

# short wave magazine

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APRIL 1997 £2.50 ISSN 0037-4261

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- ◆ AIRBAND METEOROLOGY



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State of the art for the very best performance from both base and handheld scanners.

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A fully adjustable desk top stand for use with all handhelds. Fitted coaxial fly lead with BNC & SO239 connectors.

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As above with 20dB pre-amp.

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A low profile discreet scanner antenna optimised for the UHF bands c/w 10' cable. Receives 25-1000 MHz

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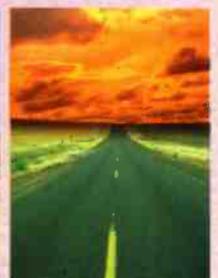
for further details contact  
**Phil Jeffery**  
in our TRADE DEPARTMENT

Phone:

Intl (0044) 1705 698113

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### BEARCAT UBC 860XLT

Wideband base scanner with **TURBO SCAN**.  
COVERS CIVIL AIRBAND.

- 66-956MHz (with gaps)
- 100 Memories
- AM/FM
- 12V DC
- Mains adaptor supplied.

£139.00



### BEARCAT UBC 3000XLT

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

- 2S-1300MHz (with gaps)
- TURBO SCAN
- 400 Memories
- AM/FM/WFM
- Supplied c/w NiCads & charger

£189.95



### BEARCAT REPLACEMENT NICAD PACKS

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For 100/200/205 XLT...£34.95
- BP220  
For 220 XLT...£29.95
- BP2500  
For 2500/3000 XLT...£34.95

uniden

£139.00



### BEARCAT UBC 220XLT

Easy to use with a good receiver.

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

SPECIAL PRICE  
£199.00



### BEARCAT UBC 120XLT

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

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



BEST UK PRICE

### YUPITERU MVT7100E

Yupiteru's own EMC version of this popular radio.

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



BEST UK PRICE

### AOR AR8000

Still the No.1 seller

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

# NEVADA



£379.00

### ICOM IC-R10

- All mode - FM, WFM, SSB, CW, AM Receiver
- Newly designed 'BUSY CATCH SCAN'
- Wide band coverage with all mode receive capability (0.5MHz - 1300MHz)
- 1000 memory channels with memory name function
- VSC (Voice Scan Control)
- Full computer access capability
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## HOT PRODUCTS

### TRIDENT 2400

Top of the range with ultra wide frequency coverage and all mode reception including SSB. Easy to use direct keyboard control.

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- Priority Channel Monitoring
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SPECIAL PRICE  
£259.00

### YUPITERU MVT 9000 EU

With a range exceeding 2000MHz, a real time bandscope, twin VFO receiver, and a host of other features, this will be Yupiteru's flagship model in 1997!

Note the EU version is especially designated by Yupiteru for the UK and Europe to meet full EMC specifications and is supplied with Yupiteru's own original English handbook.



£475.00

### SCANMASTER TSC 2601

Handheld scanner high gain antenna. 29cm long, covers 100 - 1000 MHz with 3.4 dB gain @ 900 MHz.

£15.95

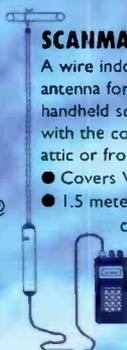


### SCANMASTER NOMAD

A wire indoor extension antenna for both base and handheld scanners. Suspend it with the cord supplied in the attic or from a curtain rail.

- Covers VHF/UHF
- 1.5 meters long
- Supplied complete with 4mtrs coax & BNC plug

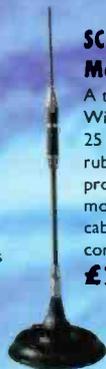
£19.95



### SCANMASTER Mobile

A top quality Wideband Antenna 2S - 1000 MHz with rubber boot protected magnetic mount and cable/BNC connection.

£29.95



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handhelds

# iC an

# Reaction Tune Another Receiver!

Reaction Tune the  
**NEW**  
ICOM IC-R10

Use the OptoLinx  
for computer controlling  
the ICOM IC-R10



Computer Not Included

### Another radio to tune, another reason to purchase the Scout.

Until now the AOR AR8000/2700 were the only hand held scanners to take advantage of the **Scout's** Patented Reaction Tune function. The Scout can now tune the new ICOM IC-R10 hand held scanner (shown below). Connection is easy: No modifications required - No custom cables to buy - Just plug and play.

Scanner hobbyists and communication professionals benefit from the **Scout's** unique functions. Whether you're searching for new frequencies in your neighborhood, or testing for interference, the **Scout** is the ultimate communications tool.

Armed with a 400 frequency memory register, the **Scout** does not record duplicate frequencies, instead it coordinates repeated frequencies into a hit register storing up to 255 hits per frequency. Attach it to your belt and begin your day, the **Scout** will alert you when a signal is received by its beeper or vibrator function.

You won't miss a thing with Reaction Tune. The **Scout's** CI-V compatible output allows it to interface to the AOR AR2700/AR8000, ICOM R7000, R7100, R8500, R9000 and now the new IC-R10 (shown opposite). The **Scout** captures the frequency, then sends the serial data to the receiver and tunes the scanner to the frequency for instant monitoring in less than one second. Recorded frequencies can be downloaded to a PC using the optional OptoLinx universal interface •

## SPECIFICATIONS

- ▶ 10MHz - 1.4GHz frequency coverage
- ▶ Stores and records 400 frequencies in memory with 255 hits for each
- ▶ Interface to a PC for frequency download using optional OptoLinx PC interface
- ▶ Distinctive beeps indicate frequency hits, pager style vibrator for discreet recording
- ▶ Automatic EL backlight for night operation
- ▶ 16 segment RF signal strength bargraph
- ▶ Frequencies are automatically saved when unit is turned off
- ▶ Reaction Tune the ICOM R7000, R7100, R8500, R9000, IC-R10, and AOR AR2700, AR8000, and the Radio Shack Pro 2005/6 using the Optoelectronics OS456, Radio Shack Pro 2035/42 using the Optoelectronics OS535

U.S. Patent No. 5,471,408



Radio Not Included

Scout with ICOM IC-R10  
Mono Cable required (shown)

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*Good Listening*

### Cover Subject

Will Jaques Villeneuve emulate Damon's success this year? This month we take a look at the pit radio that made Williams successful in last year's Grand Prix season.

Photo copyright Williams Grand Prix Engineering Ltd.

# Communique

SEND YOUR  
NEWS TO  
KEVIN NICE AT  
THE EDITORIAL  
OFFICES

## MILITARY WIRELESS SOCIETY

The **Military Wireless Amateur Radio Society** was founded in 1992 by **John Taylor-Cram ZE1COC**. The aims of the club are to further interest in ex-military radio and electronic equipment and to assist members in finding available items to complete projects and to have the pleasure of using wartime and post-war wireless/radio on the club Nets.

Present membership of the club is 247 in 17 countries and a 29-page A4 size newsletter is sent out every other month. Club Nets are h.f. on 3.625 on Saturdays at 0900-1030, WT Net on 3.577MHz at 0900 on Sundays and a v.h.f. Net on 50.6MHz f.m. at 1000 on Sundays. Special Event Stations do take place.

Current subscriptions prices are £7 UK, £10 Europe and £14 for the rest of the world. For more information about the Society, call John on **(01705) 250463**.

## ONE-PAPER RAE

The Radiocommunications Agency and the City & Guilds have announced proposes to simplify the format of the Radio Amateurs' Examination (RAE), resulting in reduced fees and more speedy release of results.

The examination is currently taken in two parts, at a cost of £19.40 per paper. However, following a request from the Radio Society of Great Britain (RSGB), it has been agreed that from May 1998, the two papers will be amalgamated into one paper of eighty questions. The revised examination cost will be £26.

Candidates who already have a pass in one part of the current RAE will be able to continue to carry over that pass until May 1998, when they will need to re-sit the full new examination. Other changes agreed were a reduction in the one-off centre approval fee from £250 to £100 for centres running this examination. Hopefully, these changes will

encourage more people to take up amateur radio in the future.

For further details, candidates should contact the **City & Guilds of London Institute, 1 Giltspur Street, London EC1B 1JP** or telephone on **0171-294 2468**.

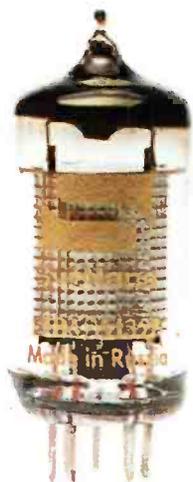
## FROM RUSSIA WITH LOVE

Svetlana Electron Devices, Inc. is an American company that is expanding into the audio valve market with its own versions of valves made in St. Petersburg, Russia.

One such valve is the popular EF86/6267 audio small-signal pentode. Manufactured in Svetlana's own factory in Russia, the new EF86 features a solid metal shield canister to improve structural rigidity compared to older versions of the EF86.

The very high voltage gain with the pentode configuration, with low noise, low microphonics and low heater-cathode hum induction makes for the ideal valve for phono, guitar and microphone preamps.

**Svetlana Electron Devices, Marketing and Engineering, 3000 Alpine Road, Portola Valley CA 94028, USA. Tel: + 1 (415) 233-0429.**



## NEW 80-CHANNEL CB SETS

The Radiocommunications agency has announced that 80-channel CB sets will soon be available in the UK.

A questionnaire, sent by the RA to all CB licence holders back in 1995, clearly showed a demand for sets that covered both the UK and the European CEPT services in one piece of equipment.

The specification, to which all UK only sets must be approved (MPT 1382) has now been revised to allow the set to contain both the CEPT channels and the UK only channels in one piece of equipment. However, it is important to note that, regardless of the channels incorporated, such sets may only be used in the UK.

Further details from **Radiocommunications Agency, Tel: 0171-211 0211**.

## DATONG TO PHASE OUT AMATEUR RADIO PRODUCTS

Datong Electronics Ltd. has been involved in the Amateur Radio market for over 20 years and has built up an enviable reputation for producing high quality equipment. However, over the years Datong has diversified and now the lion's share of its income is derived from other markets.

With this in mind, they have decided to phase out their range of Amateur Radio products over a period of time. Datong will build a final batch of some of their models during the spring of this year and once that is all sold no more will be produced.

The following models fall into this category: AD270 Active Antenna, AD370 Active Antenna, D70 Morse Tutor, RFA Wide Band Amplifier, VHF 2m Converter, VLF Converter. All their other products will be discontinued when present stock is exhausted.

Datong will continue to accept units for repair and servicing for as long as is practical. This

generally means that spares are no longer available and when this happens they will supply circuit diagrams to allow the customer to attempt a repair themselves.

The range of Counter Surveillance Receivers and Radio Direction Finders will continue to be designed and manufactured.

**Datong Electronics Ltd., Clayton Wood Close, West Park, Leeds LS16 6QE. Tel: 0113-274 4822.**

## RADIO AND TVDX NEWS

All the TV transmitters formerly operating on ch. R4 (85.25MHz video) and R5 (93.25MHz video) in the Slovak Republic went off-air 1 January and have relocated at u.h.f. This is to allow a move from the present OIRT FM Band (67-73MHz) into the CCIR 88-108MHz European f.m. spectrum. New stations opening will be placed within the CCIR allocation.

TVDXers having a bad time in the West Midlands on ch.E2 might consider the wideband f.m. radio link operated by Birmingham's hospital radio BHBN. This 1W vertically polarised radio transmission at 48.450MHz radiates BHBN from the studio at Dudley Road Hospital into other West Midland hospitals.

Edinburgh's 'Channel 6' should now be on the air transmitting pages of text on ch.E34. The service was four months late in opening due to Radio Authority and DTI administration problems. The service should initially offer 300 pages of text rising to 800 in the future when the local council, education and other bodies will be offered space. Start up costs were around £200000 with an annual running cost of £100000.

Ryn Muntjewerff (Holland) recently had confirmation that his reception of 11 June 1995 originated from a commercial ch.E3 station in Turkey, the logo '6' being clearly seen in the corner of the screen. This takes Ryn's total of countries received via TVDX to 69!

More potential problems may

NEWS • NEWS

## THE '97 LEICESTER SHOW IS DEFINITELY ON!

John Wilson came across this interesting picture whilst rummaging around in his attic. Bill Lowe, founder of Lowe Electronics, is enthusiastically greeting Austin Forsyth, then Editor of *Short Wave Magazine*, at the first Leicester Show, 25 years ago last October.

We have just heard that there will definitely be a 1997 Leicester Show at the Granby Halls, Leicester on Friday 17 & Saturday 18 October. So keep that weekend free.

Photo by Chris R Cooper.



arise around the country UK for TVDXers on ch.E2 with a recent RSGB application to the UK Radiocommunications Agency for eleven 50MHz repeaters around the UK including Portsmouth, Nottingham, Shaftesbury, Fleet and Stoke on Trent. And in Holland, the 50MHz amateur band has now been accepted as a normal amateur radio allocation where-as previously a special licence was necessary for 50MHz operation.

The Kazakstan authorities are auctioning broadcasting licences in two main cities - Almaty and

Akmola - to legalise several private transmitters which are now operational. Licences on offer cost up to \$180000 with annual payments of \$24000. Up to the present the only legal broadcasters have been the public channel Kazak-TV and an independent station NTK.

## WORLDSPACE SYSTEM DEMONSTRATED

WorldSpace's revolutionary new satellite digital radio communications system achieved two key technical milestones this month as the ambitious

## WINDMILLS & WATERMILLS EVENT

Following on from the success of last year's event, once again, the **Denby Dale Amateur Radio Society** are organising the above event, which is to be held on 11 May 1997 on behalf of the SPAB (Society for the Protection of Ancient Buildings). Last year, 32 Windmills and Watermills were activated, and the Society hope that this year, many more will be added to the list.

By holding this event, Denby Dale have the opportunity to promote the SPAB and its good works and the opportunity to visit (via the airwaves) the diverse range of Windmills and Watermills. Besides this, the event brings amateur radio to the general public who will be visiting the individual Mills.

Last year, individual QSL cards were designed with a line drawing of the Mill on one side and a potted history of the Mill

and the relevant contact information on the other, thus making a superb collection. A certificate was also given to those who contacted 10 or more Mills.

There was a tremendous response on the day (80m almost ground to a halt!) and many Mills had a successful day with a huge number of people through their doors. Some of the Mills are actually working Mills and not only provide flour, but also give informative tours.

Contacts were made as far afield as America and Russia, which has resulted in a query from a South African Windmill, who hopefully will join in the event being held this year! The Society would like to send a big thank you to all the radio clubs and individuals throughout the country, who helped to make the event as successful as it was last year.

This year, however, the Society expect more Mills on the air and they would like to hear from anyone, as soon as possible,

programme advances on schedule for first spacecraft launch in June 1998.

The twin milestones were: an end-to-end validation of WorldSpace's digital broadcast system; and completion of the WorldSpace geostationary satellite Critical Design Review (CDR).

"We now are two steps closer to achieving our vision of creating an 'information affluence' for the world's emerging market regions, which are grossly underserved by existing short wave, a.m. and f.m. radio coverage", commented Noah Samara, WorldSpace Chairman and Chief Executive.

WorldSpace will provide international programmers with direct broadcast capability to the 4.6 billion people that populate Asia, Africa, the Middle East, Mediterranean Basin, Latin America and the Caribbean.

These regions will be served by three satellites, each providing over 100 channels of digital-quality audio and multimedia programmes. The use of satellite baseband processing and powerful L-band travelling wave tube amplifiers allows WorldSpace broadcasts to be received by small, portable receivers.

The end-to-end validation of WorldSpace's

broadcast system occurred at the Toulouse, France facilities of Alcatel Espace - WorldSpace's prime contractor. Music from a digital compact disc was MPEG 2.5 Layer 3 coded and routed by cable through a prototype ground station, then sent to an engineering model of a WorldSpace satellite payload transmitter. The signal was processed, and fed to a prototype WorldSpace portable receiver.

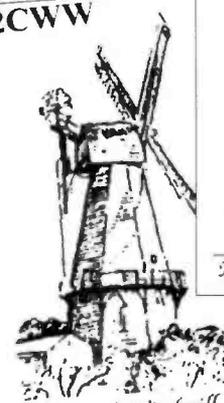
"This end-to-end demonstration simulated the complete WorldSpace system from the programme producer in a radio studio to the listener with a personal receiver", according to Patrick Fournié, WorldStar Program Director at Alcatel Espace.

## Design Frozen

The Critical Design Review for the WorldSpace satellite occurred at the Toulouse facility of Matra Marconi Space, Alcatel Espace's subcontractor for the spacecraft. Successful completion of the review allowed the spacecraft design to be frozen. This clears the way for assembly and checkout of WorldSpace's first satellite, AfriStar, which will

provide broadcast coverage for Africa, the

**GB2CWW**



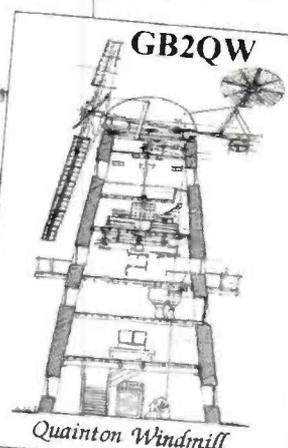
*Cranbrook Windmill*

**GB2MFW**



*Maude Foster Windmill*

**GB2QW**



*Quanton Windmill*

**GB2CMW**



*Church Mill Watermill*

who feel they could put on or assist with setting up a station at one of the Mills. Coverage is hoped to widen this year to include Scotland, Ireland, Wales, the West Country and, if possible, more in the North of England.

Can you help? If so, contact **Jasmine Marshall G4KFP**, Secretary of the Denby Dale ARS, at **Hedgeways B&B, 63 Highmoor Lane, Hartshead Moor, Cleckheaton BD19 6LW** or telephone Jasmine on **(01274) 869849**.

► Middle East and Persian Gulf, as well as parts of the Near East and Europe.

Production of AfriStar flight hardware has started, with integration of the satellite's propulsion subsystem now underway. Initial payload integration is scheduled for April, while overall satellite integration is expected to commence this August.

AfriStar is scheduled for a May-June 1998 launch on an Ariespace Ariane rocket. It will be followed at six month intervals by the launches of WorldSpace's AsiaStar and CaribStar satellites.

AsiaStar will broadcast to an area extending from India to Korea, and to Southeast Asia; while CaribStar will cover South America, Latin America, and the Caribbean.

The satellites will carry six transponders, each transmitting through a pair of 150W L-band travelling wave tube amplifiers.

Broadcasters will up-link their programmes to the WorldStar spacecraft either through centralised hub facilities or individual feeder link stations located anywhere in the global coverage areas. The signals from individual feeder link stations are managed by an on-board satellite baseband processor, then transmitted via

the spacecraft's three high-power beams. WorldSpace's use of an onboard baseband processor is the first such application on a commercial satellite, and it provides added flexibility by allowing broadcasters to operate the individual feeder link stations.

The WorldSpace satellites are based on Matra Marconi Space's Eurostar 2000+ satellite

bus configuration. They will have a launch mass of approximately 2.75 tonnes.

### Dedicated Ground Network

WorldSpace will use a dedicated ground network to control the satellite system and manage its broadcasting mission. Each spacecraft will have its own regional operations

centre. These regional operations centres will be supported by WorldSpace's Technical Support Services in Toulouse.

Testing of the reception technology for WorldSpace's new-generation portable satellite receivers is also continuing. The evaluations have included simulated satellite broadcasts using a helicopter with a digital

### CANADA - GLOBALSTAR MOBILE SATELLITE

Loral Space & Communications Ltd. (NYSE: LOR), and Canadian Satellite Communications Inc. (Cancom), recently announced an agreement in principle to provide fixed and mobile wireless services throughout Canada using the Globalstar satellite-based communications system. Cancom would own the majority interest in Globalstar Canada, pending approval by Industry Canada.

With this announcement, Canada joins a group of over 100 countries planning to offer voice, data, and FAX services via Globalstar's low earth orbit (LEO) satellite system. Globalstar L.P. is a partnership

of leading international satellite and telecommunications manufacturers and cellular operators that is constructing a \$2.5 billion system of 48 LEO satellites to provide global mobile communications. The Globalstar system is expected to provide an array of affordable mobile satellite services, including basic voice telephony, enhanced telephony services such as call forwarding, conferencing, and call waiting, data, messaging and FAX services, paging, and position locating services virtually anywhere in the world.

Globalstar Canada will be particularly useful in remote areas that have no wireless or wireline telephony service. The Globalstar venture is well aligned with Cancom's

corporate mission to provide a wide range of satellite-based services to remote and underserved communities across Canada. The Globalstar system is designed to connect with existing terrestrial switching networks and will complement Canada's cellular and PCS providers by providing services in areas without cellular coverage.

Bernard L. Schwartz, chairman and CEO of both Globalstar and Loral stated, "We believe Globalstar is particularly well-suited for the vast Canadian marketplace. Loral is pleased to join AirTouch and Cancom in providing a robust fixed and mobile wireless service enabling the efficient extension of telephony service throughout Canada".

### ARLX005 HAARP AIR TEST TRANSMISSION

Unfortunately, too late to look out for, but did you hear the High Frequency Active Auroral Research Program (HAARP) facility in Gakona, Alaska, transmitted a test signal on March 8, 1997? They are seeking reports from SWLs in Alaska and in the "Lower 48" to determine how well the HAARP transmissions can be heard to the south.

During this test, the HAARP facility transmitted on or near the frequencies 3.4 and 6.99MHz to give listeners the opportunity to listen for the HAARP facility and to claim a QSL card. The test was conducted on 8 March from 0430UTC.

The format of the test was a constant carrier (no modulation)

signal followed by a c.w. message at 10w.p.m., according to the following schedule:

| Time (UTC) | Freq (MHz) | Signal       | Antenna Position |
|------------|------------|--------------|------------------|
| 0430       | 6.99       | Carrier only | Pointed up       |
| 0435       | 6.99       | c.w. message | Pointed up       |
| 0440       | 6.99       | Carrier only | Pointed to SE    |
| 0445       | 6.99       | c.w. message | Pointed to SE    |
| 0450       | 3.40       | Carrier only | Pointed up       |
| 0455       | 3.40       | c.w. message | Pointed up       |

The transmission beginning at 0450 was primarily for Alaskan listeners. Reception reports should include signal strength during the constant carrier transmission period along with the text of the c.w. message.

Complete details on this test and a QSL address is listed on the HAARP home page at:

<http://server5550.itd.nrl.navy.mil/announce.html>

The HAARP facility - now in the developmental prototype

stage - has been undergoing testing since it was completed in late 1994. Multiple transmitters feed multiple antenna elements (there are 48 antenna elements on the site, arranged in eight rows of six columns; however, at this time, only 18 elements are active. The test will use 17 antennas with a net transmitter

power of 340kW). The final configuration could have 180 antenna elements and a combined transmitter power of 3.6MW. HAARP's stated scientific purpose is to study "the properties and behavior of the ionosphere, with particular emphasis on being able to understand and use it to enhance communications and surveillance systems for both civilian and defence purposes." HAARP is managed by the US Air Force and the US Navy.

For more information, check <http://server5550.itd.nrl.navy.mil/haarp.html> the HAARP home page.

transmitter, and a prototype receiver. These tests were conducted by Germany's Fraunhofer Institute, a pioneer in digital audio broadcasting.

The production WorldSpace receivers will be equipped with STARMAN chipsets - micro integrated circuits capable of processing the satellites' high-quality voice, image and data transmissions. WorldSpace has awarded contracts to SGS Thomson and ITT Intermetall guaranteeing each company an initial production of one million STARMAN chipsets.

The WorldSpace System will use MPEG 2.5 Layer 3 digital compression, which was developed by Fraunhofer Institute specifically for the WorldSpace programme and adopted by some manufacturers as their Internet standard for compression. The compression makes it possible for WorldSpace satellites to broadcast quality audio at transmission rates as low as 16 kilobits per second.

## GLOBAL WIRELESS SERVICE

"Canada is a welcome addition to our Globalstar markets," said Arun Sarin, President and COO of AirTouch Communications. "We already have Globalstar service provider rights in the United States and Mexico. This will complete our coverage of North America and further our strategy of providing truly global wireless service".

Alain Gourd, Cancom President and CEO said, "We are delighted this agreement with world leaders in satellite communications has taken shape. This will certainly strengthen Cancom's position as Canada's leading provider of comprehensive satellite services".

Globalstar's customers will place or receive calls using hand-held, vehicle-mounted or fixed terrestrial terminals. Both the hand-held and vehicle-mounted terminals are expected to resemble cellular telephones. The fixed terminals will resemble conventional telephone booths. Globalstar is developing terminals capable of accessing both the Globalstar satellite system and the user's terrestrial cellular service. The primary market is expected to be customers who travel worldwide and need a single reliable 'phone connection, and customers who travel in North America beyond the range of normal cellular telephone systems.

On behalf of Globalstar

Canada, Cancom has filed an application with Industry Canada for approval to build and operate the Canadian gateways for the Globalstar system. Globalstar Canada anticipates providing commercial services in late 1998. Globalstar Canada will be a Canadian-owned and controlled corporation. Globalstar Canada will be majority-owned and controlled by Cancom Globalstar Holdings Inc., a wholly-owned direct subsidiary of Cancom. AirTouch/Loral Canada Co., will hold the remaining minority interest.

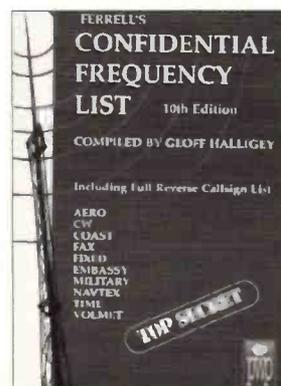
Cancom, trading on the Toronto and Montreal Stock Exchanges (SAT) with Head Office in Montreal and Operation Centre in Mississauga, is the foremost provider of digital satellite services in Canada. Cancom's Broadcast Division offers digital TV and radio signals in English and French to more than 2600 small cable companies reaching close to 4 million homes across the country. Cancom's Business Division provides customised integrated satellite and terrestrial mobile, data and Internet networks throughout the country and Cancom's Business Television leads in providing permanent and on request multi-point private broadcasting networks as well as the One Touch interactive distant learning systems. Cancom is the exclusive distributor of QUALCOMM's mobile geostationary OmniTRACS system in Canada.

## TWO LONG AWAITED ADDITIONS

### CFL-10

It's been three years since the last (9th) edition of Ferrell's Confidential Frequency List. Having acquired the title, SWM publishers - PW Publishing - have just launched the latest version.

Now available from the SWM Book Store, the 10th Edition enjoys a new easy-to-read format whilst retaining the



## NATIONAL TRANSMITTER NEWS

**Hulme:** A new television relay station opened on 31 January 1997, about 1km south of Manchester city centre.

The relay is a joint effort by the BBC and NTL on behalf of the ITC and is located on a mast near to the junction of Stretford Road and Chorlton Road. It is designed to bring good television, NICAM and teletext reception to approx. 750 people in the district of Hulme, which includes the area around Jackson Crescent, Hulme Street and Rockdove Avenue.

### STATION DETAILS

|           |                 |    |
|-----------|-----------------|----|
| Channels: | BBC1 (N. Wales) | 51 |
|           | BBC2            | 44 |
|           | ITV (Granada)   | 41 |
|           | Channel 4       | 47 |

|                |          |
|----------------|----------|
| Antenna Group: | B        |
| Polarisation:  | Vertical |
| ERP:           | 10W      |

**Chaigley:** A new television relay station opened on 6 January 1997, about 6km west of Clitheroe.

Provided jointly by the BBC and NTL on behalf of the ITC, it is designed to bring good television, NICAM and teletext reception to approx. 320 people in the rural area of Lancashire, just to the north of Longridge Fell. This includes the communities of Chaigley, Walker Fold and Hesketh Lane.

### STATION DETAILS

|           |                  |    |
|-----------|------------------|----|
| Channels: | BBC 1 (N. Wales) | 21 |
|           | BBC2             | 27 |
|           | ITV (Granda)     | 24 |
|           | Channel 4        | 31 |

|                |          |
|----------------|----------|
| Antenna Group: | A        |
| Polarisation:  | Vertical |
| ERP:           | 8W       |

Reception advice is also available from ITC Engineering Information and BBC Engineering Information at the addresses below.

**ITC Engineering**  
Kings Worthy Court  
Kings Worthy  
Winchester  
Hants SO23 7QA  
Tel: (01962) 848647

**BBC Engineering Information,**  
Villiers House  
The Broadway  
Ealing  
London W5 2PA  
Tel: 0181-231 9191

wire binding that allows this essential 'utility bible' to lay flat on the shack table.

Featuring 450 pages of up-to-date frequencies and a very comprehensive callsign listing detailing location, station type, mode and frequencies, this latest issue of CFL priced at £19.95 is an absolute must for every utility listener, both phone and datamode enthusiast alike.

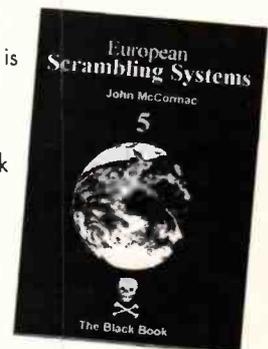
To get your copy of Ferrell's Confidential Frequency List 10th Edition contact Michael or Shelagh at the 'SWM Book Store' today! **Tel: (01202) 659930, FAX: (01202) 659950 or E-mail: bookstore@pwpub.demon.co.uk**

### THE NEW 'BLACK BOOK'

This amazingly educational tome is now in its fifth edition. Giving the low-down on many of the world's satellite TV encryption schemes, the *European Scrambling Systems*

by John McCormac is now available from the 'SWM Book Store' priced at £34.00.

Containing nine chapters covering topics from the principles of security through to a history of Smartcard flaws that have been discovered. If you have an interest in Satellite TV reception, this is a book that you really should add to your wish list. Contact, Michael or Shelagh at the 'SWM Book Store' today! **Tel: (01202) 659930, FAX: (01202) 659950 or E-mail: bookstore@pwpub.demon.co.uk**



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.

**\* Short Wave Magazine & Practical Wireless in attendance**

# Rallies

**APRIL 6:** The Launceston Amateur Radio Club are holding their Rally at Launceston College. There will be a Bring & Buy stand, many traders, RSGB Morse test on demand, refreshments, hot snacks from 7am. Doors open at 10.30am. Further info. from **Art G3XNE** on **(01288) 354564**.

**APRIL 13:** The 16th Mobile Rally of the Lough Erne Amateur Radio Club will be held at the Killyhelvin Hotel, Enniskillen, Northern Ireland. Doors open at 12 noon. Tyrone Amateur Electronics, Icom, Yaesu, Waters & Stanton will be there as well as many other traders. **Keiran G17NET** on **(01365) 348063** and **(01365) 327133** (evenings).

**APRIL 19:** International Marconi Day exhibition at the Wireless Museum in Puckpool Park, Seaview, Isle of Wight. There will be a display of early Marconi gear and working short wave transmitting station. Free entry and free parking plus refreshments. **Douglas G3KPO** on **(01983) 567665**.

**APRIL 19:** SAMS '97 Computer & Electronics Show Rally will take place at Bingley Hall, Staffordshire Showground, Weston Road, Stafford (A518 Stafford-Uttoxeter Road), signposted from junction 14 on M6, bus shuttle from Stafford Railway Station. Doors open 10am to 4pm and admission is £2.50 for adults, children under 14, 50p, concessions, OAPS, RSGB members, student card, UB40, £1.50. Advance tickets £1.50 plus s.a.e. This is the 9th consecutive year for AMS at Bingley Hall. Last year's show saw just under 100 trade stands, covering the computing spectrum, including PC, Einstein, Amiga, AtariST and Atari8-bit, along with accessories, software, books, components and lots more. There will be lots of free parking, a licensed bar from 11am, refreshments, meals, cafeteria. More information from **Sharon Alward** on **(01473) 741533** or FAX on **(01473) 741361**.

**APRIL 27:** The BATC Rally '97 is being held at the Sports Connexion, Coventry. Doors open at 10am (9.30am for disabled visitors). Entrance is £1, 50p for OAPs and under 14s. There will be all the usual features of BATC rallies, over 200 trading tables, Bring & Buy, large outdoor flea market, specialist more television displays, ex-broadcast vehicles, etc. GB6ATV talk-in on S22 and GB3CV (RB9). There are full refreshment facilities and a licensed bar. **Mike Wooding G6IQM** on **(01788) 890365**, FAX: **(01788) 891883**, E-mail: **batc97@g6iqm.demon.co.uk**

**MAY 5:** The Dartmoor Radio Rally are holding their rally at the Yelverton Memorial Village Hall, Meavy Lane, Yelverton, Devon. There is parking for 600 cars, access for disabled visitors, playground for children, trade stands, Bring & Buy, etc., refreshments. Doors open at 10.30am. Talk-in on S22. **Ron G7LLG** on **(01822) 852586**.

**MAY 5:** The Mid-Cheshire Amateur Radio Society are holding their rally at Winsford Civic Hall, Town Centre, Winsford. Doors open at 11am (10.30am for disabled visitors). Admission is £1, under 14s free with adults. Talk-in on 2m. There will be ample parking, a bar and catering services, too. All the usual traders will be there, there will also be a Bring & Buy stand. The rally is fully signposted. More details from **David G4XUV**, QTHR on **(01606) 77787**.

# Bandscan

# EUROPE EUROPE EUROPE

Listeners to Radio France Internationale (RFI) were surprised in mid January when, at a very short notice, the Paris-based broadcaster dropped a number of short wave transmissions. The useful European frequency of 6.175MHz, which carries the English-language programme at 1600UTC, now only comes on at 1700UTC every day, except weekends, when it starts at 1500 on Saturday and 1730 on Sunday.

As a result, European English-language short wave listeners are effectively disenfranchised by RFI six days a week. In an announcement just before the changes occurred, RFI pointed out that English programmes are available via the Internet ([http://www.francelink.com/radio\\_stations/rfi/](http://www.francelink.com/radio_stations/rfi/)).

But many regular listeners do not enjoy access to the 'net, and rely on short wave to hear Paris. Maybe some lobbying is in order to seek restoration of RFI in English in Europe on 6.175MHz.

In the meantime the 1600UTC transmission is still carried on 9.485, 11.615, 11.70, 12.015 and 15.53MHz to the Middle East and Africa. If you have Astra reception equipment, you can hear the hour long lunchtime RFI English programme via World Radio Network at 1400UTC.

Also in France, the domestic news service, France-Inter, has withdrawn all medium wave services, although the long wave service on 162kHz continues. A variety of medium and high-powered transmitters in Strasbourg, Toulouse, Marseilles, Nice and other key cities are off the air on frequencies such as 675, 1161 and 1350kHz.

## VOICE OF AMERICA

Voice of America's attempt to privatise VoA Europe - the Music and More service beamed by satellite to European rebroadcasting outlets - has failed. As a result, VoA Europe's analogue satellite subcarrier on Eutelsat went off the air, replaced by a mixture of Deutsche Welle non-German language programmes (the satellite subcarrier of VoA

Europe was leased from DW's television operation). Listeners to the many radio stations and cable systems across Europe which took VoA Europe found themselves hearing something completely unexpected when they tuned in.

VoA Europe has now been replaced by a service called VoA Express. This takes VoA English programmes and mixes them with music in a more bland presentation format. The service is available to rebroadcasters via a digital feed on Eutelsat. That means anyone who wants to take the service needs a special digital receiver which retails at around US\$2000.

Few broadcasters want to spend that sort of money to provide another radio station and VoA will not provide receivers free-of-charge to its affiliates. As a result, the audience for VoA Express is likely to be very limited.

## BBC WORLD SERVICE

BBC World Service made wholesale changes to its English services at the end of March when the new schedules came into effect. Instead of operating five time shifted streams of English programmes, there are now just three.

The five streams were introduced at a huge cost two years ago when BBC World Service was 'regionalised'. Expensive new continuity studios were constructed in Bush House to cope with the additional services, and huge numbers of continuity announcers were recruited to keep all five streams on the air.

Now World Service has decided that the system is too expensive and complex to maintain. New schedules have been drawn up for the three streams, which still time shift programmes to cope with the different time zones across the world (so that drama isn't broadcast at breakfast time when listeners tend to want news and current affairs).

The changes have not resulted in a return of the popular media programme *Waveguide* on the World Service, and the broadcaster remains the only major international station which doesn't have a regular

programme that keeps listeners up-to-date with trends in international broadcasting.

## RADIO NETHERLANDS

Radio Netherlands celebrates its 50th anniversary this year. To mark the occasion, it is throwing open its doors to listeners in June with a special Open Day. On Saturday 7 June between 1000 and 1600 you can call into Radio Netherlands' studio complex in the media town of Hilversum, which is just to the east of Amsterdam (about half-an-hour by train).

There will be special live transmissions in the Dutch-language service, and there will be plenty of people from the English-service on hand as well (including, no doubt, Jonathan Marks and Diana Jansen, co-hosts of the weekly Media Network programme).

Radio Netherlands is at: **Witte Kruislaan 55, 1217 AM Hilversum**. If you are travelling by train, get off at Hilversum Noord station, turn right towards the huge PTT Tower which is right next to Radio Netherlands building. If you can get to Hilversum on the first Saturday in June, you'll be in for a very special day!

## DIGITAL BROADCASTING

Finland's national public service broadcaster, YLE, is grasping the nettle of the digital broadcasting challenge and launching a subscription digital television channel this year. The service, aimed at Finns and Finnish-speakers outside Finland, will be a mix of YLE's two domestic television channels.

At the same time, YLE will start a free-of-charge digital relay of Finnish-, Swedish- and English-language programmes for listeners across Europe, together with an exclusively Finnish service. All the services will be provided on Eutelsat through Norway's Telenor company. For more information about the service, call Telenor direct on **+47 9078 6610**.

## VOICE OF RUSSIA

More cuts for international broadcasting have been in the news recently. The Voice of

Peter Shore,  
c/o SWM Editorial offices,  
Broadstone, Poole, Dorset.  
BH18 8PW

Russia (formerly Radio Moscow) is cutting back its Russian-language service from 18 hours to 10 hours every day. Other language services may be affected during the rest of 1997.

The station is already a shadow of its former self. At the end of the Cold War, Radio Moscow broadcast in well over 60 languages and was one of the top three broadcasters in terms of the number of hours it broadcast each week.

### NATIONAL RADIO SERVICE

Do you fancy running a national radio service in Britain? The Radio Authority could have a solution for you. It is considering advertising a franchise to operate a long wave service on a frequency allocated to the BBC which has never been utilised and has now been surrendered.

There are one or two problems however. Long wave needs high power transmitters and huge antennas. And the initial studies which the Radio Authority's technical people have made show that a transmitter can't achieve national coverage, and that reception in central London would be marginal. Don't rush to make an application until things are a little more clear!

That's all for this European round-up of news from the broadcasting world. Join me in July's edition of *Short Wave Magazine* for the latest developments. Good listening!



Radio Nederland

### AVON

**Bristol International RC:** Tuesdays, 8pm. 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.

**RSGB City of Bristol Group:** last Tuesdays, 7pm. New Friends Hall, Purdown, Bell Hill, Stapleton, Bristol BS16 1BG. April 22 - Aerials, ears, eyes and the radio operator - electricity in action by Peter Grainger, Bristol University. Robin Thompson G3TKF on (01225) 420442.

**South Bristol ARC:** Wednesdays, 7.30pm. Whitchurch Folkhouse Assoc., Bridge Farm House, East Dundry Rd, Whitchurch. April 2 - 10GHz activity evening, 9th - Microwave radio demonstration, 16th - Quiz night, 23rd - 3rd evening to build a basic receiver. For more information ring (01275) 834282 on a Wednesday evening.

### BEDFORDSHIRE

**Dunstable Downs RC:** Fridays 8pm. Chews House, High Street South, Dunstable, Bedfordshire. New members and visitors welcome, just drop in or call Paul G7TSJ on (01582) 861936.

### BUCKINGHAMSHIRE

**Aylesbury Vale RS:** Wednesday evenings, 8pm. Hardwick Village Hall, (Hardwick is situated off the A413 between Aylesbury and Buckingham). April 2 - Opening evening, 16th - Visit to Bletchley Park. Gerry Somers G7VFN on (01296) 432234.

### CHESHIRE

**Mid-Cheshire ARS:** Meetings held every Wednesday, 8pm, at Cotebrook Village Hall, North of Tarporley, Cheshire. April 2 - Talk on Astronomy by David Banks, 7th - Committee meeting, Alvanley Arms A49, 8.30pm, 9th - HF on air/construction night, 16th - Hi Tech equip. and Internet Display G7LQD/G6JAK, 23rd - Techniques of safe driving by Ron Parteos. Ted Bannister GORBA on (01606) 592207.

### DERBYSHIRE

**Derby & DARS.** Wednesdays, 7.30pm. 119 Green Lane, Derby. Martin Shardlaw G3SZJ, 19 Portreath Drive, Allestree, Derby DE22 2BJ on (01332) 556875.

### DEVON

**Appledore & DARC:** 3rd Mondays, 7.30pm. Appledore Football Clubroom. April 21 - Talk by Roger GODIZ on his work as Novice co-ordinator for the RSGB. Dave Brierley G3YGJ. (01237) 476124.

### DORSET

**Blackmore Vale ARS:** 2nd & 4th Tuesdays, 8pm. Shaftesbury School, Dorset. April 8 - AGM. Stuart G7JIF (01953) 814055.

### EDINBURGH

**Lothians RS:** 2nd & 4th Wednesdays, 7.30pm. Orwell Lodge Hotel, Polworth Terrace, Edinburgh. April 9 - 24GHz

by Brian Flynn GM8BJF, 23rd - Mini talks. Tommy Main GM4DCL, QTHR on 0131-663 8501 day and evening.

### GREATER LONDON

**Wimbledon & DARS:** 2nd & last Fridays, 7.30pm. St Andrews Church Hall, Herbert Road SW19. April 11 - Microprocessors - applications in amateur radio by G4ZXO. (01737) 356745.

### HAMPSHIRE

**Hordean & DARC:** 1st & 4th Tuesdays, 7.30pm. Lovedean Village Hall, Lovedean Lane, Lovedean, Hants. April 1 - Natter Night, 22nd - CW operating techniques by G3JFF and G3JLK. S. Swain (01705) 472846.

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

### HEREFORD & WORCESTER

**Hereford ARS:** 1st & 3rd Fridays, 8pm. Many talks and interesting evenings including, April 4 - Informal meeting with Morse class available, 18th - Talk on Air Traffic Control by Bob Bowden G3IXZ. Tim G0JWJ, QTHR. Tel: (01432) 279435 or Paul G0DJF on (01432) 353765.

### HERTFORDSHIRE

**Hoddesdon RC:** Alternate Thursdays, 8pm. Conservative Club, Rye Road, Hoddesdon. April 24 - Open forum. Don G3JNJ on 0181-292 3678.

### KENT

**Dover RC:** Wednesdays, 8pm to 10pm during term time. Duke of York's Royal Military School, Dover. Morse classes are held from 7pm to 8pm and Novice training courses are also conducted as required at that time. The club is in the course of registering as a C&G Exam centre and hopes to be operational as such in time for the May exams next year (1997). The club also operates a CB station and encourages practical project work. April 23 - Club operating and natter night. Brian Hancock G4NPN on (01304) 821007.

**Maidstone YMCA ARS:** Fridays, 8pm. YMCA Sports Centre, Melrose Close, Maidstone, Kent, ME15 6BD. March 28 - Good Friday, Shack clearance, April 4 - Junk sale, £1 visitors, 11th - Rally meeting, 18th - Measurements (p), 22nd - Dummy Morse tests by Colin Wilson G0VAR. (01622) 743317.

### NORFOLK

**Norfolk ARC:** Wednesdays, 7.30pm. Formal and informal meetings at The Norman Centre, Bignold Road, Off Drayton Road between 'Asda' and Three Mile Cross Roundabout, Norwich. April 2 - AGM, 9th - Night on the air/construction QRP/Morse practice, 16th - Night on the air/construction QRP/Morse practice, 23rd - Surplus equipment sale. Mike G4EOL. (01603) 789792.

### NORTH YORKSHIRE

**Hambleton ARS:** All meetings held at Allertonshire School, Northallerton, 7.30 to 9.30pm. April 10 - Satellites and SSTV, 24th - Packet, operating and video. More details from John GOVXH on (01845) 537547.

### NOTTINGHAMSHIRE

**Mansfield ARS:** 2nd Mandays, 7.30pm. Navices particularly welcome. April 14 - Satellite communications. Dave G4CVO bring the intricacies of 'space' communciations down to earth. David Peat G0RDP on (01623) 631931.

### SHROPSHIRE

**Salop ARS:** Thursdays, 8pm. The Telesports Club, Abbey Foregate, Shrewsbury. MArch 27 - Talk on Light by Ken G3UDA, April 3 - Night on the air/natter night, 10th - Construction evening, bring that project along and see what can be done to save it!, 17th - Night on the air/Telford Rally discussion, 24th - SSB by Simon G0EYI. Ian Davies G7SBD, QTHR ar @ GB7PMB.

### SOMERSET

**Yeovil ARC:** Thursdays, 7.30pm. The Red Cross Centre, 72 Grove Avenue, Yeovil. March 27 - Club station on the air and committee meeting, April 3 - Talk on The Washford BBC Transmitter by Neil Wilson, 10th - Introduction to Basic Logic by G3TSK, 17th - AGM, 24th - Club station on the air and committee meeting. Malcolm Sadler on (01460) 54657

### WARWICKSHIRE

**Stratford-upon-Avon & DR:** 2nd & 4th Mondays, 7.30pm. Home Guard Club, Main Street, Tiddington, Stratford-upon-Avon. April 14 - AGM. 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.

### WEST SUSSEX

**Worthing & DARC:** Wednesdays, 7.30 for 8pm. The Parish Hall, South Street, Lancing. March 27 - The Internet by G7OIR. Roy G4GPX. (01903) 753893.

### WEST YORKSHIRE

**Wakefield & DR:** Tuesdays, 8pm. The Ossett Community Centre, Praspect Road, Ossett. April 1 - On the air, 8th - Matormania with G4BLT, 15th - On the air, 22nd - AGM. Bob 0113-282 5519 or G3WWF@GB7WVRG.

### WILTSHIRE

**Trowbridge & DARC:** 1st & 3rd Wednesdays, 8pm. The Southwick Village Hall, Southwick, Trowbridge. April 2 - Telewest communications, 16th - Natter night. Ian G0GRI on (01225) 864698.

Lorna Mower, Short Wave Magazine, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Club Secretaries: Send all details of your club's up-and-coming events to:

# Grassroots



# Editorial

## ONE-VALVE COMPETITION

I know that a lot of readers have built the Denco One-valve Receiver described in the December '96 issue. However, it would seem that the closing date I originally set for sending in your logs and photographs didn't give you enough time to build the project, let alone get it working. To offset this, I am extending the closing date by a couple of months to 3 April '97.

Some of you have had problems with the project - I have even been accused of publishing an untried circuit! Many thousands of receivers have been built to this design, as well as the closely related HAC One and the myriad of similar designs from other sources. One-valve receivers require patience and a lot of experimenting to get the best out of them, as well as a good antenna and earth system. I have found that the set I built to illustrate the article is very touchy as to the position of the adjustment 'screw' in the Denco coil.

## LETTERS

A lively letters page brings any magazine to life. But, to achieve this you, the readers, have to provide the letters. Of late, you have not been doing this. Letters can be controversial, topical or just downright interesting, as long as they relate to radio. That doesn't mean that you can emulate postings seen on the Internet Newsgroups, however, as I will wield the 'blue pencil' and remove any objectionable, rude or obscene language.

**Dick Ganderton G8VHF**

# Letters

The Editor reserves the right to shorten any letters for publication but will try not to alter their sense. Letters must be original and not have been submitted to any other magazines. **The views expressed in letters published in this magazine are not necessarily those of Short Wave Magazine.**



### Dear Sir

I note some scanners now carry the new CE label, but not all scanners carry this label. What exactly does it mean, but most important of all, what about the older scanners still in use? Will they become illegal or obsolete? Thanks.

**Mr X  
Bradford**

*I decided, some months ago, that SWM really ought to carry the definitive article on CE marking. Fortunately, John Wilson had just set up a test lab in Devon to carry out CE testing, so I was able, with little difficulty, to persuade him to get going on his computer - yes, he does possess one, albeit a lap-top - and tell us all about CE marks. Ed.*



### Dear Sir

I would like to follow up three points in Paul's letter (SWM February 1997) regarding rallies.

**Stands selling toffee, toys, games and 'phones.** I am not convinced by Paul's observations. Firstly, 'phones can be a useful addition to any shack, so I personally do not feel they are inappropriate for a rally (particularly if cheaper at rallies than in the High Street).

Secondly, 'non-amateur' stands, selling sweets, toys, carvings, paintings and such like do seem irrelevant to a rally, that is, to a rally that is aimed solely at the radio amateur. Some rallies, however, aim to cater for the radio amateur plus family, and, at these rallies, 'non-amateur' stands are surely entirely appropriate. (I've personally found these stands very convenient for buying Christmas and Birthday presents). I would cite the very successful and popular Elvaston Castle Rally as being a rally for the whole family, offering a whole marquee (and more) of non-amateur stands and other non-amateur attractions.

**The invasion of computers.** I've always expected that traders stock items which they believe will sell. Surely the prevalence of computer stands at rallies indicates the popularity of computers within the hobby?

(There is also the consideration that it is usually easier and cheaper - pay, plug & play - to upgrade a PC than to upgrade a radio). A browse through an amateur radio magazine will show that computers are very much now an adjunct to amateur radio itself.

**Inexpensive stands for small traders.** This is a worthwhile suggestion and some rallies do indeed offer inexpensive stands in car boot or flea market areas. Unfortunately, many rallies incur significant costs and cannot always offer inexpensive stands. Many rallies are organised by non-profit making bodies such as local radio clubs and they have to be as certain as possible of recovering their costs, they cannot afford to make a loss from their rally.

**Ian Brothwell G4EAN  
Arnold  
Nottingham**

*I would tend to agree with Ian's views. I have found some very useful bits of gear that are now in use in my non-radio workshop, and I did buy Brown Owl a wok at the Verulam Christmas Rally! However, I would not like to see non-radio stands ousting radio stands. Ed.*



### Dear Sir

With being a s.w.l. for a number of years and quite content in this role, could I, through your 'Letters' page, appeal to the Nets and Event Stations to please mention the names of their Net and Event Stations more often during their 'overs'.

**Bill Simpson  
Lancaster**



### Dear Sir

I have just been reading the February edition of SWM and found the article on kit building of great interest. I am writing to you in the hope that you may be able to help.

I have searched everywhere in vain to obtain a circuit or a kit of a m.w., l.w. and f.m. receiver to build. Nobody seems to produce any kits for this type of receiver and I am at desperation stage!

The radio would be battery operated with manual rotary tuning, ideally using dedicated

radio i.c.s, including a separate i.c. for audio output of about 1W. Not much to ask I know, but I am writing to you as a last resort, maybe you have a suitable circuit stashed away somewhere?

I would really appreciate any help that you may be able to give.

**Dean Gale  
Huntingdon  
Cambridgeshire**

*Finding a suitable circuit is not difficult. However, just as do the kit manufacturers, you will find it very hard to gather together the necessary components. Anyone out there got any ideas? Ed.*



### Dear Sir

Dansette 1961 model RT 222- I wonder if any of your readers can help me with my problem? Some time ago the battery was reversed on my Dansette RT 222, resulting in the expiry of the six transistors and other odds and ends. The set has sentimental associations as it was a retirement present to my late father and I would like to fix it if possible.

The transistors are OC44/GET114, OC45/GET874, OC78/GET114 and OC78D/GET114. If anyone can suggest a source of supply, or suitable alternatives without a major rebuild, or have any other ideas, I would be very grateful for the information.

**Peter Linzey  
Elderslie  
Renfrewshire**

*Anyone help Peter on this ? Ed.*



### Dear Sir

As a newcomer to s.w.l., and unfortunately a very slow learner, may I ask the help of SWM and its readers to shed light on my problem, which is all to banal, I fear.

Here in Watchet, we are situated exactly 2.25km NINE of the Washford transmitter masts. This is a small terrace house with a cat's cradle of telephone and high power lines down the back of the house. As you can imagine, the reception situation is not good. My set is an old Sony SW600 and I have experimented with bits of wire over the house and outside, to

my wife's exasperation. However, the better the wire, the better the noise, or so it seems.

I would like to invest in a good set-up, including perhaps active antennas, c.t.u.s, etc., but is there any point in better equipment given the physical situation of the house? Sometimes I can hear the mush of Radio 1 and others from Washford on the telephone and other equipment without turning the power on!

With best wishes for your excellent magazine.

**Tom Eley**  
**Watchet**  
**Somerset**

 **Dear Sir**

I was very interested to read *Radio Secrets*, the article by David White in the February issue as I was one of the first to be enrolled in the top secret 'Y' Branch of the Royal Navy.

After a long period of training, I was sent to my first operational station at Flowerdown, near Winchester. It was a Foreign Office radio station run by civilians, forerunner of GCHQ I imagine. The civilian operators were gradually replaced and when the last left we were then 100% Navy personnel. We became HMS *Flowerdown*, entitled to the Navy rum ration!

Then the WRNS started to arrive and were soon sitting with us in front of the good old HRO receivers. They were very good operators, so it was good to see the photo of the WRNS at the Bletchley reunion. I feel that some of them were at *Flowerdown*, but I have a bad memory for faces and am not too good on names. I am 82 next year, but I do remember Suzanne Marriot and Clive Luckin.

We were a very happy ship's company, so much so that when a notice went up asking for volunteers to go on a PO course, with no guarantee that we would return to *Flowerdown*, there were no volunteers. A day or two later, another noticed was posted naming those who would have to take the course, and my name was up there.

Eventually, I became PO Tel (S), was informed that I was to be an instructor and sent to Ceylon, now Sri Lanka, to instruct. When I was demobbed, in 1946 I think, my official ranking was PO Tel (S) (N)\*, the asterisk was for being able to read and instruct in Japanese Morse.

I would like to send greetings and best wishes to any of the 'Y' Branch who might remember me.

**Denis R. C. White**  
**Long Eaton**  
**Nottingham**

 **Dear Sir**

Small is Beautiful I am used to having receivers that need a crane to lift them! However, I recently visited a radio rally and I just had to purchase something. This something turned out to be the cheapest set on show, a Tandy DX260 9-band receiver, which slipped easily into my pocket.

As for results, using a pair of headphones from a small cassette recorder (I do not like small speakers) the results were astounding, my favourite stations HCJB and Radio Brazil coming in loud and clear. The selectivity was excellent, a small red light coming on to ensure you were spot on frequency. Further icing on the cake was the addition of an amplified speaker.

My experience of radio extends, man and boy, over 60 years and as a hobby for the young people of today, it has no equal. Best wishes for the future.

**W. Coupland**  
**Tyne & Wear**

 **Dear Sir**

The current issue interested me very much as I was a keen reader of *SWM* from (about) the beginning of 1938 until the wartime close down. I have only recently returned to short wave listening and find the magazine as good as, or better than ever.

Except - and that is the reason for this letter - the tendency, especially noticeable in this issue, to render some pages of text irritatingly difficult to read by the use of a background pattern or coloured overprinting. I refer, in this issue, to the 'Memories', pages 31 to 38 and to the 'WinRadio' reviews, pages 48 to 53.

Despite my age, there is nothing wrong with my eyesight, but I think you will find that if you attempt seriously to read these pages, which I suggest you may only have read closely in original typescript or galley proof form, in any case without the overprinting, you will find, especially in the 'WinRadio' review, that the background makes close concentration on

the text very distracting.

**P.V. Jacobs**  
**Grasmere**  
**Cumbria**

*Sorry about that. We do read every page after it is made up, but often it is not until it is printed that such difficulties as you experienced show up. Our Art Department, who actually make up the magazine, like to be able to experiment with new ideas on articles that are not too restricting for technical reasons. Ed.*

## SILENCE WAS GOLDEN

 Headlined 'The Interval Signal', an interesting little piece in a 1930 journal complained about hearing no sound when tuning and being uncertain whether they were 'listening' to a rather long interval or whether the fault was in their tuning.

The BBC at this time had tried various tuning signals from piano scales and oscillating valves to the tuning fork, but would not contemplate the Continental practice of ".....marking the intervals between items by the use of a metronome or other device which will assure listeners that the station is working and that sets are in order". Hamburg, apparently, used strokes on a gong, indicating the number of minutes to go before the next item on the programme.

The BBC decided to use, somewhat sparingly, their own method of staying in contact with the listener. If the announcer said that there would be a short interval of three or four minutes, no signal would be used, if the length of time before the next item was uncertain, strokes on metal resembling a muffled cymbal would be used at half second intervals. "Perhaps this signal may eventually develop into something more musical, such as the chimes of Cologne or the sleigh bells of the Polish station" was the comment.

Surely they never intended the coy Mickey Mouse voices singing tiresome jingles to inform us that we are listening to Radio 2 or 4? Or the filling up of the frequency with the idle DJ chatter before, after and often during the music? Let's put the clock back 50 years to that lovely silence between programmes - please?

**Joan Ham**

## SWM SERVICES

### SUBSCRIPTIONS

Subscriptions are available at £25 per annum to UK addresses, £30 in Europe and £32 (Airsaver), £37 (Airmail) overseas. Subscription copies are despatched by accelerated Surface Post outside Europe. Airmail rates for overseas subscriptions can be quoted on request. Joint subscriptions to both *Short Wave Magazine* and *Practical Wireless* are available at £45 (UK) £54 (Europe) and £58 (rest of world).

### Components for SWM Projects

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

The printed circuit boards for *SWM* projects are available from the *SWM* PCB Service, Badger Boards, 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 £2.60 each, photocopies are also £2.60 per article, plus £1.00 for subsequent parts of serial articles.

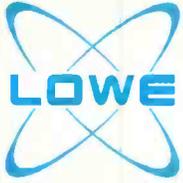
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### Technical Help

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



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# THE

*Like it or not, the system of CE marking on products is here with a vengeance, even though many manufacturers and importers would like it to go away. What many readers have asked is "How important is it that products have the CE mark, and is it illegal to buy and operate a piece of equipment which is not correctly marked?" In this article John Wilson clears away some of the mystery.*



# MARK- A LAYMAN'S GUIDE

**T**he concept of a clearly defined mark or symbol to show that a product meets certain minimum standards is not new; for example the BSI 'Kite' mark has been around for a very long time in this country and is accepted as a basic assurance that the product to which it is attached conforms to an applicable standard. In most developed manufacturing countries in Europe, similar marking systems have evolved with the same aim - to show that the manufacturer is willing to take responsibility for making his product conform to certain agreed and accepted standards of performance, whether that be resistance to fire, accuracy of performance, strength to withstand loads, and so on. However, the technical demands of the various agreed product standards vary considerably, and whilst it is reasonably easy to show that an armchair fabric covering is fire resistant, it is much more difficult to test, say, a piece of electrical mining machinery to prove that it will not ignite inflammable gases and cause an underground explosion.

## PRODUCT STANDARDS

As each country developed its own product standards and introduced matching legislation to ensure

compliance it became increasingly difficult for manufacturers to sell into a foreign market because it required a close understanding of the standards in the target country, and it was therefore a logical step within Europe to use the closer relationships which came about under the Common Market treaties to harmonise product standards on a European basis. The process of harmonising common standards has been going on for many years and has been extremely successful. It is now possible for a British manufacturer to sell into Germany by making sure that the product complies with the European standard, and for a French manufacturer to sell into Italy on the same basis. The way in which compliance is indicated to the end user is the presence of the 'CE' label on the product, and this is where we came in - does the sight of a CE label mean anything at all to you as a potential buyer of the product? To answer this question we need to ask a few more.

**Who is responsible for applying the mark?** If the product is made in Europe, the manufacturer applies the CE label, and by doing so makes a declaration, which has to be signed by a person of senior responsibility that the product complies with all relevant European Directives covering it. If the product is manufactured outside Europe, it is the responsibility of the importer representing the overseas manufacturer to

make that same declaration and apply the CE label. Note that 'importer' is taken to mean the manufacturer's appointed representative in Europe, and not some back door or 'grey' importer who has no authority whatsoever to apply a CE label.

**All relevant Directives?** Very important, this one. Although we as radio hobby enthusiasts tend to think of the CE mark as relating to unwanted emissions and resistance to interference covered by the EMC (Electro Magnetic Compatibility) Directive, the Low Voltage Directive and the Machinery Directive may also apply to radio related products, particularly in the power supply area, and it would be an unwary manufacturer or importer who signed a declaration of conformance assuming that he was only dealing with r.f. interference and forgetting or ignoring the safety implications inherent in the Low Voltage Directive.

### Who deals with infringements?

In the United Kingdom apart from Northern Ireland the local government Trading Standards Departments are responsible for overseeing the operation of the CE marking legislation, and the system is 'complaints driven'. In other words, if anyone suspects that a product has been given a CE label without complying with the terms of the various Directives, the local Trading Standards office is the place to contact. Complaints can be lodged by any individual or any company, and one result of this in

Germany has been the use of the complaints procedure by companies against their competitors in order to gain commercial advantage. For a manufacturer or importer the penalties for non-compliance can be quite severe, and I know of active prosecutions now taking place against Personal Computer companies in the UK which will probably result in stringent action being taken.

**What is the official line on all this?** Let me quote from one relevant Government document:

*"Most electrical and electronic products made or sold in the United Kingdom, including imports, must:*

- *Be so constructed that they do not cause excessive electromagnetic interference and are not unduly affected by electromagnetic interference:*
- *In the case of certain radio transmitting equipment, be subject to EC type examination by a notified body; and*
- *Carry CE marking."*

And the penalties? Let me quote again:

***"Failure to comply with these requirements:***

- *Will mean that those electrical or electronic products may be prohibited from being placed on the EEA market,*

# NEVADA

# SHORTWAVE & SCANNING SPECIALISTS

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| KENWOOD R-2000..HF, RX & VHF.....       | £425 |
| SOMMERAMP SRG-8600DX (AS 9600).....     | £299 |
| SONY PRO 80.....ALL MODE HANDHELD.....  | £215 |
| SONY 7600D.....PORTABLE RECEIVER.....   | £85  |
| SONY SW-1.....C/W CASE & ACCS.....      | £129 |
| SONY 2001.....BOXED.....                | £85  |
| YAESU FRG-8800.....HF RECEIVER.....     | £350 |

### LATE ARRIVALS

|  |      |
|--|------|
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| LOWE AP 150.....AUDIO PROCESSOR UNIT.....            | £169 |
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| TRIDENT TR980.....BOXED.....                         | £125 |
| YUPIITERU MVT 7100..BOXED.....                       | £225 |
| YUPIITERU MVT 7200.....                              | £275 |

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|   |      |
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| AOR 2001.....BASE SCANNER.....                    | £175 |
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| AOR AR900.....BOXED.....                          | £139 |
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| BEARCAT 65XLT.....TO CH VHF/UHF.....              | £50  |
| BEARCAT 175XLT.....                               | £75  |
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| FAIRMATE HPIOD.....H/HELD - BOXED.....            | £165 |
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High speed FM Nearfield Receiver sweeps range of 30MHz - 2GHz in less than 1 second.  
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Computer controlled interface for Realistic Pro 2035...£249.95

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Receive and decode RTTY signals on shortwave to produce live on screen weather pictures  
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- Includes CW tutor mode • Complete stand alone unit • 12V Supply required.

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We are a SONY SHORTWAVE CENTRE and carry the full range of Receivers **IN STOCK!** All our stock is guaranteed by SONY (UK).

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|--|---------|
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| SONY SW100E Miniature World Receiver.....  | £199.00 |
| SONY SW7600G World Receiver.....           | £179.00 |
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This is the most POWERFUL DSP unit on the market. Variable bandwidth down to 10Hz! Plus a host of features!  
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17 element wideband beam covers 105 - 1300 MHz with over 12dB gain! Transmit & receive on all frequencies.  
£249.95  
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Now an absolute bargain for the licenced Radio Amateur. Not only a 2/70cms dual band transceiver, but receives with scan facilities.

- 108-173.9MHz
- 400-511.9MHz
- 800-999MHz

- SPECTRUM CHANNEL DISPLAY
- FULL VHF/UHF DUPLEX
- UP TO 5W RF OUTPUT



**PSU STAND/CHARGER**  
A combined desk stand and PSU/Charger for handheld scanners, Opto counters, Scout, Cub & 3300  
Price.....£34.95

## GLOBAL AT 2000

Shortwave tuner NEW version with Q selector to reduce interference (100 kHz - 30 MHz)  
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## HOWES SHORTWAVE TUNERS

Covers- 500 kHz - 30 MHz

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| GW40.....Windom.....(40 - 10 mtrs).....    | £55.00 |
| GW80.....Windom.....(80 - 10 mtrs).....    | £65.00 |
| EFW.....End Fed Wire (s/w/waves).....      | £59.95 |
| DLB.....Long Wire Balun.....               | £39.95 |

Plastic coated flex wire...74p per metre  
**G5RV FOR THE PERFECTIONIST**  
- uses 450Ω ladderline & balun for coax feed.  
G5RV Plus Full size (80 - 10 mtrs).....£75  
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EFW - Shortwave Antenna  
20 meter s/w receive end fed wire antenna. Balun fed, uses high quality "Flex Weave" copper wire. 1-30MHz  
Price.....£59.95

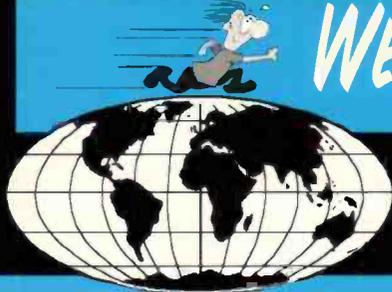
DLB - Shortwave Balun  
Matches end fed long wires to 50Ω coax, helps on rec. to reduce noise & interference. Transmits up to 100W. Fully moulded for full weather protection.  
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An excellent British made SW receiver, boasting more than 100 dB of dynamic range in AM mode!

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- Remote control included

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PROFESSIONAL GRADE ULTRA WIDEBAND SCANNER

Covers 10kHz - 2600MHz. All mode reception and a huge range of facilities.

DEMAND IS HIGH for this set and supplies are limited. CALL NOW AND PAY BY 3 POST DATED CHEQUES!.. ~~£1749~~ **£1569**

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### NEW! ICOM R8500



YES, we've got them IN STOCK!

This receiver is everything we hoped it would be, covering 100kHz - 2GHz and lots of features including computer control.

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### YAESU FRG 100



NOW you can have a CHOICE OF EITHER:

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### SCANNER ANTENNAS

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- Wideband coverage
- 100 kHz - 1 GHz
- Special VHF/UHF section
- For handheld & base scanners

Vastly improves reception on short waves - fully adjustable to suit your room, attic, garden and extends to 45ft if required. Supplied c/w fitted BNC plug, support line and insulator ready to go.

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#### DIAMOND D707 ACTIVE WIDEBAND ANTENNA

For the serious listener, active antennas give the ultimate reception.

- Variable pre-amp gives 20dB gain
- Covers 500KHz - 1500MHz
- Japanese high quality

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#### SCANMASTER DE-LUXE

DELUXE DESKTOP ANTENNA 500kHz - 1500MHz

A beautifully engineered top performance desktop antenna. Should substantially improve your scanners reception when used at home. Supplied c/w 4.4mtrs of good quality cable & fitted BNC plug ready to go. May be mounted on the floor, ceiling, wall or desktop..... **£39.95**

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HIGH QUALITY MULTIBAND RADIOS

### SANGEAN ATS818



BACK BY POPULAR DEMAND!  
**£139.95**  
+£6 P&P

- 150kHz - 29.99MHz ● 87.5MHz - 108MHz
- 54 memories ● AM/FM/SSB
- AM Wide/Narrow filter ● RF gain control

If you are looking for a really good no nonsense portable SW receiver that covers SSB - this set represents unbeatable value for money!

## AR 8000

FLAGSHIP HANDHELD



SPECIAL OFFER

~~£349~~  
**SPECIAL £299**

LAST FEW!

- Continuous coverage, 500kHz-1900MHz
- 1000 memory channels
- All mode reception - AM, NFM, WFM, USB, LSB, CW
- Rotary tuning dial
- Selectable steps, 50Hz - 995kHz
- Band scope ● Twin frequency display
- Alpha-numeric display
- Data clone facility ● Computer control

This set is supplied complete with these accessories:-

- NiCad batteries ● Antenna
- 12V cigar plug and lead
- Belt clip ● UK mains charger
- Carrying strap

ONLY LIMITED QUANTITIES AT THIS PRICE - SO HURRY!

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A NEW BUDGET PRICED COMMUNICATIONS RECEIVER

Covers 30kHz-30MHz Supplied c/w Power Supply **ONLY £159.95**

### ROBERTS R827

Multi-band Digital Pre-set Stereo World Radio

- Receives SSB & CW
- SW, MW, LW, FM
- 45 preset stations
- 5 tuning methods:

Price..... **£159.95**  
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### ROBERTS R861

Professional DIGITAL MULTI BAND Radio

Portable Shortwave & VHF FM radio with RDS & SSB reception

- MW/LW/SW /FM STEREO
- 150kHz - 29.99MHz
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## books

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A complete insight to buying, owning and operating a scanner..... **£16.95** + £2.75 p&p

Europe's Number 1 Supplier

# The CE Mark - a Layman's Guide

or imported into the United Kingdom, and withdrawn if previously placed on the market;

- Could result in penalties comprising imprisonment for a term not exceeding 3 months, or a fine not exceeding £5000, or both."

Now before you begin hastily checking all your radio equipment to make sure that it is CE marked, let me reassure you that as a private owner of equipment you are not liable to the penalties I have quoted, and you won't suffer a knock on the door late at night and see your precious receiver being carted away for destruction. However, if you are contemplating buying a new radio or accessory it would be as well to check that it does carry the CE label and that the dealer or company selling it to you is prepared to back it up by confirming that the label is genuine. Since the regulations apply to a manufacturer or importer, and not a private individual, there can be no harm in buying a second-hand item from a previous owner, and the same document from which I have already quoted goes on to state:

" The Regulations are NOT retrospective; products supplied in the EEA before 28 October 1992 are exempt from the Regulations."

Presumably, this means that second-hand items originally sold before October 1992 can be re-sold by a dealer without the need for CE marking. This ought to make second-hand receivers very desirable items?

## Who tests the equipment to see if it complies?

Larger manufacturers sometimes have their own test facilities, but since a good well equipped test laboratory currently costs somewhere in excess of half a million pounds to establish, I am talking about **large** manufacturers. Smaller manufacturing and importing

companies make use of independent test houses who normally charge for the tests on a daily time basis and pass results of the tests to the manufacturer who will then make up a technical file as supporting evidence for a signed declaration of conformity, normally signed by a senior director of the company. Another user of the independent test houses may well be the Trading Standards Departments when they are investigating a complaint against a manufacturer or an importer, so it is essential that the test house is truly independent. I am in the fortunate position of running just such a test house here in North Devon, having been tempted out of retirement by the opportunity to use my considerable r.f. experience to help small manufacturers.

## What tests are carried out?

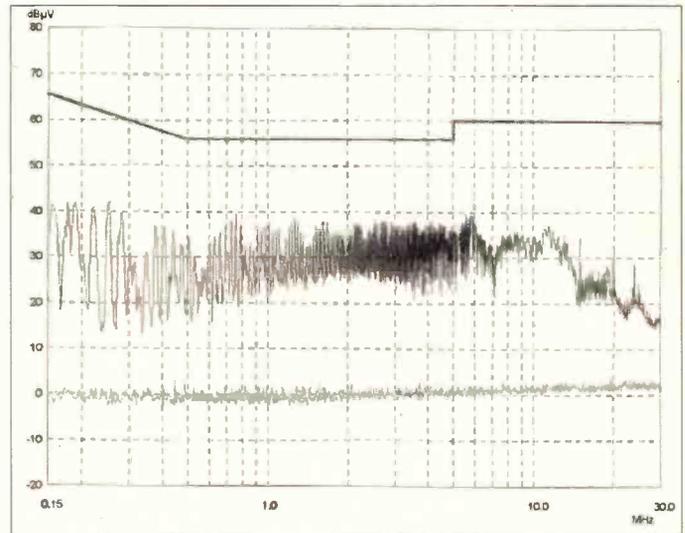
They fall under two main headings:

**Emission**, which checks what unwanted signals are being emitted from the equipment under test, and further split into radiated, i.e. propagated by radio type emissions, and conducted, in which the unwanted signals are propagated down the mains lead or signal leads connected to the unit under test, and

**Immunity**, which tests the ability of the manufactured unit to withstand interfering signals which might stop its correct working, and again split into radiated, i.e. signals being picked up via radio type propagation, and conducted, where the interfering signals arrive via the power leads or signal leads.

## EURO NORM STANDARDS DOCUMENTS

Tests can't be conducted without applying some actual levels to the measurements taken, and these are laid down in the appropriate EN (EuroNorm) standards documents applying to the type of equipment being



tested. I find it ironic that the whole basis on which these tests were laid down, at least by the British Standards of the past, related to the minimising of interference to the free enjoyment of broadcast radio and television, but here we are at a stage when that enjoyment is seriously threatened by noise generated by electrical and electronic equipment - notably the personal computer, if only because the PC is around in such large numbers and is, in general, being built down to a price rather than up to a specification, with only sufficient care being taken to get emissions within the limits laid down in the EN standards and no more than that.

So one has to ask the next question: **What are the emission limits, and how do they relate to real life?** Well, since I run a test house and have to use computers on a day to day basis, I naturally check them regularly to ensure that their emissions do not compromise measurements being taken. To do this I make use of a screened anechoic chamber which has a measured screening attenuation of about 130dB and therefore ensures that any signals I measure in the chamber are definitely coming out of the equipment under test and not from some high power radio or TV station outside. Radiated emissions are measured in the frequency range of 30 to 1000MHz and conducted emissions in the range 150kHz to 30MHz. It may

surprise you to learn that it is the conducted emissions which predominate and for readers of *Short Wave Magazine* it is probably the 150kHz to 30MHz range which is of particular interest. Without going into the technicalities of the test setup just take a look at **Graph 1** which shows the conducted emissions from the mains lead of the PC. The line on the upper part of the graph is the test limit and you will see that the emissions are below the limit and the computer has therefore passed this test and can be labelled, as indeed it is, with a CE mark.

## COMPUTER NOISE

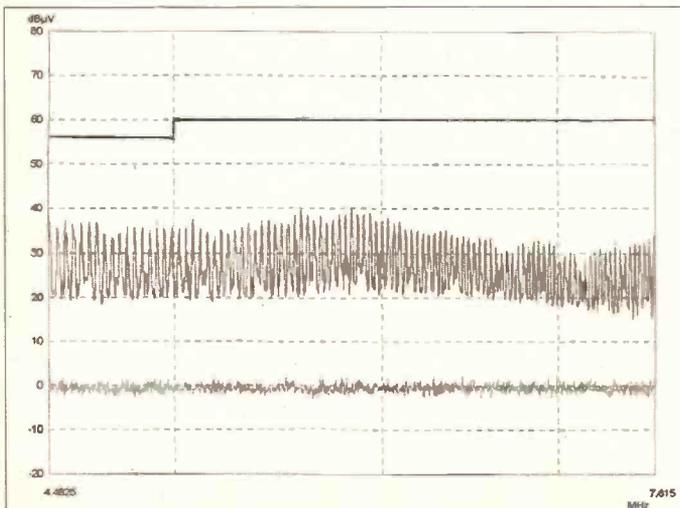
However, consider what this actually means. The noise floor of the measuring system I use is shown along the bottom of the graph at about 0dB, and the Y axis is calibrated in dBmV into 50Ω. Thus, 0dB is 1mV and the noise generated by the computer is averaging 30dBmV across the whole frequency range, with peaks over 40dBmV at lower frequencies. 40dBmV is 100mV p.d. which is the same as a signal meter reading of S9+6dB, and even the average 30dBmV corresponds to a reading of almost S8, so is it any wonder that you can't use a short wave receiver anywhere near a computer? And this, bear in mind, is a brand new PC which passes the tests for CE marking.

To show the nature of the

noises being generated by the PC, take a look at **Graph 2**, which shows a slice of the spectrum from about 4.5MHz to 7.6MHz. You can see quite clearly the regular spacing of the noises and they are all approaching S9 in amplitude. Is this the end of short wave listening as we know it?

### SEA OF ELECTRICAL NOISE

In essence, these regulations had to come about sooner or later, because we are drowning in a sea of electrical noise, stretching from long wave to light frequencies. It may be selfish to complain that my enjoyment of the hobby of short wave listening is being affected by squeaks and groans generated by everything from washing machines to my son's computer but there are more serious problems such as the well documented cases of mobile telephones stopping the electronic ignition systems in adjacent vehicles, and such is the concern of the military about radiation from computers and terminals that they have a complete programme (TEMPEST), one aspect of which is investigating and preventing this radiation from being picked up and rewritten to another computer screen. Similarly, most financial institutions operate their data processing systems inside screened rooms to prevent information being picked up outside and also to prevent outside interference getting in and crashing the system.



### BUREAUCRATIC

The concept of uniform standards across the whole of Europe is extremely sensible, but there is the usual evidence of engineering standards being rewritten by bureaucrats so as to make the regulations almost incomprehensible to the average reader.

However, there are some compensations to be had from the dry and dusty texts. As I sit here and study them, as I have to on a day-to-day basis, I can't resist the occasional smile. The standards are drawn up as either generic (covering all equipment) or product specific; for example there is a standard called EN 55013 which covers all aspects of testing emissions from broadcast radio and television receivers, with a matching EN 55020 covering immunity of the same products. The standard which contains the most bureaucratic, and hence the funniest, language is EN 55014, grandly entitled *Limits and methods of measurement of radio disturbance characteristics of electrical motor operated and thermal appliances for household and similar purposes, electric tools and similar electric apparatus*. Wow - what a title, and you should see it written in German!! As you might expect, this standard tells you how to carry out emissions testing on things such as vacuum cleaners "Vacuum cleaners ....shall be measured while operating continuously without accessories and with an empty

dust bag in place. Vacuum cleaners with a mains lead retracted by an automatic cord reel are to be measured with the mains lead pulled out completely"; on coffee grinders, food mixers, clocks, and one which raises a titter "Massage apparatus shall be operated continuously without load" - so no comfort for me there, just as I was imagining a session with an attractive young lady inside the anechoic chamber!

### TESTING TOASTERS

The list seems endless, and includes instructions on how to set up a Scalextric model race track and a model railway; defines toaster testing as "...toasters are to be tested according to 7.3.4.9.1 or 7.3.4.9.2 using as normal load slices of white bread about 24h old, dimensions approximately 10cm x 9cm x 1cm, to produce golden brown toast." I'll bet you didn't know that there was a British Standard slice of toast, did you? Oh the information you can find in *Short Wave Magazine*. I'm quite looking forward to most of these appliances coming along, but there is one I won't know how to deal with. Paragraph 7.3.2.9 reads "Internal vibrators shall be operated continuously in the centre of a steel plate container filled with water, the volume of the water being 50 times the volume of the vibrator". Well, it makes a change from testing radios, but I do wonder which bureaucrat drew up that test, and whether or not it was intended as a joke that somehow got printed in the standards document - but there it is, and I have to be prepared to test it for emissions and immunity.

### TIME TO BE SERIOUS

As far as you, the individual is concerned, it's up to you to check that the product you buy carries a valid CE label. Although a period of time was allowed for manufacturers and importers to dispose of stock, that time has now run out, so anything you buy should be

correctly marked. Equally, as an individual, there are no penalties imposed upon you just for owning unmarked equipment, and it won't be taken away and confiscated, so don't worry, but if you want to continue enjoying your short wave listening it would be wise to at least remember that if the rules have been observed, the CE mark should mean that the equipment you bought has been checked for radiated and conducted emissions by a reputable test house (such as the one at Bideford in North Devon). Whatever happens don't be misled by advertised statements saying "Only this one is legal to buy" because it should actually read "Only this one is legal to sell" and that's quite a different matter.

### AND SO TO OTHER THINGS

My friend HCJW wrote a very informative letter about my T2FD article and found an early reference to the importance of treating this type of antenna as a travelling wave system, which means that the T2FD should be constructed as a transmission line with the top and bottom wired parallel for their whole length and **not** brought together to a common feed point mid-way between the elements. I also want to thank all the other folk who wrote asking me if I could supply bits and pieces, and the answer is that I have only just finalised the construction of the balun box and the terminator box - which have to be separate if they are to fit the transmission line concept, and will be in touch with you very soon. Thank you for your interest and your patience. Long live the T2FD.





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★★★★★ Table top receiver of the year 1996/7 - World Radio TV Handbook  
 ★★★★★ Awarded Five Stars - Passport to World Band Radio 1997

★★★★★ Four star rating - Radio Netherlands / World Radio TV Handbook  
 ★★★★★ Awarded Four Stars - Passport to World Band Radio

## AR7030



## AR3030



### AOR AR7030 & AR3030... a wider choice of short wave listening

#### AR7030 - High dynamic range short wave receiver £799

The AR7030 has established itself at the top end of 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 AR7030 is ready to go straight from the carton box** being supplied with mains power supply, infrared control (batteries are included) and illustrated operating manual. The standard I.F. filter bandwidths of 2.2, 5.5, 6.5 & 9.5 kHz provide excellent selectivity for casual AND serious DXing on short wave. Of course it is possible to further customise the receiver with the addition of optional filters, battery pack etc.

Early April'97 will see the arrival of the **NB7030** option. This is a multi-part option combining a switchable noise blanker, integrated audio notch filter with auto search for tone, CPU upgrade with 400 memory channels each capable of holding 14 character alpha-tag comments, auto display of station ident (from stored memory data) while tuning the receiver, multiple on/off programmable timer etc... Price is expected to be around £198 inc VAT.

For those who desire the enhanced CPU without the noise blanker or notch filter, the CPU upgrade will be available separately as the AR7030 FEATURES CPU.

The IBM PC Windows®95 control package **Data-Master** is now well established. It provides computer control for the AR7030 & AR3030 receivers with "virtual" front panels, data base, logbook, MufSight propagation prediction, map projections, listening aids, spectrum trace, learning aids and more. The latest version will now operate on earlier Windows® 3.1x systems. £129 + £3 P&P

#### AR3030 - Short wave receiver 30 kHz - 30 MHz £499

The **AR3030** receiver combines a classical appearance on the outside using aluminium extrusion & cases with a high-tech low noise DDS (Direct Digital Synthesizer) design inside with the legendary Collins 6 kHz AM mechanical filter fitted as standard, the result is the short wave "CLASSIC" from AOR.

**Due to its continuing success,  
 you can now own a "CLASSIC"  
 for as little as £499**

*If you are looking for an easy to use quality short wave receiver, then look no further.*

The list of "standard features" is exceptional:

- Frequency coverage 30 kHz ~ 30 MHz
- ALL MODE receive AM, S.AM, NFM, USB, LSB, CW & FAX with true carrier re-insertion
- 5 Hz DDS tuning
- Fully adjustable BFO on USB, LSB, CW & FAX
- Unrivalled selectivity offered by the **Collins** 6 kHz AM mechanical filter
- Options of a substitute **Collins** 4 kHz AM mechanical filter, **Collins** 2.5 kHz SSB mechanical filter and **Collins** 500 Hz CW mechanical filter (ceramic SSB filter fitted as standard)
- TCXO for the ultimate in frequency stability ideal for data communications and ECSS
- Dual VFOs plus 100 memories which retain all operating data
- Front panel AGC fast / slow
- Standard rear panel RS232C connector, I.F. output, audio outputs and carrier operated relay
- Large analogue S-meter
- Direct frequency entry by MHz, kHz or metre band
- Optional VHF all mode converters for AIRBAND (108 - 146 MHz) and MARINE (118 - 167+ MHz)

## AR5000 high performance in a single wide band receiver...

Cyber Scan®



The AR5000 advances the frontiers of performance providing excellent strong signal handling, high sensitivity and wide frequency coverage with microprocessor facilities to match. Features include **automatic electronic preselection** between 500kHz - 999.999999MHz. 'True receive' throughout its range, not an up-converter above 1GHz.

Government departments on both sides of the Atlantic have carried out extensive trials against rival units and we are pleased to find they are placing orders for the AR5000, good sensitivity at frequency extremes, excellent range of facilities, compactness & light weight leading to great flexibility in operation.

- Very wide frequency coverage 10kHz - 2600MHz
- All mode reception: AM, FM, USB, LSB & CW
- Automatic electronic preselection of the front end
- Excellent strong signal handling
- NCO (Numeric Controlled Oscillator) with tuning steps down to 1Hz
- TCXO fitted as standard
- Multiple I.F. bandwidths 3, 6, 15, 30, 110 & 220kHz (500Hz optional)
- Auto mode bandplan selection
- Multi-function LCD with 8 character alpha-text comments
- Extensive search & scan facilities
- "Cyber Scan" fast search & scan speeds up to 45 channels / increments per second
- Analogue S-meter
- 1000 memory channels and 20 search banks with EEPROM storage
- Auto memory store
- Extensive RS232 command list
- Sleep timer / alarm
- Standard DTMF decode / display
- Optional CTCSS search & decode
- Two aerial inputs with programmable switching from the front panel
- Flexible BANK LINK menu with enhanced features such as DELAY, PAUSE, VOICE etc
- Built-in squelch tone eliminator
- Audio and discriminator out plus tape recorder control
- SDU ready
- More, more, more...!

Optional **SDU5000** spectrum display unit for the AR5000, AR3000A, ICR7000, R7100 & R9000 receivers



## 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. In 1985 the AR2002 became the worthy successor extending the frequency coverage into the UHF band. In 1989 AOR released the revolutionary AR3000 providing all mode receive AM, NFM, WFM, USB, LSB & CW with smooth tuning in 50 Hz steps and unbroken coverage from 100 kHz - 2036 MHz... Building on this success AOR continued the EVOLUTION to bring the AR3000A to the market in 1992, smooth tuning, faster scan / search rates & more. The AR3000A became an overnight success and demand continued to steadily increase, to-date over 70,000 units have been sold worldwide. Simply there has never been a serious competitor to the range anywhere close to the price... truly excellent value for money. Even the world's armed forces including the largest Airforce and Navy have employed the AR3000A in its up-to-date high-tech hardware for backup purposes; performance, quality, reliability and performance-cost-factor being excellent...

Now is **YOUR** chance to own an amazing **AR3000A** receiver at the extremely attractive price of **£799.00 inc VAT.**



## AR8000 - wide band hand-held receiver, affordable RRP £349

The **AR8000** UK receiver is an all mode full featured wide band hand held receiver offering computer control and more... Frequency coverage is from 500 kHz - 1900 MHz without gaps with all mode reception... twin frequency display, alphanumeric text comments. This has become "the" model by which all new entries are measured, used extensively by government organisations... why not simply have the best?

**AR8000 UK £349.00**  
**CU8232 interface £99**  
**PC-MANAGER software £49**  
**SC8000 soft case £17.95**





# BUILD A VLF RADIO

# PART 1

# PART 1

*Build a VLF  
RadioScience  
Observing Receiver  
Using a Virtual  
Inductor to Overcome  
the Coil Problem.*

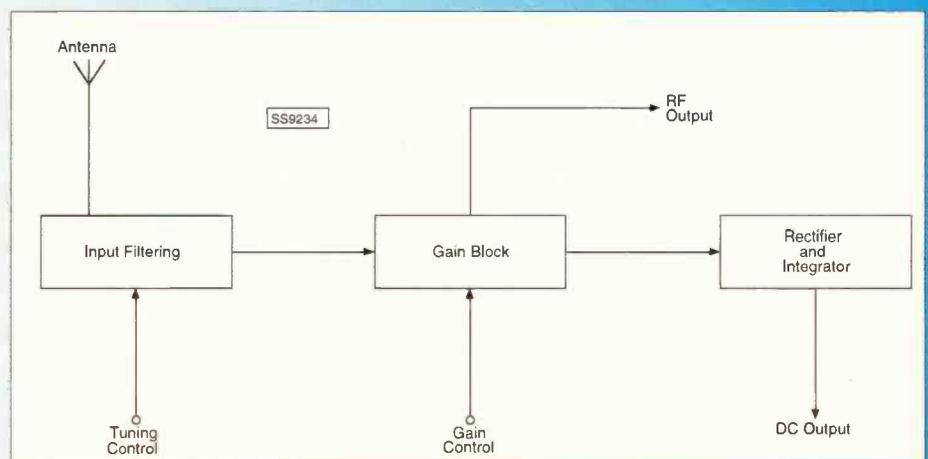
**R**adioScience Observing is an extension of the short wave and monitoring hobbies, and consists of making amateur science observations of natural phenomenon associated with radio waves. Included in this term are radio astronomy, propagation studies, observing terrestrial natural radio signals (e.g. 'whistlers' and 'spherics'), recording signals from the planet Jupiter, and detecting solar flares by observing their

effect on the earth's ionosphere. In this first part, Joseph J. Carr describes a receiver project to allow you to monitor these phenomenon.

My three-part series in *Short Wave Magazine* (see References) is a good source for those who want an overview of the field. A bibliography is provided at the end of Part 3 (January 1995). From the amount of mail I received, it appears that

RadioScience Observing is a popular on-air 'sport'. Among the projects in those articles were very low frequency (v.l.f.) receivers used to observe solar flares by their effect on v.l.f. signal levels. Solar events (Figs. 1.1a and 1.1b) cause electromagnetic radiation, relativistic particles and slower particles that affect the earth's ionosphere anywhere from eight minutes to many hours after the event.

On the short wave bands,



**Fig. 1.2: Block diagram of typical v.l.f. t.r.f. receiver.**

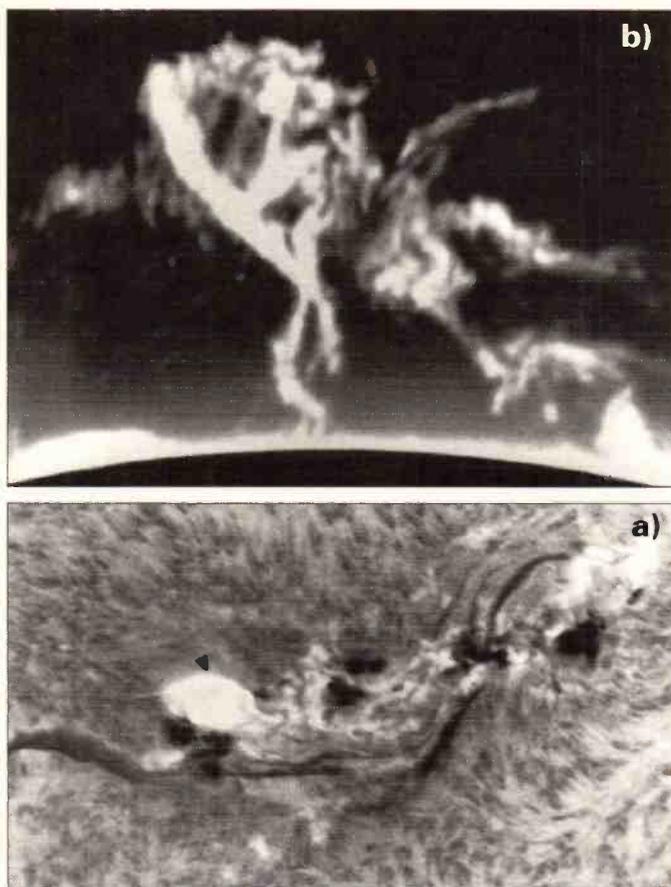


Fig. 1.1: a) Solar flare; b) Solar prominence  
(Photos courtesy Jean Drogosco of France).

the effect of flares is the Sudden Ionospheric Disturbance (SID) event. Long distance reception takes a nose dive that can sometimes be quite profound. The event of 12 November 1961 was so severe that it wiped out all 'skip' reception for days. As fate would have it, that event occurred at the first weekend of the American Radio Relay League's annual

Sweepstakes Contest began for radio amateurs. During those three days, the US National Bureau of Standards (now National Institute of Standards and Technology) time and frequency station broadcast a 'W2' propagation forecast...a 'W1' would've been inaudible.

Oddly, the same solar event that triggers a massive suck-out of short wave

propagation enhances v.l.f. propagation, especially during daylight hours. The reason is quite simple. The burst of solar energy causes heavy ionisation of all levels of the ionosphere, and pushes the D-layer even lower than usual. The heavily ionised layers absorb short waves, but act like a waveguide for v.l.f. signals, providing easier propagation over distances. The waveguide behaviour results from the fact that the distance between the Earth's surface and the D-layer of the ionosphere is only a few wavelengths at frequencies between 10 and 40kHz.

SID hunters use the sudden increase in v.l.f. signal levels from distant stations as an indication that a solar flare had occurred. Some people are known to use a SID receiver, a Geiger counter pointed skyward, and optical means for detecting and observing solar events.

## The Problem With Receivers

Very few radio receivers go down to the frequencies that SID hunters value most. Even communications receivers that have very good v.l.f. coverage rarely receive below 30kHz...which is where most of the 'action' is found. Most people doing SID hunting home-brew t.r.f.-style receivers such as

### Fig. 1.2.

There are three major sections to the receiver: input filtering, 70 to 80dB

gain block, and rectifier/integrator. The gain block is not inordinately difficult to build at these frequencies, and several methods were discussed in the original series. The rectifier/integrator usually consists of a voltage doubler circuit based on 1N60 germanium diodes (which are preferred to silicon for their lower junction potential), while the integrator is a 10 to 470 $\mu$ F capacitor. The integrator provides a d.c. voltage that is the time average of the rectifier output, hence of the received r.f. signal.

The input filtering on some of the receivers can be quite complex, but simple L-C parallel resonant circuits (Fig. 1.3a) work quite well. Indeed, many SID hunters use only a single tuned L-C network for selecting operating frequency. The problem, however, is that the high value inductors (60 to 150mH) are difficult to obtain, especially in forms that include a means for adjusting inductance and a low-impedance winding for antenna connection. A wide variety of methods are used to overcome this problem, and some were discussed in my original series.

The original designer of the SID hunting receiver used by most American observers was Art Stokes of Ohio. He is affiliated with the American Association of Variable Star Observers Solar Division (AAVSO-SD). Unfortunately, the JW Miller inductors used in the original design are 'out of print' (as publishers would say), and that forced a lot of receiver builders to use some odd substitutes. Mr Stokes came up with a solution for the inductor problem: he designed a receiver based on a 'virtual inductor' (Fig. 1.3b).

## Virtual Inductors

A 'virtual' anything is something that works like another thing, even though it isn't actually that other thing (confused?). For example, on an operational amplifier, both inputs behave exactly the same. By grounding the non-inverting

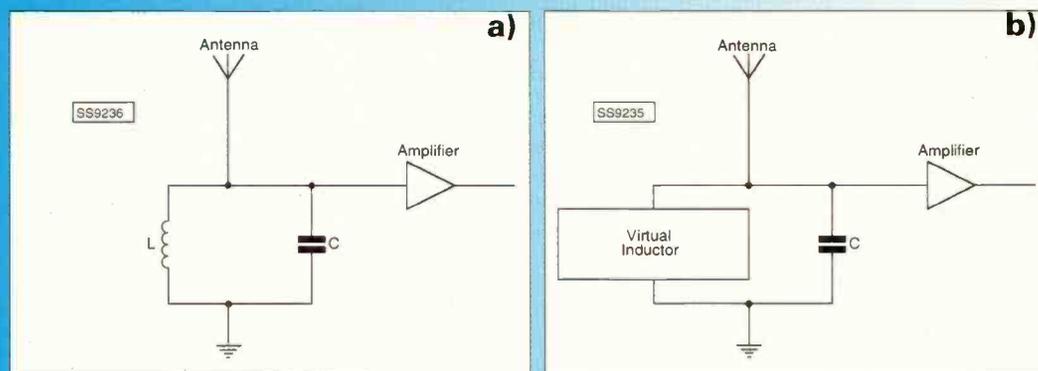


Fig. 1.3: a) Input L-C tuning; b) input L-C tuning using a virtual inductor.

## Building a VLF Radio - Part 1

(+IN) input, as is done in inverting follower amplifiers, its potential is set to zero. A voltage measurement of the inverting (-IN) input reveals that it, too, is at zero volts potential and thus behaves as if it were grounded. A virtual inductor is a circuit that behaves like an inductor, but isn't. A virtual inductor must store energy for a short period of time, and provide a voltage/current phase difference the same as a wire wound (actual) inductor. In other words, it must show inductance.

The circuit shown in **Fig. 1.4** for the virtual inductor. It consists of two operational amplifiers (IC1 and IC2) in a rather unusual arrangement. The inductance is measured across the terminals marked 'L' (one of which is grounded). The actual inductance is a function of R1, R2, R3, R5 and C1:

$$L = \frac{(R1 R3 R5) C1}{R2}$$

In Stokes' design, R2 = R3, so Equation (1) reduces to:

$$L = R1 R5 C1$$

By making either resistor (R1 or R5), or the capacitor (C1), variable, one creates a variable inductor. Recall that was one of the hardest requirements to meet in actual inductors of the values needed in v.l.f. receivers. In the Stokes design, the resistors were all 3.3kΩ, with R5 being 3.3k to 13.3kΩ variable, and the capacitor was 1nF, which evaluates to an inductance range of about 11 to 43mH. In several versions that I built from Stokes' article the values of the inductance were within tenths of a mH of these values. If the virtual inductor is paired with a 0.002μF tuning capacitor in the t.r.f. receiver (i.e. 'C' in **Fig. 1.3b** or C2 in **Fig. 1.5a**), then the tuning range will be on the order of 16 to 33kHz. Experimenting with various values of C1 (down to 220pF) and the tuning capacitance (also down to 220pF - guess what is the smallest value I had on hand), I was able to receive the 60kHz signal from WWVB, and some signal I was not able to identify around 71kHz.

The circuit diagram for my variation of the Stokes receiver is shown in

**Fig. 1.5a**, with the power distribution portion of the circuit being shown in **Fig. 1.5b** for sake of simplicity. The virtual inductor is after the circuit of **Fig. 1.4**, and consists of IC1a and IC1b.

A note on the operational amplifiers is in order. These circuits operate well into what is commonly called the 'ultrasonic' region, so unconditionally stable, frequency compensated models such as the popular 741 will not work properly. I used an RC-4136 quad op-amp for IC1 because Stokes used it originally, and it is easily available through mail-order DIY electronics components firms. The second amplifier, IC2, was selected to be a CA-3240. This device is a dual op-amp using the same pin-outs as the popular LM-1458 device, but with the characteristics of the Bi m.o.s. CA-3140 devices. Any combination of op-amps can be used if you wish to wire your own, but with the printed circuit board - See Part 2 you will need to use those specified (unless pin-for-pin compatibles are found). The requirement is for a high gain-bandwidth product because of the gains required at frequencies up to, say, 71kHz.

Stage IC1c is the main gain block of the amplifier. With the values shown, this amplifier will produce gains from unity up to 101. A buffer amplifier (IC2a) is provided for the 'RF Output' function, and it has a gain of two. If this proves to be too much gain for the 'RF Output', then either reduce the gain of IC1c using the potentiometer gain control (R7), or convert the stage into a unity gain follower (remove R14 and R15, and then replace R15 with a short circuit).

Amplifier IC1d provides buffering for the rectifier and integrator stage (IC2b). In the original design this stage was not used, but because I wanted an 'RF Output' function, it became necessary because the action of the diodes in the rectifier severely distorted the 'RF Output' waveform. Amplifier

### You Will Need

#### Resistors

Carbon film, 5%, 0.25W

|       |   |                |
|-------|---|----------------|
| 100Ω  | 1 | R10            |
| 1kΩ   | 2 | R6             |
| 3.3kΩ | 4 | R1, R2, R4, R5 |
| 10kΩ  | 3 | R11, R14, R15  |
| 100kΩ | 2 | R8, R9         |
| 1MΩ   | 1 | R13            |

#### Potentiometers

Multi-turn Preset

|       |   |    |
|-------|---|----|
| 10kΩ  | 1 | R3 |
| 100kΩ | 1 | R7 |

#### Capacitors

Polystyrene, 5%

|                        |   |            |
|------------------------|---|------------|
| 100pF                  | 1 | C1         |
| <i>Polyester layer</i> |   |            |
| 1nF                    | 3 | C3, C4, C5 |
| 2nF                    | 1 | C2         |
| 1μF                    | 1 | C6         |

Electrolytic, 16V, sub-min. radial

|        |   |                    |
|--------|---|--------------------|
| 1μF    | 4 | C10, C11, C12, C13 |
| 10μF   | 1 | C7                 |
| 1000μF | 2 | C8, C9             |

#### Semiconductors

Diodes

|      |   |        |
|------|---|--------|
| 1N60 | 2 | D1, D2 |
|------|---|--------|

Integrated Circuits

|         |   |     |
|---------|---|-----|
| RC-4136 | 1 | IC1 |
| CA-3240 | 1 | IC2 |

IC1d acts as a unity gain, non inverting follower, and provides buffering isolation between the gain stage (IC1c) and the rectifier (IC2b).

The rectifier used in this circuit is a halfwave 'ideal' or 'precise' rectifier circuit that 'servos out' the 0.2 to 0.3V junction potential of the diodes, producing a nearly ideal pulsating d.c. output. The integrator action comes from the time constant of R12 and C7. Some people prefer to alter the time constant, either shorter by using a capacitance less than 10μF, or (more often) longer by using capacitances up to 220μF (however, I found the 10μF quite satisfactory).

The original intent of this design is for it to be a current output circuit in order to drive a 0-1mA strip chart (paper) recorder, of which the Gulston model 190 seems favoured. But the fact that there is a capacitor and resistor to ground, also means that the output is a voltage as well. I found that, with signal levels found in

the USA, values of d.c. voltage between 1.4 and 7.6V were obtained. As a result, a voltmeter or voltage-input recorder could be used.

Another recording option is to use an A/D converter to input the signal levels to a computer. I used the Pico Technologies Ltd. 16-channel model that works through the parallel printer port of my computer. I can dedicate an old MSDOS machine to this task (which can be purchased used in the USA for \$50 or so). Also, should you wish to build your own A/D converter, check the Walraven article listed in the references for an easy project.

The power distribution scheme is shown in **Fig. 1.5b**. Both +V and -V are needed. Although Stokes originally used ±10V for his power supplies, I elected to use ±12V because it is more easily available in small d.c. power supplies. Note that a capacitor is used at each i.c. power supply terminal (C10, C11, C12 and C13). I used

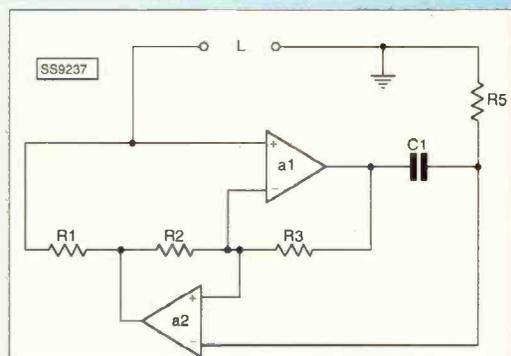
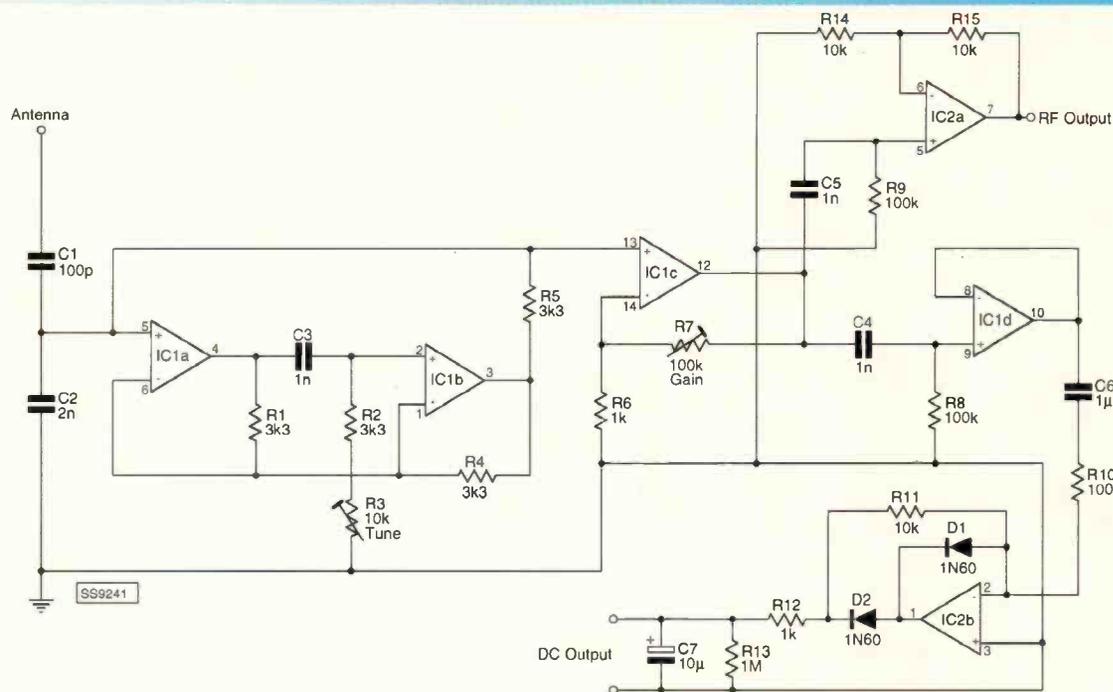


Fig. 1.4: Circuit for the 'virtual inductor' a.k.a. 'gyrator'.

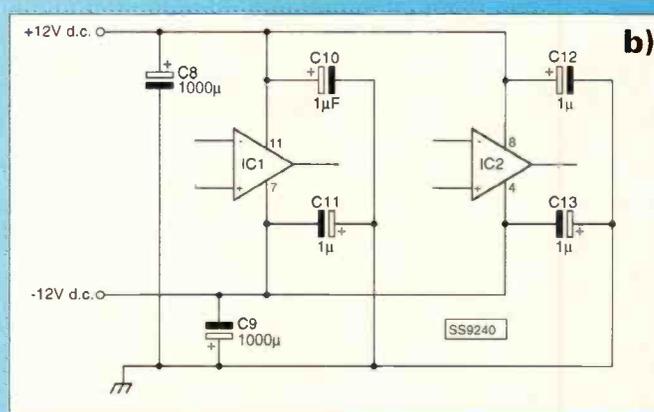


Fig. 1.5: a) Circuit for the v.l.f. receiver; b) power distribution scheme.

0.1µF capacitors in several models, and they worked quite well. But in one version, the circuit tended to oscillate at some gain settings unless the values were increased to 1µF. These capacitors should be installed as close as possible to the body of the i.c. it protects.

Both d.c. power supply lines are also decoupled by large value electrolytic filter capacitors. Because of the tendency to oscillate, I increased the values to 1000µF from the 470µF used in the original circuit. Note on both these capacitors and those decoupling each IC power terminal that polarity is important. If the capacitor carries polarity markings (it will in the case of C8 and C9,

and may in the others), then be absolutely certain to observe the polarities shown in the diagram. Otherwise, the capacitor may short out rather spectacularly...in fact it may explode.

In some really intractable cases of oscillation, a second set of decoupling capacitors, on the order of 100µF each, may be located at some intermediate point between A1 and A2 on the printed circuit board. I did not find this to be a problem, but a builder who corresponded with me reported such problems (and this solution). I don't know what other layouts problems may have contributed to his problem because he was not using either my p.c.b or Stokes' p.c.b. design.

Because of the tendency to oscillate, I elected to use on-board trimmer potentiometers for the 'Gain' (R7) and 'Tune' (R3) functions. This arrangement doesn't pose any inordinate difficulty in operation because SID hunting receivers tend to be aligned to one frequency, and then remain there for a long term. Thus, the need for a 'diddle stick' or screwdriver to adjust the frequency is not too much of a bother.

Alignment of the circuit is done initially with a sine wave audio frequency or function generator that covers frequencies up to 35kHz or so. The 'DC Output' of the receiver can be monitored on a meter or d.c.-coupled oscilloscope, or the

'RF Output' can be monitored on either an oscilloscope or suitable audio voltmeter. First, tune the r.f. generator through the range to find the resonant frequency as it exists. Once you know that, you can adjust the tuning control (R3) to both ends of its range to find the minimum and maximum frequencies. You can then adjust the signal generator for the desired frequency, and then tune the receiver (R3) to that point. The 'Gain' control can be set to nearly maximum initially, but may have to be reduced if output levels are too high.

**To Be Continued**

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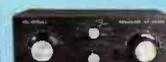
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# The Truth is

Following on from his revelations of floating communication platforms, John Locker reports on some very mysterious goings on a quarter of a million miles away.

**H**ot on the heels of the announcement by NASA that traces of ice have been found on the moon, comes an even more startling revelation. Scientists in America have identified an object orbiting the lunar surface at a distance of 1000km.

Using high power earth based telescopes, and digital imaging from the

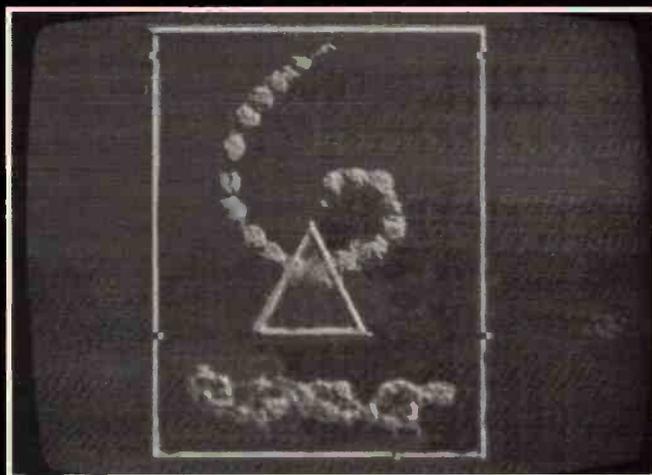


Fig. 2: Picture on Par Olnie's TV screen.

## Data Stream

Meanwhile what appeared to be a stream of data, similar to that received in 1977 by SETI, the Search For Extraterrestrial Intelligence - showered down on sensitive military listening equipment at regular intervals puzzling staff at the Cheyenne Mountain HQ of NORAD. One of the staff decided to plot the vectors of the signal source and identified the pattern as a lunar orbit.

Shortly afterwards the Keplerian Elements relating to the object were released onto the internet in error along with a batch issued daily for earth's own Geostationary communications satellite - see Fig. 1.

Scandinavian satellite enthusiast, Par Olnie, downloaded the batch into his satellite tracking program only to find that when this particular object was fed into the tracker, identified only by a standard catalogue number - a curious pattern emerged on screen.

Saving the data, he E-mailed NORAD, who after a few days came back with an admission that they had

Hubble Space Telescope, the surface of the object was mapped over a period of six weeks. Following this, a group of scientists from the Californian Space Research Centre - CSRC - led by Prof. O'Lail concluded that the 'satellite' was responsible for the mysterious signals in the radio spectrum previously attributed to certain types of Solar Flare.

Fig. 1: Part of the Keplerian Elements File including other spurious info.

### PANAMSAT 3R

1 23764U 96002A 96346.44864259 -  
.00000263 00000-0 00000+0 0 1161 2 23764  
0.0172 31.7433 0002028 207.0742 320.0846 1.00267460

### 3360 MEASAT 1

1 23765U 96002B 96353.78665926 -.00000248 00000-0 00000+0 0  
912 2 23765 0.0223 39.8439 0001211 209.1880 213.2839 1.00268320

### 3419 KOREASAT 2

1 23768U 96003A 96348.52213120 -.00000363 00000-0 10000-3 0 864 2  
23768 0.0315 91.7494 0000983 206.8861 87.7448 1.00266269 3342

### GORIZONT 31

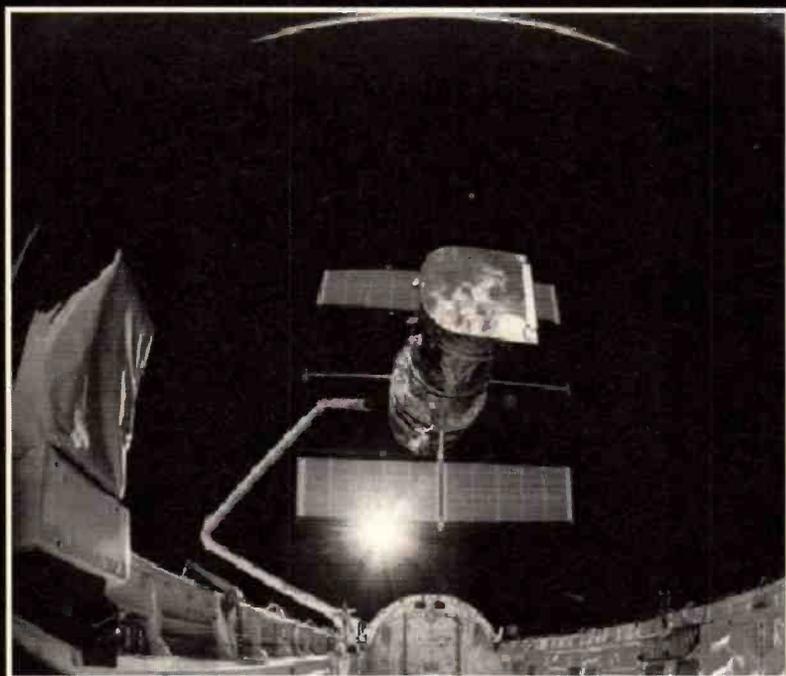
1 23775U 96005A 96353.39162146 .00000143 00000-0 00000+0 0 2071 2  
23775 0.8770 290.8559 0003418 287.9214 49.6634 1.00257531 3307

### PALAPA C1

1 23779U 96006A 96349.30515046 -.00000200 00000-0 10000-3 0  
1274 2 23779 0.0198 357.3784 0002337 249.2332 96.9520  
1.00269325 3 01041997 X

1 23780U 96007A 96348.52315415 .00000123 00000\_0  
00000+0 0 785 2 23780 0.6942 271.5614 0005174  
201.5618 78.1326 1.00101221 015

# Out There?



**Fig. 3: Hubble Telescope.**

made a mistake, but were curious as to his findings. They explained that a 'video' signal had been observed and Par promised to monitor the object whenever its path took it near to, but beyond the Clarke Belt.

For a short time in late February the 'satellite' appeared to track behind the arc for a few hours each day. In a recent article published in the magazine *Euro Science* Olnie admitted that at first he could not believe that he had been asked to keep an eye on an unidentified lunar orbiter, however, in true amateur fashion he spent hours scanning the skies in the C, Ku and Telecom bands. Then came the breakthrough. "One morning", said Olnie "I realised that this object

could possibly be the same craft that I had read about in a science journal in December last year. It was rumoured that a type of communications satellite may have been placed in Moon orbit thousands of years ago by an extraterrestrial civilisation to monitor activities on earth. With this in mind, I dug out an old S-Band LNB, and mounted it on my 3m satellite dish, leaving the receiver tuned to the frequency of 2.450GHz. I chose this frequency as it is the resonant frequency of water - it seemed an

appropriate starting point".

"When the opportunity arose I again tracked the satellite, and early one morning could not believe my eyes when an image started to break through the noise on my TV screen - **Fig. 2.**

## Breakthrough

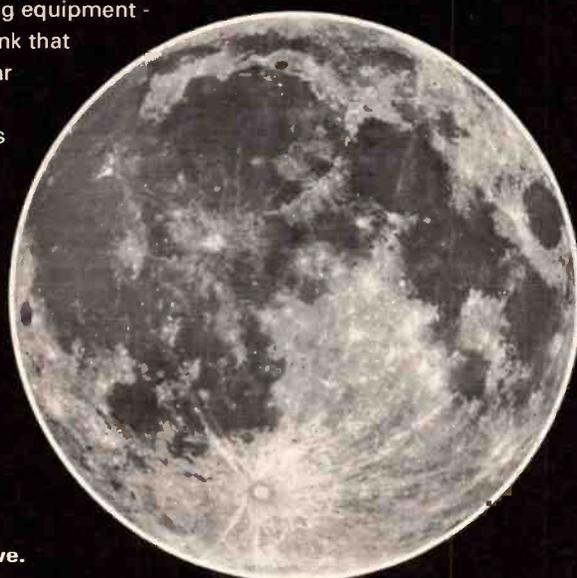
Scientists at CSRC are now examining the image in an attempt to try and

decide exactly what it means. They are however certain that this is the greatest breakthrough mankind has ever made in the search for extraterrestrial life. They say that it may also explain why occasionally strange 'echo' transmissions are picked up on TV receiving equipment - they think that the lunar satellite receives and stores the

signals for a number of years, then transmits them back to earth - perhaps it is a way of trying to communicate with us.

By early April this mysterious object will, for a short time, pass tens of thousands of miles behind the Astra group of satellites and in an unprecedented move, subscribers to the Sky Satellite TV package have been circulated, requesting that they report any 'strange' pictures that may appear on their screens.

The findings of the Science team should be available during the first week of April, at this time it is anticipated that a full media briefing will take place!



**Fig. 4: Our Lunar perspective.**

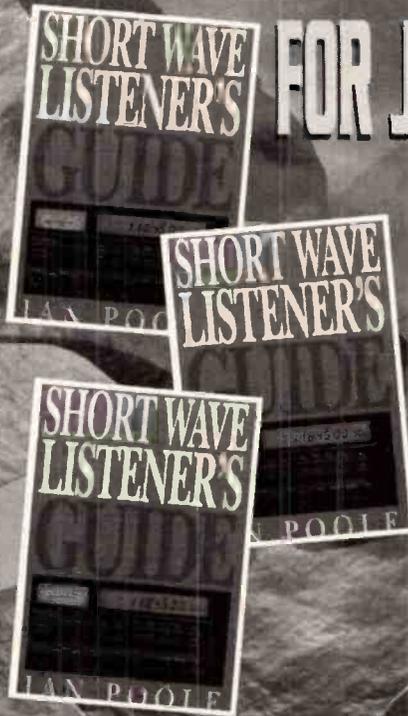
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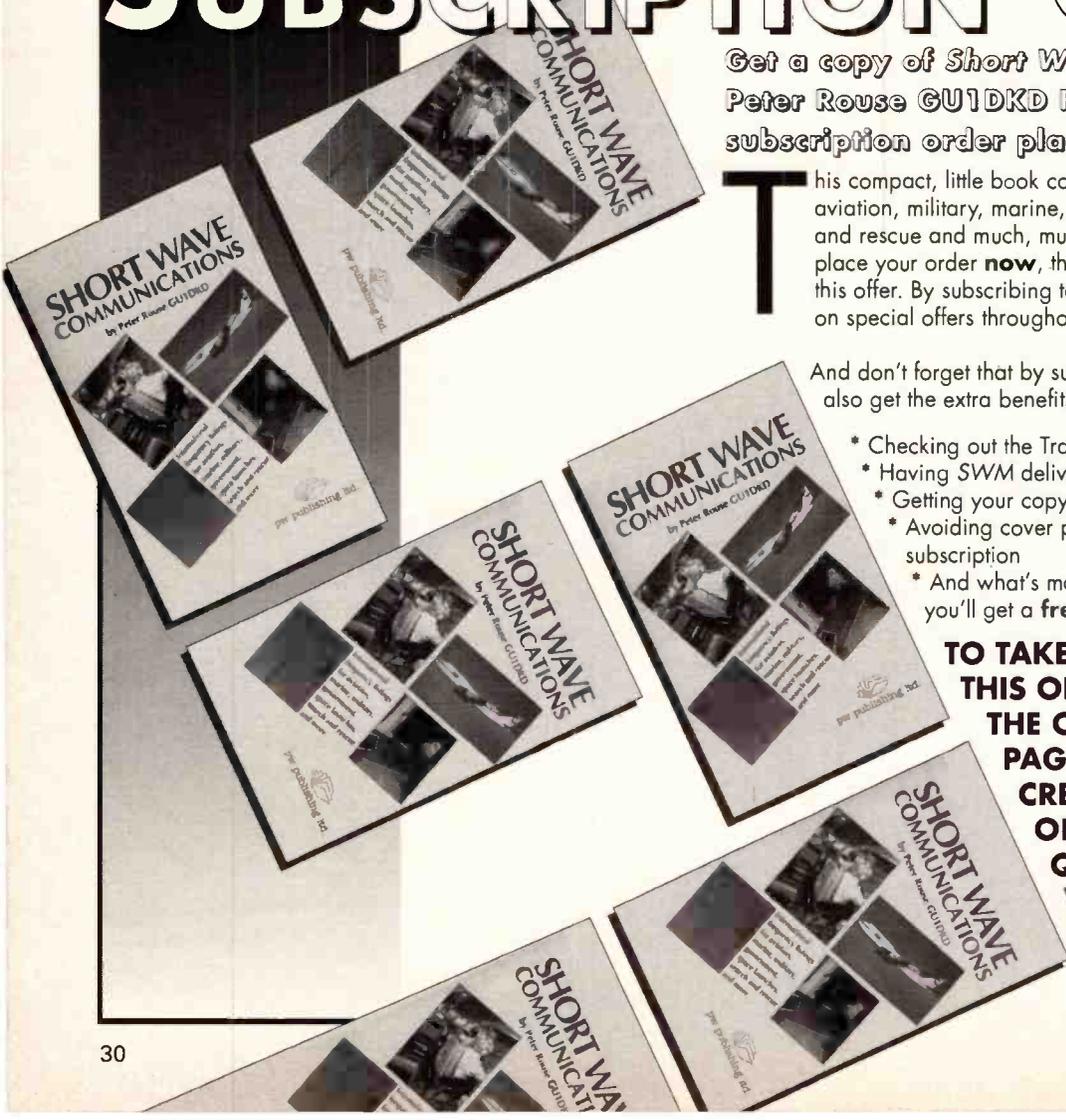
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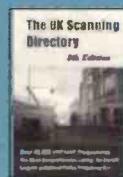
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| FRG-7700 | + FRV/FRT-7700  | £349.95 | AR-2700      | Ex demo | £139.95 | MVT-8000   | Immaculate | £249.95  |
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| R-1000   | VGC             | £299.95 | Icom IC-R1   | VGC     | £169.95 | IC-8500    | VGC        | £1299.95 |
| HF-225   | Incl. FM an new | £349.95 | IC-PRO 80    | As new  | £169.95 | IC-R7000   | VGC        | £549.95  |
| HF-150   | As new          | £299.95 | VT-125       | VGC     | £129.95 | OPTO SCOUT | As new     | £299.95  |



# Easyfax 2.6

**F**AX has been in use on the h.f. bands for many years and has proved to be a dependable and cheap way to transmit a whole range of images from the latest press pictures through to satellite weather images. All but a few of the press pictures have disappeared onto satellite but there remains a copious supply of weather charts and satellite images spread throughout the h.f. bands and from all over the globe.

Before I get too deep into the program let's take a look at how the h.f. FAX system works. Although the images are quite impressive the FAX technology used is not exactly high tech and is derived from the early electro-mechanical devices that were used on land-line systems. Don't even think about hooking-up the office FAX machine - the technology's totally different! Although most modern systems generate and receive faxes electronically it's easier to visualise if I describe the earlier systems.

The process starts by the operator wrapping the weather chart around a FAX drum. This drum is then spun at either 60, 90 or 120 r.p.m. Running alongside the drum is a helical thread that carries a photo-sensitive scanner. This slowly moves the length of the drum and produces an output voltage that varies according to whether the image under the sensor is black, white or some shade in between. The speed that the sensor moves along the scale is very important and is defined by the term Index of Co-operation or IOC. We don't need to fully understand this here, just be aware that selecting the correct IOC will ensure that the aspect ratio of the picture is correct and you don't get elongated or squashed images! The output voltage from the sensor is passed to a special transmitter that can move its carrier frequency  $\pm 400\text{Hz}$  from its nominal frequency. The usual standard is to use +400Hz for white and -400Hz for black.

At the receiving end the process is the exact reverse, except the optical sensor is replaced with some form of marker.

That's a pocket-book introduction to FAX, now for just a couple of frills. To make sure the receiver knows the correct IOC and drum speed to use, a simple sequence of tones and phasing signals are used. This starts with a 300 or 675Hz tone to show IOCs of 576 or 288 respectively. This is then followed by a 30 second period where a single pulse from black to white is sent at each turn

of the drum. With this basic understanding in place I'll now move-on to look at Easyfax in a bit more detail.

Setup process. This is where you simply put the disk in drive A: and type run **A:setup** from the program manager. The set-up managed the full installation with no problems and gave the user the option to select the destination drive and directory and also created a dedicated program manager group for the program and help files.

Once installed the review can double click on the Easyfax icon to start the program. The user interface uses all the usual Windows features, so feels very familiar. The only unusual aspect being the range of icons that are used to short-cut to the various features of Easyfax. Although strange at first, the graphics are very descriptive and soon remembered.

*Have you ever wondered how you can receive those wonderful FAX charts that often appear in SWM. If so then read-on, Mike Richards reckons this new software package from Australia could be just what you've been waiting for.*

version occupied a fairly modest 1.9Mb of hard disk space. The hardware connections were also very straightforward with just two flying leads emerging from the

## What Does It Do?

For those, like me, who are impatient and just want a quick run down here's what Easyfax has to offer. The program and associated hardware runs on a standard Windows based PC and supports all the standard h.f. FAX drum speeds and IOCs including the most popular 120 rpm/576 or 288 IOC settings. It also features fully automated FAX reception and has its own built-in scheduler for unattended operation. Received images can be viewed and tidied-up within the main program and subsequently stored as .PCX files. Easyfax demands a 386 or better processor running Windows 3.0 or later.

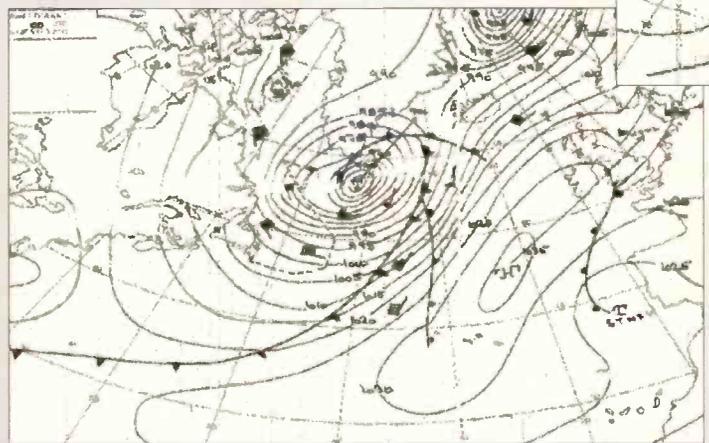
## Getting Started

Easyfax comes very well presented in a neat plastics box that looks suspiciously like a video cassette box. Inside are to be found the manual, hardware interface, 3.5in disk and a couple of audio adapters to suit the various output arrangements that are to be found on modern receivers. Although not covered in the supplied manual, installation of the software was very simple and used the standard Windows

display with three horizontal lines. All you have to do is set the receiver's tuning so that the received signal neatly straddles the two outer lines. Although this display was very effective, there was a delay between a change in the signal and the display being updated. I found I soon got used to this and the tuning indicator certainly helped to get the signal tuning spot-on. One of the common problems with computer based decoding systems is the poor frequency accuracy of the system clocks. The stability is usually okay, its just the absolute frequency that's out. This results in the FAX program's drum speed

## That First Picture

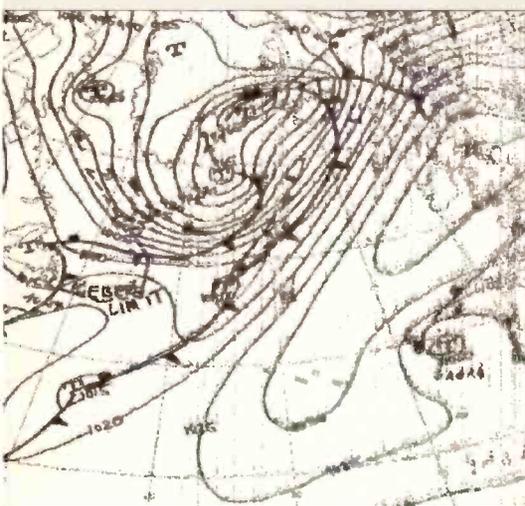
This proved to be very simple thanks to the well thought-out user interface. For basic manual reception all you have to do is click the new FAX icon and click the green traffic light - it couldn't be much easier! As well as starting to build-up a picture Easyfax also displays a tuning indication system. This uses an oscilloscope type



small (88 x 50 x 24mm) interface unit. One of these leads was terminated in a male-female 9-pin D-type connector and needed to be linked to the computer's serial port. If your PC has a 25-way connector (like mine!) you will need to make sure you've got one of the 9-pin to 25-pin adapters that are available from any decent computer store. The program is only set to work with COM 1 or 2 so you need to make sure one of these ports are available. The other lead connects to the speaker jack of your receiver and was supplied terminated in a standard 3.5mm mono jack. Once the connections are complete, you

display with three horizontal lines. All you have to do is set the receiver's tuning so that the received signal neatly straddles the two outer lines. Although this display was very effective, there was a delay between a change in the signal and the display being updated. I found I soon got used to this and the tuning indicator certainly helped to get the signal tuning spot-on. One of the common problems with computer based decoding systems is the poor frequency accuracy of the system clocks. The stability is usually okay, its just the absolute frequency that's out. This results in the FAX program's drum speed

being slightly too fast or slow. The error is only very small but it gives a picture that slants across the screen. The solution is to adjust a correction factor in the fax program to compensate for the error. Easyfax have made this very simple with keyboard controls to adjust the drum speed in very fine increments. Once you have set this up and have nice straight pictures, the program automatically saves the settings for future use. You should therefore only have to carry-out this exercise very infrequently. As soon as the picture is complete you can then choose to save it to disk by using the file menu.



**Two charts showing North Atlantic Surface Pressure Received using EasyFax.**

## Hands-Free!

Whilst manual reception is great when you first get your hands on the program, you soon get fed-up with having to wait 15-20 minutes whilst the picture builds-up and then manually saving the image. The solution is to use Easyfax's automatic reception facilities. In its simplest form you just tune into the desired station and press the AUTO icon on the toolbar. Easyfax will then monitor the incoming signal for the start tones I described earlier. Once a tone is detected it will switch to the appropriate drum speed and IOC and start the reception process. When the stop tone (450Hz) is detected the received image is automatically saved to disk and the programs sets itself up for the next picture. This really is an effortless way to pick-up a

set of FAX charts from your favourite station.

The next sophistication is to make use of Easyfax's scheduler facility. This is used in conjunction with the automatic reception and lets the operator preset up to six timeslots when automatic reception will be activated. The benefit here is that you can refer to the transmission schedule for the desired FAX station and then choose exactly which charts you want Easyfax to receive. You can literally leave the receiver and PC running whilst you go about your business and let it get on with the reception of just the charts you want. In order to do this you need to be confident that the frequency stability of your receiver is good enough to stay in-tune over these extended periods. You also need to make sure the fire risk is minimised by using good quality kit with the correct fuse ratings in the mains plugs! However, you will find that most modern communications receivers are sufficiently well specified to be able to handle this type of operation. For the review period, I used

## Specification

|                   |   |
|-------------------|---|
| Receive Speeds:   | 60, 90 & 120r.p.m.                      |
| Receive IOC:      | 176, 288, 352, 576, 704 and 928         |
| Greyscale:        | 16 levels                               |
| Rotation:         | Clockwise & anti-clockwise in 90° steps |
| Max Picture Size: | Approx 20mins at 120l.p.m.              |
| File format:      | PCX                                     |
| Picture zoom:     | x1 & x2                                 |
| Interface Port:   | COM 1 & COM 2                           |
| Min. Audio level: | 10mV r.m.s.                             |

Easyfax with a Lowe HF-150 and HF-250 with no problems, other than the apparent insensitivity of the interface. Whilst the manual suggested Easyfax would operate with audio levels down to 10mV, the review model would not work from the receiver's line/rec. out jacks. I found I had to use the external speaker jack in order to get sufficient drive for Easyfax. Some investigation showed that the transformer coupled input to the Easyfax interface is low impedance which would understandably cause a problem with line/rec. out jacks.

## Interface Secrets

If you've ever tried to run FAX programs such as Hamcomm in Windows you will realise that there must be something special about Easyfax. This is because conventional DOS based FAX programs inevitably crash when you try to run them under Windows. The reason for the failure is tied-up with the stringent timing needed for successful FAX reception. All these other programs rely on exclusive access to the PC's internal timers to achieve this accuracy. Unfortunately, Windows just doesn't allow this type of exclusive access and the ensuing argument usually ends in some form of system crash! The only way around this problem is to employ some form of external processing to handle the critical bits of the decoding process. This is exactly what Easyfax have done in their interface which contains several ICs and a crystal reference oscillator. The result is a decoding system which carries on working reliably even when minimised with other applications operating.

## Picture Quality

The best way to judge the picture quality is to look at the examples

these dots. The three options have varying degrees of coarseness so you have to decide the best compromise between removing the unwanted dots and losing genuine information from the images.

## Lots of Help

Whilst the 15-page manual provided some basic help on using Easyfax by far the best aid was the on-line help provided in the Windows help file. This provided very good detail on all the operational areas of the program. This was supplemented by an excellent HF FAX listing. Rather than use a conventional frequency list, Easyfax comes with a much more interesting graphical display. This comprises a map of the globe with clickable links on all the FAX stations. When you click on one of these links you are presented with a simple list of the current frequencies, call sign and operational times for that station. This was a really good way to find FAX stations and to sort out their location. With so many stations operating as relay stations for material originated elsewhere it's often difficult where the actual transmitter is located.

## Summary

Easyfax certainly offers something different as it lets you receive h.f. FAX images from within the Windows environment. The pay-off is a slight loss of quality, but the results are still perfectly usable, especially when you consider that the major influence on image quality is h.f. propagation, not this program. Where the program really scores is in its ease of use. The automated software installation combined with the simple operation via the tool bar icons makes it ideally suited to those just starting in FAX. Easyfax is available from **Martin Lynch & Son, 140 - 142 Northfield Avenue, Ealing, London W13 9SB. Tel: 0181-566 1120. Price £99.95.** If you have Internet access you can visit the Easyfax home page for more information at: <http://www.ozemail.com.au/~ozesport/easyfax/index.html>

# Gander Aeradio

**Gander Aeradio is one of the busiest Aeradio stations and has served the Airline Industry for more than 50 years. Dick Moon relates the story of this important station.**

In 1935, the British Air Ministry chose a site near the town of Gander as an airport for land based planes. At that time, Air Traffic Control was not a separate entity and wireless operators were responsible for landings and take off. All communications were carried out by Morse Code.

During the Second World War, Gander became the transit airport for planes being ferried from the United States to Europe and the Royal Air Force Ferry Command took control of the station. Apart from its ferrying operations, the station also monitored signals from vessels of the German navy and passed valuable information onto Naval headquarters in London.

After the war, when Newfoundland had become a Canadian province, Gander fell under the jurisdiction of the Canadian Air Transport Division, and in 1957, new and improved facilities were erected. During the 1990s, a large increase in air traffic necessitated the introduction of new transmitters, receivers and other equipment and later in 1970, computerisation arrived and a.m. voice transmission was changed to s.s.b.

Gander had now become an important link in the safe passage of aircraft between Europe and North America, and the call "This is Gander Radio" was soon being regularly heard in the cockpits of aircraft crossing the Atlantic.

## SERVICES

As part of the world-wide Aeronautical Fixed Telecommunications Network (AFTN), Gander provides the following services to aircraft and airlines:

- 1) A continuous guard on 15 h.f. frequencies and four v.h.f. frequencies to respond to in-flight emergencies.
- 2) Monitoring of status and control of various navigation aids such as VORTAC and VOT.
- 3) Regular communication between the Air Traffic Controller and the pilot of the aircraft.
- 4) *En-route* information on radio

aids, the operational status of airports, actual and forecast weather and *en-route* pilot reports.

- 5) Providing a 24hr communications link between airline offices and their aircraft.
- 6) Regular broadcasts at 20 and 50 minutes past the hour of weather information (VOLMET) over selected areas. Frequencies used are 3.485, 6.604, 10.051 and 13.270MHz. These are shared with New York.
- 7) The issuing of NOTAMs.
- 8) The exchange of operational and administrative messages via a fixed telecommunications network. This network consists of five Aeradio stations, Gander, Shannwick, New York, Santa Maria and Iceland and covers all air routes over the whole of the selected area. These stations share the responsibility of guarding that portion of the route during which the messages from an aircraft can be received most effectively.

The duties of a regular station also include designating primary and secondary frequencies to aircraft, receiving position reports and company messages, transmitting company and meteorological reports and handling any emergency procedures.

Normally, primary guard is handed over to the next network station at the FIR, but occasionally it is necessary to release or retain guard before or after the boundary.

The selection of primary and secondary frequencies is normally made by the network station, but should these prove to be unsuitable, the aircraft or ground control station may initiate

alternatives. Air/ground frequencies may also be used for message exchange between networks, but must at no time interfere

with air/ground communications with aircraft, which at all times have priority.

## FREQUENCY ASSIGNMENT

The following rules apply to the assignment of frequencies:

- Family A** is used for all aircraft flying the Southern NAT routes.
- Family B** is used for aircraft registered west of 30°W flying Central or Northern NAT routes.
- Family C** is used for aircraft registered east of 30°W flying Central or Northern NAT routes.
- Family F** is used for all aircraft flying Central or Northern routes.

Southern routes are those which enter New York or Santa Maria regions. The Central and Northern Routes comprise all others. Aircraft registered in Australia use families designated for aircraft registered east of 30°W. If a family overload occurs, aircraft may be directed to change to another family.

Normally flights are assigned Primary and Secondary frequencies from the same family. Night time frequencies are often 2 and 5MHz, while between dawn and dusk, higher frequencies are used, depending on propagation conditions.

At certain times of the year, ice patrol aircraft operate out of Gander, and are normally assigned Family A or F frequencies. The main volume of traffic at Gander is Westbound and these aircraft normally have their frequencies assigned before entering Gander airspace.

Shannwick requires aircraft to report on either 8 or 13MHz at 30°W and it is sometimes necessary for the Gander operator to re-assign frequencies.

## Frequency Families

Gander operates on four frequency families as shown:

| Family A | Family B | Family C | Family F |
|----------|----------|----------|----------|
| 3.016    | 2.899    | 2.872    | 3.476    |
| 5.598    | 5.616    | 5.649    | 6.622    |
| 8.906    | 8.864    | 8.879    | 8.831    |
| 13.306   | 13.291   | 13.306   | 13.291   |

All frequencies in are in MHz.



# Airband Meteorology

*Airband weather broadcasts can confuse the uninitiated! By the time you've read this article, Godfrey Manning G4GLM will have shown you that all such broadcasts follow a set pattern. Once 'in the know,' you too can deduce useful information - just like a pilot!*

**B**roadcasts are unusual on the airbands. Most messages are referred to as 'transmissions' as they are intended for just one recipient. Broadcasts, on the other hand, are transmitted one-way with the intention that many listeners will hear. The commonest airband broadcasts are weather reports.

There are two main broadcasts. VOLMET covers a wide geographical area and includes reports about many aerodromes. ATIS originates at a particular airport, is intended for local reception by aircraft going to or from that aerodrome, and doesn't cover anywhere else.

Here are some examples. On v.h.f. there are four VOLMET broadcasts in the UK: London VOLMET (Main) 135.375, London VOLMET (South) 128.6, London VOLMET (North) 126.6 and Scottish VOLMET 125.725MHz. Each covers different aerodromes according to which part of the country is involved.

Coverage is fine when received from a high-flying aircraft but will be patchy while at ground level. (I remember when there was just the one London VOLMET). On h.f. with wider coverage (but only operational at certain times of day) is RAF VOLMET on 4.715 and 11.253MHz u.s.b.

Whenever I mention VOLMET, I'm deluged with letters from readers who think it means VOLume METeorological report (VOLume as in hearing the signal at good volume on the radio). Then I get another postbag from rival readers who have decided that VOL comes from French *voler* (to fly or steal, only one of which applies in this case!). They agree on the MET part, thank goodness. Well, it's lost in the mists (if that's appropriate to an article on

weather) of time, so please don't write in again. I accept that both could be correct. Let's call it a score-draw!

All are speech transmissions, computer-generated from the digitally pre-recorded distinctive voice of Mr. West. If simultaneously broadcast from more than one ground relay station, VOLMET can appear to be a few kHz away from the nominal channel centre. Some receivers will therefore give a weak rendition of the signal unless fine tuning is available.

ATIS, on the other hand, is a tape-recording made by a controller at the appropriate aerodrome and doesn't have this trouble. London (Heathrow) is on 123.9MHz, for example. Sometimes, ATIS is also broadcast from a nearby v.o.r. beacon so as to improve coverage.

Heathrow's broadcast can also be heard on the Biggin Hill 115.1 and Bovingdon 113.75MHz beacons. A v.h.f. airband receiver that doesn't cover the 108-118MHz navigation sub-band could therefore be a disappointment!

## WHAT'S TO HEAR?

VOLMET, with which I'll start, is slightly different to ATIS as no operational information is sent. The recording cycles through each airport in turn and then returns to the identifier before starting at the first airport again. For example: "This is London VOLMET Main. This is London VOLMET Main. Amsterdam at 0930..."

So the first numerical information is the time of the weather observation, in this case half-past nine in the morning. Times are in UTC (also known as

Z, Zone, time in the aviation world) 24-hour clock.

Note that numerals are spoken in an accentuated fashion so as to avoid confusion. They are nearly always quoted as separate digits: "Amsterdam at zero niner tree zero..." The bulletin may, however, use 'Hundred' or 'Tousand.' No, I haven't spelt any of these incorrectly - they really are pronounced in that exaggerated way!

## WIND

Then it's straight in with the wind, degrees (magnetic) of the compass from which it comes, and speed in knots: "Too seven zero degrees zero fife knots." It might be variable in direction (in which case the extremes through which it varies are given) and speed might also be variable. In severe conditions the maximum recorded gust is also quoted.

A catch is that the direction is magnetic when observed at an aerodrome. Winds at altitude are presented as true direction. Why is this critical? Runways are numbered as the first two digits of their compass heading.

Example: runway 27 requires a take-off or landing heading of 270° and the pilot needs to relate this to the wind. Ideal wind is a head-wind, on the nose. An aircraft carrier can sail in the necessary direction to achieve this - at an airport, it's a matter of luck! Runway 27 would be exposed to a pure head-wind from 270°.

Usually, wind comes from a less favourable direction. In **Fig. 1** the runway 27 is subject to a wind of 300° 10kt. This is coming from 30° to the right of the flight-path. Trigonometry can resolve the wind into two components. The actual wind is equivalent to the

# THE INFORMATION REVOLUTION

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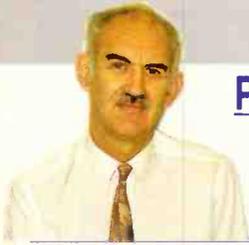
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- \* Guarantees improved range
- \* BNC terminated coax.
- \* OK for Garmin etc.

**WATSON WEP-400 Earpiece**



**W&S**  
£14.95

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

**WATSON QS-200**



**W&S**  
£9.95

- \* Mounts handy on dash grill
- \* The safe way to go mobile
- \* Attaches in seconds
- \* Doesn't use nasty adhesive!

**WATSON QS-300 Desk Stand**



**W&S**  
£19.95

- \* Handheld Desk Stand
- \* Firmly holds handheld
- \* Adjustable angle
- \* BNC plug to SO-239 socket
- \* Superbly made unit.

**1997 Catalogue**

144 pages full of rigs accessories and articles  
Send £2.50 in stamps, or cheque or credit card.



**WATSON FC-128 Counter**

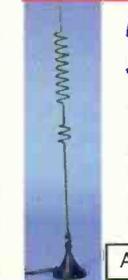


**W&S**  
£79

1MHz - 2.8GHz

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

**WATSON WSM-1900 Antenna**



**W&S**  
£29.95

**Mini -Magnetic Scanning Ant.**

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

Airband Civil & Military model WSM-225

**Portable Scanning Whips**



- \* 25MHz to 1900MHz
- \* Fully flexible with BNC fittings
- \* Out-perform factory supplied models.

- Tele-Gainer** 41cm long rigid telescopic whip with knuckle joint £14.95
- Regular-gainer** 21cm flexible whip that is ideal as replacement whip £12.95
- Super-Gainer** 40cm flexible model for the ultimate in gain £19.95

**OptoElectronics Xplorer**

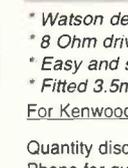


**W&S**  
£798

25-1300MHz  
Nearfield Monitor

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

**WEP-300 Earpiece**



**W&S**  
£9.95

- \* Watson design
- \* 8 Ohm driver
- \* Easy and secure
- \* Fitted 3.5mm plug

For Kenwood order WEP-300K  
Quantity discounts available  
Phone for quote.

**REMEMBER at W & S**

- \* We PRICE MATCH
- \* Give you 10 days approval
- \* Have 4 Service Engineers
- \* Still offer help after the sale!

# Airband Meteorology



Low cloud also makes it hard to see the runway on approach. CAVOK (pronounced almost like the word 'Cavalcade') is short for Cloud And Visibility OK, so you'll have no problem landing there.

exchanged by two radio operators, with no language in common, just by sending appropriate Q-codes. All international air traffic control is in English, spoken, not Morse - yet the quaint old Q-codes are still with us and long may they last!

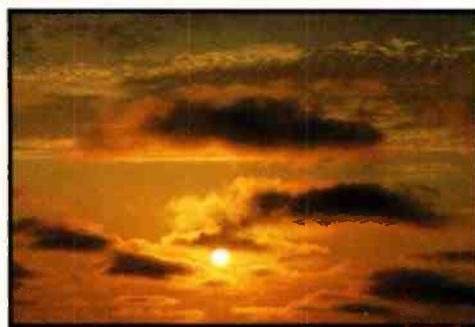
The altimeter is actually pressure-sensitive. Air pressure changes with height in a known way, for example it halves on ascending from sea level to 18000ft. It also changes with the weather. Hence, altimeters have a pressure compensation scale;

simultaneous action of a headwind of  $10\cos(30) = 8.7\text{kt}$  (9kt is near enough) and a crosswind from the right of  $10\sin(30) = 5\text{kt}$ . The headwind is less important (all but the lightest tailwind is best avoided, though).

Rule of thumb: wind from  $30^\circ$  to the side, crosswind equals half the reported windspeed. If you don't believe me, take a  $30^\circ/60^\circ$  set-square as sold by stationers for school geometry; measure the longest and shortest sides.

It's the crosswind that causes steering difficulties. It tries to push the tail fin, in this case to the left; the aircraft pivots around the undercarriage and so the nose swings right. This is called 'weathercocking' and you can see why! Failure of an into-wind engine (one on the right) makes things worse, so this is called the critical engine.

Any other low cloud is reported as oktas (eighths of sky cover) and height above ground. The height refers to the lowest part of the cloud, the cloud base; the cloud tops are not mentioned. "Six okta too thousand feet" is a thick layer, but high enough up not to matter. Alternatively, cloud can be 'Few' (1 or 2 oktas), 'Scattered' (3 or 4), 'Broken' (5, 6 or 7) or 'Overcast' (8 oktas).



## TEMPERATURES & PRESSURES

Flying instructors remind you to check 'Ts and Ps' meaning Temperatures and Pressures (on the engine instruments). Well, weather has temperature too. Actual outside air temperature is given in degrees Celsius: "Temperature plus air," a rather chilly  $8^\circ$  above freezing. Dew point is next: "Dew point minus wun."

At the moment, the air can hold its moisture content. Should the temperature drop to the dew point, the air becomes saturated and fog could form. At just below freezing, as in this case, there's a risk of freezing fog that sticks to your wings as an ice layer - dangerous!

Pressure comes in two forms: QFE and QNH. The actual Q-codes are a remnant of the old Morse days. It's amazing how much information can be

incorrect adjustment of this enables the altimeter to read anything you like!

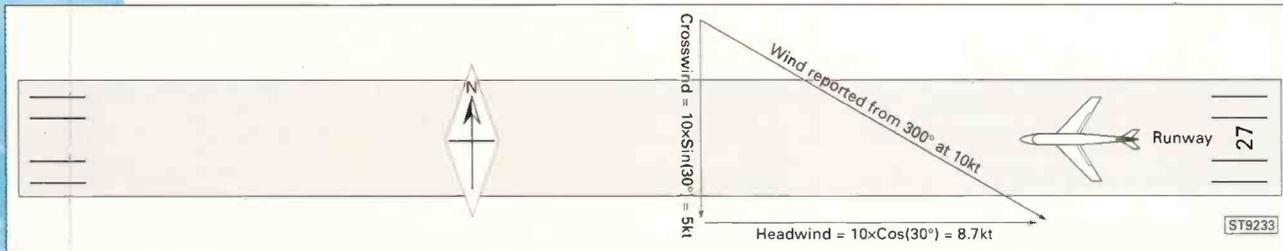
Only two settings are usually relevant near an aerodrome. They are as follows. QFE is the altimeter setting that causes the instrument to read zero feet on touchdown. It's actually the pressure shown on an ordinary barometer at the aerodrome. The QNH setting is usually greater and forces the altimeter to read elevation above sea level. If you dug a hole in the runway that's so deep that the bottom is at sea level, you would be unpopular with the airfield manager. You could lower a barometer to the bottom of the hole, read it with a telescope, and find that it shows QNH.

All pressures are in millibars, sorry, I mean hectopascals. A bar is one atmosphere so a millibar is

## VISIBILITY & CLOUD

Can you see to land (or even take off)? The next figure is the horizontal visibility in kilometres (metres if it's misty). If visibility is really good the report is "Ten kilometres or more." Inclement weather that limits visibility is specifically mentioned: "Fower hundred metres in drizzle." Other significant weather is also introduced, including recent rain, thunderstorms, hail, indeed any of the interesting conditions that you might find during a British summer - if you're not careful.

Fig. 1: Vector resolution of wind direction.



a thousandth of that. Trendy meteorologists tell us to use hectopascals instead, being the scientific unit of pressure. The numbers work out the same, so who cares?

Note why QNH matters. It enables you to read altitude above sea level. Your charts also show heights of terrain in feet above sea level. If you're approaching an airport at 1500ft (on the QNH setting) and a nearby hill rises to 1600ft, watch out or you'll hit it!

## ATIS BROADCASTS

Now that you've understood the principal weather measurements, you'll find that you can follow most of an ATIS broadcast. There are a few pieces of extra operational information, though.

It all started when air travel was rare and controllers coped with a civilised workload at a steady, easy pace (does this remind you of the bowling of a well-known cricket team?). Nowadays, of course, airports can't build extra terminals fast enough, carriers squabble over how many slots they're getting and controllers are under stress. That's progress.



One way to ease controller workload is to take away the task of having to repeat up-to-the-minute aerodrome weather each time a flight calls in. This is also safer, the controller transmits less and so there's more chance of a pilot finding a gap in which to get a word in edgeways. The weather is broadcast by a continual tape loop and each bulletin is given an identifying letter.

First of the day might be A, then B, and so on. You might have "Luton information Alpha, the wun six tree zero weather." An hour later, it could be updated to "...information Bravo, the wun seven tree zero weather." Letters A and B are spoken phonetically (Alpha, Bravo, Charlie, Delta, etc.) to avoid confusion.

Having copied the ATIS, a pilot has simply to call in as follows:

"Luton Radar, Shortwave fower niner seven, Viscount with information Alpha." (Not that there are any more passenger flights by Viscount, I just like the sound of the engines! Well, if the Editor lets J.W. reminisce about wine and old radios, I can be nostalgic over aeroplanes - but don't worry, I won't digress about chocolate). The controller is thus reassured that the pilot has copied weather bulletin A on the ATIS. If the weather has just been updated to issue B, the pilot is advised accordingly.

Other ATIS information would be the runway: "Landing runway too seven right, departure runway too seven left." This usually

follows the main weather parameters. Any other operational information might follow. Heathrow likes to remind us that wingtip clearance is not assured on taxiways, after two pilots found this out the hard way (this incident made the national television news).

The classic end to an ATIS is of the form: "Would all pilots please report their aircraft type, and that information

Foxtrot has been received, on first contact with Coventry Approach." You know what to say - I just gave you the answer two paragraphs previously!

## Information Source

The *Get Met* leaflet is free of charge from **CAA Safety Promotion Section, Aviation House, Gatwick Airport, West Sussex RH6 0YR**, but you must send a self-addressed pre-paid envelope to accommodate 105 x 150mm weight 17g. It mainly lists (rather expensive) pre-recorded telephone weather bulletins (some are by facsimile). These telephone services are based on TAF (Terminal Area Forecast) and METAR (METeoroological Aerodrome Report), which are respectively forecasts and current (actual) weather for selected aerodromes. Also available are area forecasts. These are in a slightly easier format than VOLMET or ATIS, but the weather terminology that I've now explained will help you to understand these.

Finally, the *Get Met* booklet lists which aerodromes are covered by which VOLMET. Pilots are expected to check en-route and destination weather as part of pre-flight planning. Now you've no excuse to get caught out! To see how altimeters etc. work, visit my Museum (for address, see my 'Airband' column on page 70 of this issue).

## Abbreviations

|        |  |
|--------|--|
| ATIS   | Automatic Terminal Information Service |
| CAA    | Civil Aviation Authority               |
| ft     | feet                                   |
| h.f.   | high frequency                         |
| kHz    | kilohertz                              |
| kt     | knots                                  |
| MHz    | megahertz                              |
| u.s.b. | upper sideband                         |
| UTC    | Universal Co-ordinated Time            |
| v.h.f. | very high frequency                    |
| v.o.r. | v.h.f. omni-directional radio range    |



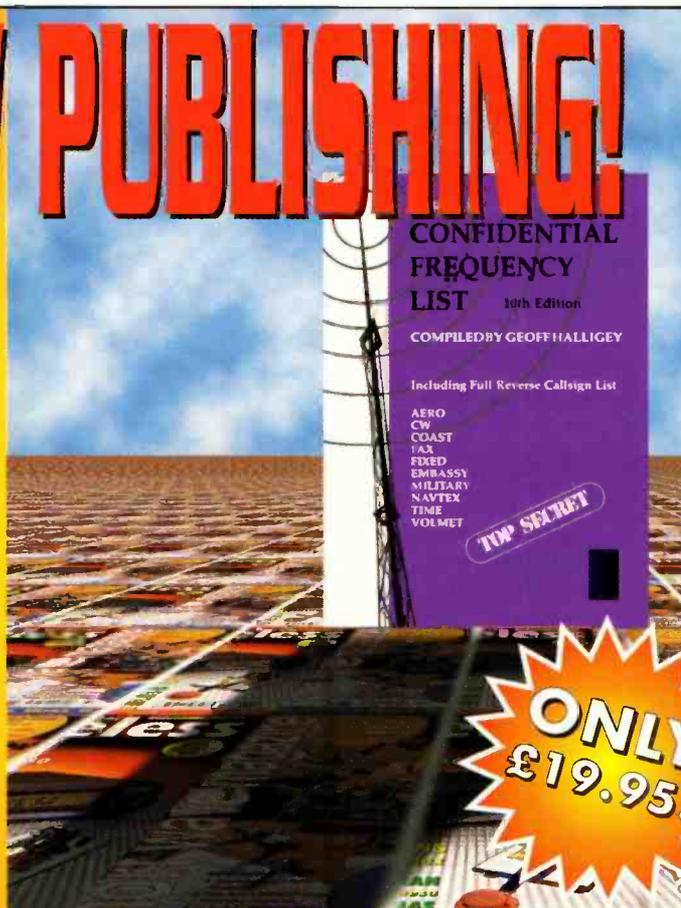
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This popular, well read, frequency list compiled by Geoff Halligey continues to go from strength to strength and is now in its 10th Edition. This 'Top Secret' confidential listing covers 1.6 - 30MHz and it's spirally bound A5 format makes for easy reading and reference.

Included within its 350 plus pages are frequencies covering all modes, utility services and for the first time NAVTEX. Also featured is the reverse frequency list showing every known frequency against each callsign, who's using what frequency and mode.

*Ferrell's Confidential Frequency List* is one book that every listening enthusiast should own and at £19.95 it's well worth every penny.

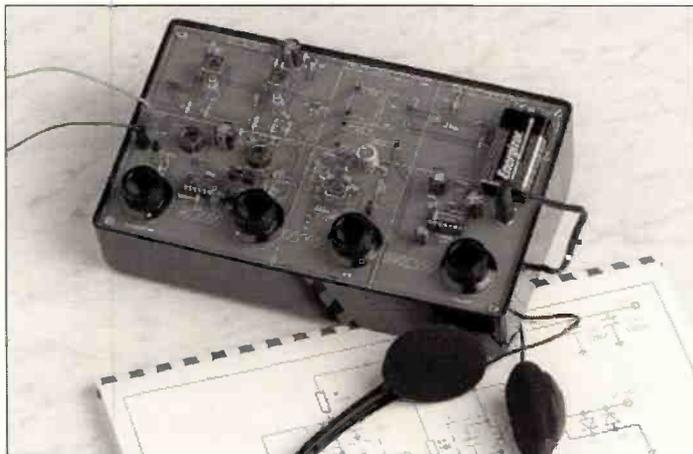


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The manual contains complete schematics and theory of operation of all the building blocks. Use this trainer to receive frequencies from 500kHz to 110MHz!

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Simply connect the building blocks to build AM, SW, Superhet and Direct Conversion receivers. Decode SSB, CW and FM!. Use proven building blocks to develop and test your own designs.

Pricing: Complete £129.00  
Kit £89.00  
(Kit excludes case & headphones)

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Add 17.5% Vat to Total Price

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(Out of office hours ordering by answering machine)

# THE RF SPECTRUM TERMINATOR

Covering 100kHz-2GHz, all mode, IF Shift, APF and direct RS-232C compatibility.

Icom have once again set a "standard" to which all other base station scanners must be judged.

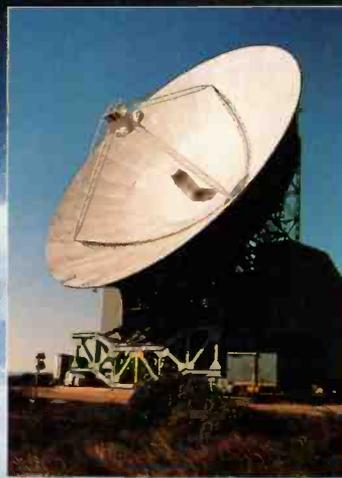
Offered with 5 years parts and labour including accidental damage, worth £126.

Order during May and June and receive an Icom SP-21 matching speaker and an AD-55 mains PSU - ALL FREE OF CHARGE.

**RRP: £1695**

Deposit £295, and 24 payments of £70.14. Total cost of loan £283.36. (APR 19.9%)

OR: 36 payments of £50.86. Total cost of loan £431.03. (APR 19.9%)



COMMUNICATIONS RECEIVER  
**IC-R8500**

**MARTIN LYNCH**  
& Son  
THE AMATEUR RADIO EXCHANGE CENTRE

To place your order for a new IC-R8500, call the Martin Lynch & Son sales team on 0181 - 566 1120

Martin Lynch & Son is a Licensed credit broker. Full written details are available upon request. E&EO

## KENWOOD TS-570D/M

### NEW PRODUCT



One of Martin Lynch & Son's best selling HF rigs is the new TS-570D, from Kenwood. So why mention it in a Short Wave Magazine. Simple! Its got the best receiver for short wave we've come across for many years. We have disconnected the transmit section (easily re-enabled) to safe guard against accidental transmission and to ensure non licensed users can legally own and use the receiver.

- 16 bit AF-stage DSP delivers superb audio quality
- Digital filtering gives you the edge when the going gets tough
- Large clear easy to read display, showing all major operating parameters
- Set up operator engineered features using the new menu system
- CW auto tune - A world first, altering the VFO to your preset pitch
- 100 memories. Extensive Memory functions including browsing of contents
- Compact size 270x96x271. Weight 6.8kg

Supplied with Mains PSU for receiver operation. ML Price: £1329. Available on finance, £229 deposit and 36 payments of only £39.96, cost of loan £338.66

## ICOM ICR-10E

When Icom introduce a new scanner, the competition take a deep breath. The amazing ICR-1E introduced over 5 years ago stopped all other scanner sales in their tracks. With the introduction of the new ICR-10E, looks like Icom are about to continue a tradition. Just look at these features:

- All mode FM, WFM, SSB, CW, AM
- 500KHz-1300MHz
  - Real Time Bandscope
  - 1000 memories
  - Alphanumeric tag to each memory
  - ❖ Tunable bandpass filters employed for excellent RX performance
  - Multi function dot matrix display
  - Full Computer access capability.

Now available from stock  
RRP £379.

**CALL FOR THE UK'S BEST PRICE!!!**

Available only from Martin Lynch with 5 years warranty, including accidental damage, for only £50!



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## NEW... Icom ICR-8500

Covering 100kHz-2GHz, all mode, IF Shift, APF and direct RS-232C compatibility. Icom have once again set a "standard" to which all other base station scanners must be judged.



Offered with 5 years parts and labour including accidental damage, worth £126. Order during May and June and receive an Icom SP-21 matching speaker and an AD-55 mains PSU - ALL FREE OF CHARGE.

RRP: £1695. Deposit £295, and 24 payments of £70.14.  
Total cost of loan £283.36. (APR 19.9%)  
OR: 36 payments of £50.86.  
Total cost of loan £431.03. (APR 19.9%)

## Welz WS-1000



NEW

### specification

- ▶ 500kHz-1300MHz
- ▶ AM/NBFM/WBFM
- ▶ 1/5/6.25/9/10/12.5/15/20/25/30/50/100kHz steps
- ▶ 400 memories ▶ Skip search
- ▶ Power voltage from only 2.2-3.5V DC
- ▶ Dimensions in mm: 58(w) x 97(h) x 24(d)
- ▶ 16mA power save 1 sec.
- ▶ Weight: 200 grams incl. batteries & antenna

NOW AVAILABLE FROM STOCK

SPECIAL OFFER  
ONLY £299  
incl. VAT & FREE postage

## AR-8000 UK

The best scanner on the market. Don't argue. My scanner man Graeme said so. To find out why, give him a call. Even if he does spell his name rather strangely.  
RRP: £410.

ML PRICE SLASH: NOW ONLY £309.

## The New AOR AR-7030



Probably the best engineered receiver in the world.

NOW AVAILABLE ON FREE FINANCE.

RRP: £799.  
Deposit: £99.  
12 payments of £58.33.

## AKD TARGET RECEIVER

The ideal way to starting off the wonderful hobby of Short Wave listening. Offered with mains PSU, Short wave aerial wire and operating manual.



£159.95 p&p £7.50

## Opto Electronics Scout

The most innovative product for scanners of 1995? Connect this little frequency counter up to your AR-8000 and see it make the scanner jump onto a frequency that its literally just "sniffed" out of the air! Termed "Reaction Tune", it has many uses both for the hobbist and commercial user.

RRP: £449. ML Price: £369 Super low cost finance available from only £27.50 p/m!

## New AOR AR-5000

For those who take the entire radio spectrum very seriously. The AR-5000 covers 10kHz through to a staggering 2600MHz! All mode base receiver, setting new standards in all band performance.

RRP: £1749. Lynch Price: £1569.

Deposit £269, 12 payments of £119.39. Cost of loan: £132.70 or Deposit £269, 24 payments of £65.13. Cost of loan: £263.12. (APR 19.9%)



NEW PRODUCT

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& Son

THE AMATEUR RADIO EXCHANGE CENTRE

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■ Finance on all products is also available. (Subject to status).

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No this is no wind-up!  
Invented by an Englishman, Trevor Baylis, this new AM/FM & SW receiver needs NO BATTERIES or External power!

Wind the cranking handle and sit back and enjoy up to 40 minutes of listening, without lining the pockets of your local battery provider! When its run out, simply wind the handle up again.

Exclusive to Martin Lynch  
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\* DSP 599zx \*  
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**NEW LOW PRICES**  
Digital Signal Processing will enhance any receiver performance by removing one main ingredient - NOISE! If you haven't heard a DSP unit work, then call into the London Showroom for a demo. MFJ-784B All mode Tunable DSP..£249  
DSP 9+ All mode DSP at only .....£189  
DSP 59+ As above but more features .....£249  
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## Lowe HF-150



We sell as many to commercial users as we do to enthusiasts. The best built, best performing receiver under £500.

RRP: £419. Deposit £59, 12 payments of only £30, ZERO APR.

Why not add a keypad for fast frequency access? only £44.95.

## AR-1500EX



My favourite sub-£200 handie scanner. All mode incl SSB/CW (BFO), easy to operate and supplied with Nicads & charger.

RRP £289

Limited stock.

ML Price: £189 p&p £10

# SCOOP PURCHASE!

## Look-alikes

### Police look-alike Lapel speaker

Suitable for most scanners on the market. Only £11.50 incl. delivery.



### Police look alike Earpiece. MyDEL P-300

As used by many government establishments throughout the world, the new MyDEL P-300 easy to wear "over the ear" earpiece is available now, including FREE P&P.



(State which scanner the P-300 is for when ordering).

ONLY £9.95 p&p FREE!

## Lowe PR-150



Matching the HF-150, a preselector can greatly enhance reception of weaker signals,

that would otherwise be lost in the noise caused by stronger signals. They really do work. Suitable for most other receivers.

Ask for details.

**NEW LOW PRICE: £199.**

## NEW MVT-9000

**"A thoroughbred amongst scanners"**



The new MVT-9000 scanner offers performance that is usually reserved for commercial operators. Pocket size and a host of important features. NOW AVAILABLE FROM STOCK

**PRICE: £439**

## NOISE REDUCTION

Suffering from power line noise? Got a noisy street lamp or thermostat clicking away? Slip in line the ANC-4 and see it disappear. If not send it back and get a refund!  
RRP £195 incl. p&p.

## Garmin GPS-12XL Includes Active Compass

# NEW

Similar spec to its predecessor, the GPS 45XL, except this one works at aircraft speed!

ONLY £249.



## 5th EDITION UK SCANNING DIRECTORY

**NEW** Available from stock. Order yours now, before they ban it from sale!

ONLY £18.50 P&P £2



## Yaesu FRG-100

Retailing at £599, the new receiver from Yaesu takes some beating. At £469, its an even better buy!

RRP: £599.

**NEW LOWER ML price CASH/SWITCH £469.** Super low cost finance available from only £36.66 p/m!



USED EXAMPLES AVAILABLE FROM ONLY £399 Call for availability

## datong active aerials

AD-370/270 The pair of Active Aerials were originally designed for the Royal Navy several years ago and to date, no other manufacturer has been able to offer such performance from a compact design.

If you are stuck for space and need a good high performance SHORTWAVE ANTENNA then order yours today!

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OPENING TIMES MON - SAT : 9.30 - 6.00 LATE NIGHT THURSDAY BY APPOINT-

# RAF Fairford - Gloucestershire

## The Royal Airforce Benevolent Fund's International Air Tattoo 1997

### RAF Fairford - Gloucestershire

**The Value Plus Variety Show** - You will need your walking shoes to see all the aircraft in the two mile static line-up, and to take in the 500 or more attractions of RIAT 97 - action-packed arena, roadshows, virtual reality rides, marching bands, craft fair, motor show, exhibitions, street entertainers and strolling players. The romance of ballooning will be remembered, too, with a Sunset Festival to release up to 40 hot air balloons. And there are food villages, beer tents, lots of ice cream vendors, picnic areas and a crèche for 2 to 10 year olds running special shows for children.

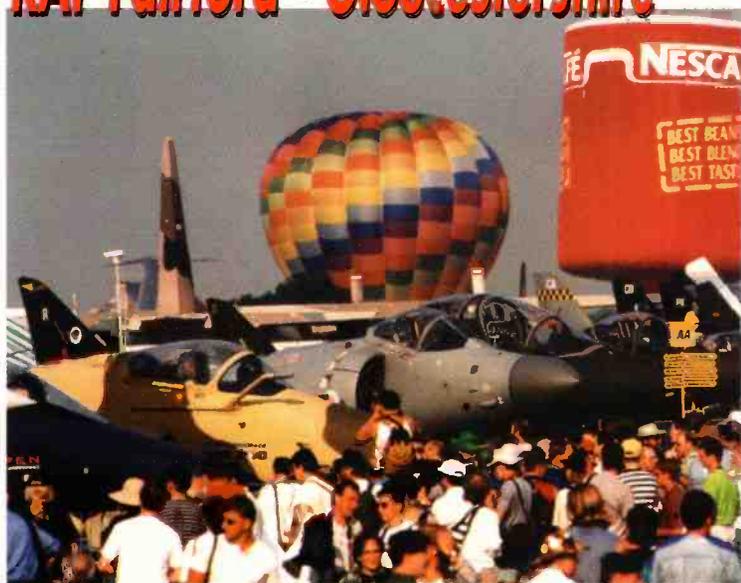
**Tiger 97** - The aircraft of the NATO Tiger Squadron Association, formed in 1961, are united by a common emblem of strength, determination and efficiency, but they also glory in some of aviation's most creative paintwork. The Tiger 97 static display will dazzle and intrigue - an exceptional opportunity to get a first-hand look at Tiger Art and to find out more about this distinctive Squadron Association.

**Top Guns - Fighter 97** sets the scene for the world's first international fighter, air defence and AWACS meet. The skies above RAF Fairford become a Theatre of the Air for flying demonstrations from the elite of solo and aerobatic team pilots - the real-life Top Guns - as they go through their electrifying routines. Many of the Fighter 97 aircraft will also be on static display, with crews standing by, in an impressive show of international military air power.

The **Breitling Fighter Challenge** will see RIAT 97 fighter pilots 'strapping in' for a knock-out, one-to-one, simulated aerial combat competition to find the Champion Fighter Pilot of the World. All the action will be relayed to spectators on a giant screen - more Top Gun thrills for Tattoo visitors.

**The Eagle Soars** - The might of the United States Air Force is in the spotlight for Britain's official 50th anniversary tribute at RIAT '97. After becoming an independent air force in 1947, the USAF embarked on a remarkable 50 years of development. The Spirit of the Eagle will be captured in a unique flying display tracing landmark USAF operations from the early Cold War years to more recent campaigns like Operation Desert Storm. In a show-stopping finale the RAF Red Arrows fly with USAF to wish the world's biggest air force a very happy birthday.

**Big skies, big flying displays, big family spectacle...** nothing compares to the fast paced action of The Royal International Air Tattoo, as over 400 aircraft from 35 nations fly in to take part. Breathtaking aerial routines, a two mile static park, vintage aeroplanes and modern jets, the eccentric and the rare, an exciting blend of entertainment to give you the best day out of the year!



#### THE HOT NEWS LINE - (0891) 122999

Just a 'phone call away - information on aircraft, facilities, attractions and RIAT 97 booking arrangements, including grandstand seats and the VIP Aviation Club (£75 per guest).

#### How To Book RIAT 97 Tickets

Save £4 buying tickets in advance from branches of Waitrose or by writing to **RIAT 97 Tickets, PO Box 1940, Fairford, Glos. GL7 4NA**. Credit card sales on the Ticket Hotline, phone **(0891) 122997**. Adult advance tickets are £16 (£20 on the day), accompanied children, 15 and under, free!

**Calls on (0891) numbers are charged at 50p per minute of which 15p per minute is donated to the RAF Benevolent Fund Enterprises, PO Box 1940, Fairford, Glos. GL7 4NA**

It sounds a great day out doesn't it! So, now's your chance to **win** a ticket (children aged 15 and under are now **free** if accompanied by an adult).

All you have to do is answer the ten questions set out opposite, fill in the form and send your entries to us here at **Short Wave Magazine, Air Tattoo Competition, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.**

CLOSING DATE IS **2 MAY 1997.**

## SO, WHAT ARE YOU WAITING

# - 19 & 20th July

The gates to RAF Fairford open at 6.30am and the flying programme runs from 10.30am

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Tattoo 1997



- Q1:** Which Air Force is celebrating its 50th Anniversary this year?
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- Q4:** How many miles will the static aircraft display cover at RIAT 97?
- Q5:** What is the name of the Royal Air Force's aerobatic display team?
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- Q7:** Which country has an aerobatic display team called The Patrulla Aguila?
- Q8:** What is the name of the aircraft flown by the Red Arrows team?
- Q9:** Which plane is known for its vertical take-off and landing?
- Q10:** What are the French Air Force aerobatic display team called?

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From time to time the RAF Benevolent Fund may wish to send you details of other events or services, which they feel may be of interest to you. Please tick the box if you do not wish to receive this information.

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**FOR?**

to 6.15pm.

POST TO: Short Wave Magazine, Air Tattoo Competition, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.

**INTERNATIONAL AIR TATTOO  
COMPETITION**

# The London Crusadar



**G**-HEMS Express Newspapers SA 365N Dauphin has become a familiar sight in London's skies as it speeds rapidly to accident scenes. Purchased five years ago and converted into the best equipped medical helicopter in Europe, it carries a crew of two pilots, a doctor and a paramedic. This allows the arm of the hospital to reach the accident site and administer the essential life saving treatment to badly injured victims that otherwise would not be available until reaching hospital.

The helicopter can also rapidly transport the patient to the correct hospital for the injuries, which could otherwise be several hours away by road ambulance. The aircraft and its pilots are provided at no charge

to the public by Express Newspapers, with all maintenance, fuel and aviation costs being met by the Royal London Hospital Trust.

The doctors come from the National Health Service and the paramedic from the London Ambulance Service (LAS). Tasking is through the LAS Control Centre in Waterloo, where a special HEMS (Helicopter Emergency Medical Service) desk is manned by helicopter paramedics and constantly monitors all 999 calls for the serious accidents which requires the teams medical expertise.

## PRIMARY ROLE

The aircraft started operations in its primary role in May 1989, operating initially out of Denham

and then Biggin Hill. August 1990 saw the completion of the helipad on top of the Royal London Hospital in Whitechapel and the aircraft positions daily to the hospital to operate from the roof top helipad.

The Royal London Hospital has been equipped as the most advanced trauma centre in the UK and there is a dedicated lift from the helipad to the resuscitation room and patients are being dealt with by a trauma team within two minutes of the helicopter landing.

To date September 1993 the aircraft has carried out over 4000 missions, In 1992, 395 patients were carried or escorted and a further 328 treated at the accident site of those carried out. Twelve would definitely have died if HEMS had not been scrambled. Many more have

*John O'Toole G7UYT  
says the London  
Crusadar and other air  
ambulance in this  
country need our  
support, read on and  
find out why!*

spent less time in Hospital and have recovered with less disability because of the aircraft intervention.

This year, 1993 alone, over 374 patients have been carried or escorted and further 205 treated at the accident site. The 'Scramble' takes two minutes from initiating by London Ambulance Service on a dedicated telephone and any part of the London and the M25 can be reached in ten minutes and less.

#### LANDING SITE

The landing site at the scene of the accident is the discretion of the captain who chooses the nearest and safest. In the case of the Cannon Street incident, the aircraft landed between the railway lines at the end of the

track and subsequently carried the most injured back to the Royal London Hospital.

The aircraft, built by Aerospatiale in France, is twin engined and cruises at 150 knots, giving an effective radius of action of 50 nautical miles in 20 minutes. It is equipped to carry two patients, medical equipment which includes oxygen, defibrillator, oxycap Propaq 106 Lifestat 100 and a Thomas pack with drugs.

Many other countries have been using medical helicopters for years and have proved the added value of the service they offer to the normal ground ambulance. The UK, as usual, is slow to catch up. Helicopters are expensive to operate, but when used in a life saving role, the expense justifies the end result.

#### SUPPORT NEEDED

The *London Crusadar* and other air ambulances in this country need the support of the general public. Remember, one day you could be the person who needs their expertise.

Donations and information:- **Helicopter Emergency Medical Service, The Royal London Hospital, Whitechapel Road, London E1 1BB, England. Registered Charity No. 232968, Tel: 0171-247 6722.**



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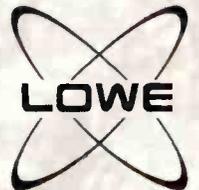
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# Grand Prix Racing Cars

**- keeping in touch with the pits**

With the 1997 Formula One season now under way a lot of SWM readers will be following the fortunes of World Champion Damon Hill in his new Arrows car. However, he won his crown in a Williams racing car, which also won the Constructor's Championship - an achievement to be proud of. Philip C. Mitchell has been looking at the role radio communications plays in the Williams team.

Communications between the driver, his car and those unsung heroes, the engineers back in the pits, played an essential part in Williams' remarkable 1996 success. If you are at the wheel of a Formula 1 racing car, with over 750b.h.p. under your right foot and capable of over 200m.p.h., the last thing you want to be bothered with are a lot of pretty dials telling you how your car is behaving, like we mortals do crawling along the M1 at seventy.

So, to allow the driver to concentrate one hundred percent on driving he has a minimum of instrumentation to look at and act on. Therefore, it makes sense to transmit the maximum amount of information possible about how the engine and suspension are coping with so much punishment, back to the technical wizards in the pits for evaluation purposes. Hence the need for an efficient communication system that, in principle, will at least give some advance warning of a problem and

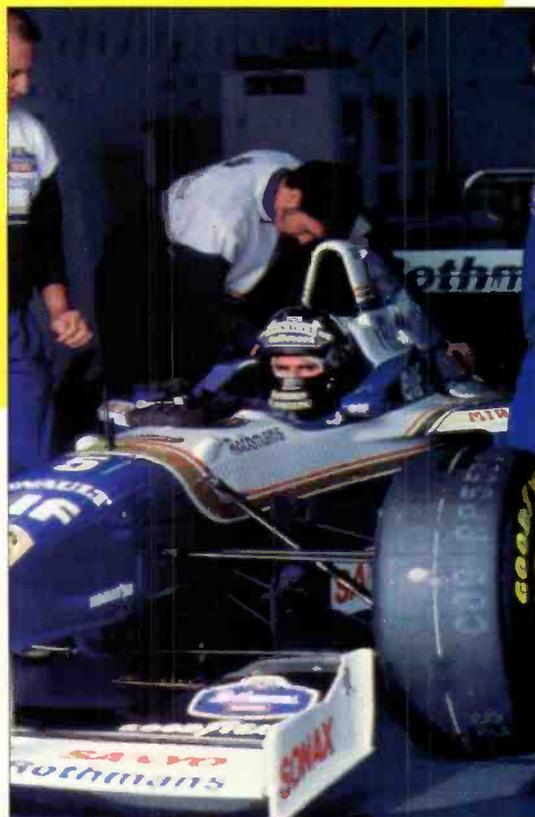
allow them to keep the driver up to date with any possible action that can be taken to

overcome it. Also, in trying to keep ahead of your competitors, it helps if you have some form of summarised information recorded about the car's performance during race and practice laps.

#### Systems Used

On the Williams F1 racing cars there are two communications systems for the transfer of data (telemetry) in addition to a v.h.f. radio link between driver and pit staff. The latter uses the conventional p.m.r. communication frequency of 168MHz within the Base TX allocated band of 165.05 - 168.25MHz, but all traffic is digitally encrypted - just in case the opposition are listening in! Communication between driver and race engineers usually

**Damon Hill in his 1996 Rothmans Williams F1 car. The v.h.f. and telemetry antennas are just in front of Damon on the chassis top.**  
Copyright Williams GP Engineering



concentrates on tactics and such factors as when or whether to come in for fuel, tyres, etc. and for a dialogue to be established in the event of a mechanical problem. The simple p.t.t. button for v.h.f. communication is on left hand side of the driver's cockpit.

#### Telemetry Systems

The two independent telemetry systems are concerned with the transmission of essential data from the engine and the chassis back to the race engineering staff in the pits. The engine performance data concerns temperatures at various points such as cylinders, coolant, transmission, etc., pressures within the casing and engine speed are monitored by some 50 sensors at approximately 100 samples per second. The information from the sensors is stored by an on-board computer, ready to be transmitted from the car on every lap as it passes the pits. The race engineers receive about 0.5Mb of performance data per lap, depending on length of circuit, to be processed by their computers. The engine telemetry system operates at approximately 3.1GHz, again depending on the circuit, is manufactured by Magneti Marelli.

#### Real Time

As the telemetry requirements for the car's chassis parameters are not the same as that of the engine, there is a need for a different system capable of handling more data in real or semi-real time, i.e. a continuous flow of data back to the pits. The chassis telemetry system can handle up to 1Mb of data per lap with its sensors monitoring such data as suspension movement (of which there is so much during a lap of, say, a short twisting circuit such as Monte Carlo), considerable G forces during fast cornering and overall speeds. Apart from the continuous nature of the data transmission, post processing of the data is the same as that for engine telemetry. Some channels of data are however further processed to give summarised information for future assessment on certain aspects of car performance. The chassis telemetry system is manufactured by Telxon in conjunction with Pi Research and Plextek and operates via an omni-directional antenna on approximately 3.8GHz, varying according to circuit topology.



**The telemetry and communications suite at the Silverstone motor racing circuit.**

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- Continuous AM coverage 150kHz - 29.999MHz

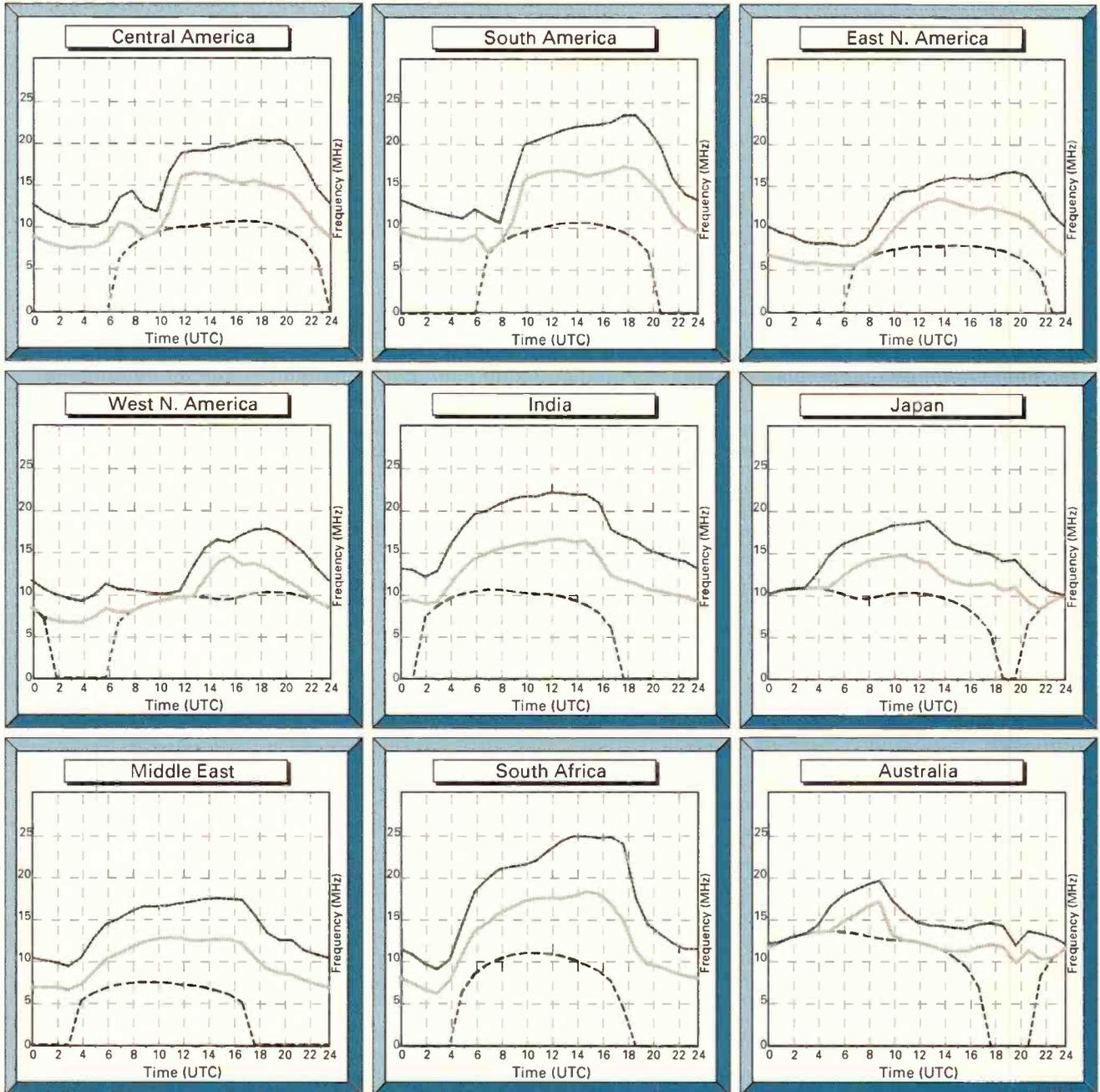
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# World Propagation Forecasts April

Circuits to London



## How to use the Propagation Charts.

The charts contain three plots. The lower dashed line represents the lowest usable frequency (LUF), or ALF (Absorption Limiting Frequency). The chances of

success below this frequency are very slim.

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

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

probability of success for the path and time.

To make use of the charts you must select the chart most closely located to the region containing the station that you wish to hear. By selecting the time chosen for listening on the horizontal axis, the best frequencies for listening can be

determined by the values of the intersections of the plots against frequency.

Good luck and happy listening.

# Amateur Bands Round-up

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

"Life is real, life is earnest", says the scribe. And, alas, it is. The pressures are on for the commercial interests to pinch the amateur bands. In a way, we're the victims of our own success - the OSCAR series sparked the thoughts leading to the 'Little LEOs' - Low Earth Orbital satellites whose aim is to take our bands for international mobile telephones.

The RSGB isn't perfect, Heaven knows. But - it's all we've got at national level to defend us, and to help defend amateur radio at international level. They need more members, simply because greater numbers mean more clout - as any trade unionist knows. Seriously, we are talking about the very survival of amateur radio. Please help.

## Letters

Our 'starter for ten' this time comes from **Cliff Stapleton** in Torquay who finds himself quite amazed at the lists of some other contributors. What's wrong? Well, for one thing, a noticeable absence of solar activity, though it seems almost certain we have now turned the corner and can look to some years of improving conditions; for a second the knack of picking the right times to be around.

There are some parameters here: firstly, is there propagation between here and our target? Secondly, given there is propagation, will he be buried under the European QRM? Thirdly, given you can resolve these two, is your man curled up asleep in his nice warm bed at the time you're listening? Fourthly, does your antenna 'see' your target area? It follows then that a serious scratch for a particular area takes all these things into account. Look at the propagation listings for the month to see when there is propagation to your chosen area. Bearing in mind that most DX is either East or West does your antenna favour these, or can it be made to? You can always hang up an impromptu wire antenna for the rare African. If your man is likely to be in bed and asleep, then look for an alternative propagation time when he could be operating and listen then. If you're really keen, buy an alarm clock and be prepared to jump out of bed in the middle of the night, log your man and hop back into your pit again! One of the propagation programs (if there is one for your particular computer) is a Godsend here. However, the computer

program only tells us about the 'positive' factors - given specified flux or sunspot number it gives you a possible forecast; but it **cannot** take into itself the unpredictable negative factors like magnetic storms. If at 0800UTC the program predicts JA/VK/ZL by the bucketful, and you switch on and hear only a tired old band emitting a noise like frying eggs, then you deduce a negative has entered the system and switch off!

A welcome return to the fold by **Karl Drage** near Kettering, who has discovered the joys of QSLing. QSLing direct is an expensive game, the more so as so many of the rarer stations ask for return postage in terms of 'green stamps' (dollar bills) rather than IRCs. Even IRCs can be a problem; they aren't usable in a few countries. Add to all that the problem that, while our UK postal system is almost free from deception, in many parts of the world they catch on quickly to the fact that a letter addressed to 'WX2YZ' will contain dollar bills or IRCS so such letters will be routinely opened, the money stolen and the rest burned. Personally, I refuse to QSL other than via the Bureau system, unless I am aware that the station is having a very-first contact or something of that nature. OK, so the Bureau system is slower, but that is down to the users. Have you got envelopes at your Bureau? Do you write out your QSL card immediately and send it off to the Bureau smartly? Most important of all for an s.w.l. is the report from your station worthwhile? For example, how does his signal compare with others from the same area if any: is the signal fading and if so by how much and over what period of time. While so many listener reports over the years have been pure dross (You're 5 & 9 from next door; please QSL), the **good** ones stick out in memory and one feels they are more worthy of a card than the guy we were in contact with! One might compare signals against others from the same part, or show signal strength graphically over a couple of hours or maybe even note he was being called by some rare d.x. and not hearing it.

Newcastle, Staffs, is home to **Ted Hearn** who has done more listening as a result of being on the sick-list from work - a mixed blessing! using the same antenna but coupled now through a Global AT2000 tuner, Top Band came up with AB4VV, KD3PX, K2WK, VE2RP, WA1OXT, and of course umpteenth

Europeans. Turning to 3.5MHz we find among the Europeans AD6C, CU8AH, EA8PP, LUs OD5PI, OD5NH, OY6CQQ, OY9JD, PY2ROB, TA3J, TF3HP, VE3FKK, VO1WIZ, VO1FB, VO1SA, VY2ROB, XE1FLY, YV1DIG, ZL1ANJ, ZL1IU, ZL1/VK3DZM, ZP5YOE, Z32AF, 1A0KM, 4X1VF, 5T5DB, 6Y5PA, and 9K2MU. Up again, to 7MHz and we find AP2RP, CO6RQ, CU2HI, CP2DD, CP6UA, FM5GU, HK4CYR, HK6/P/N2ZLG, HR5AAP, HI8PLE, HS1NGR, HL5BDD, HP1XVH, HC4L, KF4AME/T16, LU3HYS, OD5OD, PS, PT, PYs, PZ1EL, SU1GS, TI4CF, TT2JIC, TT8WL, XE1NUA, XT2DP, YVs, ZPs, and a brace of 9H1s. On 14MHz A71BH, DH2JD/HI3, DL5MLB/EA6, EA9AU, FK8GM, PYs and LUs, SU3AM, TA6C, TA4/DF2LM/P, VR2IP, VUs assorted, VK, ZP5PIB, ZL2OOO, 3V8BB, a couple of 4Xs 5B4BH, 9H1ZE and 9H4OM, while a final lift to 21MHz gave no more than NC4Z and ZS5PT.

Another return to the fold is **John Collins** in Birmingham who sticks to 7MHz Phone. On January 20, the band produced 9K2MU, UX0LZ, J69B (direct QSLs only), GW0GEI, Z32XX, 4K6KM, YO3GDA, 3E1DX, XF4CA, EX8VZ and 9A1HDE. From 0400UTC John noted the Voice of Turkey broadcasting to North America on 7100kHz - which should make Turkey pretty popular! Finally, the Royal Signals net control station, around 0140, GM4FDZ was a maximum meter-reading signal in Brummagen, beating even the French stations under.

A very nice letter came in from **Dean Lewis, WA3WGV**, 1193 Azalea Lane, Palatine IL 60074, whose roots lie in South Wales, and I have answered him direct. However, if you happen to be a s.w.l. in the southerly part of GW I guess Dean will respond to a decent report.

Now to **Ted Trowell** in Minster, Isle of Sheppey, all logged on c.w. On Top Band OH0/OZ1FG, 9H1BT both around 2100Z while an hour later WW2Y came in. For 3.5MHz nothing is noted but on 7MHz around 1900 VK2APV, 5X1P, and in the 2200 slot TI4CF, KP2J and FM5FJ. In the morning on 10MHz (0800) Ted found ZL4NB, while around 1600 A71CW, VE3XO, while around 2200 ZS6QU, TU4FF, and KP2J were noted. Next 14MHz where trade peaked, with logging of A71CW, 7Z5OO, 8P9EM at 1100, followed at 1600 by NX7K, ZS6ME, 9Y4VU, W6JU, VQ9CH, K7ZZ,

9K2MU, W9KNI/6, W6T2Z, ZS4XJ, VE7SR, N6XMMW, ZS1AAX, W4MJ/MM, W6OV, plus at 1800 P40WA. At 2000Z we find PY2FM, PY5BLG, LU4FD, PY1VOY, PY6GE, 6W6JX, and KC4AAA, the US Base at the South Pole where the operator was Nick UY3YH. Up again to 18MHz where at 1100 Ted noted 9K2MU, and at 1500Z FY5YE, 3DA0CA, 9L1KA, FM/F5NBX, 5X1P, 5N3/SP5XAR, PT7WX, VP5/WQ7X, VK0IR, 9L1KA, CT3/DJ1OJ and KP4Y. Finally, 21MHz where ZS6SA, EA8AOY were entered in mid-morning and FM5GS in mid-afternoon.

## Heard Island

VK0IR has come and gone. As they racked up some 80 000 contacts from the island they must qualify as the most successful DXpedition of all time, and I am surprised that only Ted Trowell gives them a mention. Nearly thirty months of preparation went into this one.

## Yemen

Some of you may have noticed 7O1A between December 14 and 21; this was a demonstration station set up by DJ9ZB and JH1AJT, all sideband, with a view to persuading the Yemen authorities to sanction amateur radio operation again. We live in hope on this one; the last full-throttle efforts from the country were 7O1AA by some 9K2 operators and 7O8AA by a couple of French ops, both back in 1990. Since then it has climbed up the 'most wanted' lists to number four. Incidentally, the American 59(9) DX Report say they have seen a copy of the 7O1A licence document.

## Andaman

**Mani** VU2JPS has finally received the gear sent by Jim Smith and the HIDXA group, so this is another rare one to be activated.

## Finis

The Editor, Dick Ganderton G8VHF and Yours Truly attended the RSGB Presidential Installation of G18AYZ at Belfast.... and our mutual interest (*trains, Ed*) led us to the Ulster Folk and Transport Museum- WELL WORTH A VISIT.

Letters as usual please, to me at PO Box 4, Newtown, Powys SY16 1ZZ, to arrive by the beginning of the month - and the more the merrier!

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# SSB Utility Listening

This month, I have some answers to more readers letters, and also a few more items for your diaries. I seem to have received quite a few messages and bits of news from the Internet, which just goes to show how useful it really can be.

First up is **Carl Hender** who wrote to say that he heard the *Virgin Challenger* balloon working Portishead early in the morning after its launch. He has his own web-site, and says that it contains a transcript of the contact between Richard Branson and Portishead Radio on 5.610MHz, and it is also available as a Real Audio3 file (so you can hear the action as it was recorded live). The URL: <http://www.flexnet.co.uk/~hender/~radio.htm> is the one to point that browser at.

## Letters

**Arthur T** from Kent writes to say that he has just returned to utility listening after quite a few years away, but now finds that most of the stations he used to listen to have disappeared. He says that he does not want to buy a new copy of Klingenfuss, only to find that the stations he used to listen to have really gone, not just changed frequency.

Well, Arthur, a lot of stations have moved away from short wave towards land-line connections and (more recently) also an increase in the use of satellite links. However, there are still thousands of stations to listen to, and whether you can hear them (or not) depends upon your radio equipment and your skill as a listener. If you can't afford a copy of Klingenfuss, why not try a copy of *Ferrell's Confidential Frequency List*? It's about half the price of the *Klingenfuss Utility Guide*, but does not contain quite so much details about all the data transmission modes. Both are available from the *SWM Book Store*, so look in this issue of the magazine for ordering details.

Arthur also asked if I had any information sheets relating to utility listening. I must admit that I have been considering this idea for a few months. I would like to be able to provide some sort of fact-sheet, similar to those offered by Godfrey Manning's 'Airband' column. At the moment, I'm still trying to think about the areas that each fact-sheet would cover, but if anybody has any suggestions,

please write with details. So far, I have thought of the following areas: what are utility signals, getting a suitable receiver, antennas, maritime frequencies, aeronautical frequencies, other frequencies. Naturally, some of these are going to be quite large!

**Peter G** from Glasgow writes in response to the recent listing of military exercises mentioned a few months back. He wants to know why I did not mention any frequencies to be used during the exercise. Well, Peter, these are military exercises, and they like to use random or one-off frequencies for these kinds of events, so as to avoid casual listeners.

That does not stop people searching for their signals though. Most of the exercise only last a week, and it usually only takes a day or two for details of their active frequencies to be found and passed around (usually via the Internet). In fact, almost all their frequencies are quite well-known, and have been published several times over. Probably the best book for this kind of frequency information is *Eavesdropping on the British Military*, which is also available from the *SWM Book Store*. To find the air defence frequencies, listen to the Architect broadcasts at H+00 and H+30 on the regular Architect frequencies; at the end of the broadcast, they will transmit the two-letter codes for the active frequencies. There are plenty of sources of the frequency list for these two-letter codes (including the above named book); when you hear the codes being broadcast, tune-in to the correct frequency, and you should start to hear signals.

Peter also asked a few other questions which I will be covering in the next few months.

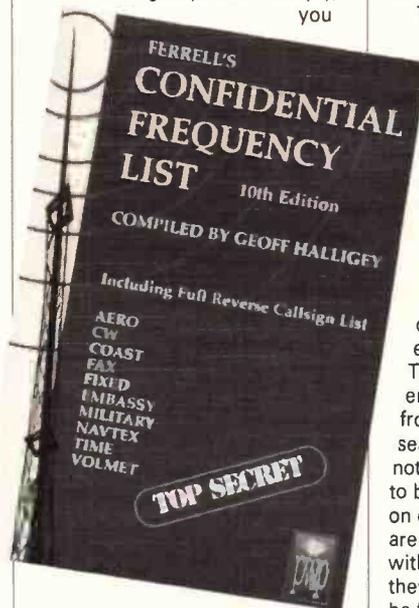
## WUN

It would appear that a number of readers have recently discovered the Internet, and the World Utility Network (WUN). I imagine that this is the result of people acquiring computers over the Christmas period, starting to use the Internet, and then hearing about WUN. Within the space of one week I received three E-mails from people with questions and comments about WUN. One E-mail asked how to join, and two went to great lengths to explain

what it was all about, and how to join.

This all made me think that it was time for a reminder about how to join the WUN. The World Utility Network is an Internet group dedicated to spreading news and information about utility signals in the shortwave bands. It is not restricted to voice comms., as it also covers all those digital modes. There are over a thousand members around the world who receive between ten and twenty E-mails per day with information about signals heard, and advance information about events to listen out for.

So, how do you join this group? Quite simply, you



send a simple E-mail message to [majordomo@grove.net](mailto:majordomo@grove.net), leaving the subject line completely blank, and just the message **subscribe wun** in the body of the E-mail. That's all there is to it! By return, you will receive a list of rules, and details of where to send your information. Within a few hours, you will start to receive E-mail messages from all around the world.

I have been a member of the group for over two years, in fact, I joined very soon after the group was set-up at the start of 1995. Every month they produce a Newsletter, *WUNNEWS* which combines members logs and articles of interest to its members. If you're a utility listener and on the Internet, this is one group that you should be a member of.

## Diary Dates

For those of you who listen to air traffic across the North Atlantic on the NAT tracks, the summer has a few interesting flights to listen for.

A few weeks back I happened upon an advertisement from Swissair announcing that in celebration of the 50th anniversary of transatlantic services to North America, they would be undertaking two DC-4 flights across the Atlantic. The *Spirit of Swissair* DC-4 will operate one way New York-Gander-Shannon-Zurich on both trips, the return is from Geneva or Zurich to New York on the more usual jet aircraft.

The schedule was outlined as follows:

New York (JFK) to Gander, departing 10 May; Gander to Shannon, departing 12 May; Shannon to Zurich, departing 14 May. New York (JFK) to Gander, departing 12 June; Gander to Shannon, departing 14 June; Shannon to Zurich, departing 16 June.

This will be a rare opportunity for h.f. civil aero enthusiasts to try to log a DC-4. The Douglas DC-4 is a four-engined piston powered aircraft from the early 1940s. The final seating layout for these flights is not known, but there is not likely to be more than 100 passengers on each flight. Also, these aircraft are very slow when compared with today's jet aircraft, and since they are not pressurised, they will be flying much lower than normal. Both these factors mean that it should be very easy to identify the flights as they cross the Atlantic. The flight numbers have not been announced yet, so I cannot say which callsigns to listen for, but any low and slow Swissair flights across the Atlantic on the dates mentioned must be the anniversary flight.

# Scanning

This month, as promised, we'll take a look at base station sets and what's what. Like the previous month, it's not a definitive listing but rather a look at what's available and what you should look for with a short list of sets 'known' to me.

I'll start by looking at what facilities are available on existing sets and give a brief outline of what you should look for when purchasing a base. Then a peek at some of the 'die-hard' sets still doing the rounds and available second-hand.

Like the first outline on hand-helds, it may make sense to commit the readies on a second-hand set if you're new rather than buy something brand new that you may not get full use out of. Like cars - my other hobby! - it makes sense to buy something second-hand after you've passed the test rather than rushing out to buy the latest Porsche 911 turbo! So you can drive - but how much experience have you got?

## My Mailbag

Thank you to all those readers who wrote in to say they missed the military airband section of this column. The new section, by Peter Bond, is proving to be really good and my advice is to send stuff in to Peter. I will handle the scanner stuff, however. Yes, I miss it too, but this is a scanning column after all!

Thanks to **Miles Foreman**, of Redruth for the clipping from 'The West Briton' of 16 January '97 regarding the prosecution of two scanner users. The pair were noticed driving around Devoran in a manner described as 'suspicious'.

Police stopped their vehicle and a scanner was found under the passenger seat tuned into nine police channels. They were each given a conditional discharge for a year and ordered to pay prosecution costs. Both admitted listening to messages they were not authorised to receive.

This underlines what I've always said about scanners and the police. They are interested. They will prosecute. You will be charged!

Without getting on my soapbox again I'll end this bit with the following information: If you listen in public or act in a manner likely to attract attention, then you deserve what you get. Be aware. Be cautious. Be very careful!

## Help Needed

Can anyone help **Patrick O'Brien GW1SXX** of Caernarfon who is looking for an instruction manual for a PRO-44 by Netset? Patrick is also looking for frequencies local to his area. He is on BBS and can be contacted there at GB7ABB or GB7OSP. His home address is: **12 Church Street, Caernarfon, Gwynedd LL55 1SW**. Any help would be appreciated.

Also, info. required on the following: Tracker system frequencies. Skynet 2000, Autocall and Recall. Are they all the same? All answers to me at the masthead address please!

## Reader News

**John Kerr** writes in with news about a.t.u.s on hand-helds, something I touched on in my last column. John uses a 10m long wire antenna with a Global a.t.u. to an MVT-7100 and reports excellent results. He reports that the same wire length with a balun also works well but says he prefers the a.t.u. set-up.

John also experimented with a 3m length of wire attached to the '7100's telescopic by a crocodile clip. He tells me it worked well in his conservatory. It goes to show that you experiment and find your best from that! Then, isn't that what radio is all about?

**Peter Peck** writes in from Llangejni, in Anglesey, with news that he is interested in marine communications and can be pointed in the direction of what can be heard and where. Firstly, you can hear ship-to-ship comms on channels 6,8,9,10,13,15,17,67,68,70,72,75,76, 77 and 78.

The marine v.h.f. band runs from 156.000 to 162.000MHz and, in Llangejni, you're going to need one brilliant antenna to get much! Spend your weekends in Holyhead or Amlwch....or move!

On board ship hand-helds, which are u.h.f., operate on three channels and these are: CH1 - 457.525 paired with 467.525, Ch2 - 457.550 paired with 467.550 and Ch3 - 457.575 paired with 467.675.

You will hear berthing instructions from, typically, bridge to deck, cargo op's between Mates and crew and so on and if they use the ship's boat for a jolly, then probably that as well!

Thanks to **Paul Wey** of **PROMA** for the disk. I'll get around to reading it soon. For

those interested in contacting **PROMA**, which deals with frequencies and is a good source of reference, they can be contacted at: **2 Icknield Way, Baldock, Hertfordshire SG7 5AJ**.

A quick mention to **SH** of Warwick. Thanks for the info on the new Short Range Business Radio (SRBR). Those interested can hear transmissions on u.h.f.....but where? Anyone with any idea contact me and we'll try to publish a list!

## Emergency Services

News in also reports that we may see, in the not too distant future, a 'joint' going on between Police, Fire and Ambulance communications under the Public Safety Radio Communications project. Briefly, this is about the emergency services, using digital communications, on the proposed 380 - 400MHz u.h.f. band. It will be encrypted, of course. A pilot scheme may operate with Lancashire Constabulary with a system phasing in between 1999 - 2003 nationwide. It is believed Racal, NTL and BT are being asked to submit the plans for this system.

## Illegal Transmitting

Now the ultimate in news stories! From the *Daily Mail* of 25 January '97 comes the story of a Belgian youth who was transmitting to aircraft and adopting the role of the control tower, illegal, of course. The child, who was 15 at the time, managed to transmit messages which resulted in aircrew being asked to repeat their instructions.

In one case the pilot of an Alitalia 737 was told to "go down to 10000 feet" but controllers at the airport at Zaventem managed to intercept the dud message and, in the words of the *Daily Mail*, to "avert a catastrophe". If that wasn't scary enough, two days later the pilot of a Sabena jet was told to change course. Controllers once again managed to foil a disaster.

Eventually tracked down, the child had been given a radio scanner and a transmitter, allegedly an amateur radio transmitter, as presents by his father, and his rationale in pirating the airwaves? "To see what would happen". Currently held in custody, the child faces up to two

years for "interfering with air safety and endangering the lives of passengers". Two years?

As a student Social Worker I know the courts can be lenient and sometimes don't take full account of what's what, but just two years? It makes my blood boil to think the Europeans are as lenient as this. If this happened in the UK I would hope, sincerely, that the criminal involved would be looking at at least 10 years, with remission after public review at five. However, it should be longer.

Imagine what would have happened if just one aircraft had listened to the false instructions.....and no, to the best of my knowledge, the infamous 'Glasgow' transmitter still hasn't been located. He's the idiot who uses air frequencies to do the same as the Belgian. I've also heard about the same happening at Manchester. Apologies to Godfrey Manning on that story, it's in your domain I believe, but it mentioned the awful word scanner.

## Main Menu

What's a wideband scanner? is the first question you may ask. Simply, it is a very versatile bit of kit as it covers a huge whack of the spectrum with no gaps.

For example, AOR took this into practice with their venerable AR2001 which covered 25-550MHz with no gaps and could be a.m./f.m. programmed. Their later AR2002 went up to 1300MHz, and I had one many years ago, being, as it was then, the ultimate in radio receivers for the 'high' frequencies above 30MHz.

Some sets are serious, being able to discriminate signals properly and also being sensitive enough to tweak out good reception. Some are not. My advice here is pretty biased, buy only from a reputable manufacturer and do not believe all you read on ability!

Be aware of step rates or 'tuning increments'. Typical channel steps in the UK are 12.5kHz and you should purchase a scanner that has this step, many US sets do not. Ideal sets will offer a 1kHz step rate, and this is brilliant. If it offers the ability to tune 0.5kHz, snap the salesman hands off at the wrist and part with the money - this step rate is the perfect one!

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SHORT WAVE MAGAZINE

# PCB SERVICE

Printed circuit boards for SWM constructional projects are available from the SWM PCB Service. The boards are made in 1.5mm glass-fibre and are fully tinned and drilled. For a list of boards see May '95 issue of *Short Wave Magazine* (p.48).

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local/DX) gives you the chance to block out local channel or strong signals which will otherwise intermodulate with the one you want. It's a filter, in effect, although its downside is that it may miss weak signals.

Again, look for one with the standard BNC fitting. There are still scanners on the market using odd antenna connectors! The universal BNC allows you to connect up to most of the add-on external and internal antennas on the market, which increases your listening range. If you're staying with base sets, then you do need an outside antenna.

### What's Available?

What's available? Wow, what a choice! What's more, what a question! Like hand-helds, the choice is staggering and ranges from entry level to professional grade receivers more at home in GCHQ than in 15, The Drive, Middle England!

Two good starters are the Bearcat UBC860 XLT at £140 and the Realistic PRO-2037 at £180. Both offer a.m./f.m., and both have the TV section docked out, leaving you to tune from 66-960MHz, which should cover most of what's out there.

An ultimate scanner looks like the AR5000, which covers from 10kHz to 2.6GHz, all modes, that's a.m./f.m./s.s.b./c.w. It would need a family of antennas to keep up with its abilities and costs a cool £1500. That's right, one and a half grand....however, orgasm springs

to mind when I see this particular set! It has everything you could possibly wish for in a set, can be computer controlled and can whizz through channels at 45 channels per second....my bet is that GCHQ has a few of these!

### Second-Hand Market

On the second hand market are sets like the AR2800, which covers 500kHz to 1.3GHz with gaps, and covers the a.m./f.m./w.f.m./s.s.b. spread. This means that it can pick-up short wave. Remember the a.t.u. however, and it's a good buy if you get offered one at a reasonable price. What's reasonable? Around £150.

The AR3000A is another venerable beast which will be established on the second hand market now. How do you sum this up? Well, Peter Rouse, who is sadly no longer with us, reckoned this one was a 'must' and I'd agree with him. Well built, solid and ideal, this set was used for a while by certain UK Government departments, a damn good recommendation if you needed one!

Icom market their IC-R100 as a scanner covering 100kHz to 1.8GHz and this is still available for both new and second-hand markets. A tiny, lovely little set it would appear to be suited to the serious user. Fitted with an Automatic Frequency Control (AFC) this is a feature which some enthusiasts will find useful when trying to keep up with the doppler shift and no, I haven't the word

space to describe what this is, so don't start worrying about it!

### Huge Selection

Like hand-helds, there is a huge selection available and the proviso I'd go with is that "you pays your money and you takes your chance". Having said that, you need to keep an eye out for bargains. These can be had in the Trading Post section in the back of this magazine or in local or dealers showrooms.

Sometimes, manufacturers like AOR have 'sales' and advertise the same. Can I hear someone saying this section is biased towards AOR? It looks like it, but then, they are a prolific manufacturer and do some great gear.

I've had an AR2000 for a good few years now and while it's showing its age it is still a good little set. I started scanning off seriously with an AOR set anyway so maybe I am a bit biased! Why not? However, in the interests of fairness, I also rate Yupiteru as makers of excellent kit. So there!

### Base Sets

Lastly, as an airband anorak, no mention of base sets would be complete without mentioning the Signal R-535. This is the beast amongst lesser animals and is about as specialised as they come. It looks like something from the cockpit of a warhorse, being functional and no nonsense. It covers 108-143 and 220-380MHz with a.m. only and has 60

channels. It is still regarded as being brilliant kit and, as I've said, is worthy of mention simply because it's a specialist bit of radio and dedicated to airband, civil and military. If you're seriously into airband, then this is the one to go for.

### What's Next?

What can you expect next? I'll take a look at the frequency spread next month, in a general way, so that you can map out what's where. It's up to you to find it, however! I'll point you in the direction and after that, go the hobby way and scan!

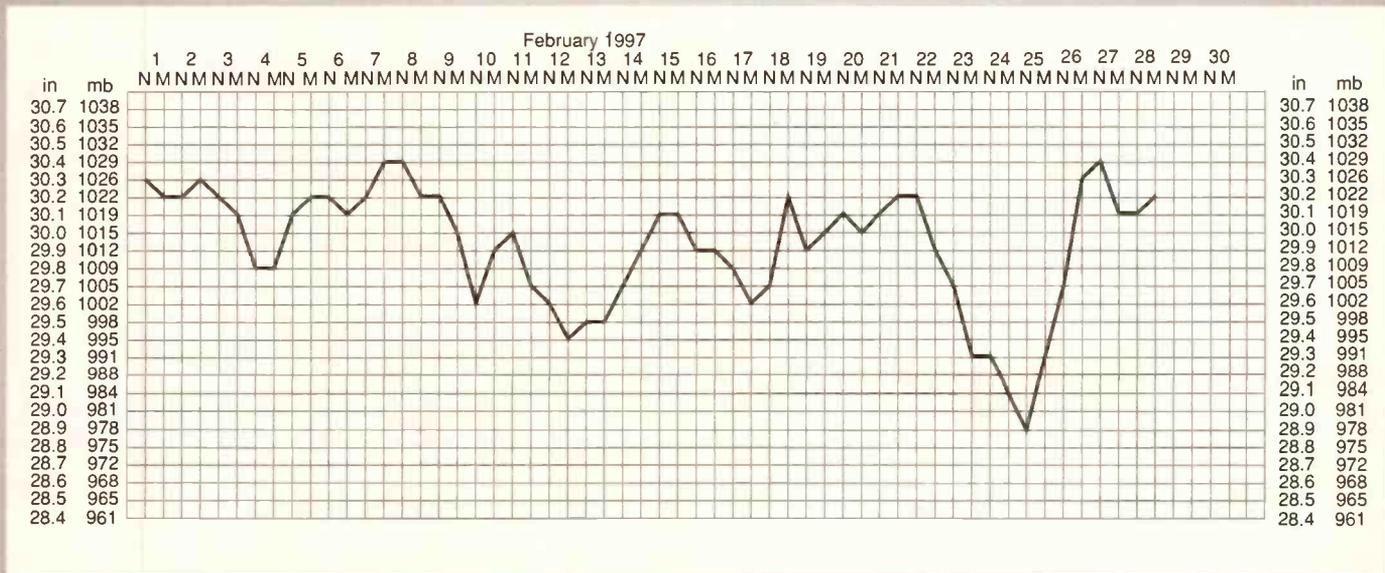
Maybe, over the next few months, we'll open a forum on what you find is good and bad about the scanners you use. I'd like to hear what you say about the kit you use. The column is read by manufacturers, so any groans, moans and praise you may have about kit can be certainly aimed in the right direction. If you have any tips or points you want to raise with other users then send them in too. Remember, this is your column and your input helps it get along.

Lastly, I'm back on disk, but cannot accept computer disks as I use a dedicated word processor and not a PC! As yet I'm still unable to access a PC so, for the time being, can you desist from sending me copy on disc?

Until next month then, keep scanning, and catch you down the log sometime.

Kevin Nice, c/o SWM Editorial Offices, Broadstone

## Propagation Extra



Ron's barometric pressure chart for the month of February 1997

Watch out next month for a change to this page. We will be bringing you a series of charts that show valuable solar and geophysical information that relates to prevailing radio propagation. Data for the charts will be gathered during the calendar month prior to the cover month of the issue.



Practical Wireless has teamed up with the nationwide communication specialists Odyssey Corporation PLC, to give away a free Ericsson mobile phone, with free connection to readers of the magazine.

The Ericsson GA 318 is one of the smallest and most reliable digital mobile phones on the market. Just 130 x 49 x 32.5 millimetres in size and a lightweight 248 grams, the GA 318 fits snugly into your pocket or in the palm of your hand.

Calling line identification, phone book and call waiting are just some of the many features of the GA 318. In conjunction with computer and fax lines, the phone can be used to send and receive data.

The GA 318 is a digital phone, so you can take it abroad and use it on your travels. Digital technology also makes it impossible to tap into your conversations.

Each phone has a retail value of approximately £300, and comes with a 14 day trial period during which you can judge it for yourself. If you do not want to keep it, simply return the phone in perfect condition and its original packaging to Odyssey.

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All sections of the contract must be completed including the telephone number.

**YOU MUST ENCLOSE WITH YOUR APPLICATION** one proof of address and one proof of signature. **Address** - driving licence or bank statement, utility bill, i.e. gas, electricity, telephone or a credit card statement, addressed to the applicant only, at the current address and dated within the last three months. **Signature** - copy of credit card or cheque guarantee card, UK passport or driving licence.

Photocopies are fine, any original copies sent will be returned.

Please post your completed application to: PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.

If you have any enquiries regarding the mobile phone, ring the Odyssey Help Desk on 0181-740 0040.



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cellular agreement  
subscriber details (BLOCK CAPITALS)

securicorcellular services

|  |       |   |                   |
|--|-------|---|-------------------|
| Name:  | _____ | If less than 3 years previous address                         | _____             |
| Address:   | _____ |   | _____             |
| Town:  | _____ | Town  | _____             |
| County:  | _____ | County  | _____             |
| Postcode:  | _____ | Postcode  | _____             |
| How long at this address? Years: _____ Months: _____ |       | How long at this address                                      | Work telephone no |
| Home telephone no:                                   | _____ | If an individual date of birth                                | _____             |
| charges (excluding call charges).                    | _____ | Company registered no:  | _____             |
| Monthly subscriptions £                              | _____ | Tariff option Regular Caller Plus One                         | _____             |
| Standard subscription: 15.00                         |       | VAT at the standard rate is payable on the applicable charges | _____             |
| Itemised billing: 2.95                               |       | Monthly charges are invoiced monthly in advance.              | _____             |

#### an agreement between

Securicor Cellular Services Limited of Aquila House, London Road, Redhill Surrey RH1 1NR (the Company) and the party described above (the Subscriber), whereby it is mutually agreed as follows: 1. The Company shall provide cellular telephone services subject to the terms and conditions overleaf. 2. This agreement shall come into effect upon connection of the Subscriber's equipment to the system. 3. Securicor Cellular Services may carry out a credit check with credit reference agencies which will retain a record of that search. If you default on your account. We will record this fact with an agency. This information may be used by lenders in assessing applications for credit by You and members of your household, and for debt tracing and fraud prevention

I understand that this agreement is for a minimum of 12 months service. Subscriber's signature: \_\_\_\_\_

|  |       |           |       |       |       |
|--|-------|-----------|-------|-------|-------|
| Full name:   | _____ | Position: | _____ | Date: | _____ |
| Securicor Cellular Services Limited. Registered no. 569829. Registered office: Sutton Park House, 15 Carshilton Road, Sutton, Surrey SM1 4LD |       |           |       |       |       |

for office use only (This section does not form part of the agreement) Administrative office (tick one) Redhill Leeds

|                     |       |                   |       |
|---------------------|-------|-------------------|-------|
| Mobile no:          | _____ | Dealer Code 80DI: | _____ |
| Credit approval no: | _____ | SIM Card:         | _____ |
| New account no:     | _____ |                   | _____ |
| IMEI no.            | _____ |                   | _____ |

#### Instructions to your bank or building society to pay direct debits

Please fill in the whole form and send it to Securicor Cellular Services Limited, Aquila House, London Road, Redhill, Surrey RH1 1NR



|  |  |
|--|--|
| 1. Name and full postal address of your Bank or Building Society branch:<br><b>To the Manager,</b> | Originator's identification number: <u>9 9   3   4   3   7  </u>   |
| Bank/Building Society.   |  |
| Address:   | 4. Bank or Building Society account number:<br>_____   |
| Postcode:  | 5. Securicor ref. number: _____  |
| 2. Name(s) of account holder(s)  | 6. Instructions to your Bank or Building Society:<br>Please pay Securicor Cellular Services Direct Debits from the account detailed on this instruction subject to the safeguards assured by The Direct Debit Guarantee. |
| 3. Branch sort code:<br>_____  | Signature(s): _____  |
| (From the top right hand corner of your cheque.)   | Date: _____  |
| Bank and Building Societies may not accept Direct Debit Instructions for some types of account.    |  |

## TERMS AND CONDITIONS FOR PROVISION OF CELLULAR SERVICES

- Definitions
  - "Cellphone" - the mobile telephone(s) used by you for provision of the Service.
  - "Charges" - the charges payable by you to us for provision of the Service.
  - "Network" - the cellular telephone system operated by Telecom Securicor Cellular Radio Ltd ("Cellnet").
  - "Service" - the cellular air time service enabling you to use your cellphone and additional services.
  - "SIM Card" - your identity module card with a unique telephone number for use with a GSM cellphone to gain access to the Service.
  - "We/Us" - Securicor Cellular Services Limited with its registered office at Sutton Park House, 15 Carshilton Road, Sutton, Surrey, SM1 4LD (registered number 589829).
  - "You" - the customer named overleaf responsible for payment of the Charges.
- Provision of Service
  - 2.1 We will endeavour to make the Service available to you provided that you observe your obligations under this contract.
  - 2.2 You will be entitled to the quality of service generally available to our cellular customers. It is not always technically possible to provide a service free of faults as quality of service may be affected by matters beyond our control including the specification of your cellphone, the performance of the Network and atmospheric and topographical conditions.
  - 2.3 Any time quoted for provision of Service is to be treated as an estimate. We will endeavour to meet estimated times but will not be liable for any failure to do so.
- Variation of Charges and Service
  - 3.1 Vary charges payable by you from time to time by giving prior written notice to you.
  - 3.2 Suspend the Service in an emergency or for repairs or maintenance of the Network and equipment used in provision of the Service.
  - 3.3 Alter any code or number issued to you in connection with the Service.
  - 3.4 Vary the maximum amount of Charges which may be incurred by you and which may remain unpaid at any one time.
  - 3.5 Make charges for some administrative actions brought about by You not complying with your obligations under the agreement.
  - 3.6 Make an additional monthly charge if you cancel your direct debit payment instruction and pay in a different way.
  - 3.7 Request that you make an interim payment to us when in our reasonable opinion your current call usage or account history give us justification.
- Cellnet Equipment
  - 4.1 You are responsible for obtaining a cellphone and any other necessary equipment to enable us provide the Service to you. You will ensure that such equipment is of a type approved by the relevant regulatory authority.
- Mis-use of Service
  - 5.1 You will not use the Service in breach of any instructions issued by us or otherwise fail to comply with any legal or similar requirement relating to the Service.
  - 5.2 You must take all reasonable measures to ensure that the Cellphone is only used by persons authorised by you.
- SIM Card
  - 6.1 SIM cards issued by us will remain the property of Cellnet.
  - 6.2 You must inform us immediately if your SIM card is lost, stolen or damaged. We will issue a replacement card as soon as possible but we reserve the right to charge for doing so. You will be liable for all Charges incurred until we receive notice of the loss, theft or damage.
- Payment of Charges
  - 7.1 You must pay for all charges invoiced to you within 15 days of the date of our invoice.
  - 7.2 VAT at the applicable rate will be payable on all Charges.
  - 7.3 We may charge interest at 4% per annum above the base rate for the time being of National Westminster Bank plc from the due date of payment until the date of actual payment.
- Limit of Liability
  - 8.1 We do not exclude or limit our liability for death or personal injury arising from our negligence.
  - 8.2 Subject to 8.1 above, our liability will not exceed £500 in respect of all claims arising in any one calendar year.
  - 8.3 We will not be liable (whether in contract, tort or otherwise) for any loss of profit or for any indirect or consequential loss.
- Term
  - 9.1 The initial period of this contract will be 12 months or such other period as may be agreed in writing. After expiry of the initial period, the contract will (subject to 10 and 11 below) continue until terminated by either of us giving not less than 90 days written notice.
- Disconnection
  - 10.1 We may disconnect you from the Network -
  - 10.1.1 On termination of this contract under 11 below.
  - 10.1.2 If our telecommunications licence is revoked or terminated for any reason.
  - 10.3 If you are in breach of any of the terms of this contract which are capable of remedy within 14 days. If you remedy the breach within 14 days, we will reconnect you to the Network as soon as practicable and after you have paid the applicable reconnection fee.
  - 10.4 If we have reasonable grounds to suspect that fraud or mis-use has occurred.
  - 10.5 If we have reasonable grounds to suspect that You will not be able to pay your bill.
- Termination
  - 11.1 This contract may be terminated by us with immediate effect if you commit any breach of your obligations under this agreement which cannot be remedied within 14 days or (in the case of a breach which is capable of remedy within 14 days) which is not so remedied, or (being an individual) you commit an act of bankruptcy or (being a corporation) a receiver or administrator is appointed over your assets or if you make any deed or arrangement with or composition with any of your creditors. We reserve the right not to release for re-use the electronics serial number of your Cellphone until you have paid to us all outstanding Charges under this contract.
- Emergency & Reverse Charge Calls
  - 12.1 No charge will be made to you in respect of calls for emergency services made available through the public telephone network.
  - 12.2 We may temporarily suspend the Service during such period as we consider necessary to give priority to the Network to those dealing with an emergency.
  - 12.3 You must not initiate reverse charge calls on the Network.
- Restriction on Transfer
  - 13.1 This contract is personal to you and you must not assign it to any third party. We reserve the right to assign our rights and obligations under this contract to a third party on giving written notice to you.
- Entire Agreement
  - 14.1 This document constitutes the entire agreement between you and us. It replaces the provisions of any previous agreement, warranty or representation made or given relating to the service.
- Modification
  - 15.1 No modification to this contract will be valid unless confirmed in writing by one of our directors or our contract manager on our behalf.
- Legal Construction
  - 16.1 This contract will be construed in accordance with the laws of England and the courts of England will have exclusive jurisdiction in relation to any matter arising out of it.
- Force Majeure
  - 17.1 We will not be liable for any breach of this contract if caused by act of God, war, emergency, compliance with any statutory obligation, industrial disputes, fire lightning, flood, exceptionally severe weather, acts or omissions of persons for whom we are not responsible or any other cause beyond our reasonable control.
- Notices
  - 18.1 Any notice under this contract must be given in writing and delivered by hand or sent by prepaid post to the following address (or such other address as may be notified from time to time). To us: Customer Service Department, Securicor Cellular Services Limited at the address shown on your invoice to you. The address specified overleaf. You must tell us if you change your address.

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# FREQUENCY EXCHANGE

Kevin Nice  
G7TZC

This month, a big thanks go to 'MC' of Bath, for some very interesting digital logs. Unfortunately, space constraints this month, only allow a selection to be published. More to follow....

| MHz      | Mode     | Time    | Call          | Location                    | Monitor | Notes  |
|----------|----------|---------|---------------|-----------------------------|---------|--|
| 2.23750  | SITOR-A  | 2141    | RETXX***      | Spanish MOI, Madrid         | mc      | 100bd/400/1, Crypto to RETYVA, Alicante and UNID station TYVZ.   |
| 2.23750  | SITOR-A  | 2141    | RETYVA***     | Guardia Civil, Alicante     | mc      | 100bd/400/1, MSG in SS to MOI Madrid.  |
| 2.23750  | SITOR-A  | 2142    | RETYVZ***     | Guardia Civil, ???          | mc      | 100bd/400/1, Calling MOI Madrid selcal TXXX.   |
| 2.47400  | Baudot   | 2027    | PBC           | Dutch Navy, Goeree Island   | mc      | 75bd/850, CARB.  |
| 2.49050  | SITOR-A  | 2025    | RET...***     | Guardia Civil, ???          | mc      | 100bd/400/1, Calling selcals TWVB, TWVL.   |
| 2.65551  | PICC-6   | 2149    | ???           | British Mil, ???            | mc      | VFT: 2ch of Piccolo-6, eng ch idle.  |
| 2.65591  | PICC-6   | 2149    | ???           | British Mil, ???            | mc      | VFT: 2ch of Piccolo-6, crypto.   |
| 2.84500  | Baudot   | 2151    | PBB           | Dutch Navy, Den Helder      | mc      | 75bd/850, CARB.  |
| 3.12190  | UNID     | 2029    | ???           | ???                         | mc      | 150bd/400 FSK UNID System, sync, cont, ACF=0.  |
| 3.16850  | SITOR-A  | 2234    | RETYMV***     | Guardia Civil, Cuenca       | mc      | 100bd/400/1, MSGs in SS to RETXX Madrid and RETYVM Murcia.   |
| 3.16850  | SITOR-A  | 2235    | RETXX***      | Spanish MOI, Madrid         | mc      | 100bd/400/1, MSGs to RETMV Cuenca.   |
| 3.16850  | SITOR-A  | 2235    | RETYVM***     | Guardia Civil, Murcia       | mc      | 100bd/400/1, MSG to RETXX Madrid.  |
| 3.17500  | c.w.     | 2204    | V***          | SLHFB                       | mc      | "V" continuously.  |
| 3.19500  | c.w.     | 2159    | R***          | SLHFB                       | mc      | "R" continuously.  |
| 3.27534  | RS-ARQ   | 1817    | ???           | ???, ???                    | mc      | 240bd 8-tone, crypto.  |
| 3.32100  | m.c.w.   | 1947    | R***          | SLHFB                       | mc      | "R" continuously.  |
| 3.480    | u.s.b.   | 1820    | Brit.Mid 9G   | Brussels?                   | ban     | Asking Ops about H/row slots via Portishead  |
| 3.81000  | RS-ARQ   | 1850    | ???           | ???, ???                    | mc      | 228.7bd/150, SLGs.   |
| 3.81000  | SITOR-A  | 2022    | ???           | ???, ???                    | mc      | 100bd/300/E, Selcals BYUY continuously.  |
| 3.84051  | PICC-6   | 2037    | MKK           | Royal Air Force, London     | mc      | VFT: 2ch of Piccolo-6, eng ch "muh 04 de mkk lalalalala pal kklilo".   |
| 3.84091  | PICC-6   | 2038    | MKK           | Royal Air Force, London     | mc      | VFT: 2ch of Piccolo-6, crypto ttc.   |
| 4.742    | u.s.b.   | 1625    | S9K           | ?                           | ban     | Requesting wx for Kinloss and Waddington from Architect.   |
| 4.742    | u.s.b.   | 1715    | Ascot 2670    | ?                           | ban     | Selcal checks with Architect.  |
| 5.535    | u.s.b.   | 0025    | Speedbird 068 | Cairo                       | ban     | Seriously ill passenger. Possible diversion Cairo. Requesting status of BA staff in Cairo. Eventually continued to LGW(26/2/97). |
| 5.610    | u.s.b.   | 1925    | Atlantic 653  | France                      | ban     | DC6 calling ops via Portishead.  |
| 5.661    | u.s.b.   | 2029    | AERDFO1414    | ?                           | hw      | wkg Malta and requesting WX.   |
| 5.680    | u.s.b.   | 1245    | Sarex 41/137  | North Sea                   | ban     | Practice SAR with Kinloss.   |
| 5.685    | u.s.b.   | 1139    | CWL 83        | 53N004W                     | ban     | Position report to MKHS.   |
| 5.685    | u.s.b.   | 1141    | CWL 8         | 54N005W                     | ban     | Position report to MKHS.   |
| 5.696    | u.s.b.   | 1145    | K98/K92       | ?                           | ban     | Radio check with Cukitrose.  |
| 6.556    | u.s.b.   | 1611    | Malaysian 137 | Australia                   | ban     | Position report to Perth.  |
| 6.657    | a.m.     | -       | SYN2          | ?                           | ban     | Numbers Station.   |
| 7.99051  | PICC-6   | 1930    | VHC           | Australia                   | kn      | Op chat with GFH also crypto ttc on 0.91 offset.   |
| 13.88600 | RS-ARQ   | 0837    | ???           | ???, ???                    | mc      | 240bd 8-tone, idle on beta.  |
| 13.98800 | CROWD-36 | 1045    | ???           | Russian Diplo, ???          | mc      | crypto.  |
| 14.30000 | MSS      | 0918    | ???           | Russian Mil, ???            | mc      | 12 tone vocoder (3300Hz pilot), ttc on l.s.b.  |
| 14.38230 | Baudot   | 1608    | DOR***        | Bulgarian MFA, Sofia        | mc      | 150bd/500, Press review in Bulgarian.  |
| 14.38500 | CROWD-36 | 1245    | ???           | Russian Diplo, ???          | mc      | 10bd, opchat ends "OK OK".   |
| 14.38730 | Baudot   | 1519    | DOR***        | Bulgarian MFA, Sofia        | mc      | 150bd/500, MSGs and SFGs to Embassy Havana.  |
| 14.43203 | SITOR-A  | 1450    | ???           | Zaire PTT, Lubumbashi       | mc      | 100bd/170/1, MSG in EE about cobalt shipment to Antwerp.   |
| 14.44800 | CROWD-36 | 1041    | ???           | Russian Diplo, ???          | mc      | crypto.  |
| 14.52074 | ROU-FEC  | 1017    | ???           | Romanian Embassy, ???       | mc      | 218.3bd/400, crypto (bitmask=0).   |
| 14.52390 | SWED-ARQ | 1031    | SAM           | Swedish MFA, Stockholm      | mc      | 100bd/400/22/E, Opchat to Dhaka.   |
| 14.52390 | SWED-ARQ | 1031    | SAAM57        | Swedish Embassy, Dhaka      | mc      | 100bd/400/22/E, MSGs in SS signed "ambassaden dhaka".  |
| 14.52500 | ARQ-90   | 0845    | DIPL***       | French MFA, Paris           | mc      | 200bd/400/E, SLGs const. carrier btw bursts.   |
| 14.53205 | MSS      | 0920    | ???           | Russian Mil, ???            | mc      | 12-tone vocoder (3300Hz pilot), ttc (on l.s.b.).   |
| 14.53517 | FEC-100  | 1455    | ???           | French Embassy, ???         | mc      | 192bd/400/1, SLGs.   |
| 14.58100 | 36-50    | 1337    | ???           | Russian Navy, ???           | mc      | 36bd/250, idle.  |
| 14.59351 | PICC-6   | 1115    | MIS           | RAF Port Stanley, Falklands | mc      | Piccolo-6, "de mts pls to qsy to the f61 f61 mate k zub 1108z".  |
| 14.60700 | RS-ARQ   | 0847    | ???           | ???, ???                    | mc      | 228.7bd/150, ALIS bursts.  |
| 14.61163 | UNID     | 1035    | ???           | ???, ???                    | mc      | 250bd/170 FSK UNID Fast ARQ System, ACF=75.  |
| 14.61700 | FEC-100  | 1440    | TAD..         | Turkish Emb, Addis Ababa    | mc      | 144bd/850/E, MSG in TT to MFA Ankara headed "fm:adis.ababa".   |
| 14.61904 | RS-ARQ   | 0951    | TAD           | Turkish MFA, Ankara         | mc      | 240bd 8-tone, File transfer "107573.001" ends "TKS SCA PSE++".   |
| 14.61904 | RS-ARQ   | 1112    | TAD..         | Turkish Embassy, Moscow     | mc      | 240bd 8-tone, MSGs in TT starts "tad de moskova".  |
| 14.61904 | RS-ARQ   | 1221    | TAD..         | Turkish Embassy, Baku       | mc      | 240bd 8-tone, File transfers to Ankara start BK-18-01.ZIP.   |
| 14.64000 | CROWD-36 | 1117    | ???           | SQUAD Station, ???          | mc      | opchat "all ok will qsp".  |
| 14.65500 | 36-50    | 1001    | ???           | Russian Navy, ???           | mc      | 50bd/200, ttc.   |
| 14.68900 | UNID     | 1042    | ???           | ???, ???                    | mc      | 250bd/170 FSK UNID Fast ARQ System, irregular bursts.  |
| 14.69900 | Baudot   | 1122    | YIX70         | INA News, Baghdad           | mc      | 75bd/400, NX in Arabic.  |
| 14.70852 | PICC-6   | 1119    | MKK           | Royal Air Force, Akrotiri   | mc      | Piccolo-6, "de mkk rgrgrgrg m8 kklilo".  |
| 14.71200 | CROWD-36 | 0741    | ???           | Russian Diplo, ???          | mc      | crypto.  |
| 14.73500 | UNID     | 1527    | ???           | ???, ???                    | mc      | 75bd/850 FSK UNID System, sync, cont, revs, ACF=64 lead-in, ACF=0 ttc.   |
| 115.700  | a.m.     | 24hr    | TNT           | Stoke-On-Trent              | tt      | Trent VOR Beacon.  |
| 118.050  | a.m.     | various | -             | B'ham                       | tt      | Airport, Approach ATC.   |
| 118.300  | a.m.     | various | -             | B'ham                       | tt      | Airport, Tower ATC.  |
| 121.800  | a.m.     | various | -             | B'ham                       | tt      | Airport, Ground ATC.   |
| 126.275  | a.m.     | various | -             | B'ham                       | tt      | Airport, ATIS.   |
| 131.325  | a.m.     | various | -             | B'ham                       | tt      | Airport, Director ATC.   |
| 166.675  | n.f.m.   | various | -             | B'ham                       | tt      | Ladywood Taxi Firm.  |
| 441.175  | n.f.m.   | various | -             | B'ham                       | tt      | Wheel Clamping company, City Centre.   |
| 453.050  | n.f.m.   | various | -             | B'ham                       | tt      | Toxa Firm.   |
| 453.200  | n.f.m.   | various | -             | B'ham                       | tt      | Toxa Firm, Digbeth area.   |
| 455.475  | n.f.m.   | various | -             | B'ham                       | tt      | Airport Ground, Rebroadcast of 121.800MHz.   |
| 455.575  | n.f.m.   | various | -             | B'ham                       | tt      | Airport Fire Crews.  |
| 455.700  | n.f.m.   | various | -             | B'ham                       | tt      | Airport Apron.   |
| 456.425  | n.f.m.   | various | Foxtrot       | B'ham                       | tt      | British Rail Transport Police.   |

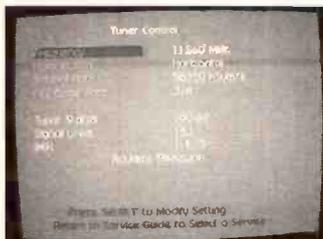
# Satellite TV News

## Heavenly Sightings.....

I write this month's article having experienced the first house move in 25 years. House moving is one of life's most stressful experiences, in my case not helped by Gastric 'Flu on the main move day! I still sit amongst boxes and chaos. First problem is that the back garden has been rotavated and turved, it's like walking on jelly and will take months to settle, so my dish remains off its stand until a new concreted-in dish post is sorted out. I'm dishless, antenna-less and signal-less.

Another regular contributor to this column is **John Locker**, who has also recently moved within Wirral, but to a prewar house with an established garden, so his 1.2m offset system is already up and running. Fortunately he can still sight across to 68.5°E and PAS-4 and west to PAS-1 @ 45°W. John comments how an increasing number of satellite circuit feeds are going digital though he has enjoyed some success via Eutelsat I F4 @ 25.5°E.

There is, however, happier news on the digital TV front, as I've seen on reader **Tom Cardwell's** video tape. Tom lives in Wiltshire and is using a Nokia/Kirch 'D Box' feeding from an 800mm dish and reports success both with digital broadcast programming and with news feeds ex Intelsat K (21.5°W).



**Tom Cardwell operates his Nokia digital receiver to display this parameter listing for a Reuters feed on Intelsat K.**



**Australian tennis feed via Eutelat II f4 @ 7°E using a SIS/EBU decoder.**

The important point to note is that normal broadcast digital TV has digital parameters completely different to those on lower grade news feed circuits and Tom's reprogrammed the receiver to lock a wide variety of each signal type. This is not an enthusiasts' (DX) operational tool as much reprogramming is necessary.

All is not lost, however, as a German company is producing the Mascom 9500, a digital receiver that will automatically self-lock onto digital signals once tuned in, be they news feeds or broadcast TV. You only have to tune the receiver to the exact frequency and the 9500 does the rest. The unit is now being upgraded and should be available shortly - watch this space!

**Bandula Gunasekera** (Sri Lanka) confirms the increasing number of digital feeds but both C and Ku-bands are on stream in that region in analogue in a big way, one new entry is an Iraqi TV channel taking up transponder space via AsiaSat-2 in extended C-Band - 3.644GHz.

**David Lindsey Gilroy** from St. Albans is a very happy man with France 3 now 'blasting in' from Telecom 2B at 12.732GHz/audio 5.8MHz in Secam - they've been carrying full time live Rugby Union coverage, whereas suffering Brits only saw - hours later - recorded highlights. "C'est bon, monsieur"! The 5°W slot is becoming crowded now with Telecom 2D also on station, a very active hot spot in the sky for both programming and news/sports feeds.

**Roy Carman** (Sandown, IoW) also comments on the 5°W spot, though with thoughts on the neighbouring 4°W slot presently occupied by the Israeli *Amos* bird and comments that 4°W may only be operable in Ku FSS and into DBS bands as the adjacent 5°W Telecom satellite slot will spread over with mega strength Telecom band signals. Roy comments on the *Hot Bird 2* on station at 13°E with various new TV services now on stream including Portugal's RTP, which departed Eutelsat II F2 at 10°E. An interesting end of January sighting was via Intelsat K with a live report from the tree and tunnel folk, protesting at the A30 construction work. January 23rd was the transponder firing up day for Telecom 2D and Roy logged nine downlinks with various test cards and other adjustments, frequency moves,

etc. The Turkish ATV programme appeared this same day at 11.643GHz horizontal on this same bird.

Christmas wishes from **Edmund Spicer** who has recently left Worthing 6th Form College for Egham University. Whereas Worthing sported a single tracking dish from 30°W to 23.5°E, Egham has three fixed receivers on Telecom 2B/D 5°W, Eutelsat 13°E and Astra 19°E. Edmund comments that RTL-9 and RTL-TVi on 5°W are encrypted in Smartcrypt other than 1800-2000UTC on RTL-9. We'd like to hear of other experiences of satellite TV within education.

The February '97 edition of *SatFACTS*, the New Zealand satellite magazine for trade and hobbyist has the following disturbing comment following the report on the SPRSCS '97 satellite trade show... "The era of TVRO as a hobby' is plainly on the wane, going the way of laser discs and 8-track tape" and goes on to say that dealers relying on hobbyist purchasing as their livelihood were finding that sales are down and disappearing rapidly compared with a year ago. Personally, I feel more optimistic as European activity is totally Ku-band orientated, there's still a long life with many analogue channels and you don't need a large dish such as our New Zealand counterparts use for C-Band. It's likely that the new second generation of auto-locking digital MPEG receivers will hit the market within the year and I feel the long term potential is exciting. I'm much happier than a year ago regarding hardware!

## Space News

Good news for our Asian readers with Intelsat signing with Matra Marconi to purchase and launch a new 'K' series bird slotting at 95°E and offering 30 Ku-band transponders for TV-DTH use across India, SE Asia and Indonesia. Completion is expected Autumn 1998. Elsewhere in the region India's public broadcaster Doordarshan is re-considering its involvement with Turner's CNNI service. Currently CNNI downlinks via INSAT 2B, 2C - having paid £1m for transponder access - but the agreement ends this July and CNNI content doesn't include sufficient Indian programming. Australian Kerry Packer has offered £95m (49%) for access to



**The Hot Bird 2 two-day test at 29°E also confirmed Eutelsat's claim to this slot. Astra are seeking a 28.2°E slot for their digital services, but Eutelsat's historical claim and actual transmissions tend to confirm they will get 29°E.**



**Happy greetings via Intelsat K at 21.5°W.**

Doordarshan's DD3 English language service, which needs reviving. The Indian government are very touchy on foreign involvement with home broadcasting affairs.

As from December '96, a satellite receiving licence has been necessary in India, this is a government attempt to subdue unregulated DTH growth. Star TV is targetting India with a 40-channel package (ISKYB) from April/May '97. This will rival the DirecTV and Modi Entertainment satellite packages also starting this year. Sony is reckoning to enter the Indian satellite market with an investment of nearly £40m and at least three music channels, all based in India with a high level of local input.

Sony Japan have expressed an interest in taking 33% of Murdoch's (News Corporation) JSKYB (Japan Sky Broadcasting) which takes the air April/May '97 initially with 12 channels increasing to 150 within 12 months via the JCSAT-3. JSKYB are in discussion with PerfectTV to use a common receiving standard. PerfectTV reckon to have over 100 channels on-air by year's end before rival DirecTV appears in the sky with their 100-channel service in October '97.

Yet another RTL satellite (+ cable) channel will be on-air over Europe before mid-Summer. RTL-Plus will offer time delayed and repeat programmes from the other RTL channels (RTL; RTL-2; Super RTL).

Medium power Israeli bird *Amos* at 4°W will soon offer European viewers Venezuelan

# DX Television

Although January is traditionally a quiet month for long-distance TV reception, the current period was particularly notable with plenty of activity to satisfy most enthusiasts. A good bout of Meteor-Shower activity occurred during the first few days of the month thanks to the Quadrantid shower. Various snatches of signals were seen, mainly of test

cards from Sweden and Denmark; the latter was easily identified during the many brief 'pings' of signal. Tropospheric reception occurred on the 24th, 25th and also the 30th with signals from as far away as Denmark. Sporadic-E openings occurred on the 19th and 20th; the latter lasting from late morning until early evening. All in all, an interesting month. Let's hope that the trend continues!

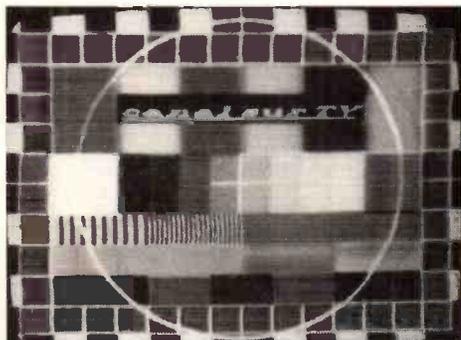


Fig. 1: The Spanish Canal Sur TV network operates at u.h.f. throughout Andalucia.

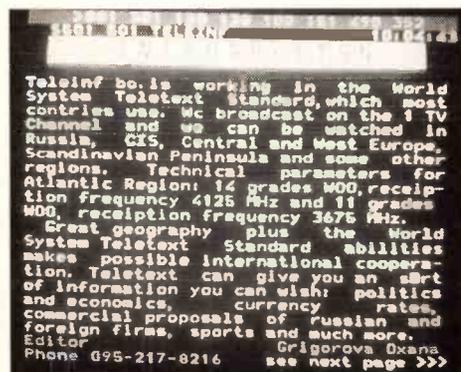


Fig. 2: Many pages of Teleinf, the Russian ORT teletext service, are in English. This was received from St. Petersburg via tropospheric reception by Pertti Salonen in Finland.



Fig. 3: Typical 'Senderdia' caption as radiated by the old DFF transmitters throughout East Germany.

## Reception Reports

**Peter Barber** (Coventry) noted Sporadic-E signals on the 19th between 1705 and 1747UTC. These included TVE-1 (Spain) and several Eastern European Channel R2 signals. The opening on the 20th was more impressive with the Danish test card on Channel E3 and weak unidentified video on R2 at 1129UTC. By 1300, Icelandic programme schedules (Channel E4), the Swedish test card (Channel E4) and Italy on the news (RAI UNO on Channel IA) had been logged. Various colour-bar patterns and programme schedules were seen around midday on Channel R2 but could not be identified. At 1644UTC, Estonian pictures were resolved on Channel R2 from the Tallinn outlet. RAI UNO returned with the 'tg1' news programme at 1716 on Channel IA; Channel IB was active a little later in the evening. Many unidentified signals were received throughout the other Band I channels but by 2005 the band was completely empty.

**Shaun Taylor** (Howden) also logged Italy on Channel IA from

1830UTC on the 20th. Other Sporadic-E signals included TVE-1 Spain (Channels E2 and E4) and RTP-1 (Portugal, Channel E3). Both networks were broadcasting their news programmes at 1930.

**Stephen Michie** (Bristol) identified signals from Slovenia (SLO-1 on Channel E3), Sweden (SVT-1, Channel E3), Denmark (DR-TV, Channel E3) and Belarus (TKb, Channel R2) around midday during the opening. Germany (ARD-1), Italy (RAI UNO) and Croatia (HRT-1) were present between 1800 and 1830UTC.

## Tropospheric Reception

**Tim Bucknall** (Congleton) was astonished to find signals from the new Telefis na Gaelige network which opened at the end of 1996 throughout Eire. The new network operates at u.h.f. and there are several high-powered outlets which should be easy to receive in the UK. Tim logged signals from Cairn Hill (Channel E50, 800kW e.r.p. Horizontal polarisation) and Spur Hill (Channel E63, 10kW e.r.p. Vertical polarisation); RTE-1 and RTE-2 signals were also seen from Kippure on Channels E40 and E43 respectively. The mystery signal received from the west on Channel E59 by **Andrew Burfield** (Braintree) in December seems likely to have originated from the new network. The Irish networks use system I (the same as the UK) so you will have no difficulty receiving the sound on a normal British TV set.

Stephen Michie reports many French and Dutch transmissions throughout Band III and u.h.f. on January 14th. The Danish TV-2 network outlet was received on Channel E40. Unfortunately, co-channel interference from a UK transmitter marred the picture. Peter Barber logged French Canal Plus signals throughout the day. Belgium (RTBF-1 E8) was also present with a news bulletin around midnight. On the 15th, conditions improved and the distinctive DR-TV test card from Denmark on Channel E7 was seen. French Canal Plus broadcasts were present on Channels L7, L8 and L10.

## FM Reception

**Mike Gaskin** (Cornwall) heard several f.m. stations during a period of tropospheric activity between January 13th and 15th. These included all the usual London stations, Channel 103 FM, a 3.8kW outlet in Jersey, Radio LM FM at 95.80MHz from the north-east of Eire. There were Radio France stations everywhere! The Sporadic-E opening on the 20th provided Swedish 1 and 3 networks at 87.60MHz and 97.30MHz around midday. The band opened up again to Croatia at 1815UTC with HRT-1 from Psunj on 97.30MHz.

Mike also reports an unwelcome intrusion into Band I consisting of several strong carriers using both n.b.f.m. and a.m. transmission modes. No doubt this is the start of the new p.m.r. network that has been on the cards for some time. Test tones and taped speech were heard.

## Other Points

The Fremont Point transmitter photograph featured in the February issue brought back memories for **B.M. McKeowen** (Sheerness). He was one of the gang who erected it.

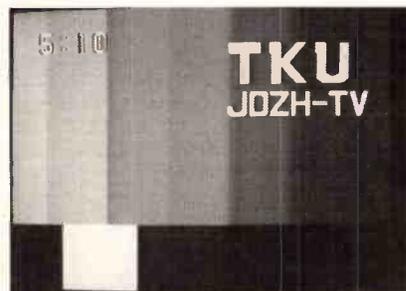


Fig. 4: Japanese station TKU during a test transmission. Photograph supplied by Hokykoky Maggnomito.



Fig. 5: TKU opening caption.

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**Janes Military Communications 12th edition 1991-1992.** A vast volume of 814pp. Large format, wraps. Contains descriptions, photographs and basic details of the world's military communications equipment. Brand new. Published at over £100. **SPECIAL PRICE £30** postage £5.50. Overseas postage extra.

**Eddystone Communications Receiver Data 1950-1970.** A facsimile reprint of the circuit diagrams, general description and some service notes for sets from: 1950-1970. 50 pages. **£9.75** incl p&p.

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**Racal RA17 Communications Receiver Technical Service Manual.** Facsimile copy, contains general description includes circuit diagrams, layout and alignment and brief fault finding notes. Large format. 46 pages. **£9.50** incl p&p.

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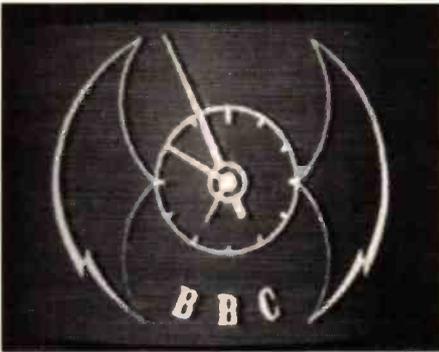
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**Fig. 6: From the archives! The BBC 'Bat's Wings' Clock radiated in the Fifties.**

**Interference**

**Dave Lauder** (Barnet) is writing a major feature on the subject of TV and video interference for a future issue of *RadCom* magazine. One of the findings concerns a four-set distribution amplifier covering 40-860MHz. Apparently it is also sensitive to 3.57/14 and 28MHz signals getting in via the mains cable!

Some of the more modern TV receivers are causing

interference to the h.f. bands. Conversely, Peter Barber has problems with a scanner which produces spurious patterning to local Sutton Coldfield BBC-1 transmissions on Channel 46. Certain satellite receivers cause severe diagonal patterning on Channel 46 even when the antenna is plugged directly into the TV. Adjusting the satellite receiver's modulator does not solve the problem but the interference can be reduced if the r.f. lead between the satellite receiver and VCR is carefully positioned.

**Dr. G.L. Manning** (Edgware) queries a small white square dot which is sometimes superimposed in the left-hand corner of his local ITV picture. The dot is to help transmitter technicians identify the source of a signal in areas where a split-network operates. For instance, in the Central TV area, the Waltham (East Midlands) transmitter (and its dependent relays) occasionally superimposes a white dot to distinguish it from broadcasts from West and South Midlands transmitters.

**Service Information**

**Eire:** The following 'Telefis na Gaeilge' transmitters are now operational throughout Eire:-

| Station        | Channel | Power (kW) | Polarisation |
|----------------|---------|------------|--------------|
| Mullaghanish   | E31     | 500        | H            |
| Kippure        | E59     | 500        | H            |
| Clifden        | E32     | 10         | V            |
| Castletownbere | E63     | 10         | V            |
| Holywell Hill  | E33     | 20         | H            |
| Spur Hill      | E63     | 10         | H            |
| Cahirciveen    | E49     | 15         | V            |
| Ballybofey     | E64     | 0.5        | V            |
| Casla          | E49     | 5          | V            |
| Crosshaven     | E65     | 2          | V            |
| Cairn Hill     | E50     | 800        | H            |
| Maghera        | E68     | 500        | H            |
| Lahinch        | E50     | 0.1        | V            |
| Three Rocks    | E55     | 25         | H            |

**United Kingdom:** Central Television has a regional teletext service, i.e. East, West and South Midlands. This is broadcast by the appropriate transmitters serving the sub-regions.

**Channel 5 Transmitters**

The network should open on 30 March. The Channel 35 transmitters will not be operational until later in the year. No further frequencies will be added to the terrestrial network once these come on-air.

**Keep On Writing!**

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



**Check Eutelsat II F2 @ 10°E for unusual news items. With several broadcasters departing for 13°E, 10°E may well become busier for news and corporate feeds.**

soaps via the 'Telenovela Channel' intended for Rumania, Hungary and Poland, running up from an initial 8 hours to almost 24 hours a day. Russian and Czech sound tracks will be added later. The service is being administered by London group 'Zone Vision'. New arrival on *Amos* is Turkish broadcaster ATV who will have their main ATV1 service supplemented with a second channel carrying children's and film programming.

Ted Turner is looking to improve his programming

services across Europe with general entertainment channels similar to his TBS Super station ex-Atlanta, USA. Talks are in progress, but nothing concrete has been announced. With the Warner Channel dropping out of the Sky Multi Channel package and Warner merging with Turner Stateside, Ted Turner may offer an entertainment channel based around Warner programmes.

Better news for RTVE Spain with the government confirming financial backing of £117m and entering the digital TV arena. TVE



**Roy Carman (Sandown, IoW) snapped a traditional PM5544 test card ex-Italy on Eutelsat II F2 @ 10°E.**

Tematica will join with Teleconica on the Hispasat satellite and offer services to rival Canal Plus Espagne.

Keep a check on your local Sainsbury for new dishes, a digitally compressed MPEG business network is being constructed across 364 UK stores for product news and staff training, the first digitally compressed satellite TV 'service' in food European retailing. The service is based around Scientific Atlanta's PowerVu compression. Both Safeway and Vauxhall

Motors currently have corporate hookups running (witness the dishes on their stores and garages) but their services use MAC analogue technology.

Check out for new Arab uplink stations on your dials with Arabsat now having completed construction and testing of new sites at Riyadh (Saudi) and in Tunisia. The stations will generally work into Arabsat birds.

# Airband

As promised, the results of the Christmas Quiz (see January's 'Airband'). Entries were received from **Andrew Green** (Barnsley), **Peter Johnson** (Hastings), **Roger Preston** (Rickmansworth) and **C. Sutcliffe** (Sunderland). The low turnout and the delay between the quiz appearing and any entries being received suggests that this must have been more difficult than previous years!

So, well done all who entered, just shows that it's worth a try even when effort is required. Some of the answers have appeared in previous issues of 'Airband.'

**Question 1:** QNE is the altimeter reading that would be indicated when landing at the aerodrome with standard pressure setting, 1013.25 hectopascals (was millibars) or 29.92 inches of mercury (in the USA). This is only necessary when the day's atmospheric pressure is so low that it is off the scale of most altimeters. With the bad weather associated with such conditions, should you be flying anyway?

**Question 2:** QFF is set on an altimeter only under extremely cold conditions. This compensates for an error that would occur had QNH been set. In fact, at temperatures below -13°C the altimeter would over-read on QNH. Rarely needed under operational conditions, this is mainly of academic interest to meteorologists.

**Question 3:** With two channel v.h.f. relays, each transmitter (eg. for VOLMET) is offset by 5kHz from the published frequency. Other offsets are required for different numbers of relays sharing the same frequency.

Each entrant only managed to get one answer correct at best. In particular, QFF was not a misprint for QFE. I'm not sure what the US military mean by 'pressure altitude' in this context, Roger, it might be QNE or more likely actual airfield elevation above sea level (relevant to QNH).

As my decision is final, I have chosen Mr. Sutcliffe as the winner by randomly selecting from the entries with one correct answer. Well deserved as he presents a clear explanation of QNE including specifying its use when air pressure is below 950 hectopascals. This applies in the USA, British specification altimeters can work down to 800

hectopascals. I've passed his address to the Editor so as to send a suitable reward.

## ACARS Explained

Andrew has only been interested in the airbands for 18 months. With his quiz entry he asked a question about Aircraft Communications Addressing and Reporting System (ACARS). In this country, it explains the quick bursts of rasping noise on 131.725MHz. Each burst is digitally-encoded information, that is, the information is passed over the air in a format similar to that found in a computer system.

To decode ACARS you actually need to link a computer to your radio and specialist products to enable this are advertised in this magazine. Unfortunately, each airline adopts its own variations on the coding scheme and so results are disappointing as the computer software can't be programmed to 'know' all the possible schemes. A friendly request to Mike Richards' 'Decode' column might get him to print some more details.

ACARS is bidirectional. The crew can initiate messages from the aircraft to ground, but the most common transmissions are automatically invoked by the aircraft itself. An example is take-off time.

Aircraft have microswitches rigged to the undercarriage legs. When the aircraft weight compresses the oleo shock-absorbers, the switches close (and among other things inhibit the 'Gear Up' lever in the cockpit). Weight coming off the switches means the flight has taken off.

The operating company can send messages to the crew as well. So far, ACARS is mainly used for communication between aircraft and the airlines, never for air-traffic control.

## Receiver Hardware

As you'll see at any control tower, airband v.h.f./u.h.f. antennas are vertically polarised. A transmitting aircraft could be anywhere, its signal arriving from any direction and indeed any angle of elevation. That's why directional antennas (including log-periodics) are unsuitable for the airbands, even when mounted on a rotator.

What alternatives are available to **Stefan Allum** (Framlingham)? Readers have sent favourable

reports on the Air-33 as advertised in this magazine, a discone is an option if broadband coverage is required (you can even transmit on several amateur bands), but I haven't yet had any reader comments on the Air-44.

Whatever you put up, make it weatherproof, safely attached (away from overhead cables) and do not forget to check third-party liability cover in your house insurance policy.

## Flight Operations

I'm told by **Euan Smith** (Helensburgh) that North Atlantic h.f. circuits (example: NAT-A 5.598MHz) can carry military traffic when air force flights liaise with naval vessels during exercises at sea. With operations conducted below 6000ft (presumably altitude) I hope the weather was kind!

I hope that **T.A. Brodie** (Plymouth) enjoys the trip to Heathrow that the family are arranging as a treat. The viewing area is on top of Terminal 2/Queen's Building but, as the apron has grown over the years, seems far from the runways.

On 123.9MHz, a.t.i.s. will tell you which runways are operational. Clearance delivery is 121.7 or 121.975; Ground Movements Control 121.0, 121.7, 121.9; Tower (Aerodrome Control) is 118.5, 118.7 or 124.47MHz. Between them, these frequencies control everything that can actually be seen in the vicinity.

## Information Sources

Please would all readers note that 'Airband' is a spare-time paid hobby, I'm not an employee of the magazine. I'd like some time to develop my Museum, too! So I can't provide a direct correspondence service. Any question worth asking is worth printing in this column for all to share.

If you want frequencies and charts of airways, why not buy the same publications that pilots carry? Various suppliers including the RAF sell to the public by mail order and I list these organisations in *Airband Factsheet* which is yours, free for the asking, if you send a reply-paid self-addressed envelope to the Broadstone Editorial Offices (to hold two A4 sheets).

For example, **Ronald Howe** (Sittingbourne) would like a list of

## Control Tower at Benbridge.

Christine Mlynek.



frequencies for over-the-pole flights. All you need is listed on the front cover of the Aerad *Polar Chart (High Altitude)*.

I recommend getting the Factsheet which tells you how to contact Aerad for the latest prices. You will be interested that most Polar frequencies are part of the North Atlantic (NAT) h.f. network (there are too many to list here).

Perhaps cheaper than the Aerad *Supplement* at £4.99 (includes inland postage, an extra £1.75 should cover overseas airmail), but less detailed, is *Frequency Guide* from **Air Supply, 83b High Street, Yeading, Leeds LS19 7TA, Tel: (01132)**

**509581**. It's your choice. Thanks to Air Supply for kindly sending a review copy. It only seems to cover the UK (Aerad gives you Europe etc.).

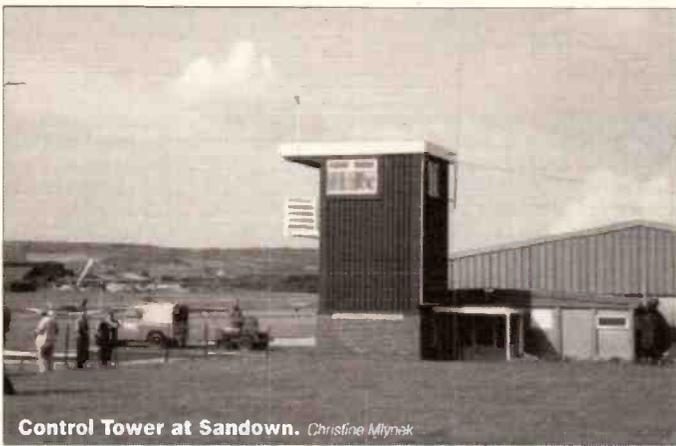
Those mysterious LATCC sectors are listed in full detail, but not the Scottish ones, which were by now out of date anyway! Good news is that updates are planned every six months. Unlike Aerad there's the added bonus of military u.h.f. assignments. Reverse frequency lookup is always useful but you can't find company frequency when only the airline name is known.

I find it hard to validate large reference books although I did note the authors were caught out by AFIS (rather than a.t.i.s.) at Coventry - then they're not alone! If really hard-up then this book is cheaper and smaller than Aerad and RAF supplements and the presentation is easy to read.

## Follow-Ups & Foul-Ups

Updating this month's article on 'Airband Meteorology,' *AIC 4/1997* from the CAA introduces improved wind reporting. Large airports will quote the short-term averaged wind strength but light aircraft pilots sometimes prefer to be told the instantaneous reading. In this case, the controller will now prefix the information with the words 'Instant wind.'

Page 70, February, asks about 128.825MHz and **Bob de Savigny-Bower** (Woking) notices



Control Tower at Sandown. *Christine Mlynec*

that Rhein Radar, Frankfurt/Wurzburg Upper Sector, is on this frequency.

The photo on page 72 in February wasn't a DH.89 Dragon Rapide and **R.G. Taylor** (Henley-on-Thames) should know as he flew in the Dominie military version just before the war. Having studied the reference books I agree that the photo actually shows a DH.84 Dragon.

### Frequency & Operational News

As promulgated in *GASIL* 1 of 1997 from the CAA, Sumburgh's radar (includes offshore service for helicopters serving oil rigs)

changes to 131.3 (was 126.1MHz). I'm sad to see that Ipswich Airport (I had flying lessons there) is closing. By chance, it's the only grass runway from which I've flown, at one time accommodating Suckling's Dornier 228 scheduled flights.

Last month I summarised the extensive changes to Scottish airways frequencies. *AIC* 15/1997 explains that this re-arrangement was necessary to increase capacity, especially as many north Atlantic flights will start operating at reduced vertical separation (1000ft instead of 2000ft).

Scottish Air Traffic Control Centre issues a chart of the new sectorisation (but no frequencies

are shown, you have to match it up to the Aerad or similar *Supplement*). Sectors are: Antrim, Central, Dean Cross, Forth (Low and High), Hebrides, Moray, South West. You can obtain this single A4 sheet from: **Manager ATC (Airways), National Air Traffic Services Ltd., Scottish and Oceanic Area Control Centre, Atlantic House, Sherwood Road, Prestwick, Scotland KA9 2NR**. Don't forget the pre-paid self-addressed envelope.

LATCC frequencies have been affected too and it's been difficult

for me to keep up - without becoming a rival to Aerad! A helpful clarification from **A.H. Harrison** (Chester-le-Street) suggests that, in the Pole Hill sector, 131.05 has been withdrawn but 118.775, 126.875, 129.1, and 135.575MHz are current.

The next three deadlines (for topical information) are April 14, May 19 and June 16. Replies always appear in this column and it is regretted that no direct correspondence is possible.

### Abbreviations

|          |  |
|----------|--|
| AFIS     | Aerodrome Flight Information Service                     |
| AIC      | Aeronautical Information Circular                        |
| a.t.i.s. | automatic terminal information service                   |
| CAA      | Civil Aviation Authority                                 |
| ft       | feet   |
| GASIL    | General Aviation Safety Information Leaflet              |
| h.f.     | high frequency   |
| kHz      | kilohertz  |
| LATCC    | London Area & Terminal Control Centre                    |
| MHz      | megahertz  |
| QFE      | altimeter pressure setting, reads zero when on aerodrome |
| QNH      | altimeter pressure setting, reads height above sea level |
| u.h.f.   | ultra high frequency                                     |
| v.h.f.   | very high frequency                                      |
| VOLMET   | VOLume METeoroological report                            |

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# MilAir

## Brize Norton Radar Frequencies

|         |             |        |                  |         |               |
|---------|-------------|--------|------------------|---------|---------------|
| 119.0   | Primary     | 128.25 | Radar            | 338.65  | Primary       |
| 123.3   | NATO Common | 133.75 | Approach & Radar | 344.0   | NATO Common   |
| 123.55  | Radar       | 133.9  | Radar            | 356.875 | Primary       |
| 123.725 | Radar       | 134.3  | Primary          | 376.625 | Into Fairford |
| 127.25  | Radar       | 257.1  | Primary          | 379.125 | Withdrawn?    |
|         |             | 268.5  | Withdrawn?       | 385.4   | NATO Common   |
|         |             | 277.35 | Radar            |         |               |

## No UHF Changes

The letters I received voicing concern over possible future u.h.f. frequency changes, prompted me to do a little investigating, (see December issue of *Short Wave Magazine*). Having approached various sources, I eventually spoke to an 'informed source' who very kindly did some checking for me. The outcome was that as of early February the situation was that "There are currently no plans for any major changes of this sort". For the immediate future I am sure all airband enthusiasts will all agree that this is good news.

Actually, if you think about this situation logically it would seem a pointless exercise to change all the frequencies for anything other than logistical operational reasons. The purpose of the last changes in 1992, was to make more available frequencies by allocating a much higher number of new frequencies utilising three decimal places, 251.225 for example. If you link this policy of more available channels with the base closure programme over the past five years, there must be more than enough frequencies available for all the necessary needs. Since 1992, at least fourteen civil and military airfields that had u.h.f. frequencies in use have closed

or been reduced in status. If each of these had say an average of 15 frequencies in use, then over 200 frequencies have been made available for re-allocation. With all this in mind, I would hope that any significant changes could be avoided in the near and perhaps the distant future?

## Brize Norton

Dave from Woodstock, near Oxford, writes to me with some questions about Brize Norton and in particular their radar frequencies. He asks why Brize Radar seems to have so many frequencies compared with most other radar units, and follows this by asking what frequencies are in use as he feels he is missing a number of discrete frequencies. Firstly, I would assume that Brize has a larger number of radar frequencies available as it can provide the Approach and let down facilities for a number of adjacent airfields. This includes airfields such as Benson, Fairford and Lyneham, and before their closure, others such as Kemble and Upper Heyford. Also it is almost directly under the Westcott corridor which may necessitate the use of their radar facilities for aircraft climbing into or leaving this airspace. The actual Westcott corridor is controlled by

London Military using frequencies such as **133.9** or **275.35**. Also, I think a fair amount of civil light aircraft also contact Brize for a Lower Airspace Radar Service, (including those into Oxford Kidlington), so all in all it can be a busy radar unit. Having checked my records the Brize Radar frequencies I have listed are shown below, I see from my notes that some have not been heard in use for some time so they may have been withdrawn? Can anyone update the list?

## NATO Common Frequencies

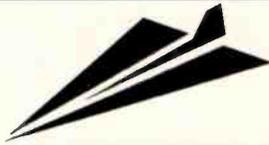
Incidentally, having just typed the section about Brize Norton it occurred to me that it is worth making a comment about the NATO Common Frequencies. Those of you who have been airband listeners for years will take this as read, but others who are new to the hobby, may not realise their significance. These v.h.f. and u.h.f. frequencies remain constant throughout all NATO airfields, the Air Traffic control allocations are as follows: Tower **122.1/257.8**, Approach **362.3**, Approach - Radar **123.3**, Radar **344.0 / 385.4**. Almost every military airfield will utilise these frequencies at some time, some as

their main frequencies others as a standby. Experience has shown that the v.h.f. frequencies are most likely to be heard in use, from my home I regularly hear 123.3 in use with two adjacent airfields. If you have half a dozen free channels, it is well worth putting these frequencies into memory.

## Thunderbirds

News has reached me that the US aerobatic team the Thunderbirds are due to display at the Mildenhall, USAF 50th anniversary show. Consequently, so you can listen to them in action, next month I shall include a list of their display frequencies. With the airshow season almost upon us, if readers would like to send in any other recently noted frequencies in use by other Aerobatic Teams, I will hopefully include a listing in the next couple of months.

**Information** Lastly, I am in debt to Keith who has written in with a most comprehensive log of aircraft movements. Unfortunately, I do not have the space to include extensive movement details, so I would like to repeat my earlier request. Please keep sending in your logs, but it would help me greatly if you could highlight any items that you feel are unusual or perhaps provide new frequency or other topical information - thanks - see you next month.



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# Info In Orbit



Fig. 1: GOMS infra-red image on 17 February (from METEOSAT-6).

Fig. 3: NOAA-14 image of UK from George Newport.

The first test transmission from METEOSAT-6 of a GOMS image dated 17 February 1997 at 0600UTC - see my image Fig. 1 - was made at 1054UTC on 18 February. GOMS is the geostationary WXSAT operated by the Commonwealth of Independent States. Together with METEOSAT, GOES and GMS image retransmissions, METEOSAT WEFAX is really giving value for money! Announcement of the test was made after last month's press deadline for 'Info', as often seems to be the case. Another three test transmissions were made but I had to stow my dish immediately after the above slot because of imminent storm force winds. **George Newport** of Canterbury sent high quality GOMS prints a few days later.

## Current WXSATs

METEOR 3-5 was transmitting images of somewhat improved quality during early February. I noticed the change during January, then comments about it began appearing on an Internet WXSAT mailing list. Around mid-February my images degraded, then recovered their quality on 19 February. Visible-light images from NOAAs 10 and 12 are rapidly improving as spring arrives and the sun's elevation increases.

METEOSAT-6 became the European operational satellite from 0800UTC on 13 February, when operations were transferred from METEOSAT-5. There was a short scheduled delay, then at 0838UTC a METEOSAT-5 0800UTC image was disseminated. The first METEOSAT-6 image was the D2 (European infra-red format) image transmitted at 0858UTC.

As is widely known, EUMETSAT encrypt almost all of METEOSAT's primary data, requiring an expensive decryption unit, hardware interface and licence to be obtained if all the images are to be used. With plans for the additional retransmission of GOES-9 and GOMS images being recently revealed, I asked EUMETSAT to clarify the situation - would the new re-transmitted images remain unencrypted?

**Volker Gaertner** of EUMETSAT User Service responded - "From 1 April 1997 onwards all foreign satellite formats (GOES-8, GOES-9 and

GMS) will be disseminated in unencrypted form unless the operators of the other spacecraft would explicitly require that those formats have to be encrypted. The GOES-9 and GMS digital formats will be available from early May 1997 onwards".

Following this clarification, we now have the interesting situation that anyone with PDUS equipment should soon be able to receive clear primary data images from Japan, America and Russia, but may not be able to receive clear METEOSAT images (other than the very few unencrypted transmissions!).

## World Radiocommunications Conference - 1997

Some commercial satellite interests are once more seeking access to bands below 1GHz, including the amateur allocations at 146 and 430MHz. Little 'low-earth-orbiting satellite' (LEO) interests have proposed adding 219-225MHz to their list of desired allocations for the non-voice, non-geostationary mobile-satellite service (MSS). The AMSAT News Service Bulletin 047.01 issued by AMSAT HQ at Silver Spring on 16 February, says that the move was contained in the industry's so-called 'flexible allocation proposal,' delivered at the 13 February meeting of the FCC Informal Working Group (IWG) 2A. Little LEO targets now include 146 to 148, 219 to 225 and 430 to 450MHz. The ARRL and AMSAT were among those objecting to the concept. The 1997 World Radiocommunications Conference (WRC-97) is to be held later this year. 'Info' will feature details at they become available.

## Letters & Pictures

**Peter Schoen** wrote from Germany to send a selection of images from GOMS, METEOR 2-20 images (transmitted by GOMS), and NOAAs-12 and 14. Peter monitors GOMS directly, using a TH2 loop Yagi and has heard the transmissions, as well as those many periods when GOMS is not disseminating imagery. Peter uses a Timestep h.r.p.t. set-up located in his backyard (sounds familiar!) From a large selection I have included a summertime h.r.p.t.

(high resolution) image of Sicily, with the island of Malta and the coastline of Tunisia included in this channel 2 image.

George Newport of Canterbury regularly sends me sets of high quality pictures. I have selected Fig. 3, a summer picture from NOAA-14, showing the UK totally cloud free on a July day.

**Roger Ray** of Telford sent in several images from which I selected one from May of last year. Roger has assembled a portable WXSAT receiving system to



Fig. 2: NOAA-14 image of Sicily from Peter Schoen 28 July 1996.

provide live images while away on holiday. This system is based on a laptop computer, portable Timestep two-channel receiver, and a rebuilt crossed-dipole antenna.

## Bulletin Boards (BBSs)

There are a number of BBSs providing information on satellites and allied subjects, and some also carry software. Probably the best non-commercial sources are the RIG BBS and Starbase 1.

The **RIG** (Remote Imaging Group) BBS is on (01344) 874140 and provides probably the cheapest instant source of Kepler elements. When you dial in, the elements of our favourite satellites are dumped on the screen before the sign-on invitation arrives. This means that you can dial-in and then exit - for the cost of a short phone call. Some software and images are also available for members to download.

**Starbase-1 BBS** is run by Nick Stevens and can be contacted on either: 0171-703 3593 or 0171-701 6914. If you register and subscribe to the BBS you get significant privileges including the use of the off-line reader (OLR). This allows you to set up groups and forums

for monitoring on the BBS (I monitor astronomical societies' astronomy pages, amongst others). You can then log-in at any time and download a compressed file containing the postings in each group. This can be uncompressed after you leave the BBS, making it an economical process to keep up-to-date with all the chat and information. I joined Starbase-1 some years ago and find it an excellent source of software and HST images.

## MIR Operations During 1997 (March to May)

Many readers have expressed an interest in MIR activities so I shall include occasional notes. VideoCosmos have provided a list of the operations scheduled for MIR during 1997. The following extract covers the period until May.

March EVA (extra-vehicular activity - US program)  
26 April Progress M-35 (11F615A55 No.235) launch  
27 April Progress M-34 undocking and deorbit  
28 April Progress M-35 docking to PkhO port

These launches and flights may be heard by monitoring the frequencies previously published for MIR and its associated support activities.

## Beginners - Kepler Elements

There have been many letters asking for explanations of Kepler elements; as it is some years since I covered this topic, I am providing some notes during the next few editions. Let us start right at the beginning by referring to an example of a launch - the American WXSAT NOAA-14, which was launched a few years ago. Being a member of the NOAA constellation (that is, it was joining NOAAs 10, 11, 12 and 13), several facts were already known about its planned orbit. Launch was to place it into an 'afternoon ascending' orbit - one in which it would pass over any given place on earth, travelling northwards during the afternoon. The term 'ascending' refers to its direction (northward) when crossing the equator, so that NOAA-14 passes over the UK travelling northwards during the afternoon. NOAA-12 is in a

## Frequencies

NOAA-14 transmits a.p.t. on 137.62MHz  
 NOAA-12 transmits a.p.t. on 137.50MHz  
 NOAAs transmit beacon telemetry on 137.77 or 136.77MHz  
 METEOR 3-5 (or 2-21) use 137.85MHz  
 OKEAN-4 and SICH-1 occasionally use 137.40MHz  
 METEOSAT-5 (geostationary) uses 1691 and 1694.5MHz for WEFAX  
 GOES-8 (western horizon) uses 1691MHz for WEFAX  
 MIR 145.55 and 143.625MHz.

'morning descending' orbit. These descriptions remain valid (for a long period after launch) because the NOAAs are essentially 'sun-synchronous', that is, their orbits remain nominally synchronised with the sun. METEORs, on the other hand, are non-sun-synchronous; their orbital planes constantly rotate with respect to the sun. This is the reason that orbits of the METEOR WXSATs change so occasionally the solar panels receive limited illumination for several days. This requires the operators to power down some of the onboard systems.

All satellite orbits are defined by a set of measurements, and these parameters are called Kepler elements, after the astronomer Johannes Kepler who first described the orbits of planets around the sun, in terms of these parameters. Each parameter has



Fig. 4: NOAA-14 from May 1996 from Roger Ray.

been given a name - some more unhelpful than others! The parameters are Epoch, inclination, Mean Motion, Mean Anomaly, Right Ascension of Ascending Node, Eccentricity, Argument of Perigee, and optionally, Decay and Epoch Revolution. The optional parameters can be used if required, as will be explained in a future edition.

As mentioned a month or so back, the American Department of Defence uses radar to measure a satellite's position and movement. The time at which a set of Kepler elements is computed is called the Epoch, and can be expressed either as a decimal (of a day), with an associated day number, or in normal fashion. Most satellite tracking programs permit this entry in either format. For routine monitoring I often use Instant Track running on my PC, and the current MIR elements, as on 21

February, have the Epoch 97049.4096 (etc.), which converts to 18 February 0949UTC - give or take a few seconds. These elements are therefore 3.3 days old. Due to external influences - such as solar activity, or even the proximity of the Moon - satellite orbits (and therefore the associated Kepler elements) change. Always use recent element sets to ensure your program remains accurate.

## FENG YUN 2B

The planned Chinese geostationary WXSAT Feng Yun 2B (FY-2B) is officially due for launch sometime this year; it will be located at 105° East. Operationally similar to GMS (the Japanese WXSAT) it will have high resolution stretched VISSR (Visible/ Infra-red Spin Scan Radiometer) data (5km infra-red, 5km water vapour and 1.25km visible), together with low resolution WEFAX (analogue), DCP (Data Collection Platform) capability and a new digital S-band FAX service (CCITT G3) for domestic distribution of charts and imagery.

For beginners wondering what some of these terms actually mean - firstly the position given above (105° East) means that the WXSAT will be stationed over that longitude and will therefore not be receivable from the UK. We can expect that the data may eventually be made available for dissemination by METEOSAT. This has become an agreed practice, as seen from the schedules for METEOSAT, GOMS and GOES which also disseminate images from other WXSATs. The term VISSR refers to the high resolution data stream obtained by the satellite's radiometer (which produces raw images prior to processing). WEFAX is the lower resolution image format, produced by reducing the primary resolution to a level for transmission within a short time scale. DCP capability refers to the collection of data from ground-based transmitters such as buoys, which measure parameters of the local environment and transmit the information to the satellite.

The Australian Bureau of Meteorology is working with the China Meteorological Administration on the Feng Yun 2B satellite, and is providing a Turn Around Ranging Station to support FY2AB operations, as it does for the Japanese GMS satellite.

The down link characteristics are shown in **Table 1**. My thanks to Mike Kenny of Satellite Engineering, Bureau of Meteorology, Melbourne, Australia, for providing this information.

## TRAKSAT Version 4.01

Another well-known DOS based satellite tracking program is TRAKSAT, written by Paul E Trauffer. TRAKSAT is a general purpose tracking program, using the usual NORAD, NASA 2-Line element set. New with this version are two fully rendered 3D earth views with full colour sun and shadow. These views are impressive. This version is a fully protected mode program with no DOS 640K limits, and uses extended or expanded memory, requiring only 250K of free RAM. This is the fourth major re-write.

The program runs on IBM AT, PS/2, 286 and above computers with 2Mb RAM. HIMEM or some other memory manager should be installed. As is usual for tracking programs, a maths co-processor is highly desirable, and MS DOS v5.0 or above is required.

For testing purposes, I ran the program under Windows 95. The menu has multiple options and can be configured for different stations - I added Plymouth, UK to the other Plymouths already in the database! The satellite database can be modified to permit further additions or name changes. Up to six satellites can be simultaneously displayed, and the alternative of a tabular display is available.

## Software Availability

When I obtain WXSAT and associated software (tracking, display or image processing), I usually provide some details in

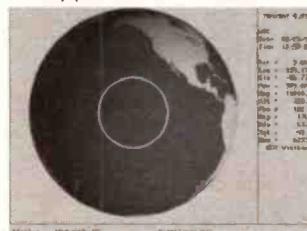


Fig. 5: Tracksat 3D view.

this column. Many readers have asked about the availability of software on different platforms so I recently obtained collections of DOS, Windows 3.1 and Windows 95 programs. When requesting software please mention which platforms you are using. Most DOS and Windows 3.1 programs run under Windows 95 but not vice versa. I can now provide

## Kepler elements - MIR and Shuttle

- 1) For a print-out of the latest WXSAT elements, MIR, and the Shuttle (if in orbit), send a stamped addressed envelope and secured 20p coin or separate, extra stamp. Transmission frequencies are given for operating satellites. During Shuttle operations I send Kepler elements by return-of-post.
- 2) I also send monthly Kepler print-outs to many people. To join the list please send a 'subscription' of £1 (secured, plus four self-addressed, stamped envelopes) for four editions.
- 3) You can have the data as a computer disk file containing recent elements for the WXSATs, and a large file holding elements for thousands of satellites. A print-out is included, identifying NASA catalogue numbers for the WXSATs, Amateur Radio satellites, and others of general interest, ideal for automatic updating of your tracking software. Please enclose 50p with your PC-formatted disk and stamped envelope.

Finally, thanks to many readers who wrote such complimentary letters about the 'Space Special', long after its publication. I continue to receive requests for further information about MIR, the Shuttle and GOES WXSATs from 'Info' readers all over the world. Meanwhile brother John (see last month's 'Info') continues to make progress back to normal health.

whichever version is requested. I recently obtained the latest shareware versions of Graphic Workshop - the 32-bit (Windows 95) version and 16-bit versions, together with Lview and other software - all in their latest versions. This should enable readers to convert files from native formats (such as BMP) to more compressed formats, such as JPEG or GIF, as well as image enhancement.

## Shuttle Launch Schedule

**Leif Lindeskov** of Denmark has been monitoring Shuttle and other transmissions and tells me that he believes he has monitored WA3NAN using 14.395MHz (the official re-transmission frequency is 14.295MHz). Leif also reports hearing interfering transmissions on 14.295MHz.

The next scheduled launches are: STS-83 (*Columbia*) on 3 April at 0701UTC into a 28.45° inclination orbit. STS-84 (*Atlantis*) on 15 May at 0805UTC into a 51.6° inclination orbit for a MIR linkup.

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

Table 1: FY-2B downlink characteristics

| Channel | Frequency  | Modulation (MHz) | Power (dBm) | Bandwidth (kHz) |
|---------|------------|------------------|-------------|-----------------|
| LR-FAX  | 1691.0 MHz | a.m./f.m.        | +57         | 260             |
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# Decode

## All the Data Modes

### Death of Morse?

Towards the end of February there were a number of features on the major news channels announcing the end of Morse code. If you missed the full news reports you're probably wondering what all the fuss is about. So I'll bring you up to speed. What has really changed is the formal cessation of the Morse code distress watch system on February 1, 1999. This is where ships at sea and other professional users of maritime radio have an obligation to keep a watch on the agreed distress channels. A typical example here is the long established 500kHz emergency frequency. Just writing about it takes me back to my youth when I remember admiring the design for a very early transistorised 500kHz c.w. transmitter in one of the famous Mullard circuit books. That was in the days of OC71 transistors when an OC35 was considered quite revolutionary.

Enough reminiscing, back to Morse code. The use of Morse code for distress and other emergency signals has a very long history incorporating such famous events as the sinking of the *SS Titanic* and the tracking and successful arrest of Dr. Crippin! It has really survived very well, primarily because it is a very simple system requiring only very basic equipment. In the hands of trained operators it also offers the facility to communicate reliably through the most awful r.f.

most major shipping lines.

The significant change for this year is the decision to make GMDSS the primary distress system and the introduction of new maritime laws and international agreements that require all ships over a certain displacement to carry and operate GMDSS equipment.

As well as offering a very reliable communication system, the other attraction of GMDSS is its ease of use. This means the whole crew can be trained to use it successfully and you don't have to rely on having a radio operator to hand before you can make a distress call. The other attraction is that GMDSS distress signals are automatically routed to an appropriately located emergency centre complete with the ship's precise location. The Morse based system relied on a local ship hearing the distress call and then signalling ashore to get further help. So you can see that GMDSS is a potentially much safer system that even enables solo yachtsmen to be accurately located and rescued in the most remote areas of the oceans.

Clear evidence of this is to be found in the rescue of the British yachtsman that made the headlines a couple of months ago. That rescue just would not have been possible with the old Morse based system. The sad point about the closure of the Morse stations is the loss of the highly skilled radio operators that have reliably communicated good and

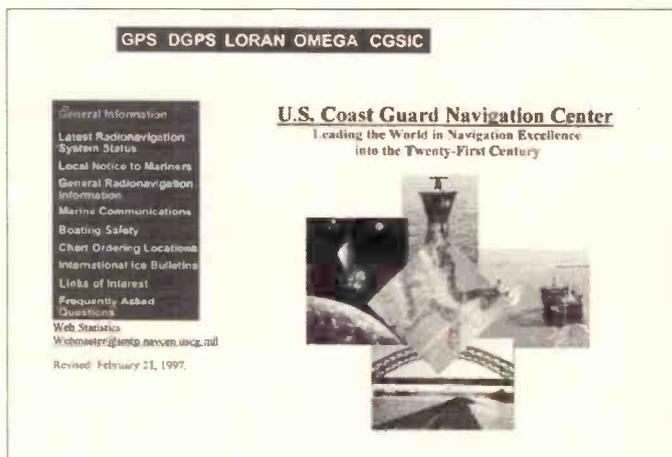


Fig. 1: US Coastguard Web site.

is also still being taught in the services and remains one of the most secure inter-ship communication systems in times of war.

### BARTG 97

I always seem to forget to mention this popular rally, so I thought that I'd get a really early plug in for this year! For those that haven't heard of BARTG, this is the British Amateur Radio Teledata Group which is set-up to promote and support the use of data signals by amateur radio operators. Whilst this in itself is not directly of interest to 'Decode' readers, the type of trader that exhibits at the show is. If you want to get your hands on some decoding equipment or maybe want to find out more about some of the old electro-mechanical teleprinter and FAX systems, this is the place to go.

In addition to the trade stands, this year's show sees the introduction of DataStream '97. This is a series of lectures on a range of subjects that may well prove of interest to readers of this column. The provisional list of

readers letters will soon reveal that the most popular area for utility monitoring is weather data. This is probably due to the hopelessly unpredictable weather we get in the UK and everyone's belief that, with a bit of live data, they can beat the forecasters! Well, the new Meteocode program adds another weapon to your armoury. The program has been designed to transform the SYNOPTIC type data that's broadcast by the many RTTY weather stations that are to be found on the h.f. bands.

These stations send out monotonous streams of five digit number groups, often 24 hours a day. This data is a coded form of the raw weather observations that feed into the massive mainframe computer systems used to provide the major weather reports. The format used to encode these weather reports is very well publicised and I've given examples of how to manually decode it in previous 'Decode' columns. You will also find that many of the better RTTY decoding programs such as Hamcomm feature a basic decoding system that can convert the five digit

|       |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|-------|---|---|---|---|----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Let's | + | A | B | C | D  | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
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conditions. If it's so good, why are the authorities pulling the plug on Morse code? The answer lies in the stars or satellites to be more exact. Satellite communications systems now feature highly reliable, global communications that are immune to the vagaries of h.f. propagation that cause us so many problems. No more worries about where we are in the sunspot cycle or trying to make sense of MUFs, it's all just a push-button operation thanks to the new GMDSS. This is an acronym for Global Maritime Distress and Safety System. This system has been available for some time now and is used in varying degrees by

bad news to ships throughout the world. In the UK, the prime example is our own Portishead Radio. The operators there have been real survivors in the rationalisation of the UK radio stations and I'm sure all the 'Decode' readers would join me in wishing them the very best of luck for the future. However, all is not lost as Morse is not going to disappear from the h.f. bands, there will remain lots of activity, not only amongst radio amateurs, but also from third world countries where the combination of simplicity, low cost and effectiveness make it a system that just cannot be ignored. Morse

topics to date is: Data comms. for beginners, satellite data comms., advanced data comms. and a question and answer session. If you'd like to go, the rally is being held on Sunday September 14 at Sandown Park Racecourse, Esher, Surrey. My thanks to **Ian Brothwell** for keeping me up-to-date.

### Meteocode

Yes, another new program for the PC, but this one's a little bit different. Thanks to Andrew Jefferys for sending me a review copy.

A look through a selection of

Table 1: RTTY Figures to Letters Look-up Table.

groups into plain language reports. Whilst this is extremely helpful, there's still a lot of work to do before you can use the readings to help see what the weather's going to be like.

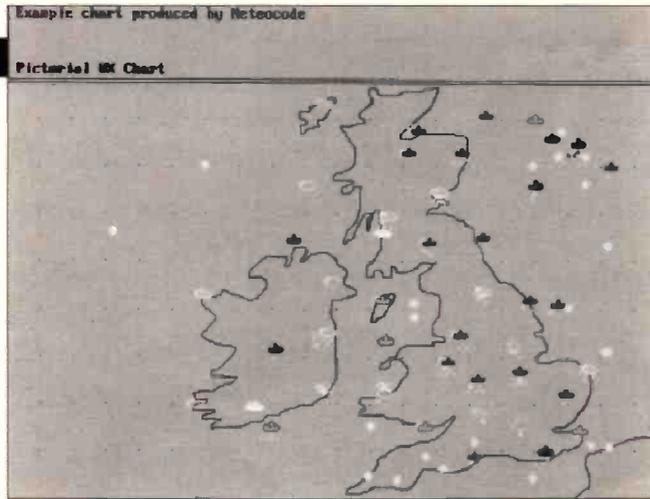
Meteocode could well be the answer as it takes the decoding a step further and presents the data in graphical form. For example, it will take a stream of weather data for the UK and produce a map showing the variation in cloud cover across the country. It can be

set to do this for a wide variety of reporting systems. As you can see from the examples in the column, this makes the RTTY weather data at least as useful as traditional FAX charts. Meteocode is designed to operate from a disk file containing all the data rather than directly off-air. Although this may at first seem a little long winded, there are a number of advantages. The most important of which can be to cleanse the data.

One of the problems with RTTY as a communications system is its susceptibility to corruption from noise and other propagation problems. If you store the received text to a log file first you can then check it out using a simple text editor to remove/correct any errors. The most common error is an inversion from figures to letters due to a corrupt shift character. This can be put right very quickly by referring to a simple look-up table like the one I've shown in **Table 1**.

Saving received data to a text or log file is easy to do as most of the better decoding programs include a log file (available in the registered version of Hamcomm) where you can capture all the received text for later processing. Meteocode includes a specialised conversion routine so that it can directly handle data from a Hamcomm log file. This special routine is needed because the Hamcomm logging system precedes each line of text with the time it was received. As you can imagine, leaving this in would cause great confusion in the decoding process. If you really must decode off-air, Meteocode does support this providing you have a stand-alone RTTY decoder that can supply the data to the PC in ASCII format via the serial port. As well as being a very useful decoding tool Meteocode makes very modest demands of the PC. The minimum requirements are a very modest, XT compatible (8086) with 640Kb memory, VGA or SVGA graphics capable of displaying 640 x 480 in 16 colours. You will also need around 5Mb of free hard disk space and MS DOS 3.3 or above. This should be considered an absolute minimum requirements and a 386 processor based system would be much more comfortable. Still, I must congratulate Andrew on keeping to such modest requirements when many programmers are bringing out massive packages that struggle to run on a Pentium!

The program comes supplied on two 3.5in disks, the first of which contains all the program files and a few examples, whilst the second disk holds the main reference database. The review version used a basic manual installation system, but Andrew reports that all new versions will be supplied with a fully automatic installation routine which I'm sure will please many



**Fig. 2: Meteocode cloud cover chart.**

users. Once installed, the program is controlled by a series of 3D push-button menu systems as you can see from the screen shots I've shown in the column. The first area to go to is the set-up option where you can change a few basic display parameters, select file directories, printer options and set the external decoder configuration. The facility to customise the directories used is very useful to keep the various input and output files separated. The printer set-up catered for Epson compatible units and featured drivers for both 60 and 120d.p.i. image resolution. The final set-up option covers the use of an external decoder for direct off-air decoding. The options provided were very comprehensive and included support for COM ports 1 to 5, baud rates of 110 to 9600 with all the usual stop bit and parity options. With everything set-up the next step is to start decoding from a previously saved data file.

Here there are basically two options - decode to text or to a chart. Starting with the text option the program will scan the data file and present the operator with a list of all the message types that have been found within the data. Discrimination between decodable and non-decodable systems is shown by using different text weights. All you then have to do is select the required message and start the decoding. Progress of the decode is shown on a thermometer type scale and, once complete, you can view the result on the screen or save it to a disk file for further processing. The option to decode RTTY weather data to a chart is a real bonus and sets Meteocode apart from other systems that just use text decoding.

To decode to a chart you start by selecting the required file in the same way as for text decoding. You then use the chart menu to select the type of chart you want to display. The options available are very comprehensive and include; air temperature, air pressure, air pressure tendency, sea surface pressure and cloud cover. Once the decoding is complete you can then choose to view, save or print the

file. I've shown a couple charts in the column and you can see the detail is very good. The full screen display is in colour and is well presented. By now you will have worked out that I enjoyed using Meteocode and think it a worthwhile addition for any listeners with an interest in decoding weather data. Meteocode is available from Andrew Jefferys at £18 all inclusive in the UK or £25 for delivery outside the UK. For this you get the two disks plus a full printed manual. Send your orders to **7 Oakes Close, Bury St Edmunds, Suffolk IP32 6QE**. Andrew is also available via E-mail: **sis5322@pbs5.milton.port.ac.uk**. My thanks to Andrew for supplying the review copy.

### Readers' Slot

SWM certainly seems to span the globe with its coverage. The latest 'DX' letter for me comes from **Jeff Bell** in Riverdale, Western Australia. He's been following this column for some time and has put together a good decoding set-up. The antenna is the much talked about (you heard it here first!) T2FD which is set-up to operate between 5 and 30MHz. This is supplemented by a 13MHz dipole for specialist monitoring. The receiver is the ever popular Icom R71A which feeds an old Telereader CWR-670 decoding unit that he picked-up cheap from a local radio amateur. Although the set-up works very well Jeff is hoping to be able to upgrade one day.

**F. Binnington** of Onehouse has written asking if I can help him receive his first FAX picture with JVFAX. He reports that he's been operating very successfully with HAMCOMM but can't get a thing with JVFAX. The fact that HAMCOMM works is a good sign that there's nothing wrong with the interface so the most likely problem area is the way the program's been set-up. One of the common mistakes is to use the wrong interface settings. Here's what would normally be the correct settings if you have a standard HAMCOMM interface

connected to COM port 2 on the PC. To begin with you need to set the first section of the configuration screen as follows: Demodulator: 8 bits comparator, Addr: 02F8 IRQ: 3. If your interface is connected to COM port 1 you need to change the Addr: to 03F8 and the IRQ to 4. Now tune close to a decent strength FAX signal press F for FAX and A to start the decoding you should now start to see some signs of a signal building up. For new users its well worth using the Auto tune function as this will do all the fine tuning for you and should get you some sort of image. Once you've mastered the basics you'll find that manual tuning is best as it gives you very fine control over the image quality. One other useful tip for new listeners is not to use narrow filters, audio or r.f., when receiving FAX. Any reduction of the receive bandwidth effectively reduces the resolution of the final image. There are times when you do have to use filters to cut out interfering signals but you should leave them out whenever you can.

### Internet Hot Site

If you want to know more about GMDSS or maritime radio systems/regulations and you have Internet access it's well worth taking a look at the US Coastguard site. The US freedom of information laws mean that the range of information freely available is quite amazing. The site's URL is: <http://www.navcen.uscg.mil/>

### Readers Special Offers

If you'd like a copy of Hamcomm/JVFAX, etc. I've arranged a very special offer with the Public Domain and Shareware Library (PDSL). They have put together a library set of all five disks for just £12.00, all inclusive. Using PDSL also makes ordering simpler as they accept all the usual credit cards so you can order by phone - you don't even have to write a letter. Please direct all orders and enquiries about this disk set to **PDSL, Winscombe House, Beacon Road, Crowborough, Sussex TN6 1UL. Tel: (01892) 663298** and request library volume: H008739abcde. IBM PC Software (1.44Mb disks): Disk A - JVFAX7.0, HAMCOMM3.1 and WXFAX3.2 Disk B - DSP Starter plus Texas device selection software. Disk C - NuMorse 1.3 Disk D - UltraPak 4.0 Disk E - Mscan 1.3 and 2.0.

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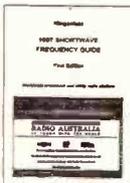


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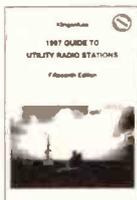
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# Off the Record

Long wave, a band that many considered to be in terminal decline appears to be making a comeback. Following the outstanding success of Irish station Atlantic 252 with their broadcasts to Britain, a new Dutch station, Delta 171, propose to run a similar service when planning difficulties over their transmitter site are overcome.

With 2MW of power, they are clearly looking for an audience beyond their national boundary. Not to be outdone, the Radio Authority are reported to be considering advertising a new national commercial station on 225kHz.

Previously United Christian Broadcasters (UCB) had wanted to use this frequency for a high power station on the Isle of Man. However, UCB suggested that this frequency along with 549 and 6.203MHz has been given to them by Russia.

Just how Moscow can give a christian organisation the use of frequencies for use in another geographical area must be questionable, particularly as both Britain and Russia are members of the European Broadcasting Union. Indeed, Russia still uses 225 and 549kHz, at very high power, for their domestic services and 6.203MHz is a shipping channel. In the UK, the frequency of 225kHz was originally allocated to the BBC for reinforcement of the Radio 4 long wave service, but for years has remained unused.

## Ding...Ding

The familiar callsign of Radio Caroline, two strokes of a ships bell, could well be returning to short wave. A fairly hefty valve transmitter has been constructed for land based use outside the UK. This facility is intended to have dual frequency capability using short wave during daylight and possibly medium wave at night.

The s.w. frequency is unlikely to be in any of the usual pirate bands but in an over spill area of the 49m band that is predominately used by international broadcasters. Another interesting project is a move to get Caroline on the Internet, the address of the web site is not yet available, but the information could well bring world-wide support and be an excellent public relations and revenue raising facility.

The latest Caroline news is available on their premium rate 'phone line (0839) 669990, calls are charged 39p per minute cheap rate and 49p at other times. The profits from this service are used in the maintenance and restoration of

their ship the *Ross Revenge*.

## Turning The Tide

Are the DTI loosing their teeth? In recent months there have been an increasing number of instances where British court judgments and government ministerial decisions have been overturned by European law. Indeed, the European Court of Justice has ruled that "Every national court must apply Community law in its entirety and must accordingly set aside any provision of national law which may conflict with it".

The Marine Offences (Broadcasting) Act of 1967 and the Broadcasting Act of 1990 both contain penalties for British persons involved in offshore pirate broadcasting. European law encompasses everyone regardless of their country of origin so all citizens are subject to the same regulations.

While Europe does have anti-pirate legislation, their preventative measures do not include boarding ships on the high seas, arresting British persons and dismantling the station using as much force as may be required. Nor does European law give an immunity against the prosecution of those conducting such a raid in British courts, which is the case under UK law.

Clearly much of this legislation is now completely flawed as discrimination on grounds of race or nationality are now taboo. With the intense competition in radio I don't suppose there will be a rush of new offshore stations encircling our coastline, but a legal loophole would at least appear to exist.

## Pirates Of Olde

Radio Atlantis only broadcast for just over a year, owing to the introduction of the Dutch marine broadcasting legislation. Originally Atlantis programmes were transmitted from Radio Caroline's ship the *Mi Amigo* commencing on 15 July 1973. By December a vessel previously used by Radio Condor had been obtained, renamed '*Janine*' and was on air on 270m with programmes in Flemish and English.

Disc jockey **Steve England** and radio engineer **Andy Anderson** plus a small devoted gang of radio personalities succeeded in putting fun back into broadcasting. Programmes were punctuated by zany jingles, hilarious commercials and radiated a continuously happy and carefree atmosphere.

Atlantis closed on 31 August 1974, the MV *Janine* was sold for

scrap to ship breakers Van de Marel in Holland. This same company that broke up the Radio Scotland ship *Comet* and the Caroline North ship MV *Caroline*.

Offshore Echo's and Alphasound Productions have very recently produced a new CD called *The Story of Radio Atlantis*, this is a remastering of the vinyl album of the same name with additional material added. If you have never heard this station you will get from this CD a taste of a unique sound that recaptures those exciting days when the skull and crossbones flew freely above the waves of the North Sea.

The CD is £14.99 inclusive of postage anywhere in Europe, from **Offshore Echo's, PO Box 1514, London W7 2LL.**

## Radio Free London

Radio Free London (RFL) first came to the air in August 1968 on the first anniversary of the Marine Offences Act, which had caused the closure of many offshore stations. A medium wave transmitter was set-up in a flat at Shepherd's Bush, London, where many of the former Radio Caroline staff had taken refuge.

The antenna was a long horizontal wire which ran across a road and a railway track and was attached to the fire escape of a building which happened to be used by the BBC! Radio Free London received much publicity due to their involvement with the Free Radio Association's Rally in Trafalgar Square on 17 August 1968.

Over the years RFL has broadcast to the capital rather spasmodically, later moving to f.m., which continued until November 1995. Since then the service has been carried on s.w. to give Europeans the chance to hear the UK's oldest land based pirate.

Radio Free London's short wave presenters are more or less the same as those of North and West Kent Radio (WNKR). I didn't manage to hear the marathon broadcast planned for last Christmas, but their spokesman **Andy Walker** claims RFL to be the most listened to s.w. pirate, he could well be right.

## Pirate News

German station Radio Dr. Tim has recently been raided by three PTT officials and two police officers. The raid happened on a Sunday during a relay of Radio Wonderful, the 120W transmitter, modulator and crystal were all seized.



There isn't a lot of...  
In fact it's the...  
the word

Radio Natalie is a new station from Estonia, some programmes are relayed via other operators. Future plans include running their own transmitter and a mail order business.

The station takes its name from the operators daughter. Transatlantic Radio has made the trip to Chile with a SINPO of 32333. London m.w. pirate Radio Argus has been heard with very strong signals in Kent, particularly as the claimed power is just 10W.

Former pirate radio operator **Eddie Austin**, now a director of South East Radio, has just succeeded in obtaining an eight year community radio licence for two frequencies in the Folkestone and Dover areas of Kent. Pilots using Staverton Airport near Gloucester have experienced difficulties with their navigational aids, the problem apparently came from a transmitter carrying BBC Radio 4.

On 17 November, Radio Caroline started their successful 28 day RSL at Bristol, from a ship-board nightclub on the MV *Thekla*. There is speculation that this venture may lead to them bidding for a full time licence for the Bristol area, due to be advertised next year - the station says this is untrue.

## And Finally

A letter from **John Parr** of Bradford saying he had just got back into the world of amateur radio and was surprised to read columns like 'Off The Record' in *SWM* and it was a refreshing change from years ago. The credit, of course, goes to the Editor who started this page as an experiment back in July 1991.

For a future article I would like to know how readers first became involved or interested in what can loosely be described as hobby radio. For myself I can recall making crystal sets for fellow pupils at boarding school where these things were outlawed.

The transistor radio had not yet been invented, but a close proximity to the Brookmans Park transmitter, a heating pipe earth and a bed spring antenna were just some ingredients in this clandestine schoolboy operation. How about you?



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# LM&S

## Long, Medium and Short Waves

My first review of reception in the 'Long, Medium & Short' wave broadcast bands was published ten years ago this month in the first issue of the redesigned *Short Wave Magazine* dedicated to the listener. Several of the contributors to that article have sent reception reports to me every month since then and I thank them most sincerely for their loyal support.

A great many listeners, both here and overseas, have played their part in making 'LM&S' such a success by sending details of their reception to me either on a regular basis or from time to time.

### Long Wave Reports

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

The reports suggest that the sky waves from the Radiotelevisione italiana (RAI) 10kW outlet at Caltanissetta, Italy on 189kHz seldom reached the UK in January. They were detected after dark on one occasion by **Paul Bowery** in Burnham-on-Crouch but most of the listeners who searched for them were disappointed.

### Medium Wave Reports

Quite often the propagation conditions at night in January were favourable for the reception of m.w. broadcasts over transatlantic paths. During the first week **John Slater** (Scalloway, Shetland) found that some stations in E.Canada and E.USA could be clearly received at dawn and even later! The band was searched from 2300 until 0200UTC on several occasions by **Darren Beasley** in Bridgwater and he logged more stations than ever before. Over in Co.Down **Robert Connolly** (Kilkeel) listened between 0100 and 0230. Most often heard was CHAM on 820kHz, which rated SINPO 22222 at 0230 on the 4th.

Frequent checks were made by **David Edwardson** in Wallsend. On the 8th he heard his first ever Venezuelan - R.Vibracion on 1470, which rated 25552 at 0140. Next night he heard another - R.Dos Mil on 1500 at 0130. Three stations in Colombia were logged by **Paul Crankshaw** in Troon: HJKH on 650, rated 11111 at 0752 on the 15th; HJAT on 1100-32232 at 0806 on the 18th and HJXJ on 770 - 22222 at 0800 on the 27th. The conditions on the 21st were so good that **David Sayles** (Doncaster) received WJDM on 1660 from 0445 until 0600 continuously! On February 1 **Harry Richards** (Barton-on-Humber) listened to a discussion programme from WNRB in Boston, MA on 1510. Their signal rated 24233 at 0030.

A surprising number of m.w. stations in the Middle East and N.Africa were heard after dark - see chart. The sky waves from the

numerous low power outlets in Spain made reception difficult from some areas. There were some reports of unusual reception during daylight - quite often **George Millmore** (Wootton, IoW) logged Vatican Radio on 1530 as SIO444 at 0930!

A test transmission on 1485kHz by Classic Gold was received on January 17 by **Brian Keyte** in Bookham. He logged it as 32432 at 1435. Their new transmitter is located 8km south of Newbury and has an e.m.r.p of 1kW. The station is to be renamed 'Classic Gold 1431 & 1485'. No doubt reports from other areas will be welcome at P.O. Box 210, Reading, Berkshire RG31 7RZ.

In the Midlands the BBC Asian Network is now carried by the transmitters at Sedgley on 828kHz, Freeman's Common on 837 and Langley Mill on 1458.

### Short Wave Reports

There are indications that sunspot cycle 23 has now commenced but it is unlikely that broadcasters will be able to provide a reliable service in the **25MHz (11m)** band for some time to come.

The propagation conditions in the **21MHz (13m)** band are unstable and daily variations in the strength of signals received during daylight have been evident. Sometimes R.Australia's broadcast to Asia via Darwin on 21.725 (Eng 0630-1100) has reached the UK. It was rated 25532 at 0912 in Wallsend; 34233 at 1004 by **John Eaton** in Woking; 33333 at 1045 by **Thomas Williams** in Truro.

Also received here during some days were the Voice of Turkey 21.715 (Tur to W.Asia, Australia 0500-1000), noted as 44444 at 0746 by **Rhoderick Illman** in Oxted; RFI via Allouis? 21.580 (Fr to Africa 0900-1600) 34222 at 0945 in Scalloway; UAER, Dubai 21.605 (Eng to Eur 1030-1055) 24333 at 1035 by **Tony Hall** in Freshwater Bay IoW; BSKSA Riyadh, Saudi Arabia 21.665 (Ind? to S.E.Asia 1000-1150) 15432 at 1045 by **Fred Pallant** in Storrington; UAER, Dubai 21.605 (Eng to Eur 1330-1355) 55545 at 1330 by **Simon Hockenhull** in E.Bristol; RFI via Issoudun 21.620 (Fr to E.Africa 0800-1500) 22222 at 1320 in Kilkeel; BBC via Ascension Is 21.660 (Eng to W/E.S.Africa 1100-1700) 34333 at 1430 by **Stan Evans** in Herstmonceux; BBC via Limassol, Cyprus 21.470 (Eng to S/E.Africa 1300-1700) 45444 at 1432 by **Michael Griffin** in Ross-on-Wye; R.Portugal Int via Sines 21.515 (Eng to M.East, India 1430-1500) 43333 at 1433 by **Ron Damp** in E.Worthing.

The conditions in the **17MHz (16m)** band are also unstable. However, it has often been possible to receive broadcasts from stations in several continents during the day. Noted before noon were the BBC via Woofferton, UK 17.640 (Eng to S.Africa

### Long Wave Chart

| Freq (kHz) | Station       | Country    | Power (kW) | Listener                 |
|------------|---------------|------------|------------|--------------------------|
| 153        | Bechar        | Algeria    | 1000       | H*                       |
| 153        | Donebach DLF  | Germany    | 500        | A.B.C.F.*.F*.G.H.J.*     |
| 153        | Bod           | Romania    | 1200       | A                        |
| 162        | Allouis       | France     | 2000       | A.C.E.*.F*.G.H.I.J.*     |
| 171        | Nador Medi-1  | Morocco    | 2000       | A.H*                     |
| 171        | B'shakovo etc | Russia     | 1200       | A.C.*.F*.H.J.*           |
| 177        | Oranienburg   | Germany    | 750        | A.C.*.D.F*.G.H.J.*       |
| 183        | Saarouis      | Germany    | 2000       | A.C.*.E.*.F*.G.H.I.J.*   |
| 189        | Caltanissetta | Italy      | 10         | A*                       |
| 198        | Droitwich BBC | UK         | 500        | A.C.E.*.F*.G.J.*         |
| 207        | Munich DLF    | Germany    | 500        | A.B.*.C.*.D.F*.G.H.I.J.* |
| 207        | Azilai        | Morocco    | 800        | A*.H*                    |
| 216        | Roumoules RMC | S.France   | 1400       | A.B.C.F*.G.H.I.J.*       |
| 225        | Raszyn Resv   | Poland     | ?          | A.B.*.C.*.F*.G*.H        |
| 234        | Beidweiler    | Luxembourg | 2000       | A.C.E.*.F*.G.H.J.*       |
| 234        | Ark'gelsk etc | Russia     | 500        | F*                       |
| 243        | Kalundborg    | Denmark    | 300        | A.B.C.D.F*.G*.H.J.*      |
| 252        | Tipata        | Algeria    | 1500       | A.B.*.C.*.G*.H*          |
| 252        | Atlantic 252  | S.Ireland  | 500        | A.C.*.E.*.F*.G.H.I.J.*   |
| 261        | Burg(R.Ropa)  | Germany    | 200        | A.B*.H*.J*               |
| 261        | Taldom Moscow | Russia     | 2500       | A*.F*.J*                 |
| 270        | Topolina      | Czech Rep  | 1500       | A.C.*.D.F*.G.H.J.*       |
| 279        | Minsk         | Belarus    | 500        | A.C.*.D.F*.G.H.J.*       |

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

Listeners:- (D) Rhoderick Illman, Oxted. (H) Fred Pallant, Storrington.  
 (A) Paul Bowery, Burnham-on-Crouch. (E) Stephen Jones, Oswestry. (I) Tom Smyth, Co.Fermanagh.  
 (B) Simon Hockenhull, E.Bristol. (F) Eddie McKeown, Newry. (J) Norman Thompson, Dabry.  
 (C) Sheila Hughes, Morden. (G) George Millmore, Wootton, IoW.

0500-0700), rated 35553 at 0530 by **John Parry** in Larnaca, Cyprus; R.Australia via Darwin 17.715 (Eng to Asia 0000-0830?) 34432 at 0800 in Oxted; R.Slovakia Int 17.485 (Eng to Australia 0830-0857) 35232 at 0839 by **Eddie McKeown** in Newry; DW via Rwanda 17.800 (Eng to Asia, Australia 0900-0950) 44444 at 0933 in E.Worthing; AIR via Bangalore 17.387 (Eng to Pacific areas 1000-1100) 34333 at 1000 in Scalloway; V of Russia 17.860 (Eng [WS] to S/S.E.Asia 0900-1400?) 44333 at 1000 by **Clare Pinder** in Appleby; BBC via Woofferton, UK 17.640 (Eng to N.Africa 0700-1500) 25432 at 1017 by **Tim Allison** in Middlesbrough; Israel R, Jerusalem 17.545 (Heb [Home Sce rly] to W.Eur, N.America 0800-1425) 44444 at 1038 in Truro; R.Pakistan, Islamabad 17.900 (Eng to Eur 1100-1120) 43424 at 1100 by **Norman Thompson** in Oadby.

After mid-day, Africa No.1, Gabon 17.630 (Fr to W.Africa 0700-1600) was noted as 44544 at 1239 by **Ross Lockley** in Galashiels; BBC via Ascension Is 17.830 (Eng to W/C.Africa 0730-2100) 44444 at 1340 in Kilkeel; R.Prague, Czech Rep 17.485 (Eng to E.Africa 1400-1430) 33233 at 1425 by **Peter Pollard** in Rugby; RFI via Moyabi, Gabon 17.560 (Eng to M.East 1000-1500) 43433 at 1430 in Herstmonceux; BBC via Antigua, W.Indies 17.840 (Eng to N/C.America 1400-1700) 34333 at 1500 by **Vera Brindley** in Woodhall Spa; RCI via Sackville, Canada 17.820 (Fr to Eur, Africa 1500-1600) 25433 at 1520 in Storrington; Monitor R via WSHB? 18.930 (Eng to Eur, M.East, Africa 1600-1900) SIO422 at 1714 in Woking; WYFR via Okeechobee, USA 17.555 (Eng to Eur 1600?-1900?) 24322 at 1741 in Bridgwater; R.Netherlands via Bonaire 17.605 (Eng to S/E.W.Africa 1830-2025) 44444 at 1845 by **Vic Prier** in Colyton.

The conditions in the **15MHz (19m)** band are more reliable. In the morning the BBC via Masirah Is, Oman 15.310 (Eng to S.Asia 0300-0915, 1000-1400) was 24422 at 0757 in Oxted; BBC via Ascension Is 15.400 (Eng to Africa 0700-1130) 34332 at 0915 in Middlesbrough; Voice of Armenia, Yerevan 15.270 (Eng to Eur,

M.East 0930-1000 Sun only) 45554 at 0933 in Wallsend; V of Russia 15.490 (Eng to S/S.E.Asia 1000-1200) 44333 at 1000 in Appleby; AIR via ? 15.050 (Eng to NE.Asia 1000-1100) 54444 at 1043 in E.Worthing; R.Pakistan, Islamabad 15.470 (Eng to Eur 1100-1120) 43433 at 1115 in Herstmonceux; R.Finland via Pori 15.245 (Eng to Australia 1130-1200) SIO555 at 1135 by **Philip Rambaut** in Macclesfield; DW via Rwanda 15.410 (Eng to W.Africa 1100-1150) 42432 at 1145 in Ross-on-Wye; VOIRI Tehran 15.260 (Eng to Asia 1100-1200) 34232 at 1154 in Newry.

During the afternoon RFI via Allouis? 15.155 (Eng to Eur, Africa 1200-1300) was rated 44444 at 1210 by **Sheila Hughes** in Morden; RNB Brazil 15.445 (Eng to N.America 1200-1320) 32222 at 1245 in Scalloway; BBC via Rampisham & Skelton, UK 15.575 (Eng to Eur, M.East, W.Asia 0600-1800) 35423 at 1245 in E.Bristol; R.Romania 15.390 (Eng to Eur 1300-1356) 54444 at 1324 by **Tom Winzor** in Plymouth; RCI via Sackville, Canada 15.425 (Fr to C.America 1300-1400) 34433 at 1345 in Kilkeel; RCI via Sines, Portugal 15.325 (Eng to Eur, M.East, Africa 1430-1500) 45544 at 1430 in Bridgwater; RFI via Allouis? 15.530 (Eng to Africa 1600-1700) SIO444 at 1600 by **Tom Smyth** in Co.Fermanagh; China R.Int via Mali 15.130 (Eng to E/S.Africa 1600-1657) 24232 at 1618 in Woodhall Spa; Channel Africa via Meyerton 15.240 (Eng to C/W Africa 1600-1700) 33333 at 1630 by **Bernard Curtis** in Stalbridge.

Later, VOA via Selebi-Phikwe, Botswana 15.445 (Eng to Africa 1630-1800 [Sat/Sun add 1600-1630]) was 35433 at 1712 in Freshwater Bay; KTNB Salt Lake City, USA 15.590 (Eng to N.America 1600-0000) 43333 at 1720 in Colyton; WWCR Nashville, USA 15.685 (Eng to Eur 1100-0000) 34243 at 1730 in Woking; RNB Brazil 15.265 (Port, Eng, Ger to Eur 1630-2020) 22222 at 1750 in Truro; RAE Buenos Aires, Argentina 15.345 (Eng, Fr, Ger, It, Sp to Eur, N.Africa 1900-2300) 32322 at 1945 in Rugby; RTV Marocaine via Tanger 15.335 (Ar to W.Eur 1100-1500, 2200-0000) 21121 at 2250 in Oadby.

Noted in the **13MHz (22m)** band during the morning were SRI via Sottens? 13.685 (It, Eng, Fr, Ger, Port to

# Medium Wave Chart

| Freq (kHz) | Station              | Country      | Power (kW) | Listener          | Freq (kHz) | Station             | Country        | Power (kW) | Listener               | Freq (kHz)   | Station          | Country      | Power (kW) | Listener                |
|------------|----------------------|--------------|------------|-------------------|------------|---------------------|----------------|------------|------------------------|--|------------------|--------------|------------|-------------------------|
| 520        | Hof/Hurzberg (BR)    | Germany      | 0.2        | J*                | 900        | Milan               | Italy          | 600        | B*,C*,J*,K*            | 1386   | Athens           | Greece       | 50         | C*                      |
| 531        | Ain Beida            | Algeria      | 600/300    | C*,K*             | 900        | COPE via ?          | Spain          | ?          | B*                     | 1386   | Boisakovo        | Russia       | 2500       | B*,C*,G*,J*,K*,D*       |
| 531        | Leipzig              | Germany      | 100        | B*,J*,K*          | 909        | B'mans Pk(BBCS)     | UK             | 140        | K,P                    | 1395   | Lushnje(Tirana)  | Albania      | 1000       | B*,K*                   |
| 531        | RNE5 via ?           | Spain        | ?          | B*,J*             | 909        | M Side Edgel(BBCS)  | UK             | 200        | H                      | 1395   | Lopic            | Netherlands  | 120/40     | B*,C*,K,Q               |
| 531        | Beromunster          | Switzerland  | 500        | K                 | 918        | Plesived(Sloven nR) | Slovenia       | 600/100    | B*,C*,J*,K*,D*         | 1404   | Brest            | France       | 20         | B*,C*,J*,K              |
| 540        | Wavre                | Belgium      | 150/50     | B*,C,H*,J*,K      | 918        | Madrid(R.Int)       | Spain          | 20         | B*                     | 1413   | RNE5 via ?       | Spain        | ?          | B*,J*,K*                |
| 540        | Solt                 | Hungary      | 2000       | C*                | 927        | Wolvertem           | Belgium        | 300        | B*,C*,J*,K             | 1422   | Heusweiler(DF)   | Germany      | 1200/600   | B*,C*,D*,J*,K*          |
| 540        | Sidi Benhour         | Morocco      | 600        | B*,J*,K*          | 927        | Evoral(RRE)         | Portugal       | 1          | C*,J*                  | 1431   | Kopani           | Ukraine      | 500        | B*,J*                   |
| 549        | Les Trembles         | Algeria      | 600        | B*,J*,K*          | 936        | Bremen              | Germany        | 100        | B*,C*,J*,K*            | 1440   | Marnach(RTL)     | Luxembourg   | 1200       | A*,B*,C*,D*,J*,K*,L*,R* |
| 549        | Thurau (DLF)         | Germany      | 200        | B*,C*,J*,K*       | 936        | Venezia             | Italy          | 20         | C*,K*                  | 1440   | Damman           | Saudi Arabia | 1600       | J*                      |
| 549        | Beli Kriz            | Slovenia     | 20         | C*                | 936        | RNE5 via ?          | Spain          | ?          | B*,J*,K*               | 1449   | Squinzano        | Italy        | 50         | B*,C*                   |
| 558        | Espoo                | Finland      | 100        | B*                | 945        | Toulouse            | France         | 300        | J*,K*,P                | 1449   | Redmoss(BBC)     | UK           | 2          | C                       |
| 558        | Rostock(NDR)         | Germany      | 20         | J*                | 954        | Brno (CroZ)         | Czech Rep      | 200        | B*,K*                  | 1458   | Flake            | Albania      | 500        | B*                      |
| 558        | RNE5 via ?           | Spain        | ?          | B*,J*,K*,D*       | 954        | Madrid(Cl)          | Spain          | 20         | B*,G*,K*               | 1467   | Monte Carlo(TWR) | Monaco       | 1000/400   | A*,B*,C*,D*,J*,K*       |
| 567        | Berlin               | Germany      | 100        | C*,J*,K*          | 963        | Pori                | Finland        | 600        | B*,C*,F*,J*,K*         | 1476   | Duba             | UAE          | 1500       | B*,C*                   |
| 567        | Tullamore(RTE1)      | Ireland (S)  | 500        | B*,C,F,H,I,P      | 963        | Paris               | France         | 8          | C                      | 1485   | SER via ?        | Spain        | ?          | B*                      |
| 567        | RNE5 via ?           | Ireland (S)  | ?          | B*,K*             | 963        | Tir Chonail         | Ireland (S)    | 10         | K*                     | 1494   | Clermont-Ferrand | France       | 20         | B*,C,K*                 |
| 576        | Muhlacker(SDR)       | Germany      | 500        | B*,C*,J*,K        | 972        | Hamburg(NDR)        | Germany        | 300        | B*,C*,J*,K*,D*         | 1494   | St.Petersburg    | Russia       | 1000       | B*,C*,D*,F*,J*,K*,Q*    |
| 576        | Riga                 | Latvia       | 500        | K*                | 972        | RNE1 via ?          | Spain          | ?          | B*,J*                  | 1503   | Stargard         | Poland       | 300        | K*                      |
| 576        | Barcelona(RNE5)      | Spain        | 50         | B*,K*,D*          | 981        | Alger               | Algeria        | 600/300    | B*,C*,G*,K*            | 1503   | RNE5 via ?       | Spain        | ?          | B*                      |
| 585        | Paris(FIP)           | France       | 8          | C,J               | 981        | Coimbra             | Portugal       | 10         | G*                     | 1512   | Wolvertem        | Belgium      | 600        | A*,B*,C*,D*,J*,K*,Q*    |
| 585        | Madrid(RNE1)         | Spain        | 200        | B*,J*,K*,D*       | 990        | Berlin              | Germany        | 300        | B*,C*,J*               | 1521   | Kosice(Czaitce)  | Slovakia     | 600        | B*                      |
| 585        | Dumfries(BBCScott)   | UK           | 2          | L,J*              | 990        | R.Bilbao(SER)       | Spain          | 10         | B*,K*,P                | 1521   | Duba             | Saudi Arabia | 2000       | B*,C*,K*                |
| 594        | Frankfurt(HR)        | Germany      | 1000/400   | B*,C*,J*,K*       | 990        | Redmoss(BBC)        | UK             | 1          | J*                     | 1530   | Vatican R        | Italy        | 150/450    | B*,C*,D*,G*,J*,K        |
| 594        | Oujda-1              | Morocco      | 100        | B*,C,K*           | 990        | Tywyn(BBC)          | UK             | 1          | I                      | 1539   | Mainflingen(ERF) | Germany      | 700        | B*,C*,D*,J*,K*          |
| 594        | Muge                 | Portugal     | 100        | B*,J*,K*          | 999        | Schwerin (RIAS)     | Germany        | 20         | J*                     | 1539   | Valladolid(SER)  | Spain        | 5          | B*                      |
| 603        | Lyon                 | France       | 300        | G,K*,P            | 999        | Gnigriopol          | Moldova        | 1000       | C*                     | 1566   | Sarnen           | Switzerland  | 300        | B*,C*,D*,J*,K*,Q*       |
| 603        | Sevilla(RNE5)        | Spain        | 50         | B*,J*,K*          | 999        | Madrid(COPE)        | Spain          | 50         | B*,J*                  | 1575   | Genova           | Italy        | 50         | B*,C,K*                 |
| 612        | Newcastle(BBC)       | UK           | 2          | I                 | 1008       | SER via ?           | Canaries/Spain | ?          | B*,J*                  | 1575   | SER via ?        | Spain        | 5          | B*,K*,Q*                |
| 612        | Athlone(RTEZ)        | Ireland (S)  | 100        | B*,C*,G*,J,K      | 1008       | Flevo(Hilv-5)       | Holland        | 400        | B*,C*,J*,K,Q           | 1584   | SER via ?        | Spain        | 2          | B*,K*                   |
| 612        | Sebba Aioun          | Morocco      | 300        | C*                | 1017       | Rheinsender(SWF)    | Germany        | 600        | B*,C*,J*,K*,P          | 1593   | Holzkirchen(VDA) | Germany      | 150        | B*,D*,J*,K*,M*,D*       |
| 612        | RNE1 via ?           | Spain        | 10         | B*                | 1017       | RNE5 via ?          | Spain          | ?          | B*,J*,K*               | 1602   | SER via ?        | Spain        | ?          | B*,K*                   |
| 621        | Wavre                | Belgium      | 80         | B*,C*,J*,K        | 1026       | SER via ?           | Spain          | ?          | B*,J*                  | 1602   | Victoria(EI)     | Spain        | 10         | B*,K*                   |
| 621        | RNE1 via ?           | Spain        | 10         | B*                | 1035       | Lisbon(Prog3)       | Portugal       | 120        | J*                     | Note: Entries marked * were logged during darkness. All other entries were logged during daylight or at dawn/dusk. |                  |              |            |                         |
| 621        | Barcelona(OCR)       | Spain        | 50         | J*,K*             | 1044       | Dresden(MDR)        | Germany        | 250        | B*,J*                  | (G) Sheila Hughes, Morden  |                  |              |            |                         |
| 630        | Vigra                | Norway       | 100        | B*,C*,J*,K*       | 1044       | Thessaloniki        | Greece         | 150        | C*                     | (H) Stephen Jones, Oswestry  |                  |              |            |                         |
| 630        | Tunis-Djedeida       | Tunisia      | 600        | B*,J*,K*          | 1044       | Sebba-Aioun         | Morocco        | 300        | J*                     | (I) Brian Keyte, Bookham   |                  |              |            |                         |
| 639        | Praha(Liblice)       | Czech        | 1500       | B*,C*,J*,K*       | 1044       | Saba-Stabat(SER)    | Spain          | 10         | B*,K*                  | (J) Eddie McKeown, Newry   |                  |              |            |                         |
| 639        | RNE1 via ?           | Spain        | ?          | B*,J*,K*          | 1053       | Zaragoza(UK)        | Spain          | 10         | B*,J*                  | (K) George Millmore, Wootton lW  |                  |              |            |                         |
| 648        | RNE1 via ?           | Spain        | 10         | B*,J*             | 1053       | Talk R.COPE via ?   | UK             | ?          | H,K,P,R                | (L) Clare Pinder, while in Appleby   |                  |              |            |                         |
| 648        | Orfordness(BBC)      | UK           | 500        | B*,C,K,P          | 1062       | Kalundborg          | Denmark        | 250        | B*,C*,J*,K*            | (M) Harry Richards, Barton-on-Humber   |                  |              |            |                         |
| 657        | Neubrandenburg(NDR)  | Germany      | 250        | B*,J*             | 1071       | R France via ?      | France         | ?          | K                      | (N) Chris Ridley, Co.Sligo, Eire   |                  |              |            |                         |
| 657        | Napoli               | Italy        | 120        | K*                | 1071       | Brest               | France         | 20         | K                      | (O) David Sayles, Doncaster  |                  |              |            |                         |
| 657        | Madrid(RNE5)         | Spain        | 20         | B*,K*             | 1071       | Lille               | France         | 40         | C*                     | (P) Tom Smyth, Co.Fermanagh  |                  |              |            |                         |
| 657        | Wrexham(BBCWales)    | UK           | 2          | H,J*              | 1071       | Bilbao(EI)          | Spain          | 5          | B*,J*,K*               | (Q) Thomas Williams, Truro   |                  |              |            |                         |
| 657        | Messkirch(RohrdtSWF) | Germany      | 150        | B*,C*,J*          | 1080       | Katowice            | Poland         | 1500       | B*,C*,J*,K*            | (R) Tom Winzor, Plymouth   |                  |              |            |                         |
| 666        | Situntai(R. Vilnius) | Lithuania    | 500        | J*                | 1080       | SER via ?           | Spain          | ?          | B*,J*,K*               |  |                  |              |            |                         |
| 666        | Lisboa               | Portugal     | 135        | B*,J*,K*          | 1089       | Krasnodar           | Russia         | 300        | J*                     |  |                  |              |            |                         |
| 675        | Lopic(R10 Gold)      | Holland      | 120        | B*,C,F,J*,K       | 1089       | Talk Radio UK via ? | UK             | ?          | K,P                    |  |                  |              |            |                         |
| 684        | Sevilla(RNE1)        | Spain        | 500        | B*,J*,K*          | 1089       | Nitra(Jarok)        | Slovakia       | 1500       | C*,J*,K*               |  |                  |              |            |                         |
| 684        | Availa(Beograd-1)    | Yugoslavia   | 2000       | B*,C*,J*,K*       | 1098       | RNE5 via ?          | Spain          | ?          | B*,K*                  |  |                  |              |            |                         |
| 693        | Tortosa(RNE1)        | Spain        | 2          | B*,J*             | 1107       | AFN via ?           | Germany        | 10         | B*,L*,J*,D*            |  |                  |              |            |                         |
| 693        | Droitwich(BBCS)      | UK           | 150        | H,K,P             | 1107       | RNE5 via ?          | Spain          | ?          | B*,J*                  |  |                  |              |            |                         |
| 702        | Fleensburg(NDR)      | Germany      | 5          | B*,J*,D*          | 1107       | Talk R.UK via ?     | UK             | ?          | K                      |  |                  |              |            |                         |
| 702        | Monte Carlo          | Monaco       | 40         | K*                | 1116       | Bari                | Italy          | 150        | B*,C*,D*               |  |                  |              |            |                         |
| 702        | Zamorala(RNE1)       | Spain        | 10         | J*                | 1116       | Pontevedra(SER)     | Spain          | 5          | B*,G*,J*               |  |                  |              |            |                         |
| 711        | Rennes 1             | France       | 300        | B*,C,F,J*,K       | 1125       | La Louviere         | Belgium        | 20         | B*,C*,J*,K*            |  |                  |              |            |                         |
| 711        | Heidelberg           | Germany      | 5          | B*,C*,J*          | 1125       | Deanovec            | Croatia        | 100        | C*,K*                  |  |                  |              |            |                         |
| 711        | Laayoune             | Morocco      | 600        | K*                | 1125       | RNE5 via ?          | Spain          | ?          | B*,J*,K*               |  |                  |              |            |                         |
| 711        | Murcia(COPE)         | Spain        | 5          | B*                | 1125       | Llandrindod Wells   | UK             | 1          | I                      |  |                  |              |            |                         |
| 720        | Lisnagarvey(BBC4)    | Ireland (NI) | 10         | K*                | 1134       | COPE via ?          | Spain          | 2          | B*,G*,K*               |  |                  |              |            |                         |
| 720        | Norte                | Portugal     | 100        | C*,J*             | 1134       | Zadar(Croatian R)   | Yugoslavia     | 600/1200   | B*,C*,G*,J*,K*         |  |                  |              |            |                         |
| 720        | Lots Rd.Ldn(BBC4)    | UK           | 0.5        | C,K,P             | 1143       | Stuttgart(AFN)      | Germany        | 10         | B*,J*,K*               |  |                  |              |            |                         |
| 729        | Cork(RTE1)           | Ireland (S)  | 10         | B*,C*,F,I,J*,K*,P | 1143       | Boisakovo(Mayak)    | Russia         | 150        | C                      |  |                  |              |            |                         |
| 729        | RNE1 via ?           | Spain        | ?          | B*,J*,K*          | 1143       | COPE via ?          | Spain          | 2          | B*,J*,K*               |  |                  |              |            |                         |
| 738        | Paris                | France       | 4          | C*,J*,K           | 1152       | Cluj                | Roumania       | 950        | C*                     |  |                  |              |            |                         |
| 738        | Poznan               | Poland       | 300        | B*,C*,K*          | 1152       | RNE5 via ?          | Spain          | 10         | B*,K*                  |  |                  |              |            |                         |
| 738        | Barcelona(RNE1)      | Spain        | 500        | B*,J*,K*,P        | 1161       | Strasbourg(Flnt)    | France         | 200        | B*,C*,J*,K,P           |  |                  |              |            |                         |
| 747        | Flevo(Hilv2)         | Holland      | 400        | B*,C*,J*,K,P      | 1170       | Lipacy              | Belarus        | 150        | C*                     |  |                  |              |            |                         |
| 747        | Cadiz(RNE5)          | Spain        | 10         | J*                | 1179       | SER via ?           | Spain          | ?          | B*                     |  |                  |              |            |                         |
| 756        | Braunschweig(DLF)    | Germany      | 800/200    | B*,C*,J*          | 1179       | Solweborg           | Sweden         | 600        | A*,B*,C,F,J*,K*,L*,D*  |  |                  |              |            |                         |
| 756        | Bilbao(EI)           | Spain        | 5          | B*,K*             | 1188       | Kuime               | Belgium        | 5          | B*,C*,J*,K             |  |                  |              |            |                         |
| 756        | Redruth(BBC)         | UK           | 2          | J*,K              | 1188       | Reichenbach(MDR)    | Germany        | 5          | B*                     |  |                  |              |            |                         |
| 765        | Sottens              | Switzerland  | 500        | B*,C*,G*,J*,K*    | 1188       | Stoinck             | Hungary        | 135        | J*,K*                  |  |                  |              |            |                         |
| 774        | Sofia                | Bulgaria     | 50         | B*,J*             | 1197       | Munich(VDA)         | Germany        | 300        | C*                     |  |                  |              |            |                         |
| 774        | Enniskillen(BBC)     | Ireland (NI) | 1          | J*                | 1197       | Virgin via ?        | UK             | ?          | F,K                    |  |                  |              |            |                         |
| 774        | RNE1 via ?           | Spain        | ?          | B*,G*,J*,K*       | 1206       | Bordeaux            | France         | 100        | B*,C*,J*               |  |                  |              |            |                         |
| 783        | Leipzig(MDR)         | Germany      | 100        | B*,C*,J*,K*,D*    | 1206       | Wroclaw             | Poland         | 200        | B*,C*,J*,K*            |  |                  |              |            |                         |
| 783        | Mirafra(R.Porto)     | Portugal     | 100        | B*,C*,J*          | 1215       | Virgin via ?        | UK             | ?          | H,K,P,R                |  |                  |              |            |                         |
| 783        | Dammam               | Saudi Arabia | 100        | K*                | 1224       | Virgin              | Bulgaria       | 500        | K*                     |  |                  |              |            |                         |
| 792        | Limoges              | France       | 300        | B*,J*,K*          | 1224       | Lelystad            | Holland        | 50         | B*,C*,J*               |  |                  |              |            |                         |
| 792        | Lingen(NDR)          | Germany      | 5          | J*,D*             | 1233       | Liege               | Belgium        | 5          | B*,J*                  |  |                  |              |            |                         |
| 792        | Sevilla(SER)         | Spain        | 20         | B*,J*,K*          | 1233       | Virgin via ?        | UK             | ?          | F                      |  |                  |              |            |                         |
| 792        | Londonderry(BBC)     | UK           | 1          | P                 | 1242       | Marsille            | France         | 150        | B*,G*,J*               |  |                  |              |            |                         |
| 801        | Munchen-Ismaning     | Germany      | 300        | B*,C*,J*,K*       | 1251       | Marcali             | Hungary        | 500        | B*,C*,J*               |  |                  |              |            |                         |
| 801        | Ajlun                | Jordan       | 2000       | K*                | 1251       | Huisberg            | Netherlands    | 10         | B*,J*                  |  |                  |              |            |                         |
| 801        | RNE1 via ?           | Spain        | ?          | B*,J*,K*          | 1251       | Duba                | UAE            | 600        | K*                     |  |                  |              |            |                         |
| 810        | Madrid(SER)          | Spain        | 20         | B*,J*,K*          | 1260       | SER via ?           | Spain          | ?          | B*,J*                  |  |                  |              |            |                         |
| 810        | Westergien(BBCScott) | UK           | 100        | B*,C*,E*,F,I,K,P  | 1269       | Neumunster(DF)      | Germany        | 600        | B*,C*,J*,K*            |  |                  |              |            |                         |
| 819        | Batra                | Egypt        | 450        | B*,C*,K*          | 1269       | COPE via ?          | Spain          | ?          | B*                     |  |                  |              |            |                         |
| 819        | Toulouse             | France       | 50         | B*,C*,J*          | 1278       | Strasbourg          | France         | 300        | J*                     |  |                  |              |            |                         |
| 819        | Warsaw               | Poland       | 300        | B*,C*,J*,K*       | 1278       | Dublin/Con(RTEZ)    | Ireland (S)    | 10         | B*,I,K*,P              |  |                  |              |            |                         |
| 828        | Hannover(NDR)        | Germany      | 100/5      | B*,J*             | 1287       | RFE via ?           | Czech Rep.     | 400        | B*,J*,K*               |  |                  |              |            |                         |
| 828        | Rotterdam            | Holland      | 20         | C*,J*             | 1287       | Lerida(SER)         | Spain          | 10         | B*,J*                  |  |                  |              |            |                         |
| 828        | Barcelona(SER)       | Spain        | 50         | B*                | 1296       | Kardzali            | Bulgaria       | 150        | K*                     |  |                  |              |            |                         |
| 837        | Nancy                | France       | 200        | B*,C*,J*,K,P      | 1296       | Valencia(COPE)      | Spain          | 10         | B*,J*,K*               |  |                  |              |            |                         |
| 837        | COPE via ?           | Spain        | ?          | B*,J*,K*          | 1296       | Orfordness(BBC)     | UK             | 500        | I,P                    |  |                  |              |            |                         |
| 846        | Rome                 | Italy        | 540        | B*,C*,J*,K*       | 1305       | Rzeszow             | Poland         | 100        | J*,K*,P                |  |                  |              |            |                         |
| 855        | Berlin               | Germany      | 100        | B*,J*             | 1305       | RNE5 via ?          | Spain          | ?          | B*,K*                  |  |                  |              |            |                         |
| 855        | RNE1 via ?           | Spain        | ?          | B*,J*,K*,P        | 1314       | Kvitsoy             | Norway         | 1200       | B*,C*,F*,J*,K*,D*,Q*   |  |                  |              |            |                         |
| 864        | Santah               | Egypt        | 500        | C*,K*             | 1323       | W'brunn(V.Russia)   | Germany        | 1000/150   | B*,C*,J*,L,P           |  |                  |              |            |                         |
| 864        | Paris                | France       | 300        | C*,J*,K           | 1332       | Rome                | Italy          | 300        | B*,C*,J*,K*            |  |                  |              |            |                         |
| 864        | Socuellamos(RNE1)    | Spain        | 3          | B*,K*             | 1341       | Lakihegy            | Hungary        | 300        | C*,J*,K*               |  |                  |              |            |                         |
| 873        | Frankfurt(AFN)       | Germany      | 150        | B*,C*,J*,K*,D*    | 1341       | Lisnagarvey(BBC)    | Ireland (NI)   | 100        | B*,C*,F*,G*,I,K,N,D*,Q |  |                  |              |            |                         |
| 873        | Zaragoza(SER)        | Spain        | 20         | B*,C*             | 1341       | Tarrasa(SER)        | Spain          | 2          | B*,G                   |  |                  |              |            |                         |

# Transatlantic DX Chart

| Freq (kHz) | Station | Location        | Time (UTC) | DXer      |
|------------|---------|-----------------|------------|-----------|
| <b>USA</b> |         |                 |            |           |
| 860        | WFAN    | New York, NY    | 0600       | C,D       |
| 670        | WMAQ    | Chicago, IL     | 0746       | C         |
| 770        | WABC    | New York, NY    | 0125       | D         |
| 780        | WBNN    | Chicago, IL     | 0848       | C         |
| 790        | WAXY    | S.Miami, FL     | 0755       | C         |
| 820        | WBAP    | Fort Worth, TX  | 0836       | C         |
| 840        | WHAS    | Louisville, KY  | 0810       | C         |
| 850        | WVEF    | Boston, MA      | 0058       | A,D,G     |
| 870        | WWL     | New Orleans, LA | 0826       | C         |
| 880        | WCBS    | New York, NY    | 0838       | C,D       |
| 1010       | WINS    | New York, NY    | 0015       | A,C       |
| 1030       | WBZ     | Boston, MA      | 2319       | D         |
| 1050       | WEVD    | New York, NY    | 0004       | D         |
| 1080       | WTIC    | Hartford, CON   | 0000       | C         |
| 1100       | WTAM    | Cleveland, OH   | 0831       | C         |
| 1100       | WWWE    | Cleveland, OH   | 0840       | G         |
| 1120       | KMOX    | St.Louis, MO    | 0827       | C         |
| 1130       | WBBR    | New York, NY    | 0110       | A,C,D,G   |
| 1180       | WHAM    | Rochester, NY   | 0100       | A,C       |
| 1190       | WOVO    | Ft.Wayne, IN    | 0832       | C         |
| 1440       | WLPZ    | Portland, MA    | 0053       | C         |
| 1500       | WTOP    | Washington, DC  | 0235       | B,C,D,FG  |
| 1510       | WLAC    | Nashville, TEN  | 0020       | F         |
| 1510       | WNRB    | Boston, MA      | 0030       | A,C,D,E,F |
| 1520       | WWKB    | Buffalo, NY     | 0020       | C,FG      |
| 1540       | WDCC    | Albany, NY      | 0105       | A,C       |
| 1560       | WQEW    | New York, NY    | 0345       | C,D,F     |
| 1590       | WAKR    | Akron, OH       | 0117       | C         |
| 1590       | WARV    | Wanwick, RI     | 0100       | C         |
| 1590       | WSMN    | Nashua, NH      | 0115       | C         |
| 1660       | WJDM    | Elizabeth, NJ   | 0046       | C,F       |

| <b>CANADA</b> |      |                    |      |           |
|---------------|------|--------------------|------|-----------|
| 560           | CHVO | Carbonear, NF      | 0207 | D         |
| 580           | CJFX | Antigonish, NS     | 0005 | C,D,G     |
| 590           | VOCM | St.John's, NF      | 2344 | A,C,D     |
| 620           | CKCM | Grand Falls, NF    | 0040 | C,D       |
| 640           | CBN  | St.John's, NF      | 0002 | C         |
| 650           | CKGA | Gander, NF         | 0030 | A,C,D     |
| 680           | CFTR | Toronto, ON        | 0835 | C         |
| 680           | CKXG | Grand Falls, NF    | 0830 | C         |
| 710           | CKVO | Clareville, NF     | 0200 | A,B,C,D   |
| 740           | CBL  | Toronto, ON        | 0810 | C         |
| 740           | CHCM | Marystown, NF      | 0019 | C,D       |
| 750           | CBGY | Bonaville Bay, NF  | 0055 | A         |
| 780           | CFDR | Dartmouth, NS      | 0620 | C,D       |
| 820           | CHAM | Hamilton, ON       | 0100 | B         |
| 920           | CJCH | Halifax, NS        | 0120 | C,D,G     |
| 930           | CJYQ | St.John's, NF      | 2323 | A,B,C,D,G |
| 940           | CBM  | Montreal, PQ       | 0147 | C,D       |
| 950           | CKNB | Cambellton, NB     | 0850 | C         |
| 990           | CBY  | Corner Brook, NF   | 0220 | B         |
| 1010          | CFRB | Toronto, ON        | 0001 | C,D       |
| 1070          | CBA  | Moncton, NB        | 0312 | C         |
| 1140          | CB1  | Sydney, NS         | 0905 | C         |
| 1270          | CJCB | Sydney, NS         | 0920 | C         |
| 1370          | RFO  | St.Pierre/Miquelon | 0115 | D         |
| 1380          | CFDA | Victoria, BC       | 0001 | C         |
| 1400          | CBG  | Gander, NF         | 0800 | C         |
| 1540          | CHIN | Toronto, ON        | 0100 | C         |
| 1600          | CHNR | Simcoe, ON         | 0809 | C         |

- DXers:**  
 (A) Darren Beasley, Bridgewater.  
 (B) Robert Connolly, Kilkree.  
 (C) Paul Crankshaw, Troon.  
 (D) David Edwards, Wallsend.  
 (E) Harry Richards, Barton upon Humber.  
 (F) David Sayles, Doncaster.  
 (G) John Slater, Scalloway.

After mid-day R.Australia via Darwin 11.660 (Eng to SE.Asia 1130-1300) was SIO433 at 1220 in Macclesfield; R.Romania Int, Bucharest 11.940 (Eng to Eur 1300-1400) SIO333 at 1300 in Co.Fermanagh; R.Jordan via Al Karanah 11.690 (Eng to W.Eur, E.USA 1400-1630) 43334 at 1400 by **Gerald Guest** in Dudley; Voice of Greece, Athens 11.645 (Gr, Eng to Eur, N.America 1400-1450) 44444 at 1445 in Woodhall Spa; RCI via Sines, Portugal 11.915 (Eng, Fr to Eur, M.East, Africa 1430-1600) 34332 at 1455 in Middlesbrough; R.Australia via Darwin 11.660 (Eng to Asia 1430-1800) 45544 at 1500 in Cyprus & SIO454 at 1540 in Doncaster; WWCN Nashville, USA 12.160 (Eng to N.America, Eur 1400-2300) 34443 at 1505 in Kilkree; Israel R, Jerusalem 11.605 (Eng to Eur, USA 1500-1530) 54544 at 1515 in Herstmonceux; RFI via Allouf? 11.615 (Eng to M.East, Africa 1600-1700)

43333 at 1610 in Stalbridge; RFI via ? 12.015 (Eng to Africa 1600-1700) 43233 at 1630 in Rugby; R.Australia via Shepparton 11.880 (Eng to Asia 1700-2058) SIO332 at 1722 in Woking; R.Netherlands via Meyerton 11.655 (Eng to Africa 1730-2025) 45444 at 1750 in Bridgewater; Monitor R.via WSHB 11.550 (Eng to Eur, M.East, Africa 1800-1958) 34333 at 1812 in Freshwater Bay; R.Kuwait via Kabd 11.990 (Eng to Eur, N.America 1800-2100) 32323 at 2000 in Appleby; SRI via ? 11.640 (Eng, Fr, It, Ger to Africa 2000-2200) 44333 at 2015 in Colyton; AIR via Bangalore 11.620 (Eng, Hi to Eur 1745-2230) 44345 at 2145 in Oadby.

Some of the broadcasts in the **9MHz (31m)** band before noon come from R.New Zealand Int on 9.700 (Eng to Pacific areas Mon-Fri 0816-1206, Sat/Sun 0758-1206), rated 22432 at 0905 in Galashiels; R.Australia via Shepparton 9.860 (Eng to Pacific, Asia 0600-1200) 33333 at 0920 in Morden; HCJB Quito, Ecuador 9.445 (Eng to S.Pacific 0700-1100) 45434 at 0930 in Ross-on-Wye; R.Netherlands via Bonaire, Ned.Antilles 9.830 (Eng to Pacific 0730-1025) SIO333 at 0951 in N.Bristol; SRI via Schwarzenburg? 9.885 (Eng, Fr, Ger, It to Far East 1100-1245) SIO344 at 1111 by **Peter Gardner** in

Glasgow; Croatian R, via Deanovec 9.830 (Cr, Eng to Eur 0600?-1230) 44545 at 1130 in Oadby.

Later, R.Norway Int on 9.590 (Norw (Eng Sun) to Eur 1300-1330) was 22222 at 1300 in Truro; R.Veritas Asia, Philippines 9.555 (Ben to Asia 1430-1425) 45444 at 1425 in Cyprus; R.Australia via Darwin 9.615 (Eng to Asia, Pacific 1500-1755) 34333 at 1527 in Woodhall Spa; TWR Manzini, Swaziland 9.500 (Eng to C.Africa 1600-1830) SIO211 at 1825 in Macclesfield; Voice of Greece, Athens 9.375 (Eng to Eur 1900-1910) SIO444 at 1906 in Doncaster; Voice of Indonesia, Jakarta 9.525 (Eng to Eur 2000-2100) 32333 at 2025 in Rugby; RCI via Sackville 9.805 (Fr, Eng to Eur, Africa 2000-2230) 32243 at 2130 in Colyton; AIR via Delhi? 9.950 (Eng to W.Eur 2045-2230) 44444 at 2138 in Plymouth; BBC via Skelton, UK 9.410 (Eng to Eur, N/C.Africa 0300-2300) 44444 at 2155 by **Martin Cowin** in Kirkby Stephen; R.Cairo via Abis 9.900 (Eng to Eur 2115-2245) SIO222 at 2200 in Co.Fermanagh; VOFC Taiwan via WYFR USA 9.985 (Eng to Eur 2200-2300) 43333 at 2200 in Stalbridge.

Noted after dark in the **7MHz (41m)** band were R.Thailand via Udonthani 7.295 (Eng to Eur 1900-2000) 45544 at 1937 in Wallsend; VOIRI Tehran 7.260

# Local Radio Chart

| Freq (kHz) | Station              | ILR | o.m.r.p | Listener      | Freq (kHz) | Station               | ILR | o.m.r.p | Listener              |
|------------|----------------------|-----|---------|---------------|------------|-----------------------|-----|---------|-----------------------|
| 558        | Spectrum, London     | I   | 0.80    | B,E,I,K       | 1161       | Southern Counties R   | B   | 1.00    | B,F*,I,K              |
| 585        | R.Solway             | B   | 2.00    | C             | 1161       | Tay AM, Dundee        | I   | 1.40    | G*,I,J,L              |
| 603        | Cheltenham R         | I   | 0.10    | B,C,D,G,I,K   | 1170       | Amber SGR Ipswich     | I   | 0.28    | B                     |
| 603        | InvictaSG, Lirt'brme | I   | 0.10    | B,F,I,K       | 1170       | SCR, Portsmouth       | I   | 0.50    | I,K                   |
| 630        | R.Bedfordshire(3CR)  | B   | 0.20    | B,E,I,K       | 1170       | Signal G, Stoke-on-T  | I   | 0.20    | J                     |
| 630        | R.Cornwall           | B   | 2.00    | C,I,K,N       | 1170       | Swansea Snd, Swansea  | I   | 0.58    | J                     |
| 657        | R.Clywd              | B   | 2.00    | C,I,K         | 1170       | 1170AM, High Wycombe  | I   | 0.25    | B,C,I                 |
| 657        | R.Cornwall           | B   | 0.50    | C,K           | 1242       | InvictaSG, Maidstone  | I   | 0.32    | B,F,I,N               |
| 666        | Gemini AM, Exeter    | I   | 0.34    | C,D,E,I,K     | 1242       | IoW Radio, Wootton    | I   | 0.50    | K                     |
| 666        | R.York               | B   | 0.80    | C,I           | 1251       | Amber SGR, Bury StEd  | I   | 0.76    | B,C,G*,I              |
| 729        | BBC Essex            | B   | 0.20    | B,F,I,K       | 1260       | Brunel CG, Bristol    | I   | 1.60    | K                     |
| 738        | Hereford/Worcester   | B   | 0.037   | C,I,K         | 1260       | Marcher G, Wrexham    | I   | 0.64    | L                     |
| 756        | R.Cumbria            | B   | 1.00    | B*,C,I,J      | 1260       | R.York                | B   | 0.50    | C                     |
| 756        | R.Maldwyn, Powys     | I   | 0.63    | C,H,I         | 1296       | Radio XL, Birmingham  | I   | 5.00    | B,C,I,J,K,L           |
| 765        | BBC Essex            | B   | 0.50    | B,C,F*,I,K    | 1305       | Gt Yks G, Barnsley    | I   | 0.15    | C                     |
| 774        | R.Kent               | B   | 0.70    | B,F*,I,K      | 1305       | Premier via ?         | I   | 0.50    | B,I,J,K               |
| 774        | R.Leeds              | B   | 0.50    | C,I           | 1323       | S.Coast R, Southwick  | I   | 0.50    | B,I,K                 |
| 774        | 3 Counties SG, Glos  | I   | 0.14    | C,G           | 1323       | Somerset Snd, Bristol | B   | 0.63    | B*                    |
| 792        | Chiltern SG, Bedford | I   | 0.27    | B,I,K         | 1332       | Premier, Battersea    | I   | 1.00    | B,C,I,J               |
| 792        | R.Foyle              | B   | 1.00    | C,N           | 1332       | CG 1337, Peterbor'    | I   | 0.60    | B,L,M                 |
| 801        | R.Devon & Dorset     | B   | 2.00    | C,E,I,K       | 1332       | Wiltshire Sound       | B   | 0.30    | K,L                   |
| 828        | Chiltern SG, Luton   | I   | 0.20    | B,I           | 1359       | BreezeAM, Chelmsford  | I   | 0.28    | B*,I                  |
| 828        | Magic 828, Leeds     | I   | 0.12    | C             | 1359       | CG 1359, Coventry     | I   | 0.27    | LL                    |
| 828        | ZCR CG, Boumemouth   | I   | 0.27    | D,G,K         | 1359       | R.Scient              | B   | 0.85    | I,K                   |
| 837        | R.Cumbria/Furness    | B   | 1.50    | C             | 1359       | Touch AM, Cardiff     | I   | 0.20    | L                     |
| 837        | Asian Netwk Leics    | B   | 0.45    | B,C,I,K       | 1368       | R.Lincolnshire        | B   | 2.00    | B*,I                  |
| 855        | R.Devon & Dorset     | B   | 1.00    | K             | 1368       | Southern Counties R   | B   | 0.50    | B*,F*,I,K             |
| 855        | R.Lancashire         | B   | 1.50    | C             | 1368       | Wiltshire Sound       | B   | 0.10    | I,K                   |
| 855        | R.Norfolk            | B   | 1.50    | B,I           | 1413       | Premier via ?         | I   | 0.50    | B*,C,D,I,J,K          |
| 855        | Sunshine 855, Ludlow | I   | 0.15    | B,G,I         | 1431       | Breeze AM, Southend   | I   | 0.35    | A*,B*,I,J             |
| 873        | R.Norfolk            | B   | 0.30    | B,I           | 1431       | Cl.Gld 1431 Reading   | I   | 0.14    | I,J,K                 |
| 936        | Brunel CG, W.Wilts   | I   | 0.18    | I,K           | 1449       | R.Peterboro/Cambos    | B   | 0.15    | C,I,L                 |
| 945        | S.Coast R, Bexhill   | I   | 0.75    | B,I,K,L*      | 1458       | R.Cumbria             | B   | 0.50    | C                     |
| 945        | Derby (Gem AM)       | I   | 0.20    | C,I           | 1458       | R.Devon & Dorset      | B   | 2.00    | C,I,J,K               |
| 954        | Gemini AM, Torquay   | I   | 0.32    | I,K           | 1458       | 1458 Lite AM Manch'   | I   | 5.00    | L                     |
| 954        | Wyvern AM, Hereford  | I   | 0.16    | B,F*,I        | 1458       | R.Newcastle           | B   | 2.00    | IM*                   |
| 963        | Asian Sd, Manchester | I   | ?       | C             | 1458       | Sunrise, London       | I   | 50.00   | B,E,I,J,G*,K,L        |
| 963        | 963 Liberty (Viva)   | I   | 1.00    | B,I,K         | 1458       | Asian Netwk Langley   | B   | 5.00    | E,I                   |
| 990        | R.Devon & Dorset     | B   | 1.00    | C,I,K         | 1476       | CountySG, Guildford   | I   | 0.50    | B,C,D,FG*,I,J,K,L*,M* |
| 990        | Gt Yks G, Doncaster  | I   | 0.25    | I             | 1485       | Cl.Gld 1485 Newbury   | I   | 1.00    | B*,I,J                |
| 990        | WABC, Wolverhampton  | I   | 0.09    | I             | 1485       | R.Humberside (Hull)   | B   | 1.00    | B,F*,G*,L             |
| 999        | Gem AM, Nottingham   | I   | 0.25    | B,I           | 1485       | R.Merseyside          | B   | 1.20    | B,C,D,F*,G*,N         |
| 999        | Red Rose G, Preston  | I   | 0.80    | C,L*          | 1485       | Southern Counties R   | B   | 1.00    | B,I,K                 |
| 999        | R.Solent             | B   | 1.00    | B,F,I,K,L*    | 1503       | R.Stoke-on-Trent      | B   | 1.00    | B,C,I,J               |
| 1017       | WABC, Shrewsbury     | I   | 0.70    | H,I,J         | 1521       | R.1521 Craigavon, NI  | I   | 0.50    | C,L,N                 |
| 1026       | R.Cambridgeshire     | B   | 0.50    | B,I,J         | 1521       | Fame 1521, Reigate    | I   | 0.54    | A*,B,F,G*,I,J,K,L     |
| 1026       | Downtown, Belfast    | I   | 1.70    | C,L,N         | 1530       | R.Exsex               | B   | 0.15    | B,F*,I,K              |
| 1026       | R.Jersey             | B   | 1.00    | I,K           | 1530       | Gt.Yks G, Hudders'f d | I   | 0.74    | C,I,J,L,N             |
| 1035       | RTL Country 1035     | I   | 1.00    | B,G*,I,K,L*   | 1530       | Wyvern, Worcester     | I   | 0.52    | A*,G,I,J,K,L          |
| 1035       | R.Sheffield          | B   | 1.00    | C             | 1548       | R.Bristol             | B   | 5.00    | I,K,L                 |
| 1035       | N.Sound, Aberdeen    | I   | 0.78    | A*,J,L        | 1548       | Capital G, London     | I   | 97.50   | B,G*,I,K,L            |
| 1116       | R.Derby              | B   | 1.20    | A*,C,F*,I,J,L | 1548       | City G, Liverpool     | I   | 4.40    | C,I,L,N               |
| 1116       | R.Guernsey           | B   | 0.50    | B,F*,G,I,K    | 1548       | Max AM, Edinburgh     | I   | 2.20    | G,I,J,L               |
| 1116       | Valleys R            | I   | ?       | J,E           | 1557       | R.Lancashire          | B   | 0.25    | C,I                   |
| 1152       | Amber, Norwich       | I   | 0.83    | B,G*,J        | 1557       | Mellow, Clacton       | I   | 0.0     | G,I                   |
| 1152       | Clyde 2, Glasgow     | I   | 3.06    | J,L           | 1557       | Northants CG          | I   | 0.76    | G*,I,L                |
| 1152       | LBC 1152             | I   | 23.50   | B,I,K         | 1557       | S.Coast R, So'ton     | I   | 0.50    | I,K                   |
| 1152       | Pic'ly 1152, Manch'r | I   | 1.50    | C,L*          | 1584       | KCBC, Kettering       | I   | 0.04    | G,I                   |
| 1152       | PhymSnd AM, Plymouth | I   | 0.32    | D             | 1584       | London Turkish R      | I   | ?       | B,G*,I,K              |
| 1152       | Xtra-AM, Birmingham  | I   | 3.00    | G,I,L*        | 1584       | R.Nottingham          | B   | 1.00    | B,G,I,L               |
| 1161       | R.Bedfordshire(3CR)  | B   | 0.10    | B,I           | 1584       | R.Shropshire          | B   | 0.50    | C,I                   |
| 1161       | Brunel CG, Swindon   | I   | 0.16    | C,F*,I,K      | 1584       | Tay, Perth            | I   | 0.21    | I,J,L                 |
| 1161       | Gt.Yks, Hull         | I   | 0.35    | G,L*          | 1602       | R.Kent                | B   | 0.25    | B,I,F*,G,I,K          |

- Note: Entries marked \* were logged during darkness. All other entries were logged during daylight or at dawn/dusk.
- Listeners:  
 (A) Tim Allison, Middlesbrough.  
 (B) Paul Bowers, Burnham-on-Crouch.  
 (C) Robert Connolly, Kilkree.  
 (D) Francis Hearne, N.Bristol.  
 (E) Simon Hockenhull, E.Bristol.  
 (F) Sheila Hughes, Morden.  
 (G) Nicola Huttings, Wellington.  
 (H) Stephen Jones, Oswestry.  
 (I) Brian Keyte, Bookham.  
 (J) Ross Lockley, Galashiels.  
 (K) George Millmore, Wootton, IoW.  
 (L) Chris Ridley, Co.Sligo, Eire.  
 (M) David Sayles, Doncaster.  
 (N) Tom Smyth, Co.Fermanagh.  
 (D) Tom Winzor, Plymouth.

# Tropical Bands Chart

| Freq (MHz) | Station              | Country       | UTC  | DXer                | Freq (MHz) | Station               | Country       | UTC  | DXer            |
|------------|----------------------|---------------|------|---------------------|------------|-----------------------|---------------|------|-----------------|
| 2.310      | ABC Alice Springs    | Australia     | 2048 | E,I,N               | 4.830      | China Huayi BC        | China         | 2300 | S               |
| 2.325      | ABC Tennant Creek    | Australia     | 2000 | E,I,N               | 4.830      | R.Bangkok             | Thailand      | 1505 | S               |
| 2.485      | ABC Katherine        | Australia     | 2048 | I,N                 | 4.830      | R.Tachira             | Venezuela     | 0205 | C,E,S           |
| 3.200      | TWR Manzini          | Swaziland     | 1920 | V                   | 4.832      | R.Rejo                | Costa Rica    | 0807 | L,S,U           |
| 3.210      | Em.National, Maputo  | Mozambique    | 2015 | E,S                 | 4.835      | ABC-Alice Springs     | Australia     | 0105 | E               |
| 3.220      | CPBS 1, Beijing      | China         | 2140 | N                   | 4.835      | R.Tezuulian, Coban    | Guatemala     | 2345 | U               |
| 3.220      | Channel Africa       | S.Africa      | 1745 | M,U                 | 4.835      | RTM Bamako            | Mali          | 2156 | D,H,K,L,M,N,S,V |
| 3.230      | SABC Meyerton        | S.Africa      | 1700 | U                   | 4.840      | Heilongjiang, Harbin  | China         | 1115 | S               |
| 3.240      | TWR Shona            | Swaziland     | 0318 | M                   | 4.840      | AIR Bombay            | India         | 0035 | C,E,S,V         |
| 3.245      | AIR Lucknow          | India         | 1500 | S                   | 4.845      | RTM Kuala Lumpur      | Malaysia      | 1646 | V               |
| 3.255      | BBC via Maseru       | Lesotho       | 2050 | B,E,M,N,D,S,V       | 4.845      | ORTM Nouakchott       | Mauritania    | 0010 | E               |
| 3.270      | SWABC 1, Namibia     | S.W.Africa    | 2118 | E,M,N,S,U,V         | 4.850      | R.Yaounde             | Cameroon      | 2035 | E,M,S           |
| 3.280      | V.O.Puijiang         | China         | 1455 | S                   | 4.850      | CNR 1                 | China         | 1653 | V               |
| 3.287      | R.Madagascar         | Madagascar    | 1858 | B,V                 | 4.850      | AIR Kohima            | India         | 1555 | E,L,N,O,S       |
| 3.290      | Nambian BC,Windhoek  | S.W.Africa    | 2118 | E,M,N,S             | 4.860      | AIR Delhi             | India         | 1556 | H,N,O,S,V       |
| 3.300      | R.Cultural           | Guatemala     | 0318 | M                   | 4.865      | PBS Lanzhou           | China         | 2153 | E,I,N,S         |
| 3.306      | ZBC Prog 2           | Zimbabwe      | 2118 | B,E,M,N,U,V         | 4.870      | R.Cotonou             | Benin         | 2120 | H,N,S           |
| 3.315      | AIR Bhopal           | India         | 1710 | S,U                 | 4.875      | R.Roraima, Boa Vista  | Brazil        | 0105 | E,M,S           |
| 3.316      | SI/BS Goderich       | Sierra Leone  | 2117 | E,H,N               | 4.879      | R.Bangladesh          | Bangladesh    | 0045 | E               |
| 3.320      | SABC (RSG) Meyerton  | S.Africa      | 1740 | B,E,N,S,U,V         | 4.885      | R.Clube do Para       | Brazil        | 0341 | M,S             |
| 3.325      | FRON Lagos           | Nigeria       | 2121 | N                   | 4.885      | R.Difusora Acreana    | Brazil        | 0040 | E               |
| 3.330      | Christian Voice      | Zambia        | 1905 | B,M                 | 4.885      | KBC East Sce Nairobi  | Kenya         | 1925 | S,V             |
| 3.335      | CBS Taipei           | Taiwan        | 2158 | L,N,V               | 4.890      | RRI Paris             | via Gabon     | 0402 | M               |
| 3.338      | R.Maputo             | Mozambique    | 1940 | V                   | 4.890      | R.Port Moresby        | New Guinea    | 1907 | L,L,N,S         |
| 3.340      | R.Uganda, Kampala    | Uganda        | 2053 | N,V                 | 4.890      | ORTS Dakar            | Senegal       | 0545 | S               |
| 3.345      | AIR Jaipur           | India         | 0027 | E,S                 | 4.895      | RTM Kuching           | Sarawak       | 2320 | S               |
| 3.345      | RRI Temate           | Indonesia     | 2150 | N,V                 | 4.900      | Haixia 2              | China         | 1528 | H,I,S           |
| 3.345      | Channel Africa       | S.Africa      | 1907 | B,V                 | 4.900      | SLBC Colombo          | Sri Lanka     | 0050 | E,V             |
| 3.356      | R.Botswana           | Gaborone      | 2139 | B,M,N               | 4.905      | R.Nat.N'djamena       | Chad          | 2154 | E,H,I,M,N,S,V   |
| 3.365      | GBC R-2              | Ghana         | 2102 | C,L,M,N             | 4.905      | CPBS 1, Beijing       | China         | 2309 | S               |
| 3.365      | AIR Delhi            | India         | 1445 | K,L,S,V             | 4.910      | RTG Conakry           | Guinea        | 1748 | H               |
| 3.375      | Em.National,Mulenvos | Angola        | 1910 | B                   | 4.910      | AIR Jaipur            | India         | 1345 | S               |
| 3.375      | R.Nacional S.Gabriel | Brazil        | 0030 | E                   | 4.910      | R.Zambia, Lusaka      | Zambia        | 1942 | K,M,N,S,V       |
| 3.377      | R.Nacional, Mulenvos | Angola        | 2124 | E,N                 | 4.915      | R.Anhanguera          | Brazil        | 0915 | S               |
| 3.395      | RRI Tanjung Karang   | Indonesia     | 1452 | V                   | 4.915      | R.Difusora, Macapa    | Brazil        | 2140 | N               |
| 3.900      | Hulunbeier, Hailar   | China         | 1455 | S,V                 | 4.915      | GBC-1, Accra          | Ghana         | 2136 | E,K,M,N,S,V     |
| 3.915      | BBC via Kranji       | Singapore     | 2050 | F,J,L,M,U,V         | 4.915      | KBC Cent Sce Nairobi  | Kenya         | 1814 | N,V             |
| 3.925      | NSB (R Tampa)        | Japan         | 0830 | S,V                 | 4.920      | R.Quito, Quito        | Ecuador       | 0650 | H,K,L,S         |
| 3.945      | AIR Gorakhpur        | India         | 1520 | S                   | 4.935      | KBC Gen Sce Nairobi   | Kenya         | 1810 | E,M,N,S,V       |
| 3.945      | R.Tampa 2, Tokyo     | Japan         | 0800 | S                   | 4.940      | AIR Guwahati          | India         | 0040 | E,S,V           |
| 3.950      | Qinghai PBS, Xining  | China         | 1320 | H,S,V               | 4.950      | R.Nacional, Mulenvos  | Angola        | 2148 | E,N,V           |
| 3.955      | BBC via Skelton      | England       | 1940 | A,E,H,J,M,T,U       | 4.950      | AIR Srinagar          | India         | 1725 | S,V             |
| 3.960      | Xinjiang PBS, Urumqi | China         | 1430 | H,S,V               | 4.950      | R.Pakistan, Peshawar  | Pakistan      | 1720 | V               |
| 3.965      | RRI Paris            | France        | 2200 | E,M,U               | 4.950      | VDA via Sao Tome      | Sao Tome      | 2052 | N,S             |
| 3.970      | R.Korea via Skelton  | England       | 2147 | C,M,P               | 4.955      | R.Nac. de Colombia    | Colombia      | 0100 | E,S             |
| 3.975      | R.Budapest           | Hungary       | 2005 | E,F,H,K,L,M,U,V     | 4.960      | Hanoi 2               | Vietnam       | 1315 | S               |
| 3.976      | RRI Pontianak        | Indonesia     | 1605 | V                   | 4.970      | PBS Xinjiang          | China         | 0055 | E,S             |
| 3.985      | Nexus, Milan         | Italy         | 0700 | K,L,M               | 4.970      | AIR Shillong          | India         | 0055 | E,V             |
| 3.985      | China R via SRI      | Switzerland   | 2200 | A,L,T,U,W           | 4.975      | Fujian 1, Fuzhou      | China         | 2305 | S               |
| 3.990      | Xinjiang BS, Urumqi  | China         | 1400 | S                   | 4.975      | R.Uganda, Kampala     | Uganda        | 1805 | M,N             |
| 3.995      | DW via Julich        | Germany       | 1913 | B,D,E,F,H,L,M,U     | 4.980      | PBS Xinjiang, Urumqi  | China         | 1455 | E,S             |
| 4.000      | RRI Padang           | Indonesia     | 1650 | V                   | 4.980      | Ecos del Torbes       | Venezuela     | 0006 | E,H,I,M,N,S     |
| 4.005      | Vatican R            | Italy         | 0740 | B,E,J,L,P           | 4.985      | R.Brazil Central      | Brazil        | 0110 | S               |
| 4.035      | Xizang PBS, Lhasa    | Tibet         | 1305 | E,S                 | 4.990      | R.Animas, Chocaya     | Bolivia       | 0915 | S               |
| 4.430      | Xinjiang BS, Urumqi  | China         | 1509 | H,S                 | 4.990      | AIR Ext.Service       | India         | 0006 | M,S             |
| 4.460      | CPBS 1, Beijing      | China         | 1330 | S,V                 | 4.990      | FRON Lagos            | Nigeria       | 2040 | S               |
| 4.500      | Xinjiang BS, Urumqi  | China         | 1558 | E,H,M,S,V           | 5.005      | R.Nacional, Bata      | Equ Guinea    | 2300 | S               |
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| 4.775      | R.Tarma              | Peru          | 0230 | S                   | 5.040      | PBS Fujian, Fuzhou    | China         | 0055 | E,S             |
| 4.777      | R.Gabon, Libreville  | Gabon         | 2135 | C,K,L,N,S           | 5.040      | RRI Pekanbaru         | Indonesia     | 2315 | S               |
| 4.783      | RTM Bamako           | Mali          | 2141 | C,D,M,N,S,U         | 5.045      | R.Cultura do Para     | Brazil        | 0330 | E,H,M,S         |
| 4.790      | Azad Kashmir R       | Pakistan      | 1445 | S,V                 | 5.047      | R.Togo, Lome          | Togo          | 2115 | M,N,S           |
| 4.790      | R.Atlantida          | Peru          | 0245 | S                   | 5.050      | Guangxi PBS, Nanning  | China         | 1521 | N,S             |
| 4.800      | CPBS 2 Beijing       | China         | 0005 | E,S                 | 5.050      | Haixia 1              | China         | 1515 | D,H             |
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| 4.800      | LNBS Maseru          | Lesotho       | 2021 | B,E,L,M,N,V         | 5.050      | R.Tanzania            | Tanzania      | 1820 | G,M,N,S,V       |
| 4.805      | R.Nac. Amazonas      | Brazil        | 2315 | S                   | 5.055      | RFO Cayenne(Matoury)  | French Guiana | 2135 | E,L,N,S         |
| 4.815      | R.Difusora, Londrina | Brazil        | 2353 | H                   | 5.060      | PBS Xinjiang, Urumqi  | China         | 0008 | D,E,M,S         |
| 4.815      | R.diff TV Burkina    | Ouagadougou   | 2010 | B,C,H,M,N,S,V       | 5.075      | Caracol Bogota        | Colombia      | 1640 | E,K,L,M,S       |
| 4.820      | E.Prov Huila         | Angola        | 1944 | N                   | 5.090      | Taiwan 2 Sce, Beijing | China         | 1322 | S               |
| 4.820      | R.Botswana, Gaborone | Botswana      | 0608 | M,V                 | 5.125      | Taiwan 1 Sce, Beijing | China         | 1320 | S               |
| 4.820      | La Voz Evangelica    | Honduras      | 0225 | S                   | 5.163      | CPBS 2, Beijing       | China         | 1310 | S               |
| 4.820      | AIR Calcutta         | India         | 0020 | E                   | 5.295      | CNR 1                 | China         | 2025 | V               |
| 4.820      | Xizang, Lhasa        | Tibet         | 1135 | S                   | 5.320      | CNR 1                 | China         | 2026 | V               |
| 4.828      | ZBC R-4              | Zimbabwe      | 1942 | M,N,S,V             |            |                       |               |      |                 |

- DXers- (H) John Eaton, Woking. (I) David Edwardson, WallSEND. (J) Simon Hockenhill, E.Bristol. (K) Sheila Hughes, Morden. (L) Rhoderick Illman, Dexted. (M) Eddie McKeown, Newry. (N) Fred Pallant, Storrington. (O) John Parry, Larnaca, Cyprus. (P) Clare Pinder, while in Appleby. (Q) Peter Pollard, Rugby. (R) Vic Prier, Colyton. (S) John Slater, Scalloway. (T) Tom Smyth, Co.Fermanagh. (U) Norman Thompson, Oadby. (V) Mahendra Vaghjee, Rose Hill, Mauritius. (W) Thomas Williams, Truro.

(Eng to Eur, M.East 1930-2028) SIO433 at 1947 in Doncaster; R.Tirana, Albania 7.270 (Eng to Eur 1930-2000) 44544 at 1950 in Galashiels; DW via Sines 7.285 (Eng to Eur 2000-2050) SIO444 at 2004 in N.Bristol; Voice of Nigeria, Ikorodu 7.255 (Eng to W.Africa 1900-2100), heard at 2015 in Oadby; Israel R, Jerusalem 7.465 (Eng to Eur, N.America 2000-

2030) 44334 at 2015 in Rugby; R.Bulgaria via Plovdiv 7.335 (Eng to Eur 2000-2100) 44334 at 2030 in Colyton; VOA via Selebi-Phikwe, Botswana 7.415 (Eng to Africa 1900-2230) SIO444 at 2101 in Kirkby Stephen; RCI via Skelton, UK 7.235 (Eng to Eur, M.East, Africa 2100-2230) 43333 at 2115 in Stalbridge; AIR via Aligarh? 7.410 (Hi, Eng to Eur

1745-2230) 43233 at 2125 in Newry; China R.Int via Russia 7.170 (Eng to Eur 2200-2257) 33333 at 2200 in Morden; Monitor R.Int, via WSHB 7.510 (Eng to S.Eur, W.Africa 2300-2355) 33333 at 2305 in Truro; R.Bulgaria via Plovdiv 7.375 (Eng to N.America 0000-0100), heard at 0030 in Glasgow; R.Yugoslavia via Bijeljina 7.115 (Eng to Eur, E.USA 0100-0130) 55545 at 0115 in E.Bristol.

The following broadcasts to Europe were logged in the 6MHz (49m) band in addition to those noted last month: R.Netherlands via Julich 6.045 (Eng 1130-1325) rated SIO444 at 1130 in N.Bristol; SRI via Lenk 6.165 (Fr, It, Ger, Eng 0500-2100) 55555 at 1326 in Plymouth; BBC via Rampisham, UK 6.195 (Eng 1600-2330) SIO444 at 1600 in Co.Fermanagh; Bayerischer Rundfunk, Germany 6.085 (Ger) 54544 at 1615 in Oadby; R.Estonia, Tallinn 5.925 (Eng 1620-1630 Mon-Fri) 43333 at 1620 in Morden; R.Slovakia Int 5.915 (Eng 1730-1757) 43444 at 1741 in Freshwater Bay; R.Tirana, Albania 6.270 (Eng 1930-2000) 54454 at 1935 in Kirkby Stephen; RAI Rome 6.030 (Eng 1935-1955) 54544 at 1940 in Ross-on-Wyke; R.Budapest, Hungary 5.970 (Eng 2000-2030) 42232 at 2016 in Newry; REE via Noblejas 6.125 (Eng 2000-2100) 43344 at 2020 in Rugby; Polish R, Warsaw 6.035 (Eng 2030-2125) 44444 at 2033 in Woodhall Spa; R.Romania Int, Bucharest 5.990 (Eng 2100-2200) 32233 at 2100 in Dudley; RCI via Skelton, UK (Eng 2100-2230) 23433 at 2125 in E.Bristol; R.Ukraine Int 6.100 (Eng to Europe 2200-2300) 34543 at 2219 in Bridgwater; R.Sweden via Horby? 6.065 (Eng 2230-2258) 33333 at 2230 in Truro.

EQUIPMENT USED - \$February, #March, \*April'97

- #\* Tim Allison, Middlesbrough. Lowe HF-225 + r.w.
- \* Robert Amelot, Beau-Bassin, Mauritius. Yaesu FRG-7 + r.w.
- S#\* Darren Bawley, Bridgwater. Yaesu FRG-100 + a.t.u. + 15m wire.
- S#\* Paul Bowery, Burnham-on-Crouch. Sangean ATS-803A + 30m wire.
- S#\* Vera Brindley, Woodhall Spa. Sony CRF-320 or Sangean ATS-803A + r.w.
- S Kenneth Buck, Edinburgh. Lowe HF-225 + r.w. in loft or l.w. loop.
- S#\* Robert Connolly, Killekeel. JRC NRD-525 + Datong AD370.
- S#\* Martin Cowen, Kirkby Stephen. Hitachi TRK-5854C + built-in whip.
- S#\* Paul Crankshaw, Truro. ADR AR7030 + Mag Balun + 30m wire or loop.
- S#\* Bernard Curtis, Stalbridge. Bush portable or Tatung TMR7602.
- S#\* Martin Dale, Stockport. Grundig Satellit 3000 or Sangean ATS-803A + a.t.u. + 23m wire or Cappa loop.
- S#\* Ron Damp, Worthing. JRC NRD-525 + Mag Balun + 14m wire.
- # Eric Duncan, St.Andrews. ADR AR7030 or ADR AF5000 + balun + 50m wire or W-Q m.w. loop.
- S#\* John Eaton, Woking. Lowe HF-225 + Datong AD270 + a.t.u. + r.w.
- S#\* David Edwardson, WallSEND. Trio R-600 + R-Balun + invern V trap dipole or 2.5m X 2.5m m.w. loop.
- S#\* Stan Evans, Herstmonceux. Kenwood R-2000 + Balun + 11m wire in loft.
- S#\* Peter Griffin, Glasgow. Yaesu FRG-8800 + indoor r.w.
- S#\* Michael Girdin, Ross-on-Wyke. Lowe HF-225 + a.t.u. + 45m wire.
- # Bill Griffith, while in Doha, Qatar. Sony ICF-SW55 + 5m wire.
- S#\* Gerald Guley, Dudley. Roberts RC818 + r.w. (location 300m a.s.l.)
- S#\* Tony Hall, Freshwater Bay, IoW. Yaesu FRG-7 + r.w. or RF845.
- S#\* Ted Harris, Manchester. Roberts RC818.
- S#\* Francis Heame, N.Bristol. Sharp WO1370 + r.w.
- \* Simon Hockenhill, E.Bristol. Roberts RB17, ITT Colt, Bush TR130.
- S#\* Sheila Hughes, Morden. Sony ICF-7600DS + loop or Panasonic DR48 + 15m wire.
- \* Nicola Hutchings, Wellington. Sony Walkman.
- S#\* Rhoderick Illman, Dexted. Kenwood R-5000 + r.w. or Sony ICF-7600DS.
- S#\* Ronald Jeffries, Berkeley. Kenwood R-5000 + a.t.u. + 15m wire.
- \* Stephen Jones, Dswestry. Sanyo DCC W7 Hi-Fi + r.w.
- S#\* Brian Key, Bookham. CA117 radio in car + loop above sunroof.
- S#\* Ross Lockley, Galashiels. Realistic DX-300 + a.t.u. + 40m wire or Sangean ATS-803A.
- S#\* David Matthews, Llandrindod Wells. Lowe HF-225 + 30m wire.
- S#\* Eddie McKeown, Newry. Tatung TMR 7602.
- S#\* George Millmore, Wootton. IoW. Rascal RA17L + loop or Sangean ATS-803A.
- S#\* Fred Pallant, Storrington. Trio R-2000 + Howes CTUB 8 + r.w.
- S#\* John Parry, Larnaca, Cyprus. Realistic DX-400 + r.w.
- S#\* Roy Patrick, Derby. Lowe HF-125 + 22m wire.
- S#\* Clare Pinder, while in Appleby. JRC NRD-525 + a.t.u. + r.w.
- S#\* Peter Pollard, Rugby. Sony ICF-20010 + r.w.
- \* Vic Prier, Colyton. Not stated.
- S#\* Philip Rambaout, Macclesfield. Int. Marine Radio R700M + r.w.
- S#\* Richard Reynolds, Guildford. Sangean ATS-803A + a.t.u. + 10m T.
- S#\* Harry Richards, Barton-on-Humber. Grundig Satellit 700 + AD270 or r.w.
- S#\* Chris Ridley, Co.Sligo, Eire. Morphy Richards R124 + loop or Philips R242 car radio.
- # Alan Roberts, Quebec, Canada. Lowe HF-225 + 11m vertical dipole.
- S#\* Alan Roberts, while at St.Bernard de Lacolle, Canada. Beverage antenna aimed at NE Europe.
- S#\* David Sayles, Doncaster. RK not stated + Timewave DSP5992X processor.
- S#\* Eric Shaw, Chester. Lowe HF-225 + 7m wire.
- S#\* Chris Shorten, Scalloway. Matsui MR-4099 + 10m wire.
- S#\* John Slater, Scalloway, Shetland. Lowe HF-150 + a.t.u. + 20m wire.
- S#\* Tom Smyth, Co.Fermanagh. Sangean ATS-803A or Morphy Richards R191.
- S#\* Tony Sticklell, Thomton Heath. Yaesu FRG-7700 + 20m wire or loop.
- # Tony Sticklell, while in Loire Valley. Yaesu FRG-7700 + r.w.
- S#\* Norman Thompson, Oadby. Matsui MR 4099 + 20m wire in loft.
- # Phil Townsend, London. Lowe HF-225 + preselector + r.w. or loop.
- # Mahendra Vaghjee, Rose Hill Mauritius. Lowe HF-225E + Dressler ARA 60 or r.w.
- S#\* Ted Walden-Vincent, Gt.Yarmouth. Sangean ATS-803A.
- S#\* Thomas Williams, Truro. Sharp 5454 or Gundig Yacht Boy 206.

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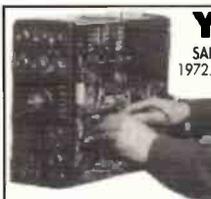
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| Joseph D. Moell & Thomas N. Curlee.                               |                  | 325 pages. £21.95 |
| TRANSISTOR DATA TABLES (BP401).                                   |                  | 178 pages. £5.95  |

## PROJECTS

|   |                |                  |
|---|----------------|------------------|
| COIL DESIGN AND CONSTRUCTION MANUAL BP160.      | B.B. Babani.   | 106 pages. £3.95 |
| HOW TO DESIGN AND MAKE YOUR OWN PCBs BP121.     | R. A. Penfold. | 66 pages. £2.50  |
| MORE ADVANCED POWER SUPPLY PROJECTS BP192.      | R. A. Penfold. | 92 pages. £2.95  |
| PROJECTS FOR RADIO AMATEURS AND SWLS BP304.     | R. A. Penfold. | 92 pages. £3.95  |
| SHORT WAVE SUPERHET RECEIVER CONSTRUCTION BP276 | R.A. Penfold.  | 80 pages. £2.95  |
| SIMPLE SHORT WAVE RECEIVER CONSTRUCTION BP275   | R. A. Penfold. | 88 pages. £3.95  |

## VALVES/TUBES

|  |                     |                   |
|--|---------------------|-------------------|
| ELECTRON TUBE LOCATOR.   | George H. Fathauer. | 350 pages. £19.95 |
| ESSENTIAL CHARACTERISTICS (TUBES & TRANSISTORS)  |                     |                   |
| (Original Publishers General Electric) Re-published by Antique Electronic Supply (Arizona)             |                     | 475 pages. £9.95  |
| HANDBOOK OF RADIO, TV, INDUSTRIAL & TRANSMITTING TUBE & VALVE EQUIVALENTS.                             |                     | 60 pages. £2.95   |
| RADIO VALVE GUIDE BOOKS 1-5  |                     | £2.95 each        |
| RCA RECEIVING TUBE MANUAL (Original Publishers Radio Corporation Of America)                           |                     |                   |
| Re-published by Antique Electronic Supply (Arizona)  |                     | 384 pages. £10.50 |
| RCA TRANSMITTING TUBES   |                     |                   |
| (Original Publisher Radio Corporation of America) Re-published by Antique Electronic Supply (Arizona). |                     | 318 pages. £9.95  |
| TUBE SUBSTITUTION HANDBOOK   |                     | £15.50            |

Well, Easter once more! If you've got time on your hands, we have several new titles to choose from this month, plus an increase of material on CD ROM. As you can see, I have highlighted Airband titles in our profile pages to coincide with the theme of this issue.

Bye for now, 73 Michael

To match our Airband theme this month we have selected six useful and interesting books.

Profiles



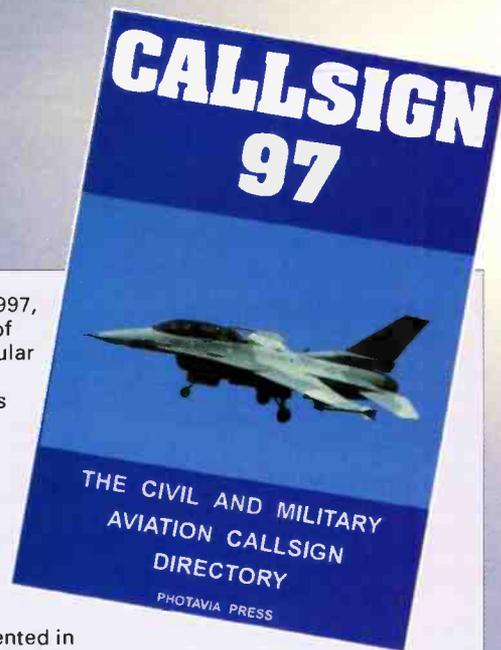
Callsign 97

Updated and enlarged for 1997, Callsign 97 contains a lot of new information. In particular discrete frequencies have been added to the h.f./u.h.f. directories and at least one new map has been added.

This wire spiral bound, A5 format, book contains over 7600 civil and military aviation callsigns. There are over 2700 additions, amendments and deletion, including almost 1000 new callsigns.

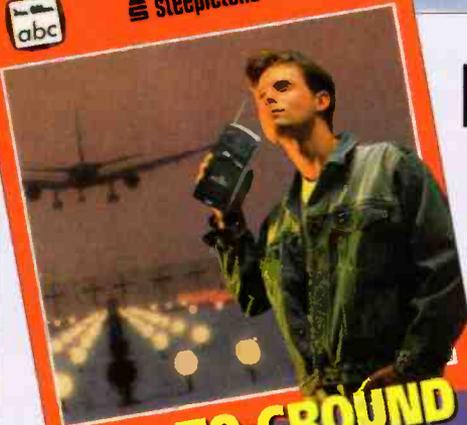
The military directory is presented in alphanumeric callsign order and Unit/Squadron order, while the civil directory is in alphanumeric callsign order plus Air Traffic Control 3-letter prefix order.

Callsign 97 costs £8.95



abc

steepletone



AIR TO GROUND RADIO FREQUENCIES

Ken Davies

For the aviation enthusiast part of the undeniable fascination of the hobby is to be able to listen in to the radio transmissions between aircraft and controllers. This pocket-sized book lists all the radio frequencies - both civil and military - that are likely to be encountered during the course of a day at any of Britain's many airports and airfields. Essential information for a successful day's listening.

Air To Ground Radio

Frequencies costs just £4.99

Air To Ground Radio Frequencies

UNDERSTANDING ACAP Aircraft Communications Addressing

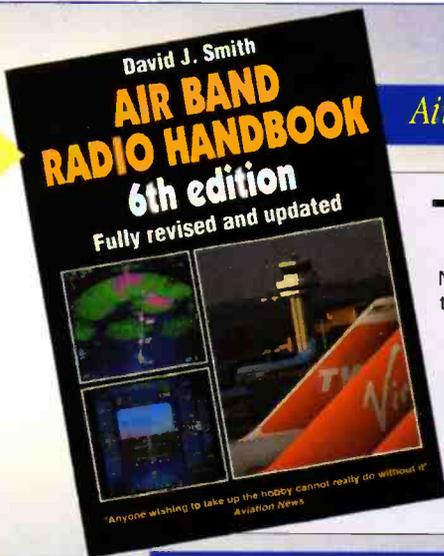


Here is the information in Aircraft Communication

- Two Letter Abbreviations
- Q Reports
- Message Formats
- Airport Identifiers

Third Edition

# Profiles



## *Air Band Radio Handbook*

This book has been acknowledged for over ten years as the essential reference for both ground-based air band listeners and flyers alike. Now it has been fully reset and revised to bring it up to date.

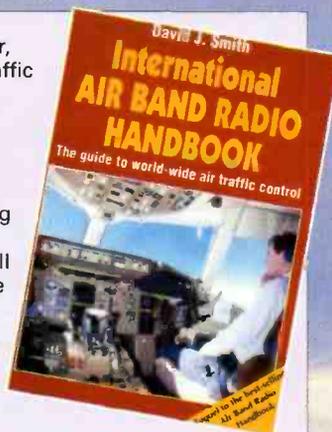
Written by David Smith, who is a professional air traffic controller, *Air Band Radio Handbook* is an indispensable guide to this popular and fascinating hobby.

*International Air Band Radio Handbook* costs **£9.99**

## *International Air Band Radio Handbook*

Written by a professional air traffic controller, this entirely new book explains how air traffic control is regulated internationally and includes brief details of each country's system, together with the radio frequencies for all major airports. Also included are navigational aids, radio phraseology, flight plans, interception and emergency procedures as well as weather reporting and an ICAO airport code letter listing. A comprehensive section on the USA ATC system will be of interest to all who venture over the other side of the Atlantic.

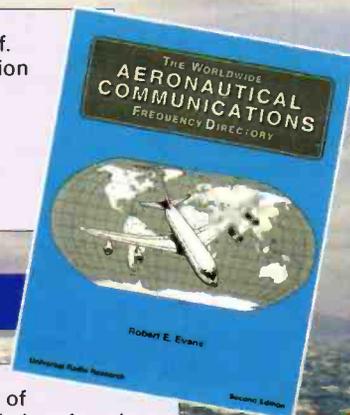
*International Air Band Radio Handbook* costs **£9.99**



## *The Worldwide Aeronautical Communications Frequency Directory*

This book covers aeronautical radio communications, voice and digital, in the h.f. and v.h.f./u.h.f. bands. Divided into logical sections, it provides useful information and frequencies on just about everything airband, military and civil.

*The Worldwide Aeronautical Communications Frequency Directory* costs **£19.95**



## *Understanding ACARS*

Aircraft Communications Addressing and reporting System (ACARS) is a form of v.h.f. radioteletype used to transmit data and messages between commercial aircraft and airport ground stations. This book provides all the information you need to interpret and understand these messages. Abbreviations are fully explained and there are useful tables of airline and airport identifiers.

*Understanding ACARS* costs **£9.95**



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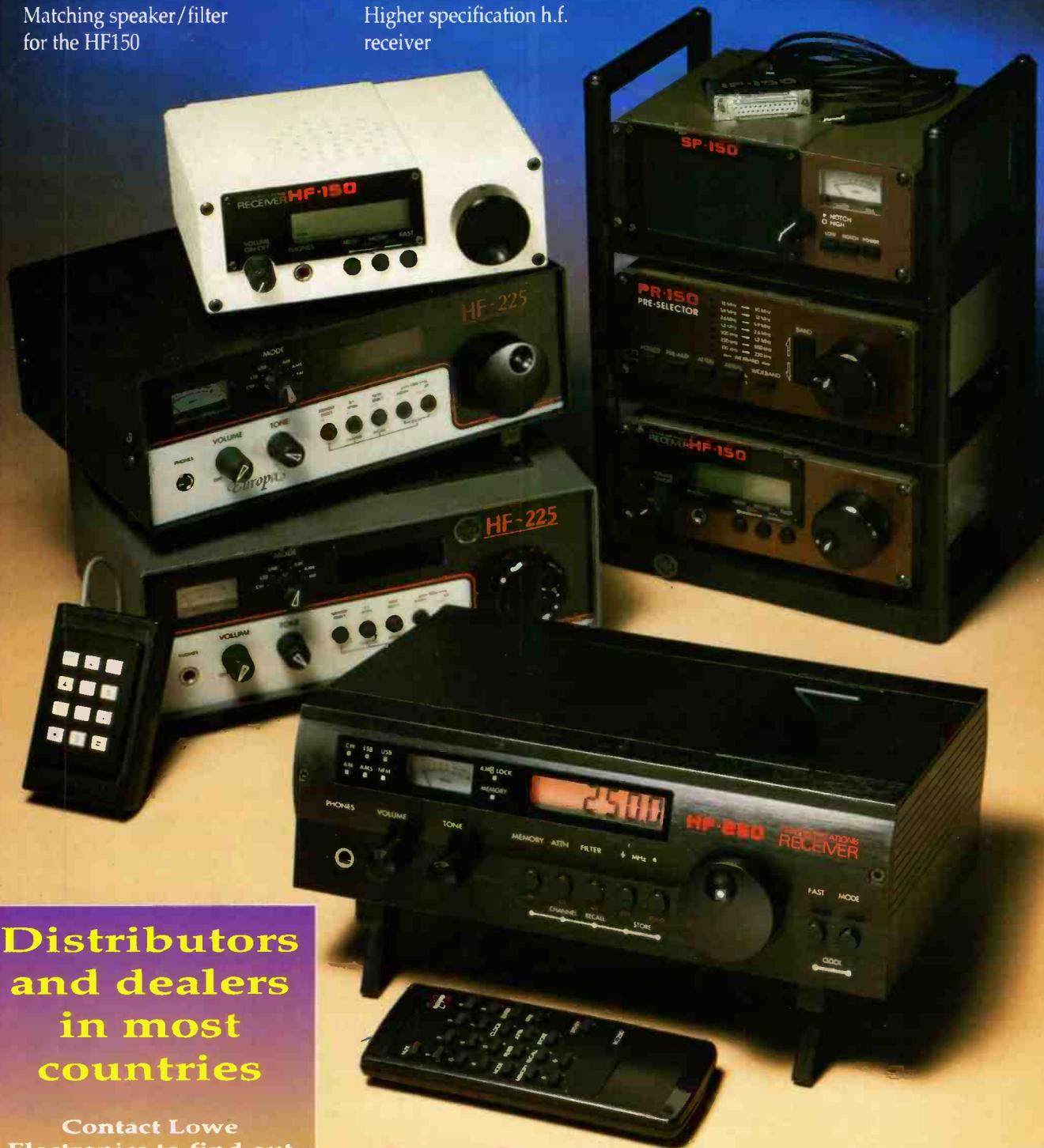
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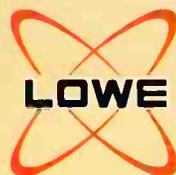
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