shortwave magazine

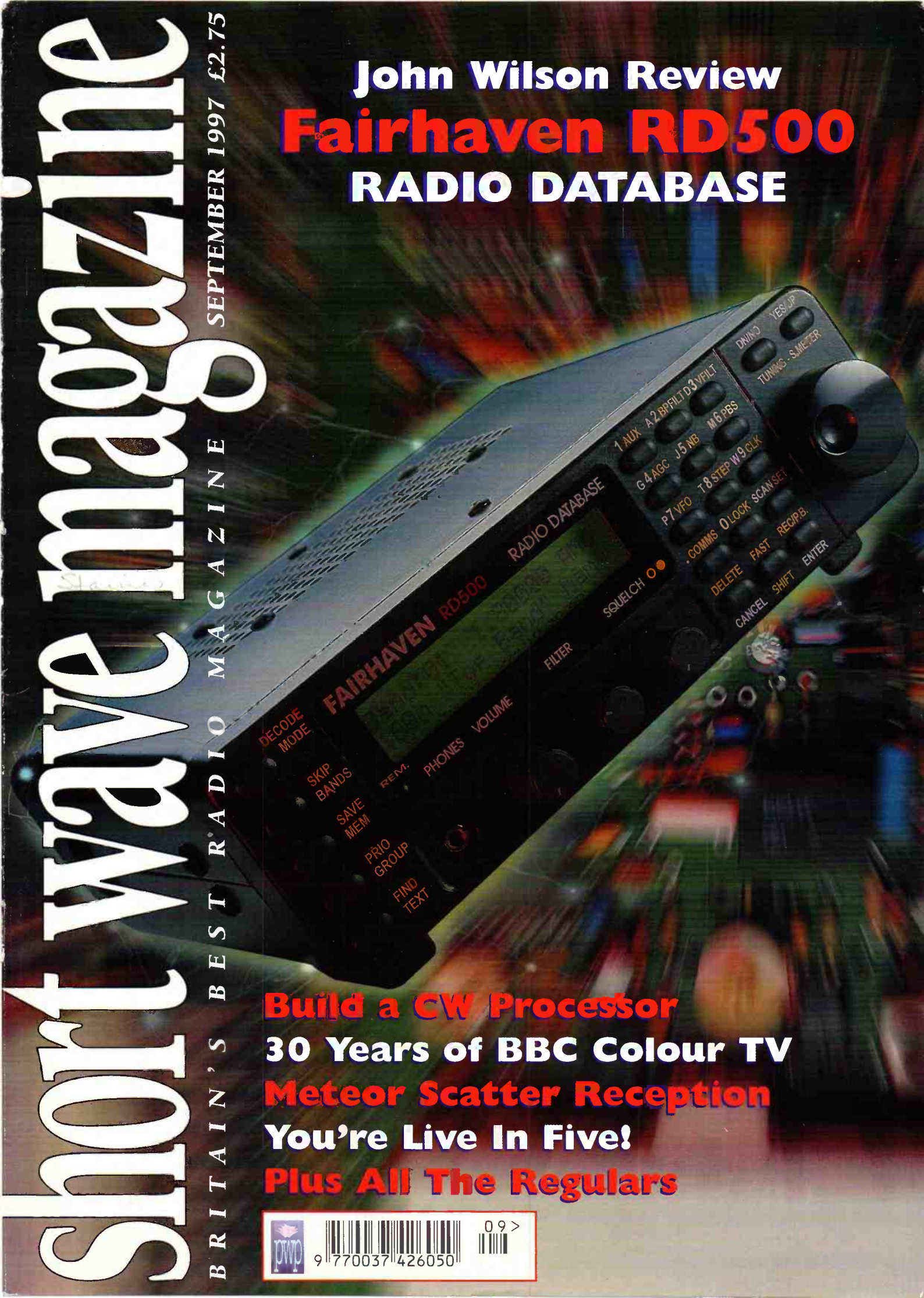
BRITAIN'S BEST RADIO MAGAZINE

SEPTEMBER 1997 £2.75

John Wilson Review

Fairhaven RD500

RADIO DATABASE



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BEARCAT UBC 3000XLT

New top of the range handheld from Uniden with **TURBO SCAN**

- 25-1300MHz (with gaps)
- TURBO SCAN
- 400 Memories
- AM/FM/WFM
- Supplied c/w NiCads & charger

£189.95

BEARCAT UBC 220XLT

Easy to use with a good receiver.

- 66-956MHz (with gaps)
- 200 Memories
- Supplied c/w NiCads & charger

£199.00

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BEARCAT UBC 120XLT

Airband handheld that is easy to use with **TURBO SCAN.**

- 66-512MHz (with gaps)
- 100 memories
- Supplied c/w NiCads & charger

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UBC 9000XLT

A new 500 channel base station model covering 25MHz to 1.3GHz in two continuous bands (25-550MHz and 760-1300MHz). Featuring Twin Turbo scan & search modes with 10 user definable priority channels - plus a host of other features!

Accessories included:
AC mains power adapter, telescopic antenna and owners manual.

Optional CTCSS board.....£49.95

new!

STANDARD AX700 mkII

SCANNING RECEIVER WITH PANORAMIC DISPLAY

A beautifully engineered radio perfect for home or mobile use. See up to 1MHz of Bandwidth at a glance on the large panoramic display plus full information on the channel being monitored.

- 50 - 904.995MHz
- 100 memories
- 12V or 240V operation with power supply supplied
- Sensitive receiver
- 2W audio output
- 10/12.5/20/25kHz scanning steps
- Price includes power supply

£449.95

£449.00

YAESU FRG-100

This receiver provides solid coverage from 50kHz to 30MHz with all mode reception of AM, SSB and CW. 50 fully tunable memory channels store frequency, mode and filter selections. The FRG-100 has twin 12 hour and 24 hour programmable clocks with on timer and sleep timer. The set requires 12V DC.

New low price £489 £449

FM option available - add £39

new!

£499.00

DRAKE SW2

A new low cost receiver from this famous American manufacturer with exceptional sensitivity, selectivity and dynamic range. A ruggedly built radio that is easily transported with optional carrying handle or vehicle mounted for mobile use.

- 100kHz - 30MHz
- AM/SSB
- 100 memories
- Easy tuning
- Selectable Sideband Synchronous detection
- Dual antenna inputs
- Long wire short wave antenna
- 12V DC operation

£795.00

JRC NRD 345G

A cracking new receiver aimed at the Broadcast and Shortwave listener. JRC build some of the World's finest receivers and this is no exception. Designed to give clarity and interference free reception.

- AM synchronous detector
- Low noise PLL chip
- Wide dynamic range
- Sensitive receiver
- Noise blanker
- RS232 computer I/F
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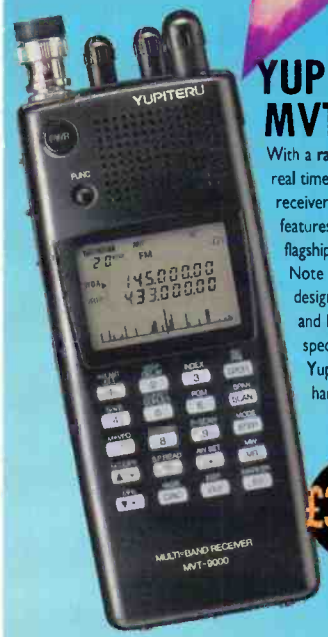
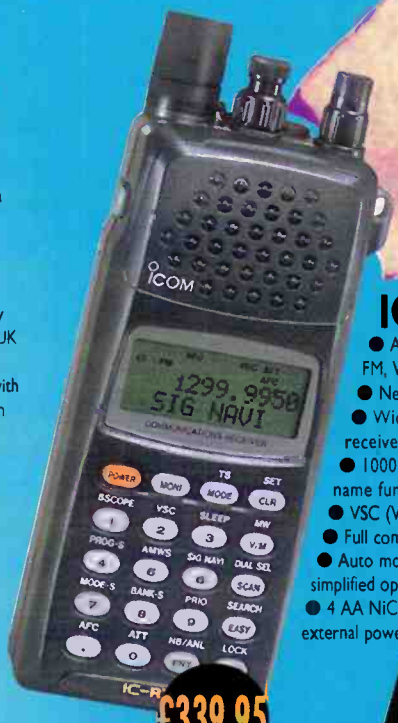


YUPITERU MVT 9000 EU

With a range exceeding 2000MHz, a real time bandscope, twin VFO receiver, and a host of other features, this will be Yupiteru's flagship model in 1997!
Note the EU version is especially designated by Yupiteru for the UK and Europe to meet full EMC specifications and is supplied with Yupiteru's own original English handbook.

£395.00



ICOM IC-R10

- All mode - FM, WFM, SSB, CW, AM Receiver
- Newly designed 'BUSY CATCH SCAN'
- Wide band coverage with all mode receive capability (0.5MHz - 1300MHz)
- 1000 memory channels with memory name function
- VSC (Voice Scan Control)
- Full computer access capability
- Auto mode and tuning step for simplified operation
- 4 AA NiCads or 4.5-16V external power supply

£339.95

£269.00

YUPITERU MVT 7100 EU

Yupiteru's own EMC version of this popular radio.

- 530kHz-1650MHz
- AM/FM/WFM/SSB/CW
- 1000 Memories
- C/w NiCads & charger

AOR AR8000

Still the **No.1** *seller*

- All mode FM, WFM, SSB, CW, AM
- 500kHz-1900MHz
- Computer control
- Data clone
- 1000 Memories
- C/w NiCads & charger

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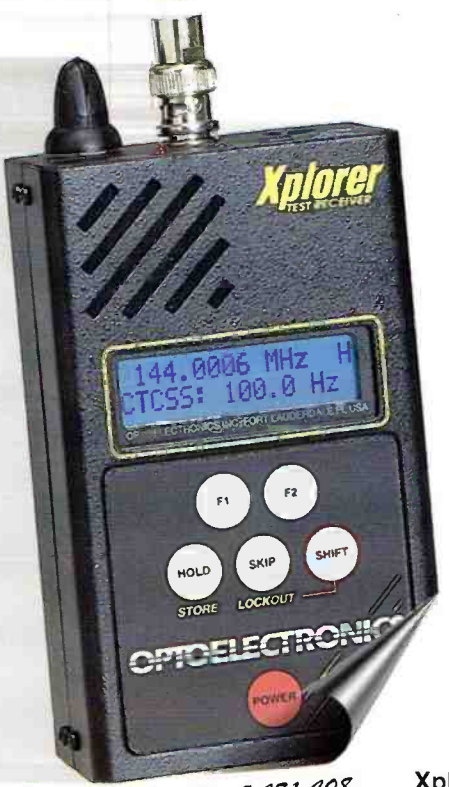
The Xplorer Test Receiver. The professional choice when speed, performance, and reliability are an issue !

For Commercial and Mobile Radio testing, the **Optoelectronics Xplorer** stands alone. Let the Xplorer perform all your quick radio checks, instantly determining the radio's frequency, **CTCSS, DCS, DTMF**, deviation or signal strength. The Xplorer automatically locks on to any nearfield signal from **30MHz - 2GHz** in less than a second.

There is **no setup necessary**-Whether you're in the field or in the shop, the Xplorer is the portable, compact and **economical solution** for any two-way communications business.



Patent No. 5,471,408

FEATURES

- Nearfield receiver, sweeps **30MHz-2GHz** in <1 second
- Decodes **CTCSS, DCS,** and **DTMF**. Manually record tones into memory
- Lockout up to 1000 frequencies
- Store **500 frequencies** in **memory** with time & date stamp, as well as number of hits per frequency
- NMEA-0183 **GPS interface** for recording Latitude & Longitude coordinates (GPS Required)
- **VFO mode** for tuning to specific frequencies
- PC interface for **downloading** data from **memory**
- FM demodulation / **Built-in speaker**
- **Auto** or manual frequency **hold**
- **Maximum nearfield** reception / Up to **1/4 mile** away

MADE IN U.S.A.

Xplorer includes: TA100S antenna, NiCads, Charger, PC Download cable and software

SPECIFICATIONS	
Freq. Range	30MHz - 2GHz
Modulation	FM Deviation
Freq. Response	50 - 3000Hz
Auto Sweep Time	<1 second
Input 50 Ohm	-59dBm @100MHz -25dBm @1GHz
Display	2 line LCD
Power	Internal NiCad

CTCSS Decode

DCS Decode

DTMF Decode

CTCSS, DCS, and DTMF Decoding

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Cover Subject
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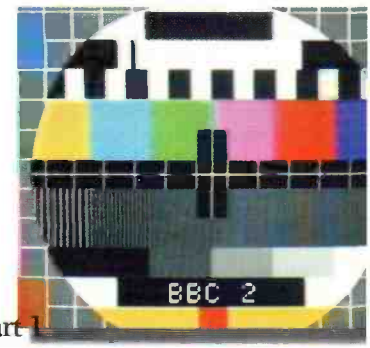

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Regular Columns

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September 1997

Communiqué

DSP Blaster by K6STI

Following Mike Richards' mention of Brian Beezley K6STI's *DSP Blaster* program in his August 'Decode' column, Mike Le Ves Conte has tested it and reckons that it's the 'bee's knees', giving reasonably affordable DSP to those with a 486 and SoundBlaster card (it will not work with other cards). He reckons that it's as good as many of the £300-£400 hardware units and works a treat in real time with *RadioRaft, Hamcomm, JVFAX, ModeMaster* and for cleaning up signals before analysing with a program such as *Spectrogram*, also recently mentioned in 'Decode'. Following discussions with K6STI, readers may be interested in the following information, particularly those without Internet or E-mail access.

The cost of *DSP Blaster* is $125, or equivalent, and Brian will supply the program on diskette, although updates go onto the Internet, so they will eventually become 'dated'. He accepts Visa, MasterCard, Discover, International Money Orders, cheques drawn on a US bank and cash (any) - in a registered letter. For those not wishing to send their credit card details over the Internet, Brian will accept the details over the phone between 0700 - 1800 Pacific time (1400 - 0100UTC) only. Readers should have a 'user name' and 'callsign' ready, to save on the phone bill.

Brian Beezley K6STI, 3532 Linda Vista Drive, San Marcos, CA 92069 USA.Tel: 001 760 599 4962. E-mail: k6sti@n2.net

Brian has also authorised Mike Le Ves Conte to issue the manual and program in its 'demo' form on disk. This is fully functional and less than 40Kb in size, but 'times-out' after a few minutes and does not retain the user defined settings.

Readers should send a 3.5in disk and prepaid reply envelope to: **Mike Le Ves Conte, 28 Woodlands, Paddock Wood, Kent, TN12 6AR. E-mail: charlie@centrenet.co.uk**

Roberts Radio Competition Winner

The lucky winner of the Roberts Radio R861 Competition, in the January and February 1997 issues of *SWM* was Terry Baker of Mid-Glamorgan. He was presented with his Roberts R861 radio by John Hencher, Area Sales Manager for Roberts Radio, at the local Leeke's store who stock the Roberts Radio range. Our picture shows a very happy Terry Baker on the right receiving his prize from John Hencher with Dick Ganderton, Editor of *SWM* on the left.

24-Hour Global News Service via WorldSpace

Bloomberg LP and WorldSpace have jointly announced an agreement to broadcast 24-hour news and information on 23 channels beamed from the three satellites in the WorldSpace digital direct satellite delivery system.

Bloomberg, which broadcasts in seven languages throughout the world, will feed programmes in English, Spanish, French and Italian on the *AfriStar* satellite; Japanese and English on *AsiaStar*; and Spanish, Portuguese and English on *AmeriStar*. Most of the programme content will feature audio feeds from Bloomberg Television, utilising a unique format that broadcasts programmes in 30-minute cycles, or 'wheels', 24 hours a day. The service will premiere in the third quarter of 1998, following the June 1998 launch of WorldSpace's first satellite, *AfriStar*.

The agreement with Bloomberg is the latest in a series of benchmarks in the development of WorldSpace's satellite digital radio business. In June, consumer electronics leaders Hitachi Ltd., Panasonic (Matsushita), Sanyo and JVC announced agreements with WorldSpace to develop and mass produce a new generation of portable radios that will be able to receive broadcast programmes direct from satellites, heralding the next wave in the dissemination of global audio information, entertainment and education.

Noah Samara, WorldSpace chairman and chief executive officer, said, "Teaming with Bloomberg demonstrates the growth and strength of the WorldSpace enterprise. Together, Bloomberg and WorldSpace will deliver news and information, offering a world of information to make a difference in people's lives throughout the world."

"The WorldSpace system will bring Bloomberg news and information to a vast new audience," said Michael Bloomberg, founder and CEO, Bloomberg LP. "Providing the underserved and emerging regions access to independent, quality journalism is vitally important to their future growth. We are pleased to be a part of this ambitious and valuable new broadcast platform."

Added Noah Samara: "WorldSpace's high-quality, direct broadcast capacity will bring a whole new community of listeners to the Bloomberg broadcast service. Broadening its already extensive global coverage, Bloomberg will use WorldSpace technology to provide invaluable news, information and insight to audiences in the developing regions of the world."

Bloomberg LP, with headquarters in New York, is an information services, news and media company with 75 news bureaux worldwide and encompasses Bloomberg Financial Markets, a premiere provider of online financial information; Bloomberg News, an award-winning wire service providing news stories to leading newspapers worldwide; Bloomberg News Radio, 24-hour nationally distributed news radio, and Bloomberg Television, broadcast in seven languages

Simon Taylor of TDC (left) finalises the appointment with Mitsubishi's James Pemberton while Nigel Furmston oversees the event from the footplate. The venue was the Bluebell Railway.

Freeware CD ROM

The **Public Domain Shareware Library** (PDSL) have released a new CD ROM in the Libris Britannia series. This is the *Libris Britannia 6, Freeware Library* CD ROM.

This CD is a collection of over 1800 Public Domain and Freeware programs requiring no fee for personal use (certain authors may require a fee for use in a business environment), many including source code.

Priced at just £10, this is a great way to obtain free programs. Place your order now for one from PDSL at **Winscombe House, Beacon Road, Crowborough, East Sussex TN6 1UL** or alternatively, order by 'phone, PDSL take most major credit, debit and switch cards, call **(01892) 663298**.

covering financial markets, the world of business and economics, politics, sports, lifestyles and entertainment. In addition the company publishes two magazines, *Bloomberg Magazine* and *Bloomberg Personal*, and a line of investment books under the imprint of Bloomberg Press.

Based in Washington, DC, the WorldSpace enterprise was founded in 1990 to provide direct satellite delivery of digital audio communications services to the emerging and underserved markets of the world, including Africa, Asia, Latin America and the Caribbean, and the Middle East. By the end of the decade, WorldSpace will have three satellites in orbit, with the first launch scheduled for June 1998, to transmit quality information, education and entertainment programming to a service area that includes over 4.6 billion people.

Specialist Distributor

Mitsubishi Electric has announced that TDC has been appointed as the specialist distributor for their r.f. components. Specialising in r.f. products, Basingstoke nased TDC is a technically led, engineering based company providing high levels of customer support and back-up. "As a specialist in communications we have also made the transisition to address the wireless markets, particularly with p.m.r. and now GPS. Mitsubushi's r.f. power modules provide the ideal opportunity, with a wider product range to provide even better solutions to our customers," said Managing Director Jerry Sandys. As well as supplying the Mitsubishi r.f. product range, the company already has major plans to introduce starter kits for r.f. power modules, making it easier for engineers to use.

Mitsubishi Electric Europe BV, Semiconductor Division, Travellers Lane, Hatfield, Herts AL10 8XB. Tel: (01707) 276100.

Radio & TVDX News

Changes across Hungary's TV broadcast scene with MTV-2 going to satellite and the former MTV-2 terrestrial channels being 'awarded' to incomer commercial broadcasters 'M-RTL' (Magyar RTL Television) and to 'MTM-SBS'. The M-RTL group have the UK's Pearson company within the partnership which go on-air during the coming Autumn.

The MTM group is part owned by the Scandinavian Broadcasting System. The 10 year licence will cost each company around £30 million over the period. One of the losers in the application round - 'MKTV' is challenging the government's decision in their selection procedure for the winning groups.

Newcomer into the New Zealand airwaves is the UK's MTV channel which from July transmitted an unscrambled free-to-air service. Initially the UK version will be transmitted but in the coming months presentation will change to that of a locally originated NZ presentation together with additional local pop shows. MTV-UK replaced the TVNZ local channel 'Horizon'.

A new data service is being transmitted across the City of London on Classic FM wavelengths in conjunction with BT Broadcast Services. Financial data from the 'TenFore' company that has previously been satellite delivered is now additionally mixed with the programme distributed via DAB (digital audio broadcast) and broadcast over London. Classic FM are also experimenting with a DAB data service which incudes financial, Internet and other information.

Silent Key Advisory Service

David G3RCQ has set up a division within his accountancy practice to deal solely with the valuation and sale of deceased amateurs' and short wave listeners', known as 'Silent Keys', radio equipment.

David views the parallel similar to inheritance of real estate in as much that as radio equipment continues to become more expensive that mysterious room in the house containing vast sums of electronic equipment has to be professionally valued if the benificiaries are to receive full value.

A qualified accountant with 40 years of radio and electronic experience, David passed the RAE in 1962 and traded in used amateur radio equipment under the G3RCQ Electronics banner. He also founded and ran for many years the *List A Rig Advertiser.*

David will advise on a one-to-one basis with solicitors, accountants and relatives and make arrangements for the speedy sale of equipment.

For further information, help and advice contact David at **Cole & Co. Accountants, 9 Troopers Drive, Harold Hill, Romford, Essex RM3 9DE**.

Active Antenna Tunner

An antenna tunning unit is high on the list of accessories for any short wave listening station. The new Palstar AM30 is designed to improve the performance of most wire antennas and will even work with the short telescopic whip antenna supplied with the unit. Frequency coverage is from 300kHz to 30MHz and the unit has a variable gain control (-3 to +10dB) and a tuneable input stage to provide selectivity and optimum reception of weak signals. The AM30 is for listening only and is not designed to be used with a s.w. transmitter. Power is provided from an internal 9V battery or an external 12V d.c. supply. The price has been set at £79.95.

Specifications

Frequency coverage:	300kHz - 30MHz
Gain:	-3 to +10dB adjustable
Antenna connections:	SO-239
Dimensions	45 x 140 x 121mm
Weight:	0.45kg
Power	9V d.c. battery (included) 12V d.c. external supply

Nevada Communications, 189 London Road, North End, Portsmouth PO2 9AE. Tel: (01705) 662145.

Wake Up To CD Sounds

Having made their breakthrough into the clock radio market last year, **Roberts Radio Limited** have introduced what will now be their third product in this sector, a CD version - the CR966 2-Band Stereo CD Clock Radio. The CD clock radio provides the customer with access to the better quality sound which the CD afford, in the bedroom.

Whether it be used to go to sleep to, to wake up with, or simply to enjoy their CD collection, it provides a quality, multi-functional product which negates the need for separate devices. It has a recommended retail price of £90.

The top-loading CD player element offers 21 memories, programmable and l.c.d. display and CD track indications, as well as play, pause, track, skip facilities and track access keys.

The clock radio features include f.m. stereo and m.w. waveband coverage, a 12 hour digital clock with green l.e.d. display, pm indicator, snooze facility and adjustable sleep timer. Users can wake to the CD, radio or the alarm. What more could you want? Telephone **0121-355 3446** for more information.

After The Event

Back on the 11 May 1997, 90 Windmill, Watermills, Wind/Water Pumps, Spade Mills, etc., were activated at locations around Great Britain, the Republic of Southern Ireland, Holland the Republic of South Africa.

The Society for the Protection of Ancient Buildings (SPAB) in London each year hold a National Mills Day and this year, Mills outside Great Britain joined in and helped to make a truly memorable day.

The Denby Dale ARS, who are located in W. Yorkshire, are the official organisers of this event and with the help of local clubs and individual amateurs throughout Great Britain, the Republic of Ireland, Holland the Republic of South Africa, their individual mill was promoted.

The history and the location of the Mill, together with the events taking place at the Mill on the day were reported over the airwaves to the countless amateurs who filled the bands. This benefits not only the variety of Mills on the day, but also promotes Amateur Radio to the visitors to the Mills.

The theme this year for the event was 'Youth' and this was ably promoted by the amateurs to complement not only the Mill but also Amateur Radio/Novice Section.

The Denby Dale ARS were overwhelmed by the enthusiasm, generosity and able assistance that they received again this year and would like to thank everyone who assisted them in putting on, yet again, a truly memorable day. Those interested in helping out in the event for 1998, should contact **Jasmine Marshall**, Event Organiser, on **(01274) 869849** in November.

The Faster Route

Finding the right computer fair has just got a whole lot easier as search engine supermos **netXtra** launch their latest tool. A comprehensive database of computer fairs, shows and radio rallies is being compiled by the Suffolk based company, which is using software based on its award winning Accommodation Search Engine to produce the new search system.

Visitors will be able to select events by data, type and location. Event organisers will be able to avoid clashes and there will be low cost advertising space available if they wish to promote individual fairs or exhibitions. The system has been designed for quick and easy use and incorporates a map so that there is no need to enter specific towns or counties.

netXtra believe their new system is the most thorough and comprehensive in its sector and with a massive increase in Internet activity, it will soon become the natural way to look for event information.

The search engine is on **http://www.computerfairs.co.uk** and details of the newly booked events can be passed to netXtra on **info@computerfairs.co.uk**

National Vintage Fair

The **National Vintage Communications Fair** is being held on **Sunday 26 October 1997** in Hall 11 at the NEC in Birmingham. Features include vintage radio and broadcasting, classic valve audio and hi-fi, early telephones and PO equipment, gramophones, phonographs and recordings, film and television and lots more.

Doors open at 10.30am until 4pm and tickets are £5 on the door. Further details are available by 'phoning **(01392) 411565**.

Membership Discount Card

Leicester Radio Society is one of the oldest radio societies in the UK (formed in 1913) and now requires a move to newer premises with better facilities for training and operating, ready for the next millennium.

The Society have negotiated a series of discounts with hotel groups and car rental companies within the UK. Anyone who needs to hire a car or book hotel rooms within the UK could benefit from the card and make savings, up to 35% on car hire!

Companies currently involved include Avis Rent A Car, Hertz (UK) Ltd., EuroDollar Rent A Car, Stakis Hotel, Wayfarer Inns and Jarvis Hotels. Together, these excellent companies offer a superb range of accommodation and vehicle hire possibilities.

You don't have to be a licensed Radio Amateur in order to obtain a card, as it is available to anyone, anywhere around the world, or within the UK. Some car rental companies are also offering discounted rates within the USA and Europe. Every card sold increases funds available for new premises, equipment and training.

As the cards are taken up, the Society expect that other companies will offer discounts, broadening the range and type of savings that can be made, and then these will be updated onto the web site. Anyone, or any company wishing to offer further discounts are welcomed.

The discount card has been price at £10 (Sterling) and can be obtained using a Mastercard, Eurocard or Visa credit card. The Society intend that this modest outlay is recovered very rapidly as bookings and consequent savings are made.

The new website for the LRS is now well under way and contains details about the Society and its members and what they are hoping to achieve. An order form for the discount card is included and can be printed off, complete and posted. Subscribers should allow 28 days for delivery. Check out **http://www.foobar.co.uk/dialin/silver/lrs**

The Leicester Radio Society are not a commercial company, they are a reputable amateur radio society with ideas for the future. LRS seeks to further amateur radio in general and all monies raised will be used to this end.

Find out more from **John Alexander, LRS, Gilroes Cottages, Off Groby Road, Leicester LE3 9QJ** or E-mail at **lrs@jalex.easynet.co.uk**

New Venue

The **Bishop Auckland Radio Amateur Club Rally** will be held on **November 23rd** at Spennymoor Leisure Centre. Please note that this is a **new venue**, ideally suited for both trader and disabled visitors as it boasts good parking and easy access to a large ground floor.

There will be the usual radio, computer, electronics and Bring & Buy stalls as well as catering and bar facilities. As you can imagine, there is lots to do for all the family within the confines of the leisure centre for those of the family not interested in radio.

Doors open at 11am (10.30am for

disabled visitors). Admission is £1, under 14s free of charge if accompanied with an adult. Talk-in on S22.

More details from **Mike G0PRQ**, Rally Organiser, on **(01388) 766264**.

Free Catalogue

Now available from **Waters & Stanton Electronics**, free of charge, is a new and enlarged 48-page MFJ catalogue. Contained within are many new radio related products, including transceivers, kits, antennas and Morse and data products,

To get your new catalogue, write to Waters & Stanton Electronics at **Spa House, 22 Main Road, Hockley, Essex SS5 4QS** or telephone on **(01702) 206835** or FAX on **(01702) 205843**.

LAR Still Open

Tom and Hazel from the **Leeds Amateur Radio Communications Centre** in Leeds have advised us that their franchise agreement with Lowe Electronics has now been discontinued. Unfortunately, some of their customers have been led to believe that the shop in Leeds has closed. But this is not the case.

The shop is still open under their own name LAR Communications Centre, who are approved dealers for Icom, Kenwood, Yaesu and many other amateur radio products. It's now 21 years since the shop was opened and Tom and Hazel would like to thank all their customers and friends in the trade for their good wishes and continued support.

The Leeds Amateur Radio shop can be found at **LAR Communications Centre, 12 Station Road, Crossgates, Leeds LS15 7JX**, Tel: **0113-232 8400**, FAX: **0113-232 8401** or E-mail at **lar.leeds@btinternet.com**

Send your news to Zoë Crabb at the Editorial Offices

RAE Courses

The **Widnes & Runcorn Amateur Radio Club** will be running an RAE and Novice RAE course at The Beacons, Simmons Lane, Frodsham, Cheshire. Enrolment takes place on Friday 5 September 1997 from 7.30pm.

Further information can be obtained from the course tutors, **Dave Bibby G1PIX** on **(01928) 591401** or **Dave Wilson G7OBW** on **(01270) 761608**.

The **Bradford & Ilkley Community College** Adult Education are holding Morse classes on Wednesdays 7-9pm, commencing 17 September 1997, at Hanson School, Sutton Avenue, Five Lane Ends, Bradford 2, West Yorkshire. It is a 30 week course in preparation for the 12w.p.m. RSGB Morse test, all beginners are welcome.

'Phone **Vicky Turner G0RJC**, course tutor, on **(01274) 586882** from 9 September onwards.

A 20 week Novice Course will start on 6 September 1997 at **Nunsfield House Community Association Amateur Radio Group**, Nunsfield House, 33 Boulton Lane, Alvaston, Derby. The Radio Group holds a City & Guilds examination centre certificate.

The course will end with the exam in March 1998. The course tutor is **Frank Whitehead F.I.E.E.I.E. G4MLL** who can be contacted at **18 Bath Road, Mickleover, Derby DE3 5BW** or by 'phone on **(01332) 512080**.

Nunsfield House Community Association Amateur Radio Group is the radio group that organises the Elvaston Castle National Radio Rally in June each year, so you can be sure of a well run course!

The **Glenrothes and District Amateur Radio Club** is planning to run a course to prepare candidates for the Radio Amateurs Examination to be held in May 1998. The course will be from 7pm to 9pm Monday evenings beginning late September, leading up to the C&G exam in May 1998.

A second course in Morse code will be run during the same period on Tuesday evenings from 7 to 9pm and provides training for beginners and those amateurs wishing to improve on the basic 12w.p.m. required for the 'A' licence. Both courses will be held at Balwearie High School in Kirkcaldy.

Contact **Ken Horne GM3YBQ** on **(01592) 265789** evenings or **Evelyn Hamilton** at Balwearie High School on **(01592) 640335** mid September for further details of enrolment.

Australia Bandscan

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

The fallout from the reduction in Radio Australia (RA) services has begun. With the closure of the Darwin transmitter, services into south east Asia have been reduced. This had the effect of cutting Australians living in Cambodia off from vital news of the developing military crisis in that country in early July.

Australians had been advised of RA frequencies by the Australian embassy in Phnom Penh saying that this was one of the few ways to receive vital information of the developing situation. As it turned out reductions in the RA services meant that RA was often presenting too weak a signal to be useful. This in turn meant that Australians in Cambodia had to rely on UK and USA short wave radio services for information.

Australian diplomats in Cambodia, while stopping short of saying that Australian lives had been endangered, made the point that the continued presence of a good RA signal would have improved expatriate morale there.

As far as schedules are concerned, Europe appears to have fallen off RA short wave schedules, leaving the Astra 1B satellite as the only recommended source of RA signals. Nonetheless, I would be interested to hear from readers who have pulled in RA since July. Schedules at **http://www.abc.net.au/ra/**

ABC & SBS Budget Cuts

As signalled in 'Bandscan Australia' June 1997 there have been large cuts in the Australian Broadcasting Corporation (ABC) budget for the next three years. Thre will be a loss of 600 staff in the next year on top of a loss of 300 staff who have accepted voluntary redundancy.

For the Special Broadcasting Service (SBS) the total budget will decline from $88.1 million (about £39 million) for the 1996-97 financial year to $79.2 million (£35 million) in 1998-99. That looks like about 5% reduction per year in nominal terms more in real terms.

New Regulator

From 1 July this year Australia has a new telecommunications and radiocommunications regulator. The new body, known as the Australian Communications Authority (ACA), is a merger of the former Australian Telecommunications Authority (AUSTEL) and the Spectrum Management Agency (SMA).

Aside from its telecommunications duties, the new authority will facilitate access to the radiofrequency spectrum through licensing of services, managing radio interference and regulating industry compliance with mandatory standards and conditions. ACA is tasked with resolving competing demands for spectrum by conducting auctions and managing technical allocations schemes and registering voluntary industry codes of practice.

ACA will represent Australia at international organisations and conferences. ACA is at **http://www.sma.gov.au**

Frequency Spectrum Sale

The old SMA raised over $1 million (£450000) from a series of auctions of frequency space in the 500MHz band. The results have given over half the spectrum offered to SIMOCO Pacific, owned by four UK pension funds.

SIMOCO is reported to have plans to create a national network for its Trans European Trunk Radio (TETRA) technology. Commentators see this as a strategic foothold in the cellular telephone market and a national police and emergency services network.

Details of the auction process at **http://www.sma.gov.au** A proposal to allocate the 25.35 to 28.35GHz band for spectrum licensing is at **http://www.sma.gov.au/support/pubs/media/29apr97.htm**

National Transmission Network

In line with current economic philosophies the government proposes to sell by tender the national transmission network. The National Transmission Agency (NTA) currently operates 550 transmission facilities used by the ABC, the SBS and others.

The government has assured users and the community that service levels will not decline and has promised the ABC and SBS of funding to cover the payment for the use of the privatised facilities. Further details are at **http://www.dca.gov.au/mediarel/c7097.html**

Pay Television

The shakeout in Australia's fledgling pay TV market is continuing. The latest news has a merger between Foxtel and Australis Media.

Foxtel is a joint venture between News

Rallies

August 30: The Annual Wight Wireless and Computer Rally will be held at the National Wireless Museum, Arreton Manor, Nr. Newport, Isle of Wight. Open 1000 to 1700. Free entry and plenty of free parking. Free stalls for both private and business use. There will be refreshments, exhibitions and collections for RAIBC Talk-in on S22. **Douglas Byrne G3KPO** on **(01983) 567665**.

August 30: The Dorking Computer Fair is to be held at the recently re-furbished Dorking Halls, Reigate Road, Dorking. The venue is situated on the A24 in the town centre. From the M25, the nearest exit is junction 9. There will be a large range of new and used computer equipment on offer at bargain prices. The event is open from 1000 to 1600, admission is £1 adults, £1 OAPs and under 16s. **Steve Bealch** on **(01342) 842966**.

August 31: The Telford Rally in Shropshire is 20 years old this year. The rally will be held, as usual, in the Telford International Centre. There is plenty of parking in Telford Town Centre car parks. There will be major dealers, a flea market and much more in two purpose built exhibition halls with plenty of room to enjoy the day. Also, disabled visitors will be well catered for. **Tony M0AMP** on **(01743) 235619** or via GB7PMB.

August 31: The Chessington Computer Fair will be held at the Chessington Sports and Leisure Centre, Garrison Lane. **Steve** on **(01342) 842966**.

September 6: The Ballymena Amateur Radio Club are holding their annual rally at Ballee High School, Ballymena, Northern Ireland. Doors open to the public at around 1200 noon. More info. from Club Secretary **Jeffrey Clarke GI4HCN** on **(01266) 659769**.

September 6: The Redhill Computer Fair will be held at the Harlequin Theatre, Warwick Quadrant, London Road, Redhill, Surrey. Situated in the centre of Redhill, all manner of computer bargains for sale by a wide range of exhibitors. Doors open 1000 to 1600. Admission is £1 for adults, £1 for OAPs and under 16s. **Steve Bealch** on **(01342) 842966**.

September 6: The 3rd Northampton Radio Rally & Car Boot Sale is to be held at the heart of the Shires Shopping Village Showground on the A5, just two miles north of Weedon, Northamptonshire There will be a Bring & Buy, organised by the Northampton Repeater Group. Bring the family as they can spend the day in the 'olde worlde' shopping village. Refreshments and toilets are also on site. Car parking only 50p. All enquiries on **(01604) 32478**.

September 7: The Andover RAC are holding their 2nd Annual Radio & Computer Boot Sale at the Army Air Corps Museum at Middle Wallop Airfield, near Andover, Hampshire. Talk-in on S22 - 144.550MHz. **(01264) 391383** for further information.

***September 7:** The Lincoln Hamfest will be held at the Lincolnshire Showground, four miles north of Lincoln on the A15. There will be the usual trade stands, Bring & Buy, Morse test with two passport size photos required, refreshments, bar and ample free parking. Talk-in on S22 and SU22. For further details contact either **John** or **Sue** on **(01522) 525760**.

September 7: The Bristol Radio & Computer Rally is to be held at Brunel Centre, Temple Meads Station, Bristol. Doors open at 1030 to 1600 (disabled visitors 1015). Admission is £1. There will be a large Bring & Buy, under £30 Bring & Buy, refreshments, 100+ tables, (table hire at £15 each). **Muriel Baker G4YZR, 62 Court Farm Road, Whitchurch, Bristol BS14 0EG** or 'phone on **(01275) 834282** (24hr answerphone).

September 13: The Reddish Rally is to be held at St Mary's Parish Hall, Reddish Road, Stockport, Cheshire. Doors open at 1000, and there is parking. Talk-in on S22. Further details on **0161-477 6702**.

September 14: The Bury Radio Society's Annual Rally will take place at the Castle Armoury, Castle St., Bury, Lancashire. This is close to the M66/M62 motorway network and is near to the town centre Metrolink and bus stations. Morse tests will be held on the day. Doors open at 1030 (1000 for disabled visitors). Admission is £1 at the door. Talk-in on S22. **0161-761 5083.**

September 14: The BARTG will be holding their rally at Sandown Park Racecourse, Esher, Surrey. BARTG '97 will follow the proven and popular format of previous BARTG rallies, however, there is one major difference - this is DataStream '97 - a series of lectures covering various aspects of data comms in amateur radio. General enquiries from **Ian Brothwell G4EAN, 56 Arnot Hill Road, Arnold, Nottingham NG5 6LQ, Tel: 0115-926 2360**.

***September 21:** This year's Scottish Amateur Radio Convention (SARCON_ takes place at the Royal Highland Exhibition Hall, Ingliston, Edinburgh. The rally is full supported by the RSGB, and there will be a large Bring & Buy, large trade presence, full lecure programme, Morse test on demands and lots more. Admission is £3 for adults, £2 for disabled visitors and OAPs and children under 14 go free. Doors open 1030 to 1700. **Tom Menzies GM1GEQ** on **0131-445 3928** or **FAX** on **0131-229 3111**.

September 21: The Peterborough Radio & Electronics Society East of England Rally will be held at the Peterborough Showground, easy access from A1, A605, A47. There will be trade stands, radio car boot plus other local attractions, acres of free parking, catering and bar, etc. Doors open 1030 (1000 for disabled visitors). Admission £1.50. Talk-in on S22 via G3DQW. For booking details contact **Ted G0REM** on **(01733) 766471**, QTHR, **tmelnyczuk@compuserve. com** or for rally enquiries contact **Vince G8NGZ** on **(01733) 331211**, QTHR, **G8NGZ@compuserve.com**

September 21: The Central Lancaster Radio Rally will be held at the Central Lancaster High School, Crag Road, Lancaster. The show will be signposted from J34 M6 motorway (five minutes). Doors open 1030 and admission is £1. There will be three halls a Bring & Buy, refreshments, plus all the usual traders. **Sue Griffin** on **(01524) 64239**.

September 21: The Kidderminster Radio & Electronics Fair is to be held at the Kidderminster College, Hoo Road, Kidderminster, Worcs. Doors open at 1000 until 1500 and admission is £1.50. There will be the usual traders along with a Bring & Buy, Flea Market, food and drinks and talk-In on S22. **John G8MGK** on **(01527) 545823** or mobile on **(0860) 147954** or alternatively contact **Tony G4ALT** on **(01562) 69652** or mobile on **(0860) 902165**.

Corporation and Australia's soon to be partially privatised telecommunications carrier Telstra. Part of the deal will see Telstra paying $70 million (£31 million) to News Corporation for failing to roll out its cable network to four million homes.

The final arrangement will see News Corporation, Telstra and Australis each with one third interest in the new pay TV vehicle.

Weather Bureau Frequencies

The Australian Bureau of Meteorology transmits a number of radiofacsimile services on short wave. These include AXM on 2.628, 5.100, 11.030, 13.920 & 20.469MHz and AXI on 5.755, 7.535, 10.555 & 15.615MHz. Times are 0015 to 0000UTC. Schedules can be found at **http://www.bom.gov.au/other/rad_sch/axm_sched.shtml**

Weather forecast information from the VLM Casey Antarctic base transmitter is on 7.4681MHz. Information includes wave heights, sea surface temperatures, wind forecasts and general weather forecasts. Schedule is at **http://www.bom.gov.au/other/rad_sch/vlm_sched.shtml**

Military HF Communications

The government has selected Boeing Australia to develop a new high frequency radio communications network system for long range communications around Australia and to Australian Defence Forces (ADF) ships and aircraft operating in the region.

The system will comprise four new ground stations located in the Riverina area of south west New South Wales, Townsville in Queensland, Darwin in the Northern Territory and the North West Cape in Western Australia.

The new system will provide the core military communications network to complement the use by the ADF of commercially provided terrestrial and satellite communications links. The system will present a substantial increase in capability over the existing system according to the government. As a result of this process nine existing communications facilities will be closed.

Outback Wireless Opportunities

Through the Prime Minister's Science and Engineering Council, Australia is examining the options for providing services to rural and remote areas using wireless technologies. The impetus comes from the demand for a range of services from Australians living in Australia's outback coupled with the extremely high cost of the provision of a cable network.

Possible services include high speed Internet connections via satellite; remote diagnosing and monitoring of sick and injured people; and high quality digital terrestrial TV.

Other News

The government has announced the appointment of a communications consultant to provide retail marketing and issues management advice for the partial sale of Australia's telecommunications carrier Telstra. The government believes that the partial sale will enhance Telstra's ability to compete in the newly de-regulated telecomms market.

ABC birthday. The ABC started Australia's first independent news broadcast services in June 1947 and has just turned fifty.

Grassroots

AVON

Bristol International RC: Tuesdays, 2000. The Little Thatch Country Club, 684 Wells Road, Whitchurch, Bristol. All visitors are welcome. The club has been formed so that all radio enthusiasts, whether they be Licensed Amateurs, s.w.l.s or CBers can get together and have a good natter and do things that you do in radio clubs. PO Box 28, Bristol BS99 1GL.

South Bristol ARC: Wednesdays, 1930. Whitchurch Folkhouse Assoc., Bridge Farm House, East Dundry Rd, Whitchurch. September 3 - Top band activity, 7th - Bristol Radio Computer Rally, 10th - Bring & Buy - Car boot sale, 17th - Review of Bristol Rally, 24th - 10m activity evening and committee meeting. For more information ring (01275) 834282 on a Wednesday evening.

BUCKINGHAMSHIRE

Aylesbury Vale RS: Wednesday evenings, 2000. Hardwick Village Hall, (Hardwick is situated off the A413 between Aylesbury and Buckingham). September 3 - Mini talk night, 17th - Discussion evening. Gerry Somers G7VFV on (01296) 432234.

CHESHIRE

Mid-Cheshire ARS: Meetings held every Wednesday, 2000, at Cotebrook Village Hall, North of Tarporley, Cheshire. September 1 - Committee meeting, 3rd - Construction night plus h.f. club station on air, 10th - Informal, 17th - Proposal for new comittee, 24th - AGM, all members please attend. Ted Bannister G0RBA on (01606) 592207.

DEVON

Appledore & DARC: 3rd Mondays, 1930. Appledore Football Clubroom. September 15 - Computers & Radio a talk by Jeff G4SPF. Den Williams G0UMT on (01237) 471802 for more information.

Exmouth ARC: Alternate Wednesdays at the Scout Hut, Marlpool Hill, Exmouth. September 10 - Computer evening, 24th - Test card evening. D. Fox G0NRR on (01395) 271880.

Torbay ARS: Fridays, 1930. ECC Social Club, Highweek, Newton Abbot. September 19 - Rig analysis from G0UHY. Peter G4UTO. (01803) 864528.

EAST SUSSEX

Hastings Electronics & RC: 3rd Wednesdays, 1930. West Hill Community Centre, Croft Road, Hastings. The club runs courses for the RAE and Novices and is approved as an examination centre for City & Guilds exams. Doug Mepham G4ERA, 8 The Close, Fairlight, E. Sussex TN35 4AQ or 'phone on (01424) 812350.

EDINBURGH

Lothians RS: 2nd & 4th Wednesdays, 1930. Orwell Lodge Hotel, Polworth Terrace, Edinburgh. September 10 - Programme introduction and Scottish Convention preview, 17th - Internet demonstration. Tommy Main GM4DCL, QTHR on 0131-663 8501 day and evening.

GREATER LONDON

Southgate RC: 2nd & 4th Thursdays. Winchmore Hill Cricket Club, The Paulin Ground, Firs Lane, Winchmore Hill, London N21 3ER. August 28 - Radio on the air, September 11 - Aderen Ball G8PSF home-brew microwaves, 25th - Radio on the air. Dave Michael G0ASA on 0181-482 6795, FAX: 0181-807 5366.

HAMPSHIRE

Horndean & DARC: 1st & 4th Tuesdays, 1930. Lovedean Village Hall, Lovedean Lane, Lovedean, Hants. September 2 - Natter night, 23rd - 6m operating by Chris G3WOS. S. Swain (01705) 472846.

Southampton ARC: Mondays, 1900. This club is now up-and-running after some years of inactivity. New members welcome. Harold McIntyre on (01703) 737715.

HEREFORD & WORCESTER

Hereford ARS: 1st & 3rd Fridays, 2000. Many talks and interesting evenings including, September 5 - SSB field day, 19th - Talk on d.s.p. filters by Mike Davies G0WZY. Tim G0JWJ, QTHR. Tel: (01432) 279435 or Paul G0DJF on (01432) 353765.

Malvern Hills RAC: 2nd Tuesdays. Red Lion, St. Annes Rd. September 9 - Oscar Phase 3d update by Roy Jinks G7RVM. Dave Hobro G4IDF on (01905) 351568 evenings and weekends.

HERTFORDSHIRE

Hoddesdon RC: Alternate Thursdays, 2000. Conservative Club, Rye Road, Hoddesdon. August 28 - BBQ at Tolmers Scout Camp, Cuffley, September 11 - Talk on First Aid by Tony Sargent, 13th - Hoddesdon Carnival, callsign GB2HCD, 25th - Slide show and talk - IOTA - Neville Cheadle G3NUG. Don G3JNJ on 0181-292 3678.

Verulam ARC: 2nd & 4th Tuesdays, 2000, RAFA Club, New Kent Road, St Albans. New members and visitors welcome. September 23 - A talk entitled 'SSB on microwaves'. Ian Forsyth G0PAU on (01923) 222284.

KENT

Dover RC: Wednesdays, 2000 to 2200 during term time. Duke of York's Royal Military School, Dover. Morse classes and Novice Training Courses are also conducted between 1900 and 2000 on the same evenings. September 3 - Evening -non-lander' cruise to Calais, 10th - Club operating and natter night and committee meeting. Brian Hancock G4NPN on (01304) 821007.

Medway AR & TS: Fridays, 1930. Tunbury Hall, Catkin Close, Tunbury Avenue, Walderslade, Chatham, Kent. August 30 - Maritime mobile (visit to Southend by river boat, 6/7th September - Demonstration station at the Strood Steam Fair, 12th - Bob Oxley G3WWI digital radio, 20th - GEC Marconi Avionics Open Day (by invitation only). G3VUN, 40 Linwood Avenue, Strood, Rochester, Kent ME2 3TR. (01634) 710023.

NORFOLK

Norfolk ARC: Wednesdays, 1930. Formal and informal meetings at The Norman Centre, Bignold Road, Off Drayton Road between 'Asda' and Three Mile Cross Roundabout, Norwich.September 3 - Night on the air, construction QRP and Morse practice, 6/7th - SSB National Field Day, 10th - Town and Country briefing, 14th - Summer Town and Country Show Weekend Event, 17th - Night on the air, construction QRP and Morse practice, 24th - Special presentation of MFJ equipment by Mark Franics of Waters & Stanton. Mike G4EOL. (01603) 789792.

West Norfolk Airband Monitoring Group: Regular informal meetings on Thursdays, 1930. Dave on (01485) 578183 for details.

NORTH YORKSHIRE

Hambleton ARS: All meetings held at Allertonshire School, Northallerton, 1930 to 2130. More details from September 4 - Video, 18th - operating night. John G0VXH on (01845) 537547.

WARWICKSHIRE

Mid-Warwickshire ARS: 2nd & 4th Tuesdays, 2000. St Johns HQ, Warwick Div., 61 Emscote Road, Warwick. September 9 - Members' home construction by club members, 23rd - Book reviews by club members. G8XDL on (01926) 498115.

WEST MIDLANDS

South Birmingham RS: West Heath Community Association, Hamstead House, Fairfax Road, West Heath, Birmingham. August 30 - Club stand at Telford Rally, meeting at 1930 for an 2000 start, September 3 - Visit by Martin ofd Legend JSM Local Trader, starts at 2000. Don Keeling on 0121-458 1603.

WILTSHIRE

Trowbridge & DARC: 1st & 3rd Wednesdays, 2000. The Southwick Village Hall, Southwick, Trowbridge. September 3 - G3MQD talk, 17th - Natter night. Ian G0GRI on (01225) 864698.

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

Editorial

The Fairhaven RD500, reviewed by John Wilson in this issue, appears to be another exciting and innovative development in receiver design - and it's British! The concept is radically different to previous receiver designs and indeed, the designer doesn't even call it a receiver.

The last couple of years have seen designers almost falling over themselves to bring to the marketplace receivers that are far removed from the traditional concept. We've seen the AR7030 from AOR (UK), the WiNRADiO from Australian company Rosetta Laboratories and the Target HF-3 from AKD, each offering a different approach to receiver design. The AR7030, with its minimalistic approach to front panel controls and bringing a hitherto undreamed of r.f. performance to the ordinary listener, produced problems with measuring the performance! The WiNRADiO harnesses the power of a modern PC to provide a powerful 'virtual' front panel and an incredible number of memories. The AKD staggered everyone by offering a respectable performance at a remarkably low price. You can read all about the Fairhaven Radio Database in John's review - you will find it very interesting reading.

Dick Ganderton G8VFH

Letters

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

IF YOUR LETTER IS PUBLISHED YOU WILL RECEIVE A £5 VOUCHER TO SPEND ON ANY SWM SERVICE.

Dear Dick
I usually find John Wilson's receiver reviews to be of a very high quality. He appears to give a fair judgement of each set, and, very wisely, compares each set with its peers in the same price bracket.

I was a little surprised, therefore, that when he reviewed the Drake SW2, he could only find the Lowe HF-150/225 to compare it with. What about the Yaesu FRG-100, which seems still to be a current receiver selling for between £400 - 500? While it might not be quite up to the standard of the Lowe HF-150 and Drake SW2 in terms of its r.f. performance, it certainly beats them both on the features basis.

Unlike the HF-150 and SW2, the FRG-100 has a proper 'S'-meter, 50 memories with scan facilities, remote tape control, optional f.m., timers, clock, optional narrow c.w. filters, CAT/RS-232 control among others.

While for some, r.f. performance is the ultimate, for others (including myself), some of the features are preferable.

I'm sure that this was just an oversight by John, but I did feel I should write to put the record straight.

I should add that I have no connections with Yaesu other than being the happy owner of an FRG-100!

Regards
Paul Wilton
Eastleigh

John did acknowledge his omission at the end of his review of the AOR NB7030 in last month's issue. ***Ed.***

Dear Sir
Sincere congratulations on the new format of *SWM*. I can now read **every** word with ease.

While writing to you I take the opportunity to ask a pretty dumb question - forgive the age, lack of experience and steep learning curve I find myself on!

Could you - or Brian Oddy - compile an idiot's guide to his **four** page LM&S contribution to the magazine. Why all the listeners' names - do they like to see themselves in print? In an **August** magazine we are being told what happened in **May** - How does that help me?

What is e.m.r.p?

I am obviously missing something, at the same time I see many of your contributors often saying they have not got enough 'space' to give us more!

Funny old world we live in - maybe I'm funny too!

I will certainly continue my sub now I can read the Mag - was considering giving it up! Cheers and all the best.
John Joint

The way in which Brian's LM&S column in laid out is the result of what readers want and how they use it. The reason for listeners' names being quoted is so that you, the reader, can easily cross-reference the other information given in the column. The August issue is published towards the end of July and is, therefore being prepared from the end of June through early July. It is printed sometime after the second Thursday of the month. This means that Brian Oddy has to compile his column during the first half of June, so the latest logs he can use are those sent in during May. These are still relevant as you can use them to compare with your own logs to see how you performed against them. What is e.m.r.p? Effective mean radiated power. ***Ed.***

Dear Dick
Am I the only one who gets the impression that RAF Finningley is not actually completely closed down? For instance, I can receive an extremely strong MOULD repeater, 74.0750MHz n.f.m., which is listed as being located in Devon. I, for the record, live near Rotherham, and the nearest Military Installation is probably Catterick Garrison, I say this as, from what I can make out, it is Army Regiments that are sometimes talked about. A good friend of mine can also receive this repeater, and he has a bad source of noise around those frequencies, emanating from goodness knows where. As I type this I am receiving a transmission on the said frequency, right in front of my unscreened computer. Unless it was nearby I don't see how this could happen.

Another point to mention is that, whilst listening to civil airband recently, a pilot flying a small aircraft used Finningley as a locator when asked by an ATC for his location. Why would a pilot use this airstrip for location purposes when the council just want to turn it into another prison like the ex-RAF Lindholme and RAF Moorlands? If anyone is able to enlighten me I suggest that they contact Peter Bond who compiles the MilAir column. Also, can anyone please give me active frequencies for RAF Waddington, RAF Coningsby and Catterick Garrison. All information given will be gratefully received.
W from Rotherham

Dear Dick
I have read your last editorial.

I have a computer, I love computer and I make many thinks with it. But I think that it isn't the best for everythings.

I use it for my work, my hobbies (of course, radio). I decode many utilities modes and make packet with it.

My computer have internet connection and I am suscriptor to many listserver and usenet. And I prefer the magazines for information. I waste a lot of time in twice message and another situation (usenet). Only the nice - and few - people that answer the question in 'seconds' make necessary internet.

I answer your question. I prefer the old style. Books, magazines in paper. I can take it and read it in many place. Travel with a book: Yes. With a notebook: No. For example, I read yours magazines in my bed before I fall asleep or sit down in the mountains while I look at the countryside and listen to the birds. Could I do the same with a CD?

I don´t want to be a computer's slave.

The best for you and your staff.

(Sorry for my little English)
Rafael de Vicente (Suscriptor *SWM* and *PW*)
Madrid, Spain

I have left Rafael's English untouched. I only wish that my grasp of foreign languages was half as good. ***Ed.***

Dear Sir
I read with concern that the *ARRL Handbook* is to cease production as a printed book. My PhD and research include study of the 'prestructure' of books. In other words, the 'cultural context' of the printed words on the

ADVERTISERS INDEX

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page - the size, shape, and price of a book, and how this reflects upon its use and function.

Moving from 'dead-tree' to CD-ROM is no simple step. Although the transfer of informational material (databases, listings etc.) and the making available of otherwise elusive archives of material on CD-ROM is generally beneficial, there are more problems associated with the transfer of a book like the *ARRL Handbook* to CD-ROM.

Current technology does not permit a CD-ROM to be read with the ease of a book. The glare from a screen is straining on the eyes which must do much more work with a c.r.t. or l.c.d. monitor than with a printed page. That you cannot easily read a CD-ROM in bed, whilst 'at ease' alters the very nature of the book itself. These are not cosmetic differences: they are major changes in the culture of reading, and we fail to recognise them at our peril.

Environmentally, the movement to CD-ROM is a good one in most cases, but the manufacturing process and the waste involved when the CD-ROM is no longer readable, together with the paper used when an article is printed off (remember the 'paperless office' we were promised?) also incur an environmental cost.

I am a beginner in communications: I bought a copy of the 1993 *ARRL Handbook* from my local library for £1, became interested, and am looking to buy or build a receiver to use with my new PC radio demodulator. Would I have entered the hobby via an old CD-ROM as easily as I entered it curled-up relaxing with a book?

I would urge the ARRL to continue to produce the printed *Handbook*, perhaps alongside the CD-ROM version to test reader reactions.

It may well be time to move to CD-ROM for informational resources. Most text and image files on CD-ROM are readable cross-platform, due to the ISO 9660 standard, and the new cross-platform GUI (graphical user interface) that the web browser has become. We should not however forget that not everyone can stump up the £200 required for a suitable second hand machine.

Certainly, we need to be more careful with 'reading' books traditionally perused at leisure, whilst curled up under the duvet!

And I'm no Luddite either. I've been in computing for more than 15 years, and work on Macs and PCs. :-)

Best Wishes,

Dr. David Harrison.

http://www.pncl.co.uk/~prospero/dh.html

Dear Dick

I would like to correct a little error that crept into the July 97 'Satellite TV News' column. On page 65 the top right corner picture shows a colourful test card. This is **not** an EBU test card but a Dominique Curchod Production (DPC) test card. Although this signal was routed though the EBU network, DPC is a production company located in Geneva.

If you want to know more about the EBU don't hesitate to visit our web site:

http://www.ebu.ch

Best regards,

Jean-Louis Querton

Dear Dick

I wonder if any readers may be able to help with my research?

Around the late 1970s possibly 1977 the Russians were beaming extremely high power broad band radio transmissions that were very rich in harmonics, about every 5kHz right across the s.w. broadcast bands. This interference sounded like very high level clicks at varying speeds of around 5-15Hz and went on for hours at a time, making reception of normal s.w. signals across the Atlantic virtually impossible.

Even the BBC was distressed as the Russian signals were jamming the World Service. I seem to recall the *Tomorrows World* programme ran a 'special' around this time showing the build up of weather fronts along the path of these radio beams. If any one has any information on this subject, dates, time frequency, a copy of the *Tomorrows World* programme, any news reports, articles, etc. I would be very pleased to hear from them.

Response to the address above or E-mail:

earmark@compuserve.com

Many thanks,

Roger Waldron

Dear Sir

I have noted with interest the gradual change in format of *SWM* and agree with most of what has been said about background colour making some of the recent articles difficult to read. However, I must admit that the August edition is much improved in this respect. I then reached LM&S. I now find that the charts are printed in a very light grey, with no sectioning between the columns, especially noticeable for the Medium Wave Chart. I must admit to having to resort to a ruler or some other straight edge in order to read the data. I found the old style of a few months ago much more readable. There is no question of my cancelling my subscription to such an excellent magazine, but I do wonder how many people, with poorer eyesight than myself, have similar problems.

Barry Henshall

Urmston, Manchester

Dear Sir

I have enjoyed reading *Short Wave Magazine* very much over the past ten years and as you are aware, it is very popular here in Ireland. I have two suggestions for you - don't know if you'll like them or not!

To start with, how about a few features on the Irish radio scene? There has been an explosion here over the last five years in the communications spectrum, like the opening of new local f.m. radio, MMDS TV, Community u.h.f. TV, the opening of two new proposed TV channels and the development of Search & Rescue.

My second suggestion is an article or column on f.m. radio reception? It is a big effort, using high gain antennas trying to receive stations from W. Ireland and the UK.

(Name & address supplied)

We have published articles on the Irish scene in past issues of SWM and will continue to do so as and when. ***Ed.***

SWM Services

Subscriptions

Subscriptions are available at £30 per annum to UK addresses, £35 in Europe and £38 (Airsaver), £45 (Airmail) overseas. Subscription copies are despatched by accelerated Surface Post outside Europe. Airmail rates for overseas subscriptions can be quoted on request. Joint subscriptions to both *Short Wave Magazine* and *Practical Wireless* are available at £50 (UK) £59 (Europe) and £63 (rest of world), £74 (airmail).

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, 87 Blackberry Lane, Four Oaks, Sutton Coldfield B74 4JF. Tel: (0956) 374918 (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.

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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.

Part 1

Build a CW Processor

Are you a c.w. nut? Then this inovative add-on filter unit, designed by Robert Penfold, could be just what you're looking for.

Relatively few communications receivers are properly equipped to receive c.w. transmissions, possibly because this mode is less popular than 'phone and digital modes. Reception of c.w. requires a very narrow bandwidth for optimum results, and bandwidths of as little as 100Hz are sometimes used.

In theory it is possible to use very narrow bandwidths indeed, but extremely narrow passbands make it very difficult to initially locate stations. Also, very slight tuning drift can result in the station being lost. In practice, a bandwidth of a few hundred hertz gives good freedom from adjacent channel interference, while still enabling stations to be easily located and kept within the receiver's passband.

Ideally, the filtering should be applied in the intermediate frequency stages of the receiver, but excellent results can be achieved using audio filtering. Even a fairly basic audio filter can provide a very useful reduction in adjacent channel interference.

One slight problem with audio filtering is that signals within the intermediate frequency passband can operate the automatic gain control circuit and greatly reduce the sensitivity of the receiver. This results in relatively low sensitivity, possibly making it difficult to copy the wanted transmission.

Intermediate frequency filtering attenuates signals outside the passband before they reach the automatic gain control circuitry, and thus avoid the problem. Despite this drawback, audio filtering can be surprisingly effective when seeking out weak c.w. signals on a crowded band.

An advantage of audio filtering is that it can be in the form of an add-on unit which connects to the receiver's tape or headphone output. It therefore requires no modifications to be made to the receiver.

The audio filter described in this article has been designed for high performance rather than for low cost. The multi-stage analogue filtering provides excellent results, with a reasonably flat passband, but high attenuation just outside the passband. It includes a phase locked loop (p.l.l.) tone decoder which acts as a tuning indicator, and can also control an audio oscillator.

Same Room Performance

Provided reception conditions are not too poor, the audio oscillator provides an almost perfect signal, and it is rather like having the operator of the other station in the same room using a practice oscillator! This is not exactly a new idea incidentally, and I remember building a simple *SWM* project of this type some 25 to 30 years ago. It probably has its origins much further back than that.

The output from the oscillator can be mixed with the ordinary audio signal and the levels of the two signals

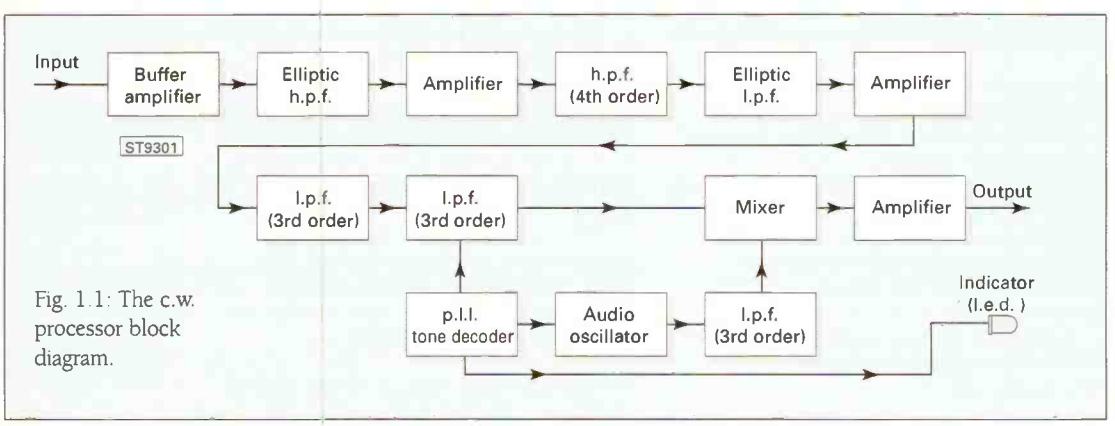

Fig. 1.1: The c.w. processor block diagram.

are independently adjustable. If desired, the normal audio signal can be muted and the received signal can then be monitored via the reconstituted audio signal alone.

While this gives very impressive results with an almost infinite signal to noise ratio, it does have one slight drawback. This is simply that the operator is rather remote from the received signal and is left unaware of any frequency drift, fading, increase in noise, etc. This makes it impossible for the operator to take remedial action when reception starts to deteriorate.

It is therefore better to opt for a combination of the original and reconstituted signals, rather then just using the reconstituted audio tone. The operator is then in a position to detect reception problems, and possibly correct them, before things deteriorate too far.

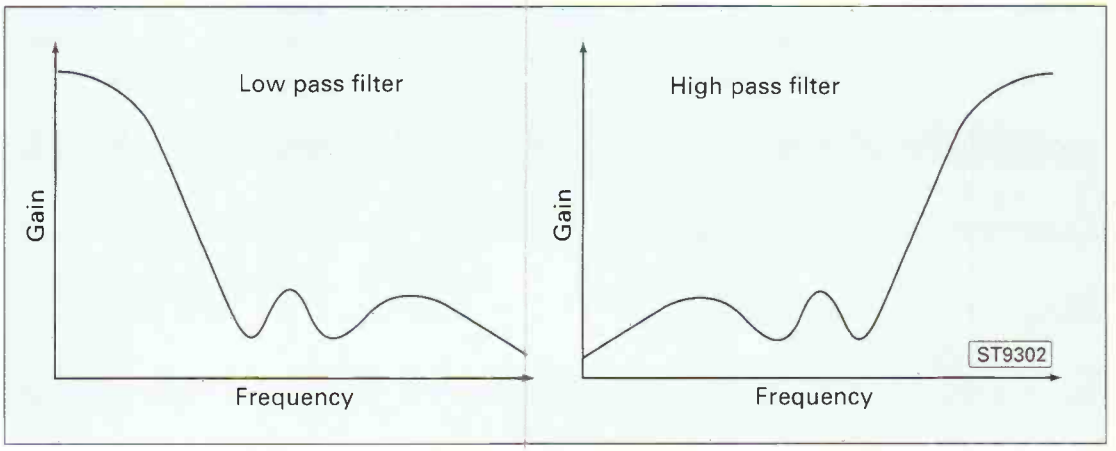

Fig. 1.2: Typical responses for elliptical lowpass and highpass filters.

System Operation

Block diagram **Fig. 1.1** shows the general arrangement used in the c.w. processor. Reasonable results can be obtained using simple CR bandpass filtering, but this very simple approach tends to give a rather narrow bandwidth at the -6dB points, but a wide bandwidth at around -20 to -40dB.

Better results can be obtained using separate highpass and lowpass filters with the cut-off frequency of the latter a few hundred Hertz higher than the cut-off frequency of the former. This approach makes it easy to obtain any desired bandwidth, with a very flat passband.

The out-of-band attenuation is determined by the quality of the highpass and lowpass filters and can be very high using the right type of filtering. Complex analogue filtering tends to use large numbers of resistors, capacitors, operational amplifiers and (possibly) inductors, but as the cost of these components is relatively low, the overall cost of this kind of filtering is not necessarily that high.

In this design, the input signal is first taken to a buffer amplifier which ensures that the next stage is driven from a suitably low source impedance. The second stage is an elliptic highpass filter, and this is a passive circuit based on capacitors and inductors.

An elliptic filter provides a very high initial attenuation rate, but tends to suffer from relatively low attenuation in the stop band. In fact, the attenuation goes to a very high level just outside the passband, but then falls back quite markedly further beyond the cut-off frequency. Typical highpass and lowpass elliptic filter responses are shown in **Fig. 1.2**.

Another slight problem incurred with elliptic filters is that there can be relatively high losses within the passband. The basic elliptic filter is, therefore, backed up by an amplifier which compensates for losses within the passband, and a fourth order highpass filter which provides a high level of attenuation at frequencies where the elliptic filter has ceased to give good results.

This double barreled approach works very well with the elliptic filter providing a very high initial attenuation rate and the conventional highpass filter ensuring that there is good attenuation at frequencies well beyond the cut-off frequency.

The lowpass filter uses the same basic technique, but rather than using a single fourth order filter to back-up the elliptic filter, two third order filters are utilised. This provides slightly improved performance above the cut-off frequency which is where most of the interference is likely to be found.

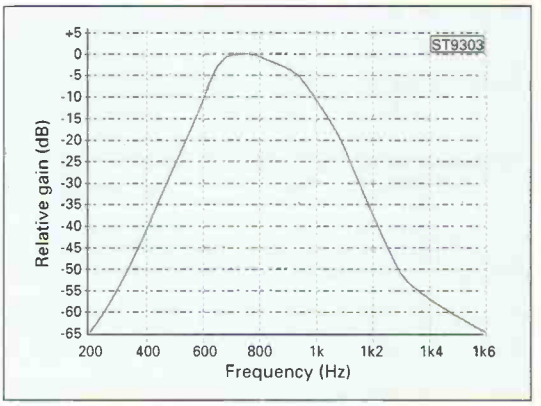

Fig. 1.3: The frequency response for the prototype c.w. processor.

By analogue signal processing standards the level of performance provided by the two filter banks is extremely good. **Fig. 1.3** shows the frequency response obtained from the prototype processor. While the performance of this circuit does not quite rival digital signal processing (d.s.p.) units, it provides extremely good results in practice.

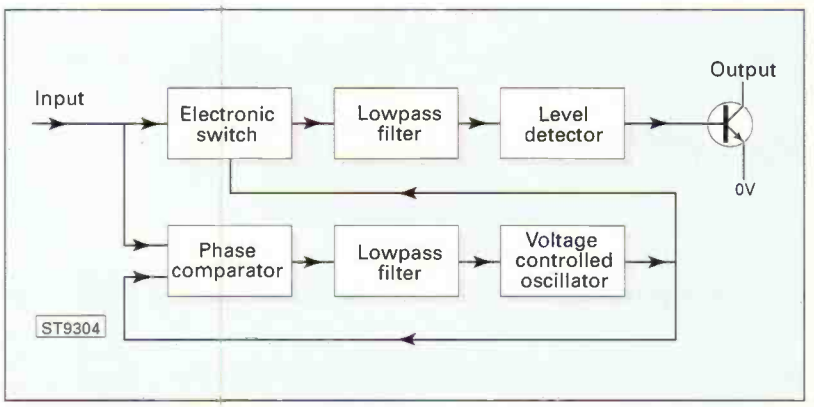

Fig. 1.4: The arrangement used in the p.l.l. tone decoder.

The reduction in general noise and adjacent channel interference is usually very marked indeed. The quality of the filtering is high enough to render many interfering signals totally inaudible.

Some of the filtered signal is sent to a mixer stage and then to a simple audio power amplifier. The power amplifier functions mainly as a buffer stage which enables the circuit to drive virtually any type of

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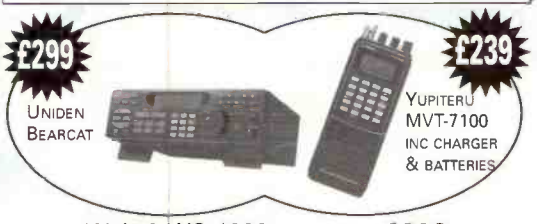

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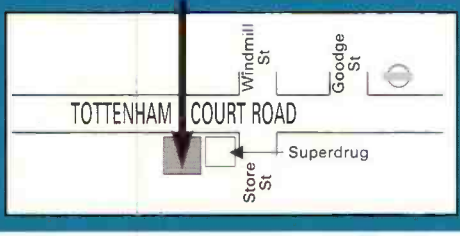

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Tone Decoder

The filter is also used to drive a phase locked loop tone decoder which has a very narrow lock-in range. This tone decoder uses the arrangement shown in the block diagram of Fig. 1.4.

The basic function of a phase locked loop is to keep an oscillator on the same frequency as, and in-phase with, the incoming signal. The phase locked loop is comprised by the phase comparator, the lowpass filter, and the voltage controlled oscillator.

One input of the phase comparator is fed with the input signal and the other input is fed with the output signal from the voltage controlled oscillator. A series of pulses are produced at the output of the phase comparator, but these pulses are fed to the control input of the voltage controlled oscillator via a lowpass filter.

This smoothes the pulses, producing a control voltage that is equal to the average output potential from the phase comparator. A high control voltage is produced if the input frequency is higher than the voltage controlled oscillator's frequency, or a low voltage is produced if the input frequency is lower than the operating frequency of the voltage control oscillator.

This keeps the voltage controlled oscillator locked in phase with the input signal due to a standard negative feedback action. The additional stages are needed to convert the basic phase locked loop into a tone decoder. The input signal is fed through an electronic switch that is controlled by the output of the voltage controlled oscillator.

The switch is turned on during positive input half cycles, which therefore results in synchronous half-wave rectification of the input signal. A lowpass filter smoothes the output from the electronic switch to produce a strong positive d.c. signal which is fed to a level detector.

The output from the level detector then switches on an open collector output transistor. Of course, proper half-wave rectification is only obtained if the phase locked loop is properly locked onto the input signal.

If the phase locked loop is not properly locked on, the electronic switch will randomly 'chop' the input signal. The output from the electronic switch will then be a random mixture of positive and negative signals, giving an output voltage from the lowpass filter that will stray little from 0V.

The input voltage to the level detector is therefore too low to activate this stage and

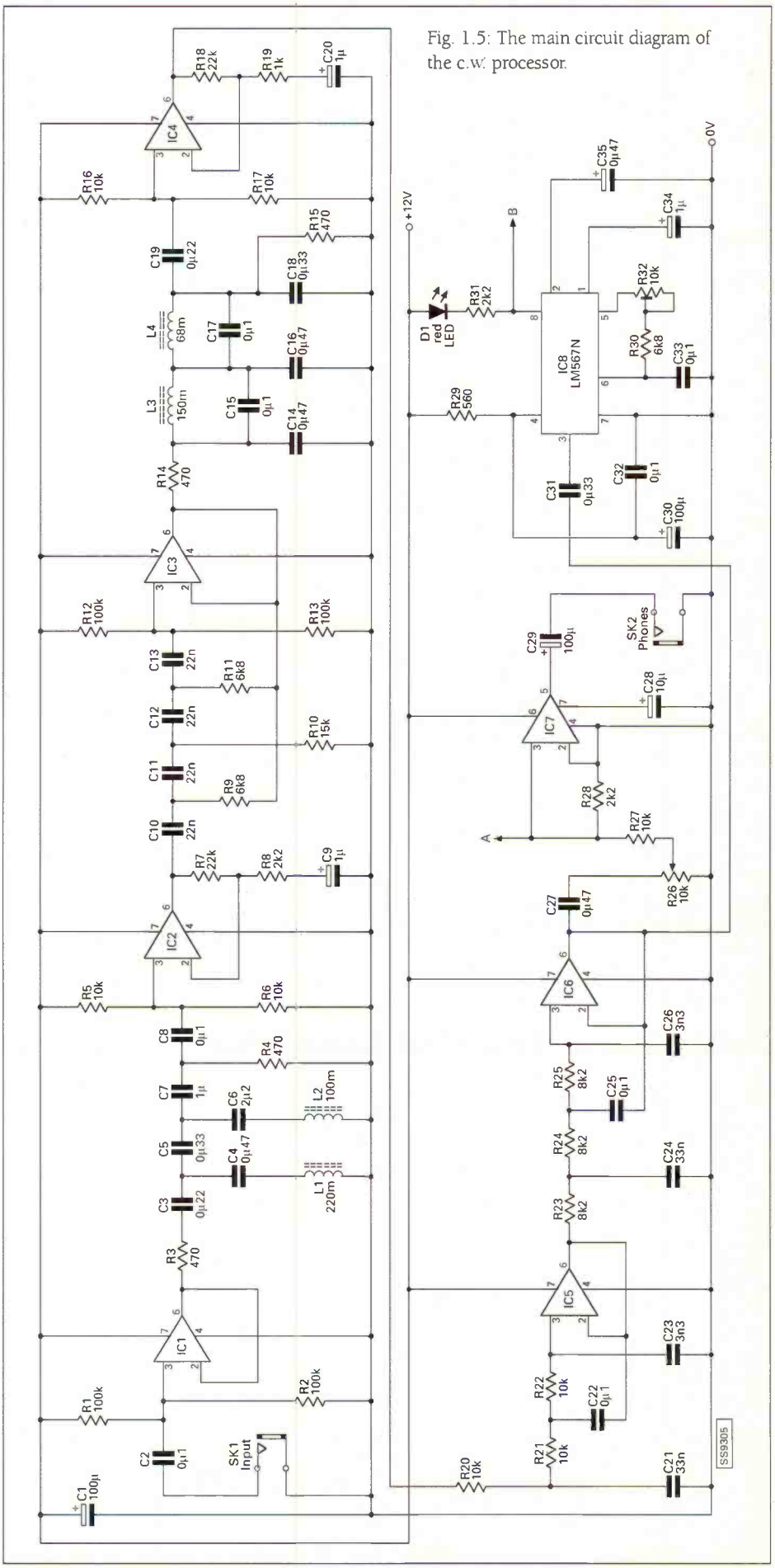


Fig. 1.5: The main circuit diagram of the c.w. processor.

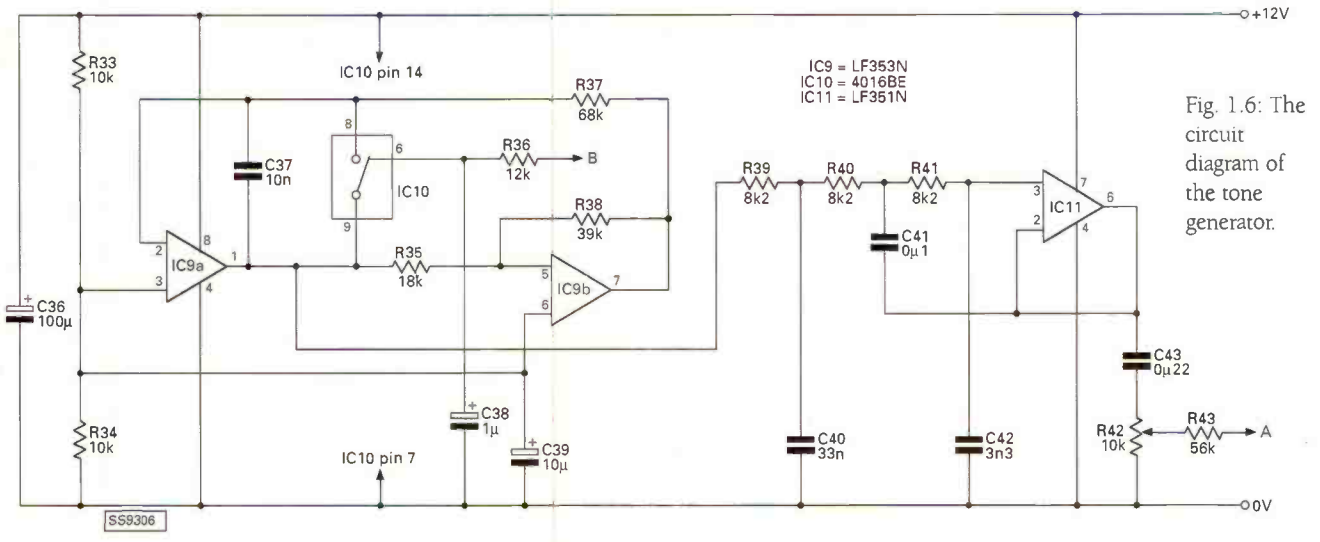


Fig. 1.6: The circuit diagram of the tone generator.

switch on the output transistor. Consequently, the output transistor is only switched on when the phase locked loop locks onto a suitable input signal. In practice, the lock-in range of the phase locked loop is quite narrow and is no more than about ±100Hz.

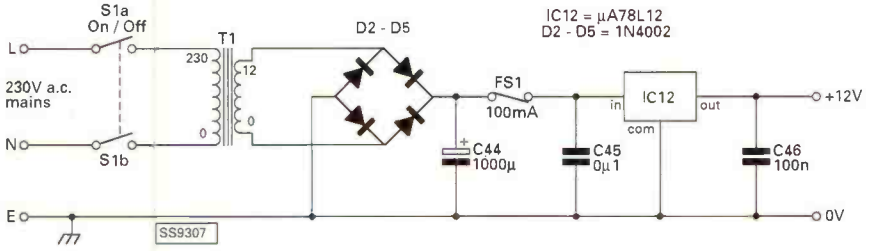
Returning to the block diagram of **Fig. 1.3**, the phase locked loop tone decoder operates a light emitting diode that acts as a tuning indicator as well as providing the decoded c.w. signal in visual form. The tone decoder also controls a simple audio oscillator that provides a triangular output wave form.

This signal is processed by a third order lowpass filter which greatly reduces its harmonic content and gives a reasonably pure sinewave output signal. This signal is fed to the mixer stage where it is added to the filtered version of the input signal.

There are separate volume controls for the direct and reconstituted signal so that the two can be mixed at any desired levels.

PART 2 NEXT MONTH

Fig. 1.7: The circuit diagram of the stabilised 12V mains p.s.u.



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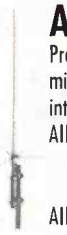

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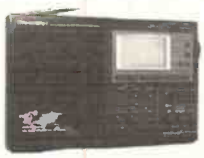

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The Fairhaven RD500 Radio Database

John Wilson has been longing to get his hands on the new Fairhaven RD500 receiver to see just how it stacks up against the opposition.

The front panel of the RD500 has a 'busy' look.

I have sat in front of many receivers in my long career in h.f. communications, particularly in the last two years, and can now reflect a little on what I have seen and experienced. When I pushed through my original decision to manufacture a short wave receiver - the HF-125 - in the UK, I based my insistence on a belief that the Brits are pretty inventive people and can take imaginative steps in directions of design which startle and surprise other nations. I also like to think that this first receiver lit a small fire in the bellies of British designers. Perhaps the appearance of new British designed and built receivers, such as the AR7030, the AKD Target HF-3 and now the Fairhaven RD500, is partly the result of my arguments against the "If we want another receiver we'll have it designed and made in the Far East" syndrome.

The four receivers I have mentioned so far represent the thoughts and ideas of individual designers, and illustrate quite well that there are many different opinions about what constitutes a good design and what should be the overall 'package' of features and facilities offered to the end user. These designs are the antithesis of the 'Corporate' approach, where the marketing men analyse competitors' products and build a paper design in committee. The result of the corporate decision making is that many designs produced by this process all appear to be the same - just like the politics of the centre, or the current crop of cars on the road - can you really tell the difference between a BMW, Nissan, Ford or General Motors product when you see them from a rear three quarter view? The point of this philosophical introduction is to prepare you for my review of a very interesting receiver; so individual that the designer calls it a 'radio database', rather than a 'radio receiver'.

Cunning Plan

When I received the Fairhaven RD500 and unpacked it my first impression was "It's a v.h.f. scanner" because the receiver front panel seemed full of multi-titled push buttons, After the utterly simple front panel appearance of other receivers I had recently sampled, the RD500 looked over populated, but as I began to use the facilities offered I realised that here was a designer making his own statement about what a receiver should do, and I can now appreciate his thinking. I have a theory that the editorial staff at *Short Wave Magazine* have a cunning plan (to quote Baldric) to test my ability and patience by removing the handbooks from any equipment that they send to me for review. Certainly the RD500 was no exception to this rule because once again I was cast upon an open ocean without a paddle, but I found that using the RD500 became very easy in a relatively short time, and by the time a replacement handbook had arrived on my doormat I no longer needed it apart from checking details of the memory functions (and was I surprised!).

The receiver itself is quite small (205 (w) x 65 (h) x 193mm (d)) and weighs only 600g. It is finished in the inevitable black and constructed as a front and back panel mounted on side rails which carry separate top and bottom covers. Inside the receiver is a single horizontal board occupying the underside of the side rails, with obvious provision for another board to fit in the top position of the side rails which makes me wonder what accessory facilities are to be provided in the future. Just visible behind the front panel are three vertical boards carrying all the control processors, the display drivers and a huge amount of computer memory. I'll mention this in greater detail further down the review.

Busy Look

As I have said, the front panel looks busy, having no less than 22 keys, three rotary controls for Volume, Filter and Squelch, a headphone jack and a main tuning knob as well as the main display panel. The rear panel is equally well populated with two SO-239 antenna sockets and a three position switch to select antenna functions, the power input socket, external loudspeaker jack, a pair of gold plated phono sockets for left and right stereo output and two 7-pin DIN sockets, one for cassette control and the other serving a dual function as keyboard connector and RS-232 input/output. Don't you by now get the feeling that there is more to the RD500 than was at first apparent?

Let's use the RD500 as a straightforward receiver. Switch on using the squelch control - having of course connected the 12Vd.c. supply from the power unit which is provided with the receiver - and you can begin tuning around. The full frequency coverage is 40kHz to 40MHz and the reception modes provided are l.s.b., u.s.b., a.m., c.w., n.b.f.m. and Synchronous a.m. Very comprehensive, but there is again more to this than meets the eye because you can select the c.w. mode to operate with a shift above or below the centre frequency, and this can be a big advantage in rejecting adjacent signals when using the mode; also, the synchronous a.m. system allows you to select upper or lower sidebands as well as both sidebands as the occasion demands.

As I investigated each mode I found other facilities which demonstrated the designer's clear intention to put as many operating features as possible into the radio, such as the provision of pseudo stereo c.w. reception. Now for those of you who don't listen to c.w. this may not be of overwhelming importance, but what happens is that a stereo image is constructed with low frequencies on one side of your head and high frequencies on the other, with all the panoply of signals spread across the virtual sound stage. Not a new idea, but it's the first time I've encountered it in a receiver and it works very well - you do of course need stereo headphones, but who has anything else these days? Have I said too much about c.w.? Then what about tuning the RD500?

Tuning

The main tuning control is positioned at the right hand edge of the panel which is fine for right handed operators but a mite awkward for others. The knob spins smoothly without too much drag, and the usual 'speed up' operates unobtrusively in all modes. Basic tuning steps are 5Hz in s.s.b., c.w. and Sync. a.m., changing to 100Hz in normal a.m. mode, and these represent ideal tuning rates in practice. However, a range of other tuning rates is provided using the 'Step' facility, and with a simple button press you can have 1, 5, 9, 10, 12.5, 25 and 50kHz step sizes. This comprehensive selection seems to cover any tuning increment an operator could wish for, and includes the important (for Europe) 9kHz step for Medium Wave listening. But the RD500 has more; with another single button press you can move a cursor underneath the frequency display and select tuning rates from 10Hz to 1MHz as you step the cursor along. Note that these functions are available at the press of a button and are therefore very easy to use.

Below the frequency display is the signal strength meter, which appears as a horizontal row of segments behind a printed legend numbered 3, 5, 7,9, and then +10, 30 and 50dB. The calibration of the meter as far as one could read it was good, and is based on 6dB per 'S' point, or in this case 12dB per numbered segment. However, before going on to the more general performance of the receiver, let me describe some of the facilities available from the front panel keypad.

Anyone who has used a calculator, FAX machine or video recorder will be familiar with the concept of doubling or tripling the functions of a press button by providing a 'second function' key. In the RD500 the primary keypad functions are alpha-numeric covering 1 to 0 and A to Z (both upper and lower case), the decimal point, scan, cancel and enter. The second functions are extensive and interesting, so read the next section with care. I can't list every second function because that would mean reproducing the operating manual, but here are the most significant:

Shift 'AUX' brings up an auxiliary function screen covering r.f. attenuator (single 20dB step); cassette recorder control via the external recorder socket, and which switches on the recorder whenever the squelch opens; insertion of an audio low pass filter; a.v.c. (nice to see the term a.v.c. rather than a.g.c.) which adds audio derived a.v.c. to the r.f.-derived control when using synchronous a.m.; and a simply labelled 'AUX' function which brings in a high impedance preamplifier on the second antenna input for use with a short whip or wire.

So what? Many receivers have a high impedance input preamplifier, but the RD500 designer has made the two antenna inputs combine in anti-phase, and by using the 'AUX' function you can thus create an antenna nulling system to cancel out local interference. All you need is a 10kΩ pot, or Fairhaven can provide a nulling box already made up. This is a very elegant facility and demonstrates the work of an inventive mind in the designer. And if this is not enough, a final function on this first button reserves memory space for recording.

Recording? Well, believe it or not, the RD500 incorporates a digital recording and playback system which can run all the time in the background and store the preceding few minutes of audio on the signal to which you are listening. This means that you can go back if you missed something, and there it is carefully preserved for you. Brilliant feature accessed at any time the receiver is in use by the Shift 'REC/PB' key.

Shift 'BPFILT' introduces you to six different functions relating to c.w. filtering and a selection of filter characteristics all of which work well, but the c.w. stereo function I mentioned earlier is outstanding. Switching between conventional filtering and the stereo filter is quite an experience, and I'm completely hooked. How can I ever listen to c.w. again without the stereo facility?

Shift 'VFILT' gives you a notch and peak filter, both tuneable by the centre knob on the front panel labelled 'Filter'. Both notch and peak filters introduce a 'phaser' type of noise which is typical of this type of filter and sounds as though you are listening at one end of a long drainpipe. However, although not as outstanding as the c.w. stereo filter, they work passably well, with the peak seemingly more effective than the notch, and they are available in all reception modes, not just c.w.

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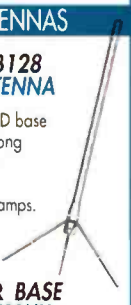

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Shift 'AGC' (why a.g.c. this time and not a.v.c.?) allows you to select three a.g.c. speeds and tie them to each mode so that, for example, if you have chosen slow a.g.c. and a.m. mode, that speed will be called up each time you subsequently use a.m., although you can change the relationship at any time by using the Shift 'AGC' function. This is a very flexible arrangement and a well thought out feature.

Shift 'NB' lets you switch an i.f. derived noise blanker on and off, whilst Shift 'PBS' brings up a pass band shift system, the use of which I have covered in many other reviews. Whilst this works quite well in the RD500, it is not a fully variable shift, having fixed steps of 200, 600H, 1100 and 1700Hz up and down in frequency relative to the centre of the i.f. and lacks the 'fine tune' effectiveness of a fully variable control - but it's a useful thing to have included in the overall specification.

The remaining second functions include 'VFO' which gives access to 26 (A to Z) stores, each containing frequency, mode, auxiliary settings and a 20 character text string. These are intended to be used as a 'notepad' facility for quick access to favourite frequencies or bands: 'CLK' which accesses a very comprehensive clock and timer setup including local and time zone information, time and date format (yes, date is included), and five timers with four having a one-year look ahead for controlling both the receiver and external cassette recorder, and the fifth being a sleep timer which will switch the receiver off after a preset time.

Future Upgrades

More facilities are being planned for the future, and these will be included in firmware upgrades from time to time (another weak pun). Shift 'COMMS' takes you into a control menu for the serial RS-232 link between the RD500 and a computer, and enables transfer of data in both directions so that you can, if you wish, download complete databases of information from the computer or upload from the receiver to the computer. Powerful stuff this, but simply executed and easily understood.

Shift 'SCAN'. This opens up a full range of frequency and memory scanning facilities, and although lacking the ultimate scanning requirement for an h.f. receiver, that of having the squelch setting stored uniquely in each memory, the RD500 provides everything else. A series of simple steps allows you to select whether to stop the scan when a signal is encountered and resume when the signal stops, wait for a preset time after the signal ends, wait for a preset time after the signal is first encountered then proceed, or scan continuously without stopping.

The simple uncluttered construction of the receiver.

Further features are auto memory in which signals are automatically stored whenever the squelch opens during a scan for later reviewing by the user, and auto tune in which the receiver automatically tracks drifting signals to ensure accurate tuning, and displays a centre zero tuning meter in place of the 'S' meter on the main display to show the auto tune in action. Finally the priority frequency can be enabled so that the receiver automatically checks this at intervals during scanning. The actual priority frequency and mode are set by the user using another function (Shift 'PRIO').

Mode selection is via a single button, which brings up a numbered screen display showing all the modes available - "USB", "LSB". "CWL" (c.w. on l.s.b.), "CWU" (obvious), "NFM" (narrow band f.m.), "ASD", "ASL", "ASU", covering all the options for synchronous a.m.), "AMW" and "AMN" (wide and narrow filtered a.m.). Listening in all modes produced pleasant results, although the lock range for the synchronous a.m. detector is narrower than on other comparable receivers. However, the RD500 never lost synchronous lock whilst I was using it, and the ability to switch modes at the push of a button made it easy to check which a.m. mode was producing the best audible results.

Radio Database

And so to the memory system, which requires a review article to itself. The storage capability of the RD500 is huge, which is why the receiver is called a 'Radio Database'. I mentioned earlier that there are 26 'v.f.o.' stores for instant access to favourite frequencies, but there are also 99 band setups which can be programmed by the user to store band start and end frequencies, tuning step size, reception mode and a 20-character text string to identify the band - for example you can programme a band to start at 3.5MHz, end at 3.8MHz, tune in 10Hz steps in lower sideband mode and show a text message saying "80 metre amateur band".

When you press the 'BAND' button the band number is displayed together with the start frequency, mode and text identifier. You can then tune around using the normal tuning knob within the band edge limits, and the receiver will 'roll over' at each band edge to start again. Selection of the band in use can be done either by entering the band number using the keypad, or the easier method of using the UP/DOWN buttons above the tuning knob. This 'Instant' access to any band you choose to put into the system is an excellent feature and well engineered. But the real power comes into play when you start to use the database:

The RD500 comes with 512Kb of database which can be expanded to 2Mb. Some of this is used by the digital recording system but the remaining memory can store 13290 channels with 512Kb or 54681 channels with the 2Mb extension. You didn't read that incorrectly, that's fifty four thousand channels. Whilst this may seem totally silly, just think of the possibility of having an entire *Klingenfuss Guide* (or even a *Ferrell's Confidential Frequency List* **Ed.**) at your fingertips stored within your receiver - quite a thought.

Of course, any memory system has to be capable of being accessed sensibly, and this is why the memories have been arranged in groups so that you could store all frequencies of common interest within a group, and label the group with a text string. When I received the RD500 I found that group A1 was designated "LW/MW

Broadcast" and the display told me that there were 33 entries already in it. By using the main tuning knob I could step through the entries, with each one coming up with frequency, mode and a text identifier such as "BBC Radio 4", or "Denmark Radio 1" and so on. By pressing the 'GROUP' button and using the tuning knob I could step through the groups, with each group title appearing as I turned. When a group of interest came along, such as "Misc. Comms." all I had to do was press 'ENTER' and I was then back to using the tuning knob to scan the frequencies within the group. And talking of scanning, I could also use the scan facility to scan all the recorded channels in the group for activity. All this is very well organised and carefully arranged to be easy to use, and I enjoyed it immensely.

Using the database as a 'lookup' is also easy, because you can ask the RD500 to search the memory titles for words, such as "BBC" or "USAF" or "France" and so on, using the alpha numeric keypad to enter the text you wish to find. Having found matching entries, you can look at them and select the one you wish to use, or you can transfer them from one group to another to build up new groups. In addition to all this, you can down load the entire memory contents to a computer using the RS-232 facility, or construct a database on a computer and up load the lot into the RD500. It doesn't end here either, because the RD500 comes complete with a package of floppy disks containing data base software and a ready constructed database. Installing this into my computer took only a few seconds and I then had an easy to use Windows data base in from which I could select and use the RD500.

The whole memory/database system has been carefully thought out and developed, and there are still facilities I'm sure I didn't investigate fully. In the owner's handbook the description of the radio receiver side of the RD500 occupies but one paragraph, which maybe shows the designer's thoughts on the relative importance of the Database compared to the Receiver.

Performance

But at £799 it still has to perform as an h.f. receiver, so I ran it through my usual r.f. performance tests. How did it do? Surprisingly well, with a noise floor of -121dBm and an s.s.b. sensitivity of -111dBm (0.7μV p.d.). The synthesiser was quiet, with a decent reciprocal mixing performance as shown in Table 1.

This is very similar to the Drake SW2 and somewhat better than the JRC NRD-345, so it's not bad at all. When I came to measure the 3rd order intercept point I came across a curious anomaly using the standard 20kHz spacing for the two input frequencies. The RD500 handbook quotes an intercept point of +10dBm, which is about the limit of performance of the Plessey first mixer used in this receiver. However, my first measurements came up with -3.5dBm which was a long way (13.5dB) down on the specification. I then took measurements at 50kHz and 100kHz and got +9.5dBm which was nearer the mark, and it was not until I checked both (2F1-F2) and (2F2-F1) products that I realised that the first i.f. filter at 45MHz was not sitting symmetrically across the receiver passband and it was the second mixer which was generating the poor intermod performance.

You're left in no doubt as to which receiver you are connecting your antenna leads to!

In other receivers I have tested, the second mixer device was often the same as the first mixer, thus ensuring that signals getting through the first i.f. filter did not generate higher intermod levels in the second mixer, and this should be addressed by Fairhaven, because it compromises the receiver's performance in the presence of close by strong signals such as those found in short wave broadcast bands. Don't get me wrong, this is a better result than at least one recently tested receiver gave, so keep this in mind when mentally evaluating the RD500, but at the same time, there is a receiver in the same price range as the RD500 which provides a remarkable +27dBm intercept point at the same signal spacing.

Final impressions

The RD500 is a different and very individualistic receiver which demonstrates the thoughts of a designer who has chosen a new path and knows where he is going. Within a small box he has built a receiver with most of the operating functions and facilities anyone could demand, but in the 'Database' concept he has clearly developed an approach which I think has great merit, and as Fairhaven progress it will be most interesting to see what comes next.

The handbook needs some serious attention as there are significant gaps in the information it contains (just what is the function of those gold plated stereo phono sockets on the rear panel?), but the r.f. performance is better than the front panel would suggest and the inclusion of neat ideas such as the use of the second antenna input as a noise cancelling system and the inclusion of a digital audio recorder shows real initiative. Well done the Brits, and well done Fairhaven.

Post Script

And just as a final taster, the RD500 comes complete with a button bristling infra red controller, which seems to do everything one could do from the front panel, but about which the handbook says absolutely nothing!

The Fairhaven RD500 retails at £799 inc. P&P direct from the manufacturer **Fairhaven Electronics Ltd., 47 Dale Road, Spondon, Derby DE21 7DG. Tel: (01332) 670707**. We have also been informed, just as we went to press, that **Waters & Stanton, 22 Main road, Hockley, Essex SS5 4QS Tel: (01702) 206835** have just been appointed as a Fairhaven dealer in the UK.

Table 1.

Spacing from wanted signal (kHz)	Reciprocal mixing ratio (dB)	dBc/Hz
5	81	115
10	83	117
20	91	125
50	108	142
100	109	143

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You're Live In Five!

Wayne Sheldon describes the techniques used by local radio stations to bring a live outside broadcast to the listener.

The modern-day local radio station aims to be an integral part of the community, no longer satisfied to wait about for issues to come to it, it seeks every opportunity to go out amongst the public. Whether it's the annual jazz festival or an interview with animal rights campaigners at a fox hunt, a car will be despatched to send back live coverage.

To send the material back to the studio a radio link is used, a land-line would be just too inflexible. Obviously, any use of radio is of immediate interest to *Short Wave Magazine* readers, so let us delve deeper.

Range Of Frequencies

The broadcasters use a whole range of frequencies tucked away in spectrum, that at a first glance, seems to be unused. Frequency guides euphemistically refer to these bands as 'Fixed and Mobile' allocations.

'Broadcast Ancillary Support' transmissions, with their low power and weird channel offsets, can be easily overlooked. It is for these reasons that hunting down outside broadcasts (OB) frequencies can be so frustrating, time-consuming, but most definitely addictive!

However, before we get down to the intricacies of allocations, let us concentrate on typical OB operations. When it arrives at the scene, the first task of the radio-car will be to switch on the transmitter, raise the link antenna as high as possible and check to see that the studio is receiving a strong, clear signal.

Often, the vehicle will be moved several feet backwards or forwards in order to find the best position. This specially equipped vehicle, often a Land Rover, contains a sound mixer, microphones and specialised receivers and transmitters. Externally, it will have several whip antennas and a pneumatic pump-up mast.

You're Live In Five - using BBC Wiltshire Sound's radio car.

Functional Equipment

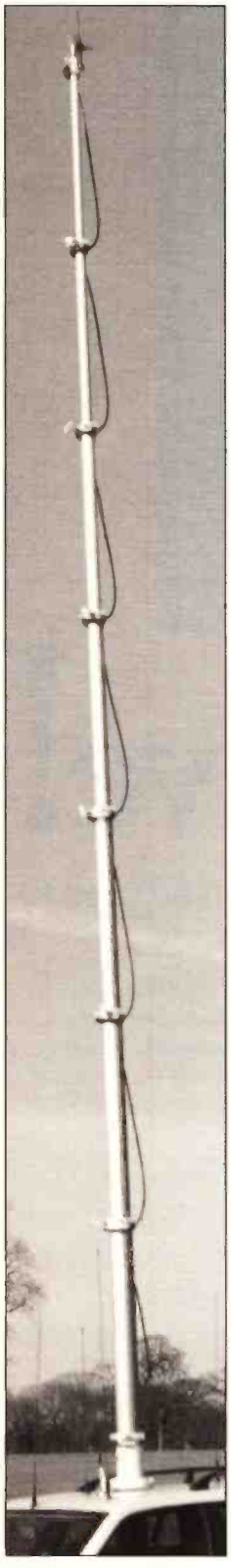
Equipment is functional, so the insides of such vehicles tend to be a little disappointing to look at. After all, the main emphasis is on ease of use and speed getting the message back to the listeners.

Usually, any records or jingles that you hear originate at the studio. This leaves the presenter free to concentrate on delivering his material. Incidentally, everything goes out live - at least, all the broadcasts I have attended have been live. There is no tape delay like you find on studio 'phone-in programmes

As you may be aware, the broadcasters go to great lengths in order to transmit as high a fidelity sound as possible, outside broadcasts are no exception. This requires a highly stable wideband transmission, on an interference free v.h.f. or u.h.f. channel. This is where the problems start as there are only a limited amount of channels available, which have to be shared by different stations throughout the country.

Interference Avoided

If mutual interference is to be avoided, the link transmitter has to be very low powered (which limits its range), or a directional antenna has to be used. In practice, a mixture of approaches is taken. Transmitter power could be typically a few hundred milliwatts from



Ready to go 'on air' with the pneumatic mast erected. Air for the mast is provided by an engine-driven compressor. The mast itself is supplied and fitted to the Peugeot 405 estate car by Clarke Masts Ltd., of Binstead, Isle of Wight.

an 'eye-in-the-sky' aircraft or several watts from a news-car.

The same goes for antennas, around town, the first choice may be a simple quarter wave vertical antenna. For more difficult terrain, a small Yagi beam antenna may be more effective.

'Remote' receivers are often installed on the top of hills and tall buildings to ensure good reception from editorially important areas. Each receiver's output is fed back to the studio on a private land-line.

The studio engineer simply selects the source picking up the best signal. In cities, reflections from high rise blocks can often lead to transmissions arriving from unexpected directions, particularly at u.h.f., hence the receiver nearest the OB is not always the best choice.

Excellent Network

The BBC have an excellent network of remote sites. Independent Local Radio (ILR) stations tend to have less ambitious set ups, no doubt reflecting their different style of programmes. For instance, an OB engineer from my local independent told me that they only had two hill top stations for reception of their link signals, each one covering a whole county, whereas the local BBC station, covering a fifth of the area, uses no less than four separate sites!

So, what are these other frequencies, alluded to earlier, used for? Firstly, the presenter or reporter at the OB needs to be given instructions by the producer back at the studio: "You are live in five..." or "Turn your microphone gain up a bit, you are too quiet". Hence, this channel is called the 'cue' or 'talkback' channel and is usually at v.h.f. around 141MHz.

Another frequency would be used for a radio-microphone, so the presenter can go 'walkabout' without having to worry about the trailing wire of a conventional type of mic. Frequencies for these can be anywhere between 52 and 860MHz, though ones in the old 405-line television bands (Band 1 and III) seem most popular.

Our intrepid radio man would of course take with him a hand-held to listen for his cues. Some DJs from stations with a tight budget (who said ILR?) dispense with talkback altogether and wander around with ordinary v.h.f. portable clamped to their ear, taking cues directly off-air.

Chopped In Two

About three years ago there was a massive re-organisation of ancillary support frequencies. The important 141MHz band, used for OB talkback and for programme sound links, was effectively chopped in half! The top 400kHz of the band was taken from the broadcasters and given to the military.

After the shake up, there were fewer channels available. For instance, the BBC lost almost half of their 13 channels. This resulted in greater co-channel interference because many more stations had to be crammed onto the same frequency. **Table 1** gives the current bandplan.

To make matters worse new services had to be squeezed into the band as well! The only way they could be accommodated was if the channel spacing was reduced from 25 to 12.5kHz. For the existing stations this was disastrous.

The minimum bandwidth required for sending high quality sound over an f.m. transmitter is just about 25kHz. Therefore, the broadcasters could no longer use 141MHz for programme links. Even if they could, they'd probably have their live broadcast wiped out by interference from some hill-top station two counties away!

After some wrangling, the DTI compensated the broadcasters by releasing a block of frequencies at the top of Band III. The allocation (in most of the country) is 223.950 to 224.500MHz. However, within 80km of London, frequencies around 213MHz were to be used initially. **Table 2** shows the 224MHz bandplan.

New Band

The new band was engineered to overcome the problem of high-powered base transmitters overpowering the weaker radio-car's. Base stations transmit studio talkback at 141MHz, whereas the mobiles transmit their high quality programme sound at 224MHz. (Full duplex is possible because the frequencies are so far apart).

Another benefit is that at a major outside broadcast, rival companies don't have their talkback receiver desensitised by the other company's radio-van parked 10m away! Traditionally, almost all of the main programme contribution links have been at u.h.f.

Between 446 and 470MHz ancillary services have a dozen or so channels, generally hidden in 'unallocated' Private Mobile Radio (PMR) bands. This may seem wasteful in terms of spectrum usage now that the 224MHz band is also in use.

However, in practice, the station's news reporters send their live bulletins over a 224MHz link, whereas a radio show would be transmitted via a u.h.f. channel. The two separate roles of entertainment and news collection can thus be conducted simultaneously.

The u.h.f. channels were unaffected by the upheavals that troubled 141MHz, but who knows what will be in store for them after Stage 3 Spectrum Review (28 to 470MHz) is completed?

The last two frequencies in Table 1, 141.375MHz and 141.4625MHz are wideband channels used by the BBC. Their 75kHz bandwidth makes them suitable for carrying a variety of different signals, for instance, very high quality music.

However, their unusual role is to support television outside broadcasts by carrying multiplexed talkback and studio sound. (Multiplexed: a cunning scheme to enable two or more conversations to be sent simultaneously over a single channel).

Up, Up And Away

Additionally, these two frequencies can also be used whilst airborne, as demonstrated by a BBC Hereford & Worcester DJ recently. He conducted his entire radio show - live! - from a helicopter circling above the county, (no, I don't know why he would want to either!). Independent local radio stations, on the other hand, favour frequencies around 455 and 468MHz for their aerial (sorry) exploits.

At some larger outside broadcasts, a small studio is set up on site, compete with sound engineer. He plays the music and mixes the sound, which is then sent in the usual way, via the 'link', back to the main studios. Here it is promptly piped back out to the medium wave

and v.h.f. f.m. transmitters and thus onto the listener. At the OB this signal is re-broadcast - usually at v.h.f. - with just enough power to cover the whole site. Interspersed with the programme sound will be talkback for the presenters.

CD Quality

Whilst chatting to my 'mole' transmitter engineer in the local public house, it came to light that there is a microwave band set aside for transmitting signals of Compact Disc quality from one place to another. As my 'mole' had no further information, I sent off to the ever helpful Radiocommunications Library at the Department of Trade & Industry for further clues.

A few days later I received a slim booklet giving the specifications for Digital Auxiliary broadcast radio relays, operating between 1.450 and 1.530GHz. Signals are pulse width modulated at 700K/bits second, which sounds suspiciously similar to NICAM to me.

If you look at **Table 3** you will see that there are ten channels in this little known band. However, only six of them may be used away from a fixed location. Beam antennas are used, so the chance of ever coming across one of these transmissions by accident is extremely slim. Nevertheless, it is still worth looking out for vehicles with strange microwave antennas.

The Future

Digital OB is obviously going to be the next major growth area for the ancillary services. Band II v.h.f. f.m. listeners have come to expect their programmes to be in stereo, something that analogue links do not support. More spectrum will have to be found at 1.5GHz for use by the new national radio services such as Classic FM and Virgin 1215.

When DAB (Digital Audio Broadcasting) starts in a few years time, CD quality OB links will be virtually mandatory. Accommodating these additional links (at 400kHz a time) into an already overcrowded band will be a frequency planner's nightmare, but for the listener, outside broadcasts will never have sounded so good!

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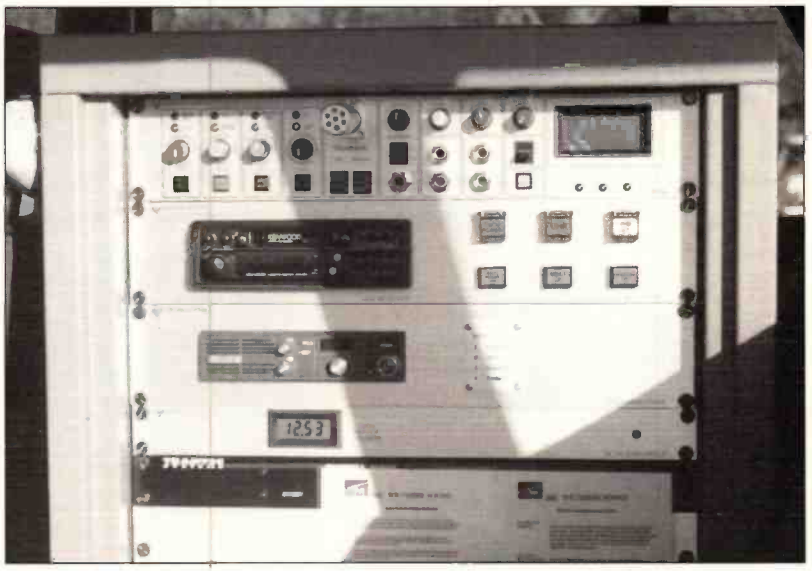


Table 1: 141.0 to 141.5MHz Bandplan - Talkback and wideband frequencies.

141.00625 to 141.19375MHz	Independent Local Radio
141.20625MHz	BBC Radio
141.21875MHz	BBC Radio
141.23125MHz	BBC Radio
141.24375MHz	BBC Radio
141.25625MHz	BBC Radio
141.26875MHz	Not available to BBC
141.28125MHz	Not available to BBC
141.29375MHz	BBC Radio
141.30625MHz	BBC Radio
141.31875MHz	BBC News
141.325 to 141.3575MHz	Not allocated to BBC
141.3750MHz	BBC 75kHz wideband channel
141.4625MHz	BBC 75kHz wideband channel

Note: Channel spacing is 12.5kHz. However it's offset by 6.25kHz - hence the odd looking frequencies.

Table 2: 223.95 to 224.50MHz Bandplan - Broadcasters programme contribution links.

223.95000 to 224.06875	ILR local radio
224.08125 to 224.16875	BBC local radio 8 chs
224.18125 to 224.50000	BBC TV/Radio/News

Table 3: Digital Auxiliary Broadcast Services, 1487.0 to 1492.0MHz

1487.25MHz	Ch1	V	ILR Fixed
1487.75MHz	Ch2	H	BBC Fixed (First choice)
1488.25MHz	Ch3	V	BT Transportable
1488.75MHz	Ch4	H	ILR Transportable
1489.25MHz	Ch5	V	BBC Transportable
1489.75MHz	Ch6	H	ILR Transportable
1490.25MHz	Ch7	V	BBC Transportable
1490.75MHz	Ch8	H	BT Transportable
1491.25MHz	Ch9	V	ILR Fixed (First choice)
1491.75MHz	Ch10	H	BBC Fixed

ILR	Independent Local Radio
BBC	British Broadcasting Corporation
BT	British Telecom
H	indicates Horizontal Polarisation
V	indicates Vertical Polarisation

All photographs by Ian Dyer, Supervisory Engineer, BBC Wiltshire Sound.

Above: The OB installation inside the vehicle. Note the all-important 'Programme Meter' on the top right of the unit and the Kenwood car radio for monitoring purposes!

Bottom Left: A lot of equipment in a small place! The OB equipment is mounted behind the driver's seat in the estate car. The installation is typical of a series of vehicles fitted out by Gemtek systems to a BBC specification and similar vehicles are employed by BBC Radio Gloucestershire, WM & Shropshire, and Hereford & Worcester.

30 Years Of BBC Colour Television

The first colour television service in Europe was introduced on 1 July 1967, albeit on a very limited scale, when the BBC just managed to pip the West German television service to the post! The full BBC-2 Colour Television Service on began on 2 December 1967. Keith Hamer and Garry Smith relate the story.

Fig. 1.1: A caption radiated in the late fifties to announce the start of a BBC experimental transmission in colour.

Fig. 1.2: The first BBC-2 Identification Symbol used for Colour Television in 1967.

The First Colour Transmission

Colour television was demonstrated as far back as 5 September 1928 by John Logie Baird in Glasgow. He demonstrated both his colour and stereoscopic inventions to the British Association. The process resembled three-colour printing or three-colour cinematography. The images were transmitted alternately in green, blue, and red at the rate of 30 images a second, or three times as fast as a normal television. Because the eye blends the three colours, the process gave the impression of natural photography. The screen used on 5 September 1928 was about 50mm square, and only 'close-ups' of assistants' heads, flowers, and a policeman's helmet were shown.

Baird's Colour Television

Although transmissions using Baird's monochrome television system were discontinued in 1937, the inventor continued his research and on 20 December 1940 he demonstrated his new colour television system. The experiment was conducted at his home on a screen 760mm wide and 610mm high and was, apparently, a great success. The colours of hair, clothes, and other objects were reproduced faithfully and the pictures in colour were much better than those in black-and-white, which John Logie Baird also demonstrated as a comparison.

The screen was part of a radio-television-gramophone which Baird had evolved as a deluxe model for home use. He was actively trying to make a smaller television-only version with a screen 127 x 100mm.

Techniques for showing television programmes to cinema audiences were being planned, but the transmission definition of 405 lines (which determined the quality of the picture) was not high enough for cinema showing. In 1946, it was thought that the most interesting developments could have come in outside broadcasts, one of television's biggest triumphs. Experts predicted that "coloured and stereoscopic systems may also be adopted in the future".

Early Research

The BBC began preparatory work on colour in the laboratory as long ago as 1946. Engineers investigated the problems associated with colour optics without regard to any particular system of colour television. The research work included an appraisal of colour fidelity, involving colour analysis and synthesis, and of fundamental physiological aspects such as the effects of colour flicker and the problems associated with colour on visual acuity.

This research led to the design of a colour television camera channel and, later, a 16mm slide-and-film scanner. With this equipment, colour pictures could be produced and studied on a colour monitor constructed for the purpose using a sequential scanning process providing separate red, green and blue signals.

Prior to 1949, it was thought that a practical

Part 1

Fig. 1.3: The mechanical Globe Identification Symbol used by BBC-1 to introduce colour programmes, which began on 15 November 1969.

television system would require the transmission and reception of these three signals, each occupying a bandwidth equal to that of the existing monochrome system (3MHz for the British 405-line system). Such a system would have resulted in a grossly inefficient use of spectrum space, even if the space were available, and would have had another disadvantage in that the system would not be compatible, that is, it would not enable a satisfactory black-and-white picture to be received on existing monochrome receivers.

In 1953, the National Television System Committee (NTSC) in America put forward a system in which only two signals needed to be transmitted, one describing variation in brightness of the scene to be transmitted (the luminance signal) and the other, variations in saturation and hue (the chrominance signal). These signals were (and still are) transmitted simultaneously and interleaved in such a way that they occupied no more bandwidth than the equivalent monochrome transmissions. Furthermore, the transmissions enabled a satisfactory black-and-white picture to be obtained on a normal monochrome receiver.

High-Definition Colour Television

On 7 October 1954, the first high-definition 'compatible' colour television picture was radiated by the BBC from the medium-power transmitter at Alexandra Palace. The transmission consisted of slides and 16mm motion pictures and was generated from equipment working on 405-lines using a modified version of the NTSC system which had been used as the standard for colour television in the USA from December 1953.

The transmission standards employed during the BBC tests in October 1954 were very similar to those used on a regular basis from October 10, 1955. Only one colour television receiver was actually available to display the pictures on this very historic occasion, but by all accounts there was a large viewing public watching the compatible monochrome pictures in their own homes on standard domestic television receivers. Members of the press were given a demonstration of colour television on 20 October 1955. No doubt many newspapers and journals of the day carried exciting articles about the new hi-tech invention.

Many hundreds of tests were subsequently carried out as a joint effort between the Research Department of the Marconi Wireless Telegraph Company and the BBC Engineering Division. Observers concluded that in the adapted NTSC system there existed a standard capable of providing excellent colour pictures and compatible monochrome signals of a very high standard.

During the winter of 1955-56, a regular series of test transmissions was radiated from the transmitter at Alexandra Palace. The main purpose of the transmissions was to test the compatibility of the pictures on a comparatively large sample of domestic receivers. Again, only slides and 16mm films were used, this time the equipment being of BBC design and manufacture. Prior to the start of the tests, Studio A at Alexandra Palace had been equipped with a single colour camera of Marconi design.

Live Scenes

The first occasion on which colour pictures including 'live' scenes from the studio were broadcast occurred on 3, 4 and 5 April 1956 during a special demonstration for delegates of Study Group IX of the CCIR (Comité Consultatif International des Radiocommunications) who were visiting the UK, as part of a world-wide assessment of the development of colour television.

Studio A at Alexandra Palace had been equipped with a second experimental colour camera by the autumn of 1956 and, a little later, a 35mm Cintel film scanner was installed to supplement the slide and 16mm film scanner. With this equipment, together with the enthusiastic help of a small group of staff, an ambitious and comprehensive series of programmes was broadcast. The programmes were beamed from the Crystal Palace outlet due to the closure of the Alexandra Palace transmitter on March 28th, 1956. These tests took place in the winter of 1956-57 and were observed in people's homes on specially developed experimental colour receivers. The transmissions were, of course, also seen by a much larger audience using black-and-white domestic sets.

On 30 and 31 January 1957, a special programme was broadcast for the benefit of a large gathering of members of both Houses of Parliament on six receivers installed in a room inside the House of Lords.

UHF Field Trials

On November 11th 1957, experimental monochrome television transmissions began in Band V on 405 lines from the Crystal Palace transmitter. A further series of experimental colour programmes was broadcast from the studio at Alexandra Palace during the winter of 1957-58 and was seen by a much larger audience on colour receivers than in the previous year. The main objective of the tests during this period was to assess critically the quality of the colour picture which could be obtained in the home under normal viewing conditions.

The tests also gave engineers the opportunity to investigate any problems which may have arisen at the transmitting end. The transmissions included a substantial number of broadcasts from the studio with 'live' cameras which would, as in any broadcast television service, have been the principal source of colour programmes. After the results of the tests had been analysed it soon became obvious that an acceptable colour service could be given. It was later decided, in full agreement with the British Radio Equipment Manufacturers' Association (BREMA), who had co-operated in the experimental colour work from its beginnings, to radiate a further series of tests during 1957-1958 but with some change of emphasis.

At the conclusion of these tests in 1958, the studio at Alexandra Palace was dismantled and the cameras installed temporarily in a van which carried out two outside broadcasts. The slide-and-film scanning

Fig. 1.4: The BBC Colour Test Card 'G'. A modified version of this was first transmitted in 1972.

equipment was moved to the studios at Lime Grove from where a regular series of colour test transmissions was radiated outside normal programme hours. This series of tests began in the autumn of 1958 and continued, with only short breaks, until 1960. In total, the long series of test transmissions had extended over almost six years. This was, by BBC standards, quite an exceptional period of time. Some people at the BBC began to ask why the introduction of colour television remained in a state of suspended animation with the prospect of a colour television service apparently no nearer by 1960. By that year, it was anticipated that the NTSC system would eventually be adopted in every country throughout the world!

'Ally Pally' Studios Converted For Colour

The studio from which the experimental programmes originated was the old Studio A at Alexandra Palace where the world's first, regular, public high-definition Television Service began on 2 November 1936. It was most appropriate that the first experimental colour programmes to be radiated in the UK should also find their home in this studio using in all major aspects (with the addition of chrominance signals) the same scanning standards as those of twenty years before.

Studio A had a floor area of some 186m^2 (2000 sq. ft) and was equipped with a lighting system of simple design capable of providing about 150kW of power for the modern illuminators which were necessary to produce an acceptable colour picture. The two cameras were three-tube 3-inch image orthicon types manufactured by the Marconi Wireless Telegraph Company. The camera tubes had to be closely matched for geometry and shading and transfer characteristics. For use in the studio where the colour temperature of the lighting was about 3200K, the most sensitive tube was selected for the blue channel and the tube with the best definition was used for the green channel.

Up until March 1957, only RCA image orthicon tubes (type 6474 having a G5 decelerator electrode and no field mesh) were used, except for the demonstration to the Houses of Parliament on 30 and 31 January 1957, when one camera used English Electric image orthicons (type P809), which were on loan from the English Electric Valve Company. A number of tubes having an antimony-caesium photo-cathode were tested at Alexandra Palace as, theoretically, these could have had a sensitivity four times greater in the blue part of the spectrum than a conventional caesium-bismuth silver photo-cathode. However, the results were disappointing and many tubes were found to be less sensitive. The tubes lasted for only seventy-one hours before being withdrawn from service due to ion burns.

The camera viewfinder employed a 7-inch tube of good quality. The output of the red, green and blue head amplifiers could be selected for viewing either singly or with red or blue superimposed on green or with all three outputs superimposed. During programmes, the viewfinder was normally switched to the green channel although occasionally the red channel was selected. The viewfinder was often at an inconvenient height for the cameraman due to the large physical size of the camera. An attempt was made to use a periscope attachment to lower the effective height of the viewfinder. This hi-tech innovation proved to be extremely unpopular with most of the cameramen!

Sound

The sound facilities in Studio A at Alexandra Palace were provided by one boom-mounted microphone and five fixed points. A flying-spot 35mm colour film scanner manufactured by Rank-Cintel was installed in an adjacent room. There was also a combined flying-spot scanner, made by the BBC, for viewing 2 or 3in transparencies as well as 16mm film. The signals from these machines, and from the studio cameras, were fed in RGB form to the combined apparatus and production control room where each source had its own decoder from which the signal was obtained in its NTSC form. The mixer was a standard eight-channel type operated without a line-clamping amplifier and was fed with composite coded signals from each source. To enable fades to black-level, one of the eight channels was fed with 'syncs and burst'. In order to maintain the correct picture/sync ratio, it was necessary to fade up a second channel as the first was faded down. This was sufficient for most programme requirements but it was not possible to superimpose two channels which required full modulation from each because the resulting double-amplitude colour 'burst' would have operated the chrominance automatic gain control circuits in receivers and reduced the saturation accordingly.

All the ancillary equipment, such as the wave form generator, camera control units and distribution apparatus, was also housed in the control room. A seven-way mixer was used to control the inputs from the six microphone points in the studio and the sound from the desk and tape machines plus the audio from the 16mm and 35mm film scanners. Three colour picture monitors based on the RCA shadow-mask tube and designed and manufactured by the BBC were provided. One displayed the picture being transmitted to the network while another previewed the next camera shot.

The third monitor was used for general purposes including the display of the broadcast picture as received off-air from the Crystal Palace transmitter.

These monitors, which were in short supply, were carefully positioned so that they could be seen to the best advantage by the camera control operators as well as the producer and vision switcher.

In Part 2 Keith and Garry will continue the story.

Romanian Summers

Michael Osborn recalls his experiences of radio and life in Eastern Europe.

It's surprising what a young student, not to mention aspiring journalist and broadcaster will do to gain experience in his cherished field. I have been that very youth, who since 1990, has been to Eastern Europe time and time again to work for the English Language World Services there.

Aside from gaining professional experience, I was able to listen to the radio on Europe's other side and witness countries undergoing tumultuous, often difficult change. My impressions and memories are strongest from Bucharest and Radio Romania International.

Unusual Vacation

The prospect of an unusual summer vacation alongside the chance to work at a radio station led me to Romania back in 1991 and again during 1995. I had been a regular listener of Radio Romania's English programmes since the 1989 Revolution, which helped to change my impressions of the country. But I was still haunted by the awful television images of starving, abandoned orphans and a country strangled near to death by its former rulers.

Above: Ceausescu's Palace, Bucharest.

Top right: Romanian Radio HQ, Bucharest.

I was met at Bucharest's then run-down airport by Frederica Dochinoiu, the radio's head of English programmes, whose home I stayed in during the hot Balkan summer of 1991. We rode into the centre of Bucharest over unkempt roads and quickly saw evidence of the damage done to the city at the whim of murdered dictator Nicolae Ceausescu.

First Impressions

Frederica was very eager to record my first impressions of Romania when we reached Romanian Radio's grandiose building that very afternoon, clearly,

interviews were to become a regular feature of the many times ahead at the radio house.

Working at Radio Romania International gave me every opportunity to take public transport alongside Bucharesters every day (including the slick underground system, the useful Ceausescu legacy) and explore a city of some two million people, but at this time, showing the effects of its grim past, and suffering economic hardships.

My presence as a Westerner was all too obvious as small children pestered me for lucrative dollars and shops appeared drab with little on offer. By 1995, however, I was no unusual sight as Romania had embraced the West fervently and shops were brighter, not to mention prices hugely inflated. Strikingly, lottery fever now gripped the Romanian capital!

Romanian Radio

Romanian Radio lies on the Strada General Berthelot, tucked away in the centre of town. It remains here despite a Ceausescu scheme to re-locate the radio house to a stunningly large building down town, rather like his infamous 'Peoples' Palace' that is today a part-finished shell.

The English Section occupies a couple of uninspiring offices alongside the station's additional 15 language services, staffed by a small team of reporters and translators. My job as resident native English speaker was to check over the news and programme scripts, whilst my services as a presenter were often called upon for evidently desirable native tones! It was an honour to host *Listeners' Letterbox* above all, popular with audiences back home.

The English staff took a very lively interest in my

presence in their country and my thoughts on Romania. Being a member of their target audience, they were anxious to find out what I thought of their broadcasts. All this led them to record a flourish of interviews amass with probing questions!

The English Section also sends staff every year to Romanian Radio's station situated in the Black Sea coastal resort of Mamaia, which for a time took me away from the capital, and lead to further radio interviews! Radio Vacanta (Holidays) is a seasonal service with programmes in English, French, German and Russian, especially for foreign tourists between May and October, which can be heard beachside during the day, as well as over 1458kHz on the radio. This radio service stands as a testament to Romania's important and vibrant tourist trade.

Special Attention

Since 1989, the English Section has interviewed many foreign visitors to the country, paying special attention to any of their listeners venturing into Romania. This is in stark contrast to the pre-1989 days of Radio Bucharest, when any such contact was forbidden and the programmes merely brimmed with over-ripe statistics about the economy and other propaganda. In fact, an apology for enforced years of untruths was broadcast soon after in December 1989.

However, despite the English Section of Radio Romania International winning the freedom to produce a variety of programmes more accurately projecting their country to the world, my visits there revealed other new problems. The English Section's than drab offices (finally re-decorated amidst chaos in 1995) were often short of paper and tape reel, raw essentials for the work of broadcast journalism.

The din of the old-style mechanical typewriters drowned out all other life at busy times, blunt evidence of the absence of computers at Radio Romania International, even in 1995. The work of the journalists was hindered by masses of antiquated paperwork and constant shortages of essential resources.

Indeed, a country that ranks as the second poorest in Europe can barely afford to operate such an extensive short wave service, and the government continues to cut away at subsidies. A Romanian friend confessed to me that poor audiences are affecting the state-run Romanian Broadcasting Corporation, as Western-style competition has introduced choice to Bucharest's radio dial.

Different Stations

Always with portable receiver and convertible power supply whilst abroad, checking the f.m. band in the Romanian capital shows it is developing, albeit carefully regulated. The state has allowed private broadcasters to set up since early 1990 over the regular 88-108MHz range, whilst the East European 66-73MHz continues to be used, although I was unable to monitor this band!

Eleven stations were heard, including the RBC's prime service 'Actualitati', a mix of current affairs and music. Radio Contact is perhaps the best known private station and jockeys for the vital youth audience alongside Pro-FM, Delta Radio and Radio 20 Plus. They deal in a diet of snappily presented Western 'pop' music and commercials, whilst the RBC sticks to more sedate, serious programming.

Meanwhile, the private broadcasters have won agreements with the BBC, Radio France International and even Adventist World Radio, to relay their Romanian and French news bulletins and other material direct over f.m. As a simple consequence of geography (Bucharest is just over 45km away from the border), Bulgarian Radio's programmes were crisply heard on the f.m. band to compliment the foreign presence on the city's local radio dial, aside from vibrant broadcasting generated by the Romanians themselves.

Reception & Entertainment

Short wave reception left much to be desired in the apartment block of my friend Ana-Maria, whose family home I stayed in over the summer of 1995, although the BBC World Service could be found with comparative ease. However, Romania boasts plenty of beautiful countryside and open spaces offering many an excellent listening post.

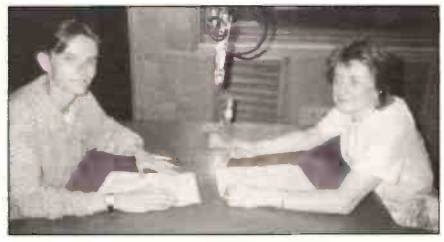
Broadcasts in Romanian from many stations naturally proliferate Romania's short wave, but unlike 1989, when foreign radio was often the only source of reliable information, freedom has brought more accessible forms of entertainment, like American 'soaps' all over Romanian TV, access to cable and satellite channels too. The station regularly viewed at the radio house was in fact the ubiquitous Cable News Network (CNN).

Endearing Place

Such summers spent in Romania have left an indelible impression in many senses. It is a country still suffering from the impact of past tyranny and definitely struggles to success with democracy, the free market, plus both the good and bad of Westernisation. This became all too obvious whilst I worked at Radio Romania International's English Section, where broadcasters piece together programmes about their country, for the world, with inadequate resources and literally on a shoe string!

The station remarkably manages to provide a voice for Romania, a country woefully ignored by our own media. Above all, it was their invitation that provided me with experience of not just a radio station, but an endearing people and country.

English Section staff members (summer 1991) including Michael Osborn.



Michael Osborn and Frederica Dochinoiu presenting Listeners' Letterbox.

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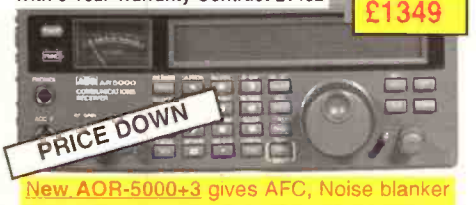

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For the very best in ATUs the AT-200 has to be the choice. Hundreds in use around the UK - it's the best.

MFJ-784B DSP filter

W&S £239

- 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.

OptoElectronics Scout

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

W&S £348

Free Freq. Guide

The sure way to get frequencies

OptoElectronics Xplorer

25-1300MHz
Nearfield Monitor

W&S £798

PRICE DOWN

- Complete FM Receiver
- Spectrum scan in 1 second!
- Reads out exact frequency
- Records "hits" and multiples
- Shows tones and deviation
- Computer interface option
- Ni-cads & AC charger

WATSON FC-128 Counter

1MHz - 2.8GHz

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!

W&S £79.95

WATSON QS-400

NEW W&S £9.95

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

WATSON QS-300 Desk Stand

Super W&S £19.95

- Handheld Desk Stand
- Firmly holds handheld
- Adjustable angle
- BNC plug to SO-239 socket

Portable Antenna

1.8 - 30MHz W&S £14.95

Unwinds to 28ft, supplied with 3.5mm plug and whip clip adaptor. Winds back in seconds. Great for portable use, indoors etc. Connects to any receiver

WATSON BNC Scanning Whips

Watson Super Scan Whips

No other models offer the same features and performance. Beware of copies that only "look the same!" You can rely on Watson to give you the kind of performance and quality that is synonomous with the name. The most popular scanning antennas in the UK. - Fact!

- 25MHz to 1900MHz
- Fully flexible with BNC fittings
- Out-perform all others

Tele-Gainer 41cm long rigid telescopic whip with knuckle joint £14.95

Regular-gainer 21cm flexible whip that is ideal as replacement whip £12.95

Super-Gainer 40cm flexible model for the ultimate in gain £19.95

WATSON WSM-1900 Antenna

Mini -Magnetic Scanner Mobile Antennas

W&S £29.95

Airband Civil & Military model WSM-225

- 25MHz to 1.9GHz Car Antenna
- 29cm super magnet that really sticks!
- Low profile 400mm long black whip
- 2.75m of coax fitted BNC plug
- Out-performs all others
- Scanning whilst on the move

WATSON WMM-1 Modem

Lowest Price Ever!
Money Back Warranty

W&S £69.95

The best value in data decoders!

- 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

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.

WATSON WEP-400 Earpiece

W&S £14.95

- Improved
- Soft pad
- Left/right fit
- 8 Ohm driver
- Extremely comfortable
- Fitted with 3.5mm plug

WATSON WSC-2 Belt Case

NEW W&S £14.95

Combined quick release spring clip and belt loop. Self adjusting, fits all handys.

Meteor Scatter Reception

Joe Carr K4IPV brings us some more fascinating radio aspects of nature's incredible phenomena - The continuing story of Radio Science Observing.

Meteors are the blazing final display of objects from Space that are destroyed by the friction of plummeting through the Earth's atmosphere at extremely high speeds. Meteor scatter communications and DXing uses the ionised trails of falling inbound meteors to scatter or reflect radio signals.

My first introduction to meteor scatter was in amateur radio when I was a teenager. One of the men - 'Irv' - in our local amateur radio club was a noted 2m band (144-148MHz) DXer with around 27 states to his credit. For an east coast operator, at that time, working 27 states on 2m was an astounding feat. Most 2m communications was 'line of sight', or just over the horizon. Irv' explained how he used meteor scatter to work distant states.

Both amateur operators and receiver enthusiasts can DX using passing meteor ionisation trails. If you own a v.h.f. scanner - or other receiver, then it's possible to pick up distant stations that are normally inaudible when their signals are reflected from meteor trails.

The diagram **Fig. 1** shows the basic scatter mechanism for meteor trail DXing. Signals that leave the transmitter antenna at the angle shown would normally pass right through the atmosphere without suffering enough refraction to be bent back toward earth (which is how high frequency 'skip' communications occurs). When a meteor plummets through the ionosphere towards its fiery death, it leaves behind an ionised trail that acts like a radio mirror. Signals that intersect the trail are forward-scattered back to the earth, rather than travelling into outer space. If a receiver antenna is located at the point where the signal returns to earth, then a brief spike in signal level is heard. We will talk a bit about the types of signals heard in a moment.

Meteors

Meteors are called the 'driftwood of space' because they are formed from the debris zipping through space. Some meteors may be pieces of asteroids, or small objects that are left over from the formation of the planets. The Antarctic meteor that some scientists claim show signs of life was, it is believed, blasted off the surface of Mars by a large impacting object. Some space debris may also come from our Moon or other objects in the solar system. Now that we have a lot of man-made 'space junk' up there, I supposed that not all 'meteors' are natural material.

Meteors consist of pieces as small as a grain of dust, or big enough to do some really serious damage on earth. Even the grain of dust sized objects can cause a streak of light as it burns up in the atmosphere. Some

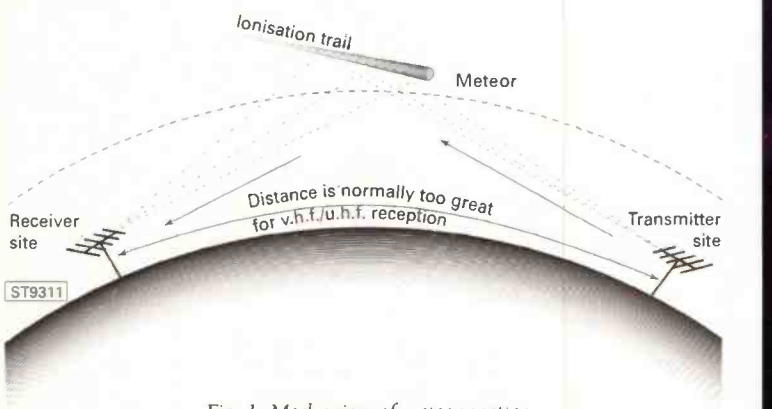

Fig. 1: Mechanism of meteor scatter.

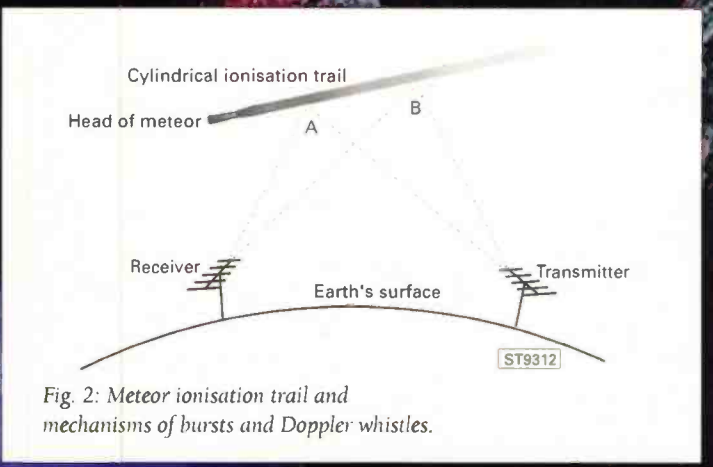

Fig. 2: Meteor ionisation trail and mechanisms of bursts and Doppler whistles.

scientists believe that the extinction of the dinosaurs occurred because of a massive meteor hit, probably in the Gulf of Mexico and Yucatan area of Mexico. In Arizona there is a meteor crater that is 1.6km wide and 180m deep. That's serious! Incoming meteors have velocities ranging from 11 to 72kms^{-1}.

When a meteor hits the atmosphere it packs a large amount of energy. That energy is given up in the form of friction and ionisation of the atmosphere. The friction is great enough to heat the meteor to incandescence, which is seen from the surface as 'shooting stars'. Oddly, for all the great visual display only about 10% of the energy is accounted for by friction, and the rest by ionisation. Unless, of course, the meteor is large enough to hit the earth's surface, in which case some of the energy is expended making the ground shudder and killing dinosaurs.

Ionisation by incoming meteors occurs as low as 50km and as high as 150km, with most being in the range 80 to 110km. The ionisation is caused by the high speed and incandescence of the meteor passing through the earth's gaseous atmosphere. Electrons are stripped from air molecules, causing the ionisation phenomenon.

Meteors & Radio Signals

OG Villard W6QYT reported on meteor detection by amateur radio in the June 1947 issue of *QST* magazine. During World War II, other observers, especially radar operators and scientists, noted sudden bursts where signal strength popped up and then dropped back down again. Most of these 1941 events were on the newly developed 100MHz radar units. In World War II, these anomalies were recognised as scatter from ionised meteor trails. Earlier observers - c1936 - had observed the same anomalies, but the source was not correctly identified.

The cylinder of ionisation that accompanies a meteor is shown in **Fig. 2**. The cylinder forms in nearly a straight line, with the degree of ionisation falling off both along the line - as the meteor loses energy - and radially outward from the line of travel.

Two different phenomenon are observed: **signal level bursts** and **doppler whistles**. A burst is a sharp increase in the signal strength of a distant station. In some cases, stations that are barely audible will jump to S7 to S9 or more for a very brief period, and then drop down again. In other cases, stations that are not audible at all suddenly become audible for a brief period. These increases can be seen by a brief kick of the receiver's S-meter, or are noted audibly in headphones or loudspeaker. The geometry of the signal at point 'A' in **Fig. 2** shows how bursts occur: the signal reflects 'mirror-like' from the ionised trail.

Doppler whistles occur from situations like the geometry of point 'B' in Fig. 2. In addition to the forward scatter of point 'A', there will be a weak signal

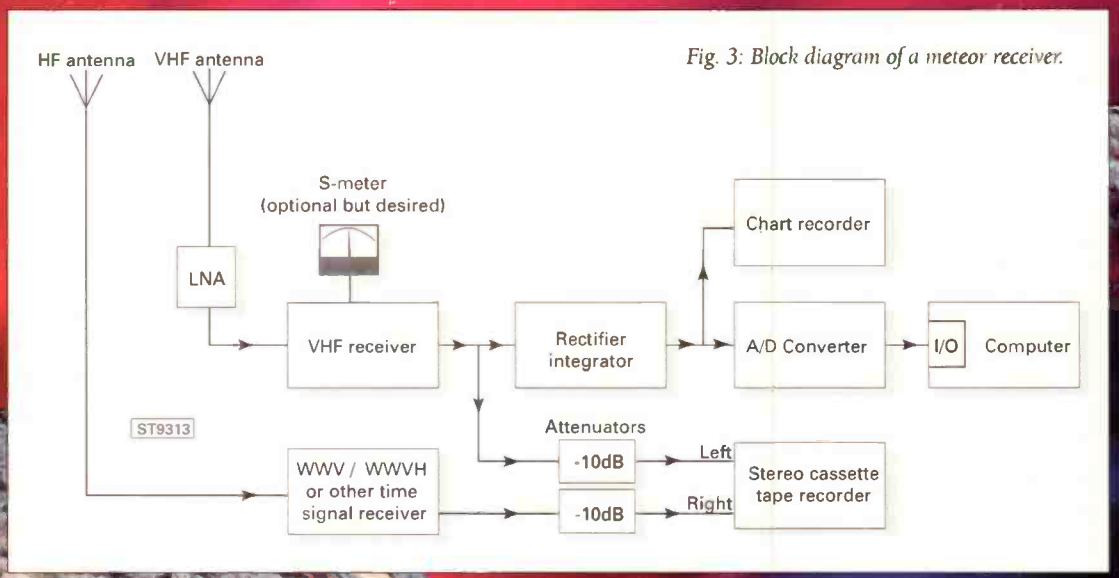

Fig. 3: Block diagram of a meteor receiver.

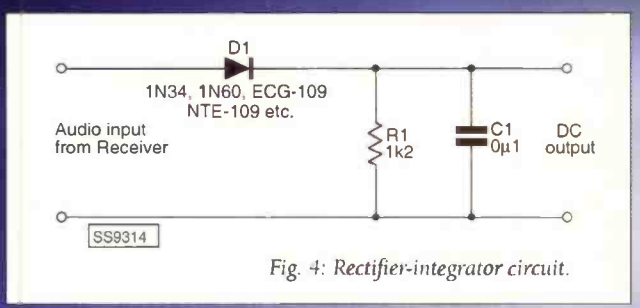

Fig. 4: Rectifier-integrator circuit.

scattered from the high velocity head of the meteor (B). This path is described as 'rapidly lengthening', which results in a Doppler shift of the signal frequency. When the direct and Doppler shifted signals arrive at the receiver they produce a beat note that descends from a high to a 'gurgling' or 'grunting' low tone.

Many of the earliest observations of meteor scatter were noted in the high frequency short wave bands, especially 25m (11MHz) and 31m (9MHz). Others noted activity on 11m (27MHz, today's Citizen's Band) and 28-30MHz (10m amateur band). In the 1930s, 10 and 11m operation was considered u.h.f. and was a daunting technical feat. Surface distances of 2200km were noted. Today, there is so much activity on these bands that making meteor observations is extraordinarily difficult. If you look for h.f. bursts, then wait until the maximum usable frequency (m.u.f.) drops below the point needed to encourage ionospheric skip. Even then, the signal intensities will be lower than in the v.h.f. bands ie.50-300MHz.

In October 1946 a spectacular Radio Science Observing event occurred, and many amateur operators took part. The Giacobini-Zinner comet made its periodic reappearance, dragging with it a healthy collection of space debris. Amateur radio operators made observations in the 6m band (50-54MHz). According to one observer: "...by about 8:30p.m. a peculiar rumble was noticeable on all 50MHz signals coming from beyond the horizon". The normally 'local' 6m band saw DX of 320 to 2000km all across the band. These openings occur from other causes as well, but are somewhat rarer than on, say, 10 or 11m.

The 6m amateur band is usually for local communications, but not nearly as local as the 2m amateur band. These v.h.f. frequencies are almost universally regarded as 'line of sight' bands. By 1953, however, amateur radio operators were using meteor scatter for 2m DX. Contacts between stations 1500km apart became possible. Up to 37 states could conveniently be worked from the east coast of the United States. Certain well placed stations in the centre of the country could access stations in the entire lower 48 states (which was all of our states in the 1950s - Hawaii and Alaska became states later on).

A lot of amateur operators use c.w. dot-dash Morse code for weak signal experimentation because it is a lot more efficient than voice modes. But on meteor scatter, normal speed c.w. is chewed up mercilessly by the rapid flutter characteristic of meteor scatter. The dots had a way of disappearing into the fading rhythm. But the flutter was rapid enough to permit amplitude modulated (a.m.) signals to remain intelligible. Some amateur operators - mostly in Europe - use very high speed c.w. for the transmission. These signals were recorded on tape as they are transmitted, and then played back at a slower speed to decode the transmission.

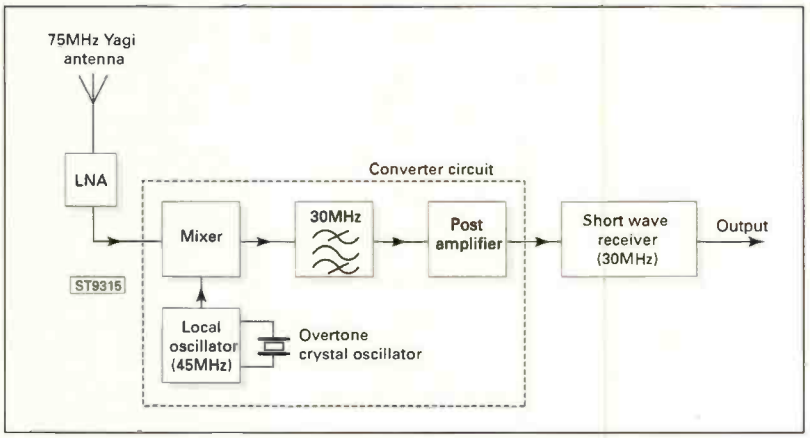

Fig. 5: 75MHz converter block diagram.

Observing Opportunities

Meteors occur all the time. One source claims that more than 100 million dust-size particles hit the earth's atmosphere every day, and many of them are visible. Look into the sky on most nights and you will occasionally see a 'shooting star'. These are meteors. Although meteors impinge earth all the time, there are several times every year when the incidence goes up because a 'meteor shower' occurs. **Table 1** shows the major showers with the peak dates, observation times for 40°N latitude and 55°N latitude, as well as 35°S latitude, and the antenna offset direction for maximum yield.

Simple Systems For Reception

Amateur radio operators have been observing and using meteor scatter communications for several decades. But you don't need to have a amateur licence to participate. But if you have a v.h.f. receiver, then you can watch for meteor activity. Although the high frequency bands exhibit some meteor activity, it is not as intense as in the v.h.f. region and is obscured by too many other signals. Indeed, the 11m Citizen's Band (once popular for meteor observers) is impossible today.

The v.h.f. bands between 50 and 300MHz are accessible to most scanner owners. The greatest activity occurs in the 50 to 150MHz region. There are a number of stations on the air constantly in this region, so they make good beacons. In the United States, such signals are lower v.h.f. TV channels 2 through to 5, the f.m. broadcast band - 88-108MHz - and the 75MHz FAA beacons. Equivalent frequencies in UK and the rest of Europe can also be used for this purpose.

On the 10m amateur band, a DX club operates a series of beacons on 28.200MHz, and these can be used for meteor work. The 10m beacons are operated on all continents, and can be used to predict propagation. The beacons transmit signals in 10dB steps, and are repeated every three minutes. The transmissions are sent as Morse at 22w.p.m., followed by a series of four one-second dashes. These dashes are sent at power levels of 100, 10, 1W and 100mW (giving the -10dB steps).

More detail on currently operating beacons is available on the World Wide Web at http://www.ncdxf.org/beacon.htm Also on that web site are links to other sites where you can download computer software of interest to DXers. **Table 2** shows some of the beacons that are currently on the air. Check the web site for additional frequencies that are expected shortly.

Figure 3 shows the block diagram of a simple meteor detection system based on a v.h.f. receiver. Although a receiver with an 'S-meter' is preferred, others will also work. A v.h.f. antenna aimed at the correct section of the sky picks up the signals. The signals are then amplified in a low-noise amplifier (LNA), before being applied to the antenna input of the v.h.f. receiver. Turn off any limiters - as in f.m. receivers- or a.g.c. that may be in use.

The audio output of the receiver is split into two paths. One path goes to a rectifier-integrator - see **Fig. 4**, while the other goes through a 10dB attenuator pad to the line input of a stereo cassette tape recorder. If you have a receiver with an 'a.g.c. output', then use the d.c. signal produced for the a.g.c.

The rectifier-integrator is one of several similar designs originally made popular by amateur radio astronomer Jeff Lichtmann. It consists of a germanium diode rectifier, followed by an RC integrator. The diode can be either the 1N34 or 1N60. In v.l.f. SID hunting receivers the integrator has a long time constant, but for this purpose (looking for rapid bursts of energy) a very short time constant (100 to 200μs) is used.

The output of the rectifier-integrator is fed to either (or both) a paper chart recorder or an analogue-to-digital (A/D) converter. The A/D converter is used to convert the analogue d.c. voltage to a form that the computer can use. If the signal is fed to more than one instrument, for example both a chart recorder and the computer, then some means of isolation may be necessary. A unity gain non-inverting operational amplifier can be used for this purpose.

If you want to keep a time track to correlate meteor activity with others, then use a short wave receiver to monitor a standard time station. In the USA, WWV (Colorado) or WWVH (Hawaii) are used. WWV and WWVH operate on 5, 10, 15, and 20MHz, and provide voice and digital time signals (the male announcer is in Colorado, the female is in Hawaii). Feed the audio output of the time receiver to the unused audio input of the stereo cassette recorder - which is of course why a 'stereo' recorder is used.

VHF-to-Short Wave Converter

If you don't have a suitable v.h.f. receiver, but do own a reasonably decent short wave receiver, then you can build a converter that makes it possible to hear v.h.f. signals on the short wave bands. **Figure 5** shows a typical converter block diagram for a 75MHz FAA beacon receiver. It can also be used for other frequencies in the 30-200MHz region, provided that the correct crystal and other components are provided. The antenna and LNA are as shown in **Fig. 3**, with the converter circuit inside the dotted line. The mixer and local oscillator (l.o.) combined by the heterodyning process to produce a difference signal (r.f.-l.o.) at 30MHz. The difference frequency is called the 'intermediate frequency' - i.f. - in Superhet radios. Other i.f. frequencies can be used, but make sure that neither the i.f. nor the l.o. harmonics will fall inside the receiver passband. In other words, don't use any combination in which 75MHz (or other selected v.h.f. frequency) is an integer multiple of either l.o. or i.f. otherwise you are creating in-band 'birdies' The correct difference signal is

Table 1: Meteor Shower Data

Shower	Peak	Velocity (kms^{-1})	Rate/Hr	Path	Time (Local)	Latitude	Antenna
Quadrantids	Jan 1-4						
Offset		42	50	NW-SE	0200-0740	40N	SW
		42	50	E-W	0740-0900	40N	S
		42	50	NE-SW	0900-1430	40N	SE
		42	50	NW-SE	0100-0430	55N	SW
		42	50	N-S	0430-0700	55N	W
		42	50	N-S	0940-1220	55N	E
		42	50	NE-SW	1220-1545	55N	SE
ETA Aquarids	May 1-6						
		64	15	NE-SW	0400-0630	40N	NW
		64	15	E-W	0630-0830	40N	N
		64	15	NW-SE	0830-1050	40N	NE
		64	15	NE-SW	0500-0610	55N	NW
		64	15	E-W	0610-0820	55N	N
		64	15	NW-SE	0820-0930	55N	NE
		64	15	NW-SE	0400-0640	35S	SW
		64	15	E-W	0640-0820	35S	S
		64	15	NE-SE	0820-1100	35S	SE
Arietids June	1-15						
		39	60	N-S	0500-0745	40N	W
		39	60	NE-SW	0745-0930	40N	NW
		39	60	E-W	0930-1015	40N	N
		39	60	NW-SE	1015-1155	40N	NE
		39	60	N-S	1155-1425	40N	E
		39	60	N-S	0510-0640	55N	W
		39	60	NE-SW	0640-0900	55N	NW
		39	60	E-W	0900-1030	55N	N
		39	60	NW-SE	1030-1250	55N	E
		39	60	N-S	1250-1420	55N	E
Ophiuchids	June 17-26						
		xx	20	N-S	1900-2150	35S	W
		xx	20	NW-SE	2150-2300	35S	SW
		xx	20	E-W	2300-2350	35S	S
		xx	20	NE-SW	2350-0100	35S	SE
Capricornids	July 10-Aug 5						
		xx	20	N-S	2030-2240	35S	W
		xx	20	NW-SE	2240-0015	35S	SW
		xx	20	E-W	0015-0115	35S	S
		xx	20	NE-SW	0115-0300	35S	SE
		xx	20	N-S	0300-0500	35S	E
Delta Aquarids	July 26-31						
		43	20	NE-SW	2400-0100	40N	NW
		43	20	E-W	0100-0330	40N	N
		43	20	NW-SE	0330-	40N	NE
		43	20	N-S	0100-0400	35S	E
		43	20	N-S	2150-0000	35S	W
		43	20	NW-SE	0000-0140	35S	SW
		43	20	E-W	0140-0230	35S	S
		43	20	NE-SW	0230-0400	35S	SE
		43	20	NE-SE	0400-0630	35S	N-S
Pisces Australid	July 15-Aug 20						
		xx	20	N-S	2130-0115	35S	W
				N-S	0255-0700	35S	E
Perseids	Aug 12-13						
		61	50	NW-SE	2330-0430	40N	SW
		61	50	E-W	0430-0730	40N	S
		61	50	NE-SW	0730-1230	40N	SE
		61	50	NW-SE	2130-0340	55N	SW
		61	50	NE-SW	0800-1410	55N	SE
Orionids	Oct 21-22						
		67	20	N-S	0015-0145	40N	W
		67	20	NE-SW	0145-0350	40N	NW
		67	20	NW-SE	0500-0700	40N	NE
		67	20	N-S	0700-0830	40N	E
		67	20	N-S	0000-0050	55N	W
		67	20	NE-SW	0050-0330	55N	NW
		67	20	E-W	0330-0510	55N	N
		67	20	NW-SE	0510-0750	55N	NE
		67	20	N-S	0750-	55N	E
		67	20	NW-SE	0200-0315	35S	SW
		67	20	E-W	0315-0530	35S	S
		67	20	NW-SE	0530-0700	35S	SE
Leonids	Nov 14-18						
		72	10	N-S	0200-0430	40N	W
		72	10	NE-SW	0430-0600	40N	NW
		72	10	E-W	0600-0700	40N	N
		72	10	NW-SE	0700-0840	40N	NE
		72	10	N-S	0840-1100	40N	E
		72	10	N-S	0150-0320	55N	W
		72	10	NE-SW	0320-0540	55N	NW
		72	10	E-W	0540-0720	55N	N
		72	10	NW-SE	0720-0940	55N	NE
Phoenicids	Dec 5						
		13	50	NE-SW	1420-1900	35S	NW
		13	50	E-W	1900-2100	35S	N
		13	50	NW-SE	2100-0140	35S	NE
		72	10	N-S	0940-1100	55N	E
Geminids	Dec 10-14						
		35	60	N-S	2115-0100	40N	W
		35	60	NE-SW	0100-0200	40N	NW
		35	60	E-W	0200-0230	40N	N
		35	60	NW-SE	0230-0330	40N	NE
		35	60	N-S	0330-0700	40N	E
		35	60	N-S	2050-2330	55N	W
		35	60	NE-SW	2330-0130	55N	NW
		35	60	E-W	0130-0250	55N	N
		35	60	NW-SE	0250-0450	55N	NE
		35	60	N-S	0450-0740	55N	E
Ursids	Dec 21-23						
		35	13	E-W	2200-1600	40N	S

Table 2: Beacon Frequencies

Slot	Country	Callsign	14.100MHz	18.110MHz	21.150MHz	24.930MHz	28.20MHz	Status
1	United Nations	4U1UN	X:00:00	X:00:10	X:00:20	X:00:30	X:00:40	O
2	Canada	VE8AT	X:00:10	X:00:20	X:00:30	X:00:40	X:00:50	O
3	USA Mainland	W6WX	X:00:20	X:00:30	X:00:40	X:00:50	X:01:00	O
4	Hawaii	KH6WO	X:00:30	X:00:40	X:00:50	X:01:00	X:01:10	O
5	New Zealand	ZL6B	X:00:40	X:00:50	X:01:00	X:01:10	X:01:20	C
6	Australia	VK6RBP	X:00:50	X:01:00	X:01:10	X:01:20	X:01:30	O
7	Japan	JA1IGY	X:01:00	X:01:10	X:01:20	X:01:30	X:01:40	P
8	Russia	XX	X:01:10	X:01:20	X:01:30	X:01:40	X:01:50	P
9	China	XX	X:01:20	X:01:30	X:01:40	X:01:50	X:02:00	O
10	Sri Lanka	4S7B	X:01:30	X:01:40	X:01:50	X:02:00	X:02:10	O
11	South Africa	ZS6DN	X:01:40	X:01:500	X:02:00	X:02:10	X:02:20	O
12	Kenya	5Z4B	X:01:50	X:02:00	X:02:10	X:02:20	X:02:30	O
13	Israel	4X6TU	X:02:00	X:02:00	X:02:10	X:02:20	X:02:30	O
14	Finland	OH2B	X:02:10	X:02:10	X:02:30	X:02:40	X:02:50	O
15	Madeira	CS3B	X:02:20	X:02:30	X:02:40	X:02:50	X:00:00	O
16	Argentina	LU4AA	X:02:30	X:02:40	X:02:50	X:00:00	X:00:10	O
17	Peru	OA4B	X:02:40	X:02:50	X:00:00	X:02:50	X:02:50	C
18	Venezuela	YV5B	X:02:50	X:00:00	X:00:10	X:00:10	X:00:20	O

O On The Air
C Under Construction
P Planning Started

selected by using a 30MHz bandpass filter. If the loss through the mixer and filter is excessive, then use a post conversion amplifier to recover the lost signal. In this system, the 75MHz FAA beacons appear at 30MHz on the s.w. receiver.

If you substitute a lowpass filter for the bandpass filter, then various v.h.f. frequencies around 75MHz can be tuned, even when the LOA crystal controlled on a single frequency. The short wave receiver acts as a 'variable i.f.' in this case.

References:

Bain, Walter F. (1974). *VHF Propagation by Meteor-Trail Ionisation*. QST, May 1974 (reprinted in Pocock, 108-122).

Black, Bill. 'Monitoring Meteor Activity by Radio'. *Satellite Times*, May/June 1997, 22-25.

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Sickles, Robert M., 'Radio Detection of Meteor Infall'. Reprinted in Jeff Lichtman's column 'Radio Astronomy', *Satellite Times*, May/June 1997, 90-91.

Villard, O.G. (1947). 'Meteor Detection by Amateur Radio', QST, June 1947 (reprinted in Pocock, 98-103).

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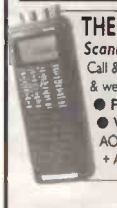

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Naughty Parts!

How many times have you dropped a small part, and spent hours trying to find it? John Worthington GW3COI seems to have come up with a solution. Read on and find out what it is.

There must be many in our fraternity who, for one reason or another, never construct any gear. Well, at least they are spared the agony of the dropped part. At the moment I am in the middle of building a complicated transceiver and in spite of quite a bit of experience behind me, I still suffer from dropping parts.

It is a strange fact, but parts lost in this way seem to obey gravity with any exactitude and if you open your legs and look straight down, seldom does the item immediately reveal itself and you begin to swing slowly round your seat with head down and bulging eyes.

This seldom produces results and you have to rise from your seat and genuflect - if your knees will stand it! Things like tiny washers and solder tags can carelessly be abandoned but grubscrews are usually very scarce and therefore vital. However, they have a life of their own and have been known to bounce up to several feet away from the constructor, landing in a trouser turn-up belonging to a very infrequent visitor.

Researched Problems

I have researched these problems for many years, but so far no perfect solution has been achieved. The first thing a constructor should avoid is working anywhere the carpet has a complicated or jazzy pattern - searching on such induces vertigo, nausea and very bad temper, causing a flow of mistakes on one's p.c.b. work!

Linoleum under foot is bad, too, as the lack of friction enables the parts to skid long distances. A tiled floor is poor with its 'joins' where some tiny parts can conceal themselves like SAS men.

Probably the ideal floor surface would be a matt black closewoven material, as used in making dinner jacket, because the thin, tinned wires on many parts would glint pleasantly.

Solution Winner

Actually, a friend came up with a solution and for a time I thought he had a winner. In his shack he built a sloping smooth floor so that any dropped part rolled into a fitted gutter.

He obtained the idea by standing outside one day and observing the rain on his roof. His success was dimmed the day when his XYL brought him a cup of coffee and fell on her face negotiating the unfamiliar slope!

I have had one or two ideas sent to me, but the only one that had promise was from a chap in Glasgow who told me that he always wore his kilt when constructing any gear and dropped parts simply entered his sporran.

I am thinking about this still. Could I get into one of the XYL's skirts?

...ENTERED HIS SPORRAN...

SKY HIGH WIT

This month's Book Profiles highlight six satellite books. Save £10 and buy the Guide to Weatherfax Services (16th Edition) at the special offer price of £15 (was £25). Order your copy now!

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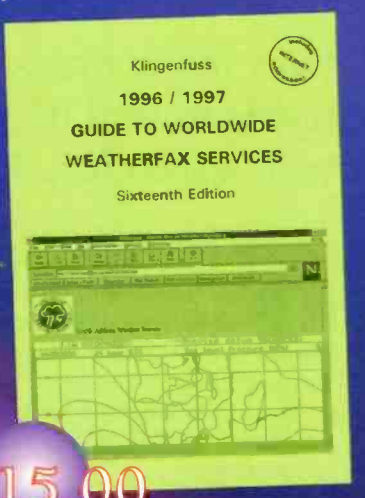

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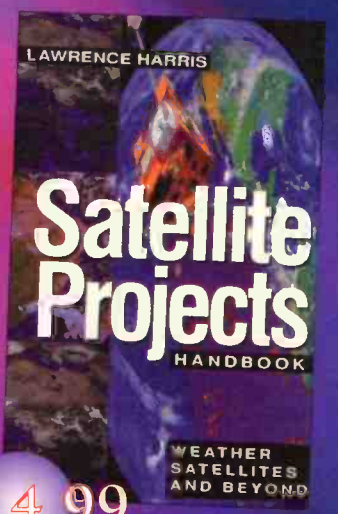

This handbook provides access to the exciting world of satellites without enormous financial outlay. As an introduction to satellite operations, it provides the layman with the necessary information to set-up a receiving system for producing weather satellite pictures. All aspects of setting up a home satellite station are covered, including the practicalities of working within a budget, where to buy kits and ready built system and lots more. £14.99

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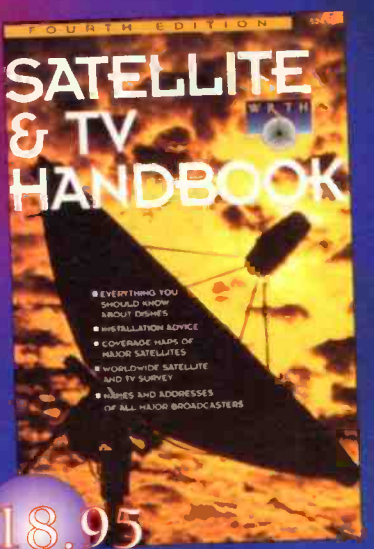

This fourth edition, written by the experts from the respected *World Radio TV Handbook*, will be a great help to everyone interested in the world of satellite radio and television as well as terrestrial TV. With the aid of over 300 pictures and graphics, you will find all the information you need to know about installing your own satellite system including over 180 maps of satellite coverage areas world-wide, world-wide TV channel information, in depth explanations of complicated satellite related subjects and much, much more. £18.95.

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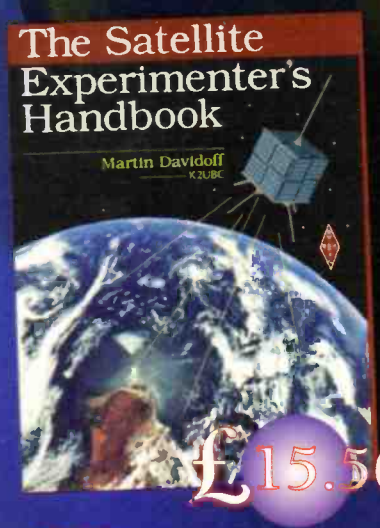

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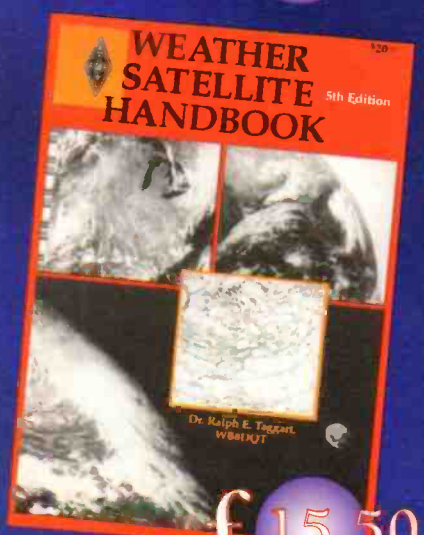

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Discover The Difference With DSP

A neat and tidy DSP 'Add On'. A useful size comparison is provided by the A4-sized manual and the useful DSP 'facts' book also supplied.

Rob Mannion G3XFD, Editor of *Practical Wireless*, says you shouldn't despair if your existing receiver doesn't have Digital Signal Processing fitted - all you have to do is to consider fitting an 'Add on unit' such as the SGC 'Power Clear'.

In the past three years I've tried and tested the latest Amateur Radio transceivers for review purposes - and many of them have come fitted with Digital Signal Processing (DSP). And bearing in mind that most of us when we're active on the bands do more listening than transmitting I feel strongly that the dedicated listener will find much benefit also.

However, before I go further into the benefits of DSP I should mention that I think the technology - as marvellous as it is - is no substitute for the best radio frequency filtering. The addition of digital techniques should only be to support a good set of crystal filters or mechanical filters.

Unfortunately though, it's too easy for manufacturers to adopt DSP as standard (as it's cheaper) and to make the provision of high-quality mechanical and crystal filtering as 'optional extras'.

Digital Processing

So, what is DSP and how does it work? Well, the principle is simple...although the processes carried out to achieve it are very complex indeed.

To explain it simply, it's necessary to look at a few basics. And I'll base my explanation on the audio and supersonic (above normal audio frequency range) DSP techniques at present employed in equipment available for the non-professional user. This form of DSP is very useful for radio enthusiasts because unlike true r.f. DSP, it's very easy to incorporate it into existing equipment - with dramatic results.

In a nutshell, the incoming signal to the DSP unit is variable in amplitude and is known as an analogue signal. In other words it increases or decreases in levels of amplitude with the applied modulation. This also applies to a signal which is demodulated from a frequency modulated (f.m.) signal.

An f.m. transmission is where the original varying amplitude signal - let's say from a microphone - is used to place intelligence on the outgoing radio transmission by varying the frequency by a specified amount. At the receiving end various forms of detectors are used which then reproduce a varying amplitude signal from the incoming frequency variations.

So, simply put, both f.m. and a.m. (and the specialised form known as s.s.b.) produce the same form of signal (analogue) ready to be fed to the headphone socket or power amplifier and on to the speakers.

The incoming variable amplitude (analogue) signal is then converted into digital form (using binary encoding techniques) by a device known as an analogue to digital (A-to-D) converter. This first stage offers one of the great advantages to DSP filtering because it's here that the incoming waveform is 'sampled' and a digitally encoded form of the original signal is produced.

The Magic?

Once the A-to-D conversion is carried out, the complex electronic software can manipulate the original signals and that's where the 'magic' takes place although this is modern 'magic' courtesy of very sophisticated 'binary number crunching'. And to provide you with an idea of just how much the original analogue signal can be 'manipulated', you've only got to watch TV where the video effects so beloved of modern programme producers can be seen in action.

The same startling effect where you see pictures 'roll over', being 'squeezed' and with presenters suddenly appearing to be 'posted' through letter-boxes are all carried out by analogue video signals being converted to digital binary streams. These are then processed to create the wanted visual effects before they are re-converted to analogue form again to present the picture - complete with the often crazy effects - on your TV screen.

In a radio communications application we can programme or set the digitally processing system to totally ignore other signals and interference. And here you have to remember that most forms of interference are in the form of variable amplitude signals.

The DSP unit can be set to ignore many types of pre-programmed signals - including those that pass through the wanted audio passband or 'hover' on a nearby frequency. Heterodynes and whistles, deliberate jamming signals, all can be removed in an extremely effective way. And if you're bothered by the dreadful 'buzzing' signals emanating from a nearby TV receiver's line and field timebases - a good DSP unit could solve your problems once and for all!

The DSP unit can have many features built-in and most offer noise reduction which can be extremely effective indeed. Another commonly offered feature rids Radio Amateurs of one form of nuisance once and for all: 'The carrier swisher'.

There's just no point in anyone placing their transmission on top of yours and 'scratching' or whistling

into the microphone anymore because the DSP unit can remove (in some cases) up to four or five of these signals.

Once processed, the DSP unit then provides the operator with a very useful addition to communications. But the feature that most of us will appreciate the most is that most 'add on' unit take audio in and provide the processed audio out. In other words you just plug it into your existing receiver's headphone socket and away you go - and that just what I did with the SGC 'Power Clear' DSP unit.

Adding On DSP

Adding DSP to my own Alinco DX-70 transceiver was a revelation and in my opinion proves an important point. And the point is that although DSP can help any receiver, it comes into its own when working with a receiver that's already equipped with good quality r.f. filtering.

The Alinco DX-70 is a super little transceiver which comes with 'narrow' filtering as standard, which in a 'budget priced' transceiver is rare, surprising and pleasing. However, having already experienced DSP noise reduction and 'auto notch' facilities I was anxious to try it out on my excursions on the 3.5MHz amateur band.

I used the 'Power Clear' over a period of four weeks or so on s.s.b. transmissions and listening periods and found it to be extremely effective on the very crowded and busy Amateur Bands. It wasn't the first time I'd tried the SGC DSP system because I saw how effective it was on the SGC semi-military/marine style transceivers on show at the 1997 Dayton HamVention.

Trying it on my own much used DX-70 was rather different though, as I was so used to it running 'barefoot'. However, having much previous experience using DSP filters, I aware there for every benefit there's a drawback: so don't be disappointed at the 'non hi-fi' audio you get after the DSP 'treatment'. After all...it's not 'high fidelity' we need on the bands...just the reliable communications that the 'Power Talk' and its cousins can provide.

In use the 'Power Clear' is simplicity itself. All you do (using the supplied leads and power plug) is to provide a nominal 13.6V. It matches to 4 or 8Ω and also has audio inputs and outputs matched for 600Ω 'line' use.

All the necessary plugs and sockets are provided on the rear, except for the 3.5mm headphone socket which is sensibly mounted on the front panel.

The audio input from your receiver is fed to the rear of the unit. The DSP audio signal is then available either at the headphones or the built-in speaker unit which is provided with a 500mW low power amplifier unit. However, for use with an out-board speaker the unit is provided with a 5W amplifier and a socket is provided on the rear for this facility.

The 'Power Clear' incorporates SGC's 'Adaptive Signal Processing', to digitally 'gate out' - effectively 'ignores' - noise on the frequency in use. Also included is SGC's trademarked 'Spectral Noise Subtraction System' which again dramatically reduces noise, this time in the spectral region of the band in use.

The operator can also adjust the bandpass of the audio signal by independently setting the Low, High and Centre frequency on the front panel. These can be used separately or in combination to set the audio output for the best perceived results.

The notch filter facility built-in to the 'Power Clear' is a very powerful and useful listening 'tool'. Once it detects any continuous tones (caused by heterodynes, etc.) the DSP unit attenuates them by up to 40dB.

Usefully, the Notch Filter on this unit will filter out up to five tones at once. (I found it to be very effective and extremely helpful on s.s.b.).

There are eight options pre-set into the unit's memory. These are:

Voice Bandwidth

VW: Wide (300Hz to 3.1kHz) with notch, noise reduction & SNS

VM: Medium (300 to 2kHz) with notch, and noise reduction

VN: Narrow (300Hz to 1.7kHz) with notch and noise reduction

CW: Filter on 1kHz ±200Hz) no notch, but with noise reduction

Data Bandwidth

AMTOR: Filter on 2.175kHz (±150Hz)

SITOR: Filter on 1.7kHz (±150Hz)

PACTOR: Filter on 2.175kHz (±200Hz)

Two digital filters are user in the eight preset functions. For voice and c.w. functions a filter with a shape factor of 1:1 (130ms delay) is used. The low, centre and high frequency points of the filter can be adjusted to reduce adjacent channel interference. For data modes a second short delay filter is selected to assist 'handshake' operation. The extra filter provides extremely steep skirts to overcome adjacent channel interference.

Seven memory locations are provided for the user to programme. When a memory has been allocated the appropriate l.e.d. above the allocation illuminates.

My Opinion

So, what's my opinion of the 'Power Talk' DSP unit? Well, to be honest, I've never come across such a simple to operate unit as this before. When fitted on SGC's transceivers it was a powerful but easy-to-use facility. However, presented in this form (it's only about the size of a small extension speaker) in my opinion it's a very effective and ideal 'add on'. It comes with an excellent manual and a very helpful little booklet describing DSP techniques (see September *PW*, page 11 to find how you can get a copy free!).

The only thing that I think can go against the 'Power Talk' is its 'ruggedised' styling which clearly displays SGC's military and marine traditions. However, I liked it because it is so neat and if I do buy an add-unit for my Alinco DX-70 this is the unit I'll probably go for. It's so small and neat you'll hardly notice it's there...but you'll certainly hear the difference!

My thanks to Waters & Stanton Electronics, 22 Main Road, Hockley, Essex SS5 4QS for the loan of the review unit which costs £299.95.

Specifications

(Abridged from manufacturer's specifications)

Audio output:	5W into 4/8Ω 0-3.5V r.m.s. Line (600Ω) 0-350mV r.m.s.
Audio input:	(From transceiver line out 600Ω) 100-350mV r.m.s. (From source speaker output) 4/8Ω 1 to 3.5V r.m.s.
Frequency response:	300Hz to 3.2kHz ±3dB
Internal speaker:	500mW
Absolute delay:	130ms (SNS, ADSP and bandpass modes)
Noise reduction (SNS):	0 to 20dB (AMTOR, SITOR and Packet.
Adaptive noise reduction:	10dB (typical)
Notch signal tone reduction:	>40dB (up to five tones)
Notch action time:	<20ms
Data mode output delay:	<2ms
Operating temperature:	-30° to + 60°C.

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Using RF Splitters and Combiners

Splitters and combiners are widely used by professional engineers for applications such as power amplifier signal combining in order to increase the total power output and power dividing/splitting for distribution of signals whilst providing isolation between signal ports. Andy Ikin looks at what makes them tick.

The short wave listener can also make use of Splitters and Combiners for improving the performance of antennas and receivers by exploiting the signal isolation and the constant port impedance that is provided. The two way Splitter/Combiner will be considered, as this type has the most relevant use for the s.w.l.

To fully exploit the virtues of Splitters/Combiners, it is important to know how they work and what limitations there are. However, firstly we will analyse the simplest combiner and splitter, a 'T' junction connector as shown in Fig. 1.

Using the 'T' junction as a splitter with a 50Ω input, the power would be divided equally and the current is halved causing the output impedance rise to 100Ω, therefore representing an impedance mismatch in a 50Ω system. Also there would be no isolation between the outputs. For example if two receivers were to be fed from one antenna then there would be two problems; local oscillator/synthesiser noise and change in the impedance of the antenna filters from one receiver would affect the other receiver. Also as the receivers have 50Ω inputs then the antenna input to the 'T' junction would see 25Ω causing a mismatch. This mismatch probably would not be problem with a passive antenna, however an active antenna seeing such a low impedance may generate intermodulation products. The 'T' junction could also be used as a combiner for coupling two antennas to one receiver either to reduce the effects of fading or to combine two antennas of different frequencies. If we ignore the impedance mismatch, then the problem of the isolation is dominant. The current from the two antennas would flow between themselves, causing the antennas to simply behave as one antenna and in some cases this would lead to signal loss.

Two Problems

Summarising the above the 'T' junction has two problems; an impedance mismatch and no isolation and therefore is not suitable for use with receivers or antennas. To overcome these problems the Splitter/Combiner must have the same input and output impedance (normally 50Ω) and there must be isolation between the two input/two output ports. To achieve this, it is necessary to used a transformer type of Splitter/ Combiner.

Fig. 1.

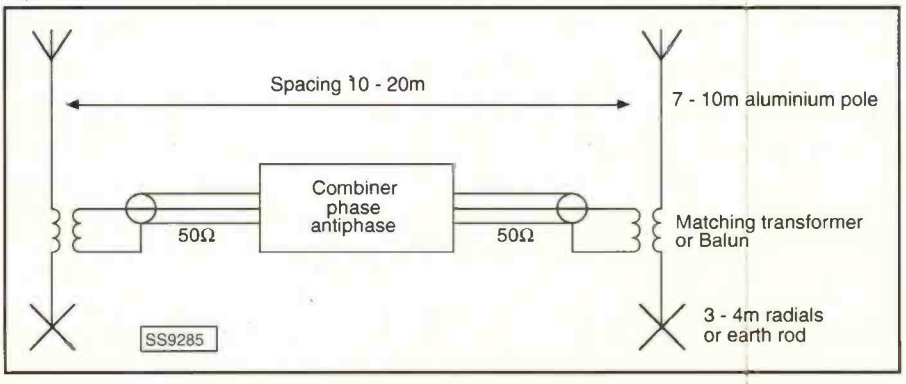


Fig. 2.

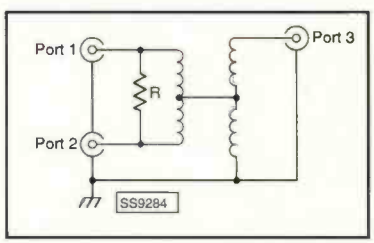
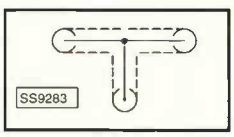


Fig. 3.



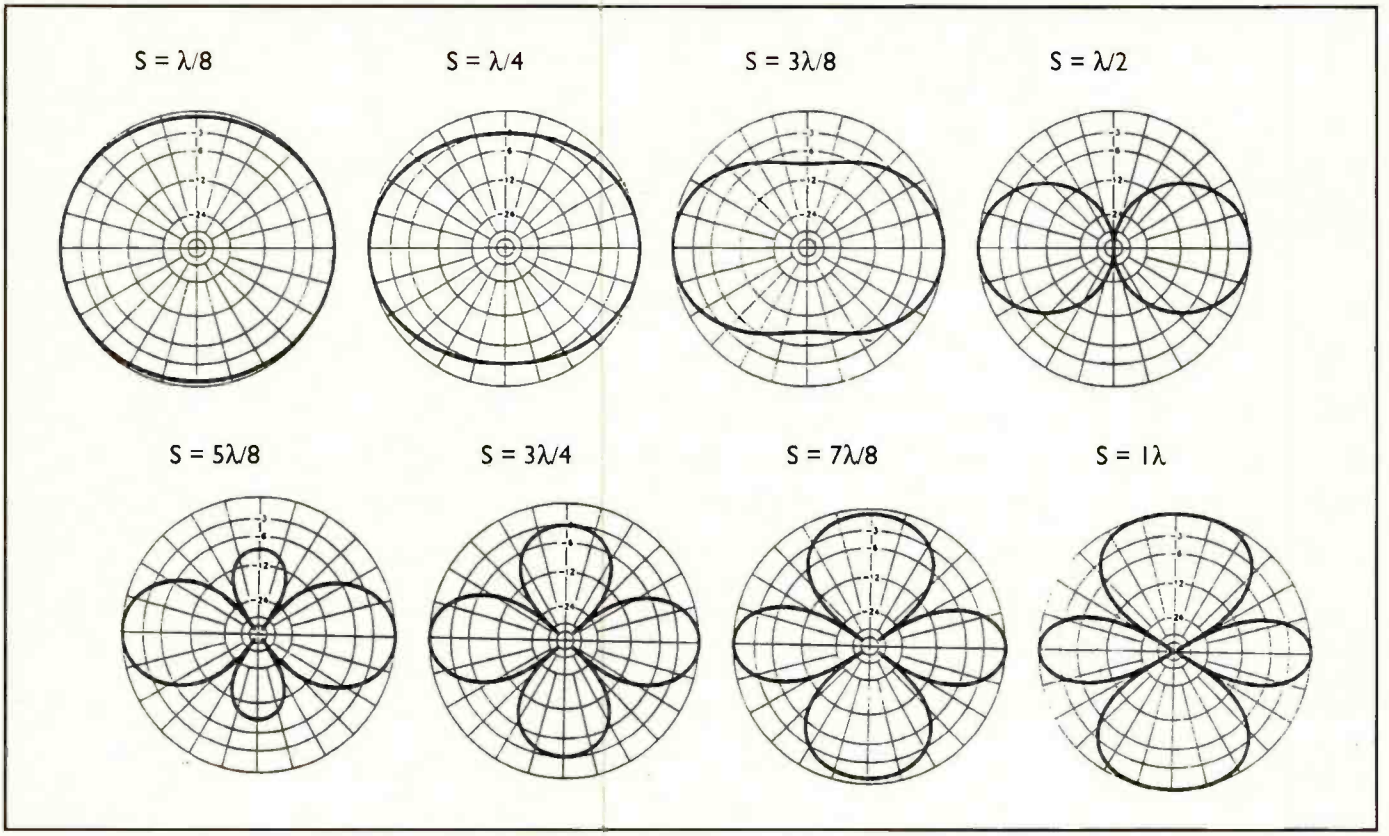


Fig. 4: Horizontal reception pattern for two element vertical array (phase).

A simple two port Splitter/Combiner consisting of a centre tapped transformer is shown in **Fig. 2**.

Using **Fig. 2** as a combiner with two inputs (equal phase) each of 1V at 50Ω. The current flow would be to the transformer centre tap where the current will double causing the impedance to drop to 25Ω. This 25 ohm output is connected to a transformer to step-up the impedance back to 50 ohms. Therefore the output is 1.4V at 50Ω i.e. a 3dB increase in power. The isolation between the input ports is provided by considering that a signal at Port 1 will arrive at Port 2 180° out of phase due to the phase reversal of the centre tapped transformer. At the same time the signal from Port 1 arrives at Port 2 via the resistor in phase. The resistor is equal to the impedance across the transformer, therefore the signals arriving at Port 2 will have equal amplitude and will be out of phase and therefore will cancel out. Similarly a signal applied to Port 2 will cancel out at Port 1. Therefore the isolation between Port 1 and Port 2 will be high. In practice the port isolation is dependant on the correct 50Ω termination of the combined Port 3. The isolation will usually be 20-30dB over the specified bandwidth.

Splitter

To consider **Fig. 2** as a splitter, with all the ports terminated at 50Ω, then a 1V signal applied to Port 3 will be stepped down to 25Ω, therefore the 0.71V at 1.4 times the current will appear at the transformer centre tap. The current is split equally between Ports 1 and 2 therefore the voltage at Ports 2 will be 0.71V, Hence each output of Port 1 and 2 is 3dB lower than the input Port 3. If there is an impedance mismatch on Port 1 or 2 this will be seen as a signal flowing back through the splitter which will cancel out due to the 180° phase shift of the centre-tapped transformer and the resistor as described above.

To summarise, **Fig. 2** is a two-way 0° Splitter/Combiner. Splitter/Combiners are available that can be either 0°, 180° and 90° between ports. Where two signals of different amplitude and phase are applied to a Splitter/Combiner, then the output port will be the vector sum of the input ports.

From the above it is obvious that the transformer type splitter/combiner will be ideal for antenna and receiving applications by providing high port isolation and a 50Ω impedance. In the simple case of a single antenna being used to feed two receivers then the isolation provided will ensure there is no interaction between the receivers. Where the Splitter/Combiner is to be used for combining antennas then a little more consideration is required.

Phased Array

One of the simplest directional antennas (phased array) can use two identical vertical groundplane or earth return antennas, connected either in-phase or anti-phase see **Fig. 3**. This phased array will work from 3-30MHz. By using a Splitter/Combiner with the antennas, will the prevent direct antenna coupling and reduce antenna interaction from changing the reception patterns. Using a antenna spacing of 20m will provide improved directivity from 7 to 30MHz when combined in-phase. reception patterns for these antennas are shown in **Figs. 4 & 5**.

For receiving purposes these antennas can use weather-proof broadband matching transformers 'Baluns' i.e. the antennas do not have to be resonant or narrow band as with transmitting antennas. Also the antenna length is not critical because the loss of few dB

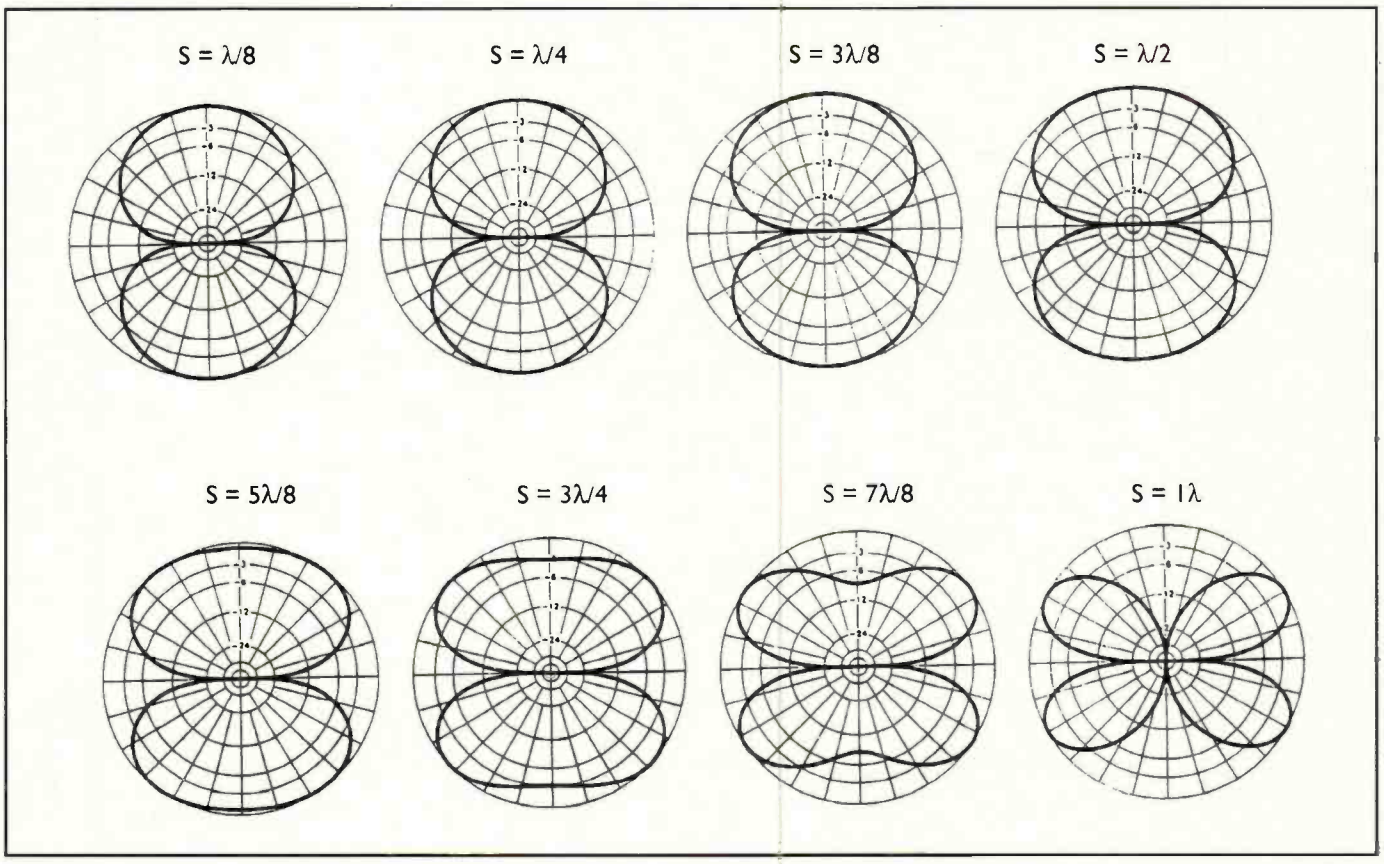


Fig. 5: Horizontal reception pattern for two element vertical array (anti-phase).

does not normally affect the receiver noise performance. Ideally the matching transformers should be 200 to 500Ω input to 50Ω for the feeder.

The primary and secondary windings should be isolated so that the antenna return path is not the feeder, otherwise the antenna reception pattern may be distorted. Also there is a risk of mains borne noise getting into receiver if the feeder/mains earth is used as the antenna return path. The use of standard 'Longwire Baluns' as a matching transformer is not recommended because there is no isolation between primary and secondary i.e. the earth side of the antenna winding is connected to the feeder screen.

The feeder screen should not be grounded at the antenna as this can result in noise being induced, due to the earth loop formed between the receiver mains earth and the grounded antenna feeder.

Active Antennas

Alternatively two active antennas (vertical polarised) such as the Datong AD370 can be used. In fact, active antennas are more ideally suited to phased arrays than passive antennas. This is because their small size ensures there is negligible mutual coupling between the antennas and their output impedance is constant. At my own home, two 10m vertical dipoles with Universal Magnetic Baluns are used for the phase array. The dipoles are mounted on the side of single story buildings with as spacing of 20m. Also two Datong AD370s are used mounted on the garden fence.

The antennas are connected to the splitter/combiner by two equal lengths of 50Ω feeder cable (RG58C). A switching arrangement to allow the user to reverse the phase of one port of the combiner is necessary so that the antenna reception pattern can be changed. If this phase switching arrangement is not used then significant signal cancellation may result due to the direction of the signal and the phase difference due to the antenna spacing. This can be readily seen just by examining the nulls in the antenna patterns of Fig. 4 & 5. In some cases the use of phase switching can reduce interference. This phase reversal can be either built into the combiner/splitter or could be a separately switched phase reversal transformer.

Diversity Reception

Where two antennas are used to provide diversity reception to reduce the effects of fading then a similar phase reversal scheme is also necessary. Similarly a Longwire antenna may be used for lower frequency reception and combined with a high frequency dipole. Where there is an overlap in the antennas frequency range, then the same considerations in the phase difference will apply.

Splitter/Combiners for the s.w.l. are available from:
Lowe Electronics, Tel: (01629) 580800
Shenzi Communications, Tel: (01325) 374229
Wellbrook Communications, Tel: (01425) 674174

Note: some of the above suppliers can provide a Combiner/Splitter with a phase reversal switch, and antenna matching transformers 'Balun' with isolated windings.

The AD370 active antenna is available subject to them having any remaining stock, from Datong Electronics, Tel: 0113-274 4822.

Amateur Bands

Round-up

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This month has seen a certain lack of activity in the radio sense, due to other commitments like holidays - for the first time in a score of years in the company of a YL. A startling situation for an aged buffer having seventy turns on the coil!

However much we humans must move with events, there's not a lot we can do about the eternal verities of sunspots and seasons. At this very moment 'summer conditions' prevail, perhaps best described as a combination of lightning crashes interspersed with the dull sound of frying eggs emitted by a tired band. Perhaps I should earth down the antennas **now**!

That done we can take a peep at the mail.

Letters

The first envelope I opened contained the *Just Listening* magazine of the International Listeners Association run by **Trevor GW4OXB** at 1 Jersey Street, Hafod, Swansea SA1 2HF for the benefit of all types of listeners. An interesting - and - cautionary - note this time refers to the owner of a Sony SW77 receiver, which in the fullness of time developed a 'scratchy' volume control. It was taken to a small local dealer displaying a Sony sign, rather than spend the money on sending it back to Sony. When it eventually returned the back was welded on, and no signals came out. It was sent to Sony for a report, and they returned it within a week saying it was impossible to repair as the inside had been sprayed with something they tactfully called 'miscellaneous fluid', which had affected all components. The moral is simple. With an expensive bit of gear **don't** let an inexperienced 'service-man' tamper. You **might** save a few shillings but you have a good chance of writing-off a valued friend.

When **Ted Hearn** wrote from Newcastle, Staffs, on June 28, he felt moved to ask what had happened to summer? It was certainly wet at John O'Groats but at least by one week and three days later we can confirm that Lands End was quite warm and summery. Anyway, Ted tackled 3.5MHz to find G0OWE, G3MRV, GB2RN, GI3WWM, GI3WWF/P, DA1CQL/M. Cranking up to 7MHz he noted BV5BG, DL5EBE, EA5ELE, EA3CJC, F5/DF5UR/M, HZ1CCA, IZ2ABN, LU1MH, OH3KCB, a 'special' signing OM9SIAD, ZA1MH. For 14MHz I've removed from the list some of the run-of-the-mill European callsigns, leaving such as A41LZ, A71BY, BV5GQ, CU3RA, D22BAQ, EA8KV, EA6/DL7AIV, another 'special' in ED3SCB, EA8AK, EA8AMT, EP2SMH, HA/W0YR, IV3SUL, IS0GYW, JA3GFA, JY5RN, JY5HR, LU9MBY, LU1DEA, LU9FOP, OM5FM, PY1LI, PY7EC, PT7VB, PY3AJB, SQ5AAS, TA1ZJ, UA9XFY/3, UA9CBO, US1HT, UA1ZKF, VU2XLZ, VE1SS, VE9ST/M, VU2PCD, V63KU, VO1RMA, VE1WI, VU2RX, VE3LL, Z31VP, 4X4JU, 4X1MO, 5X4F, 6W6/K3IPK, and the usual crop of smaller fry. At 18MHz the list starts with CP8XA, CU3DJA, EA1CGG/M, EA7FET, EA8AK, FG5HR, FM5MN, IT9WNH, KP4DII, LU1EMB, PY7ZZ, S54W, YD22BM, ZA1MH, 4X4BL, 4X4FR, and 9H1AL. Finally 21MHz showed the odd sign of life, with A41LZ, CU7BA, DL7LSH, DL7KO, EA1MK, KP4YB, LA4LG, PR7DB and YC7JKS logged.

Nice to hear again from **Harry Richards** in Barton-on-Humber. Harry enclosed a cutting from the *Grimsby Evening Telegraph* of April 8, which gave a nice spread to the activities of Lincoln Short Wave Club in commemorating the anniversary of the opening of the Marconi beam station at Tetney on April 5, 70 years earlier. Although the station was closed in 1939, the original buildings are still used by a local company, though not, alas, for the original purposes.

My anonymous correspondent comes next, with a question about dissimilar materials used in the construction of antennas. I think this is meant to refer to electrolytic corrosion, which is a bugbear to all who need to build things for use out of doors. Basically, put two dissimilar metals in contact and set them out in dampish air, and they form the poles of a battery. Just as a dry cell gradually eats away the inner pole until the battery is done for, so with our two dissimilar metals, one will be eaten away. Some combinations are worse than others, obviously.

Aluminium antenna parts are normally used with zinc-plated nuts and bolts as a best combination, but this only holds good if you are able to finish assembling the antenna without 'bruising' the zinc plating. My own feeling is very definitely along the lines of giving the whole works a good lick of outdoor paint before hoisting aloft, unless the antenna lives in a dry clean loft. Quite apart from questions of the antenna 'falling to bits' the first onset of electrolytic corrosion often sets up noises in the receiver to interfere with weak-signal reception Extending the thought a little, the use of several pieces of wire soldered together to make an end-fed, say, is not good practice; if you must do this, at least give each soldered joint a dab of paint to keep the joint dry.

The next letter has a distinctive writing but lacks a signature; we deduce **John Collins** in Birmingham forgot to sign it! John had a try at 14MHz on June 24, to copy 9A3DU/MM, 9A9A, RA9DX, EK6GT, LA4GHA, and KH6FKG - which is a pretty fair reflection of the state of 14MHz in the wee small hours in summer at a low point in the sunspot cycle. On June 26, John began operation on 7MHz at midnight, with UA1AKJ, then CP2PZ, CX2DC, HR2A, 7X2LZ, FP5BU, FG5HR(QSL via F6BUM), and CQ4FMX. UX3HX at 0200 was RS59 and asking for cards via Box 1617 Poltava City, Republic of Ukraine. RW9AB/6, Box 7212 Chelyabinsk City, 454138 Asiatic Russia, heard at 0220 was noted as being in Oblast 102.

Our next stop is Barnsley, where **Colin Dean** keeps things active. On 7MHz sideband, Colin mentions A45ZN, CT3DZ, DS5RNM, ET3BT, HS1NGR, HZ1CCA, OY/DL6YFB, OH5AB/MVI, R1MVI, TA2IJ, UN7NDX, VU2SWJ, YC8TXW, YC0FEO, YK1AO, ZA1MH, ZL1PB, IB/DL6NBR, 5A1A, and 9K2AI. Turning to 14MHz sideband signals were logged from AL7O, AP2JZB, A41JR, A71EF, A92GE, BV2KI, BV3CD, BV5GQ, CY1SCD, EK7DX, EZ8BD, HL5PVN, HS2CRU, JY5HO, R1FJR, R1MVI, SU0ERA, S79KMB, UA0ZBK/0, UK9AA, VR2UZ, VS97KM, XW2A, ZD7PP, ZL1BO, 4J8YL, 4L1DX, 4S7SW, 6W6/K3IPK, 9K2HN, 9N1CU, and 9N1RHM. Up a notch at 18MHz sideband was resolved from BV5BG, JK6XKI, JY5HX, Z21CS and 7Q7JL. Finally, at 21MHz OJ0/DL6GV was logged.

Another one to complain about the weather was **Ted Trowell** in the Isle of Sheppey; Ted comments crossly that on June 24 he had to turn the central heating back on! One must admit that there have been more contrasts in the weather this June than for a long time. On the bands activity was in a bit of a mess, partly due to conditions and partly alas due to the chores in the garden. Everything mentioned was on c.w. of course; on 7MHz LU3HUJ, and K2MV at 0500, and on 10MHz at 1800 9J2HN and V85HY. At 14MHz around 1500AD7P, ZS6QU, VE3DZZ, at 1800 6V1A, ET3BN, BV7FD, at 1900 9Q5BQ, and at 2200 ZL3RG. Operations on 18MHz began at 1300 with 5B4/G3LNS who is now resident there, at 1500 9K2HN and SV5/HA6NL/P, finishing off with 1900 VQ9KH. Up again to 21MHz to find(1500) 9V1YC, PY2NZR, 4Z4FW(1900) PY1SL, PY4BRW, LU9FAA, LU9AFZ, and 9K2RR. 1000 on 24MHz saw Ted hook EA6/DL1KBQ, and at 1500 PY2XB, IZ4APU, 9A3GU, ES4RC; Finally 28MHz where luck resulted in 6W6/K3IPK.

Here & There

The RSGB's *Islands On the Air* programme, originally thought up by the late Geoff Watts of Norwich and the only listener to reach the *CQ* Hall of Fame, is growing apace. F9RM now leads the Honour Roll with 882 islands and there are over 1000 on the list. One of the nicest things about this programme is that the IOTA Manager has - and continues - to look at the question of QSLs, and to press expeditions to meet his guidelines. IOTA is now a 'Very Big Thing' in the world amateur radio context.

How does one keep up to date? Almost all the events on the bands receive a first mention, happen, and pass into history before they can be reported here. The answer comes back to a subscription to the weekly *DX News Sheet*, published by RSGB and written by arch-DXer (and keen QRP operator too) **Chris Page, G4BUE**. Chris gets his last input by 0600 on the day of publication and so if your copy isn't held up by postal difficulties then it's still hot news when you get it. Furthermore, for those who collect them, the lists of QSL addresses are a godsend. For details on subscriptions, contact RSGB, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JA. Tel: (01707) 659015.

Of course if you have a keen DX amateur nearby, you may do nearly as well by following him around - until he goes on holiday! And if you are in touch with him rather than merely following him round, you may be able to help him hook that rare one, by no more than monitoring his transmission or his listening frequency.

The HF & IOTA Convention is at Beaumont Conference Centre, Old Windsor in Berkshire over September 26, 27, 28 September. For more details on this contact Marcia Brimson or Fay Huxley at RSGB - the telephone number is above.

Finale

That's yer lot for this time, friends. As always, letters to me please by the first of the month. Don't just send lists - I'm just as interested in your doings and your thoughts!

Satellite TV News

ROGER BUNNEY
35 GRAYLING MEAD
FISHLAKE
ROMSEY, HANTS
SO51 7RU

Last month I reported that my satellite dish installation had just been put into operation and that, mercifully, analogue TV is still alive and well with many news feeds still not having succumbed to digital. Of two problems reported, the council are insisting on a full planning permission application +£90 to consider allowing my dish to remain in the garden. Meanwhile, the varying positioner readings on the horizon to horizon motor were caused by motor 'splats' from the cabling being induced onto the unscreened pulse and sensor cables. These have been replaced with individually screened cable, earthed (into real earth) at each end, which seems to have solved that problem.

Orion-1 @ 37°W, though primarily sold as a digital bird, has witnessed considerable analogue activity this past month. The BBC Wales 'UKI 116' SNG truck has been touring venues across South Wales mid-July, including Haverfordwest and Pembroke, inserting live into the evening *Wales Today* programme. A flick of the tuning knob and UKI-116 disappeared and *Fox News* offered live coverage of the murder in Miami's South Beach of Gianni Versace, the dress designer. The July 15th shooting produced several SNG feeds being fed live on *Orion* and PAS-3R @ 43°W in both PAL and NTSC, most being in Spanish and Italian with interest sustained into the 16th and 17th with more on the spot feeds as facts emerged over the slaying.

Full marks for regional coverage June 30th and an *Orion* sighting from the BBC's Plymouth SNG truck 'UKI-231' with analogue coverage of the Island Games in Jersey, Channel Islands.

It's Summer in the Northern Hemisphere so sports activity across the Clarke Belt is very active - golfing freaks can spend hours monitoring Intelsat K @ 21°W whilst those more active can view the superb coverage, now refined to an art, of the French *Tour de France* with motor bike/helicopter coverage live over some of France's beautiful scenery. Telecom 2C @ 3°E carries most of the OB action - and from time to time - BBC OB feeds and news inserts. Whereas the Beeb always terminate their inserts with colour bars, audio tone and an ident, the French crash out of programme coverage and simply cut carrier without ceremony!

A letter from **Mr. R. Frost** (Felixstowe) asks if I can include his Astra 19°E sightings of 'Bloomberg Info TV' and the 'TLC' channel has now become 'Home and Discovery'. Well, they've been mentioned, but perhaps it's worth emphasising that this column encourages readers to explore the Clarke Belt and find other satellite activity rather than what's happening on *Astra* with your Comet £99 system! A slight tweak on your Astra dish will bring in the 16°E II F3 Eutelsat bird full of exotic signals - even on your Comet system. And the rich variety of largely unscrambled programming available from Eutelsat's (*Hot Bird*) 13°E slot using an 0.8m dish is remarkable.

Endorsing these comments is **Dean Rogers** (Abbeywood, SE2) who is using his Amstrad SRD550 with an 0.8m dish, Cambridge Universal LNB and an IRTE 'Multisat' arm. The 'Multisat' is a small motorised LNB arm accessory that provides a limited tracking range onto other satellites using

An MPEG feed via Intelsat K @ 21.5°W, now seen only in digital.

a fixed (non-tracking) dish. Dean, for example, can view Telecom 2C @ 3°E tracking onto Eutelsat's at 7, 10, 13, 16°E, passing Astra 19°E and onto DFS *Kopernikus* birds at 23.5 and 28°E. Across this limited section of sky are a mass of satellite signals, unusual programming and news/outside broadcast feeds on Telecom 2C and the *Kopernikus* birds. Telecom 2C carries many French, UK and occasional Irish programmes. Dean logged *Kopernikus* DFS-2 with the German Golf championships for German TV in *The European Tour - The Deutsche Bank Open* matches, audio with clean fx only was at 7.20MHz and the German language commentary + fx were at 6.60MHz. Remember this is the OB feed into the studio centre (it was also fed to Sky Sports) so you see all the golf without advertisement breaks. For football fans there's lots of French football for Canal + carried on Telecom 2C again with local language commentary + fx on one track and clean fx on another audio subcarrier. And it's unscrambled!

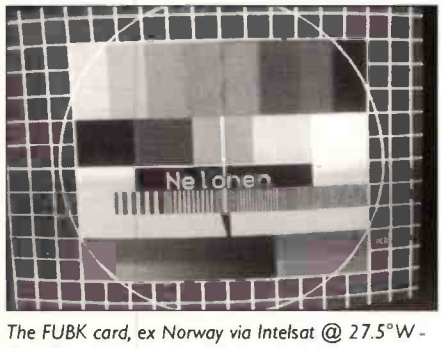
I reported in another magazine column that our old friend **Roy Carman** (Lake, IoW) has now met with another four fellow sat zappers on the Isle of Wight. I'm pleased to put enthusiasts in touch with each other for self help, advice and socialising so any Isle of Wight or other readers wanting to meet fellow enthusiasts in their area let me know. Roy comments that *THOR-2* at 1°W is now firing up on all cylinders and we're rapidly approaching a Scandinavian 'hot spot' in our Southern skies. Moving onto Eutelsat II F4 @ 7°E and the 'slug' table, this is the menu of upcoming news breaks and inserts that sits at 10.967GHz horizontal. Roy notes that this often fills with WTN, APTV and RTV news feeds for European distribution - perhaps the ones you're missing in digital on other birds...the slug menu is carried as a sound in syncs (SIS) transmission, the image continually shaking in time with the accompanying music. Many contribution circuits use SIS for distribution - it's now possible to obtain 'EBU Descramblers' that both steady the picture and recover the audio for about £99. But the EBU have recently placed a large order for MPEG-2 digital encoders, so anticipate an end to SIS soon.

Clive Manning (Northampton) will certainly be watching digital TV. A year ago he bought a Nokia d-Box (with Irdeto CAM and smart card for Multichoice) and was impressed with picture quality. When Multichoice changed encryption to favour Dutch market receivers (the Nokia was intended for Germany) he changed to a Pace DVR500, a much simpler beast, though with much less versatility, being designed specifically for Dutch Multichoice. So, if you're thinking of buying a digital receiver, ensure it's versatile enough to change receive parameters for different transmitted MPEG signals! **Julian Reedwood** (Christchurch) has just bought an upgraded, modified Nokia d-Box and we await his findings with interest!

The recent civil unrest across Albania was well covered in various news feeds and Roy viewed several on Eutelsat II F2 10°E and on Intelsat 705 @ 18°W. The latter is often used by Italian SNG trucks and one such feed was monitored via uplink truck ITA-12 at Valona, a report into the RAI news programme TG2 showing gangs armed with AK47 rifles roaming the streets. The same day an 'EBU Tirana Path 1' SNG unit was uplinking out of Albania's capital city Tirana into RAI's TG1 news programme on Eutelsat II F4 @ 7°E (11.078GHz vertical).

The most significant event of the period was the Hong Kong hand-over to China and this was well covered on many satellite paths. The Spaniards comparing Hong Kong to their own ongoing friction with the UK over Gibraltar drew obvious parallels with at least two Hispasat (30°W) live OB feeds featuring the 'Rock' in the background and another with a Spanish insert ex

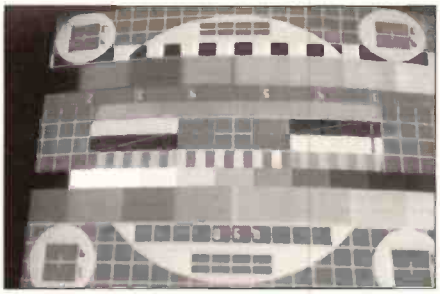
Long live analogue! This, too, will go digital, but with the EBU's own unique MPEG standard.



The FUBK card, ex Norway via Intelsat @ 27.5°W - digital!

A digital news feed via Eutelsat II F3 @ 16°E.

Analogue bliss from the 1°W Scndanavian 'hot spot'.



A familiar 0249 test card following a MIR space station news feed via Intelsat K for Europe in analogue.

John Locker's discreet teleport, hidden from the outside world. The Gregorian feed motorised 1.2m dish is used in conjunction with his Nokia d-Box for digital reception.

Hong Kong showing the British departing the colony! Roy Carman monitoring the events via 7°E comments that none of the mass of Red Army trucks arriving in Hong Kong, unlike any 'western' convoy, had visible radio antennas, at least not until the light armoured vehicles appeared sporting antennas and 20mm cannon. At times the digital feed broke up into squares and 'video corruption'. For an hour on the 11.176GHz vertical transponder the army advance was carried live, terminating at 2340BST June 30th with the 'EBU Hong Kong' caption.

Once more history was seen to happen on our screens.

News In Space

Dutch Nethold (Multichoice) are dropping various channels in their digital package - from August 1 NBC, CNBC, Discovery, CMT and numerous 'free' channels are being added such as various RTTLs, Kindernet, Zomer TV and numerous radio channels, though a valid smart card is still necessary to receive them.

Intelsat 803 is being deployed - once launched end September - at 21.3°W and will replace the vintage Intelsat 515 bird, which in turn moves to 31.4°W and replaces the even older 506 craft 'which will then be de-orbited' The Intelsat 802 satellite, successfully launched June 25th, has slotted at 174°E over the Pacific operating in both C and Ku-Bands. Other series 800 craft are as follows - 801 is at 64°E over the Indian Ocean, the upcoming 804 will locate at 29.5°W to service Africa. The future 805 is booked for 55.5°W and 806 at 40.5°W, both Atlantic Ocean birds and will service Latin America. The high powered Intelsat K-TV bird will launch early 1999 and locate over the Indian Ocean at 95°E offering high powered Ku service across SE Asia and the Pacific fringes.

The Intelsat series 900 are at an advanced planning stage intending to launch Summer 2000 in the Asian/Pacific region. The new mega birds will feature 44 C-Band and 12 Ku-Band transponders.

Fresh on the recent news of *Telstar 401* demise, the *Tempo* satellite, intended for the DBS service @ 17°W in the Echostar package has lost power through unknown causes, which may result in the loss of several transponders. Pending establishing the cause of the power down problem, upcoming launches of satellite using similar power supplies has been delayed notably PAS-6 via *Ariene* for a 43°W destination.

Finally, the European Commission are planning a clamp down on the manufacture and sale of pirate decoders plus the essential smart cards. The proposed EU directive will be presented to EU members before end 1997.

DX Television

by Keith Hamer and Garry Smith

Keith Hamer &
Garry Smith
17 Collingham
Gardens
Derby DE22 4FS

There was a dramatic increase in Sporadic-E activity during June and the number of readers' letters reflects this. In general, an excellent month with virtually every European country identified at some stage. Many of the openings lasted several hours; the 18th was one of the better days with over 15 hours of continuous activity reported.

Sporadic-E Reception Reports

Throughout June, signals from Spain and Italy were commonplace. Eastern European countries such as Ukraine and Belarus were also noted on many occasions. Rare signals this season include Austria and Switzerland, both identified by **Vince Richardson** (Dolgarrog) and **Peter Chalkley** (Luton). Iceland made a lengthy appearance on the 10th between 1030 and 1430UTC, according to **Peter Barber** (Coventry) who spotted the 'RUV ISLAND' PM5534 test card and text pages headed 'RAS 1 RUV' on E4. On the 14th, the Rumanian second network, TVR-2, appeared on R2 at 1343UTC and lasted almost an hour.

In the Netherlands, goodies such as Iran, Turkey (Star TV) and Jordan have also been encountered several times this season. The best times for reception seems to be between 0500 and 0700UTC, so get out of bed if you want to see the exotics!

The Italian private station with 'VIDEO' logo in the lower right of the screen is officially using Channel E2 but with an unusually large negative offset. **Tom Crane** (Hawkwell) measured its vision frequency at 47.872MHz. Using a receiver such as a D-100 which has a narrow vision i.f. bandwidth, the signal can often be separated from other stations on Channel E2. There are rumours that a second Italian private station is also operating with a large offset on Channel E2.

Exotics

On 1 June in Derby, the Syrian second network was identified at high strength between 0630 and 0730UTC on Channel E2. Peter Chalkley (Luton) also noted this with strong pictures and Arabic sound. At 0710UTC a second Arabic transmitter was present. This could well have been Iran.

On the 9th, Portugal's second-network FuBK test card with 'RTP LISB2' identification was observed on E2 at 1300UTC co-channelling with Spain. This was the 35W RTP-2 outlet located at Valenca do Doura in the north of the country. At 0836UTC on Channel E2 on June 20th, a colour-bar pattern was noted from an easterly direction. This signal may have originated in the Middle East. Signals from both Ukraine's YT-1 and YT-2 networks were around at the time on Channel R2.

Serbian Mystery

Serbia has a new logo in the form of an oval satellite dish in the top left of the screen. The v.h.f. terrestrial service displays a number '1' immediately to the right. With the satellite version the word 'SAT' is displayed. The only Band I outlet listed is Kapaonik on Channel E3 with 100kW e.r.p. but on June 27th, signals were also resolved on Channel E4 at fair strength. Is a new transmitter operating or were the Serbian broadcasts being relayed by Croatian TV, who operate two high-power outlets on this channel?

Sporadic-E Log For June

It has been suggested that a collective reception log might be of interest to let DXers compare notes. Any comments or suggestions for improvements would be appreciated.

1st: Syria (SYR-2) E2, also second Arabic station; Denmark (DR-1) E3; Slovenia (SLO-1) E3; Serbia (RTS/PTC) E3; Italy (VIDEO) E2; Italy IA and IB (RAI UNO); Corsica (Canal Plus) L2 and L4; Spain (TVE-1) E2, E3 and E4; Czech Republic (Nova TV) R2.

2nd: Italy (VIDEO) E2; Italy IA and IB (RAI UNO); Spain E3.

3rd: Italy IA and IB; Serbia E3; Corsica L2; Iceland (RUV) E4; Lithuania (LTV) R2; Ukraine R2 (YT-1); Belarus (bT) R2; Estonia (ETV) R2; Russia (ORT) R2;

4th: Lithuania R2; Russia (PTJ) R2; Belarus R2; Slovenia E3; Croatia E4; Germany (ARD) E2 and E4; Norway (NRK-1) E3.

5th: Finland (YLE) E3 and E4; Sweden E2; Ukraine (YT-1) R2; Lithuania R2; Russia (PTJ) R2.

6th: Italy E2 (VIDEO) and IA (RAI UNO); Spain E4; Portugal (RTP) E3; Germany E4; Sweden (SVT-1) E2; Czech Republic R2.

7th: Sweden E2 and E3; Czech Republic R2.

8th: Germany E4; Denmark (DR-1) E3 and E4; Sweden E3 and E4.

9th: Finland E3 and E4; Italy IA; Spain E2, E3 and E4; Portugal E3; Austria (ORF) E2a; Germany E2; Serbia E3; Croatia (HRT) E4; Slovenia E3.

10th: Italy IA; Sweden E2, E3 and E4; Denmark E4; Portugal E3; Spain E3 and E4; Norway E3 and E4; Iceland E4.

11th: Spain E2, E3 and E4; Portugal E2 (RTP-2) and E3 (RTP-1); Italy IA and IB.

13th: Norway E3 and E4; Italy IA; Spain E2 and E4.

14th: Rumania (TVR-2) R2.

16th: Portugal E3; Spain E3; Italy E2 (VIDEO), IA and IB (RAI UNO).

17th: Spain E3 and E4; Italy IA and IB; Serbia E3; Croatia E4.

18th: Serbia E3; Croatia E4; Slovenia E3; Italy E2 (VIDEO), IA and IB (RAI UNO); Corsica L2; Germany E2; Austria E4; Sweden E2 and E4; Norway E2, E3 and E4; Czech Republic R2; Belarus R1; Ukraine R2 (YT-1).

19th: Lithuania R1 and R2; Ukraine R2; Belarus R2; Sweden E2 and E3.

20th: Ukraine R2 (YT-1 and YT-2); Croatia E4: Italy E2 (VIDEO); Unidentified colour bars on E2 from the east (see 'exotics').

21st: Italy E2 (VIDEO), IA and IB (RAI UNO).

22nd: Italy E2 (VIDEO), IA and B (RAI UNO); Switzerland (DRS) E2; Corsica L2; Croatia E4; Spain E2 and E4.

23rd: Spain E2; Sweden E2; Norway E2; Italy IA and IB.

24th: Italy E2 (VIDEO) and IA (RAI UNO);

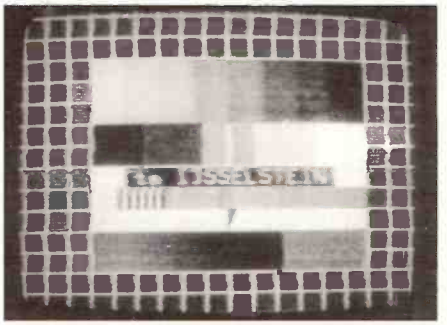


Fig. 1: An unidentified Dutch FuBK test card photographed by Stephen Michie (Bristol).

Fig. 2: Estonian 'AK' news intro from Tallinn on Channel R2.

Fig. 3: Lithuanian news programme on Channel R2 with 'LTV' logo in the top-left of the picture.

Fig. 4: Sample text pages (Videostrani) from Slovenia. The SLO-1 logo appears in the top-right of the screen.

Portugal E3; Spain E2, E3 and E4.
25th: Spain E2, E3 and E4; Italy E2 (VIDEO), IA (RAI UNO and TVA) and IB (RAI UNO); Russia (ORT) R1.
26th: Spain E2, E3 and E4; Slovenia E3; Corsica L2; Hungary (MTV-1) R2; Czech Republic R1.
27th: Serbia E3 and E4; Portugal E3; Spain E2, E3 and E4; Italy IA.
28th: Italy IA and IB; Corsica L2; Spain E3.
29th: Italy IA; Spain E3 and E4.

The reception reports shown above were kindly supplied by Peter Barber (Coventry), Vince Richardson (Dolgarrog), **Shaun Taylor** (Howden), **John Woodcock** (Basingstoke) and Peter Chalkley (Luton).

Tropospheric Reception

Band III was active in early June. **Shaun Taylor** (Howden) identified Denmark on Channel E6 from Sydsjaelland on the 4th and 5th. Peter Barber saw Belgian signals from BRTN-1 (Wavre E10) on the 3rd and RTBF-1 (Wavre E8) on the 4th and the Dutch 'Nozema Nederland 1' PM5544 test card from Markelo on E7 on the 5th.

Meanwhile, **Tim Bucknall** (Congleton) has been using a scanner to detect distant u.h.f. transmitters under flat conditions with considerable success. The French transmitters at Brest and Lille, both on Channel L21, were immediately heard and a check on Channel E35 revealed signals from Goes in the Netherlands. More recently, test transmissions from the Channel 5 outlet at Darvel (Channel 35) have been identified. During a Sporadic-E opening, Tim identified the Varanger Channel E2 transmitter which is located close to the Norwegian/Russian border.

Ian Milton (Ryton) received numerous Norwegian stations in Band III and at u.h.f. These included TV-2 on E12 and u.h.f. plus TV Norge and NRK-2 radiating test cards.

Channel 5 News

Channel 35 test transmissions have now taken place in the Midlands and will increase in duration towards September. The Wrekin test occurred on June 29th and was received in colour in Derby, suggesting that severe co-channel interference will be a reality rather than a possibility. **Chris Howles** (Birmingham) advises that many viewers in Telford rely on the 10kW Fenton (Stoke-on-Trent) relay because of ghosting problems from the nearby Wrekin. Since the Wrekin and Telford Channel 5 transmitters will share the same frequency, some interesting co-channel effects will presumably occur!

Keep On Writing!

Please send DX-TV reception reports, equipment news, of-screen photographs and general information to arrive by the 3rd of the month to:- Garry Smith, 17 Collingham Gardens, Derby DE22 4FS, England.

Finally, a big 'thank you' to the many *SWM* readers who have offered help regarding the faulty Amstrad PCW8256 word processors. The drive belts were eventually changed and this appears to have solved the problem.

Fig. 5: Hong Kong's 'TVB' station distributed at u.h.f. (System I, as in the UK and Eire), photographed by Hukunaga Mituhiro (Japan).

Fig. 6: 'Tropo' in the early Seventies provides this month's visit down memory lane. The BBC-1 Identification caption received in Derby on Channel 33.

Short Wave Column: A Life On The Ocean Wave

My only real experience of life at sea is a Dutch ferry. I travelled with my nautical chum who bored me rigid on the journey to the docks with tales of tying your sheets to the binnacle with the seacocks aft. As we pulled out he took his position on the poop, arms akimbo and said this was the life for him.

"I suppose you are still playing with your little radios, then? Can't we get up on the bridge - see what kit they have got?" His tone suggested revenge was called for.

"Well, let me talk you through that little lot", I said, gesturing to the aerials on the gantry.

"Nothing to worry about", said I with a staged concern, "but the long rod with like a spring at the bottom. That's for calling or distress on 2182. Can't see it getting very far, the loading coil's corroded." The colour drained from my friend's face.

"And that dipole for 156 megs. Not enough gain for these waters. I would not leave port without stacked yagis and a rotator." I understand my fisherman's friend decanted his Seafarer's Platter into the sink and never left his cabin for the whole voyage.

There was, of course, nothing wrong with the ship's aerials.

If you are in the AR7030 class, key in 2182 after nightfall. Set the filter one higher than the USB default to get all the audio and listen. The Calling Channel is USB but AM is still allowed. Turn the bass up a bit to see how many ships are off-channel and leaking carrier as you hear the beat notes. Find out how many fist-mikes have been dropped or left swinging against the bulkhead in a Force Ten as you wrestle with appalling audio. Remember, your 7030 is only telling it exactly like it is, think of the poor operator at the coast station. Fish and ships stories to **bob@aor.co.uk**

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AR5000

AR5000 £1495 AR5000+3 £1749

Government departments on both sides of the Atlantic have carried out extensive trials against rival units and we are pleased to find they are placing orders for the AR5000, good sensitivity at frequency extremes, excellent range of facilities, compactness & light weight leading to great flexibility in operation. Features include **automatic electronic preselection** between 500kHz - 999.999999MHz. 'True receive' throughout it's range, not an up-converter above 1GHz.

PLUS PERFORMANCE Capabilities have been further increased with the launch of the ***AR5000+3*** providing three enhanced facilities: **A.F.C.** switchable automatic frequency control for accurate tracking of unusual bandplans, **noise blanker**, switchable to help reduce the effects of ignition noise especially while mobile, **synchronous AM**, featuring double and selectable sideband with an easy to use wide lock range.

See the full technical review in HAM RADIO TODAY magazine, Vol.15 No.6, Chris Lorek concludes *"...I must admit that I'm a fan of AOR's receivers, and having tested the AR5000, even more so. If I could afford the £1,749 price tag, there would be one in my shack. For the keen listener, or indeed the professional monitor, this receiver is worthy of very careful consideration..."*

- Very wide frequency coverage 10kHz - 2600MHz
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The **AR8000UK** provides a frequency coverage from **500 kHz to 1900 MHz** without gaps in the range (actual acceptable frequency input from 100kHz). The AR8000 combines full computer compatibility with advanced wide-band radio receiver technology. The all-mode reception provides AM, USB, LSB, CW, NFM and WFM. An independent ± 2.0 kHz SSB filter is fitted as standard and the USB/LSB modes use true carrier re-insertion with correctly calibrated frequency read-out (not offset by 1.5 kHz). Step size is programmable in multiples of 50Hz for smooth tuning. A custom manufactured ferrite bar aerial is neatly internally installed at the top of the receiver's cabinet to enhance receive performance when listening in population centres to Medium Wave services. The high visibility dot matrix LCD provides great detail including a signal strength bar meter, band-scope, twin VFO frequencies displayed simultaneously, ALPHANUMERIC comments stored along with frequency, mode & attenuator status simplifying the job of recalling and identifying memory channels, password protection etc. **Computer control** and clone of data between two AR8000UK receivers (optional interface required).

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Architect

Hans-Peter Tillman writes from Germany, and reminds me that he wrote last year asking for an address for the RAF VOLMET station. I do remember his original letter, and put it aside for further research, as I was expecting to speak with somebody who would be able to provide an accurate address. That piece of research led nowhere, and Hans-Peter's original letter seems to have been overlooked. I'm very sorry about that, I hope that you'll forgive me.

By way of making amends, I thought that I would ask the readers of this column for their advice on this subject. Does anyone have an accurate address for the RAF VOLMET broadcast which operates on 5.450 and 11.253MHz. I have seen several different addresses over the past 10 years, but the same two keep appearing. Unfortunately, I know that they are both wrong, as I have visited both locations, and there is no longer any suitable RAF presence in either case. The most often quoted address is the fabled 'Room 200, RAF West Drayton'. I have contacts at this establishment - it is better known as the London Area Terminal Control Centre - LATCC - they tell me that there never was a 'Room 200', so I have no idea where that address originated. The RAF have all but pulled-out of West Drayton now, so that address is obviously no longer valid. For some reason, Klingenfuss still insists on listing this address in his *Utility Guide*.

The next most common address to be quoted is that of 'RAF Upavon, Wiltshire'. This is another place that I have visited in search of an answer. Many years ago, there used to be a large 'antenna farm' adjacent to the airfield, but this has now gone completely. There is evidence that this site used to house the transmitters that were 'Architect', but they are now (possibly) at a site between Swindon and Oxford.

The third option for an address is 'HQ Strike Command, RAF High Wycombe'. Once again, I have visited this site, and there are certainly no visible h.f. antennas anywhere to be seen. Given the way that these systems work, it is very possible that the broadcast is prepared at one location, fed by land-line to a second location, and then transmitted. Therefore, it is possible that the broadcasts could actually originate at High Wycombe - but where are they transmitted from? In my opinion, you would send a QSL card to the transmitter station, which is not necessarily the place where the operator is sitting. The RAF VOLMET broadcast is a little different, in that the 'voice' is actually generated electronically, but I'm not sure if I would want to QSL with a rack of electronic equipment!

With all the above information and evidence against certain addresses, does anyone have a good address for the RAF VOLMET broadcast?

Albrook

I was very surprised to hear a brief transmission from the USAF GHFS station during the middle of July which mentioned some dates of operation. Over the following few days the full text of the transmission, and the reason behind, were discussed at length on the Internet.

The transmission was on 11.175MHz just after 0000UTC in the early hours of Wednesday 16th July, and was as follows:

"Attention all stations, Attention all stations: This is Albrook AFB providing service from 5 April 1969 through 15 July 1997. This is Albrook, signing out."

Over the next few days, the full story was released. The USAF GHFS station at Albrook AFB in Panama is no more, and the above transmission was the final one from the station. The station was part of the USAF's 'Southern Command', and according to the *New York Times*, Southern Command HQ will be moving to Miami and closing Albrook by the end of September. They were originally supposed to close 'by' 1999, but the date was moved forward due to various command/mission shifts.

Another station, AFH3 (its 'official' callsign), has been lost to history. Now, there are rumours that Andersen GHFS on Guam in the Pacific will disappear next, or may just become a 'remote station' for one of the other GHFS stations.

Letters

Plenty of letters to work through this month. First up is **Alan Blair** from the north east, who asks for the postal address of the NOAA in the USA, so that he can 'write-off' for a copy of the *Flight Information Handbook* which I mentioned recently. I have written back personally to Alan, but since this piece of information may be required by other, I'll repeat it here also.

NOAA's National Ocean Service (NOS) is the sole distributor of public sales of Defence Mapping Agency aeronautical charts and Flight Information Publications (otherwise known as FLIPs). These materials may be purchased form a variety of NOAA chart sales agents throughout the US, or you can order them directly from NOAA. The publications are ordered from:
NOAA Distribution Division N/ACC3, National Ocean Service, Riverdale MD, 20737-1199, USA

If you are buying goods from them and you are not in the USA, the easiest and cheapest method is via a credit card. Personally, I would still recommend 'phoning them to place an order, but if your circumstances dictate that an overseas 'phone call is impossible, a letter is the best option.

Next up is **Derrick Hine** from Hampshire who writes to ask for a list of frequencies used by Concorde. Derrick wants to listen to Concorde as it departs Heathrow and heads out towards the Atlantic, and then still hear it as it crosses the ocean.

The only information that I have relates to its oceanic crossing. Naturally, Concorde uses normal v.h.f. air-band for communications in the London area, and on its journey towards the west. Once it reaches the Atlantic airspace (or rather, the start of its special flight track which starts in the Bristol Channel) it does all it communications via h.f. radio.

All Concorde flights fly in a special airway, a long way above the normal transatlantic jets. These special airways are affected much less by the tradewinds, so are fixed (i.e., they don't change on a day-to-day basis like the others do). Otherwise, they still maintain regular contact with the oceanic control centres at Shanwick, Gander and New York. The normal transatlantic jets fly in airways which carry designations of letters of the alphabet; the most northerly track is 'Track A', the next one slightly south is 'Track B', then 'Track C', and so on. The tracks used by Concorde are known as 'Track SM', 'SN' and 'SO'.

Looking through the latest *RAF En-Route Supplement*, the following frequencies are the most likely to be used by Concorde (all u.s.b.): **Shanwick & Gander** - 2.872, 5.649, 8.879, 11.336MHz. These are the h.f. frequencies used by 'aircraft registered east of 30° West', and are known as the NAT-C family. During the summer months, British Airways operates an extra transatlantic Concorde flight a few days each week. This extra flight operates to Bridgetown in Barbados, and is flight BAW273 - outward leg and BAW272 - return leg.

Don't forget that Air France still operate their Concordes, and when they fly from Paris they fly north towards the Channel before they go supersonic. From Derrick's location near the south coast it should be possible to hear Concorde flights from both airlines. I don't have any up-to-date information on flight arrival and departure times for Concorde flights, but your 'local friendly travel agent' will be able to help with both British Airways and Air France timetables. Derrick also asked if anyone had 'heard' a Concorde using ACARS. I have seen reports that they are not equipped with ACARS, but I am ready to be proved wrong.

Scanning

JOHN GRIFFITHS
132 HOWARD STREET
OXFORD
OX4 3BG

Well, it appears that there are many letter writers amongst you who are still searching for ways of making your set-ups less affected by such things as computer hash. I've covered that one recently so anyone wanting some form of explanation, please look to the year's back issues.

However, one area I haven't covered is in-car. Most of the answers here involve fitting suppressors or pulling over, you should **not** be operating a scanner whilst driving.

However, a letter from a reader in Cornwall has come up with a unique suggestion and I'm including it for both its simplicity and its unique approach to an old problem. The reader in question has an in-car cassette with a portable CD player.

After having had some poor audio back on the scanner, this reader went and experimented, which is a trademark amongst scanner enthusiasts anyway!, and tried plugging the cassette player adaptor into the headphone socket of his scanner, popped the tape end into the cassette and...in his own words "...the audio was superb!".

He has since discovered that he needs to modify the stereo jack to suit the mono headphone socket. However, he tells me that the resulting quick fix has given the idea of in-car entertainment a whole new slant! Any other quick fix mods any of you can come up with would be appreciated.

Cornwall Air Ambulance frequencies from this reader inform me that the unit uses an MBB Bo 105 DBS with registration G-CDBS. It reports into Ambulance Control with the callsign 'Helimed 181' on 171.0875 with control responding on 166.2875MHz.

Colour scheme is all over red with yellow lettering and it is an active unit, so readers and holidaymakers down that end should see plenty of action from the unit.

Newcomers

An interesting letter from **Gavin Bray** of Cardiff asks about further sections aimed at the newcomer. Gavin has an MVT-7100 but reports poor results on s.s.b. and what would happen by attaching simple antenna to the set.

Well, I've covered the subject of newcomers previously this year, so it may help you to get back issues but, as you are a brand new convert to the hobby, there would be no harm in giving you some basic and simple advice.

Firstly, for scanning, you really need a dedicated antenna mounted as high as you can get it. There are many on the market in all shapes and sizes and my own preference is for a vertical and not a 'nest of dipoles'.

With a nest, which looks like a chimney sweep's brush, you get high windage on the exposed multi-planes, wind moan and it also identifies you as the proud owner of a scanner. A vertical, or monopole, it depends on your terminology, is a far more aesthetic bet.

I would go for something like a Scanmaster to begin with, fed by RG-58 50Ω coaxial cable of sufficient length, but if you doubt your ability to solder, get the supplier to fit BNC plugs on the cable. Make sure you have enough though!

Get Technical?

If you want to get really technical, and want to cover as much as you could on v.h.f. and u.h.f., then, providing money is no object, look at putting up a Log Periodic such as the CLP 5130-2 at around £200. But be aware that you will also need a rotator, around £65 for an AR300XL type, plus cable and a secure mounting kit built to take the weight of the antenna.

Failing that, if you are cash strapped and aren't we all? - then you may find the Scanmaster a more cost-effective bet.

As for s.s.b. reception, you would be better off with an external antenna. Again, if you want to experiment, then the SW-2 Portable Antenna may prove to open up the capability of your scanner some more.

This is a wideband antenna, covering from 100kHz to 1GHz, so can be used 'right through' the scanner's range. A plug is fitted to this kit and it sells for around £20.

However, you can't beat a good set-up via an a.t.u. and longwire for the frequencies from long wave to around 30MHz. Many to choose from, such as the Howes CTU8 and CTU9 kits, or ready built a.t.u.s such as the Global AT-2000, the MFJ-16010 types.

For wire antennas, look at the DRAE end-fed longwire which covers 1 - 30MHz. Pricey at £60, it is ready to go into the a.t.u.

However, as it is a good length, you'll need at least 30m of space to erect it in, but bear in mind that it does not have to be 'straight', as you can route the wire all around to fit over both sides of the house.

As for s.s.b. reception, the only advice I can give you is to practice on the amateur bands, 7MHz is good, and keep on practising with the demodulating until you are good at it! I hope this goes some way to answering your query, Gavin.

Letters

A post card saying 'thanks' from **Soltau** in Germany was well received from **Duncan** in response to a query he made to me. Always happy to oblige!

Likewise, the letter from **Elsie Forigell** made me smile. No address though. Its contents are surprising to say the least but I think that the laugh is on me, the writer knows what I mean.

Also, the letter from **Andrew W** concerning the UFO and Harrier on Salisbury Plain. Nice try, the photo was examined by a professional body and is a fake!

Just to clear up something here, I'm availed of back-up for lots of items you send in, be that frequency searching or photos of UFOs, newsclippings and so forth. However, if it makes you happy trying to pull the wool over these old eyes, fair go. I'm up for it!

News Clippings

On the subject of news clippings, a beauty from Basildon. The *Yellow Advertiser* of that area, contains the news that Police have launched a crackdown on scanner users who monitor their frequencies. The clipping says that equipment has been brought in which will pinpoint a scanner user, whether they are reacting to the information or not, as the paper says.

This, I believe, belongs in the field of rumour. All receivers emit a very low field strength - generated by the local oscillator - which would be impossible to pinpoint exactly. Am I therefore right in thinking that it is a ruse by a cash strapped constabulary to warn people off? Anyone with news, technical or otherwise, please write in!

Signals Reported

On low-band v.h.f., **Alan Burnett-Provan** reports signals on 40.180 and 40.220MHz in n.f.m. and languages heard being Italian, German and English. This is in MOD territory although it would possibly be other equipment users on the continent.

Also, he heard two Italians talking on 37.700MHz and ending with what sounded like telephone pips. Anyone any idea on this one? Do write in.

I tried some v.h.f. Band 2 DXing on 10 July and came away with some, what sounded like, Polish around the 96MHz mark. It could well have been Russian.

It was filled with a lot of QRM/N and faded really fast but there were periods when it was pretty good. I can't ID it, so can anyone else?

Also, a bit further down what sounded like Norwegian. I'd appreciate any comments.

For the technical amongst us, this was on a Hitachi Portable which both has f.m. and s.w. bands fitted and must be somewhere near 15 years old now!

Scanner Antenna

Lastly, an old issue of a Maplin magazine, *Electronics and Beyond* for October 1996, turned up when I was rooting through some old back issues of various magazines. In it, on page 21, was a report on a scanner antenna known as Super Scan Mk11.

Reviewed by Chris Barlow G8LVK, the antenna sounds pretty trick and just the thing for many owners. Not having heard of it before, I'd be interested if any of you out there use it. What's it like?

All I can tell the rest of you is that it is an active antenna and covers from 1 to 2000MHz. In the photos it looks a bit like my old SkyScan and also a bit like the Scanmaster I have.

It does, however, get a good review. I'd be interested in hearing from any of you who have used this, do let me know what it's like.

Until Next Time

That's it again. I'd appreciate news on UFO activity concerned with radio listening, h.f., v.h.f. and u.h.f. or anything you've downloaded via your modems. Also, anything about the paranormal and radio related items.

Obviously, your scanning news would be handy too, so get the letters coming in and let's see what's out there!

Be careful, be sensitive and be aware!
Catch you next month.

Airband

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The Red Arrows are scheduled to perform, according to AIC 93/1997 from the CAA, at Dartmouth on August 29. Dates in September are Cardiff (6), Duxford & Folkestone/Shepway (7), Coningsby (12), Leuchars (13), Biggin Hill (14), Guernsey & Jersey (18) and Cowes (21).

To avoid dissapointment, remember that appearance is never guaranteed but a good guide is to ring the free telephone number **(0500) 354802** after 7pm the night before. Any Temporary Restricted Airspace (including that required for the Reds) will be announced on the recorded message.

Disappointed, though, is **Arthur Budd** (Southport). Sea-wall construction has been declared a hazard to this year's Southport Airshow and so the event has been cancelled. Perhaps the works will be finished in time to allow an airshow next year.

I hope the Elvington Air Spectacular went without disappointment. **Ken Cothliff** (Air Supply, Yeadon) sent me information but I'm afraid it arrived too late for my August column, Ken. Apparently, the event was controlled on 130.5MHz.

Unfortunately, I must make the point that this column operates on about a six-week lead time, so once you have some news (perhaps you've planned an event) let me know as soon as possible!

Anyway, I give deadlines at the end of each column. For example, the September deadline is for the November issue (on sale October 23).

Cranfield Report

I attended the PFA Rally on July 5. Sorry that no readers took up my offer to meet there. I'm please to report three improvements this year.

Firstly, revised arrangements meant no queues. Well done the PFA on dealing with last year's problems.

Also, a local broadcast on 107MHz f.m. gave commentary and background information concerning the event (which included a flying display) although I was competing for the radio with my Chris who wanted to listen to the Test Match!

Finally, a flight simulator was present. For the reasonable fee of £9 you could have quarter of an hour at the controls of a medium jet transport closely modelled on a B.737 glass-cockpit but with no motion system.

Slots were subject to pre-booking but hadn't fully sold out by the end of the morning. Recommended if you have the chance.

Follow-Ups & Foul-Ups

Sorry that the abbreviations decode was missed out from both my July and August columns. This month's table includes the missing information. Having said that, no-one wrote to me in frustration at not understanding something for want of an abbreviation, I'm pleased to say.

I was interested in the letter on page 10 of the July issue from **Chris Sloan** (Fife). As Chris is obviously an airband enthusiast, I hope my comments here will reach the right quarter.

The problem with broadband scanners is that they are too broadband for their own good, put more scientifically, the design is necessarily a compromise. This means that, on h.f., interfering signals can spoil reception of wanted transmissions.

A dedicated h.f. receiver (such as the HF-150) is designed with this problem in mind and is likely to provide better reception. The compromise here is limited coverage, usually stopping at no higher than 30MHz.

Another budget receiver that's had good reviews is the Target HF-3 from AKD (see their adverts in this magazine); I haven't had the chance to try this equipment myself, though.

So, Chris' problem originates in the radio-frequency front-end of the receiver: that's to say, the first few parts of the circuit that process the signal. So, computer control is not the answer.

There is of course WiNRADiO, a radio that fits inside a computer, but it's not that cheap. Also, recent articles in *SWM* surround it in controversy.

If I was given the choice, my personal approach would be to avoid letting computers and radio sets get near each other, at best, a long interface cable seems sensible, as does avoiding putting a radio inside a computer if you can help it.

Individual locations vary, as does propagation from day to day. If results still seem to need improvement, an antenna tuning unit (a.t.u.) should be considered and attention to the antenna itself is worthwhile.

Finally, any reputable dealer will let you try receivers before you go ahead and purchase so a visit to a showroom should be considered.

Information Sources

You need my *Airband Factsheet*. I'm not a clairvoyant, but if you read my column then I'll be surprised if the information in the *Factsheet* is of no interest to you!

It's two A4 sheets and includes a chart of supersonic routes specifically drawn up for enthusiasts (I'm not aware of any other similar chart despite a thorough search). Yours for the asking from the Broadstone Editorial Offices (but **not** from me!) if you send a self-addressed reply-paid envelope.

For example, you know your location. Given a radio-navigation chart you could work out which airways lie overhead. With the addition of an *En-Route Supplement* you can find out the frequencies on which those airways are controlled.

Wrong Impression

Now, I may have given the wrong impression to a couple of readers (one just says "I enclose an s.a.e." but has no name), including **C.R. Holme** (Bournemouth) and **John Weir** (Edinburgh).

In July I said that you could consult me for the frequency of a particular stretch of a chosen airway. My source is indeed the Aerad *Supplement*.

You'll understand that I can't send one of these books to each reader who writes in! So, there's no list I can send. A specific enquiry will be answered here but, if you want the whole list, buy from Aerad (see *Factsheet*).

On the subject, the latest Aerad *Supplement* does not include certain information such as ICAO four-letter locator decode. This has been separated into a new book, *Flight Information Supplement*, and I recommend ordering a copy of this when purchasing *Supplements*.

The *Get Met* pamphlet, smaller than A5, is free if you send a self-addressed reply-paid envelope to **CAA Safety Promotion Section, Aviation House, Gatwick Airport, West Sussex RH6 0YR**. Although it contains useful information about weather reports and forecasts, the frequencies for RAF Volmet need updating - as **Frank Slater** (Spalding) found out. They are now 5.450 and 11.253MHz.

Frequency & Operational News

For John Weir, let me explain the procedures for approaching a large terminal taking Heathrow as an example. Aircraft are guided towards the aerodrome by London Airways.

Eventually, perhaps having been descended to some extent, the flights arrive at the Terminal Manoeuvring Area (TMA). At this point, they could be held at Bovingdon, Lambourne, Biggin Hill or Ockham (popular jargon calls these 'stacks').

Eventually (if not immediately) the aircraft leave (or pass) the holds. The northerly two streams from Bovingdon and Lambourne are merged by one Director; the other two streams, from the south, are merged by a different radar Director.

Finally, the streams converge towards the final approach and are handed off to a single final Director frequency. Only when on the i.l.s. are aircraft transferred to Aerdrome Control which is more commonly known as Tower. Aircraft keep up a steady rate of descent the whole time.

Originally, all three Directors sat in the

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UHF Changes

I am pleased to report that our listing last month appears to include the bulk of the primary June u.h.f. frequency changes. As we reported earlier in the year, we were informed that there was no planned major change of the UK frequencies - This June mini change round would seem to compound this statement.

It is interesting to note that a couple of European sources have reported that some NATO countries appear to have started moving frequencies out of the 225 - 240MHz band. Presumably, to free this band for possible use by civil air traffic in the future, as per an initial recommendation made in 1994. It can be seen from last month's listing that the UK is still currently utilising and allocating new frequencies within this band. So at present it would seem that we are not as yet following this practice.

I still get letters from people, (thanks **Tim** and **Bill**), asking about the introduction of 8.33kHz spacing within the airbands. At present I have no new information on this subject but as soon as concrete information becomes available I will let you know.

ADR UHF Changes

As reported last month, it seems that changes have definitely taken place within the Air Defence frequencies. Unfortunately, apart from the original information passed on to me, no further letters have been forthcoming. Please drop me a line if you have any new information. The following new frequencies have been noted so far 240.300, 311.750, 310.125 & 357.700MHz.

B-2A - In The UK

The first official touchdown by the B-2A in the UK was made at the International Air Tattoo at RAF Fairford on Saturday July 19th. The aircraft was on a Global Power mission from and to Whiteman Air Force Base with just the brief stop at Fairford. It has been reported that a second aircraft, operating as an 'Air Spare', in case of unserviceability, was held over Flamborough Head whilst the primary aircraft made its visit. Did anyone hear the second aircraft holding?

A most interesting story was related to a group of us by a visiting United States Air Force pilot on the Saturday evening of the show. Apparently, when the B-2A visited the UK and made a fly-by at the Farnborough Air Show last September, a British company, (who shall remain nameless), decided to try out their new Radar Detection/Missile Guidance Systems on the B-2A to see how effective their new system was on stealth technology. The radar detection systems on the B-2A allegedly lit up like a Christmas tree, in a similar fashion to F-4G Wild Weasels in the Gulf War searching out the Scud sites. The British company supposedly reported later that they had not only got a weak radar signature off the B-2A, but also a heat signature from the engines. The outcome being that whenever the aircraft now visits an air show it is always shadowed by a pair of F-15 Eagles. Not to make the stealth aircraft visible to radar, as they would have you believe, but to give a confused reading to any ground radar units who try to identify the B-2A radar signature. Hmmm... Well it's a good story - I'll leave you to draw your own conclusions!

Refuelling Areas

George from Dorset , writes to me regarding the operational status of the Air to Air Refuelling Areas (AARA) - See 'MilAir' June *Short Wave Magazine*. These areas are not permanently active but are promulgated as in use by the issue of a NOTAM, (Notice to Airmen). This is usually in the form of a Navigational Warning which will list the times of operation and the height to which the area will be active and any other relevant information. The frequencies used are allocated as required by London Military and from my experience usually seem to come from a block of frequencies reserved for these areas. Having said that, I have also heard aircraft refuelling in these areas using Air Defence Radar and standard London Military air traffic frequencies.

Manston

Word has reached me from two sources that RAF Manston is to close later this year or early in 1998. Sadly, once again yet another RAF airfield steeped in military history will cease to exist. As yet, I have no information as to whether the site will continue to be used as a civil airfield or be turned in to the inevitable industrial estate.

Lastly, I would once again remind readers that regrettably, I do not have time to answer letters / queries personally - All replies will be made through the MilAir column.

Airband

Heathrow Tower but have now physically moved to LATCC as part of the Central Control Function. There is no need for pilots to be aware of this change.

Note, please, that there is no such thing as high or low level control at an aerodrome. Hope that answers your point, John, but write in again if I've stimulated any further questions.

Martin Sutton (CAA) has again sent changes to the UK *Aeronautical Information Publication* (*AIP*), previously known as the *UK Air Pilot*. Hope the house-move went well, Martin, and that it was worth missing Cranfield for! As usual, I summarise information that will interest enthusiasts but pilots should consult the original documents.

Aerodromes: Sheffield now has a.t.i.s. 121.7 and the fire service can communicate with pilots in distress on the usual frequency 121.6MHz. Early days for Sheffield, **Andrew Green** (Barnsley) saw no more than four arrivals, non scheduled, on local TV news the day it opened.

Sherburn-in-Elmet has a new runway 06/24 length 700m. Walton Wood, heliport near Pontefract, loses its Air/Ground on 123.625MHz and associated Aerodrome Traffic Zone.

Airways: UA20 crosses UB3 between HEMEL and WELIN and a new reporting point, BUZAD, marks the place. (I remember that there was a BUZAD reporting point here many years ago). New reporting point GIRNU appears to be in the sea 20nm east of Scatsta.

The Watford reporting point, part of Northolt SIDs among other things, is now officially called WATFO (all reporting points have five capital letter designators to fit in to air traffic computer systems). A new point, innominate, at N51° 08.97' E001° 37.61' is on G1 between the Dover v.o.r. and the Flight Information Region boundary.

Beacons: The Birmingham n.d.b. on 406kHz was BIR but has been changed to BHX. (Sorry to disappoint dedicated followers of propagation, no, you haven't found a new one!).

Visual Reference Points: Manchester gets a new one: Hilltop.

Navigation systems continue to be updated. According to *AIC* 82/1997, there is still insufficient confidence to rely exclusively on Global Positioning System (GPS) satellites, but the situation is under review and more widespread reliance might be possible in the future.

Meantime, Omega (various v.l.f. channels but especially 10.2kHz) is being phased out. I remember a flight in a Boeing 720 navigated by Omega, it didn't seem to have the usual v.o.r. indicators in the cockpit!

The changes to both GPS and Omega seem to stem from what the US Government want the rest of the world to do as they support both systems. Funding certainly comes into the equation, no surprise.

Next Deadlines

The next three deadlines (for topical information) are September 15, October 20 and November 10. Replies always appear in this column and it is regretted that **no** direct correspondence is possible.

Abbreviations

AIC	Aeronautical Information Circular
a.t.i.s.	automatic terminal information service
B.	Boeing
CAA	Civil Aviation Authority
f.m.	frequency modulation
GASIL	General Aviation Safety Information Leaflet
GHz	gigahertz
h.f.	high frequency
Hz	hertz
ICAO	International Civil Aviation Organisation
i.l.s.	instrument landing system
kHz	kilohertz
LATCC	London Area & Terminal Control Centre
m	metres
MHz	megahertz
n.d.b.	non-directional beacon
nm	nautical miles
SID	Standard Instrument Departure
u.h.f.	ultra high frequency
v.h.f	very high frequency
v.l.f.	very low frequency
v.o.r.	very high frequency omni-directional radio range

Info in Orbit

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PLYMOUTH
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During a period of a few days in July we saw the Mars Pathfinder probe reach its destination, land safely and commence a programme of exploration; there was a crisis on MIR, but a text-book performance by the Shuttle crew on STS-94. Meanwhile progress in the WXSAT field continued with FENGYUN-2 producing its first image, and NOAA, METEOR and METEOSAT WXSATS providing their best summer imagery.

Current WXSATS

Total coverage of the weather on planet earth came a step nearer with the successful deployment of FENGYUN-2. Launched by a CZ-3 rocket from Xichang, China on 10 June, it arrived on station at 105°E seven days later. As with GMS (Japan), GOMS (Commonwealth of Independent States - Russia), and GOES-9 (US), it cannot be received in the UK because of its location. The radiometer was operated on 21 June and the first publicly released image - see **Fig. 1** - was made available by the National Satellite Meteorological Center (NSMC), China Meteor-ological Association (CMA), People's Republic of China. It was an image of the earth in visible-light (0.55-1.05 micron) scanned that day between 0536 and 0601UTC. The resolution of the visible-light sensors is quoted as 1.25 x 1.25km.

For effective weather monitoring, and compatibility with other geostationary WXSATS, FENGYUN-2 carries two other sensors:

water vapour (6.2 - 7.6 micron) with resolution 5 x 5km.

infra-red (10.5 - 12.5 micron) with resolution 5 x 5km.

The quality of the original image is very high. FENGYUN-2 is spin stabilised at 100 rotations per minute, and orbits at 35800km (geostationary). The Australian Bureau of Meteorology (BOM) is working with the China Meteorological Administration on the FENGYUN-2B satellite and is providing a Turn Around Ranging Station to support FENGYUN operations, as it does for the Japanese GMS-5 satellite.

METEOR 3-5 Both Directions

NOAA WXSATS transmit continuously - 24 hours per day (NOAA-12 on 137.50MHz and -14 on 137.62MHz), so we hear both of them during northbound and southbound passes. METEOR 3-5 (137.85MHz) only operates in sunlight, so for much of the year it is heard on either southbound or northbound passes - the others being in darkness. During July and early August this year, METEOR 3-5 was in sunlight over Britain during both ascending and descending passes. The plane of its orbit progresses westwards (it is not sun-synchronous), so as it moves towards the morning terminator, transmissions continue in reducing levels of sunlight. Eventually the illumination becomes too low so the transmitter switches off; this can occur while the WXSAT is well above the local horizon. The ending of transmissions during ascending morning passes will have occurred by mid-August, leaving just the descending afternoon ones transmitting in daylight.

OKEAN 1-7 (also known as 4)

The oceanographic WXSAT OKEAN 1-7 (137.40MHz) has not been operational on a regular basis for a long time. A recent E-mail from **Alex Ivanov** provided a transmitting schedule for late July, so an occasional transmission might be heard in future months. Even when in full operation the satellite does not transmit continuously; it has a side-looking radar system (which requires heavy power to operate) as well as a microwave sounder. OKEAN can record image data so some transmissions contain a playback of an earlier scan, making OKEAN telemetry unusually interesting.

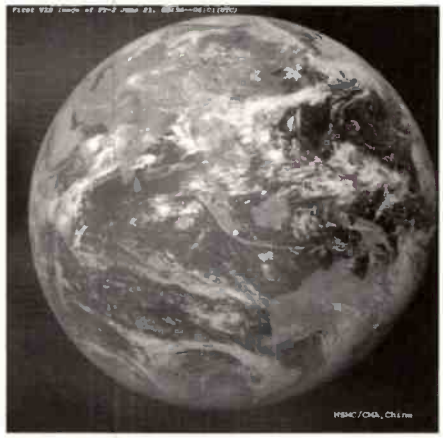

Fig. 1: FENGYUN-2 first visible image, courtesy CMA.

Partial Re-activation of Earlier NOAAS

I was momentarily puzzled when, while watching a NOAA-12 pass at 0836UTC on 16 July, my utility scanner (a PRO-2004 fed by a second external WXSAT antenna) suddenly received a strong beacon on 137.77MHz. NOAA-12 transmits a beacon on 136.77MHz so I had expected to see this frequency displayed. Knowing that NOAA-14 (which does have a beacon on 137.77MHz) would not be around, I checked one of the satellite tracking programs which I keep updated with a large set of current Kepler elements - and immediately identified NOAA-11 high above Britain. I have not logged any transmissions from NOAA-11 for many weeks, so I contacted NOAA on the Internet to ask for confirmation. **Thomas Kleespies** immediately responded:

"NOAA-11 is being partially reactivated because the HIRS instrument [see reference info later] has failed on NOAA-12. Without the NOAA-12 HIRS, critical sounding data was not available. The NOAA-11 HIRS (and entire TOVS instrument suite) is part of the 'TIP' data, and this is transmitted on the beacon frequency. There won't be h.r.p.t./a.p.t. from NOAA-11 - you'll still have to depend on -12 and -14."

"The TOVS sounder data is also included in the h.r.p.t. data stream too, and the h.r.p.t. transmitter works on NOAA-11. But, even though for most users h.r.p.t. means 'imagery', don't confuse the two. The AVHRR imaging instrument failed on NOAA-11 way back in September 1994. NOAA-12 and -14 will continue to be the operational imaging satellites".

"The beacon on the NOAA s/c is used by tracking antennas to lock onto the signal and track. The TIP data are modulated in this signal. If memory serves me correctly, this includes all the h.r.p.t. data without the AVHRR imagery". My thanks to Thomas for confirming this logging.

The equipment just referred to is as follows:

HIRS - High resolution Infrared Radiation Sounder.

TOVS - TIROS Operational Vertical Sounder.

TIP - TIROS Information Processor.

Summer NOAA Passes

All the NOAA WXSATS were launched into sun-synchronous orbits - those where the plane of the orbit remains more or less constant in relation to the sun. Consequently NOAA WXSATS pass over a given location at more or less the same time each day. Because of this we see marked seasonal effects in the content of the images received from the NOAA WXSATS.

The progress of a typical summer NOAA-12 ascending (north-bound) evening pass, seen in **Fig. 2**, displayed on a tracking program (TrackII), monitored on 20 July at about 18:40UTC. The sun's terminator is crossing west Africa; countries to the east have had sunset, but the Atlantic and Americas are still in afternoon sunshine. Britain is enjoying summer evening sunshine. The screen dump also shows the manned Russian space station MIR to the west of north America, and SICH-1 (the oceanographic satellite) on the eastern side of Australia. METEOR 3-5 is over the south pole.

Because the footprint of NOAA-12 overlaps the darker east and the sunlit Atlantic, NOAA-12 is operating in 'daylight' mode, passing northbound where the sun is at a low angle (near sunset) so the visible-light image is not well-illuminated. The actual image received from NOAA-12 at that time is shown in **Fig. 3**. In the raw image the visible-light section (right-hand-side) is fairly dark. The upper edge shows the south coast of Greenland in sunshine - as can be seen in the screen dump. The left section is infra-red; Spain can be easily seen by virtue of its heat - late afternoon on a hot July evening. The raw visible-light image reveals very little detail, yet, as with METEOR images, there is much information within. I applied a contrast stretch to this image and the result is **Fig. 4** - the same image - but much enhanced.

Contrast expansion reveals the amount of detail actually present in the image but which cannot normally be seen because our eyes cannot discern the low contrast between areas of dark pixels. This enhancement was done using the test program's own contrast expansion. Some programs don't include image enhancement options, but this is not a problem. Several image processing programs are available, particularly for computers running the Windows operating system. The main option that WXSAT decoding programs should provide is conversion from the raw image to one that can be recognised by standard image processing software.

This aspect (image format conversion) is one which confuses many new recruits to the WXSAT scene. Several correspondents have written asking how to convert (and compress) raw images to fit on one standard floppy disk. Disks come in either 720Kb (DD - double-density) or 1.44Mb (HD -

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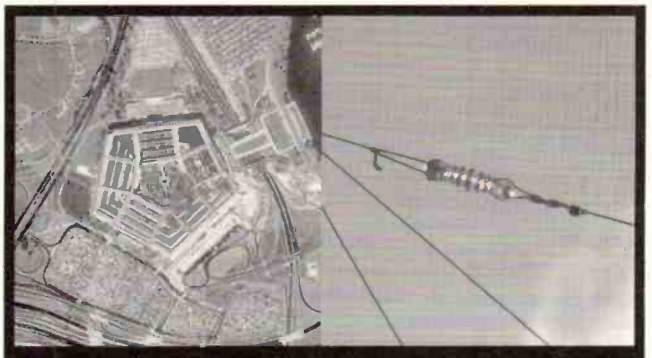

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high density) formats. A raw image from a long METEOR pass may occupy over 2Mb.

The first task is to check the documentation which comes with the program, to find out to what standard the program can convert its native format. Most programs can produce 'BMP' files - the native 'Windows' bitmap format. This stores data in uncompressed form, identifying the location of each pixel in the image, together with the brightness (intensity) of that pixel.

Saving the raw image in 'BMP' format still produces a very large graphic - perhaps 2Mb of image - if the original picture was a large one. This format can now be imported into virtually all graphics programs for further processing. A number of programs originally had the 'GIF' option. GIF is a very efficient format but it was copyrighted by Compuserve a few years ago and although it can now be used (as far as I am aware) without infringing any laws, some programmers understandably removed GIF options pending clarification of the law.

Once imported into a graphics program, the image (occupying perhaps 2Mb can be saved in PCX, GIF, JPG, or any of several other portable formats. JPG is probably the most economical format but it carries a minor penalty in being able to lose some original image information. By using certain algorithms, data can be compressed with a small loss, but resulting in a much smaller file size. An original raw image of 2Mb may be converted into a JPG image of under 50Kb! Such programs usually allow the compression factor to be set to carry zero or small data loss.

I have tried a number of graphics viewers and image processors - all running under the Windows 3.1 and 95 environments - and have come to the conclusion that the best programs are *Paint Shop Pro* (currently version 4.12 occupying 3Mb) and *Graphics Workshop for Windows* (currently version 1.1x patch 2 occupying 1.8Mb). Both are shareware programs - see later for details of availability.

Correspondence

It is encouraging to hear again from new readers who have requested and received software and Kepler elements, and who have successfully used them to monitor satellites with scanning receivers. **Richard Morris** of Bedworth told me that he was new to computing, but has a PRO-2006 scanner so can tune to 143.625MHz, to hear the MIR cosmonauts voice communications. After installing the satellite program (I am not sure which one Richard uses) he was able to predict MIR passes, and listen in with his family, and they have found this most enjoyable. Richard is wondering whether he should be learning Russian!

Alan Jarvis of Cardiff sent me an image received and processed using Christian Bock's "splendid WXSAT program". The image is of very high quality and in full colour - an option offered by the program. To use this option on polar satellites, a number of settings have to be made, but the process is fully described in the included help file. The software requires a sound card and works extremely well on computers running under Windows, preferably with higher speed processors. I gave details of this program in a previous issue - see 'software'.

STS Plus - new version - 9726

David H. Ransom, Jr. is the author of the well-known satellite tracking program *STS Plus*, and version 9726 was released in late June. David describes this as a 'features upgrade' to formalise new features and changes which were initially released as Beta Test Version 9707. Program documentation has also been changed. Several minor cosmetic bugs have been fixed and a new screen dump option is available. A 'PCX' image file of the tracking map can be initiated at any time by pressing the asterisk key. This feature is only available with EGA and VGA display adapters. Also included is a small program which converts images from PCX to GIF format. The normal Mercator projection, with a few WXSATS on display, is seen in **Fig. 6** .

Software

For the benefit of readers who want to try out software before registering, I keep the latest versions of many programs for DOS, Windows-3.1 and -95 when issued. Graphics software (as mentioned above) usually requires two or three HD floppies, so please remember to enclose these if requesting either of the programs mentioned above. Satellite tracking software is almost essential as a first step to entering the hobby so I keep the latest versions of *STS Plus* (now 9726), *Trak401, PC Track,* Winorb v3.3, and Gordon Train's amazing program *WST* (especially written for PC computers of low specification). WXSAT image decoding programs *wxsat* and *wavzip* (using sound cards) are available. I also add space images to 'fill up' remaining disk capacity; the latest batch of images was from the *Mars Sojourner* rover. Please enclose a secured 50p for any request, and if you wish to avoid sending disks, please add 50p per disk.

Shuttle Launch Schedule

STS-85 (*Discovery*) was scheduled for launch on 7 August, and STS-86 - the next MIR mission - is scheduled for 18 September. 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 and stamped s.a.e. for the A4 booklet. I am also preparing a booklet giving details of the work and structure of MIR.

Kepler elements - MIR and Shuttle

1. For a print-out of the latest WXSAT elements, MIR, and the Shuttle (when available), 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 immediately.

2. I also send monthly Kepler print-outs 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 current 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.

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 (or 2-21) use 137.85MHz
OKEAN-4 and SICH-1 use 137.40MHz
METEOSAT-5 (geostationary) uses 1691 and 1694.5MHz for WEFAX
GOES-8 (western horizon) uses 1691MHz for WEFAX
MIR voice on 143.625MHz.

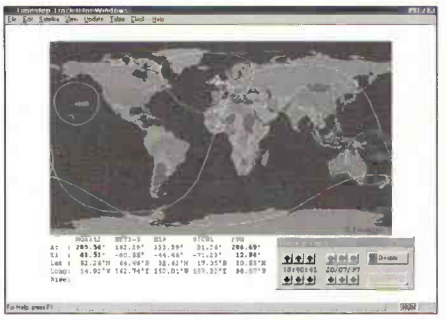

Fig. 2: Screen dump from TrackII of NOAA-12 footprint on 20 July at 1840UTC.

Fig. 3: NOAA-12 actual image received on 20 July at 1840UTC.

Fig. 4: NOAA-12 20 July 1840UTC enhanced visible-light section of previous image.

Fig. 5: NOAA-14 on 19 July from Alan Jarvis.

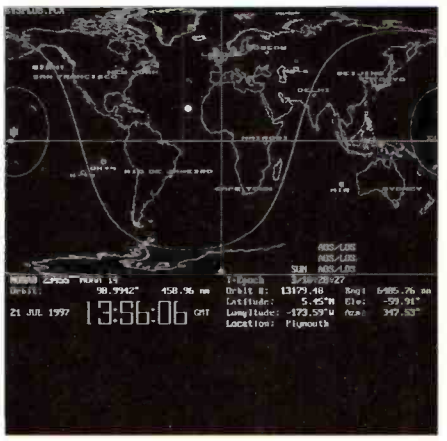

Fig. 6: screen dump from STS Plus showing track of NOAA-14 on 21 July at 13:57UTC.

Decode

MIKE RICHARDS G4WNC
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Web http://dialspace.dial.pipex.com/mike.richards/

Synop Analysis

Yet more new software! As I've said before, this really is turning out to be a good year for radio related software. The latest to come my way is *WXGraph* by Marcel, PA3GG. This very neat and compact package has been designed specifically to work with Wilhelm Schroeder's popular *Hamcomm*. However, it can work with other RTTY programs providing the data is stored in the same format. The program can be picked-up from a number of software sites, but I found my copy on the popular Funet site in Finland. Being written for a DOS environment it is very compact and can run with a pretty basic PC system.

The limited, disk based documentation doesn't advise on the minimum requirements, but it certainly looks as though it conforms to the traditional standard of DOS 3.0 or later with a VGA monitor. Another advantage of being DOS based is that it is also very fast in operation.

The program is supplied as a self-extracting .EXE file, which you just copy to the directory of your choice and execute. This automatically extracts the necessary program files and places them in the current directory. The complete package only requires some 283Kb of disk space, so it really is suitable for the most basic of PC systems.

So what does it do? *WXGraph* has been designed to provide a more user friendly display of the Synoptic data that is broadcast from the many RTTY weather stations dotted around the World. Whereas *Hamcomm* does an excellent job in converting the 5-digit number groups into plain language, *WXGraph* takes this a step further and plots the data graphically. This really brings the information to life and makes it easy for even inexperienced weather watchers to both spot weather systems and track their movement.

Before you can start using *WXGraph*'s interesting features, you need to get hold of some data. If you already use *Hamcomm* this is very easy. All you have to do is tune to one of the RTTY weather stations and start receiving the data using *Hamcomm*. If you're not sure where to look for these try Quickborn on 4.583, 7.646, 11.638MHz or Bracknell on 4.488MHz. You also need to have the registered version of *Hamcomm* so you can save the decoded data into a *.LOG file. This is selected from *Hamcomm*'s FILE menu and is very straightforward. When doing this remember you only want to capture the five-digit groups, so make sure *Hamcomm*'s Synop decoder is turned-off. This is done via the TEXT menu.

Once you've received a suitably long batch of data you just need to save the *.LOG file with a suitable name and you can close *Hamcomm* and move to *WXGraph*. To load your new file into *WXGraph* you follow the directions on the menu bar and selrct Option 4. This causes *WXGraph* to scan your data file so that it can identify the appropriate groups of data. This has to be done because during your monitoring period the type of reports being transmitted may well have changed. Once this operation is complete a number of new files will have been created with the data separated out into the appropriate times and dates.

With the preparation complete you can now use the LOAD option to view the results of the analysis. When you do this you are presented with a menu where you can select the required file from those you have scanned. The selection is done using a simple step-down menu controlled by the PC's arrow and Page-up/down keys. When you do this *WXGraph* will draw a map of Europe on the screen and show the position of all the reporting weather stations using either a dot or a square. The dots are used to represent land stations and the squares are for ships. *WXGraph* uses an ingenious colouring system to help illustrate the various readings obtained from the stations scattered around Europe.

I'll start with the sea level pressure chart first. You will see from **Fig. 1** that the program displays a map of Europe with dots or squares as described earlier. These indicators are shown in differing colours depending on the sea level pressure at that station. The index for the colour scale is shown at the bottom of the screen.

As if all this isn't enough, Marcel has included the facility to control the changeover points of the scale using the arrow keys. You can, therefore, slide the threshold points and the gap between them to whatever you want. I found this to be a very useful tool as you could use it to spot areas of particularly high or low pressure - very simple but effective!

In addition to the analysis of sea level pressure, you could also select air temperature. This featured all the adjustment facilities of the pressure chart so was a really powerful tool. Just to add the icing on the cake, *WXGraph* includes what Marcel calls the 'facility to walk the map'. When you have a map displayed you can press the space bar and a cross-hair cursor appears on the screen. If you then use the arrow keys to move this to one of the weather stations you can hit ENTER and the program will display the full decoded reports from the station along with it's name and location. This really was an ingenious combination of the plain text decoding of *Hamcomm* and the easy to use map based display. What's more the program is supplied as freeware!

If you want to use another decoding program to provide the raw data you just need to make sure the data is presented in the same form as *Hamcomm*. To pick up a copy of this excellent little utility either use the link on my Web site or go direct to the Funet archive at **ftp.funet.fi/pub/ham/misc/wxgraph1.exe** If you come across any other interesting weather related programs, please make sure you E-mail or drop me a line with the details.

More Weather

If after running *WXGraph* you find you want to understand more about the weather and in particular the information that's to be found on the air waves help is at hand. Philip Mitchell has been deeply involved in this aspect of the hobby for many years and has produced an excellent book that provides a mine of information about this very specialised area of radio reception. I've been prompted to give his book another plug as Philip has kindly sent me a copy of the very latest and much enhanced version. The latest edition has expanded to some 88 pages of A4, is nicely bound and presented and includes a supporting forward by Bill Giles of the BBC Weather Centre. Where Philip's book really scores is his determination to keep away from all the technical jargon. This makes the book eminently suitable for those who expand their interests from radio into weather. Of course the two areas are inextricably linked as the weather can and does have a significant effect on weather propagation.

As with the previous editions, the book uses a very logical progression through all the different sources of weather data. It starts with a look at basic weather charts and moves onto a whole range of the more advanced charts. This is followed by a look at the RTTY weather transmissions, including lots of good advice on where to look and how to set about receiving these stations. This information is supplemented by two new areas that provide data on NAVTEX transmissions and that available from the weather satellite systems. This is all rounded-off with a comprehensive reference section that provides FAX and RTTY frequencies plus details of the popular decoding systems and a very useful address list. The final few pages contain a sample log keeping system. Overall, Philip's *Fax, Satellite and RTTY Weather Reports* remains an excellent publication that I'm sure will appeal to many 'Decode' readers. The book is available from the *Short Wave Magazine* Book Store, price £11.50 plus P&P. (Order form on page 99) My thanks to Philip for the supply of the review copy.

More DSP Blaster

First of all an apology - the file for the software was misprinted in last month's 'Decode'. The correct location is **http://www.megalink.net/'n1rct** Just in case it happens again, the error was printing the number 1 in the n1rct callsign as the letter l! (*A function of the font used. **Ed***) Now down to business. After last month's taster, I've had lots of enquiries for more information - even more so because no one could find the software! I'm assuming you've now found the software and followed the documentation to get it loaded on your system. To make the connection all you do is take the fixed output from your receiver and connect it to the line-in of your SoundBlaster PC card. If your receiver doesn't have a fixed output you can use the external speaker jack but you will need to keep the volume well down or you will overload the input stages of the SoundBlaster. To listen to the results of *DSP Blaster* you can either use the PCs speaker system or you could use the PC card's line-out jack to connect to an external amplifier. If you're intending to use *DSP Blaster* to help with you data decoding I would suggest you use the PC's speakers to monitor the audio and use the line-out connection from the PC card to connect to your decoding system. This way you can control the volume from the speakers

Freq (MHz)	Mode	Time (UTC)	Station	Freq (MHz)	Mode	Time (UTC)	Station
2.2330	ARQ/E//VFT	2233	MOI Bonn	14.7995	ARQ/E//72/I/400	1959	Unid
2.2338	ARQ/E//75/E/85	2235	GSK Bonn [HF]	14.9267	ARQ/E3//192/E/380	1331	FF Dakar [RFTJ] ?
2.2355	ARQ/E//96/E/85	2240	LSK Bonn [HF]	14.9276	ARQ/E3//192/E/400	1344	FF Dakar [RFTJ]
3.8327	ARQ/342//200/E/400	2232	FF Paris [RFFP] ?	14.9598	ARQ/E3//192/E/380	0653	FF Dakar [RFTJ]
4.2025	3SC//50/N/170	1650	Ship *Tha Swerdlow*	14.9704	ARQ/SWE//100/I/400	0709	MFA Stockholm ?
5.0630	ARQ/E//192/E/400	2055	Unid.	15.8980	FEC/A//192/E/400	1012	MFA Paris [RFGW]
6.3415	3SC//50/R/170	1118	Riga Radio (YLQ)	15.9617	ARQ/E3//192/E/370	1113	FF Ft De France [RFLI]
6.8340	ARQ/E//184/I/370	2049	Unid	16.0877	ARQ/E3//100/E/400	1621	FF Le Port [RFVI]
7.4863	ARQ/E//72/I/120	0852	Unid.	16.1252	ARQ/342//200/E/400	1448	FF Djibouti [RFQP]
8.0280	FEC/ROU//164.5/R/400	1003	MFA Bucharest [V5G]	16.1932	ARQ/342//200/E/400	1557	FF Djibouti [RFQP]
8.4140	3SC//50/N/170	1055	Ship Unid (UPAA)	16.2277	ARQ/E//96/E/400	1513	FF Bangui [RFFXI]
9.0797	ARQ/E3//100/E/400	2022	FF Djibouti [RFQP]	16.3247	ARQ/E3//192/E/380	1050	FF Libreville [RFTJD]
10.1775	ARQ/E3//192/E/400	0756	FF Paris ? [RFFA]	16.3320	FEC/ROU//164.5/R/400	1022	MFA Bucharest [V5G]
10.3640	ARQ/E3//48/E/850	1931	FF Libreville [RFTJDA] ?	16.7975	3SC//50/R/170	1520	Ship Unid
10.4930	FEC/ROU//164.5.R/400	1006	MFA Bucharest [V5G]	16.7985	3SC//50/R/170	1045	Ship *Noworos*/UFXI
10.4937	ARQ/E3//48/E/400	2253	FF Port Bouet [RFTJF]	16.7995	3SC//50/R/170	1332	Ship Unid (UBCI)
10.9177	ARQ/E3//48/E/400	2324	FF Dakar [RFTJ] ?	16.8025	3SC//50/R/170	1513	Ship *Mariq Poliwanowa*
10.9551	ARQ/E//48/I/850	2035	FF Port Bouet [RFTJF] ?	16.8030	3SC//50/R/170	1552	Ship *Frix Argentina*/C4TW
11.0437	ARQ/E3//192/E/400	1550	FF Libreville [RFTJD]	17.0200	3SC//50/N/170	1310	Murmansk Radio (UDK)
13.5437	ARQ/E3//192/E/400	1902	FF Libreville [RFTJD]	17.5509	ARQ/E3//192/E/400	1442	FF Dakar [RFTJ]
13.5725	ARQ/E//184/-/340	1421	FF Paris [RFFX]	18.1700	ARQ/6//200/E/400	1140	MFA Paris [RFGW]?
13.8550	FEC/ROU//164.5/R/400	1302	MFA Bucharest [V5G]	18.3208	ARQ/E3//192/E/400	1254	FF Unid ?
14.5605	ARABIC//50/N/400	1040	Petra Amman (JYF2)	18.7042	FEC/A//96/E/400	0725	Piab Bonn (DGS70H5)
14.5730	ARABIC//50/R/400	1105	Jana Tripoli	18.8930	3SC//50/R/170	1212	Ship *Srtm Tarhan*
14.5857	ARQ/E3//200/E/400	1630	FF Ndjamena [RFTPL] ?	18.8935	3SC//50/R/170	0722	Ship Unid
14.6267	ARQ/E3//192/E/400	0655	FF Ft De France [RFLI]	19.0507	ARQ/E3//192/E/400	1615	FF Provence ?
14.6810	FEC/ROU//164.5/R/400	1011	MFA Bucharest [V5G]	19.5303	ARQ/E3//96/I/400	0947	TAAF Kerguelen (FJY2)
14.6990	ARABIC//75/N/400	1114	INA Baghdad (YIX70)				

Day Watson's Complex Frequency List.

without altering the signal being passed to the decoder. If you have an external decoder that's all there is to the set-up. However, if you want to try *DSP Blaster* with a software based decoding system you will have to run DSP Blaster as a terminate and stay resident program (TSR). Because *DSP Blaster* uses the processor built into the SoundBlaster card to do all the hard work, it can be left running on its own without effecting other programs that may be operating on the PC. The only proviso being that the other programs must leave the SoundBlaster card well alone! You can see from this that the *DSP Blaster* program's main function is to kick start the SoundBlaster card and provide the display features. To run *DSP Blaster* in this TSR mode you just have to select TSR from the main screen rather than exit. If you want to return to *DSP Blaster* you just press the Pause key. An alternative and much faster system is to use the CTL/Shft system. By pressing Ctl + Shift and the appropriate letter for the required filter you can quickly change any of the settings. This overcomes the delays you may suffer as your PC changes video modes.

Once you've completed the set-up you just have to run the program and enjoy yourself! If you take a look at **Fig. 2** you will see that DSP Blaster starts with a wonderful graphic display that clearly shows all the filter blocks ready for use. To activate a particular filter all you have to do is move the cursor to the appropriate box and a drop-down menu will be displayed showing the state of the filter and its current parameters. You can then adjust the settings and activate the various filters as required. This really is an excellent way to configure a filter system. The assorted high pass, low pass and band pass filters will provide invaluable basic control for data enthusiasts.

One of the other more advanced filter systems provided is the active noise reduction system. This uses a Widrow-Hoff LMS algorithm to provide adaptive matching between an FIR filter and the incoming signal. This system attempts to identify the spectral peaks of the signal and then remove any remaining mush. The effect is very impressive but, like all filter systems, don't be tempted to over do it. Turning the effect to maximum may initially seem like a good idea, but there are usually a number of significant distortion products added that overcome any benefits. It's always wise to exercise moderation and apply the minimum filtering that will do the job.

Although *DSP Blaster* includes a very impressive multiple notch filter it's not a lot of good for data listeners as it effectively takes-out the data! If you're into c.w. monitoring the c.w. peaking and coherent bandpass filters provide a significant improvement in signal to noise. I'm sure *DSP Blaster* is going to become very popular with anyone with a suitable PC. If you can offer any tips for 'Decode' readers please write and let me know.

RadioRaft Frequency Selection

Now that many of you can start examining the more complex modes I thought it would be helpful if I provided an up-to-date frequency list showing modes that can be received with *RadioRaft*. As usual Day Watson has come to the rescue with his excellent complex frequency list and I've provided an extract in the column.

See last month's 'Decode' column for details of software available.

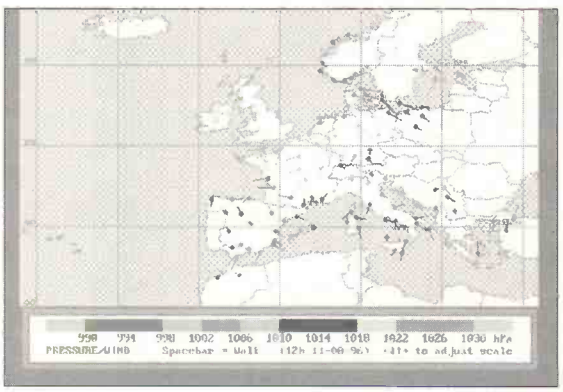


Fig. 1.

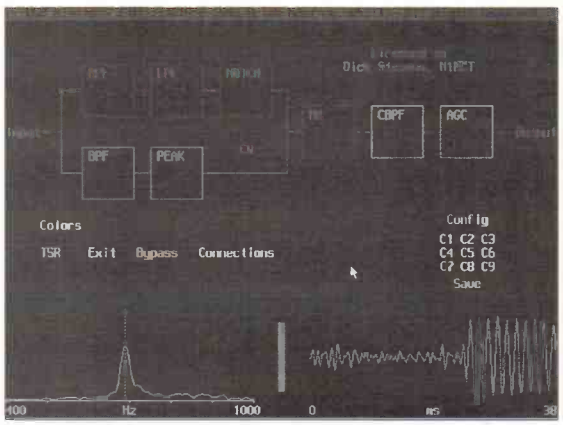
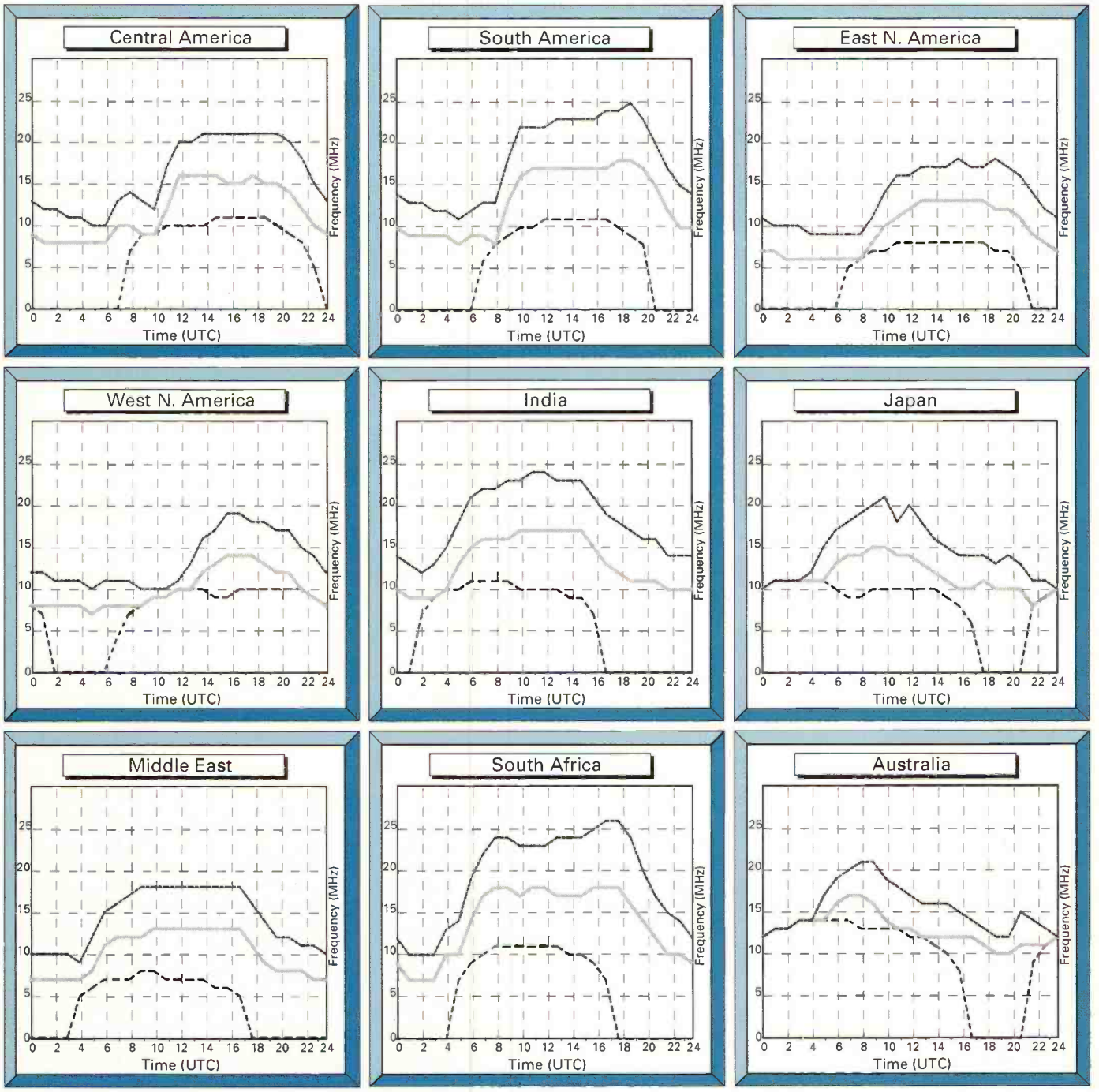


Fig. 2.

World Propagation Forecasts

JACQUES D'AVIGNON
VE3VIA

September 1997.
Circuits to London



How to use the Propagation Charts.

The charts contain three plots. The lower dashed line represents the lowest usable frequency (LUF), or ALF (Absorption Limiting Frequency). The chances of success below this frequency are very slim.

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

Lastly, the upper dashed line, represents the maximum usable frequency (MUF) a 50% probability of success for the path and time.

To make use of the charts you must select the chart most closely located to the region containing the station that you wish to hear. By selecting the time chosen for listening on the horizontal axis, the best frequencies for listening can be determined by the values of the intersections of the plots against frequency.

Good luck and happy listening.

Propagation Extra

KEVIN NICE
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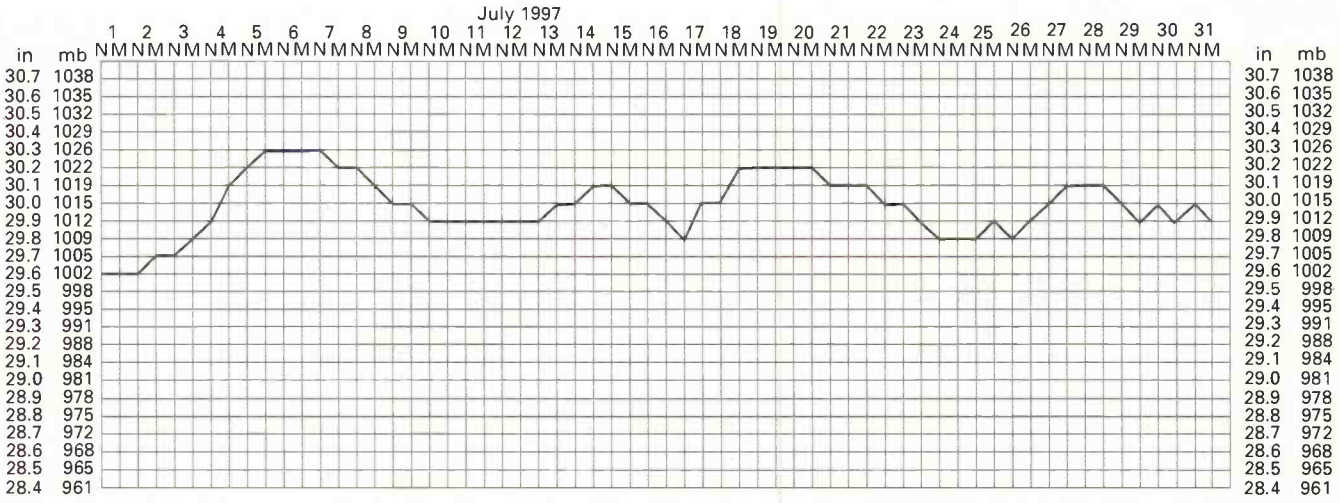
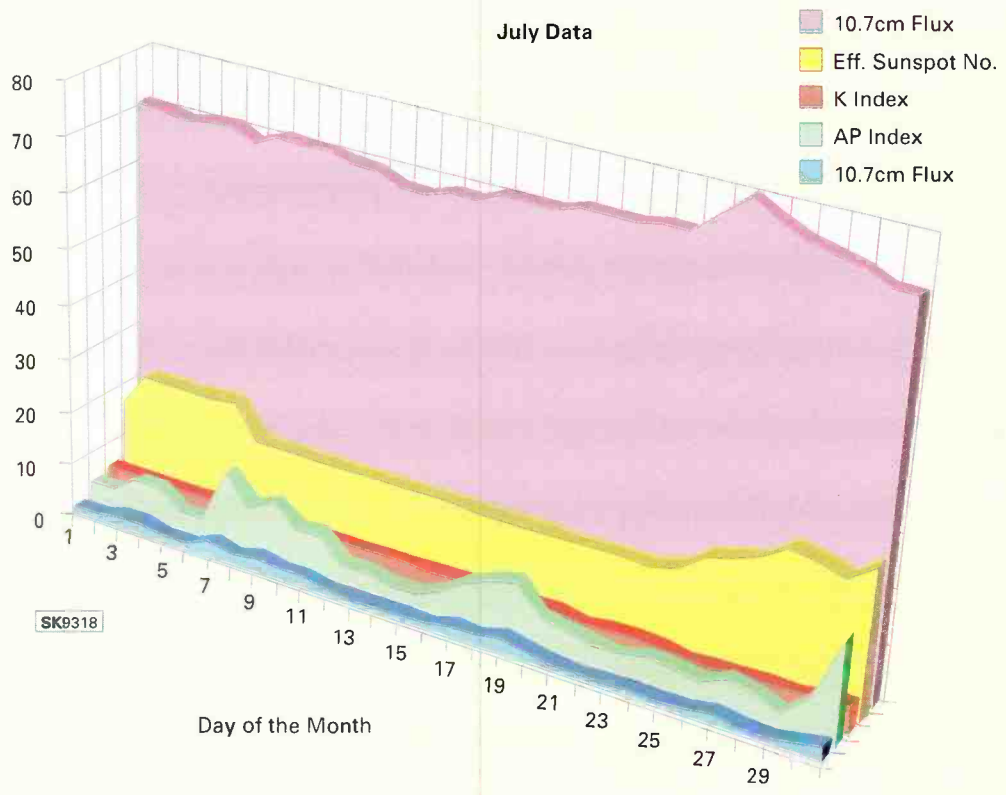
BROADSTONE

Ron Ham's barometric pressure chart, taken at Storrington, W. Sussex, July 1997.



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.



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STANDARD AX-700 MK2

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LM&S

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

The proposed cuts in the short wave services provided by Radio Australia were detailed in Bandscan by Greg Baker on page 8 of the June issue of *SWM*. Since they came into effect their broadcasts are being sadly missed by listeners throughout the World.

It may be difficult to receive their remaining broadcasts in the UK because they are beamed from Shepparton on bearings which are not ideal. Reports on them would be very welcome here for 'LM&S'.

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 June.

Whilst searching the band after dark **Tony Stickells** (Thornton Heath) noticed that the R.France 2MW transmitter at Allouis on 162kHz is sometimes closed down around 2300UTC. An early closure on June 2 enabled him to hear the co-channel Turkish Radio-Television TRT-2 service from Agri at 2312UTC. He logged it as SINPO 24213.

The sky waves from the Radiotelevisione Italiana (RAI) 10kW outlet at Caltanisseta, Italy, on 189kHz reached the UK during several evenings in June. They were logged on the 10th as 22222 at 2120 by **Sheila Hughes** in Morden; on the 22nd by **Norman Thompson** in Oadby; on the 30th as 13342 at 2050 by **Fred Pallant** in Storrington.

Medium Wave Reports

The broadcasts from m.w. stations in E.Canada and E.USA seldom reached the UK in June because the whole of the transatlantic path was in darkness for only a brief period each night. On two occasions, both early in the month, Tony Stickells heard WNRB in Boston, MA on 1510 at around 0130UTC. There were no other reports.

The long hours of daylight discouraged some listeners from waiting for the sky waves to arrive from distant stations in the Middle East and N.Africa but those who did so were not disappointed! Some interesting logs were compiled around dusk - see chart.

The new ILR Valleys Radio outlet at Aberdare on 999kHz was heard for the first time on June 17 by **Nicola Hutchings** in Wellington, Somerset. Until then she was able to pick up BBC R.Solent on 999 with her Sony Walkman but the ground waves from Valleys R now dominate the frequency.

For several months **Brian Keyte** (Bookham) has observed phase distortion on the strong signals from ILR 963 Viva. On June 17 it became obvious that it is caused by their use of two transmitters on 963kHz - between 1125 and 1305UTC the signals from Lea Bridge Road, Hackney (950W) and Glade Lane, Southall (70W) arrived out of step by about half a second!

Short Wave Reports

Until the propagation conditions in the **25MHz (11m)** band improve it will remain unused for broadcasting.

Daily variations in propagation occurred in the **21MHz (13m)** band during June. When favourable R.Portugal Int via Sines? 21.720 (Port to ? 0900-1100) was rated 33333 at 0900 by **Thomas Williams** in Truro; UAER, Dubai 21.605 (Ar to Eur 0615-1030) 43333 at 0930 by **Bernard Curtis** in Stalbridge; RAI Rome 21.520 (It to Africa 0600-1300) SIO333 at 1109 by **Philip Rambaut** in Macclesfield; BBC via Ascension Is 21.660 (Eng to W/E/S.Africa 1100-1700) 35433 at 1247 by **Michael Griffin** in Ross-on-Wye; RFI via Allouis? 21.580 (Fr to Africa 0900-1600) 44444 at 1305 by **Robert Connolly** in Kilkeel; R.Portugal Int via Sines 21.515 (Eng to M.East, India 1330-1400) 34333 at 1335 in Morden; RFI via Issoudun 21.620 (Fr to E.Africa 0800-1500) 34233 at 1416 by **Eddie McKeown** in Newry; BBC via Ascension Is 21.490 (Eng to Africa 1500-1645) 34333 at 1500 by **Ernie Wiles** in Bedford; DW via Antigua 21.560 (Ger to ? 1400-1555) 15332 at 1550 in Storrington; UAER, Dubai 21.605 (Ar to Eur 1355-1600) 34322 at 1551 by **Rhoderick Illman** in Oxted; BBC via Cyprus 21.470 (Eng to E.Africa 1400-1700) SIO332 at 1553 by **John Eaton** in Woking; R.Portugal Int via Sines 21.655 (Port to Brazil 1600?-2000) 44444 at 1750 by **Vic Prier** in Colyton; HCJB Quito, Ecuador 21.455 (Eng, u.s.b. + p.c.) 25343 at 2002 by **Darren Beasley** in Bridgwater.

Propagation also varied daily in the **17MHz (16m)** band. During morning R.Japan via Ascension Is 17.815 (Eng, Jap to C/S.Africa 0700-0900, 0930-1000) was 44343 at 0804 in Oxted; R.Slovakia Int 17.570 (Eng to Australia 0830-0857) 45444 at 0851 in Bridgwater; RFI via Issoudun? 17.650 (Fr to M.East 0700-1500) 34333 at 0900 in Bedford; DW via Rwanda? 17.800 (Eng to Asia, Australia 0900-0950) 44444 at 0902 by **Tony Hall** in Freshwater Bay, IoW; R.Prague, Czech Rep 17.485 (Eng to W.Africa 0900-0925) 55545 at 0915 in Ross-on-Wye; R.Austria Int via Moosbrunn 17.870 (Ger, Eng to Australia 0800-1100) 43333 at 0930 in Truro; Africa No.1, Gabon 17.630 (Fr to W.Africa 0700-1600) SIO233 at 1045 by **Phil Townsend** in E.London; SRI via Schwarzenburg? 17.515 (Eng, Fr, Ger, It to Far East 1100-1245) 54444 at 1103 by **Tom Winzor** in Plymouth.

After mid-day the BBC via Ascension Is 17.830 (Eng to W/C.Africa 0730-2100) was rated 23323 at 1300 by **Gerald Guest** in Dudley; REE via Noblejas? 17.755 (Sp to S.America 0900-1900) 44444 at 1315 in Kilkeel; Voice of Russia 17.610 (Eng [WS]) 33322 at 1320 in Stalbridge; RCI via Sackville, Canada 17.820 (Eng to Eur, Africa 1330-1400 Mon-Sat) 44344 at 1336 in Woking; BBC via Skelton, UK 17.705 (Eng to Eur, Africa 1200-1630) SIO322 at 1400 by **Tom Smyth** in Co.Fermanagh; RFI via Moyabi, Gabon 17.560 (Eng to E.Africa, M.East 1400-1500) SIO333 at 1430 in Macclesfield; DW via Antigua 17.765 (Ger to ? 1400-1555) 25443 at 1551 in Storrington; R.Prague, Czech Rep 17.485 (Eng to M.East, E.Africa 1600-1627) 54444 at 1610 by **Chris Shorten** in Norwich; WYFR via Okeechobee, USA 17.555 (Eng to Eur 1600-2200?) 43433 at 1810 in Colyton; R.Nederlands via Bonaire, Ned Antilles 17.605 (Eng to S/E/W.Africa 1830-2025) 44333 at 1858 in Newry; VOFC Taiwan via WYFR 17.750 (Eng to Eur 2200-2300) 33222 at 2200 by **Clare Pinder** in Appleby.

The conditions in the **15MHz (19m)** band have been more reliable. During the morning R.Japan via Moyabi, Gabon 15.230 (Eng 0700-0800) was noted as 43333 at 0715 by **Ron Damp** in E.Worthing; R.Austria Int via Moosbrunn 15.410 (Eng to Eur, M.East 0730-0800) 55555 at 0731 in Plymouth; R.Pyongyang, Korea 15.180 (Eng to SE.Asia 0800-0850) 22222 at 0825 in Norwich; Voice of Armenia, Yerevan 15.270 (Fr, Eng to Eur 0800-0900 Sun) 43433 at 0855 by **Stan Evans** in Herstmonceux; BBC via Cyprus 15.565 (Eng to M.East, W.Asia 0600-1500) SIO222 at 0925 in Macclesfield.

After mid-day RFI via Allouis? 15.195 (Eng to Eur 1200-1300) was SIO444 at 1230 in Co.Fermanagh; Voice of Turkey, Ankara 15.290 (Eng to ? 1230-1330) 22322 at 1305 by **Peter Pollard** in Rugby; BBC via Masirah Is, Oman 15.310 (Eng to S.Asia 0300-0915, 1000-1400) 33333 at 1320 in Kilkeel; R.Sweden via Horby? 15.240 (Eng to Asia, Pacific 1330-1400) 33333 at 1330 in Truro; RCI via Sines, Portugal 15.325 (Eng, Fr to Eur, M.East, Africa 1330-1500) 43333 at 1345 in Stalbridge; Voice of Greece via Kavala 15.175 (Gr [Eng 1335-1345] to Eur, N.America ?-1350) 42345 at 1350 by **Bill Griffith** in W.London; Israel R, Jerusalem 15.650 (Eng to Eur? 1400-1430) 44344 at 1400 in Appleby;

LONG WAVE CHART

Freq (kHz)	Station	Country	Power (kW)	Listener
153	Bechar	Algeria	1000	D*,F,G
153	Donebach DLF	Germany	500	A*,B*,C*,D,E,F,H
153	Bod	Romania	1200	B*,F*,G
162	Allouis	France	2000	A*,B,C,D,E,F,G,H
162	Agri	Turkey	1000	F*
171	Nador Medi-1	Morocco	2000	D*,F*,G
171	B'shakovo etc	Russia	1200	B*,C,F,G,H
171	Sasnovy	Belarus	1000	G
177	Oranienburg	Germany	750	A,C,D*,F,G,H
180	Polati	Turkey	1200	F*,G
183	Saarlouis	Germany	2000	A,B*,C,D,E,F,G,H
189	Caltanissetta	Italy	10	B*,D*,F,G
198	Droitwich BBC	UK	500	B,C,E,F,G,H
207	Munich DLF	Germany	500	C,D,F,G,H
207	Azilal	Morocco	800	D*,F,G
216	Roumoules RMC	S.France	1400	C,D,E,F,G,H
225	Raszyn Resv	Poland	?	B*,C*,D*,E,F,G,H
234	Beidweiler	Luxembourg	2000	A,C,D,F,G,H
243	Kalundborg	Denmark	300	A,B,C,D,F,G,H
252	Tipaza	Algeria	1500	B*,C*,D*,F*,G
252	Atlantic 252	S.Ireland	500	A,C,D,E,F,G,H
261	Burg(R.Ropa)	Germany	200	C,F,G,H
261	Taldom Moscow	Russia	2500	F*,G
270	Topolna	Czech Rep	1500	B*,C,D*,F
279	Sasnovy	Belarus	500	B*,F,G

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

Listeners:-
(A) John Eaton, Woking.
(B) Sheila Hughes, Morden.
(C) George Millmore, Wootton, IoW.
(D) Fred Pallant, Storrington.
(E) Tom Smyth, Co.Fermanagh.
(F) Tony Stickells, Thornton Heath.
(G) Norman Thompson, Oadby.
(H) Phil Townsend, E.London.

WWCR Nashville, USA 15.685 (Eng to N.America, Eur 1100-2200) 54544 at 1430 in Bedford; R.Nederlands via Tashkent 15.585 (Eng to S.Asia 1330-1525) 45344 at 1442 in Ross-on-Wye; BBC via Ascension Is 15.400 (Eng to Africa 1500-1930) SIO333 at 1600 in E.London; VOA via Botswana? 15.445 (Eng to Africa 1600-1800) SIO232 at 1610 in Woking; SRI via Schwarzenburg? 15.530 (Fr, Ger, Eng to S.Asia 1500-1630) 43344 at 1615 in Freshwater Bay; R.Prague, Czech Rep 15.640 (Eng to Eur, M.East, E.Africa 1700-1727) 55555 at 1700 in Colyton.

Later, WYFR via Okeechobee 15.695 (Eng to Eur, Africa 1600-1900) was rated 34333 at 1745 by **Vera Brindley** in Woodhall Spa; WEWN via Vandiver, USA 15.745 (Eng to Eur, Africa 1800?-1900?) 34333 at 1835 by **Ross Lockley** in Galashiels; RNB Brazil 15.265 (Port, Eng, Ger to Eur 1630-2020) 45333 at 1850 in Bridgwater; Africa No.1, Gabon 15.475 (Fr to W.Africa 1600-1900) 45545 at 1856 in Storrington; Voice of Vietnam, Hanoi 15.010 (Eng to Eur 1900-1930) 44434 at 1900 in Morden; R.Nederlands via Bonaire 15.315 (Eng to S/E/W.Africa 1830-2025) 34333 at 1900 in Newry; RCI via Sackville 15.325 (Eng to Eur, M.East, Africa 2000-2129) 33343 at 2038 in Oxted; R.Australia via Shepparton 15.365 (Eng, Fr to Pacific 2200-0800?) 23332 at 2200 in Storrington; VOFC Taiwan via WYFR? 15.600 (Eng to Eur 2200-2300) 34333 at 2210 by **John Slater** in Scalloway; LJB via Sabrata, Libya 15.415 (Ar to Eur, N.Africa, M.East 1115-1315, 1745-0500) 44343 at 2215 in Oadby; VOA via Philippines? 15.305 (Eng to E/SE.Asia 2200-0000) SIO333 at 2234 by **Francis Hearne** in N.Bristol.

In the **13MHz (22m)** band R.Finland via Pori 13.645 (Eng to Australia 0800-0827) was noted as 45554 at 0814 by **David Edwardson** in Wallsend; R.Korea via Kimjae 13.670 (Eng to SE.Asia 1030-1100) 33333 at 1048 in Kilkeel; SRI via Sottens? 13.635 (Eng, Fr, Ger, It to Far East 1100-1245) SIO444 at 1100 in Co.Fermanagh; ISBS Reykjavik 13.860 (Ic [u.s.b.+ p.c] to Eur 1215-1300) 44444 at 1216 in W.London; R.Bulgaria via Plovdiv 13.790 (Eng to E.Asia 1200-1300) 54444 at 1245 in Norwich; SRI via Sottens? 13.635 (Eng, Fr, It, Ger to SE.Asia 1300-1445) 55545 at 1300 in Bedford; R.Prague, Czech Rep 13.580 (Eng to Eur, E.Africa, N.America 1300-1327) 55444 at 1315 in Ross-on-Wye; UAER, Dubai 13.675 (Eng to Eur 1330-1355) SIO433 at 1330 in E.London; R.Austria Int via Moosbrunn 13.730 (Ger, Eng, Fr, Sp to Eur 0400-1800) 32113 at 1330 by **Robert Frost** in Felixstowe; R.Pyongyang, Korea 13.785 (Eng to Eur, M.East, Africa 1500-1550) 33222 at 1500 in Morden; R.Kuwait via Kabd 13.620 (Ar to Eur, N.America 0930-1605) 44444 at 1543 in Oxted.

Later, Monitor R.Int via KHBI N.Mariana Is 13.770 (Eng, ? to E.Eur 1800-1958) was 43334 at 1800 in Dudley; Voice of Turkey 13.695 (Eng to Eur? 1830-1925) 44444 at 1833 in Newry; R.Damascus, Syria 13.610 (Eng to Eur 2005-2105; to N.America 2105-2205) 22222 at 2010 in Truro; SRI via Sottens? 13.635 (Ar, Eng to N.Africa 1845-2030) 32332 at 2024 in Bridgwater; WWCR Nashville, USA 13.845 (Eng to E.USA 1300-0100?) 43333 at 2037 in Woking; WHRI South Bend, USA 13.760 (Eng to E.USA, Eur 1500-2057) 33333 at 2048 in Plymouth; R.Havana Cuba 13.725 (Eng [USB] to Eur 2100-2130) 32222 at 2100 in Appleby; RCI via Sackville 13.650 (Fr, Eng to Eur, M.East, Africa 1900?-2200) 54454 at 2115 in Oadby.

Noted in the **11MHz (25m)** band were Slovak R.Int, via Velke Kostolany 11.990 (Eng to Australia 0830-0857) 44444 at 0832 in Plymouth; R.Sweden via Horby? 11.650 (Eng to N.America 1130-1200) SIO444 at 1130 in Co.Fermanagh; BBC via Meyerton, S.Africa 11.940 (Eng to Africa 0600-1600) 34443 at 1145 in Kilkeel; ISBS Reykjavik 11.402 (Ic [u.s.b.+ p.c] to Eur 1215-1300) 44444 at 1215 in W.London; Polish R, Warsaw 11.815 (Eng to Eur 1200-1255) 54444 at 1250 in Norwich; R.Finland via Pori 11.900 (Eng to W.Eur, USA 1230-1255 Mon-Sat) 45444 at 1253 in Ross-on-Wye; RS Makedonias, Thessaloniki 11.595 (Gr to Eur 0600-2255) 23333 at 1257 in Oxted; R.Jordan via Al Karanah 11.690 (Eng to W.Eur, E.USA 1000-1630) 55444 at 1300 in Morden; Vatican R, Italy 11.625 (Eng to Asia, Pacific 1345-1403) 55555 at 1345 in Bedford; Voice of Israel, Jerusalem 12.080 (Eng to Eur? 1400-1430) 44344 at 1400 in Appleby; REE via Noblejas 12.035 (Sp to Eur 0700?-1900?) SIO444 at 1615 in E.London.

Later, R.Kuwait via Kabd 11.990 (Eng to Eur, N.America 1800-2100) was 45544 at 1810 in Wallsend; R.Nederlands via Flevo 11.655 (Eng to Africa 1730-2025) 44444 at 1855 in Newry; R.Romania Int, Bucharest 11.940 (Eng to Eur 1900-1955) 42332 at 1900 in Galashiels; AIR via Bangalore 11.620 (Eng, Hi to Eur 1745-2230) 44433 at 1925 in E.Worthing; R.Bulgaria, Sofia 11.720 (Eng to W.Eur 1900-2000) 55555 at 1950 in Oadby; REE via Noblejas, Spain 11.775 (Eng to Eur, Africa 2000-2100) 54544 at 2050 in

LOCAL RADIO CHART

Freq (kHz)	Station	ILR BBC	e.m.r.p (kW)	Listener
558	Spectrum, London		0.80	F,I,K
585	R.Solway	B	2.00	A
603	Cheltenham R.	I	0.10	A,E,F,I,K,L
603	InvictaSG,Litt'brne	I	0.10	D*,F,I,K,M
630	R.Bedfordshire(3CR)	B	0.20	C,E,F,I,K,L,M
630	R.Cornwall	B	2.00	A,F,I
657	R.Clwyd	B	2.00	A,F,I,J,L,M
657	R.Cornwall	B	0.50	A,F,I
666	Gemini AM, Exeter	I	0.34	A,D,F,I,K
666	R.York	B	0.80	A,D,F,H,L
729	BBC Essex	B	0.20	D,F,I,K,L,M
738	Hereford/Worcester	B	0.037	AE,,I,K,L,M
756	R.Cumbria	B	1.00	A,H
756	R.Maldwyn, Powys	I	0.63	F,I
765	BBC Essex	B	0.50	D,F,I,K
774	R.Kent	B	0.70	F,I,K,M
774	R.Leeds	B	0.50	A,F,H
774	3 Counties SG, Glos	I	0.14	A,E,F,I
792	Classic Gold 792		0.27	F,I,K,L,M
792	R.Foyle	B	1.00	A,J
801	R.Devon & Dorset	B	2.00	A,F,I,K
828	Classic Gold 828	I	0.20	F,K,L,M
828	Magic 828, Leeds	I	0.12	H
828	2CR CG, Bournemouth	I	0.27	I
828	Townland R, Ulster	I	0.80	A
837	R.Cumbria/Furness	B	1.50	A,H
837	Asian Netwk Leics	B	0.45	A,F,I,K,L,M
855	R.Devon & Dorset	B	1.00	F,I,O
855	R.Lancashire	B	1.50	A,H
855	R.Norfolk	B	1.50	F,K,L,M
855	Sunshine 855,Ludlow	I	0.15	E,F,K
873	R.Norfolk	B	0.30	F,I,K,L,M
936	Brunel CG, W.Wilts	I	0.18	E,F,I,K
936	Yorkshire Dales R	I	?	A,F,G,H
945	S.Coast R, Bexhill	I	0.75	E*, F,I,K,M
945	Derby (Gem AM)	I	0.20	A,E*,F,I
954	Gemini AM, Torquay	I	0.32	E,F,I
954	Wyvern AM, Hereford	I	0.16	F
963	Asian Sd,Manchester	I	0.80	A,H
963	963 Liberty (Viva)	I	1.00	F,H*,I,K,L
990	R.Devon & Dorset	B	1.00	F,I,K
990	Gt.Yks G, Doncaster	I	0.25	F
990	WABC, Wolverhampton	I	0.09	F,I
999	Gem AM, Nottingham	I	0.25	F,I
999	Red Rose 9-99 P'stn	I	0.80	A,H
999	R.Solent	B	1.00	D,E,F,I,K,M
999	Valleys R, Aberdare	I	0.300	E,F
1017	WABC, Shrewsbury	I	0.70	A,F,H,K,L,M
1026	R.Cambridgeshire	B	0.50	F,L,M
1026	Downtown, Belfast	I	1.70	A,H,J
1026	R.Jersey	B	1.00	E,F,I
1035	RTL Country 1035	I	1.00	E*,F,H*,I,K,L
1035	N.Sound, Aberdeen	I	0.78	A,F*,G
1107	Moray Fth,Inverness	I	1.50	G,J
1116	R.Derby	B	1.20	A,D,E*,F,H,K,L,M
1116	R.Guernsey	B	0.50	D,E,F,I,K
1116	Valleys R,Ebbw Vale	I	0.500	E,G
1152	Amber, Norwich	I	0.83	E*,F*,G*
1152	Clyde 2, Glasgow	I	3.06	G
1152	GNR, Newcastle	I	1.80	H
1152	LBC 1152		23.50	F,H,I,J*,K
1152	Pic'ly 1152,Manch'r	I	1.50	A
1152	PlymSnd AM,Plymouth	I	0.32	O
1152	Xtra-AM, Birmingham	I	3.00	L
1161	R.Bedfordshire(3CR)	B	0.10	F,K,L,M
1161	Brunel CG, Swindon	I	0.16	A,F,K
1161	Big Easy Magic 1161	I	0.35	E*,G*,I
1161	Southern Counties R	B	1.00	F,I,K
1161	Tay AM, Dundee	I	1.40	G,H
1170	Amber SGR, Ipswich	I	0.28	F*,G*,H*,K,L
1170	GNR, Stockton	I	0.32	A,G,H
1170	SCR, Portsmouth	I	0.50	F,I,K
1170	Swansea Snd,Swansea	I	0.58	A,C,E
1170	1170AM,High Wycombe	I	0.25	D,F,K,M
1242	InvictaSG,Maidstone	I	0.32	E*,F,K,M
1242	IoW Radio, Wootton	I	0.50	F,I
1251	Amber SGR,Bury StEd	I	0.76	F,G*,H,K,L,M
1260	Brunel CG, Bristol	I	1.60	E
1260	Marcher G, Wrexham	I	0.64	E*,J
1260	SabrasSnd,Leicester	I	0.29	F
1260	R.York	B	0.50	A
1278	1278 W.Yorks Cl.G	I	0.43	G
1296	Radio XL,Birmingham		5.00	D*,E*,F,G,H,I*,K,L
1305	Big Easy Magic AM	I	0.15	A,G,H
1305	Premier via ?	I	0.50	F,G*,H*,I,J,K
1305	Touch AM, Newport	I	0.20	E,J
1323	S.Coast R,Southwick	I	0.50	F,I,K,M
1323	SomersetSnd,Bristol	B	0.63	A,E,F
1332	Premier, Battersea	I	1.00	A,F,G*,H,I,K
1332	CG 1332, Peterbor'	I	0.60	G,H*,L
1332	Wiltshire Sound	B	0.30	F,I
1359	BreezeAM,Chelmsford	I	0.28	B,F,K
1359	CG 1359, Coventry	I	0.27	F,L
1359	R.Solent	B	0.85	F,I
1359	Touch AM, Cardiff	I	0.20	E,G
1368	R.Lincolnshire	B	2.00	F,L
1368	Southern Counties R	B	0.50	D*,F,I,K,M
1368	Wiltshire Sound	B	0.10	I
1377	Asian Sd,Manchester	I	?	H
1413	Premier via ?	I	0.50	A,E*,F,G*,H,I,K
1413	Yorkshire Dales R	I	?	A,G,H
1431	Breeze AM, Southend	I	0.35	E*,F,G*,H*,K,M
1431	Cl.Gld via Reading	I	0.14	F,H*,I,K
1449	R.Peterboro/Cambs	B	0.15	F,L
1458	R.Cumbria	B	0.50	A
1458	R.Devon & Dorset	B	2.00	A,F,I
1458	1458 Lite AM Manch'	I	5.00	E*,G,H,J
1458	R.Newcastle	B	2.00	G
1458	Sunrise, London	I	50.00	E*,G*,H*,I,K,L
1458	Asian Netwk Langley	B	5.00	C,F
1476	CountySnd,Guildford	I	0.50	A,D*,E*,F,G*,H*,I,K,M,N*
1485	Cl.Gld via Newbury	I	1.00	F,H*
1485	R.Humberside (Hull)	B	1.00	D*,F,H
1485	R.Merseyside	B	1.20	A,D*,E*,H,I,J
1485	Southern Counties R	B	1.00	F,I,K,M
1503	R.Stoke-on-Trent	B	1.00	A,D,F,G,H,I*,K*
1521	R.1521 Craigavon,NI	I	0.50	A,E*,G,J
1521	Fame 1521, Reigate	I	0.64	E*,F,H,I,K,M
1530	R.Essex	B	0.15	D,F,K,M
1530	1530 AM W.Yorks CG	I	0.74	A,E*,F,H
1530	Wyvern, Worcester	I	0.52	C,E*,F,I
1548	R.Bristol	B	5.00	F*,I
1548	Capital G, London	I	97.50	E*,F,G*,H,I,K
1548	Magic 1548 Liverp'l	I	4.40	A,E*,F*,H
1548	Forth AM, Edinburgh	I	2.20	E*,G
1557	R.Lancashire	B	0.25	A,E*,G,H
1557	Mellow, Clacton	I	0.125	F,K
1557	CG 1557, N'hampton	I	0.76	E*,F,G*,H,K,L
1557	S.Coast R, So'ton	I	0.50	F,H*,I,K
1584	KCBC, Kettering	I	0.04	E*,F
1584	London Turkish R	I	0.20	B,E*,F,K
1584	R.Nottingham	B	1.00	E*,F,K,L
1584	R.Shropshire	B	0.50	A,F
1602	R.Kent	B	0.25	F,I,K,M

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

Listeners:-

(A) Robert Connolly, Kilkeel.
(B) John Eaton, Woking.
(C) Francis Hearne, N.Bristol.
(D) Sheila Hughes, Morden.
(E) Nicola Hutchings, Wellington.
(F) Brian Keyte, Bookham.
(G) Ross Lockley, Galashiels.
(H) Ross Lockley, while in Dent.
(I) George Millmore, Wootton, IoW.
(J) Tom Smyth, Co.Fermanagh.
(K) Tony Stickells, Thornton Heath.
(L) Norman Thompson, Oadby.
(M) Phil Townsend, E.London.
(N) Thomas Williams, Truro.
(O) Tom Winzor, Plymouth.

MEDIUM WAVE CHART

Freq (kHz)	Station	Country	Power (kW)	Listener
520	Hof/Wurzburg (BR)	Germany	0.2	D*,I*
526	Vatican R.	Italy	5	I*
531	Ain Beida	Algeria	600/300	E*,I
531	Leipzig	Germany	100	D*,E,I*
531	RNE5 via ?	Spain	?	D*,E,I*
531	Beromunster	Switzerland	500	I,J
540	Wavre	Belgium	150/50	D*,E,I,J
540	Solt	Hungary	2000	I*
540	Sidi Bennour	Morocco	600	D*,E*,I*
540	Vitoria(EI)	Spain	10	I*
549	Les Trembles	Algeria	600	B*,D*,E*,I
549	Thurnau (DLF)	Germany	200	A,B*,D*,E,I,J
558	Espoo	Finland	100	D*
558	Rostock(NDR)	Germany	20	D*
558	Tirgu Jiu	Romania	200	E*
558	RNE5 via ?	Spain	?	E*
567	Tullamore(RTE1)	Ireland (S)	500	C,E,H,I,J
567	RNE5 via ?	Spain	?	I*
576	Muhlacker(SDR)	Germany	500	D*,E*,I*
576	Barcelona(RNE5)	Spain	50	E*,I*
585	Paris(FIP)	France	8	E,I,J
585	Madrid(RNE1)	Spain	200	D*,E*,I*
585	Gafsa	Tunisia	350	I*
585	Dumfries(BBCScot)	UK	2	C,D*
594	Frankfurt(HR)	Germany	1000/400	D*,E*,I*
594	Oujda-1	Morocco	100	E*,I*
594	Muge	Portugal	100	A*,D*
603	Sevilla(RNE5)	Spain	50	D*,E*,I*
603	Newcastle(BBC)	UK	2	C
612	Athlone(RTE2)	Ireland (S)	100	C,E,I,J*
612	Sebaa Aioun	Morocco	300	E*
612	RNE1 via ?	Spain	10	E*,I*
621	Wavre	Belgium	80	D*,E,I,J
621	Orava(H.Lehota)	Czech	14	I*
621	Batra	Egypt	2000	I*
621	RNE1 via ?	Spain	10	I*
621	Barcelona(OCR)	Spain	50	E*
630	Vigra	Norway	100	D*,E*
630	Tunis-Djedeida	Tunisia	600	D*,E*,I*
639	Praha(Liblice)	Czech	1500	D*,E*,I
639	RNE1 via ?	Spain	?	D*,E,I*
648	RNE1 via ?	Spain	10	I*
648	Orfordness(BBC)	UK	500	E,I,J
657	Neubrandenburg(NDR)	Germany	250	D*
657	Napoli	Italy	120	E*,I
657	Madrid(RNE5)	Spain	20	E*,I*
657	Wrexham(BBCWales)	UK	2	B,C,D*,H,I
666	MesskirchRohrd(SWF)	Germany	150	D*,I*
666	Sitkunai(R.Vilnius)	Lithuania	500	D*
666	Barcelona(COPE)	Spain	10	I*
675	Lopic(R10 Gold)	Holland	120	D*,E,I,J
684	Sevilla(RNE1)	Spain	500	D*,E*,I*
684	Avala(Beograd-1)	Yugoslavia	2000	D*,E*,I*
693	Tortosa(RNE1)	Spain	2	D*,I*
693	Droitwich(BBC5)	UK	150	E,H,I,J,L
702	Flensburg(NDR)	Germany	5	D*,I*
702	Monte Carlo	Monaco	40	I
702	Slovensko 1 via ?	Slovak Rep.	?	I*
711	Rennes 1	France	300	D*,E,I,J
711	Heidelberg	Germany	5	I*
711	Laayoune	Morocco	600	E*,I*
711	Murcia(COPE)	Spain	5	I*
720	Tayevad	Iran	400	E*
720	Lisnagarvey(BBC4)	Ireland (N)	10	H
720	Norte	Portugal	100	D*,E*,I*
720	Lots Rd.Ldn(BBC4)	UK	0.5	C,E,I
729	Cork(RTE1)	Ireland (S)	10	C,D*,H
729	RNE1 via ?	Spain	?	D*,E*,I*
738	Paris	France	4	E
738	Poznan	Poland	300	D*,I
738	Barcelona(RNE1)	Spain	500	D*,E*,I
747	Las Palmas	Gran Canaria	20	I*
747	Flevo(Hilv2)	Holland	400	D*,E,I,J
756	Braunschweig(DLF)	Germany	800/200	D*,E*,I
756	Bilbao(EI)	Spain	5	E*,I
756	Redruth(BBC)	UK	2	C,E,H,I*
765	Sottens	Switzerland	500	D*,E*,I
774	Hrvatski R.	Croatia	50/10	I*
774	Enniskillen(BBC)	Ireland (N)	1	D*
774	RNE1 via ?	Spain	?	D*,E*,I*
774	Plymouth(BBC)	UK	1	L
783	Leipzig(MDR)	Germany	100	D*,E*,I
783	Miramar(R.Porto)	Portugal	100	D*,I
783	Dammam	Saudi Arabia	100	E*
792	Limoges	France	300	E
792	Lingen(NDR)	Germany	5	I*
792	Sevilla(SER)	Spain	20	D*,E*,I*
792	Londonderry(BBC)	UK	1	H
801	Munchen-Ismaning	Germany	300	D*,E*,I
801	RNE1 via ?	Spain	?	I*
810	Volgograd	Russia	150	E*
810	Madrid(SER)	Spain	20	E*,I
810	Westerglen(BBCScot)	UK	100	C,H,I
819	Batra	Egypt	450	E*,I*
819	Toulouse	France	50	D*,I
819	Trieste	Italy	25	I
819	Warsaw	Poland	300	E*,I*
828	Hannover(NDR)	Germany	100/5	I*
828	Rotterdam	Holland	20	D*,I
837	Nancy	France	200	H*
837	COPE via ?	Spain	?	E*,I*
846	Rome	Italy	540	E*,I
855	Berlin	Germany	100	D*,E*,I*
855	R.Bucharest	Roumania	750	I*
855	RNE1 via ?	Spain	?	D*,E*,I
864	Strakonice	Czech Rep.	7	I
864	Santah	Egypt	500	E*,I*
864	Paris	France	300	E,I,J
864	Socuellamos(RNE1)	Spain	2	E*,I*
873	Frankfurt(AFN)	Germany	150	C,D*,E*,I
873	Zaragoza(SER)	Spain	20	D*,E*,I*
873	Enniskillen(R.UI)	UK	1	H
882	COPE via ?	Spain	?	D*,E*,I*
882	Washford(BBCWales)	UK	100	B,C,E,I,J
891	Algiers	Algeria	600/300	D*,E*,I
891	Huisberg	Netherlands	20	E*,I
900	Brno(CRo2)	Czech Rep	25	D*
900	Milan	Italy	600	B*,D*,E*,I
900	Qurayyat	Saudi Arabia	1000	I*
900	COPE via ?	Spain	?	I*
909	B'mans Pk(BBC5)	UK	140	E*,I
918	Plesivec(Sloven'nR)	Slovenia	600/100	B*,E*,I
918	Madrid(R.Int)	Spain	20	D*,E*,I*
927	Wolvertem	Belgium	300	D*,E,I,J
927	Zakynthos	Greece	50	I*
927	Evora(RRE)	Portugal	1	I*
936	Bremen	Germany	100	B*,D*,I
936	RNE5 via ?	Spain	?	B*,E*,I
945	Toulouse	France	300	B*,D*,E*,I*
954	Brno (CRo2)	Czech Rep.	200	E*,I
954	Madrid(CI)	Spain	20	D*,E*,I*
963	Pori	Finland	600	D*,E*,I*
963	Tir Chonaill	Ireland (S)	10	E*
963	Seixal(RRE)	Portugal	10	I*
972	Hamburg(NDR)	Germany	300	B*,D*,E*,I
981	Alger	Algeria	600/300	B*,E*,I
981	Megara	Greece	200	I*
981	Coimbra	Portugal	10	I*
990	Berlin	Germany	300	B*,E*,I
990	Potenza	Italy	10	I*
990	R.Bilbao(SER)	Spain	10	B*,D*,E*,I*
990	Redmoss(BBC)	UK	1	D*
990	Tywyn(BBC)	UK	1	C,I*
999	Schwerin (RIAS)	Germany	20	D*
999	Torino	Italy	20	I
999	Madrid(COPE)	Spain	50	B*,D*,I*
1008	SER via ?	Canaries/Spain	?	I*
1008	Flevo(Hilv-5)	Holland	400	D*,E,I,J
1017	Rheinsender(SWF)	Germany	600	D*,E*,I
1017	RNE5 via ?	Spain	?	D*,E*,I
1026	SER via ?	Spain	?	D*,E*,I*
1035	Lisbon(Prog3)	Portugal	120	D*
1044	Dresden(MDR)	Germany	250	D*,E*,I*
1044	Sebaa-Aioun	Morocco	300	E*
1044	S.Sebastian(SER)	Spain	10	E*,I
1053	Zarogoza(COPE)	Spain	10	D*,I
1053	Talk R.UK via ?	UK	?	E,H,I
1062	Kalundborg	Denmark	250	B*,D*,E*,I
1062	R.Uno via ?	Italy	?	B*,E*,I
1071	Brest	France	20	B*,E*
1071	Riga	Latvia	50	D*
1071	Bilbao(EI)	Spain	5	E*,I*
1071	Talk Radio UK via ?	UK	?	I
1080	Katowice	Poland	1500	D*,E*,I*
1080	SER via ?	Spain	?	D*,E*,I
1089	Talk Radio UK via ?	UK	?	E,H,I
1098	Nitra(Jarok)	Slovakia	1500	D*,E*,I
1098	RNE5 via ?	Spain	?	E*,I*
1107	AFN via ?	Germany	10	C,D*
1107	RNE5 via ?	Spain	?	D*,I*
1107	Talk R.UK via ?	UK	?	E,H,I,J
1116	Bari	Italy	150	I
1116	Pontevedra(SER)	Spain	5	D*,I
1125	La Louviere	Belgium	20	D*,E*,I,J
1125	Deanovec	Croatia	100	I
1125	RNE5 via ?	Spain	?	D*,E*,I*
1125	Llandrindod Wells	UK	1	C
1134	COPE via ?	Spain	2	D*,E*,I*
1134	Zadar(Croatian R)	Yugoslavia	600/1200	D*,E*,I
1143	AFN via ?	Germany	1	C,D*
1143	R.Due via ?	Italy	?	I
1143	COPE via ?	Spain	2	E*,I*
1152	RNE5 via ?	Spain	10	E*,I*
1161	Strasbourg(Flnt)	France	200	E*
1161	S.Sebastian(EI)	Spain	50	I
1179	SER via ?	Spain	?	I
1179	Solvesborg	Sweden	600	D*,E*,F*,I,K*
1188	Kuurne	Belgium	5	D*,E*,I,J
1188	Reichenbach(MDR)	Germany	5	D*,I
1188	Szolnok	Hungary	135	E*,I
1188	San Remo	Italy	6	I
1197	Munich(VOA)	Germany	300	I*
1197	Virgin via ?	UK	?	E,H,I,J
1206	Bordeaux	France	100	I*
1206	Wroclaw	Poland	200	I
1215	Virgin via ?	UK	?	E,H,I,L
1224	Lelystad	Holland	50	D*,I
1224	COPE via ?	Spain	?	I*
1233	Liege	Belgium	5	D*,I
1233	Virgin via ?	UK	?	H,I
1242	Marseille	France	150	D*,H*,I*
1242	Virgin via ?	UK	?	I*
1251	Marcali	Hungary	500	D*,I
1251	Huisberg	Netherlands	10	D*,I*
1260	SER via ?	Spain	?	D*,I*
1260	Guildford (V)	UK	0.5	E,I,J
1269	Neumunster(DLF)	Germany	600	D*,E*,I
1269	COPE via ?	Spain	?	E*,I
1278	Dublin/Cork(RTE2)	Ireland (S)	10	C,E*,H,I
1287	RFE via ?	Czech Rep.	400	D*,E*,I
1287	Lerida(SER)	Spain	10	E*,I*
1296	Valencia(COPE)	Spain	10	I
1296	Orfordness(BBC)	UK	500	C,I
1305	Rzeszow	Poland	100	D*,E*
1305	RNE5 via ?	Spain	?	D*
1314	R.Due via ?	Italy	?	I
1314	Kvitsoy	Norway	1200	D*,E*,I
1314	RNE5 via ?	Spain	?	I
1323	Zyyi(BBC)	Cyprus	200	I*
1323	W'brunn (V.Russia)	Germany	1000/150	D*,I
1332	Rome	Italy	300	D*,E*
1341	Lakihegy	Hungary	300	I
1341	Lisnagarvey(BBC)	Ireland (N)	100	B*,C,E*,H,I
1341	Tarrasa(SER)	Spain	2	E*,I*
1350	Pecs	Hungary	10	I
1350	Cesvaine/Kuldiga	Latvia	50	D*,E*,I
1359	Arganda (RNE-FS)	Spain	600	D*,E*,I
1368	Foxdale(Manx R)	I.O.M.	20	B*,C*,E*,H,I*,K
1377	Lille	France	300	D*,E,I,J
1377	Ukraine	Ukraine	50	I
1386	Athens	Greece	50	I*
1386	Bolshakovo	Russia	2500	B*,D*,E*,I
1395	Fllake	Albania	1000	E*,I
1395	Lopic	Netherlands	120/40	A,D*,E,H,I,J
1404	Brest	France	20	D*,E,I
1413	RNE5 via ?	Spain	?	E*,I*
1422	Heusweiler(DLF)	Germany	1200/600	D*,E*,I
1440	Marnach(RTL)	Luxembourg	1200	B*,E*,F*,G,H,I
1440	Damman	Saudi Arabia	1600	B*,I*
1449	RAI via ?	Italy	?	E*,I*
1449	Redmoss(BBC)	UK	2	D*,I*
1467	Monte Carlo(TWR)	Monaco	1000/400	D*,E*,I
1476	Wien-Bisamberg	Austria	600	D*,I*,K*
1485	AFN via ?	Germany	1	I*
1485	SER via ?	Spain	?	I*
1494	Clermont-Ferrand	France	20	E*,I
1494	St.Petersburg	Russia	1000	E*,I,K*
1503	RNE5 via ?	Spain	?	E*,I*
1512	Wolvertem	Belgium	600	B*,D*,E*,F,I,J,K
1512	Jeddah	Saudi Arabia	1000	I*
1521	Kosice(Cizatice)	Slovakia	600	D*
1521	Duba	Saudi Arabia	2000	E*
1530	Vatican R	Italy	150/450	B*,D*,E*,I
1539	Mainflingen(ERF)	Germany	350(700)	D*,E*
1539	SER via ?	Spain	?	I*
1557	Nice	France	300	I
1566	Sarnen	Switzerland	300	D*,E*,I,K*
1575	Genova	Italy	50	I
1575	SER via ?	Spain	5	E*,I
1584	SER via ?	Spain	2	E*,I*
1593	Holzkirchen(VOA)	Germany	150	D*,E*,I
1602	SER via ?	Spain	?	I
1602	Vitoria(EI)	Spain	10	E*
1611	Vatican R	Italy	15	I

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

Listeners:-
(A) John Eaton, Woking.
(B) Sheila Hughes, Morden.
(C) Brian Keyte, Bookham.
(D) Eddie McKeown, Newry.
(E) George Millmore, Wootton IoW.
(F) Clare Pinder, while in Appleby.
(G) Vic Prier, Colyton.
(H) Tom Smyth, Co.Fermanagh
(I) Tony Stickells, Thornton Heath.
(J) Phil Townsend, E.London.
(K) Thomas Williams, Truro.
(L) Tom Winzor, Plymouth.

Bridgwater; RCI via Sackville 11.690 (Eng to Eur, Africa 2000-2130) 43433 at 2115 in Colyton; R.Globo, Rio de Janeiro, Brazil 11.805 (Port 0900-0330) 44333 at 2115 in Scalloway; R.Prague, Czech Rep 11.600 (Eng to Africa, Asia 2130-2157) 44434 at 2142 in Woodhall Spa; R.Australia via Shepparton 11.695 (Eng, Fr to Pacific 2200-0800?) 32332 at 2200 in Storrington; BBC via Ascension Is 11.835 (Eng to W.Africa 1900-2300) 42243 at 2233 in Woking; BBC via Ascension Is 11.750 (Eng to S.America 2000-0200) 33333 at 2300 in Stalbridge.

In the **9MHz (31m)** band R.New Zealand Int via Rangitaki, N.Island 9.795 (Eng to Pacific areas 0459-0816) was logged as 34343 at 0459 in Woodhall Spa & 24532 at 0645 in Wallsend. Also noted during the morning were AWR via Slovakia 9.440 (Eng to Eur 0700-0755) 54444 at 0745 in

Ross-on-Wye; WYFR via Okeechobee, USA 9.985 (Eng to Eur, Africa 0500-0745) 55444 at 0745 in Bedford; R.Nederlands via Bonaire, Ned.Antilles 9.820 (Eng to Pacific 0730-0925) 33343 at 0804 in Oxted; KNLS Anchor Point, Alaska 9.615 (Eng to F.East 0800-0900) 33333 at 0830 in Scalloway; R.Vilnius, Lithuania 9.710 (Eng to Eur 0830-0900) 22222 at 0838 in Truro; BBC via Skelton, UK 9.410 (Eng to Eur, N/C.Africa 0200-2230) 44434 at 0925 Freshwater Bay; R.Prague via Litomysl 9.505 (Eng to Eur 1030-1057) 33233 at 1051 in Dudley; R.Nederlands via Nauen 9.860 (Eng to Eur 1030-1225) 55555 at 1115 in Herstmonceux.

During the afternoon the Voice of Vietnam, Hanoi 9.840 (Eng to Far East 1330-1400) was 23222 at 1340 in Stalbridge; R.Mediterranee Int via Nador, Morocco 9.575 (Fr, Ar to N.Africa, S.Eur 0500-0100) 54544 at 1410 in W.London; R.Pakistan, Islamabad 9.485 (Eng to M.East, E.Africa 1600-1630) 43333 at 1609 in Norwich; VOA via Gloria, Portugal 9.760 (Eng to M.East 1700-2200) SIO444 at 1700 in E.London; R.Pyongyang, Korea 9.325 (Eng to Europe, M.East, Africa 1700-1750) 34443 at 1703 in Woking.

Later, R.Omdurman, Sudan 9.200 (Eng to Africa 1800-1900) was 34232 at 1825 in Bridgwater; R.Tirana, Albania 9.570 (Eng to Eur 1845-1900) 33333 at 1845 in Newry; Israel R, Jerusalem 9.435 (Eng to Eur, N.America 1900-1925) 43444 at 1900 in Colyton; TWR via Meyerton, S.Africa 9.510 (Fulani to W.Africa 1930-2000) 33433 at 1930 in Storrington; VOIRI Tehran, Iran 9.022 (Eng to Eur 1930-2027) 44444 at 1932 in E.Worthing; Voice of Indonesia, Jakarta 9.525 (Eng to Eur 2000-2100) 22222 at 2030 in Appleby; Voice of Armenia, Yerevan 9.965 (Eng to Eur 2030-2100) 34433 at 2030 in Galashiels; China R.Int, Beijing 9.920 (Eng to Europe 2000-2157) 32222 at 2033 in Plymouth; R.Bulgaria, Sofia 9.700 (Eng to Eur 2100-2200) SIO444 at 2100 in Co.Fermanagh; R.Romania Int, Bucharest 9.690 (Eng to Europe 2100-2155) 34323 at 2150 in Oadby; AWR Alajuela, Costa Rica 9.725 (Eng to C/S.America 2300-0000) 22222 at 2305 in Morden; AIR via Delhi? 9.950 (Eng to NE/SE.Asia 2245-0045) 32322 at 0020 in Kilkeel; RCI via Sackville 9.535 (Eng to USA, Caribbean 0100-0300) SIO333 at 0219 in N.Bristol.

In the **7MHz (41m)** band Ra Skelton, UK 7.235 (Russ, Fr, Eng 1800-2200, also to Africa) 43444 at 2038 in Oxted; R.Budapest, Hungary 7.250 (Eng 2100-2130) 42443 at 2107 in Newry; R.Ukraine Int, Kiev 7.240 (Eng 2100-2200) 32432 at 2111 in Bridgwater; AIR via Aligarh? 7.410 (Hi, Eng 1745-2230) 44434 at 2220 in Woking.

There are many more broadcasts to Europe in the **6MHz (49m)** band. Those noted during the morning originated from HCJB Quito 5.865 (Eng 0700-0900), logged as 33333 at 0720 in Bedford; R.Austria Int, via Moosbrunn 6.155 (Eng 0730-0800) 54444 at 0734 in Plymouth; WEWN Vandiver 5.825 (Eng ?-0950) 33323 at 0815 in Stalbridge; R.Vlaanderen Int, Belgium 6.035 (Eng 0900-0925 Mon-Sat) 54544 at 0920 in Ross-on-Wye; R.Nederlands via Wertachtal 6.045 (Eng 1030-1225) 43433 at 1155 in Herstmonceux.

Later, Polish R, Warsaw 6.000 (Eng 1700-1800) was 43333 at 1730 in Morden; R.Sweden via Horby? 6.065 (Eng 1730-1800, also to M.East, Africa) 44344 at 1735 in Woodhall Spa; R.Vlaanderen Int, Belgium 5.910 (Eng 1800-1830) 55444 at 1800 in Appleby; R.Slovakia Int 6.055 (Eng 1830-1900) 54444 at 1830 in Norwich; BBC via Rampisham & Skelton, UK 6.195 (Eng 1700-2230) 44545 at 1830 in Oadby; SRI via Lenk 6.165 (Fr, It, Ger, Eng 0400-2000) 31234 at 1900 in Felixstowe; R.Estonia, Tallinn 5.925 (Eng 1900-1930, Mon/Thurs only) 21421 at 1922 in E.Worthing; R.Sweden via Horby 6.065 (Eng 1930-1958, also to M.East, N.Africa) 55534 at 1930 in Colyton; RAI Rome 6.015 (Eng 1935-1955) 54554 at 1954 in Bridgwater; R.Prague via Litomysl 5.930 (Eng 2000-2027) 54544 at 2000 in Galashiels; China R.Int 6.950 (Eng 2000-2157) SIO222 at 2000 in E.London; RCI via Skelton, UK 5.995 (Fr, Eng 1900-2200, also to M.East, N.Africa) 44444 at 2038 in Oxted; BBC via Cyprus 6.180 (Eng 1900-2200, also to N.Africa) 22232 at 2051 in Woking; AWR via Slovakia 6.055 (Eng 2100-2158) 43343 at 2104 in Newry; Vatican R, Italy 5.885 (Various ?-2210) 44444 at 2210 in Truro.

Those noted to other areas were the BBC via Sackville 6.175 (Eng to N.America 2200-0330) 33333 at 2350 in Kilkeel; R.Nederlands via Flevo 6.020 (Eng to N.America 2330-0125) SIO444 at 0000 in Co.Fermanagh; BBC via Antigua 5.975 (Eng to S/C.America 2100-0700) 43333 at 0120 by **Harry Richards** in Barton-upon-Humber; R.Nederlands via Ned.Antilles 6.165 (Eng to N.America 2330-0125) SIO333 at 0123 in N.Bristol.

TROPICAL BANDS CHART

Freq (MHz)	Station	Country	UTC	DXer
2.485	ABC Katherine	Australia	2102	D
3.210	Em.Nacional, Maputo	Mozambique	2110	J
3.240	TWR Shona	Swaziland	1842	F,G
3.245	R.Clube Varginha	Brazil	0330	J
3.255	BBC via Meyerton	S.Africa	2041	C,D,F,G,J
3.270	SWABC 1, Namibia	S.W.Africa	2131	A,C,F,G,J
3.290	Namibian BC,Windhoek	S.W.Africa	2029	A,C,F,G,J
3.300	R.Cultural	Guatemala	0315	D,J
3.306	ZBC Prog 2	Zimbabwe	2038	C,G,J
3.315	AIR Bhopal	India	0030	A
3.316	SLBS Goderich	Sierra Leone	2029	C,D,G
3.320	SABC (RSG) Meyerton	S.Africa	2037	A,C,G,J
3.325	FRCN Lagos	Nigeria	2026	A,G,J
3.330	Christian Voice	Zambia	2034	C,G,J
3.365	GBC R-2	Ghana	2040	A,C,D,F,G,J
3.380	R.Chortis	Guatemala	0305	F
3.380	NBC Blantyre	Malawi	2039	A,G,J
3.390	BBC via Meyerton	S.Africa	2035	G
3.395	ZBC Gweru	Zimbabwe	2013	G,J
3.915	BBC via Kranji	Singapore	2130	B,C,D,F,M
3.955	BBC via Skelton	England	0430	F,L
3.955	Nexus, Milan	Italy	2100	I
3.970	R.Korea via Skelton	England	2100	F,H,I,M
3.975	R.Budapest	Hungary	2009	F,H,I
3.985	China R via SRI	Switzerland	2100	F,K
3.995	DW via Julich	Germany	2223	A,C,F,L,M
4.735	Xinjiang, Urumqi	China	2330	A
4.750	Xizang BS, Lhasa	China	0030	A
4.755	R.Educ CP Grande	Brazil	0340	A,J
4.760	TWR Manzini	Swaziland	0256	F
4.765	R.Integracao	Brazil	2350	A
4.770	Centinela del Sur	Ecuador	0100	A
4.770	FRCN Kaduna	Nigeria	1920	F,G,H,J
4.777	R.Gabon, Libreville	Gabon	2120	C,F,G,I,J
4.783	RTM Bamako	Mali	1950	A,C,G,J
4.790	Azad Kashmir R.	Pakistan	0055	A,J
4.790	R.Atlantida	Peru	0235	J
4.800	LNBS Maseru	Lesotho	1949	C,J
4.805	R.Nac.Amazonas	Brazil	2350	A,C,J
4.815	R.Difusora, Londrina	Brazil	2248	A,C
4.815	R.diff TV Burkina	Ouagadougou	1943	A,C,G,J
4.820	R.Botswana, Gaberone	Botswana	2146	F
4.820	AIR Calcutta	India	1818	G
4.830	R.Tachira	Venezuela	0202	A,D,F,J
4.832	R.Reloj	Costa Rica	0430	J
4.835	R.Tezulutlan, Coban	Guatemala	2135	A,C
4.835	RTM Bamako	Mali	2100	A,C,F,G,I,J
4.840	AIR Bombay	India	0050	A
4.845	R.Fides, La Paz	Bolivia	0045	A,J
4.845	ORTM Nouakchott	Mauritania	2149	A,F,J
4.850	R.Yaounde	Cameroon	2231	C,F,J
4.860	AIR Delhi	India	1917	C,G
4.870	R.Cotonou	Benin	1941	F,G,J
4.885	R.Clube do Para	Brazil	0335	F,J
4.885	R.Difusora Acreana	Brazil	0055	A
4.890	RFI Paris	via Gabon	0358	F,J
4.895	Voz del Rio Arauca	Colombia	0050	A
4.905	R.Nat.N'djamena	Chad	1916	F,G,J
4.910	R.Zambia, Lusaka	Zambia	2129	J
4.914	R.Cora del Peru,Lima	Peru	0335	J
4.915	R.Anhanguera	Brazil	0155	F,J
4.915	PBS Guangxi, Nanning	China	2340	A
4.915	GBC-1, Accra	Ghana	1944	A,C,F,G,J
4.915	KBC Cent Sce Nairobi	Kenya	2002	J
4.920	R.Quito, Quito	Ecuador	0340	E,J
4.927	RRI Jambi	Indonesia	2220	J
4.931	R.Internacional	Honduras	0400	J
4.935	KBC Gen Sce Nairobi	Kenya	2002	D,J
4.940	R.Abidjan	Ivory Coast	2345	A
4.950	VOA via Sao Tome	Sao Tome	2005	D,G,H,J
4.955	R.Nac. de Colombia	Colombia	0337	A,J
4.960	R.Federacion, Sucua	Ecuador	0055	J
4.960	VOA via Sao Tome	Sao Tome	0328	F,J
4.975	R.Uganda, Kampala	Uganda	2039	G,J
4.980	Ecos del Torbes	Venezuela	2350	A,F,J
4.985	R.Brazil Central	Brazil	2355	A,J
4.990	FRCN Lagos	Nigeria	1941	G
5.005	R.Nacional, Bata	Eq.Guinea	1921	G,J
5.009	R.TV Malagasy	Madagascar	1811	C,G,J
5.010	R.Garoua	Cameroon	0301	F
5.010	AIR Thiru'puram	India	0055	A
5.015	R.Brazil Tropical	Brazil	0115	A
5.020	Ecos del Atrato	Colombia	0335	J
5.020	La V du Sahel,Niamey	Niger	1953	F,G,J
5.025	R.Parakou	Benin	2040	G,J
5.025	R.Rebelde, Habana	Cuba	0303	A,F,J
5.025	R.Uganda, Kampala	Uganda	2019	G,J
5.030	AWR Latin America	Costa Rica	0158	A,F,J
5.040	Voz del Upano, Macas	Ecuador	0105	A,C
5.045	R.Cultura do Para	Brazil	0110	A,C
5.047	R.Togo, Lome	Togo	2035	A,C,F,G,J
5.050	R.Tanzania	Tanzania	2037	F,G,J
5.055	RFO Cayenne(Matoury)	French Guiana	0105	A
5.075	Caracol Bogata	Colombia	0200	A,E
5.100	R.Liberia, Totota	Liberia	2132	C,J

DXers:-

(A) Robert Connolly, Kilkeel.
(B) Bernard Curtis, Stalbridge.
(C) John Eaton, Woking.
(D) David Edwardson, Wallsend.
(E) Bill Griffith, S.W.London.
(F) Eddie McKeown, Newry.
(G) Fred Pallant, Storrington.
(H) Clare Pinder, while in Appleby.
(I) Vic Prier, Colyton.
(J) John Slater, Scalloway.
(K) Tom Smyth, Co.Fermanagh.
(L) Ernest Wiles, Bedford.
(M) Thomas Williams, Truro.

Maritime Beacons

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

Because of the long hours of daylight during April, May and June some listeners searched for the ground waves from beacons around the UK and some other countries. Those who were prepared to wait for the sky waves from more distant beacons to arrive after dark were not disappointed!

At night, **Peter Rycraft** (Wickham Market) received for the first time the beacons on the Canaries at La Isleta Lt (LT) and Punta Lantailla Lt (NA) both on 291.9kHz. Two in Estonia - Akmenrags (AK) and Mys Taran (BT), which share 312.5, were heard after dark by **Victor Robb** in Belfast. He also logged the Butt of Lewis (BL) 289.0, which had eluded him for quite some time. In Kilkeel **Robert Connolly** added Wustrow Lt, German Baltic Coast (WU) on 314.0 to his list. He noticed that Rozewie Lt, Poland (RO) is now on 310.5; also that Stavanger, Norway (LEC) 319.0 is much weaker now and sometimes absent during daylight.

In Hove, **Andrew Tett** waited until local TV sets were switched off before searching the band on May 24, 25 & 26. Between 0100 & 0200UTC he heard several beacons along the coastline of Spain. The most distant signal came from Mahon, Balearic Is (MH) on 292.0. Despite the high level of electrical noise in the Birmingham area, **Dave Dawson** compiled an extensive log, mainly at night. At 0555 on May 30 he heard for the first time Nieupoort, Belgium (NP) on 285.0. Good conditions at night on June 12 enabled **Ross Workman** (Shoreham) to log Punta Carena, Italy (NP) 289.5 and Llobregat, S.Spain (OR) 303.5.

An interesting first report came from **Larry Manderson** in Colchester. He picked up the ground waves from 24 beacons during daylight. After dark he received the sky waves from some quite distant beacons including Mahon, Balearic Is (MA) on 292.0.

A considerable improvement in reception has been noted by **Brian Heath** (Stapleton) since he installed a variable bandwidth filter in his NRD-535 receiver. When set to 2kHz bandwidth some beacons are buried in noise but at 0.5kHz they are clearly audible. It is difficult to generalise because many different types of receiver are in use. If possible, use the c.w. mode, select a narrow i.f. filter, turn the a.g.c. off and adjust r.f. & a.f. gain controls for best reception. It may be advantageous to connect a sharply tuned audio filter between the set and a pair of headphones.

LONG WAVE MARITIME RADIOBEACONS

Freq (kHz)	C/S	Station Name	Location	DXer
284.5	LZ	Lizard Lt	S.Cornwall	B,C,D,E,G,H,I,J,K,M,N*,O,S,T,U
284.5	MA	Cabo Machichaco	N.Spain	D*,E*,G*,H*,M*,N*,U
284.5	PR	Porkkala	Finland	G*
285.0	NO	Cabo de la Nao Lt	S.Spain	N*
285.0	NP	Nieupoort W.Pier	Belgium	D*,E,G,H,Q,U
286.0	TR	Tuskar Rock Lt	S.Ireland	A,B,D,E*,G,H,J,L,M,N*,Q,S,T
286.5	AL	Almagrundet Lt	Sweden	L
286.5	BC	Baily Lt	S.Ireland	D,M
286.5	DG	Riga Lt	Latvia	N*
286.5	FI	Cala Figuera	Majorca	D*,M*,N*
286.5	FT	Cap Ferret Lt	W.France	B*,D,E,K,M*,N*,U*
286.5	NK	Inchkeith Lt	F of Forth	A
287.3	BT	Bjargtangar Lt	Iceland	N*
287.3	IB	I.Berlenga	Portugal	N*
287.5	CV	Cabo Carvoeiro Lt	Portugal	M*
287.5	DO	Rosedo Lt	France	D*,N*
287.5	FR	Faerder Lt	Norway	D*,M*,N*
287.5	IB	I.Berlenga	Portugal	D*
287.5	MD	Cabo Mondego	Portugal	D
287.5	SE	Sete Mt St Clair	S.France	D*
288.0	HH	Hoek van Holland	Holland	D*,K,N*
288.0	KL	Sklinna Lt	Norway	D*,N*
288.0	OH	Old Hd of Kinsale	S.Ireland	B,D*,J,M*,O
288.5	CT	Pt de Combrit Lt	France	N*
288.5	FI	Cabo Finisterre Lt	N.W.Spain	B*,D,G*,H*,N*,P*,S*,U*
288.5	YM	Ijmuiden Lt	Holland	D*,E,G,H,N*,Q
289.0	BL	Butt of Lewis Lt	Is of Lewis	M
289.0	BY	Baily Lt	S.Ireland	A,B,D,E,J,M,N,O
289.5	KY	Oksoy Lt	Norway	N*
289.5	LO	Landsort S Lt	Sweden	H*,N*
289.5	MN	Hammerodde	Denmark	D*,N*
289.5	NP	Punta Carena	Italy	D*,H*,U*
289.5	SN	Ile de Sein NW Lt	France	D*,G,I,K,N*,Q,U
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292.5	SM	Pt St.Mathieu Lt	France	B,C,D,G,I,J,K,M,N*,O,S,U
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293.0	RN	Rhinns of Islay Lt	Is of Islay	A,D,J,M,O
293.0	SY	Svinoy Lt	Norway	D*,N*
293.5	RO	Cabo Silleiro Lt	N.Spain	D*,N*
294.0	KU	Kullen High Lt	Sweden	D*,N*
294.0	PH	Cap d'Alprech	France	B,C,D,E*,G,I,H,J,K,L,M,N*,Q,R,S,T,U
294.5	KC	#Old Hd of Kinsale	S.Ireland	D*
294.5	PS	#Pt.Lynas Lt	Anglesey	D,J,M,O,Q
294.5	PT	#Souter Lt	Durham	A
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295.0	SN	Sletnes Lt	Norway	D*,N*
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296.0	KN	Skrova Lt	Norway	D*,N*
297.0	FG	Pt de Barfleur Lt	France	B,C,D*,E*,G,H,I,J,K,L,M,N*,Q,R,S,T,U
297.5	MA	Mantyluoto	Finland	D*
297.5	MK	Mys Mikulkin	SSR Arctic	D*
297.5	PS	Cabo Penas Lt	N.Spain	D,N*,O*
298.0	GX	Ile de Groix	France	B*,D*,K,M,N*,Q,U
298.0	TA	Cabo Gata	S.Spain	D*,N*
298.5	RR	Round Is Lt	Is Scilly	A,B,C,D,E*,G,H,I,J,K,L,M,N*,Q,S,T,U
298.5	SW	Skagen	Denmark	D,N*
298.8	HO	Hornbjarg	Iceland	D*
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299.0	BN	Les Baleines	W.France	D*,N*
299.0	UN	Understen Lt	Sweden	D*,N*
299.5	NP	Nash Pt Lt	S.Wales	B,D,E,G,H,I,J,M,N*,Q,S*,T
299.5	SK	Skomvaer Lt, Rost	Norway	D*
299.5	VR	Utvaer Lt	Norway	A,D*,M,N*
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300.0	TI	Cap d'Antifer Lt	N.France	K,N*
300.5	DU	Dungeness Lt	Kent	B,C,D*,G,H,I,J,K,L,M,N*,Q,R,S,T,U
300.5	LA	Lista	Norway	A,D*,J,M*,N*
301.0	CA	Pt de Creach	France	B,C,D,E*,G,I,J,K,M,P*,Q,S,T,U
301.0	ER	Eierland Lt	Holland	D*,N*
301.0	HA	Pt del Hank	Morocco	D*
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306.0	TN	Thyboron	Denmark	A,N*
306.5	GJ	Le Grand Jardin Lt	France	N*
306.5	RS	Ristna	Estonia	D*,H*
306.5	UT	Utsira	Norway	A,B,D*,E*,G,H*,J,M,N*,P*,Q
307.0	GL	Eagle Is Lt	Ireland	A,D,J,M,N*
308.0	PI	Cabo Espichel	Portugal	D*
308.0	RC	Cabo Roca	Portugal	D,N*
308.0	RD	Roches Douvres Lt	France	D,J,N*
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310.0	ER	Pt de Ver Lt	N.France	B,D*,I,K,N*,P*,Q,S,T,U
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310.5	DA	Damietta Mouth	Egypt	D*
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310.5	RO	Rozewie	Poland	D*
310.5	SG	Sjaellands N Lt	Denmark	D,N*
311.0	GD	Girdle Ness Lt	NE.Scotland	A,D,M
311.0	NF	N.Foreland Lt	Kent	B,C*,E*,G,H,I,J,L,N*,Q,R,S,T,U
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315.5	ND	Nidden	Lithuania	D*
316.0	IN	Ingolfshofdhi Lt	Iceland	A*,D*
319.0	LEC	Stavanger	Norway	A,B,C,D*,G,H,J,M*,N*,O
331.0	FH	Frederikshab	Greenland	D*
337.0	MY	Myggenaes	Faeroe Is	M*
352.0	RBA	Rabat Sale	Morocco	D*
367.0	JV	Jakobshavn	Greenland	D*
372.0	OZN	Prins Chris's Sund	Greenland	B*,D*
381.0	AB	Akraberg	Faeroe Is	A*,B*,D*,H*,M,N*,P*,U*
404.0	NL	Nolso	Faeroe Is	A*,B*,D*,H*,M,N*,U*
404.0	NS	Narssaq	Greenland	D*

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

DXers:-

(A)	Kenneth Buck, Edinburgh.
(B)	Steve Cann, Southampton.
(C)	Dave Clench, while at Ford.
(D)	Robert Connolly, Kilkeel.
(E)	Dave Dawson, Birmingham.
(F)	John Eaton, Woking.
(G)	Brian Heath, Stapleton.
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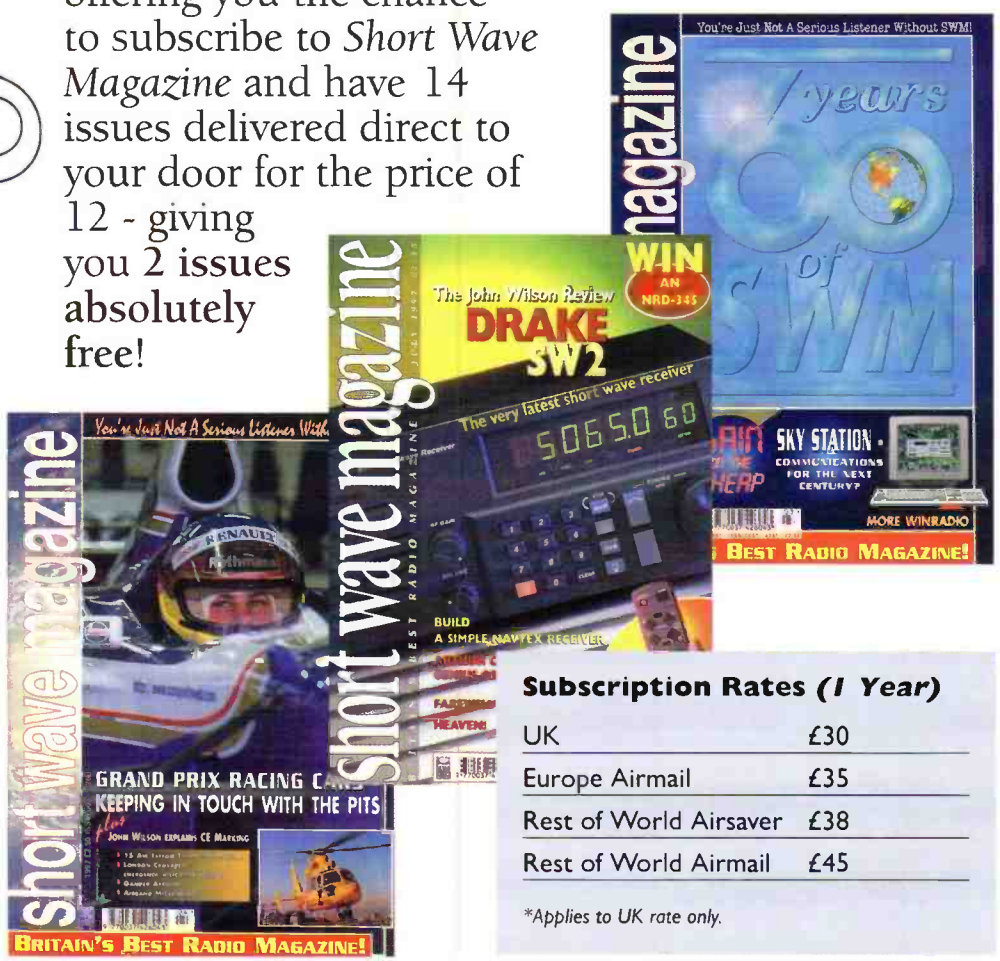

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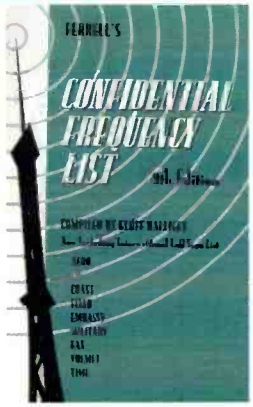

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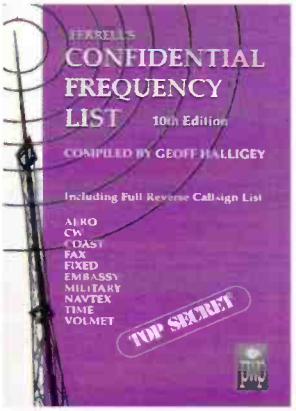

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