

short wave magazine

APRIL 1998 £2.75

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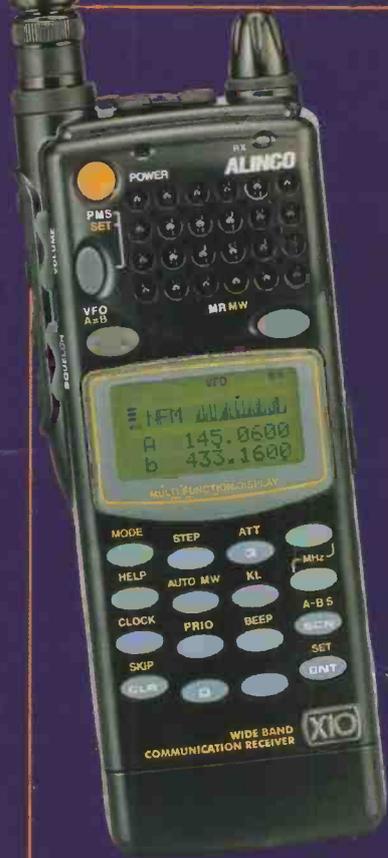


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The receiver has "breathtaking performance" ensuring this set is destined to be a number one seller

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108 - 170MHz 806 - 1000MHz
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- **BAND MEMORIES:** 10
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CATALOGUE OFFER

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Techtoyz

the miniature test equipment line from optoelectronics

TMC100 Rubber Duck Antenna

They're Compact and Easy to Use...Featuring **Techtoyz**, the Pager Sized Test Equipment line from **Optoelectronics**.

If compact test equipment is what you're looking for, then the **Techtoyz** line is for you. All three **Techtoyz** products are built into pager style cases, small enough to fit in your palm, yet powerful enough to take on your biggest jobs. The Techtoyz line includes the new Micro Counter and Micro DTMF decoder, and now introduces the all new Micro RF Detector, a two mode (bargraph or numerical display) signal strength meter. Each mode can be set to activate a beep when signal strength reaches a selectable level from 1 -100, that also activates the hit counter which stores up to 250 hits. The Micro RF detector covers a wide, 10MHz - 2GHz, frequency range.



Bargraph Mode

**MADE
IN
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Numerical Mode



Micro Counter

- 10MHz - 1.2GHz Range
- 12 character LCD Display
- 1kHz, 100Hz and 10Hz Resolution
- 2.5mm stereo jack for optional antenna
- Store 3 frequencies in memory



Micro DTMF Decoder

- Internal microphone for audio input
- Line audio input jack
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Cover.

Photographs courtesy of Peter Blanchard.



Please Help!

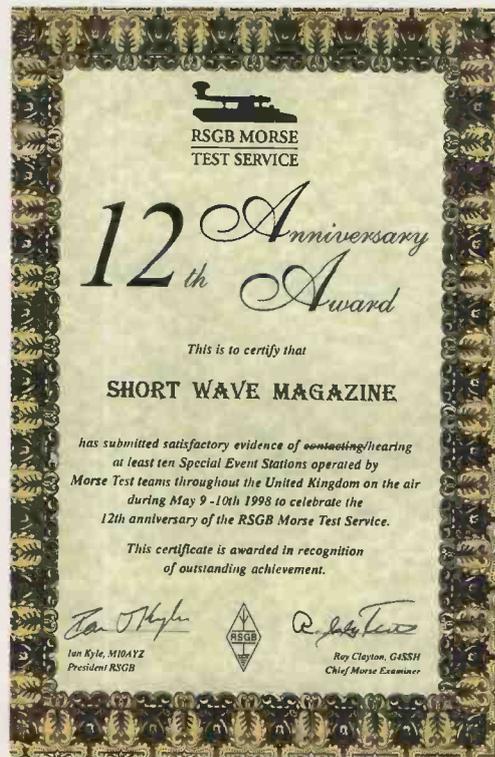
Please try and help to make Zoë's job easier by filling in your Trading Post forms as neatly and clearly as possible. Please write in **BLOCK CAPITALS** and always check your contact details are correct, you'd be surprised at the many who incorrectly write their own telephone number!

New Indoor Loop Antenna

Keep a look out for the ALA 2000 broadband Loop, newly introduced by **Wellbrook Communications**. It has a frequency range from 150kHz to 30MHz and is functionally identical to the ALA 1530 outdoor loop, reviewed in the 1998 *WRTH*. Costing £69.95 including P&P, find out more from Wellbrook Communications at **Wellbrook House, Brookside Road, Bransgore, Christchurch BH23 8NA, Tel: (01425) 674174**.

Yupiteru MVT-3300EU Winner

The lucky winner of the competition held in the February 98 issue to win a Yupiteru MVT-3300EU was **Mr A. Jackson**, in Bristol, who will be receiving his receiver, kindly donated by **Nevada Communications**, shortly.



RSGB Morse Test Service

During the 12th anniversary weekend of the 9-10th May, the County Morse test teams will again be on the air. For ease of identification, all stations will use a special event GB0 prefix, followed by the county code suffix, e.g. the Isle of Wight will use the callsign GB0IOW and London will use GB0LDN. The Chief Morse Examiner will use GB0CW and the Deputy Chief Morse Examiner GB0MTS.

There will be a minimum of 26 stations active and a Morse Test 12th Anniversary certificate will be available to any amateur who makes contact with at least 10 of the GB stations. The cost of the certificate is £2.50 (cheque or postal order made out to the RSGB), \$5 or six IRCs.

Applications with log extracts only should be sent to the Chief Morse Examiner, **Roy Clayton G4SSH, 9 Green Island, Irton, Scarborough, N. Yorkshire YO12 4RN**. QSL cards are not required to claim the award, which is also available to listeners for hearing these stations. Activity will be concentrated in the 80 and 40m bands.

Lighthouse Activity Weekend

A total of 36 stations were established at lighthouses and lightships in 14 countries over the weekend 23/24 August 1997. The event is **not** a contest and each station decides how they will operate their station regards modes and bands.

This year, The Lighthouse/Lightship Activity Weekend will be from **0001UTC on Saturday 22 August until 2359UTC on Sunday 23 August 1998** and all radio amateurs in the world can join in the fun of the weekend by establishing a station at a lighthouse or lightship.

To assist other stations, it is requested that participating stations add 'Light', 'LGT', 'Lighthouse' or 'Lightship' after their call. Also, if any amateurs wish to join in the weekend, then please let Mike Dalrymple know. He will eventually need to know the callsign, the QTH and QSL information.

So far, 25 countries have said they will be joining in the fun of the weekend and invitations have gone out to another 38 countries in the last few weeks.

For further information, contact Mike at **11 Shawfield Avenue, Ayr, Scotland KA7 4RE** or E-mail at: **gm4suc@compuserve.com**

INTERNATIONAL SHORT WAVE LEAGUE

MONITOR AWARD

This is to Certify that

operator of station has submitted satisfactory evidence of having worked/heard 25 members of ISWL.

DATE PRESIDENT

CERTIFICATE NO. SECRETARY

Monitor Award

The **International Short Wave League** are pleased to announce that the Monitor Award is now open to non-members of the ISWL. The Monitor Award is now available to all licensed amateurs and s.w.l.s.

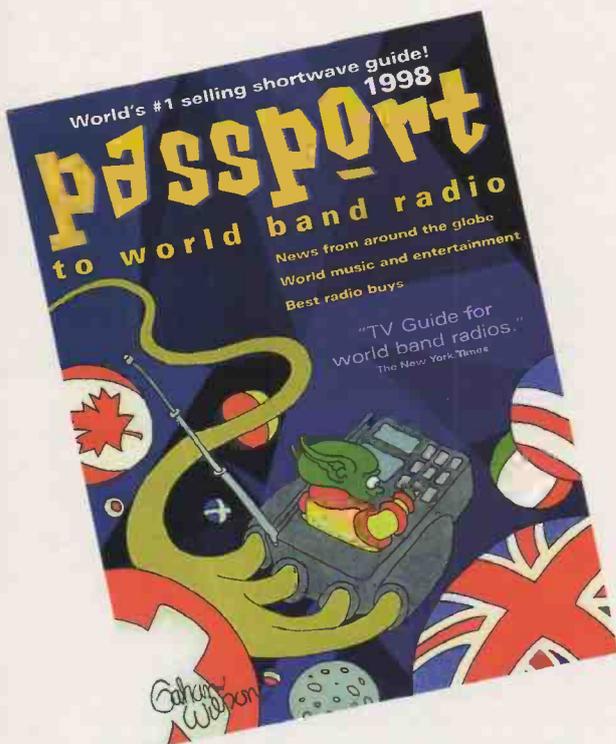
To qualify for the award, applicants must have 25 confirmed contacts with ISWL members. This can be either QSLs or reception reports. A certificate, like the one shown, will be awarded for the first 25 confirmed contacts and endorsement stickers for each subsequent 25.

A *Check Book*, containing a listing of all current ISWL members is available to help prospective Monitor Award hunters in their quest. Licensed ISWL members can be found on the ISWL Nets. A list of the ISWL Nets can be obtained from the ISWL HQ or from our website at <http://www.aber.ac.uk/%7Esrj5/iswl.html>

Full details about the award and costs, etc. from: **ISWL Awards & Contests Manager, Belle Fleurs, Wade Reach, Walton on the Naze, Essex CO14 8RG**. The *Monitor Award Check Book* is available from: **David Beale G-10618 / G0DBX, 'Kenwood', London Road, Louth, Lincolnshire LN11 8QH**.

Passport 1998

Have you ordered your copy of *Passport To World Band Radio 1998*? If not, why not place your order now? *Passport To World Band Radio 1998* covers it all, what's on, what to buy, how to get started and how to get the most from your listening. Order your copy now from the SWM Book Store for only £15.50 plus £1 P&P (UK).



Capacitor Wizard

Now available from ICHE, the Capacitor Wizard, made by Independence Electronics in the USA. The Capacitor Wizard is an extremely fast and reliable way to check capacitors of 1µF and above in circuit!, eliminating the need to remove the capacitor for accurate tests. The Capacitor Wizard claims to find bad caps that even very expensive capacitor checkers miss entirely, even out of circuit!



The Wizard's method of measurement is based on sound basic electronics. It is an a.c. ohm meter, with its frequency, waveform and measurement

point carefully chosen to maximise its ability to measure low values of ESR (Equivalent Series Resistance) of capacitors 1µF and above. Any capacitor failure mode will cause the ESR of that capacitor to increase in resistance (except shorts).

If a capacitor has dried out, is open or otherwise has suffered drastic failure, the measured ESR will be near infinity. If a capacitor has changed capacitance slightly, it has a problem, and that problem will show up as several ohms increase in the ESR. For this reason, a standard capacitance meter that does not measure ESR could lead you to believe that a bad capacitor is actually good!

For more information on the Capacitor Wizard, call ICHE for a catalogue on 0115-932 0152, FAX on 0115-944 4004 or visit the ICHE website at <http://www.iche.com>

Network News

The *Military Air Scan Network News* is a quarterly, military only, airband publication, only available by annual subscription from **MGT Publishing, PO Box 564, Norwich NR7 8DD**. Subscription rates are £12 (UK) inc. P&P, £14 (Europe/Rest of world) inc. P&P. Cheques to be payable to MGT Publishing.

Grassroots List

Don't forget, you can still receive a full listing of Grassroots by sending a stamped self-addressed envelope to Lorna Mower at the Editorial Offices. Please mark your envelope 'Grassroots List'. If you have Internet access, take a look at www.pwpub.demon.co.uk/SWM/grassroots

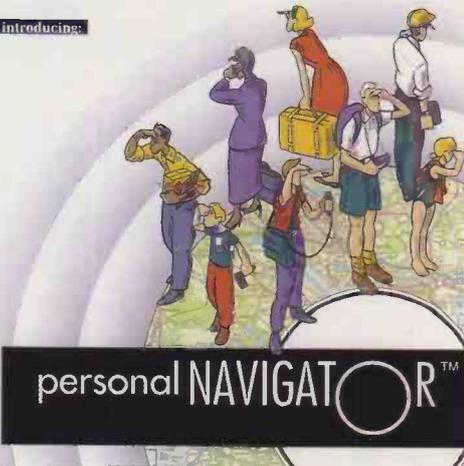
Personal Navigator - Special Offer!

The *Personal Navigator* software package, available from **Nevada Communications** can be used as a stand-alone reference or linked to a GPS to give satellite navigation and real time tracking of the movement of your vehicle. Digital maps give full colour topographical coverage of the UK and in addition the package includes the good pub guide and the good guide to Britain, listing over 10 000 places to visit or drink at.

Egon Ronay's guide of more than 5000 hotels, restaurants, pubs, etc., enable you to pinpoint their location. A postcode database of more than 1.6 million postcodes is built-in and simply by typing in the postcode, you can instantly read a full address whilst the map re-positions itself to show the location. A petrol stations database even tells you the location of the nearest petrol station! Amazing, eh!

The recommended retail price is £119, however, Nevada are giving all *Short Wave Magazine* readers the chance to purchase one for just **£99 including P&P**. Order yours now by contacting Nevada at: **189 London Road, North End, Portsmouth, Hants PO2 9AE, Tel: (01705) 698113 or FAX: (01705) 690626**, remembering to quote *SWM*!

introducing:



Send your news to Zoë Crabb at the Editorial Offices

rallies

***March 29:** The Cunningham District Amateur Radio & Computer Rally will be held at the Magnum Centre, Harbourside, Irvine, Ayrshire, Scotland. Doors open at 1100 (1030 for disabled visitors). There will be a Bring & Buy, Morse tests and all the usual traders, etc. **Mr W. Gebbie** on (01560) 321009. E-mail: supergit@msn.com or gm3usl@qsl.net

March 29: The Pontefract District Amateur Radio Society Component Fair is to be held at Carlton High School. The venue is 300m from the Carlton Community Centre. Car parking will be at the school as usual. The venue will be signposted from the major roads. There will be a talk-in on 2m. For unlicensed visitors, Nigel Ferguson G0BPK can be contacted 0900 to 1400 on (mobile) (0411) 420409 for directions. Doors to the fair open at 1100 (disabled visitors will be admitted at 1030). Once again all traders will be on the ground floor. The bar and tea room (tea room open for early visitors) will be on the first floor. Morse tests will be conducted. Admission will be by prize programme. Contact **Nigel G0BPK** on (01977) 616935 in the evening or on (01977) 606345 during the day, or E-mail at g0bpk@aol.com. Traders please contact **Colin G0NQE** on (01977) 677006.

April 5: The Cambridgeshire Repeater Group (CRG) are holding their annual rally at The Bottisham Sports Centre (Part of Village College), Lode Road, Bottisham, Near Cambridge. The event will feature an Auction Sale, Trade Stands, a Bring & Buy and a Car Boot Trading area. For further details and booking in of traders may be obtained from: **Paul Dyke G0LUC, 41 High Street, Puckeridge, Ware, Herts SG11 1RX** or telephone on (01920) 821536.

April 5: A Radio Fleamarket is to be held at the University Sports Centre - Uia Wilrijk/Antwerpen in Belgium, close to A-12, Belgium. Open from 1200 to 1800 local time. Radio stb: 145.7625MHz Repeater Antwerpen and 145.425MHz simplex freq. Call ON4OSA. More information from **ON4CDV Gaetan CM/OSA**, E-mail: on4cdv@mail.dma.be club site: <http://bewoner.dma.be/on4osa/main.htm>

April 18: The SAMS'98 Computer & Electronics Show is to be held in the Bingley Hall, Staffordshire Showground, Weston Road, Stafford (A518 Stafford-Uttoxeter Road), signposted from junction 14 on M6, (bus shuttle from Stafford Railway Station). Doors open 1000 to 1600. Admission for adults is £3, children under 14, 50p, Concessions, OAPs, RSGB Members, Student Card, UB40, £2, (Advance Tickets £2 plus s.a.e.). This is the 10th consecutive year and the 13th AMS (All Micro Show) at Bingley Hall. Last year saw an attendance of approx 3000 and around 100 trade stands covering the computing spectrum, along with accessories, software, books, components, radio, satellite and much more. There will be masses of free parking a licensed bar from 11am and refreshments, meals and a cafeteria. A great day out! **Sharon Alward, Sharward Promotions, Knightsdale Business Centre, 30 Knightsdale Road, Ipswich, Suffolk IP1 4JJ**, Tel: (01473) 741533, FAX: (01473) 741361 or E-mail: services@sharward.co.uk

April 19: The Yeovil ARC 14th QRP Convention is to be held at Digby Hall, Hound Street, Sherborne.

CONTINUED ON PAGE 7

Datax For System Developers

Link Into Feba

Feba Radio Sunday is an annual opportunity for churches around Britain to have a Feba Radio prayer spotlight in one of their services that day. Link into Feba Radio Sunday by requesting a Churches Information Pack (which includes a cassette to play in church and prayer topics) from **Jennie Ring, Feba Radio, Freepost, Worthing, West Sussex BN14 7BR** or Tel: **(01903) 237281** (24 hours).

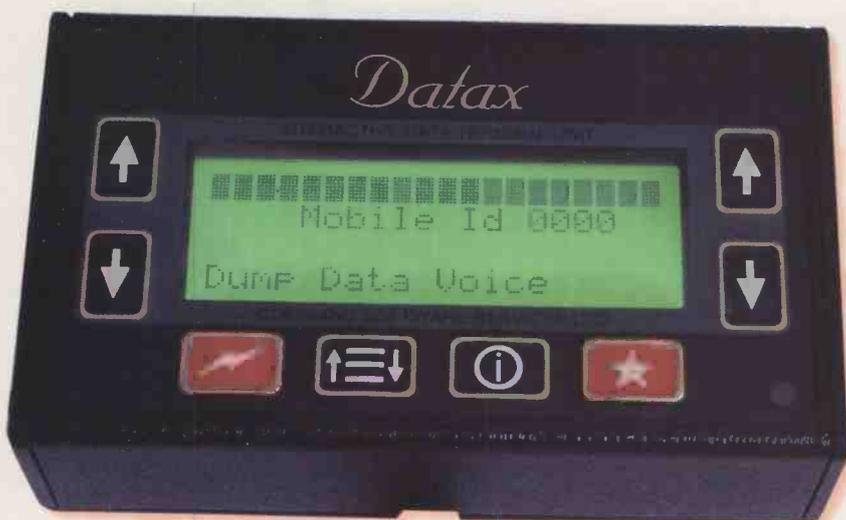
Diplomat Communications has released a build-variant of the popular Datax Mobile Data Terminal. The Datax MDT has been widely recognised by the taxi, private hire, and courier industries as the industry-standard preferred data terminal.

The ready availability of a universal hardware platform, based around the popular 87C51 microcontroller, enables other organisations to develop specialised but cost-effective solutions for their clients. An inbuilt RS-232 interface enables the Datax terminal to communicate with PCs or external peripherals such as GPS receivers, printers and card-swipe readers.

Software is already available that complies with MPT1379 and ETS 300 113. The unit is currently being evaluated for a MAP 27 interface.

At less than £200 and only 124 x 75 x 35mm in size, the unit is the favourite platform for application developers and end users alike. For further information and a data sheet, contact **Stewart Harding** or **Ivor Davies** at **Diplomat Communications Ltd.** on **(01256) 381656**.

At less than £200, the Datax MDT is the favourite platform for application developers and end users alike.



May Fair

The **National Vintage Communications Fair**, is held this year on Sunday 10th May 1998 in Hall 11 at the NEC in Birmingham. Doors open at 10.30am until 4pm and then entry fee is £5. For further details and booking/advertising forms, contact **Sunrise Press, Spice House, 13 Belmont Road, Exeter, Devon EX1 2HF** enclosing an s.a.e. or telephone **(01392) 411565**.

Credit Where Credit's Due

Last month's *SWM* carried an item on a hoax distress call involving the Search and Rescue services in the Irish Sea. Unfortunately we omitted to credit the source of this item. So, to put things straight, thanks go to the World Utility News club.

The MMIC Solution

Mitsubishi Electric is announcing the introduction of the MGF7136P receive and transmit front end GaAs MMIC, which is ideal for 1.9GHz applications such as PHS handy 'phones. The small outline device comes complete with integrated power amplifier.

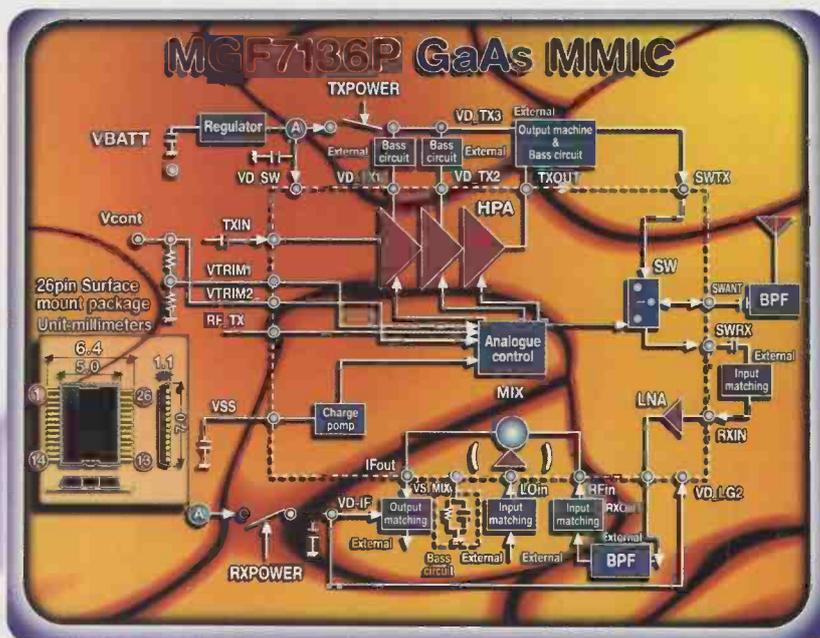
MGF7136P, which measures just 7 x 5 x 1.1mm and comes in a surface mounting 26 pin package, is already a best selling market leading device in Japan. Features include a power gain of typically 38dB for the transmission amplifier, with a typical adjacent channel power greater than or equal to 55dBC at ±600kHz.

Operating current consumption is just 140mA (drain) at 21dBm output power. The new device features an input matching circuit for the transmission amplifier that operates in conjunction with an external output matching circuit, but includes a negative generator.

The receive amplifiers typically provides 14dB gain with a minimum noise figure of typically 1.8dB. The receive amplifier operates with internal output and external input matching circuits. For the receiving mixing circuit, which operates in conjunction both external input and output matching circuits, gain is typically 9dB with a noise figure of typically 7dB.

In r.f. switching, insertion loss is typically 0.6dB with an isolation of typically 20dB. The device's control logic incorporates RX/TX switching and timing control as well as transmission amplifier-bias trimming.

Mitsubishi's highly integrated RX/TX front end MMIC solution the MGF7136P.



The new Merlin Battery Guard.



Power Protector

Flat batteries on today's vehicles, ambulances and other vehicles cost operators millions of pounds per year. Not to mention creating dangerous situations involving emergency vehicles or nightmares for fleet managers having a truck full of expensive equipment stranded at the side of the road. The problem is getting worse.

With more lighting, heating, navigation and tracking aids fitted to modern vehicles, flat batteries will feature as a regular occurrence for most drivers. However, the new Merlin Battery Guard System prevents such problems by disconnecting the battery from loads before it is completely discharged.

An intelligent management system ensures that enough power is retained in the battery to allow re-starting of the engine at all times. Made up of three components (a switch, precision relay and microprocessor controlled Central Processing Unit), the Merlin Battery Guard is simple to install and operate.

Once the vehicle's engine is switched off, the Merlin Battery Guard starts monitoring battery condition. If the unit senses that the battery voltage has dropped below 12 of 24V d.c. (depending on the system) for more than four minutes, an alarm will sound and the relay will automatically disconnect the battery, preventing further discharge.

For systems that must never be disconnected (e.g. memories for vehicle management system stereos, etc.) a fused 5 amp bypass circuit is provided so that systems can remain active after Battery Guard Shutdown. Supplied as a kit with all cabling and terminations ready for installation, the Battery Guard costs £160. As the Merlin Battery Guard will pay for itself through call out savings and extended battery longevity alone - can you afford to be without one?

Available direct from **The Merlin Group, Unit 1, Hithercroft Court, Lupton Road, Wallingford, Oxfordshire OX10 9BT, Tel: (01491) 824333, FAX: (01491) 824466.**

Radio & TVDX News

One of the first local area TV licences - Isle of Wight TV12 should be on the air this summer. Reckoning on a seven day-a-week transmission schedule, the studio base will be at Medina High School and offer local news, education and entertainment. The transmission channel is as yet unknown. And nearby Isle of Wight Radio will soon leave their 1242KHz medium wave channel in favour of v.h.f. Two transmitters will prove the island's coverage, the main ex Chillerton Down and a small relay at Ventnor. The v.h.f. channels may be on-air by April for a period of dual transmission i.e. mw and v.h.f. before 1242 closes down.

Fashion group Benetton have sold off their Milan based news channel SEI-TV - complete with equipment, transmitters etc. - to the Italian language Swiss TV and Radio - TV Svizzera.

Albania's RTV Shquiperia has only partial coverage across the country, following the riots and civil unrest during 1997 which caused serious damage to equipment and transmitters. The large towns of Shkodra and Lezha have no TV available and the financial situation within the state is such that no date can be given as to the restoration of the service.

Programme hours on Ukraine's TV channel '1 + 1' have been extended from 9 to 12 hours daily. The commercial station went into profit Autumn '97 and uses the UT-2 transmission channels covering 95% of the population. And nearby Latvia dropped the SECAM colour standard in favour of the West European PAL standard from 1st. January this year.

Poland's new TV channel 'Nasza Telewizja' went on-air January 17th offering 17 hours of daily programming targeting a female audience. Coverage is main central Poland

joining with the 'TV Odra' network during the evening hours extending coverage into Western Poland.

The government in Botswana is to open a national TV service offering news and current affairs across Botswana, vacancies are currently being advertised in the media press.

We're well into the new solar cycle no.23 looking forward to a relatively high peak of sunspot activity - and high MUFs hopefully up to the v.h.f. region - in about March 2000. TE (trans Equatorial skip) has already been experienced into the Mediterranean region from stations South of the Equator and with luck the southern UK should experience evening TE into low v.h.f. this coming Autumn.

Lake On Net

The latest **Lake Electronics** Catalogue of kits and equipment for amateurs, CB and short wave listeners can now be found on the Internet. So,

why not visit their web pages at

<http://ourworld.compuserve.com/>

homepages/radkit and see the complete range of kits on screen, together with ordering information!

rallies

Dorset. Doors open 0900-1700. There will be high quality lectures with the Reverend George Dobbs as 'VIP', plus trade stands, Bring & Buy and refreshments, etc. Talk-in on S22. Entry is £2, which includes prize draw ticket. **Peter G3CQR, QTHR**, or telephone on (01935) 813054.

April 19: The 17th Mobile Rally of the Lough Erne Amateur Radio Club will be held at the Killyhevin Hotel, Enniskillen, Northern Ireland. Doors open at 12 noon. Tyrone Amateur Electronics will be there and it is hoped Icom, Yaesu, Waters & Stanton as well as the usual interesting variety of other traders and the Bring & Buy. **Keiran G17NET** on (01365) 348063 (daytime) and (01365) 327133 (evenings).

April 19: The Swansea ARS Amateur Radio & Computer Show will be held in the Swansea Leisure Centre on the A4067 Swansea-Mumbles coast road. Doors open 10.30am to 5pm. Attractions include trade stands, Bring & Buy, h.f./v.h.f. stations, special interest groups, a licensed bar and full catering, S22 talk-in. **Roger Williams GW4HSH** on (01792) 404422

May 4: The Dartmoor Radio Rally is to be held at the Yelverton memorial Village Hall, Meavy Lane, Yelverton, Devon. There will be parking for 600 cars and access for disabled visitors. There will be trade stands, a Bring & Buy, refreshments, etc. Doors open at 1030, talk-in on S22. There is beautiful views over Dartmoor, so ideal for a picnic, why not bring the whole family. **Ron G7LLG** on (01822) 852586.

May 10: The Drayton Manor Radio & Computer Rally will be held at Drayton Manor Park, Fazeley, Tamworth, Staffordshire on the A4091. Main traders are in four marquees, there will also be a large outside traders flea market, a Bring & Buy stall, local clubs and special interest stands. Doors open 1000 onwards. For Trader information call **Norman** on 0121-422 9787, for general enquiries, call **Peter G6DRN** on 0121-443 1189, evenings please.

May 17: The Dunstable Downs Radio Club will be holding its Annual Amateur Radio Car Boot Sale at the Stockwood Country Park, Luton, Bedfordshire. The site opens at 0900 until 1300. Leave M1 at junction 10a, turn left and follow signs for 'Mossman Collection'. Talk-in on S22. Note new address for bookings! Please do not use any other address or phone number. **DDRC, PO Box 4053, Dunstable, Beds LU5 5ZJ.**

May 17: The Rippon & District Amateur Radio Society (RADARS) are holding their 41st Northern Mobile Rally at The Pavilion, Great Yorkshire Showground, Harrogate. There will be the usual traders, a Bring & Buy and quality catering (possibly a bar). Doors open at 1030. Access behind Sainsbury's, off A661 Wetherby Road. **Gerald Brady G0UFI** on (01765) 640229 (combined phone and FAX number), E-mail: **woody@tangan.demon.co.uk** or packet at **g1uxp@gb7cym**

May 24: The 22nd East Suffolk Wireless Revival (organised by Ipswich RC, Martlesham RS and the Felixstowe & DARS) is to be held at Stoke High School, SSE of main rail station, map ref: TM164435. This Radio & Computer Rally is open from 10am (9.30am for disabled visitors) until 4pm. Talk-in on S22. Further details from **Sam Jewell G4DDK** on (01394) 448495, E-mail **jewell@btinterbet.com**

Send your news to Zoë Crabb at the Editorial Offices

TOP
QSL

Pirate Operators

Dear Sir

I have recently stumbled on what sounds like a form of 'amateur' radio, outside the amateur bands, using frequencies around 6.6 and 3.4MHz. The operators use the l.s.b. mode and hold 'QSOs' in typical amateur radio style, with similar call signs.

They even use amateur transceivers. I have heard mention of the Icom IC-706 and Yaesu FT-430S for example, although these would need to be modified slightly to transmit on non-amateur frequencies. They also speak of using antennas such as multi-band dipoles, which many amateurs use.

These operators might possibly be pirates, there may be a link with CB radio, as I heard one mention 'eleven metres', which is 27MHz! Similarly the 6.6 and 3.4MHz bands are referred to as '45' and '86 metres'.

This operation might seem to be most popular in France, judging by the amount of French I hear, though this may be because the propagation (at least on '45 metres') generally favours their signals here. Can anyone shed any light on these signals?

Ian L. Wadman
Newbury
Berks

I recently received the following communication from the Radiocommunications Agency. It answers some of Ian's questions and it is definitely worth taking note of its contents!
"The Agency has recently monitored an upsurge of amateur-style illegal radio activity on a range of frequencies at HF, but particularly around 6.6MHz. The frequency band 6.525 - 6.765MHz is assigned for the exclusive use of the aeronautical service. Consequently unauthorised operation within this band is viewed very seriously by the Agency and other Administrations. The Agency, working with its international colleagues, is determined to take action against those who insist on using this part of the radio spectrum for personal radio communications without regard for authorised use. Those detected can expect to be prosecuted. Furthermore, initial monitoring has indicated that some of those involved may well hold amateur radio licences. Any amateurs found operating in this way would also risk jeopardising their licence as the Agency would have no alternative but to consider revocation. I am sure that the great majority of licensed operators who work within licence conditions will support the Agency's response to this problem." **Ed.**

Help Needed

Dear Sir

Please could you put my message in your 'Letters' page as it would be a big help to me. I have recently become interested in the hobby of scanning, but I really haven't a clue what I'm doing and what I'm spending my hard earned dosh on, so help!

Please could another scanner hobbyist in the Kettering, Northants area show me the ropes of getting started in this brilliant hobby? Many thanks.

Si, 78 Wood Street
Kettering
Northants NN16 9PP

Dear Sir

I have a PK-232 MBX t.n.c. which has developed a fault that prevents it 'talking' to the PC. It appears that an i.c. is faulty. As I am unable to solder, because of very poor vision, I need the address of someone who would be prepared to repair the t.n.c. for me.

I have put a message on the local Packet and also on the local Amateur Radio page on the Internet, but unfortunately nobody has replied or appears to want to help me. Hope you can assist.

Kindest regards.

K. Macleod GM4VST
84 Drumossie Avenue
Inverness
IV2 3SX

Can any reader offer to help Ken repair his t.n.c., or Si with his scanner? **Ed.**

Manuals

Dear Sir

Having recently added the recently reviewed Yupiteru MVT-9000 to my collection of 'toys', I was very disappointed with the instruction manual, almost to the point that I was considering selling the radio back to the shop. However, whilst poking about on the 'net, I came across a chap from the States by the name of Rich Wells in the Radio Scanners section.

If you and your readers have not seen some of the research done by this person, I strongly urge you to do so! Just look up Richard using any search engine whilst browsing Radio Scanners. Oh yes, he has completely rewritten the user manual for the MVT-9000 and at last I can make the infernal thing to work like the designers intended, and no, I am not selling it!

Andy Goloskof
Tewkesbury
Glos.

PS. How on earth does this magazine just keep getting better and better? I know of no other publication that has consistently managed to improve its standard at this rate and for so long. Keep up the excellent work.

RAFARS

Dear Sir

I have recently taken over the post of General Secretary of the Royal Air Force Amateur Radio Society. May I please use your letters column to iron out some misunderstandings about becoming a RAFARS members.

At a rally I attended last month, I talked to many visitors and was amazed to hear that some, who were in the RAF as National Servicemen, did not think that they would qualify for membership of RAFARS. Nothing could be further from the truth. We welcome into membership anyone who has served in the RAF at all, including the reserves, and anyone associated with the RAF, including civilians employed by the MOD (Air). Cadets and instructors of the ATC or the RAF section of a CCF are also very welcome. Commonwealth, NATO and Allied Air Force personnel can become Associate members.

The Society's 'in house' magazine QRV is published every six months and is a forum for our activities and for members to tell of their history and experiences. There is a great fund of knowledge out there which needs remembering and recording before we all step off this world.

I would like to urge anyone who fits our membership criteria to contact our treasurer Peter Lewin G0JKW at 24 Brookfields Road, Wyke, Bradford BD12 9LU for an application form.

Mike Street G3JXJ
General Secretary RAFARS
Telford
Shropshire

Radio Australia

Dear Sir

I bought myself the February copy of SWM on 22nd January and reading LM&S reception reports was interested in the report by a s.w.l. in Bristol of Radio Australia being received on 9.435MHz.

On January 25th (Sunday last) I decided to see if I could get it on my little Grundig 205, which has two short wave bands and uses a small telescopic antenna. It brought in Radio Australia quite strongly.

I then tried it on my Yaesu FRG-7700 and it was a very good reception, so I put it in the set's memory. Finally, I tried to receive the transmission on an old Philips tuner amplifier, which has just got one s.w. band, again it was there! and they were playing music by the original Australian group, 'The Seekers'. The time was 2030 hours or thereabouts.

I have monitored this frequency on and off for a week and have found quite steady results, right up to 2200 hours. Having

spent some of my war service in Australia in 1945-46, I have always kept in touch with families I was befriended by, so hence my interest in Radio Australia, and the pleasure of being able to listen to the Pacific and Asia transmissions, so I am grateful to the listener who gave the frequency into the magazine.

Incidentally, I wrote to you last week about the excellent service I received from Lowe Electronics who repaired and serviced by Yaesu FRG-7700, the radio is working as good as it did when new!

**Patrick Connor
Trowbridge
Wiltshire**

Dear Sir

I think your correspondent David Clarkson may be rather disappointed in attempting to monitor the high frequency marine u.s.b. radio-telephone bands. I have been retired from marine communications engineering about seven years and have noticed a very marked reduction in h.f. R/T traffic during this time, although this in part is due to the reduction in number of ships.

Most official ship's business is conducted by written messages for which the international telex (teleprinter) network is extensively used. The great majority of radio-telephone traffic always used to originate on passenger ships by passenger's calls. Although rarely (far fewer) ship-to-ship calls still occur between ships where technical problems arise or even for a chat, these calls mostly use the h.f. R/T single frequency simplex intership channels, not via a coast radio station.

Time is very important to modern ship's operations as money is only earned when the ship is sailing - not whilst in port or docking.

Because the new mandatory Global Maritime Distress and Safety System (GMDSS) takes advantage of the Inmarsat satellite service there has seemingly been a marked increase in marine satellite terminals fitted to passenger/cargo ships. On these ships the great majority of telephone and telex traffic is made over the Inmarsat network (some specialised passenger ship terminals are even capable of several simultaneous telephone calls).

Even those ships not yet fitted with satellite systems may have marine radio-telex (Sitor ARQ mode) teleprinter system installed for use with terrestrial s.s.b. equipment, sometimes with unattended scanning facilities covering several h.f. telex channels/bands.

Note: This radio-telex system has the grand title 'narrow band direct printing telegraphy' and is compatible with international land telex network, sometimes by direct through dialling.

For the above reasons, I think Mr Clarkson may find very little h.f. R/T voice traffic because it is mostly conducted over satellite. There are two notable exceptions, these are Greek and Soviet ships, which are still frequently to be heard, but not in English.

I never understood the reasoning behind the provision of the h.f. R/T calling channels, whenever I wanted to make commissioning test calls to coast radio stations, I simply set up the radio on the relevant primary paired u.s.b. frequencies, monitored the coast station until free and then made my test call.

I can remember though, in pre-Inmarsat days, where there was a queue of 23 ships waiting to establish an R/T call through Portishead radio. Coast radio station operators were really little gods in those days, if you missed your turn - tough!

Mr Clarkson might be better to try monitoring Portishead's h.f. R/T working channels, particularly 8MHz band, but I don't have any up-to-date frequencies as the ITU regulations (including frequencies) have changed since I retired. The higher of the paired frequencies is usually coast transmit/ship receive.

Name & address supplied

Dear Sir

Today I received the latest (March 1998) issue of *SWM*, and I thought I might send a note/E-mail for the Letters page. The March issue is very good, and I especially like that 'SSB Utilities' column! Very good indeed. (Well, you would say that, wouldn't you? Ed)

Anyway, I thought that I would comment on the letter by Terry Campbell of Moray on the choice of a replacement scanner for airband listening. He says "how can the VT-225 be ideal for airband listening when the upper limit of the u.h.f. range is 391MHz?" Well, within the next few years this will cease to be a problem, because that portion of the u.h.f. airband has been re-allocated - part of it is now being used for the TETRA system. I'm sure that John Griffiths can comment on that system, what it is used for, etc. I know that it is in use in a few 'test areas' around the UK already, with more to follow.

Terry Campbell now has his MVT-7100, but in a few years time airband transmissions will start to move to 8.33kHz steps - can his MVT-7100 cope with this? I have an MVT-7200, which has 6.25kHz steps, so I should be able to hear most transmissions. Some may sound a bit 'woolly', but even I am waiting to see what happens before considering a new scanner.

However, in the meanwhile, I would agree with Terry; the MVT-7100 is certainly a scanner that I would recommend.

Another letter in the same issue, from William Tait, comments on the increasing size of

computer programs. I still remember writing programs to run in DOS, and I am still not entirely happy in using Windows programs, whether they are 3.1, 95, or NT variety. When you look through the seemingly endless computer magazines and see the price of computer software and hardware falling at surprising rates. One wonders where it is all going to end - I'm just waiting for PCs to be given away with cornflakes packet-tops, or with a full tank of petrol!

**Graham Tanner
graham.tanner1@virgin.net
London**

Dear Sir

I read with interest your editorial in the March issue of *Short Wave Magazine* (note that name!), in which you say that 'some of the regular columns will be getting an increased page allocation to allow us to make the pictures larger'. While improvements are always welcome, this reader, for one, doesn't actually want bigger pictures.

What I would like to see are more column-inches of textual information. In particular, Graham Tanner's SSB Utility Listening column is given a pitiful amount of space, especially when compared to that allocated to such distinctly non-short wave topics such as DXTV, Weather Faxes and - for goodness sake - Satellite TV News.

Graham frequently says that he cannot explore a particular subject because he hasn't enough space, so why not give him some more? A couple of pages should do it - *SWM* might then compare more favourably with *Monitoring Times'* coverage of this topic.

**Pete Wiggins
Stroud
Gloucestershire**

Well, here it is. I hope that you, and all the other readers, appreciate the new ideas and 'look' of the UK's best selling hobby radio magazine in both content and visual appeal (not easy with a technical subject). As usual, we always listen to your comments - and we strive long and hard to bring you the very best information and most interesting articles within a well balanced magazine each month. Ed.

ed's comments

You should have noticed that there have been some changes with this issue of your favourite magazine.

First, we have colour throughout and this has allowed Steve, our Art Editor to make better use of the pages. Second, we have rejigged the regular

columns to give us more useable space. Scanning, as a regular column, has gone.

Instead we will be giving more pages in the body of the magazine to scanning articles. A new Broadcast section has been created incorporating LM&S and Bandscan.

In this issue, Airband has been taken out of the back of the magazine and forms part of the Airband Special. Next month it returns to its normal position and Propagation will form the basis for the special feature.

A new column appears with this issue - ENIGMA have agreed to compile a bi-monthly column on Numbers Stations and this will alternate with Jerry Glenwright's very popular 'ShackWare'.

Grassroots will no longer appear in the magazine's pages. However, if you are interested in club activities, just send a stamped addressed envelope to Lorna Mower at the Broadstone Offices and she will send you a complete listing or for those of you with internet access, you can find the info at www.pwpub.demon.co.uk/swm/grassroots

As always, your constructive criticism will be welcomed - It is my intention to maintain *SWM's* position as the UK's leading hobby radio magazine.

Dick Ganderton G8V FH

Dick Ganderton has been looking at Sony's quality portable worldband receiver - the ICF-SW55.



Sony ICF-SW55

Tuning

Three methods of tuning are provided. Direct tuning is by means of a keypad on the left of the large liquid crystal display panel. The desired frequency is simply input, in kHz for frequencies below 30MHz or MHz for the f.m. band, followed by pressing the EXE button to finish the input. Below the keypad are two buttons that allow you to step the frequency up or down in preset steps. Above the keypad is a flat disk that can be rotated using a thumb to tune or 'jog' the frequency. The rate of tuning can be selected to be fast, slow or the disk can be locked out. On the fast setting one revolution moved the frequency about 20kHz while on slow it moved about 2.5kHz per rev. I found it very easy to operate the jog disk with my right thumb to fine tune a station. The weight of the set, coupled with its good design, allows the various pushbuttons to be operated without the set moving around the desktop.

Modes

The mode is selected by using the 'AM Function' button and then using the memory selection buttons to toggle the appropriate mode (a.m., u.s.b. and l.s.b.), filter width and step. The settings are shown on the display, but not when set to receive f.m. broadcast stations. The only selection there is stereo/mono and audio tone.

Sony have a reputation for producing equipment that is well designed and equally well-built. The ICF-SW55 is no exception. With continuous frequency coverage from 150kHz long wave to 29.999MHz on short wave plus 76 to 108MHz f.m. stereo, this neat receiver offers the ideal package for anyone looking for a well-built receiver to take on holiday or just to use for general listening.

The receiver is easy to use, takes up little tabletop space and offers a reasonably pleasing audio sound from the speaker outlet on the front.

Peter Shore
c/o SWM Editorial Offices,
Arrowsmith Court,
Station Approach,
Broadstone,
Dorset BH18 8PW

E-mail:
peter.shore@pwpub.
demon.co.uk

Bandscan Europe

Who says that the world's changed? I rather think that old habits die hard, particularly in international politics which is one of the things that makes the short wave broadcast bands so interesting to observe.

This is clearly demonstrated in Albania where the jamming of international radio broadcasts has resumed. It seems that the Albanian security service, a device of the government of the day, is deliberately blocking programmes of the Voice of America when the Albanian opposition's spokesmen are being interviewed, or when reports about the opposition's activities are being aired.

New Director

Swiss Radio International has a new director. Carla Ferrari joins the Bern-based broadcaster after a journalistic career in the Swiss Broadcasting Corporation, including a spell as a senior reporter in the United

States. Staff morale has plumbed the depths in the past few months, but the appointment of Ferrari - who, by all accounts, is a dynamic and personable manager - has helped lift the pall of depression hanging over Giacomettistrasse 1.

There are a number of in-house working parties examining different aspects of the station's output, and it is likely that the focus of the English-language service will shift from the UK and Europe to North America (the newsroom for the whole of Swiss Radio International, which includes the German, French, Italian, Arabic, Spanish, Portuguese and Romansch language services, works entirely in English). Watch out for some interesting developments as the year progresses.

Unlikely Route

From Stoke-on-Trent via Russia back to the UK is an unlikely route for programmes, but one that seems to be quite effective for United Christian Broadcasters. The gospel-

based station has hired eight hours of time on the 1386kHz transmitter in Kaliningrad to beam its programmes into Britain and Ireland.

Between 1630 and 0030UTC you can hear UCB's programmes with good strength across much of the UK, which is hardly surprising when you remember that the transmitter used to carry Radio Moscow's English-language service and they can send a whopping 1.2MW of signal into the ether.

Another Christian radio station using new channels to reach its audience is HCJB. The Ecuadorian station is now hiring time from Merlin Communications International in the UK to beam programmes in Russian, Uzbek and Tajik to countries of the former Soviet Union. The Skelton site in Cumbria is the source for these transmissions.

Finnish Service

A correction to last quarter's column in which I reported that the BBC's Finnish service was due to close at the end of

Memories

The ICF-SW55 has 125 memory channels divided into 25 'pages' with each 'page' able to carry five stations. Sony preset short wave broadcast station frequencies in 'pages' 5 to 25 at the factory so that you can get going as soon as you switch on. A printed list of the stations and the frequencies preprogrammed is supplied with the instruction manual in five languages and a copy of Sony's *Wave Handbook*. I found that the preset 'pages' bore little resemblance to the printed list and this might be a bit disconcerting to the beginner.

The display can show the station name if you program it in using the keypad in the 'label edit' mode. This is very useful as an aid to remembering what you have put into each memory channel. Of course, you have to change it each time you reprogram a memory channel - it's not like RDS.

Clock And Timer

A comprehensive digital clock is provided with a world map displayed showing the time zones. By pushing the 'World Time' button the time zone can be selected using the 'Jog' disk. As the disk is rotated the main cities in each zone are displayed along with the difference from UTC. Summer Time can be selected by toggling the appropriate button.

A complete alarm system is provided enabling you to be woken up with the radio playing.

Two audio outputs are provided, stereo 'headphones' and 'line out' with a remote control socket to permit a tape recorder to be used to record transmissions.

Accessories

A range of accessories is supplied with the receiver. The set itself has a carrying case to protect it, while a larger carrying case is also provided to keep the other bits and pieces in and protect the smaller

case. You also get a mains p.s.u., stereo headphones, s.w. compact antenna and external antenna connector.

The ICF-SW55 costs £235 from

Haydon Communications,
132 High Street,
Edgeware, Middlesex HA8 7EL.
Tel: 0181-951 5781

who kindly provided the review sample.



specification

| | | |
|----------------------------------|---|--------------------|
| Frequency Coverage: | AM | 150kHz - 29.999MHz |
| | FM | 76 - 108MHz |
| Intermediate Frequencies: | AM | 55.845MHz; 455kHz |
| | FM | 10.7MHz |
| Antennas: | Built-in ferrite rod for l.w. and m.w. Telescopic whip for s.w. and f.m. | |
| Audio Output: | 400mW at 10% t.h.d. | |
| Speaker: | 770mm dia. | |
| Power requirements: | 6V d.c. internal 4 x AA cells; mains adaptor. | |
| Dimensions: | 194 x 127 x 39mm | |
| Weight: | 900g inc. batteries. | |

March. In fact programmes ceased at the end of December, leaving 18 stations across Finland without a news service, although the Finnish news agency STT and a commercial media company Alexpress have services which might replace the Bush House news.

Cut Back

The Voice of Russia has cut back its English-language service by eight hours every day and is now on the air for just 16 hours, between 0200 and 1000UTC and again from 1400 to 2200UTC. At the same time as the English service cuts took effect, broadcasts in Albanian, Chinese, Polish, Portuguese, Spanish and Serbo-Croat were reduced.

Most of the station's considerable number of short wave frequencies continue to be used, indicating that while programme budgets may be under fire, the transmission fund is still relatively unharmed. The cuts come despite considerable lobbying of the Russian Foreign Ministry by Armen Oganesian, Voice of Russia's head.

Big Names

In Africa, there has been trouble for the big names in international radio broadcasting. All relays of foreign radio stations have been ended in the Democratic Republic of Congo (until recently known as Zaire). This includes

the BBC World Service, Radio France Internationale and Voice of America. The reason for the ban, instituted by the Congo government, is an alleged 'campaign of misinformation' led by 'foreign media'.

The Gabon short wave station, Africa No 1, is now available world-wide on the Internet. Africa No 1, owned partly by the French government, broadcasts pop music, news and features and is widely listened to across much of West Africa.

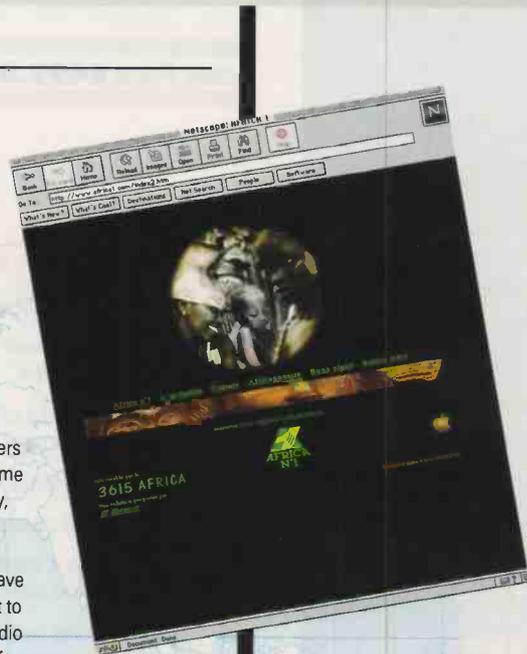
At the moment there is no audio on the site, but it is likely that this will be added during the year. The web site can be found at www.africa1.com and you can tune in on short wave between 0500 and 2300UTC on 9.58MHz, from 0700 to 1600UTC on 17.630MHz and from 1600 to 2100UTC on 15.475MHz.

New Service

In the Middle East there is a new service overnight on 954kHz medium wave. London-based World Radio Network is now hiring a 100kW transmitter in Jerusalem between 2005 and 0430UTC to deliver its WRN1 African and Middle East service which includes a variety of international radio stations' programmes.

The channel can be difficult to hear in parts of the region because of other high-

powered transmitters on the same frequency, although reception reports have been sent to World Radio Network from across the Middle East and North Africa, and from a number of European countries.



The front page of Africa No 1's Web Site.

And Finally

For now that's all, but remember to keep your ears on the bands until the next review of international broadcasting in Europe, Africa and the Middle East. Good listening!



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South West

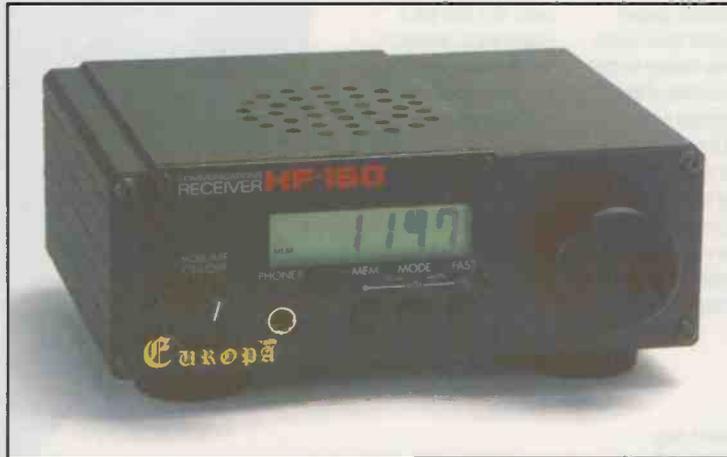
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****Review by the respected UK reviewer, Chris Lorek, G4HCL in "Ham Radio Today", April 1998. Call Lowe for a copy of the review and a colour leaflet with full specifications**

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Every equipment reviewer that has had the opportunity to try the NRD 545 to date has been amazed at the performance that JRC engineers have managed to cram into this small box. Now you have the opportunity to win one of these superb receivers from the very first shipment out of the factory. JRC, in conjunction with Lowe Electronics, the exclusive UK distributors and "Ham Radio Today"

magazine are offering one as a prize in our simple competition. Just answer the questions below and return the completed form to Lowe Electronics. All correct entries will be entered into a draw together with those from a similar competition in the next issue of Ham Radio Today. The first entry drawn out will be the winner! (A clue - most of the answers can be obtained from a study of the front panel of the radio and by reading the specification sheet. The rest are contained on the JRC Japanese web site and in the review by Chris Lorek that will be published in the April issue of "Ham Radio Today".

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| DSP Pass-Band Shift | Wide Dynamic Range |
| DSP Noise reduction | Variable Tuning |
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| DSP Noise Blanker | Clock Timer |
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| DSP AGC | RTTY Fine Tuning |

1. In what month and Year was JRC founded ?
2. How many rotary control knobs are there on the front panel of the NRD -545?
3. How many memories does the receiver have ?
4. What does ECSS stand for ?
5. What is the function of the grey button below and to the right of the main tuning knob?
6. What is the claimed dynamic range at 300 Hz IF bandwidth ?

Closing date for entries is 30th April, 1998. There is no cash alternative and no correspondence will be entered into. No purchase necessary

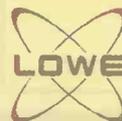
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■ BRIAN ODDY G3FEX, THREE CORNERS, MERRYFIELD WAY, STORRINGTON, WEST SUSSEX RH20 4NS

LM&S

The time system used in the UK will change from Greenwich Mean Time (GMT) to British Summer Time (BST) on March 29, a few days after this issue arrives on the bookstalls. All clocks in the UK will then display a time which is one hour ahead of GMT. However, the s.w. broadcasters will still refer to Universal Time Co-ordinated (UTC),

which for most purposes is the same as GMT.

To avoid confusion, place a clock by your receiver and set it to UTC (=GMT). Be sure to state times of reception in UTC when sending reports to broadcasters or to me for this series.

Long Wave Reports

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

Whilst searching the band at night **Simon Hockenull** (E.Bristol) heard an unidentified station on **189kHz** broadcasting pop music from 0100 until 0230UTC. It seems likely that it came from Rikisutvarpid, the National Broadcasting Service in Iceland, via their new 300kW outlet at Gufuskalar, W.Iceland on **189kHz**.

Medium Wave Reports

Although the broadcasts from some m.w. stations in Canada and the USA reached the UK at night during January the propagation conditions proved to be very disappointing.

Until the end of December **John Slater** (Scalloway, Shetland) found reception to be quite good. Even after sunrise on the 30th he logged CJCH Halifax, NS on **920kHz** as SIO333; CJFX Antigonish, NS **580** as SIO333; WBZ Boston, MA **1030** as SIO222; VOCM St.John's, NF **590** as SIO322; WEEI Boston, MA **850** as SIO322; WBBR in New York, NY **1130** as SIO222. However, the propagation conditions deteriorated on the 31st and since then he has only heard CJYQ in St.John's, NF on **930** early in the morning and WBBR around dawn.

One of the stations in the recently extended m.w. band in the USA, namely WCMQ in Miami Springs, FL on **1700**, was heard at 0325 on January 10th by **Robert Connolly** in Kilkeel. Also on the 10th he logged CKVO in Clarendville, NF on **710** as 22222 at 0250; CHAM Hamilton, ON **810** as 22332 at 0300; WINS New York, NY **1010** as 22222 at 0310; WTOP Washington, DC **1500** as 22332 at 0320.

The ident 'Sports Radio 850' from WEEI on **850** was heard on the 12th by **David Edwardson** in Wallsend. Their transmission rated 25532 at 2203. In Guildford **Richard Reynolds** listened to CJYQ on **930** from 2243 until 0026 playing 1950-60s pop music. Reception was quite good, rating 23332.

The sky waves from some stations in the Middle East and N.Africa also reached the UK after dark - see chart. Good reception from two in Egypt, namely **Batra** on **819** and **Santah** on **864**, was noted by **George Millmore** in Wootton, IoW.

While searching for distant local radio stations in Bookham, **Brian Keyte** noticed that ILR R.Liberty could be heard on both **963** and **972kHz**. He wrote to them and was informed that the frequency of the Glade Lane,

Southall transmitter had been changed to **972kHz** because their use of two transmitters on **963kHz** (Hackney Marsh and Glade Lane) caused a phasing belt about 1.5km wide from Finchley through Croydon.

Short Wave Reports

At present the **25MHz (11m)** band is not being used for broadcasting but some unmodulated carriers have been noted which suggest that some transmitters are being set up in readiness for the summer season.

Daily variations in propagation were evident in the **21MHz (13m)** band during January. Noted during the day were the Voice of Turkey, Ankara **21.715** (Tur to W.Asia, Australia 0500-1000), rated 55444 at 0915 in Scalloway; BSKSA Saudi Arabia **21.495** (Ar [Holy Quran] to SE.Asia 0900-1200) 54444 at 1021 by **John Eaton** in Woking; R.Nederlands via Madagascar **21.480** (Du to Asia, Pacific 1030-1125) 14111 at 1030 by **Thomas Williams** in Truro; Vatican R, Italy **21.850** (Port, Sp to S.America 1000-1030) 45544 at 1030 by **Vic Prier** in Colyton; UAER, Dubai **21.605** (Eng to Eur 1030-1100) 44444 at 1042 by **Eddie McKeown** in Newry; RAI Rome **21.520** (It to Africa 0600-1300) SIO433 at 1123 by **Philip Rambaut** in Macclesfield; RFI via Issoudun **21.620** (Fr to E.Africa 0900?-1500) 11121 at 1205 by **Robert Hughes** in Liverpool; HCJB Quito, Ecuador **21.455** (Eng, u.s.b. + p.c.) SIO222 at 1300 by **Tom Smyth** in Co.Fermanagh; R.Portugal Int via Sines **21.515** (Port, Eng to M.East, India 1300-1430) 23332 at 1340 in Kilkeel; UAER, Dubai **21.605** (Eng to Eur 1330-1355) 45554 at 1340 in Wallsend; R.Japan via Ascension Is **21.490** (Jap to S.Africa 1300-1400) 24432 at 1356 by **Rhoderick Illman** in Oxted; BBC via Ascension Is **21.660** (Eng to W/E.S.Africa 1100-1700) 25333 at 1400 in E.Bristol; RFI via Issoudun? **21.580** (Fr to S.Africa 0900-1600) 33333 at 1430 by **Bernard Curtis** in Stalbridge; BBC via Ascension Is **21.490** (Eng to S.Africa 1500-1530) 34333 at 1525 by **Stan Evans** in Herstoncoeur; WYFR via Okeechobee, USA **21.525** (Eng, Fr, Port to Eur, Africa 1600-2000) 25232 at 1630 by **Darren Beasley** in Bridgwater.

Propagation also varied daily in the **17MHz (16m)** band but some improvement in reception was evident. During the morning R.Japan via Ascension Is **17.815** (Eng, Jap to Africa 0700-0900) was rated 44554 at 0715 by **John Parry** in Larnaca, Cyprus; V of Russia **17.795** (Eng [WS]) SIO444 at 0906 by **Francis Heame** in N.Bristol; DW via Rwanda? **17.800** (Eng to Africa 0900-0950) 44444 at 0920 by **Tony Hall** in Freshwater Bay, IoW; R.Austria Int via Moosbrunn **17.870** (Ger, Eng to Australia 0800-1100) 24432 at 1017 in Oxted; AIR via Bangalore **17.387** (Eng to Pacific areas 1000-1100) 34333 at 1030 in Scalloway; BBC via Cyprus **17.705** (Eng to N.Africa 0900-1200) 44444 at 1030 in Stalbridge.

After mid-day R.Ukraine, Kiev **17.725** (Eng to Eur? 1200-1300) was 45343 at 1215 in Bridgwater; BBC via Ascension Is **17.830** (Eng to W.C.Africa 0730-1000, 1100-2100) 22122 in Liverpool; Israel R, Jerusalem **17.545** (Heb [Home Sec rly] to W.Eur, N.America 0700-1455) 54444 at 1225 in Colyton; R.Romania Int, Bucharest **17.745** (Eng to Eur, N.America 1300-1355) 55555 at 1300 in Herstoncoeur; Africa No.1, Gabon **17.630** (Fr to W.Africa 0700-1100, 1200-1600) 44444 at 1355 in Kilkeel; BBC via Antigua, W.Indies **17.840** (Eng to N/C.America 1400-1900) 34434 at 1432 in Woking; RFI via Moyabi, Gabon **17.560** (Eng to E.Africa, M.East 1400-1455) 34233 at 1433 in Newry; WYFR via Okeechobee, USA **17.555** (Eng to Eur 1600-1945) 43333 at 1746 in Truro; R.Nederlands via Bonaire, Ned Antilles **17.605** (Du to Africa 2030-2125) 54434 at 2100 by **Martin Cowin** in Kirkby Stephen.

The propagation conditions in the **15MHz (19m)** band enabled some broadcasts to be heard thousands of kilometres beyond the intended target area. Noted in the reports were the Voice of Malaysia, Kajang **15.295** (Mal to S.Asia 0830-1025), rated 34333 at 0830 in Scalloway; WWCR Nashville, USA **15.685** (Eng to N.America, Eur 1100-2200) 51155 at 1255 by **David Hall** in Morpeth; VOA via Philippines 15.425 (Eng to E.Asia 1100-1500) 33553 at 1315 in Cyprus; R.Nederlands via Madagascar **15.585** (Eng to S.Asia 1330-1525) 11121 at 1335 in Liverpool; WEWN via Vandiver, USA **15.745** (Eng to Eur, Africa? 1200-1755?) 33333 at 1445 by **Ernest Wiles** while in Tunisia; WYFR via Okeechobee **15.695** (Eng to Eur, Africa 1600-1845) 33343 at 1640 in Woking; KTBN Salt Lake City, USA **15.590** (Eng to N.America 1600-0000) 24222 at 1645 in Newry; VOA via Greenville, USA? **15.120** (Eng to Eur, N.Africa 1700-1800) SIO322 at 1700 in Co.Fermanagh; Channel Africa via Meyerton **15.240** (Eng, Port? to C/W Africa 1700-1755) 11111 at 1716 by **Martin Dale** in Stockport; WHRI South Bend, USA **15.105** (Eng to

LONG WAVE CHART

| Freq (kHz) | Station | Country | Power (kW) | Listener |
|------------|---------------|------------|------------|--------------------|
| 153 | Bechar | Algeria | 1000 | C* |
| 153 | Donebach DLF | Germany | 500 | B,D,E*,G*,H*,K |
| 153 | Bod | Romania | 1200 | C* |
| 162 | Allouis | France | 2000 | B,C*,G*,H*,K |
| 171 | Nador Medi-1 | Morocco | 2000 | C*,H* |
| 171 | B'shakovo etc | Russia | 1200 | B,C*,E,F,G,H* |
| 171 | Lvov | Ukraine | 500 | E* |
| 177 | Oranienburg | Germany | 750 | B,F,G*,H* |
| 180 | Polati | Turkey | 1200 | C*,J |
| 183 | SaarLouis | Germany | 2000 | B,C*,E,F,G*,H*,K |
| 189 | Gufuskalar | W.Iceland | 150 | D*,E*,J |
| 198 | Etimesgut | Turkey | 120 | I |
| 198 | Droitwich BBC | UK | 500 | B,C*,E,G*,K,M* |
| 207 | Munich DLF | Germany | 500 | B*,C*,D,F,G*,H* |
| 207 | Al Karanah | Jordan | 600 | I |
| 207 | Azilal | Morocco | 800 | C*,F*,H* |
| 216 | Roumoules RMC | S.France | 1400 | B,C*,D,E,G*,H*,K |
| 225 | Raszyn Resv | Poland | 7 | B,E*,F*,H* |
| 234 | Beidweiler | Luxembourg | 2000 | B,C*,E,G*,H*,M* |
| 243 | Kalundborg | Denmark | 300 | B,C*,D,E,F,G*,H* |
| 252 | Tipaza | Algeria | 1500 | A*,B*,E*,H*,L |
| 252 | Atlantic 252 | S.Ireland | 500 | B,C*,E*,G*,H*,K,M* |
| 261 | Burg/R.Ropa | Germany | 200 | B,C*,G |
| 261 | Taldom Moscow | Russia | 2500 | C* |
| 270 | Topolna | Czech Rep | 1500 | B,D,E*,F*,G*,K |
| 279 | Sasnovy | Belarus | 500 | C*,E*,F,H* |

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

Listeners:-

- (A) Bernard Curtis, Stalbridge.
- (B) Martin Dale, Stockport.
- (C) Alec Griffiths, Thurso.
- (D) Simon Hockenull, E.Bristol.
- (E) Sheila Hughes, Morden.
- (F) Rhoderick Illman, Oxted.
- (G) George Millmore, Wootton, IoW.
- (H) Fred Pallant, Storrington.
- (I) John Parry, Larnaca, Cyprus.
- (J) Philip Rambaut, Macclesfield.
- (K) Tom Smyth, Co.Fermanagh.
- (L) Ernest Wiles, while in Tunisia.
- (M) Thomas Williams, Truro.

C.America 1300-1800) 33322 at 1730 in Stalbridge; RNB Brazil 15.265 (Port, Eng, Ger to Eur 1630-2020) 23222 at 1758 in Truro; R.Nederlands via Bonaire, Ned.Antilles **15.315** (Eng to Africa 1830-2025) SIO333 at 1854 in N.Bristol; RAE Buenos Aires, Argentina **15.345** (Eng, Fr, Ger, It, Sp to Eur, N.Africa 1800-0000) 24333 at 2100 by **Fred Pallant** in Storrington.

Also logged during the day were R.Finland via Pori **15.225** (Eng to Australia, Asia 0900-0930), rated 44444 at 0918 in Freshwater Bay; BBC via Skelton & Rampisham, UK **15.565** (Eng to Eur, M.East, Africa 0600-1500) 24333 at 0957 in Oxted; Vatican R, Italy **15.595** (It, Fr, Eng to Eur, Asia 1100-1130) 55555 at 1120 by **Sheila Hughes** in Morden; R.Bulgaria, Sofia **15.130** (Eng to Eur 1200-1300) SIO433 at 1200 in Macclesfield; RFI via Issoudun? **15.540** (Eng to Africa 1200-1300) 34433 at 1210 in Bridgwater; BBC via Cyprus **15.575** (Eng to E.Eur, M.East 0600-1500) 35543 at 1250 in Wallsend; RTV Marocaine via Tanger **15.335** (Ar to W.Eur 1100-1500) 44444 at 1405 in Kilkeel; V of Turkey, Ankara **15.290** (Eng to Eur, Asia, Pacific 1330-1430) 53553 at 1410 in Herstmonceux; R.Sweden via Horby? **15.240** (Eng to N.America 1430-1500) 43444 at 1443 by **Vera Brindley** in Woodhall Spa; VOA via Woofferton, UK **15.205** (Eng to Eur, M.East 1500-1700) 54444 at 1503 by **Tom Winzor** in Plymouth.

In the **13MHz (22m)** band SRI via Sottens? **13.685** (Eng, It, Ger, Fr to Australasia 0830-1030) was 44444 at 0831 in Newry; R.Austria Int via Moosbrunn **13.730** (Eng to Eur, Australia 0830-0900) SIO444 at 0841 in N.Bristol; Monitor R, via KHBI Saipan, N.Mariana Is **13.840** (Eng to Asia, Pacific 0800-1000) 24222 at 0934 in Truro; R.Denmark via RNI **13.800** (Da to Far East 0930-1000) 34332 at 0949 in Oxted; UAER, Dubai **13.675** (Eng to Eur 1030-1055) 44433 at 1035 in Herstmonceux; AWR Costa Rica **13.750** (Eng to C/N.America 1130-1300) 25232 at 1259 in Bridgwater; ISBS Reykjavik **13.860** (lc [u.s.b.+ p.c.] to Eur 1215-1300) 45554 at 1300 in Wallsend; R.Vlaanderen Int, Belgium **13.680** (Eng to Eur, N.America 1300-1325) 43222 at 1310 by **Chris Shorten** in Norwich; Croatian R, Zargreb **13.830** (Cr, Eng to N.America 1230-2100) 44444 at 1350 in Kilkeel; WWCR Nashville, USA **13.845** (Eng to Africa 1400-0000) 44444 at 1423 in Woking; WHRI South Bend, USA **13.760** (Eng to E.U.S.A, Eur 1400-0100?) SIO333 at 1540 in Macclesfield and 35433 at 2005 by **Ross Lockley** in Galashiels; WEWN Birmingham, USA **13.615** (Eng to N.America, Eur 1600-2000) 34333 at 1620 in Woodhall Spa; UAER, Dubai **13.675** (Eng to Eur 1600-1640) 43444 at 1631 by **Bill Griffith** in W.London; RCI via Sackville, E.Canada **13.690** (Fr, Eng to Eur, Africa 2000-2300) 34333 at 2111 in Freshwater Bay.

Broadcasts from distant places were also received in the **11MHz (25m)** band. R.New Zealand on **11.905** (Eng to Pacific areas 0459-0816 Mon-Fri, 0459-0758 Sat/Sun) was 43433 at 0800 in Herstmonceux; KFBS Marpi, N.Mariana Is **11.650** (Russ to E.Eur 0900-1100) 55444 at 0940 in Scalloway; FEBC Bocaua, Philippines **11.635** (Eng to Asia 0930-1100) 43343 at 1057 in Morpeth; HCJB Quito, Ecuador **12.005** (Eng to Caribbean 1100-1600) SIO322 at 1207 in Macclesfield; V of Vietnam, Hanoi **12.020** (Eng to F.East 1330-1400) 34333 at 1330 in Newry; R.Australia via Shepparton **11.660** (Eng to Asia 1330-1700) 33233 at 1500 by **Clare Pinder** in Appleby; R.Nederlands via Meyerton, S.Africa **11.655** (Eng to Africa 1730-2025) 45344 at 1745 in Woking; WWCR Nashville, USA **12.160** (Eng to N.America, Eur 1400-2200) 43333 at 2000 in Kirkby Stephen; WYFR Okeechobee, USA **11.580** (Eng to Eur, Africa 2100-2300) 25432 at 2126 in Storrington; RCI via Sackville **11.945** (Fr, Eng to Eur, Africa 2000-2300) 34333 at 2126 in Freshwater Bay; BBC via Ascension Is **11.750** (Eng to S.America 2000-0200) 24321 at 2245 in Oxted; R.Nac da Amazonia, Brazil **11.780** (Port 0900-0200) 23332 at 2330 in Bridgwater; BBC via Kranji, Singapore **11.955** (Eng to F.East 2200-0300) SIO444 at 2357 in N.Bristol; R.Havana Cuba **11.760** (Sp to C.America 0000-0500) 33222 at 0150 in Kilkeel.

Also mentioned in the reports were Slovak R.Int, via Velke Kostolany **11.990** (Eng, Slov to Australia 0830-0927), rated 54444 at 0841 in Plymouth; VOIRI Tehran **11.875** (Eng to M.East, Asia 1100-1230) 43333 at 1155 in Morden; ISBS Reykjavik **11.402** (lc [u.s.b.+ p.c.] to Eur 1215-1300) 33333 at 1215 in W.London; BBC via Skelton & Woofferton, UK **12.095** (Eng to Eur, N/W.Africa 0500-2100) 35333 at 1250 in E.Bristol; RCI via Sines, Portugal **11.915** (Eng, Fr to Eur, Africa 1430-1600) 44444 at 1433 in Woodhall Spa; RCI via Skelton, UK **11.935** (Eng, Fr, Russ to Eur 1430-1659) 43444 at 1445 in Truro; Israel R, Jerusalem **12.080** (Eng to W.Eur, N.America 1500-1530) SIO433 at 1500 in Co.Fermanagh; SRI via ? **12.075** (Eng, Ger, Fr to S/C.Asia 1400-1615) 32233 at 1550 in Liverpool; RFI via Gabon? **12.015** (Eng to Africa

LOCAL RADIO CHART

| Freq (kHz) | Station | ILR BBC | e.m.r.p (kW) | Listener | Freq (kHz) | Station | ILR BBC | e.m.r.p (kW) | Listener |
|------------|-----------------------|---------|--------------|-------------|------------|-----------------------|---------|--------------|-------------|
| 1242 | IoW Radio, Wootton | I | 0.50 | EG | 1242 | IoW Radio, Wootton | I | 0.50 | EG |
| 1251 | Amber SGB, Bury St Ed | I | 0.76 | A,F | 1251 | Amber SGB, Bury St Ed | I | 0.76 | A,F |
| 1260 | Brunel CG, Bristol | I | 1.60 | G | 1260 | Brunel CG, Bristol | I | 1.60 | G |
| 1260 | SabrasSnd, Leicester | I | 0.29 | F,H* | 1260 | SabrasSnd, Leicester | I | 0.29 | F,H* |
| 1260 | R York | B | 0.50 | A | 1260 | R York | B | 0.50 | A |
| 1296 | Radio XL, Birmingham | I | 5.00 | A,B,EG,H* | 1296 | Radio XL, Birmingham | I | 5.00 | A,B,EG,H* |
| 1305 | Big Easy Magic AM | I | 0.15 | AB | 1305 | Big Easy Magic AM | I | 0.15 | AB |
| 1305 | Premier via ? | I | 0.50 | F | 1305 | Premier via ? | I | 0.50 | F |
| 1323 | S.Coast R, Southwick | I | 0.50 | F | 1323 | S.Coast R, Southwick | I | 0.50 | F |
| 1323 | Somersetsnd, Bristol | B | 0.63 | F | 1323 | Somersetsnd, Bristol | B | 0.63 | F |
| 1332 | Premier, Battersea | I | 1.00 | FG,I | 1332 | Premier, Battersea | I | 1.00 | FG,I |
| 1332 | Cl.Gold 1332 Pt'bo | I | 0.60 | AB | 1332 | Cl.Gold 1332 Pt'bo | I | 0.60 | AB |
| 1332 | Wiltshire Sound | B | 0.30 | F | 1332 | Wiltshire Sound | B | 0.30 | F |
| 1359 | BreezeAM, Chelmsford | I | 0.28 | F | 1359 | BreezeAM, Chelmsford | I | 0.28 | F |
| 1359 | Cl.Gold 1359, C'try | I | 0.27 | F,H* | 1359 | Cl.Gold 1359, C'try | I | 0.27 | F,H* |
| 1359 | R.Solent | B | 0.85 | G | 1359 | R.Solent | B | 0.85 | G |
| 1388 | R.Lincolnshire | B | 2.00 | F | 1388 | R.Lincolnshire | B | 2.00 | F |
| 1368 | Southern Counties R | B | 0.50 | E*,F,G | 1368 | Southern Counties R | B | 0.50 | E*,F,G |
| 1368 | Wiltshire Sound | B | 0.10 | EG | 1368 | Wiltshire Sound | B | 0.10 | EG |
| 1377 | Asian Sd, Rochdale | I | 0.10 | B | 1377 | Asian Sd, Rochdale | I | 0.10 | B |
| 1413 | Premier via ? | I | 0.50 | F | 1413 | Premier via ? | I | 0.50 | F |
| 1413 | Yks Dales R, Skipton | I | 0.10 | AB | 1413 | Yks Dales R, Skipton | I | 0.10 | AB |
| 1431 | Breeze AM, Southend | I | 0.35 | E*,F | 1431 | Breeze AM, Southend | I | 0.35 | E*,F |
| 1431 | Cl.Gold, Reading | I | 0.14 | C*,E*,EG | 1431 | Cl.Gold, Reading | I | 0.14 | C*,E*,EG |
| 1449 | R.Peterboro/Cambs | B | 0.15 | A,F,G* | 1449 | R.Peterboro/Cambs | B | 0.15 | A,F,G* |
| 1458 | R.Cumbria | B | 0.50 | A | 1458 | R.Cumbria | B | 0.50 | A |
| 1458 | R.Devon & Dorset | B | 2.00 | A | 1458 | R.Devon & Dorset | B | 2.00 | A |
| 1458 | 1458 Lite AM Manch' | I | 5.00 | B,I | 1458 | 1458 Lite AM Manch' | I | 5.00 | B,I |
| 1458 | Sunrise, London | I | 50.00 | B*,F,G,H* | 1458 | Sunrise, London | I | 50.00 | B*,F,G,H* |
| 1476 | CountySnd, Guildford | I | 0.50 | D,E,EG | 1476 | CountySnd, Guildford | I | 0.50 | D,E,EG |
| 1485 | Cl.Gold, Newbury | I | 1.00 | D,F | 1485 | Cl.Gold, Newbury | I | 1.00 | D,F |
| 1485 | R.Humberside (Hull) | B | 1.00 | A,F | 1485 | R.Humberside (Hull) | B | 1.00 | A,F |
| 1485 | R.Merseyside | B | 1.20 | A,B,G,I | 1485 | R.Merseyside | B | 1.20 | A,B,G,I |
| 1485 | Southern Counties R | B | 1.00 | FG | 1485 | Southern Counties R | B | 1.00 | FG |
| 1503 | R.Stoke-on-Trent | B | 1.00 | A,B,E*,F,G* | 1503 | R.Stoke-on-Trent | B | 1.00 | A,B,E*,F,G* |
| 1521 | R.1521 Craigaon, NI | I | 0.50 | A | 1521 | R.1521 Craigaon, NI | I | 0.50 | A |
| 1521 | Fame 1521, Reigate | I | 0.64 | FG | 1521 | Fame 1521, Reigate | I | 0.64 | FG |
| 1530 | R.Essex | B | 0.15 | E*,F,G | 1530 | R.Essex | B | 0.15 | E*,F,G |
| 1530 | Cl.Wd Yorks | I | 0.74 | A,F | 1530 | Cl.Wd Yorks | I | 0.74 | A,F |
| 1530 | Cl.Gold, Worcester | I | 0.52 | FG | 1530 | Cl.Gold, Worcester | I | 0.52 | FG |
| 1548 | R.Bristol | B | 5.00 | G | 1548 | R.Bristol | B | 5.00 | G |
| 1548 | Capital G, London | I | 97.50 | FG | 1548 | Capital G, London | I | 97.50 | FG |
| 1548 | Magic 1548 Liverp'l | I | 4.40 | A,B,F | 1548 | Magic 1548 Liverp'l | I | 4.40 | A,B,F |
| 1548 | Cl.Gold, Sheffield | I | 0.74 | F | 1548 | Cl.Gold, Sheffield | I | 0.74 | F |
| 1548 | Forth AM, Edinburgh | I | 2.20 | F* | 1548 | Forth AM, Edinburgh | I | 2.20 | F* |
| 1557 | R.Lancashire | B | 0.25 | AB | 1557 | R.Lancashire | B | 0.25 | AB |
| 1557 | Mellow, Clacton | I | 0.125 | F | 1557 | Mellow, Clacton | I | 0.125 | F |
| 1557 | Cl.Gold 1557 N hant | I | 0.76 | H* | 1557 | Cl.Gold 1557 N hant | I | 0.76 | H* |
| 1557 | S.Coast R, So'ton | I | 0.50 | FG | 1557 | S.Coast R, So'ton | I | 0.50 | FG |
| 1584 | KCBC, Kettering | I | 0.04 | F,H* | 1584 | KCBC, Kettering | I | 0.04 | F,H* |
| 1584 | London Turkish R | I | 0.20 | E*,F,G | 1584 | London Turkish R | I | 0.20 | E*,F,G |
| 1584 | R.Notttingham | B | 1.00 | B,E*,F | 1584 | R.Notttingham | B | 1.00 | B,E*,F |
| 1584 | R.Shropshire | B | 0.50 | A,F | 1584 | R.Shropshire | B | 0.50 | A,F |
| 1584 | Tay, Perth | I | 0.21 | E*,F | 1584 | Tay, Perth | I | 0.21 | E*,F |
| 1602 | R.Kent | B | 0.25 | FG | 1602 | R.Kent | B | 0.25 | FG |

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

Listeners:-

- (A) Robert Connolly, Kilkeel.
- (B) Martin Dale, Stockport.
- (C) Francis Hearne, N.Bristol.
- (D) Simon Hockenhill, E.Bristol.
- (E) Sheila Hughes, Morden.
- (F) Brian Keyte, Bookham.
- (G) George Millmore, Wootton, IoW.
- (H) Peter Pollard, Rugby.
- (I) Tom Smyth, Co.Fermanagh.
- (J) Tom Winzor, Plymouth.

1600-1700) 43323 at 1600 in Stalbridge; R.Pakistan, Islamabad **11.570** (Eng to M.East 1600-1630) 43333 at 1616 in Norwich; R.Jordan via Al Karanah **11.690** (Eng to W.Eur, E.U.S.A 1100-1730) 34434 at 1600 by **Gerald Guest** in Dudley, 55555 at 1630 in Tunisia and 22222 at 1649 in Stockport; REE via Noblejas, Spain **11.775** (Eng to Eur, Africa 2000-2100) 31421 at 2000 in Galashiels.

In the **9MHz (31m)** band R.New Zealand's broadcast to Pacific areas on **9.700** (Eng Mon-Fri 0816-1206, Sat/Sun 0758-1206) was rated 33233 at 0800 in Appleby, 35553 at 0906 in Wallsend and 43343 at 1045 in Morpeth. R.Australia's broadcast to Pacific areas and N.America via Shepparton on **9.580** (Eng 0800-1400) was rated 32433 at 0908 in Guildford.

Also received during the morning were R.Nederlands via Bonaire, Ned.Antilles **9.830** (Eng to Pacific 0730-0925), rated 43433 at 0839 in Oxted; R.Vilnius, Lithuania **9.710** (Eng to Eur 0930-1000) SIO333 at 0935 in N.Bristol; R.Mediterranean Int via Nador, Morocco **9.575** (Fr, Ar to N.Africa, S.Eur 0500-0100) 55444 at 1000 in Scalloway; KTWR Guam **9.865** (Eng to Asia 1000-1100) SIO333 at 1015 in Macclesfield; SRI via Schwarzenburg **9.885** (Eng, Ger, Fr, It to SE.Asia 1100-1330) 45544 at 1102 in Newry; Vatican R, Italy **9.645** (Eng to Eur 1120?-1130?) 54444 at 1125 in Freshwater Bay; R.Prague via Litomysl **9.505** (Eng to Eur 1130-1157) 44333 at 1135 in Morden; BBC via Skelton, UK **9.410** (Eng to Eur, N/C.Africa 0400-2230) 44444 at 1200 in Tunisia.

Later, the Voice of the Mediterranean, Malta via ? **9.660** (Eng to Eur 1230-1300) was 34434 at 1230 in Dudley; R.Veritas Asia, Philippines

9.520 (Tam, Tel [Eng i/d] 1400-1455) 22222 at 1428 in Truro; SRI via Schwarzenburg? 9.885 (Eng, Ger, Fr to S/C.Asia 1400-1615) 54444 at 1435 in Plymouth; VOA via Morocco? 9.760 (Eng to Eur, N.Africa, M.East 1700-2200) 44444 at 1705 in Woodhall Spa; R.Romania Int, Bucharest 9.690 (Eng to Eur 1700-1755) 33323 at 1718 in Stockport; R.Nederlands via Flevo 9.895 (Eng to Africa 1830-2025) 54444 at 1910 in Kirkby Stephen; R.Australia via Shepparton 9.500 (Eng to Asia, Pacific 1430-2200) 33333 at 1925 in Stalbridge; R.Nederlands via Madagascar 9.605 (Eng to Africa 1730-2025) 35443 at 1930 in Storrington; V of Vietnam, Hanoi 9.840 (Fr to Eur 1930-2000) 34433 at 1930 in Colyton; R.Thailand, Udonthani 9.535 (Eng to Eur 2030-2045) 43333 at 2043 in Norwich; VOIRI Tehran 9.022 (Sp to Eur 2030-2127) 33333 at 2050 by Peter Pollard in Rugby; RCI via Sackville 9.805 (Fr, Eng to Europe, Africa 2000-2230) 55445 at 2120 in E.Bristol; R.Cairo via

Abis 9.900 (Eng to Eur 2115-2245) 32332 at 2130 in Galashiels; V of Turkey, Ankara 9.655 (Eng to Eur, N.America 2300-0000) SIO333 at 2300 in Co.Fermanagh; R.Cancao Nova, Brazil 9.675 (Port 24hrs) 24432 at 2304 in Bridgwater; R.Nac del Paraguay 9.735 (Sp 0800-0400) 33232 at 2329 in Woking; R.Havana, Cuba 9.820 (Eng to N.America 0100-0500) 34443 at 0150 in Kilkeel.

In the 7MHz (41m) band the Voice of Nigeria, Ikorodu 7.255 (Eng, Fr, Hau to W.Africa 0500-0900) was 34544 at 0751 in Guildford; RFPI Costa Rica 7.385 (Eng 24hrs) 22222 at 0844 in Plymouth; KTBN via Salt Lake City 7.510 (Eng to N.America 0000-1600) 44444 at 0925 in Scalloway; AWR (KSDA) Agat, Guam 7.455 (Eng to Asia 1000-1100) 33222 at 1020 in Morden; BBC via Kranji, Singapore 7.110 (Eng to Asia 2200-0045) 43433 at 2324 in Woking; WJCR Upton, USA 7.490 (Eng to E.USA 24hrs) 21122 at 2335 in Liverpool.

MEDIUM WAVE CHART

| Freq (kHz) | Station | Country | Power (kW) | Listener | Freq (kHz) | Station | Country | Power (kW) | Listener |
|------------|----------------------|--------------|------------|-------------------|------------|--------------------|--------------|------------|------------------------------|
| 520 | Hof/Wurzburg (RR) | Germany | 0.2 | H* | 1197 | Virgin via ? | UK | ? | C,I,K*,L |
| 531 | Ain Beida | Algeria | 600/300 | A*,E*,L* | 1206 | Bordeaux | France | 100 | H |
| 531 | Torshavn | Faeroe Is. | 100 | G | 1206 | Wroclaw | Poland | 200 | A*,E* |
| 531 | Berg | Germany | 20 | C*,H*,I* | 1215 | Virgin via ? | UK | ? | C,I,K*,L |
| 531 | RNE5 via ? | Spain | ? | A*,H*,I* | 1224 | Vidin | Bulgaria | 500 | I* |
| 531 | Beromunster | Switzerland | 500 | A*,C* | 1224 | Lelystad | Holland | 50 | A*,C*,H* |
| 540 | Wavre | Belgium | 150/50 | A*,C*,H*,I* | 1224 | COPE via ? | Spain | ? | A*,C* |
| 549 | Sidi Bennour | Morocco | 600 | A*,C*,H*,I* | 1233 | Liege | Belgium | 5 | A*,C*,H* |
| 549 | Les Trembles | Algeria | 600 | A*,C*,H*,I* | 1233 | Virgin via ? | UK | ? | C |
| 549 | Thurnau (DLF) | Germany | 200 | A*,C*,H*,I*,K* | 1242 | Marseille | France | 150 | A*,C*,H* |
| 558 | Espoo | Finland | 100 | A*,C*,H*,I* | 1242 | Virgin via ? | UK | ? | C |
| 558 | RNE5 via ? | Spain | ? | A*,C*,H* | 1251 | Marcali | Hungary | 500 | H* |
| 567 | Berlin | Germany | 100 | I* | 1251 | Huisberg | Netherlands | 10 | A*,C*,H* |
| 567 | Tuilamore(RTE1) | Ireland (S) | 500 | A*,C*,G,I,K*,L,N | 1260 | SER via ? | Spain | ? | A*,C*,H*,I* |
| 567 | RNE5 via ? | Spain | ? | A*,C*,I* | 1260 | Guildford(V) | UK | 0.5 | LL |
| 576 | Muhlacker(SDR) | Germany | 500 | A*,C*,H*,I* | 1269 | Neumunster(DLF) | Germany | 600 | A*,C*,H*,I*,K* |
| 576 | Barcelona(RNE5) | Spain | 50 | A*,C*,H*,I*,K* | 1269 | COPE via ? | Spain | ? | C* |
| 585 | Paris(FIP) | France | 8 | I* | 1278 | Strasbourg | France | 300 | I* |
| 585 | Madrid(RNE1) | Spain | 200 | A*,C*,H*,I* | 1278 | Dublin/Cork(RTE2) | Ireland (S) | 10 | A*,C*,G,I*,K*,L |
| 585 | Dumfries(BBC Scot) | UK | 2 | G,H*,I* | 1287 | RPE via ? | Czech Rep | 400 | A*,H*,I* |
| 594 | Frankfurt(HR) | Germany | 1000/400 | C*,H*,I* | 1287 | Lerida(SER) | Spain | 10 | A*,C*,I* |
| 594 | Ouidia-1 | Morocco | 100 | A*,C*,I* | 1296 | Kardzali | Bulgaria | 150 | A* |
| 594 | Muge | Portugal | 100 | A*,C*,H*,I*,K* | 1296 | Valencia(COPE) | Spain | 10 | A*,C* |
| 603 | Lyon | France | 300 | E,I | 1296 | Orfordness(BBC) | UK | 500 | G,I |
| 603 | Sevilla(RNE5) | Spain | 50 | A*,C*,H*,I* | 1305 | Rzeszow | Poland | 100 | H*,I* |
| 603 | Newcastle(BBC) | UK | 2 | G,H* | 1314 | Kvitsoy | Norway | 1200 | A*,C*,H,I,K* |
| 612 | Athlona(RTE2) | Ireland (S) | 100 | A*,C*,E,G,I,L | 1323 | W'brunn (V.Russia) | Germany | 1000/150 | A*,B*,C*,E*,H*,J,K* |
| 612 | Sebba Aioun | Morocco | 300 | I* | 1332 | Rome | Italy | 300 | A*,H*,I*,K* |
| 621 | RNE1 via ? | Spain | 10 | A*,C*,E*,H*,I*,K* | 1341 | Lisnagarvey(BBC) | Ireland (N) | 100 | A*,C*,E*,G,I* |
| 621 | Wavre | Belgium | 80 | A*,C*,H*,I* | 1341 | Tarrasa(SER) | Spain | 2 | A* |
| 621 | RNE1 via ? | Spain | 10 | A*,C*,I* | 1350 | Cesvaine/Kuldiga | Latvia | 50 | H*,I* |
| 621 | Barcelona(OCR) | Spain | 50 | E*,H* | 1359 | Arganda (RNE-FS) | Spain | 600 | A*,C*,H*,I*,L |
| 630 | Dannenberg(NDR) | Germany | 100 | C* | 1368 | Foxdale(Manx R) | I.O.M | 20 | A*,C*,E*,G,I*,L |
| 630 | Vigra | Norway | 100 | A*,C*,H*,I* | 1377 | Lille | France | 300 | A*,H*,I* |
| 630 | Tunis-Djedeida | Tunisia | 600 | A*,E*,H*,I*,K* | 1386 | Bolshakovo | Russia | 2400/1200 | A*,B*,G*,H*,I*,K* |
| 639 | Praha(Liblice) | Czech | 1500 | A*,C*,H*,I* | 1395 | Flake | Albania | 1000 | A*,C*,I* |
| 639 | RNE1 via ? | Spain | ? | A*,C*,H*,I* | 1395 | TWR via Fljake | Albania | 500 | B*,H* |
| 648 | Jeddah | Saudi Arabia | 2000 | K* | 1395 | Lopic | Netherlands | 120/40 | A*,H*,I*,K* |
| 648 | RNE1 via ? | Spain | 10 | A*,C*,H* | 1404 | Brest | France | 20 | A*,C* |
| 648 | Orfordness(BBC) | UK | 500 | G,I,K* | 1413 | RNE5 via ? | Spain | ? | A*,C*,H*,I* |
| 657 | Neubrand'nburg(NDR) | Germany | 250 | I* | 1422 | Husweiler(DLF) | Germany | 1200/600 | A*,C*,H*,I*,K* |
| 657 | Napoli | Italy | 120 | A*,I* | 1431 | Kopani | Ukraine | 500 | H* |
| 657 | Madrid(RNE5) | Spain | 20 | A*,C*,H*,I* | 1440 | Marnach(RTL) | Luxembourg | 1200 | A*,B*,C,I,K*,L |
| 657 | Wrexham(BBC Wales) | UK | 2 | C,G,H*,K* | 1440 | Dammam | Saudi Arabia | 1600 | E* |
| 666 | Messkirch(Rohrd(SWF) | Germany | 150 | A*,C*,H*,I* | 1449 | Redmoss(BBC) | UK | 2 | D*,H* |
| 666 | Sitkuni(R.Vilnius) | Lithuania | 500 | H* | 1467 | Monte Carlo(TWR) | Monaco | 1000/400 | A*,H*,I*,K* |
| 666 | Lisboa | Portugal | 135 | H* | 1476 | Wien-Bisamberg | Austria | 600 | A*,C*,I*,K* |
| 666 | Barcelona(SER) | Spain | 50 | C* | 1485 | SER via ? | Spain | ? | A*,C* |
| 675 | Marseille | France | 600 | H* | 1494 | Clermont-Ferrand | France | 20 | A*,C*,H*,I* |
| 675 | Lopic(R10 Gold) | Holland | 120 | A*,G,H*,I*,K* | 1494 | St Petersburg | Russia | 1000 | A*,B*,I*,J*,K* |
| 684 | Sevilla(RNE1) | Spain | 500 | A*,G,H*,I* | 1503 | Stargard | Poland | 300 | A*,C* |
| 684 | Avala(Beograd-1) | Yugoslavia | 2000 | A*,C*,H*,I* | 1503 | RNE5 via ? | Spain | ? | A* |
| 693 | Tortosa(RNE1) | Spain | 2 | A*,C*,H* | 1512 | Wolvertem | Belgium | 600 | A*,B*,C*,E*,F*,H*,I*,J,K*,M* |
| 693 | Droitwich(BBC5) | UK | 50 | C,I | 1521 | Kosice(Cizatec) | Slovakia | 600 | A*,C*,I* |
| 693 | Enniskillen(BBC5) | UK | 1 | L | 1521 | Duba | Saudi Arabia | 2000 | I*,K* |
| 702 | Flevo(NDR) | Germany | 5 | C*,J* | 1530 | Vatican R | Italy | 150/450 | A*,C*,E*,H*,I*,K*,M* |
| 702 | Monte Carlo | Monaco | 40 | A*,I* | 1539 | Mainflingen(ERF) | Germany | 350/700 | A*,C*,H*,I*,K*,L |
| 711 | Rennes 1 | France | 300 | A*,C*,H*,I* | 1548 | 1548 | Kuwait | 600 | G* |
| 711 | Laayoune | Morocco | 600 | I* | 1557 | Nice | France | 300 | A* |
| 711 | Murcia(COPE) | Spain | 5 | A*,C* | 1575 | Genova | Italy | 50 | A*,C*,K* |
| 720 | Lisnagarvey(BBC4) | Ireland (N) | 10 | I* | 1575 | SER via ? | Spain | 5 | A*,C*,I* |
| 720 | Norte | Portugal | 100 | A*,C*,H* | 1584 | SER via ? | Spain | 2 | A*,C*,I* |
| 720 | Lots Rd Ldn(BBC4) | UK | 0.5 | C,G,I,L | 1593 | Holzkirchen(VOA) | Germany | 150 | A*,H*,I*,K*,L |
| 729 | Cork(RTE1) | Ireland (S) | 10 | C*,G,H*,I*,L | 1602 | SER via ? | Spain | ? | C*,I*,K* |
| 729 | RNE1 via ? | Spain | ? | A*,C*,H*,I* | 1602 | Vitoria(E) | Spain | 10 | A*,C*,I* |
| 738 | Paris | France | 4 | E,I | 1611 | Vatican R | Italy | 15 | A* |
| 738 | Poznan | Poland | 300 | A*,H*,I* | | | | | |
| 738 | Barcelona(RNE1) | Spain | 500 | A*,C*,E*,H*,I* | | | | | |
| 747 | Flevo(Hilv2) | Holland | 400 | A*,C*,H*,I*,K* | | | | | |
| 756 | Braunschweig(DLF) | Germany | 800/200 | A*,C*,H*,I* | | | | | |
| 756 | Bilbao(E) | Spain | 5 | A*,C*,H*,I* | | | | | |
| 756 | Redruth(BBC) | UK | 2 | H*,L | | | | | |
| 765 | Sottens | Switzerland | 500 | A*,C*,H*,I*,K* | | | | | |
| 774 | Enniskillen(BBC) | Ireland (N) | 1 | H* | | | | | |
| 774 | RNE1 via ? | Spain | ? | A*,C*,H*,I*,K* | | | | | |
| 783 | Leipzig(MDR) | Germany | 100 | A*,C*,H*,I*,K* | | | | | |
| 783 | Miramar(R.Porto) | Portugal | 100 | A*,C*,H*,I* | | | | | |
| 792 | Limoges | France | 300 | C*,I | | | | | |
| 792 | Lingen(NDR) | Germany | 5 | I* | | | | | |
| 792 | Sevilla(SER) | Spain | 20 | A*,C*,H*,I* | | | | | |
| 792 | Londonderry(BBC) | UK | 1 | L | | | | | |
| 801 | Munchen-Ismaing | Germany | 300 | A*,C*,H* | | | | | |
| 801 | RNE1 via ? | Spain | ? | A*,C*,H*,I* | | | | | |
| 810 | Madrid(SER) | Spain | 20 | A*,C*,I* | | | | | |
| 810 | Westerglen(BBC Scot) | UK | 100 | C,G,I,K*,L* | | | | | |
| 819 | Batra | Egypt | 450 | I*,K* | | | | | |
| 819 | Warsaw | Poland | 300 | A*,C*,H* | | | | | |
| 819 | S.Sebastian(EI) | Spain | 5 | A* | | | | | |
| 828 | Hannover(NDR) | Germany | 100/5 | A*,C* | | | | | |
| 828 | Rotterdam | Holland | 20 | H* | | | | | |
| 828 | Barcelona(SER) | Spain | 50 | A*,C* | | | | | |
| 837 | Nancy | France | 200 | A*,C*,H*,I* | | | | | |
| 837 | COPE via ? | Spain | ? | A*,C*,I* | | | | | |
| 846 | Rome | Italy | 540 | A*,C*,H*,I*,K* | | | | | |
| 855 | Berlin | Germany | 100 | C*,H*,K* | | | | | |
| 855 | RNE1 via ? | Spain | ? | A*,C*,H*,I*,K* | | | | | |
| 864 | Santah | Egypt | 500 | C*,I*,K* | | | | | |
| 864 | Paris | France | 300 | A*,C*,H*,I* | | | | | |
| 864 | Socuellamos(RNE1) | Spain | 2 | I* | | | | | |
| 873 | Frankfurt(AFN) | Germany | 150 | A*,C*,G,E,H,I*,K* | | | | | |
| 873 | Zaragoza(SER) | Spain | 20 | A*,C*,I* | | | | | |
| 882 | COPE via ? | Spain | ? | A*,C*,H* | | | | | |
| 882 | Washford(BBC Wales) | UK | 100 | C,G,I,K*,L | | | | | |
| 891 | Algiers | Algeria | 600/300 | A*,C*,H*,I*,K* | | | | | |
| 891 | Huisberg | Netherlands | 20 | H*,I* | | | | | |
| 900 | Brno(CRo2) | Czech Rep | 25 | H*,I* | | | | | |
| 900 | Milan | Italy | 600 | A*,C*,H*,I* | | | | | |
| 900 | Durayyat | Saudi Arabia | 1000 | K* | | | | | |
| 900 | COPE via ? | Spain | ? | A*,I* | | | | | |
| 909 | B'mans Pk(BBC5) | UK | 140 | I,K* | | | | | |
| 909 | M'side Edge(BBC5) | UK | 200 | C | | | | | |
| 918 | Plesivac(Sloven'nR) | Slovenia | 600/100 | A*,C*,H*,I*,K* | | | | | |
| 918 | Madrid(R.Int) | Spain | 20 | A*,C*,I* | | | | | |
| 927 | Wolvertem | Belgium | 300 | A*,C*,H*,I* | | | | | |
| 936 | Bremen | Germany | 100 | C*,H*,I* | | | | | |
| 936 | RNE5 via ? | Spain | ? | A* | | | | | |
| 945 | Toulouse | France | 300 | A*,C*,H* | | | | | |
| 954 | Brno (CRo2) | Czech Rep | 200 | C*,H*,I* | | | | | |
| 954 | Madrid(CI) | Spain | 20 | A*,C*,H*,I* | | | | | |
| 963 | Pori | Finland | 600 | A*,C*,H*,I*,J*,K* | | | | | |
| 963 | Tir Chonail | Ireland (S) | 10 | C*,I* | | | | | |
| 963 | Tunis-Djedeida | Tunisia | 200 | I* | | | | | |
| 972 | Hamburg(NDR) | Germany | | | | | | | |

TROPICAL BANDS CHART

| Freq (MHz) | Station | Country | UTC | DXer | Freq (MHz) | Station | Country | UTC | DXer |
|------------|------------------------|-------------|------|---------------|------------|------------------------|---------------|------|---------------|
| 4.760 | TWR Manzini | Swaziland | 0430 | S | 4.960 | VOA via Sao Tome | Sao Tome | 0303 | EK |
| 4.765 | R.Integracao | Brazil | 0110 | A,B,S | 4.960 | Hanoi 2 | Vietnam | 2055 | L |
| 4.770 | FRCN Kaduna | Nigeria | 2105 | A,D,L,K,L | 4.965 | R.Alvorada | Brazil | 0105 | A |
| 4.775 | AIR Impfal | India | 0100 | K | 4.970 | PBS Xinjiang | China | 230 | S |
| 4.775 | TWR Manzini | Swaziland | 0400 | A,S | 4.970 | AIR Shillong | India | 0110 | A |
| 4.777 | R.Gabon. Libreville | Gabon | 2133 | A,L,P,S | 4.975 | Ondas del Ortegua | Colombia | 2318 | R |
| 4.783 | RTM Bamako | Mali | 2142 | A,F,K,L,Q,R,S | 4.975 | R.Uganda, Kampala | Uganda | 1910 | D,E,H,J,K,L |
| 4.785 | R.Super. Ibague | Colombia | 2335 | B | 4.980 | PBS Xinjiang, Urumqi | China | 0020 | H,S |
| 4.790 | Azad Kashmir R. | Pakistan | 0045 | A | 4.980 | Ecos del Torbes | Venezuela | 0128 | A,B,K,R,S |
| 4.790 | R.Atlantida | Peru | 2340 | B,S | 4.985 | R.Brazil Centrai | Brazil | 0115 | A,B |
| 4.800 | R.Nac Amazonas | Brazil | 0118 | K | 4.990 | R.Ancash, Huaraz | Peru | 0930 | S |
| 4.800 | CPBS 2 Beijing | China | 2352 | B,S | 5.005 | R.Nepal, Kathmandu | Nepal | 1543 | A,L,S |
| 4.800 | AIR Hyderabad | India | 1545 | A,L,S | 5.009 | R.TV Malagasy | Madagascar | 1900 | B,D,L,S |
| 4.800 | R.NBS Maseru | Lesotho | 2046 | L,S | 5.010 | R.Garoua | Cameroon | 2059 | E,J,S |
| 4.805 | R.Nac Amazonas | Brazil | 2305 | A | 5.010 | AIR Thiru-puram | India | 0125 | A,K,S |
| 4.815 | R.diff TV Burkina | Quagadougou | 2102 | A,B,I,K,L,R,S | 5.012 | R.Copacabana Rio | Dominican Rep | 2333 | B |
| 4.820 | R.Botswana, Gaborone | Botswana | 1912 | K,L,R,S | 5.015 | R.Cristal Int | Brazil | 2346 | B |
| 4.820 | Xizang, Lhasa | Tibet | 2309 | R | 5.020 | PBS-Jiangxi Nanchang | China | 0130 | A,K |
| 4.825 | ZBC R-4 | Zimbabwe | 1831 | R | 5.025 | ABC Katherine | Australia | 2132 | L |
| 4.830 | R.Tachira | Venezuela | 2212 | A,B,K,L,S | 5.025 | R.Parakou | Benin | 2129 | L,R |
| 4.832 | R.Reloj | Costa Rica | 0840 | S | 5.025 | R.Rebelle, Habana | Cuba | 0135 | A,S |
| 4.835 | ABC-Alice Springs | Australia | 2137 | A,L | 5.025 | R.Uganda, Kampala | Uganda | 2056 | L |
| 4.835 | R.Tezulutlan, Coban | Guatemala | 0055 | A | 5.030 | AWR Latin America | Costa Rica | 0931 | A,D,J,R,S |
| 4.835 | RTM Bamako | Mali | 2044 | A,B,E,H,I,K | 5.030 | RTM Kuching | Sarawak | 2142 | L,S |
| 4.840 | AIR Bombay | India | 1540 | L,R,S | 5.035 | R.Aparecida | Brazil | 0127 | S |
| 4.845 | ORTM Nouakchott | Mauritania | 2240 | A | 5.045 | R.Cultura do Para | Brazil | 0110 | A |
| 4.850 | R.Yaounde | Cameroon | 2245 | A,E,K,R,S | 5.047 | R.Togo, Lome | Togo | 2157 | A,J,K,L,Q,R,S |
| 4.860 | AIR Delhi | India | 1536 | L,J,L,R,S | 5.050 | Guangxi FBS, Nanning | China | 2115 | S |
| 4.865 | PBS Lanzhou | China | 1536 | A,H,K,L,L,S | 5.050 | Haixia 1 | China | 2305 | A |
| 4.870 | R.Cotonou | Benin | 2048 | L,R | 5.050 | AIR Aizawl | India | 0120 | A |
| 4.875 | R.Roraima, Boa Vista | Brazil | 0040 | A,S | 5.050 | R.Tanzania | Tanzania | 1944 | E,J,K,L,S |
| 4.879 | R.Bangladesh | Bangladesh | 0050 | A | 5.055 | RFO Cayenne(Matoury) | French Guiana | 2315 | A,R,S |
| 4.880 | AIR Lucknow | India | 1332 | S | 5.055 | Pakistan BC, Rawalp'di | Pakistan | 1440 | S |
| 4.885 | R.Clube do Para | Brazil | 2245 | A,K,S | 5.060 | PBS Xinjiang, Urumqi | China | 1549 | A,L,R,S |
| 4.885 | R.Difusora Acreana | Brazil | 0055 | A | 5.075 | Caracol Bogota | Colombia | 2146 | A,B,D,F,I |
| 4.890 | RFI Paris | via Gabon | 0420 | F,K,S | | | | | |
| 4.890 | R.Port Moresby | New Guinea | 0915 | S | 5.090 | Taiwan 2 Sce.Beijing | China | 1301 | S |
| 4.895 | Voz del Rio Arauca | Colombia | 2250 | R | 5.100 | R.Libigia, Totota | Liberia | 2155 | L,S |
| 4.895 | Pakistan BC | Pakistan | 1619 | R | 5.125 | Taiwan 1 Sce.Beijing | China | 1550 | L,S |
| 4.900 | Haixia 2 | China | 1240 | 125 | 5.163 | CPBS 2 Beijing | China | 2305 | A |
| 4.905 | R. La Oroya | Peru | 0135 | A | 5.320 | CNR 1 | China | 2310 | A |
| 4.910 | Tennant Creek | Australia | 2136 | L | | | | | |
| 4.910 | AIR Jaipur | India | 1307 | S | | | | | |
| 4.910 | R.Zambia, Lusaka | Zambia | 1926 | E,J,L,S | | | | | |
| 4.915 | R.Anhanguera | Brazil | 0900 | S | | | | | |
| 4.915 | GBC-1, Accra | Ghana | 2200 | A,L,S | | | | | |
| 4.915 | Pakistan BC, Islamabad | Pakistan | 0110 | A | | | | | |
| 4.915 | R.Cora de Peru, Lima | Peru | 0930 | S | | | | | |
| 4.920 | R.Quito, Quito | Ecuador | 0125 | C,D,K,R,S | | | | | |
| 4.920 | AIR Madras | India | 1538 | H,J,L,R,S | | | | | |
| 4.925 | R.Nacional, Bata | Guinea | 2200 | L | | | | | |
| 4.927 | RRI Jambi | Indonesia | 2220 | S | | | | | |
| 4.935 | KBC Gen Sce Nairobi | Kenya | 1935 | D,L,M | | | | | |
| 4.935 | R.Tropical, Tarapoto | Peru | 0055 | A | | | | | |
| 4.940 | AIR Guwahati | India | 1538 | A,L,S | | | | | |
| 4.940 | R.Abidjan | Ivory Coast | 2250 | A | | | | | |
| 4.945 | R.Difusora | Brazil | 0100 | A | | | | | |
| 4.945 | R.Progresso | Brazil | 2300 | A | | | | | |
| 4.950 | R.Nacional, Mulvenos | Angola | 1835 | Q | | | | | |
| 4.950 | AIR Srinagar | India | 1538 | L,M,R,S | | | | | |
| 4.950 | R.Madre de Dios | Peru | 0120 | A | | | | | |
| 4.950 | VOA via Sao Tome | Sao Tome | 2100 | H,N,S | | | | | |
| 4.955 | R.Nac. de Colombia | Colombia | 2315 | A,S | | | | | |

DXers:

- (A) Robert Connolly, Kilkeel.
 (B) John Eaton, Woking.
 (C) David Edwardson, WallSEND.
 (D) Bill Griffith, S.W.London.
 (E) David Hall, Morpeth.
 (F) Brian Heath, Stapleton.
 (G) Simon Hockenull, E.Bristol.
 (H) Robert Hughes, Liverpool.
 (I) Sheila Hughes, Morden.
 (J) Rhoderick Illman, Oxted.
 (K) Eddie McKeown, Newry.
 (L) Fred Pallant, Storrington.
 (M) John Parry, Larnaca, Cyprus.
 (N) Clare Pinder, while in Appleby.
 (O) Peter Pollard, Rugby.
 (P) Vic Prier, Colyton.
 (Q) Philip Rambaut, Macclesfield.
 (R) Richard Reynolds, Guildford.
 (S) John Slater, Scalloway.
 (T) Tom Smyth, Co.Fermanagh.
 (U) Thomas Williams, Truro.

Some of the many broadcasts to Europe come from R.Japan via Woofferton, UK **7.230** (Jap, Eng 0600-0800), rated 43433 at 0755 in Herstonmouceux; AWR via Forli, Italy **7.230** (Eng 0900-1000) 33233 at 0930 in Appleby; V of Russia **7.390** (Eng [WS]) 34333 at 1446 in Woodhall Spa; Israel R, Jerusalem **7.465** (Eng 1645-1700 & 2000-2025 [also to USA]) 44444 at 1651 in Stockport and 54544 at 2000 in Galashiels; DW via Sines **7.285** (Eng 2000-2050) 44444 at 2010 in Rugby; R.Tashkent, Uzbekistan **7.105** (Ger 1935-2030) 22222 at 2015 in W.London; R.Bulgaria, Sofia **7.530** (Eng 2000-2100) SIO333 at 2026 in N.Bristol; V of Mediterranean, Malta via ? **7.440** (Eng 2000-2100) 44333 at 2035 in Bridgwater; AIR via Aligarh? **7.410** (Hi, Eng 1745-2230) 41144 at 2055 in Morpeth; R.Portugal **7.110** (Eng 2100-2130) 33333 at 2115 in Stalbridge; RCI via Skelton, UK **7.235** (Eng 2100-2230, also to Africa) 23422 at 2125 in E.Bristol; R.Ukraine Int, Kiev **7.240** (Eng 2200-2300) 43344 at 2204 in Freshwater Bay; R.Moldova Int **7.520** (Eng 2300-2325) 45243 at 2300 in Newry.

The occupants of the **6MHz (49m)** band during the evening include R.Prague, Czech Rep 5.930 (Eng to Eur, M.East, Africa 1700-1727) 32233 at 1715 in Stockport; BBC via Rampisham & Skelton, UK **6.195** (Eng to Eur, N.Africa 1600-2330) 55545 at 1730 in Tunisia; R.Austria Int, via Moosbrunn **6.155** (Eng to Eur 1730-1800) 54444 at 1732 in Plymouth; R.Slovakia Int **6.055** (Eng to Eur 1930-1957) 44344 at 1930 in Newry; R.Yugoslavia **6.100** (Eng to Eur 1930-2000) 54444 at 1939 in Norwich; China R.Int via ? **6.950** (Eng to Eur 2000-2157) 43433 at 2000 in Colyton; Polish R, Warsaw **6.035** (Eng to Eur 2030-2125) SIO333 at 2032 in N.Bristol; R.Korea via Kimjae **6.480** (Eng to Eur 2100-2200) 31231 at 2100 in Galashiels; R.Sweden via Hockby **6.065** (Eng to Eur 2130-2158) 42223 at 2130 in Dudley; RCI via Sackville **5.925** (Eng to Eur, Africa 2100-2200) 53433 at 2135 in E.Bristol; WYFR via Okeechobee,

USA **5.810** (Eng to Eur, Africa 2000-2100) 24232 at 2156 in Bridgwater; R.Taipei Int via WYFR? **5.810** (Eng to Eur 2200-2300) 43322 at 2200 in Truro; R.Ukraine Int. **5.905** (Eng to Eur 2200-2300) 54333 at 2200 in Appleby; V of Russia **5.965** (Eng [WS]) SIO433 at 2200 in Co.Fermanagh; WHRI South Bend, USA **5.745** (Eng to E.USA, Eur 2200-0400) 44444 at 2330 in Morden.

LIST OF EQUIPMENT USED LM&S February, #March, *April'98

- * Darren Beasley, Bridgwater: Yaesu FRG-100 + a.t.u. + 15m wire.
 * Vera Brindley, Woodhall Spa: Sangean ATS-803A + r.w.
 * Robert Connolly, Kilkeel: JRC NRD-525 + Datong AD070 active antenna.
 * Martin Cowin, Kirkby Stephen: Hitachi TRK-5854E + built-in whip.
 * Paul Crankshaw, Troon: ADR AR7030 + 1m square loop.
 * Bernard Curtis, Stalbridge: Tatung TMR7602 or Grundig Ocean Boy + r.w.
 * Martin Dale, Stockport: Grundig Satellit 3000 or Sangean ATS803A or Codar CR70A + a.t.u. + r.w.
 * Eric Duncan, St.Andrews: Icom IC-R8500 + 1.75m diam m.w. loop or W-Q m.w. loop or balun + 60m wire.
 * John Eaton, Woking: JRC NRD-345 + Datong AD070 or a.t.u. + r.w.
 * David Edwardson, WallSEND: Trio R-600 + Pi-Balun + invert V trap dipole or 2.5m X 2.5m loop.
 * Stan Evans, Herstonmouceux: Kenwood R-2000 + Balun + 11m wire in loft.
 * Bill Griffith, W.London: JRC NRD-535 + 25m wire.
 * Alec Griffiths, Thurso: Radio Shack PRO-2045 or Philips AS440 or Sanyo G3001 or Steepleton MBR-7 or Vega Salena + dipole or r.w.
 * Gerald Guest, Dudley: Roberts RC818 + r.w. (location 300m a.s.l.)
 * David Hall, Morpeth: ADR AR7030 + 13m wire.
 * Tony Hall, Freshwater Bay, IoW: Yaesu FRG-7 + 13m wire or RFB45
 * Ted Harris, Manchester: Roberts RC818
 * Francis Heame, N.Bristol: Sharp WQ7370 + r.w.
 * Brian Heath, Stapleton: JRC NRD-5357 + r.w.
 * Simon Hockenull, E.Bristol: Roberts R817, ITT Colt, Bush TR130
 * Robert Hughes, Liverpool: Lowe HF-225 Europa or PR-150 or ADR AR7030 + 15m indoor wire or Drake RBE + RF Systems MTA on roof.
 * Sheila Hughes, Morden: Sony ICF-7600DS + loop or Panasonic DR48 + 15m invert L.
 * Rhoderick Illman, Oxted: Kenwood R-5000 + r.w. or AN-1.
 * Brian Keyte, Boxborn: ADR AR7030 + r.w. or loop.
 * Ross Lockley, Galashiels: Realistic DX-300 + a.t.u. + 40m wire or Sangean ATS803A.
 * Eddie McKeown, Newry: Tatung TMR 7602.
 * George Milner, Wotton, IoW: Sangean ATS-803A or Rascal RA17L + loop.
 * Fred Pallant, Storrington: Trio R-2000 + Howes CTUB a.t.u. + r.w.
 * John Parry, Larnaca, Cyprus: Realistic DX394 + t.w.
 * Clair Pinder, while in Appleby: JRC NRD-525 + a.t.u. + r.w. or Sony ICF-SW55.
 * Peter Pollard, Rugby: Sony ICF-2001D + r.w.
 * Vic Prier, Colyton: RCA AR66LF + a.t.u. + 20m horizontal loop in loft or Redifon P651N + active vertical in loft.
 * Paul Pybus, Hull: Fisher 58 tuner + 13m wire or loop.
 * Philip Rambaut, Macclesfield: Int Marine Radio R.700M + r.w.
 * Tom Read, Macclesfield: Tatung TMR 7602 + a.t.u. + 10m wire.
 * Richard Reynolds, Guildford: Sangean ATS-803A + l.w./m.w. loop or 60m dipole or r.w. in loft.
 * Harry Richards, Barton-on-Humber: Grundig Satellit 700 + AD070 or r.w. or Grundig Yacht Boy 400 or Matsui MR4099
 * Chris Shorten, Norwich: Matsui MR4099 + 10m wire.
 * John Slater, Scalloway, Shetland: Lowe HF-150 + a.t.u. + 20m wire.
 * Tom Smyth, Co.Fermanagh: Sangean ATS-803A or Morphy Richards R919
 * Tony Stickles, Thornton Heath: ADR AR7030 + 20m wire or loop.
 * Phil Townsend, London: Lowe HF-225 + preselector + r.w. or loop.
 * Ernest Wiles, NE Bedford: AKD Target HF3 + a.t.u. + Window.
 * Ernest Wiles, while in Malta, Tenerife & Tunisia: AKD Target HF3 + indoor wire.
 * Thomas Williams, Truro: Gundig Yacht Boy 206 or Sharp 5454 + r.w.
 * Tom Winzor, Plymouth: Kenwood R-1000 or Trio BR59D or Trio 58D 9RS + Miller ant.



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- * 100kHz - 1300MHz
- * WFM, NFM, AM
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- * Illuminated Display
- * Audio and Carrier Search
- * Signal Strength meter
- * RF attenuator switch
- * Ni-cads and AC charger

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Garmin GPS-III

With complete moving map of the UK & Europe

The new GPS-III is loaded with a moving map covering millions of miles of motorways, ordinary roads, railways, rivers and shorelines. 12 channel receiver means fast positioning from switch-on, and the display width can be zoomed to cover from 500ft to 5,000 miles. Sit the GPS-III on the dashboard and watch your progress as you travel. Display rotates vertical or horizontal. We have the latest UK version in stock now.

18

AR-7030 PLUS Anniversary Edition

Offer Ends 1st May

Includes:
Noise Blanker
Notch Filter
Whip Antenna



£899.95

- * 0 - 32MHz
- * SSB CW AM FM Data
- * AM Synchronous
- * 100 Memories
- * 4 filters fitted
- * Switched Pre-amp
- * Passband tuning
- * Enhanced AGC
- * Noise spike compression
- * Six level attenuator
- * Bar S-meter
- * AC adaptor included

AR-7030 Standard model **£694.95**

Yupiteru MVT-9000 Ours are **£389** CE Approved



Not all versions are - buy from us and be confident - of legal UK stock!!

- * 530kHz to 2039MHz
- * 1000 Alphanumeric Memories
- * Duplex monitoring & tracking
- * USB LSB CW AM FM
- * Channel spectrum scope
- * Blistering scanning speed
- * Good performer on the SW bands
- * Totally programmable
- * Multiple tuning steps
- * Extremely sensitive front-end
- * Good strong signal performance
- * Includes AC charger and Ni-cads

KENWOOD R-5000

£929



- * 100kHz - 30MHz
- * SSB CW AM FM
- * 100 Memories
- * 10Hz steps
- * 3 IF Filters
- * Analogue S-meter
- * Dual AGC
- * Dual Noise Blanker
- * Wide dynamic range
- * Notch filter
- * IF shift control
- * Built-in timer
- * Built-in AC supply
- * Ext. 12v DC operation

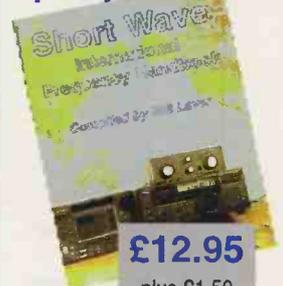
Lowe HF-150 Europa



£499

5kHz - 30MHz SSB - CW - AM, Dual Filters, 60 Memories, Front-end bandpass filters, Internal 8 x AA ni-cad holder plus charger, 12V or 230V external supply - see Review this month

Short Wave International Frequency handbook



£12.95
plus £1.50 Postage

ICOM ICR-8500

£1549



- * 100kHz - 2GHz
- * SSB CW FM WFM AM
- * 1000 Memories
- * 4 IF Bandwidths
- * Alphanumeric display
- * Analogue S-meter
- * RS-232 interface
- * IF shift & Audio filter
- * Keypad entry option
- * Min tuning step 10Hz
- * 12v DC supply
- * Windows software £49.95

Fairhaven RD-500 20kHz - 1.75GHz **£799.95**



The new Fairhaven RD-500 offers you wide band coverage on all modes SSB - CW - FM AM. The enormous memory capacity and alphanumeric display enables you to build up a very comprehensive data base of stations.

WATSON

WAT-2 Short Wave ATU

- * 500kHz - 30MHz
- * 6 Band Positions
- * "Q" Control
- * Long wire systems
- * Coax feed systems
- * SO-239 output
- * Size 84x55x60mm

£69.95



SPECIAL GPS-38 Clearance

£99.95

Limited Stocks

The GPS-38 can give your location within 50ft! Totally self-contained, it runs from 4 x AA cells and has a live route display that traces your progress graphically. Measures distance, speed, altitude, Lat/Long, and even WAB grid locator!



We can supply any ham radio item - phone for deal

Save £££s.. on Batteries



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- * 1.5V cells
- * No memory effects
- * Charging mid cycle is OK
- * 5 year charge shelf life
- * 3 times capacity of ni-cads
- * Very low cost

Price Down

This is a brand new technology which has major advantages over ni-cads. Now you get a 1.5v cell that will hold its charge for up to 5 years and has 3 times the current capacity of normal ni-cads. We are offering these at a very special price direct from Canada. In stock.

Starter Kit comprising 4 x AA and AC charger £13.99
 4 x AA cells - fully charged £5.95
 8 x AA cells - fully charged £10.99
 4 x AAA cells - fully charged £6.25

Welz WS-2000 Scanner

£299



£269

- * World's smallest scanner
 - * FM, WFM, & AM
 - * 500kHz - 1300MHz
 - * Fast scanning speed
 - * Clear LCD readout
 - * 2000 Memories
 - * Even better sensitivity
 - * Good strong signal handling
 - * Runs from just 2 x AA cells
 - * Battery saving mode
- Ham Radio Today Review of WS-2000 says "Lovely little set - very sensitive receiver."

Accessories:

| | | |
|----------|-------------|--------|
| CNB-401 | Ni-cad pack | £11.95 |
| CSA-401 | AC charger | £36.95 |
| WSC-1000 | Soft case | £14.95 |

AOR AR-8000 Scanner

£299.95



- * 500kHz - 1900MHz
- * WFM, NFM, SSB, AM
- * 1000 Memory Channels
- * 20 Search Banks
- * 30 ch. per second search
- * Band Scope Display
- * Password Protect
- * Computer control outlet
- * Signal Strength meter
- * Illuminated Display
- * Programmable Steps
- * Ni-cads and AC charger.

£249.95

MVT-7100 Scanner

- * 100kHz - 1650MHz
- * NFM, WFM, SSB, AM
- * 1000 Memories
- * Signal Strength Meter
- * Illuminated keypad - display
- * 500 Ch. pass memories
- * 30 Ch. per second speed
- * Unique mode scan
- * Ni-cads & AC Charger



PRICE MATCH

Vectronics Active HF Antenna



£69.95

This portable active antenna covers 300kHz - 30MHz and also provides adjustable front-end selectivity. Ideal for use indoors and outside portable operation, it is the answer to those looking for a compact antenna system for short wave work.

24 Hour Digital WallClock + Temperature & Date

£34.95

- * 265mm diameter
- * 24/12 hours LCD
- * 55mm digits
- * date - day - month
- * Celsius / Fahrenheit
- * 2 x AAA cells



Available End of March

AT-2000 Listener ATU

£99.95

For the very best in ATUs the AT-2000 has to be the choice. Hundreds in use around the UK - it's the best.



MFJ-784B DSP filter

£239.95



- * Works with any receiver or transceiver
- * This filter is fully programmable with memories
- * 16 factory pre-set positions for easy use
- * Plugs directly into the headphone socket
- * Drives speaker or headset to good volume
- * Requires 12v DC at approx. 500mA.

WATSON GPS Active Antenna



W&S £39.95

- * 1.6GHz GPS ant.
- * Low profile for car
- * Magnetic mount design
- * 6dB gain design
- * Guarantees improved range
- * BNC terminated coax.
- * OK for Garmin etc.

OptoElectronics Scout

£349.95

- * 10MHz - 1.4GHz
- * 400 Memories
- * 255 hits record
- * Auto store/ recall
- * Interfaces with AR-8000
- * Ni-cads and charger



WATSON FC-130 Counter

£79.95



This new model has a wide frequency range and is powered by internal ni-cads. External BNC socket with aerial makes it very sensitive. Supplied with AC charger, it is very well built. Don't be fooled by the price!

SALE

Micro Counter

£89.95

New from Optoelectronics is the Techtoyz counter that is "pager" size and can clip on to your belt. Claimed to be the smallest in the world, it covers 10MHz to 1.2GHz. Runs for 10 hours from 1 x AA cell.



This Month

Opto R11

A nearfield receiver that covers 30MHz - 2GHz in less than a second and locks onto any FM signal providing good speaker output and instant deviation reading. Includes ni-cads and charger. £369.95



NEW

QS-400

£9.95

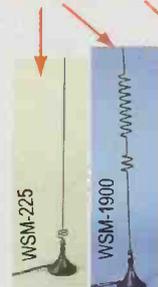
- * Mounts handy or GPS on dash grill
- * The safe way to go mobile
- * Quick release feature.
- * Doesn't use nasty adhesive!



Scanning Antennas

Mobile Handy

Aeronautical, Marine Emergency Services
 W-881 Super gainer
 25 - 1900MHz BNC £19.95



VSM-1900 Mobile
 1/2 inch magnet antenna
 5 - 1900MHz plus cable fitted BNC £29.95

VSM-225 Airband Mobile
 1/2 inch magnet antenna
 HF/UHF airband plus cable fitted BNC £29.95

ICOM PCR-1000

A most Amazing Receiver

PRICE MATCH



10kHz to 1300MHz SSB FM AM computer receiver. The remote black box plugs directly into your PC. Because it can be positioned remotely from the PC, there is no problem with interference. This is the next generation of receivers - here now! Its performance knocked our socks off.

WATSON

Hunter Counter

NEW

£59.95



Amazing Price

- * 10MHz-3GHz
- * 8 Digit Display
- * Battery Save
- * Hold button
- * 6hr batt. life
- * Ni-cads
- * Charger
- * Antenna

In Stock Now!

Yaesu FRG-100

£419.95



Probably one of the most underrated receivers on the market. It covers the complete short wave spectrum and performs better than anything else in this price bracket. With our 10-day approval you can't go wrong! Runs from 12V. Suitable matching power supply £44.95.

ICOM IC-R10

£295



Save £80!

- * 500kHz - 1300MHz
- * NFM, WFM, AM, SSB
- * 14 tuning steps
- * 1000 Memories
- * Multi scan modes
- * Real-time band scope
- * Noise blanker
- * bypass memories
- * Inc. Ni-cad & Charger

WATSON

WMM-1 Multimode Modem

- * Packet, AMTOR, CW
- * SSTV, Fax, RTTY
- * NAVTEX, SYNOP
- * Transmit and receive
- * Needs PC 286 or better
- * Includes software
- * No external power required
- * Connects to RS-232

£69.95



PART 1

Small Loop Antennas

Building and Deploying

This month, we bring you a small antenna series in which Joe Carr gets his teeth into small loops.

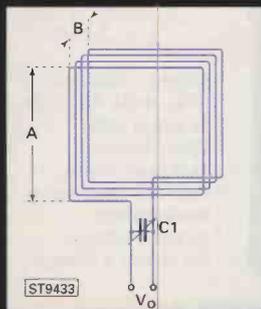
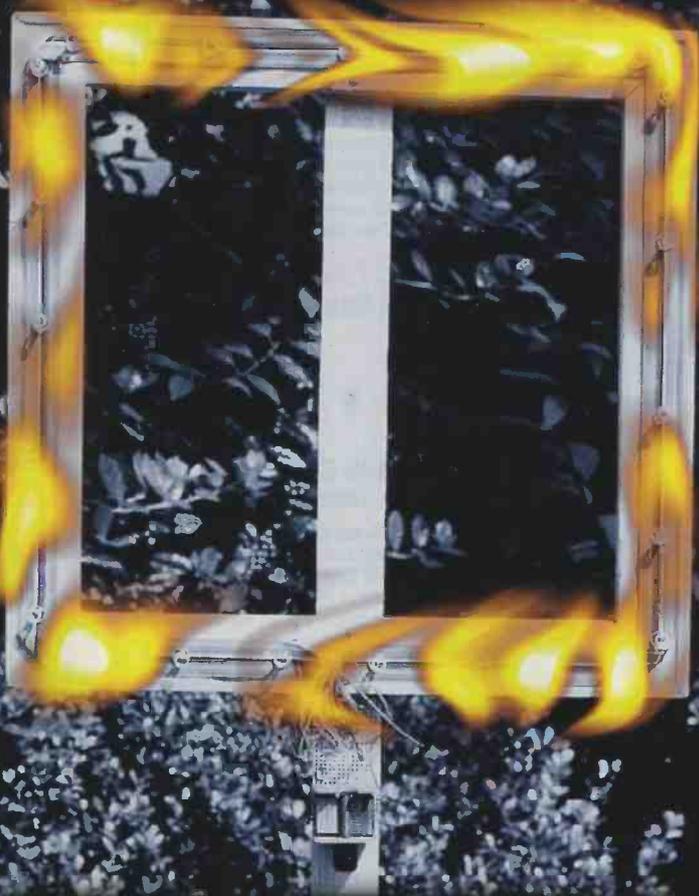


Fig. 1.1: The basic square loop antenna.

From the number of articles and books on the market about medium wave, h.f., and l.f./v.l.f. small loop antennas, I conclude that they are quite popular. In my own antenna books (*Practical Antenna Handbook* and *Joe Carr's Receiving Antenna Handbook*) the chapters on small loops have drawn a great deal of positive comment. But what's missing in a lot of the discussion is how to most effectively use a loop antenna. Let's rectify that oversight. But first, for those who came to the table late, let's review the basics of small loop antennas. For those who wish to pursue more information about loop theory, a references section is provided at the end.

Small Loop Theory

The class of loop antenna being discussed here is *small loops*, i.e. those loops with a total wire

length that is very short compared with one wavelength of the received signal; typically $\leq 0.15\lambda$. Loop antennas can have a circular, square, rectangular, hexagonal or octagonal shape. Some of the references at the end of the last part in this series will give details for all of these shapes, so for this brief treatment we will consider only the square variety. The square loop is mechanically easiest to build, and performs very nearly the same as circular loop antennas of similar size.

Figure 1.1 shows the basic square loop antenna, with sides of length 'A'. The depth ('B') is the width of the windings, either coplanar or parallel planar with respect to each other (the parallel planar case is shown).

The gain of the loop is less than a dipole for the same frequency, and one normally expects to see very low signal voltages at the output terminals for any given electric field strength. The output voltage can be increased significantly if

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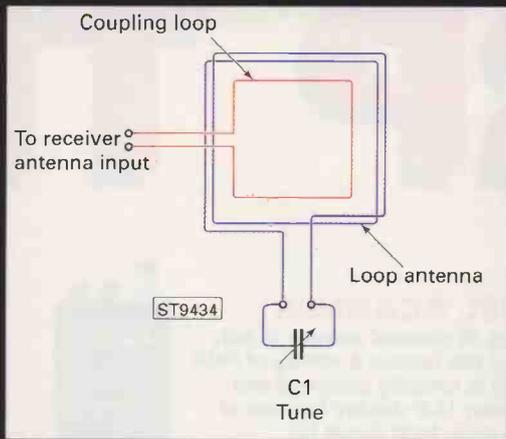


Fig. 1.2: Loop antenna with coupling transformer loop.

the loop is tuned to resonance by a parallel capacitor such as C1 in **Fig. 1.1**. Although untuned loops are used, the increase in output signal voltage is approximately equal to the Q of the tuned circuit. Values of 50 to 100 are normally 'worst case' for the Q of practical loop antennas, and Q values approaching 1000 are not impossible to obtain. These numbers translate into a large signal strength advantage for the tuned type of loop.

While the use of tuning greatly increases the signal voltage at the resonant frequency, there are trade-offs to consider. The tuning control is most conveniently adjusted by hand, which means that a need to change frequency requires the loop to be close at hand. Remote tuning becomes a problem (although variable capacitance diodes - Varactors - are sometimes used to overcome this problem). On the plus side, loops attenuate unwanted signals by two mechanisms: nulls in the pattern (of which, more shortly) and tuning discrimination. If there are strong local signals even slightly removed in frequency from the desired signal, then the discrimination offered by the tuning selectivity helps attenuate that signal, and improves the ability of the receiver with regard to overload, desensitisation, and intermodulation distortion (with the power levels seen on a.m. and i.f. broadcast band transmitters, this can be a significant improvement in performance).

Some loop antennas are designed as transformers, and have a low impedance coupling loop wound along with the antenna loop (**Fig. 1.2**). For medium wave loops, the coupling winding can be only one turn, although for i.f. and v.l.f. loops up to five turns are used. Even for i.f. broadcast, however, a one-turn coupling loop is often found sufficient.

The azimuthal radiation or reception pattern for the ideal small loop antenna is shown in **Fig. 1.3**. It is a 'figure-of-eight' pattern with the maxima off the ends of the loop, and minima (nulls) perpendicular to the loop. The nulls of practical loops run from 20dB relative to the minima for sloppily assembled projects, to 40dB for well done jobs. With nearly perfect assembly, and some additional features, loops with nulls up to 60dB are possible. Some literature claims 80dB nulls, but I am sceptical of these results. A 60dB reduction is 1 000 000:1, which is difficult to achieve in practice (an 80dB reduction is 100 000 000, so you see the basis for my scepticism). The ideal pattern of **Fig. 1.3** can

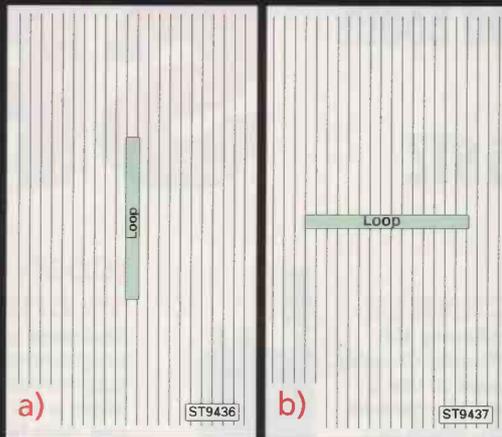


Fig. 1.4: a) Wave fronts parallel to loop plane creates minimal reception (null); b) wave fronts at right angles to loop plane create maximum

be distorted by local interaction with the Earth, buildings, and other conductive or dielectric objects nearby (another reason for scepticism).

That the loop nulls are achieved when the loop is broadside to the arriving signal seems counterintuitive to some people, but there is a solid physical basis for the phenomenon. **Figure 1.4** shows two situations with the loop in two different positions orthogonal to each other. In these figures, the parallel lines represent isopotential lines on the approaching wavefronts of the arriving signal. When the loop is oriented broadside to the signal (**Fig. 1.4a**), few lines of force are cut, so the signal induced in the loop is very small; this is the null condition. But when the loop is oriented 90 degrees with respect to the arriving signal (**Fig. 1.4b**), the wire in the loop is cut by several different lines of force, so a maxima is achieved.

Larger small loops have a greater aperture, or capture area than smaller small loops (if you can follow that!), so will present a high signal voltage to the receiver. At some point, however, the loop is no longer 'small', so the pattern achieved will not be as shown earlier. There is a distinct trade-off between loop size and signal levels, both for electromagnetic reasons (i.e. small loops are $\leq 0.15\lambda$) and mechanical reasons (large loops are harder to assemble and use). For most common uses, loops of 0.6 to 1.5m per side are preferred. The loops prepared for this and my prior papers on loops were 610mm and 900mm per side because these sizes correspond to material sizes available in hobby shops and DIY hardware stores.

Figure 1.5 shows four different forms of loop antenna. **Figures 1.5a** and **1.5b** are commercially available loop antennas, both of which interface with the same model loop preamplifier. Because of the

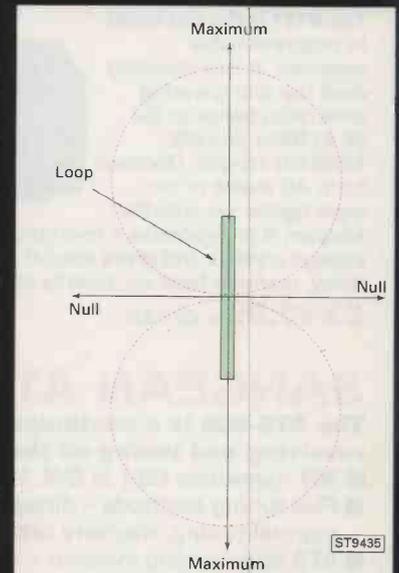


Fig. 1.3: Azimuthal pattern of the small loop antenna (not loop orientation).



Fig. 1.5: a) Commercial loopstick; b) commercial square loop; c) planar wound loop; d) depth wound loop.

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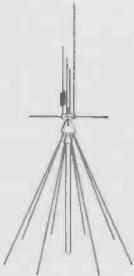
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Deploying the Loop - Standard Method

When people hear that the loop produces considerably less signal than a dipole or vertical they sometimes ask "Why use one?" The answer depends on the application. Of course, radio direction finding (RDF) is one application, but for most people that is not the principal attraction of the small loop antenna. Neither is the fact that the loop can be installed on a table top, so requires a lot less space than any other form of antenna, the principal use. The most common use for small loop antennas on crowded bands is interference reduction of off-axis signals.

Consider the situation in **Fig. 1.6a**. The antenna here has an omnidirectional pattern, so receives equally well in all directions. Suppose that two signals, 'Sig1' and 'Sig2', are on the same frequency, but arrive from different directions. Even if they are of the same power level (see inset to **Fig. 1.6a**), they will overwhelm the receiver, and cause considerable interference with each other.

And if one signal is considerably stronger than the other, then it may overwhelm the other, preventing reception. However, even if the weaker signal cannot be easily heard (or heard at all), it may still cause problems. In my locale, we have an a.m. broadcast station on 780kHz. For years, sensitive a.m. broadcast receivers (car radios and communications receivers, for

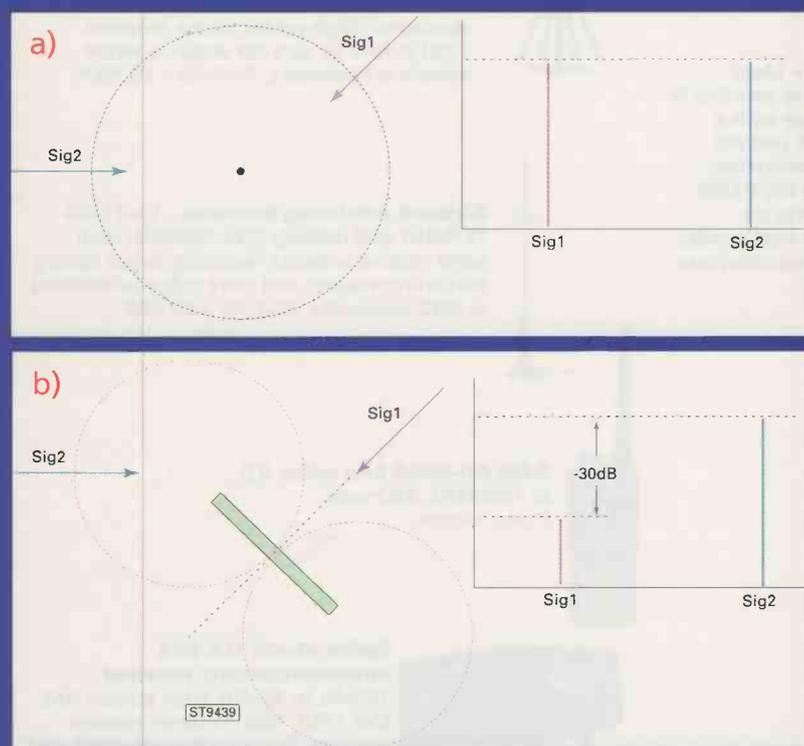


Fig. 1.6: a) Two equal strength signals arriving from two different directions to an omni-directional antenna; b) Aiming the null at the undesired signal reduces its strength, making it easier to pick up the desired signal.

example) would exhibit a 10kHz heterodyne when tuned to that signal. The problem was another station on 790kHz 160km away. And while we were in the 'deep fringe' area of its ground wave pattern, there was sufficient signal from this adjacent channel station to interact with the 780kHz signal and create a 10kHz beat note. It seems that the radio regulatory authorities muffed that one; the 790kHz station eventually changed frequency or went off the air.

Figure 1.6b shows the situation where a loop antenna is used to null out one of the stations. Although maximum sensitivity occurs when the maxima lobe is pointed at the desired signal, this isn't always the best approach. Assume that we want to monitor Sig2, and need to be rid of Sig1. By pointing the deepest part of the antenna null at the unwanted station (Sig1), we can considerably reduce the signal level seen by the receiver (see inset to **Fig. 1.6b**), even if the signals are the same strength. Indeed, even if Sig1 is considerably stronger than Sig2, a considerable improvement in signal-to-noise ratio (S/N ratio) is possible by correct loop pointing. The depth of the null, used to null the offending signal, is usually far more important than the lost signal occurring because the maxima is off-axis to the desired station. S/N ratio is, at the end of the day, what's important. Most people agree that an S/N ratio of around 10dB is necessary for what is described as 'comfortable' listening.

low gain (less than a dipole), it's often the case that loop users employ preamplifiers to make up the difference. **Figure 1.5c** shows a planar wound loop antenna. It is built using do-it-yourself picture frame wood stock available in most hobby and craft stores. The advantage of this type of stock is that the ends are already cut at 45° angles, and have the tongue and groove cuts that allow them to fit together. A little carpenter's glue (PVA), and the assembly is quite strong.

The wiring on the loop is computer flat ribbon cable. The variant in **Fig. 1.5d** is a depth wound loop antenna. It is made from spruce stock bought at a hobby shop (the kind that caters for model builders). This stock comes in 3 x 24in lengths. The wire is 26s.w.g. enamelled magnet wire, and is secured to the cross arms by making 6mm slits for each wire at the ends of the wooden cross arms.

Deploying the Loop - With Rotation

Unless a loop is used for reception of a single station, it will be necessary to re-orient the nulls and maxima in order to accommodate different situations, different frequencies, etc. As most loops are desktop affairs, one could simply shove the loop around as needed. But that's not a terribly elegant solution. A bit less messy is the method shown in **Fig. 1.7**. The 'rotator' in this case is nothing more than the bit of furniture called a 'Lazy Susan'. About 1m in diameter, it sits in the centre of a dining table, and can be rotated to bring food items right to the diner.

Although new Lazy Susans might be a bit expensive for this use, used ones (not antiques, of course) are often quite reasonable. Also, DIY woodworking supplies shops often carry the mechanisms at a low cost, and these could be pressed into service without the decorative wood pieces. Also, I've seen an 'unfinished' Lazy Susan kit advertised in a magazine. To reorientate the loop, one merely rotates the table portion of the Lazy Susan.

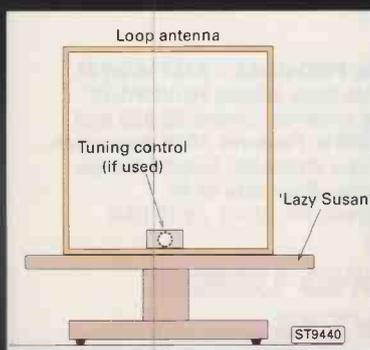


Fig. 1.7: Lazy Susan method of aiming a loop.

I've seen a variation on this theme that would permit remote rotation of a loop antenna. There are small rotating platforms available that are used by merchants to create rotating merchandise or advertising displays. Typical rotation speeds are on the order of 1 to 12r.p.m. Some of them use a 12V d.c. motor, and these could be used to rotate a loop placed in the attic or at some other remote site (240V a.c. motors are not recommended for this use). Of course, some sort of end-of-travel stops, limit switches, or electro-optical sensors would be needed to prevent full rotation of the table. Otherwise, the feeder would soon become entangled and snap off.

Deploying the Loop - Where To Install It

For most people, the question of where to install a loop is quite simple: right at the receiver table, of course. But this might not be the right answer. A friend of mine in Norfolk, Virginia, uses an a.m. broadcast band loop to pick up *The Grand Ol' Opry* show on WSM, Nashville, TN (650kHz). He has a house with two stories above ground, and an attic, and is not constrained as to where in the house the antenna could be placed (a long-suffering, tolerant wife helps). Experimenting showed that the best siting was on the ground floor, where presumably signal levels were weakest. But, as it turns out, the co-channel sky wave and adjacent channel ground wave and sky wave signals were considerably weaker on the first floor than above ground. Again, the issue is less one of signal strength, but rather of signal-to-noise ratio. For that particular case, with the angle of arrival of the various signals, the best solution was the lowest point in the house.

Deploying the Loop to Boost Portable Radio Performance

Most portable l.f., m.w. or short wave radios use either an internal loopstick or built-in telescoping whip antenna. Neither antenna is a top performer, with the loopstick being sufficient mostly for local reception only. Of course, if distant interference is a problem at your location, then this is not a bad attribute, but for other purposes it is a problem. Fortunately, the loop antenna can come to the rescue of marginal performing a.m. and m.w. portable radio receivers.

Figure 1.8 shows the use of a box loop to enhance the performance of a small portable radio that uses a built-in loopstick antenna. The loopstick (see insert) is an inductor wound on a ferrite rod, usually about 10 to 13mm in diameter and several cm long. Unlike the box loop, the maximum pick-up on a loopstick

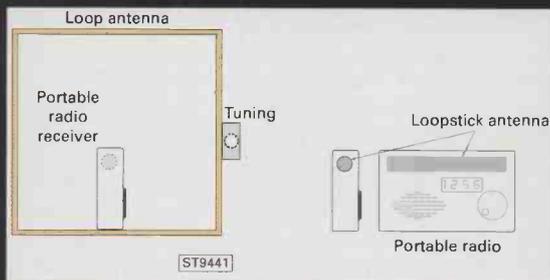


Fig. 1.8: Sports Fan's Loop uses a large box loop to augment the portable radio's loopstick antenna.

Short Wave Magazine, April 1998

occurs broadside to the ferrite rod, with the nulls being off the ends. The placement of the loopstick in this particular radio is shown in the inset. For any given radio, the set must be positioned within the box loop such that the maxima and nulls of the two antennas coincide. This requirement means that the loopstick will be perpendicular to the plane of the box loop (see main drawing; the dot represents the end of the loopstick antenna inside the receiver).

The box loop is 600 to 1000mm on each side, and is resonant at the frequency desired. A typical loop, designed to resonate in the a.m. broadcast bands with a 365pF variable capacitor, would have ten turns of wire, spaced across 10mm depth, on sides of 610mm. When the radio and the box loop are tuned to the same frequency, energy picked up by the larger aperture box loop is coupled into the loopstick, resulting in a large increase in signal strength received.

This loop is popularly known as the 'Sports Fan's Antenna' in the USA because it was once used by a lot of sports fans to pick up distant ball games. It is the practice of American baseball and football teams to not broadcast a game in the vicinity where it is played (i.e. 120km radius), unless the stadium is sold out. These blacked out games might, however, be broadcast over a.m. stations >120km away, and the Sports Fan's Loop permits the fan to use the portable radio to hear the game.

Short wave receivers usually have a telescoping whip antenna, rather than a loopstick. **Figure 1.9** shows this same concept for receivers with the whip style of antenna. The concept is shown schematically in **Fig. 1.9a**, and an actual product in **Fig. 1.9b**.

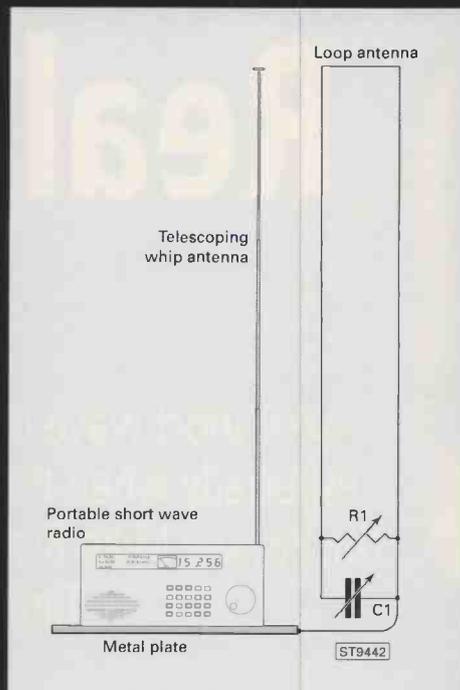
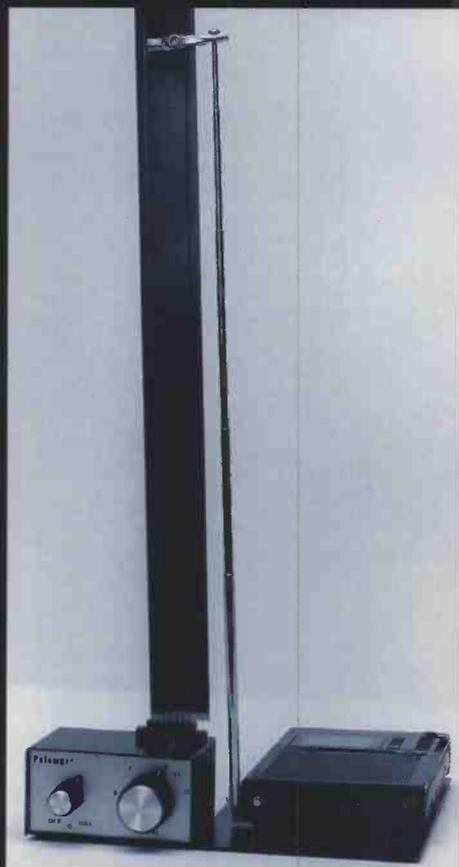


Fig. 1.9: a) Sports Fan's Loop idea for radios with whip antenna; b) commercial version.



Next Month...

Next month we will take a look at more ways to deploy the small loop to maximise the reception of signals in the v.l.f. through low-h.f. regions. We will also take a look at the use of two or more loops for both diversity reception and additional directivity.

Realistic DX-394 Receiver

New short wave receivers are always greeted with much interest, especially when they're aimed at the budget end of the market. In this review Mike Richards takes a close look at the latest release from Tandy - the Realistic DX-394 Receiver.



Overview

The DX-394 is a modern, dual conversion receiver featuring phase-locked-loop technology for tuning accuracy and stability plus a comprehensive range of memory functions. The frequency coverage provided is 150kHz through to 29.9999MHz with no breaks. This wide range, combined with s.s.b., c.w. and a.m. receive modes, makes this receiver ideal for a wide range of listening styles.

Ins And Outs

The review model came complete with all you need to get going quickly. Rather than use a plug-top type power supply, the DX-394 uses an internal power unit with a fixed mains lead. This came ready fitted with a 13A style plug with the appropriate 3A fuse fitted. You can also use the DX-394 with an external 13.8V power supply if you prefer, the connection for this being via a standard 3.5mm jack on the rear panel. The size of the DX-394 does not really make it ideal for mobile use, but the low voltage supply could be handy for those who enjoy caravan holidays. The DX-394 was well set-up for a number of different antenna types thanks to the inclusion of high and low impedance sockets. These used an SO-239 socket for the low impedance connection and a phono socket for unbalanced high impedance antennas.

You can even connect a telescopic antenna (supplied) via a hole in the top of the case if you're really desperate! I can't really

recommend using the telescopic antenna unless you're in a particularly quiet location, as it does a fine job of picking-up all the local interference and not much signal. To be fair though this is a weakness of the antenna not the receiver. Also on the rear panel is a 3.5mm jack for connection of an external speaker. Although the internal speaker produced acceptable quality for general communications work, a good external speaker makes broadcast listening infinitely more pleasant. However, don't be tempted to connect to your hi-fi as the DX-394's humble 0.8W output power will soon get lost. I was glad to see that the DX-394 was fitted with a fixed level audio output socket that was independent of the volume control setting. If you're interested in any of the FAX, SSTV or data modes this makes the ideal point to connect the decoder. You can also use this output to connect other accessories. Final items on the rear panel included an earth connection point and an attenuator switch (20dB). This latter feature can be extremely useful for reducing overload problems when listening at times when broadcast signal levels are very high. The only other connection of interest is a miniature 3.5mm headphone jack on the front panel.

Tune-Up

Using a larger cabinet size has given Realistic the opportunity to include more controls on the front panel. This they have used to very good effect as you will see. The main rotary tuning knob was, now common place, digital system. As a result, rotation of this control caused the frequency to change in discrete steps rather than

continuously. The tuning knob movement itself was very smooth, but lacked the weight and quality feel of more expensive receivers. The light weight of the tuning mechanism meant it was not possible to spin the knob to change frequency. The logic behind the operation of the tuning has been very well thought-out to provide optimum tuning rates for all the listening modes. To start you just use the up and down buttons on the front panel to select the appropriate frequency steps. The steps available were 100Hz, 1, 5 and 10kHz, which should suit just about everyone. The internal processor included some presetting of tuning steps to align with currently displayed frequency. This was very helpful and greatly speeded-up the tuning operation.

The programming used 10kHz for long wave, 10 or 9kHz steps for medium wave, 5kHz steps for short wave and 1kHz for amateur bands. Getting the best from s.s.b., c.w. or the narrow band data modes often requires tuning steps of less than the DX-394's minimum of 100Hz. This has been catered for with the provision of a fine tune control. Like the main tuning, this operates in steps, but they are set a 50Hz so you can effectively tune to within 25Hz of the desired frequency which is fine for all but the most advanced narrow band modes.

One really useful tuning facility was the LIMIT tune system. This idea has clearly been exported from Realistic scanners, but is a very useful aid in a short wave receiver. I found it particularly useful for trawling across sections of the amateur bands looking out for DX-394. Once you've set the upper and lower limits you can freely tune around and the DX-394's processor will loop you back to the beginning of the band when you reach the band edge. If the band is particularly quiet you can let the receiver scan the band. Unfortunately, the automatic scanning has limited use on the h.f. bands due to the very high noise levels which causes the scan to keep stopping. Still, the manual limit tuning was well worth having.

The DX-394 had a number of other systems designed to speed-up the tuning process. The most obvious being the provision of a numeric keypad for direct frequency entry. This could be used to go directly to any frequency with just a few button presses. There was also a band button that cycled the receiver between long wave, medium wave and short wave. This was backed-up by a metre button that cycled through the short wave broadcast bands. These features, combined with the automatic frequency step selection made tuning around very quick indeed. Another helpful feature was the lock button. A single press of this disabled all the buttons and tuning controls to prevent them being accidentally knocked off frequency - very handy for late night DXing.

Memory Matters

Keeping track of all those favourite frequencies is helped by the 160 internal memories in the DX-394. To help categorise these memories they were split into banks of ten memories, the banks being assigned to broadcast and short wave bands throughout the receiver's range. Whilst this was great for broadcast listening, it only left ten memories for the entire non-broadcast sections of the short wave spectrum. This is not really enough if you want to use the receiver for utility monitoring. On the brighter side, the monitor memory was very good for keeping an eye on a hot frequency. This memory was very quick to set-up and to use, leaving you free to tune around, yet keep an eye on a special frequency.

Time To Listen!

If you're seriously into DXing a good clock is a necessity and preferably one that can handle dual times, i.e. local and UTC. The DX-394 has this built-in and clearly shown on the main display. This is extremely useful both in utility and broadcast listening. Just to complete the picture the DX-394 also includes a timer so you could use it as an alarm clock to get you up ready for some early morning grey line DXing!

Get DXing

To check-out the performance, I connected the DX-394 to my random wire antenna and set about seeing just what a budget

receiver could do. Starting with the broadcast bands and a.m. reception, I found the DX-394 to be remarkably good. The audio quality, whilst not of the best reproduction was plenty good enough for general listening. One of the problems encountered with broadcast listening is the very high signal levels, particularly in the evenings. Although the DX-394 suffered some overload I found I could easily tame this by careful use of the r.f. gain control or in extreme cases the 20dB attenuator. The only snag being the position of the attenuator switch on the rear panel! With no tone control or i.f. bandwidth switching the DX-394 did struggle a bit when trying to deal with some of the busier broadcast bands. But to be fair you can't expect much more from a receiver in this price range. I was particularly interested to see how the DX-394 would fare as a utility receiver as this is my specialist interest. I was initially very disappointed with the tuning noise from the synthesiser. This revealed itself as a silencing of the signal for every tuning step. This is an all-too common penalty of a budget design but I found I soon got used and was quickly pulling in all manner of s.s.b. stations. The 100Hz tuning steps of the main knob were generally fine and I found I only used the fine tune control if I was intending to stick with a particular station for a while. The audio quality on s.s.b. was not as good as on a.m. due to increased distortion. Despite this, I was still able to pull-in a remarkable range of signals and the DX-394 felt very lively. When changing to c.w. reception the DX-394 switched over to a separate detector. There was no information on this detector in the manual, but appeared to be set-up with a narrower audio bandwidth. I couldn't see much point in the two separate c.w. positions. The only difference I could detect was that the carrier insertion point was switched between upper and lower sideband. I also tried the DX-394 with FAX and RTTY reception and found that both the frequency stability and frequency steps were fine for general use.

Inside Story

A check of the service manual shows that the DX-394 uses a fairly conventional dual conversion superhet system. The first i.f. runs at 45MHz with a second conversion down to 455kHz for the main filtering. All the press buttons and tuning knobs were controlled by the on-board c.p.u. Looking at the circuit diagram, I was surprised to see so many transistors and f.e.t.s. Most receivers these days rely heavily on integrated circuits for the main circuit blocks. Another unusual feature was the inclusion of an r.f. amplifier before the first mixer. Whilst this can provide higher overall sensitivity this extra gain deteriorates the intermodulation performance of the first mixer. This configuration means that you should make sure you back-off the r.f. gain control wherever possible to reduce the risk of intermodulation distortion.

Conclusion

The DX-394 certainly offers a different approach to the budget communications receiver market. Whereas many competitors tend to keep the extras to a minimum, Realistic appear to have taken a different viewpoint. The inclusion of limit tuning, memory scanning, r.f. gain along with timers makes this a very versatile receiver. As always with budget equipment compromises have to be made and these show mostly in demodulator quality and overload performance. The DX-394 is suitable for a wide range of listening from data modes through to broadcast monitoring, but its performance is at its best when receiving a.m. modes. The DX-394 costs £199.99 and is available from most Tandy stockists.



Specification

| | | | |
|-------------------------------|-----------------------------------|--------------------------------|------|
| Frequency Coverage: | LW | 150 - 509.9kHz | |
| | MW | 510 - 1729.9kHz | |
| | SW | 1.73 - 29.9999MHz | |
| Sensitivity: | AM 10dB (S+N)/N at 30% modulation | | |
| | LW | 10µV | |
| | MW | 7µV | |
| | SW | 1µV | |
| | SSB 10dB (S+N)/N | | |
| SW | 0.3µV | | |
| Selectivity: | CW 10dB (S+N)/N | | |
| | SW | 0.1µV | |
| IF Rejection: | ±7kHz (a.m.) 50dB | | |
| | ±15kHz (s.s.b./c.w.) | | 50dB |
| IF Rejection: | (Lo-Z) | 80dB | |
| Spurious Rejection: | (Lo-Z) | 80dB | |
| IF Frequencies: | 1st | 45MHz | |
| | 2nd | 455kHz | |
| Antenna Impedance: | Lo-Z | 50Ω | |
| | Hi-Z | 2kΩ | |
| Audio Output Power: | | 800mW (10% t.h.d.) | |
| Internal Speaker: | | 77mm dia., 8Ω | |
| Power Requirements: | | 230V 50Hz, 13VA; 13.8V d.c. 8W | |
| Operating Temperature: | | 0 - 43°C | |
| Dimensions: | | 96 x 233 x 230mm | |
| Weight: | | 2.1kg | |

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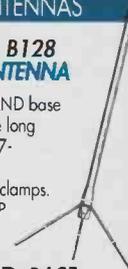
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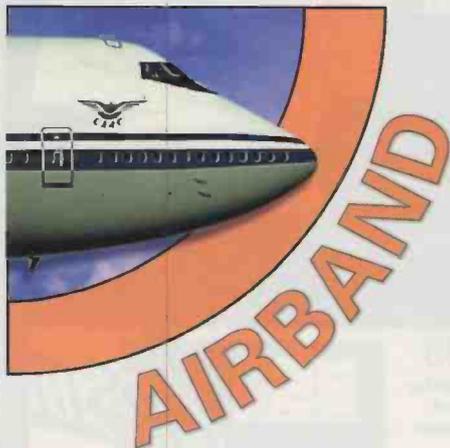
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Glasair. Christine Mlynek.

Airband Special

The Christmas Quiz (January issue) proved challenging as only two readers attempted an entry. I was surprised not to receive more entries and that greater imagination was not apparent on the part of my readers! Aviation engineering is traditionally conservative and it takes a long time to introduce radical new techniques. I suppose the poor response to my competition reflects this philosophy.

Both **Andrew Green** (Barnsley) and **Colin Sutcliffe** (Sunderland) wrote about controlling aircraft by data exchange. Andrew suggests that the controller would send instructions up via ACARS. He doesn't make it clear if the controller would directly manoeuvre the aircraft like this or if it is just a means more speedily to pass instructions to the pilot.

A disadvantage that I can see, Andrew, is the human interface. How does a controller tell the ACARS system what to send? Typing is less intuitive than spoken instructions. May I suggest automatic voice recognition? The system could read back the controller's instructions to ensure accurate recognition, the pilot will receive a precise copy as text rather than voice.

I thought that Colin's idea was more practical. Controllers would still talk to pilots so the human link would be visible. However, when out of v.h.f. range (eg. over the north Atlantic) the aircraft's position would be monitored through a satellite data link. This information would then build up a radar-like picture on the controller's cathode ray tube screen.

Again I see a problem. It would necessitate every aircraft in that airspace being suitably equipped. Just one aircraft that doesn't show on the display would be a menace. This is surmountable in my opinion. The far greater problem of requiring all aircraft to carry a minimum standard of navigation equipment has already been solved.

On balance, out of the two good ideas, I award the prize to Colin. I was sorry that not more readers had a try and that the entries weren't developed in a bit more detail. Nonetheless, two interesting suggestions have resulted from my original question.

Receiver Hardware

Tom Herrington has noticed the publicity about the Scanap AP-1000 receiver (see last month's 'Airband.'). This equipment claims 8.33kHz channel capability - but I'm still waiting to hear from

someone who's tried one!

How can you speed up the number of channels per second that your receiver scans through? For example, the v.h.f. communications airband is currently divided into 25kHz channels.

RK (Manchester) has noticed that most local frequencies only lie on 50kHz channels, the interleaved 25kHz ones being vacant. Hence scanning with 50kHz spacing (starting at a suitable place!) could double the scan speed.

This is a historic remnant from 1974 when the 25kHz channels were first introduced. It means that there is still a bias towards allocating the original 50kHz ones. However, don't assume that 25kHz channels are unoccupied; the suggestion about scanning at 50kHz intervals means that some traffic will be missed.

Follow-Ups

What were those Lynx helicopters doing, that I reported in February? I've had replies from **Steve Foster** (Burton-on-Trent), **Andrew Horrex** (Ipswich) and an air traffic controller who also lives near the helicopters' route.

Operation 'Gryphon's Eye' took place on Salisbury Plain from 24 to 28 November. The Army Air Corps 3 Regiment (Wattisham) and RAF sent helicopters to participate. Control was from an E3 Sentry. When positioning from Wattisham it is convenient to route north of Aylesbury to avoid controlled airspace. The area is indeed a busy part of uncontrolled airspace, with many training aircraft passing by.

One reader remembers **Martin Sutton** (CAA). In general, if you want to communicate with another reader, put your letter in a stamped envelope. Write the addressee's name on the envelope but leave a blank space for me to fill in the address. Send me the prepared letter in the open envelope and tell me in which issue you saw the addressee's name. I'll pass your letter on. It's gratifying to re-unite long-lost colleagues in this way.

Going back to January, **Len Woolley** (Bude) sent a copy of his directory of flight numbers on computer disc. Unfortunately, it is now out-of-date as British Airways have changed their numbering scheme (again!). But, Len, you still haven't told me if readers can obtain the (updated) disc from you and, if so, how much it costs.

Also in January, I explained how v.h.f. aeronautical Ground/Tower frequencies are sometimes paired with u.h.f. channels for controlling airside vehicles. At Manchester, Tower 118.625 might be paired with 455.55 and not (so local **Noël Fairhurst** tells me) with 476.95MHz.

Thanks, Noël, for your complimentary

appreciation of Chris' photographs. I'm glad that we make a good team. Not only does it mean that she can embellish my column, but when I drag her off to air displays it gives her something to do!

Information Sources

I noticed that **Kevin W** (Hertfordshire) was trying to locate US Air Force bases ('SSB Utilities', February p.68). By now Graham Tanner will have mentioned my suggestion in his column but I'll summarise again here.

One source is the standard AERAD, etc. publications. Now, air bases are of little concern to civil traffic and so AERAD might not mention them at all.

I looked up Edwards Air Force Base in *Western Hemisphere Supplement* and found the latitude/longitude of a VORTAC beacon listed there (N34° 58.9' W117° 43.9'). Reference to a chart (or even a school atlas!) puts this half-way between Los Angeles and Las Vegas.

More detail is seen on *US Government Flight Information Publication Enroute Low Altitude Chart L3*. To the south-west of the beacon lies Edwards itself and due west of the beacon is the separate Edwards Air Force Auxiliary North Base.

I was in luck by referring to an easily available reference. I also expect that the US Government would include more comprehensive details in their own *Flight Information Publication*.

To find UK sources of routine information, don't forget to send off to the Broadstone Editorial Offices for a copy of my *Airband Factsheet*. It's free as long as you send a pre-paid self-addressed envelope capable of holding two A4 sheets.

Scottish Airways

This area has been well documented in 'Airband' but **Peter McGinn** (Edinburgh) would like some clarification. It would help you to know, Peter, that Edinburgh does not control airways. This is done from the Scottish Oceanic and Area Control Centre, Prestwick.

To clear up the high level sectors about which you were unsure, 125.675 is Southwest Sector; 129.225 Dean Cross; 132.725 Central; 133.675 Hebrides; and 134.775MHz Forth High.

At slack periods, eg. at night, one controller can manage all the aircraft in more than one sector. This is possible by the ground radio stations for those sectors being coupled together. It doesn't matter which frequency the aircraft calls on, all aircraft hear each other and the same controller.

Piper J3C-65 Cub. Christine Mlynek.



Short Wave Magazine, April 1998

This is known as band-boxing.

Typical band-boxing arrangements are that 126.3 Terminal Manoeuvring Area Inbound is coupled with 124.5MHz Forth Low. Another combination is Southwest with Dean Cross and Central; also, Forth High with Forth Low.

Frequency coverage depends on the location of the ground relay. A ground-based observer will receive high-flying aircraft from a long way off, but other ground stations will be screened by terrain and obstructions and hence inaudible. The ground station for some sectors might be in range but others will be too far away to hear.

When approaching an airport, pilots leave the airways frequencies and contact that airport directly (eg. on the Tower frequency). So it is not necessary to be able to receive an airways frequency when at an airport, making localised interference of no consequence.

Frequency & Operational News

Source: *GASIL* 1 of 1998 from, and Martin Sutton at, the CAA. Canterbury, Kent, is the site of a new aerodrome 136.125 (the first non-airways control frequency in the 1990 frequency extension, I think); Glasgow's a.t.i.s. changes from 132.175 to 129.575; another new one is at Pembrey in Pembrokeshire 124.4, but liaise with Pembury Range danger area 122.75 or London Information 124.75MHz before approaching!

Navigation wise, Denham has new Visual Reference Points at Maple Cross and St. Giles; Humberside Locator n.d.b. (HBR, 350.5kHz) has been withdrawn; Teesside has lost its i.l.s. markers. Reporting point SADAL is replaced by RIDLY (in the Clacton sector, affects London City arrivals).

On airways, London Heathrow Compton and Southampton departures that were on 129.075 are changed to 134.125; Midhurst departures that were on 120.475 are changed to 133.175MHz.

In the London Control Zone, helicopters may no longer enter/exit at Denham.

Andrew Green notes that the police base a helicopter at the new Sheffield airport but potential airline visitors (eg. KLM) aren't in evidence yet.

I'm planning to attend the Friedrichshafen show on the Thursday (only), so perhaps see some of you there. Au'lander, bitte langsam sprechen.

The next three deadlines (for topical information) are April 6, May 11 and June 8. Replies always appear in this column and it is regretted that **no** direct correspondence is possible.



Abbreviations

| | |
|--------------|--|
| ACARS | Aircraft Communications Addressing and Reporting System |
| a.t.i.s. | automatic terminal information service |
| CAA | Civil Aviation Authority |
| GASIL | General Aviation Safety Information Leaflet |
| i.l.s. | instrument landing system |
| kHz | kilohertz |
| MHz | megahertz |
| n.d.b. | non-directional beacon |
| u.h.f. | ultra high frequency |
| v.h.f. | very high frequency |



Robert Connolly GI7IVX gives us an insight into air and marine civil/military operations within the Republic of Ireland. Robert says although the basic principles are the same in the UK, there are differences or unfamiliarity in some areas.

Irish

Air & Marine Communications

The Irish Republic consists of one Flight Information Region (FIR), namely Shannon, which is controlled from a centre located at Shannon airport in the south west of Ireland. This centre controls the air traffic both on and off airway routes, plus the upper airspace above 25000 feet or Flight Level 250.

However, there is a large area of airspace on the east coast stretching from the border with Northern Ireland to the south of Dublin, which is controlled solely by Dublin. This area extends up to 20 000 feet (FL 200).

Shannon Centre interfaces with the London Air Traffic Control Centre, Scottish Control, Dublin Control and Shanwick Oceanic Control. Dublin Control interfaces with Shannon, London and Scottish Control centres, along with the Manchester Sub-Centre and an indirect link via the Scottish Centre to Belfast International Airport for lower level overflights.

The Republic of Ireland has three official International airports, Shannon, Dublin and Connaught (Knock). It also has quite a few regional airports which have been developed during the past two decades, such as Waterford, Sligo, Galway, Kilarney and Donegal.

The regional airports operate feeder flights into Dublin and Shannon along with some direct flights to the UK. Shannon was originally designed for a function similar to Prestwick in Scotland, namely as a final refuelling stop before the transatlantic crossing and was the only

international airport in the country.

However, with the longer range of today's aircraft, there is less need to use these refuelling stops and Shannon has suffered a sharp decline in traffic in recent years, although it is regularly used by both Irish and UK airlines for pilot training. Some airlines still use Shannon as a refuelling stop, notably the CIS airline, Aeroflot, on their Moscow to Cuba route.

I am reliably informed that all aircraft refuelling at Shannon is now handled by Aeroflot, who bring the fuel in from the CIS by sea tankers. Apparently, this is a way in which the CIS can earn 'Hard Currency'!

Dublin is now the major airport in the country with flights to Europe, UK and the USA, plus its feeder services to the regional airports. The third international airport, Connaught, was built at Knock a few years ago after a priest there felt there was a need for an airport in order that people, particularly Americans, could more easily visit a religious shrine there.

The priest raised the money for the airport, built it and died shortly after it was opened. After about three years of operation, it became subsidised by the state as it was not making

money. The airport is built on high ground and as a result, suffers greatly from fog and low cloud.

A large amount of the traffic handled by Shannon consists of overflights enroute for the transatlantic crossing to/from Europe. Shannon controls these until 15°W, they are then handed over to Shanwick Oceanic Control.

Shanwick is an acronym for Shannon and Prestwick. All the Oceanic control is carried out from the Oceanic centre at Prestwick, who in fact do not



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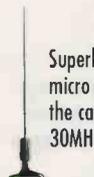


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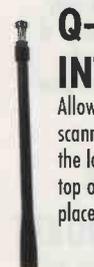
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speaking directly to the aircraft. Instead, messages are sent to and received from the aircraft by communicators at the h.f. transmitter site located at Ballygreen on the west coast of Ireland.

These communicators relay the messages back to Prestwick where all the control decisions are taken. It is also interesting to note that the London Air Traffic Control Centre uses a radar located in the South East of Ireland.

USAF flights between Europe and the United States and vice versa, fly across the Atlantic using the organised track system which varies from day to day. As a result, many of the oceanic track entry points take them across Irish air space and no prior diplomatic military overflight clearances are requested. RAF aircraft entering or leaving the oceanic track system are not permitted to overfly Irish air space and have to be vectored around it.

Table 1

Dublin & Shannon Enroute Frequencies

| Freq | Centre | Sector | Remarks |
|---------|---------|------------|--------------------------|
| 124.650 | Dublin | AREA | Below FL 200 |
| 129.175 | Dublin | AREA | Below FL 200 |
| 124.650 | Dublin | RADAR | |
| 119.550 | Dublin | RADAR | |
| 131.150 | Shannon | CORK | |
| 135.600 | Shannon | High Level | |
| 134.275 | Shannon | SOTA | Oceanic Transition Area |
| 124.700 | Shannon | Low Level | |
| 132.150 | Shannon | BABAN | |
| 135.225 | Shannon | SOTA | Oceanic Transition Area |
| 121.700 | Shannon | SOTA | Clearance Delivery Freq. |

Military Air

The Irish Air Corp operates from various sites within the country. They have a few jet trainers which are fairly old, formally Allouettes, but now more modern Dauphines, and a couple of executive jets for flying VIPs. They are not an airforce, but a section of the army and tend to be fairly secretive.

Some of their bases have navigational aids which are not listed in any official civil publications. The main roles for the helicopters are border patrols and search and rescue (SAR). The Allouettes were replaced a couple of years ago due to their limited SAR facilities, particularly at night.

This limited facility meant that the UK Royal Air Force were frequently called upon for SAR missions in Irish waters. Another improvement in their SAR capability came about four years ago when Shannon Air Rescue was formed and equipped with a long range Sikorsky helicopter. This was to service the Islands off the west coast and part of the Atlantic Ocean.

All the helicopters are equipped with h.f., v.h.f. and marine v.h.f. radios. The most recent development is the acquisition of a helicopter by the Irish police for 'eye in the sky' observation. This is operated and maintained by the Air Corp.

Military air operations, particularly helicopters, are not restricted to the normal FIR boundaries, part of which either fall short or are across the border with Northern Ireland. These operations are however restricted by the geographical boundaries. The same goes for the military operations by the security forces within Northern Ireland.

The authorities in Eire maintain that they have the highest number of foreign military intrusions in Europe, somewhere in the region of over two thousand per year. This is not just military helicopters from Northern Ireland accidentally flying across the border, but includes a very large number of intrusions by the USAF.

This is due to the fact that nearly all of the

Marine

The coastal radio station maritime frequencies are of a similar set up to the UK system with the use of v.h.f., h.f. and m.f. radio from centralised control points, namely Malin Head and Valentia. The v.h.f. system covers the complete coast and although different local areas are identified, they are controlled from either of the two main stations.

The h.f./m.f. system covers the longer ranges involved in the Atlantic Ocean. In addition, there are of course the port radio stations, which are operated locally using v.h.f.

On v.h.f., channel 67 (156.375MHz) is reserved as the safety channel and in common with international operations channel 16 (156.8MHz) is the calling frequency. Channel 67 is again controlled by the coast radio stations unlike the UK system where it is used by the Coastguard.

Ireland does not have a coastguard structure like the UK and therefore the coastal stations take on this responsibility for search and rescue. Table 2 shows the various v.h.f. coastal stations and their frequencies.

Table 2

Ireland VHF Coastal Radio Frequencies

| Ch | Transmit (MHz) | Receive (MHz) | Station (MHz) | Controlled From |
|----|----------------|---------------|---------------|-----------------|
| 23 | 161.750 | 157.150 | Malin Head | Malin Head |
| 24 | 161.800 | 157.200 | Glen head | Malin Head |
| 83 | 161.775 | 157.175 | Belmullet | Malin Head |
| 83 | 161.775 | 157.175 | Dublin | Malin Head |
| 87 | 161.975 | 157.375 | Wicklow Head | Malin Head |
| 26 | 161.900 | 157.300 | Clifden | Valentia |
| 28 | 162.000 | 157.400 | Shannon | Valentia |
| 24 | 161.800 | 157.200 | Valentia | Valentia |
| 23 | 161.750 | 157.150 | Bantry | Valentia |
| 26 | 161.900 | 157.300 | Cork | Valentia |
| 83 | 161.775 | 157.175 | Minehead | Valentia |
| 23 | 161.750 | 157.150 | Rosslare | Valentia |

As I mentioned earlier, Valentia and Malin Head control the h.f. radio system with Valentia being the only station to handle c.w. transmissions. Table 3 shows the various frequencies used for transmit purposes by both stations.

The coastal stations in Ireland do not use NAVTEX transmissions. This is due to the fact that Ireland lies within the NAVTEX responsibility areas of Portpatrick, in Scotland and Niton, in the south of England. Navigational warnings, etc. pertaining to Ireland are issued on NAVTEX by either of these stations depending on position.

Irish Navy

From its base near Cork, the Irish Navy operates a fleet of five mine sweepers around the coast and Atlantic approaches, mainly for fishery protection

Table 3

Ireland HF Coastal Station Frequencies

| Freq. (kHz) | Mode | Station | Callsign |
|--------------|-------|------------|----------|
| 500 | phone | Malin Head | EJM |
| 512 | phone | Malin Head | EJM |
| (MHz) | | | |
| 1.841 | phone | Malin Head | EJM |
| 2.182 | phone | Malin Head | EJM |
| 2.593 | phone | Malin Head | EJM |
| 4.121 | phone | Malin Head | EJM |
| (kHz) | | | |
| 429 | c.w. | Valentia | EJK |
| 500 | c.w. | Valentia | EJK |
| 512 | c.w. | Valentia | EJK |
| (MHz) | | | |
| 1.827 | phone | Valentia | EJK |
| 2.182 | phone | Valentia | EJK |
| 2.211 | phone | Valentia | EJK |
| 2.590 | phone | Valentia | EJK |
| 2.614 | phone | Valentia | EJK |

and anti-smuggling duties. These mine sweepers are ex Royal Navy and are a great improvement on a few years ago when they had three ships, only two of which were operational, with only a crew for one. They also became involved with search and rescue operations within Irish waters and Atlantic Ocean. Communications are carried out on v.h.f. and h.f. marine frequencies using various modes including c.w. and RTTY.

Marine Search & Rescue (SAR)

Search & Rescue responsibility lies with the two main coastal radio stations, Valentia and Malin Head. They co-ordinate the rescues in a similar way to the Plymouth and Lossiemouth Rescue centres in the UK.

As I mentioned earlier, they also serve as the equivalent of the UK Coastguard. Rescues in coastal areas are controlled using the call sign of the local v.h.f. stations, e.g. Dublin Radio. They call out and co-ordinate the search with the lifeboats around the coast which are operated and maintained by the RNLI and the helicopters of the Irish Air Corps. They can also call out the Irish Coastal Rescue Service who can carry out shore searches and shore rescues.

VHF channels 16 and 67 are used for coastal SAR operations. Some of these SAR operations also require the assistance from the emergency services located in Northern Ireland and therefore some communications is required, usually by radio, with Belfast coastguard. This only occurs when the rescue occurs on the boundary of responsibility of the two areas.

This can, however, sometimes cause problems. I can recall listening to an incident one night last year when Dublin Radio was controlling an SAR operation between Dublin and just south of the boundary with Northern Ireland on v.h.f. channel 67 involving a lifeboat and helicopter which were firing flares for illumination.

These flares were sighted from the Northern Ireland coast and reported to Belfast coastguard, who were unaware of the SAR operation in the south. Our local lifeboat was launched and searched for two hours before they became aware of the SAR operation being controlled by Dublin Short Wave Magazine, April 1998

Radio just south of them.

SAR operations in the Atlantic occur regularly and frequently involve foreign fishing trawlers, are carried out on 2.182MHz and controlled by either coastal station depending on the position. In addition, the communicators at the transmitter site for Shanwick radio on the west coast of Ireland can also become involved in Atlantic Ocean rescue operations, particularly when helicopters are involved.

Until recently, the Irish authorities had to rely very much on search and rescue helicopters from the UK for Atlantic rescues and even night coastal rescues. However, the replacement of the Irish Air Corps helicopters resulted in much better night and bad weather rescue coverage in coastal areas.

The longer range search and rescue helicopter based at Shannon has also helped in Atlantic rescues. There are still times when SeaKing helicopters are requested from the UK for long range Atlantic operations and RAF Nimrod aircraft provide the top cover for such operations. This usually involves the Sea-King flying to Shannon for refuelling before its onward flight to the rescue scene.

Generally, there is a great deal of co-operation between Ireland and the UK for SAR helicopters and Naval ships. As Ireland has no long range SAR aircraft, RAF Nimrod aircraft carry out the air searches in the Atlantic Ocean areas.

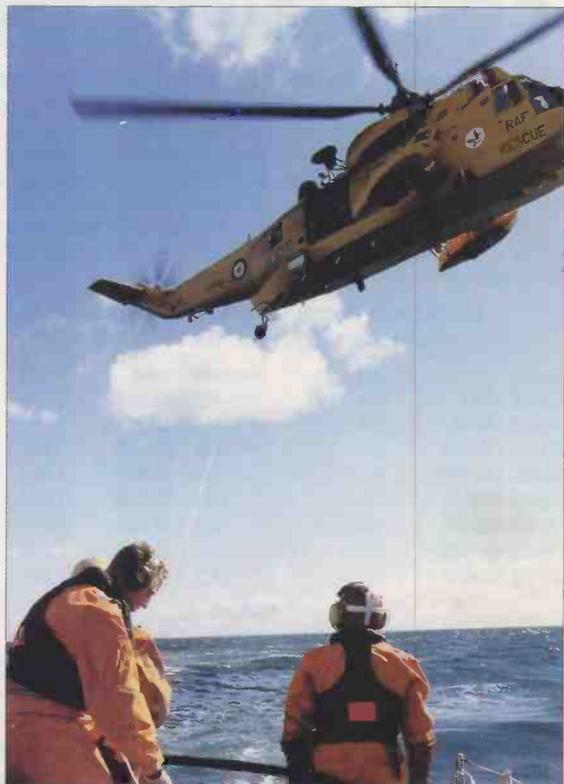
A well deserved rest for the Nimrod.



Antonov stops over for refuelling.



SeaKing attempt to winch lifeboat!



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Not only do some lightweight makes fold up in the first puff of wind, but their bandwidth is poor due to the small diameter of the elements. CQ-DX Beams are made to last, and their bandwidth is excellent - no trimming capacitors necessary. Designed and built to professional standards, these beams are available world-wide only from EastComm. Each beam is DC grounded, completely sealed to prevent moisture ingress, and fitted with a downlead and 'N' socket. All saddle clamps are Diecast Zinc Alloy. Booms allow for end fixing as well.

**Don't throw money away on short-term solutions.
Buy a beam that will last! BUY CQ-DX!**

| Model | Band | Elements | Gain | Boom | Price |
|----------------|------|---------------|--------|------|---------|
| CQ-DX 50/4Y | 6m | 4EL | 10.6dB | 3.8m | £104.95 |
| CQ-DX 144/4Y | 2m | 4EL | 10.6dB | 1.5m | £64.95 |
| CQ-DX 144/10Y | 2m | 10 EL | 13.6dB | 3.6m | £89.95 |
| CQ-DX 144/10XY | 2m | 10 EL crossed | 13.6dB | 4.0m | £109.95 |
| CQ-DX 430/10Y | 70cm | 10EL | 13.6dB | 1.5m | £69.95 |
| CQ-DX 430/18Y | 70cm | 18EL | 17.6dB | 2.8m | £79.95 |
| CQ-DX 430/18XY | 70cm | 18 EL crossed | 17.6dB | 3.2m | £94.95 |
| CQ-DX 430/24Y | 70cm | 24EL | 18.2dB | 4.0m | £104.95 |

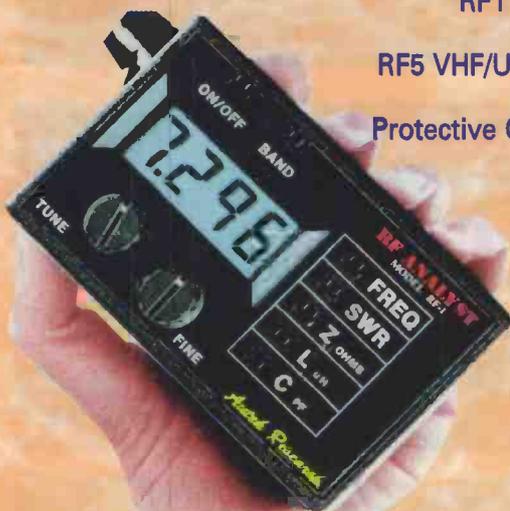
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RF1

The **RF1** adjusts antennas, feedlines, and RF networks, from 1.2 to 35MHz in 5 bands. It measures RF values of true impedance (0-2000Ω), SWR (1 to 15.1). C (0-9999pF) and L (<0.04 to 300μH). It instantly reads out impedance and SWR. Feedline loss and phasing, Q, tuned-circuit resonance can be accurately measured and adjusted, L and C are measured at the RF frequency of interest, not at 1kHz or 100kHz as with other L/C meters.

The **RF5** is continuously adjustable from 35 to 75MHz, and 138 to 500MHz (typically 530MHz) in 3 bands. It measures RF values of true impedance (0-600Ω), SWR (1 to 6:1), and its **INSTANT SWR mode** finds the frequency of minimum SWR (or Z) on command automatically.

Both units fit into the pocket, and run on a standard 9V battery (or 7 - 12V).

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LOW PASS FILTERS
Lowpass filters are commonly made from thin lightweight materials, assembled with pop rivets, and not even any earth terminals! Their performance is, at the least, poor.

Delta Filters are tough construction, with attenuation slopes avalanching down immediately after transmitting frequency range. Heavily built deep notching Chebyshev designs, prevent interference from harmonic or spurious emissions - a must for good operating. Low power models use silver-mica capacitors and phenolic connectors. High power models use thick teflon TFE insulation sheet, brass or copper capacitor plates, all connections soldered.

- 420 50Ω 600W 30MHz SO239 **£59.95**
 - 421 50Ω 8kW 30MHz SO239 **£89.95**
 - 425 50Ω 600W 56MHz SO239 **£59.95**
 - 426 50Ω 3kW 54MHz SO239 **£79.95**
- P&P £5.95 each filter**

- TRANSCIVING BANDPASS FILTERS**
250W 50Ω
- 412 50-50.5MHZ SO239 **£69.95**
 - 413 144-148MHZ SO239 **£69.95**
- P&P £5.95 each filter**

These Bandpass transceiving filters are designed to lessen or eliminate interference from nearby transmitters

operating in close proximity to transceivers. As they are transceiver style, they will also effectively reduce any transmitted spurious and harmonic emissions from your transmitter. The 412 and 413 are two stage, parallel resonant circuit, top-coupled designs. Each unit will pass the listed band of frequencies, and attenuate or block all frequencies above and below that band segment. The filters are connected between the transceiver output and the antenna. Direct grounding of the filter may offer better overall performance, but generally the station's earth ground will be sufficient.

SUPPRESSORS

Delta suppressors protect coaxial line centre conductors from DC and low frequency AC voltage/current transients. Delta suppressors deliver as much current to ground as the centre conductor of the coaxial line can. The circuit, active at all times, neutralizes minute transients which often cause receiver noise. Direct hits can be handled, but not under all conditions.

- 301/U 1.5 - 200MHz 1kW SO239 **£44.95**
- 302/U 30-500MHz 1kW SO239 **£49.95**
- 302/N 30-500MHz 1kW N **£46.95**

P&P £4.95 each suppressor

Sigma Wire Antennas

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Sigma Antennas are easy to assemble using the supplied instructions

All antennas marked * have a 3kW Current Balun option for only £18 extra.

Heavy Duty Deluxe G5RV's SO239 TERMINATION

Louis Varney designed the G5RV as a 1.5λ impedance, which can be matched to a 50Ω centre-fed doublet on 14.15MHz, hence the top length of 102ft. This gives a low feed point

| | | | | | |
|-------------|------------------|-----------------|-----------|---------------|----------|
| G5RV | Full Size | 80/40/20/15/10m | 102' long | £39.95 | 4.95 p&p |
| G5RV | Half Size | 40/20/15/10m | 51' long | £24.95 | 4.95 |

Shortened Dipole Antennas* SO239 TERMINATION

| | | | | |
|-----------------|------|-----------|---------------|----------|
| SLS-40K | 40m | 38' long | £66.95 | 5.95 p&p |
| SLS-80K | 80m | 69' long | £77.95 | 5.95 |
| SLS-160K | 160m | 100' long | £83.95 | 5.95 |

Receiving Dipole SO239 TERMINATION

| | | | |
|------------|----------|---------------|----------|
| SRD | 46' long | £49.95 | 4.95 p&p |
|------------|----------|---------------|----------|

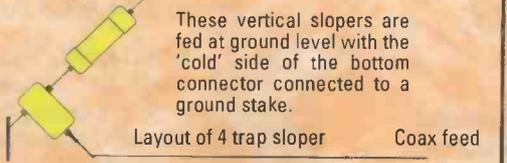
Trapped Dipole Antennas* SO239 TERMINATION

| | | | | | |
|-----------------|---------------------|---------|-----------|----------------|----------|
| SD-32 | 20/15/10m | 2 Trap | 27' long | £83.95 | p&p 5.95 |
| SD-34 | 20/15/10m | 4 Trap | 24' long | £142.95 | 7.95 |
| SD-42 | 40/20/15/10m | 2 Trap | 55' long | £89.95 | 5.95 |
| SD-44 | 40/20/15/10m | 4 Trap | 47' long | £147.95 | 7.95 |
| SD-52 | 80/40/20/15/10m | 2 Trap | 105' long | £103.95 | 7.95 |
| SD-54 | 80/40/20/15/10m | 4 Trap | 97' long | £161.95 | 7.95 |
| SD-56 | 80/40/20/15/10m | 6 Trap | 86' long | £219.95 | 9.00 |
| SD-68 | 160/80/40/20/15/10m | 8 Trap | 154' long | £297.95 | 10.00 |
| SD-610 | 160/80/40/20/15/10m | 10 Trap | 148' long | £349.95 | 10.00 |
| SD-162 | 160/80m | 2 Trap | 208' long | £125.95 | 7.95 |
| SDW-34W | 30/17/12m | 4 Trap | 32' long | £139.95 | 7.95 |
| SDW-46W | 40/30/17/12m | 6 Trap | 46' long | £199.95 | 9.00 |
| SDW-58W | 80/40/30/17/12m | 8 Trap | 85' long | £274.95 | 9.00 |
| SDW-610W | 160/80/40/30/17/12m | 10 Trap | 152' long | £315.95 | 10.00 |

| | | | | | |
|----------------|---------------------|--------|-----------|----------------|----------|
| SVS-31 | 20/15/10m | 1 Trap | 14' long | £49.95 | p&p 4.95 |
| SVS-32 | 20/15/10m | 2 Trap | 13' long | £79.95 | 5.95 |
| SVS-41 | 40/20/15/10m | 1 Trap | 28' long | £52.95 | 5.95 |
| SVS-42 | 40/20/15/10m | 2 Trap | 24' long | £81.95 | 5.95 |
| SVS-51 | 80/40/20/15/10m | 1 Trap | 53' long | £59.95 | 5.95 |
| SVS-52 | 80/40/20/15/10m | 2 Trap | 49' long | £88.95 | 5.95 |
| SVS-53 | 80/40/20/15/10m | 3 Trap | 44' long | £118.95 | 7.95 |
| SVS-64 | 160/80/40/20/15/10m | 4 Trap | 77' long | £156.95 | 7.95 |
| SVS-65 | 160/80/40/20/15/10m | 5 Trap | 73' long | £189.95 | 7.95 |
| SVS-161 | 160/80m | 1 Trap | 105' long | £70.95 | 5.95 |

Trapped Slopers* SO239 TERMINATION

Anti-corrosion compound for copper wire antennas:
ACJ-1 Sachet
£7.95 p&p £1.95



These vertical slopers are fed at ground level with the 'cold' side of the bottom connector connected to a ground stake.

All Band SA-10 450Ω TERMINATION

SA10 operates on all bands 160m - 10m. It can be installed as a flat top, sloper, or inverted 'V'. The top is 135ft/41.15m of heavy duty stranded copper wire, with low loss end insulators. A centre insulator is fed with 100ft/30.48m of 450Ω heavy duty twin ribbon feeder. It will work well from the balanced line output of your antenna tuner. **£59.95 p&p £10**

All Band Limited Space SAS-2 450Ω TERMINATION

SAS-2 will operate on all bands 160m - 10m. It can be installed as a flat top, sloper, or inverted 'V'. The top is of heavy duty stranded copper wire, and provides 135ft/41.15m electrical length, with a physical length of only 70ft/21.34m through the use of antenna shorteners. The centre insulator is fed with 100ft/30.48m of 450Ω heavy duty twin ribbon feeder. This antenna will work well from the balanced line output of your antenna tuner. **£89.95 p&p £10**

Off Centre Fed Dipoles SO239 TERMINATION

| | | | | |
|----------------------|--------------------|-----------|---------------|----------|
| OCF Full Size | 80/40/20/17/12/10m | 135' long | £65.95 | 5.95 p&p |
| OCF Half Size | 40/20/10m | 68' long | £50.95 | 5.95 |

Baluns & Centre Connectors



Lightweight, sealed, weatherproof, with Solid Brass rustproof terminals. Jumper wires not needed. Soldering of antenna wire not necessary. DC grounded for lightning protection. SO239 Connector. Stainless Support Hook (except SCE-1/S).

SPB-1 Pro-Balun 1:1 impedance ratio "voltage" Balun that matches 50-75 ohm coax to 50-75 ohm load. 3 - 35MHz, 1.5kW. **£29.95 p&p £4.95**

SPB-1-C Pro-Balun 1:1 impedance ratio "current type" balun that matches 50-75 ohm coax to 50-75 ohm load. 1.5 - 60MHz, 3kW. **£32.95 p&p £4.95**

SPB-4 Pro-Balun 4:1 impedance ratio "voltage" balun that matches 50-75 ohm coax to 200-300 ohm load. 3 - 35MHz, 1.5kW. **£32.95 p&p £4.95**

SCE-1 1kW centre connector for a dipole antenna. **£14.95 p&p £2.75**

SCE-1/S 1kW connector for a vertical sloper antenna. **£14.95 p&p £2.75**

Traps & Shorteners



These heavy duty deluxe 600W traps are housed in weatherproof enclosures. No soldering or jumper wires are required.

Use 2 traps for a dipole, or 1 trap for a Vertical sloper.

ST-10 28MHz trap **£29.95 each p&p £4.95**

ST-12 24MHz trap **£29.95 each £4.95**

ST-15 21MHz trap **£29.95 each £4.95**

ST-17 18MHz trap **£29.95 each £4.95**

ST-20 14MHz trap **£29.95 each £4.95**

ST-30 10MHz trap **£31.95 each £4.95**

ST-40 7MHz trap **£31.95 each £4.95**

ST-80 3.5MHz trap **£31.95 each £4.95**

Antenna 'Shorteners' are excellent where installation space is limited. Housed inside weatherproof, sealed enclosures, so no periodic cleaning is required.

Two are needed for a dipole, one for a vertical sloper.

SLC-40 Shorten a 40m Dipole to 38' overall. **£19.95 each p&p £2.75**

SLC-80 Shorten a 80m Dipole to 69' overall. **£21.95 each p&p £4.95**

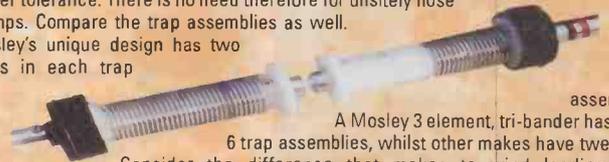
SLC-160 Shorten a 160m Dipole to 100' overall. **£21.95 each p&p £4.95**



Mosley H.F. Antennas



All Mosley Antennas have pre-drilled and colour coded element pieces which makes assembly quick and easy. All hardware is of stainless steel and tubing is aircraft grade, drawn, aluminium. This means that the telescopic tubing can be of closer tolerance. There is no need therefore for unsightly hose clamps. Compare the trap assemblies as well. Mosley's unique design has two traps in each trap



assembly. A Mosley 3 element, tri-bander has only 6 trap assemblies, whilst other makes have twelve! Consider the difference that makes to wind loading and structural stability.

| | | | | |
|---------------------------|------------------------|-----------------------|------------------|-----------------|
| VERTICALS | RV-4-C | 10/15/20/40m | £269 Carr | £10 |
| | RV-6-C-WARC | 10/12/15/17/20/40m | £359 | £10 |
| | RV-7-C-WARC | 10/12/15/17/20/30/40m | £379 | £10 |
| STANDARD | TA-31-JR-N | 10/15/20m | 1 EL | £199 £10 |
| | TA-32-JR-N | 10/15/20m | 2 EL | £299 £15 |
| | TA-33-JR-N | 10/15/20m | 3 EL | £349 £15 |
| | TA-33-JR-N-WARC | 10/12/15/17/20m | 4 EL | £499 £15 |
| HEAVY DUTY | TA-31-M | 10/15/20m | 1 EL | £229 £10 |
| | TA-32-M | 10/15/20m | 2 EL | £399 £15 |
| | TA-33-M | 10/15/20m | 3 EL | £509 £15 |
| | TA-33-M-WARC | 10/12/15/17/20m | 4 EL | £659 £15 |
| HEAVY DUTY COMPACT | TA-53-M-WARC | 10/12/15/17/20m | 4 EL | £769 £15 |
| HEAVY DUTY CLASSIC | CL-33-M | 10/15/20m | 3 EL | £679 £15 |
| | CL-36-M | 10/15/20m | 6 EL | £989 £20 |
| WARC BANDS | TW-33 | 12/17/30m | 3 EL | £829 £15 |

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as well as various Military and private exec jets. Also features BHX's regular 'traffic'. The best of the five days compressed into a 2 hour action video.

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VHF DXing with ACARS



A decade or so ago the USA based firm Aeronautical Radio Inc. (ARINC) developed an air/ground digital data link which they christened the Aircraft Communications Addressing and Reporting System or ACARS. Its prime function was to facilitate messages between cockpit and company.

With less aircraft carrying a flight engineer the sending of routine messages such as the time airborne or ETA for destination was becoming a chore the two remaining cockpit crew could well do without. Onboard sensors to detect when doors were closed, when taxiing commenced or when the wheels left the ground and to automatically transmit the information to the company operations centre enabled captain and co-pilot to concentrate on their main task.

Increase Range

Subsequent development has seen ACARS used for an increasing range of functions: over the Southern Pacific, on routes frequented only by the ACARS-equipped aircraft of United, Air New Zealand and Qantas a modified form is even used for long-range air traffic control. On Atlantic routes American Airlines are running trials of the receipt of Oceanic clearances via ACARS and this facility should be available to all ACARS users by the end of this year. Geographic coverage has also increased with the latest ground stations being established in China.

The advent of affordable software to decode ACARS transmissions spawned a new breed of 'cyber-spotter' on this side of the Atlantic. Since Short Wave Magazine, April 1998

each message contained not only the flight number but also the all-important aircraft registration the traditional grubby notebook could be thrown away. Why get cold standing around on airport viewing terraces? Spotting could now be done from the comfort of home, even those awkward night flights would be faithfully logged and stored in the PC for perusal in the morning!

In the States a different market emerged, that of the amateur cryptographer who attempted to make sense of the endless strings of numbers downloaded by some flights and found himself in an esoteric world of engine gas temperatures and turbine speeds.

Traditional s.w.l.s could be forgiven for believing that neither of these approaches to ACARS holds much of interest for them. As the title suggests, however, I think there is a third approach which does.

Two Frequencies

Virtually all European ACARS traffic is carried on just two frequencies: 131.725 and 131.525MHz. Unlike airband voice channels neither are sectorised in any way. Both are in use throughout the Continent: though the second is mainly limited to use by Lufthansa and American Airlines aircraft. Herein lies the first big advantage for the DX chaser: reception is limited only by propagation conditions.

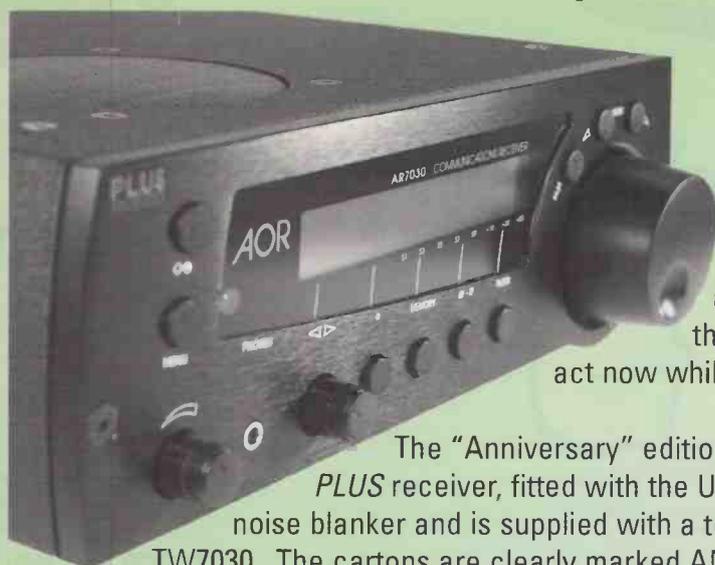
To understand the other advantages we need to look back for a moment to developments that lessened the appeal of the airband to the DXer. First, the stored flight plan robbed flights of their individual identity, substituting flight number for aircraft registration as radio callsign. Then, in response to the fuel crises of the early Seventies, controllers were encouraged to place aircraft on the



Dave Peel examines the use of aircraft telemetry to spice up your airband DXing.

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Short Wave Column: Things Can Only Get Better

I write this on a wet Sunday afternoon with nothing on the horizon but the deadline. Nearly as dead as the radio. An AOR it may be, but it has been dragged down to the level of the competition by SID.

A Sudden Ionospheric Disturbance has killed radio propagation and the BBC World Service has, bless them, apologised for it. Sure, I can check it's sensitivity and small-signal handling on what signals remain or try lower frequencies - but this SID is a big SID, so I shall leave the radio for later.

Looking for inspiration, I pick up an old logbook from the early eighties. The BBC are using 25650 to Africa and RSA reply on 25790. The one I remember well was VOA on an unbelievable 26040KHz. Up here, all on its own, no attempt was made to limit bandwidth from Greenville. Hearing Willis Conover playing Jazz Classics in near-FM quality was what radio was all about. Sadly, both Willis and that exceptional 11 Metre outlet are no longer. But will we hear that sort of thing again?

Perhaps. All the physical evidence suggests we have started the long climb into Sunspot Cycle 23 and by the millennium, broadcasters could consider using 11 Metres again. In fact, all the congestion on the lower bands the AR7030 was designed to deal with, will get better as the broadcasters "spread out" to the higher bands. So, here's to the future...

And if you are a Transmission Planner, mail me at bob@aor.co.uk and let us know how high you are going to go. On a wet Sunday at AOR, we are ready for the challenge.

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most expeditious routing rather than leaving them to slavishly process from one radio beacon to the next. Secondary radar did away with the need for position reports and inertial navigation systems with dependence on ground-based 'navaids' so it became far harder to detect precisely where each transmission was coming from.

ACARS, paradoxically, puts the clock back: all message headers commence with the aircraft

removed the concluding computer checksum and the time sent (which is the same as the time over each waypoint) but added a few spaces. Note the precision with which the on-board computer calculates the estimate for the next waypoint. Each report concludes with outside air temperature, wind direction/speed and fuel remaining (x100 US gallons).

Exception

At the moment, such reports are the exception rather than the rule, and likely to remain so until at least the year 2005 or thereabouts! Luckily there are other types of transmission which include the aircraft's location.

Many top-of-the-range executive jets are ACARS-equipped and use a standard format which enables ground agencies to obtain a precise position by interrogation whenever they require it. Here are two transmissions from Gulf Stream 4s, one as transmitted and the other annotated:

```
N990WC 15 0 M49A GS0001
(2N50346W 1300110 60261-44Z
```

```
N621JH 15 4 M04A GS0001
latitude longitude wind Flight Level temperature
(2N53080 E 2018 077 62 410 -46 (Z
```

However there are pitfalls for the unwary. Boeing's latest creation, the 777, has extensive on-board telemetry known as AIMS (Aircraft Information

Management System). This stores five 'snapshots' of data during the course of the flight which are then downloaded as the aircraft nears its destination. Nestling among the strings of numbers, which mainly relate to the performance of its engines (serial numbers 777006 and 777037 if you are really interested!), are those which give the aircraft's location of 42.3312° North 69.6913° West or just East of Boston (Maine)! Clearly the information that this was at 2333UTC and the download was around 0430UTC next morning needs to be taken into account!

```
N773UA H1 9 D38A UA0918
#DFBE23C007730918K1A0EGLL0710962333ER
209 184284227482748-1778-17803699937005480267 7655 752812221222 0039
60911111129613010000000 0 4 23312 -696913 397 28 425
-0005 0013 06694 22 0 47286 48067 10140 9992 44
48 445256802900411000 0 57000 57700 77700 6777037
3444 3444292)005 16 0) 05 03006006 0) 16 36 29 0) 0)38557-4954985
5875886 8643 8606 862 86340523942 487 483 696 68911 71 75
83 89379379105109 06 0) -02 24 -13-306-306-308-309-308-237
-237-237-237-308-308-307-306-307 008 009-417-371-024
000 001106103005016 000 000 000 000 0020
```

```
N656UA H1 8 F37A UA0960
N53231W003081,WAL, 070640,370, TELBA, 071320,KIDL1, M56,24545,237
N52398W002186,TEL17, 071320,370, KID18, 072120,LIN19, M57,25939,226
N51462W001214,KID18, 072124,370, LIN19, 072404,MID, M57,27825,213
N51298W000586,LIN19, 072404,370, MID, 072744,SFD, M57,29028,209
N51091W000280,MID, 072732,370, SFD, 073148,WAFFU,M58,29527,204
N50456E000075, SFD, 073132,370, WAFFU,073316,HARDY, M58,28828,198
N50354E000226,WAFFU,073316,370, HARDY,073424,DPE33, M57,28121,195
```

Here successive transmissions plot the course between Wallasey and Dieppe of a 767 *en route* from San Francisco to Paris at Flight Level 370 via airways UA34, UB39 and UA47. For clarity I have

Another point to consider is that while some airlines decimalise their geographic co-ordinates others retain traditional degrees and minutes. One such is UPS, here a DC-8 has left East Midlands shortly before midnight on the 19th for Cologne. The location information (P, for Plus, indicates North or East) is supplemented by wind direction and speed and aircraft speed and direction.

Another major source of location information is

Short Wave Magazine, April 1998

Qantas 747 SP, en route. Courtesy Boeing

Chinese Airline 747 SP, can you catch one of these?
Courtesy Boeing



registration, most also include the flight number which is in use as a callsign on voice transmissions, and the text of some messages includes the aircraft's precise location. It is these messages that can provide the DXer with a powerful tool for exploring v.h.f. propagation.

When ICAO debated what to do about ATC frequency saturation over Northern Europe the use of ACARS for position reporting was seriously considered. In the event the more conservative solution of trebling voice channels available by using 8.33kHz spacing is to be adopted. However, United Airlines already back-up some of their voice position reporting with automatic ACARS reports, as this example shows:

```
N874UP 30 9 M16A UP6070
182345 18EMA CGN P521714M0005758////273037////////0405 0127 0132 0124
182355 18EMA CGN P514051P0001846////257033//////// 0429 0131 0135 0128
190002 18EMA CGN P510048P0013753////268027//////// 0435 0093 0096 0093
```

the network of beacons and waypoints which define the airways system along which civil airliners operate. Airlines maintain master databases of these with those relevant for a particular flight being uploaded via ACARS prior to departure. In this extreme example a Qantas 747 crew is requesting weather information for the three Flight Levels they are most likely to use on their routing from London to Bangkok:

```
ACARS mode: H Aircraft reg: UH-DJF
Message label: H1 Block id: 4 Msg. no: F20R
Flight id: 0F0002
Message content:-
#M1BRFQWJ/TS125408,270796/W0290.350.370:BPX.CLN.GARRD.REDFR.TUL.IP.SPY.BED
UM.DHE56.JUJST.DHE.DHE60.TALS.R.CDR.CDR14.MALU.KOLJA.
NINTRA.KERDR.LIE.K.DROT.SONL.R.ELDRU.BEMBI.LBN.EL.DPOKR.WUKL.
RNDOR.TU.IDERR.UK.JP.IN.FU.FE.DL.DL.DLR.NABLR.MRAGO.OG.PEGAS.
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HG.BN.JAMRN.FIAPD.DLJHANG.HARPR.AKAT.PATNI.SAHIL.SAMAR.ASARI.HR.DPN.FB.LLK.K
USMI.GGC.DB.TK.CER.MDRK.DOPID.BEPDR.74PTN.SASAU.PTN.BISIA.DWI.TANEK.AKK.UTBO
/00370/SPLHABK0044327
```

The original message would have been transmitted in several instalments as there is a limit of 220 characters for the content of any one message. The routing itself is a mix of three-letter VOR callsigns (e.g. CLN for Clacton), two-letter NDB callsigns (EL is Karsava in Latvia) or standardised imaginary waypoints derived from fixes from two beacons located elsewhere. These always have five letters leading to some very imaginative spelling (Leicester becomes LESTA for example).

Points of Reference

Not surprisingly these can be very useful points of reference for the DXer too, as in this position and weather report from a Delta Airlines Tristar overhead Newcastle *en route* from Cincinnati to Frankfurt:

```
[18/11/1995 09:23]
ACARS mode: 2 Aircraft reg: N762DA
Message label: 00 Block id: 5 Msg. no: 2306
Flight id: 0L0048
Message content:-
3C02 POSWX 0048/17 KCUG/EDDF N762DA
REP
FI DL0048/AN N762DA/OU NEW 0920 F370
DS /FB 0394/TR MS61/WU 001055
SK CLERR /TB SM00TH /CZ M0.840
```

However, note that this transmission was made three minutes after passing the beacon: which is quite a few miles when you're travelling at Mach 0.84!

A more accurate source of information is the DFB239 report which can be downloaded on demand from Delta operations or transmitted automatically at five minute intervals by Delta's 767 or MD-11 aircraft. Here an MD-11 on the same Short Wave Magazine, April 1998

service as the Tristar above is midway between Pole Hill and Goles on airway UB105:

```
[13/12/1995 07:48]
ACARS mode: 2 Aircraft reg: N811DE
Message label: H1 Block id: 0 Msg. no: 056A
Flight id: DL0048
Message content:-
#DFB239N811DE00481312 074754032 5354 -145370-31-60 39 80J2-111 45600
271 403 0999
```

| | |
|-------------|---|
| #DFB239 | message type |
| N811DE | aircraft registration |
| 0048 | flight number |
| 1312 074754 | date and time |
| 832 | Mach number |
| 5354 -145 | latitude/longitude (negative numbers are South or West) |
| 370 | flight level |
| -31 -60 | true and static air temperatures |
| 39 88 | wind (039 degrees at 88 knots) |
| J2-111 | type of ACARS installation? |
| 45600 | fuel remaining |
| 271 | reciprocal of heading? |
| 403 | speed (knots) |
| 0999 | exhaust pressure ratio? |

Fedex's fleet of MD-11 freighters are programmed to automatically download a position report when over, or in the vicinity of, selected beacons en route. Here N604FE is passing close to the Honiley VOR on its descent into Stansted:

```
ACARS mode: N Aircraft reg: N604FE
Message label: 16 Block id: 7 Msg. no: M89A
Flight id: FH0004
Message content:-
260004/AUTPOS/LLD N522359 W0012522
/RLT 25472/SAT -038
/WND 246035/TAT ***/TRS 469/CAZ 078
/FOB 026600
/DAT 960826/TIM 134254
```

Another trap for the unwary is the download of data from previous flights. This Condor 767 is in United Kingdom airspace operating their flight 106 from Dusseldorf to Punta Cana in the Dominican Republic but downloading data relating to flight 363 from Bangkok to Munich the day before. Note too that, while the voice callsign has three digits, the ACARS callsign has a prefix indicating the day of departure.

```
ACARS mode: C Aircraft reg: D-ABUB
Message label: H1 Block id: 2 Msg. no: D982
Flight id: DE7106
Message content:-
#DFBR0201076302D-ABUB21 DEC96 15585506
C1D-ABUB21 DEC96 155855..DE5363E2
C26UTB0E00M0036.02000800410075E
C3N2930003501111100000000007B
C4724650013000030329
C5724195200100407630
-----[22/12/1996 08:27]
```





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What's Needed

To receive ACARS you will need, in addition to suitable decoding software such as Lowe's *Airmaster*, a PC, 386 or better and a 'spare' scanner. The latter should have a socket for the 3.5mm jack plug which will output to the PC and a BNC connector for the external antenna which you will have to locate well away from the computer and its monitor if you are to enjoy good reception. Conventional wisdom says that scanning is not possible with ACARS because of the brevity of the transmissions. My own experience is that it is possible in most reception conditions, though squelch settings are critical.

Although based on North American practice Ed Flynn's *Understanding ACARS* is an invaluable guide. Other useful publications are a book listing airline fleets, an *OAG World Airways Guide for routings* and a list of IATA three-letter airport



codes and an *RAF Flight Information Handbook*, or similar, for ICAO four-letter Location Indicators.

To edit the long strings of data that your *Airmaster* will pull out of the ether you will need a word-processing package. You may also wish to install one of the dedicated ACARS editors which are now available. Flightdeck's *Flight Database 2* is advertised in *SWM* while Bart Hoekstra's *Dacars* program is available as shareware from him by sending £10 or the equivalent to: **Bart Hoekstra, Vlaamse Gaai 16, 7423 DH Deventer, The Netherlands.**

Dacars takes each log file generated by

Known abbreviations

| | |
|-------|--------------------------|
| ALT | Altitude |
| CG | Centre of Gravity |
| DMU | Data Management Unit |
| ECYC | Engine Cycles |
| EGT | Exhaust Gas Thrust |
| EHRS | Engine Hours |
| EPR | Exhaust Pressure Ratio |
| ESN | Engine Serial Number |
| FF | Fuel Flow |
| GW | Gross Weight |
| HPT | High Pressure Turbine(?) |
| LP | Low Pressure |
| MN | Mach Number |
| N1/N2 | Speed of turbine stages |
| OIP | Oil Pressure |
| OIQH | Oil Quality |
| OIT | Oil Temperature |
| TAT | True Air Temperature |
| VB | Vibration(?) |

Airmaster and produces a list of each flight received together with the date and time of the first transmission. All messages from the flight are grouped together and may, if desired, be saved to a sub-file or printed. The list can be viewed in order of reception or sorted into flight number or aircraft registration order. In addition a master index of all aircraft received is maintained with an asterisk in the initial file indicating those which are being added to the list.

There will never be an ACARS equivalent of the various programs which translate the five-digit groups of RTTY weather broadcasts into plain language because each airline's system differs. Occasionally a transmission is seen which sheds a little light on the format of some of the types of message received. One such comes from a PremiAir holiday flight from Las Palmas to Stockholm. The format is a standard one, used with little modification by many Airbus A320 operators. However here the various parameters are labelled, albeit with abbreviations whose meaning is not always known:

```
[23/03/1996 20:09]
ACARS mode: 0 Aircraft reg: -DY-CND
Message label: 10 Block id: 9 Msg. no: 0845
Flight id: DK1202
Message content:-
ACM01 GCLP ESSA 1453
R01 NDTE-NACELLE,TEMP,MUST,BE,MULTIPLIED,/,/,/,
A320,ENGINE,CRUISE,REPORT,(01)/,
AC, ID, DATE, UTC, FROM, TO, FLT/
CC, DY-CND, MAR23, 200040, GCLP ESSA, 1202/
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C1, 06, 03765, 5000, 41, 0010, 0, 0100, 45, /
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ESN, EHRS, ECYC, RP, /
EC, 000141, 00567, 00167, 21 /
EE, 000100, 00567, 00167, 21 /
EPA, EGT, N1, N2, FF, P125, /
N1, 1486, 4500, 0890, 0075, 1492, 00359 /
N2, 1486, 4554, 0080, 0076, 1468, 00441 /
P25, T25, P3, T3, P49, SUR /
S1, 10660, 0288, 1629, 4574, 07574, 074 /
S2, 10781, 0293, 1640, 4577, 07539, 074 /
BRF, HPT, LP, GLE, PO, TN, P2, T2
T1, 097, 001, 1, 0035, 41, 016, 05045, N320 /
T2, 099, 001, 1, 0023, 49, 012, 05031, N332 /
ECW1, ECW2, EUM, OIP, OIT, OIQH, /
U1, 03014, 00000, 00000, 207, 116, 5588 /
U2, 03014, 00000, 00000, 208, 113, 5582 /
UB1, UB2, PHA, /
U3, 039, 010, 335 /
U4, 014, 000, 034 /
```

With the majority of airlines now being delivered with ACARS equipment installed as standard, usage of the system will continue to expand an exponential rate for the foreseeable future. Increasingly sophisticated use of telemetry to keep ground-based engineers abreast of all aspects engine and air frame performance while the aircraft is still in flight. This coupled with the inevitable expansion into some form of air traffic control will ensure that ACARS is much more than the "toy for our pilots to play with", that it was dismissed as by the management of one airline!



What Are the Airbands?

I f I explain what frequencies and bands are, it will make it easier to understand the rest of this article! There's an inexplicable, almost magical, effect when you pump radio signals into an antenna. Another antenna, even a long way off, will receive those signals. Even in the absence of anything physical in between - the two antennas might each be on spacecraft drifting in a perfect vacuum!

If you like physics, you'll look at it as follows. An alternating current signal is connected to an antenna. The electrons in the antenna oscillate back and forth, under the influence of the applied current. For some reason, the electrons in a distant antenna become affected in the same way. It's as if they sense the transmitting antenna's electrons and they start to oscillate in sympathy.

This introduces the concept of frequency. If the electrons make a single back/forth cycle once a second then this is described as one cycle (of oscillation) per second. The unit of frequency is hertz (Hz, originally cycles per second or c/s). Radio signals usually require oscillations of at least thousands of times a second (kHz) or millions of times (MHz). They even reach thousands of millions of times (GHz).

You can also see what a wide range of frequencies is covered by radio signals. Purely for our convenience, nothing to do with physics, this huge range is sub-divided. A particular sub-division is called a band.

Non-physicists may now wake up again! If you only want the simple, practical approach to frequencies, then you know that it's the number you dial up on your receiver's tuning display so as to Short Wave Magazine, April 1998

enable you to hear a particular chosen transmitting station. A bit like dialling a telephone number to get through to a chosen person.

So, What Are The Bands?

You'll find that most conversations between civil (and some military) aircraft and controllers (or even airline company offices) take place in what's called the very high frequency (v.h.f.) communication airband. The frequencies between 118-137MHz have been exclusively set aside for this purpose and no-one else may use them. But this is only a part of the entire v.h.f. band. For example, 144-146MHz is also in the v.h.f. band but is available to radio amateurs (like me!).

When we say 'v.h.f. airband' we refer to part of the 30-300MHz v.h.f. band that's been set aside for aircraft. Greedy aviators don't get all the v.h.f. band to themselves - just their fair share of it. So, stereo radio broadcasts are also in part of the v.h.f. band - a different part. We call this the v.h.f. broadcast band.

There is another v.h.f. allocation, for navigation beacons (108-118MHz). Some of these carry useful voice weather broadcasts as a bonus and are not to be missed.

Another important band is at ultra high frequency (u.h.f.) and you'll find mostly military pilots here. Most allocations lie between 225-400MHz. Not all of this space is exclusive to aeronautical communications. Also, you'll notice that u.h.f. covers 300-3000MHz and we've got just a part of it starting at 225MHz. But, that's outside the band! Very clever, you spotted it, but I'm afraid the title 'u.h.f. airband' is here to stay - even if a little inaccurate.

The last main band is high frequency (h.f.)

Godfrey Manning G4GLM says that 'Airband' is an unofficial title for radio frequencies allocated to aeronautical purposes. The word doesn't appear in any international radio regulations, in fact, it should be 'Airbands' as there are more than one of them!



covering 3-30MHz. You'll find all sorts of things here including short wave broadcasters and, yes, we amateurs again! Dotted around amongst this lot, in tiny parcels of frequencies within the h.f. band, are aeronautical stations for controlling aircraft when far from the nearest transmitter (or even land). Such as over the North Atlantic or Sahara Desert.

To confuse you, they've done it again! Aeronautical h.f. starts at 2MHz which is strictly medium frequency (m.f.). This is conventionally



Wyton? No! North Weald.
Canberra.
Christine Mlynek.

called h.f. by us aeronautical types - are we forgiven?

Summary

That was complicated enough to have me taking a rest and reaching for some chocolate (well, J.W. drinks wine while writing, doesn't he?). The principal communication band is 118-137MHz v.h.f. Currently split into channels 25kHz apart, it might become further sub-divided into 8.33kHz slots.

Military pilots are more likely to communicate on u.h.f. and take up frequencies within a broad 225-400MHz allocation (12.5kHz channels). Long-range speech won't work on v.h.f./u.h.f. and so h.f. is required, various frequencies within the 2-30MHz range being allotted. The speech is carried by the radio waves using amplitude modulation (a.m.) except for h.f. where it's upper sideband (u.s.b., a type of single sideband).

Navigation beacons are found in various places. The v.h.f. navigation band is 108-118MHz with 50kHz spacing. I haven't yet mentioned that there are various other navigation aids on frequencies that aren't covered by any of the above.

Whether or not an enthusiast would need full coverage of these is hard to say, it's a personal choice. The rest of this article will cover the most commonly encountered navigation beacons.

VOR

VOR stands for v.h.f. omni-directional radio range. You now know what the v.h.f. (navigation) band is. Omni-directional means that it doesn't matter from which direction the aircraft approaches the beacon, it'll still work.

So, what's a 'radio range'? It doesn't tell you range (distance). As far as I can tell, it's a term favoured in the United States that suggests an area over which one ranges or roams (or flies).

There's that song, *Home on the Range*, in our case you can home in on the range as the beacon guides your aircraft towards it. Imagine the beacon sitting in the middle of a giant compass card. All points of the compass radiate out from it, like the spokes from the hub of a wheel. Not just north, west, etc., but every possible point. We usually choose one of these spokes (called radials) corresponding to the nearest whole number of degrees. So south is 180°.

Let's say I am actually due south of the Belfast beacon and want to fly towards it. First, to tune it in I look at a radio-navigation chart which tells me to select 117.2MHz. Each beacon has an identity code and in the headset I here the Morse letters BEL. I now know I've got the correct beacon tuned in.

A display in the cockpit consists of a line that moves around in the instrument's window (or even on a cathode ray tube, like a v.d.u. screen, these days). There's also a knob marked Omni Bearing Selector (OBS) which I turn until the line centralises vertically in the display. This display is supposed to be a bit like a map, it's called a horizontal situation indicator (h.s.i.).

Finally, there's a three-digit indicator that shows a compass bearing. If I'm south of the beacon and want to fly towards it, I have to head north. That's



Sopwith Triplane.
Christine Mlynek.

a compass heading of 000° (and we always write all three digits to reduce the chance of errors). The line, representing a radial, is centred, and vertical, in the display. The aircraft is represented in the middle of the display. What this means is that the aircraft will fly ahead, along the line. The three-digit indicator will show 000° as I have to follow the northbound radial to get to the beacon.

What about the opposite direction? I had set the bearing **to** the beacon. Let's say I've just arrived overhead the beacon and now want to go due east, away from it. Simple - set the OBS knob to the 090° **from** radial and I'll be doing just that. I again turn the aircraft until the radial line is once more centred vertically in the face of the display.

Note that I've chosen a calm day. I won't go into the effects of wind drift other than to say that the radial line would still pass through the centre point of the display but will be inclined at an angle to the vertical.

Non-directional Beacon

An older type of aid to *en-route* navigation is the non-directional beacon (n.d.b.). Despite their name, these tell you something about direction. The name again implies that you can receive these from any direction. These simple beacons are found close to (or in!) the medium wave around 190-1750kHz. Round here, the Chiltern beacon comes in on people's car radios at 277kHz with its Morse identity of CHT.

The airborne receiver has a directional antenna coupled to an instrument that displays a pointer. If the beacon is to your left, the pointer turns to point

Short Wave Magazine, April 1998

left. To fly towards it, turn the aircraft until the pointer now points ahead - i.e. vertically up the instrument.

Things can go wrong at this frequency. The signals travel further at night, so does interference from other beacons or even broadcasters on nearby frequencies. This makes it less certain that the pointer is indicating the beacon that you think it is.

There are enthusiasts who take advantage of the increased coverage to see which distant beacons they can hear. I said it's a personal choice, but listeners such as these obviously need a set that picks up these frequencies.

Distance

So much for beacons that tell you bearings. How about distance? The appropriately-named distance measuring equipment (d.m.e.) is a sort of radar.

These beacons are often found with v.o.r.s. The aircraft sends out a signal that the beacon picks up and then returns. The aircraft times how long it takes for the return to come in. The speed of radio waves in air is known, so the distance can be calculated and displayed on a digital indicator.

Various channels are provided for d.m.e. in another part of the u.h.f. range 962-1213MHz. Not many non-pilot enthusiasts will have receivers for that area.

A horizontal bar appears in the display. If towards the top of the instrument, the aircraft is below the glidepath (this is how an approach is started). When the bar begins to drop in the display, the pilot descends to follow it, keeping it central. If the bar falls below centre then the aircraft is too high.

How high should the aircraft be at any point on the approach? Of course, if the glideslope bar is centred in the display then the aircraft is at the correct height! But it's as well to be sure so further checks are made.

This is where a d.m.e. beacon, placed close to the runway, is useful. If you're one nautical mile from the runway on a standard 3° glideslope then you should also be 300 feet above the runway's elevation.

At fixed points along the approach path there are often marker beacons on 75MHz. These have antennas pointing vertically upwards. The aircraft can't receive them unless flying directly overhead. Furthest from the runway is the outer marker.

When overflown, a blue light flashes on the instrument panel in time to a series of Morse dashes that are heard in the headphones. Next comes the middle marker (amber light and alternating dots and dashes). The inner marker has all but disappeared these days. There was one at the northern end of Hatfield, I wonder if it was demolished when they closed the aerodrome?

The published charts will tell you how high you should be when overflying each marker. So you see that i.l.s. really involves a combination of localiser, glideslope, markers and perhaps a locator n.d.b. and/or d.m.e.

It's time for us to come in to land now. There are other radio systems that I haven't room to touch on here (TACAN, microwave landing system, satellite navigation, radar, etc.) but I've covered the most commonly used ones.



Come In To Land

The current radio aid for approaching and landing on a runway is the instrument landing system (i.l.s.). Really, this is a combination of five separate devices. The start of the final approach is sometimes marked by a low-powered n.d.b. called, in this case, a locator.

Having arrived in line with, and approaching, the runway, you now need directional guidance. Imagine a v.o.r. with just one radial that leads to the runway. This is called the i.l.s. localiser and shares the v.h.f. navigation band with v.o.r. beacons. The same cockpit display is used, too, switching from v.o.r. to localiser as required. Radial line vertically in the display means the aircraft is flying straight towards the runway.

How about height? The aircraft must descend smoothly and steadily towards the runway. The i.l.s. glideslope (glidepath) beacon tells us this; they're found in another part of the u.h.f. band between 329.15-335.0MHz.

Short Wave Magazine, April 1998

How do you find out the frequencies for both beacons and communications in your area? A vast range of official books (called *Supplements*) and maps (called charts) are sold by mail order to the public and I list suppliers on the *Airband Factsheet*. To get your free copy, send a self-addressed envelope with sufficient postage for two A4 sheets to the Broadstone Editorial Offices.

If you'd like to see some navigation instruments in action then come to my Museum in north London. It's free of charge but please make an appointment first by telephoning 0181-958 5113 between 9am and 9pm. This number is **only** provided for making appointments, **not** for enquiries to my 'Airband' column which must be submitted in writing.

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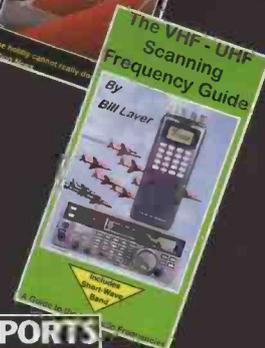
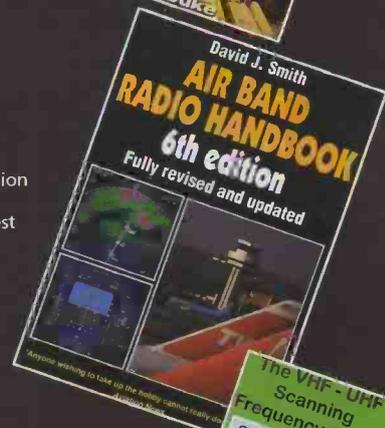
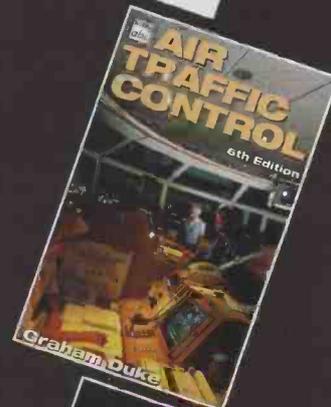
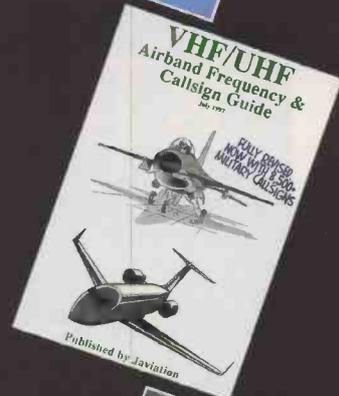
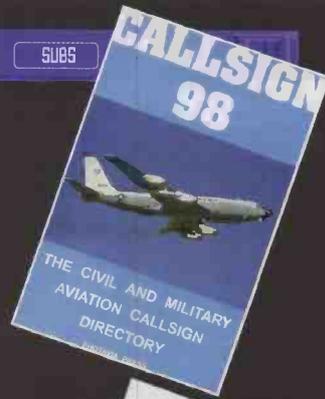
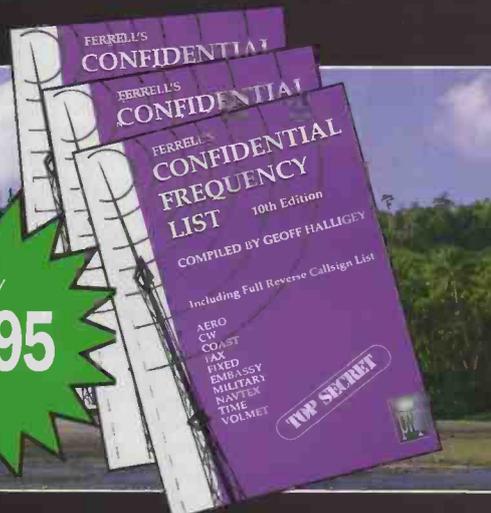
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Nostalgia

Is There A Future For It?



AR88LF on top.
AR88D underneath.
Ben Nock.

Bob Ellis offers a few thoughts on some of the old favourites of his youth

Whiling away a wet afternoon looking at a few back issues of your soaraway *SWM*, I happened upon an article in which John Wilson had a go at the R107. I worked for, and with, John Wilson for about twelve years up at the Matlock Emporium - they say you only get eight for Aggravated Burglary, but I digress.

In that time, John demonstrated a life-time of radio engineering experience allied to a powerful sense of the aesthetic. I, on the other hand, had a somewhat shorter life-time of experience, married to a sense of the faintly ridiculous.

What John has missed entirely is the value of the oversized military wireless as a replacement for furniture and a fashion statement. The first radio to have pretensions toward being a bedside table was a SETS RECEIVING; CANADIAN NO 52, a rather large Christmas present given as a bribe for peace back in 1963.

Our house already had things the grown ups called 'occasional tables'. OK then, the 52 was occasionally a table and mostly a radio. It was smuggled into the house under cover of darkness after delivery from Everybody's Store in Coxbench - a Derbyshire village name first to fall foul of my schoolboy humour. They were glad to see the back of it, no doubt.

It came with an enormous power supply, the on/off switch - based on a design stolen from the set of an early Hammer horror film - placed jauntily above the power output socket. This was a Bakelite casting, an International Octal surface mount with the pins standing proud above the front panel.

If you switched on without the plug in, your finger would come down on the h.t. pin, initiating an early form of aerobics. Health and Safety legislation has taken so much from the hobby...

The 52 Set got me cricket from the antipodes, merry greeting from Tirana and the start of a lifetime of listening to World Service - then the Empire & General Overseas Service of The BBC and now World Service Radio and almost unlistenable to.

Remembering those early days, we recently set off on a pilgrimage to Coxbench - only to find that Everybody's Store is now a part of the elevated section of the A38. The pub is still there, though we were unable to test that...

Among the things the 52 Set lacked, apart from sensitivity, selectivity, frequency accuracy or stability, were the broadcast bands. If you were an a.m. DXer in those days it meant the only receiver to have was an R1155. John likes those. Mine had a vibrator power supply, a curious electro-mechanical method of producing the high voltage needed for the valves from a car battery - and not what you are thinking.

Receiving at maximum gain drew thirteen amps or more, requiring an overnight battery charging session if we were to catch the jazz next day from Allouis. We must have listened in a constant heady atmosphere of hydrogen and oxygen from the fizzing cells, which probably explains this writing style...

You see, the R1155 had no audio stages. You either listened on an ex-Army headset (the original design based on a wireless operator who had ears in a different place to the rest of us) or you ripped out the d.f. or Radio Direction Finding part of the set and fitted a little amplifier. This was a 6J5G, a 6Q5G if you wanted bags of gain and microphony, into a Class A 6V6G. These are classic valve types that will mean nothing to a generation brought up on m.o.s.f.e.t. current-dumpers and long-tailed pairs. I belong to a generation that regarded the sub-miniature 6V6GT as a form of hi-tech. Anyway, this power duo got you two and a half watts of pure distortion.

The height of technical snobbery at that time was to strap the anodes together with a 1.5MΩ

Short Wave Magazine, April 1998

resistor so each one of us who did this could lay claim to be the 'inventor' of negative feedback. Being a good old fashioned self-publicist, I 'invented' my own form of negative feedback. This was to connect the secondary of the output transformer in series with the output valve's cathode by-pass capacitor. Yes, I know Quad was doing it at the output of their Series 2 amplifiers, but the self-taught will never acknowledge plagiarism.

Seaman's Chest

I digress, again. Then there was the R107. This was a seaman's chest of a radio, doubling as a larger bedside table than the 52 Set. Power was presented to an R107 via a Mil-spec connector that was nearly the size of the old twin-pin kettle plug. As a young man, I thought they had simply got hold of a duff kettle socket, so applied the plug with a toffee hammer. This was the node for all the electrics, the table lamp atop the R107 and a fan heater. You could get all the wires in if you removed the cable clamp from the kettle plug - and all this with no earth. Health and Safety take note...How we made it to adulthood, I'll never know!

At least the R107 had plenty of room inside for modifications. In those days, a man was judged by the size of his output stage. Build bigger, better - get the maximum wattage into your cottage. By the time the R107 got its new output stage, we were dicing with death. It had ultra-linear push-pull KT66s with four hundred volts on the plate. When Radio Caroline came on-air, the whole street knew about it.

The case was painted a satanic black. Two breeze blocks got the same treatment and went underneath as legs - a bedside table weighing in at about two hundredweight. The nights were lost listening to King Crimson on Big L's *Perfumed Garden* with John Peel. No one could have heard the doorbell. The man wanted to buy The Radio From Hell, cost no object. For a fiver, the R107 made its final journey. It had fought and won a war for us - on the beaches, in the air and in my bedroom. Never before had so much been done for so little...

A month later it was spotted in a *rece* by my troops. Seen in a garden near Brailsford, the black case *sans* radio, the lovingly restored front panel replaced by chicken wire and two rabbits. And at the going down of the sun and in the morning, I still remember it.

Free Hernia

Then there was the AR88D. Mine came in an oak case with the offer of a free hernia. Even then, there was a curious kind of inverted snobbery. If you were a 'proper' short wave listener who listened to hams and anything that was not Radio Moscow, you had the AR88D. If you enjoyed long wave listening you were but a pretender to the hobby and had the AR88LF. These were seen by the hard-core as 'not a real communications receiver' and people would turn their backs at radio rallies. I always wanted one. My AR88D is remembered for its excellent audio on which Radio Northsea International accompanied exam revision. Remember Kenny Everett, who never quite got up in time for his *Kenny and Cash Breakfast Show* at Capital Radio, then on 539m - that's metres - by the way 'on the Medium Rave Band'.

Short Wave Magazine, April 1998

To have that audio quality available for the music stations on long wave would have been utopian. The Moscow Home Service, then on 173 - that's kilohertz by the way - played doom-laden pieces of the Russian classics that matched my teenage angst to a tee (short pause while broadcast antenna designers fall about at that last pun, I could be waiting a long time).

Anyway, the Monday evening ritual walk from the *Rose & Crown* pub - no drink problem we used to live there, honest - lead to G3PTT's farm and a chance to drive the coveted AR88LF. There was (and still is) not a power on earth that would make him part with it. At the time of going to press he is still using it. Enough of this.

Scour The Rallies

Space does not allow for all the radio stories. If I am to suffer this arthritis in the hands in later life, it will end in tuning an HRO with a Top Band bandspread coil pack. The real HRO men would scour the rallies for the wooden case that held the coil packs and spend a dog's age restoring it with teak oil as the rest of the furniture in the house fell apart... The rites of passages when you get your first Racal RA17 with the rites of massage as the chiropractor tries to fix your back. The defensive remarks when you tell them down at the club that your other radio is an Eddystone 840C. The career long friend who took you to the Derby Rally where you picked up a 62 Set, the same friend who hit the talk-bar as you rigged the antenna to see if you had a future as a dummy load. The games master who made you Net Controller for Derby School CCF Operations, Map Exercises, who could not understand why Geneva was concerned that Radio Silence was filled with Pink Floyd albums on three NATO frequencies. Had enough?

We won't see radios like that again. All I wish is that the new generation of listeners get the same sense of pioneering fun we did. Perhaps in forty years time, *SWM* will carry a nostalgic piece about the day the wife used an AOR AR7030 as a door stop. Oh, how we laughed.

SWM



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Low-Cost Accessories

John Griffiths

I have recently had a month to try out some new gear, loaned to me by Mike Haydon of **Haydon Communications, 132 High Street, Edgware, Middlesex HA8 7EL. Tel: 0181-951 5781**. These are low cost kit aimed at enhancing listening with both v.h.f./u.h.f. scanners and those scanners which also have the ability to cover h.f. Mike kindly sent on a Q-Tek Apollo 2000 desk-mounted/indoor scanning antenna, a Q-Tek DC 2000 discone and also a Q-Tek h.f. Inductive Interface - all affordable items aimed at the scanning enthusiast.

Firstly, I put everything to test using my VT-225, AR2000, PRO-80 set up, and using the military and civil airband available to me here in Oxford. This is a relatively good area to scan through as the civil portion is well active with signals and the military portion also produces some good copy with overflights out of Brize and any para drops that may be underway at Weston-on-the-Green. Given the proximity to London, there was a good opportunity to catch lots of civilian flights as well. Some p.m.r. and other signals were also chased.

The Apollo 2000 is a weird looking bit of kit which comprises a central antenna plus three telescopic whips which can be extended either vertically or horizontally, allowing lengths to be altered to maximise reception. It sits on three tripod legs which have rubber feet attached - so the YL or XYL can't complain you're scratching her table with your listening addiction! I have to say here that I'm not a fan of indoor antennas like this as earlier desk mounted antenna tended to look like a mad scientist's invention. However, I was surprised by the quality of construction of this piece of equipment and it appears to be up to the job it is designed to do. I ran it on the VT-225 and scanned through the 100 mixed channels I have in memory, comparing it to the sets own hand-held antenna plus a spare SSE EB-A0608 whip I use now and again. Both of these whips give good, clear reception of signals and are pretty sensitive. I have cross-checked them against the antenna supplied with the AR2000, for example, and found them to be vastly superior.

Without getting technical, the Apollo 2000 claims to be able to cover 0-1650MHz. I used it between 108-400MHz approx. and was surprised by what it was able to do. It produced clean copy, and there was good reproduction with very little breakthrough once I had adjusted it's various bits for maximum reception on both airbands. There was some breakthrough due, I suppose, to its variable length and 'jack of all trade' construction but it pulled in signals, when properly set up, with slightly better results than my other antenna. A good example of this came from a signal on 118.875, Oxford Tower, which was copied both sides by all antenna on test. I set up the VT-225 on the Apollo and used the AR-2000 as back-up. Signals were received both sides on the VT-225, aircraft side only on the AR-2000. I then swapped them over and while the VT-225 still picked up both sides on its own whip, the ground station was weaker. The AR-2000 picked up both sides again on the Apollo. Further tests showed that the Apollo would pick up better than both whips in long term testing, with a signal that was more powerful in terms of reception. It also threw my rationale that desk mounted antennae are a bit of wishful thinking! Obviously this one has an edge.

I then moved to testing the DC-2000 which is an outside discone claimed to cover 25-2000MHz and having a transmit range of amateur v.h.f./u.h.f. bands with a power handling output of 200W. I put the DC-2000 on a temporary siting on the TV mast - we have no TV so there is no antenna there! - and fed it with good quality coaxial cable. Again, I was able to set

up the VT-225/AR2000 combo...and wow! Did things come alive! I don't have access to an outside antenna usually and am limited to the hand-held's whips. Putting the DC-2000 up gave me a tremendous boost to all signals with the ancient AR2000 coming *alive!* Signals were well received and I found that I wandered out of airband - my usual haunt - into all manner of areas that, previously, have been less than good here due to my location! In fact, the results were so good that I was late for work one morning and spent a whole Saturday listening in on my day off - and I haven't done that in ages, believe me!

Lastly, I tried something I viewed with some suspicion, this being Q-Tek's Inductive Interface. It is a BNC fit rubberised whip with a push terminal at its top for attaching a long wire to, thus insulating the wire in effect. I mounted this on my AR2000 and was well pleased with results on h.f., although I could only cope with broadcast stations as the AR2000 does not have s.s.b. resolution ability. It produced good signals with very little overloading and breakthrough - as claimed. However, when I put it on my Sony ICF PRO-80....! I use the war-horse of a Sony for monitoring 2.182MHz and military h.f. communications and usually it runs through a Global a.t.u. from a long wire and through a Howes Filter. The results are sometimes good. On its own telescopic whip 2.182 is, strangely enough, better. This is due to the fact that the long wire arrangement suffers from time base breakthrough from next door's heating timer - sometimes wiping out reception for up to a minute on a regular as clockwork basis. Annoying, but that's life. Yet, when I put the long wire straight to the Q-Tek inductive interface, the time base signal was almost non-existent!

Reception on 2.182 was suddenly quieter, and copy readable and at good strength. This on a random length of wire shoved out of my second storey room window and lying on the ground! I roamed the h.f. bands on s.s.b., stopping off at 5.680 (Edinburgh Rescue) and also on 11.175, which is the US military network (GHFS) master channel - brilliant! The equipment coped well and gave me clearer, more easily readable signals - and I am so impressed by this piece of equipment that it is on the shopping list! For anyone in a situation like mine, this random wire approach is sometimes an only option and you have to take what you can get. I would suggest that getting the wire upwards - over the roof of the house - would be better than the situation it is in now but, with the results I have had, I'd suggest that attaching the inductive interface would be better than the a.t.u./Filter set up! Verdict? A clear winner and well worth the reasonable outlay and minimum fuss approach to listening.

The cost of all this kit is well within the average budget. The Apollo 2000 costs £49.95 and would be good for those with no access to the roof or outside mounting. The DC 2000 costs the same, and is therefore a good mid-range purchase. The Inductive Interface costs £12.95 and, if your set has a BNC fitting and you want to experiment with long wires for h.f. listening on your scanner, this is the best way to do it. All kit is available from Mike Haydon of Haydon Communications, and I'd like to extend thanks to Mike for the loan to review the pieces. I've been a fan of low cost kit for ages and Q-Tek is a new company on the market - one which will go pretty far if this is anything to go by.

This is my last regular contribution to *SWM* - My new career is taking up most of my time. Thankyou for all the input you have made to the column over the past years.



Notes from the Front Line

John Griffiths



...Look of pure horror...

Sherlock Holmes would have probably solved this case in seconds. With me it took longer. Mainly because I'm not the smartest of people and mainly also because I did my stuff covertly. The response to which - in fact, the reason - was also a covert operation. I tell you this, if the SAS are looking for recruits, then my partner would be in the top ten when it comes to operating behind enemy lines!

I suppose it's my fault. I should know by now that women and radio don't really mix. When I first moved in, my partner said she didn't mind me having a hobby and, if radio listening was that, then that was fine. I can still see the look of pure horror on her face when I unpacked my small bit of kit, an AOR AR2000, Yupiteru VT-225, Sangean ATS-803A, Sony PRO-80, Global a.t.u., Datong AD370, Air 33 Scanmaster base - plus cables, plugs, p.s.u.s,

speakers and extension leads and said, rather happily, that where did she want me to put them?

The answer was along the lines of a place where the sun is destined never to shine! I should have known this was going to be trouble...

Making It Habitable

I persevered, eventually discovering what used to be a coal shed in the garage and set-to happily making it habitable. In went a scrap of carpet, a wall heater and some rack shelves. An old table was cut down to serve as a desk and a set of drawers - upside down and stepped - would serve as a stand for the kit,

Pretty soon, the shack looked cosy enough to sleep in and once everything was connected up, it sounded - and felt like - a little corner of England, which is forever heaven.

Being out of the way and in the garage it didn't bother her too much, but I still felt anxious whenever I was in there listening and she'd walk past the open door looking a bit vexed. It took me a while to realise she didn't suffer from blood pressure but she had a habit of going a sort of brick red when she was roused. Being a red-head, it certainly gave her some sort of visage, which wouldn't have shamed any self-respecting Berserker from days of yore.

Frankly, I'll admit to hearing the words of Publilius Syrus, way back in the 1st Century BC when

he said "Shun an angry man for a moment - your enemy forever!". Like a distant warning bell, I chose to ignore them...

Standard Practice

We lived with it. My partner put up with it and it became accepted that I'd slip out to my little domain on nights when the TV was boring or when she was at work and I was home. It became standard practice to find me either under the bonnet of my Mini Clubman or sitting, peacefully, in the shack. She certainly never tried hard to find me, knowing I'd be in one of two places at any time. Well, I thought, at least it's handy.

I suppose she learned to live with the fact that the man she was living with had a strange and absorbing hobby and - even if he was, as she delicately puts it, an "anorak of the first order" - it kept me out of trouble. Like a United Nations agreement, she tactfully ignored my ramblings through the ether as long as I spent some time with her in the house.

However, I think it started going wrong when that time became less and less. Then again, this QTH is such an ideal spot for airband listening!

Short Wave Magazine, April 1998

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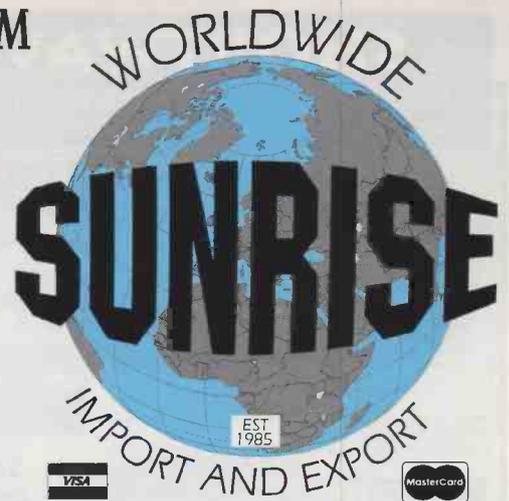
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Part Of The Fun

As many listeners will undoubtedly know, part of the fun of the hobby is in experimentation. It wasn't too long before I had rigged up a long wire that hung, delicately, between the two trees in the garden. A rather slim and certainly unobtrusive antenna which had an absolutely brilliant performance through the a.t.u. on h.f.

I spent many a happy hour flying with the boys in the USAF as they hacked Globemasters and C-130s across the globe and spoke to Croughton and Incirlick, Anderson and Guam. I was there in the cockpit of the passenger and cargo flights across the Atlantic, imagining the scene as the plane thundered on over a brooding, heaving sea.

I was right next to the ship's master out in a pretty heavy North Sea as he called his rig up on 2.182MHz for his orders and time of arrival. I was the Invisible Man. I flamin' well loved it!

Long Wire Successful

The long wire proved so successful that a stereo antenna was made from two old telescopes and whapped into the eaves. Suddenly, we were getting high definition stereo stations on 88-108MHz with so much choice of listening it was a real competitor for the TV and video!

Encouraged by this, I ran another long wire through the trees for the sole purpose of experimenting with it against the AD370 on the PRO-80. Marconi had nothing on this kid!

Then, one balmy morning, I had the house to myself. Cup of tea, switch on the main power and into the cosy, snug little shack. The Spanish have a good word for what happened next. *Nada*. It means nothing! Both verticals were working on the scanners and the AD370, when connected to the PRO-80, produced good signals, but the wires were absolutely dead. Nothing sang in them and they were apparently not trawling either.

Mystified, I checked all my connections in the shack, my earths and to no avail. It wasn't there the problem lay. Out into the garden and - horror of horrors! There were my two wires, dangling down from their trees!

Blamed The Birds

At first I blamed the birds. Maybe something tried to sit on them? Flew into them? Heaving them down carefully, I was aware that the break in them looked strained. Aha, I thought. It's birds. It was, but not of the feathered variety. Oh no! Avian saboteurs were not responsible for this mishap.

When my partner returned, I questioned her closely, but she smilingly denied any knowledge, adding - and an insult to injury - that she was glad because there was no way her garden was going to look like something out of *Short Wave Magazine*, rather than *Beautiful Homes & Gardens*.

There followed an armistice of sorts with an agreement made that no more 'unsightly' wires would resemble an aerial tramway across the garden. Reluctantly I agreed. However, as many a listener knows, the truce didn't last!

One evening, when she left, I set to with ladders and fixings and ran a wire up between the trees - this time without its plastics sleeve. Impressed by its near-stealth invisibility, I again enjoyed my little hobby. However, a happy man is a suspicious man and my frequent visits to the shack stung her to closely examine the house exterior.

Sharp eyed as any eagle, she soon became aware

of the sunlight on the wire. Not that she told me however, oh no, this was gloves on time. This was war!

Female Of The Species

What happened next is probably a good indication of cunning, of the truth in the old saying that "the female of the species is more deadly than the male". My partner brightly announced she would do some gardening and I nodded, suspecting some ulterior motive but, despite constant surveillance, found no reason to doubt her motive to faff about the flowers and shrubs.

After a nervous half an hour watching her through the rear window, I settled into some h.f. listening and raised 11.175 on the digital display. The voice that blasted through the speaker was that of a Southern boy, called Andrews, and asking for a 'phone patch - heaven!

Then, just as the double identifier response sparked through - do-dee - the set went sphput, fizz - and a long white noise of static announced that, for now at least, the ether was dead. I turned to the window where she was whistling and raking up leaves. Dilemma time!

Did I go outside and look up or did I play it cool? Are you a radio listener yourself? That's right. I went outside. Casually, I looked up whilst asking if she'd like a cup of tea? Brightly, she answered that yes, she'd love one - but, there above her head, was the wire, still up...!

Connection Ripped Out

I eventually discovered that the connection of my Stealth MkII supposedly hidden in the undergrowth had been ripped out! It lay, disconnected, whilst a few feet from it the naked copper wire swung with an almost indecent grace just under its exit around the back of the tree bole. *Drat!*

Was this an accident - or had that garden rake been used in a malicious fashion? Was this a game of wills played with an almost nonchalant disregard for pleasure or was it quite simply innocence? I looked at her, quietly weeding the shrub border and I knew - damnit I just knew - we were at war!

The situation is still tense as I sit at the keyboard and write down this news bulletin from the front. So far, four antennas have been lost to enemy action. Always carried out in great secrecy, the results of the enemy's actions and cunning have been truly impressive. I believe that I know the enemy - but the mendacity employed is beyond my reasoning.

Beyond Enemy Reach

The propaganda machine is chillingly convincing and the face presented is that of almost angelic proportions. Currently, I am experimenting with a wire slung along the side of the garage and disguised by a coat of paint, a wire that snakes its way along the guttering and up the downspout, along the roof tiles and peeks its head at the front face of the chimney.

It works, it pulls in well and is on a par with the (accepted) AD370 that resides in peace on an eave - way beyond the reach of the enemy because I know that the enemy fears heights, yet for how long? How long must I sit in my shack, biting my nails as I listen in to the pure joy of signals from the ether - knowing - with every passing second - that the enemy may soon discover my latest project and set to with an unholy vengeance to destroy it? I am out of answers. I have no other avenues left to me..

I wonder if anyone's found a way to make a Silver Birch act like a vertical?



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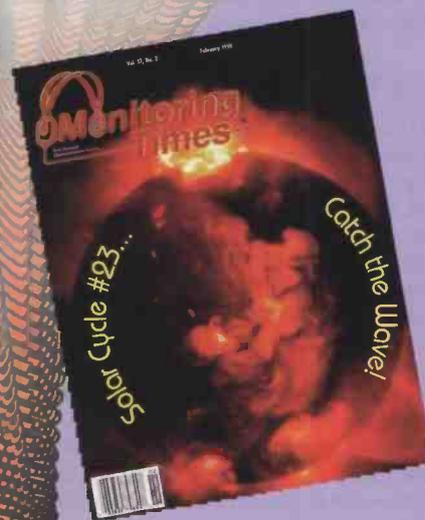
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Propagation Forecasts

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

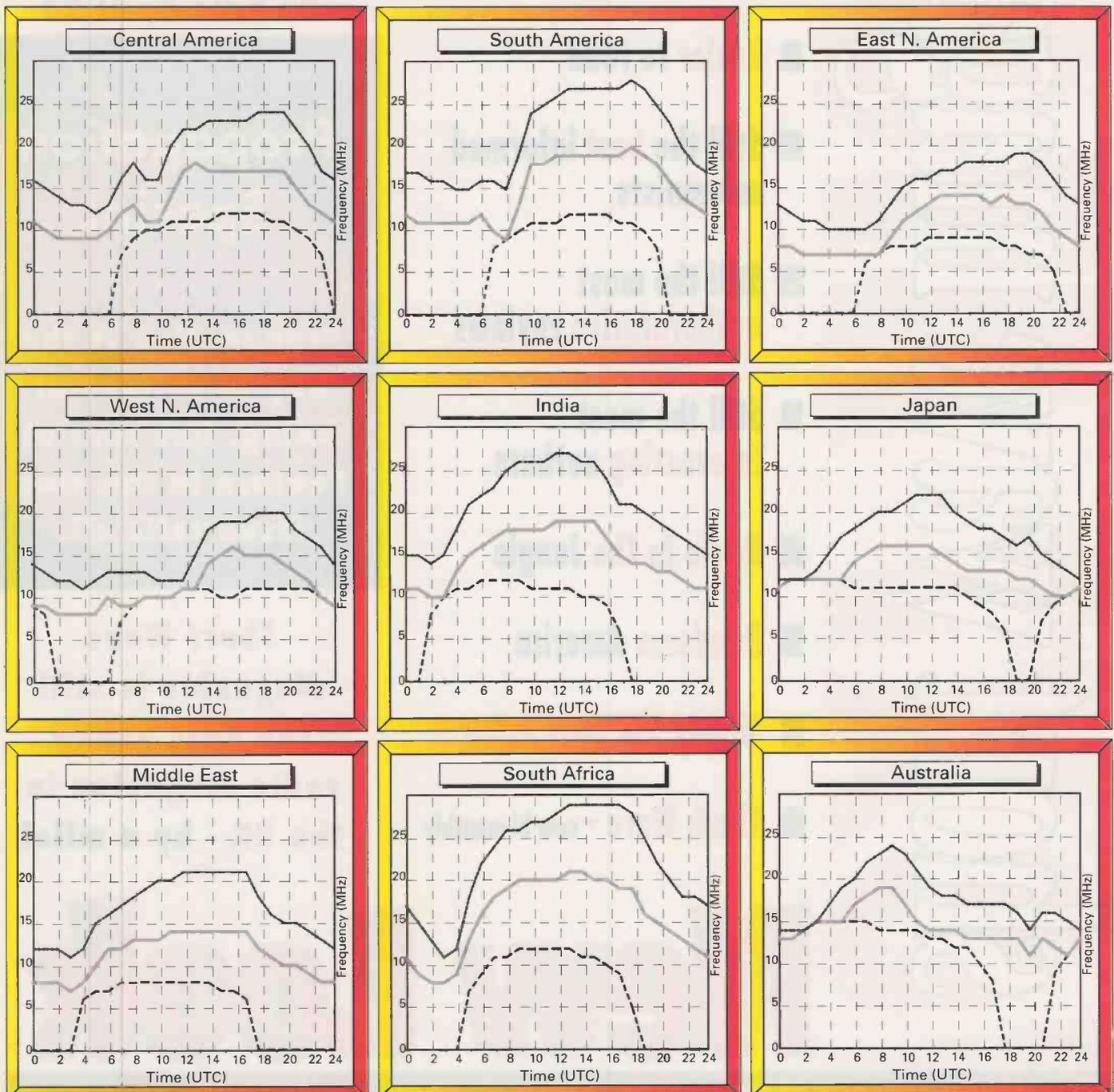
Lastly, the upper dashed line, represents the maximum usable frequency (MUF) a 50%

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.

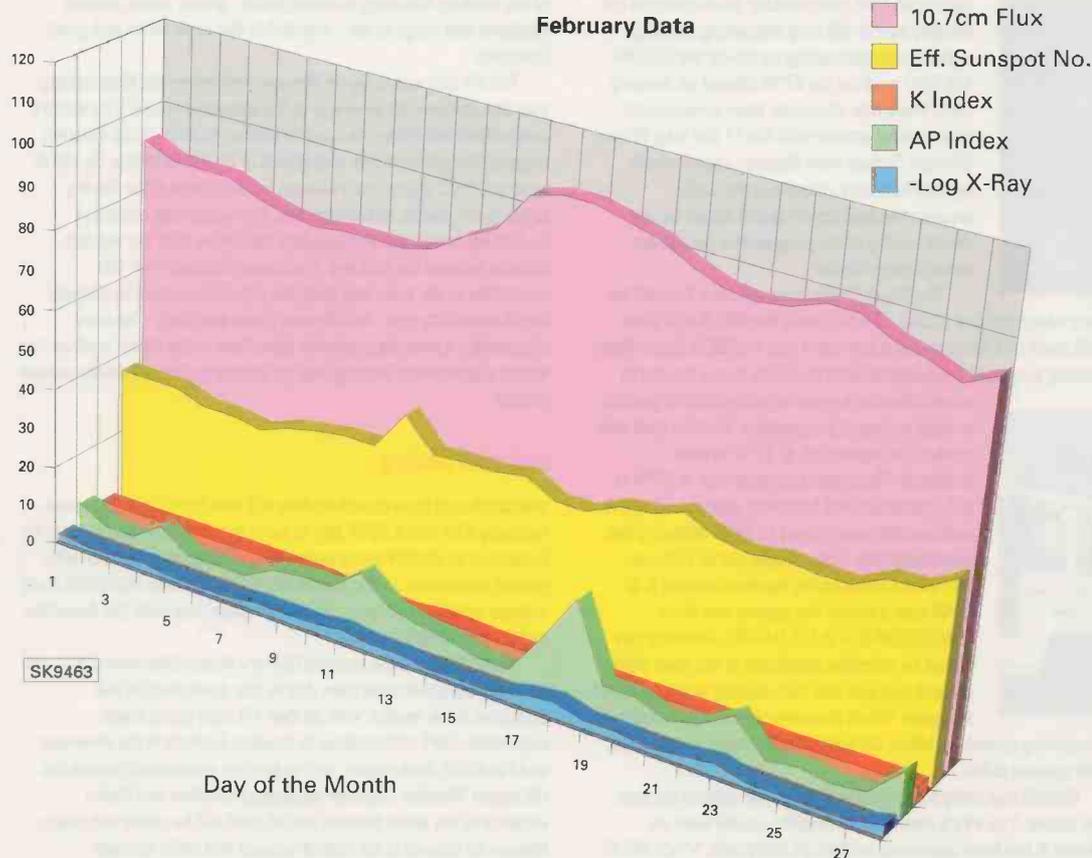
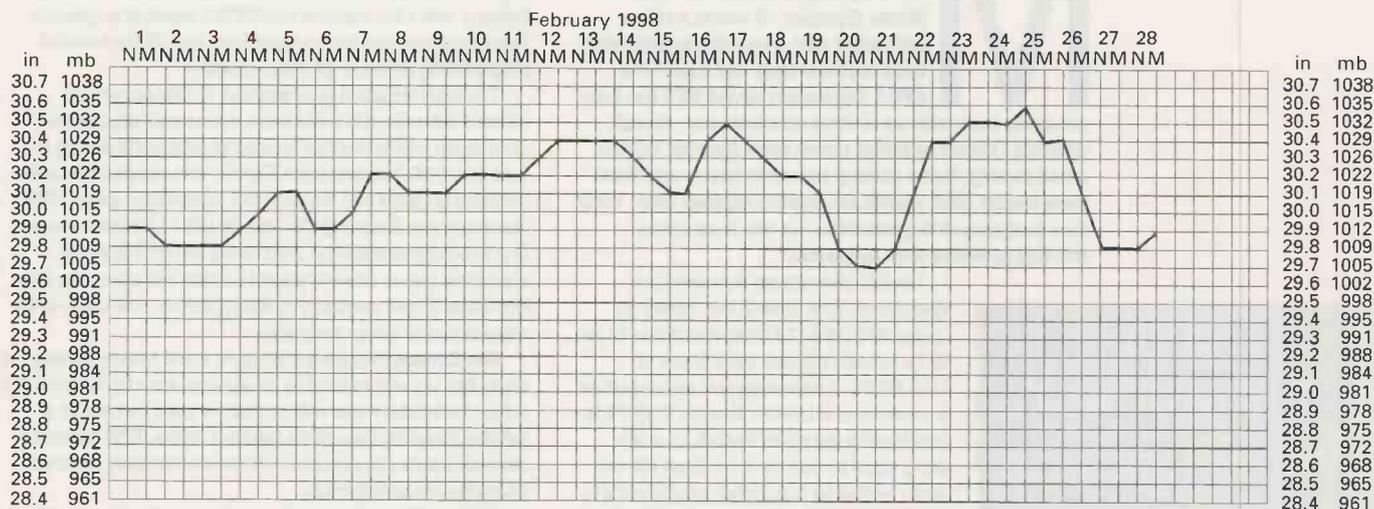
Good luck and happy listening.

April 1998
Circuits to London



Propagation Extra

Ron Ham's barometric pressure chart, taken at Storrington, W. Sussex, February 1998.



guide to the chart

The 10.7cm solar radio flux is used as an indicator of the general level of solar activity.

The K and AP indices are measures of geomagnetic activity.

The K index ranges from zero (very quiet) to nine (severely disturbed).

K values of five or greater correspond to geomagnetic storm conditions that can relate to poor propagation conditions.

The AP index ranges from 0 to 400. An AP of 30 is the threshold for geomagnetic storm conditions.

Satellite TV News

Much more analogue satellite activity has been reported from mid January into February, helped in part with the 1998 Winter Olympics - if you're a skiing enthusiast with a tracking satellite dish then you must have had a ball! The DFS-2 *Kopernikus* bird at 28°E has been extremely busy with up to three simultaneous - though differing - European skiing events apart from ice hockey, speed skating, figure skating and other snowy activities! Dean Rogers (SE2) spends his satellite zapping time - other than European skiing searching out the more earthy sporting activities such as football!

The 15th International Tournament in Maspalomas, Gran Canaria, was carried via Eutelsat II F3 (16°E 11.678GHz horizontal - 10 Jan 98) for Eurosport though audio fx only at 6.60/7.20MHz - commentary was perhaps added as a voice over in London. Telecom 2C @ 3°E is a good hunting ground for football, it's a very strong signal particularly in the South UK and carries football for both French networks and for feeds into the UK. Eutelsat II F4 @ 7°E also is a very active bird with many EBU circuits on leased transponders though the analogue feeds usually are 'encrypted' with sound-in-sync transmission (SIS). This results in a picture that is visually unstable. The audio is sent as basic digital information within the line sync structure and the picture jumps as soon as audio is transmitted - though as received on your home receiver there is no audible sound from your loudspeaker, you require an EBU 'descrambler' to re-establish the missing sound. My only interesting sporting sighting was cars racing on ice via the BTI-UKI-156 SNG truck on the 27°W Intelsat on January 25th. There has, of course, been considerable international activity with the 17 day long Winter Olympic Games from Nagano, Japan, which opened February - Intelsat is the main programme feed carrier out of Japan for the World - many of the programme circuits are unfortunately digital!

The South Crofty is a traditional Cornish tin mine which has just closed. Our old friend the BBC South West SNG truck UKI-231 featured a live insert into the BBC's South West evening magazine programme from the mine, it now having to close following a government refusal to provide monies to keep it in operation. The live feed was carried via Intelsat 605 @ 27°W in clear analogue. The present satellite now at 27°W is 605, previously 803 had been operational at this spot but has now moved to 21°W replacing the incumbent 515. I was caught out on February 2nd with a live evening insert on Intelsat K @ 21°W with a colour bar pattern and ident 'SWISSCOM SUI W.E.F. DAVOS'. Thinking this would be recorded highlights of the days skiing I paused and was less than excited when up came a caption 'World Economic Forum' followed with an opening speech by Hilary Clinton to the gathered ensemble of well dressed suits!

PAS-3R has really livened up with analogue activity the past few weeks. The VVYX news/teleport facility usually seen on Intelsat K has been appearing on PAS-3R lately with 'VVYX ATLN' colour bars, one evening a hand-held camera outside of the uplink teleport facility showed a bleak snow swept panorama of snow covered cars and trucks plus one of their medium size dish. A new one on me - the 'Baton Rouge Teleport' - came up via the Brightstar/Reuters West-East Intelsat K lease @ 0730hrs, 12th February with a live interview into GMTV's breakfast programme. There are at least two live analogue feeds into UK live breakfast programming carried on 21° most weekdays.

The Satellite Festival aired weekend 16-18th January, an informal collection of live interviews, video taped offerings and other studio activity intended for satellite enthusiasts running at least 0900-2100. Interesting that TESUG - who organised the event - managed to extract over 3 days of free transponder useage of the newly launched Sirius-2 @ 5°E - clear PAL @ 12,225GHz horizontal. One video tape presentation aired during SATFEST that was enjoyed by mature viewers featured a visit to and around the radio ship *Mebo-2*, used previously by Radio Caroline, now slowly being restored back to former her glories.

Roy Carman (Sandown, IoW) spent a cold January tracking the Clarke Belt and was warmed by the sightings from the Sahara of the annual Paris-Dakar motor rally. Impressive shots from the air of vehicles ploughing through the sand and stones, 27°W carried live interview inserts into various European networks early evenings during the period of the race.

Eutelsat I F4, an elderly bird slotted in an inclined orbit at 25° East, seems a rare sighting for me but Roy watched an interesting SISLink 26 (UKI-257) live insert on January 16th at 11.174GHz horizontal - from a transport cafe! First pictures was shot of steaming plate full of steak, mash, veg. and gravy. The item discussed the demise of the roadside transport cafe, comparing traditional dining with the more modern approach of the Little Chef type operation. Tractor facilities now include in-cab sleeping further reducing the turnover in transport cafes. I well recall the early days of my working life using transport cafes - greasy pipes, steamy windows and mugs of tea - wonderful! But good value and good company.

The IF4 bird was busy on this day, remember the Malmesbury pigs that escaped on their way to the slaughter house? The world's media descended into the town to follow the trails of the itinerant piggies through the fields and woods of sleepy Wiltshire. So did at least one SNG uplink truck who set up their base at the Poultry Cross in the middle of Malmesbury, the output was carried at 11.134GHz horizontal and included interviews with the vet that actually nabbed the final pig. The chase attracted over 100 journalists to the town and even the American networks featured the Malmesbury pigs - which were given sanctuary. The story diverted for a time the problems elsewhere in the World such as Iraq which at the time of writing may be occupying more satellite airtime shortly.

Intelsat should have launched their 806 bird from Cape Canareral February 27th into a 40°W slot to serve the Americas and Europe in C-band up to 40dBW levels suggesting dishes down to 1.8m with current noise spec. LNBS. Interesting that it can dual illuminate from a single uplink, a European uplink can beam into both the Americas and Europe simultaneously.

Orbital News

March 31st and the popular Country Music Television (CNT) will close the European operation due to 'the economics of the European cable market' with all their UK staff being made redundant. CMT will continue to develop markets in the Americas and Pacific/SE Asia region. And in another announced closure the UK based 'Weather Channel' including the Italian and Dutch versions of the same channel and all staff will be made redundant. Reason for closure is the lack of viewers and cable carriage - reckoned an audience share of approximately 0.1% of the Astra channels.



Launch of Ariane 502 - live via Telecom 2C.
John Locker.



Launch of Ariane 502.
John Locker.



SNG truck just being rigged for transmission.
John Locker.

As channels close, others open! Sony Entertainment Television (SET) will open for cable carriage early March with a service mainly Hindu language movies, entertainment and news. London based facility Molinare will present the service out of Soho. ITN have bought out the ailing Lyons based Euronews operation and is bringing in new programme formats to 'zip-up' presentation. It's been taken on the Spanish digital platform 'Canal Satelite Digital' (CSD). Good news for the Palestinian Broadcasting Authority who have gained ITU approval for their own satellite and frequency spectrum rather than relying on spectrum currently in ownership by Israel.

PanAmSat's PAS-6 bird @ 43°W and launched only last



Sirius-2 carried the Satellite Festival-98 programme, overnight radio programming was carried in vision.

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<http://www.fis.netica.net>

Dean Rogers snapped this skiing offering via Eutelsat 7°E.

Digital Space
Dublin

UKI - 120

Setanta Sport GAA Gold

19.20-20.55 GMT 11/01/98

Telecom 2C @ 3°E with Setanta Sports programming. Dean Rogers.

Paris Dakar

Feed Inter
Keep Rolling

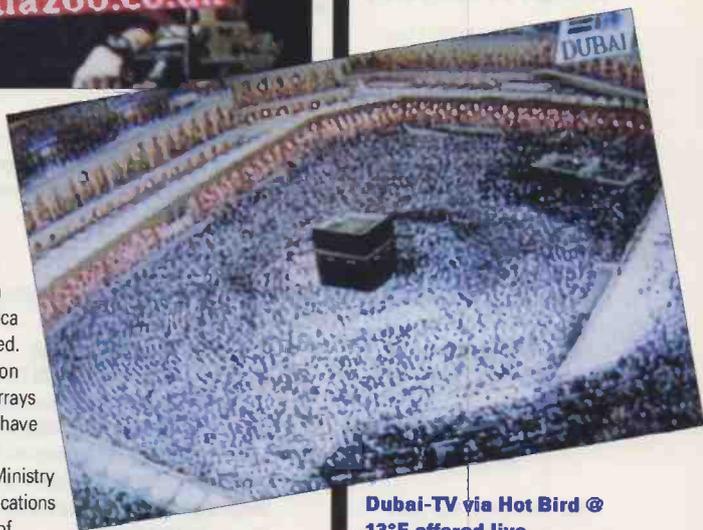
The Paris-Dakar race, caption via Intelsat 27°W.

Summer has trouble from her gallium arsenide solar panels resulting in lost power output. Some of her transponder capacity has been switched off though her main Sky Latin America output hasn't been affected. Future satellite construction will opt for silicon solar arrays from which no problems have reported.

Meanwhile, Japan's Ministry of Post and Telecommunications will favour development of digital satellite television rather than digital terrestrial TV. Both NHK and WOWOW Tokyo based groups reckon to be launching on the BS-4 digital satellite at launch in the year 2000.

More news on the failed launch of AsiaSat-3 Christmas Day. The first launch stages went OK but six hours into flight a final burn on the Proton launch rocket fired up for one second rather than the intended two minutes. The satellite ended up in an elliptical orbit of 36000km maximum height, 200km minimum and has now been written off! It will eventually burn up in the Earth's upper layers and has now become an insurance claim! The bird should have slotted at 105°E and had been fully booked. AsiaSat may now buy a second hand satellite in orbit elsewhere and move it to 105°E as a temporary measure pending construction/a rethink of the situation.

Prima-TV is a satellite distributed digital channel targeting Rumania with news, talk, feature films and cultural offerings. And HBO Rumania has also launched a premium channel for distribution to the country's main cable networks, both channels are carried via Amos, 4°W on their Eastern Europe beam.



Dubai-TV via Hot Bird @ 13°E offered live Ramadan religious ceremonies, the mass of people circulated anti-clockwise around the central black structure.

INTRAX HOL 14

U2 concert Rotterdam

Mono audio via SIS
left audio 6,6 MHz
right audio 7,2 MHz
deemphasis j17
bandwidth 280 KHz
Also on Euroradio
Transponder V (2Mb)
(1st choice)

Another Dean Rogers offering, a Eutelsat 7°E U2 concert.

KEITH HAMER & GARRY SMITH, 17 COLLINGHAM GARDENS, DERBY DE22 4FS

Keep On Writing!

Please send your DXTV and f.m. reception reports, news and information to arrive by the first of the month to:- Garry Smith, 17 Collingham Gardens, Derby DE22 4FS, England.

Service Information

Belgium: After RTBF-1 has closed down, Eurosport 21 is aired encrypted via the Liège transmitter on Channel E3.

We understand, from information just received via Gösta van der Linden (Rotterdam, Netherlands), that the two Belgian Flemish-language TV services have changed their names. BRTN TV1 is now called VRT TV1. The teletext service is known as TeleTekst. BRTN TV-2 is now called VRT KETNET/CANVAS. The teletext service is known as CanText.

Norway: NRK-1 has been showing the FuBK test card with 'NRK-1' identification. This test card was last aired during the early Seventies, along with Test Card "F"!

The names of the Norwegian services, TV-2 and NRK-2, are causing some confusion. These are not the same services. TV-2 is an independent service and so is TV Norge (which is also aired via satellite).

All three services use u.h.f. channels. To confuse things even more, there are local stations operating, albeit on low-power, plus regional opt-outs of the high-power main services!

Fig. 1: Nick Brown's reception of the Channel 5 test picture from the Black Mountain site in Northern Ireland. Note the inclusion of the transmitter location and channel.

Fig. 2: Dutch regional tests from TV Drenthe on Channel E25 received in Sunderland by Peter Barclay.

DX Television

The *Quadrantids Meteor-Shower activity around January 3rd and 4th traditionally provides a deluge of signals in Band I and often Band III. This time, conditions were exceptionally quiet. Tropospheric reception penetrated many areas throughout the United Kingdom. DXers in southern and central England encountered French, Belgian and Dutch signals while those in the north were entertained with goodies from Norway, Sweden and Denmark. The 10th and 11th were the most rewarding dates.*

January Log

Several readers have voiced their opinions on the collective log and have given it their seal of approval. The log highlights tropospheric reception. Transmitter names have been included where possible.

- 9: Belgium: RTBF-1 E8 (Wavre).
- 10: Netherlands: NED-1 E4 (Lopik) and E29 (Goes); NED-2 (Goes); NED-3 E30 (Lopik) E35 (Goes); Luxembourg: RTL+ E7 (Dudelange); Belgium: RTBF-1 E8 (Wavre), BRTN TV1 E10 (Wavre) and E43 (Egem), BRTN TV2 E25 (transmitter unknown) and E46 (Egem); France: Canal Plus L5 (Lille), L7 (Rouen) and L9 (Caen).
- 11: Denmark: DR-TV E31 (København) and TV-2 E26 (Århus), E27 (Åbenra), E28 (Thisted), E30 (Vejlø), E33 (Varde), E40 (Ringkøbing), E53 (København) and E56 (Skive); Norway: TV-2 E44 (Bokn); Sweden: SVT-2 E44 (transmitter unknown); Belgium: BRTN TV1 E43 (Egem); Canal Plus Belgique E50 (Wavre); Netherlands: NED-3 E35 (Goes) and Omroep Zeeland E54 (Goes).
- 25: Netherlands: NED-1 E29, NED-2 E32 and NED-3 E35.
- 26: Belgium: RTBF-1 E8 (Wavre).

Readers' Reports

Peter Barber (Coventry) kept a look out for Meteor-Shower reception on the 3rd, particularly around 1700UTC when peak activity was forecast, but very little was seen. Peter comments that the general lack of DX this time of year can be off-putting, especially for newcomers.

Other enthusiasts were luckier. **Stephen Michie** (Bristol) noted 'pings' of signals on Channel E4 at 1150UTC on the 2nd and also on the 5th at 1159UTC. **Simon Hockenhull** (Bristol) noted activity on Channels E2, R1 and E3 during the evening of the 3rd.

On the 10th, Stephen reported various Dutch signals from the Lopik and Goes outlets. Despite the number of Channel 5 transmitters using E35, the Dutch NED-3 signal from Goes is still evident.

The Belgian BRTN TV2 network on E46 was identified with programmes at 1900UTC. In Coventry, Peter Barber monitored French Canal Plus stations on Channels L5, L7 and L9 for most of the day.

At 2230UTC, the detective series *Columbo* with subtitles was discovered on Channel E7, possibly from Luxembourg. The u.h.f. signals were mainly from within the UK.

Peter comments that the build-up for tropospheric reception at u.h.f. follows a certain trend with Anglia TV on Channel E24 from Sandy Heath appearing first, followed by BBC-1 (E31), BBC-2 (E27) and Channel 4 (E21).

Last summer, several of the new Dutch regional services were seen on test by **Peter Barclay** (Sunderland). These included TV Friesland on Channel E28 and TV Drenthe on E25.

Omroep Zeeland on Channel E54 from the Goes transmitter is currently on test and **Tom Crane** (Essex) spotted this one on the 11th at 0131UTC showing a selection of local news pages called *Zeeland Nieuws*. The test card is the Philips PM5544 with 'OMR. ZEELAND' at the top and 'NOZEMA GOES KAN. 54' towards the bottom. A signal co-channelling with BBC-1 Dover on Channel E50 is believed to be Canal Plus Belgique from the Wavre outlet.

Scandinavian Opening

On the 11th, the Danish DR-TV network on Channel E31 (Copenhagen) was received from 0945 until 1330UTC by **Peter Barclay** in Sunderland. The PM5534 test card was shown until the first programme commenced at 1130UTC.

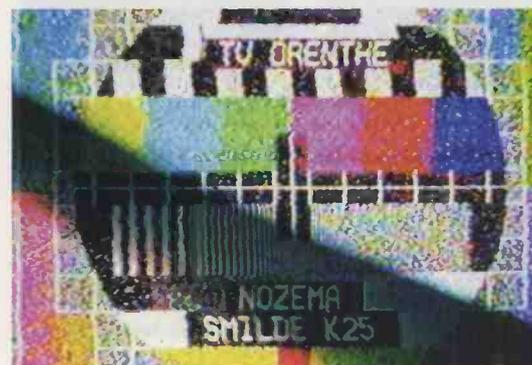
Many second-network TV-2 channels were also active with variable reception quality, except Channels E28 and E30 which supported colour for most of the time. Children's programmes were shown for most of the morning.

The Norwegian TV-2 service on Channel E44 from Bokn was resolved between 1050 and 1145UTC. Programmes included the *Benny Hill Show* complete with the Thames TV caption and logo at the beginning!

Once the Norwegian signal had faded, Sweden (SVT-2) took over with a sports programme showing skiing action. Programme schedules were screened from 1150 until 1200UTC when the PM5534 test card appeared. The signal faded out completely at 1201UTC.

Storm Damage

Another lift on the 23rd and 24th brought in UK stations for **Martin Dale** (Stockport). Unfortunately, the recent gales have damaged his u.h.f. grid installation, bending the rotator support mast and partially jamming the rotator.



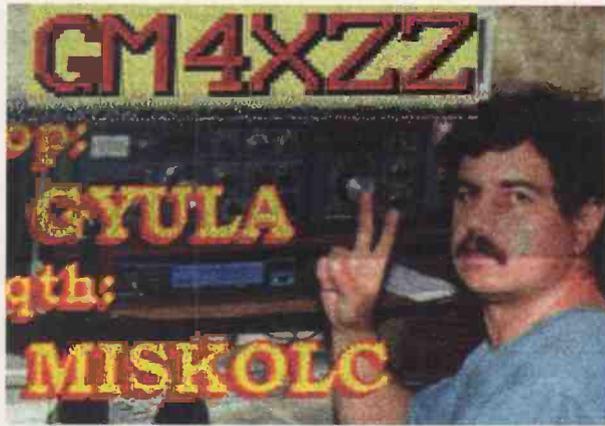


Fig. 3: SSTV from Hungary received by George Newport in Canterbury.

The antenna can now only be rotated through 90° but luckily the grid can still be turned to face south-east. Martin is actively planning to add a D-100 DX-TV converter and Band I dipole to his installation in time for the Sporadic-E season. **Geoffrey Powell** (Tamworth) is also hoping to take-up TV DXing in the near future.

ICOM Vision Adaptor

L.J. Lewis (Romford) wonders if any DXers have successfully used the now defunct ICOM TV-R7100 TV Receive adaptor (for use with an ICOM 7000/7100 scanner) for DX reception. *It's still listed as current in my '8500 manual - KN.* We have heard reports that add-on units of this type tend to be somewhat insensitive but can anyone comment on their suitability and performance?

Black Mountain Tests

During Channel 5 tests early last year, **Nick Brown** (Rugby) noticed that the test picture from the Black Mountain site on Channel E37 included the transmitter name and channel at the top. It seems that this transmitter is the only one to have included identification during the test period. For u.h.f. DXing, Nick uses two horizontally-stacked wideband grids feeding a medium-gain Labgear CM7271 mast-head amplifier.

Whilst on the subject of UK transmitters, **George Garden** (Edinburgh) points out that an incorrect National Grid Reference in the BBC/ITC pocket guide implies that the Chatton transmitter is located somewhere out in the North Sea!

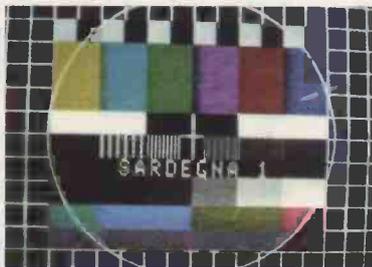


Fig. 4: The FuBK test card radiated by one of the private TV stations in Sardinia.

FM Reports

Band II reception has proved disappointing, according to **Mike Gaskin** (Cornwall) with Sporadic-E and Meteor-Shower activity being unusually quiet. Using a scanner set to narrow-bandwidth f.m., **Tim Bucknall** (Congleton) has discovered f.m. stations in Èire and Wrotham in Kent, can be received on demand. During the January tropospherics, Simon Hockenhill (Bristol) found many UK stations present including Croydon on 105.4, 105.8 and 106.2MHz and Thames Valley FM on 95.2MHz.

Slow Scan TV

George Newport (Canterbury) has sent a selection of colour pictures, received mostly on 14230kHz using a Datong active antenna and Icom 9000 receiver in conjunction with an HP 850 printer.

David Hunt (Brighton) is also a keen SSTV enthusiast and has a number of colour pictures received on 20 and 80 metres. We hope to feature some of these shortly.

Aerial Techniques

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Decode

You may not have taken time out to think about it, but accurate timing is an essential part of any form of data mode monitoring! Not only do you need accurate time to catch the start of that illusive FAX schedule, but you need very accurate timing to get reliable reception of most data modes. In these days where almost everyone has a digital watch or clock to hand you wouldn't expect absolute time to be a problem. But what about your computer, is the system clock right or has it been corrupted by an errant piece of software? The answer to this particular dilemma is to be found in a very neat piece of software called *TrueTime*. Which is available free of charge, from the National Physical Laboratory.

By far the easiest way to get it is from their Web site, which can be found at <http://www.npl.co.uk/npl/cetm/taf/truetime.html>. The program is very simple, efficient and is DOS based so it will run on just about any PC. It's also very conservative on disk space, taking just 160Kb.

In order to run it you will need a modem. No worries, as *TrueTime* only requires the most basic set-up. The data link runs at just 1200 baud. You should find you can pick-up a V22 1200 baud modem for less than £20 at a rally or even in one of the 'freebie' ad papers.

Don't worry if you have a faster modem, it should automatically run at the lower speed. Once you have the *TrueTime* software installed, you will need to make some changes to the 'truetime.ini' file to make sure it can find your modem. To do this you just need to open the 'truetime.ini' file with a simple text editor. You can use *EDIT* from DOS or *Notepad* from within Windows to do this. Once you've got the file open you need to scroll down to find the line with the COM port in it. Fortunately, the folks at NPL have made this bit easy as you'll find some guidance notes associated with each line of the '.ini' file. In addition to making sure the COM port line points to the port where your modem is connected, you may have to alter some of the other commands. However, unless you know what

you're doing, I should just give the program a try - it will probably work fine.

Don't forget to save the changes you've made! If you do need to get a bit more technical with the ini file setting you just need to make sure you've got your modem's manual handy before you start. The other vital step is to make a back-up copy of the '.ini' file before you make any changes! This could well get you out of trouble if you get in a bit of a mess with the changes.

Once you have the program set-up and working properly it really is a dream to use. All you have to do is run the program and, following display of the NPL logo, it will dial-up the *Truetime* number (0891) 516 333 (premium rate) and automatically update your computer's time and date information. The whole operation usually takes less than a minute so the call charges will be very low indeed.

As you can see, the whole process is wonderfully quick and easy to use. If you want to really get into this time business you will find that the *Truetime* number provides a mass of detailed time information. The easiest way to find out more is to take a look around the NPL *TrueTime* Web site I mentioned earlier. Rather than

rely on NPL's 'phone service you can actually get a lot of time and frequency information from the airwaves. The most obvious source is the many standard frequency stations that are to be found throughout the spectrum. Probably the most famous NPL source is the MSF transmission on 60kHz. As well as providing a very accurate 60kHz source, the station includes coded time information. I won't cover this in detail here, but there have been a number of articles describing the system. These standard frequency signals are extremely useful for checking the accuracy of your receiver's tuning system, but there is much more you can do. If you enjoy FAX reception you will find the MSF signal provides an excellent reference for setting-up your FAX program's synchronisation.

Spot On

The key element is to get the calculated drum speed absolutely spot-on. If you have any errors here you will find the resultant picture will be displayed or printed with a distinct skew. Whilst this may not be too serious with some of the shorter charts, unattended reception of longer charts could well be a total disaster.

To set your drum speed using MSF you first set your FAX program to IOC 288 and a drum speed of 60 or preferably 120r.p.m. With all this set start attempting to receive a FAX and tune your receiver close to 60kHz. You now need to fine tune your receiver so that you start to see a clear vertical pattern starting to build-up. If your drum speed is correct you should find that the pattern remains exactly parallel to the edge of the chart. To really check that all is set OK you need to leave this running for around five to ten minutes.

If, like most listeners, you find that the image is skewing to one side or the other you need to look out the handbook for your decoder to see how to alter the clock correction. You will normally find that the manual gives you a few clues as to what changes you need to make to cure the skew. This is by far the best way to set-up the drum speed, not just because of the inherent accuracy of MSF, but also because it's always there!

If your receiver doesn't cover down to 60kHz all is not lost, as there are other standard frequency signals you can use. Popular frequencies to try are 2.5, 5, 10, 15 and 20MHz. The only problem with these other stations is the much higher levels of noise on the h.f. bands which makes receiving a clean pattern very much more difficult. The secret here is to pick your time. Rather than choose the time of best propagation for the frequency in question you are better off listening when the band is down from its peak. I say this because virtually all the standard frequency stations use very powerful transmitters so they will generally remain audible until the band closes.

Bracknell Gone

The famous Bracknell RTTY data transmissions on 4.489MHz finally ceased on January 31. **Bill Clarke** of Aspatria was the first to contact me with news of its demise. Unlike last year's Offenbach FAX closure, there doesn't appear to have been much warning of the closure - at least not to the general public.

As with all these things there always seems to be another station around that can provide the required data. In this case it's the ever reliable Hamburg Met. on 3.855, 7.880 or 13.8825MHz. If you've not monitored these weather data stations before let's just briefly run through the data they provide.

One of the fundamentals of good weather forecasting is accurate, up-to-date measurements. Put simply, if you know precisely what's going on in the world at the moment you stand a fair chance of being able to predict what's going to happen next!

At the root of knowing the 'now' is detailed weather reports from monitoring stations around the world. In order to get as much data as possible, the weather authorities use all manner of sources. In



NCDC is the world's largest active archive of weather data. NCDC produces numerous climate publications and responds to data requests from all over the world. NCDC operates the World Data Center-A, Meteorology, which is collocated at NCDC. NCDC's web site has received a number of awards.

NOAA's NOAA Server offers access to distributed NOAA data and information from NOAA Data Centers and

addition to dedicated weather monitoring stations, reports are received from ships, aircraft, airports and registered amateur weather monitors. As you can imagine, collating and communicating all this data is a mammoth communications exercise.

The World Meteorological Organisation (WMO) uses a wide range of channels to do this, but the one that interests us is their RTTY broadcasts. These use a special coding system to keep the data as compact as possible to speed the communication process. If you tune into one of these stations you will find that they generally use either 50 or 75 baud RTTY with the data presented as strings of five-digit groups. Whilst these groups can be decoded manually, there are a number of decoding programs around that can convert the five-digit groups into plain English text.

One of the most popular of these programs being *Hamcomm*. If you want to get really fancy there are other packages that will also plot the results on a map with weather symbols so providing a very easy to use view of the data. With the rapid development of the Internet as a major source of data you will not be surprised to find that the coded weather data is now being captured and presented for public use on the Internet.

In another 'Decode' I'll give you a more detailed run-down on just how the code works.

News Update

John Sharman of Reading has written to me asking for help with Morse and RTTY press frequencies. As far as Morse code is concerned there is very little press information sent via this medium. The only one I'm aware of that can be found occasionally is the transmission of newspaper articles by ship-to-shore radio operators. Finding these is a bit of a hit and miss operation but please drop me a note if you're aware of any regular skeds. Receiving Press RTTY reports is very much easier as many of the Middle Eastern countries still use this medium. If you want to use a book to find them the market seems to have dried-up.

The older *Klingenfuss Guide to Utility Stations* used to contain an excellent press station summary that was set-out according to the time of day. All you had to do was pick the time of day and you could see all the stations that were scheduled to be active. This really was an excellent guide.

Unfortunately, this has been omitted from the 1998 edition, probably because of the closure of so many stations. If you have an older edition you can still use it but you will find that many of the stations have closed. The best way to use the 1998 guide to find press stations is to look at the Station List.

This section shows each country followed by the main utility operators for that country. Included in this list are air, maritime, press, telecomms and diplomatic. Against each utility you will find the QSL address (if available) and a simple listing of all the active frequencies.

The abbreviation used for press is PRS so all you have to do is scan through this section looking for PRS to find the press stations. The number still active is in decline but one that's always seems to remain topical is the Iraqi News Agency in Baghdad for obvious reasons. The frequencies to monitor are 7.565, 10.1625 and 14.699MHz. This signal is usually pretty strong in the UK so you shouldn't have too much trouble finding and decoding it. Another old favourite is JANA (Jamahiriyah News Agency) located in Tripoli and operating on 12.186, 14.573 and 15.462MHz.

NAVTEX DX

If you don't enjoy tuning around to find your DX then NAVTEX could be just right for you. This is because all the NAVTEX stations transmit on the same frequency! Sounds rather like chaos I know, but there is clear reason for wanting all the stations on the same frequency. The NAVTEX service is designed to provide important navigational and safety information to ships at sea and one of the most important aspects is that the service has to be fully automated and deliver local information. The solution to this dilemma has been to use a network of relatively low powered transmitters operating at the lower end of the medium frequency

band.

This provides a limited operating range of around 400 nautical miles. To cope with all the stations operating on the same frequency, they are each allocated specific time slots throughout the day in which to send their information. The current frequency for the system is 518kHz, but a second frequency has been reserved (490kHz) and will be available in early 1999. This latter change links in with full implementation of the Global Maritime Distress and Safety Systems (GMDSS).

The importance of NAVTEX can be gauged by the fact that it has been a requirement for all passenger ships to be equipped with NAVTEX since August 1993. To give you an idea of how the scheduling works here's the time slots and callsigns for some of the stations that can easily be heard in the UK. Niton Radio; 0018, 0418, 0818, 1218, 1618, 2018. Portpatrick Radio; 0130, 0530, 0930, 1330, 1730, 2130 Cullercoats Radio; 0048, 0448, 0848, 1248, 1648, 2048. Although the technical specification for NAVTEX demands a humble 50W e.r.p., the actual range that can be achieved is a lot more than the normal 400 nautical mile reception area.

Walter Blanchard has been monitoring NAVTEX for some time and has found that he can hear stations up to 1600km away with close to 100% reliability. When it comes to finding more serious DX, it's timing that plays the key role. The first thing you need is some luck with timings.

If a local station is on the air at the same time as the distant one you're trying to catch, you'll fail. You also need a well honed reception station. Fairly obviously you're receiver must tune down to 518kHz and include a s.b. reception. On the decoding front you can use any decoder that can handle FEC or SITOP-B.

The standard transmission format is the conventional 170Hz shift with a speed of 100 baud. One tip from Walter is to read your decoder's manual and make sure you're properly set-up for this mode. *Hamcomm* is an excellent choice, but fares much better on weak FEC signals when the speed calibration is carried-out.

Another important extra is to make sure the receiver's bandwidth is kept fairly narrow to help cut-out any interfering signals. Walter reports excellent results with his Icom R71 using an i.f. bandwidth of 250Hz. If you don't have adjustable i.f. bandwidths you can go a long way to improve your chances of DX by using an external audio filter.

This can either be one of the classic Datong units or even one of the newer DSP based devices. If you do use a DSP filter make sure the automatic notch filter is disabled or it will swallow-up your signal!

So what can you expect to be able to receive? Using Walter's experience as an example. He reports that the early parts of the evening will see the likes of Reyjavik and Split appearing, promptly followed by many Eastern Mediterranean stations. As the night progresses you can expect to see US and Canadian stations appearing. If you're really lucky you could do as well as Walter and catch Miami!

The antenna system for this type of DX is clearly very important and Walter uses a top band dipole. However, there are a host of loop antenna designs around and I'd be interested to hear of any ingenious NAVTEX antenna systems.

Now if you really want to make NAVTEX DXing easy, you can use *Hamcomm* with the Log to File feature enabled. This will put all the received messages into a simple text file that you can look at when you wake-up in the morning! If you do decide to use this technique, remember to set *Hamcomm* so that it prints the time as the first line of each message. In this way you will be able to review the file and identify any DX. If you can beat Miami please write and let me know!

NAVTEX - Microsoft Internet Explorer

File Edit View Go Favorites Help

U.S. COAST GUARD



NAVTEX Maritime Safety Broadcasts

NAVTEX in the United States

The International Maritime Organization has designated NAVTEX as the primary means for transmitting coastal urgent maritime safety information to ships worldwide. In the United States, NAVTEX is broadcast from Coast Guard facilities in Boston, Portsmouth VA, Miami FL, New Orleans LA, San Juan PR, Carlsbad CA, San Francisco CA, Astoria OR, Kodiak AK, Honolulu HI, and Guam. The Coast Guard began operating NAVTEX from Boston in 1983, and completed its last installation in Adak Alaska, on the Aleutian Islands, just in time to meet IMO's August 1993 requirement that ships carry NAVTEX receivers.

NAVTEX coverage is reasonably continuous in the east, west and Gulf coasts of the United States, as well the area around

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- PC running Windows95 (Pentium™ recommended) ●
- The SkySpy software program ●

Connect the demodulator to Com1 or Com2 of your PC and the other end to the airband receiver. Software installation to your hard disk is easy and requires just a few minutes. Program features include:-

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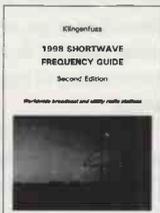


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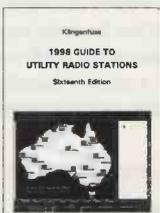
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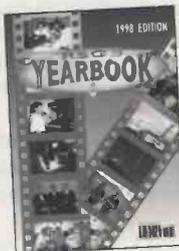
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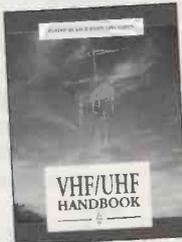
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Mil Air

Wattisham

Two letters have arrived concerning helicopter operations at the former RAF base at Wattisham. This airfield is now home to the Army in the form of 3 and 4 Regiments who operate the Gazelle AH.1 and Lynx AH.7 / AH.9 helicopters. Mr F. from Lowestoft has queried whether the base air traffic still uses 124.925 and asks if this frequency can be identified. According to my records this is the old v.h.f. approach frequency that was replaced by 125.8 at the end of 1996 and presumably has not been used since then?

The other letter from JF, concerns the operations of Wattisham based helicopters at the old USAF base at Woodbridge. He has identified a couple of frequencies he has noted during visits in the past year, and asks if there are any other frequencies that I am aware of. I must confess that I haven't visited Woodbridge since the departure of the USAF several years ago, consequently I have had a dig through the records to see what I could find.

The three frequencies 259.1, 340.125, 337.775 are all listed as frequencies for operations at Woodbridge, whilst 256.9 and 254.8 have been noted as 3/4 Regiment squadron frequencies.

Lightning F.6, XS936/DF of the Lightning Training Flight.



Firstly, let me thank everyone who has sent in letters, E-mails and news-cuttings regarding the subject of Air Defence Radar. The range of information has been most interesting including both current and historical items. It is obvious that this is a subject that intrigues many readers and consequently I intend to compile all the varied information into a more comprehensive article, for inclusion in a future issue.

18 Squadron

An E-mail has reached me from Tim H. who wants to discover any information on Squadron frequencies or callsigns used by 18 Squadron. This Royal Air Force unit returned to the UK during 1997, when they moved from Laarbruch in Germany to their new base at RAF Odiham. Despite contacting several sources I have not had a great deal of luck with information noted since their arrival at Odiham. To be honest, watching the odd Chinook HC.2 arrive and depart at this Hampshire base does not seem to top of everyone's hit list! One source has suggested that they have used the callsigns 'TOPIC' and 'POLAR' in recent months. The callsign, RAFAIR 7C followed by two digits was apparently used whilst in Germany, but has not yet been noted in use in the UK. The same story seems to apply to operations frequencies, I have checked with all the people I was confident would come up with some information but to no avail. The only positive suggestion I have had for a squadron frequency is 254.95, this was noted in use during an exercise in Germany in 1995. This may possibly be an exercise frequency rather than a squadron allocation - Any ideas or comments anyone?

Dutch Trip

Bob from Cheltenham is fairly new to airband listening having only got his new v.h.f./u.h.f. radio at Christmas. He has already identified traffic on several hundred frequencies in the UK and is now looking forward to a trip to the Netherlands. When he has finished his A-Level exams in June he is off to stay with a Dutch pen-pal for two weeks and he writes to ask a couple of questions. First and perhaps most importantly, he asks if it is OK to use his scanner in Holland. Secondly, his pal lives just a couple of miles from the Dutch Air Force Base at Twenthe, so he asks if I know any frequencies for this base, and also any other helpful information I can pass on.

I have to assume that Dutch law is similar to ours, and therefore I presume that the use of a scanner to monitor airband frequencies is most likely illegal. Consequently, it would be foolhardy of me to suggest otherwise. What I can do is tell you of my own personal experiences and leave you to draw your own conclusions. I have been to Holland on several occasions and have

used my radio on each trip without any problems. The Dutch are a nation of very keen aircraft enthusiasts and I have seen many radios in use at both Civil and Military airfields without any apparent concern from the authorities. In fact whilst visiting one base in 1994, some air crew actually stopped by the base fence for a chat and happily passed on some of the base frequencies.

Twenthe, is home to approximately 35 F-16A/Bs, which are operated by 313 and 315 Squadrons of the Dutch Air Force. Listed below are some of the latest frequencies I have for Twenthe which should hopefully get your radio humming with action, (channel/stud numbers are listed in brackets).

| | |
|------------|---|
| Tower | 399.875 (01), 119.95 |
| Approach | 283.25 (08), 259.55 / 119.7 |
| Radar | 281.125 (11), 334.0, 344.475 (09), 345.025 (10), 122.45 |
| Ground | 336.2 (13) |
| Operations | 232.775 (16) 315 Sqn Ops, 265.125 (17) 313 Sqn Ops |

Have a good trip Bob and don't forget to let us know how you get on.

SSR

By coincidence, two letters arrived within a couple of weeks of each other asking about the workings of Secondary Surveillance Radar (SSR), and Squawk codes. My thanks go to Jim H. and Adrian for their correspondence and to answer their questions the following is a quick overview of the workings of this radar system.

Basically, SSR works by the interaction of two main components, a radar transmitter on the ground and a transponder in the aircraft. The radar sends out a signal that interrogates the aircraft transponder, this then sends back a pre-set, four-figure code known as the squawk code. This code will then be painted on the radar identifying the individual trace. The number range of these codes is ascertained using the binary system and consequently only the numbers 0 to 7 are used. Of the four figure codes, the first two digits denote the air traffic unit to whom the code is allocated, the last two digits are issued sequentially to each individual aircraft. Some of the codes are computer generated, such as civil or military air traffic working the airways system. For example, London Control uses the range 5001 to 5077 for domestic traffic. Others can be issued manually by controllers at individual stations, (such as for VFR traffic wishing to transit an airfield control zone). Some SSR codes are fixed and do not have variable digits, an example of this would be the aircraft radio failure code which is 7600.

With the modern computerised radar systems using digital signal processing these codes can be processed by a system called Code Callsign Conversion. The digital radar can access the codes in the UK ATC computer and can then consequently display additional information such as callsign, height read-out and airfield of origin. From a military airband listener's point of view, the allocation of a new squawk to an aircraft is a good guideline that a frequency change is about to take place. Consequently, if you are following an aircraft across the UK and you hear a new Squawk code allocated get ready to punch in or select the new frequency.

As our February picture was a TU-95 Bear, I thought this month we would indulge in some nostalgia and include a picture of the aircraft whose regular job it often was to intercept the Russian Air Force. Photographed in 1982 is Lightning F.6, XS936/DF of the Lightning Training Flight. (Sigh - Those were the days!).

As always, if anyone can add to this information please drop me a line or E-mail me at milair@pwpub.demon.co.uk

Amateur Bands

Our start is to mention an event which has upset the Wrexham short wave listeners and radio amateurs considerably, namely the death aged 80 on January 6 of Sid Jones GW3HHF. For many years Sid and his wife Dot ran a radio and TV shop in Wrexham - the only place locally where one could get parts and helpful information at a fair price. Apart from being an RSGB member for some 50 years, Chairman and then President of Wrexham club, Sid managed to force the local education authorities into running an RAE course - an effort to which we owe the majority of the radio amateurs in the area. Sid gave unstintingly of his time to many charities, regardless of the cost to himself. The whole community, as well as Amateur Radio and short wave listening, will be the poorer with his passing.

A New Band!

A new harmonised European amateur I.f. band at 135.7 to 137.8kHz is now available as, from January 3, on the basis of non-interference with other services either within or outside UK. The grapevine says that some of the folk who have been preparing for the advent of the band by listening have had some very interesting results - I expect a flood of reports to this column!!

Letters

First stop this time is the Isle of Sheppey and Ted Trowell. Ted comments that conditions are improving, which is more than can be said for his throat! Ted usually monitors the c.w. end, and this time he mentions Top Band for at 0600 EA6ACC, at 0800, W2GD, at 2000 5B4ADA, JA7NI, JH1RES, C42A, OH2MAM, C31LJ, CT3FN, OY/SM4VMS, OY9JD, ZB2/DL7VEE at 2100 W2QD again, K8DX, and K1GUN. Ted skipped Eighty, but on 7MHz logged IS0/YO3RA, at 1600, 5B4/EU1AA at 1800, FP5EJ, VK2QM, VE1ZJ, VK8AV, and 9K2ZZ at 1900. A look on 10MHz in late afternoon turned up 5B4/EU1AA, and CU1/DL3KUD. Up again to 14MHz for EA8CN at 1100, and K6WG, VE7OM, OX3XR, ZS1AAX, VE7NH, FR5BT, ZS6QU, and EA8/DL10J all at around 1700. Mid-morning on 18MHz produced UA9CM, VK8CW, UA2FM/MM in the Med., while a session around 1600 produced P49I, K2LE, CT3/LA7RJ/P, K0DEQ, W6VUN, AG4Z, JY5HX and N6ND. For 21MHz the favoured time was 1500, and it gave FR8BT, LU1ZC, W4YE, LU9BR, PY3ACD, PY2NCM, K5FU, K4KQ, VE3AR, 5B4AGC, VE3NL, and W6TZD. Finally 24MHz: at 1100 A43XXV, EA8/OH2BYS, at 1300 3B8FG, and at 1500 CU1/DL3KUD and N3CEU. All, of course, c.w. signals. The times (UTC) are noted for readers guidance but, of course, it must be remembered that a c.w. signal can be accurately copied by any reasonable operator when a sidebander of the same strength would not even be heard.

Harry Richards in Barton-upon-Humber writes in occasionally, usually with interesting gleanings; this time from the *Daily Telegraph* in which one 'RU' points out that maritime stations in Australian waters would continue to use Morse until the formal finish date of 1 February 1999. However, he then goes on to quote an Aussie search-and-rescue officer who "expected yachts and pleasure craft which currently use amateur frequencies will continue to use Morse code well into the next century." Perhaps 'RU' might have worded that a little better - perish the thought that ownership of a boat could replace the RAE as a qualification! Seriously though, there are known to be a significant proportion of maritime mobiles having doubtful credentials for amateur operation. Harry's second clipping concerns a fifty-year old Etronic BC radio in daily use at Bollington near Macclesfield,

which, the article claims has racked up one hundred thousand hours without any repair or service. The article claims that there is no other known case of such long service - but I would take a bet that there are many OAPs still using their old receivers though maybe not so heavily as this one.

A somewhat belated copy of *Just Listening* has come in from the International Listeners Association by way of Trevor Morgan GW4OXB. Belated, partly by way of a hospital trip for surgery, and then by the printer not being available in December. We hope Trevor is OK again. Interestingly enough his editorial refers to a lack of response to the various contests the ILA lay on for listeners. This seems to be reflected when one looks at, for example, the results of the CQ or ARRL contests, where the UK representation is just plain pathetic when compared them against other countries on a *per capita* basis. Details of the ILA can be obtained from GW4OXB at 1 Jersey Street, Hafod, Swansea SA21 2HF.

Data Communications

We have a note from Ian Brothwell G4EAN, the Hon Secretary of BARTG. The BARTG 1998 HF RTTY contest runs from 0200UTC on March 21 to the same hour on March 23. Rules can be found at the BARTG web site www.bartg.demon.co.uk in the BARTG pages at GB7NOT and in the winter 1997 edition of the club magazine, *datacom*. BARTG mention that several other web sites are carrying rules which are several years out of date! Contest logs to John Barber, GW4SKA, PO Box 611, Cardiff CF2 4UN, Wales. The BARTG Annual Rally will be on Sunday September 13, details later. Finally, the AGM - The Lucas Arms, Grays Inn Road, Kings Cross on Saturday November 14.

Next in the pile comes a letter from Colin Dean in Barnsley; Colin listened to 3.5MHz s.s.b. signals and logged A61AJ, A61AN, A61AO, A61AQ, AP2N, FG/F6GNZ, HB0/DL1RWB, JA2, JA5, JA6, JY9QJ, KP2AD, KP3A, PJ2HB, P43DJ, TA3D, TG9NX, T15KD, UA0ACG, UN0AA, VK2, VK4, VK7, VP2EZ, W6, W7, XE1VV, YN1RVR, ZA1MH, 3V8BB, 4L50, 6Y5IC, 8Q7AA, 9K2GS. Tuning down to 7MHz Colin reports AP2RP, AP2WAP, A61AS, A92BE, C6AGR, DS5RNM, FM5DN, FP5BZ, FR5CC, HC5NVF, HL3ERJ, HS0/IK4MRH, JA2, JA8, J8/DF2SS, OD5PN, R1ANZ, SU3AM, TT8SA, TT8TT, TT8Z, TZ6TT, VK1MJ, YB2WQ, ZA1MH, ZL1BMW, 3V8BB, 5A1A, 8Q7AA, and 9K2SS.

How nice to hear again from John Collins in Birmingham after an unusually long silence. John still runs his Eddystone receiver and has a carefully-cut twenty metres of end-fed wire, at around 15 metres above ground. This enables John to find various interesting things, such as for example 1X5AA in Chechnya, calling for his cards to go via WA3HNK. First heard on Sunday on 7MHz he was on 3780 on Monday evening under a king sized pile-up. Reverting to 7MHz, John notes GU2FRO - an IOTA catch for Sark - and GJ4TXB operating the club stations GJ3DVC for a Lions Club event. Among the others, John picks out V47XK, EK1BF for Moldova, ET3AT, UA0KA, EW7LO, a UE1QSK who sounds as though he might be a bit 'iffy', T94DO in Bosnia, IT9RRU, IT9LSB, A61AJ, A71BY, AP2RP, 8P6FN, HL1DHZ, KP4SQ, 9A4DH, EA9BB, EA5/GW3INZ, OY4TN, LX1EP, YS1SH and finally OM2DX. Finally, John points out that VK4LV is on the key for a rather rare IOTA reference.

My anonymous correspondent wonders about log-keeping by computer. By and large, it has much going for it. If the computer is coupled to a modern receiver properly and the program is compatible, all the QSO details go in at the press of a button, so all you need to key in is the callsign. Also, given the right program, it is possible for contest organisers to take logs on disk and compare them, which makes an enormous difference in log-checking. Nowadays, one can expect over ninety per cent of contest logs to be offered on disk, which gets over the biggest problem of them all - the unreadable handwritten log!

Coming Events

Between May 6 and 17, look out for Agalega and St Brandon activity; the USKA group will be on Cargados Island in the St Brandon Archipelago. A bit nearer home we note Guernsey activity from G4YVW who will be active as GU4YVW/M between 9 and 14 April. If you want Jan Mayen start looking now - JX7DFA is there as I write and will be there until October. Send the cards to his home call of LA7DFA. On Svalbard, we hear that JW0M is now active on RTTY. Now to Cambodia where XU2FB is now active as XUF2B - no, that's not a typing error!

A92BE is now QRT and has moved after 23 years to A4-land. Thailand-hunters might look for the HS1RU signal as net control at 1305z daily on 7.060MHz. Finally, D2BB is now active for the rest of 1998, his cards go to W3HNK.

Input

That's it for another month. As always, I need input from readers. Lists, questions, comments, or whatever - they all help to make the column. Deadline, as always, is the first of the month.

SSB Utilities

Marine Band

Alex M writes from Dorset to say that he has just acquired his first real short wave receiver, a Target HF-3, and is busily listening to the marine bands. He writes to offer some suggestions to Dave Clarkson, who was asking about the DX-394 receiver, as Alex was considering one of those himself.

Alex suggests listening between 0730 - 0800 and 1730 - 1830UTC, as he has found these to be the best times for activity on 2.182MHz. He reports that he occasionally hears Malaga Radio and Valencia Radio from Spain from 1735UTC onwards, and also sometimes during the day depending upon conditions. In the February column, I listed the marine calling-channels, and Alex has sent in a list of channels and frequencies for Portishead Radio.

Portishead Radio - Marine Channels

| Channel | Shore TX | Ship TX |
|---------|----------|---------|
| 402 | 4.360 | 4.068 |
| 816 | 8.764 | 8.240 |
| 822 | 8.782 | 8.258 |
| 826 | 8.794 | 8.273 |
| 831 | 8.809 | 8.285 |
| 1201 | 13.077 | 12.230 |
| 1230 | 13.164 | 12.317 |
| 1232 | 13.170 | 12.323 |
| 1602 | 17.245 | 16.363 |
| 1611 | 17.272 | 16.390 |
| 1615 | 17.284 | 16.402 |
| 1618 | 17.293 | 16.411 |
| 1623 | 17.308 | 16.426 |
| 1632 | 17.335 | 16.453 |
| 1637 | 17.350 | 16.468 |
| 1640 | 17.359 | 16.477 |

All frequencies in MHz u.s.b.

A few months back I mentioned a request from Kevin W who wanted to know how to identify places from code-words, and how to find out the location of various airfields in the USA. This has prompted several letters, E-mails and postcards, all with varying degrees of information. Before I talk about the various answers received, it is worth pointing out that all the USAF bases in the USA are named after famous or historical aviation-related people, so (for example) Andrews AFB is not found near the town of Andrews. The only exception to this rule is the air base at Area 51, but as that place does not exist (because the US Government tells us so!), we do not need to consider it! Anyway, on with the letters.

Our very own Godfrey Manning wrote to suggest the Mr. W uses the official US Government publications to find the location of air bases. This relies on you having a copy of the *US Department of Defense Flight Information Publication (Enroute)*. This is the book that I told you about earlier last year, and is the US equivalent of the RAF's *En-Route Supplement*. It lists all the airfields in the USA, both civil and military, and as part of each entry it lists the exact latitude and longitude. The primary benefit of this book over other publications is that it lists details for the airfields for all arms of the US Services, not just the Air Force. The entry for Andrews AFB shows its lat/long as 38°48.7N 76°52.0W, so you should be able to find this in your world atlas - you do have a world atlas, don't you? For those of you who are able to plot a lat/long on a map, this will be quite easy, but for those of you who have difficulty with this, I would recommend one of the other solutions listed below. Godfrey and I have spoken on this matter, and he will be mentioning this in his 'Airband' column.

David Jones sent an E-mail message with one possible answer. David has a copy of a rather old book about USAF bases, titled *US Air Force Air Power Directory*, which he acquired in 1994. It gives an excellent picture of the USAF at that time under the following sections:

- Organization and deployment
- Warfighting roles
- Aircraft
- Ordnance
- AIR BASES
- UNITS
- Order of battle

The book covers the USAF, Air National Guard and Air Force Reserve and it gives a historical description of each base and the units linked to it. The book was published in the UK by Aerospace Publishing Ltd for *World Air Power Journal*; does anyone know if a more up-to-date edition available? The ISBN numbers are (hardback) 1 874023 25 5, and (softback) 1 874023 57 3.

From David's book, Scott AFB is in the US State of Illinois, and is listed as the HQ of AF Communications Command; David guesses that this is the home of HILDA, and asks is it also home for HILDA EAST?

Well, from my own research, and from about 10 years of listening, I can confirm that all the Hilda callsigns are connected with Scott AFB where Hilda is a code-word used to identify a Command Post for USAF transport flights operated by Air Mobility Command (AMC). As I have mentioned before, there are in fact three parts to Hilda, and they are responsible for different areas of the globe.

John White suggests a similar book, titled *The Illustrated Directory of the US Air Force* by Michael Roberts (published by Guild Publishing). This is a huge book - John calls it a large coffee-table book! - which contains details of every USAF base with details of their activities, staff numbers, size in acres, aircraft based there, and other information including their phone numbers! The location information is a bit vague, and in most cases just names

the State where each base can be found, but that does at least allow to find an approximate location instead of just having its name. This, again, is an old book (published in 1989), so the unit information can be taken with a very large pinch of salt. After the Gulf War in 1991, there were a lot of changes, with several bases closing, and many units changing equipment and/or location.

Vincent Richardson writes to say that he has a CD-ROM containing maps, name and locations, history, and unit information for all USAF bases world-wide. The CD-ROM is published by Softkey, and is titled *Air Commander - The modern US Air Force*. Vincent says that he got his copy from ASDA, but I have no other information on the availability of this item.

One other computer-related answer to search the World-Wide Web for the name of the airfield concerned. Using virtually any of the search-agents, you will get a long list of matches to your chosen airfield; then you have to work through them until you find the information you want. As an example, I found more than 4400 matches for Edwards AFB, and over 2500 for Andrews AFB. For USAF information, the best place to start is their very own web-site, which is <http://www.af.mil> and follow the links to sites where you will find a very long list of links to other web-sites in the USA and around the world.

Coast Guard

David Jones, who provided some of the answers and information for the item above, also asked a question about the US Coast Guard (USCG). He would like to know about the callsign used by the radio operators at the USCG station at Chesapeake on the east coast of the USA, and also if I know of any sources of information about the US Coast Guard.

Well, the callsigns used by the operators is CAMSLANT Chesapeake, which stands for Communications Area Master Station Atlantic; there is a similar operation on the west coast at Point Reyes in California which goes by the callsign CAMSPAC. The station at Chesapeake covers the area from the Canadian border down to the Caribbean, but uses remote transmitter sites all along the east coast. Since David has access to the Internet, I would strongly recommend that he looks at <http://www.uscg.mil> which contains a lot of general information about the USCG. For specific information about CAMSLANT, including its marine frequencies, try <http://www.tcpet.uscg.mil/camslant> For those of you who want to know what kind of aircraft or helicopter you are listening to on 5.696 or 8.983MHz, try http://www.gem.net/~berri/files/misc/uscg_air.html where you will find a full listing with some information compiled by some very familiar names.

HF Conditions

Dave Murphy has written to comment about the improved h.f. propagation conditions recently, and to show just what can be achieved using his 20-year-old battered National Panasonic receiver.

On New Years Eve, Dave was listening to 5.643MHz, and he heard Qantas 2903 with a position report as it passed 55° South, with a hand-off from Brisbane ATC to McMurdo Centre on 5.726MHz or 8.998MHz. They even gave the flight a v.h.f. frequency (129.7) which they called "The T-Bird Frequency".

Well Dave, this flight was one of the pleasure flights over the South Pole which operate from Australia over the Christmas and New Year period. They used to be operated by Air New Zealand as well, but now only QANTAS flies the route. Dave asks is anyone knows who T-Bird Control might be?

Dave would also like to write to QANTAS for a QSL for this flight, and the address address that I have on file is: **Qantas International Centre, 203 Coward Street, Mascot, New South Wales 2000, Australia.**

Good Luck with your QSL request, and please let us know how it turns out.

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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, 12 Hazelhurst Road, Castlewich, Birmingham B36 0BH. Tel: 0121-681 4168 (Mon.-Fri.9am-5.30pm).

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 £2.85

each, photocopies are also £2.85 per article, plus £1.00 for subsequent parts of serial articles.

Binders, each taking one volume are available for £6.50 plus £1 P&P for one binder, £2 P&P for two or more, UK or overseas. Please state the year and volume number for which the binder is required. Prices include VAT where appropriate.

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TECHNICAL HELP

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

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VHF/UHF Frequency Guide with Callsigns

Following the UHF changes that took place throughout June we have a fully revised and updated Guide available. Expanded to nearly 300 pages, ring bound as before and available for £12.50 inc. postage.

For those with our April 1997 edition we have a supplement available with all the changes. This is FREE OF CHARGE - just send a large SAE.

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Want to improve performance on the AM broadcast bands both MW & SW? We now have available a small PCB that fits internally within the AR8000 and allows the narrower SSB filters to be selected when in AM mode. This can greatly assist with AM listening on crowded Short wave bands. Once the PCB is fitted the narrower filters can be selected by pressing the LOCAL button and deselected in the same way. For further details please give us a call. PCB included FREE with all AR8000 orders

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Accessory Kits

| | | |
|------|--|--------|
| ASU8 | Antenna Selector & 5dB step attenuator (includes hardware) | £27.90 |
| CSL4 | SSB & CW Audio Filter for internal fitment in a receiver | £10.50 |
| DCS2 | "S Meter" for signal indication on direct conversion receivers | £10.90 |
| RA30 | HF RX Rotary Attenuator 0/15/30dB for internal fitment | £3.90 |
| SPA4 | Scanner Preamp. 4 to 1300MHz wideband for discons etc. | £15.90 |

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| | | |
|------|--|--------|
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73 from Dave G4KQH, Technical Manager.

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Info in Orbit

The free availability of WXSAT images came a little nearer during February when NASA scientists, working with scientists from the China Meteorological Agency (CMA) started an experimental site archiving images from FENGYUN-2, the geostationary Chinese WXSAT. As a continuous sequence of images was produced, I had an early opportunity to see the results.

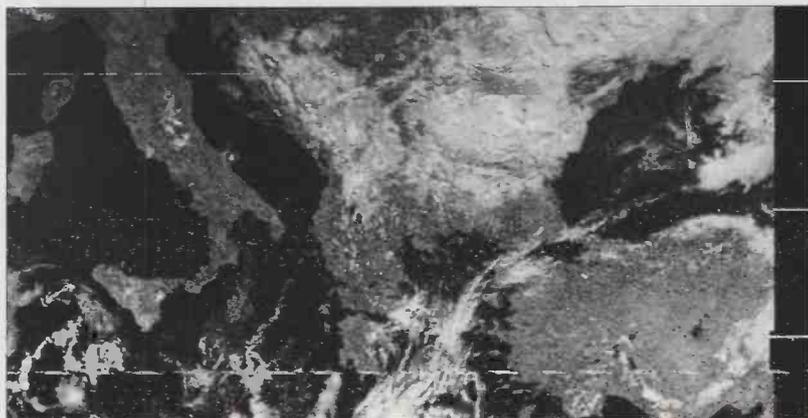


Fig 1: FY-2 1 February 1998 at 0301UTC.

Dr. James Dodge is Program Manager for the Global Data Integration and Validation Science Division, Office of Earth Science at NASA Headquarters, and he told me that they have begun experimental reception of FENGYUN-2 imagery. Routine operations are expected to commence in March, and James has agreed to notify me of the formats and locations of the final imagery.

Meanwhile, for those with Internet web access, some visible-light and two infra-red bands from FENGYUN-2 can be seen at the following site: <http://rsd.gsfc.nasa.gov/goesg/earth/Weather/>

Fig 2: NOAA-14 image 1247UTC 10 February.



FENGYUN-2's scan radiometer obtains a full view image once an hour. This is split into three channels of visible (0.55-1.05µm), infrared (10.5-12.5µm) and water vapour (6.2-7.6µm). The resolution of the visible channel is 1.25km (below the satellite) while the infrared and water vapour channels are about 5km.

With images from both American GOES WXSATS, the Russian GOMS, Japanese GMS and Chinese Fengyun WXSATS now all freely disseminating images, only the European METEOSAT remains out-of-step with its transmission of almost entirely encrypted high resolution (PDUS) imagery.

Current WXSATS

With daylight hours and the level of illumination increasing rapidly, NOAA-14 daytime images are improving. At the time of writing (mid-February) METEOR 3-5 is taking a four-week rest while its orbit precesses through the terminator. On those previous occasions when its transmitter has been left operating through such minimal power conditions, it has not been transmitting over Britain anyway. By mid-March we should be receiving a.p.t. once more as it passes southbound during the day. More comments on METEOR images later.

Up On The Roof!

For many months the signal coming from my roof-mounted crossed-dipole has been almost nil. Instead, I have been using my back-up antenna, mounted just a couple of metres above ground level. Early February brought perfect weather to persuade someone else to climb up high and do a swap! Frank Russell is a local professional 'ham' who erects antennas, and he went to the same school as I did, so who better to entrust such an important job. The old antenna was brought down to ground level and the internal connections were found to have broken completely. They will now be repaired, but meanwhile the replacement antenna has once more enabled me to see over to Turkey (via the polar orbiters).

I have a poor eastern horizon so I hope that most other WXSAT monitors in Britain can see much further east and south than my image shows.

Letters & Pictures

The most unusual images this month came from **Ben Ramsden**, who is currently living in Kuala Lumpur, where he has a portable WXSAT receiving system. Ben uses satellite prediction tables to determine the best time to go onto the local beach to receive a pass! He reminded me that being in an equatorial region, there are only two passes of any significance for each satellite. NOAA-12 imagery is of limited use because it comes over during the morning and evening twilight.

While on location Ben uses a RIG turnstile antenna with some 10m of feeder, planted in the sand on Batu Feringgi beach, Penang (latitude 5.5°N, 100.2°E) with the antenna therefore very close to the ground. This was fed into a Dartcom receiver powered by torch battery (2x6V). The audio output from the receiver is fed into a Sharp MD-MS702H Minidisk recorder (in mono mode). This is a very small 'near CD quality' digital recording system, which includes a rechargeable battery.

Back home Ben replays the minidisk audio into a Martelec JF2 Interface which is connected to a Toshiba Tecra 700CT laptop PC running JVFX7.0 software. **Figure 3** - a METEOR 3-5 image - is one result of experimentation with various volume levels to optimise grey scale range. Ben feels that the grey scale has been degraded by the Minidisk A/D process, and that the audio recording level does not look completely fixed.

Overall, Ben is pleased with the result. I hope that Ben can

manage at least one more for 'Info' before he leaves Malaysia.

Notice that Ben's METEOR image is properly synchronised. During January and early February there were many reports concerning the 2.4kHz sub-carrier in the METEOR a.p.t. signal - it was drifting. I also received a few poorly synchronised images, so I set the appropriate software option to 'un-synchronous' (which relates to this 2.4kHz carrier) and all later images synchronised correctly.

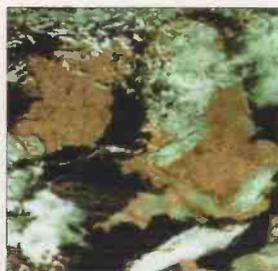
George Newport of Canterbury sent some pictures received from a south coast weather group via SSTV. The group use 3.785MHz i.s.b. wr-180, so I am stretching the normal boundaries of 'Info' to include them - mainly because they are in full colour and of high quality. One section is a colourised NOAA-14 image, and another is a colourised METEOSAT-6 D2 format image from 1 February.

C R J Healey, a fellow citizen of Plymouth sent some images from his METEOSAT system, but they were unusually noisy, so I contacted him to see whether the recent extremely heavy and persistent rain had got inside his cables or converter. This proved to be the case, and was cured by an overnight rest on a central heating radiator! Subsequent images were virtually noise free.

Peter Schoen of Germany is one of the h.r.p.t.-receiving group who had the opportunity to receive SeaWiFs (Sea-viewing Wide Field-of-View Sensor) images from the SEASTAR satellite. Near coastlines, chlorophyll, dissolved organic material and suspended sediments from rivers and lagoons affect the colour of the ocean. By observing the colour of different parts of the oceans, scientists can measure the amount of these materials in ocean water. Initial transmissions were unencrypted, allowing h.r.p.t. (high resolution picture telemetry data from NOAA WXSATS) users to collect the data on 1702.5MHz (which is within the band used for h.r.p.t. data).

'Info' Pictures

Most of the images used in this column are provided by readers, some on disk and some as print-outs, with an occasional one from my own collection. A reader has asked me whether I can provide copies on disk. Except for any copyrighted images I will be happy to do this, and ask only that a PC-formatted disk be sent with a return addressed stamped envelope and secure 20p coin. Please specify the image(s) required; if they are not available the coin will be returned.



Information from NASA

I am regularly asked for NASA addresses from people wanting information about satellites and space projects. The following (in Americanees!) should provide the majority of answers: **World Data Centre A for Rockets and Satellites, Code 633, Goddard Space Flight Centre, Greenbelt, Maryland 20771, USA.**

On a point of minor interest, my workplace back in the late 1960s and early 1970s was World Data Centre C, which was a wooden hut at the Radio and Space Research Station in Slough. Ahh! Those were definitely the days!

Science Line

Channel 4's *Equinox* programme 'Moscow - We have a problem' was broadcast in January, and featured the MIR cosmonauts including Michael Foale. For more information on this and other projects, you can contact **Science Line - (0345) 600 444**, a free information service. It is open every weekday afternoon between 1300 and 1900 on the above number, which is charged at local call rates. My thanks to **Peter Wade** for sending me a copy of the leaflet from which this information was obtained.

METOP Funding Agreed

The Member States of the European Space Agency took a significant step forward by declaring the METOP Programme started on 12 December 1997. METOP is a series of three meteorological operational polar orbiting satellites, the first of which, METOP-1 is the prototype - see above launch schedule.

On 28 January 1998, the EUMETSAT Council made very positive decisions with respect to the financial commitments towards METOP-1, and resulting from this, on 30 January, the ESA Earth Observation Programme Board gave its final go-ahead on the 1998 budget, thereby releasing the industrial

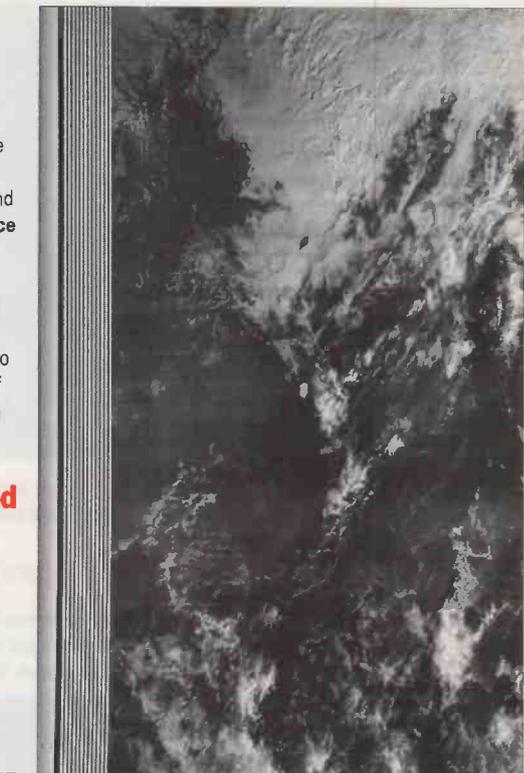
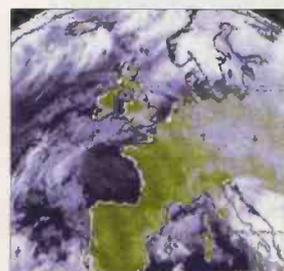
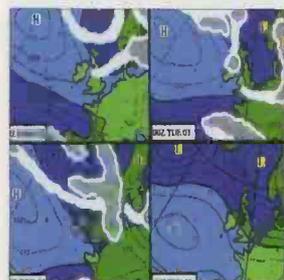


Fig 3: METEOR 3-5 30 January at 0132UTC from Ben Ramsden in Malaysia

work. ESA and EUMETSAT have now released an 'Authorisation To Proceed', to the European industry, allowing all planned activities to start on the METOP spacecraft.

The tasks currently include procurement of long lead equipment items, and the start of work by all contractors. These activities will run until the end of September 1998, by which time the EUMETSAT Council anticipates the release of the full EPS Programme. EPS is the EUMETSAT Polar System, which comprises the space segment, launches and operations during the 14 years related to the METOP satellites. It is planned to be implemented in co-operation with ESA, CNES (the French national space center) and NOAA (the US National Oceanic and Atmospheric Administration).



Instruments on METOP will produce high-resolution images, vertical temperature and humidity profiles, and temperatures of the land and ocean surface on a global basis. Also on board the satellites will be instruments for monitoring ozone and wind flow over the oceans. The instrument payload will be of significant

Fig 4: Image collection from George Newport.

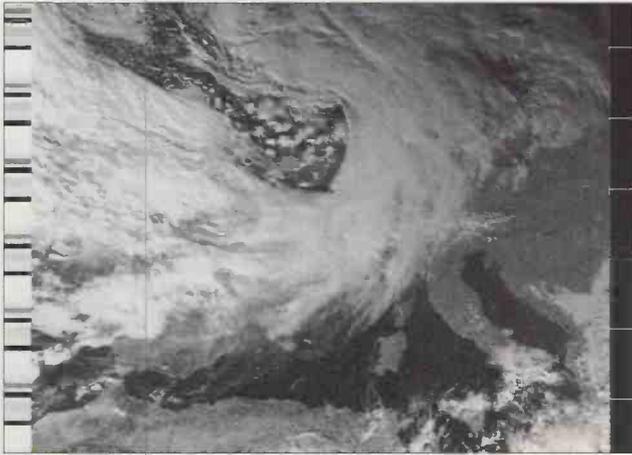


Fig 5: NOAA-14 19 January from C R J Healey.

industry. The first launch is planned for 2003 as part of an international joint system in co-operation with the USA.

The New 'picture' Formats

The above launch schedules show the long-term commitment made by the meteorological agencies to the continuing provision of weather satellite images. The 'a.p.t.' and 'WEFAX' formats (used



Fig 6: SeaWiFs image 1053UTC 7 January from Peter Schoen.

by the polar and geostationary satellites respectively) have been with us since the sixties, despite incredible advances in digital technology. Not surprisingly these two analogue formats are to be replaced with new digital formats. WEFAX (from geostationary WXSATS) will be replaced by l.r.i.t. (low rate image transmission), and a.p.t. will be replaced by l.r.p.t. (low rate picture telemetry).

All the NOAA satellites listed above will carry a.p.t. (analogue) equipment, so we are still looking at a.p.t. transmissions, probably until the year 2007. It was this fact which convinced me that a receiver upgrade was justified!

The transition from a.p.t. to l.r.p.t. will occur with the NPOESS (National Polar-orbiting Operational Environmental Satellite System). The first European polar orbiter, METOP-1, will be launched in early 2003, carrying the digital l.r.p.t. hardware - and this will provide the first opportunity to receive this type of data. The METOP series will fly in 'morning' orbits, and the NOAA series will fly in 'afternoon' orbits. During the period 2003 through 2010, both a.p.t. and l.r.p.t. will be available.

Shuttle Launch Schedule

STS-90 *Columbia* on 2 April at 1819UTC (under review). Mission duration 16 days, 21 hours, 48 minutes. The primary payload is 'NeuroLab' - a mission dedicated entirely to life sciences. It focuses on the human neurological system and how it responds to the

value to meteorologists and other scientists, particularly those studying the global climate. In addition to benefits to weather forecasting and climate studies from the EPS system, there will be a contribution to high quality employment opportunities in the European space

challenges of space flight. The neurological system is composed of the brain, spinal cord, peripheral nerves and sensory organs, and is the most complex system in the body. Although much physiological data has been collected over the years about how adaptation to microgravity occurs, researchers are just beginning to understand space physiology.

STS-91 *Discovery* on 29 May at 0105UTC for 9th MIR docking mission. Payload SPACEHAB-SM. Mission duration 9 days, 19 hours, 31 minutes.

A comprehensive listing of all Shuttle flights and payloads, together with associated information is available from me as the *Shuttle Pack*. Please include a secure £1 coin and stamped s.a.e. for the A4 booklet.

Launch Schedules

The currently operational polar orbiting WXSATS are scheduled to be replaced during the next few years. The following dates are those currently set for launch:

| | |
|--------------|---|
| USA | NOAA-K (NOAA-15) - 9 May 1998. This will enter a morning (0730 local time) orbit and will therefore replace NOAA-12. NOAA-L - late 1999, NOAA-M - mid 2001, NOAA-N - late 2003, NOAA-N' - mid 2007 |
| CIS (Russia) | METEOR 3M1 - later this year, METEOR 3M2 - 2000 The new Meteor series will be placed in sun-synchronous 'morning' orbits. |
| China | FENGYUN-1C - 1998 |
| European | METOP-1 - early 2003 METOP-2 - mid 2007 |

All the above are polar orbiting WXSATS.

Geostationary launch dates

GOES-M - early 2000

GOES-L - 2002 (GOES-L and -M will not be launched in sequence)

Kepler elements - MIR and Shuttle

- 1 For a printout of the latest WXSAT elements, MIR, and the Shuttle (if in orbit), send a stamped addressed envelope and secured 20p coin or separate, extra stamp. Transmission frequencies are given for operating satellites. This data originates from NASA. Kepler elements are sent by return-of-post.
- 2 I also send monthly Kepler printouts to many people. To join the list please send a 'subscription' of £1 (secured, plus four self-addressed, stamped envelopes) for four editions.
- 3 You can have the data as a computer disk file containing recent elements for the WXSATS, and a large file holding elements for thousands of satellites. A print-out is included, identifying NASA catalogue numbers (for the WXSATS, Amateur Radio satellites, and others of general interest), ideal for automatic updating of your tracking software. Please enclose 50p with your PC-formatted disk and stamped envelope.

METEOSAT-6 (geostationary) uses 1691 and 1694.5MHz for WEFAX
GOES-8 (western horizon) uses 1691MHz for WEFAX
MIR uses 143.625MHz for voice.

Frequencies

NOAA-14 transmits a.p.t. on 137.62MHz

NOAA-12 transmits a.p.t. on 137.50MHz

NOAAs transmit beacon data on 137.77 or 136.77MHz

METEOR 3-5 (normally) transmits on 137.85MHz when in sunlight.

OKEAN-4 and SICH-1 use 137.40MHz for brief, scheduled periods.

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OOPS!!

Wage War On Whistles Part 2 Feb. '98 SWM

Having laid low the gremlins that attacked Part 1 in the January '98 issue, we thought that would be the end of the matter.

Unfortunately, one of the gremlins must have been very hardy as some more errors appeared in Part 2, all to do with the Veroboard layout.

The headings above the board should read **FILTER 'A'**, **FILTER 'B'**, etc.

Input capacitor C3 of Filter 'A' is missing - it should be between K1 & K3.

Coupling capacitor C5 between Filter 'B' and the Buffer Amp. is also missing. It should be between P21 & P24.

Resistor R11 in Filter 'B' has no outline. It fits between P21 & P24.

There should not be a track break at M24. There should be a break at M25.

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PROsat II is used by most leading Weather Satellite enthusiasts. They have come to rely on the vastly superior features of **PROsat II**. Features such as 1,000 frame full screen full colour animate, 3D, direct temperature readout, latitude-longitude overlays and country outlines from NOAA, and Windows export make Timestep products preferred by most serious users. All satellites are catered for including the awkward Japanese GMS and the very infrequent Soviet Okean series. All current SVGA cards are supported. NOAA images contain full resolution visible and infrared data in a stunning 2.4Mb file!

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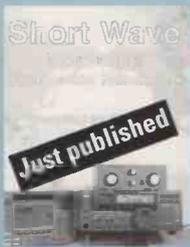
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Attention - 123!

Welcome to the first regular column dedicated to covering the more esoteric inhabitants of the h.f. bands. Although the so-called numbers stations will be our main theme, we'll also be featuring all kinds of unidentified oddities, such as the Buzzer, the Crackle and the Backward Music Station - to name a few.

What Are Numbers Stations?

Most numbers stations are run by the world's intelligence agencies, and are used to communicate to their agents in the field. As they are intended to be received on very basic equipment, they are impossible to miss when tuning over the h.f. bands. Far from being boring and meaningless, as many believe, they present an intellectual challenge not present in other areas of s.w.l'ing.

Of the numerous stations operating, none are alike in their habits, they all have their own idiosyncrasies and complexities to unravel. This is where the challenge lies, for we must glean as much as possible with what initially seems very little to go on.

We cannot treat them as we would broadcast, amateur or utility stations, for they are something totally alien and follow their own rules. We must adapt our mind accordingly and create order, where a casual monitor would only see chaos.

With great patience and systematic logging we can discover these rules, predict schedules and analyse traffic. But, unfortunately, never decode their messages.

Identification & Naming

Correct identification is vital, and ENIGMA has adopted a foolproof station reference system, where each station is allocated its own number, e.g. E18, G2A, S6C, V7, M54, X6. Voice stations are split into four language groups: E - English, G - German, S - all Slavic languages, V - all other languages (e.g. Spanish, Romanian, Mandarin), M - Morse, the bulk of all numbers activity, X - unidentifiable modes/sounds, including XP - polytone numbers (Russian intelligence).

Another category MX is used to refer to all classes of single letter transmissions (in Morse). Please write to us if you'd like the full station check list.

Each agency uses its own distinctive station formats, and these are crucial clues to identification. We can't rely on callsigns, as these are rarely used, and of those which are, only a few have ever been registered with the ITU: the rest are bogus.

Logging a station as, for example, "YL GG five-figure" or "c.w. five-figure pairs" is quite inadequate and of little value. Often exact frequency is of little importance, however, frequency band, date and time are always vital. Since we cannot make sense of the messages sent, we must 'squeeze' all we can from what remains, i.e. the so-called 'externals'. Externals not only include every element in a transmission, but also its scheduling pattern.

Glossary Of Basic Terms

Being a specialised area of monitoring, a specialised terminology is needed. Here are a few of the more commonly used terms:

Call - the repeated element/s at the beginning of most numbers transmissions. This may often identify the Schedule.

Preamble - the elements found between the call and the message which follows. This usually includes a Decode Key and Group Count but may include more, less, or not even be present.

Decode Key (DK) - a 2, 3 or 4 figure number used to decode the Message. If not present, it may be included in the Header or 1st Group(s).

Group Count (GC) - a figure which indicates the length of an associated Message by stating the number of Groups within it.

Groups - the grouped figures or letters which make up the Message. Usually grouped into fives, for convenience in transcription. They may or may not be random.

Message - the purpose of the transmission - always encrypted. It need not always be in 'text' form, but usually is.

Ending - the elements following the end of the message. Often this alone is sufficient to identify the station. No two agencies use identical endings - as if by mutual agreement. It certainly makes the monitoring agencies' work much easier.

Repeat Sequence - the method by which, and number of times, a particular message is repeated, if at all. For example it may be repeated within the same transmission, may appear 20 mins later on a different frequency, may be the same day/time/freq. next week...

Format - the particular arrangement of tuning signal, call preamble(s), message(s), message ending(s) and final ending within a transmission. The format is unique to any particular

station and defines it.

Schedule - a set of transmissions by a particular station which uses a distinct timing (and often frequency use) pattern and which are aimed at the same recipients. Schedules are often identified by the use of schedule ID numbers within the Call. Scheduling is often extremely complex and a station may operate changing schedules over a short period. If the habits of a station are not understood, scheduling may seem quite chaotic.

We hope these few terms may help you when reading future articles, as you will find them constantly being used!

What's Out There?

Finding number stations is often extremely easy, however, it can also be very difficult and frustrating. It all depends on what we're looking for. A few mavericks don't operate identifiable schedules and finding them is purely a matter of chance - they pop up once and months go by before they reappear.

Fortunately, the vast majority of stations are more well behaved than this, they follow predictable habits. Much of our work at ENIGMA is involved with tracking down lost or new schedules rather than stations themselves.

To confuse matters even more, different schedules of the same station may follow different habits. This all adds to the challenge they pose for us, it's like trying to solve a three-dimensional jigsaw at times! We need to work out the clues before we can solve the puzzle - often within a very short period, as schedules tend to be very restless!

The casual listener, unaware of the habits of these stations, is unlikely to hear very much nowadays. Our two busiest and easiest to find families became extinct last autumn: OLX (S16 & M6) from Prague, with its 23 hours-per-day schedules and the NNN (E12)/M2 family, with its colossal signal, will be sadly missed. However, for the organised listener, there are numerous stations to be found throughout the day.

To start you off, we've chosen just three: M16's Lincolnshire Poacher **E3** (named after its tuning signal), **M45** - a minor player in the vast and complex M1 family - which also includes its clone, S21, and the bizarre M50. Lastly, **S28** - formerly XB, the mysterious 'Buzzer'.

E3 - hourly on the hour 1000-2200UTC on three parallel frequencies taken from the following: 16.475, 16.084, 15.682, 14.487, 13.375, 12.603, 11.545, 10.426, 9.251, 8.464, 7.755, 7.337, 6.959, 6.900, 6.485, 5.746 and 5.422MHz. Transmissions consist of 200 sets of five-figure paired groups lasting 45 minute u.s.b. Uses a ten minute 'call' and a complex sliding schedule linked to encrypted five-figure headers.

M45 - only appears twice weekly. Tuesday and Thursday 1802UTC now returned to its '555' schedule: 4.957/4.555MHz. Schedule number always corresponds with last three figures of lowest parallel frequency! Like all family members, it is **hand-keyed**. Call: 555. three-figure, DK and GC in preamble, repeated at ending. Ends: 000. Uses c.w. (occasionally m.c.w.) and short zeros, i.e. one dash. See what you can work out from the last group!

S28 - After many years, we only discovered this to be a numbers station late last Christmas Eve, when a short message replaced the incessant buzzing. On 4.625MHz continuously, a.m. Keep listening, you may just hear another message, but the patience of Job is required!

Good listening! If you get any queries or would like further information please get in touch with us at **ENIGMA, 17-21 Chapel Street, Bradford, West Yorkshire BD1 5DT**.

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Pirate Television

I have in the past referred to the amateur radio/CB type of transmissions that can be heard around 6.6MHz. This is not an official amateur band but has been used by pirates for many years.

Keith from Norfolk very kindly sent me some samples of slow scan TV pictures, originally transmitted in colour, on the lower sideband of 6.650MHz. I wonder if anyone else has stumbled on anything interesting on these frequencies, or indeed any other form of pirate television?

Radio London

The book by **Chris Elliot**, mentioned last quarter, *The Wonderful Radio London Story* is available from **Offshore Echo's**, PO Box 1514, London W7 2LL. The price is £24.99 inclusive of postage.

There is also a triple CD of the same name, lasting almost four hours, to accompany the book. This is narrated by **Keith Skues** and includes the voices of **Philip Birch, Tony Blackburn, Dave Cash, John Peel** and many others. The three CDs and a 24-page booklet are £24.99 post paid.

Help FM

This is to be a legal RSL with initial intentions to broadcast to the London area. Programmes will be directed to categories of people that are "in need" and are not catered for on main-stream radio. These include the homeless, jobless, the disabled and those with a drink or drugs addiction.

This proposed station is seeking voluntary supporters to help in all aspects of putting the station on air. Help FM is to seek registration as a charity and if successful would broadcast to other cities too.

If you have technical, presentation, fund raising or counselling skills and time to spare contact: **Help FM, 88 High Street, Colliers Wood, London SW19 1BT.**

Off the Record

Last quarter's 'OTR' just missed the Christmas and New Year period when the s.w. pirates were as active as ever. Radio Free London provided an almost non-stop service on 5.805MHz. Radio Argus had planned to use 6.400MHz but all I could receive was North Korea.

The 48 metre band was full of life with lots of stations offering excellent reception. These included Pamela, Laser, Weekend Music, Boarder Hunter and Level 48. Radio Laser, International Music, and Level 48 were also heard with night time programmes on 75 metres.

More recently, Jolly Roger Radio have been broadcasting a tape of European Classic Rock on f.m. for listeners in Ireland, other stations to are relaying EKR too. European Classic Rock is an authorised satellite station, they have a night sustaining service called Night Tracks and are based at Maidstone in Kent. You can hear them on Astra (19.2°E) Channel 35, 10.994GHz audio subcarrier 7.38/7.56 on TCC/Challenge TV, they are well worth a listen.

The initials EKR originally stood for East Kent Radio, however they failed to secure the East Kent small scale radio licence. This area was won by a community based group called 'The Sound', which now broadcasts as Neptune Radio, but scarcely employs anyone of local origin.

Radio Mario

This is an unlikely name for a s.w. pirate, but emerged during the latter part of 1997. Radio Mario comes from Eastern Holland from a town called Goor and run by 37 year old **Ludwig Caarels**.

Radio Mario works in conjunction with Radio Roberto based not far away in Geesteren and is run by **Appie Joling**. Their QSL indicates them to be using 650W on 3.910MHz from a 27m high longwire antenna. They also claim to use in excess of 1kW on medium wave! The mailing address for Radio Roberto/Mario is **PO Box 185, 7470 AD, Goor, The Netherlands.**

Caroline News

Simon Dee one of Radio Caroline's original DJs (and briefly a TV personality) is back on radio. He now hosts a Saturday programme between 1 and 2pm on Isle of Wight Radio on 1242kHz.

The *Ross Revenge* could be back on air with another one month RSL on 14 June 98. You can write to the Caroline ship **c/o The Old House at Home**, (it's a pub) **1 High Street, Queenborough, Isle of Sheppey, Kent ME11 5AA.**

Horizon Magazine says that the s.w. service should be on air soon...how soon that is the question? You can now actually hear Caroline on their Internet web site, there are instructions to download this facility.

The place to visit is <http://www.radiocaroline.co.uk> The Radio Caroline E-mail address is **106352.55@compuserve.com** However, if you are not equipped to surf the Net you could try their premium rate news line **(0839) 669990**. Calls cost 39p per minute cheap rate, 49p at other times.

Free Broadcasting Society

Veteran radio presenter and former pirate broadcaster **Alan West** has recently become General Secretary of the newly founded International Free Broadcasting Society. It was primarily Alan that made the famous Mayday. Mayday broadcast from the Radio North Sea ship *Mebo 2* when they had a serious fire aboard in 1971.

The aims of the IFBS is to create an international free broadcasting station, apparently not aboard a ship, that would give a voice to the oppressed and under-privileged. They wish to promote freedom of speech and information and suggest they will become something of an anti-establishment organisation.

It appears they wish to emulate Costa Rica's Radio For Peace International and provide a similar service to Europe, Africa and Asia. Initially time will be hired from other small s.w. stations.

For further details send three IRCs or a large stamped addressed envelope to **IFBS, 1st Floor, 9 Kings Road, St Leonards, Sussex TN37 6EA.**

European Court

Radiofax boss **Trevor Brook** has passed another hurdle in his case against the British Government. The European Commission of Human Rights has appointed an officer to report on the facts of the case on behalf of the Commission.

Mr Brook has been seeking a licence for his short wave radio station for 12 years and been refused at each approach. He believes these refusals are unjustified interference with the right to communicate information and a breach of *Article 10* of the European Convention on Human Rights.

Trevor says "I am naturally very encouraged by the progress so far and believe the great amount of work it has taken to get to this point will prove to have been worthwhile".

This case could be amongst the last from the UK to be heard in Strasbourg, following announcements that the European Convention on Human Rights is to be incorporated into British law. Trevor Brook has been running Surrey Electronics since 1967, specialising in research and design of products for the broadcasting industry.

Radio Argus

This station has provided me with a review of their past years activities, much of which if published would probably lead to me peeling potatoes at my local penitentiary. Suffice to say that their relationship with Free Radio London has deteriorated somewhat and that future relays are unlikely.

Long wave is still being considered despite the dimensions of the antenna and there is a conflict of opinion over the audio bandwidth. I suppose as the favourable period of the solar cycle approaches their plans to beam programmes to the USA on around 15MHz are quite plausible. I only hope they don't make the mistake made by a local BBC station.

The morning DJ thought it would be smart to unite a 'phone-in listener with a Canadian relative and have a three-way telephone conversation on air. The call was answered after a long period of ringing "Hello, you are live on BBC Radio".

A hesitant conversation took place and the presenter clearly sensed something was badly wrong. "Well, what's the weather like where you are?" "Very dark" came the reply. "Oh well, what exactly is the time in Canada?" "It's quarter past five", "Ah so it's teatime then" "No, we were in bed, it's just after 5am in the morning!" (CLANG !!!).

Meanwhile back at Argus they are doing a frequency survey in the 5.8 and 15MHz areas. If you are in London you may hear tests on 5.835MHz and 270kHz as well as 1593kHz.

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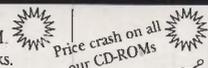
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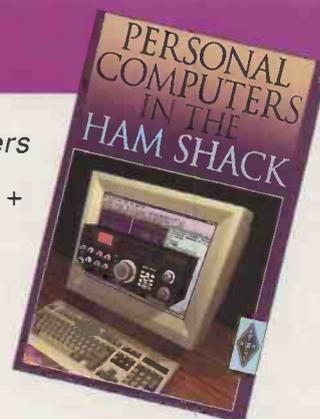
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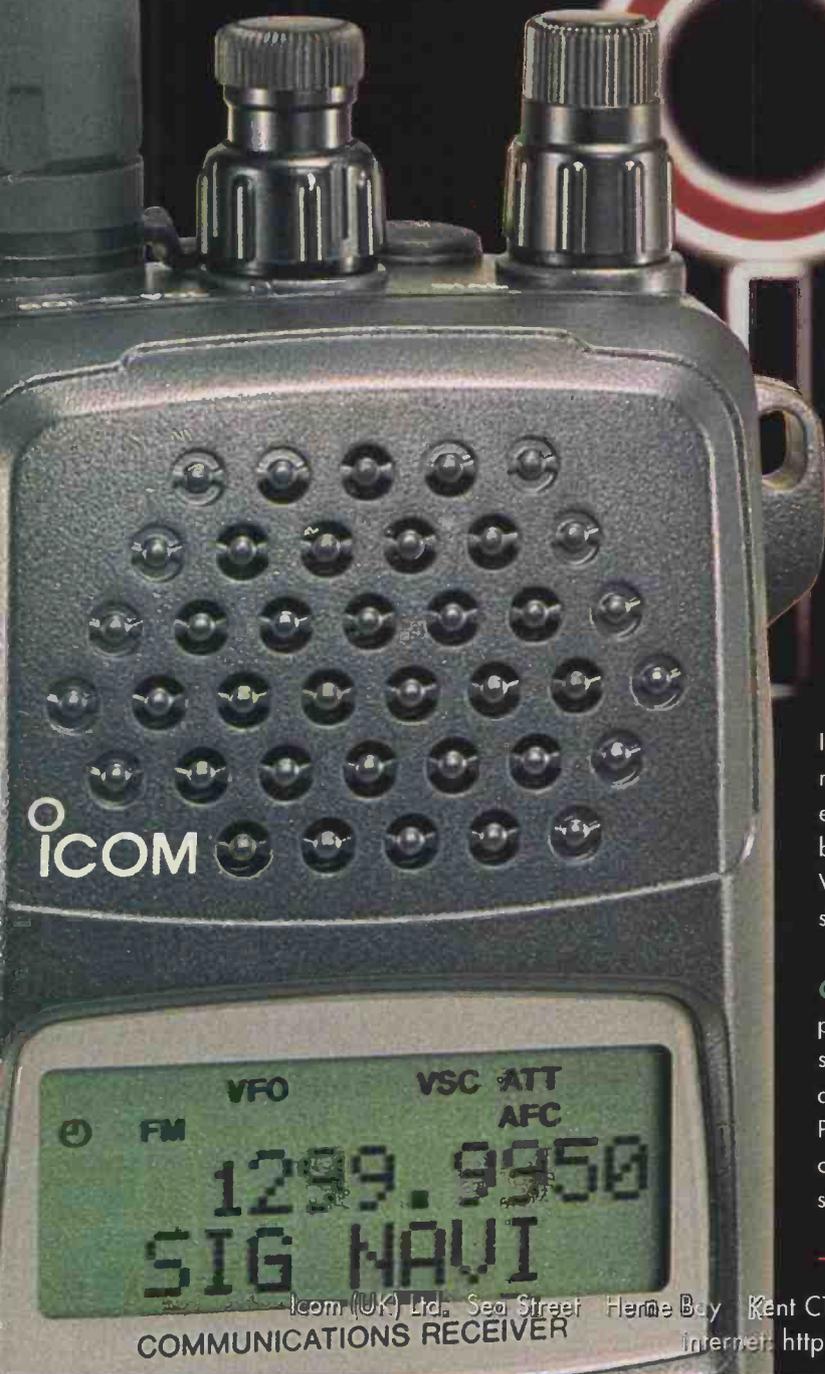
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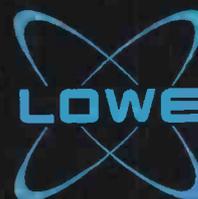
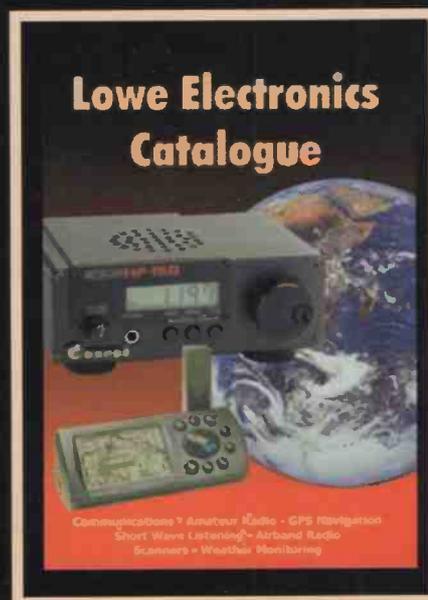
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