MERRY CHRISTMAS FROM *SWM*

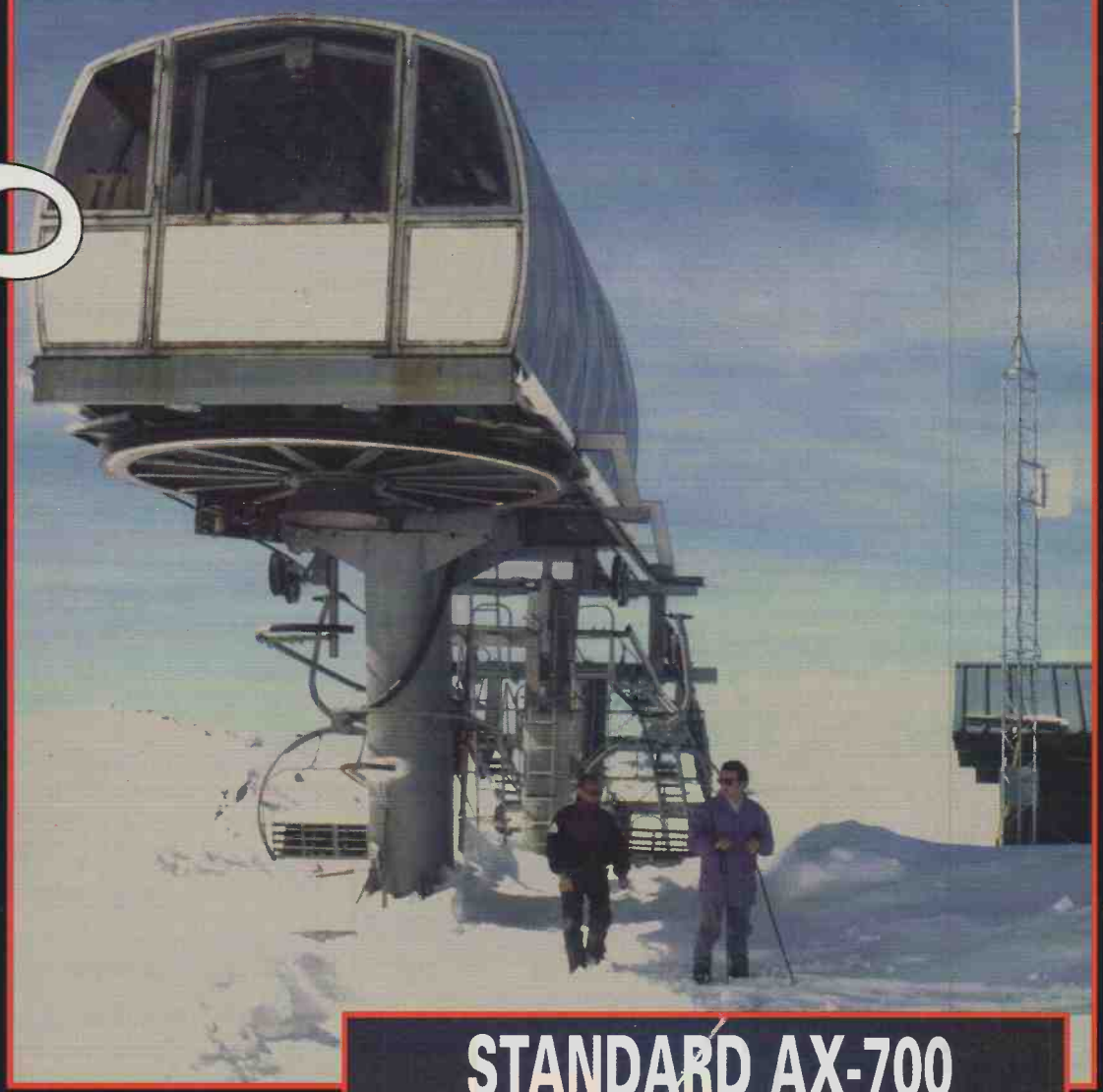
shortwave magazine

BRITAIN'S BEST RADIO MAGAZINE

JANUARY 1998 £2.75

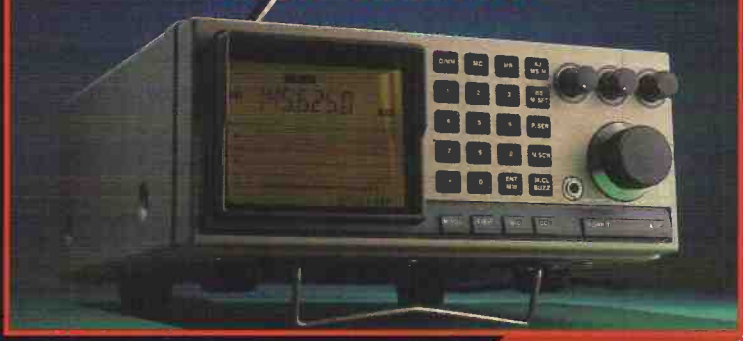
RADIO NEIGE

DX FROM THE SNOW



STANDARD AX-700

Base Scanner



* JW Reflects On A Year Of Receiver Testing
* Build A Peak / Notch Filter

all the Regulars

REVIEWED

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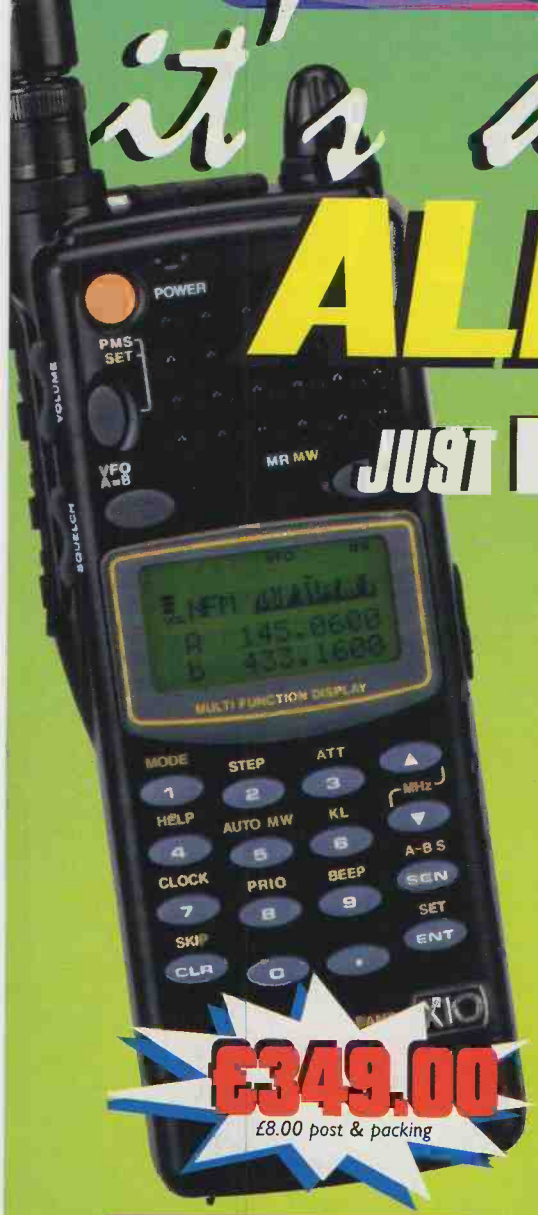
it's arrived!

ALINCO DJ-X10E SCANNER

JUST LOOK AT THESE FEATURES!



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  AM WFM - NFM - SSB - CW
- **1200 MEMORY CHANNELS**
- **CHANNEL SCOPE SPECTRUM ANALYSER**
  that allows monitoring of 40 channels at a glance
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  During searches you can tune in the strongest signal displayed on the channel scope
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- **SWITCHABLE ATTENUATOR**
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- **KEYPAD LOCK CONTROL**

DJ X10E includes FREE

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- **NICAD BATTERY PACK**
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OPTIONAL EXTRAS

EBP-33N....Small size 650mAH NiCad...£39.95
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SPECIFICATIONS

Frequency.....100kHz - 2000MHz
Memories.....1200
Scan Speed....25 ch/sec
Scan Steps.....Selectable (50Hz - 500kHz) in 20 fixed steps
Receiver.....Triple Superheterodyne
Dimensions...57(H) x 150(W) x 25.5(D)
Weight.....320g (with EBP-37N Battery pack)

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ICOM'S NEW COMPUTER RADIO SYSTEM

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- **FREQUENCY:**
  66 - 88MHz 300 - 470MHz
  108 - 170MHz 806 - 1000MHz
- **MODES:** AM/NFM
- **STEPS:** 5, 6.25, 10, 12.5, 25kHz
- **MEMORIES:** 200
- **BAND MEMORIES:** 10
  (user re-programmable)
- **PRIORITY CHANNELS:** 10
- **SCAN/SEARCH SPEED:** 30 per sec
- **POWER:** Requires 4 x AA batteries
- **SUPPLIED WITH:** Antenna, Earpiece, Carrying Strap and built-in Desk Stand

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An exciting new handheld packed with features - but at a price you can afford! The receiver has "breathtaking performance" ensuring this set is destined to be a number one seller

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- AM synchronous detector
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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

£499.00

DRAKE R8B

NEW MODEL -NOW IN STOCK!

- AM, FM, USB, LSB, RTTY, CW
- Freq range: 100kHz-30MHz
- Wide/narrow noise blanker
- RF pre-amplifier for enhancing weak signals
- 1000 memories
- RF attenuator
- Tone control
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- Notch filter
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- Two 24 hour clock timers
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The new R11 Test Receiver...

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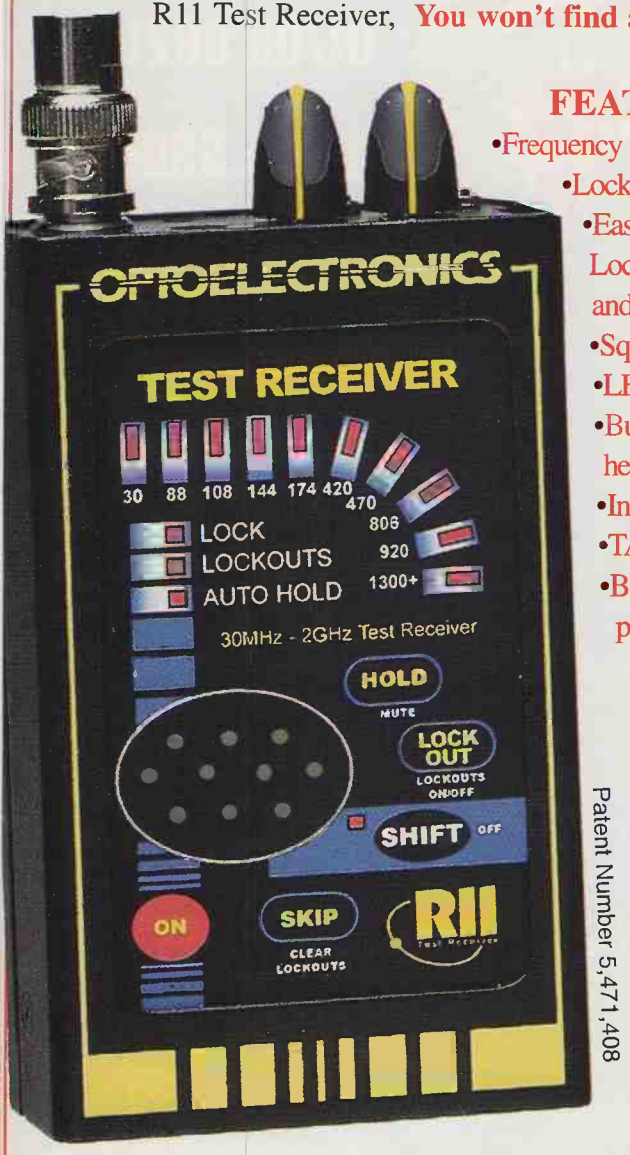
The **NEW** R11 is a Nearfield FM Test Receiver capable of sweeping **30MHz - 2GHz** in less than one second. The R11 can lock onto a **5 watt UHF signal** as far away as **500 feet** and demodulate the signal through its built-in speaker. A unique feature of the R11 is its ability to determine what band the frequency is transmitting in and display it on its LED indicator. When speed is an issue, reach for the R11 Test Receiver, **You won't find a faster nearfield FM test receiver anywhere.**



Patent Number 5,471,408

FEATURES

- Frequency Range: Analog FM, 30MHz - 2GHz
- Locks onto 5 watt UHF signals as far away as 500 feet
- Easy to use keypad functions: Frequency Hold, Frequency Skip, Frequency Lockout, and the Shift key feature for Audio Mute, Enable/Disable Lockouts, and Lockout Clear
- Squelch and Volume control knobs
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- Built-in speaker for instant frequency demodulation and headphone jack for earphone audio
- Interface with the Scout for Reaction Tune
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Reaction Tune with Scout using optional CB-RT

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Vol. 56 ISSUE 1, JANUARY 1998
ISSN 0037-4261
ON SALE DECEMBER 23
Next issue on sale JANUARY 22

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Cover Subject

Read about the high altitude low power ski slope radio station that provides entertainment, safety information and ads via cable cars.

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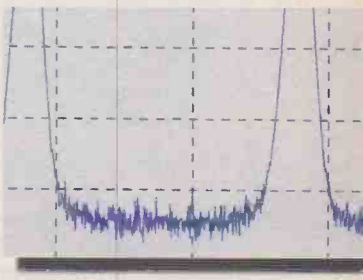
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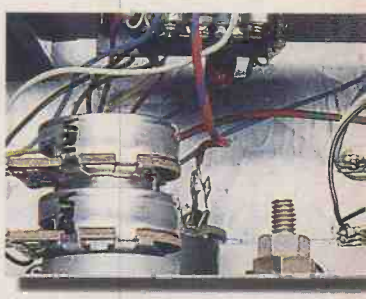
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Regular Columns


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Communiqué

Save On Bills!

Grundig, the leading German television manufacturer has introduced a revolutionary new switch to a number of televisions which could save British consumers up to £35 per year - representing more than a third of the current £91.50 TV licence fee.

Research by power distributors has shown that half of all TV sets are never switched off with consumers taking the easy option and leaving their televisions in standby mode, rather than switching off the power supply, which can cost up to £70 per year in fuel bills.

The new eco-switch developed by Grundig can cut this in half, by means of a switch-off which is automatically built-in for stand-by operation. The eco-switch completely cuts the television set's power supply after a selected switch-off time, which can be set by remote control.

The Grundig models equipped with the eco-switch are: **M70-1690/9FT 28in widescreen, M82-1690/9 FT 32in widescreen** and the **ST84-796/9 33in jumbo screen**.

A Scientific Approach

Adrian Dening G4JBH, a professional radio officer, assisted by **Haydn Kraus G1PZK**, a former school technician, and guests from the Yeovil ARC are directing a practical weekend course at the end of March entitled 'A Scientific Approach To Global Communications', to be held at **Kilve Court Residential Education Centre, Nr Bridgwater, Somerset**.

Kilve Court is a Georgian House with modern extensions and facilities, situated in about 25 hectares of wooded grounds, near the North Somerset Coast. It is located about 20km west of Bridgwater on the A39. The Centre is run by the Education department of Somerset County Council.

Starting on **Friday 27th March** at **5pm** and concluding on **Sunday 29th March** at **2pm**, the course is open to all age groups and is suitable for radio amateurs, listeners or anyone with an interest in radio.

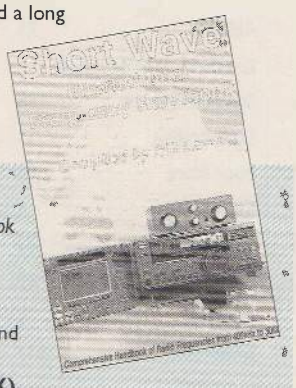
Elements of the course include: the history of radio, what are radio waves and how do they travel, different types of transmissions, satellites, communication, television and weather, computers and the Internet. Participants will be able to transmit during the weekend as a special amateur callsign, **GB2KRC**, will be operational.

The cost of the Course is £89, which includes full board accommodation. If you fancy attending, then contact the Course Director in the first instance on **(01935) 413163** or E-mail on **106471.620@compuserve.com**

New Receiver Kit

Cambridge Kits announce a receiver kit for the new amateur band radio at 136kHz. It is a lower cost version of their 60kHz receiver, which was originally for their MSF clock, with details of modification to 136kHz. This compact receiver features a narrow band i.f. (only 100Hz wide), 'S' meter and headphone outputs, 50dB a.g.c. range and a built-in antenna capable of receiving stations up to 3000 miles away.

The introductory price, for readers quoting *SWM*, is only £29.30 including P&P (UK only). Cambridge Kits feel confident that short wave listeners will find a long wave product interesting.



Popular Frequency Guide

The third edition of the *Short Wave International Frequency Handbook* has recently been published by **Waters & Stanton**. Now in A4 format and running to 176 pages, it contains 'bang up-to-date information' on short wave frequencies, together with features on short wave receiver, antenna tuners, airband on the short waves and the marine services.

The price remains unaltered at **£12.95 plus £1 postage (UK)**. Obtain your copy from ***SWM* Bookstore, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.**

ISWL Changes

The International Short Wave League Elections were held during October 1997 and have resulted in the following changes to the ISWL Council. As of 1st December 1997, **Mike Parker, G-8264/G4IUF/N6SVL** from Harrogate in Yorkshire has been elected to the position of ISWL Honorary President.

John Raynes G-16436/G0BWG has been elected to the position of ISWL Honorary Secretary. The election to John also means that as of the 1st December 1997 the address of the ISWL HQ, will change to that of the Secretary.

Therefore, requests for information, orders for publications and **all** ISWL related correspondence should now be addressed to: **John Raynes, G-16436/G0BWG, 267 Pelham Road, Immingham, NE Lincolnshire DN40 1JU, England.**

Finally, in recognition of her hard work and dedication to the ISWL, **Evelyn May G-17197/G0OZI** is now installed as Honorary Vice President.

Morse Course

There is still time to register for the Morse Code (12w.p.m. RSGB test preparation) course to be run at Newbury College starting on Tuesday 6 January 1998. The Morse Code for Amateurs course no. is 99208B.

Contact the **Newbury Technical College** directly on **(01635) 35353** for further information, or alternatively, contact the course tutor, **Ray Oliver G3NDS** on **(01672) 870892**.

Designer Awards

The 1998 Young Electronic Designer Awards (YEDA) presentations are to be held in Manchester on June 29th, as part of the celebrations making the fiftieth anniversary of the world's first stored program computer. The machine - the antecedent of the programmable computer in use today - was unveiled in June 1948 by a team of engineers at The University of Manchester.

The 1998 YEDA finalists' projects will be displayed and judged at The Museum of Science & Industry in Manchester on Sunday 28 and Monday 29th June 1998, alongside a working replica of the computer which has had such an impact on life over the past half century. The Awards presentation dinner will take place on the evening of Monday 29th June 1998 in the adjacent

Granada Television Studios.

Sponsored in 1998 by Cable & Wireless and The Institution of Electrical Engineers (IEE), the Young Electric Designer Awards, now in their thirteenth year, are presented annually to students in three age groups between 12-25, for the development of an electronics-based device or system which meets an everyday need. Prizes include cash awards of up to £2 500 (shared by student and school or university), equipment, certificates and trophies.

By entering YEDA, students have the chance to develop their innovative talents, to improve their technical know-how and to develop business and marketing acumen, all essential requirements in preparing for an engineering career. Project work can be undertaken as part of students' studies within the National Curriculum.

In 1997, winning entries included a device to enable scuba divers to communicate under water, a domestic alarm system to let deaf people know if the telephone or door bell is ringing or if a smoke alarm is going off, a device to fit to domestic irons to prevent clothes being scorched, bicycle safety lights with direction indicators and a device to detect if electric fences are switched on or off.

Entry forms for 1998 are now available from the organisers, which must be returned and completed by the 1 March 1998. Student projects have to be developed to working prototype level in time for regional judging in April. Further development can take place before the national final in June.

So, if you are interested and would like further information, or an entry form, contact: **The YEDA Trust, 60 Lower Street, Pulborough, West Sussex RH20 2BW, Tel: (01798) 874767, FAX: (01798) 873550** or E-mail: **postmaster@yeda.compulink.co.uk**

New Exam Centre

The **Sandwell Amateur Radio Club** have registered a local primary school with the City & Guilds as an approved Centre for the 1998 Novice Radio Amateur and Radio Amateurs examinations. The club, which meets at their own premises in **The Broadway, Oldbury, West Midlands**, has been conducting RAE and NRAE classes for a number of years and entering candidates as external candidates at a local college.

"We felt that the time had come for the club to have it's own exam centre" the Club Chair **Martin Prestidge G2BXP** said, "so we decided to go down the road of registering a nearby school as an exam centre".

The school chosen, **Causeway Green Primary** in **Penncricket Lane, Oldbury**, has good public transport links with Birmingham, West Bromwich and Dudley, and is about one mile from Junction 2 on the M5 motorway.

For further information, contact the club officers:

Chairman: Martin Prestidge G2BXP, **48 Parkfield Road, Oldbury, West Midlands B68 8PT** on **0121-552 4902** or the Secretary: **Clive Binnell G0TVR, 146 Hales Crescent, Semthwick, West Midlands B67 6QX** on **0121-429 6061** or last but not least, the Treasurer: **Archie Holyoake G4OJJ, 281 Causeway Green Road, Oldbury, West Midlands B68 8LT** on **0121-532 7039**.

National Maritime Museum

NATIONAL MARITIME MUSEUM

Communication on land and at sea has always been vital to both naval and merchant fleets and essential for safety and security. This spring, the Open Museum at the National Maritime Museum looks at the subject in more detail, with a one-day course on Saturday 21 February entitled Keeping In Touch.

The course will explore early methods used to assist ship-to-ship and ship-to-shore communications, flag signalling, the Admiralty Telegraph, the early electric telegraph and the wireless telegraph. Speakers will be Dr Allan Chapman (Oxford University), David Brown (Naval Historical Branch), Mary Godwin (Cable & Wireless) and Jenny Wraight (Admiralty Library).

Course fees are £25 (concessions £15) for the course. For a free prospectus or bookings, contact **Caroline Tilbrook** on **0181-312 6747**. Further information is also available on the NMM web site at **http://www.nmm.ac.uk**

Radio & TVDX News

The BBC World Service will soon be available across Nairobi, Kenya at v.h.f. Band 2, sharing facilities with the commercial broadcaster 'Capital Radio' - at this time test transmissions are on-air. The service will air in Swahili, Somali and English.

The Greek state second TV channel 'ET-2' has just experienced a major revamp of its programming output following a dramatic fall-off in viewing figures, now reckoned to be down to single % numbers. ET-2 is now called 'NET' and is concentrating on current affairs, educational and cultural programming. Both ET-1 and ET-2 services lost their captive audiences when commercial TV boomed in the late 1980s.

Terrestrial digital TV transmissions are now being aired across Berlin within the u.h.f. channels E43, E59 (Alexanderplatz) and ch.E48 (Schaferberg) using 1kW e.r.p. transmitters. The former transmitter site is also used for the ch.E5 'TV Berlin' output.

The sell-off into the private sector of the state broadcaster TV2 has been delayed at least four years after a lack of support from parliament. It will maintain output as TV2 and gain a further 3% of licence revenue (taking it to 15%) in the year 2000.

Expansion for the Mexican TV network 'TV Azteca' with ventures into neighbouring Nicaragua, Panama, Costa Rica, Honduras, Peru and the Dominican Republic this coming year and future plans suggest moves into the major population regions of Chile, Colombia, Ecuador and Venezuela before the year 2000.

There have now been 31 applications (as of mid October) for either temporary or permanent RSL TV licences. The new RSL licences will allow transmissions for either a 56 day or two year initial term, decision time will be during the Spring 1998. Many UK cities have applications for licences with perhaps the Isle of Wight being the application with the largest area - these could well provide unique TVDXing possibilities in the coming years.

The main meteor shower periods for **1998** are detailed, thanks to the British Astronomical Association - Meteor Branch for once again providing this data.

Shower	Main Period	Peaking
Quadrantids	January 1-6	January 3-4 (late afternoon)
Lyrids	April 19-25	April 22
May Aquarids	April 24-May 20	May 4-5
Cetids	May 7-June 9	May 14-25
Delta Aquarids	July 15-August 20	July 29 & August 6
Perseids	July 20-August 20	August 12 (late evening)
Giacobinids	possible late p.m.	October 8
Orionids	October 16-24	October 20-22
Taurids	October 20-November 30	November 3
Leonids	November 15-20	November 17 (poss. strong bursts)
Geminids	December 7-16	December 13-14
Ursids	December 17-25	December 22-23

Send your news to Zoë Crabb at the Editorial Offices

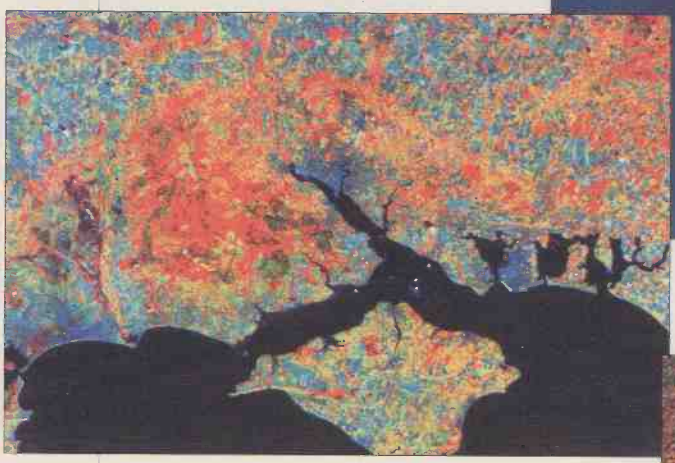
Communiqué

Earth Images From Earth Images

If you are interested in high resolution satellite imagery, you may find that a home reception system is somewhat out of your financial reach. Recently the apparent solution arrived from Richard Arthur at Earth Images of Keynsham near Bristol. They are offering a variety of images in both printed and electronic form.

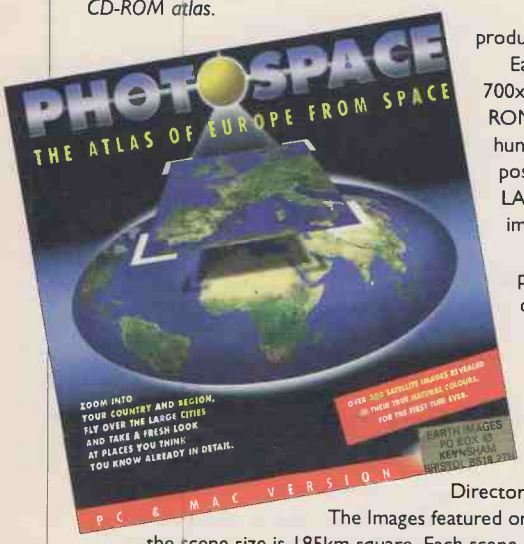
The images are sourced from the LANDSAT 5 satellite which orbits at an altitude of 705km. Use of the Thematic Mapper sensor data allow true colour images to be produced.

Section from a true colour 700 x 500mm poster showing Portland Bill and Chesil Beach.



Two false colour images produced from i.r. imagery shown here are post card size prints.

CD-ROM atlas.



Earth Images are offering 700x500mm posters, a CD-ROM collection of hundreds of images and post card/QSL cards of LANDSAT generated images.

Earth Images themselves provide professional data and image services. They have been publishing satellite remote sensing products, in the main directed towards education, for over a decade. Most of the material has been based on false colour images used for professional land use monitoring, but by the year 2000 Earth Images will be distributing **global** high definition true natural colour images.

Earth Images satellite remote sensing products are examples of 'Art-in Science' helping to remove conceptual barriers between art and science - an central theme of the aims of the Earth Images Project.

Earth Images also offers a range of professional earth science services managed by its Directors who have backgrounds in geology and education.

The Images featured on the posters and CD-ROMs are created by utilising data from LANDSAT's Thematic Mapper, the scene size is 185km square. Each scene comprises 100 million bytes of data. Authentic natural colours are used due to state-of-the-art processing of visible light data. The images are geometrically corrected for distortions caused by curvature of the Earth's etc.

Infra-red data is normally used for technical applications of satellite imagery as it gives better atmospheric penetration and when processed to provides better differentiation of vegetation. You can find out more about the posters, cards and CD-ROMs from **Earth Images Limited, PO Box 43, Keynsham, Bristol BS18 2TH. Tel:/FAX: 0117-986 1144.**

Radio Amateurs' Course

John Beaumont G3NGD is once again running a Radio Amateurs' Course commencing in January 1998, at North Trafford College, on a Monday evening, 1800 to 2030 hours (to sit the December 1998 exam). Find out more from **John G3NGD, North Trafford College, Talbot Road, Stretford, Manchester M32 0XH** or telephone on **0161-886 7077** or contact Admissions on **0161-886 7000**.

WACRAL Conference '97

The 1997 WACRAL Conference took place over a gloriously sunny autumn weekend at the Forest Lodge Conference Centre in the beautiful countryside of South Shropshire. Members enjoyed a weekend of Christian fellowship, amateur radio and leisure activities.

A full programme of lectures and demonstrations included an introduction to data comms by G4WQL, the basics of GPS by G0JFM, using the Internet for telephoning the world by G0PPQ and a special mission lecture on Operation Agri by Stan Crees of BMS.

The Conference construction competition featuring the 'Sudden' 80m receiver kit was well supported and the silver trophy was won, for the second year running, my Mike G3LRQ, who achieved the required 'elegance' factor by mounting his rig inside a fashionable Ascot hat!

At the AGM, new appointments to the Executive Committee were G0TJA and G3WWH. Committee member G0JFM undertook to edit the new callbook, Shirley CSWL 1199G was 'volunteered' to act as QSL Manager and G4YJW will now handle the WACRAL Awards programme.

If you require more information, contact the Membership Secretary at **51 Alma Road, Brixham, Devon TQ5 8QR, Tel: (01803) 854504.**

Mike G3LRQ's 'Ascot Hat' receiver won the WACRAL Construction Trophy.

Fairhaven Now 0-1.75GHz

Fairhaven announce the new 1.750GHz version of their RD500 Radio Database. The new RD500 covers 0 to 1.750GHz and is based around the previous h.f. version, which now includes tighter i.f. filters and sub-octave antenna filters. The extra v.h.f./u.h.f. board fits within the receiver's case which is only 203mm wide and makes it a small but very versatile receiver. It still has up to 55 000 text records which gives the receiver the facility to instantly name almost any channel that forms part of its massive database. It can also make use of the large on-board memory to make a permanent, digital recording of up to four minutes of audio. The receiver can also receive TV sound with a high quality PLL vision demodulator and stereo f.m. and has video and stereo outputs. It also retains the stereo c.w. feature, proving Fairhaven's commitment to producing a general purpose receiver, not just a scanner with extended h.f. coverage. The RD500's unusual ability to process Morse signals into stereo, which won praise from *SWM*'s John Wilson, is quite an experience for any keen c.w. enthusiast. Individual Morse signals are spread into different directions (left to right) when using headphones, according to their frequency. This helps the listener to focus his attention on the station of interest.

Provided with the RD500 package is software which enables users to collect and download information from document scanners or other file formats and download the records into the receiver, this is a breakthrough for any scanning enthusiast who has had to thumb through scanning directories for a particular station, because the receiver can do word searches of up to 20 characters without being connected to a computer. The Windows software allows importing of most file formats which can then be efficiently edited and transferred directly to the receivers memory. Users can also connect directly to Fairhaven's Internet Web site to download databases or link into other databases on the Word Wide Web.

Fairhaven will be upgrading any existing RD500HFs to the new specification in the new year. By way of saying thank you to existing customers they are offering the upgrade for just £99. The new RD500 is available now at £898.

New Schedules From WRN

Just arrived on the news desk is the programme guide from the World Radio Network. These guides are distributed around the world by WRN and includes details of programmes, broadcast services, which include multi-lingual streams to North America and Europe. The new German-language service is also included.

WRN say that their broadcasting concept is simple - they bring together the best programmes from public service broadcasters around the world, and re transmit them globally in top quality sound. The programmes carried are of high editorial standard, and claim to provide listeners with a unique blend of news, views and information.

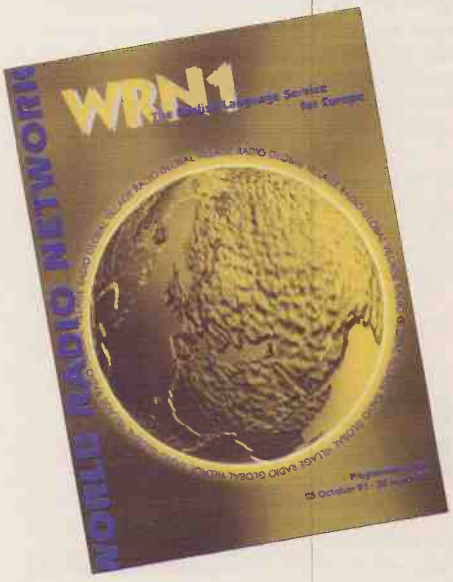
WRN services already utilise DAB technology in readiness for the early 1998 experimental Polish Radio DAB Radio service in which it is due to take part.

DAB Digital Radio will eventually replace conventional f.m. broadcasting, allowing transmission of 'CD' quality programmes.

In Europe the first DAB Digital Radio receivers will on the market from Spring 1998. This will provide listeners in London and Birmingham in the UK the opportunity to hear WRN1 24 hours-a-day. In Norway WRN1 is available on DAB Digital Radio overnight on NRK's Alltid Nyheter.

Currently, WRN1 is available via Satellite, Cable networks and the Internet. The satellite broadcasts are carried by Astra at 19.2°E on the side of VH-1 (11.538GHz), you must select the audio subcarrier at 7.38MHz. The Internet RealAudio feed is at **www.wrn.org**.

For more details of WRN services and a programme guide contact: **World Radio Network, PO Box 1212, London SW8 2ZF**. E-mail: **letters@wrn.org** FAX: **+44 (0) 171 896 9007**, Answer-line: **+44 (0) 171 896 9010**.



Editorial

Well, Dick is on his holidays in the USA and since he's staying just down the road from the Rocky Mountains, I imagine he too is experiencing weather similar to that here in the UK. I guess there is somewhat more snow around over there. Perhaps it resembles the scene featured on our front cover this month. Definitely time to turn up the shack heating, snuggle into the headphones and listen to those lower frequencies.

Propagation does really seem to be improving and if you look a the 'Propagation Extra' charts on page 67 you can see that this is indeed so.

I was recently chatting to a fellow short wave enthusiast talking of antennas, receivers and direction finding equipment to mention a few topics, but we ended up drifting into a discussion about the age of 'the average listener', and the fact that our favourite hobby isn't attracting new followers of a young persuasion. I'm not convinced that this is the case. I do accept that there are many more activities that will obviously attract the younger mind. My own children are a constant reminder of this, but they are both - at the ages of seven and eight years - fascinated with my radio gear. It's really up to me to nurture their natural curiosity and give their enthusiasm and curiosity some encouragement.

I have been set wondering though what the age range of our readership is. Do you think that you may be the youngest or indeed the oldest *SWM* reader? If so, write to me and let me now about your interests and station.

As you read this piece it will be but a few days to go before Christmas. So may I wish you all, from all of us here at *Short Wave Magazine*, seasons greetings and a prosperous, DX filled new year.

73
Kevin Nice
Assistant Editor

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 Sir
Just a note in response to your comments in the last issue of *SWM* regarding the way Rallies now seem to have a preponderance of computer goods. This does seem to be the case at the ones I have attended latterly and quite frankly I now very often do not bother to go to them as a result. I was sorry that the Stafford Radio Rally disappeared after two years. Now there seems to be only a rally catering purely for the computer enthusiast!

This is not to say that I am 'anti-computer'. I used them extensively before I retired, but am now quite happy to use straightforward short wave receivers. I enjoy minor building projects, but do find the eyes and not-so-steady hands make things difficult. Miniaturisation has made it a far cry from the days when I built my first one-valve set and later t.r.f. sets in the late forties. Then, nice, chunky valve bases could be soldered with a 40W soldering iron! Indeed, some of your recent articles brought back a few memories.

In fact, I had planned to build a s.w. set when I retired, but a quick peek at the innards of a modern set frightened me off!

I started off with a Lowe HF-225, but now have a Kenwood R-5000, which I use with a digital signal processor. I have a long wire antenna (I still want to call it an aerial!) with balun and a dipole cut for the 20 metre band. I use this set-up to monitor the amateur bands and also some data transmissions. For the latter I use the Momentum MCL 1100 Easyreader, which works well, but has its limitations.

I see that much of Mike Richards' column is often devoted to computer programmes and it is obvious that this gives more scope. This must be particularly the case now so many RTTY transmissions from places like Beijing and Belgrade seem to have disappeared.

Another of my interests is airband, and this is catered for with a Yupiteru MVT-7100.

Many thanks for an interesting magazine. As a former newspaper Editor, I do not envy you your very early deadlines!
Brian Dawson
Eccleshall
Stafford

Dear Sir
November's crystal set project was excellent. I had to use bell wire for the coils, which meant modifying the design a bit. I can get Radio 4, several medium wave stations and the World Service, all loud and clear, plus numerous fainter medium wave and short wave stations.

The Crystal Set Society are looking for members and are offering a $50 prize for the best project to include in their next book. Details from **PO Box 3026, St Louis MO 61130 USA, FAX: (314) 725-7062, E-mail: xtalset@midnightscience.com** or **Website: www.midnightscience.com**

You can subscribe to a newsletter with information about crystal sets and one-valvers - a fascinating hobby.
Richard Felton
Somerset

Dear Sir
I have recently become interested in the hobby of scanning and s.w.l.ing since I bought my first copy of *SWM* in March - which, I must say was very interesting and I haven't missed a copy since, keep up the good work!

I've been an active CBer for about five years now and I bought my first scanner in August, which is a Realistic PRO-26 (25-1300MHz). Quite often I will sit, searching up and down the frequency range to see what's out there, as well as up-to-date with airband listening.

I am now saving my 'pennies' for a Realistic DX-394 s.w. receiver and I was wondering what John Wilson's conclusions were on this receiver. I would also like to know if there is any software on satellite monitoring that I can run on my Amiga 500+, because I would like to involve my computer in this very great hobby of mine.
Mike Chamberlain
Redcar
Cleveland

Mike, pleased you like SWM *and welcome to the hobby. Unfortunately John hasn't reviewed the DX-394. As for Amiga 500+ software, Jerry Glenwright, our 'ShackWare' columnist may be able to point you in a helpful direction here. - **KN***

Dear Sir
Having read the November *SWM* with great ease and enjoyment it would be churlish of me not to follow up my somewhat acerbic, but partly tongue-in-cheek letter of the 27th September, with this one to say that the virtual elimination of distracting backgrounds and the use in many places of heavier typeface made it a real pleasure to read the magazine.

The general content, as always, is good and varied. You have a real gem in John Wilson. But the most intriguing titbit was contained in an advertisement - that on page 43 by SMC - which tells us that live New York Police Department radio traffic is available on the Internet!
Alan Jarvis
Cardiff

Dear Sir
Thank you for your interesting and thought provoking observations contained in your Editorial of the November issue. Personally speaking, I find an unselfish attitude to noise lacking on the part of some dealers, who must play very loud pop music at Rallies.

When helping at the International Short Wave League's stand at Pickett's Lock, I found it extremely difficult to have an in-depth conversation about the radio hobby with visitors to our stands, because of such a dealer opposite.
Sheila Hughes
Morden
Surrey

*Brown Owl agrees wholeheartedly with you on this one! Loud 'music' from some of he computer sellers at Ham Radio at Friedrichshafen can be a nightmare, although the Organiser can usually be persuaded to descend on the offenders with all her Germanic powers! **Ed.***

Dear Sir
Oh! Dear; Mr Tony Ward should perhaps go back to college and find out the difference between an operating system (DOS) and Interpreters like BASIC. To ask why anyone

writes DOS programs shows a lack of knowledge of the principles of computing.

Tony, have a close look at Windows 95 and you will find that DOS 7 is there making it all work on your computer; without DOS one would not have anything. I think you will find that the best (and fastest) programs are written in assembler language and the less good (and slower) are written using interpreters like BASIC.

With regard to the speed of any given machine perhaps programmers should note that the majority of people having spent a large sum of money do NOT expect to have to spend yet more for just the latest whiz bang of a program. Programmers should write for the AVERAGE machine, not the very latest. Anyone can get away with poor programming using a CRAY but try it on a 286 and see if it works.

My experience of most of the current programs is of poor quality programming usually through badly thought out routines and lack of sufficient testing; and I speak as a programmer since 1967. Come on chaps, let's have some simple programs that actually do what they promise and not some monster that can only run with 128 megabytes of memory and a Pentium MMX as a minimum system requirement.

C.F. Goodall,
Gloucestershire

Dear Sir

I have read *SWM* for at least four years, very helpful magazine, what I know about s.w.l. I learnt from it. I happen to appreciate most of the equipment reviews and the LM&S listing, utilities and decoding are too much for me.

Up to now, I have not bothered your office with queries, but in your Editorial for November '97 there is an invitation, sort of, to write in with problems relating to topics covered by *SWM*. I can only hope that your busy team has time to answer two.

I am keen on m.w. DX listening and would like to try a loop aerial. The only design I have is for a 1.02m square frame (7 turns main winding tuned). This might well create interference from the landlady. I was therefore thinking of a smaller frame, 50 or 60cm side square frame. In the *SWM* for October '93 there are details for making a differential amp for a loop antenna, this suggests 50cm side. So, can you say approximate number of turns for this size?

I am trying to decide which receiver to buy. Poor health makes it difficult for me to travel round the dealers, so I was of course very interested in the review of the Yaesu FRG-100 in the current *SWM* (John Wilson).

My memory is quite shaky now, but I seem to recall that the original review of the FRG-100 was quite good, except that the bandwidths of the i.f. filters were too wide for present conditions.

John Wilson did not mention the 'goodness' or shape factor of the FRG-100 filters in his second review. Could he provide some details about the filters? That is question no. 2. I ask because with my limited knowledge, it is this figure that decides how well the signals are separated, especially when 5kHz apart. He did comment on this point in his review of the Drake SW2 in the July '97 issue of *SWM*.

Nor did he say anything re: a keypad for frequency entry for the FRG-100 in this latest review. But no matter, I can find out by contacting a Yaesu dealer. After all that, as someone with limited technical gen., I find his reviews extremely helpful and ones that I can understand.

Wilf Saunders
Bodenham
Hereford

*You are quite right in thinking that the original filters in the Yaesu FRG-100 were considered too wide for general listening and they were replaced by Yaesu after about six months. You recall that Gordon Bennett reminded me of this fact following my original article. However, the performance of filters fitted in a real receiver is more likely to be dominated by the reciprocal mixing characteristics of the receiver than by the actual filter shape factor, and this is why I always include reciprocal mixing figures in my reviews. If you have an opportunity to read one of the excellent reviews done by Peter Hart in RadCom magazine, you will see the effect of reciprocal mixing from his graphs of 'true' selectivity. Perhaps it would be a good idea for me to submit a short technical note on reciprocal mixing to Short Wave Magazine so that I can try and explain its importance to the operators of receivers. All I can say is that the FRG-100 which I reviewed performed extremely well in all respects and I can heartily recommend it to anyone. - **JW**.*

Dear Sir

I would be most grateful if you could resolve a small problem I have with John Wilson's review of the FRG-100 receiver. He gives the reciprocal mixing ratio as -82dB and as being 'respectable', whereas other receivers are around the 80dB level. This appears to be a huge difference, so how would this affect the performance?

My present receiver is an early HF-225. The FRG-100 appears to be an acceptable replacement. I imagine it is due to be replaced - hence the heavy discounting. A JRC NRD-535 would be nice, but the piggybank no longer rattles!

I have been a regular reader of *SWM* since 1972 and a subscriber for many years. Being now nearly 84 and isolated here 'radio-wise' *SWM* is invaluable and awaited with impatience each month!

G. Garraway
Keynsham
Bristol

*Someone is guilty of loose terminology with the reciprocal mixing figures published in reviews - and it may well be me! The reciprocal mixing ratio should be expressed as a positive number, and the figure for the FRG-100 should be 82dB. This compares well with other receivers as quoted my Mr Garraway at 80dB. In contrast, the reciprocal mixing performance normalised to be the theoretical noise present in a 1Hz bandwidth will be a negative number since it represents the level of noise relative to the signal in the passband of the receiver filter, and in the case of the FRG-100 at 10kHz spacing between wanted and unwanted signal, the reciprocal mixing ratio should be 82dB and the phase noise is -116dBc/Hz. As for the heavy discounting on the FRG-100, my advice would be to take advantage of it whilst it lasts, because the FRG-100 is by now a well developed, trouble free and very desirable receiver which will outlast many of its competitors. I really must write an article on reciprocal mixing! See my reply to Mr Saunders. - **JW**.*

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.

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

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

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

Technical Help

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

Europe Bandscan

Peter Shore, c/o SWM Editorial Offices, Broadstone, Dorset BH18 8PW.
E-mail: peter.shore@pwpub.demon.co.uk

If you listen to Radio Sweden regularly you may have noticed some strange things happening in broadcasts recently: unexpected silences, two different programmes being played out simultaneously or music instead of the usual programme.

The cause of these difficulties is the digital sound system which Radio Sweden installed last year. The RadioMan system, developed in neighbouring Finland and now being used extensively by the Finnish Broadcasting Corporation, has been plagued with a series of unexpected and difficult-to-solve problems. In some cases, the equipment has decided what it wants to broadcast entirely on its own, overriding the commands entered by Radio Sweden's staff.

Engineers have been trying to track down the cause of the faults which in one case were so severe that Radio Sweden took the unprecedented step of switching off the entire broadcasting system from studios through to the short wave transmitters themselves in an effort to cure the bugs. A key problem for those trying to find where the fault lies is that the way the machine behaves is neither consistent nor constant. The faults appear sporadically, which makes them extremely difficult to trace.

By the time you read this column, Radio Sweden hopes to have corrected the system and programmes will be back to normal. Two things about this episode occur to me: firstly, as a broadcaster it is extremely comforting seeing a piece of quarter-inch tape whizzing around on a tape machine rather than trusting a computer to invisibly record, edit and play-out your programme.

Secondly, if the fault had occurred in Swedish Radio's domestic news service rather than the international service, the Swedish press would have made the story front page news. It's a shame that the press doesn't take as much notice of international radio as it does of national services.

Distribution Strategy

In my last round-up of European broadcasting news, I mentioned that Swiss Radio International (SRI) is reviewing its distribution strategy. I've now discovered that the strategy review is in the hands of the Swiss government which has commissioned an independent think-tank to look at the way SRI reaches the world, and whether it has any effect in the crowded media environment in which it competes for an audience.

The review is expected to be handed to the Swiss authorities in early Spring 1998, with a decision on how SRI will reach its world-wide audience, and indeed increase it. Look out for some radical news (radical in Swiss terms, that is) by the summer.

Radio France Internationale has been suffering the same difficulties as many French industries in the last couple of months. Strikes have crippled the output, including that from the Paris-based station's English-language service. In mid-November, another one-day strike shut down RFI, with music played instead of the regular news and feature programmes.

Non-Stop News

In Norway, NRK has started to relay some of the world's leading international stations overnight on its new Alltid Nyheter (Non-Stop News) station which launched in the Spring of 1997. Alltid Nyheter has its own news service - modelled on BBC Radio 5 Live - between 0600 and 2100.

At night the station has switched to a live relay of BBC World Service with NRK's management under the impression that the World Service was a similar all-news service, but discovered that only about 60% of the output from Bush House in London is news.

To make sure that listeners in Norway did actually hear news overnight and were not sued under Norwegian trades description legislation, Alltid Nyheter turned to World Radio Network. The Oslo station now broadcasts a mixture of news programmes from the BBC and WRN1 overnight.

Listeners outside Norway who have access to the Internet with a 28.8k modem can hear Alltid Nyheter via the NRK web site at **www.nrk.no/alltidnyheter/**

Programme Guides

I saw the new BBC World Service free programme guides recently and was astounded; the information about how to listen to the BBC around the world on short wave is worse than useless. Instead of the handy bar charts showing when each short wave and medium wave frequency starts and ends transmission - a simple concept which has been used on World Service programme guides for donkey's years - there is now just a vague listing of frequencies with the uncertain times of 'mornings', 'daytime' and 'evenings'.

I do not know whether this is a result of the privatisation of World Service transmission department, or simply a complete lack of understanding of how short wave works by whichever department is responsible for the guides. If you want accurate World Service frequency information, you now have to refer to the monthly magazine, *BBC On Air*, which thankfully retains the detailed frequency charts.

The BBC's Finnish Service is to close at the end of March. Finnish-language broadcasts have been on the air since the Second World War, but for the last few years there have been no direct short wave transmissions. Instead, the Finnish Service has been carried on satellite exclusively for local rebroadcasting stations in Finland who, I

Rallies

1998

January 18: The Oldham ARC Mobile Rally is to be held at the Queen Elizabeth Hall, Civic Centre, West Street, Oldham, Lancashire. Doors open at 1100 (1030 for disabled visitors). The event features all the usual traders plus a Bring & Buy stall. Morse tests are available on demand and there is a talk-in on S22 via GB4ORC, commencing at 0730. Mobile Contact prize up to 1400. There will be refreshments and free parking available. **(01706) 846143** or **0161-652 4164**.

January 25: The Lancastrian Rally is to take place at the Lancaster University. Please note that this Rally is now under new management and will be run under the auspices of the Central Lancashire Amateur Radio Club. There will be the usual traders, Bring & Buy and ample parking space is available on the campus. Admission is £1.50 and should you require further information, contact **Jim G0GVA** on **(01772) 621954**.

February 1: The 13th South Essex Amateur Radio Society Radio Rally will take place at the Paddocks, Long Road, Canvey Island, Essex. This is one of the biggest and best rallies in Essex, (the Paddocks is situated at the end of the A130). Doors open at 1030. Features include amateur radio, computer and electronic component exhibitors, a Bring & Buy, RSGB Morse testing on demand (two passport photos required), home-made refreshments, free car parking with space outside main doors for any disabled visitors. Admission is £1. **David G4UVJ** on **(01268) 697978**.

February 1: The Harwell Amateur Radio Society will be holding its second indoor Radio & Computing Rally at the Harwell International Business Centre, 1 mile west of the A34, between Oxford and Newbury. Talk-in on S22. Doors open at 1030 (1015 for any disabled visitors). There will be trade stands, special interest groups, Bring & Buy, craft exhibitors, bar and refreshments and ample car parking with spaces for disabled visitors. Admission is £1, children free. **Arthur G0KOC** on **(01235) 815399**.

February 8: The Kidderminster Radio & Electronics Fair is taking place at the Kidderminster College, Hoo Road, Kidderminster, Worcs. Doors open 1000 to 1500 and admission is £1.50. There will be all the usual traders, plus a Bring & Buy, Flea Market. Food and Drinks and a talk-in on 145.550MHz. **John G8MGK** on **(01527) 545823** or mobile on **(0860) 147954** or **Tony G4ALT** on **(01562) 69652** or mobile on **(0860) 902165**.

February 15: Northern Cross Rally to be held at Thornes Park Athletics Stadium, Wakefield, South Yorkshire, just out of town on the Horbury Road. Easy access from M1 junctions 39 & 40. The event is well signposted and talk-in will be on 144 and 430MHz. Doors open at 1100 (1030 for disabled visitors and Bring & Buy). Details from **Peter G0BQB** on **(01924) 379680** or mobile on **(0976) 834938**, Internet on **rally@waveg.demon.co.uk** Web page at **http://www.waveg.demon.co.uk/rally/**

February 28: The 13th Rainham Radio Rally is to be held at the Rainham School For Girls, Derwent Way, Rainham, Kent ME8 0BX. It is very easy to find from junction 4 M2 motorway A278 to Gillingham or from the A2 at Rainham. Just follow the RRR Arrows. Talk-in on S22 GB4RRR. Doors open at 1000 (0930 for disabled visitors and items for the Bring & Buy). Admission is £2. There will be the usual excellent mix of trade stands, many special interest groups will also be represented: BARTG, Kent Repeater Group, Kent RAYNET, RNARS, KEPAC, TCP/IP, Kent ATV Group, G-QRP Club. BYLARA and local club stands. There is a large hardstanding carpark, a licensed bar, hot food and drinks and refreshments will be available plus somewhere to sit and eat. **Martin M0AAK** on Medway **(01634) 365980** at any reasonable time.

***March 7/8:** The London Amateur Radio & Computer Show will be held at Lee Valley Leisure Centre, Picketts Lock Lane, Edmonton, London, N9. Doors open 10am to 5pm each day. There will be trade stands with over 100 exhibitors, a Bring & Buy, RSGB committee and book stands, on-demand Morse tests, talk-in on 2m and 70cm, Special Interest Groups, disabled facilities, bars, catering, ample free parking and lectures. Adults £3, pensioners/under 14s, £2. **(01923) 893929**.

March 8: The Wythall Radio Club are holding their 13th Annual Radio Club Rally at Wythall Park, Silver Street, Wythall, near Birmingham on the A435, just two miles from junction 3

ADVERTISERS INDEX

PUBLISHED on the fourth Thursday of each month by PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Printed in England by Southernprint (Web Offset), Factory Road, Upton Industrial Estate, Poole, Dorset BH16 5SN. Tel: (01202) 622226. Distributed by Seymour, Windsor House, 1270 London Road, Norbury, London SW16 4DH. Tel: 0181-679 1899, Fax: 0181-679 8907, Telex: 881245. Sole Agents for Australia and New Zealand – Gordon and Gotch (Asia) Ltd.; South Africa – Central News Agency Ltd. Subscriptions INLAND £30, EUROPE £35, REST OF WORLD (Airsaver) £38, REST OF WORLD (Airmail) £45 payable to SHORT WAVE MAGAZINE, Subscription Department, PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. SHORT WAVE MAGAZINE is sold subject to the following conditions, namely that it shall not without the written consent of the publishers first having been given, be lent, re-sold, hired out or otherwise disposed of by way of trade at more than the recommended selling price shown on the cover and that it shall not be lent, re-sold, hired out or otherwise disposed of in a mutilated condition or in any unauthorised cover by way of Trade, or affixed to or as part of any publication or advertising, literary or pictorial matter whatsoever.

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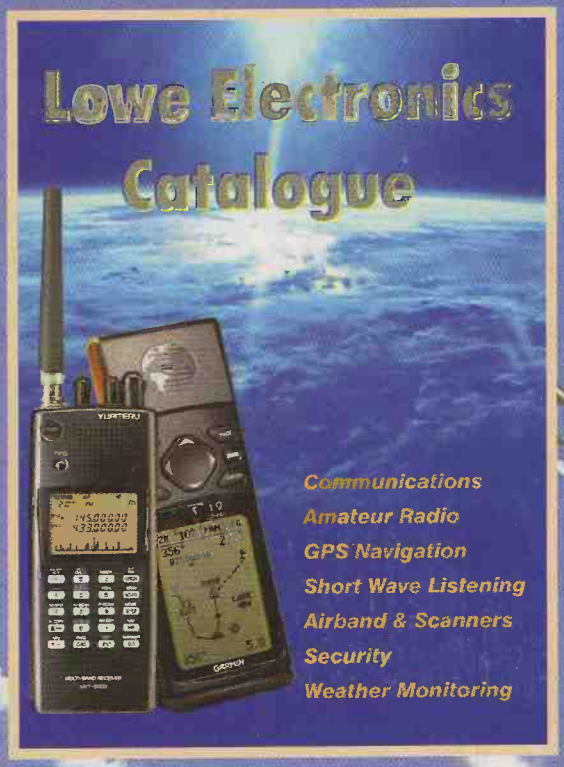

Over the last 20 years we have built a solid reputation with our customers for providing exciting and innovative products, backed up by the finest service and support expertise available anywhere in the UK. We have specialised in the sale of everything for the airband radio enthusiast, ranging from simple VHF only receivers to mutiband scanners covering all civil, military and HF communications channels.We manufacture some of the best short wave receivers in the world, and also supply radio decoding software, ham radio equipment, weather monitoring station equipment and much, much more.We have just produced our first ever 80 page full colour mail order catalogue, and you now have the chance to receive this ABSOLUTELY FREE.With no obligation to purchase at all, we are confident that you will find one of the most comprehensive product offerings in this area of technology available anywhere in the world.We are also confident that you will find something there to interest you. Just send four first class stamps to cover the postage to Lowe Electronics, and we will send our bumper colour catalogue by return. We will also throw in a free copy of our famous Airband Guide.

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understand, have been charged for the programmes.

So, few stations are now taking the material that the service cannot pay for itself, and since Finland is no longer considered a 'front-line state' between Europe and what was the Soviet Union, the programmes have been downgraded in priority.

The long wave transmitter on 261kHz in eastern Germany, formerly operated by the Soviet military, has been owned by a private German radio station for the last few years. Look out in the coming weeks for a change of output, including relays of the German-language services of a number of European international radio stations, and maybe even some English programmes, too.

New Station

A new short wave transmitting station is to be built in Italy by religious broadcaster Adventist World Radio (AWR). AWR wants to improve short wave coverage of North Africa, the Middle East and parts of Asia, and has been granted permission by the Italian authorities to construct a brand new station in the Emilia Romagna region. Construction will start in the Spring of 1998 and it should be on the air by early 1999.

Improved Reception

If you trawl around the bands you may have noticed that reception of the English service of the Sri Lanka Broadcasting Corporation has improved. That is because a daily half-hour broadcast at 1900 is now available from the high-powered Merlin Communications short wave site at Skelton in Cumbria (formerly the BBC World Service transmitting station). The broadcast has been carried on 5.975MHz daily.

And Finally

That is all for this time around. I'll be back in three months with another round-up of news from the busy European broadcasting scene. Until then, good listening!

of the M42. Doors open from 10am to 4pm and admission is just £1. There will be the usual traders in three halls and a large marquee, bar and refreshment facilities on site plus a Bring & Buy stand. Talk-in on S22. Contact **Chris G0EYO** on **0121-246 7267** evenings and weekends, FAX on **0121-247 7268** or E-mail at **g0eyo@compuserve.com**

March 14: The 5th West Wales Amateur Radio & Computer Rally will be held at Penparcau School, Aberystwyth. Doors open 1030 to 1600 (disabled visitors from 1000). Admission is £3 only. There is good parking facilities with easy access for disabled and traders to all stalls, demonstration area and catering facilities. Features include Amateur Radio, Bring & Buy, computers, software and hardware, electronics, h.f. and v.h.f. on air, packet station, repeater group, RAFARS, RSARS, WAB, RAYNET and other special interest groups, trade stalls and lots more. Talk-in on S22. Come and enjoy yourselves. For details and trade stand bookings contact **Katy GW0SFO** on **(01545) 580675**.

If you're travelling a long distance to a rally, it could be worth 'phoning the contact number to check all is well, before setting off.

The Editorial Staff of *SWM* cannot be held responsible for information on Rallies, as this is supplied by the organisers and is published in good faith as a service to readers.

If you have any queries about a particular event, please contact the organisers direct.

Editor

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. December 24 - Say 'Hello' and Christmas wishes, 31st - New Year's Eve Greetings, January 7 - CW Activity Evening, 14th - Demonstration of 70cm Repeater, 21st - History of SBARC (The Archives). For more information ring (01275) 834282 on a Wednesday evening.

CHESHIRE

Mid-Cheshire ARS: Meetings held every Wednesday, 2000, at Cotebrook Village Hall, North of Tarporley, Cheshire. December 25 - Mid-CARS Christmas Day Net on S8 145.200 (f.m.), 1100 start, January 5 - Committee meeting (Alvanley Arms 2030 hours), 7th - HF On Air G3ZTT Plus Construction Night. Ted Bannister G0RBA on (01606) 592207.

DEVON

Appledore & DARC: 3rd Mondays, 1930. Appledore Football Clubroom. January 19 - An Illustrated talk by Sq. Ldr. H. M. Williams (present Manager of the Red Arrows) on The Red Arrows. Den Williams G0UMT on (01237) 471802 for more information.

Exmouth ARC: Alternate Wednesdays at the Scout Hut, Marlpool Hill, Exmouth. January 14 - Morse evening, 1930pm. D. Fox G0NRR on (01395) 271880.

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. January 14 - Packet Radio by F. Roe GM0ALS. Tommy Main GM4DCL, QTHR on 0131-663 8501 day and evening.

GREATER LONDON

Wimbledon & DARS: 2nd & last Fridays, 1930. St Andrews Church Hall, Herbert Road SW19. January 9 - Electronic Measurements by G8DPS. J. Gale G4WYJ on (01737) 356745.

HAMPSHIRE

Horndean & DARC: 1st & 4th Tuesdays, 1930. Lovedean Village Hall, Lovedean Lane, Lovedean, Hants. January 6 - Club social evening. 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

Bromsgrove ARS: 2nd & 4th Tuesdays. Lickey End Social Club, Alcester Road, Burcot, Bromsgrove. January 13 - Construction Evening (bring your own project). Barry Taylor. (01527) 542266.

HERTFORDSHIRE

Hoddesdon RC: Alternate Thursdays, 2000. Conservative Club, Rye Road, Hoddesdon. January 8 - Open Forum, 22nd - A visit from Waters & Stanton giving a talk and bringing their latest products - don't miss it. Visitors most welcome. Don G3JNJ on 0181-292 3678.

Verulam ARC: 2nd & 4th Tuesdays, 2000, RAFA Club, New Kent Road, St Albans. New members and visitors welcome. January 13 - Computers for beginners. Ian Forsyth G0PAU on (01923) 222284.

KENT

Bromley & DARS: 3rd Tuesdays, 1930. The Victory Social Club, Kechill Gardens, Hayes. January 20 - AGM. A. Messenger G0TLK. 0181-777 0420

LINCOLNSHIRE

Grimsby ARS: Thursday nights, fortnightly, at the Cromwell Social Club, Cromwell Road. Informal meetings are held on the Thursdays in-between. Non members are welcome at any meetings, but may not attend more than three meetings in any year. January 8 - Receiving Weather Sats on your Soundcard by Dave G0IIQ with a demonstration, 22nd - Packet Update - Open Forum for packet enthusiasts, all welcome! G. J. Smith G4EBK, Hon. Sec. 6 Fenby Close, Great Grimsby, N. E. Lincs DN37 9QJ.

NORFOLK

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. January 8 - Video, 22nd - AGM. More details from John G0VXH on (01845) 537547.

WARWICKSHIRE

Stratford-upon-Avon & DRS: 2nd & 4th Mondays, 1930pm. Home Guard Club, Main Street, Tiddington, Stratford-upon-Avon. January 12 - Social evening. The Society are again organising a course of instruction for the Radio Amateur Examination of the City & Guilds of London Institute and further details can be obtained by writing to the Chairman of the Society, Mr J. Harris G8HJS, enclosing a stamped addressed envelope. The address to write to is: 57 Evesham Road, Stratford-upon-Avon, Warks CV31 2PB.

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.

What About Standi

Joseph J. Carr K4IVP, helps to demystify s.w.r. - and explains how to measure

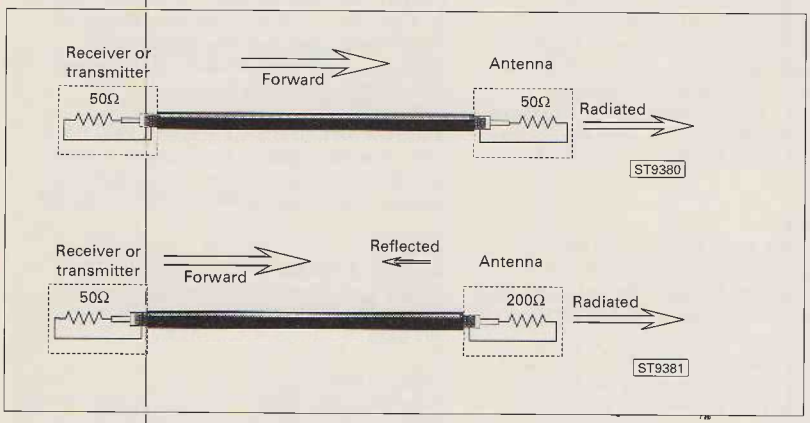

Fig. 1: a) s.w.r. situation when load and line are matched; b) situation when mismatched.

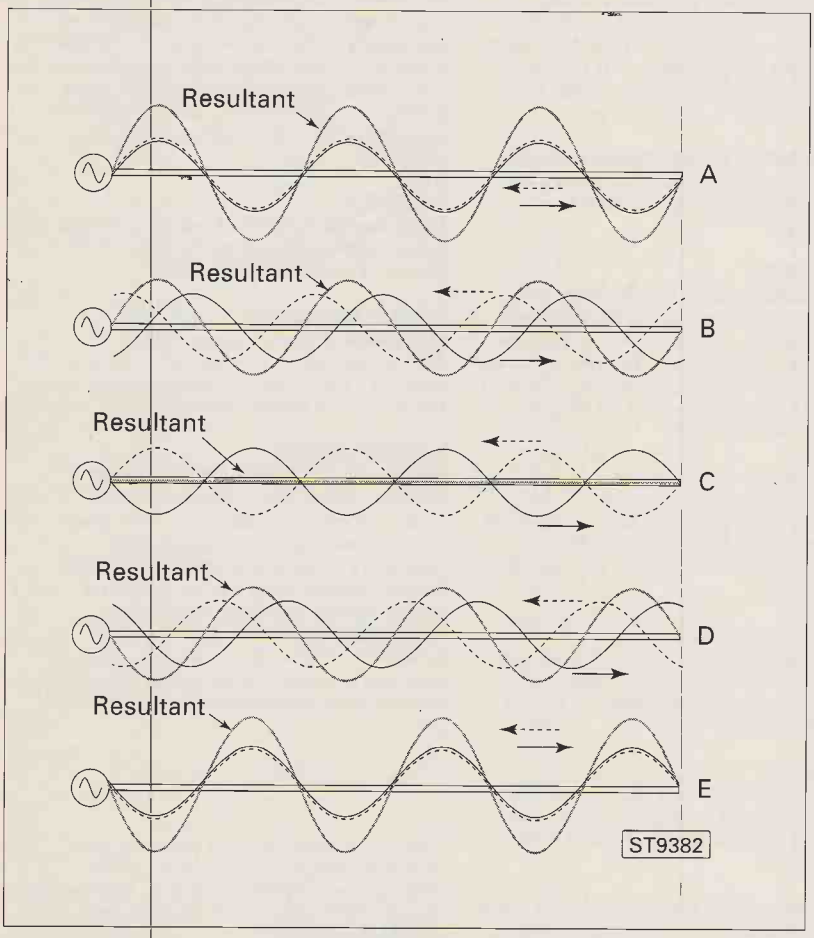

Fig. 2: Standing waves under a variety of situations.

Standing wave ratio (s.w.r.) is a topic that is of constant intense interest to radio enthusiasts. Amateur operators, short wave listeners and scanner receiver owners all use antennas, and most of those antennas work best when s.w.r. is 1:1, indicating that the antenna impedance is matched to the feedline impedance.

There is a lot of heat and smoke about s.w.r. in radio circles. It is one of the things that qualifies as an 'urban myth' in our hobby. Some of the heat and smoke on this matter is well justified. In other cases, the perceived problems are not real, and in still others the problems are little more than hogwash. In order to dispel some of the myths, let's take a look first a s.w.r. theory and then at how you can measure v.s.w.r.. The theory and one of the measurement methods apply to both receiver and transmitter operators. Antennas obey a kind of 'law of reciprocity', so work exactly the same on receive as on transmit. The only difference is that on receive the receiver input impedance is the load, and the impinging electromagnetic radio signal is the signal generator.

Figure 1 shows how the s.w.r. comes into play in an antenna system. In **Fig. 1a**, a single cycle of a signal is launched down a transmission line (it is called the 'incident' or 'forward' wave). Because the load (in this case an antenna) is matched to the transmission line, and the transmission line is matched to the transmitter or receiver, all of the incident wave is radiated into space. None is reflected back down the transmission line towards the source.

Next, consider what happens when the wave reaches the end of the line, and the load is not matched to the transmission line. In **Fig. 1b** the 50Ω line is connected to a 200Ω load. If the wave is not totally absorbed by a load resistor or antenna, then it (or part of it) will be reflected back towards the source. This reflected wave is shown in **Fig. 1b**, along with the radiated wave. The incident and reflected waves are both examples of travelling waves. The reflected wave represents power that is lost, and can cause other problems as well.

The situation in **Fig. 1a** and **Fig. 1b** represent a single-cycle pulse launched down a transmission line. In a real radio system, the oscillations of the incident wave are constant. When this situation occurs, the reflected waves will interfere with following incident waves. At any given point, the amplitude of the wave is the algebraic sum of the interfering incident and

ng Wave Ratio?

it without a transmitter.

reflected signals. The resultant caused by the interference of the incident and reflected waves is called a standing wave.

Figure 2 shows what happens when continuous incident and reflected waves coexist on the same transmission line. In the case of **Fig. 2a**, the two waves coincide, with the resultant as shown. The waves begin to move apart in opposite directions in **Fig. 2b**, which causes the overall amplitude of the standing wave to decrease, but the location of the maximum and minimum points remain stable. The condition of 180° out of phase between the two travelling waves results in a zero amplitude standing wave, as shown in **Fig. 2c**. No current flows in this case. As the waves continue to move apart, the standing wave reappears, as shown in **Fig. 2d**. The final case, **Fig. 2e**, is the case with the travelling waves in-phase with each other (0° difference). Notice that the standing wave in **Fig. 2e** is the same amplitude as that of **Fig. 2b**, but is 180° out of phase with it.

If you measure the voltage or current at all points along the transmission line from the load back to the source, then you will find a situation like one of those in **Fig. 3**. If the load, line and source are all matched, then you will find the line is 'flat' as in **Fig. 3a**. This situation obtains when the all of the incident signal is radiated (as in **Fig. 1a**). But if the load and line are not matched, then some variant on **Fig. 3b** will be found. The current and voltage rise to maxima and then fall to minima every half wavelength along the line. The current and voltage waveforms are identical, but are displaced from each other by 90° along the line.

The s.w.r. can be calculated in any of several ways. In **Fig. 3b** we see that it's possible to measure the voltage or current maxima and minima to find the s.w.r.. When the current is measured, then the s.w.r. is referred to as the Is.w.r., and when voltage is measured it is v.s.w.r. (voltage standing wave ratio). The v.s.w.r. is far more common a measure than Is.w.r., and the term 'v.s.w.r.' is used interchangeably with 's.w.r.'. The value of the v.s.w.r. is the ratio of the maximum voltage over the minimum voltage, or V_{max}/V_{min}.

We can also calculate the v.s.w.r. from knowledge of the two impedances involved. If Z_L is the load impedance and Z_O is the transmission line characteristic impedance, then v.s.w.r. is

1. If $Z_L > Z_O$ | 2. If $Z_L < Z_O$

v.s.w.r. $= Z_L / Z_O$ | v.s.w.r. $= Z_O / Z_L$

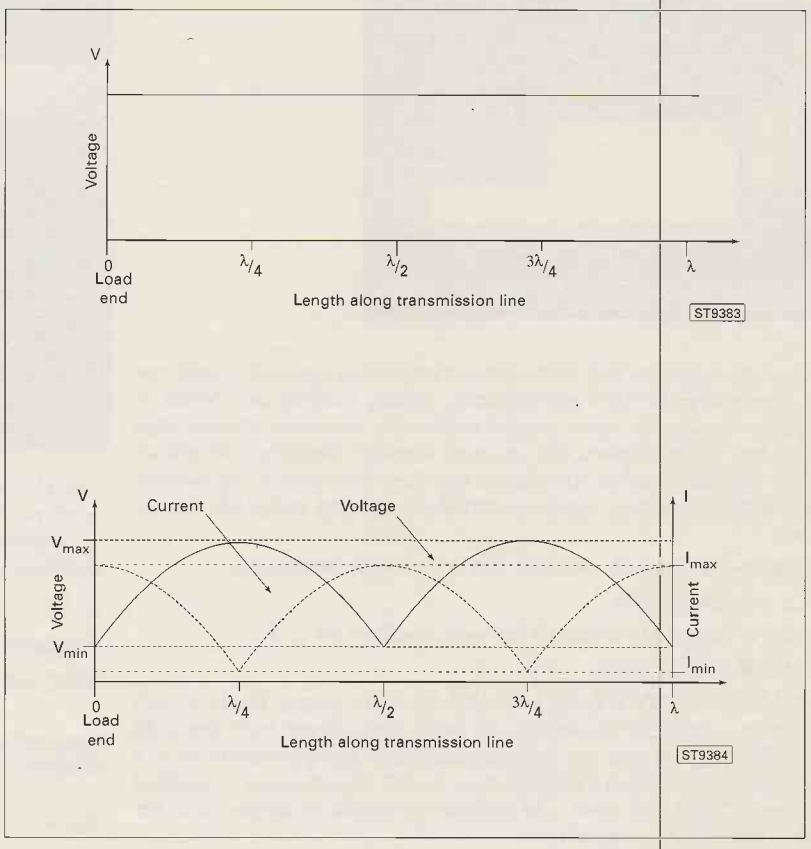

Fig. 3: a) 'Flat line' when v.s.w.r. is 1:1; b) line voltages and currents when v.s.w.r. >1:1.

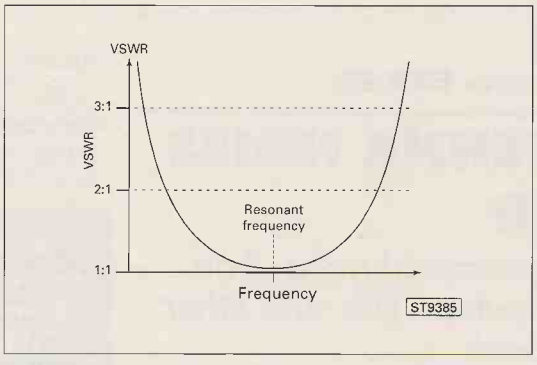

Fig. 4: v.s.w.r. v frequency plot for typical antenna.

For example, in **Fig. 1b**, Z_L is 200Ω and Z_O is 50Ω, so the v.s.w.r. is $Z_L/Z_O = 200/50 = 4{:}1$.

An implication of the repetitive nature of the voltage and current waveform in **Fig. 3b** is that the load impedance is repeated every half wavelength along the line. In other words, if the impedance is 100Ω at the load, measuring the impedance at half wavelength intervals will show the same value: 100Ω. Another implication of this fact is that transmission lines can be used for impedance transformation. This is the basis for the series line section and quarter wave section transmission line transformers.

If you measure the v.s.w.r. at various frequencies

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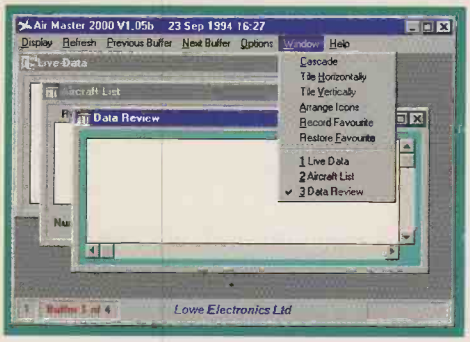

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New Year - New Look at Lowe

As we get into another New Year and one closer to the Millennium, we would like to take this opportunity of wishing all our customers a very Happy New Year. There have been many changes here at Lowes in the last year, and we thought it was about time to update everybody with "who does what where".

In line with many other businesses, we have found it uneconomic to maintain a countrywide branch structure to service our specialist market. We have therefore rationalised our branches back to two at Newcastle and Bristol plus of course the head office at Matlock, where it has been since "Bandit Bill" Lowe started the firm over 30 years ago. Our Bristol branch (right on the main A38 by Filton Airfield) is very ably run by Tony G4CYE who will give a warm welcome to any callers, and our North Eastern outpost is the domain of Richard G0SWB who is about 2 miles from Newcastle Airport as the RF flies. Both sites are retail showrooms with full demonstration facilities.

The new manager at our Matlock showroom is John G0HMZ who loves to discuss any and all aspects of ham radio or listening. Mail , Telephone and, increasingly, Internet order is the fastest growing part of our business, and this area is in the able care of David G7NBJ. Our workshop is looked after by Tony G4ZRE, assisted by Jim G7PGC. The sales office is run by Paul G0UKL/VK6GBL, and we have several other licensed amateurs on our staff.

All of us wish you a very Happy and prosperous New Year and look forward to talking to you soon.

Richard G3OQT

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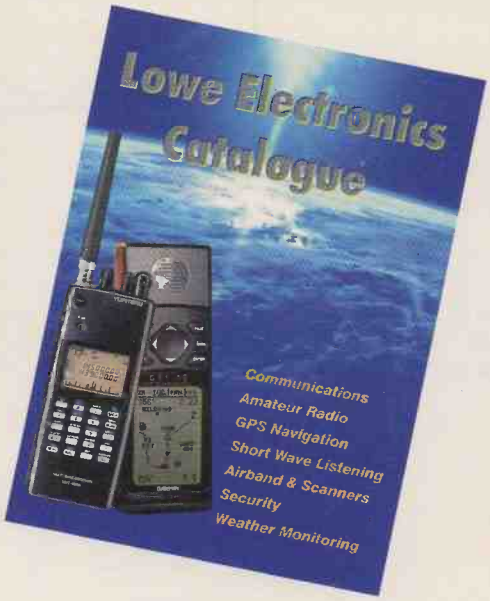

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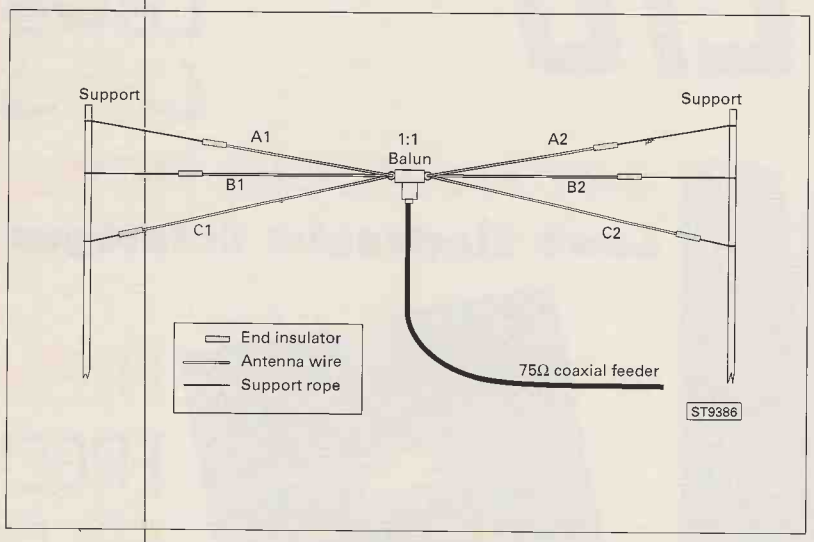
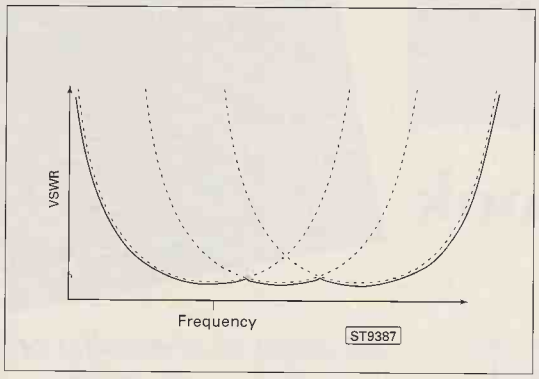


Fig. 5: a) Wideband or multiband dipole; b) resultant v.s.w.r. plot.



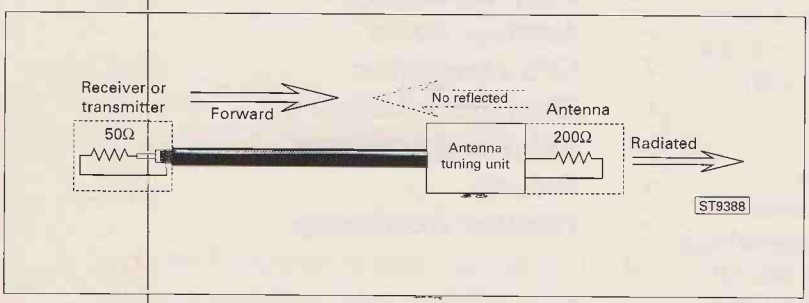


Fig. 6: Use of antenna tuning unit at far end of line.

you will find a situation like that shown in **Fig. 4**. The v.s.w.r. drops to a minimum at the resonant frequency of the antenna, and rises at frequencies above and below the resonant frequency. If the antenna and transmission line impedances are matched, then the v.s.w.r. will dip to 1:1, but any match at all means that there will be a v.s.w.r. above 1:1. Note that finding the v.s.w.r. minima finds the resonant point only, but it does not mean the antenna is matched. If the antenna feedpoint impedance is different from the transmission line impedance, the situation will not be the 1:1 ideal situation.

Mismatch of the antenna means more than just a high v.s.w.r.. In most types of antennas used by amateurs and receiver operators today a high v.s.w.r. is a symptom of some other problems, which can cause signal loss and other problems to the receiver or transmitter. For example, it is common for radio transmitters to include an automatic load control (ALC) circuit. It measures the reflected r.f. power, hence by implication the v.s.w.r., and starts turning off the transmitter as the v.s.w.r. increases. Most have a 'knee' about 1.5:1 where the power shut-down begins, and the effect increases until the transmitter is completely shut down somewhere between 2.5:1 and 3:1. I've seen a situation where a '100W' transmitter actually put out less than 1W because of where it was operating on the ALC curve with the particular antenna that had been selected for it.

The v.s.w.r.-vs-frequency curve of **Fig. 4** is relatively common for antennas such as dipoles and verticals that don't include any tuning elements. On higher 'Q' antennas, which means narrower band, the v.s.w.r. rises more rapidly than shown in **Fig. 4**. On lower 'Q' antennas the v.s.w.r. rises more slowly either side of resonance. These antennas are broadband, so are more useful in some situations.

Be careful of spurious claims of broadbanding, however. There is one way to lower the 'Q' (making the antenna more broadbanded) that is not too swift in the end: increase the resistive losses. That broadens the bandwidth, but costs more into the bargain than keeping the v.s.w.r. situation as in **Fig. 4**.

Another approach is shown in **Fig. 5**. In this case, the antenna is a standard half wavelength dipole (**Fig. 5a**). This method is used for multiband dipoles, i.e. using a single feedline for dipoles tuned to different bands. It can also be used to broadband a dipole for a single band. For example, one chap I know used the method of **Fig. 5a** to make an antenna for listening to the signals from the planet Jupiter that are found in the 18 to 26MHz band. He divided the band into three portions of about 2.7MHz each. He cut dipole A1/A2 for the high end with a resonant frequency of around 23.5MHz; dipole B1/B2 for the middle at 22MHz, and C1/C2 at the low end around 20.75MHz. The v.s.w.r.s of the three antennas overlap as in **Fig. 5b**, producing an overall v.s.w.r. curve similar to the heavy line in
Fig. 5b.

The Big Myth That Won't Go Away

We keep hearing one old v.s.w.r. myth over and over again: you can "...cut your coaxial feeder to reduce the v.s.w.r. to 1" (actually, they meant '1:1' but routinely called it '1'). Hoards of people have cut the feeder and watched the v.s.w.r. reduce to 1:1, so they cannot be talked out of the error. I even know of one CB shop in the USA who kept 300mm lengths of coaxial cable, with connections on both ends, so they could insert them into the line at the transmitter in order to find the correct length that would reduce v.s.w.r. to 1:1. But, the measurement isn't real. A measurement artifact only makes it appear to be true.

The only really proper way to reduce the v.s.w.r. to 1:1 is to tune the antenna to resonance, and then match the antenna feedpoint impedance to the transmission line impedance. For a centre-fed half wavelength dipole, or a bottom-fed quarter wavelength vertical, the proper way to resonate the antenna is to adjust the length of the radiator elements to place the correct minimum v.s.w.r. point at the desired resonant frequency. The textbook formulas only give approximate lengths, and the real length is found from experimentation on the particular antenna after it is

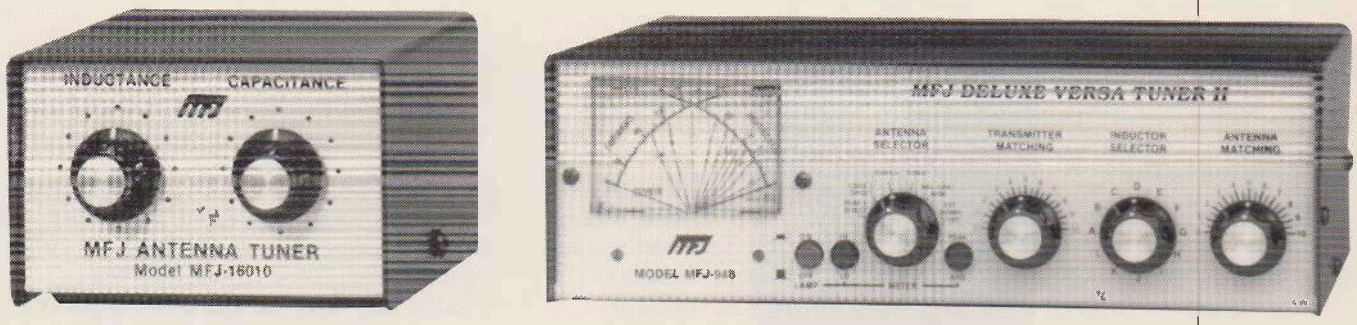


Fig. 7: Antenna tuning units: a) receiver only; b) Versatuner for both transmitter and receiver use.

installed. Even commercial antennas are adjusted this way. On certain mobile antennas, for example, this trick is done by raising (or lowering) the radiator while watching the v.s.w.r. meter.

Even when the resonant point is found, the feedpoint impedance may not be a good match to the transmission line. A v.s.w.r. will result in that case. The impedance matching should be done between the far end of the transmission line (i.e. away from the receiver or rig) at the feedpoint of the antenna. Antenna tuners intended for strictly coaxial cable are little more than line flatteners. They don't really 'tune' the antenna, but rather they reduce the v.s.w.r. looking into the transmission line so that the transmitter will work properly. If the antenna tuner is not a high pass filter (as some are), then it will also provide some harmonic attenuation.

An approach used by many amateurs (including myself) is to connect an antenna matching unit (tuner) at the output of the transmitter. For my Kenwood TS-430, I use either a Heath SA-2060A or an MFJ Differential Tuner to 'tune-out' the v.s.w.r. presented by my Hustler 4BTV and 22.7m of coaxial feeder. But I don't even pretend to be tuning the antenna. The TS-430 is a solid-state rig, and the finals are, therefore, not terribly tolerant of v.s.w.r., and will shut down with a high v.s.w.r.. The purpose of the antenna tuner is to reduce the v.s.w.r. seen by the transmitter...and to heck with the actual antenna mismatch on the roof. The tuner also serves to reduce harmonics further, thereby helping to prevent TVI.

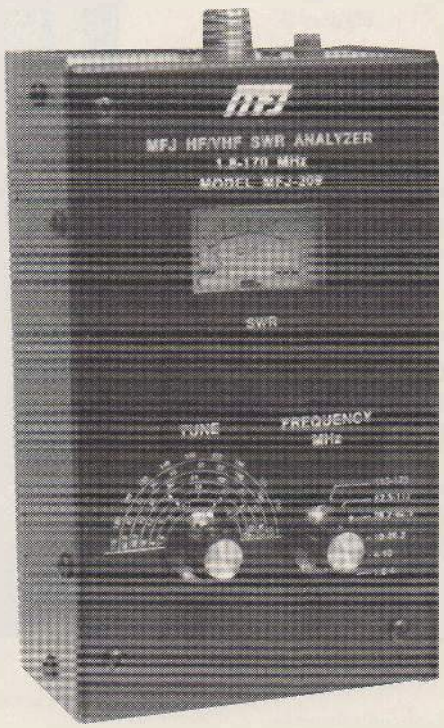


Fig. 8: MFJ-209 s.w.r. analyser.

The best form of antenna tuner is one that both reduces the v.s.w.r. (for the benefit of the transmitter), and also resonates to the transmitter frequency, preventing harmonics from getting out (a dirty little secret is that some 'line flattener' a.t.u.s are actully variable high-pass filters, and must be used with a low-pass filter ahead of them if spurious signals are to be kept at home. A better approach than the line flattener is to use an antenna tuning unit or impedance matching transformer mounted right at the feedpoint of the antenna, as in **Fig. 6**. This method matches the antenna feedpoint impedance to the transmission line impedance, causing the v.s.w.r. to drop to 1:1.

Figure 7 shows two popular forms of antenna tuning unit. **Figure 7a** is a small unit intended for receivers. You can tune it by peaking up the controls to maximize the signal level in the receiver either by ear or watching the 'S meter'. The version in **Fig. 7b** is intended for amateur radio use. It contains a cross-needle v.s.w.r. meter that also measures r.f. power levels. It can be used by receiver owners as well, but the meters will not work. Both of these a.t.u.s are products of MFJ Enterprises, Inc.

Should you even worry about v.s.w.r. on a system? Or, more correctly stated: given that a 1:1 v.s.w.r. often requires a herculean effort to achieve, at what point do you declare the battle won and send the troops home? Some of the issues are: transmitter heating of the transmission line due to power losses; reduction of power from solid-state transmitters due to s.w.r. shutdown circuitry; at high power levels there may be excessive r.f. voltage at nodes, which could lead to transmission line shorting; loss of receiver sensitivity. The feedline loss is added directly to the receiver noise figure, so may degrade the receiver's matched noise figure. The latter problem is especially severe in the v.h.f./u.h.f. scanner bands. In general, it's well worthwhile to eliminate v.s.w.r. problems.

Measuring v.s.w.r.

There are a number of ways to measure v.s.w.r., but not all of them are open to receiver operators as well as amateurs. The difference is that hams are licenced to excite the antenna with enough r.f. energy to communicate, and that power can be measured in an r.f. wattmeter. If the meter is designed to measure both forward and reflected power (as nearly all are), then

Fig. 9: MFJ-219 s.w.r. analyser for u.h.f.

these powers can be used in a mathamatical formula to calculate v.s.w.r.. Alternatively, a special version of the r.f. wattmeter idea is the v.s.w.r. meter. It is essentially a species of r.f. wattmeter calibrated in terms of v.s.w.r.. But it too requires a substantial amount of r.f. power - at least a watt or so - to be useful. **Figures 8** through **10** shows instruments that can be used by amateurs, s.w.l.s and scanner owners to measure the v.s.w.r. of their antenna lines. **Figures 7** and **8** are MFJ models; shown in **Fig. 8** is the MFJ-209, this is for the h.f. and lower v.h.f. bands (1.8 to 170MHz). The instrument in **Fig. 9** is MFJ-219 for the 440MHz u.h.f. band. In both cases, the instrument is tuned to find the minimum v.s.w.r., as indicated by a dip on the meter. This point is the resonant frequency of the antenna. An alternative method for using the meter is to set the internal frequency to the desired antenna operating frequency, and then measure the v.s.w.r. at that point. This information will tell you whether or not some additional work is needed.

More advanced models of the MFJ-209 instrument include the MFJ-249 and MFJ-259. The '249 has a digital frequency counter to accurately set the operating frequency. The '259 is like the '249, except that it also measures the antenna resistance on a second meter movement. This second bit of information allows you to know what action to take to make the antenna system right.

Figure 10 shows the AEA (Advanced Electronic Applications, Inc., Model s.w.r.-121-HF graphical s.w.r. This unit tunes the h.f. band from 1 to 32MHz, while a companion Model s.w.r.-121-VU operates in the bands 120 to 175MHz, 200 to 225MHz and 400 to 475MHz. They sweep the band and then plots the v.s.w.r. on a liquid crystal display. Both units are available in the UK from Nevada, 189 London Road, Northend, Portsmouth, P02 9AE ; Tel:(01705) 662145.

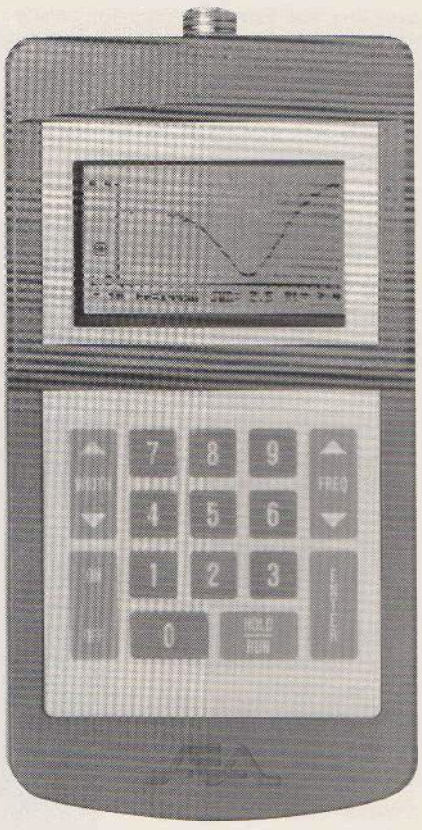
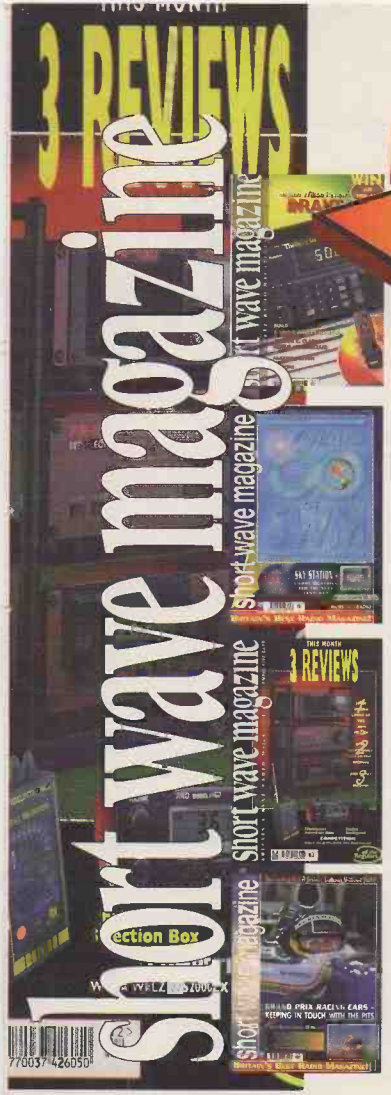


Fig. 10: AEA s.w.r.-121-h.f. graphical s.w.r. analyser.

Conclusion

The role of v.s.w.r. or s.w.r. is very important in radio and communications. It can make or break some installations, and is always a factor in the types of antennas typically used by amateurs, s.w.l.s and scanners.



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The Ionosphere Indoo

The late Fred Judd G2BCX worked on pioneering experiments that increased our understanding of ionospheric propagation. In Part 1, Fred describes how you can simulate some of his work and gain an understanding of how the ionosphere bends the radio waves for DX working.

Investigation into some of the predicted performance of physically large mechanical and/or electrical systems, is often carried out by using accurately scaled down models of the real thing. Stability in large structures such as bridges and buildings is one example. The aerodynamics of an aircraft may be determined with the aid of an exact model set up in a wind tunnel. The stresses of wave distribution of a large ship may be assessed, with reasonable accuracy, by moving a model of the vessel at different speeds and directions, in a wave tank.

These days such methods are usually augmented with the help of computers. The computer may be used to log the data and to do many calculations on the data. However, the experiments I'm about to describe were carried out without the use of computers. Calculations were carried out with the help of either a slide-rule or using tables of logarithms. You should certainly replace either of these methods by computer. Not only would it be easier, but most certainly it would be quicker.

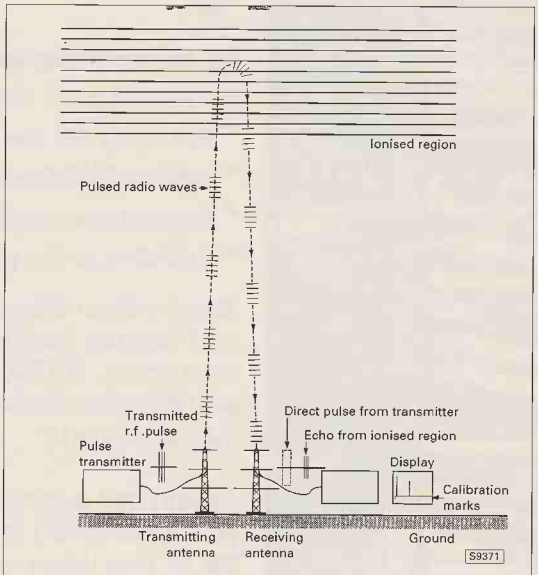


Fig. 1.1: System employed for 'sounding' the real ionospheric regions with pulse transmission and reception (see text).

Structures Theory

The 'Theory of Similar Structures' is the name of the principle, on which the above examples are based. The idea may also be applied to performance measurements of large transmitting and receiving antennas.

Very accurate scale models of the antennas are created, and all measurements are carried out at v.h.f. or even u.h.f. I made many experiments, using this method, that were described in the article 'Experiments with Scale Model Aerials' by F. C. Judd *Short Wave Magazine* January 1950. Since then, this method has been adopted and used by many professional organisations.

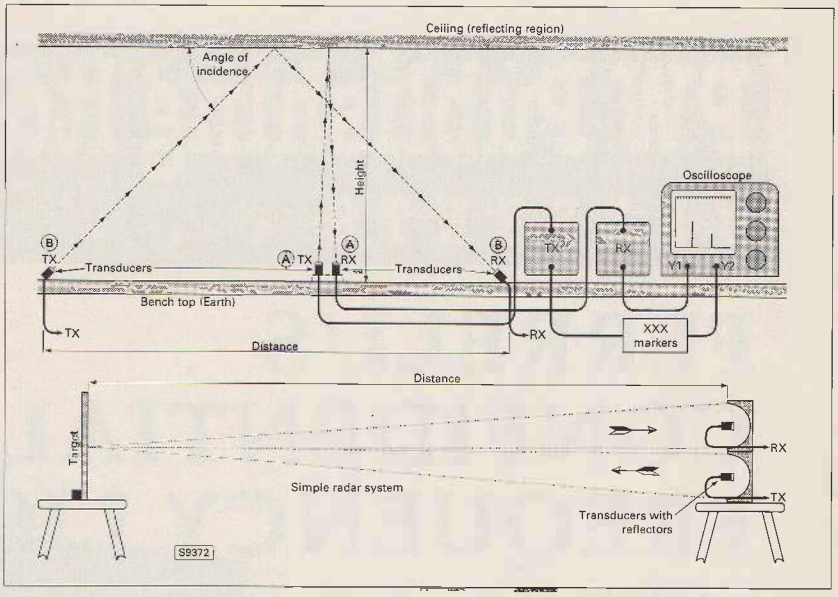


Fig. 1.2: (Upper illustration). The arrangements for two different experiments with ultrasonics. (Lower illustration). An experiment in radar. Defining the distance of a target (see text).

Simulation Indoors

Now, it is well known that elements of the ionosphere (mainly the F-layer) are responsible for the propagation of h.f. radio signals. Signals of broadcast, commercial and amateur radio transmissions, carry from one country to another, even though that other country is half-way round the world.

The special properties of the ionosphere are also used by some countries for over the horizon radar systems (OTHR). Certain ionospheric propagation 'modes', including OTHR can be simulated indoors on a working model basis. The results of experiments are displayed on an oscilloscope as they are carried out, (Examples will be shown). The oscilloscope used should preferably be a double trace with calibrated time base ranges. The transmitter and receiver circuitry requires relatively few components.

The two, readily available, transducers used, one for transmitting and one for receiving, operate at an ultrasonic frequency, i.e. sound frequencies well above audible range, at 40kHz.

Ionospheric Regions

The propagation of h.f. transmissions, via the E and F regions of the ionosphere, may cover great distances. The most usual method of propagation, is where the signals are bounced back and forth between an ionospheric layer and

rs

earth. These natural layers in the ionosphere are not in the immediate part of the atmosphere, where the air is quite dense. They occur in the region of the atmosphere where the air pressure is almost non-existent.

The height of these layers is measured at intervals during day. The height varies throughout the day, depending on the time of year, but as a general example, the F region (combined F1 and F2) has a nominal height in the region of 300-350km above the earth.

Using special pulse transmitter/receivers known as Ionosondes, the signals are sent vertically and received back on earth as echoes as shown in Fig. 1.1. An Ionosonde enables other data related to propagation conditions to be collated with the height measurement, and which can be analysed by computer.

Time plays an important part in the measurements. For example, the virtual height of an ionospheric region is derived from the time (in milliseconds) taken for the pulses to travel up to that region, and return as shown in Fig. 1.1. The velocity of radio waves, taken as 300 000km per second, means that a wave travels 300km in one millisecond. Don't forget that's the time taken to travel only one-way. So, if the height of the reflecting layer is 300km, it takes twice that time for the pulse to return from the layer.

Scaled Velocity

The velocity of ultrasonic waves in air can be taken as 334m per second. This measurement holds true at a 'normal' indoor temperature of 20°C, and a barometric pressure in the region of 1000 - 1030mb. The wavelength of a 40kHz signal (the ultrasonic frequency to be used in the model) will therefore be 334 x 1000/40 000 or 8.35mm.

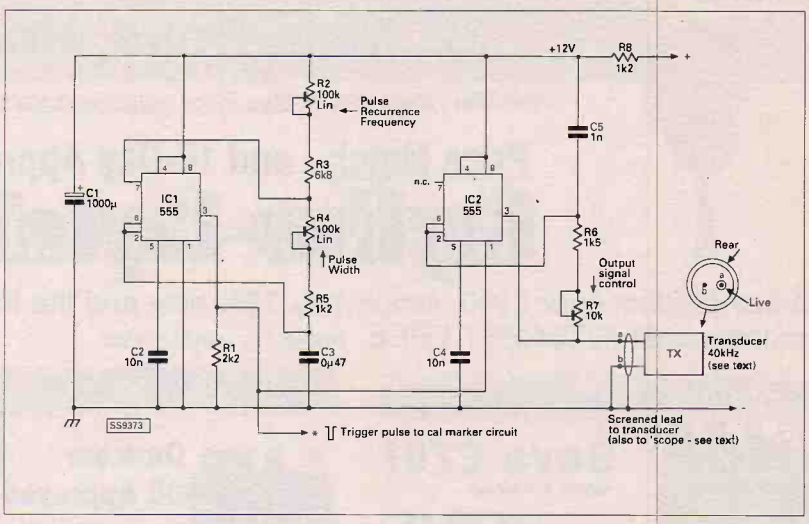
Remember, although we are working with a model velocity, the timing involved will still be in milliseconds. Other dimensions, including wavelength, are not directly proportional to those of the radio and ionospheric height. Otherwise distances and heights will be in metres.

The Working Environment

The working environment is to be indoors. I managed to find enough space in the shack, which doubles as a small spare room. The ceiling can act as the highest reflecting region (equal to the ionospheric F region) whilst a bench or table about 1m high at least 1.5m long will act as the plane of the earth.

The general arrangement is illustrated in Fig. 1.2, which also shows two typical ionospheric tests. One is measuring the height of the reflecting region (method similar to that in Fig. 1.1) using the ultrasonic transducers TX and RX, at (A) and (A). The second is measurement of hop distance with the transducers (TX and RX) at (B) and (B).

I should make it clear that in real life, the DX propagation of radio waves, by an ionospheric region., would normally be due to refraction, or bending of the waves. Think of this as slowing down one side of the wave, so that it travels 'round a corner', rather than our model. In our experimental model simulation, the signals are reflected from the ceiling, rather than refracted (bent). But the idea is a valid demonstration of what happens.



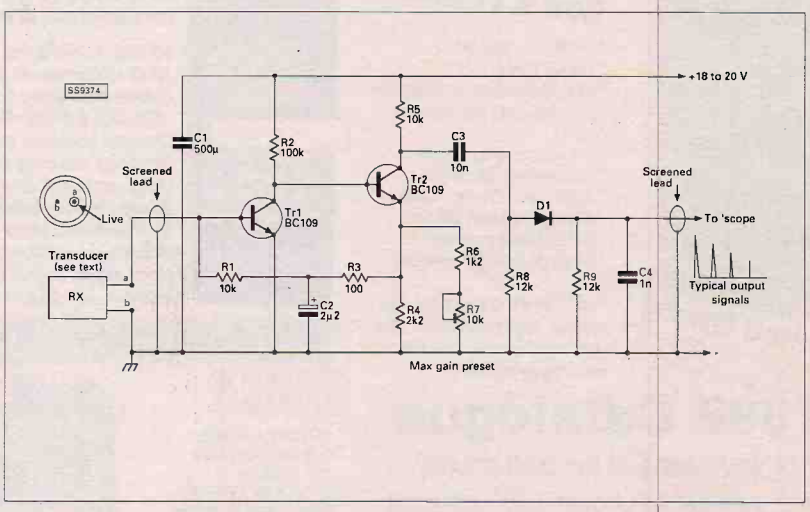


Fig. 1.3 (Top): Pulse transmitter circuit for the ultrasonic frequency transmitter transducer 307-351 (40kHz).

Fig. 1.4 (Middle): Ultrasonic receiver circuit for operation with receiving transducer 307-367 (40kHz).

The separate diagram at the bottom of Fig. 1.2, illustrates a simple ground radar experiment using the transducers fitted with small reflectors. We can in fact use this as a working example.

Assume the distance between the transducers and the target is unknown. The time taken for a short pulse signal from the transducer transmitter to reach the target and return to the transducer receiver and as measured on the scope of say 10ms.

From this value and the speed of sound in air, we can calculate the distance to the reflection, or target distance as $(334 \times 10 \times 10^{-3})/2 = 1.72$m. You can see, that although distances with this model system are relatively short, they can be fairly accurate. The accuracy depends almost exclusively on the timebase accuracy of the 'scope. Distances could be measured to better than ±1%, if the 'scope calibration that accurate.

The above example, as well as distance or height measurements in other experiments can be checked for accuracy with a tape measure. You could use a variation of this method to check the calibration of the 'scope's timebase.

There are some ultrasonic transmitter/receivers, available as a 'Parking Radar', from Maplin, order code VE08J. And after the experiments you could use it for its intended purpose.

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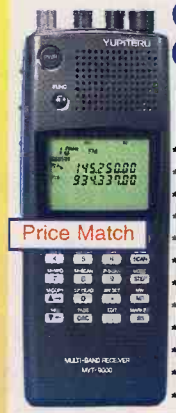

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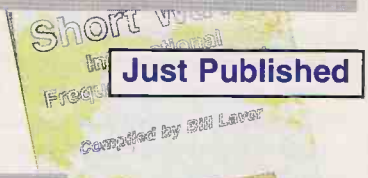

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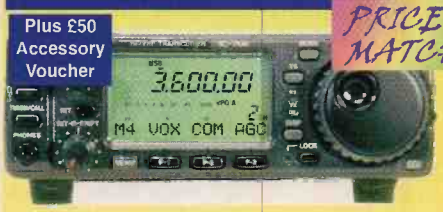

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* 25 / 12.5kHz ready
* Wideband Rx
* Nickel Hydride batt
* Wide FM broadcast
* AM for airband
* Rapid scanning
* Alphanumeric

Provisional spec

The Transducers & Circuitry

Firstly, the 40kHz ultrasonic transducers. Two are required, one for transmitting, type 307-351 and one for receiving, type 307-367. They are available from Electromail and possibly other large suppliers. *RS Data Sheet No. 003-065, March 91*, also available from Electromail, gives performance parameters including the radiation and sensitivity pattern for each unit, as well as details for other uses such as burglar alarms, counting moving objects, anti-collision systems, etc. These notes are worth obtaining. Farnell also offer the same units, Order Code 143-736 (transmitter) and 143-737 (receiver).

The Transmitter

The complete circuit is shown in Fig. 1.3. The 555 timer IC1 generates the initial negative going pulse at the required p.r.f. whilst the second 555 timer IC2 is the transmitter, its 40kHz output being in pulses of 1ms (minimum) and set by R4. The pulse recurrence frequency required is set by R2 and ranges from 10 to 50ms per scan (100 to 20Hz) to comply with the timebase ranges of the oscilloscope used.

The positive supply rail should not exceed 12V, so depending on the power supply voltage, the value of R8 should be adjusted accordingly. Connect the points (a) and (b) to a 'scope (transducer must be connected) and set R7 for maximum pulse amplitude. This adjustment must be remade later when the receiver is operational. Note: The 'trigger pulse' output is for the 'cal marker circuit'. Since the transmitter output impedance is low (500Ω) the screened lead used to feed the transducer may be several metres long.

The Receiver

This consists of two BC109 transistors operating as a high gain amplifier (circuit Fig. 1.4). This input (a) (b) is high impedance to match that of the transducer (30kΩ). The screened lead (not coaxial cable) between the transducer and the receiver input should be not longer than about 2m. Its self-capacitance will otherwise attenuate the input signal level. Set R7 for maximum output but do not use this preset to reduce the level of the signals to the scope. Use the oscilloscope Y amplifier attenuation control.

Calibration Marker Generator

This will not be necessary if the oscilloscope is accurately calibrated for each of the time base ranges likely to be used. Most modern 'scopes have a graticule with 1cm divisions (horizontal) and calibration is normally so many milliseconds per centimetre. Otherwise the circuit, as in Fig. 1.5 can be triggered with the negative going pulse from the transmitter pulse generator (pin 3 on IC1). Note however, that the first marker will not be visible but include this in counting, i.e. as preceding No. 2, the first visible marker.

The only way of setting the markers for a spacing of 1ms, unless they can be aligned with the existing calibration of the scope in use, is by the 'Lissajou' method of comparison with a 1kHz sine-wave. Use R2 to set the spacing of the markers to 2ms and R4 to set the width of each marker to a few microseconds. The repetition rate of each block of markers will be the same as the transmitter p.r.f. Output level of the markers may be set as required by R1. The negative pulse from the transmitter circuit (Fig. 1.3) can also be used to synchronise the oscilloscope time base in use, using its external triggering socket.

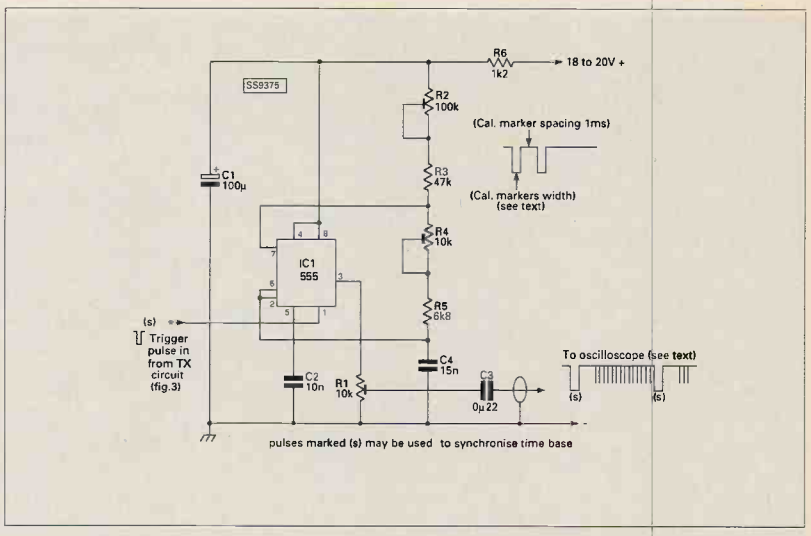


Fig. 1.5: Circuit of the 1ms marker generator (see text).

An Actual Example

The photograph Fig. 1.6 shows the result of a simple experiment. Height of reflecting region (ceiling) above the bench (earth) as depicted in Fig. 1.2. The markers at the top (m) are 1ms apart. The first echo (e1) is at 8ms. The height of the reflecting region (ceiling) above earth (bench) is therefore (33+ x 8)1000)/2 = 1.336m. Remember the total distance travelled by the pulse(s) that produced this echo is twice the actual height of the reflecting region, hence the division by 2 as above. What distance have the pulse(s) travelled to produce the second echo (e2)? The answer will be given in Part 2, which will deal with various other experiments and show photographic examples.

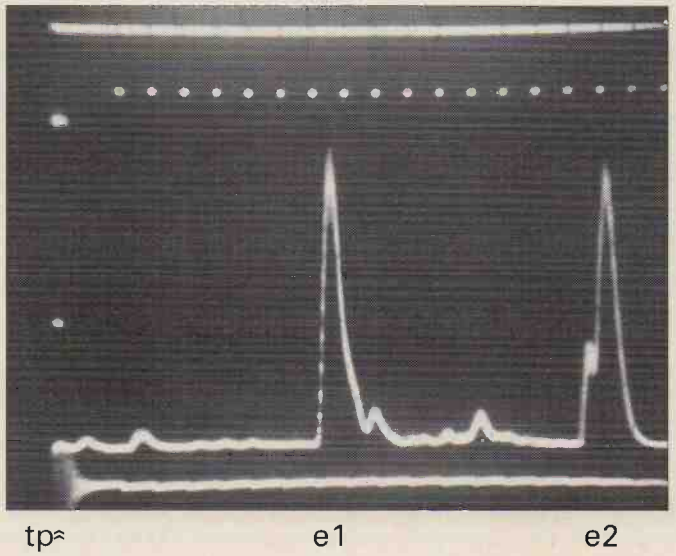
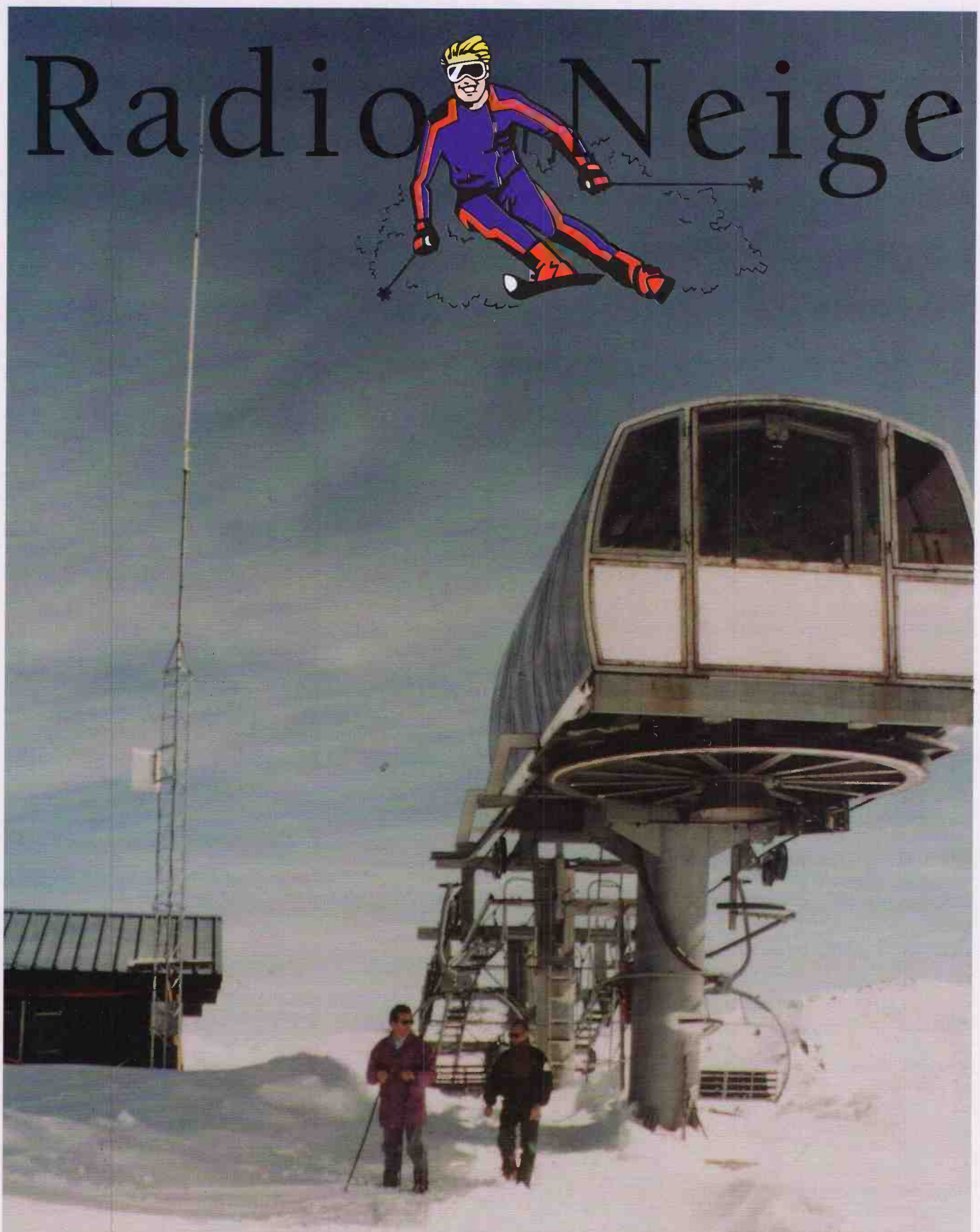


Fig. 1.6: Actual example of the ultrasonic simulation system in operation. The transmitter pulse (tp), is just visible, with the primary echo (e1) and secondary echo (e2) from reflecting region (m) and 1ms marker 'pips'.

Ref 1:
Acoustics by Alexander Wood MA, DSc (1962) Blackie and Son Ltd.

Radio Neige



Alan Roberts lives in Canada and contributes from time to time to *SWM's* LM&S column. Here he writes about a little known radio service whose signals travel far.

René Junet, with ski poles, near the Radio Neige transmitter shack at Les Menuires. The big wheel is the ski lift end pulley at the top of their La Dame Blanche slope.

At 16 ski resorts in the French Alps, Radio Neige (Neige is the French word for snow) runs 21 low-powered transmitters providing a radio entertainment service for passengers in ski-lift cable cars. The system was originally conceived as a safety feature, a one-way communication link enabling ski resort staff to talk reassuringly to customers who are unlucky enough to be stranded way above ground during breakdowns. At present over 1800 cable car cabins are fitted with solar powered Radio Neige receivers.

Radio Neige is a subsidiary of a major player in commercial broadcasting in France, Radio Nostalgie. From its headquarters in Paris, Radio Nostalgie uses satellites to feed its signals to a network of over 150 f.m. stations all over France and in Belgium, Ivory Coast, Luxembourg, Russia and Switzerland. As might be expected, Radio Neige also retransmits Nostalgie's satellite-fed signals from its alpine sites.

In 1991, the French radio regulating authority, the CSA, licensed Radio Neige to use three frequencies within the short wave 26MHz band. Their licence is renewed year by year, always keeping the same frequencies.

On a visit to the French Alps, I met René Junet, Radio Nostalgie's technician responsible for the maintenance of Radio Neige's equipment. The following details of ski resort transmitter frequencies, powers and sites came from his lap-top computer ,see Table1.

This information was up-to-date as of March 1995 and supersedes earlier lists published in DX-club journals. All signals are in narrow-band f.m. and, at source, are vertically polarised.

Radio Neige's winter season runs from late November to April and sees all their transmitters in use. They also have a summer season, but only involving some of the ski resorts.

Transmitting times follow the ski station operation schedules and vary according to the hours of daylight at different times of year. Night skiing is a feature at some resorts. The Radio Neige transmitter formerly at Megève is no longer in use.

Normal Everyday Operation

To give an idea of what is involved in putting out a Radio Nostalgie signal from one of the ski resort transmitters, I'll try to remember as much as I can of René Junet's description of how Radio Neige's installation at the Les Menuires ski station worked.

The ski resort office is at the edge of the village, a short way up from the bottom of the valley. On its roof are the satellite dish and the transmitting antenna for a 3W u.h.f. feeder transmitter. Inside the office is a small console housing the satellite receiver, a digital processor, the u.h.f. feeder transmitter, a manually switchable microphone, etc.

The satellite receiver feeds the digital processor which selects the mono sound channel and removes bass and treble from what was high quality audio. The signal is clipped at 500Hz and 5kHz to make way for tones at 200, 300 & 400Hz and 6, 7 & 10kHz, which serve as muting controls for the receivers in the cable cars.

The valley bottom at Les Menuires is not a suitable place for the 30W main transmitter, which is in fact situated about 2km away, at altitude, on the mountain on the opposite face of the valley. Just outside the transmitter shack is a 6m high pylon supporting the 25.710MHz transmitting antenna.

The Transmitting cabinet at Les Menuires.

On the same pylon is the 950MHz u.h.f. antenna receiving the feeder signal from the ski station office. In short, audio for the mountain-side transmitter comes via satellite to the ski office and then by u.h.f. feeder to the transmitter shack.

A cable car fitted for the Radio Neige service has a small solar panel on its roof and, partly hidden behind it, an aluminium box containing the receiver and its rechargeable battery. The loudspeaker faces downwards projecting its sound into the cabin.

Recent listings show the Nostalgie signal on the *Gorizont 12*, *Eutelstat II* and *Telecom 2B* satellites. Satellite signals for network use carry not only Radio Nostalgie's digitised audio feed but, along with it, encoded instructions and programming details for each station.

The digital processor at any of the network's satellite reception points responds only to instructions specific to itself, enabling individual stations to switch out of the network and run local programming for predetermined periods. Advertising slots can be sold for the entire network or for individual stations.

A skiwear company wanting to push its latest products during a championship ski meet at Tignes would record some 40 second ad's in Paris. These would go out via satellite hours before playing time, be stored in Radio Neige's Tignes digital processor to be inserted automatically at the appropriate moments into the programming from the Tignes 30W transmitter.

TABLE 1

25.710MHz	
Station	Power (W)
La Clusaz	5
Le Grand Bornand	30
Les Deux Alpes	80
Les Gets	5
Les Menuires	30
Val d'Isère	50

26.070MHz	
Station	Power (W)
Alpe d'Huez	3
Avoriaz-Morzine	6
Châtel	5
La Clusaz	30
La Plagne-Champagny	5
La Plagne-Les Coches	5
Les Arcs	30
Tignes	30

25.900MHz	
Station	Power (W)
Alpe d'Huez	30
La Plagne-Centre	5
Méribel	30
St Gervais	10
Val d'Isère	40
Valloire	20
Villard de Lans	30

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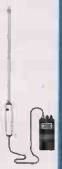

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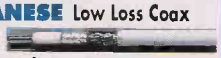

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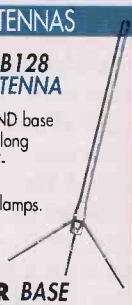

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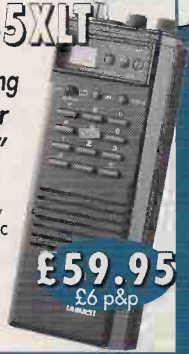

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WE'VE BEEN SHIPPING WORLDWIDE FAST FOR 27 YEARS • EUROPE'S NUMBER ONE SUPPLIER •

Under normal conditions the whole Radio Neige operation runs without local intervention, controlled from Paris. Instructions for morning switch on, for regular network programming, for periods when the ski stations run independently of the network, for evening shut down, etc., come in on the satellite signal.

In 1995 the storms that flooded northern France and Holland dumped the most snow seen for years in the western Alps. During my visit, the Radio Neige transmitter shack at Méribel was in 2 to 3m of snow and, a few steps away, a drift buried all but the tip of the 6m high transmitter tower. Under it all, the transmitter ran without hitch and René Junet and his crew didn't need to get their shovels out.

Something Goes Wrong

On the top of the Radio Neige console in the ski office are the microphone, its switch, and three push-buttons labelled 1, 2 & 3. Let's assume that something goes wrong in the winding mechanism of cable car line 1, that the cable stops, that over 100 people are trapped in cable cars which are now swinging in the cold wind and that the repair will take about two hours. Cable car lines 2 & 3 are still trundling up hill and down dale and Radio Nostalgie's background music is still issuing from all the loudspeakers on lines 1, 2 & 3.

The person who has the job of letting the unfortunates know what's in store for them, clicks the microphone switch and immediately audio feed changes from Radio Nostalgie to the ski office microphone. Pressing push-button 1 activates the pulses that mute all receivers on cable car lines 2 and 3. With the transmitter in emergency mode, Radio Nostalgie programming is switched out across the whole resort and only those in the afflicted cable cars are able to hear the bad news.

At an altitude of 2600m, the Radio Neige transmitter at Les Deux Alpes is at the half-way transfer point of the 'Jandri' cable car run.

Future Changes

They were thinking of inserting automatic individual IDs (station identifications) on all their ski resort transmissions. This would be a boon for short wave listeners but they wouldn't be doing it for the likes of us.

From his home, at an altitude of 400m, on the eastern edge of the Massif Central, 300km to the west, René Junet has line-of-sight reception from the Alps and can monitor several Radio Neige transmissions. He'd like to know which ones.

Another proposition was to change the system of control signals between the ski office and cable cars in order to restore the now missing treble and bass. I went joy riding in the cable cars at several resorts and found that in an ambience of passenger conversation, scuffing ski boots and cable rumble, it didn't matter much to me that Radio Neige receivers were delivering audio of near telephone-line quality.

René Junet countered this assertion by claiming that the newest cable cars were virtually rumble free. However, I do understand an organisation like Radio Nostalgie not being happy with a *fi* that is somewhat less than *hi*.

A further change was to be the installation of self de-icing satellite dishes, as snow accumulation there can scramble the satellite-borne switching signals. I found that their transmitter at Villard de Lans stayed on day and night, so perhaps the evening switch off signal failed to get through.

Hear Here, Hear There

In North America, short wave listeners in Maryland, Nova Scotia, Ohio, Ontario and Québec have reported hearing Radio Neige and, up to March '95, at shorter distances, so had listeners in Germany, Norway and Sweden. The only known short wave listener in France to have heard it was René Junet himself!

With Radio Neige's summer service operating for the first time in 1995, their 25.710MHz transmissions were heard in the UK on several occasions in July. During the sunspot minimum, the only chances for British listeners to receive 11m signals from the Alps will occur when parts of the earth's ionosphere temporarily activate and reflect radio waves back down.

'Openings' happen irregularly any time within two months of summer or winter solstice. An opening in early June, however, won't give you Radio Neige because the transmitters will still be off. Receivers with 'narrow f.m.' settings are best but an a.m. only radio, slightly off-tuned, can often make some sense of a narrow f.m. signal.

Apart from the trip to the Alps, all my reception of Radio Neige was done at home, here in the Montreal area. The winter I first heard them, 1992-93, I found their signals were discernible on 75 days. Over the three succeeding winters this number dropped to 44 days,

Cable car at Villard de Lans with receiver solar panel plainly visible on the roof.

then 3 days and, for the 95-96 winter, to zero with no sign of the signals ever crossing the Atlantic - a striking example of how long-range 11m propagation declines with the sunspot count.

In spite of its satisfying performance my receiving antenna is not an imposing array. It's a humble half-wave wire dipole for 26MHz hanging vertically from a pole mounted on the house chimney. Its lower insulator is only 2.1m above ground level. The receiver that did all this was a Lowe HF-225, (*smiles from John Thorpe and John Wilson*).

Stalking Radio Neige

It was November 1992 and rumour had it that test transmissions were due on a few 11m frequencies. In repeated (but fruitless) searching for these, I fell into a routine that, weeks later, led to an unexpected find.

On the 9th of December on 25.90MHz, very weak and often fading, a programme of French pop music appeared. It was there again the next day and the next.

Hoping for an ID but only able to hear snippets when the signal rose out of the background noise, I found no breaks on the hour, no news bulletins but advertisements in French popped up every ten minutes or so. On the 13th, a general sweep of 11m revealed more faint French pop music on 25.710MHz. Signal strength was a bit better here and I immediately checked it against 25.90MHz. The two were not parallel but the songs followed each other in the same sequence and the ads were the same.

Two days later came the discovery of a similar signal 26.070MHz. It seemed that someone was playing copies of the same feed tape, randomly unsynchronised, on three transmitters.

The better signal on 25.710MHz enabled me to hear more detail and catch the odd mention of 'Radio Neige' and, every so often, of 'Martinique'. There was no hint of anything Canadian: voices, accents, songs were all European French.

In less than a week, I had found three hitherto unknown transmissions in the middle of a little used international broadcasting band, claiming to come from an unheard-of radio station, with signals weak enough to make it difficult to determine whether they were in a.m. or f.m. mode.

None of the standard reference books could help. I consulted recognised s.w. experts and wrote to DX clubs and listener groups - all to no avail. No-one knew what Radio Neige was. My conclusion was that radio pirates were at play in either France or Martinique.

The signals continued to be heard into January '93. On days when propagation was better, it became clear that all three were in narrow-band f.m. Some of the commercials were farcical. One was for William Lipton whiskey - I think a non-existent brand. And the often heard Martinique reference turned out to be a joke involving ice, the meaning of which eluded me.

The facts that the signals stayed on the same frequencies day after day, that the feed tapes seemed done to professional standards and that the speakers had a 'radio announcer' ring to their voices, made the pirate explanation less likely. The theory of a Martinique source weakened, as the times at which Radio Neige was heard in Montreal matched reception of 11m broadcasts from Europe rather than from the Caribbean.

In early February '93, a new set of feed tapes came into use. The same musical format of French and international pop oldies was maintained but Radio Neige IDs became rare, being mostly replaced by slogans and jingles mentioning 'Nostalgie'. There were lots of skiing references.

The fake commercials and Martinique joke were dropped in favour of real ads for: Nescafé, an astrology service with a Paris 'phone number, Maggi soups, a health magazine, etc. Each string of ads ended with an announcement saying, in free translation, "The sound system in this cabin is for your pleasure and safety. It is your contact with the ski patrol and the ski-lifts".

New guesses were: that the signals came from a ski resort in France, that this might be a communication system for high altitude storm shelters or cable cars and that there was a good chance that Radio Nostalgie was providing the audio feed.

AOR (UK) LTD

AOR Manufacturing Ltd - World Radio Centre

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AR5000

CyberScan®

AR5000 £1495 AR5000+3 £1749

True base receivers are few and far between, some have simply evolved from the hand held equivalents with little tangible improvement in performance or facilities over their smaller counterparts. The AR5000 is not like this! Drawing from its earlier success, AOR has designed the AR5000 to be a true base station receiver - from the drawing board, this is very apparent when plugging in an external aerial, the result is unsurpassed performance instead of a clutter of music and pager breakthrough over many of the desired frequency bands.

The AR5000 strong signal handling is very good. Over the range of 500 kHz to 999 MHz this is further assisted by an automatic preselector which peaks the receiver's front end circuits for the best "on channel" sensitivity and ultimate rejection of out of band interference. These qualities have been recognised by government departments on both sides of the Atlantic.

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.

NEW!!! **Spectrum Master AR5000 PC control package** offers control via a virtual radio front panel plus text interface, including control of mode, frequency, attenuator etc including EEPROM bank switching and +3 facilities supported. Unlimited number of disk based memory banks, save multiple memory banks, memory upload/download to the same or different location using a re-numbering system, import/export data in PC-Manager format, copy data to & from clipboard... you can exchange memory data with Windows clipboard for bulk editing and export to a data base (not supplied) or other Windows applications. View band activity in a spectrum-type display window and save sound recording to disk. The Windows hypertext help system is employed. Working aids, propagation, foreign language, modulation working aids, international bandplans. International map with projections and frequency data-base and logbook. Support for the SDU5000 spectrum display unit is also provided. **£129.00 + £3 P&P**

ARD-2

Compact self powered portable ACARS & NAVTEX decoder with built-in display

Good news for airband ACARS and marine NAVTEX enthusiasts, these data reception modes may now be decoded in a single compact portable hand-held unit (158mm L, 109mm W, 53mm H excluding projections, 330g excluding batteries). Features include built-in two line LCD readout (2 x 16 characters), 512 character scroll back buffer, operation from 4xAA internal batteries or external 12V d.c. (max 280mA), internal speaker with separate volume & level controls, RS232 socket. A computer is not required for stand-alone operation, just connect audio from a suitable receiver such as the AR8000 and AR5000, however display may be viewed on a computer running a terminal driver (9600 bps ASCII). First stocks are expected by the new year 1998. **£ T.B.A.**

AR8000UK wide band hand held receiver

The **AR8000UK** provides a frequency coverage from **500 kHz to 1900 MHz** without gaps in the range (actual acceptable frequency input from 100 kHz). 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. Step size is programmable in multiples of 50Hz for smooth tuning. The high visibility dot matrix LCD provides great detail including a signal strength bar meter, band-scope etc. **Computer control** and clone of data between two AR8000UK receivers (optional interface required). ***£349***

Short Wave Column: Bob Ellis is Unwell...!

In the summer now gone, for a hay fever sufferer, a quick and jolly solution is to make it to the coast, which is, for the most part, pollen free. AOR is gaining recognition by marine users and, as a supplier, could not be further from the sea. If you live around here, you head for the English East Coast and the haven of Sutton-on-Sea. Steel yourself with a stiff scotch in The Baccus Hotel, climb the sea defences into the on-shore drizzle and look for aerial masts.

The ones on the horizon belong to BT Humber Radio, an MF/HF site for marine users. A 24 Hour watch is maintained on 2182 with voice working on Channels Q, R and S. Ships hear these on 1925, 2684 and 2810 respectively, all USB. Channel Q ship-to-shore is one of the reasons why 160m LSB ham operation is power-limited, a great test for filter shape-factor in the AR7030. Weather and Navigation info are broadcast on the half hour on 1869 USB. Night propagation will take this signal well inland. Listen at 2103GMT for a Gale Warning, the real thing.

It would be nice to think the massive tee aerial nearest the sea wall carries this, transmission at its purest. Eighty-metre hams know they share their band with Humber and other Coast Stations, a radiotelex service tests the local receiver front-ends, AOR included, on 3607.3

The eerie thing about this station is that it is unmanned, control comes from Portishead. The shape of the central building suggests an era when radio operators routed calls looking out sea before these defences were built. A smaller outbuilding still bears the legend RADIO STATION, but there is nobody here. Did Humber stay on-air during the 1953 floods? Which mast does what? Enough for now. I've been told I've got to enjoy myself at the funfair in Mablethorpe....

bob@aor.co.uk ©Bob Ellis 1997

AR7030

AR7030 'PLUS'

★★★★★ **Table top receiver of the year 1996/97** - World Radio TV Handbook
★★★★★ **Awarded Five Stars** - Passport to World Band Radio 1997/98

AR7030 - High dynamic range short wave receiver £799

The AR7030 has established itself at the top end of the high performance short wave receiver league as "the" set to have and operate. UK designed & built to high standards, 0 - 32 MHz, all mode, built-in RS232 port and more. Innovative features include auto-tune synchronous detector and automatic filter alignment.

The standard unit is supplied with everything you need to get going either for casual short wave listening or for serious DXing:- mains power supply, infrared control (with batteries for the remote), operating manual... just plug in an aerial! I.F. bandwidths are typically 2.2 kHz, 5.5 kHz, 6.5 kHz and 9.5 kHz and all mode receive.

NEW!!! NEW!!! NEW!!!

The AR7030 offers high performance at a very attractive price, by popular demand by commercial users, a new 19 inch "U3" **RACK MOUNT** version is now available. Based on the AR7030 'PLUS' receiver with NB7030, additional filters, front mounted keypad in addition to infrared remote control etc... A cost effective off the shelf solution to demanding monitoring applications.

AR7030 'PLUS' - enhanced short wave receiver £949

PLUS PERFORMANCE For the ultimate in performance for the extremes of listening, the ***'AR7030 PLUS'*** is now available (£949) offering the following enhancements:

- ✓ Increased balance of the mixer for greatest IP2 & IP3
- ✓ High tolerance 0.1% components in DDS ladder for low noise
- ✓ Enhanced RF attenuator operation for minimal intermod
- ✓ Higher spec wire aerial input transformer for minimal mixing products
- ✓ Ceramic metal cased 4 kHz (displayed) AM filter fitted as standard
- ✓ Bourns optical encoder for the smoothest DX tuning
- ✓ Features CPU fitted, 400 memories, multi timers & alpha tag

It is still possible to fit other options to the ***AR7030 PLUS***, if fitting the multi option NB7030, only the hardware is needed as the features CPU is already fitted, so quote *UPNB7030* at £163.00 if required.

If you already have an AR7030 receiver, our UK workshop can *'PLUS'* upgrade your existing unit for £170 (carriage extra) so that you are not left behind in the race for the ultimate DX performer. AOR is quite unique in offering this *PLUS* upgrade service to existing AR7030 owners, please contact us for details and prices.

Data-Master PC software is a control package for the AR7030 and AR3030 receivers. Many facilities are provided to control the receiver via graphical "virtual receivers" and text based menus, data-base, map projections, MUF predictions, logbook and much more. Support for Windows 3.1x and Windows95. *Now supports the AR7030 features CPU and NB7030 enhanced options.* **£129.00** P&P £3.00 in the EEC inc VAT.

Please phone to discuss your specific requirements, AR7030 "bespoke" design enquiries welcome.

AR3000A *Evolution at its very best*

It all started in 1983 with the AR2001 which represented the world's first "no-gaps" high performance wide range receiver... the rest is history! AR3000A all mode receive AM, NFM, WFM, USB, LSB & CW with smooth tuning in 50 Hz steps and unbroken coverage from 100 kHz - 2036 MHz. Even the world's armed forces including the largest Airforce and Navy has employed the AR3000A in its up-to-date high-tech hardware for backup purposes, performance, quality, reliability and performance-cost-factor being excellent...

£799

SDU5000 Spectrum Display Unit £799

The AR5000 may be directly connected to the optional SDU5000 without modification. The SDU5000 connects to the AR5000 i.f. output and RS232 port to provide a spectrum display of up to 10 MHz with the capability to zoom in to a single transmission. Additional facilities include peak hold and average reading. An essential tool for the professional monitor. The SDU5000 may also be used with: AR3000, AR3000A, ICOM R7000, R7100, R9000 & R8500 with varying degrees of compatibility, call for details.

It was time for a transatlantic 'phone call. It took three calls to Radio Nostalgie's Paris studio to finally contact someone who could answer my questions. His name was Christian Salama and he had a lot to say.

In The Beginning

Some time in the 1980s a certain Christian Salama was out on the mountain on a day when the cable cars stopped. Thinking of those people trapped up on the wires, he wondered why no-one had ever come up with a means of letting them know what was going on. He also foresaw the business possibilities of his idea.

Cable car technology has to be very safe and breakdowns are infrequent. Christian Salama envisaged a self-financing communications system operating more than 99% of the time as a radio entertainment service, earning its keep through the sale of commercial time and only switching into emergency mode when needed.

He sought the help of a radio communications expert and Richard Kalinouski joined the project. Their early tests, done in the f.m. band with a home-made transmitter and ordinary portable radios, were overheard in several alpine households. Sites were evaluated, powers determined and Richard Kalinouski designed the system with clipped audio and switching tones that's still in use.

Legal advice was that the Radio Neige idea was patentable in the USA, but not in France and that the way to forestall copycat operators was to install the system quickly in ten or more ski resorts. This required capital and so they turned to Radio Nostalgie.

When Radio Neige first went on air, feed for the small transmitters was on audio cassettes recorded at Nostalgie's Paris studio. Identical copies were used at each site. There was no means - and certainly no need - of synchronising the playing of the tapes.

It was at this stage that I stumbled onto their signal and it was little wonder that, with several transmitters on each frequency, I was never able to determine the tape's repeat time.

Ice In Martinique

Christian Salama explained about a French law banning booze ads at sporting events. Wording and interpretation of the law are such that a ski resort is deemed a winterlong 'sporting event'.

Martini-Rossi and Nostalgie-Neige tried getting round this by rephrasing some well known commercials with the word "Martinique" substituted for "Martini". In the early days of trying to solve the Radio Neige mystery, the only geographical clue was this incomprehensible joke about ice cubes in Martinique.

I wasn't alone in being misled and I think I must have passed this 'red herring' on to some of those from whom I'd been asking help. In an example of my own pigeons coming home to roost, a s.w. listeners group in France wrote, in answer to my questions, that Radio Neige was a pirate operation in Martinique! I forgot to ask Christian Salama about the William Lipton ad and so still don't understand its meaning.

In its tape-feed days, Radio Neige, with its independent programming, its IDs, slogans, humorous commercials and announcements all aimed at the skiing public, had a character of its own. The winter of 93-94 saw the distinctiveness of Radio Neige being whittled down as transmitters switched one by one from tape to satellite-fed Radio Nostalgie network programming.

Other changes to report at Radio Neige are the departures of Christian Salama and Richard Kalinouski and the replacement of much of their original equipment. The metal frame of the cable car solar panel was used as the receiving antenna. This turned out to be a noise source.

Short antennas have since been fitted to all Radio Neige receivers. The original transmitters were too smart looking and were subject to theft and vandalism. Their associated power amplifiers, capable of up to 150W output, were unreliable and over heated.

The new transmitters - as simple and basic as possible - don't conform to the popular idea of radio equipment and, to the untrained eye, look more like bits of small and vaguely dangerous electrical gear. The quarter wave ground-plane transmitting antennas proved unsuitable for alpine conditions and were scrapped. They tested a number of possible replacements but only one, the US made 'Cellwave' half-wave vertical whip came through the ice, snow and wind tests and these expensive units are now in service at all the Radio Neige installations.

Les Deux Alpes is still the most powerful of the Radio Neige signals but its days of 150W are over. With its new cool-running transmitter and its more efficient antenna, 80W is the current output power. Try to hear it!

Updates

Another winter, 1996-97, has passed with again no report of Radio Neige being heard in North America. On a return visit to the Alps in March '97, I found that the transmitter switch-off problem at Villard de Lans had been solved and that what could seen of Radio Neige's equipment there hadn't changed.

At Les Deux Alpes, new cable cars were in service on the 'Jandri Express' line. In these, the receivers are out-of-sight, installed inside the false ceilings so that the on-off switch is not accessible and passengers who object to Radio Nostalgie programming are no longer able to switch them off. On the new cars, the solar panels are placed well away from the doors and are less likely to be damaged by the skis of people jostling to get in.

Credits

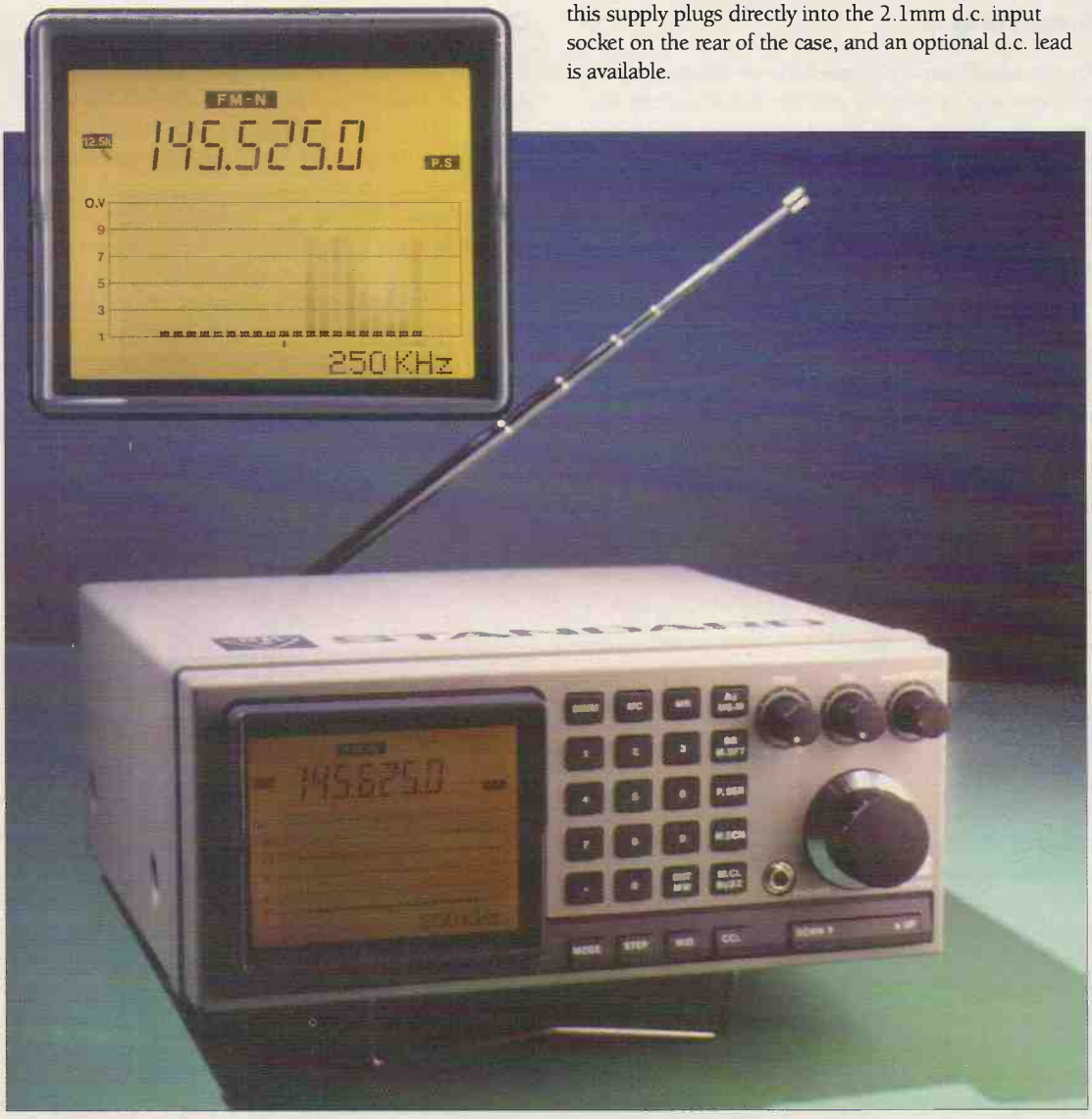
Already mentioned in the text are René Junet (of Radio Nostalgie, Lyon), Richard Kalinouski and Christian Salama. My thanks to them - they answered questions readily and told things I hadn't thought of asking. Thanks also go to Hervé Pichat (Radio Nostalgie, Paris) for the information he provided and for the way he opened doors.

Standard AX-700 Base Scanner Receiver

Chris Lorek takes a close look at the newly updated base scanner from Standard, the AX-700.

The Standard AX-700 made its first appearance in late 1990, and caused quite an enthusiastic 'stir' with its unique spectrum scope display. Good things keep on going strong, and over the years the AX-700 has been giving sterling service to many satisfied users. It has recently been re-launched as a new MkII version, which also conforms to the very stringent CE immunity and emission requirements.

With its smart metal case, base-mounted feet for desk-top placement and a chromed tilt-up stand, it's essentially a base station scanner. Yet as it operates from a 13.8V d.c. supply, mobile or portable operation certainly isn't also out of the question, there's even a plug-in telescopic whip supplied for temporary use. For home use, a leaded a.c. adapter is supplied, this is fitted with a European two-pin mains plug together with a suitable adapter for UK use. The d.c. output lead from this supply plugs directly into the 2.1mm d.c. input socket on the rear of the case, and an optional d.c. lead is available.



Coverage

The AX-700 covers the frequency range of 50 to 905MHz continuously, with reception modes of f.m. (for most two-way services), a.m. (e.g. for airband and other services), and wideband f.m. (for Band II and TV broadcast sound reception). The numeric keypad lets you enter frequencies directly, and the front-panel up/down buttons together with a click-step tuning knob can be used to manually tune around the frequency range. The tuning step sizes available are 10, 12.5, 20 and 25kHz, plus two further steps sizes in the curiously-named 'AJ' (fine-tuning) mode, these being 5kHz with the rotary channel selector and 1kHz with the up/down buttons. The usual rotary volume and squelch controls are fitted, added to these is a variable tone control so that you can adjust the sound of your local airport control tower operator to your exact preference! A front-panel earphone/headphone jack is fitted for private listening.

Searching

One hundred memory channels are provided to store your favourite frequencies, and the AX-700 usefully lets you manually tune away from any of these at the push of a button. You can of course scan through the memory channels, either all the channels or just those you've programmed with a 'MSM ('Memory Scan Memory') marker. To find new active channels the set has ten search ranges, each of which can be programmed with individual lower and upper frequency limits to suit your listening interests. In scan and search modes, the set halts as usual when it finds an active channel, i.e. when the receiver squelch raises. It can be programmed to resume either a couple of seconds after the signal level disappears, or an 'audio scan' which resumes a couple of seconds after any audio ceases on the signal, or after five seconds regardless of whether or not the signal's still there, or to halt on the first channel that's had a signal present for at least two seconds.

Panoramic Display

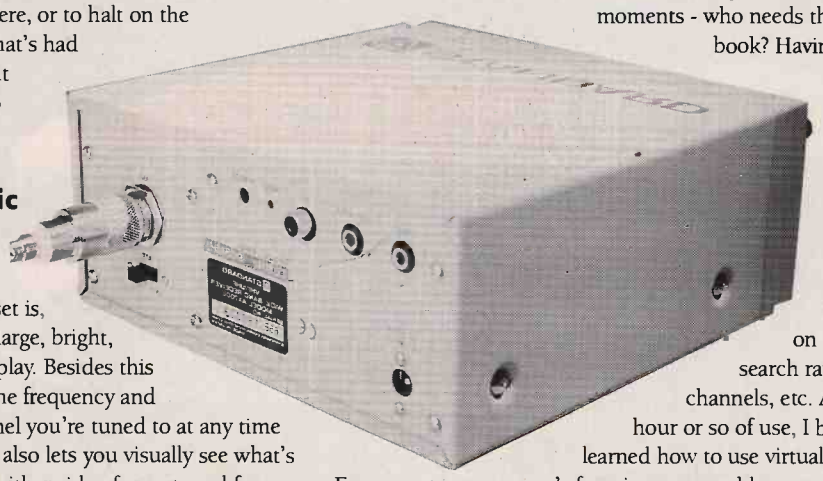
A primary feature of the set is, of course, the large, bright, panoramic display. Besides this showing you the frequency and memory channel you're tuned to at any time in text form, it also lets you visually see what's happening on either side of your tuned frequency. For this, the display provides a real-time bargraph of activity in the band, with vertical bars representing the relative strength of signals, just like that of an off-air spectrum scope. The spectrum display can be toggled to show either a 1MHz, 250, or 100kHz bandwidth at any time, the signal 'bars' automatically changing in width to reflect the channel spacing and display widths you've selected.

Round The Back

The rear panel has a number of connectors and further controls. Besides the d.c. power input and SO-239 antenna sockets, an attenuator switch is fitted which places a 20dB attenuator in line with the r.f. signal input for when strong signals start to get the better of the scanner. Complementing the front panel squelch control, which operates only in narrowband f.m. and a.m. modes, a small 'W-Mute' preset potentiometer is fitted for the wideband f.m. squelch adjustment. A 'recorder output' 3.5mm jack socket gives a 30mV audio level to your tape recorder or PC sound-card for audio recording, and there's a similar 3.5mm extension speaker output jack, which disconnects the set's internal speaker as usual when used. An 8V d.c. output is available via a phono socket for powering accessories, and a small reset hole lets you reset all the set's memories and frequencies to their default conditions should you ever have the need to.

On The Air

With the intuitively easy-to-use front-panel controls, it didn't take me long to start successfully receiving off-air signals with the set, indeed within a few seconds of switching on I was listening to a two-way conversation on my local 433MHz amateur repeater. Changing frequency was very easy with the keypad, tuning around likewise with the front-panel knob and up/down buttons. After a short period of listening around, I naturally decided to start programming the memory channels with my favourite frequencies and scanning around these. Here, the large l.c.d. came in very useful, with a large text-based display showing what was happening at each stage, e.g. 'Memory Change', 'Memory Scan', 'MS.M Scan', etc. Programming the search ranges was also helped by this display, which read 'Start Freq', 'End Freq', etc. at the appropriate moments - who needs the instruction book? Having said that, the supplied 30-page operating manual was certainly useful, with clear step-by-step instructions on changing the search range, memory channels, etc. After just an hour or so of use, I believe I'd learned how to use virtually all of the set's functions, no problems at all here.



As you'll have gathered from the above, I found the set a pleasure to use, operation-wise. The bright yellow-backlit l.c.d. was very easy to read, a front panel button switching in a two-level dimmer for night-time use. I was very pleased to find that the panoramic display updated itself continuously, i.e. at the same time as I was listening to a given frequency, without any breaks in reception as some other 'spectrum display' scanners do

PERFORMANCE TEST RESULTS

All measurements taken at 145MHz f.m., unless otherwise stated.

Sensitivity:
Input signal level in V p.d. required to give 12dB SINAD:

Freq. (MHz)	Signal Level (V p.d.)		
	f.m.	a.m.	w.b.f.m.
50	0.53	0.92	1.59
60	0.14	0.26	0.46
70	0.14	0.26	0.46
80	0.14	0.26	0.46
100	0.15	0.29	0.47
120	0.12	0.24	0.38
145	0.13	0.23	0.38
165	0.12	0.23	0.38
200	0.17	0.67	0.40
250	0.22	1.00	0.67
300	0.21	0.44	0.67
350	0.27	0.44	0.72
400	0.24	0.47	0.72
435	0.37	0.62	0.97
450	0.42	0.70	1.09
500	0.34	0.56	0.89
550	0.44	0.73	0.95
600	0.45	0.76	1.03
650	0.36	0.65	0.86
700	0.57	0.63	1.06
750	0.26	0.53	0.75
800	0.30	0.64	0.93
850	0.18	0.49	0.71
900	0.23	0.87	1.31
905	0.24	0.89	1.34

Squelch Sensitivity:
Level of signal required to raise receiver squelch

Threshold: 0.10V pd (7dB SINAD)
Maximum: 0.18V pd (19dB SINAD)

Adjacent Channel Selectivity:
Increase in level of interfering signal, modulated with 400Hz at 1.5kHz deviation, above 12dB SINAD ref. level to cause 6dB degradation in 12dB on-channel signal:

(kHz)	(dB)
+12.5	36.8
-12.5	26.3
+25	56.9
-25	56.4

Blocking:
Increase over 12dB SINAD level of interfering signal modulated with 400Hz at 1.5kHz deviation to cause 6dB degradation in 12dB SINAD on-channel signal:

+100kHz	72.9dB
+1MHz	75.6dB
+10MHz	96.7dB

Intermodulation Rejection:
Increase over 12dB SINAD level of two interfering signals giving identical 12dB SINAD on-channel 3rd order intermodulation product:

25/50kHz spacing	47.3dB
50/100kHz spacing	47.3dB

Image Signal Rejection:
Difference in level between wanted signal level and unwanted 45MHz and 455kHz i.f. image signal levels, each giving 12dB SINAD on-channel signals:

1st Image (+90MHz)	80.2dB
2nd Image (+910kHz)	Blocking limited

Maximum Audio Output:
Audio power level of 1kHz sine wave at the onset of 10% distortion level,8Ω resistive load, at external speaker socket:

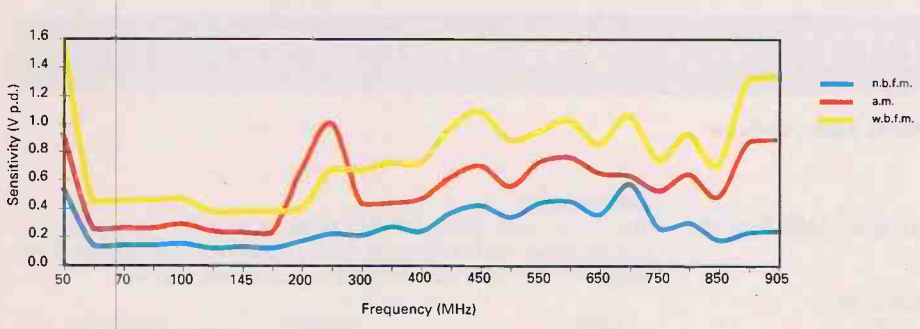
3.79W r.m.s.

Attenuator level:
Difference in signal level required to give 12dB SINAD with attenuator switched in/out:

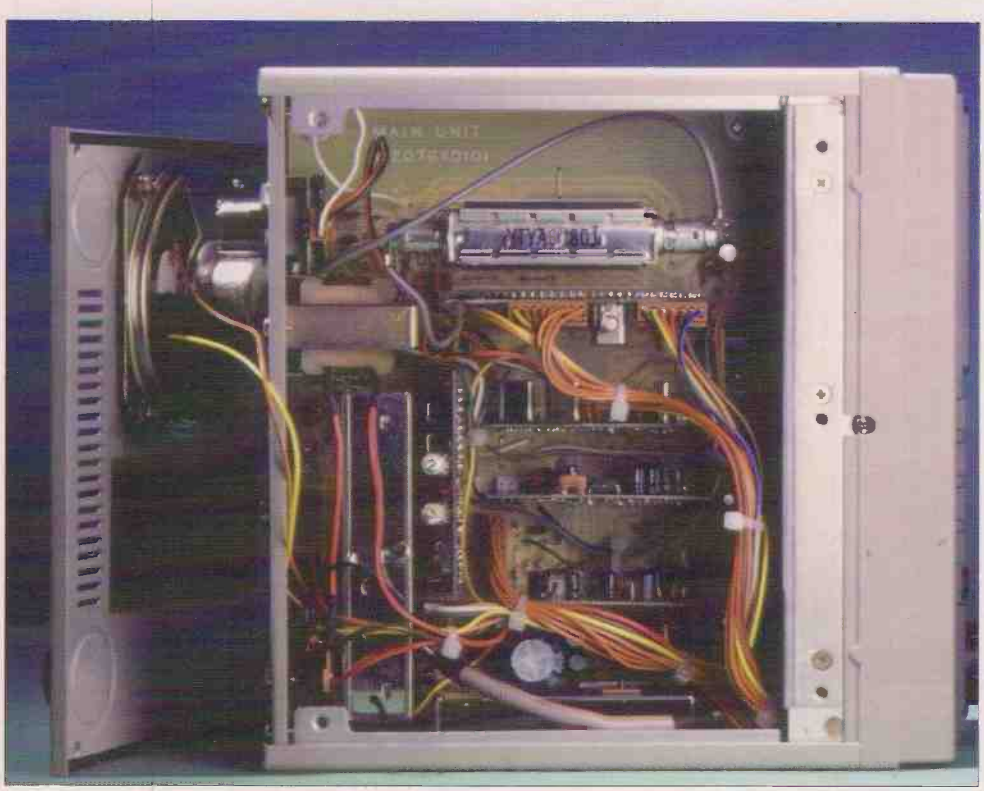
24.4dB

due to their single receiver circuits. The audio quality from the internal speaker, which was fitted at the bottom of the case, was excellent, especially when I used the small bracket to slightly tilt the front of the set upwards towards me. The variable tone control was useful also, enhancing the already-superb audio response from the set, plugging in an external hi-fi quality speaker gave even better performance on the broadcast bands using wideband f.m.

But how about the 'radio' performance? When I first used a sample of the original version of the AX-700 around seven years ago in my radio shack, I found it performed quite well using a variety of indoor and outdoor antennas. Time goes on, and the airwaves become increasingly more crowded, especially with the advent of powerful nationwide v.h.f. pager transmitters and a digital cellphone base station site around almost every corner. In my location in the south of England, which certainly is an r.f.-congested' town (I'm even told there are more radio amateurs per square mile here than anywhere else in the UK!), the AX-700 coped well on u.h.f. and the lower v.h.f. section of its coverage, including civil airband. But it did tend to suffer badly from wide-coverage (i.e. high power) v.h.f. pager transmitter breakthrough around the 145MHz amateur and 156MHz marine bands. So much so, that with my short (just 1m long) rooftop v.h.f./u.h.f. vertical connected, I had to constantly keep the attenuator switched in to prevent rather loud, and quite annoying, intermodulation breakthrough halting the scan, this wiping out even an 'S9' strength amateur repeater located about 20 miles away. I've often found this



AX-700 Sensitivity.



intermodulation rejection, where two stronger off-channel signals mix within the receiver to create a third, unwanted, on-channel interfering signal, I feel could have been better for it's primary use as a base station receiver.

Conclusions

The AX-700 was very easy to use, and I found the bright and easily-read panoramic display was extremely handy in keeping me informed if I was possibly 'missing' something else whilst monitoring a given channel. The receiver is very smart and professional looking, and the r.f. performance was typical of many wideband scanners currently on the market. However, in my opinion it wasn't up to the performance standard of some other dedicated base station receivers, although many of these are of course rather more expensive! The AX-700 is currently priced at £449.95, and our thanks go to Martin Lynch & Son, 140-142 Northfield Avenue, Ealing, London W13 9SB, Tel: 0181-566 1120 for the loan of the set for review.

STANDARD

problem on small hand-helds which are primarily designed to be used with an equally small set-top antenna, but I was a little surprised to find it on a purpose-made late-1990's base station receiver.

Having said that, I found the receiver picked up weak signals reasonably well, although occasionally not to the extent of a 'purpose-designed' set for some ranges. For example, a 51MHz amateur f.m. signal which I could clearly receive on an f.m. handheld connected to my loft-mounted antenna, I could only receive rather weakly on the AX-700, similarly on 433MHz. However, 145MHz weak-signal reception was excellent, as long as there weren't other strong signals around!

Laboratory Tests

My measured results showed that the AX-700 gave a reasonable sensitivity, i.e. the capability of receiving weak signals, across its coverage range, although this tailed off right at its lowest frequency of 50MHz, as I'd found on air. The strong signal handling was typical of that I've come to find on many other scanning receivers, nothing new here, all good 'solid stuff'. The measured

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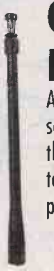

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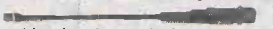

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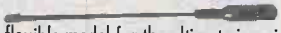

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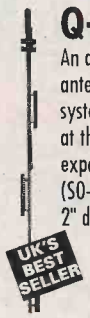

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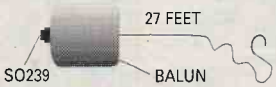

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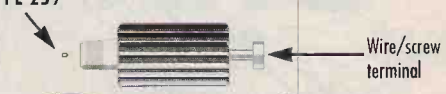

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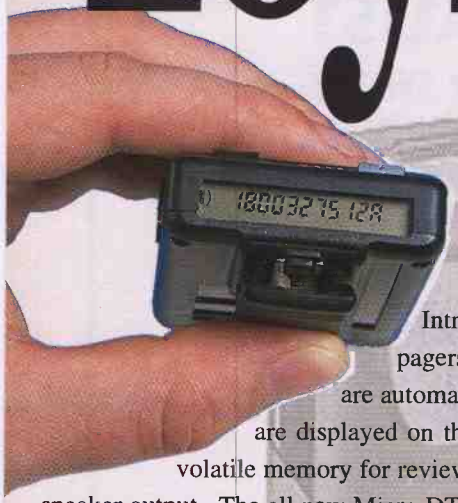

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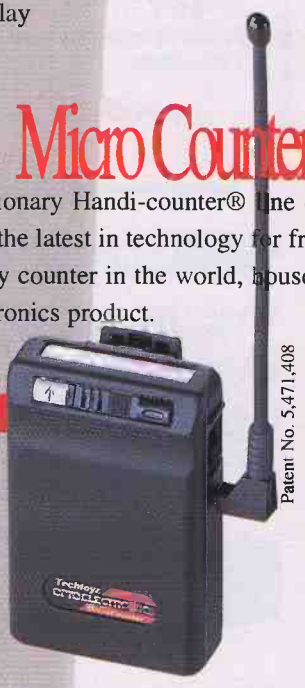

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A TESTING YEAR

AR7030 - March 1996.

SW2 - July 1997.

Lowe stack - December 1997.

TS-570 - June 1997.

FRG-100 - November 1997.

John Wilson, looking back over the past year, singled out the ongoing debate on just what methods should be used to measure receiver performance as being worthy of an article all to itself.

Who remembers Semprini on the wireless? That smooth voice saying "Old ones, New ones, Loved ones, Neglected ones." He was, of course, referring to pieces of music, but my scribblings for *Short Wave Magazine* during 1997 could well be described in the same way, because I see that I reviewed the JRC NRD-345, the Kenwood TS-570D, the Drake SW2, the AOR NB7030, the Fairhaven RD500, the Icom IC-PCR1000, revisited the Yaesu FRG-100 and the Lowe HF-150, played with the WiNRADiO, and threw in a couple of articles on the T2FD antenna and the ins and outs of CE marking on equipment. Two particular topics have run as consistent threads throughout the year: the debate on the marriage of computers to radio, and the methods of testing the performance of the latest generation of short wave receivers.

The perfect marriage of receiver and computer was exemplified by the Icom IC-PCR1000; the Romeo and

Continued on page 45

Continued From page 43.

Juliet approach, whereas the WiNRADiO behaved rather more like Petruchio and Katherina in *Taming of the Shrew*, from which comes an apt quote "O vile, Intolerable, not to be endured". Old Will Shakespeare must have been an equipment reviewer. The debate will, no doubt, continue, but I do believe that Icom have raised a signpost pointing out the road to follow for this particular type of receiver.

The other debate, on how to measure receiver performance, was sparked off by the arrival of the AR7030 from AOR; a receiver which seemed to have such a high level of r.f. performance as to place it head and shoulders above its competitors. The test results obtained by reviewers fell into two quite distinct and differing areas. There were those who employed established test methods slavishly and unthinkingly and those who raised a quizzical eyebrow and realised that something was amiss with the results obtained by those established methods and sought to find an answer to the apparent anomalies in the results. Now it's all very well for me to get carried away by the esoteric world of receiver testing, but to most readers of reviews the argument about third order intercept point measurement is about as interesting as the Vatican discussion about how many angels can stand on the head of a pin.

At this point I promptly ignored what I had just said and proceeded to write a detailed analysis of test methods which got so involved after three pages that I erased the lot and started again with a view to making it simpler. Here goes.

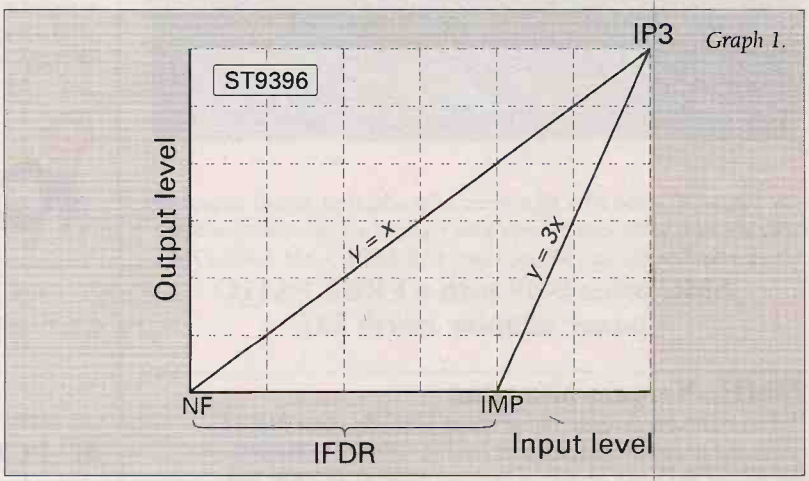
The Simpler Version

When several signals are applied to a non-linear system such as the mixer(s) in a receiver, intermodulation takes place between them, and other signals are generated (Intermodulation products). If the input signals are strong enough, the resultant intermodulation products will appear as real signals, and can be tuned in by the operator of the receiver. The level of input signals at which the unwanted products are generated depends on the front-end r.f. performance of the receiver, and it has become accepted practice to express that performance by a single figure known as the intercept point. The intercept point is actually a theoretical concept because in most cases it cannot be measured directly but is deduced from other measurements of noise floor and dynamic range, but it is nevertheless a simple way of comparing the performance of two receivers provided that the test conditions remain equal and are applied by someone who fully understands what is happening.

The standard test for intermodulation performance is to use two equal amplitude signals which are combined and fed into the receiver under test at a level which will generate intermodulation products equivalent to the noise floor of the receiver. The difference between the noise floor and the input level at which the intermodulation product appears (IMP) is taken as the intermodulation free dynamic range (IFDR), and from the relationship between the IFDR and the IMP level one can calculate the intercept point for that particular product order. The mathematicians among you will know that the two test signals in a non-linear system will generate a polynomial series of products, but for the purposes of receiver testing it is usual to consider only the second order and third order products. Why?

If the two input signals are represented as f1 and f2, the second order products will be found at f1+f2 and f1-f2 and the significant (i.e. close in) third order products at 2f1-f2 and 2f2-f1. The other third order products 2f1+f2 and 2f2+f1 are not usually taken as significant. To put some real numbers into this, my own measurements of third order performance are taken with input frequencies of 14.04 and 14.06MHz, a spacing of 20kHz. The frequencies are chosen so that I can

FRG-100 - November 1997.



Graph 1.

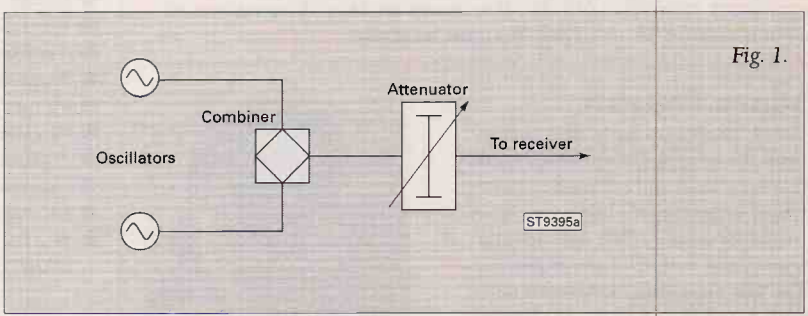


Fig. 1.

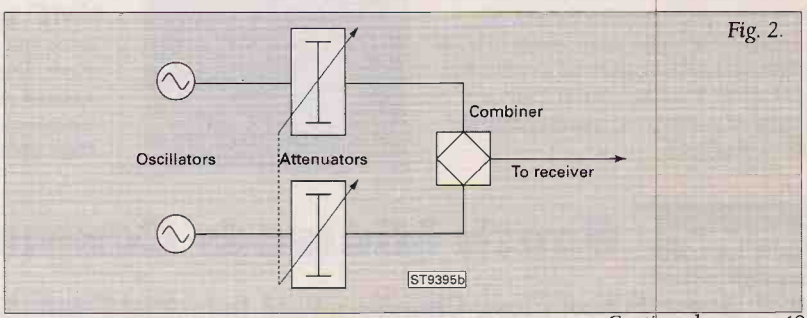


Fig. 2.

Continued on page 48

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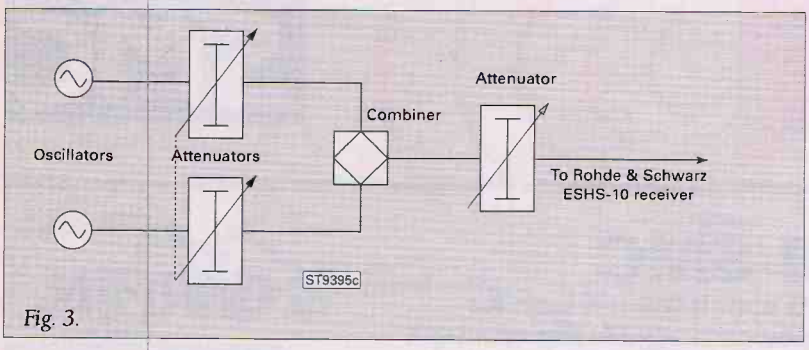
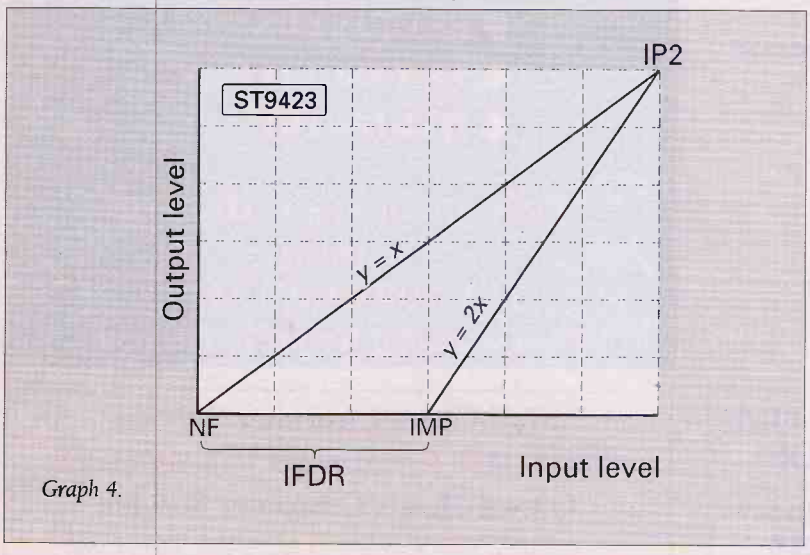


Fig. 3.

measure amateur band and general coverage receivers with the same test configuration, and the 20kHz spacing chosen because it has become an accepted standard across the world and in some cases allows me to measure second mixer performance. The measured third order products 2f1-f2 and 2f2-f1 appear at 14.02 and 14.08MHz, and you can therefore see that they are very close to the wanted signals. In real use, a receiver with poor third order performance will be characterised by a constant level of cruddy, crinkly, crunchy noise when operated in a band containing many strong signals. In poor receivers, the level of crud can obliterate wanted signals completely and weaker signals will not be heard. You can usually spot a good receiver by listening to its apparent quietness between signals, although this assumes a good phase noise performance as well - but that's another story.

The established and often quoted test setup for measuring third order performance is to use two very clean signal sources (in my case low noise crystal oscillators followed by severe harmonic filtering), feed these into an r.f. combiner which gives isolation between the two input signals but low loss between the inputs and the output port and follow the combiner by a precision attenuator having 1dB steps, into the receiver. The oscillator levels are usually set to give 0dBm (1mW into 50Ω) at the output of the combiner. One of the oscillators is then switched off and the level of the remaining single signal into the receiver is adjusted by the attenuator so that the output of the receiver (measured by a true r.m.s. meter) increases by 3dB. At this point the level of input signal is equal to the noise floor and can therefore be taken as the noise floor measurement. If the output from the combiner is 0dBm and you have 122dB of attenuation in circuit, the noise floor will be -122dBm. The second oscillator is now switched on and the receiver tuned to one of the close in third order products. The attenuator is again adjusted until the output of the receiver rises by 3dB, at which point the intermodulation product is equal to the noise floor. The attenuator setting is noted and the level of the input signal determined. Let's say that there is 26dB of attenuation in circuit, in which case with this test setup the IMP is -26dBm. The difference between the noise floor (-122dBm) and the IMP (-26dBm) is the IFDR (96dB), and the third order intercept point is +22dBm.

TS-570 - June 1997.



Graph 4.

Hang on a minute - how did he arrive at that?

Time for a picture, I think. Take the next statement on trust, since there isn't room to go into long explanations: the third order product generated from the two input test signals rises at three times the rate of the input. Therefore for each 1dB increase in input signal the intermodulation product will rise by 3dB, and **Graph** 1 attempts to show what this means in practice.

The vertical (y) axis represents the output from our non-linear device, and the horizontal (x) axis the input. The left hand origin is the noise floor level, and the input signal(s) are plotted from the noise floor using a slope of y=x. This simply means that a 1dB increase in input increases the output by 1dB. The third order IMP has its origin at the point where its level is equal to the noise floor and rises at three times the rate of the input signal, in other words a slope of y=3x. Where these two lines cross is the theoretical third order intercept point, and it's easy to see that this is equal to the IMP plus half the IFDR. Work it out by calculation or construction if you wish, you will find that the third order intercept point IP3 is equal to IMP+IFDR/2, which in my example is -26+(96/2) = +22. Now here's where the measurements can go wrong:

Because we are measuring at the noise floor of a receiver, we are looking at signal levels of a fraction of a microvolt, and we are always assuming that the intermodulation product is being generated **only** by the receiver. Let's suppose that there is some intermodulation caused by external factors in the test setup and the story will be quite different. I carried out some measurements on a receiver and found that its noise floor was -122dBm (seems familiar?) and its IMP was -40dBm. Using the standard formula this gives an IFDR of 82dB and a third order intercept point of +1dBm (IP3 = -40+(82/2). By making one alteration

RD500 - September 1997.

in the test configuration I obtained the figures I gave in my earlier example, that is an IFDR of 96dB and IP3 of +22dBm. Yet this is the same receiver. What changed?

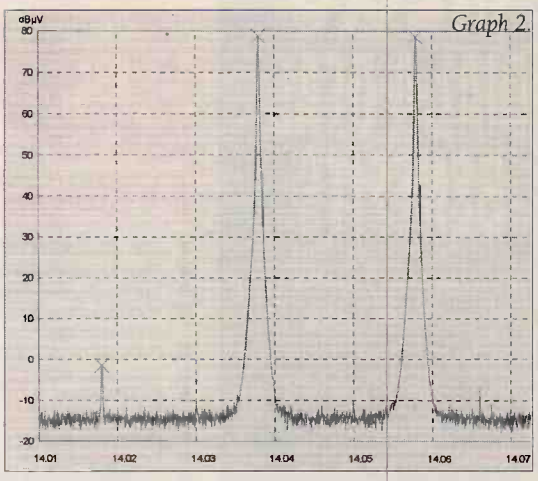
The 'Classic' Test

Figure 1 shows the 'classic' test configuration which I have described, with the signal sources followed by a combiner followed by a single precision attenuator before the receiver. **Figure 2** shows my modified setup using two matched attenuators between the signal sources and the combiner, the output of the combiner being fed directly to the receiver input. The positioning of the attenuators between the source and the combiner means that the combiner is not being subjected to levels of 0dBm (actually +3dBm to take account of a 3dB loss in the combiner) as in the classic arrangement, and the simple truth is that the intermodulation product which I measured in the first setup was actually being generated before it was applied to the receiver. This was easily confirmed by increasing the input signal by 1dB and noting the increase in output from the receiver. In setup 1 the output rose also by 1dB which means that the product I was measuring was certainly not being generated within the receiver. With setup 2, an increase in input signal by 1dB resulted in a 3dB increase in receiver output, which is in line with the y=3x slope for a third order product. Where was the intermodulation taking place outside the receiver?

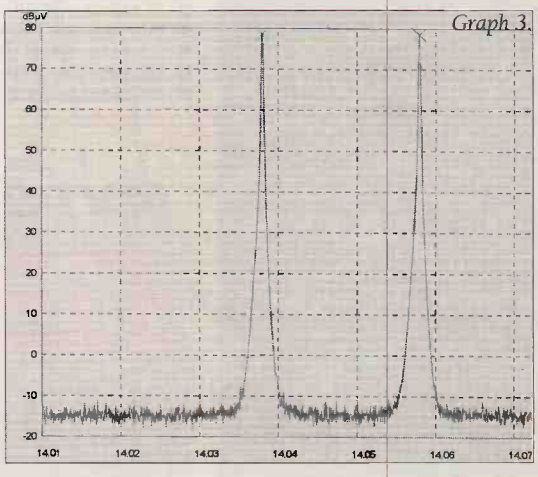
Lengthy Discussions

I have had lengthy discussions with several other reviewers about this problem, and whilst I think that the unwanted intermodulation in my case is probably taking place within the combiner, others point to interaction between the signal sources, particularly when those sources are signal generators rather than dedicated crystal oscillators. Be that as it may, the continued use of the 'classic' test configuration may not produce correct results when the receiver under test has a good r.f. performance, and this is what is meant when we say that the receiver is testing the test equipment. I have to mention at this point the apparently incorrect results obtained by the Radio Netherlands review team who continue to ignore the findings of everyone else and persist in using the old test arrangements. Their figure of +1dBm for IP3 in the AR7030 review has all the hallmarks of incorrect measurement technique. I decided to do some more investigative work on all this, and **Fig. 3** shows what I did.

I set up my two signal crystal oscillators feeding two precision attenuators into the inputs of my combiner. I followed that by a third matched attenuator and fed the signals to a Rohde & Schwarz ESHS-10 measuring receiver. This allowed me to 'move' the combiner closer to or further away from the receiver and signal sources whilst maintaining a constant overall attenuation between the signal source and the receiver. For example, if I set the attenuators between the signal and the combiner to 0dB and the attenuator between the combiner and receiver to 30dB, the combiner would be subjected to the full output of the signal source, but the overall attenuation would be 30dB. Now, changing the setting of the first pair of attenuators to 30dB and the one between the combiner and the receiver to 0dB, the combiner was subjected to signals 30dB lower but the receiver still had 30dB between it and the signal source. Use of the ESHS-10 also meant that I could produce printed records of the results, two of which are shown here.



Graph 2.



Graph 3.

Graph 2 shows the two wanted input signals from my crystal oscillators with the 'classic' test setup of combiner next to the source and 28dB of attenuation between the combiner and the receiver. Note the third order product which is clearly visible at some 14dB above the noise floor. **Graph 3** shows the same test repeated but with 28dB of attenuation between the source and the combiner, with the output of the combiner fed directly to the receiver. The third order product has completely vanished into the noise, and only poked its head over the noise when the attenuation was reduced to 27dB, at which point I was genuinely measuring the performance of the ESHS-10. Let's consider what I have just said.

I have tested a high quality professional measuring receiver using identical levels of input signals from two crystal oscillators, but with the relative positions of the 28dB attenuators and the combiner reversed. The two results obtained from the test show a difference in measured IMP of some 14dB, and if you go right back to my original example, which was not, by the way, the measurement of the ESHS-10 but a good quality receiver on the market today, you will see that the difference in measured IMP was 14dB (-26dBm compared to -40dBm). The third order product measured on **Graph 2** is not coming from the receiver but (probably) from the combiner even

JRC NRD-345 - May 1997.

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Lowe stack - December 1997.

though the combiner is a commercial high quality unit, and it means that any receiver tested which has an IP3 of greater than +1dBm will always measure around +1dBm if the test uses the old 'classic' configuration and there is no material change in the dynamic range of the receiver(s) tested. The test setup described in great detail on the Radio Netherland Web pages is exactly the 'classic' configuration, and I venture to suggest that this is why their IP3 results are consistently around +1dBm and potentially incorrect. Did I state that I would write a simple explanation? Perhaps you should have seen the complicated one.

Take deep breath, sip glass of wine, and remember the 'other' intermodulation product.

So, the third order performance will give you a good idea of the receiver's ability to operate under crowded in-band conditions, but what about the second order products? These can be measured and calculated using the same test setup as described for third order, but the resultant second order intercept point can appear much higher than the figures we have become accustomed to see for third order. This is largely because second order intermodulation products rise at twice, rather than three times the rate of the fundamental signals, and if you look at the simplified **Graph 4** you will see the similarity with the earlier third order graph except for the fact that the slope of the intermodulation product is now y=2x and the second order intercept point is calculated from IP2 = IMP + IFDR.

The Debate Rumbles On

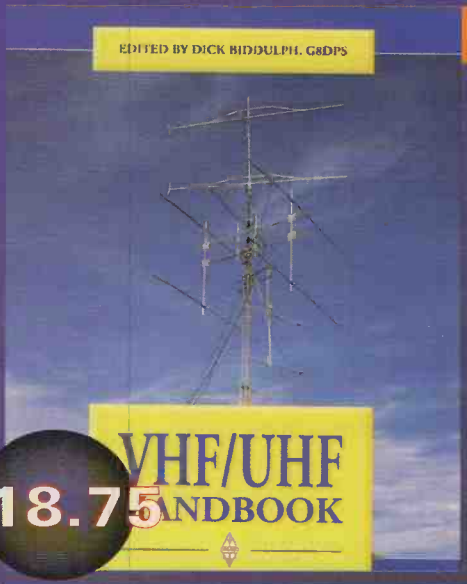
My own view of the value of second order intermodulation products was covered in my recent reviews of the Yaesu FRG-100 and the Lowe HF-150. I use the tests to give an idea of the ability of a receiver to reject simple sums of products from two short wave bands which might appear in another. For example, signals from 6.5 and 7MHz can mix together in a receiver to produce unwanted signals at 13.5MHz (6.5+7). Those receivers having some r.f. selectivity either by the use of a built in preselector or automatically switched band pass filters as in the case of the FRG-100 will have greater ability to reject unwanted signals and deliver a quieter performance than those with wide open front-ends. The contrast between the measured IP2 of +91dBm for the FRG-100 compared to the +35dBm for the wide open HF-150 is example enough of the value of front-end selectivity and I need say no more for the moment.

I hope that after you have read all this, possibly for the second or third time over Christmas, you might begin to see that measuring receiver performance is not just a simple matter of plonking on an ancient signal generator and measuring the 10dB signal-to-noise ratio. You might also get a hint of the debate which has been rumbling on around the world regarding correct measurement techniques and which has already involved visits to Hewlett Packard by Rob Sherwood, the well known engineer and reviewer for the ARRL in Amenca, at which meetings the subject of intermodulation products being generated by interconnection of two signal generators was discussed. There seems to be a general agreement between reviewers (with one intransigent exception) on how to carry out intermodulation measurements on h.f. receivers, but I'm sure that the debates will continue, and when we have decided how many angels can actually stand on the head of a pin, I'll let you know.

The other thing to keep in mind is that out and out r.f. performance is only one aspect of deciding whether or not a receiver is made for your needs, and the size, shape and weight can also be important, particularly if you want to carry your listening device to far flung corners of the Empire and run it from dubious power sources half way up Kilimanjaro. In a future article I'll try to cover the many and varied topics which affect the decision as to whether or not a receiver is right for you as a user, and do my best not to get too carried away next time.

May I wish you all a very happy and peaceful Christmas, and thank you for having read my scribblings over the last two very pleasant and productive years as a reviewer. I hope that some of what I have written may have helped you to understand and gain greater enjoyment from what is an absorbing hobby for us all.

AR7030 - March 1996.



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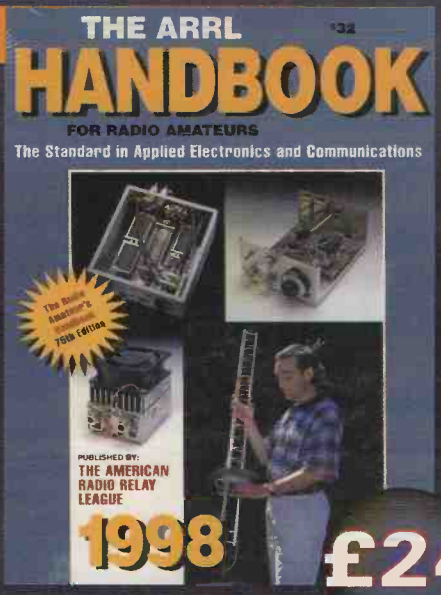

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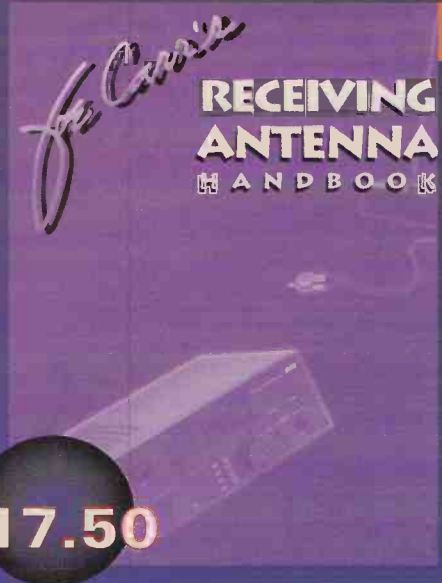

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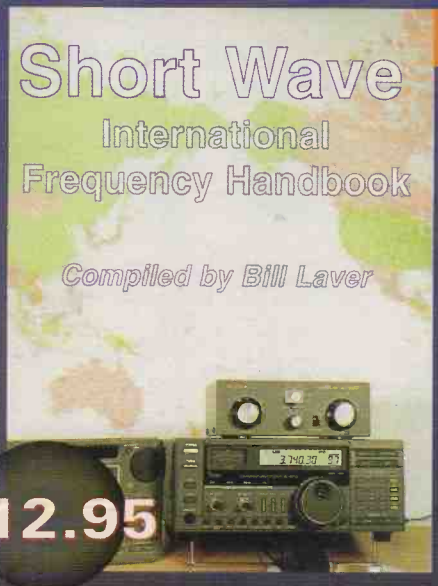

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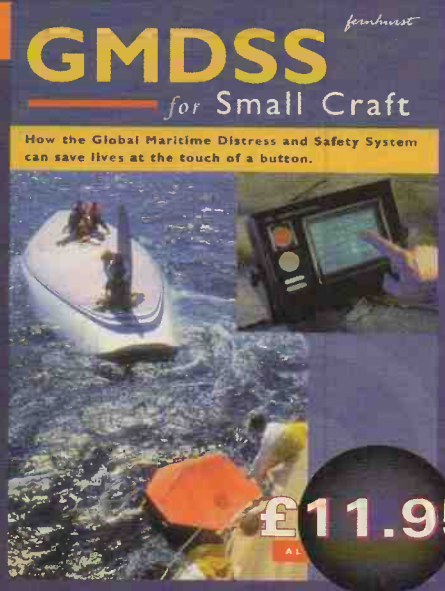

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Must Go To A Good Home

Do you often read the small ads in magazines? John Worthington GW3COI does, and thinks life would be very dull without them!

You often hear grumbles about the amount of advertising, but I think life would be very dull without the small ads particularly. I read one yesterday, which I'd never seen before, which accurately reflected an affluent society. It described a modern rig for sale at half its cost price "indistinguishable from new, duplicated purchase".

Often seen is the expression "unwanted gift" which implies that the item was one that the recipient wouldn't touch with a barge pole and is, therefore, as pristine as the day that it left the shop. I priced out one of these so-called unwanted gifts the other day involving a complete set of weather satellite gear. I started to imagine the donors of such as being a married couple agonising over their son's coming birthday and how they should give him something he'd like.

Aware Of Hobby

The advertiser had a callsign, so his folks would have been quite aware of his hobby. They eventually chose the Weather Satellite gear by sticking a pin through this magazine. I could be wrong about this, maybe he had a row with his XYL and she had pinched his cash card and had ordered the stuff fully aware he was a QRP c.w. man.

Then there's this business about the chap who must sell his rig so that it will "go to a good home". No, it's not a dog he's selling, but perhaps a much modified 1154 TX or even a home-brew RX. What does he mean by the words 'good home'?

Somewhere in the Home Counties where ne'er a harsh word is spoken or perhaps a Darby and Joan perched on a rocky crag in Mid Wales, knitting a sampler with an ancient callsign picked out in flowers. I wonder if the seller's conscience would be obliterated if he had only one offer and that from the nicotine stained fingers of a council house tenant like GW3COI.

Time Wasters

An amusing ad occurs quite often wherein the seller says he is having to advertise again "due to time wasters" He probably had no replies whatsoever to his first try, but thinks people will now be very suspicious when they see the second ad.

But this is not the general reaction as after all there is nothing to prevent anyone putting two consecutive insertions initially). Mind you, if you have a 'thing' about 'time wasters' you shouldn't be advertising at all.

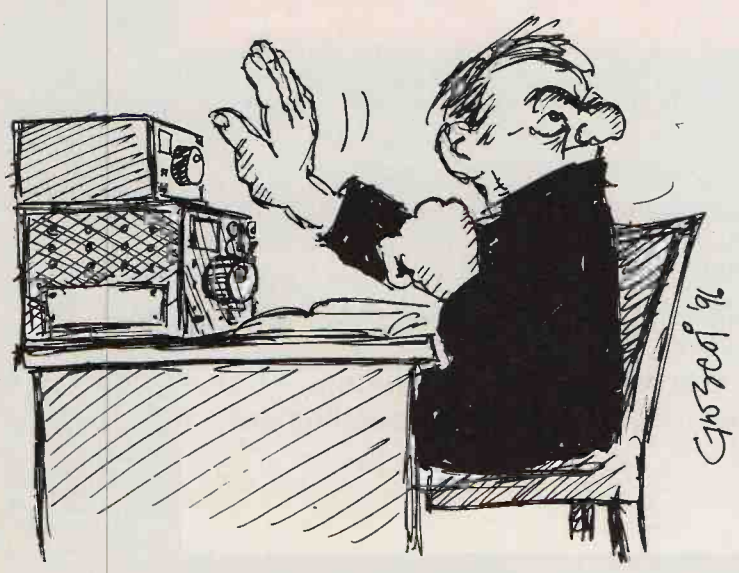
Any calls resulting from your advert will obviously take up your time and anyone who imagines a sale will result very quickly with little discussion is living in cloud cuckoo land. In any case, putting the words "due to time wasters" would certainly put a lot of blokes off as they fear having their head bitten off if they 'phone.

Dismantles & Collects

I am always intrigued by the instructions "Buyer dismantles and collects" attached to the sale details of large masts and beams. The point is, does one collect the cash from the buyer before he starts the job or what?

Suppose he finishes and then says "sorry, it's not in very good condition, the sale's off". Then he might fall off it and you could finish up being sued. It's a dodgy thing altogether and I think this is what puts me off getting a tower.

Years ago I had a home-made one and sold it "sight unseen" to a ham miles away. It was collected by the railway lorry for a small sum (those were the days!) and somehow it got badly bent in transit. The ensuing saga lasted until the dark nights came round again - a bit like this article!



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Wage War On Whistl
A Notch/Peak Filter

How many times has your reception of a distant station been spoilt by an annoying whistle that you could not eliminate? If your experience is anything like Peter Rycraft's, the answer is often. This useful add-on unit can reduce heterodyne interference and enhance the reception of c.w. signals. Part 1 describes the thinking behind the filter design.

The completed unit.

Offending whistles can originate from a number of different sources - perhaps a heterodyne caused by an adjacent carrier, or maybe a signal radiating from some local electrical equipment, such as a computer or a television receiver. Although most decent short wave receivers have some form of i.f. filtering, if the interfering signal lies within the pass band of that filter, it will still be heard.

The only practical way to remove the unwanted signal is to severely attenuate a very narrow band of frequencies, just a couple of hundred hertz, the centre frequency of which is identical to that of the annoying whistle, and thus the reminder of the received signal is unaffected and still intelligible. What we are doing is putting a narrow 'notch' in the receiver passband, and the interference is said to be 'notched out'. Since this interference can lie anywhere in the audio frequency band, it is essential that our notch can also be tuned across the band, so that it can eliminate the whistle, regardless of its frequency.

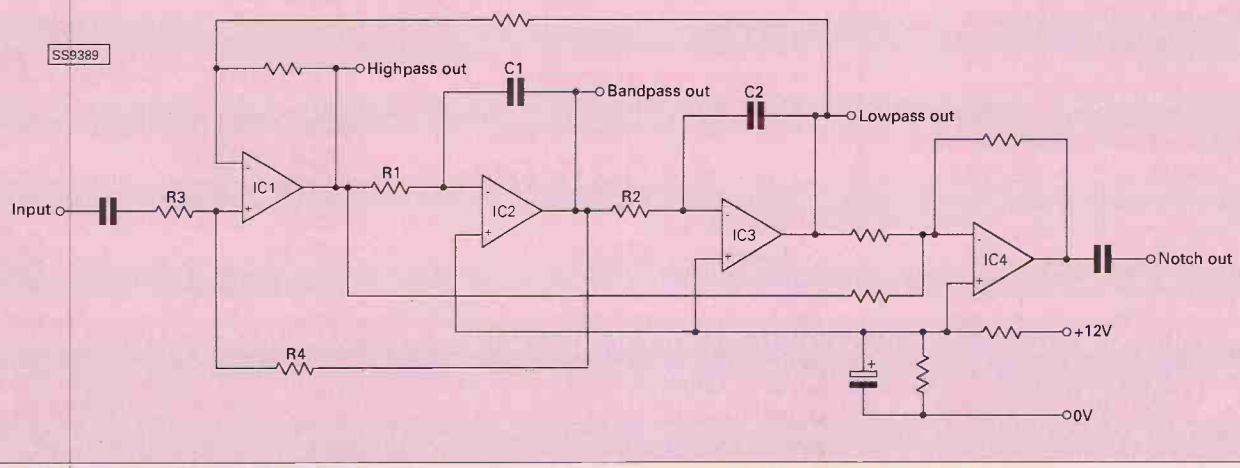


Fig.1.1.

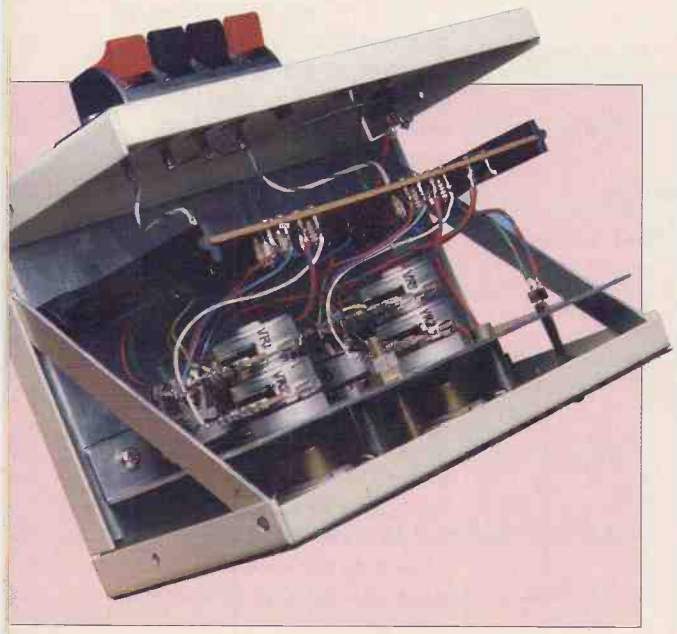
es With

The notch filter described in this article is designed to be inserted between the audio output of a receiver and a loudspeaker or pair of headphones. It is tuneable over a range of nearly 4kHz and the bandwidth of the notch at the 3dB points is just under 200Hz. It is not unusual for an interfering signal to be above 4kHz, but should one have a need to go higher than that, it is a simple matter to alter the tuning range of the filter, as will be shown later.

Another very useful facility, available at no extra charge, is the ability to convert the narrow notch into a narrow peak, thus amplifying the whistle instead of attenuating it. This is particularly helpful if listening to Morse or data transmissions, when they can be lifted clear of background noise. Sometimes reception can be improved by eliminating a local powerful signal, in order to hear a weaker one that is on, or near, the same carrier frequency.

For a few years now, one of my interests has been the DXing of marine and aero radio beacons, and the notch/peak filter has proved invaluable on many occasions. From my location in Suffolk, there are quite a number of fairly local beacons radiating strong signals and, if the conditions are right, French, Dutch, Belgian and other beacons can also be received at good signal strength. It can sometimes be quite difficult to 'see through' these beacons to what lies beyond, and this is where the filter is a great asset.

In the notch position, it can be tuned to the modulation frequency of a local beacon, thus drastically reducing its signal strength, and enabling weaker adjacent signals to be heard, or, alternatively, the filter can be tuned, in the peak position, to a wanted weak signal, thereby amplifying it, and improving the chance of identification.



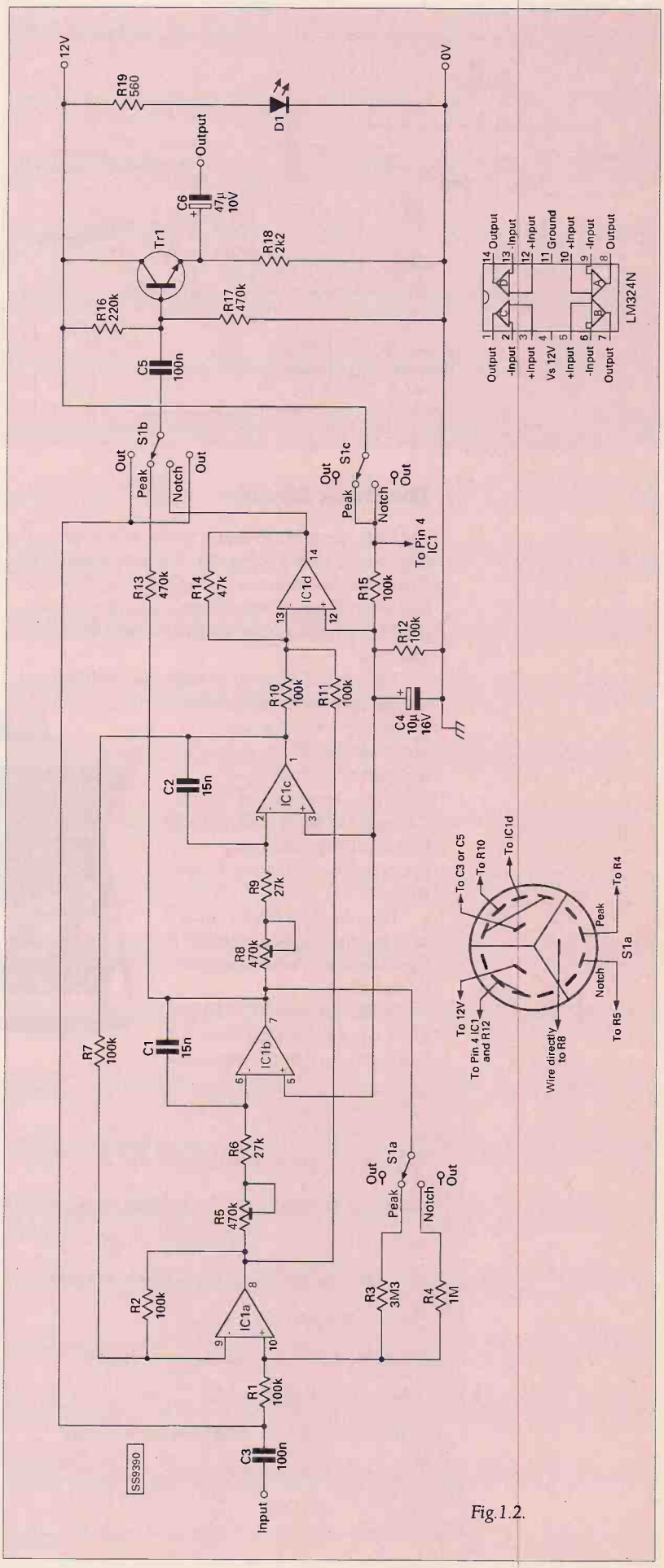


Fig.1.2.

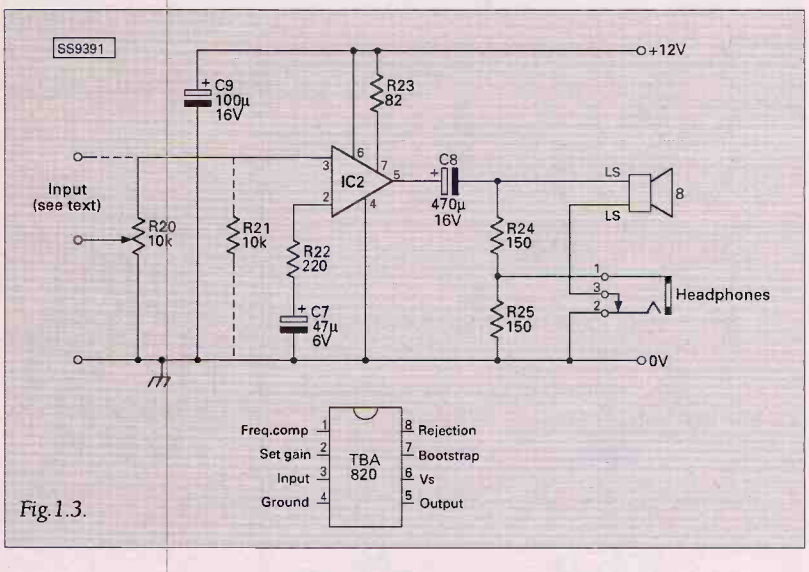


Fig.1.3.

The Basic Circuit

The basic circuit of the filter is known as a 'state variable filter', and is shown in **Fig.** 1.1. It is a multi-function filter, constructed around four op-amps, and has four outputs: highpass, lowpass, bandpass and notch, all provided simultaneously, without the need for switching.

The notch is achieved by adding the highpass and lowpass outputs equally in one of the op-amps, which acts as a summing amplifier. It can be designed to operate at a set frequency, determined by C1 = C2 and R1 = R2 or made tuneable by substituting a dual-gang potentiometer for resistors R1 and R2.

The gain of the filter is equal to its Q and this can be established by the relationship between resistors R3 and R4.

In **Fig.** 1.1 since R1 = R2 and C1 = C2, the operating frequency f_o is determined by the expression

$f_o = 1/(2\pi R C)$

where f_o is in Hz, R in MΩ and C in µF.

Thus for a frequency of 1kHz (1000Hz) and C = 1nF (0.001µF)

$R = 1/(2\pi f_o C) = 1/(2\pi * 1000 * 0.001) = 1/2\pi = 0.16M\Omega = 160k\Omega$

The Gain (and also the Q) of the filter is as follows:

Gain - Q = 1/(2(1+(R4/R3)))

Therefore, if R3 = 100kΩ and R4 = 1MΩ

Gain and Q are equal to 5.5

and similarly if R3 = 100kΩ and R4 = 3.3MΩ

Gain and Q are equal to 17

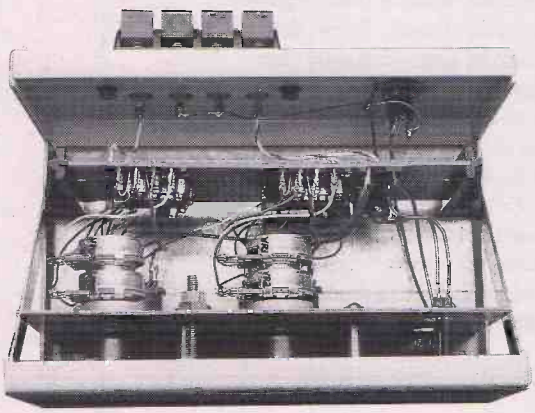
The Q of the filter determines the bandwidth of the notch or peak, and the higher the Q the narrower the bandwidth. There is a practical limit, though, as increasing the Q also increases the gain, leading to instability and self-oscillation.

The Practical Circuit

The circuit of a practical notch/peak filter is shown in **Fig.** 1.2 and it will be seen to have sprouted a few appendages compared with the basic circuit. The switching is necessary, not just for changing the mode, but also for selecting different values of feedback resistor for the notch and peak positions.

Although the notch output would drive a pair of headphones directly, provided that they were no lower than about 60Ω impedance, the peak output much prefers a high impedance load, and therefore a simple emitter follower buffer stage has been added, which can either drive a pair of headphones or feed into a power amplifier driving a loudspeaker.

The prototype, built on a plug block, used four LM741 op-amps, but the final version was made much more compact by the use of quad op-amp, type LM324N, which has a better specification than the 741 and at 50p, is good value for money. All the switching is achieved by using a 3-pole 4-way rotary switch, S1a switching between two different value feedback resistors for the notch and peak positions, S1b selects the required mode for operation, and also, in the OUT position, bypasses the filter completely, and S1c supplies 12V to the filter, but cuts off the voltage in the OUT position.



The reason that resistors R4 and R5 differ in value is that when carrying out measurements on the prototype filter, it was found that increasing the gain too much in the notch mode had the effect of reducing the depth of the notch which was unacceptable, but a high gain was needed in the peak position to obtain the required narrow bandwidth.

With the resistor values shown in **Fig.** 1.2 the notch depth is at least 40dB which is the limit of the author's measuring equipment and the gain at the centre of the peak is approaching 18dB, giving a very worthwhile improvement in signal strength. Resistors R1 and R2 in the basic circuit have now become R5 and R8 in the final model, this being a dual gang potentiometer with a linear track. A log law potentiometer

will work perfectly well, but the calibration will be rather cramped at the high frequency end of the scale.

The frequency coverage of the filter is determined by capacitors C1 and C2 and the extent of that coverage by the value of potentiometer R5/8. Resistors R6 and R9 ensure that there is always some resistance left in circuit when R5/8 is set at zero. The choice of frequency coverage is very much up to the individual to decide, but a look at some of the measurements made on the prototype may help is making a decision.

Table 1.

R5/8	R6 = R9	C1 = C2	Frequency Range
470kΩ	27kΩ	1.0nF	333Hz - 5.685kHz
470kΩ	33kΩ	1.0nF	332Hz - 4.715kHz
470kΩ	39kΩ	1.0nF	330Hz - 3.890kHz
470kΩ	27kΩ	1.5nF	238Hz - 4.040kHz
470kΩ	33kΩ	1.5nF	233Hz - 3.340kHz
470kΩ	39kΩ	1.5nF	230Hz - 2.745kHz
470kΩ	27kΩ	2.2nF	155Hz - 2.620kHz
470kΩ	33kΩ	2.2nF	151Hz - 2.180kHz
470kΩ	39kΩ	2.2nF	150Hz - 1.785kHz
220kΩ	27kΩ	1.5nF	450Hz - 4.040kHz

The low frequency end of the range is tuned with maximum resistance in the potentiometer and vice versa, and it can be seen from Table 1 that using a lower value for R5/8, i.e. 220kΩ, raises the lower end of the band, whilst the top end remains unchanged. Incidentally, the 470kΩ pot used, was in fact only 440kΩ when measured. The values chosen by the author for the final version of the filter are those best suited to his own interest in beacon hunting, but the frequency range is wide enough to cover practically any eventuality.

In Fig. 1.2 resistor R13 is used solely to reduce the output in the peak mode, and one could experiment with different values if required. The author discovered than an amplified whistle could be very hard on the ears! R14 control the gain of IC1d, and again, there is room here for experimenting. Resistors R15 and R12 provide a potential divider across the 12V supply and the resulting 6V output is fed to the non-inverting inputs of IC1b, c and d. In the emitter-follower buffer stage, the input resistance to Tr1 is approximately equal to the current gain of Tr1 multiplied by the value of the emitter resistor R18, which is 2.2kΩ.

However, this resistance is shunted by the value of the bias resistor R17, which is 470kΩ and so the resulting input impedance is going to lie somewhere between 100 and 300kΩ, depending on the gain of an average transistor. The choice of transistor is not in the least critical and any low noise *npn* type will work satisfactorily.

The current consumption of the filter is 5mA and the buffer stage draws 3mA. The buffer stage is quite suitable for driving a pair of headphones, but for decent loudspeaker reception a power amplifier is recommended. The popular TBA820 is a good choice for this application as it has a low quiescent current of 4mA and can deliver 2W into 8Ω with a 12V supply.

A suitable circuit is shown in Fig. 1.3, which, as we are not interested in high fidelity reproduction, has had some of the non essential components omitted, The voltage gain is set by R22 and approximates to 6000 divided by the value of R22, which is 220Ω, giving a gain of about 27. This is more than adequate, bearing in mind that the unit is being fed from a headphone output.

Higher gains can be obtained by reducing the value of R22, but at the expense of distortion. The volume control R20 is not strictly necessary as the level can be set by the receiver's volume control, and if this arrangement is preferred, R20 should be replaced with a 10kΩ resistor to ground (R21), and the input taken directly to pin 3 of IC2. If using the power amplifier, capacitor C6 in Fig. 1.2 should be changed to a 470nF polyester capacitor.

My final version has, in fact, two identical filters which can be used in series to great effect, and this idea many commend itself to some would be constructors. Bearing in mind my interest in beacon DXing, one filter can be used in the notch mode to eliminate a local overpowering signal and the second used in the peak mode to enhance a weaker signal.

This arrangement has proved to be most effective on many occasions. Similarly, when decoding c.w. or data transmissions, the wanted signal can be improved with one filter, while an interfering signal can be reduced with the other. The various combinations of switch positions will cover most situations, and so not require a detailed explanation.

You Will Need

150Ω	2	R24, R2
510kΩ	1	R21 (optional, see text)
0.1µF	2	C3, C5
47µF 6V	1	C7
47µF 10V	1	C6 (see text)
100µF 16V	1	C9
Semiconductors		
Diodes		
5mm l.e.d.	1	D1
Transistor		
BC109	1	Tr1
Integrated Circuits		
LM324N	1	IC1
TBA820	1	IC2

Miscellaneous Maplin Blue Case 212; 4-way lever terminal block; 2.1mm d.c. power socket; on/off switch; Slow motion drive pointer; Rotary switch 3p 4w (S1); Headphone jack (optional); Headphone jack; Veroboard 29 tracks x 19 holes; PCB guides or 'L' brackets; Instrument knobs; Clip for D1; PCB pins and hook-up wire.

Part 2 will provide you with the details of how to build your own notch/peak filter.

DX Television

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

Sporadic-E activity returned in all its glory during the second half of October with a fair share of lengthy openings. It was a reminder of the far off days of summer! Spain and Italy were a feature of most openings, although Portugal appeared once on Channels E2, E3 and, surprisingly, E4. The latter channel is a 35W relay located in the north at Valenca do Douro. Low-level tropospheric signals from Belgium and France were detectable most days but enhancement around the 21st and 22nd produced strong signals mainly of Benelux and German origin.

October Sporadic-E and Tropo Log

13 Italy E2 (VIDEO), IA and IB (RAI UNO); Spain (TVE-1) E2, E3 and E4.
15 Italy (RAI UNO) IA; Spain E3.
19 Italy E2 (VIDEO) and IA (RAI UNO).
20 Italy E2 (VIDEO) and IA (RAI UNO); Unidentified signals on R1.
21 Italy E2 (VIDEO), IA and IB (RAI UNO); Spain E2, E3 and E4. Tropospheric reception:- France (Canal Plus) L5; Luxembourg (RTL+) E7; Belgium E8 (RTBF-1), E10 (BRTN-1); Germany (ARD-1) E6.
22 Tropospheric reception: France L5 and L6; Luxembourg E7; Germany E6, E7, E8 and E11; Belgium E3 and E8 (RTBF-1), E10 (BRTN-1); Netherlands (NED-1) E4, and UHF.
24 Serbia (RTS-1) E3; Italy E2 (VIDEO), IA (RAI UNO); Unidentified E4 programme with cross-shaped logo.
25 Italy E2 (VIDEO), IA and IB (RAI UNO); Spain E2, E3 and E4; Serbia E3; Corsica (Canal Plus) L2 and L4; France (Canal Plus) L3.
26 Portugal (RTP-1) E2, E3 and E4 (Valenca do Douro 35W relay); Spain E2, E3 and E4; Italy (RAI UNO) IA.
27 Italy E2 (VIDEO), IA (RAI UNO); Corsica L2; Spain E3; Unidentified E4 programme with cross-shaped logo.
28 Germany (ARD/ZDF) E2; Italy (RAI UNO) IA and IB; Spain E3; Unidentified signals on R1.
30 Spain E3.

Reception Reports

Using a loft antenna and small-screen multi-band portable obtained from a local catalogue shop, **D. Carver** (Nottingham) has successfully captured several out-of-season Spanish openings in Band I. Spanish and Italian reception has been encountered by **Peter Barber** (Coventry) with RAI UNO on Channels IA and IB. The Italian private station 'VIDEO' just below Channel E2 on 47.870MHz has also appeared during most openings.

Moving on to tropospheric reception, the 21st and 22nd were the best days in Central England with strong German (ARD/ZDF) signals visible in Band III. On the 21st at 0735UTC, Luxembourg was identified on E7 from a news/current affairs programme called 'RTL Aktuell'.

During the evening, various Dutch u.h.f. transmissions strengthened, allowing reception in perfect colour with readable teletext information, according to **Deryck Fentem** (Derby). The NED-2 signal from Lopik was so strong it obliterated Sandy Heath and Kimberley BBC-2 signals which normally pollute this channel in Deryck's area. He is using a large-screen (and we do mean *large*!) Grundig receiver for DX and domestic use but it does have a serious drawback: the digital video processing creates an annoying mosaic effect on moving scenes!

DXing UK transmitters has its attractions, one being that signals can be received on a normal domestic receiver. **George Garden** (Edinburgh) reports a 'first' during a recent tropo lift with YTV from Emley Moor on Channel 47. The Burnhope Channel 5 transmitter on Channel 68 has also been identified.

Stephen Michie (Bristol) has sent photographic examples of Sporadic-E reception noted last summer. We are featuring some of his off-screen photos this month. Stephen uses an indoor dipole antenna which feeds a D-100 DX-TV converter.

Unusual Logos

On October 25th, TVE-1 was displaying a white 'CC' logo in the lower left corner of the picture. The usual 'tve I' symbol was absent. The Italian RAI UNO logo has been spotted in the top right and lower left corners of the screen. A cross-shaped logo within a box seen an Channel E4 is causing some head scratching. **Peter Barber** (Coventry) suggests it could be from Switzerland. Has anyone else seen it?

Reception From MIR

Michael Schulsinger (Spingfield, Ohio, USA) suggests that Peter Barber's Russian speech encountered on 143.625MHz (reported in the November issue) was almost certainly from the MIR space station. Peter now confirms this and signals have been noted roughly every 96 minutes. This equates closely to the duration of one orbit of the Earth.

FM Band Reports

On the 20th, during a tropo lift, French broadcasts from Lille on 103.7 and 105.2MHz were heard in Edinburgh by George Garden. Much of the reception was along a sea-path down the east coast. **Dave Phillpotts** (Looe) asks whether there is a European f.m. station directory available listing low-power relays. The WRTHB is useful but only the high-power outlets are listed.

Technical Problems

Channel 5's technical side is still attracting criticism. Peter Barber has noticed that after a prolonged absence the squares, crosses and numbers page (teletext page 598) has reappeared. Does anyone know its function as it is not listed on page 599?

Also, the Channel 5 text page clock began to change only every six seconds. Maybe this was a test for the introduction to Eurotime where there are ten new seconds in a minute, ten new minutes in an hour, etc! Anyway, it is now back to normal.

Sunspot Cycle

Peter Barber advises that Cycle 23 officially commenced in May 1996 and that the peak is now predicted for early in the year 2000, possibly mid-March. **Ian Johnson** (Bromsgrove) adds that conditions should steadily improve over the next 12 months, so we need to be extra vigilant and more aware of the increased possibility of F2-Layer reception.

Initial signs of F2 activity have previously occurred in mid-October with Channels E2 and R1 affected. A vigilant eye was kept on Channel E2 this October, but without success.

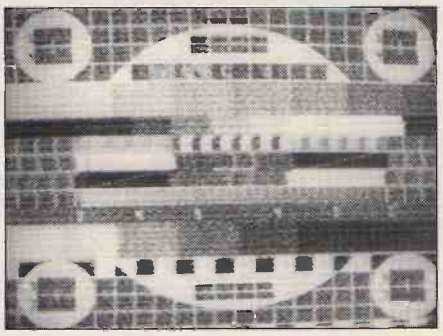


Fig. 1: The 'standard' version of the Lithuanian G-204 test card with 'LRTC' identification.

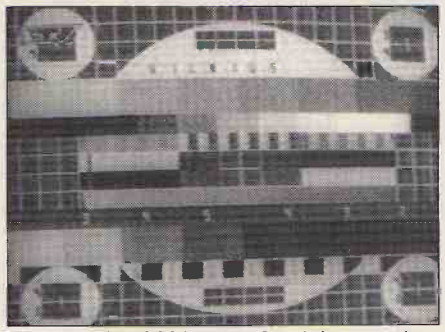


Fig. 2: Modified G-204 pattern from Lithuania with 'VILNIUS' identification. The 'LTV' logo is also present in the top left-hand corner.

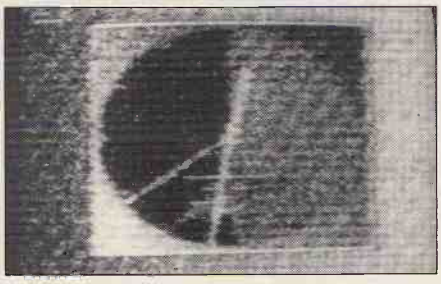


Fig. 3: LTV clock received on Channel R2.

Fig. 4: Belarus continuity announcer. A stylised 'bT'

More New Logos

Channel Four are unhappy with their 'Connections' logo, introduced less than a year ago at a cost of £500 000. The current logo is made up of circles

and lines, which symbolise the key connections between the channel itself (represented by the figure 4 in one circle) and three other entities - its programmes, society at large and the channel's viewers (we all knew that, didn't we?). Apparently, the logo has been criticised by corporate design experts. The logo is under review, but changes will probably not go ahead until the New Year.

Night-Time News

Transmissions of the famous Test Card 'F' on BBC-1 have been drastically reduced following the introduction of 'BBC News 24'. The cable-TV 24-hour news service is being shown during the night via the BBC-1 network.

The first airing via BBC-1 took place at midnight on November 9th/10th. The presentation during the first few minutes seemed embarrassingly amateurish!

Mysterious O.B. Symbols

Godfrey Manning (*SWM* 'Airband' columnist) is puzzled by a drafting template used by BBC Outside Broadcast engineers. It has various shapes including a square, triangle, circle, cross and two keyholes. Does anyone know what it was used for?

Service Information

Observations by Stephen Michie (Bristol) during recent openings are as follows:-

Belgium: The TV-1 network shows programme trails during the daytime. TV-2 uses a wide-screen version of the PM5544 test card.
Denmark: DR-TV transmits the PM5534 until midday, followed by text pages with schedules shown prior to station opening. The DR-1 logo is displayed in the top-right of the screen throughout programmes.
Netherlands: All NED-1 programmes display a '1' logo enclosed by a diamond shape with the name of the programme company below such as NCRV, AVRO, KRO, etc. At closedown, a standard PM5544 test card is broadcast followed by an FuBK pattern without identification. Then continuously scrolling text appears showing 'NOZEMA, ZENDER LOPIK, TE IJSSELSTEINI'.
Slovenia:'Live' weather pictures from popular tourist spots are broadcast during test periods. Several other countries including Switzerland, Austria and Germany also do this.

Keep On Writing!

Please send TV and f.m. reception reports, news, off-screen photographs and information to arrive by the 1st of the month to:- **Garry Smith, 17 Collingham Gardens, Derby DE22 4FS.**

Fig. 5: Spanish news programme from TVE-1.

Fig. 6: One from the Christmas archives! Test Card "F" wished everyone a 'Merry Christmas' in 1988.

Satellite TV News

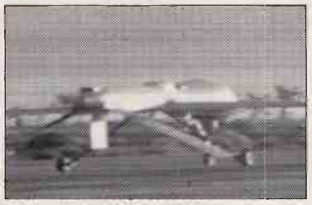
ROGER BUNNEY
35 GRAYLING MEAD
FISHLAKE
ROMSEY, HANTS
SO51 7RU

October 20th and unusual sightings on Intelsat 803 @ 27°W. Checking across the transponders at 11.590GHz horizontal NTSC standard pictures from an aircraft, hills, then close-ups of military installations, a tank and an airfield. The 1800 hours sightings continued without any audio and ceased transmission with a 'Globecast NY' and the pictures then cut. The following day late afternoon and up appeared pictures though this time of an unusual aircraft, prop to rear taxiing along a runway in the desert in the rising sun. Lifting off and yet more airborne pictures - as before the camera featured sighting lines and other inlaid data. A subsequent discussion with a learned source revealed that this was an unmanned surveillance aircraft undergoing tests prior to use across former Yugoslavia. The then present, manned, air surveillance aircraft were being spotted with missile laser sighting and these are being withdrawn. To whom these pictures were intended isn't known and unusually they were carried in the clear, analogue!

New reader **Garry Crawford** (Kennoway, Fife) has a second-hand 1m dish and 1dB noise LNB feeding a Pace receiver. He manually turns his dish from Astra (Sky) onto the various Eutelsats, Intelsats and the Scandinavian Thor slot. He's now planning to look for the various live sports feeds and I've suggested the publication *What Satellite TV* for all data on satellite, programmes, frequencies, and encryption. Perhaps Garry should talk to **Dean Rogers** (SE2) who's main interest is sports news/OB circuits. Dean comments that football was everywhere in October with matches from the French leagues on Telecom 2c, UEFA Cup and Champions League games on Eutelsat II F4 (most of these appeared on Eurosport delayed) and the European Cup Winners Cup for Channel 5 carried via Eutelsat II F3. The Norwegian game was played in falling snow and during half time Dean heard the commentators tell the studio in London that they were off for a hot coffee after commenting Chelsea had probably been freezing their nuts off! Dean's a golf fan and his 'lowlight' sighting of October was the European Tour - OKI Pro-Am via Telecom 2D (5W) for Canal Plus Espana using PAL in an encryption form that resembled System/Nagravision - but in colour.

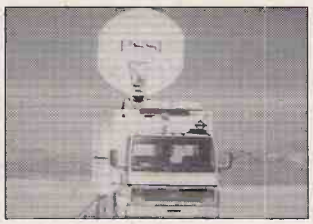
It's worth checking Intelsat K from around 0730UTC weekday Winter mornings as various feeds into the UK's breakfast TV shows can often be found. The Reuters-2 uplink truck is often active around 11.540GHz vertical with UK domestic offerings - in clear analogue. For example, morning of October 27th an item on trading standards was carried, another day featured the dangers from high levels of lead paint found in old houses during renovation. At October end the North Atlantic birds - Intelsat K 21°W, Orion-1 37°W and PAS-3R 43°W all became very active with news inserts and two way interviews ex Massachusetts during the closing days of the Louise Woodward trial, the verdicts and the judge's revised sentence. At one time, three simultaneous analogue downlinks were visible into their UK clients. Sky, BBC and ITV. Less exciting was the PAS-3R offering at 12.702GHz horizontal in clear NTSC analogue entitled *The Second Annual Worldwide Lessons in Leadership Series* with a main audio of original dialogue overdubbed in Spanish and clear English on another subcarrier.

I wonder if the traditional budget carrier Eutelsat I F5 @ 25°E is well, a heavily inclined craft requiring elevation tracking to maintain signal reception. I've seen nothing from it lately and many evening circuits traditionally carried on this bird are appearing on both Orion and PAS-3R. For example *Hands off Horton Hospital*, a live protest at 1800 concerning a hospital near Banbury was carried via Starbird UKI-94 on Orion - 12.670GHz vertical (a proposed merger of the Horton and Radcliffe hospitals). I wasn't too certain of the PAS-3R 1830 sighting from the Capsis Beach Hotel at 12.735GHz horizontal November 3rd though it looked rather warmer than Romsey in November! Orion is often carrying NTSC feeds in NTSC for MBC back into the UK from around 1730, another in clear analogue - OK if you speak Arabic...the world hasn't gone totally digital! **James Broughton** (Yateley) modified his Horizon to Horizon motor mount on his dish with an additional 150mm actuator drive on top which lets him hinge the dish upwards, achieving elevation adjustment and tracking any inclined orbit satellites. Did anyone see the 'Shell Test' transmission on Intelsat 803 27°W at 0730 morning of November 12th at 11.680GHz horizontal? They remained on colour bars for ages...



The unmanned surveillance aircraft seen on tests via 27°W.

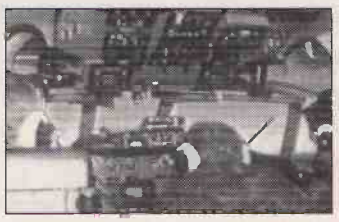
Live TV surveillance images from the aircraft.



During the UK Thrust SSC land speed attempts.

RTP Lisbon and a news feed via Eutelsat II F2 @ 10°E.

The MIR station damage shown centre RH.



Live digital pictures from the cockpit of the rescuing craft as it approaches the MIR station.

Our old friend **Roy Carman** (Sandown, IoW) has just returned from a trip into the former Eastern Bloc, he passed through the Brandenburg Gate into former Eastern Germany - which resembles a vast building site - Roy unfortunately suffered a car accident but found the local Polizei very helpful and kind. On his return, Roy checked across the satellite arc and was appalled to view Iraqi news material on Eutelsat II F3 @ 16°E (11.574GHz) showing women soldiers in action "in the name of Islam" - the Gulf area may well soon be featured in news feeds again judging by current sabre rattling mid November. Roy comments that the only unencrypted feed seen these days on Hispasat 30°W is their Lotterei National which is usually carried from exotic locations around Spain, check out 11.575GHz vertical.

There is a web site specialising in satellites, TV reception from same, equipment info, etc. and **J.M. Winsor** (Bromley) asked me to publicise the French 'Club Europeen de DX Radio Television (CEDRT)'. If you subscribe to one of their publications then you have 'free' access to the web for a year - **http:/www.ndirect.co.uk/-sorwin/cedrt.htm** - are the letters to tap, J. Winsor can be contacted via E-mail on **sorwin@ndirect.co.uk** - I'm personally not active on the 'net, relying on the Post Office for my mail, my Amstrad can only just cope with this article so I cannot comment on what you'll find on the site.

News From Orbit

The China Great Wall Industry Corp. - the Chinese outfit that launches rockets - will try their luck at orbiting ChinaSat-8 in Autumn '98 via a Long March 3B rocket. The bird will offer 36x C-Band and 16 x Ku-Band transponders. Chinese launches in recent times have been tarnished with rockets exploding and failing to reach orbit.

Spectrolab Inc. in LA have introduced a new solar cell that converts incident sunlight into electrical power at a 21.6% efficiency compared to the 12.5% norm. This was achieved by layering dual junction gallium arsenide solar cells and selectively converting sunlight into electricity.

Australia Television, the service that spans Indonesia and SE Asia has been relaunched by the ABC and The Seven Network and remains on-air - the service is now 100% English langauge and targets English speakers, 'Aussi expats' and 'affluent English speaking Asians'. And 'SVT International' should be on-air soon via Sirius-2, being a service contributed from the Swedish SVT-1 and 2 terrestrial networks.

A marriage between rivals French digital networks AB SAT and Television par Satellit should see the combined service operational end '97. AB Sat's exclusive channels 'Animaux' and adult offering 'XXL' will go onto TPS and using Simulcrypt encryption. The rival French digital service CanalSatellite welcomes a new sports channel early '98. The channel will be run by Amaury Press and L'Equipe groups and offer 24 hour sports coverage and news - as yet the channel has to receive a name. And in Poland, Canal Satellite Polska is advancing their plans to start their digital service 18 months earlier (Spring '98), to rival Nasdaq's '@ Entertainment' package (April '98).

Early October saw the demise of India's ISNAT-2D satellite, having been in operational orbit since early Summer. A loss of power is the suggestion, but the knock-on effects have been considerable, with loss of communications to the more remote parts of the sub-continent. Over 80 regional centres have lost contact with Delhi and even the National Stock Exchange (NSE) ceased trading for three days. Some services have been transferred to the ageing INSAT-2A and the new bird - INSAT-2E- won' t launch until Summer '98 and even then many of the transponders have been prebooked by Intelsat!

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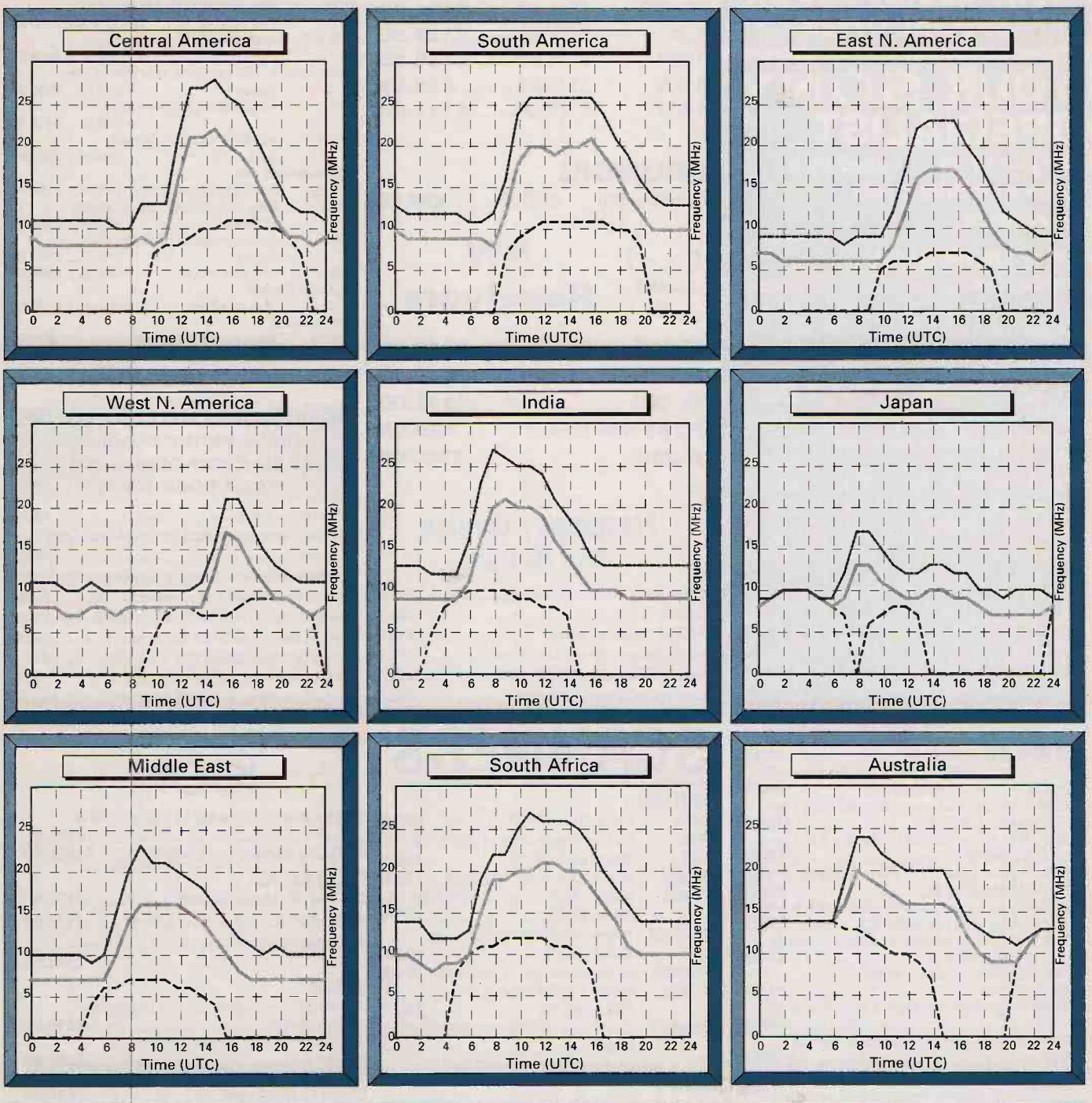
World Propagation Forecasts

JACQUES D'AVIGNON
VE3VIA

January 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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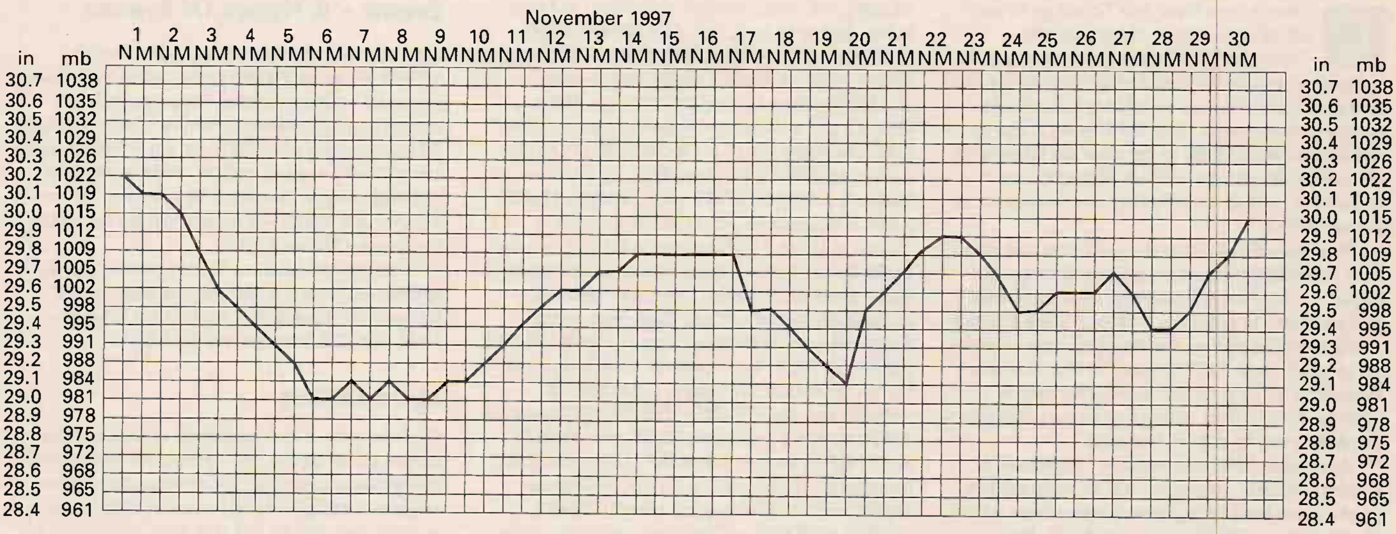
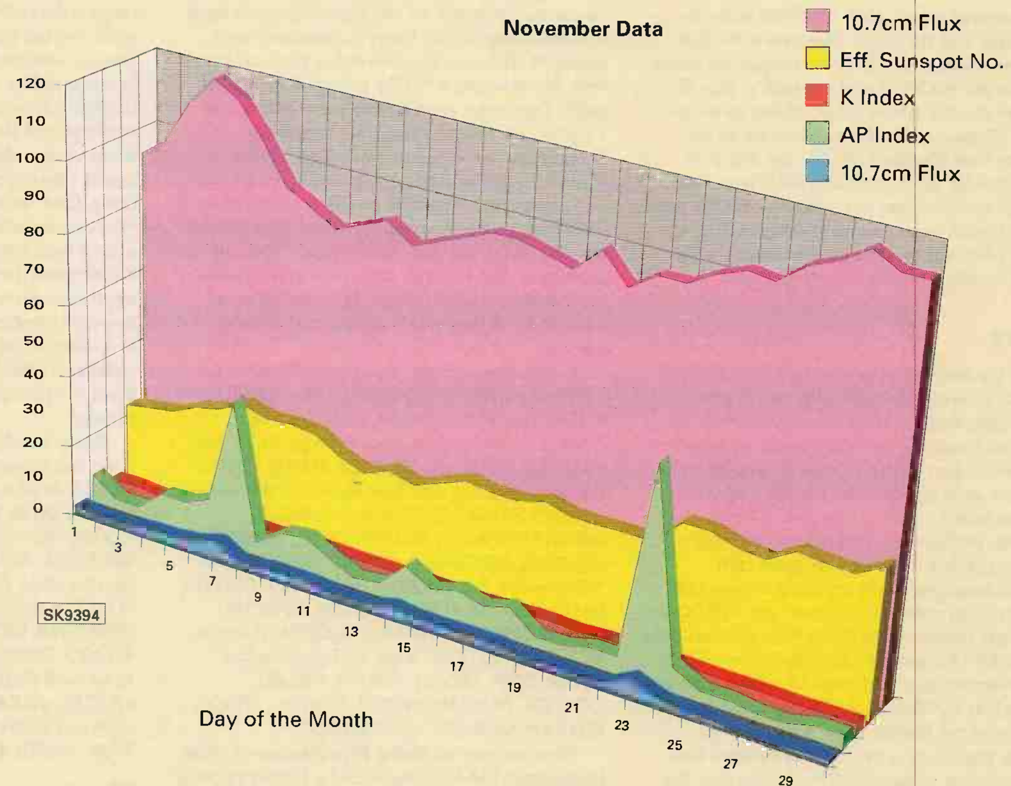
BROADSTONE

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



Amateur Bands

Round-up

PAUL ESSERY GW3KFE
PO BOX 4
NEWTOWN
POWYS SY16 1ZZ

Christmas and New Year Greetings to you all! Already, early in November the Christmas lights locally are erected and the 'early birds' among the shoppers are looking for the presents. Some of us are wondering just what to occupy ourselves with while the long dark days of the 'festive' season keep us day after day listening to the infernal line timebase noises of neighbours slumped in front of the telly after over-indulgence in food and drink.

Personally, if I can clear the paint-pots and other such decorating incidentals back into their proper places in time, I mean to spend at least some time at the drawing-board and workbench home-brewing additions to the station. For example, I can operate on all bands up to 432MHz save for 6m, so maybe a transverter or a rig for that band. Alternatively I might look at 1.3GHz - though to be sure that also demands a visit to the local hill-tops.

Again, given tolerable weather, I might look at some h.f. 'mobile' operation. Not so much actually on the move but looking for a nice spot from which the /M suffix on 14MHz c.w. might be profitable - which is not necessarily some place up on the highest available peak but almost certainly a lower site with a take-off in the preferred direction over water. If all else fails, I might sit down with a text-book and learn a bit about radio!

So many facets, so many different things to pursue - in fact, a hobby for a lifetime!

DANGER!

Observation of sunspots is a tricky old business. You **do not** look through a telescope at the sun unless you **want** to go blind. You project the image of the sun on to a bit of card and look at that. You can't even use the 'finder 'scope' to line up on to the sun. It's easier and safer to subscribe to *Sun Mag* from **Neil Clarke**, G0CAS - the title is an abbreviation for SUN spot Data, MAGnetic data, but Neil's work includes much else besides the daily records. Details from Neil on (01302) 531925. On the days when you can't be on the bands, the Six and Ten Report from G0AEV will fill you in.

Letters

First-off the interesting 'gen' from **Philip Davies** in Market Drayton, answering various questions. For example, Philip now believes DX1A was OK and argues a case for this and he goes on with one of his own in that all the YY plus three calls heard have been weak signals so he wonders whether they now have a novice or restricted licence in Venezuela. M/W2X was one mentioned back in the July issue, but it now seems some USA amateurs operating in UK are using M/own call rather than the more usual G/own call. WP3X was the contest station of the Cabo Rojo Contest club, formerly KP4XS, and the QSL Manager is W3FG. Now to Argentina, and the use of suffix letters on a call such as LU7DID/Y. LU7DID is licensed for operation in the Buenos Aires area and if he operates elsewhere in the country he signs with the appropriate suffix added; Philip adds that the suffix letter 'Y' covers the Neuquen district. As for the nuts-and-bolts, Philip found: on Top Band CU2CE, EW4MM, FG5BG, FP/KG8CO, GU2FRO, KC1XX, HB0/HB9AON(Liechtenstein), OY9JD, TK5NN in Corsica, V47KP, VX3BMV/1 in Nova Scotia, and at 0640 ZL2JR. At 3.5MHz CO2JD, FM5DN, H22A, LU6FBI, PJ9B, P40W, TI4CF, V26B, VE6SV, V8EA, in Brunei, W7DD for Arizona, ZL7AA(Chatham Is), and 6W1QV. On 7MHz EM1HO was a Ukrainian Antarctic station, while EM8I was really Ukraine, HH2PK, HK0TCN (San Andres Is), IH9/OL5Y (Pantellaria Is), JW5E on Svalbard, JY9QJ, SX2T (Greece), VP2EC, ZL3GS, ZX0F (Fernando do Noronha), and 5C8M in Morocco. Up to 14MHz where A41LZ/SJ was the Royal Omani Radio Society's Silver Jubilee station, CE8T, EY8WW, IY4FGM (Marconi Memorial station) R0/UR8LV at Cape Chelyuskin in the Russian Arctic, S97A (Sao Thome), TR8IG, TU2CI, ZD7PP, ZM2K in New Zealand, ZW2E (Couves Is), 3A1B, 3E1DX in Panama, and 9M8R. To 18MHz now, and DS5USH, KH0/JP1UEE Saipan Is), R1FJR on Franz Josef Land, ZS2JL, plus 7L4IOU and 7N2PTB both in Tokyo. At 21MHz the scalps included AY1I (Argentina), CW5R in Uruguay, D44BC, HC8N (Galapagos), HR1JPT, P29AS, VU2MB, VX8XN/P a Canadian celebration of the 200th anniversary of the Law Society, W7GN (Oregon), XF3/EA3BT (Cozumel Is), YB1AQS, Z21CS, 5X1S, and 6D2X in Mexico - which leaves 28MHz where A45XR, CV1T in Uruguay, FR5DX, HC5C, J41DKL, P3A (Cyprus), L70FM in Argentina, 3DA0ACA, 3V8BB, 5X4F, 6V1C, 9J2BO, and 9X0A in Rwanda.

Now to **Harry Richards** in Barton-on-Humber on the subject of coaxial connectors. Harry's gear uses the Belling-Lee type of connector for which he can buy ready-made leads in various lengths; but Harry's experience with buying PL-259 connector leads has been unhappy with, for example, a PL-259 pulling right off the cable! Two things must be said here. Belling-Lee TV plugs are designed to a 75Ω impedance, while PL-259s are not impedance-matched. While Harry's PL-259 was clearly a manufacturing failure, no - repeat **no** - coaxial is intended to be removed from its socket by yanking the cable! Take hold of the plug to do this, and never put any strain on the cable itself. Ready-made coaxial leads are invariably made from the solid (as against stranded) inner conductor, so they won't survive much flexing anyway.

In Newcastle, Staffs, **Ted Hearn** listened on 21MHz for AM0MM, CN8VS, EA7BA, EA3AUI, IK1RAO, KC4YCS, KM5FB, N2NU, OL2A, ON4CCN, PA3GSJ(Maritime Mobile), SX2T, SS0L, VE3ODC, YZ4IZ and ZX0F On 18MHz VK3EQ was spotted along with Europeans. 14MHz yielded DL2EHP, EU1GC, EA5/GW3LDC, F5JBQ, IH9/OL5Y, SP8GVB, TK5NN, TM1K, YO8RBO, YU1ADO, ZZ9TJP and 4U1GIC. Down again to 7MHz where Ted picked up on AM3AM, DL5LDL, EA1JG, EA3BCP, HJ5TEH, HL3ERJ, HP2CTM, OF6KD, SM3CEW, SV1ACK, VU2ESH, VU3PRA, YT1BB and YU1EBC; while on Eighty we find DJ2XB, DJ4PI, F6DZU, HB9VW, M0ARU, OZ9DDS, PA3CWP, RK3DH, SP3HDU, SP7KYI, SM4AAH, UA4HUR, and WA4YBV.

Now we turn to **Philip Northmore** of West Hampstead, London, who noted a 28MHz opening around 1500UTC on October 2 when PX5JP a 'special' in the town of St Catalana on 28.459MHz to commemorate the Brazilian visit of the Pope; the station was operated by PP5OW.

Events - & Hopes Of Events!

Let's start with one of the latter. **Jim Smith**, VK9NS will be at VU2JBS while visiting F6FYD who is in India on business; they hope to obtain a licence for Andaman or Laccadive Islands. Though A45XL has now gone QRT, the shack and antennas are still being used, by A45XJ. 9X0A is RW3AH until February. In Guyana, a YL operator, Tere ex XE1ASF and YJ8AS will be 8R1ASF for the next two years. QSL via XE1MD.

Finally in this area we hear of another Spratly Is expedition, mainly comprising members of the Chiltern DX Foundation, probably in February 1998. The QSL Manager will be G3SWH.

More Letters

Our anonymous correspondent throws another loaded gun at us this time. What, she asks, is most important in a receiver - sensitivity, gain, dynamic range or stability? *Crikey!* I suppose with this one you pay your money and take your choice! On h.f. at least, a very sensitive receiver is wasted most of the time because the noise coming in is far greater than the receiver's own noise. So - we can compromise a bit here in favour of a high dynamic range. After all, for most of the time we are trying to copy a weak signal surrounded by much bigger ones. They may not be in the receiver passband, but if they hit the mixer input hard enough l.o.! everything mixes with everything else and noise occurs, swamping our weak signal. So dynamic range is the ratio between the minimum detectable signal and the onset of intermodulation. However, there is another sort of dynamic range, which is set by the presence of *phase noise* usually from the first oscillator. Seen on a spectrum analyser any oscillator will show noise sidebands to greater or lesser extent; these will beat with strong incoming signals close to the wanted one and so create noise. Gain: we want just enough gain to turn our minimum detectable signal into our chosen audio output level and not a single decibel more; furthermore the ideal to aim at is that as the input signal rises every stage in the receiver should overload simultaneously - in practice of course the first mixer is the initial one to 'fall over.' As for stability, it's handy for 'armchair copy' but normally there is a tuning knob to give the desired results anyway!

Finally for this time, **Colin Dean** in Barnsley. Colin had a look at TopBand to find CT3BX, CU2CE, EA6SX, HB0/HB9AON, LY7A, SV8CS and UA2AA. Up to 3.5MHz for C31OF, JT1BG, KL7XX, VK3AJJ, VK4BER, VK6APZ, ZL1IU, and 5B4/RA9JR. 7MHz is a 'pet' band for Colin and here he offers AP2N, EK4JJ, HL3ERJ, HP1XTI, HZ1CCA, OD5NH, PJ9B, PJ9Q, T70A, VP2EC, VP5T, V26B, VK2XN, VU2SWJ, ZF2AH, 3V8BB, 4S7BRG, 7M2PJC, and 9Y4U. 18MHz was the spot to be for BV5GQ, D44BC, HL2DNN, SU3AM, VK3CKL, G3XAM/mm off 3V8, and 9M2TO. Up again and 21MHz produced FS5PL, PJ9B, TK5NN, T70A, YM3SV, ZD8Z, 8P9Z, and 9J2FR.

Wrap-up

That's it for this time. Send your stuff in please, to reach me by the beginning of the month to PO Box 4, Newtown, Powys SY16 1ZZ. Enjoy your break!

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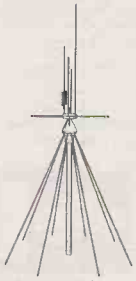
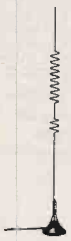


Skyscan DX-V1300 base disconne – Most disconnes only have horizontal elements and this is the reason that they are not ideal for use with a scanner. Most of the transmissions that you are likely to receive on your scanner are transmitted from vertically mounted antennas. The DX-V1300 has both vertical and horizontal elements for maximum reception. Constructed from best quality stainless steel and aluminium and comes complete with mounting pole. **£49.95** + £3 P&P.



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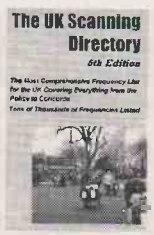

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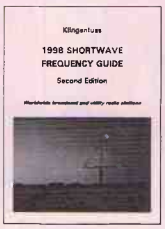

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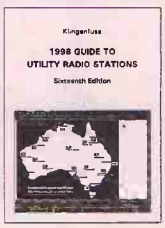

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I hope that you all have a good Christmas and that you get what you want. Many more new scanners, no doubt! I have just had a telephone call from an unnamed gentleman regarding a choice of scanners for Christmas and I hope I gave impartial advice on this area of the hobby. One comment that I often hear is that there are no 'head to head' scanner reviews in *SWM*, where two separate scanners covering the same ranges and priced more or less the same, are being done. I'd agree. It's been a long while since I've had a scanner to review. John Wilson does some pretty good technical reviews of kit. Perhaps the Editor will bear this request in mind and get two of the reviewers together for a 'Battle of The Kit' feature aimed at seeing what's what out there. Sounds like a good idea to me! I have written previous reviews from a non-technical point of view - something raised again by a few of you who 'phoned to say they don't understand things like sensitivity and dB figures, fall-off and the like.

Fair enough. As a scanner user with a limited technical knowledge I'm interested in what the particular machine can pick up, how rugged it is and whether it's worth the outlay in terms of longevity. However, reviews in the magazine are about the best you can get so my advice is to cut through the hype and look at the set and what's being said about it. Most of it - too much of it by some standards if your complaints are anything to go by! - is all positive and there must be poor scanners out there!

More Calls

On this point a lengthy telephone call from **David Stevenson** of Redruth, in Cornwall, suggested that if every scanner reviewed was so good, does it mean there aren't poor machines out there? He also suggests that we stop 'being nice to manufacturers' and go for the truth, adding that it is the consumers who pay - and if kit is poor, it's not likely to appear so within the pages of any review in *SWM*. As David puts it "...it's as if your reviewers are almost scared to be critical in a constructive manner about the realities of a particular model. Surely every scanner and radio that is reviewed cannot be as consistently good as the magazine makes them out to be?" I can't comment on Editorial policy, David, but I do tend to agree with you. If, in my opinion, a scanner isn't worth the outlay I'll say so. However, as I don't do reviews any more, you'll have to take this point up with the Editor. I hope you do!

Damon Bell of Southend wrote in to ask whether I could assist him in identifying antennas used on ships and boats. This isn't as easy as it seems! In **Fig. 1.** I've put in a drawing of a 'typical' trawler, or fishing boat, and included a key to what's what. Different vessels have different layouts, Damon, but I hope this simple diagram shows you basically where things go. This vessel has 'double' h.f. and v.h.f. whips and would be fitted with a main h.f. TX/RX and two v.h.f. sets. It makes sense nowadays to double up as she may be talking to another vessel on intership as well as monitoring Channel 16. She also has a GPS/SATNAV fit and a Decca set. Twin radars - which would be set to close and long range respectively. Larger ships would have a variety of antennas and **Fig. 2.** looks at a cargo ship, which has a slightly different lay out to the smaller vessels.

With regard to your query about Pilot boats - they would be v.h.f. fitted, with possible a ship-ship u.h.f. for use by the pilot. Cellular 'phone would be fitted as well, and most merchant ships - including trawlers - are so fitted nowadays. Some would also have 27MHz CB as well! In reality, there is such a wide range of communications available to commercial shipping nowadays that to list them all 'as standard' would not be accurate.

Staying with shipping in a sense, a request for information from

Wyn Griffiths MW0AQZ comes next. Wyn is part of the Ynys Mon Radio Users' Group and they are setting up a special event station later this year with the Holyhead Marconi connection as its focus. The first UK ship to be contacted by Marconi was the *Lake Champlain* in the 1900s. Has anyone any information on this event, perhaps a photograph of the ship herself? The event is scheduled for May to coincide with the re-opening of Holyhead's Maritime Museum and any information would be appreciated. The station operated for around two years at Holyhead before being re-sited at Seaforth, in Liverpool. Anyone with any information should contact Wyn direct at: **Tros y Garreg, Plas Road, Holyhead LL65 2LU**.

Wyn is a member of the Trearddur Bay Lifeboat crew and besides being an ex-RN man, also served with the RNXS. Now a licensed amateur, he hopes that someone somewhere will have something that the group can use in their event station. Please do try as special events stations engender the spirit of the hobby - and would prove that links exist between radio listeners and their transmitting counterparts.

Fig. 1: Fishing vessel.

1) Main h.f. whip
2) v.h.f. whip
3) Radars
4) GPS/SATNAV
5) v.h.f. whip
6) Decca Navigator antenna
7) h.f. whip

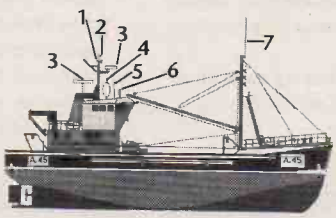
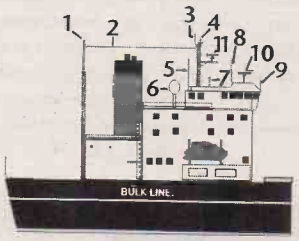


Fig. 2: Bulk Cargo vessel.

1) Radio mast
2) m.f./h.f. wire antenna
3) v.h.f. whip
4) SATNAV
5) h.f.whip
6) Telex/voice comms housing
7) Decca Nav ant
8) v.h.f. whip
9) u.h.f. (shipboard) whip
10) & 11) Radars



Not Hot

Bob Birnie of Aberdeen wrote in with a query as to what mode is used by civil and military aircraft and also asked about steps. I've written to Bob in person but for other newcomers out there who may not know the score, it's a.m. and 12.5kHz steps. Aviation queries should be addressed to Godfrey Manning, who runs the excellent 'Airband' column and while we cross over some in that most users use scanners, we try to keep our respective hobby items separate! I trust that this informs most of you as to what goes where! My thanks to Bob for the Antarctic frequencies he sent on. I'll give them a try on h.f. when I've got time Bob and will report in with what - if - I get same.

Thanks also to all those 934MHz CB operators who wrote in to tell me the band isn't dead! I appreciate that and will now just say that the matter is now closed - and that 934MHz is very much alive around the country.

Also, in my piece on marine v.h.f. Channel 6 is an intership frequency and while I took some flack from some of you who said that various Coast Guard stations aren't so fitted, I beg to differ! Most Coast Guard stations have a full fit on v.h.f., with a few having scanners in the op's room for ensuring an all around coverage! I also took umbrage by the accusation from one listener - who didn't give his name - who said that HMCG operators are not 'that hot on the air' as they are now mostly 'volunteers'. Having worked as a volunteer with the RNLI, with volunteers from HMCG, including their Cliff Teams, all I'll say is that those me and women do a bloody good job and have always been, in my dealings with them, total professional. It's all too easy to dismiss the volunteer status as being not as well trained as professionals - but I just wonder how many people out there are still walking around thanks to volunteer input from HMCG, RNLI, Private Rescue Services, St. John's and so forth. Volunteering isn't for everyone - but those who give up their time and the comfort of a home to go out and do a valuable job are, in my eyes, **most** professional. So, if you've got comments about the volunteer services I'm afraid I don't think of them as being anything less than absolutely brilliant. Well done them all.

James McGahan asks if anyone can supply fire service codes and callsigns in Hampshire. James had written in previously but the mail seems to have got lost! Anyone who can help him should write direct to: **9 Little Green Lane, Chertsey, Surrey KT16 9PJ**.

James also sent in a page from the *Monitoring Times* website - **http://www.grove.net/hmpgmt.html** - where it appears the anti-scanner law may be repealed, with some modifications. I'll leave the actualities of details out of this month and draw into them next month. However, it is as I thought it would be - mobile 'phone manufacturers *et al* going the distance and being 'spectrum hungry' and wanting privacy. I am, however, going to tempt you by saying that we could see the end of the double image problem...

...and, on that note, I'll wish you all a good month, good scanning and remember! Unusual stories, clippings and web pages to me at my home address. In the meantime - may I take this opportunity to wish you a merry Christmas and a good 1998. May you each receive what you wish for and, until next year, have a peaceful and prosperous holiday, let's be careful out there!

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This month I have several smaller items to tell you about. These don't really fall into any one category, so this month's column is a bit of a mixed bag.

A New Network?

A new network of stations has appeared recently, and is proving to be one of the more interesting ones to listen to. It is also proving to be quite difficult in determining exactly who is involved.

In September, a number of listeners became aware of a lot of activity on 5.206MHz. Once details were passed around, a lot more people started to listen, and to try to establish what kind of a network was involved. I tried listening myself during the evenings, but found absolutely no activity. However, I found the frequency very active with many stations during the morning. Since then, I have found that they do not seem to be active in the evenings, but I have yet to discover what time they start in the morning - the earliest that I have heard activity is 0700. Many people have commented that this must be Coastal Control because there is a station with the callsign Control, and other callsigns are similar to those used in the Coastal Control service.

The callsigns being used are almost always two letters, and vary between KA and KZ; there are two callsigns which seem to be special in some way - the callsigns MXU and 'Control' seem to be running the network somehow. Most of the signals are u.s.b., but they do lapse into some kind of digital transmission - possibly RTTY.

Patient listening has shown that the accents of the operators come from several different NATO countries, with Dutch, English and German accents identified so far. The voices seem to vary between adult and teenager voices, which may indicate that some of the operators are under training. Callsign MXU seems to oversee all the signals and transmissions, and only joins in when necessary, otherwise MXU remains quiet.

Just a few weeks ago, another frequency was found for this network - one station asked another to QSY to 8.3038MHz, and very soon afterwards the two stations were heard on this new frequency.

The best description so far is some kind of NATO Network, but exact details of who is involved, and what they are doing, is yet to be determined.

NAVTEX

A reader from Belgium, who I'll not name, as the authorities there are not to keen on this kind of listening, writes with a copy of a NAVTEX transmission he copied during late October. The transmission gives details of maritime broadcasts by Scheveningen Radio in the Netherlands, shows the kind of information that is available via NAVTEX, and how it can be used to help us in our part of the hobby. The broadcast message is shown in **Fig. 1**.

Coastal Control

Geoff Halligey writes with details of a possible change to the UK Royal Navy Coastal Control network. Geoff says that the Channel Echo ship calling frequency has changed from 6.509 to 6.522MHz. I have tried listening several times for the tell-tale two-tone signal, but I have had no success. However, I have not heard it on the old frequency, so maybe I am listening at the wrong time of day.

The proper title for the service known as Coastal Control is the United Kingdom Maritime Coastal Communications System (UKMACCS). For the record, here are the Coastal Control calling frequencies: UKMACCS

	Coastal	Ship
Alpha	1.780	1.875
Bravo	2.702	2.754
Charlie	3.710	3.158
Delta	4.420	4.502
Echo	6.509	6.221
Foxtrot	8.716?	8.2353
Golf	13.1349	12.3641

(all freqs in MHz u.s.b.)

If you spend a few minutes checking each of the Coastal frequencies in the above list, you should find at least one frequency active with a two-tone signal every five seconds - this indicates that the particular frequency is the active frequency, but that it is available for use.

I would be interested in hearing from other readers who can either confirm or deny the change to 6.522MHz.

Florida

Earlier this year I wrote about the closure of the USAF h.f. station at Albrook in Panama, Central America. The closure was the result of a USAF decision to remove its forces from the region, and to transfer its Southern Command to MacDill AFB on the Gulf Coast of central Florida.

During September, the withdrawal was completed, and Southern Command became active from its new base in Florida. All the same operations are carried out from here, and almost all the usual callsigns from the area (e.g., Shark is most often reported) have since been heard. There has been one minor development which has come to light since the move.

On several occasions, aircraft have been asked to contact a ground station direct on a frequency of 12.270MHz. This falls right in the middle of the 12MHz Maritime channels, but on the occasion that I heard this frequency given, I was able to hear both the aircraft and ground-party after they had changed frequency. A frequency worth watching for activity.

Virgin Balloon

Yes, it's that time again - time for intrepid balloonists (or is that balloon-atics!) to attempt to circumnavigate the globe in a hot-air balloon. Last year there were five or six attempts, and the most successful was Steve Fossett who floated all the way from central USA to India.

This year, I know of only one confirmed attempt, but I have heard rumors that there are at least another four in the planning stages. Richard Branson will be attempting the flight once again, in an identical balloon to the one used last year, launched from the same place as last year - Marrakech in Morocco. Nothing is ever certain in ballooning, and even less so in a world circumnavigation attempt such as this. The exact launch date can only be pinned-down to either December or January, and depends upon the weather at the launch site. A web-page has been set-up to keep everyone informed of progress; the web address is **http://challenger.virgin.net**

However, readers of this column can be in on the action just like last year. If everything happens like last year, the *Virgin Challenger* balloon with Richard Branson, Per Lindstrand and Rory McCarthy on board will use Portishead Radio to make contact with their ground station in London. Many readers reported hearing *Virgin Challenger* on 5.610MHz working a Virgin airliner flying across Europe, and people even heard Richard announcing their decision to abandon their attempt.

Obviously, I have no idea when the balloon flight will take place, but you can be sure that the British media will be following the story closely. Once you see something about the flight on TV or radio, or read about it in the newspaper, I would recommend that you start scanning the Portishead h.f. frequencies.

Fig. 1: NAVTEX broadcast from the Netherlands Coastguard.

ZCZC PL01
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IJMUIDEN) WILL CONTINUE THIS SERVICE.

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DAILY SCHEDULE AT 03.33/07.33/11.33/15.33/19.33 AND 23.33 HOURS UTC.

MESSAGES BROADCASTED VIA MF AND/OR NAVTEX (ENGLISH LANGUAGE ONLY) CONCERN
THE NORTH SEA AND THE NETHERLANDS PART OF THE CONTINENTAL SHELF.

Airband

GODFREY MANNING G4GLM
C/O THE GODFREY MANNING AIRCRAFT MUSEUM
63 THE DRIVE, EDGWARE
MIDDLESEX HA8 8PS

Airbus A320-211 C-FDSU (0141). Christine Mlynek.

Last month I told you about forthcoming trends in navigation. Certain radio aids will be phased out, others will continue and new ones will be introduced or become more generally accepted.

That should have started you thinking in readiness for this year's Christmas Quiz. To enter the competition, decide what single improvement to navigation and/or air traffic control you'd like to see introduced in the near future.

Send me a written description of your ideas. I'll be looking for something that's helpful, feasible and original. Keep your description succinct; no extra credit will be gained by writing at excessive length!

Entries to reach me by the February 9 deadline, please, so that the results can be announced in the April issue. Entries can not be returned (so make a copy for yourself). My decision is final (no correspondence will be entered in to) and the Editor has agreed to provide a prize.

Air Traffic Control

An opinion about present-day air traffic control is held by **Laurence Moverley** (London) and, I know, shared by many in the industry. Laurence justifiably points out that the system is complex and fragmented. In the UK and nearer parts of Europe this is certainly the case, for reasons that I'll explain.

Vast amounts of traffic converging on a few closely-grouped airports require immense co-ordination. So that one controller doesn't handle too many flights at once, airspace is divided into a number of sectors. At certain stages of flight, pilots are handed from one sector to another in rapid succession (changing frequency each time).

I would also question the efficacy of h.f. for long-distance communications, now that satellite technology has been proven (and adopted by our maritime colleagues). So, Laurence, plenty of agreement over the problems - would you like to enter the Christmas Quiz by suggesting some solutions?

Radar

Squawk code 0027 will definitely not be implemented, says *AIC* 124/1997 from the CAA. This updates the news that I gave you in last October's 'Airband'. This means that Flight Information Service Officers will not tell aircraft to select this code whilst in radio contact but outside controlled airspace.

Another one that applies in uncontrolled airspace is 0030, as mentioned in last November's 'Airband' page 75. This signifies "Am lost outside controlled airspace." **C.G. Otley** (LATCC) has written in with an important point. Code 0030 must **only** be set when instructed by a controller, **not** when the pilot decides.

It displays a label saying 'LOST' on the radar screen and causes no end of confusion if it wasn't expected. So, pilots, if you're lost, tell someone immediately! If you're not working anybody, you'll find a reassuring voice on 121.5MHz. Don't select 0030 until told to do so. This is an important point and I'm glad that CGO has drawn attention to it.

What's at Allans Hill, between Fraserburgh and Banff in Scotland? **Bill Bell** (Durham) thinks it's a radar but it's not on my list (see last October's 'Airband'). Perhaps a local person will write in?

Bill saw the last flight of Viscount G-APEY. I believe that Viscounts still operate cargo/mail flights. They were expected to remain operational into the next century - it remains to be seen if they will.

Radio Navigation

Last month, the identity of the a.d.f. indicator owned by **Andrew Stephenson RS174635** (London) was revealed. Andrew thinks that this outcome is "...magic!" His instrument is a three-inch bearing indicator or similar slave version.

The information from **Chris Dugdale** (St. Neots) suggests slightly different dial markings would confirm exactly which version you have, Andrew. Or, you could open the instrument and see if there's a synchro inside. If anyone wants to know more about synchros, write in and ask!

A general warning about instruments is given by **John Wells** (East Grinstead). Aircraft instruments up to about wartime were sometimes made to glow in the dark. The zinc sulphide paint glowed due to the addition of radium.

By now, oxidisation will have killed off any glow, but the radiation is still there. Years ago, factory workers developed illnesses from having licked their paint-brushes whilst marking dials with radioactive paint.

You can recognise these instruments by their age, by all the dial markings being in a dirty off-white paint, also by their failure to fluoresce under ultra-violet light (u.v.). I believe that they're relatively safe if unopened (anyone disagree?) but do be careful, especially if needing to dispose of them. You can't just chuck them in the dustbin!

All my instruments are radiation-free. Being more recent, they are either designed to be viewed by red or white panel lights, or else under u.v. The advantage of u.v. is that the instruments glow (mostly orange) yet the light is almost invisible to the human eye and so doesn't cause glare.

An easily-available u.v. source is that sold by security shops and locksmiths. An 'invisible' pen is available to mark the identity on valuable objects, the u.v. light allows the ink to become visible as a glow. Do **not** try the sort of u.v. tubes intended for etching printed circuit boards or erasing memory chips as the light output is harmful to eyes. Write to me if you want to know where to buy a u.v. viewer. Also useful for detecting fake bank-notes!

Continued on page 78

Scenic Squirrel (Écureuil) C-FAHS. Christine Mlynek.

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Exercise Ample Train

I had hoped to get to St. Mawgan to see exercise *Ample Train* but unfortunately other commitments prevented this. I am in debted to **Brian** and **Keith** from Gloucester who sent me a report including some callsigns and frequencies. This supplements my brief comments in the November column. Most of the fighter air traffic arrived on the 8th September, primarily using the London Military frequencies **133.3, 262.975** and **283.525**. Eight air-arms were present for the week, they were: UK, USA, Belgium, Germany, Greece, Italy, Netherlands and Turkey. The French and the Canadians Air Forces pulled out shortly before the exercise. It was good to see both the Greeks and the Turks participating in a joint venture, all too often in the past one or both of them has withdrawn because of their political differences. Quite a few support aircraft visited during the week, including Belgian, Italian and Dutch Hercules, Transalls from Germany and Turkey plus one Italian G-222.

Most callsigns used were straight Air Force alphanumerics, others noted were : RAF12 Sqn/**Wolf** and **Jackal** : Netherlands AF 313/Sqn **Tiger**: USAF 48 FW 493 FS/**Deadly** and **Jump**. Frequencies noted in use at St. Mawgan were: Tower **241.825** Stud 01 and **123.4**: Approach **357.2** Stud 02 and **126.5**: Radar **360.55** Stud 03 and **387.45** Stud 04: Ground **376.625**. Two air to air frequencies were noted although they have not indicated whether they were in use on the exercise. **252.425,** which is a known Valley air to air and **251.875** which I have listed as a possible Valley air to air but has not been confirmed. Any comments anyone?

Donna Nook

I have received a letter from JM in Sheffield who seems to have had an excellent day, watching the action at Donna Nook range. Several flights of Tornados hit the range during the afternoon with both the Primary/**232.075** and the Secondary/**342.175** frequencies being used. Whilst the range was still active with the previous flight, the next group of Tornados were held off and were transferred to what appears to be a new range frequency, **387.675**. In addition to the two primary frequencies, UK ranges quite often operate several discrete standby frequencies for such purposes as aircraft holding. Consequently, this could possibly be a new range hold frequency for Donna Nook? Incidentally, for those of you who take an interest in four letter codes, Donna Nook has been given the code EGXS.

Black Projects

In response to my comments regarding *Black Projects* in the October column, Neil from Thetford has written to me regarding an incident that he saw take place some years ago. He thinks it may have been October 1989. Apparently, when dusk was approaching one evening a few enthusiasts were just packing up to leave Lakenheath when the USAF police accompanied by the local police arrived and cleared the approach area to runway 24. This included a complete closure of the road to Brandon for at least half a mile in each direction. Neil, who was heading home from Mildenhall, parked alongside the base fence on the South side of the airfield with the enthusiasts who had been moved. After waiting for over an hour an aircraft was heard making a downwind leg overhead Lakenheath - by now it was dark. The aircraft concerned appeared to have no navigational lights and had an unusual sounding engine with a high pitched whine. The aircraft landed on Runway 24 and after a short period on the runway was escorted by numerous vehicles into a hanger. A short while later the road was re-opened. Perhaps the most likely explanation is that it was an F-111 returning with an insecure bomb load, but those present all felt that the engine noise did not fit any regular visitor to Lakenheath. Many have speculated that this may have been a *Black Project* aircraft involved in night-time trials in the UK, which had to make an emergency diversion? As is often the case no positive aircraft identification has been established. To my knowledge this road has not been closed in this manner for many years, consequently I would be very interested to hear from any of you who witnessed this event or anything similar!

Mildenhall

For those of you who like to spend some time listening to the movements at Mildenhall, advance word has reached me that the airfield is due to be closed next year shortly after the airshow. The provisional information I have is that it is due to close in the first week of June for between three and five months for extensive runway, taxiway and hardstand maintenance. Most of the current base support movements will be scheduled to operate through Lakenheath, so there will still be plenty of action in the area. I would guess that some or all of the tankers will relocate to Fairford. When I find out more information I will let you know.

Next month, hopefully some news on the change to 8.33kHz channel spacing within the airband.

SWM

Airband

Continued from page 75

Information Sources

A database program listing about 2500 flights was sent to me by **Len Woolley** (Bude). Now unfortunately, Len, I don't have an IBM/PC compatible computer on which to run it. So would readers please note, do **not** send me any disks!

Anyway, are you making this generally available to readers, Len? If so, please tell me what your arrangements are and I'll publish your details here in this column.

Follow-Ups

Last November I related some historic information about an airport at Colnbrook. Now **Mike Bennett** (Datchet) explains in more detail that Hawker had the airfield for wartime aircraft production, later Ford built a vehicle factory there and eventually Iveco took over.

Now it is destined to become a(nother) housing estate. This is something I can't understand. Every available piece of land seems to be going for houses these days - despite the continuing economic difficulties. Industry closes down, the factories are replaced by houses. We seem to have more and more people to house, fewer and fewer places for them to work in. Can anyone tell me why?

Sorry that November's abbreviations table was missing, I've merged it with this month's.

Frequency & Operational News

Following on from last November's 'Airband,' **Derek Denton** (Oldham) is able to pair more Manchester frequencies with u.h.f. f.m. ground operations channels as follows. Delivery 475.925; Ground 121.85 & 455.65; Tower 476.95; also, baggage handlers have 456.65MHz. I've passed your other non-aeronautical frequency to our 'Scanning' columnist, Derek.

Does Finningley have a Military Aerodrome Traffic Zone? According to **Andrew Green** (Barnsley) there's some confusion! My up-to-date half-mill chart definitely shows it as closed, despite what you've heard, Andrew.

And your question about Pole Hill sector, Andrew: 131.05MHz is still shown in my Aerad supplement (rather than 118.775) but short-notice changes do keep happening so there's no guarantee!

It really looks as though 8.33kHz channel spacing will apply to certain parts of the v.h.f. communications airband. *AIC* 127/97 says that January 1999 is the start date for Europe.

This mostly affects *en-route* flights in upper airspace (above FL 245) but France is more congested and will apply the new channels above FL195, other countries adopting this lower level from around 2002-2003. The UK might not need any extra channels until 2000.

Andrew wonders if adjacent channels will break through when so closely spaced. On conventional equipment, I expect they will. Worse if multiple relay sites with offset frequencies are near the new narrow channels - or will the frequency allocation ensure this can't happen?

Also, there may be some unused 25kHz channels, but too few to meet the demand without going on to narrower spacing. Another problem is that there might not be anywhere left in the country where these remaining spare channels can be allocated without being too close to an adjacent existing frequency in the same geographical area.

I can only advise that 8.33kHz spacing must be specified when purchasing new equipment. This will bring complaints of extra cost from the airlines and I haven't seen a receiver advertised in *SWM* that's capable of operating on the new channels. First person to spot one, tell me!

The next three deadlines (for topical information) are January 5, February 9 and March 9. Replies always appear in this column and it is regretted that **no** direct correspondence is possible.

SWM

Abbreviations

a.d.f.	automatic direction finder
AIC	Aeronautical Information Circular
a.t.i.s.	automatic terminal information service
CAA	Civil Aviation Authority
FL	flight level
f.m.	frequency modulation
g	grams
h.f.	high frequency
ICAO	International Civil Aviation Organisation
kHz	kilohertz
LATCC	London Area & Terminal Control Centre
MHz	megahertz
Mil	Military
NATO	North Atlantic Treaty Organisation
n.d.b.	non-directional beacon
u.h.f.	ultra high frequency
v.h.f	very high frequency
VOLMET	VOLume METeorological report
v.o.r.	very high frequency omni-directional radio range

Info in Orbit

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Christmas already? Looking at the state of my computers as we near the end of the year, I have to acknowledge some improvements which have enabled me to watch more WXSAT images come in, while continuing to research information for articles. I upgraded my Web Browser to *Internet Explorer 4 beta 2* when it was released on CD in early autumn, and removed it a few days later! There were so many bugs in the beta version I did not want to continue using it. In early October my neighbour passed me a copy of the final release version (*IE 4.0*) which I installed with trepidation. Fortunately, it has behaved extremely well although being in use nearly all day, every day, I have experienced a few inexplicable crashes. Its performance during Internet browsing is a considerable improvement over previous browsers.

In response to enquiries from several new readers, I am investigating more image processing programs for WXSAT picture conversion, and will be reporting on them next month.

Those readers who also receive the American periodical *Satellite Times* spotted my new WXSAT column 'View from Above' which started in the July/August edition. Virtually all correspondence for this feature is via E-mail. Unfortunately, my Internet Service Provider has not proved as reliable as I had hoped, and it appears that some E-mails have not been delivered, so I expect to change again in due course.

Current WXSATs

During November METEOR 3-5 was passing over Britain moving south-bound during the early hours of the morning - see **Fig. 1** - and therefore not switched on. By late afternoon it was passing north-bound to the east of Britain, but because of the short hours of daylight it was behind the evening terminator - and therefore still switched off - see **Fig. 2**. During this period it was transmitting over the southern hemisphere when in daylight.

By using a satellite tracking program and advancing the date (and changing the time), the approximate date and time when METEOR 3-5 would be in daylight while over Britain, could be estimated - see **Fig. 3** which shows METEOR 3-5 on 28 November at 1510UTC. The south-bound (night-time) passes continued to move earlier into the night, but by late November the daytime passes permit the last minute or so of transmissions to be heard before the satellite switched off. By early December several minutes of transmissions should be heard during each north-bound, mid-afternoon pass.

Meanwhile, the active NOAA WXSATs (NOAAs-12 and -14) transmit, with NOAA-12 providing both infra-red (a.p.t.) channels during south-bound and north-bound passes near both morning and evening terminators. NOAA-14's mid-day late-autumn passes are so dark that some post-pass image processing is essential to bring out the detail which is in the image. Beginners to WXSAT monitoring seeing NOAA 'visible-light' images apparently blank during November, December and January, could be concerned that their set-up was not working properly - but this is probably not the case. Most of the WXSAT a.p.t. decoding software that I have seen includes basic contrast expansion, and this is usually all that is required to enhance the low illumination levels of the land in WXSAT images. A simple contrast enhancement should reveal excellent land and cloud detail which is present in all the images.

If the decoding software does not include basic contrast expansion then you may find some image processing software useful, and new software is currently being checked for next month's 'Info'.

METEOSAT WEFAX Termination

For a year or two now, understandable concern has been expressed in letters by those interested in entering the world of WXSAT monitoring, regarding the expected cessation of WEFAX and a.p.t. transmissions. This planned termination is the result of a general upgrading of the digital hardware associated with the NOAA and METEOSAT WXSATs.

Both WEFAX and a.p.t. telemetry are relatively easy and cheap to receive and decode, and have no added costs (such as the cost of de-encryption boxes and interface cards - as required for PDUS reception).

Volker Gaertner of the EUMETSAT User Service has responded to queries concerning the timing of the 'end' of WEFAX transmissions. "In response to the question raised about SDUS analogue dissemination after the year 2000 from METEOSAT, we can confirm that for the METEOSAT Second Generation (MSG) no analogue dissemination will be available any more. It is planned to have an overlap period of about two years after the launch of the first MSG type satellite. This means that around the end of the year 2002 the SDUS (WEFAX) dissemination will cease". Launch schedules for the MSG craft currently show October 2000 for MSG-1 and 2002 for MSG-2.

Meanwhile, METEOSAT-7 commissioning tests are continuing normally.

Listen For Sputnik!

The fortieth anniversary of the launch of Sputnik-1 (4 October 1957) was marked by the 'manual' launch of SPUTNIK-40 at 0405UTC on 3 November. It transmits a simple 'beep' on 145.820MHz which I heard a day or so after launch. The small satellite is a one-third scale model of the original and its initial orbit was 383 x 391km at 51.6° inclination. The model was built by high school students in the republic of Kabardin-Balakarsk in the Russian Federation, in the Caucasus near Chechnya. The radio transmitter payload was built by students on Reunion, a French territory in the Mascarene Islands in the Indian Ocean east of Madagascar. The American Radio Relay League *Space Bulletin 34* shows that the frequency of the 'beep' tone from SPUTNIK-40 is related to the temperature of the onboard battery.

SeaWiFs

One of the latest imaging satellites to scan the earth is the SeaStar spacecraft owned by Orbital Sciences Corporation (OSC), of Dulles, Vancouver. The launch of the Sea-viewing Wide Field-of-View Sensor (SeaWiFS) has provided an unusual opportunity for those with h.r.p.t.-receiving systems (normally used for NOAA high-resolution WXSAT reception) to receive 'SeaWif' images.

The SeaWiFS project is part of NASA's Mission to Planet Earth enterprise, a long-term, co-ordinated research effort to study the Earth as a global system. NASA is observing, monitoring and assessing large-scale environmental processes, such as the productivity of the oceans, while focusing on climate change. In line with the commercial strategy of Mission to Planet Earth, government-industry partnerships provide NASA with needed data, and may lead to practical commercial data use, such as the development of fishing maps and estimation of crop yields for farmers. The data from SeaWiFS will be of great benefit to the understanding of global carbon cycling.

The SeaWiFS instrument will study the carbon cycle by observing the world's oceans from space and measuring 'ocean colour.' The colour of most of the world's oceans varies with the concentration of phytoplankton, which contain chlorophyll - which is of course, green. Near coastlines, the colour of the ocean is affected by chlorophyll, dissolved organic material and suspended sediments from rivers and lagoons. By observing the colour of different parts of the oceans, scientists can measure the amount of these materials in ocean water.

SeaWiFS represents a new way of doing business for NASA. Rather than building, launching, and controlling a satellite to study an important aspect of the Earth's environment, NASA will purchase commercially available data from a privately built satellite and use the data for environmental research.

NASA has contracted with OSC to provide - for five years - the raw satellite data which will be used for research purposes. OSC will own the rights to the data for operational and commercial purposes.

Fig. 1: METEOR 3-5 November south-bound early morning passes.

Fig. 2: METEOR 3-5 November north-bound evening passes.

Fig. 3: METEOR 3-5 November.

Fig. 5: Sat map GOES-8.

Fig. 4: A SeaWiFS image of Italy captured late October.

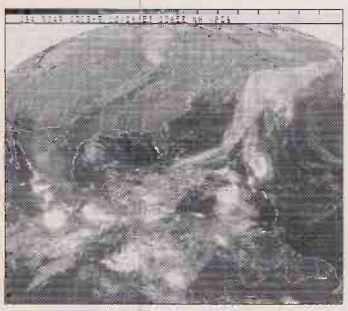

Fig. 6: GOES-8 image from Alan Jarvis.

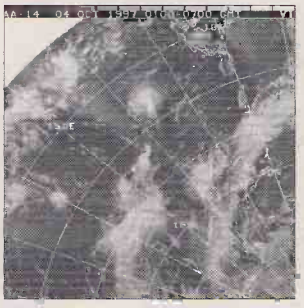

Fig. 7: GOES-8 (NOAA-14 scans) of the north polar region.

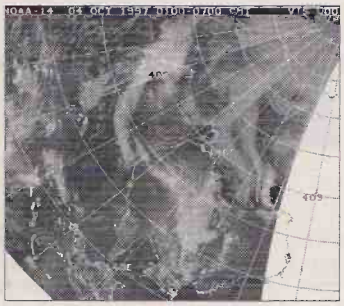

Fig. 8: GOES-8 (NOAA-14 scans) of the south polar region.

Fig. 9: NOAA-14 10 September from Derrick Herbert.

The first few months of SeaStar 'SeaWiFS' transmissions are not encrypted, and this is what provides the unusual opportunity. Oceans cover 70% of the Earth's surface, so SeaWiFS will provide information on a large part of the global biosphere.

NOAA h.r.p.t. is transmitted on 1698 or 1707MHz, and the compatible SeaStar transmissions are on 1702.5MHz. Those h.r.p.t. receivers using fixed-frequency crystals (usually 'home-brew systems') will require a new crystal. Commercial units (which usually synthesise frequencies) should only need to have the PLL (phase-lock loop) programming software changed to 1702.5MHz.

Software used to process and display NOAA h.r.p.t. needs to be modified for SeaWiFS imagery, and UK company Timestep have made suitable software available - called SEASTARX.EXE - via their Internet site, for users of their systems. An associated text file to help users is also available from their web site; **http://www.time-step.com/seawifs**

Figure 4 is shown here courtesy of Dave Cawley at Timestep, and Alex Fox from ORBIMAGE.

GOES-8 From Cardiff

Some months ago reader **Alan Jarvis** asked me for a copy of the transmitting schedule of GOES-8. Alan lives in South Wales and from a 100m high cliff-top location, which has a low western horizon, he wanted to try receiving telemetry from the American geostationary WXSAT. These transmissions, on 1691.00MHz, can be received from certain areas of Britain, as seen in **Fig. 5**, which shows the footprints of GOES-8, METEOSAT-6, GOMS, and GMS-5, of which GOES-8 overlaps some western parts of the UK.

Alan used his portable Yagi and tape-recorded the signals for later decoding at home. Alan comments that propagation conditions played a large part in the trials, and on a really good day the signals were noiseless. His first trials were made in late August but unfortunately heavy rain brought that session to an end after just two images were received. Finally, the weather improved and Alan was successful. He adds that the versatility of the WXSAT software contributed to the success of his project. Alan sent three images received during his excursions. **Fig. 6** shows the northern hemisphere infra-red image from GOES-8 transmitted in the NHIR slot for 0945UTC on 4 October 1997. All the images have remarkably low noise levels, better than those which I have obtained here in Plymouth (with the Yagi looking through bushes!).

Alan's two other pictures show the composite NOAA-14 images of the north and south polar regions produced between 0100 and 0700UTC on 4 October.

Each image comprises consecutive scans from NOAA-14. These are seamlessly sewn together by computer, but retain the different brightness levels which prevail during the different scan times. The images are then transmitted at scheduled times by GOES-8.

Derrick Herbert of Carmarthenshire used his Yaesu FRG-100 receiver, fed by a 137MHz crossed-dipole to receive some NOAA-14 images including **Fig. 9** received on 10 September.

Keith Artherton of Fakenham uses a Martelec MSR50 receiver fed by crossed-dipoles, and the *JVFax* decoder interface and software to produce his WXSAT images. **Fig. 10** is a NOAA-14 image received a few months ago and processed on his 486DX66 computer.

HRPT Images

A few of that rare breed of WXSAT monitors - the h.r.p.t.-receiving group - have occasionally written to me with samples of the high-resolution-picture-telemetry images transmitted by the NOAA WXSATs on 1698.00MHz (NOAA-12) and 1707.00MHz (NOAA-14). **Peter Schoen** of Germany sent me several h.r.p.t. and a.p.t. images some months ago so I have selected one not previously shown here. **Fig. 11** shows the island of Crete at daybreak, received using his Timestep system which is located in his backyard surrounded with houses. Although the surroundings prevent access to lower elevation passes, Peter comments that the houses reduce the effect of strong winds. Peter uses a second computer to manually track the satellites.

GOES-8 Disks

Last year I obtained a set of three HD 3.5in disks from NOAA, containing a self-teach program on the operation of the GOES WXSATs. **Colin Jackson** recently wrote asking whether these disks were still available - so here is another mention. If you would like a set, then send me a return-addressed envelope and £1.50 and I will supply the disks.

Fig. 10: NOAA-14 May image from Keith Artherton.

Coming Soon

I have been in touch with scientists at the Space Research Institute of the Russian Academy of Sciences regarding their reception and use of meteorological satellite data and they have very kindly provided documentation describing their systems. During the next few editions of 'Info' I shall be looking at the equipment used and their methods of dissemination of images throughout the Commonwealth of Independent States.

Kepler Elements - MIR and Shuttle. See last month

Shuttle Launch Schedule

STS-89 Endeavour is scheduled for launch on 15 January 1998 into a 51.6° inclination orbit for MIR docking, to deliver the Space Hab double module.

STS-90 *Columbia* is scheduled for launch on 2 April 1998 into a 39° inclination orbit for Neurolab.

A comprehensive listing of all Shuttle flights and payloads, together with associated information is available from me as the *Shuttle Pack*. Please include a £1 and stamped s.a.e. for the A4 booklet.

As we leave 1997 and enter 1998 I would like to thank all those who have written to me during the year, and to wish all readers a very happy New Year.

Fig. 11: NOAA-12 channel 2 h.r.p.t. image of Crete from Peter Schoen.

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-6 (geostationary) uses 1691 and 1694.5MHz for WEFAX
GOES-8 (western horizon) uses 1691MHz for WEFAX
MIR voice is on 143.625MHz

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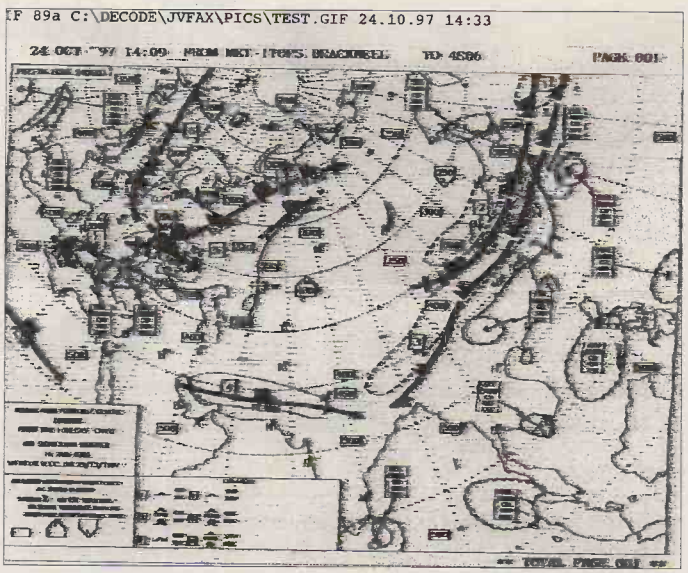
FAX Quality

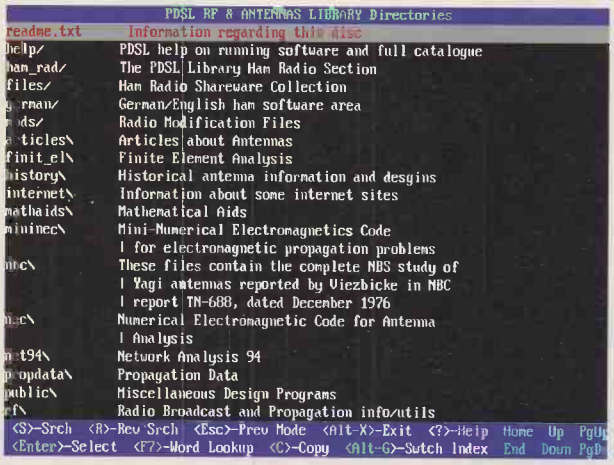
Mike Hudson of Stoke-on-Trent has written asking for help with his FAX reception. Mike's using a Dell 386SX-16 PC with *JVFAX7.0* and an unspecified *Hamcomm* type interface. Whilst this set-up, combined with his receiver, delivers excellent clean sounding signals, the resulting FAX pictures are always a disappointment. Mike's sent me some samples and I can see that he certainly does have a problem. I've shown a typical example with the column so you can see for yourself. If you look carefully at the image you will see that there is a general mist over the whole image. In addition, the right-hand edge of the image looks just as though the ink's been smeared. So what can it be? There are actually two problems. The first and easiest to fix is a simple tuning error which is causing the fairly even mist across the picture. What's happening is the background noise or mush is being interpreted by *JVFAX* as a part of the signal and consequently showing as a faint grey image.

There are basically two ways to fix this, the most obvious being to adjust the tuning so that the signal is a little closer to the pure white mark on the tuning scale. A second solution is to change the grey scale setting of the image. If you are receiving FAX charts, you only need to use pure black and white as there shouldn't be any grey content in the image. Whilst this is theoretically true, my experience is that you tend to lose detail if you do this. My preference is to run at the maximum grey scale resolution (256 shades) and fine-tune the signal for the best image quality. If you do end-up with a slight grey tinge you can always tidy it up by using one of the many paint packages that are on the market. With these packages there are two main ways to get rid of the noise dots on FAX charts. The first is to use the noise reduction mode. This just scans the image for a specified size of dot and eliminates them! Because the effect can be quite dramatic it's best to use the pre-view facility to see the effect before you destroy your precious image. The other technique is to alter the grey scale map. This might sound a bit complicated, but it's well worth having a play.



Mike Hudson's damaged FAX picture.

All you do is select this option from the appropriate editing menu in your graphics program and adjust the pale end of the grey scale curve until the grey mist disappears. As with the noise removal, most programs feature a screen preview so you can play around with the effect without the risk of losing your image. I've used both the features with great success over the years and can recommend *PaintShop-Pro* as an excellent shareware package or *CorelDraw* for a standard commercial offering. Although the latest versions of Corel are pretty expensive and not really viable for this type of occasional use, you'll find you can pick-up older versions at computer sales at very attractive prices. I managed to pick-up a full, boxed, CD version of *CorelDraw 5* for £35 at the last Brighton rally!



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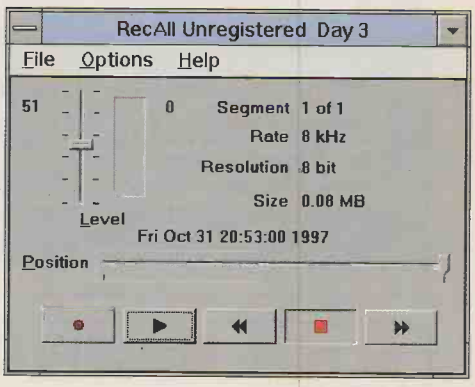
Multi-path Distortion

Getting back to Mike's image, the problem that has caused the worst of the image damage is multi-path distortion. Sounds very complicated I know, but it's really quite simple. When you receive any radio signal you will find that the signal actually gets to you via lots of different paths, not the simple straight line you might think. The classic example of this is the ghosting you can get on a TV picture if you have a large local reflector i.e. a gasometer. Whenever a signal gets to you via two different routes you will find that the two signals travel a different distance and so are subject to different delays. It's this delay that causes the problem and results in each vertical line of the FAX chart having a second line slightly off-set to the right. If you want to get technical you can calculate the time difference between the two signals. All you have to do is first measure the width of the paper print-out (in mm) and divide the result by the drum speed in revolutions per second - this will give the effective paper speed in mm per second. Here's a common example to illustrate the technique. Chart width = 200mm (typical for A4); drum speed = 120 rpm or 2 revs per second. The effective paper speed then becomes 200/2 = 100mm per second. In order to use this to work out the delay between the main image and the 'ghost' images you now need to measure the width of the smudged line in mm. In the case of Mike's sample image the line width is approximately 1mm, so the propagation delay difference must be 1/100 second or 10ms.



RecAll main dialog box.

Although multipath does sometimes manifest itself as just two paths with a simple single ghost image, it more commonly appears as a whole mish-mash of paths all with different strengths and propagation delays. The result of all this is just what you see in Mike's sample image. The smearing is caused by lots of different paths and strengths. The best clue for spotting multipath is

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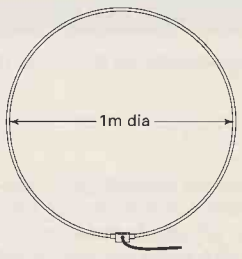

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any sign of a double image to the right of the original. So having discovered the cause, what can you do about it? The only practical option is to change frequency. You will find that virtually all the h.f. FAX stations transmit the same images on a number of different frequencies simultaneously. This is done partly to take advantage of the varying propagation conditions, but also to help with the reduction of multi-path distortion.

Before I leave this subject, I ought to point out that there is one other source of smearing distortion in FAX images that's nothing to do with propagation - filters. Whilst the addition of an external audio filter can be a really worthwhile investment for the Utility listener, they do need to be used with care or you can end-up subtly degrading the signal rather than improving it. The ear is a great tool for optimising filter settings, but new users are often tempted to over, rather than under, filter a signal. When you're listening to a FAX signal you will find that you can really wind the filters in quite tightly yet still clearly hear the two tones of the FAX signal. Although this sounds OK, what you can easily end up doing is effectively filtering-out all the detail. If you have a filter system you can try this out to see the effect. Just tune to a good clean signal (without multipath) with the filter out of circuit. Once you have a nice clean chart starting to build-up, switch-in the filter and gradually reduce the bandwidth whilst watching the picture quality. You should find that, once you move beyond a certain critical point, the finest detail in the image will start to disappear. Open-up the filter and it will return. The message from this is to always leave the filter as wide as possible when you're receiving FAX pictures. As well as causing the detail to disappear, some filter types can cause what's know as group delay distortion. This is where different frequencies are subject to differing propagation delays as they pass through the filter. If you think about it this is just what happens in real multipath so it's no surprise to find that the result is a smeared image! Once way to demonstrate this is to select RTTY mode on your filter - if it has such a thing. In RTTY mode most filters actually split the spectrum into two narrow bands one for the mark frequency and one for the space. These two bands are then filtered using separate circuitry within the filter. It's this separation that can be the cause of the increased group delay distortion.

So a few final tips when using filters for FAX reception. Always stick to simple, one band, bandpass filters and apply the absolute minimum filtering to remove any interference. If the image isn't being degraded by interference then switch the filter out!

Automatic Listening

I've joked in the past about our hobby becoming so computerised that you can just leave the gear running on its own and get on with a more sensible hobby! The latest software to arrive with me takes us another step closer to the automated station. Aptly titled *RecAll* this fascinating software package is just so simple I can't think why someone hasn't done it before. The program is designed to run in a Windows environment and is a mere 200Kb in size so it won't take much of a byte (sorry about that!) out of your hard disk space. So what does it do that's so useful? The name gives it away really as it's an audio recorder utility that uses a standard Windows sound card to record anything that arrives via the microphone input. This isn't particularly interesting on its own, but the real gem is the built-in automatic switching.

Once you've connected-up your radio, microphone or whatever, RecAll then monitors the input and only starts recording when it detects a signal. This is really great for capturing stations that only transmit very occasionally as it effectively becomes a time compressor. You can leave it to monitor a station all night and if they were only active for five minutes, that's all you'll find has been recorded - brilliant! Just to really finish off the facility it includes a date and time stamp facility so you can log transmission times right down to the nearest second. The time stamp runs continuously so you can not only see the start of the transmission, but measure the duration as well. This is potentially a very powerful tool for the serious utility listener. The whole concept of *RecAll* is just so simple, but really effective.

The recordings made by *RecAll* are standard .WAV files so you can play them back and modify them using any of the standard audio systems. The use of the .WAV file format is really useful as it offers a true digital recording of the signal which is good enough to apply to a decoding system at a later date. You even have the option to select the appropriate recording quality by adjusting the sample rate and bit size the options available were 8kHz, 11.025kHz, 22.050kHz and 44.1kHz at either 8 or 16 bit resolution. You could also pre-set the disk space that you're prepared to set aside for recordings and the action to take when the end of that space is reached. In a typical set-up you may want to rewind to the beginning and start again. You can also set the program to begin monitoring whenever it starts. This can be great if you're maybe using a scheduling program to kick your computer to life whilst you're out.

If you're using the excellent Spectrogram program you can also use this to provide some detailed analysis of the make-up of the signals captured with *RecAll*. If you want to get your hands on a demo version of the program take a look at **http://www.sagebrush.com/~sells** It really is well worth a look.

Ultimate Radio Software

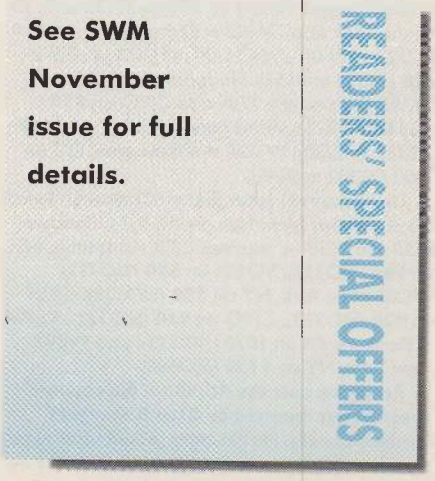
Now if you want to get at loads of radio software but don't have an Internet account or can't abide the download delays, I may just have the answer. PDSL have been offering an excellent service for many years and in recent months have been handling my reader's offers. They have just sent me their very latest radio CD-ROM. This is absolutely packed with over 4000 files running to more than 620Mb of radio related software and information files. What's more by using a CD-ROM you get effective download speeds of 200Kb/s plus.

In setting-up the CD-ROM, PDSL have taken due account of the fact that many people don't have massive Pentium PCs bursting with memory. As a result, the main menu and all the installation utilities are DOS based so they will run on the most basic of PC systems. This is great to see when so many programs are appearing on the market that require great chunks of your hard disk and demand super-fast processors with seemingly unlimited memory! I've included a screen shot of the main menu so you can see it's pretty straightforward. Navigation is done using the keyboard and because it's DOS based it feels very quick and responsive. With so many program files on the disk the menu systems needs to be very well organised or the poor operator will soon get lost and give up before the required program is found. The system used for this disk is extremely simple, but very effective. All the programs are grouped together in a system of directories and sub-directories. Within the menu program you first choose the required main directory and select it by pressing return. This menu system then changes to the next lower level of sub-directories where you can use the same technique to dig deeper. If you end up going down a blind alley you can retrace your steps by pressing the escape key. This systems proved to be a both very quick and logical method for finding what you wanted. If you prefer to work with a printed index system, you will find a global index in text format in the root directory of the CD. Before you print this out you need to make sure you've got plenty of paper in the printer as even with eight point text it runs to around 64 pages!

Let's just take a look at what you'll find on the CD-ROM that might interest Decode readers. One of the first areas to go to is the PDSL Ham Radio library section. This contains copies of the vast majority of software decoding packages including my five disk set of readers offers. Just to whet your appetite there's *JVFAX*, *HAMCOMM*, *FAX- SSTV4*, *WXFAX*, *Microscan*, *Frequency Manager*, *WEFAX*, *Weatherman* and lots more in this section alone. If you enjoy building your own antennas, you will find about every kind of design aid on the CD-ROM. Not only are there the basics to help with antenna dimensioning, but there's lots of propagation data and prediction systems so you can work out just where you should be listening to catch the best DX.

For the constructor there are sections packed with all manner of design tool from complex filter programs through to simple ohm's law teaching aids. You also have access to a huge array of receiver and transceiver control programs to help you automate you station. If you have any interest in Packet radio you can really overdose as there's tons of information from basic TNC control programs through to complete bulletin board systems and supporting network files. To supplement all the programs there's a mass of text files providing advice and guidance on a wide range of subjects from rig modifications through beginners guides. There's even a very handy set of radio related clip-art so you can liven-up your home produced QSL cards or stationery. All-in-all this is an excellent CD-ROM for anyone with an interest in radio and I would commend it to you. The full title of the CD-ROM is *Libris Britannia Series 6 RF, Antennas & Ham Radio Library*. Please direct all orders and enquiries about this disk set to **PDSL Winscombe House, Beacon Road, Crowborough, Sussex TN6 1UL. Tel. (01892) 663298**. My thanks to PDSL for supplying the review copy.

See SWM November issue for full details.



LM&S

■ BRIAN ODDY G3FEX
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STORRINGTON
WEST SUSSEX RH20 4NS

A whole year of broadcast band listening lies ahead and it is likely to be an interesting one because the propagation conditions in the higher frequency bands should improve as we continue to climb the steep slope leading to the peak of this sunspot cycle, predicted to occur in the year 2000 or 2001.

May I take this opportunity to wish all readers and contributors good listening and a Happy New Year.

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 October.
While searching the band at night in Wallsend, **David Edwardson** picked up on **189kHz** a 'phone-in programme with pop music broadcast by Rikisutvarpid, the National Broadcasting Service in Iceland. The transmission, which came from their new 300kW station at Gufuskalar in W.Iceland, rated SINPO 34543 at 0008UTC.

Some of the broadcasts from R.Ukraine International are now being carried at night by the 500kW transmitter at Lvov, Ukraine on **171kHz**. On the 18th **Sheila Hughes** listened to their programme for DXers in English "Hello from Kiev" at 2135UTC. The transmission rated 43333.

Medium Wave Reports

Broadcasts from some of the m.w. stations in E.Canada and E.USA reached our shores during several nights in October. Those from CJCH in Woodstock, NB on **920kHz** were heard at 0620UTC on the 15th by David Edwardson. He rated their transmission SINPO 23542. Before midnight on the 16th he heard two stations in St. John's, Newfoundland - VOCM on **590** (24542 at 2258) and CJYQ on **930** (24542 at 2345). A broadcast from WNRB in Boston, MA on 1510 was picked up at 0035 on the 17th by Harry Richards in Barton-upon-Humber - it was peaking 34333. He listened again on the 21st and noted their transmission as 34233 at 0005.

Over in Co.Down **Robert Connolly** (Kilkeel) logged VOCM on **590** as 22222 at 0130 on the 19th; also CKVO in Clareville, NF on **710** (32222 at 0140) and CHAM in Hamilton, NB on **820** (32222 at 0155). He received VOCM and CKVO again on the 27th, also CJYQ on **930** (23332 at 0220); WINS New York, NY on **1010** (22332 at 0230); WTOP in Washington, DC on 1500 (22332 at 0245).

Up in Shetland **John Slater** (Scalloway) found the conditions favourable on the 23rd. Between 0635 and 0650 he received CJFX Antigonish, NS on **580** (SIO333); VOCM on **590** (SIO233); WCBS New York, NY on **880** (SIO333); CJCH on **920** (SIO333); CJYQ on **930** (SIO322); KDKA in Pittsburg, PA on 1020 (SIO333); also WBBR New York, NY on **1130** (SIO444).

Reception over the Atlantic in the opposite direction was reported by **Alan Roberts** in Quebec, Canada. He has often picked up at night a weak transmission in Portugese on **836kHz** but so far has been unable to obtain an ident. Enquiries to other Dxers suggest that it may come from a 10kW station in Pico da Barossa, Azores.

The sky waves from some stations in the Middle East and N.Africa also reached the UK after dark - see chart. On the 16th **George Millmore** (Wootton, IoW) heard for the first time the 5kW outlet at Ain-Salah, Algeria on **1161** - the transmission in Arabic rated SIO222 at 1955. Much to his surprise **Brian Keyte** (Gt.Bookham) picked up a broadcast from Akraberg, Faeroe Is on **531** at 1200UTC on October 29.

Good reception from some distant m.w. local radio stations was reported by **Ross Lockley** in Galashiels. He found that ILR Swansea Sound on **1170** and BBC R.Devon & Dorset on **1458** could be received all day! He logged for the first time BBC Wiltshire Sound on **1332** at 0730 and ILR Classic Gold on **774** at 1645. At night, ILR County Sound on **1476** was very strong after the 600kW station at Wien-Bisamberg, Austria had closed down. Down in Somerset **Nicola Hutchings** (Wellington) obtained her best ever reception of GNR in Stockton-on-Tees on **1170** at 2250 on October 20.

Short Wave Reports

The propagation conditions in the **25MHz (11m)** band were unsuitable for broadcasting during October.

Propagation varied daily in the **21MHz (13m)** band but it was used by several broadcasters including UAER, Dubai **21.605** (Ar to Eur 0615-1030), rated 44434 at 0740 by **Vic Prier** in Colyton; DW via Julich? **21.680** (Eng to S.E.Asia 0900-0950) 34434 at 0917 by **Tony Hall** in Freshwater Bay, IoW; Voice of Turkey **21.715** (Tur to W.Asia, Australia 0500-1000) 44444 at 0925 in Scalloway; RAI Rome **21.520** (It to Africa 0600-1300) 24222 at 0930 by **Thomas Williams** in Truro; UAER, Dubai **21.605** (Eng to Eur 1030-1100) 43333 at 1035 by **Chris Shorten** in Norwich; BBC via Ascension Is **21.660** (Eng to W/E/S.Africa 1100-1700) 43333 at 1100 in Morden; RFI via Issoudun? **21.580** (Fr to S.Africa 0900-1600) 54454 at 1142 by **Robert Hughes** in Liverpool; HCJB Quito, Ecuador **21.455** (Eng, u.s.b. + p.c.) 35333 at 1426 by **Michael Griffin** in Ross-on-Wye; R.Portugal Int via Sines **21.515** (Eng to M.East, India 1430-1450) 25232 at 1430 by **Eddie McKeown** in Newry; BBC via Cyprus **21.470** (Eng to E.Africa 1400-1700) 44433 at 1525 by **Stan Evans** in Herstmonceux; RFI via Issoudun **21.620** (Fr to E.Africa 0800-1500) 44433 at 1540 in Kilkeel; WYFR via Okeechobee **21.525** (Eng to Eur, Africa 1600?-2200?) 44344 at 2030 by **Ernest Wiles** while in Ibiza and 33333 at 2115 by **Bernard Curtis** in Stalbridge.

The conditions in the **17MHz (16m)** band also varied daily. During the morning the BBC via Ascension Is **17.830** (Eng to W/C.Africa 0730-1000, 1100-2100) was SIO333 at 0730 in Herstmonceux; Israel R, Jerusalem **17.545** (Heb [Home Sce rly] to W.Eur, N.America 0700-1730?) 44433 at 0840 in Truro; Voice of Russia **17.730** (Eng [WS]) 55555 at 0854 by **Tom MacDowell** in C.Bedford; DW via Rwanda? **17.800** (Eng to Asia, Australia 0900-0950) 44333 at 0920 in Scalloway; R.Austria Int via Moosbrunn **17.870** (Ger, Eng to Australia 0800-1100) 54444 at 0935 in Morden; R.Prague, Czech Rep **17.485** (Eng to W.Africa 1000-1025) 35333 at 1012 by **Darren Beasley** in Bridgwater; AIR via Bangalore **17.387** (Eng to Pacific areas 1000-1100) 25222 at 1000 in Newry; DW via Rwanda? **17.800** (Eng to W.Africa 1100-1150) SIO222 at 1100 by **Tom Smyth** in Co.Fermanagh.

After mid-day, R.Cairo via Abis **17.595** (Eng to S.Asia 1215-1330) was 32333 at 1215 in Ibiza; Africa No.1, Gabon **17.630** (Fr to W.Africa 0700-1600) 21122 at 1325 in Liverpool; R.Ukraine Int, Kiev **17.680** (Uk to Eur) heard at 1400 by Phil Townsend in E.London; RFI via Moyabi, Gabon **17.560** (Eng to E.Africa, M.East 1400-1455) 43333 at 1410 in Norwich; BBC via Antigua, W.Indies **17.840** (Eng to N/C.America 1400-1700) 34333 at 1550 in Kilkeel; R.Nederlands via Bonaire, Ned Antilles **17.605** (Du to S/E/W.Africa ?-1925) 35333 at 1909 in Barton-upon-Humber; BBC via Ascension Is **17.885** (Eng, Fr to Africa 1800-1830, 1900-1945) 34223 at 1940 by **Peter Pollard** in Rugby; WYFR via Okeechobee, USA **17.555** (Eng to Eur 1600-2145) 34443 at 2009 by **Tom Winzor** in Plymouth; R.Australia via Shepparton **17.750** (Eng to Asia 0000-0400) 35333 at 0025 in Ross-on-Wye.

The conditions in the **15MHz (19m)** band were a little more reliable. Before noon, R.Japan via Moyabi, Gabon **15.230** (Eng 0700-0800) was rated SIO333 at 0730 by Francis Hearne in N.Bristol; BBC via Ascension Is **15.400** (Eng to Africa 0730-1130) 24443 at 0740 in Colyton; Israel R, Jerusalem **15.615** (Heb to W.Eur,

LONG WAVE CHART

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

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

Listeners:-
(A) Martin Dale, Stockport.
(B) David Edwardson, Wallsend.
(C) Alec Griffiths, Thurso.
(D) Sheila Hughes, Morden.
(E) Eddie McKeown, Newry.
(F) George Millmore, Wootton, IoW.
(G) Fred Pallant, Storrington.
(H) Harry Richards, Barton-on-Humber.
(I) Tom Smyth, Co.Fermanagh.
(J) Norman Thompson, Oadby.
(K) Thomas Williams, Truro.

N.America 0700-1655) 44444 at 0843 in C.Bedford; R.Finland via Pori **15.235** (Eng to Australia, Asia 0900-0930) 44333 at 0910 in Truro; AIR via Aligarh? **15.050** (Eng to NE.Asia 1000-1100) 43333 at 1032 in Plymouth; VOIRI Tehran, Iran **15.084** (Home Sce relay) 22322 at 1130 by Norman Thompson in Oadby; Israel R, Jerusalem **15.640** (Eng to Eur? 1130-1200?) 45544 at 1144 in Bridgwater; WWCR Nashville, USA **15.685** (Eng to N.America, Eur 1100-2200) 44444 at 1145 in Morden.

During the afternoon RFI via Allouis? **15.195** (Eng to Eur 1200-1300) was SIO444 at 1200 in Co.Fermanagh; BBC via Skelton & Rampisham, UK **15.565** (Eng to Eur, M.East, Africa 0600-1500) 33343 at 1405 in Liverpool; RCI via Sines, Portugal **15.325** (Eng to Eur, M.East, Africa 1430-1500) 44444 at 1430 in Stalbridge; BBC via Rampisham & Skelton, UK **15.575** (Eng to Eur, M.East, W.Asia 1500-1700) 44444 at 1600 in Ibiza; WYFR via Okeechobee **15.695** (Eng to Eur, Africa 1600-1845) 55444 at 1605 in Ross-on-Wye; RDP Portugal **15.200** (Port to USA 1200?-2000? Sat/Sun) 45554 at 1622 in Wallsend; Channel Africa via Meyerton **15.240** (Eng to C/W Africa 1630?-1830) 45344 at 1700 in Newry; Africa No.1, Gabon **15.475** (Fr to W.Africa 1600-1900) 34444 at 1715 in Rugby.

Later R.Nederlands via Bonaire, Ned.Antilles **15.315** (Eng to Africa 1830-2025) was 44444 at 1957 by **Vera Brindley** in Woodhall Spa; RNB Brazil **15.265** (Port, Eng, Ger to Eur 1630-2020) 42233 at 1843 by **David Hall** in Morpeth; VOA via Greenville, USA **15.365** (Fr to Africa 1830-2030) 24332 at 2027 by **Fred Pallant** in Storrington; RCI via Sackville **15.150** (Fr, Eng to Eur, Africa 2000-2230) 34333 at 2050 in Freshwater Bay.

More reliable conditions were evident in the **13MHz (22m)** band. Logged during the day were R.Austria Int via Moosbrunn **13.730** (Eng to Eur 0830?-0900?), rated SIO444 at 0830 in Co.Fermanagh; R.Vlaanderen Int, Belgium **13.795** (Eng 0830?-0900?) 24212 at 0832 in Newry; SRI via Sottens? **13.685** (Eng, It, Ger, Fr to Australasia 0830-1030) 44444 at 0915 in Truro; AWR (KSDA) Guam **13.720** (Eng to SE.Asia 1230-1300) 33232 at 1230 in Scalloway; Voice of Turkey, Ankara **13.750** (Eng to Asia, Australia 1200-1300?) 54444 at 1255 in Norwich; SRI via Sottens? **13.635** (Eng, Ger, Fr, It to SE.Asia 1100-1330) 33333 at 1321 by **Martin Dale** in Stockport; R.Norway Int **13.805** (Eng to N/C.America 1300-1330) 35433 at 1324 in Bridgwater; SRI via Sottens? **13.635** (Eng, Ger, Fr to S/C.Asia 1400-1615) 42433 at 1420 in Ross-on-Wye; WWCR Nashville, USA **13.845** (Eng to E.USA 1300?-0100) 33333 at 1500 in Ibiza; UAER, Dubai **13.675** (Eng to Eur 1600-1640) 33443 at 1615 in Kilkeel.

During the evening R.Ukraine Int, Kiev **13.590** (Ger to Eur 1700-1800) was 44444 at 1700 in Colyton; VOA via Selebi-Phikwe, Botswana **13.710** (Eng to Africa 1600-2130?) 33333 at 1915 in Stalbridge; WHRI South Bend, USA **13.760** (Eng to E.USA, Eur 1500-2057?) 44444 at 2019 in Plymouth; R.Havana Cuba **13.715** (Eng to Eur 2030-2130) 22332 at 2042 in Liverpool; R.Havana Cuba **13.725** (Eng [USB] to Eur 2030-2130) 32233 at 2056 in Morpeth; RCI via Sackville **13.650** (Fr, Eng to Eur, Africa 2000-2200) 54444 at 2103 in Freshwater Bay.

R.New Zealand's broadcast to Pacific areas in the **11MHz (25m)** band sometimes reached the UK. Their transmission from Rangitaki, N.Island on **11.905** (Eng 0459-0816 Mon-Fri, 0459-0758 Sat/Sun) was rated 34533 at 0730 in Wallsend. Also noted in the morning were FEBC Bocaue, Philippines **11.635** (Eng to Asia 0930-1100) 23222 at 1010 in Morden; FEBC (KFBS) Marpi, N.Mariana Is **11.650** (Russ to E.Eur 0900-1100) 44444 at 1030 in Scalloway.

During the afternoon the Voice of Greece, Athens **11.645** (Gr, Eng to Africa 1200-1250) was 33343 at 1245 in Norwich; WWCR Nashville, USA 12.160 (Eng to N.America, Eur 1400-2200) 33323 at 1415 in Stalbridge; RCI via Sines, Portugal **11.915** (Eng, Fr to Eur, Africa 1430-1600) 55555 at 1452 in Plymouth; Voice of Israel, Jerusalem **12.080** (Eng to W.Eur, N.America 1500-1530) 32333 at 1500 in Woodhall Spa; R.Jordan via Al Karanah **11.690** (Eng to W.Eur, E.USA 1000-1630) 44434 at 1501 in Rugby; R.Pakistan, Islamabad **11.570** (Eng to M.East 1600-1630) SIO232 at 1600 in Co.Fermanagh; R.Australia via Shepparton **11.660** (Eng to Asia 1330-1700) 33322 at 1600 in Morpeth; SRI via ? **12.075** (Eng, Ger, Fr to S/C.Asia 1400-1615) 34443 at 1610 in Kilkeel; BBC via Kranji, Singapore **11.750** (Eng to Asia 1615-1800) 21122 at 1655 in Liverpool; R.Japan via Sri Lanka **11.880** (Eng to M.East, N.Africa 1700-1800) 43433 at 1701 in Bridgwater.

Later, AIR via Bangalore **11.620** (Eng, Hi to Europe 1745-2230) was 24222 at 1800 in Truro; BBC via Seychelles **11.860** (Eng to Africa? 1400-1845) 43333 at 1814 by Rhoderick Illman in Oxted; BBC via Skelton & Woofferton, UK **12.095** (Eng to Eur, N/W.Africa 0500-2100) 33433 at 1830 in Colyton; R.Nederlands via Meyerton **11.655** (Eng to Africa 1730-2025) 43233 at 1832 in Newry; DW via Rwanda **11.810** (Eng to Africa 1900-1950) 45344 at 1914 in Ross-on-Wye; VOA via Botswana? **12.080** (Fr to Africa 1830-2000) 44444 at 2026 in Storrington; R.Kuwait via Kabd **11.990** (Eng to Eur, N.America 1800-2100) 22121 at 2055 in Oadby; HCJB Quito, Ecuador **12.015** (Eng to Eur 1900-2200) SIO544 at 2133 by Martin Cowin in Kirkby Stephen; BBC via Ascension Is **11.750** (Eng to S.America 2000-0200) 33332 at 2227 in Stockport.

Noted in the **9MHz (31m)** band during the early morning were the BBC via Skelton, UK

LOCAL RADIO CHART

Freq (kHz)	Station	ILR BBC	e.m.r.p (kW)	Listener
558	Spectrum, London	I	0.80	G,I
585	R.Solway	B	2.00	A
603	Cheltenham R.	I	0.10	A,B,E,G,I,K*
603	InvictaSG,Litt'borne	I	0.10	D*,G,I
630	R.Bedfordshire(3CR)	B	0.20	A,B,C,G,I,K*
630	R.Cornwall	B	2.00	A,G,I
657	R.Clwyd	B	2.00	A,I
657	R.Cornwall	B	0.50	A,G,I
666	Gemini AM, Exeter	I	0.34	A,G,I
666	R.York	B	0.80	A,B,G,H,K*
729	BBC Essex	B	0.20	D,G,I,K*
738	Hereford/Worcester	B	0.037	A,B,G,I,K*
756	R.Cumbria	B	1.00	A,G
756	R.Maldwyn, Powys	B	0.63	B,G,I
765	BBC Essex	B	0.50	A,D,G,I,K*.
774	R.Kent	B	0.70	G,I,K*
774	R.Leeds	B	0.50	A,B,G
774	Cl.Gold 774, Glos	I	0.14	A,G,H,I
792	Cl.Gold 792,Bedford	I	0.27	G,I,K*
792	R.Foyle	B	1.00	A
801	R.Devon & Dorset	B	2.00	A,G,I
828	Cl.Gold 828, Luton	I	0.20	G
828	Magic 828, Leeds	I	0.12	B,E*
828	Asian Netwk Sedgley	B	0.20	B
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	B,G,I,K*
855	R.Devon & Dorset	B	1.00	G,I
855	R.Lancashire	B	1.50	A,B,H
855	R.Norfolk, Postwick	B	1.50	G,K*
855	Sunshine 855,Ludlow	I	0.15	B,E,G,H
873	R.Norfolk, W.Lynn	B	0.30	B,G,I
936	Brunel CG, W.Wilts	I	0.18	G,I,K*
936	Yks Dales R, Howes	I	1.00	A,B,G,H
945	Derby (Gem AM)	I	0.20	A,B,E*,G,K*
945	S.Coast R, Bexhill	I	0.75	G,I
954	Gemini AM, Torquay	I	0.32	G,I
954	Cl.Gold 954, H'ford	I	0.16	B,F,G
963	Asian Sd,Manchester	I	0.80	A
963	963 Liberty (Viva)	I	1.00	E,G,H,I
990	R.Devon & Dorset	B	1.00	A,C,G,I,J
990	Big Easy Magic AM	I	0.25	B,G
990	WABC, Wolverhampton	I	0.09	B,G,K*
999	Gem AM, Nottingham	I	0.25	B,G,K*
999	Red Rose 9-99 P'stn	I	0.80	A,B
999	R.Solent	B	1.00	D,F,G,I
999	Valleys R, Aberdare	I	0.30	E,G
1017	WABC, Shrewsbury	I	0.70	A,B,G,H,K*
1026	R.Cambridgeshire	B	0.50	G,H,K*
1026	Downtown, Belfast	I	1.70	A,J
1026	R.Jersey	B	1.00	G,I
1035	RTL Country 1035	I	1.00	B*,E*,G,I
1035	R.Sheffield	B	1.00	B
1035	N.Sound, Aberdeen	I	0.78	A,G*,H
1107	Moray Fth,Inverness	I	1.50	H
1116	R.Derby	B	1.20	A,B,D,G,H,K*
1116	R.Guernsey	B	0.50	D,G,I
1116	Valleys R,Ebbw Vale	I	0.50	D,E,H
1152	Amber, Norwich	I	0.83	B*,E*,G,H*
1152	Clyde 2, Glasgow	I	3.06	H
1152	LBC 1152	I	23.50	E*,G,H*,I
1152	Pic'ly 1152,Manch'r	I	1.50	A,B
1152	Xtra-AM, Birmingham	I	3.00	G,K*
1161	R.Bedfordshire(3CR)	B	0.10	G
1161	Brunel CG, Swindon	I	0.16	A,G
1161	Big Easy Magic 1F	I	0.35	K*
1161	Southern Counties R	B	1.00	G,I,J
1161	Tay AM, Dundee	I	1.40	G,H
1170	Amber SGR, Ipswich	I	0.28	H*
1170	GNR, Stockton	I	0.32	A,E*,H
1170	SCR, Portsmouth	I	0.50	G,I,J
1170	Signal 2,Stoke-on-T	I	0.20	B
1170	Swansea Snd,Swansea	I	0.58	A,E,H
1170	1170AM,High Wycombe	I	0.25	G
1242	InvictaSG,Maidstone	I	0.32	G
1242	IoW Radio, Wootton	I	0.50	G,I
1251	Amber SGR,Bury StEd	I	0.76	G,H,K*
1260	Brunel CG, Bristol	I	1.60	H
1260	Marcher G, Wrexham	I	0.64	B,E*,H,J
1260	SabrasSnd,Leicester	I	0.29	B,E*,K*
1260	R.York	B	0.50	A
1296	Radio XI, Birmingham	I	5.00	A,B,E*,G,H,I,J,K*
1305	Big Easy Magic AM	I	0.15	A,B
1305	Premier via ?	I	0.50	G,H,I
1305	Touch AM, Newport	I	0.20	I
1323	S.Coast R,Southwick	I	0.50	G,I
1323	SomersetSnd,Bristol	B	0.63	A,G
1332	Premier, Battersea	I	1.00	A,G
1332	Cl.Gold 1332,Pt'bo	I	0.60	B,H,I,K*
1332	Wiltshire Sound	B	0.30	G,H,I
1359	BreezeAM,Chelmsford	I	0.28	G
1359	Cl.Gold 1359, C'try	I	0.27	G,K*
1359	R.Solent	B	0.85	G,H,I
1359	Touch AM, Cardiff	I	0.20	E,C,H
1368	R.Lincolnshire	B	2.00	G,K*
1368	Southern Counties R	B	0.50	G,I
1368	Wiltshire Sound	B	0.10	I
1377	Asian Sd, E.Lancs	I	?	E*
1413	Premier via ?	I	0.50	E*,G,H,I
1413	Yks Dales R,Skipton	I	0.10	A,B
1431	Breeze AM, Southend	I	0.35	E*,F,G,H,I
1431	Cl.Gold, Reading	I	0.14	G,I
1449	R.Peterboro/Cambs	B	0.15	A,G,K*
1458	R.Cumbria	B	0.50	A
1458	R.Devon & Dorset	B	2.00	A,H,I
1458	1458 Lite AM Manch'	I	5.00	B,H
1458	R.Newcastle	B	2.00	H
1458	Sunrise, London	I	50.00	B*,E*,G,H,I
1476	CountySnd,Guildford	I	0.50	E*,G,H*,I
1485	Cl.Gold, Newbury	I	1.00	G,H
1485	R.Humberside (Hull)	B	1.00	H
1485	R.Merseyside	B	1.20	A,B,H,I,J
1485	Southern Counties R	B	1.00	G,I
1503	R.Stoke-on-Trent	B	1.00	A,D*,E*,G,H
1521	R.1521 Craigavon,NI	I	0.50	A,E*,H,J
1521	Fame 1521, Reigate	I	0.64	D*,E*,F,G,I
1530	R.Essex	B	0.15	D,F,G
1530	Cl.Gold W.Yorks	I	0.74	A,B,E*,G
1530	Cl.Gold Worcester	I	0.52	A,C,G,H,I
1548	R.Bristol	B	5.00	I
1548	Capital G, London	I	97.50	G,I
1548	Magic 1548 Liverp'l	I	4.40	A,B
1548	Forth AM, Edinburgh	I	2.20	H
1557	R.Lancashire	B	0.25	A,B
1557	Mellow, Clacton	I	0.125	G
1557	Cl.Gold 1557,N.hant	I	0.76	E*,G,H,K*
1557	S.Coast R, So'ton	I	0.50	G,H,I
1584	KCBC, Kettering	I	0.04	E*,G
1584	London Turkish R	I	0.20	G,I
1584	R.Nottingham	B	1.00	B,D*,E*,G,H,K*
1584	R.Shropshire	B	0.50	A,G
1584	Tay, Perth	I	0.21	E*,H
1602	R.Kent	B	0.25	G,H,I

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

Listeners:-

(A) Robert Connolly, Kilkeel.
(B) Martin Dale, Stockport.
(C) Francis Hearne, N.Bristol.
(D) Sheila Hughes, Morden.
(E) Nicola Hutchings, Wellington.
(F) Rhoderick Illman, Oxted.
(G) Brian Keyte, Bookham.
(H) Ross Lockley, Galashiels.
(I) George Millmore, Wootton, IoW.
(J) Tom Smyth, Co.Fermanagh.
(K) Norman Thompson, Oadby.

MEDIUM WAVE CHART

Freq (kHz)	Station	Country	Power (kW)	Listener
520	Hof/Wurzburg(BR)	Germany	0.2	J*
531	Ain Beida	Algeria	600/300	B*,D*,J*,K*,N*,O*
531	Torshavn	Faerge Is.	100	G
531	Berg	Germany	20	B*,J*,K
531	RNE5 via ?	Spain	?	K
531	Beromunster	Switzerland	500	B*,C,K*
540	Wavre	Belgium	150/50	B*,J*,K,O*
540	Sidi Bennour	Morocco	600	B*,J*,K*
549	Les Trembles	Algeria	600	B*,D*,J*,K*
549	Thurnau (DLF)	Germany	200	B*,D*,J*,K,O*
558	Espoo	Finland	100	N*,O*
558	RNE5 via ?	Spain	?	B*,J*,K*
567	Tullamore(RTE1)	Ireland (S)	500	B,G,K,O*,Q
576	Muhlacker(SDR)	Germany	500	B*,J*,K*,O*
576	Riga	Latvia	500	K*
576	Barcelona(RNE5)	Spain	50	B*,K*
585	Paris(FIP)	France	8	B*,K
585	Madrid(RNE1)	Spain	200	B*,D*,J*,J*,K*,O*
585	Dumfries(BBCScot)	UK	2	G,H
594	Frankfurt(HR)	Germany	1000/400	B*,J*,O*
594	Oujda-1	Morocco	100	B*,K*
594	Muge	Portugal	100	B*,K*
603	Sevilla(RNE5)	Spain	50	B*,J*,K*,O*
603	Newcastle(BBC)	UK	2	B,J*
612	Athlone(RTE2)	Ireland (S)	100	B,G,K*,O*,Q
612	RNE1 via ?	Spain	10	B*,K*
621	Wavre	Belgium	80	B*,J*,K
621	Batra	Egypt	2000	O*
621	RNE1 via ?	Spain	10	B*
621	Barcelona(OCR)	Spain	50	J*,K*
630	Dannenberg(NDR)	Germany	100	B*
630	Vigra	Norway	100	B*,J*,O*
630	Tunis-Djedeida	Tunisia	600	B*,J*,K*
639	Praha(Liblice)	Czech	1500	B*,J*,O*
639	RNE1 via ?	Spain	?	B*,J*,K*
648	RNE1 via ?	Spain	10	J*
648	Orfordness(BBC)	UK	500	B,G,K,N,O*
657	Napoli	Italy	120	K*
657	Madrid(RNE5)	Spain	20	B*,J*,K*
657	Wrexham(BBCWales)	UK	2	B,G,J*
666	MesskirchRuhrd(SWF)	Germany	150	B*,J*,K*
666	SitkunaiR.Vilnius)	Lithuania	500	J*
666	Lisboa	Portugal	135	J*,K*
666	Barcelona(SER)	Spain	50	O*
675	Lopic(R10 Cold)	Holland	120	B,D,J*,K
684	Sevilla(RNE1)	Spain	500	B*,J*,K*
684	Avala(Beograd-1)	Yugoslavia	2000	B*,J*,K*
693	Tortosa(RNE1)	Spain	2	B*,J*
693	Burghead(BBC5)	UK	50	C
693	Droitwich(BBC5)	UK	150	B,K,O*
693	Enniskillen(BBC5)	UK	1	N
693	Startpoint(BBC5)	UK	50	Q
702	Flensburg(NDR)	Germany	5	B*,J*
702	TWR via Monte Carlo	Monaco	300	K*,O*
711	Rennes 1	France	300	B*,J*,K,O*
711	Murcia(COPE)	Spain	5	B*
720	Lisnagarvey(BBC4)	Ireland (N)	10	K*
720	Norte	Portugal	100	B*,J*
720	Lots Rd,Ldn(BBC4)	UK	0.5	B*,G,K
729	Cork(RTE1)	Ireland (S)	10	G,J*,K*
729	RNE1 via ?	Spain	?	B*,J*,K
738	Paris	France	4	K
738	Poznan	Poland	300	J*,K*
738	Barcelona(RNE1)	Spain	500	B*,J*,K*
747	Flevo(Hilv2)	Holland	400	B,J*,K,O*
747	Cadiz(RNE5)	Spain	10	K*
756	Braunschweig(DLF)	Germany	800/200	B*,C,J*,K*,O*
756	Bilbao(El)	Spain	5	B*,J*,K*
756	Redruth(BBC)	UK	2	B*,G,J*,K,N
765	Sottens	Switzerland	500	B*,D,J*,K*,O*
774	RNE1 via ?	Spain	?	B*,J*,K*
783	Leipzig(MDR)	Germany	100	B*,D*,FJ*,K*,O*
783	Miramar(R.Porto)	Portugal	100	B*,K*
783	Dammam	Saudi Arabia	100	D*
792	Limoges	France	300	B*,FK,O*
792	Lingen(NDR)	Germany	5	J*
792	Sevilla(SER)	Spain	20	B*,K*
792	Londonderry(BBC)	UK	1	N
801	Munchen-Ismaning	Germany	300	B*,FJ*,K*,O*
801	RNE1 via ?	Spain	?	B*,J*,K*
810	Volgograd	Russia	150	O*
810	Madrid(SER)	Spain	20	B*,J*,K*
810	Burghead(BBCScot)	UK	100	C
810	Westerglen(BBCScot)	UK	100	B,F,G,K*,P*
819	Batra	Egypt	450	D*,K*
819	Warsaw	Poland	300	B*,D*,J*
819	S.Sebastian(El)	Spain	5	J*
828	Hannover(NDR)	Germany	100/5	B*,J*
828	Rotterdam	Holland	20	J*
828	Barcelona(SER)	Spain	50	B*
837	Nancy	France	200	B*,J*
837	COPE via ?	Spain	?	B*,J*,K*,O*
846	Rome	Italy	540	B*,K*
855	Berlin	Germany	100	B*
855	RNE1 via ?	Spain	?	B*,J*,K*
864	Paris	France	300	B*,FK
873	Frankfurt(AFN)	Germany	150	B*,K*
873	Zaragoza(SER)	Spain	20	B*,J*
882	COPE via ?	Spain	?	B*,J*,K*
882	Washford(BBCWales)	UK	100	B,G,K,N,O*
891	Algiers	Algeria	600/300	B*,D*,J*,K*
900	Brno(CRo2)	Czech Rep.	25	J*
900	Milan	Italy	600	B*,J*,K*
900	COPE via ?	Spain	?	J*
909	B'mans Pk(BBC5)	UK	140	I*,K,N,O
909	M'side Edge(BBC5)	UK	200	B
918	Plesivec(Sloven'nR)	Slovenia	600/100	B*,J*,K*
918	Madrid(R.Int)	Spain	20	B*,J*,K*
927	Wolvertem	Belgium	300	B*,J*,K,O*,P*
936	Bremen	Germany	100	B*,FJ*,K*,O*
936	Venezia	Italy	20	K*
936	RNE5 via ?	Spain	?	J*,K*
945	Toulouse	France	300	B*,J*,O*
954	Brno (CRo2)	Czech Rep.	200	B*,K*
954	Madrid(CI)	Spain	20	J*,K*
963	Pori	Finland	600	B*,J*,K*,L*,O*
963	Tir Chonaill	Ireland (S)	10	N*
972	Hamburg(NDR)	Germany	300	B*,FJ*,K*
981	Alger	Algeria	600/300	B*,D*,J*,K*
990	Berlin	Germany	300	B*,J*,O*
990	R.Bilbao(SER)	Spain	10	B*,K*
990	Redmoss(BBC)	UK	1	H,J*
990	Tywyn(BBC)	UK	1	G
999	Schwerin (RIAS)	Germany	20	B*
999	Madrid(COPE)	Spain	50	J*
1008	SER via ?	Canaries/Spain	?	B*
1008	Flevo(Hilv-5)	Holland	400	B*,J*,K,P*
1017	Rheinsender(SWF)	Germany	600	B*,FJ*,K*
1017	RNE5 via ?	Spain	?	K*
1026	SER via ?	Spain	?	B*,J*,K*
1035	Lisbon(Prog3)	Portugal	120	J*
1044	Dresden(MDR)	Germany	20	B*,J*
1044	S.Sebastian(SER)	Spain	10	B*,K*
1053	Zaragoza(COPE)	Spain	10	J*
1053	Talk R.UK via ?	UK	?	B,C,K,N,Q
1062	Kalundborg	Denmark	250	B*,FJ*,K*,P*
1062	R.Uno via ?	Italy	?	D*,K*
1071	R.France via ?	France	?	B*
1071	Brest	France	20	K
1071	Riga	Latvia	50	N*
1071	Bilbao(El)	Spain	5	B*,FJ*,K*
1071	Talk Radio UK via ?	UK	?	B,F,O*
1080	Katowice	Poland	1500	B*,J*,K*
1080	SER via ?	Spain	?	K*
1089	Talk Radio UK via ?	UK	?	B,C,K,N,O*
1098	Nitra(Jarok)	Slovakia	1500	B*,K*,J*,K*
1098	RNE5 via ?	Spain	?	K*
1107	AFN via ?	Germany	10	B*,J*
1107	RNE5 via ?	Spain	?	B*
1107	Talk R.UK via ?	UK	?	B,K,N
1116	Bari	Italy	150	K*
1116	Pontevedra(SER)	Spain	5	B*
1125	La Louviere	Belgium	20	B*,J*,K*
1125	RNE5 via ?	Spain	?	B*
1125	Llandrindod Wells	UK	1	G
1134	COPE via ?	Spain	2	B*,K*
1134	Zadar(Croatian R)	Yugoslavia	600/1200	B*,J*,K*
1143	AFN via ?	Germany	1	B*,FJ*,K*
1143	COPE via ?	Spain	2	B*
1161	Ain-Salah	Algeria	5	K*
1161	Strasbourg(Flnt)	France	200	O*
1179	SER via ?	Spain	?	F
1179	Solvesborg	Sweden	600	B*,I*,J*,K*,P*
1188	Kuurne	Belgium	5	B*,J*,K*
1197	Munich(VOA)	Germany	300	B*,J*
1197	Virgin via ?	UK	?	B,K,N,O
1206	Wroclaw	Poland	200	B*,J*
1215	Virgin via ?	UK	?	B,C,K,N,O
1224	Lelystad	Holland	50	B*,J*
1224	COPE via ?	Spain	?	B*
1233	Liege	Belgium	5	J*
1233	Virgin via ?	UK	?	B
1242	Marseille	France	150	J*,O*
1242	Virgin via ?	UK	?	B
1251	Marcali	Hungary	500	J*
1251	Huisberg	Netherlands	10	B*,N*
1260	SER via ?	Spain	?	B*,J*
1260	Guildford (V)	UK	0.5	K
1269	Neumunster(DLF)	Germany	600	B*,J*,K*
1269	COPE via ?	Spain	?	B*
1278	Dublin/Cork(RTE2)	Ireland (S)	10	B,G,K*,N,Q
1287	RFE via ?	Czech Rep.	400	B*,J*,K*
1287	Lerida(SER)	Spain	10	B*,K*
1296	Kardzali	Bulgaria	150	K*
1296	Valencia(COPE)	Spain	10	B*,C,I*,J*
1296	Orfordness(BBC)	UK	500	B,G,N,O*
1305	Rzeszow	Poland	100	B*,J*,K*
1314	Kvitsoy	Norway	1200	B*,C,J*,K,L,O*
1323	W'brunn (V.Russia)	Germany	1000/150	B*,I*,J*,O*
1332	Rome	Italy	300	J*,K*
1341	Lisnagarvey(BBC)	Ireland (N)	100	B,D*,G,K
1341	Tarrasa(SER)	Spain	2	K*
1350	Cesvaine/Kuldiga	Latvia	50	J*,K*
1359	Arganda (RNE-FS)	Spain	600	B*,K*,N
1368	Foxdale(Manx R)	I.O.M.	20	B,F*,G,K*,N
1377	Lille	France	300	F*,J*,K
1386	Bolshakovo	Russia	2500	A*,D*,F*,J*,K*
1395	Fllake	Albania	1000	K*,O*
1395	TWR via Fllake	Albania	500	J*
1395	Lopic	Netherlands	120/40	A*,J*,K,P
1404	Brest	France	20	B*,C,F*,K
1413	RNE5 via ?	Spain	?	B*,F*,K*
1422	Alger	Algeria	50/25	K*
1422	Heusweiler(DLF)	Germany	1200/600	B*,FJ*,K*,N,O*
1431	Kopani	Ukraine	500	J*
1440	Marnach(RTL)	Luxembourg	1200	A*,B*,D*,F,K*,O*,P*
1440	Damman	Saudi Arabia	1600	D*
1449	Redmoss(BBC)	UK	2	J*
1467	Monte Carlo(TWR)	Monaco	1000/400	B*,K*
1476	Wien-Bisamberg	Austria	600	B*,J*,L*,O*,P*
1494	Clermont-Ferrand	France	20	C,K,O*
1494	St.Petersburg	Russia	1000	J*,K*,P*
1503	Stargard	Poland	300	J*,K*
1503	RNE5 via ?	Spain	?	K*
1512	Wolvertem	Belgium	600	A*,B*,D*,FJ*,K*,L0*,P*,O*
1521	Kosice(Cizatice)	Slovakia	600	B*,K*
1521	Duba	Saudi Arabia	2000	K*,M*,O*
1530	Vatican R	Italy	150/450	B*,C,D*,J*,K*
1539	Mainflingen(ERF)	Germany	350(700)	B*,C,FJ*,K,N,O*
1557	Nice	France	300	J*,O*
1575	Genova	Italy	50	B*,K*
1575	SER via ?	Spain	5	F,K*
1584	SER via ?	Spain	2	B*
1593	Holzkirchen(VOA)	Germany	150	B*,J*,K*,N
1602	SER via ?	Spain	?	B*,K*
1602	Vitoria(El)	Spain	10	B*,K*
1611	Vatican R	Italy	15	C

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

Listeners:-
(A) Bernard Curtis, Stalbridge.
(B) Martin Dale, Stockport.
(C) Alec Griffiths, Thurso.
(D) Sheila Hughes, Morden.
(E) Nicola Hutchings, Wellington.
(F) Rhoderick Illman, Oxted.
(G) Brian Keyte, Bookham.
(H) Ross Lockley, Galashiels.
(I) Tom MacDowell, C.Bedford.
(J) Eddie McKeown, Newry.
(K) George Milimore, Wootton IoW.
(L) Clare Pinder, while in Appleby.
(M) John Slater, Scalloway.
(N) Tom Smyth, Co.Fermanagh
(O) Norman Thompson, Oadby.
(P) Thomas Williams, Truro.
(Q) Tom Winzor, Plymouth.

9.410 (Eng to Eur, N/C.Africa 0400-2230), rated 45454 at 0420 by **John Parry** in Larnaca, Cyprus; R.Mediterranee Int via Nador, Morocco **9.575** (Fr, Ar to N.Africa, S.Eur 0500-0100) 44444 at 0630 in C.Bedford; R.Norway Int, Oslo **9.590** (Eng to Eur, New Zealand 0700-0730) 54444 at 0709 in Plymouth; TWR Monte Carlo, Monaco **9.870** (Eng to Eur 0755-0920 Mon-Fri, 0745-0935 Sat, 0745-0950 Sun) 44444 at 0800 in Morden; R.New Zealand Int via Rangataiki **9.700** (Eng Mon-Fri 0816-1206, Sat/Sun 0758-1206), heard at 0955 in Norwich.

After mid-day R.Australia via Shepparton **9.435** (Eng to Pacific areas 1430-2200) was 44434 at 1500 by **Gerald Guest** in Dudley & 44333 at 2015 in Truro; VOIRI Tehran, Iran **9.022** (Tur to Turkey 1630-1730) heard at 1630 in E.London; SRI via Sottens? **9.905** (It, Ar, Fr to E.Africa 1630-1815) 33233 at 1700 in Ibiza; VOA via Gloria, Portugal **9.760** (Eng to M.East 1700?-2000?) 53443 at 1855 in Freshwater Bay; R.Nederlands via Flevo **9.895** (Eng to Africa 1830-2025) 32333 at 1954 in Woodhall Spa; Israel R, Jerusalem **9.365** (Eng to Eur, USA 2000-2025) SIO433 at 2000 in Co.Fermanagh; AIR via Aligarh? **9.950** (Hi, Eng to Eur 1745-2230) 23222 at 2045 in Liverpool.

In the **7MHz (41m)** band Monitor R.Int via WSHB **7.535** (Eng [Various Sat/Sun] 0400-0958) was 44434 at 0503 in C.Bedford; BBC via Rampisham & Skelton UK **7.325** (Eng to Eur, M.East, Africa 0445-0815) SIO444 at 0700 in Co.Fermanagh; R.Japan via Woofferton, UK **7.230** (Jap, Eng to Eur 0600-0800) 33323 at 0720 in Stalbridge; RFPI Costa Rica **7.385** (Eng 24hrs) 32233 at 0811 in Morpeth; KTBN via Salt Lake City **7.510** (Eng to N.America 0000-1600) 33333 at 0945 in Scalloway; VOA via Thailand **7.125** (Eng to S.Asia 1400-1800?) 44444 at 1507 in Woodhall Spa; R.Norway Int, Oslo **7.560** (Eng to Eur, Middle East 1700-1730) 54533 at 1712 in Bridgwater; Voice of Greece **7.450** (Gr to Eur 1800-2150) 44434 at 1925 in Colyton; VOIRI Tehran **7.260** (Eng to Eur, M.East 1930-2028) 33333 at 1950 in Stockport; Israel R, Jerusalem **7.465** (Eng to Eur, USA 2000-2025) 54444 at 2000 by **Clare Pinder** in Appleby; BBC via Skelton, UK **7.325** (Eng to Eur 2000-2230) 54544

at 2025 in Kirkby Stephen; AIR via Aligarh? **7.410** (Hi, Eng to Eur 1745-2230) 42233 at 2040 in Liverpool; RCI via Skelton, UK **7.235** (Eng to Eur, Africa 2100-2230) 44444 at 2100 in Dudley; Voice of Russia **7.170** (Eng to N.America 2200-0000) 44444 at 2335 in Morden; R.Prague, Czech Rep **7.345** (Eng to N.America 0000-0027) 54444 at 0004 in Ross-on-Wye; BBC via Kranji, Singapore **7.110** (Eng to Asia 2200-0045) 23332 at 0030 in Kilkeel.

Some of the broadcasts to Europe in the **6MHz (49m)** band came from WEWN Birmingham, USA **5.825** (Eng 2100?-1000), rated 33333 at 0418 in C.Bedford; R.Japan via Skelton, UK **5.975** (Eng 0600-0700) 54554 at 0650 in Herstmonceux; SRI via Lenk **6.165** (Eng, Fr, Ger, It 0500-2030) SIO444 at 1100 in Co.Fermanagh; R.Nederlands via Julich **6.045** (Eng 1130-1325) 54444 at 1244 in Plymouth; Bayerischer Rundfunk, Germany **6.085** (Ger 24hrs) 55444 at 1609 in Oxted; Polish R, Warsaw **6.095** (Eng 1800-1855) 43333 at 1825 in Morden; RAI Rome **6.015** (Eng 1935-1955) 54554 at 1944 in Bridgwater; China R.Int via ? **6.950** (Eng 2000-2157) 43223 at 2000 in Dudley; RCI via Sackville **5.925** (Eng 2100-2200, also to Africa) 21221 at 2115 in Oadby; RCI via Skelton, UK **5.995** (Eng 2100-2230) 51144 at 2117 in Morpeth; R.Austria Int via Moosbrunn **6.155** (Various) 32333 at 2130 in Truro; R.Sweden via Horby **6.065** (Eng 2130-2158) 44444 at 2158 in Freshwater Bay; AWR via Slovakia **6.055** (Eng 2200-2230) 43433 at 2217 in Ross-on-Wye.

While beaming to other areas R.Nederlands via Ned.Antilles **5.965** (Eng to Pacific 0830-0925) rated 24222 at 0845 in Newry; Voice of Hope, Lebanon **6.290** (Eng to M.East 1600?-2100?) 45343 at 2000 in Scalloway; BBC via Antigua, W.Indies **5.975** (Eng to C/N.America 2100-0800) 43443 at 0020 in Kilkeel; R.Vilnius, Lithuania **5.910** (Eng to USA 0030-0100) noted as poor by **John Court** in Birmingham; R.Nederlands via Ned.Antilles **6.165** (Eng to N.America 2330-0125) 34333 at 0035 in Barton-upon-Humber.

SWM

TROPICAL BANDS CHART

Freq (MHz)	Station	Country	UTC	DXer
3.223	AIR Simla	India	1700	N
3.230	SABC Meyerton	S.Africa	2140	A
3.240	TWR Shona	Swaziland	1625	I
3.245	AIR Lucknow	India	1650	N
3.255	BBC via Meyerton	S.Africa	2047	A,H,I,N
3.270	SWABC 1, Namibia	S.W.Africa	2040	A,H,N
3.290	Voice of Guyana	Guyana	0650	N
3.290	Namibian BC,Windhoek	S.W.Africa	2002	A,H,N
3.300	R.Cultural	Guatemala	0724	E
3.306	ZBC Prog 2	Zimbabwe	2115	A,H,L,N
3.315	AIR Bhopal	India	1702	A,N
3.316	SLBS Goderich	Sierra Leone	1921	H
3.320	SABC (RSG) Meyerton	S.Africa	2039	A,H,O
3.325	FRCN Lagos	Nigeria	2135	A
3.330	Christian Voice	Zambia	1705	N
3.335	CBS Taipei	Taiwan	1630	N
3.345	AIR Jaipur	India	1705	N
3.356	R.Botswana	Gabarone	1700	N
3.365	GBC R-2	Ghana	2038	A,B,E,H,N
3.365	AIR Delhi	India	1807	H,N
3.380	NBC Blantyre	Malawi	1807	H
3.395	ZBC Gweru	Zimbabwe	1806	A,H
3.915	BBC via Kranji	Singapore	2155	A
3.955	BBC via Skelton	England	2107	G,L,O
3.955	Nexus, Milan	Italy	2150	A,K
3.965	RFI Paris	France	2108	G,L
3.970	R.Korea via Skelton	England	2100	J
3.975	R.Budapest	Hungary	1930	D,E,G,H,J
3.985	Nexus, Milan	Italy	0600	D
3.985	China R via SRI	Switzerland	2128	F,G,L,P
3.985	SRI Beromunster	Switzerland	1930	H
3.995	DW via Julich	Germany	2110	A,D,G,L,O
4.005	Vatican R.	Italy	1931	E,H
4.330	Xinjiang BS, Urumqi	China	0035	A,N
4.460	CPBS 1, Beijing	China	1639	H
4.500	Xinjiang BS, Urumqi	China	1600	H,N
4.735	Xinjiang, Urumqi	China	0035	A,N
4.755	R.Educ CP Grande	Brazil	0055	A
4.760	AIR Port Blair	India	1610	N
4.770	Centinela del Sur	Ecuador	0145	A
4.770	FRCN Kaduna	Nigeria	1918	A,B,H,N
4.775	AIR Imphal	India	1636	H,N
4.777	R.Gabon, Libreville	Gabon	1853	A,D,E,H,K,N
4.783	RTM Bamako	Mali	2045	A,H,N
4.785	Caiari Porto Velho	Brazil	0040	A
4.790	Azad Kashmir R.	Pakistan	1605	A,H,I,N
4.800	AIR Hyderabad	India	1606	A,H,N
4.800	LNBS Maseru	Lesotho	1815	H,N
4.815	R.diff TV Burkina	Ouagadougou	2112	A,G,N
4.820	R.Botswana, Gaberone	Botswana	1925	N
4.820	AIR Calcutta	India	1455	N
4.830	R.Tachira	Venezuela	0142	A,G
4.832	R.Reloj	Costa Rica	0640	N
4.835	ABC-Alice Springs	Australia	2143	H
4.835	RTM Bamako	Mali	2051	A,B,C,D,E,G,H,K,M,N
4.840	AIR Bombay	India	1710	A,H,N
4.845	RTM Kuala Lumpur	Malaysia	1608	H
4.845	ORTM Nouakchott	Mauritania	2205	A
4.850	R.Yaounde	Cameroon	2210	A,G,K,N
4.850	AIR Kohima	India	1500	N
4.860	AIR Delhi	India	1609	C,D,H,N
4.865	PBS Lanzhou	China	2155	A,D,N
4.870	R.Cotonou	Benin	1940	H
4.870	Voz del Upano	Ecuador	0040	A
4.879	R.Bangladesh	Bangladesh	0045	A
4.885	R.Clube do Para	Brazil	2155	H
4.885	R.Difusora Acreana	Brazil	0050	A
4.885	KBC East Sce Nairobi	Kenya	1859	G,H
4.890	RFI Paris	via Gabon	0359	G,N
4.890	R.Port Moresby	New Guinea	2000	H,N
4.895	Pakistan BC	Pakistan	1611	H
4.900	Haixia 2	China	1205	N
4.905	R.Nat.N'djamena	Chad	2048	C,D,E,G,H,N
4.905	CPBS 1, Beijing	China	2210	A
4.910	Tennant Creek	Australia	2145	H
4.910	AIR Jaipur	India	1415	N
4.910	R.Zambia, Lusaka	Zambia	1812	H
4.915	R.Anhanguera	Brazil	0637	N
4.915	GBC-1, Accra	Ghana	2049	A,H,N
4.915	KBC Cent Sce Nairobi	Kenya	1822	H
4.915	R.Cora de Peru, Lima	Peru	0445	N
4.920	R.Quito, Quito	Ecuador	0431	B,N
4.927	RRI Jambi	Indonesia	2200	N
4.935	KBC Gen Sce Nairobi	Kenya	2008	C,H,N
4.940	AIR Guwahati	India	1614	H,N
4.945	R.Difusora	Brazil	0040	A
4.950	R.Nacional, Mulvenos	Angola	1815	H
4.950	AIR Srinagar	India	1603	H
4.950	VOA via Sao Tome	Sao Tome	2047	B,C,D,E,H,J,N
4.960	VOA via Sao Tome	Sao Tome	0300	G
4.965	R.Alvorada	Brazil	0045	A
4.970	PBS Xinjiang	China	1647	N
4.975	R.Uganda, Kampala	Uganda	1915	E,H,N
4.980	PBS Xinjiang, Urumqi	China	1615	H,N
4.980	Ecos del Torbes	Venezuela	0143	A,G,H
4.985	R.Brazil Central	Brazil	0055	A,N
5.005	R.Nepal, Kathmandu	Nepal	1657	A,H,N
5.009	R.TV Malagasy	Madagascar	1808	H,N
5.010	AIR Thiru'puram	India	0055	A
5.020	PBS-Jiangxi Nanchang	China	2210	A
5.020	La V du Sahel,Niamey	Niger	1946	H,N
5.025	ABC Katherine	Australia	2140	H
5.025	R.Parakou	Benin	2142	H
5.025	R.Rebelde, Habana	Cuba	0725	N
5.025	R.Uganda, Kampala	Uganda	1947	H,N
5.030	RTM Kuching	Sarawak	2102	H
5.035	R.Aparecida	Brazil	0440	N
5.045	R.Cultura do Para	Brazil	0100	A
5.047	R.Togo, Lome	Togo	1948	A,B,H,K,L
5.050	Guangxi FBS, Nanning	China	1415	H,N
5.050	R.Tanzania	Tanzania	1710	H,L,N
5.055	RFO Cayenne(Matoury)	French Guiana	0730	N
5.060	PBS Xinjiang, Urumqi	China	0028	G,N
5.075	Caracol Bogata	Colombia	0500	A,D,E,N
5.100	R.Liberia, Totota	Liberia	2200	N

DXers:-
(A) Robert Connolly, Kilkeel.
(B) David Hall, Morpeth.
(C) Robert Hughes, Liverpool.
(D) Sheila Hughes, Morden.
(E) Rhoderick Illman, Oxted.
(F) Tom MacDowell, C.Bedford.
(G) Eddie McKeown, Newry.
(H) Fred Pallant, Storrington.
(I) John Parry, Larnaca, Cyprus.
(J) Clare Pinder, while in Appleby.
(K) Peter Pollard, Rugby.
(L) Vic Prier, Colyton.
(M) Chris Shorten, Norwich.
(N) John Slater, Scalloway.
(O) Norman Thompson, Oadby
(P) Tom Winzor, Plymouth.

LIST OF EQUIPMENT USED

LM&S $November, #December'97, *January'98

$# Tim Allison, Middlesborough: Lowe HF-225 + r.w.
$#* Darren Beasley, Bridgwater: Yaesu FRG-100 + a.t.u. + 15m wire.
$#* Vera Brindley, Woodhall Spa: Sangean ATS-803A + r.w.
$#* Robert Connolly, Kilkeel: JRC NRD-525 + Datong AD370.
* John Court, Birmingham: Sound Lab 12 band portable + 6m wire or Vega 206 or Waltham multi-band + whip.
$# Darren Coward, Haverthwaite: Realistic DX-394 + r.w.
$#* Martin Cowin, Kirkby Stephen: Hitachi TRK-5854E + built-in whip.
$#* Bernard Curtis, Stalbridge: Tatung TMR7602 or Grundig Ocean Boy + r.w.
#* Martin Dale, Stockport: Grundig Satellit 3000 or Sangean ATS-803A + r.w.
$ John Eaton, Woking: JRC NRD-345 + Datong AD270 or a.t.u. + r.w.
$#* David Edwardson, Wallsend: Trio R-600 + π-Balun + invert V trap dipole or 2.5 x 2.5m fixed m.w.loop.
$#* Stan Evans, Herstmonceux: Kenwood R-2000 + Balun + 11m wire in loft.
* Michael Griffin, Ross-on-Wye: Lowe HF-225 + a.t.u. + 45m wire.
$ Bill Griffith, while in Brazil & Peru: Sony ICF-SW55 + 5m wire.
* Alec Griffiths, Thurso: Radio Shack PRD-2045 or Sanyo G3001 or Steepletone MBR-7 or Vega Selena + dipole or r.w.
$#* Gerald Guest, Dudley: Roberts RC818 + r.w.
#* David Hall, Morpeth: AOR AR7030 + 14m wire.
$#* Tony Hall, Freshwater Bay, IoW: Yaesu FRG-7 + r.w. or RF845
Ted Harris, Manchester: Roberts RC818.
$#* Francis Heame, N.Bristol: Sharp WQT370 + r.w. or Vega 8210.
Derek Henderson, Hartlepool: Yupiteru MVT-9000 + r.w.
$ Simon Hockenhull, E.Bristol: Roberts R817, ITT Colt or Grundig Yacht Boy 206.
$#* Robert Hughes, Liverpool: Lowe HF-225 Europa + PR-150 or AOR AR7030 + 15m indoor wire or Drake R8E + RF Systems MTA on roof.
$#* Sheila Hughes, Morden: Sony ICF-7600DS + loop or Panasonic DR48 + 15m invert L.
$* Nicola Hutchings, Wellington: Amstrad radio/cassette player.
$#* Rhoderick Illman, Oxted: Kenwood R-5000 + r.w. or AN-1, Sony ICF-7600DS.
$#* Brian Keyte, Bookham: CA117 car radio or ADR AR7030 + r.w. or loop.
$#* Ross Lockley, Galashiels: Realistic DX-300 + a.t.u. + 40m wire or Sangean ATS-803A.
#* Tom MacDowell, C.Bedford: Matsui MR4099
$#* Eddie McKeown, Newry: Tatung TMR 7602.
$#* George Millmore, Wootton, I.o.W: Racal RA17L or Sangean ATS-803A + loop.
$#* Fred Pallant, Storrington: Trio R-2000 + Howes CTU8 a.t.u. + r.w.
#* John Parry, Larnaca, Cyprus: Realistic DX-394 + r.w.
$#* Clair Pinder, while in Appleby: JRC NRD-525 + a.t.u. + r.w.
$#* Peter Pollard, Rugby: Sony ICF-2001D + r.w.
$#* Vic Prier, Colyton: Racal RA17L or Redifon R551N + 19m horizontal loop or active vertical in roof.
* Harry Richards, Barton-on-Humber: Grundig Satellit 700 + AD270 or r.w. or Grundig Yacht Boy 400.
$ Chris Ridley, Co.Sligo, Eire; Morphy Richards R-124 + loop or Philips R242 car radio.
$#* Alan Roberts, Quebec, Canada: Lowe HF-225 + 11m vertical dipole.
$#* Chris Shorten, Norwich: Matsui MR4099 + 10m wire.
$#* John Slater, Scalloway, Shetland: Lowe HF-150 + a.t.u. + 20m wire.
$#* Tom Smyth, Co.Fermanagh: Sangean ATS-803A or Morphy Richards R191.
$# Tony Stickells, Thornton Heath: AOR AR7030 + 20m wire or loop.
Tony Stickells, while in Suevres, France: AOR AR7030 + r.w.
$#* Norman Thompson, Oadby: Matsui MR4099 + 20m wire in loft.
Phil Townsend, E.London: Lowe HF-225 + preselector + r.w. or loop.
* Phil Townsend, E.London: Home-built regenerative RX + r.w.
$# Ernest Wiles, NE.Bedford: AKD Target HF3 or Lowe HF-125 + Windom.
* Ernest Wiles, while in Ibiza: AKD Target HF3 + indoor wire.
$#* Thomas Williams, Truro: Gundig Yacht Boy 206 or Sharp 5454 + r.w.
$#* Tom Winzor, Plymouth: Kenwood 1000 or Trio 9R59D or Trio 59D9RS + Miller ant.

Off the Record

ANDY CADIER
28 ROMNEY AVENUE
FOLKESTONE
KENT CT20 3QI

As the millennium rapidly approaches we are shortly to experience an electronic revolution in radio communications. The arrival of digital transmission will bring about substantial changes in the quality and the choice of radio and TV broadcasts. In many respects radio and TV will become a world market, no doubt dominated by the multinational organisations. Audiences may well become so fragmented among the variety of networks available that smaller stations could well become totally non-viable. As pirate broadcasters don't have quite the same overheads as their legal counterparts it is very likely they will successfully make the digital transition.

West Coast Radio

This is technically not a pirate as programmes are recorded in Ireland but transmitted from a 100kW Deutsche Welle transmitter at Wertachtal in Germany. West Coast Radio Ireland is run by Gerard Delaney and Michael Commins who tell me that the station is run on a voluntary basis and that they are seeking a major sponsor so that the programmes can continue. Try 6.175MHz on Saturdays between 1500 and 1600UTC for their European broadcast. During the winter the same broadcast to the USA/Canada is on 5.910MHz at 0100 to 0200UTC Thursday Mornings. The station address is **West Coast Radio Ireland, Claremorris, Co. Mayo, Ireland.**

In The Dock

Following action in the High Court in London, businessman **Trevor Brook** has applied to the European Court of Human Rights complaining about the refusal of the British Government, since 1986, to grant a licence for an independent s.w. station. He believes the impossibility of obtaining access to the airwaves was unjustified interference with his right to communicate information and a breach of Article 10 of the European Convention on Human Rights.

Trevor says he is convinced this action will bring an end to British obstructionism in licensing and regrets not taking this action eleven years ago. Further information is available from **Surrey Electronics, The Forge, Cranleigh, Surrey GU6 7BG.**

Radio Caroline's vessel Ross Revenge, August 1967.

Pirate Programme

Greater London Radio is to broadcast an hour long documentary about the offshore radio pirates of the 1960s. Producer **John Myer** has been interviewing many of the personalities and radio technicians of this period. I asked John why he chose to make this programme now? He replied that he listened to these stations in his youth and as the years passed by the numbers of people that remembered and worked on these stations were clearly decreasing. He also said that many young people, both in and out of the industry, were interested in broadcasting history of which the pop pirates played a significant part. At the moment I don't have a date or time for this programmes transmission, but it is expected to be aired over Greater London Radio late December or early in the New Year.

Station News

In the October issue there was no space for details of the Radio Caroline RSL at Queenborough at the Isle of Sheppey. Briefly, I did attend...was even asked to do a show! (They cannot be serious). I found the MV *Ross Revenge* looking quite smart in the lovely summer sunshine (see photograph) and had a tour of the ship.

Chris Elliot, Station Manager of the recreated Radio London during August is writing a book about Big L, most of the DJs and many visitors to the station have added their comments to this publication. Chris was very active with his camera so there should be some very interesting pictures. When completed the book will be available from East Anglia Productions.

The Internet pirate radio bulletin operated by the Swedish Report Service are publishing a disclaimer suggesting their reports are being used as evidence by authorities prosecuting illegal stations. Radio Argus, in London, say that their 266m m.w. channel is 1125kHz, and not 1134kHz as mentioned last quarter. Despite their recent narrow escape from being raided, they have been heard on 1503kHz and several other medium wave frequencies. Radio Arugus is planning a long wave service on 270kHz, most pirates tend to steer clear of l.w. due to the required dimensions of an effective antenna. Also being discussed are some long distance h.f. broadcasts using frequencies around 11 or 13MHz where antenna sizes are considerably smaller.

Readers Letters

Bob Marsh writing from Bexleyheath on the subject of the Radio London RSL says he will never view the record *Green St. Green* by the New Vaudeville Band in quite the same light again. (It did get a lot of plays). **Melvyn Brown** of Ipswich is seeking some photos of the MV *Yeoman Rose* at Frinton. Splendid colour pictures of this ship and its equipment were included in a very informative feature written by Jeff Harris in the November issue of *SWM*, back copies are available from our the *SWM* Book Store. **Dick** from Glasgow says that Radio Zodiac has been doing test broadcasts aimed at the USA during the early morning hours on 6.400MHz.

Porta-Pop

Radio London presenter **Mark Roman** is launching a new radio company specialising in the construction of complete broadcasting suites housed in Portacabins. The prime intention is to have eight units, one housing catering and dining facilities and others containing toilets and washing facilities, studio and news room, transmitter and engineering, commercial production and administration, and two accommodation units. These multi-purpose units could easily be stacked aboard a ship, should Radio London make a welcome return, or alternatively, be rented for use by temporary RSL radio stations. Just a connection to electricity and pluming services would be required. Radio London Services are seeking customers and investors, their address is **Red Wing Farm, Howletts Loke, Salhouse, Norwich, Norfolk NR13 6EY.**

Pirate's Logbook

The darker evenings are clearly encouraging more stations to use frequencies in the 3.900 to 4.000MHz area. Here in Kent Weekend Music Radio has been heard with a fantastic SINPO of 55555 and using the same address as Radio Free London. Other stations recently heard are Subterranean Sounds, Radio Blue Sky, Spaceman, Korak, Roberto and Radio Mario. A whole host of stations appear on 3.955 and 3.985MHz, most of these are relayed by a 10kW transmitter at Milan, known as IRRS (Italian Radio Relay Service).

A relatively new area for pirates is between 5.800 and 5.850MHz. Radio Free London was one of the first arrive here on Sunday mornings. Now several stations are using these frequencies with very good results, including Radio Ozone, Union Radio and the Xenon Transmitting Company. The traditional home of European short wave pirates is between 6.200 and about 6.400MHz, most are at the lower end of this band, usually during daylight at weekends. Laser Hot Hits provide a very reliable service with plenty of station IDs and an address in Ontario, Canada. Another regular is Jolly Roger Radio from Waterford in Ireland, this station does relay other programmes including Radio Kiwi from New Zealand. Other stations heard include Star Club, UK Radio, Panther, Torenfalk, Farmers from Holland, Europe Music Radio, EuroRock, Zodiac, Pandora and Radio International.

Chit-chat

I do receive pirate related QSL type cards with requests to include them in this page. In most cases I am happy to do this, however please remember this article is printed in black and white, so black print on a red or purple background is not ideal for reproduction. A light easily visible logo is what is really needed to catch the eyes of our readers. Enjoy the festive season...see you soon.

NEW RATES. £4.00 SUBSCRIBERS, £6.00 NON-SUBSCRIBERS

Trading Post

Please write clearly in **BLOCK CAPITALS** - up to a maximum of 30 words plus 12 words for your address, and send it together with your payment of £6.00 (£4.00 subscribers), to Zoë Crabb, Trading Post, *Short Wave Magazine*, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. If an order form is not provided due to space constraints, a form from a previous issue can be used as long as the cornerflash or Subscriber Number is attached as proof of purchase of the magazine. Adverts appear on a first-come-first-served basis. If there is not enough space to feature a Trading Post ad in the issue you request it is automatically entered into the next one. All queries to Zoë Crabb on (01202) 659910. We cannot accept advertisements from traders, or for equipment which is illegal to posses, use or which cannot be licensed in the UK.

For Sale

AOR AR8000 receiver with soft case and several books, virtually unused, all contents and packaging, as new, all banks empty, £250. Tel: (01626) 365062 evenings.

AOR AR8000 wide band multi-mode scanner plus NiCads and case, boxed, six months old, £250. Also AOR CU8232 comp. interface, £65. Scancat Gold (latest), £25. John, Cornwall. Tel: (01736) 757721.

AOR SDU5000 Spectrum Display Unit, fitted with EPROM for use with both AOR and Icom receivers, boxed with leads, etc., £525. Peter on (01803) 855544.

AR3000A, SDU5000, Universal H-1200 decoder card, virtually new, all boxed and complete with manuals and cables, £1200 o.n.o. Gary on (01243) 860308 day or (01243) 586039 evenings.

AR7030 high dynamic receiver, manual plus box, superb, £500. Ellis, Carshalton. Tel: 0181-640 7417.

DX-394, mint condition, one month old, PRO-50 scanner, mint, boxed, £140 the pair. Delivery extra. Consider part exchange older comms receiver. David on (01383) 839616.

Eddystone model 358X, 10 coils in box, correct p.s.u. restored, £110. EC10 choice two, £50-£85. 870, 870A, £85 each. Wartime civilian, £75, good order, collection advised. Ring anytime. Peter, Surrey. Tel: (01372) 454381 or (0374) 128170.

Garmin GPSIII, new, unused with all instructions and guarantee, £240. Chris on (01869) 242693.

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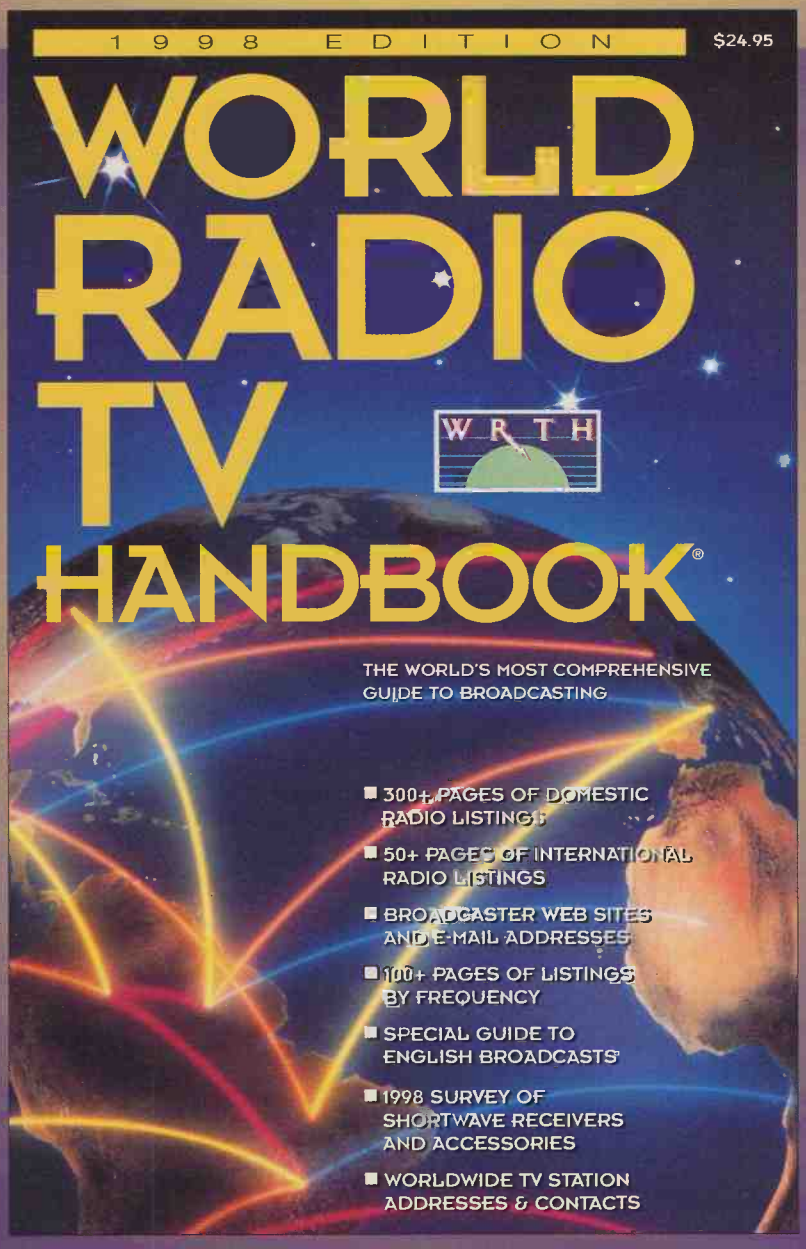

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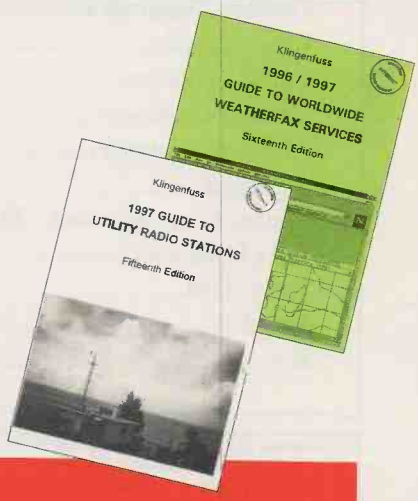

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