	ARQ/342	96	400	NIAMEY AIR (5UA)	1834
7.6140	ARQ/E	192	170	FF MARSEILLES [RFFH] ?	1053
7.6220	ARQ/POL	100	250	MFA WARSAW (SNN299)	0759
8.0280	FEC/ROU	164.5	400	MFA BUCHAREST [V5G]	1122
8.4145	GMDSS//GMDSS			CHANNEL	0804
9.0819	TWINPLEX	100	-	MFA OSLO	0800
9.1267	ARQ/E3	192	400	FF LIBREVILLE [RFTJD]	2031
9.2260	PICC//VFT	-	-	UNID.	1250
9.2265	PICC//	-	-	UNID.	1252
9.3230	ARQ/E	72	400	FF BANGUI [RFFXI]	2348
10.1600	FEC/ROU	164.5	400	MFA BUCHAREST [V5G]	2003
10.4225	ARQ/S	96	200	MFA VIENNA	0743
10.9937	COQ/8	13.3	-	ALGERIAN EMB HAVANA	2102
11.0850	FEC/A	192	400	MFA PARIS [RFGW]	0740
11.5182	ARQ/342	200	400	FF PARIS [RFFP] ?	1648
13.4190	ARQ/E	288	200	BNDVB BONN [6XM8]	1249
13.8758	ARTRAC	125	170	MFA BUDAPEST (HGX21)	0728
14.7615	PACT	100	170	MARS (NNN0MDA)	1504
15.9885	TWINPLEX	100	-	DUTCH EMB ? LOC	0735
16.3867	TWINPLEX	100	-	PAKISTAN EMB RABAT	1037
19.0317	TWINPLEX	100	-	MFA ISLAMABAD ?	0759
19.2167	ARQ/E3	92	400	FF FT DE FRANCE [RFLI]	1434

Readers' Special Offers

Here's the latest list of reader' special offers. Whilst I do my best to return orders promptly, please allow up to two or three weeks for delivery.

IBM PC Software(1.44Mb disks):
Disk A (Order Code DKA) - JVFAX 7.0, HAMCOMM 3.0 and WXFAX 3.2
Disk B (Order Code DKB) - DSP Starter plus Texas device selection software.
Disk C (Order Code DKC) - NuMorse 1.3
Disk D (Order Code DKD) - UltraPak 4.0
Disk E (Order Code DKE) - Mscan 1.3 and 2.0

Printed Literature:
Beginners Utility Frequency List (Order Code BL).
Complex Signals Utility Frequency List (Order Code AL).
Decode Utility Frequency List (Order Code DL).
FactPack 1 Solving Computer Interference Problems (Order Code FP1).
FactPack 2 Decoding Accessories (Order Code FP2).
FactPack 3 Starting Utility Decoding (Order Code FP3).
FactPack 4 JVFAX and HAMCOMM Primer (Order Code FP4).
FactPack 5 On the Air with JVFAX and HAMCOMM (Order Code FP5).
FactPack 6 Internet Starter (Order Code FP6).
For the printed literature just send a self addressed sticky label plus 50p per item (£1.50 for four, £2.50 for 7 and £3.00 for 9). For software send £1.00 per disk (£1.75 for 2, £2.50 for 3, £3.00 for 4 or £3.75 for all 5) and a self addressed sticky label (don't forget I provide the disk!).

another reference such as the Klingenfuss Air and Meteo Code Manual to decode the data, but this new guide gives an interesting and informative overview of the system.

The later sections of the book provide lots of detail on choosing decoding systems, the various transmission types and guidance for log keeping.

This is a really excellent book that provides the vital link between weather forecasting and the technicalities of utility decoding. As far as I know there's no other single publication that covers this ground.

The book, *FAX and RTTY Weather Report* by Philip Mitchell is available from Interproducts at 8 Abbot Street, Perth PH2 0EB. The all inclusive price is £8.95. My thanks to Philip for the supply of the review copy.

Home-brew Decoding

Whilst the vast majority of decode readers use commercial/ready-built decoding equipment, there are a few notable exceptions around. The latest to come to my attention is **Peter Thornton** of Thames Ditton. Having become frustrated with the lack of fully integrated decoding systems he decided to produce his own. What he wanted was to be able to decode, update his database and control his receiver all within the same package. I don't think there's anything around that does all these things so Peter had no choice but to do it himself.

The first important decision was to create a separate box of tricks to handle d.s.p. processing on the audio data signal. Doing this relieves the load on the PC's processor so that it can more easily handle the other tasks. In Peter's current set-up this box of tricks contains two processors that handle the audio data, provide d.s.p. samples for the spectrum and scope displays and also control his Lowe HF-150 receiver! The PC then takes this data and displays it using the graphical interface shown in the screen shot in this column.

The whole systems looks extremely good - any chance of a commercial implementation?

Morse Code Monitoring

Having spent much time in this column dealing with all manner of complex decoding systems, I think it's about time I took a closer look at the most basic digital mode - Morse code.

Let's start with some clarification of the terms used in this mode. If you've been browsing through radio magazines for a while you will no doubt have noticed that this mode has two names! It is either called Morse or c.w. In fact, the names actually refer to different elements of the signal. Whereas Morse code is the system of dots and dashes that are used to represent the letters of the alphabet, c.w. or continuous wave is the r.f. modulation system used to send the dots and dashes over the air waves. So, when listeners talk about c.w. and Morse they generally mean the overall system that is a combination of the Morse code and a transmitter using continuous wave transmission. That's the hard bit out of the way! So what are the benefits of the system and why is it still in use in this modern digital world that's surrounded by sophisticated satellite systems?

It's the pure simplicity of the code and transmission system that's given it such a strong position. Despite all the advances in modern satellite and computer systems, you will still find Morse code in regular use on the h.f. bands. The most common users of Morse on h.f. are ships at sea and radio amateurs. The ships usage is really maintained because of the ability of a Morse signal to cut through the most appalling conditions. It's truly amazing what can be done with a good quality Morse transmission and an experienced ear.

One of the special secrets of Morse code operation is the effective use of abbreviations. As Morse is a relatively slow transmission system, a comprehensive range of abbreviations have been developed over the years to speed the flow of messages. In addition to the well known Q-codes there are many other abbreviations used. These can be divided into procedural signals and plain short cuts. Here's a quick breakdown of the more common procedural abbreviations:

CQ	Calling
AR	end of message
K	Go ahead
BK	back to you
R	Received ok
AS	Please wait
SK	SZ Signing-off and listening for other calls

There are also a whole range of simple abbreviations that you may come across - here's a few common examples:

AGN	again	HI	laugh!	UR	your
BK	Break in	MSG	message	VY	very
CQ	Calling	OM	old man	WX	weather
CUD	could	PSE	please	XYL	wife
DR	Dear	R	received	YL	young lady
ES	and	RPT	repeat	73	best regards
FER	for	RX	receiver	88	love and kisses!
FB	fine business	TNX	thanks		

If you look carefully at these you may well spot one or two cases where the abbreviation has the same number of letters as the full word. This is not a mistake, the trick is in the selection of letters that are quick to send. A good example of this is the use of FER to replace FOR. The advantage comes because E is just a single dot whereas O is three dashes. That makes an O ten times slower to send! Another example is ES for AND. Because AND is such a common word, changing it from A(.-) N(-.) D (-..) to E (.) S(...) represents a great improvement.

However, one of the main downsides to Morse is the variability of hand sent signals. Whilst the majority of properly trained professional operators send excellently proportioned code you will find examples of very poor code on the h.f. bands. At the receiving end any distortion of the character spacing can make the transmission much more difficult to resolve.

Whilst the human ear/brain combination an cope with quite extreme distortion, this is not the case with computer based decoding systems. These rely on accurate timing to work out whether the received signal is a dot or a dash. If the element length keeps changing, the computer finds it hard to decide if the character is a dot dash or maybe the transmission speed has changed. This is why you often see high error rates when receiving poor quality hand sent Morse on a computer.

Most modern decoding systems use a number of sophisticated programming techniques to minimise the receive errors.

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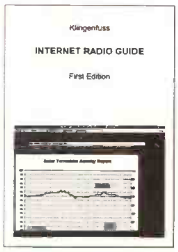

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LM&S

Long, Medium and Short Waves

The prospect of receiving one or more of the short wave broadcasts with a Crystal set would be regarded by most listeners as highly unlikely, but that is exactly what **Ron Pearce** has been doing in Bungay!

Using a home-built crystal set with a 7m inverted V antenna in the loft, he received broadcasts in the 19 to 41m bands from AWR, Budapest, Israel, Kuwait, RCI, Romania, Spain, Sweden, VOA and the Vatican during February and March.

Ron is a member of the Xtal Set Society, PO Box 3026, St.Louis, MO 63130, USA.

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 March.

The rebuilding of the 646m high long wave mast radiator near Konstantynow, Poland should now be under way but there is still disagreement between people living in the surrounding area and Polish Telecommunications as to the power output of the transmitter to be coupled to the mast when it is completed. Although 75kW is planned, 2000kW may be required to ensure good reception throughout Poland of R-1 on 225kHz. Local residents believe that the use of 2000kW would pose a threat to their health.

Whilst searching the band at 2220UTC on March 24 **Fred Pallant** (Storrington) picked up weak sky waves from the Radiotelevisione Italiana (RAI) 10kW outlet at Caltanisseta, Italy on 189kHz.

Medium Wave Reports

Despite the increasing hours of daylight during March, DXers found that it was still possible to receive before midnight the broadcasts from some m.w. stations in E.Canada and E.USA. Those from VOCM on 590kHz and CJYQ on 930, both in St.John's, Newfoundland, were logged soon after 2300UTC by several DXers. CJYQ was heard almost every night during March by **Roy Patrick** (Derby) and **Tony Stickells** (Thornton Heath). The conditions were found to be favourable during the night(s) of the 7th by **Robert Connolly** (Kilkeel); the 10th by **Ron Damp** (E.Worthing); 9/10, 12/13, 19/20 & 23/24 by **David Edwardson** (Wallsend); the 16th, 17th & 23rd by **Harry Richards** (Barton-on-Humber); the 17th & 19th by **Paul Crankshaw** (Troon). Paul found that some broadcasts could be heard up to two hours after sunrise.

The sky waves from stations in the Middle East and N.Africa also reached the UK after dark. The BBC outlet at Masirah Island, Oman on 1413 was logged for the first time by **Paul Bowery** (Burnham-on-Crouch) on March 6 as SIO222 at 1908. Over in Co.Down **Eddie McKeown** (Newry) was surprised to hear at 2223 the BSKSA outlets at Qurayyat (1000kW) on 900 and Duba (2000kW) on 1521. Exceptional conditions were noted during the evening of the 25th by **Sheila Hughes** (Morden), which enabled her to receive the broadcasts from several stations in Algeria, Morocco, Tunisia, Saudi Arabia and the Canaries - see chart.

On March 31 R.Nederlands started using the RTL 1200kW transmitter at Marnach, Luxembourg on 1440 to relay their programmes instead of the Russian outlet on 1386kHz. Down in Cornwall, **Thomas Williams** (Truro) had found reception from the relay on 1386 to be very unsatisfactory but the change has resulted in a tremendous improvement - the RTL signal rates 44444. As a devoted listener to R.Luxembourg in the 'good old days' Harry Richards could hardly believe it! The present schedule is Dutch 1930-2030 and English 2030-2225UTC. No doubt detailed reports from listeners in the UK would be welcome - send them to **Radio Nederlands, English Section, PO Box 222, 1200JG Hilversum, Holland**.

Whilst searching for distant local radio stations in Leicester, **Andrew Stokes** noticed an increase in the strength of the ground waves from ILR Capital Gold on 1548 - they rated SIO333 at 1622. The broadcasts from over sixty local radio stations were received during daylight by **Brian Keyte** in Bookham - see chart. Encouraged by the results he has obtained by using a small loop with his set, he now intends to build a much larger one! The full constructional details of a large and very effective 'Hexagonal Loop Antenna' designed by the late John Ratcliffe were published in the April '89 *SWM* - that issue is no longer available but the a photocopy of the article can be obtained form the *SWM* Bookstore at a cost of £2.60.

Short Wave Reports

Owing to the sunspot minimum period the **25MHz (11m)** band is unlikely to be used for broadcasting in 1996. In contrast the **21MHz (13m)** band is being used by some broadcasters despite daily variations in the propagation conditions. The most distant broadcast to reach the UK in this band comes from R.Australia via Darwin on 21.725 (Eng to Asia 0630-1100). Quite often it is weak or buried in the noise but sometimes it can be received very clearly. During favourable conditions it was rated 35443 at 0852 by **Tim Allison** in Middlesbrough; 35553 at 1002 in Wallsend and 34433 at 1031 by **Darren Beasley** in Bridgwater.

Also noted in the reports were BSKSA Saudi Arabia 21.495 (Ar [Holy Quran] to S.E.Asia 0900-1200) rated 33233 at 0957 by **Charles Beanland** in Gibraltar; UAER, Dubai 21.605 (Eng to Eur 1030-1055) 54544 at 1035 by **Stan Evans** in Herstmonceux; BBC via Limassol, Cyprus 21.470 (Eng to E.Africa 1300-1700) 24443 at 1300 by **Ted Harris** in Manchester; RCI via Sines, Portugal 21.455 (Eng to Eur, M.East, Africa 1330-1400) 25532 at 1344 in Storrington; UAER, Abu Dhabi 21.630 (Ar to N.Africa, Eur 0730?-1455?) SIO244 at 1400 by **Phil Townsend** in E.London; REE via Noblejas? 21.570 (Sp to S.America?) 25332 at 1401 in Storrington; BBC via Ascension Is 21.490 (Eng to E.Africa 1400-1430) 25523 at 1414 in Thornton Heath; R.Portugal via Sines 21.515 (Port, Eng to M.East, India? 1400-1600?) 24122 at 1440 in Newry; UAER, Dubai 21.605 (Eng to Eur 1600-1640) 22222 at 1600 by **Peter Pollard** in Rugby; R.Japan via Moyabi, Gabon 21.700 (Jap to Eur, M.East, Africa 1600-1700) 25432 at 1600 by **Eric Shaw** in Chester; RAI Rome 21.520 (Tt to Africa [Home Sce relay] 1410-1700, Sun only) 15331 at 1615 in Chester; BBC via Ascension Is 21.660 (Eng to W/E/S.Africa 1100-1700) 44444 at 1615 in Kilkeel; WYFR via Okeechobee, USA 21.525 (Eng, Fr, Ger, Port to W.Africa 1600-2045) 15531 at 2015 in Storrington.

The propagation conditions in the **17MHz (16m)** band also vary daily. The broadcasters using this band during the morning include R.Pakistan via Karachi 17.895 (Eng to Eur 0800-0845), rated 44444 at 0800 by **John Slater** in Scalloway, Shetland; R.Australia via Carnarvon 17.715 (Eng to Asia, Pacific 0200-0900) 35233 at 0830 in Newry; China Nat.R 17.605 (Chin [CNR-1] 0000-1230) 45534 at 0843 by **Richard Reynolds** in Guildford; DW via Rwanda 17.800 (Eng to W.Africa 0900-0950) 35543 at 0900 by **Ross Lockley** in Galashiels; BBC via Masirah Is, Oman 17.790 (Eng to India, W.Asia 0600-0830, 1000-1130) 25532 at 1001 in Wallsend; Israel R, Jerusalem 17.545 (Heb [Home Sce rly] to W.Eur, N.America 0800-1425) 44434 at 1020 by **George Tebbitts** in Penmaenmawr; R.Pakistan via Karachi 17.895 (Eng to Eur 1100-1120) 33543 at 1105 in Bridgwater; BBC via Woofferton, UK 17.640 (Eng to Eur 0800-1500) 33333 at 1144 by **Martin Dale** in Stockport and 33343 at 1223 in Gibraltar.

Those noted after mid-day were Africa No.1, Gabon 17.630 (Fr to W.Africa 0700-1600), rated SIO333 at 1400 in E.London; BBC via Antigua, W.Indies 17.840 (Eng to N/C.America 1400-1700) 44434 at 1429 by **Tony Hall** in Freshwater Bay, IoW; BBC via Ascension Is 17.830 (Eng to W/C.Africa 0730-2100) 42443 at 1605 in Barton-on-Humber and 35553 at 1955 by **John Parry** in Larnaca, Cyprus; RFI via Allouis? 17.620 (Fr to Africa 1700-1900) 34443 at 1655 by **John Eaton** in Woking; BBC via Ascension Is 17.880 (Fr, Eng to Africa 1800-1945) 25333 at 1845 in Chester; RFI via Fr.Guiana? 17.630 (Fr to America 1600-? 33222 at 1905 in Rugby; Monitor R.Int via WSHB 17.510 (Eng to Africa 1900-1957) 15332 at 1950 in Chester; R.Nederlands via Bonaire 17.605 (Eng to S/E/W.Africa 1830-2025) 45434 at 2020 by **Michael Griffin** in Ross-on-Wye; RCI via Sackville 17.820 (Eng to Eur, Africa 2000-2200) 32222 at 2100 by **Bernard Curtis** in Stalbridge; RCI via Sackville? 17.870 (Eng to Eur 2000?-2130) heard at 2020 in Storrington; WYFR Okeechobee, USA 17.845 (Eng to Africa 2000-2300?) 44444 at 2150 in Storrington; VOFC Taiwan via WYFR 17.750 (Eng to Eur 2200-2300) 44444 at 2200 in Storrington.

Daily variations in propagation have also been evident in the **15MHz (19m)** band but good reception from some areas was reported. During the morning AIR via ? 15.075 (Hin, Guj, Swa to E.Africa 0315-0530) was 45554

Long Wave Chart

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

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

Listeners:-
(A) Paul Bowery, Burnham-on-Crouch.
(B) Vera Brindley, Woodhall Spa.
(C) John Eaton, Woking.
(D) Ted Harris, Manchester.
(E) Sheila Hughes, Morden.
(F) Eddie McKeown, Newry.
(G) George Millmore, Wootton, IoW.
(H) Fred Pallant, Storrington.
(I) Tom Smyth, Co.Fermanagh.
(J) Tony Stickells, Thornton Heath.
(K) Andrew Stokes, Leicester.
(L) Norman Thompson, Oadby.
(M) Phil Townsend, E.London.

Medium Wave Chart

Freq (kHz)	Station	Country	Power (kW)	Listener
520	Hof-Saale (BR)	Germany	0.2	E*,F*,I*,P*
531	Ain Beida	Algeria	600	E*,G*,J*,P*,Q*
531	Torshavn	Faeroe Is.	100	F*,S*
531	Leipzig	Germany	100	E,F*,I*,J,Q*,P
531	RNE5 via ?	Spain	?	G*,I*,M*,P*
531	Beromunster	Switzerland	500	F,P,S
540	Wavre	Belgium	150/50	B,D,F*,I*,I*,J,P,Q,R*,S
540	Solt	Hungary	2000	P*
540	Sidi Bennour	Morocco	600	B*,G*,J*,P*,Q*
540	Vitoria(EI)	Spain	10	I*
549	Les Trembles	Algeria	600	B*,D,E*,G*,I*,J*,P*,Q*
549	Thurnau (DLF)	Germany	200	B,E,F*,I*,J,P,Q*,S
549	Quarayyat	Saudi Arabia	2000	P*
558	Espoo	Finland	100	E*,I*
558	Rostock(NDR)	Germany	20	I*
558	RNE5 via ?	Spain	?	C,I*,J*,M*,O*,Q*
567	Berlin	Germany	100	I*,P*
567	Tullamore(RTE1)	Ireland (S)	500	B,C*,D,F,J,M*,O,P*,Q,S
567	Bologna	Italy	20	P*
567	RNE5 via ?	Spain	?	I*,Q*
576	Bechar	Algeria	400	P*
576	Muhlacker(SDR)	Germany	500	B,F*,I*,J*,P*,Q*,S
576	Riga	Latvia	500	B*
576	Barcelona(RNE5)	Spain	50	B*,D,I*,J*,P*,Q*
585	Paris(FIP)	France	8	B,J,P,S
585	Madrid(RNE1)	Spain	200	B*,F*,J*,I*,M*,P*,Q*,S*
585	Dumfries(BBCScot)	UK	2	B*,F,I*
594	Frankfurt(HR)	Germany	1000/400	B,F*,I*,O,P*,Q*,S
594	Oujda-1	Morocco	100	B*,J*
594	Muge	Portugal	100	B*,I*,J*,P*
603	Lyon	France	300	P*,Q*
603	Sevilla(RNE5)	Spain	50	F*,I*,J*,P*,Q*
603	Sousse	Tunisia	10	J*
603	Newcastle(BBC)	UK	2	F,O
612	Athlone(RTE2)	Ireland (S)	100	B*,D,F,J,M*,O,P*,Q*,S
612	Sebaa Aioun	Morocco	300	B*,J*,P*,Q*
612	RNE1 via ?	Spain	10	P*,Q*
621	Wavre	Belgium	80	B,D,F,I*,J,M*,P,Q,S
621	Batra	Egypt	2000	P*
621	RNE1 via ?	Spain	10	P*,Q*
621	Barcelona(OCR)	Spain	50	I*,J*
630	Dannenberg(NDR)	Germany	100	F*,P*,Q*
630	Vigra	Norway	100	B*,I*,J*,P*,Q*,S*
630	Tunis-Djedeida	Tunisia	600	B*,E*,I*,J*,P*
639	Praha(Liblice)	Czech	1500	B*,D,F*,I*,J*,M*,O,P*,Q*,S*
639	RNE1 via ?	Spain	?	F*,I*,J*,M*,P*,Q*
639	La Coruna(RNE1)	Spain	100	S*
648	Jeddah	Saudi Arabia	2000	J*
648	RNE1 via ?	Spain	10	I*,M*,P*
648	Orfordness(BBC)	UK	500	B,D,F,J*,P,Q*,S
657	Neubrandenburg(NDR)	Germany	250	B*,P*,Q*
657	Napoli	Italy	120	J*,P*,Q*
657	Madrid(RNE5)	Spain	20	B*,I*,J*,M*,P*
657	Wrexham(BBCWales)	UK	2	B,D,F,G,H,P,Q
666	MesskirchRohrd(SWF)	Germany	300/180	B*,F*,I*,P*,Q*
666	Sitkunai(R.Vilnius)	Lithuania	500	F*,I*,P
666	Lisboa	Portugal	135	B*,I*,J*
666	Barcelona(COPE)	Spain	10	B*,Q*
675	Marseille	France	600	B*,J*,P*,Q*
675	Lopic(R10 Gold)	Holland	120	B,C*,D*,F,I*,J,N,P,Q,S
684	Sevilla(RNE1)	Spain	500	B*,F*,I*,J*,M*,P*,Q*,S*
684	Avala(Beograd-1)	Yugoslavia	2000	B*,J*,P*,Q*,S
693	Tortosa(RNE1)	Spain	2	B*,I*,P*
693	Droitwich(BBC5)	UK	150	B,D,F,J*,O,P,Q,S
702	Flensburg(NDR)	Germany	5	B,F*,I*,J*,Q*
702	Monte Carlo	Monaco	40	P,S*
702	Banska	Slovak Rep.	200	B*,F*,P*
702	Zamora(RNE1)	Spain	10	I*,P*,Q*
711	Rennes 1	France	300	B,F,J,O,P,Q,S
711	Heidelberg	Germany	5	B*,F*,I*
711	Laayoune	Morocco	600	J*,Q*
711	Murcia(COPE)	Spain	5	M*,Q*
720	Langenberg	Germany	200	B,Q
720	Lisnagarvey(BBC4)	Ireland (N)	10	D,Q*
720	Norte	Portugal	100	B*,I*
720	Sfax	Tunisia	200	J*,P*
720	Lots Rd,Ldn(BBC4)	UK	0.5	B,F,J,O,P,Q
729	Cork(RTE1)	Ireland (S)	10	B,C*,D,F*,I*,J,O*,P*,Q*
729	RNE1 via ?	Spain	?	F*,I*,J*,M*,Q*
738	Paris	France	4	B,F,J,P*
738	Poznan	Poland	300	B*,P*
738	Barcelona(RNE1)	Spain	500	B,F*,I*,J*,M*,P*,Q*,S*
747	Flevo(Hilv2)	Holland	400	B,D*,F,I*,J,M*,O,P,Q,S
747	Cadiz(RNE5)	Spain	10	I*,P*
756	Braunschweig(DLF)	Germany	800/200	B,F,I*,J*,P,Q,S*
756	Bilbao(EI)	Spain	5	B*
756	Redruth(BBC)	UK	2	D,E*,I*,J
765	Sottens	Switzerland	500	B*,D*,F,I*,J*,M*,P,Q*
774	RNE1 via ?	Spain	?	D*,I*,J*,M*,P*,Q*,S*
783	Burg	Germany	1000	B,D,F,I*,J*,P,Q*,S
783	Dammam	Saudi Arabia	100	J*
783	Tartus	Syria	600	I*
792	Limoges	France	300	B,F,J,O,P
792	Lingen(NDR)	Germany	5	F*,I*,P*
792	Sevilla(SER)	Spain	20	B*,I*,J*,P*,Q*
801	Munchen-Ismaning	Germany	300	B,F,I*,O*,P*,Q*,R*
801	RNE1 via ?	Spain	?	I*,J*,M*,P*,Q*,S*
810	Volgograd	Russia	150	J*
810	Madrid(SER)	Spain	20	B*,I*,J*,M*,P*,Q*
810	Westerglen(BBCScot)	UK	100	B*,D,F,J,O,P,Q,S*
819	Batra	Egypt	450	J*,P*
819	Toulouse	France	50	B,I*,P,Q*
819	Trieste	Italy	25	P*
819	Warsaw	Poland	300	B*,F*,I*,P*,Q*,R*
819	S.Sebastian(EI)	Spain	5	B*,I*,Q
828	Hannover(NDR)	Germany	100/5	P*
828	Rotterdam	Holland	5	B,I*,P,Q,S
828	Barcelona(SER)	Spain	50	B*,J*
837	Nancy	France	200	B,C*,G,I*,J,O,P,R*
837	COPE via ?	Spain	?	D*,J*,J*,M*,P*,S*
846	Rome	Italy	540	B*,F*,I*,J*,P,Q*,S*
855	Berlin	Germany	100	I*
855	R.Bucharest	Roumania	750	B*
855	RNE1 via ?	Spain	?	C*,F*,I*,J*,M*,P*,Q*,S*
864	Santah	Egypt	500	I*,J*,P*
864	Paris	France	300	B,C,D,F,J,P,Q,S
864	Socuellamos(RNE1)	Spain	2	P*
873	Frankfurt(AFN)	Germany	150	B,F*,I*,J*,M*,N*,P*,Q,R*,S*
873	Zaragoza(SER)	Spain	20	B*,I*,J*,M*,P*,Q*
882	COPE via ?	Spain	?	I*,M*,P*,Q*
882	Washford(BBCWales)	UK	100	B,D,F,G,J,P*,Q,R*,S
891	Algiers	Algeria	600/300	B*,G*,I*,J*,P*,Q*,S*
891	Huisberg	Netherlands	20	B,F*,I*,P*,Q*
900	Brno(CRo2)	Czech Rep	25	I*
900	Milan	Italy	600	B*,D*,F*,G*,I*,P*,Q*,S*
900	COPE via ?	Spain	?	M*
900	Qurayyat	Saudi Arabia	1000	B*,G*,I*,P*
909	B'mans Pk(BBC5)	UK	140	B,D,F,J,O*,P,Q,R*
918	Plesivec(Slovenia)	Slovenia	500/100	B*,I*,J*,P,Q*,S*
918	Madrid(R.Int)	Spain	20	B*,I*,J*,M*
927	Wolvertem	Belgium	300	B,D,F,I*,J,M*,O*,P,Q,R*,S
927	Velke Kostolany	Slovakia	40	I*
927	Evora(RRE)	Portugal	1	P*
936	Bremen	Germany	100	B,D,F,I*,J*,M*,O,P,Q,R,S*
936	Venezia	Italy	20	B*,J*,P*
936	RNE5 via ?	Spain	?	P*
936	Lvov	Ukraine	500	F*
945	Toulouse	France	300	B,I*,M*,P
954	Brno (CRo2)	Czech Rep.	200	B*,P
954	Madrid(CI)	Spain	20	B,I*,J*,M*,P*,Q*,S*
963	Pori	Finland	600	B*,F*,I*,J*,M*,Q
972	Hamburg(NDR)	Germany	300	B,D,F,I*,J*,M*,O,P,Q,S*
972	RNE1 via ?	Spain	?	J*
972	Nikolayev	Ukraine	500	F*
981	Aiger	Algeria	600/300	E*,F*,G*,I*,J*,M*,P*,Q,S*
981	Coimbra	Portugal	10	P*
990	Berlin	Germany	300	B*,F,I*,M*,P
990	R.Bilbao(SER)	Spain	10	J*,P*,Q*,S*
990	Redmoss(BBC)	UK	1	I*
990	Tywyn(BBC)	UK	1	B*,D,O,P*
999	Schwerin (RIAS)	Germany	20	I*,M*
999	Torino	Italy	20	B*,P*
999	Madrid(COPE)	Spain	50	B*,F*,I*,P*,Q*,S*
1008	SER via ?	Canaries/Spain	?	G*,I*,P*,Q*
1008	Flevo(Hilv-5)	Holland	400	B,C*,D,F,G*,I*,J,M*,P,Q,S,T*
1017	Rheinsender(SWF)	Germany	600	B,D*,F*,I*,J,M*,O*,P*,Q,S*
1017	RNE5 via ?	Spain	?	B*,I*,J*,P*
1026	SER via ?	Spain	?	I*,J*,P*,Q*
1035	Milan	Italy	50	B*
1035	Lisbon(Prog3)	Portugal	120	I*
1044	Dresden(MDR)	Germany	250	B*,F*,I*,P,Q
1044	Sebaa-Aioun	Morocco	300	J*
1044	SER via ?	Spain	?	I*,J*,P*,Q*
1053	Zarogoza(COPE)	Spain	10	I*,M*,P*
1053	Talk R.UK via ?	UK	?	B,D,F,J,P,Q,S
1062	Kalundborg	Denmark	250	B,F*,I*,J*,P,Q,S
1062	R.Uno via ?	Italy	?	P*
1062	Norte	Portugal	100	I*
1071	R.France via ?	France	?	B,I*,J,O,P,S
1071	Riga	Latvia	50	J*
1071	Bilbao(EI)	Spain	5	B*,J*
1071	Talk Radio UK via ?	UK	?	F,P
1080	Katowice	Poland	1500	B*,I*,J*,P*,Q
1080	Toledo(OCR	Spain	5	B*
1080	SER via ?	Spain	?	F*,I*,J*,P*,Q*
1080	La Coruna(SER)	Spain	2	B
1089	Talk Radio UK via ?	UK	?	C*,F,J,O,P,Q,S
1098	Nitra(Jarok)	Slovakia	1500	B*,F*,I*,J*,M*,P*,Q,S*
1098	RNE5 via ?	Spain	?	P*,Q*
1107	AFN via ?	Germany	10	I*,P*
1107	RNE5 via ?	Spain	?	P*
1107	Talk R.UK via ?	UK	?	F,J,P,Q,S
1116	Bari	Italy	150	B*,I*,J*,P*
1116	Pontevedra(SER)	Spain	5	P*
1125	La Louviere	Belgium	20	B,I*,J*,P,Q
1125	Deanovec	Croatia	100	B*,I*,P*,T*
1125	RNE5 via ?	Spain	?	F*,J*,P*,Q*,S*
1125	Llandrindod Wells	UK	1	H
1134	COPE via ?	Spain	2	F,J*,M*,P*
1134	Zadar(Croatian R)	Yugoslavia	600/1200	B*,F,I*,J*,M*,P*,Q*,S*
1143	Stuttgart(AFN)	Germany	10	B*,F*,I*,P*,Q
1143	Bolshakovo(Mayak)	Russia	150	P*
1143	COPE via ?	Spain	2	I*,M*,P*
1152	Cluj	Roumania	950	B*
1152	RNE5 via ?	Spain	10	P*,Q*
1161	Strasbourg(Flnt)	France	200	I*,P,Q,S*
1161	S.Sebastian(EI)	Spain	50	B*,P*
1170	Tbilisskaya	Russia	1200	P*
1179	Bacau	Romania	200	B*
1179	SER via ?	Spain	?	I*,Q*
1179	Solvesborg	Sweden	600	B*,C*,D*,F*,I*,J*,M*,P*,Q,S,T*
1188	Kuurne	Belgium	5	B,I*,J,S
1188	Reichenbach(MDR)	Germany	5	F,P,Q
1188	Szolnok	Hungary	135	B*,I*
1197	Munich(VOA)	Germany	300	B*,I*,P*,Q*
1197	Virgin via ?	UK	?	D,F,J,P*,Q
1206	Bordeaux	France	100	B*,I*,P*
1206	Wroclaw	Poland	200	B*,J*,P*,Q*
1215	Fllake	Albania	500	Q*
1215	Virgin via ?	UK	?	D,F,J,O,P*,Q
1224	Vidin	Bulgaria	500	B*
1224	Lelystad	Holland	25	B,D,F*,I*,P,Q
1224	Manningtree(V)	UK	0.5	J*,P*
1233	Liege	Belgium	5	F*,I*,J,Q*
1233	Brno	Czech Rep.	50	S*
1233	RFE via ?	Czech Rep.	40	B*
1233	Virgin via ?	UK	?	D,J*,P*,Q
1242	Marseille	France	150	B*,I*,P*
1242	Virgin via ?	UK	?	F,P*,Q
1251	Marcali	Hungary	500	B*,I*,P*
1251	Huisberg	Netherlands	10	F*,I*,J*,P*,Q*,S*
1251	R.Renascenca via ?	Portugal	10	P*
1260	SER via ?	Spain	?	I*
1260	Guildford (V)	UK	0.5	J,P*
1269	Neumunster(DLF)	Germany	600	B,F,I*,J*,P,Q,S*
1269	COPE via ?	Spain	?	M*,P*
1278	Strasbourg	France	300	B*,I*,P
1278	Dublin/Cork(RTE2)	Ireland (S)	10	F,J*,O,P*,Q*,S*
1287	RFE via ?	Czech Rep.	400	I*,J*,P*,Q,S*
1287	Lerida(SER)	Spain	10	I*,P*
1296	Kardzali	Bulgaria	150	J*,P
1296	Valencia(COPE)	Spain	10	B*,I*,P*,S*
1296	Orfordness(BBC)	UK	500	B*,D,Q,P*
1305	Genova	Italy	5	Q*
1305	Rzeszow	Poland	100	B*,I*,J*
1305	RNE5 via ?	Spain	?	J*
1314	R.Due via ?	Italy	?	B*,P*
1314	Kvitsoy	Norway	1200	B,D,EI*,J,K*,M*,P*,Q,S
1314	RNE5 via ?	Spain	?	P*
1323	Zyyl(BBC)	Cyprus	200	P*
1323	W'brunn (V.Russia)	Germany	1000/150	B*,D,F,I*,M*,P*,Q,S
1332	Rome	Italy	300	B*,I*,J*,P
1341	Lakihegy	Hungary	300	B*,P*
1341	Lisnagarvey(BBC)	Ireland (N)	100	B*,F,J*,P*,Q,S
1341	Tarrasa(SER)	Spain	2	J*
1350	Nancy/Nice	France	100	B,D,F,I*,J*,M*,P,Q,S*
1350	Cesvaine/Kuldiga	Latvia	50	B*,I*
1359	Arganda (RNE-FS)	Spain	600	B*,F*,I*,J*,P*,Q*
1368	Foxdale(Manx R)	I.O.M.	20	F,G*,J*,P*,Q
1368	RAI via ?	Italy	?	B*,Q*
1368	Krakow	Poland	60	B*
1377	Lille	France	300	B,D,F,I*,J,P,Q,S
1377	Ukraine	Ukraine	50	B*,P
1386	Athens	Greece	50	I*
1386	Bolshakovo	Russia	2500	B*,F*,I*,J*,M*,N*,P*,Q,S*
1395	Lushnje(Tirana)	Albania	1000	I*,J*,P*,Q*,S*
1395	Lopic?	Netherlands	?	B,D,F*,I*,J,P*,Q,S
1404	Brest	France	20	B*,D*,I*,J,P,Q*,S*
1404	Sighet	Romania	50	B*
1404	Ukraine(UR2)	via ? Ukraine	?	B*,P
1413	Masirah Is(BBC)	Oman	1500	B*,P*
1413	RNE5 via ?	Spain	?	F*,I*,J*,P*,Q*
1422	Heusweiler(DLF)	Germany	1200/600	B,C*,D,F,I*,J*,M*,N,P,Q*,S
1422	Valmiera	Latvia	50	B*,I*
1431	Kopani	Ukraine	500	D*,I*
1440	Marnach(RTL)	Luxembourg	1200	B,D,F,I*,J,K*,N*,P,Q*,S,T*
1440	St.Petersburg(RFI)	Russia	10	B*
1440	Damman	Saudi Arabia	1600	B*,I*,N*,P*
1449	Squinzano	Italy	50	B*,I*,J*,P*,Q*
1449	Redmoss(BBC)	UK	2	D,I*,O*,P*
1458	Lushnje(Tirana)	Albania	500	I*,Q*
1467	Grigoriopol	Moldova	500	I*
1467	Monte Carlo(TWR)	Monaco	1000/400	F*,I*,J*,P*,Q*,S*
1485	AFN via ?	Germany	1	P*
1485	SER via ?	Spain	?	M*,P*,Q*,S*
1494	Clermont-Ferrand	France	20	I*,J*,P*
1494	St.Petersburg	Russia	1000	B*,D*,F*,G*,I*,J*,M*,O*,P*,Q*,S*
1503	RNE5 via ?	Spain	?	J*,M*,P*
1512	Wolvertem	Belgium	600	A*,B,D,F,G*,I*,J*,L,M*,N*,P*,Q*,S,T*
1521	Kosice(Cicatice)	Slovakia	600	J*,Q*
1521	Duba	Saudi Arabia	2000	B*,I*,O*,P*
1530	Vatican R	Italy	150/450	B*,F*,I*,J*,M*,P*,Q*,S*
1530	Penheira(VOA)	Sao Tome	100	M*
1539	Mainflingen(DLF)	Germany	700	F*,S*
1539	SER via ?	Spain	?	P*,Q*
1539	Valladolid(SER)	Spain	5	J*
1548	Grigoriopol(RMWS)	Moldavia	500	I*
1557	Nice	France	300	B*,D,F,P
1566	Mjadzel	Belarus	10	B*,G*
1566	Sarnen	Switzerland	300	J*
1566	Sfax	Tunisia	1200	G*,I*,P*,Q*
1575	Genova	Italy	50	B*,I*,P*,Q*
1575	SER via ?	Spain	5	J*,M*,P*
1584	SER via ?	Spain	2	P*
1593	Holzkirchen(VOA)	Germany	150	I*,J*
1593	Dnipropetrovsk	Ukraine	5	E
1602	SER via ?	Spain	?	J*,M*,P*,Q*
1602	Vitoria(EI)	Spain	10	J*,Q*,S*
1611	Vatican R	Italy	15	F,P*,Q*,S*

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

Listeners:-

(A) Tim Allison, Middlesbrough.
(B) Paul Bowery, Burnham-on-Crouch.
(C) Vera Brindley, Woodhall Spa.
(D) Noel Carrington, Sutton-in-Ashfield.
(E) John Eaton, Woking.
(F) Ted Harris, Manchester.
(G) Sheila Hughes, Morden.
(H) Brian Keyte, Bookham.
(I) Eddie McKeown, Newry.
(J) George Millmore, Wootton IoW.
(K) Roy Patrick, Derby.
(L) Clare Pinder, while in Appleby.
(M) Peter Pollard, Rugby.
(N) Harry Richards, Barton-on-Humber.
(O) Tom Smyth, Co.Fermanagh
(P) Tony Stickells, Thornton Heath.
(Q) Andrew Stokes, Leicester.
(R) Norman Thompson, Oadby.
(S) Phil Townsend, E.London.
(T) Thomas Williams, Truro.

at 0500 in Larnaca, Cyprus; BBC via Masirah Is, Oman 15.310 (Eng to S.Asia 0300-0915, 1000-1500) 14221 at 0728 in Burnham-on-Crouch; R.Pakistan, Islamabad 15.470 (Eng to Eur 0800-0848) 44434 at 0800 in Morden; BCC via Pali, Taiwan 15.125 (Chin to C.Asia 2100-1700) 54544 at 0811 in Guildford; AWR via Slovakia 15.620 (Ger? to Africa? 0800-0900) 33233 at 0900 by **Clare Pinder** in Appleby; BBC via Ascension Is 15.190 (Eng to S.America 0900-1000) 35543 at 0951 in Wallsend; AIR via Aligarh? 15.050 (Eng to N.E.Asia 1000-1100) 24433 at 1001 in Bridgwater; UAER, Dubai 15.395 (Eng to Eur 1030-1055) 55544 at 1030 in Galashiels; BBC via Woofferton, UK 15.070 (Eng to Eur,

Local Radio Chart

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

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) Robert Connolly, Kilkeel.
(D) Ted Harris, Manchester.
(E) Sheila Hughes, Morden.
(F) Brian Keyte, Bookham.
(G) Ross Lockley, Galashiels.
(H) Eddie McKeown, Newry.
(I) George Millmore, Wootton, IoW.
(J) Tom Smyth, Co.Fermanagh.
(K) Tony Stickells, Thornton Heath.
(L) Andrew Stokes, Leicester.
(M) Phil Townsend, E.London.

Transatlantic DX Chart

Freq kHz	Station	Location	Time (UTC)	DXer
		USA		
660	WFAN	New York, NY	2221	B,D
770	WABC	New York, NY	2347	B
850	WEEI	Boston, MA	2311	B,D
880	WCBS	New York, NY	0013	B,D
1010	WINS	New York, NY	0042	B,G
1100	WWWE	Cleveland, DH	0845	B
1130	WBBR	New York	0055	B,F,G
1500	WTDP	Washington, D C.	0045	B,D,F,G
1510	WNRB	Boston, MA	0013	B,F,G
1520	WWKB	Buffalo, NY	0800	B
1560	WQEW	New York	2345	B,D
		CANADA		
580	CJFX	Antigonish, NS	2241	B
590	VOCM	St.John's, NF	2334	A,B,D,G
640	CBN	St.John's, NF	0004	B
650	CKGA	Gander,NF	0001	B,D
700	CHSJ	St John, NB	0754	B
710	CKVO	Clarenville, NF	0200	A
780	CFDR	Dartmouth, NS	0042	B
820	CHAM	Hamilton, ON	0205	A
920	CJCH	Halifax, NS	0723	B
930	CJYQ	St.John's, NF	2324	B,C,D,E,F,G
950	CHER	Sydney, NS	2322	B
990	CBY	Corner Brook, NF	0230	A
1010	CFRB	Toronto, ON	2341	B
1150	CKDC	Hamilton, ON	0215	A
1375	RFO	St Pierre/Miquelon	0117	B
1400	CBG	Gander,NF	2233	B

M.East, N/C.Africa 1000-2130) 44444 at 1057 in Gibraltar; R.Australia via Darwin 15.530 (Eng to Asia, Pacific 1100-1300) 44444 at 1117 in Freshwater Bay.

After mid-day the Voice of Vietnam, Hanoi 15.009 (Eng to Far East? 1330-1400) was 45344 at 1338 in Newry; WWCR Nashville, USA 15.685 (Eng to Eur 1100-2100) 32232 at 1350 in Barton-on-Humber; BBC via Limassol, Cyprus 15.575 (Eng to E.Eur, M.East, W.Asia 0730-1500) 34334 at 1434 in Thornton Heath; Africa No.1, Gabon 15.475 (Fr to W.Africa 1600-1900) 44434 at 1620 in E.Worthing; UAER, Dubai 15.395 (Eng to Eur 1600-1640) 33433 at 1635 in Middlesbrough; BBC via Ascension Is 15.400 (Eng to Africa 1430-1930) 43433 at 1645 in Herstmonceux.

Later, RNB Brazil 15.265 (Eng, Ger to Eur 1800-2050) was heard at 1800 by **Tom Hambly** in Hove and rated 54434 by **Stan Watkins** in NW.London; Monitor R.Int via WSHB 15.665 (Eng to Eur 1800-2000) 55455 at 1817 in Rugby; R.Nederlands via Bonaire 15.315 (Eng to S/E/W.Africa 1830-2025) 33333 at 1902 by **Tez Burke** in Bradford; VOA via Morocco 15.410 (Eng to Africa 1600-2200) 33343 at 1910 in Storrington; RCI via Sackville 15.325 (Eng to Eur, M.East, Africa 2000-2200?) 33333 at 2000 in Stalbridge; HCJB Quito 15.540 (Eng to Eur 1900?-2158) 45444 at 2005 in Ross-on-Wye; RAE Buenos Aires, Argentina 15.345 (Eng, Fr, Ger, It, Sp to Eur, N.Africa 1900-2300) 15231 at 2200 in Chester.

DXers:-
(A) Robert Connolly, Kilkeel.
(B) Paul Crankshaw, Troon
(C) Ron Damp, Worthing.
(D) David Edwardson, Wallsend.
(E) Roy Patrick, Derby.
(F) Harry Richards, Barton-on-Humber.
(G) Tony Stickells, Thornton Heath.

Propagation in the **13MHz (22m)** band is also unreliable but reception from some areas has been good. Mentioned in the reports were R.Austria Int via Moosbrunn 13.730 (Ger, Eng, Fr, Sp to Eur 0400-1800) 43333 at 0709 in Bradford; Monitor R.Int via KHBI N.Mariana Is 13.615 (Eng to Oceania 0800?-0900?) 21111 at 0850 in Truro; SRI via Schwarzenburg? 13.685 (It, Eng, Fr, Ger, Port to Australia, S.Pacific 0830-1100) 55455 at 0914 in Newry; R.Australia via Darwin 13.605 (Eng, Chin to Asia 0900-1200?) 25222 at 1155 in Barton-on-Humber; WWCR Nashville, USA 13.845 (Eng to E.USA 1400-0000) 35333 at 1430 in Bridgwater; R.Kuwait via Kabd 13.620 (Ar to Eur, N.America 0930-1605) 43333 at 1510 in Penmaenmawr; UAER, Dubai 13.675 (Eng to Eur 1600-1640) 54444 at 1600 in NW.London; R.Norway Int 13.805 (Norw [Eng Sun only] to Africa 1800-1830) 45444 at 1800 in Derby; R.Denmark via RNI 13.805 (Da [Eng first Sun of Month] to Africa 1830-1855) 45444 at 1850 in Storrington; VOA via Selebi-Phikwe, Botswana 13.710 (Eng to Africa 1630-1858) 45434 at 1832 in Burnham-on-Crouch; WHRI South Bend, USA 13.760 (Eng to E.USA, Eur 1500-2157) 25322 at 2000 in Chester; RCI via Sackville 13.670 (Eng, Fr to Africa 2000-2158) 55444 at 2023 in Ross-on-Wye; WEWN Birmingham, USA 13.695 (Eng to Eur 2000-2157) 32343 at 2120 in Woking; Monitor R.Int via WSHB 13.770 (Eng to Eur 2000-2157) 44333 at 2130 in Morden; RCI via Sackville 13.650 (Eng to Eur 2000-2158) 44444 at 2130 in E.Worthing.

Broadcasts from many areas have reached the UK in the **11MHz (25m)** band. During the morning, HCJB Quito 11.615 (Eng to Eur 0700-0830) was noted as 'poor' in Derby; Slovak R.Int, via Velke Kostolany 11.990 (Eng to Australia 0830-0857) 43434 at 0830 in Scalloway and SIO444 at 0851 by **Francis Hearne** in N.Bristol; REE via Noblejas 12.035 (Sp to Eur 0900-1900) was 54554 at 1020 in Kilkeel; VOIRI Tehran 11.930 (Eng to M.East, Asia 1130-1230) 34333 at 1130 in Newry; R.Sweden via Horby? 11.650 (Eng to N.America 1230?-1300) 44444 at 1144 in Stockport.

After mid-day R.Romania Int, Bucharest 11.940 (Eng to Eur 1300-1400) was 24222 at 1300 in Galashiels; WYFR via Taiwan 11.550 (Eng to S.Asia 1300-1500) 45444 at 1344 in Burnham-on-Crouch; R.Pakistan, Islamabad 11.570 (Ur [Eng 1400] to M.East 1330-1530) 34323 at 1400 in Rugby; BBC via Kranji, Singapore 11.920 (Eng to S.E.Asia? 1400-1500) 43434 at 1412 in Penmaenmawr; R.Australia via Carnarvon 11.660 (Eng to S.Asia 1430-2057?) heard almost daily at 1430 in Hove and rated SIO333 at 1610 by **Philip Rambaut** in Macclesfield; RCI via Skelton, UK 11.935 (Fr to Eur, M.East 1430-1500) 33233 at 1430 in Truro; BBC via Woofferton, UK 12.095 (Eng to Eur, N/W.Africa 1000-2230) 34443 at 1648 in Woking; R.Pakistan, Islamabad 11.570 (Eng, Ur to Eur 1700-1855) 54343 at 1705 in NW.London; BBC via Kranji, Singapore 11.750 (Eng to S.E.Asia? 0900-1800) 54444 at 1706 in Freshwater Bay.

During the evening, R.Japan via Sri Lanka 11.930 (Eng, Jap to M.East, N.Africa 1700-1900) was 42442 at 1750 in Chester; R.Nederlands via Flevo 11.655 (Eng to Africa 1730-2125) 34233 at 1807 in Bradford; AIR via Bangalore 11.620 (Hi, Eng to Eur 1745-2230) SIO323 at 1900 by **Tom Smyth** in Co.Fermanagh; WWCR Nashville, USA 12.160 (Eng to Eur? 1500-2300) 33333 at 2025 in Stalbridge; R.Kuwait via Kabd 11.990 (Eng to Eur, N.America 1800-2100) 55444 at 2036 by **Vera Brindley** in Woodhall Spa; BBC via Ascension Is 11.835 (Eng to W.Africa 1930-2315) 44444 at 2042 in Middlesbrough; R.Bandeirantes, Sao Paulo, Brazil 11.925 (Port 24hrs) 25542 at 2050 in Wallsend; R.Globo, Rio de Janeiro, Brazil 11.805 (Port 0900-0330) 34333 at 2102 in Bridgwater; RCI via Sackville 11.690 (Eng to Eur, M.East, Africa 2000-2130) 44444 at 2105 in Storrington.

In the **9MHz (31m)** band R.Nederlands via Bonaire, Ned.Antilles 9.720 (Eng to Pacific 0730-1025) was 33443 at 0810 in Middlesbrough; SRI via Fr.Guiana 9.885 (It, Eng, Fr, Ger, Port to Australia, S.Pacific 0830-1100) 24332 at 0900 in Galashiels; R.Nederlands via Nauen 9.650 (Eng to Eur 1030-1225) 55555 at 1030 in Newry; SRI via Sarnen? 9.535 (Eng to SW.Eur 1100-1130) 33333 at 1100 in Truro; VOA via Greenville, USA 9.590 (Eng to Caribbean 1000-1200) 25222 at 1125 in Burnham-on-Crouch; R.Norway Int 9.590 (Norw [Eng Sun] to Eur 1300-1330) 44444 at 1300 in Appleby; SRI via Sarnen? 9.535 (Eng to SW.Eur 1300-1400) 54544 at 1315 in Herstmonceux; China R.Int, Beijing 9.785 (Eng to S.Asia 1400-1557) 43433 at 1507 in Woodhall Spa; Voice of Vietnam, Hanoi 9.840 (Eng to Eur 1600-1630) SIO322 at 1617 by **Ted Walden-Vincent** in Gt.Yarmouth; SRI via Schwarzenburg? 9.885 (Eng, Ger, It, Fr to M.East, E.Africa 1700-1900) 32433 at 1714 in Rugby; WVHA via Scotts Corner, USA

Tropical Bands Chart

Freq (MHz)	Station	Country	UTC	DXer
2.310	ABC Alice Springs	Australia	1750	G
2.325	ABC Tennant Creek	Australia	2045	G,J
2.485	ABC Katherine	Australia	2045	G,J
2.850	KCBS Pyongyang	N.Korea	1617	G
3.200	TWR Manzini	Swaziland	1756	G
3.220	CPBS 1, Beijing	China	2236	N
3.220	R.Kara, Lome	Togo	2048	G,J,N,O
3.223	AIR Simla	India	1719	G
3.230	SABC Meyerton	S.Africa	2058	B,C,G,N
3.240	TWR Shona	Swaziland	1809	G
3.245	AIR Lucknow	India	1725	G
3.250	R.Pyongyang	N.Korea	1610	G
3.255	BBC via Maseru	Lesotho	2105	G,J,O
3.260	Guizhou 1	China	2300	C
3.265	RRI Bengkulu	Indonesia	1521	G
3.270	SWABC 1, Namibia	S.W.Africa	2050	C,G,J
3.290	Namibian BC,Windhoek	S.W.Africa	2323	C,G,N
3.306	ZBC Prog 2	Zimbabwe	2120	G,J,N
3.315	AIR Bhopal	India	1730	G
3.316	SLBS Goderich	Sierra Leone	2156	C,G,J,N,O
3.320	Pyongyang	N.Korea	1611	F,G
3.320	SABC Meyerton	S.Africa	2310	C,G,N
3.325	RRI Tanjung Pinang	Indonesia	1529	G
3.325	FRCN Lagos	Nigeria	2049	J,N,O
3.335	CBS Taipei	Taiwan	1836	G,J,N
3.338	R.Maputo	Mozambique	1838	N
3.340	R.Uganda, Kampala	Uganda	2040	G,J,O
3.345	Channel Africa	S.Africa	1927	G
3.356	R.Botswana	Gabarone	1946	E,G,J
3.365	GBC R-2	Ghana	2202	C,E,J,L,N,O,Q
3.365	AIR Delhi	India	1627	G
3.375	R.Nacional S.Gabriel	Brazil	2220	C,N
3.377	R.Nacional, Mulenvos	Angola	2114	G,J
3.380	NBC Blantyre	Malawi	2023	G,N
3.390	BBC via Meyerton	S.Africa	2109	G
3.815	Taiwan 1 Sc, Beijing	China	1618	G
3.915	BBC via Kranji	Singapore	2110	C,D,E,F,H,N,Q,T
3.930	KBS Seoul	Korea	2227	N
3.945	AIR Gorakhpur	India	1502	G
3.950	Qinghai PBS, Xining	China	2315	C,E,G,I,N
3.955	BBC via Skelton	England	1700	C,E,H,L,P,Q,R,S,T
3.955	R.Budapest	Hungary	2200	P
3.960	Xinjiang PBS, Urumqi	China	1515	G
3.965	RFI Paris	France	1905	B,C,H,I,Q,R,T
3.970	R.Korea via Skelton	England	2000	H,M,R
3.975	R.Budapest	Hungary	2005	B,C,I,M,R,T
3.976	RRI Pontianak	Indonesia	2239	G,N
3.980	VOA via Munich	Germany	1800	T
3.985	IRRS	Italy	1630	B,T
3.985	China R via SRI	Switzerland	2200	H,P,U,V
3.985	SRI Beromunster	Switzerland	1920	C,R,T
3.990	Xinjiang BS, Urumqi	China	1521	G
3.990	BBC via Limassol	Cyprus	1618	G,K
3.995	DW via Julich	Germany	2000	B,E,H,Q,R,T,U
3.995	DW via Meyerton	S.Africa	1930	C
4.005	Vatican R.	Italy	1810	G,H,I,L
4.035	Xizang PBS, Lhasa	Tibet	0021	E,G
4.190	CPBS Minority Sce	China	1540	G
4.330	Xinjiang BS, Urumqi	China	1432	G
4.460	CPBS 1, Beijing	China	2313	E,G
4.485	R.Fecuencia,Celendin	Peru	0034	R
4.500	Xinjiang BS, Urumqi	China	2330	E,F,G,O
4.549	R. Dif.Tropico	Bolivia	0036	R
4.735	Xinjiang, Urumqi	China	2310	C,E,F,N,O
4.750	N. Menggu PBS,Hailar	China	2348	E
4.753	RRI Ujung, Padang	Indonesia	1509	G
4.755	R.Educ CP Grande	Brazil	2344	C,N
4.760	Yunnan PBS,Kunming	China	2315	C,E,G
4.760	AIR Port Blair	India	1631	G
4.760	ELWA Monrovia	Liberia	2100	F,G,J,M,N,O,T
4.765	R.Integracao	Brazil	0015	C
4.765	Brazzaville	Pep.Rep.Congo	1958	G,J,O
4.770	Centinela del Sur	Ecuador	2323	C,E
4.770	FRCN Kaduna	Nigeria	2112	C,E,I,J,N,O,T
4.775	AIR Guwahati	India	0123	B,G
4.775	TWR Manzini	Swaziland	0400	O
4.777	R.Gabon, Libreville	Gabon	1920	C
4.783	RTM Bamako	Mali	2126	C,E,J,N,O
4.785	Zhejiang PBS,H'gzhou	China	2259	B
4.790	Azad Kashmir R.	Pakistan	1733	G
4.790	R.Atlantida	Peru	2355	B,C,E,N
4.795	R.Douala	Cameroon	2050	N
4.795	La Voz de los Caras	Ecuador	2022	R
4.800	CPBS 2 Beijing	China	2320	C,E,G
4.800	R.Buenas Nuevas	Guatemala	0200	B
4.800	AIR Hyderabad	India	0038	G,R
4.800	LNBS Lesotho	Maseru	2137	G,J,N
4.805	R.Villa Rica	Peru	2358	N
4.815	R.Difusora, Londrina	Brazil	0130	B,C
4.815	R.diff TV Burkina	Ouagadougou	2050	J,N
4.820	La Voz Evangelica	Honduras	2023	O,R
4.820	AIR Calcutta	India	1730	G,R
4.820	Xizang, Lhasa	Tibet	1534	G
4.825	R.Cancao Nova	Brazil	0020	E,R
4.828	ZBC R-4	Zimbabwe	2147	G,J,N
4.830	R.Botswana, Gaborone	Botswana	2142	J,N
4.830	R.Tachira	Venezuela	0010	B,C,E,F,N,O,R
4.832	R.Reloj	Costa Rica	0023	E,O
4.835	ABC-Alice Springs	Australia	2142	J
4.835	R.Tezulutlan, Coban	Guatemala	0240	C
4.835	RTM Bamako	Mali	2111	C,J,O
4.840	AIR Bombay	India	0129	B,G
4.840	R.Andahuaylas	Peru	2335	C
4.845	RTM Kuala Lumpur	Malaysia	1513	G
4.845	ORTM Nouakchott	Mauritania	2115	C,I,J,N,O
4.850	R.Yaounde	Cameroon	2320	C
4.850	AIR Kohima	India	0250	C,G,R
4.860	AIR Kingsway(Feeder)	India	1804	G,L,R
4.865	PBS Lanzhou	China	2205	C,E,G,J,N,O
4.865	L.V. del Cinaruco	Colombia	0050	B,C
4.870	R.Cotonou	Benin	2142	B,J,N,O
4.875	R.Roraima, Boa Vista	Brazil	0142	C,F,O
4.885	R.Clube do Para	Brazil	0201	B,C,F,O
4.885	R.Difusora Acreana	Brazil	2325	C
4.885	KBC East Sce Nairobi	Kenya	1804	C,G
4.890	R.Port Moresby	New Guinea	2022	J
4.890	ORTS Dakar	Senegal	2116	B,O
4.895	R.IPB AM C'po Grande	Brazil	0042	R
4.895	Voz del Rio Arauca	Colombia	0326	B
4.895	Pakistan BC	Pakistan	1619	A,G
4.900	Haixia 2	China	1453	G
4.900	SLBC Colombo	Sri Lanka	1655	G
4.905	R.Nat N'djamena	Chad	2107	B,J,N,O,R,T
4.910	Tennant Creek	Australia	2146	C,G,J
4.910	RTG Conakry	Guinea	2330	C,E
4.910	AIR Jaipur	India	1358	G
4.915	R.Anhanguera	Brazil	0245	C,O
4.915	GBC-1, Accra	Ghana	2208	C,I,J,N,O
4.920	R.Quito	Ecuador	0735	F,I,N,O
4.920	AIR Madras	India	1625	G,R
4.925	R.S.Miguel,Riberalta	Bolivia	0251	B,C
4.927	RRI Jambi	Indonesia	1600	A
4.935	KBC Gen Sce Nairobi	Kenya	2050	C,G,J,N,O
4.935	R.Tropical, Tarapoto	Peru	0358	B
4.940	Haixia 1	China	1450	G
4.940	AIR Guwahati	India	0118	B,G,N
4.940	R.Abidjan	Ivory Coast	2354	B,E
4.945	R.Illimani, La Paz	Bolivia	0012	B,N
4.945	R.Difusora	Brazil	2027	R
4.950	R.Nacional, Mulenvos	Angola	2034	G,O
4.950	AIR Jammu	India	1710	G
4.955	R.Cultura, Campos	Brazil	2335	C
4.955	R.Nac. de Colombia	Colombia	0008	B,C,F,R
4.960	Hanoi 2	Vietnam	1401	G
4.965	Christian Voice	Zambia	2012	G,O
4.970	PBS Xinjiang	China	1602	G,N
4.980	PBS Xinjiang, Urumqi	China	1556	G
4.980	Ecos del Torbes	Venezuela	2308	B,C,E,L,N,O,R
4.985	R.Brazil Central	Brazil	2347	C,E,N,O,R
4.990	FRCN Lagos	Nigeria	2044	C,J,N
4.990	R.Ancash, Huaraz	Peru	0327	B
5.005	R.Nacional, Bata	Eq.Guinea	2106	G,J
5.005	R.Nepal, Kathmandu	Nepal	1408	G
5.010	R.Garoua	Cameroon	2017	G
5.020	PBS-Jiangxi Nanchang	China	2315	E,H,G
5.020	La V du Sahel,Niamey	Niger	2055	A,B,C,J,N,O
5.020	SLBC Tamil Home Sce.	Sri-Lanka	1703	G
5.025	ABC Katherine	Australia	2135	J
5.025	R.Parakou	Benin	2055	B,C,J,O,T
5.025	R.Rebelde, Habana	Cuba	0145	B
5.025	R.Quillabamba	Peru	0033	N
5.025	R.Uganda, Kampala	Uganda	2022	G,O
5.030	AWR Latin America	Costa Rica	2335	C,G,L
5.035	R.Bangui	C.Africa	2149	A,B,J,O
5.040	PBS Fujian, Fuzhou	China	1553	G
5.045	R.Cultura do Para	Brazil	0008	B,C
5.045	RRI Yogyakarta, Java	Indonesia	1624	G
5.047	R.Togo, Lome	Togo	2056	A,B,C,E,J,O
5.050	Guangxi FBS, Nanning	China	1445	G
5.050	R.Tanzania	Tanzania	1900	O
5.055	RFO Cayenne(Matoury)	French Guiana	0037	B,C,O
5.060	PBS Xinjiang, Urumqi	China	1555	E,G,O,R
5.065	R.Candip, Bunia	Zaire	1832	G
5.075	Caracol Bogata	Colombia	0625	B,C,I,L,N,O,R
5.090	Taiwan 2 Sce,Beijing	China	1610	G
5.125	Taiwan 1 Sce,Beijing	China	1619	G
5.163	CPBS 2, Beijing	China	1550	G

DXers:-

(A) Paul Bowery, Burnham-on-Crouch.
(B) Tez Burke, Bradford.
(C) Robert Connolly, Kilkeel.
(D) Ron Damp, Worthing.
(E) John Eaton, Woking.
(F) David Edwardson, Wallsend.
(G) P.Gordon Smith, Kingston, Moray.
(H) Ted Harris, Manchester.
(I) Sheila Hughes, Morden.
(J) Fred Pallant, Storrington.
(K) John Parry, Larnaca, Cyprus.
(L) Roy Patrick, Derby.
(M) Clare Pinder, while in Appleby.
(N) Richard Reynolds, Guildford.
(O) John Slater, Scalloway.
(P) Tom Smyth, Co.Fermanagh.
(Q) Tony Stickells, Thornton Heath.
(R) Andrew Stokes, Leicester.
(S) Norman Thompson, Dadby.
(T) Phil Townsend, E.London.
(U) Ted Walden-Vincent, Gt.Yarmouth.
(V) Stan Watkins, N.W.London.

9.930 (Eng to Europe, Africa 1800-1930) SIO433 at 1820 in Macclesfield; VOA via Gloria, Portugal 9.760 (Eng to M.East, N.Africa 1700?-2200?) SIO323 at 1900 in Co.Fermanagh; R.Nederlands via Flevo 9.895 (Eng to S/E/W.Africa 1830-2125) 22222 at 1930 in Bradford; R.Bulgaria via Plovdiv 9.700 (Eng to Eur 1900-2000) 45555 in Manchester; R.Nac del Paraguay 9.735 (Sp 0800-0400) 33553 at 2112 in Wallsend; BBC via Hong Kong 9.580 (Eng to Far East? 2200-0100) 43333 at 2345 in Morden; R.Austria Int via Moosbrunn 9.655 (Eng to N.America 0000-0300) SIO333 at 1233 in N.Bristol; R.Universo, Curitiba, Brazil 9.565 (Port 24hrs) 24432 at 0340 in Woking.

The occupants of the **7MHz (41m)** band include Monitor R.Int via WSHB 7.535 (Eng [Various Sat/Sun] to Eur 0400-0955) 33333 at 0900 in Truro; AIR via Aligarh? 7.412 (Eng to M.East 1530-1545) 35323 at 1538 in Woodhall Spa; Sudwestfunk via Rohrdorf 7.265 (Ger to Eur 24hrs) 45444 at 1642 in Woking; Polish R, Warsaw 7.285 (Eng to Eur 1700-1757) SIO222 in Co.Fermanagh; R.Norway Int 7.485 (Eng to Eur 1800-1830, Sun only) noted as 'good' at 1800 in Derby; Israel R, Jerusalem 7.465 (Eng to Eur, N.America 1900-1930) 44343 at 1915 by **Norman Thompson** in Oadby; VOA via Selebi-Phikwe, Botswana 7.415 (Eng to Africa 1900-2230) 43433 at 1943 in Burnham-on-Crouch; AIR via Aligarh? 7.412 (Hi, Eng to Eur 1745-2230) 45444 at 1956 in Storrington; R.Romania Int, Bucharest 7.195 (Eng to Eur 2100-2156) 43433 at 2100 in Galashiels; REE via Noblejas? 7.275 (Sp to Eur 1900-2300) 55555 at 2109 in Wallsend; Monitor R.Int, via WSHB 7.510 (Eng to Eur? 2200-?) 53333 at 2245 in NW.London; R.Nederlands via Alma Ata 7.305 (Eng to S.Asia 0030-0225) 24332 at 0049 in Bradford.

In the **6MHz (49m)** band HCJB Quito 5.900 (Eng to Pacific 0700-0830) was noted as 'fair' in Derby; Deutschland R. Berlin 6.005 (Ger 24hrs) 25443 at 1103 in Manchester; R.Nederlands via Julich 6.040 (Eng to Eur 1030-1225) 45434 at 1116 in Storrington; SRI via Lenk? 6.165 (Eng to Eur 1300-1400) 54444 at 1330 in NW.London; R.Austria Int, via Moosbrunn 6.155 (Ger, Eng, Fr, Sp to Eur 0400-2300) 22233 at 1736 in Stockport and SIO444 at 2251 in N.Bristol; R.Prague via Litomysl 5.835 (Sp to Eur, S.America 1800-1827) SIO444 at 1827 in Macclesfield; Vatican R, Italy 5.880 (Eng to Eur 1950-2010) 54444 in Morden; SRI via Lenk? 6.165 (Eng to Eur 2000-2030) 43333 at 2000 in Bradford; China R.Int, Beijing 6.950 (Eng to Eur 2000-2157) SIO333 at 2000 in E.London; KBC Nairobi, Kenya 6.150 (Swa 1325-2110) 32543 at 2102 in Guildford; R.Nac Eq.Guinea via Malabo 6.250 (Sp? 0500-2200) 23332 at 2112 in Storrington; BBC via Limassol, Cyprus 6.180 (Eng to Eur 1700-2200) 43343 at 2125 in Woking; BBC via Antigua, W.Indies 5.975 (Eng to C/S.America 2100-0800) 22332 at 2148 in E.Worthing; AWR via Slovakia 6.055 (Eng to Eur 2100-2158) SIO323 at 2155 in Co.Fermanagh; BBC via Sackville, Canada 6.175 (Eng to N.America 2200-0430) 44434 at 2325 in Penmaenmawr; R.Nederlands via Bonaire, Ned.Antilles 6.165 (Eng to N.America 2330-0125) 34222 at 0046 in Newry; R.Nac del Peru, Lima 6.095 (Sp 1100-1500, 2200-0500) SIO223 at 0156 in Gt.Yarmouth.

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Grundig Satellit 500 1612kHz-30MHz synch. demod, l.s.b., u.s.b., 42 memories, p.l.l. synthesised receiver bandwidth 1.9kHz narrow, 3.4kHz wide, manuals, £165 o.v.n.o. Tel: North Humberside (01482) 891488.

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PRO-2022 desk top scanner, 68-88, 108-136, 136-144, 144-174, 380-512, 806-960, boxed, 200 memories, instructions book. David Fry, Devon. Tel: (01803) 328876.

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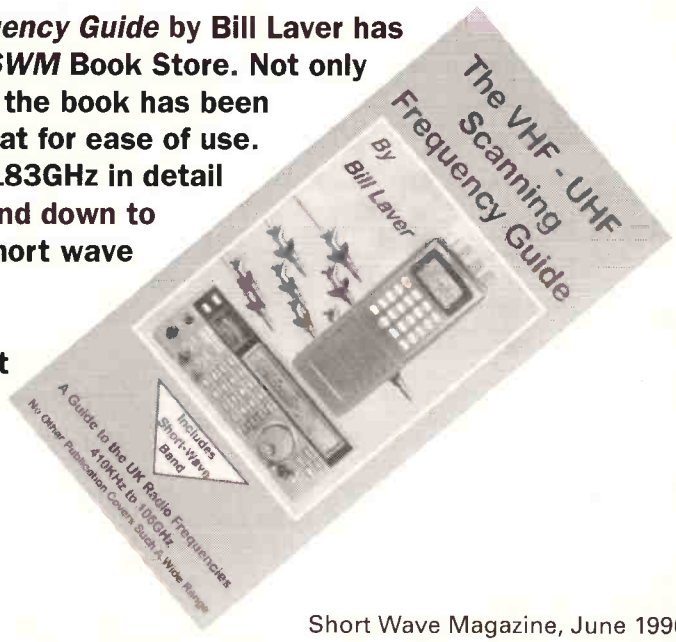

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