

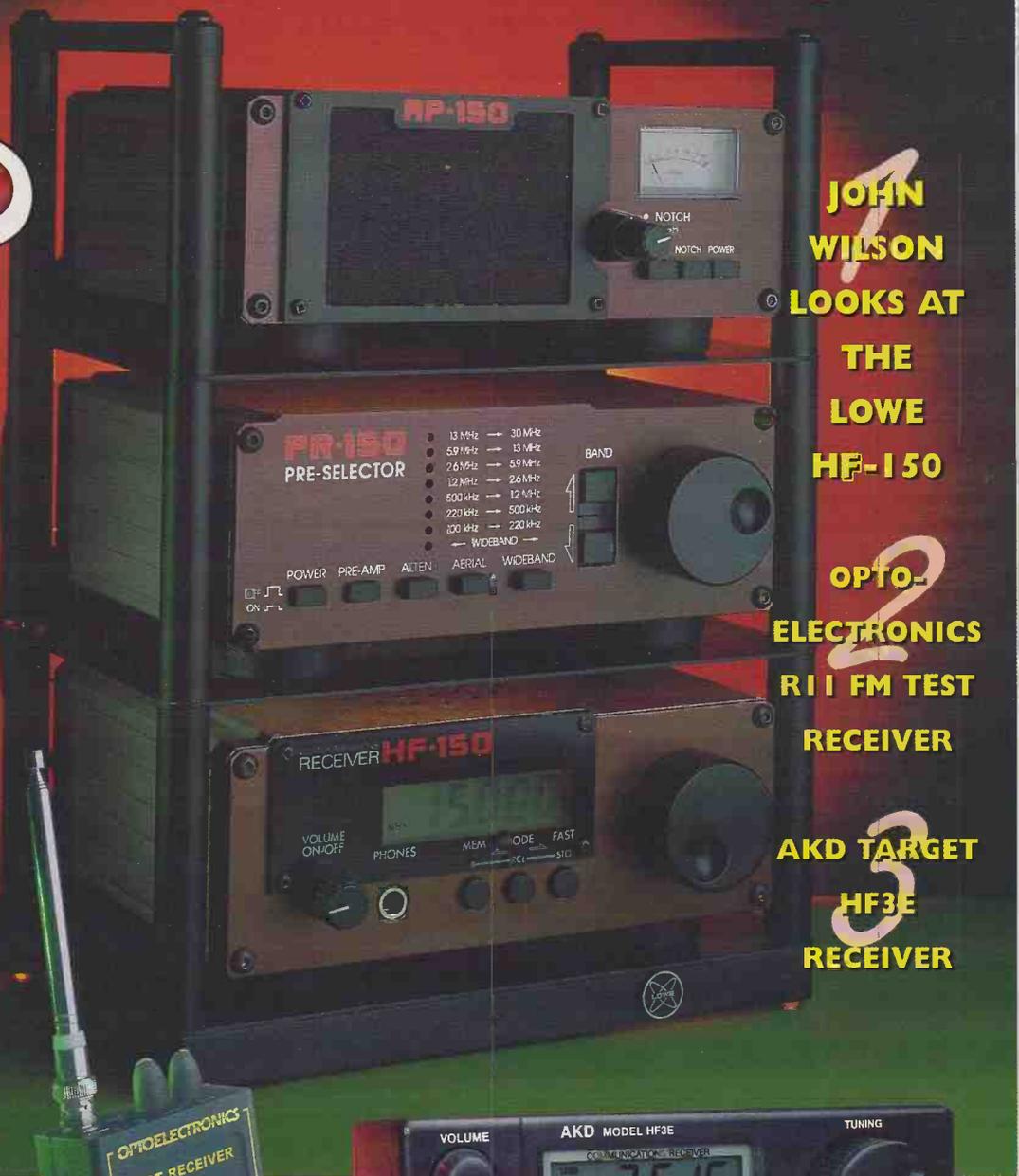
# Shortwave magazine

DECEMBER 1997 £2.75

BRITAIN'S BEST RADIO MAGAZINE

THIS MONTH

# 3 REVIEWS



**1**  
**JOHN WILSON**  
**LOOKS AT**  
**THE**  
**LOWE**  
**HF-150**

**2**  
**OPTO-**  
**ELECTRONICS**  
**R11 FM TEST**  
**RECEIVER**

**3**  
**AKD TARGET**  
**HF3E**  
**RECEIVER**

**Christmas**  
**Selection Box**

**Radio**  
**Budapest**

## COMPETITION

WIN A WELZ WS2000EX Wide Band Receiver



12 >

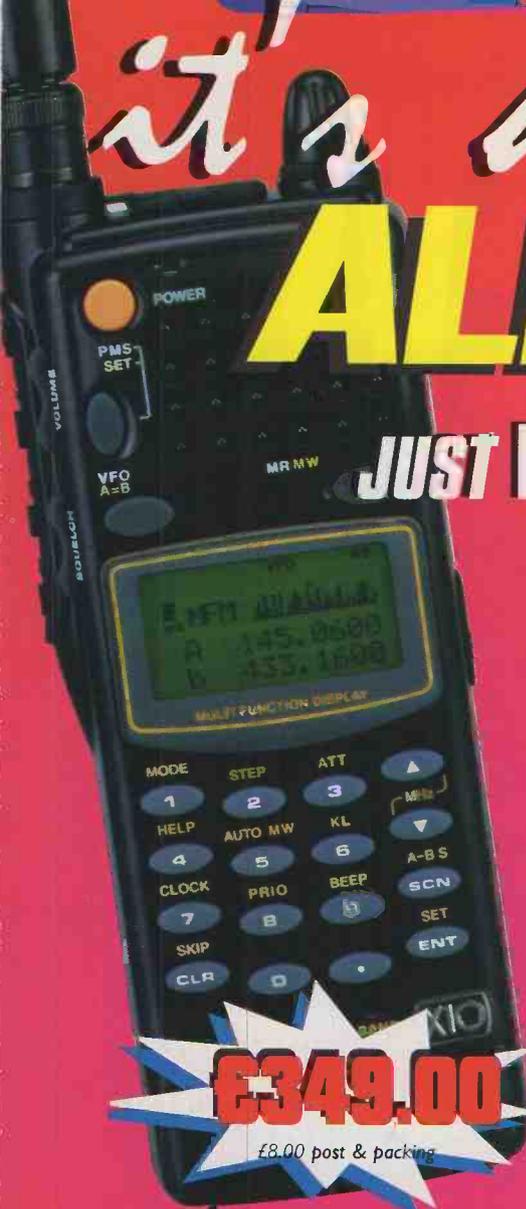
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all the  
Regulars

it's arrived!

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- EME-6.....Earphone.....£10.95

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Frequency.....100kHz - 2000MHz  
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 Scan Speed.....25 ch/sec  
 Scan Steps.....Selectable (50Hz - 500kHz)  
 in 20 fixed steps  
 Receiver.....Triple Superheterodyne  
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 Weight.....320g  
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Yupiteru's own EMC version of this popular radio.

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

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

- All mode - FM, WFM, SSB, CW, AM RX
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- Full computer access capability
- Auto mode and tuning step
- 4 AA NiCads or 4.5-16V ex power supply

**JRC NRD 345G**



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

- AM synchronous detector
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- Wide dynamic range
- Sensitive receiver
- Noise blanker
- RS232 computer I/F
- 100 memories
- Clock/Timer functions
- Supplied c/w AC mains adaptor

**£749.00**

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## FEATURES

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- Squelch and Volume control knobs
- LED frequency range indication display
- Built-in speaker for instant frequency demodulation and headphone jack for earphone audio
- Interface with the Scout for Reaction Tune
- TA100S Telescoping whip antenna included
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Reaction Tune with Scout using optional CB-RT



Patent Number 5,471,408

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may have been obtained from abroad or from  
unauthorised sources. *Short Wave Magazine* advises  
readers contemplating mail order to enquire whether  
the products are suitable for use in the UK and have  
full after-sales back-up available. The Publishers of  
*Short Wave Magazine* wish to point out that it is the  
responsibility of readers to ascertain the legality or  
otherwise of items offered for sale by advertisers in  
this magazine.

Cover Subject

John Wilson G3PCY revisits the Lowe  
HF-150, Mike Richards reviews the AKD  
HF3E receiver and Graham  
Tanner looks at the  
Optoelectronics R11 FM Test  
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December 1997

# Communiqué

## Club Callsign Selected

The **International Short Wave League's** Club Callsign **GX4BJC/P** for 1998 has been selected. The year 1998 sees operators from Northern Ireland, Scotland and Wales included, which means that **GN4BJC/P**, **GS4BJC/P** and **GC4BJC/P** will be in operation.

As in previous years, a Special QSL card will be issued upon receipt of an incoming card and an s.a.s.e. would be appreciated from anyone wishing to receive a QSL card direct. Reports and QSLs should be sent to: **ISWL Club Callsign Manager G0DBX, 'Kenwood', London Road, Louth, Lincolnshire LN11 8QH, England.**

Month	Call	Name	Location
January	G3NYY	Walt	Tewkesbury
February	G0KOC	Arthur	Didcot
March	G0LCB	Tony	Wantage
April	G0LGF	Terry	Norfolk
May	G0DBX	David	Lincolnshire
June	G14CBG	Roy	Belfast ( <b>GN4BJC/P</b> )
July	GM0PKW	John	Isle of Lewis ( <b>GS4BJC/P</b> )
August	G4IUF	Mike	Harrogate
September	G4EUI	John	Birmingham
October	G0IYZ	Chris	Derby
November	GW3CNW	Frank	North Wales ( <b>GC4BJC/P</b> )
December	M0BAX	Brian	Christchurch

## Anniversary Celebrations

The **Chester & District Radio Society** will celebrate its 50th anniversary on June 13th 1998. The whole year will witness various events to mark this landmark in the Society's history.

Firstly, an award will be made to applicants who work or hear Chester & District Radio Society members stations, five callsigns qualify for the award. A small charge will be made for the award certificate and postage.

March 21st 1998 will see the Society's 50th Anniversary Dinner and the RSGB President **Ian Kyle G18AYZ/M10AYZ** will be the Guest of Honour. Ian Kyle will address the congregation during the course of the evening.

Tickets for the dinner will be available at a cost of £20 each and the venue is the **Jarvis Abbotts Well Hotel, Christleton, Chester.** Further information regarding the award and the 50th Anniversary Dinner are available from **Roger Howells G8GWX** (Society Chairman), **52 Upton Park, Upton, Chester CH2 1DG, Tel: (01244) 374252.**

## BBC Radio Derby

A new transmitter for **BBC Radio Derby** at **Drum Hill**, located six miles north of Derby has now entered service. The Drum Hill transmitter for BBC Radio Derby gives improved reception to 200 000 people across Derbyshire and East Staffordshire.

BBC Radio Derby listeners in the Derby area should tune to 104.5MHz f.m. This new service supersedes the Sutton Coldfield service and the Derby studio transmitter on 94.2MHz.

BBC Radio Derby is also available on 95.3MHz from Stanton Moor and 111.6kHz (medium wave) from Burnaston Lane. Some listeners may need to re-position their portable receivers and adjust their antennas from this new service.

Listeners requiring advice on receiving BBC Radio Derby should contact their local radio dealer or **BBC Engineering Information, Villiers House, The Broadway, Ealing, London W5 2PA, Tel: (0345) 010313.**

## Lowe's New Catalogue

**Lowe Electronics** have recently published their first catalogue. The 78-page colour A4-size *Lowe Electronics Catalogue* contains products for use in the amateur radio, communications, GPS navigation and scanning fields. Also included are many accessory items, together with components, connectors, antennas and other products from the Lowe's varied range.

To obtain your copy of this comprehensive catalogue, just send **four first class stamps** direct to **Lowe Electronics Ltd., Chesterfield Road, Matlock, Derbyshire DE4 5LE.**



## Students Rule The Waves

The 1997 Radio 1 Student Radio Awards took place back on the 1st November at Brookes University, Oxford. The aim of the event is to celebrate the successes of student radio over the past 12 months and to highlight some of the hot new talent, which is currently dominating the airwaves in university towns across the UK.

**University Radio Falmer** from University of Sussex stormed ahead of the competition and was voted **Best Student Radio Station of '97** at the Awards. The winner was announced by Andy Parfitt, Deputy Controller of Radio 1, in a glittering ceremony in front of over 300 guests.

For the first time in the history of Radio 1, the controls will be handed over to this year's winner. They will be given the unique opportunity to broadcast a one hour special programme using their own presenters, choice of music and programme style on the Radio 1 airwaves in the new year.

Andy Parfitt said "University Radio Falmer put in all round good performance. The skill and creativity displayed in their speech programming and the diversity in music output proves the growing vitality of student radio in the UK".

University Radio Falmer were not the only winners, the city of Nottingham was celebrating when its two universities swept the board in five out of seven of the remaining categories. Kick FM at Nottingham Trent University proudly took awards for Best Factual Programme, Best Radio Presenter (speech) and the Innovation Award, whilst their rival neighbours Nottingham University

## Waters & Stanton PLC

On the 1st October 1997, it was announced that, after nearly 25 years of successful and continuous trading as a Partnership, Waters & Stanton Electronics had now become an incorporated body training as **Waters & Stanton PLC.** This change will ensure greater flexibility for the new company for future expansion and diversification.

The Partners continue as Directors with the additional appointment of **Mr M. Francis** as Sales Director. After their accreditation with ISO 9002 earlier in the year, Waters & Stanton PLC see this as a way of improving service to their many customers.

Radio received Best Entertainment Feature and Best Male Presenter.

Student Radio in the UK is a rapidly growing medium and it is an essential breeding ground for a new generation of talented radio presenters and technicians. The recognition of this talent at the awards could only take place with the continued support of Radio 1, the NUS and the Student Radio Association.

So, if you're studying at University, why not get involved with your student radio station or even get one started and who knows, next year your station could be one of the entries in the Radio 1 Student Radio Awards!

For more information, contact: **Radio One Awards, c/o NUS Press Office, 461 Holloway Road, London N7 6LJ.**



Radio 1 Student Radio Awards 1997. Best Student Radio Station - University Radio Falmer.

## Radio & TV News

With the ITC offering RSL (Restricted Service Licences) for two year periods, Oxford may be one of the first towns to open its own TV station. 'The Oxford Channel' has submitted a licence application promising up to six local hours daily with news, sports and programmes for ethnic minorities. Edinburgh may also apply for a licence as they closed down their 'Channel 35' service the day before it was due on-air.

'Channel 12', the Isle of Wight TV channel may also to apply for a terrestrial licence to expand coverage from the planned cable network. Lots of potential u.h.f. DX here!

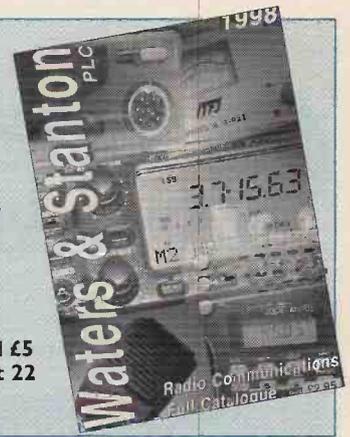
Bad times in Germany as several of the local/regional TV channels are under financial stress. The Berlin PULS-TV went bust, but the Thomas Kirch group bailed them out (with a cool \$27 million) though the less fortunate FAB-TV Berlin channel still struggles after losing millions. TV Munchen has been rescued by Robert Kirch though no viewing or financial figures are known. Other stations in Munich, Nuremberg and Hamburg also are still struggling financially.

South Africa has opened up private terrestrial TV with seven applications for the first TV network. Most are well known international media groups. The new network will offer news, sports, entertainment and local offerings. Decisions will be announced Spring 1998, though no on-air date has been announced.

## Waters & Stanton Catalogue

Available directly from **Waters & Stanton PLC** is their latest publication, believed to be the largest and most comprehensive Amateur Radio catalogue in Europe. Contained within its new all-colour pages are sections giving detailed information including technical specifications on antennas, kits, audio, amplifiers, accessories and much more.

So, how can you grab a catalogue? Well, copies of the **Waters & Stanton Radio Communications Catalogue** are available for **£2.95 plus £1 postage UK** (readers in **mainland Europe add £2.75 P&P, outside Europe add £5 P&P**). To order your copy contact **Waters & Stanton at 22 Main Road, Hockley, Essex SS5 4QS, Tel: (01702)**



## Tandy's BIGGEST Ever Catalogue

Tandy, who claim to be Britain's largest high street electrical retailer, has launched its biggest and best ever catalogue, with 500 pages packed with thousands of products. Tandy's latest catalogue features many great Christmas gifts, including radio controlled boats and planes, night vision binoculars, a huge range of mobile 'phones and accessories and replacement remote controls for virtually any TV or VCR.

By featuring everything from telescopes and electronic chess games to the wacky world of metal detectors, the catalogue caters for the whole family. To entertain youngsters, parents will find this catalogue features Star Wars and Barbie walkie-talkie sets, as well as

dozens of powerful remote control cars starting at just £9.99 for the Breeze Runner rising to £399.99 for the Mercedes DMT. The catalogue also continues to feature the wide range of specialist electronic components for which the company is renowned.

Andrew Fryatt, Managing Director at Tandy, said, "We have invested time and energy in developing this extensive catalogue which goes beyond the range of products usually available on the high street. It is now the most comprehensive consumer electrical catalogue available with something for everyone. This is backed up by the knowledgeable and friendly service of our staff in store, and from our telesales teams.

A new feature of the catalogue is Tandy 'Unlimited'. This offers customers a mail order facility to products featured exclusively in the new catalogue. By doing this we have supplemented the range of products available in our 340 high street stores, now enabling our customers access to increasingly unusual and state-of-the-art technology".

Using the new catalogue, customers can simply order any item from the Tandy 'Unlimited' range by post, FAX or 'phone, or simply by going into their nearest store. The product is then despatched in 48 hours with just a nominal postage and packing charge.

Customers can also benefit from the 'Repair Shop At Tandy', which will repair a wide range of electrical items, whether or not they come from Tandy! So, I'm sure you're all thinking 'I'd better get one of these catalogues', well, you've only got to go to your nearest Tandy store, part with a £1 coin and it's yours! By the way, the catalogue also contains £25 worth of redeemable vouchers!

Following channel allocation problems, the Greek government have now reduced the number of regional and national TV network channels previously announced. There will now be six national networks and four local TV licences, a reduction of one in each grouping. This will upset the established eight networks that each had hopes to select one of the channels on offer. ET-1 will change to an entertainment channel and ET-2 will carry news and information.

An American group CME has taken over the Budapest terrestrial TV3 station giving access to a 90% national viewing potential via a country-wide cable network. CME took over the reins October 26th.

From the BDXC news of Dutch TV channels - the ROF Irnsum transmitter is now 150kW ch. E28, omnidirectional; TV Drenthe now has its transmitting antenna some 200m up the Smilde mast; TV Flevoland opened up 1 October; check out ch.E36 for TV Noord from Hoogezaand with 100kW e.r.p. now on-air.

A note from J.M. Winsor in Bromley, Kent - host of the Website for the French based 'Club European DX Radio TV' covering satellite and TVDX reception. There's a club bulletin in French published bi-monthly. The website URL is <http://www.ndirect.co.uk/~sorwin/cedrt.htm> and Mr. Winsor can be contacted via E-mail at [sorwin@ndirect.co.uk](mailto:sorwin@ndirect.co.uk)

Finally we would appreciate any reports of the 1997 mid-November Leonids meteor shower a couple of weeks ago.



Send your news to Zoë Crabb at the Editorial Offices

# Communique

## Shortwave Listening Course



The Christchurch Radio Club have advised that they will be running a series of Special Shortwave Listening Evenings starting in January 1998. The evening meetings will be held at the Siemens Plessey (Christchurch) Radio Club, Grange Road, Christchurch at 8pm on the third Thursday of each month.

The first s.w.l. evening will be held on Thursday 15th January, entitled 'An Introduction to Shortwave Listening, The Hobby' and this will be followed each month by meetings covering various aspects of the hobby including Monitoring the tropical bands, Medium wave DXing, Use of your PC for data reception, The International Short Wave League, Monitoring the air and marine bands, etc. Guest speakers will also be on hand to present an interesting evening and answer questions on the hobby.

A programme and invitation to the course is available from **The Shortwave Shop, Radio Communications Centre, Christchurch** Tel: (01 202) 490099, who are the course sponsors.

Some of The Shortwave Shop team went on a recent DXpedition to France. The picture shows **Carla 2E1CCB, Larry M0AUY** and **Bob G6UN** (in the middle) relaxing under the midday sun following a morning of mobile DXing with the trusty Icom 706 (centre table) and Hustler mobile antennas. The DXpedition was specifically to test the theory that 'the use of Heineken enables signals to reach parts others do not reach'. No further comment! (Photo by Martin 2E1FTI aged 10 who tested the same theory on Lemonade!).

## The Conet Project

Are you interested in Numbers Stations? If you are, or even if you are wondering what on earth this news item is about, then the pack that we received in the office recently will be of interest.

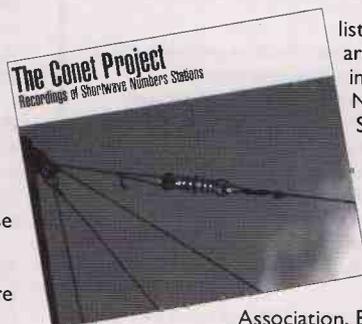
*The Conet Project* has taken three years to make and claims to "expose for the first time the frightening, intriguing and insane world of short wave espionage stations known as Numbers Stations".

Numbers Stations, as regular readers of SWM will know, are found all over the short wave spectrum. They emit unusual transmissions of both synthesised voices

reading sets of phonetic letters and/or numbers and c.w. signals. Their origin is in dispute and their purpose is unclear, but there are still many dozens of them on the air, each run by different organisations. Some of these should have shut down with the ending of the Cold War, yet they still transmit like clockwork.

Now, with the completion of *The Conet Project*, 25 years of Numbers Station activity is available to the public on a quadruple CD set containing 150 recordings. The 80-page booklet, which accompanies the CD set, contains detailed logs, essays and a definitive look-up table of all known Numbers Stations, including Morse Numbers Stations.

An invaluable and fascinating resource for all listeners, *The Conet Project* was collated from the personal archives of people from all over the world and its publishers, Irdial-Discs, claim that it is the definitive reference work on the mysterious field of Numbers Stations, containing very rare recordings from as early as 1971 as well as up to date examples of currently operating ones.



this group has also contributed to *The Conet Project*.

*The Conet Project* quadruple CD set (Catalogue No. 59ird tcp1) costs £27.50 plus £1.50 P&P in the UK from **THESE RECORDS, 112 Brook Drive, London SE11 4TQ. Tel: 0171-587 5349.**

Further details can be obtained from **Irdial-Discs, PO Box 424, London SW3 5DY.** E-mail: [irdial@irdialsys.win-uk.net](mailto:irdial@irdialsys.win-uk.net) Web: <http://www.ibmpcug.co.uk/~irdial/conet.htm>

## Short Wave International Frequency Handbook

One of the most popular short wave frequency guides has just returned to the SWM Book Store shelves. Bill Laver's *Short Wave International Frequency Handbook* is now in its Third Edition, having just been updated.

Covering the short wave spectrum from 400kHz to 30MHz, this A4 format, perfect-bound 176-page book starts off with some readable chapters giving useful information on suitable receivers, accessories and hints and advice on listening to short wave stations, including h.f. airband and marine services. It

also covers all types of s.w. activities including broadcast stations, so it is ideal for the listener who wants to know just the basic information of what he, or she, can hear. It doesn't, however, purport to replace the more expensive and comprehensive, specialist frequency guides such as *Ferrell's Confidential Frequency List*,

*Klingenfuss's Guide to Utility Stations, World Radio & TV Handbook* or *Passport to Worldband Radio.*

*Short Wave International Frequency Handbook* is available from the **SWM Book Store** price **£12.95**, plus £1.00 P&P.

**Please use the Order Form on page 99.**



## White Papers

The well-known and respected *RDI White Papers*, which are produced by the International Broadcasting Corporation in the USA and give an in-depth report on the many popular receivers, are now available from the SWM Book Store.

Each report costs £6 and will be of tremendous value in helping you make that vital decision before spending your hard-earned cash. The list of available *White Papers* is as below:

- PW-01 AOR AR3030
- PW-02 Drake R8A
- PW-03 Drake SW8
- PW-04 Icom R71A/D/E
- PW-05 Icom R9000
- PW-06 JRC NRD-535
- PW-07 Kenwood R-5000
- PW-08 Lowe HF-150
- PW-09 Sony ICF-2010/ICF-2001D
- PW-10 Yaesu FRG-100
- PW-11 How to interpret receiver specifications and lab tests
- PW-12 Popular outdoor antennas

**Please note that P&P is included for any quantity!**

Order from the Book Store now by contacting **Shelagh** or **Michael** on **(01 202) 659930** or FAX your order on **(01 202) 659950** or alternatively E-mail at: [bookstore@pwpub.demon.co.uk](mailto:bookstore@pwpub.demon.co.uk)

**Emergency RAYNET Connectors**

*Let's Get It Together*

Will your radio equipment plug into anyone's power supply without using any tools? Probably the answer is "no", or possibly "I do not know".

**Terry F. Owen G4PSH, RSGB, RAYNET, CIV Protection** suggests that we all get it together and have a National 12V d.c. connector for all emergency voluntary radio organisations in the UK. He also suggests that all these services use PL-259 antenna plugs. This way, in an emergency, you can get on the air in minutes.

The cost of the suggested connector is around £7.10, but if you do not want to spend your money, please have a connector block handy so that a pair of wires can be connected using a screwdriver. Those who decide to purchase the connectors will have a spare female connector that can be fitted with flexible leads, just in case you go to a location, station or vehicle that does not have a National Connector. Also, Terry suggests having a connecting block so that you have a 12V d.c. spare, if required. An in-line fuse should be inserted between the socket and the 12V d.c. supply.

The connectors, shown here actual size, can be obtained from your RAYNET Controller, RAYNET Supplies or some radio shops.

**Terry F. Owen G4PSH, RSGB, RAYNET, CIV Protection**  
Sutton  
Norfolk

**TrackAir for Airband**

A new pocket sized digital Airband receiver has just been introduced by TrackAir Communications. TrackAir claim that the radio fills the gap between analogue tuned and expensive handheld scanners. Certainly this tiny new a.m./f.m. portable is competitively priced at £46.94.

The set which measures some 120 x 63 x 29mm (h x w x d) weighs 125g including the two AAA cells that form its only power supply. The antenna is a telescopic rod which extends to approx. 310mm. Frequency coverage is 88-140MHz in 50kHz steps f.m. and 108-140MHz in 12.5kHz steps a.m. The pocket receiver has a total of 20 memories organised like a car radio, i.e. five per band. The set has two 'a.m.' and two 'f.m.' bands each providing the full coverage. The TrackAir receiver is supplied with stereo 'in-ear' earpieces, which, when used to listen to appropriate broadcasts provide stereo sound as an alternative to the mono internal loudspeaker. This new airband receiver is available directly from **TrackAir Communications, 3 Eileen Avenue, Leicester LE4 0DR. Tel: 0116-254 6963 or 0116-299 3017.**

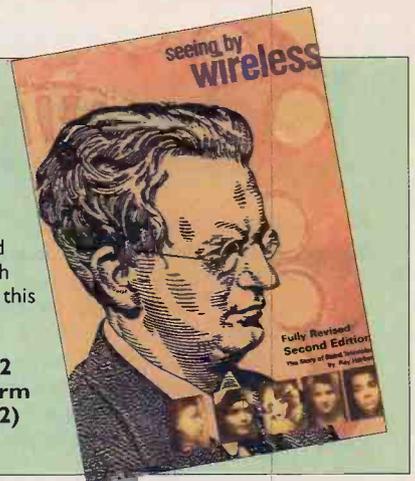


**Seeing By Wireless**

Available now from the SWM Book Store is *Seeing By Wireless* Second Edition by Ray Herbert. Now published by PW Publishing Ltd., this book has been fully revised and updated by the author.

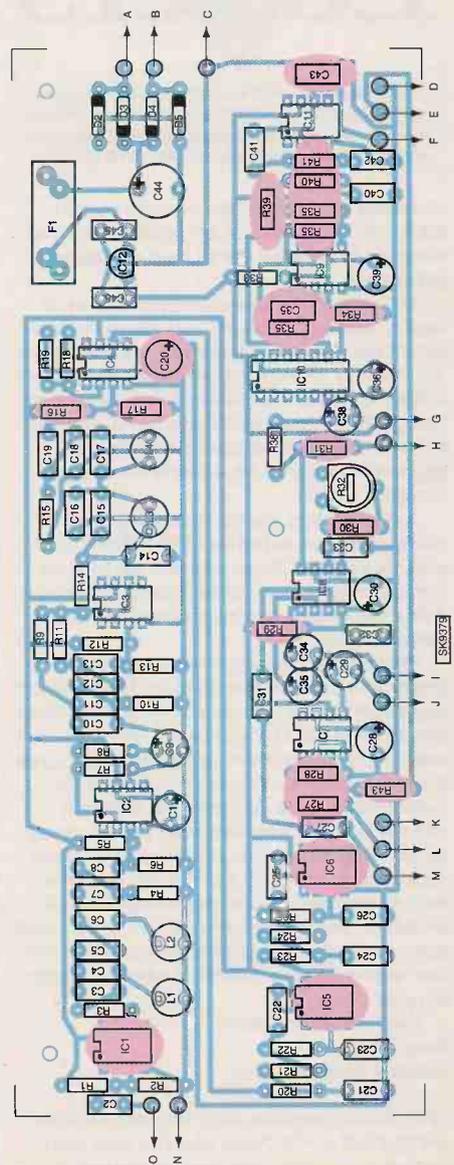
*Seeing By Wireless* tells the story of John Baird and Baird television. From the early demonstrations, which became historical events to International Operations, this book gives a fascinating insight, complete with quality photographs.

Available now for just **£4.95 plus £1 P&P UK, £2 P&P overseas.** Order yours by using the **Order Form** on page 99 or call the Credit Card Hotline on **(01202) 659930.** Order now to avoid any disappointment.



**Errata**

We've put down poison, set snares and laid traps but they managed to sneak in again! This time those damn gremlins have 'got at' the PCB artwork for the CW Filter published in the September and October issue. Here you'll find the updated component layout with the changed areas highlighted.



**Free Junk Give-away**

Low Electronics Open Day on Saturday, September 13 attracted a record crowd of customers, with some people travelling over five hours to get there. It was blessed with mostly sunny weather, except for a short period of downpour when the marquee housing Yaesu, Icom, AOR, Fairhaven and PW Publishing was almost flooded!

One attraction that really got people's interest was the Free Junk Give-away. Two years ago, Lowe Electronics bought a very large quantity of ex Home Office radio equipment, which has been mellowing in storage for some time. They decided to throw open the door of the store shed, and let customers help themselves to as much as they could carry, totally free!

Not surprisingly, this attracted great interest, and the shed was emptied by midday. Apparently there is lots more where that came from, so there will be another opening of the Junk Cave very soon! Watch their adverts. **Low Electronics Ltd., Chesterfield Road, Matlock, Derbyshire DE4 5LE. Tel: (01629) 580800, http://www.lowe.co.uk**



Happy customers carry their free goodies from the store shed at the Lowe Electronics Open Day.

**Hoka Sales**

We incorrectly stated the telephone number for Hoka Sales UK, in last month's 'Communiqé'. The correct number to contact Neil and Christine is **(01323) 487919.** Both the postal and electronic addresses were correct and are as follows: **Hoka Sales UK, PO Box 2630, Eastbourne, East Sussex BN20 9RU. E-mail: hokasales@pavilion.co.uk**

# Editorial



Well, the final Leicester Amateur Radio Show to be held at Granby Halls has been and gone. A rather sad occasion in many ways, but I have my suspicions that most of us involved in the hobby will be only too pleased to see the back of the old venue. I can tell you, from personal experience, that the venue chosen for future 'Leicester Shows' is a vast improvement over Granby Halls.

Donington has everything that Granby Halls didn't! More space, free parking right outside the hall without the need to risk life and limb crossing the 'race track', plenty of

clean loos and reasonable catering facilities. It's also much easier to get to than Granby Halls and has other interesting attractions - a large museum of historic racing cars and a 'working' race circuit. For those interested in aircraft, the East Midlands International Airport is next door - the exhibition hall is under the flight path - and I understand that during the weekend of the '98 LARS there will be a major international motorcycling event at the Donington Circuit. So, SWM and PW look forward to seeing you there on 25 and 26 September 1998 - make a note in your diaries, now!

Whilst on the subject of rallies and changes

of dates and venues, I managed to get the details of the recent North Wales Rally at Llandudno all mixed up - so, if you were hoping to visit our stand and perhaps buy a book or talk to me about the magazines, my sincere apologies. I have made a mental note to try harder next year!

If you are a rally organiser you can help me, and you, by ensuring that you send Zoë full details of your rally so that she can get the details into the Rallies diary - just because we have booked a stand doesn't mean that details will automatically get into the magazine! **Dick Ganderton G8V FH**

Dear Sir

I have been involved in the electronics industry for the last twenty years, and have seen many changes in the range of radio equipment produced. I used to work for Marconi Instruments.

With more and more emphasis on digital technology, this has made receivers more sophisticated, but at the same time, has made them less friendly when they go wrong. The idea seems to be that given to us by the far east (Japan) that if it breaks, throw it out.

With back up from all the new products with their tweeks and add-ons there is a lot of pressure to buy a new unit almost every year, so why is it that so many people prefer the older types of equipment? Perhaps it is because you don't need a degree in electronics to switch them on.

I must say that I enjoy reading your publication and have found a lot to interest me amongst the various articles written. The technical items are well put together as well as being useful in their content.

To sum up, well done to all who work so hard to make this a good all round read. I do agree with the readers who have requested your Art Department to reduce the background colouration, after all, this is a technical publication, not some work of fiction.

Yours, a loyal reader.

Ian Johnson  
St Albans  
Herts

Dear Sir

I feel I must write to comment on a couple of things in the October issue. Firstly, while John Wilson may be an exceptionally good engineer, he is quite obviously not the person to review a product such as the ICOM IC-PCR1000. The fact that he could not diagnose a 'Com Port' problem or find the Help Files shows, perhaps, a limited understanding of computers.

Also the review was incomplete; How was the software tested?, were other programs also running?, are ICOM going to update the software regularly?, will third party programmers be able to write new front ends? A lot of questions remain unanswered.

It must be realised that there are a lot of very computer literate s.w.l.s out there who have been desperately waiting for a radio such as this one, myself included. I have tried to purchase one of these receivers and despite half of the advertisers in the magazine stating "in stock now", I have had to place a back order with SMC and hope that one turns up in the next month. I understand that there has been a lot of interest in this particular product but

## Letters

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

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

advertisers are misleading the customers. I must thank SMC for their helpful and professional attitude which tipped the balance when I was deciding who to buy from.

Mr William Tait's letter stating that he sees no need in upgrading his 486 PC to the latest model; A 486DX2/66 with sufficient memory will quite happily run Windows 95. With the current price of memory (£20 for 8Mb) there seems very little excuse for not having 32Mb in a machine. Of course, you only have to look around at any amateur radio rally to be astounded at the price some people are trying to charge for old kit.

Storage space is also not an issue any more. A 6Gb hard disk can be had for £200! Suffering from e.m.i.? Buy a good CE approved case and build the machine correctly. Avoid those 'bargain' £25 cases at shows with dodgy power supplies and unshrouded switch contacts.

Why on earth are people still writing DOS programs? Products such as *Delphi* or *Visual Basic* are very simple to learn with the aid of a book and some exceptional results can be produced with them. Start waking up to the fact that unless the path of progress is followed, things die a death very quickly in the current market place. Amateur radio is an ideal platform to benefit from computers and the sooner people realise this, the better. Manufacturers please note; build the computer interface into the radios from the start and stop charging outrageous sums for 'add-on' interfaces. Incidentally, I am a mature final year computing degree student, and I am also an avid s.w.l. and working as a Technical Analyst for a major company.

Keep up the good work.

Tony Ward  
Address supplied

*SWM is a radio magazine, not a computing magazine and the ICOM IC-PCR1000 is, after all, a radio. John's brief was to review the set as a receiver that needs a computer, not as an accessory for a computer! A lot of*

readers buying this equipment will not be computer experts and to them a 'Com Port' problem would be a major catastrophe. John was highlighting a problem that Icom (UK) themselves were unable to solve immediately over the telephone.

The IC-PCR1000 has proved to be more popular than even Icom (UK) expected and demand is, apparently, outstripping supply, causing a temporary drought. By the time you read this the supply problems should be resolved. However, I'm sure that Ailsa, Phil and Norman at SMC will be delighted to read your comments on their service.

You know where to get 6Gb hard drives for £200? - Wow! Let us all into the secret, please! **Ed.**

Dear Sir

Recently I succumbed to the wonders of cable television. For an additional £5 an additional f.m. radio connection was made at the same time. This gave me access to 17 f.m. channels, all perfectly aligned and interference free.

The real gem amongst them is undoubtedly 'World Radio Network' with its HQ in London. This offers the English service of around 25 global radio stations throughout a 24-hour period, all of which are also interference and fade free. For example, such stations as Radio Australia and Channel Africa, that have always fallen victims to propagation problems, are received with same strength and quality of signal as BBC 4.

From WRN's current publicity, their transmissions are also available from Astra satellite at 19.2°E, where, if you have a satellite receiver, you will find them via VH-1 TV channel on a frequency of 11.538GHz and selecting the audio subcarrier at 7.38MHz. You can then connect the satellite receiver's audio output to your hi-fi receiver and benefit from the latter's better quality speakers.

So, does anyone need a high-gain 12-element f.m. antenna? But, maybe I'll hang onto my nice, new s.w. receiver for the time being!

Philip C. Mitchell  
Newbury  
Berkshire

*Philip, you wouldn't really want to get rid of your recently won AOR AR7030, would you? Ed.*

Dear Sir

I was particularly pleased that SWM published Gordon Bennett's article entitled 'Magnetic(?) Loops For Receivers, May '97. It is the sort of article that is useful for all of us who have an interest in confirming and developing our conceptual abilities.

Mr Bennett very carefully showed that the action of electromagnetic (radio) waves can be demonstrated from either an alternating electric wave viewpoint or an alternating magnetic wave viewpoint. Electromagnetic radiation, but its own historically descriptive name, is both concepts together and not one or the other alone.

Radio signals are easily transduced via a conducting wire, whether the wire is formed as a loop or in open lengths, but to say that a loop transduces only the magnetic component and a wire only the electric components is, as explained, quite incorrect.

Mr Bennett clarified that a loop can be viewed as a transducer of either wave component because each can be shown as inducing the other, i.e. the so called 'Magnetic(?)' loop will transduce what we view as being the electric wave component.

I was, however, subsequently concerned to read Mr Ikin's SWM July '97 letter suggesting that Mr Bennett was 'nit picking' and should in fact have covered quite different topics. Mr Ikin appears to have wrongly interpreted the content of this article and posed irrelevant questions to which he should already know answers.

Mr Bennett was writing about 'far field' electromagnetic radiation, hence his use of the word 'receiver' in the title, and not about 'far field' electric and magnetic components, which are more for e.m.c. spectrum analyser observation than radio reception.

I cannot find anywhere in the article Mr Ikin's quotation 'that a loop is so dependent on the electric field', and, of course, a loop will work within an electrostatic screen because these can be made to pass electromagnetic radiation whilst shielding against static electric fields.

Unfortunately, Mr Ikin has stated that a loop has immunity to electric field absorption by surrounding buildings. In reality, radio waves, whether viewed from an selective or magnetic concept, are affected by neighbourhood buildings (i.e. reflected, refracted, absorbed) before, or after, loop transduction.

This is why home DXers often find it necessary to tilt the axis of their receiving loop antennas to null groundwave signals, while the same antenna can be used vertically in open fields.

In a similar vein, Mr Ikin has suggested that a loop antenna has reduced susceptibility to local electric field interference. Yes, a two terminal loop antenna is quieter than a (random) wire monopole in an electric noise field, but then so also is a two terminal 'electric(?)' wire dipole centred on the same location.

Indoor wire dipoles however are electromagnetically short antennas at l.w., m.w. and s.w. frequencies when compared to a resonant loop. As Mr Bennett stated, the loop has been referred to as a Magnetic Doublet and it is the doublet that confers improved static field immunity, whether it is a loop or a dipole.

Mr Ikin expressed an interest in reading about other aspects of loop antenna performance. Many of these topics have been covered in past SWM and PW issues, and many reference manuals are available from the magazine Book Store.

Some more specialist receiving loop antenna information can also be obtained from the Medium Wave Circle Club Reprints Manager, including some articles by arrangement with the American National Radio Club. Write to MWC Reprints - David Atkins, 86 Dareham Road, New Gostessey, Norfolk NR5 0SY.

I trust that this letter is helpful and a respectfully positive contribution to the letters pages!

**Graham Maynard**  
Newtownabbey  
N. Ireland

#### Dear Sir

Personally, I agree with the point raised in your Editorial in respect of Radio Rallies (SWM November) that there is too much computer and not enough radio content. However, talking to a trader at Telford who was offering a fairly wide range of reasonably priced components, he informed me that he would be lucky to clear his expenses as not many of those in attendance seemed to be interested in the nuts and bolts of radio. As for attendances, the queues waiting to enter at Norbreck and Telford and the car parking at Elvaston and Drayton Manor seem to grow each year, even allowing for those seeking more exciting quests at the latter.

No, what is finally likely to turn me away and is perhaps to be expected is the current age of sleaze is the amount of overpricing/gripoffs. The former is, of course, left to the good sense of the buyer while the latter may vary between the 50p or so paid for a pack of PP3s dated 1066 when we do not really expect much, to the misinformation and fraud practised in some sales for much larger amounts. In my 70+ years and visits to many rallies, I thought that I had seen most, that is until this year when I lost out on two transactions.

It is March at a large indoor rally where the sea air tends to make you feel a bit light-headed. A smartly dressed, sincere gentleman assures me that the oscilloscope in which I am expressing an interest was bought new by him, that it is in good working order and meets by specifications of 20MHz bandwidth, dual channel and XY operation.

I hand over £200 cash and receive a scrap of paper complete with name, amount paid and 'phone number. On testing it back home, I found that the channel 2 trace disappears off the c.r.t. screen shortly after switching on and of course the XY and other facilities disappear with it.

I phoned almost daily for eight weeks but only engaged an Answerphone and eventually obtained the address of the trader from the number. One of my letters was answered reiterating that he was the sole owner and there had been no trouble with it, but in the meantime I had uncased the scope and found that some badly soldered work had been carried out on the channel 2 amplifier. After several months, I am still waiting for a reply to my further letters.

It is now September and after passing under one of the iron bridges the first shock is that there is now a parking fee in the previously free carpark. I meet a friendly trader who considers my choice of a new Weller soldering station reduced from a high morning price to a late afternoon one of £59.95 to be an excellent choice. The units were removed from display and packed, out of sight, in new boxes. Arriving home I found an old corroded soldering iron and a p.s.u. in a similar condition, the stand was brand new but rather expensive - unfortunately no receipt or note of traders name.

Any further expeditions will probably consist of visiting the scrap boxes in the flea market and no doubt there are others who consider that they have been conned by the 'good working order' tag. In a situation where we often have to pay cash and receipts appear to be worthless better protection is needed, possibly by registration and a guarantee from each trader to the exhibition manager. This should not be a problem for the honest ones.

**N. L. Smith**  
Stoke-on-Trent

*The Latin phrase Caveat Emptor springs to mind here. I must admit, though, that I have sometimes wished that I had opened the box to check exactly what was inside or insisted on testing the piece of gear before buying. That said, you can very often pick up a real bargain at a rally if you know something about what you are buying. And waiting until the end of the rally often pays dividends.*

## SWM Services

#### Subscriptions

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

#### Components for SWM Projects

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

The printed circuit boards for SWM projects are available from the SWM PCB Service, Badger Boards, 87 Blackberry Lane, Four Oaks, Sutton Coldfield B74 4JF. Tel: (0956) 374918 (Mon.-Fri.9am-5.30pm).

#### PHOTOCOPIES AND BACK ISSUES

We have a selection of back issues, covering the past three years of SWM. If you are looking for an article or review, or whatever that you missed first time around, we can help. If we don't have the whole issue we can always supply a photocopy of the article. Back issues are £2.85 each, photocopies are also £2.85 per article, plus £1.00 for subsequent parts of serial articles.

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

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

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

#### Technical Help

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

Australia

Bandscan Australia  
 PO Box 3307,  
 Manuka  
 ACT 2603, Australia.

# Bandscan

This time I again have a mixed collection of news including items on digital radio and television, Radio Australia, spectrum auctions, remote area broadcasting, SOLAS service changes and Australia's four wheel driving network.

## Digital Radio

The Minister for Communications and the Arts Senator Alston has announced his support for the introduction of digital radio broadcasting (DRB) into Australia. This support follows a report from the Digital Radio Advisory Committee which was established to provide a forum for interested parties to discuss the technical and policy implications of DRB.

The report recommended among other things that DRB in Australia should use the European Eureka 147 system operating in the existing L-Band frequency allocation of 1452 to 1492MHz. It suggested that the service should start in the year 2000, that existing broadcasters should have automatic right of access to DRB and that there should be no set date for the phasing out of analogue services.

As readers will no doubt be aware, the Eureka 147 system allows the multiplexing of several audio channels and allows simultaneous data transmission in a total bandwidth of 1.5MHz of spectrum space. Australian broadcasters are looking forward to options ranging from the provision of five CD quality programmes to as many as 30 voice channels.

The Minister believes that initially receiver prices will be around \$A1000 (about £445) but will rapidly fall with market penetration to the current price of a.m. and f.m. radios. DRB trials are currently under way in Canberra using 1.4876GHz in the L-Band.

Included in the tests are tests of the practicalities of a single frequency network where two radio signals are broadcast on the same frequency without causing interference. The test equipment includes source encoders allowing the compression of audio analogue or digital signals, a multiplexer to enable different programmes to be combined into one digital stream and other equipment that modulates the digital signals onto a set of carrier frequencies.

## Digital TV Trials

The National Transmission Agency (NTA) will begin digital television trials from Canberra's Black Mountain tower early in 1998. The trials will be conducted on both v.h.f. and u.h.f. frequencies using special receivers designed to measure the strength of the digital signal in various locations in the service area. The effects of ghosting and various signal levels on digital transmissions will be studied.

## Radio Australia Reception

I have had a number of letters and E-mails from readers reporting Radio Australia (RA) reception now that the Darwin transmitter has closed and services truncated. **Gerald Guest** from Dudley, West Midlands, says it is a pity that the RA Darwin transmission site has closed. He tells me that he has tried most bands and to date only been successful in hearing 11.660MHz 1500-1700UTC and 11.695MHz from 2130UTC until 2200 when stronger Asian and European stations swamped the RA signal.

**David Gascoyne** from Staplehurst, Kent, using a Grundig YB400 portable with a 930m telescopic whip has also been successful on 11.660 and 11.695MHz and in addition has brought in RA on 17.750MHz. David has received 11.660MHz from 1500UTC, 11.695MHz from 2200UTC and 17.750MHz from 0650. He notes that the RA transmissions are sometimes at variance with the RA published program. He has also tried RA with other equipment on 6.080, 9.435, 15.415 and 21.725MHz without success.

**Alfred Hopwood** who lives in Alsace in France also misses the powerful Darwin RA transmissions which he says he heard every night and many afternoons. He operates a Lowe HF-250 Europa fed with a Datong AD370 active antenna.

Until mid-September Alfred managed to bring in the Shepparton transmitter operating on 11.695MHz at around 2130-2200UTC and found that the 11.880MHz signal beamed to the Pacific was acceptable at around 2100UTC. However, after that time the path from Australia deteriorated and apart from occasional successes he has not managed to

bring in RA consistently since.

**Martyn Gardiner** from Portsmouth adds his voice to the chorus of those unhappy at the closure of the Darwin RA transmitter. Nonetheless using a Lowe HF-150 with an a.t.u. and long wire he has managed to bring in 11.695MHz at around 2200UTC. He says that his receiver's narrow i.f. filter proved beneficial and that he found it useful to switch to u.s.b. to reduce interference from a nearby station.

## Spectrum Auction Deferred

The proposed auction of spectrum in the 800MHz and 1.8GHz bands is to be deferred until the first half of 1998. Minister Alston believes that this delay will give the government time to put in place a regulatory environment to encourage the entry of efficient new operators.

The government is keen to encourage inter-carrier roaming between digital mobile communications services. This facility would allow a customer of one mobile 'phone carrier to receive service through the base station of a rival mobile carrier if that customer's carrier did not have a base station in the area. This facility would significantly extend the coverage available to a typical customer.

## 4x4 Network

The Australian National 4WD Radio Network was established in 1993 for users of HR radios in Australia's outback. The network operates with call sign VKS737 on the five frequencies 3.995, 5.455, 8.022, 11.612 and 14.977MHz from Adelaide and Woomera in South Australia, Alice Springs, in the Northern Territory, Gosford north of Sydney in New South Wales and Perth in Western Australia.

Each base has a regular listening schedule on voice and selcall and is able to provide weather and road traffic reports on request. On the web the network can be found at <http://www.sofcom.com.au/4WD/4WD.html> and its newsletter at <http://people.enternet.com.au/~pca/vks737.html>

## Rallies

**November 30:** The Portland Amateur Radio Club are holding their 3rd Annual Rally at the Burton Cliff Hotel, Burton Bradstock, Near Bridport, Dorset. Doors open at 11am. Attractions include well known amateur radio traders and dealers, crafts and hobby stalls, computer suppliers, local radio clubs, RAYNET display, raffle, Bring & Buy and an excellent choice of food with a bar open all day. Talk-in on S22 and SU22. Further information from: **The Rally Organisation, 29 Court Barton, Weston, Portland, Dorset DT5 2HJ** or telephone on (01305) 823373.

**December 7:** The SDX Cluster Support Group & Scottish DX Convention are holding their 3rd SDX Glasgow Rally at the Maryhill Community Halls, Maryhill Road, Glasgow.

There will be a variety of special interest groups with stands and displays and Morse test sessions will be available throughout the day. Once again, the famous Jackie & Sandra Cafe will be open for business throughout the day, serving hot and cold snacks, tea, coffee and soft drinks. Doors open at 10.30 for Bring & Buy registration and the cafe is also open from this time. Adults - £3, Senior Citizens - £2 and children under 14 - free of charge with an adult. **John Dundas GB7OOPS** on 0141-638 7670 or Packet @ **GB7SAN/GB7SDX** or E-mail: [j.m.dundas@btinternet.com](mailto:j.m.dundas@btinternet.com)

**December 7:** The 40th Northern Mobile Rally (Harrogate) is to be held at the Flower Hall, Great Yorkshire Showground, Harrogate, North Yorkshire. **Gerald Brady G0UFI**, Rally Manager on (01765) 640229.

**December 14:** The Leeds & District Xmas Radio & Computer Rally is to be held at the Pudsey Civic Centre (Dawsons Corner). All the usual traders will be there, there will also be a talk-in, a licensed bar and disabled facilities, etc. Further information from **John Mortimer** on (01943) 874650 (Bookings Manager), **Gordon Ryder** on 0113-255

0626 (Rally Manager) or from **Malcolm Robertson** on 0113-225 3379 (Club Secretary).

\***December 14:** The Verulam Amateur Radio Club will hold its annual rally at the Watford Leisure Centre, Horseshoe Lane, Garston, Watford, Hertfordshire, from 1000 to 1600. The Leisure Centre is located off the A405 near junction 6 of the M1 and junction 21A of the M25. Attractions will include trade stands, Bring & Buy, grand raffle, cafe, licensed bar and free car parking. Morse tests will be available. For further details call (01923) 262180 or for trade information call (01923) 265572.

## 1998

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

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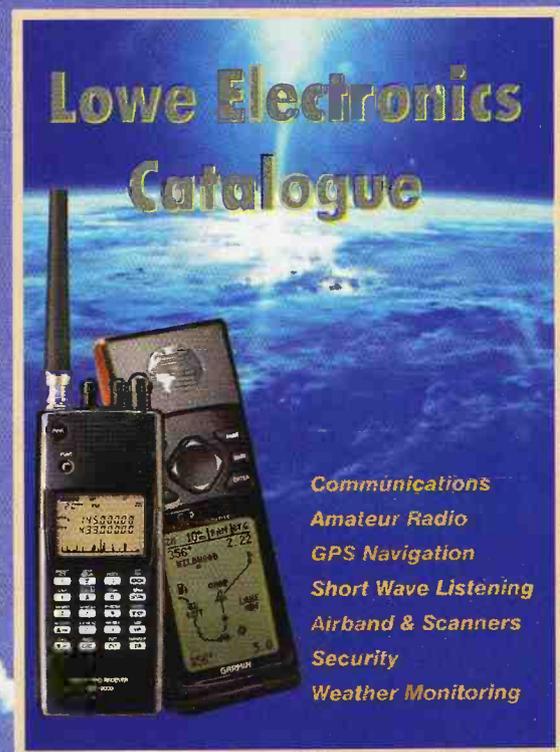
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## Radio Australia

Radio Australia (RA) transmitter sites may now be only two but for listeners in Europe the main possibilities are with the six 100kW Shepparton transmitters. The Brandon site in Queensland sports only three 10kW transmitters feeding antennas facing approximately north.

At the time of deadline for this column the RA English schedule from Shepparton was 5.870MHz 1200-1800; 5.995MHz 1300-2130; 6.080MHz 0830-2200; 7.240MHz 1800-2000 and 2100-2200; 9.415MHz 1200-2130; 9.435MHz 1430-2200; 9.580MHz 0800-1300; 9.710MHz 0800-0900; 11.660MHz 1330-1700; 11.696MHz 2130-2300; 11.880MHz 0600-0830, 0900-1100 and 1700-2130; 13.605MHz 0000-0800; 13.755MHz 2130-0200; 15.240MHz 0200-0800; 15.415MHz 0100-0400 and 0600-0900; 15.510MHz 2200-0900; 17.750MHz 0000-0400 and 0600-0900; and 17.795MHz 2100-0600. All times are UTC.

Remote Area Broadcasting Minister Alston has affirmed the government's commitment to the provision of remote area broadcasting services. He has stated that the government is committed to minimising the disruptive effects on remote area viewers of digital conversion and to limiting the costs. He also made it clear that the government was working towards rebroadcasting arrangements with carriers to ensure that all services will be available in any area with a single set of reception equipment. The Minister indicated that funds may be made available through the government's \$A250 million (£111 million) Networking the Nation fund.

## SOLAS

In Australia the Safety Of Life at Sea (SOLAS) service is maintained by the national telecommunications carrier Telstra. Telstra is contracted to maintain a 24-hour listening watch on all designated international distress and safety frequencies for any distress and emergency calls by Morse or voice transmissions.

There have been reports here however that the government has slashed \$A2 million (£900,000) from this effort. It is reported that there will be a sole operator in Perth at any one time on a 12-hour shift monitoring around 30 million square kilometres for distress calls on up to 12 h.f. radio frequencies.

The existing stations at Darwin and Townsville will be closed leaving Perth and Brisbane as the only two operating SOLAS stations to cover in total 47 million square kilometres of ocean.

## And Finally

I welcome any news and comments. In particular I am interested in any s.w.l. information on Australian stations heard by SWM readers so I can chase up more details and interesting snippets from this end.

My address has changed and is now **PO Box 3307, Manuka, ACT 2603, Australia**. For personal replies please send two IRCs. Those with an Internet connection can still get me at [greg@pcug.org.au](mailto:greg@pcug.org.au).

# Grassroots

## AVON

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

**RSGB City of Bristol Group:** last Tuesdays, 7pm. New Friends Hall, Purdown, Bell Hill, Stapleton, Bristol BS16 1BG. December 16 - Christmas social. Robin Thompson G3TKF on (01225) 420442.

**South Bristol ARC:** Wednesdays, 1930. Whitchurch Folkhouse Assoc., Bridge Farm House, East Dundry Rd, Whitchurch. December 3 - Club annual darts match, 10th - Christmas social, 17th - Sample the 'leftovers'. For more information ring (01275) 834282 on a Wednesday evening.

## BUCKINGHAMSHIRE

**Aylesbury Vale RS:** Wednesday evenings, 2000. Hardwick Village Hall, (Hardwick is situated off the A413 between Aylesbury and Buckingham). December 3 - G6NB construction contest. Gerry Somers G7VVFV on (01296) 432234.

## CHESHIRE

**Mid-Cheshire ARS:** Meetings held every Wednesday, 2000, at Cotebrook Village Hall, North of Tarporley, Cheshire. November 26 - Discussion on future events - members suggestions welcome, December 1 - Committee meeting, 3rd - HF on the air G3ZTT plus construction night, 10th - Discussion, Midcars Annual Dinner, 17th - Cheese and wine party at Club HQ. Ted Bannister G0RBA on (01606) 592207.

## DEVON

**Appledore & DARC:** 3rd Mondays, 1930. Appledore Football Clubroom. December 15 - Xmas party. Den Williams G0UMT on (01237) 471802 for more information.

**Exmouth ARC:** Alternate Wednesdays at the Scout Hut, Marlpool Hill, Exmouth. December 3 - Weather Satellites, 17th - Xmas Party. D. Fox G0NRR on (01395) 271880.

**Torbay ARS:** Fridays, 1930. ECC Social Club, Highweek, Newton Abbot. December 19 - Christmas party and quiz. Peter G4UTO. (01803) 864528.

## EAST SUSSEX

**Hastings Electronics & RC:** 3rd Wednesdays, 1930. West Hill Community Centre, Croft Road, Hastings. The club runs courses for the RAE and Novices and is approved as an Examination Centre for City & Guilds exams. December 19 - Xmas Social at the Hurst Court Conference Centre on the Ridge in Hastings. Doug Mephram G4ERA, 8 The Close, Fairlight, E. Sussex TN35 4AQ or 'phone on (01424) 812350.

## EDINBURGH

**Lothians RS:** 2nd & 4th Wednesdays, 1930. Orwell Lodge Hotel, Polworth Terrace, Edinburgh. December 10 - IOTA DX by T. Wylie GM4FDM. Tommy Main GM4DCL, QTHR on 0131-663 8501 day and evening.

## GREATER LONDON

**Southgate RC:** 2nd & 4th Thursdays. Winchmore Hill Cricket Club, The Paulin Ground, Firs Lane, Winchmore Hill, London N21 3ER. December 11 - AGM. Dave Michael G0ASA on 0181-482 6795, FAX: 0181-807 5366.

**Surrey Radio Contact Club:** Terra Nova, The Waldrons, Waddon, Croydon, Surrey. December 1 - Electronic Warfare by Derek Atter G3GRO. 15th - Natter night. Berni G8TB on 0181-660 7517.

## HAMPSHIRE

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

## HEREFORD & WORCESTER

**Malvern Hills RAC:** 2nd Tuesdays. Red Lion, St. Annes Rd. December 9 - AGM. Dave Hobro G4IDF on (01905) 351568 evenings and weekends.

## HERTFORDSHIRE

**Hoddesdon RC:** Alternate Thursdays, 2000. Conservative Club, Rye Road, Hoddesdon. December 4 -

AGM, 18th - Christmas party. Don G3JNJ on 0181-292 3678.

## KENT

**Bromley & DARS:** 3rd Tuesdays, 1930. The Victory Social Club, Kechill Gardens, Hayes. December 16 - Mince pie evening. A. Messenger G0TLK. 0181-777 0420

**Medway AR & TS:** Fridays, 1930. Tunbury Hall, Catkin Close, Tunbury Avenue, Walderslade, Chatham, Kent. December 19 - Christmas party. G3VUN, 40 Linwood Avenue, Strood, Rochester, Kent ME2 3TR. (01634) 710023.

## LINCOLNSHIRE

**Grimsby ARS:** Thursday nights, fortnightly, at the Cromwell Social Club, Cromwell Road. Informal meetings are held on the Thursdays in-between. Non members are welcome at any meetings, but may not attend more than three meetings in any year. December 4 - CW Night, fun night with c.w. practice for beginners and experts alike, 18th - Christmas Party, party night for members, XYLS and harmonics. G. J. Smith G4EBK, Hon. Sec. 6 Fenby Close, Great Grimsby, N. E. Lincs DN37 9QJ.

## NORFOLK

**Norfolk ARC:** Wednesdays, 1930. Formal and informal meetings at The Norman Centre, Bignold Road, Off Drayton Road between 'Asda' and Three Mile Cross Roundabout, Norwich. December 3 - NARC Fox hunt forum - part 1, 10th - Night on the air, construction QRP and Morse practice, 17th - Christmas dinner. Mike G4EOL (01603) 789792.

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

## NORTH YORKSHIRE

**Hambleton ARS:** All meetings held at Allertonshire School, Northallerton, 1930 to 2130. December 4 - Computers and modems, 18th - Social event. More details from John G0VXH on (01845) 537547.

## WARWICKSHIRE

**Stratford-upon-Avon & DRS:** 2nd & 4th Mondays, 7.30pm. Home Guard Club, Main Street, Tiddington, Stratford-upon-Avon. December 8 - Talk by Andrew Talbot G4JNT, Chairman of the RSGB Microwave Committee, 22nd - Night on the air. 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 MIDLANDS

**South Birmingham RS:** West Heath Community Association, Hamstead House, Fairfax Road, West Heath, Birmingham. December 12 - Christmas party, members, families and invited guests - starts 8pm. invited. Don Keeling on 0121-458 1603.

## WILTSHIRE

**Salisbury ARC:** 2nd and 4th Tuesdays, 2000 The Scout Hut, St. Marks Avenue, Salisbury, Wiltshire. Prospective members and visitors are welcome. A club Net held daily at 1830 local time and additionally 2030 Fridays S.16 (V32) 145.000. RAE tuition available. December 16 - Chairman's Pint - Christmas party and social evening at QTH of G7WBW. Jamie G7WAA on (01772) 334935 (business hours).

**Trowbridge & DARC:** 1st & 3rd Wednesdays, 2000. The Southwick Village Hall, Southwick, Trowbridge. December 3 - Christmas party and presentation night, 17th - Natter night (last meeting of 1997!). Ian G0GRI on (01225) 864698.

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

# Designing Receivers

## NE602

If you are enthusiastic about building radio receiver projects then you undoubtedly know about the Signetics NE602 chip. This well-behaved little chip can form the entire front-end (mixer/local oscillator) of a superheterodyne receiver. It can also be used in direct conversion receiver projects. In amateur radio QRP (low-power) circles the NE602 has become the chip of choice. It was originally designed for use in portable cordless telephones, but has found a much wider range of applications.

The Signetics NE602 is a monolithic integrated circuit containing a double balanced mixer (DBM), an oscillator, and an internal voltage regulator in a single eight-pin mini-DIP package (Fig. 1). The pin-outs for the device are shown in Table 1.

Table 1

Pin Number	Function
1	Input no. 1 (IN1) Differential inputs
2	Input no. 2 (IN2)
3	Ground
4	Output no. 1 (OUT1) Differential outputs
5	Output no. 2 (OUT2)
6	Oscillator base
7	Oscillator emitter
8	V+ DC power

The use of a double-balanced modulator (DBM) has certain advantages in a frequency translator element such as the NE602 device. In any non-linear mixer, the output products are of the form:

$$F_{OUT} = mRF \pm nLO$$

Where:

- F is the output frequencies
- RF is the incoming r.f. signal frequency
- LO is the local oscillator frequency
- m, n are integers or zero (0, 1, 2, 3...)

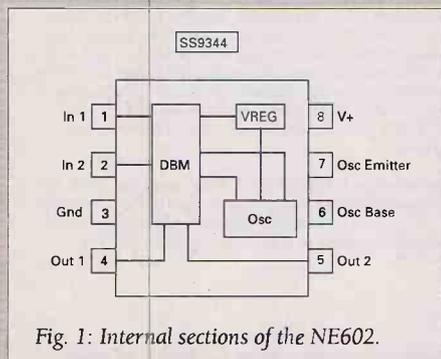


Fig. 1: Internal sections of the NE602.

In the single-ended mixer circuit, which was standard in all radios until relatively recently, the RF and LO frequencies appeared in the output ( $m = 1$  and  $n = 1$ ). This undesirable state of affairs resulted in less performance of the following stages, or the need to filter out those components rather vigorously. The DBM circuit, on the other hand, suppresses the RF and LO products, so only the higher-order products appear in the output. The significant output signals for out purposes are the sum (RF+LO) and difference (RF-LO) products. Either of these frequencies can be used as the intermediate frequency (i.f.) in a superheterodyne receiver.

Figure 2 shows a simplified version of the NE602 internal DBM circuit. It consists of two sets of cross-connected differential amplifiers (Tr1/Tr2/Tr3 and Tr4/Tr5/Tr6). These transistors are differentially driven through In1/In2, and produce differential outputs through Out1/Out2. This circuit is sometimes called a Wilson transconductance cell, or simply transconductance cell by those who forgot about poor ol' Wilson.

The DBM section of the NE602 operates to 500MHz, while the internal oscillator section works to 200MHz. Thus, the primary uses of the NE602 are in h.f. and v.h.f. receivers, frequency converters and frequency translators. The device can also be used as a signal generator in many popular inductor-capacitor (LC) variable frequency oscillator (v.f.o.), piezoelectric crystal (XTAL) or swept frequency configurations. In this article we will explore the various circuit configurations for the d.c. power supply, the r.f. input, the local oscillator and the output circuits.

The NE602 operates over a temperature range of 0 to +70°C. A companion device, the SA602, operates over the extended temperature range of -40 to +85°C. The most

common form of the of the device is probably the NE602N, which is an eight-pin mini-DIP package. Eight-lead 'SO' style surface mount ('D-suffix') packages are also available. In this article, the NE602N and related types are featured, although the circuits also work with the other packages and configurations (pin-outs might differ). The improved NE602AN and NE602AD versions are also available, and are preferred over the older NE602N (of which, some distributor stocks appear to still remain).

Because the NE602 contains both a mixer and a local oscillator, it can operate as a radio receiver 'front-end' circuit (at least the frequency converter portion of the front-end). Because the NE602 device has very good sensitivity (<0.2µV) an r.f. amplifier is rarely needed. However, this sensitivity is achieved at some cost of dynamic range. As a result, good r.f. input filtering is highly recommended. An improved NE612 is said to be available and it supposedly solves the dynamic range problem. However, I have not found a source that sells it in DIY or hobbyist quantities (i.e. one or two each), so was unable to evaluate it. The NE602AN and NE602AD are considerably better in this respect than the original NE602N devices.

The NE602 features good noise and reasonable third order intermodulation performance. The noise figure is typically 5dB at a frequency of 45MHz. The NE602 has a third order intercept point in the order of -15dBm referenced to a matched input, although it is recommended that a maximum

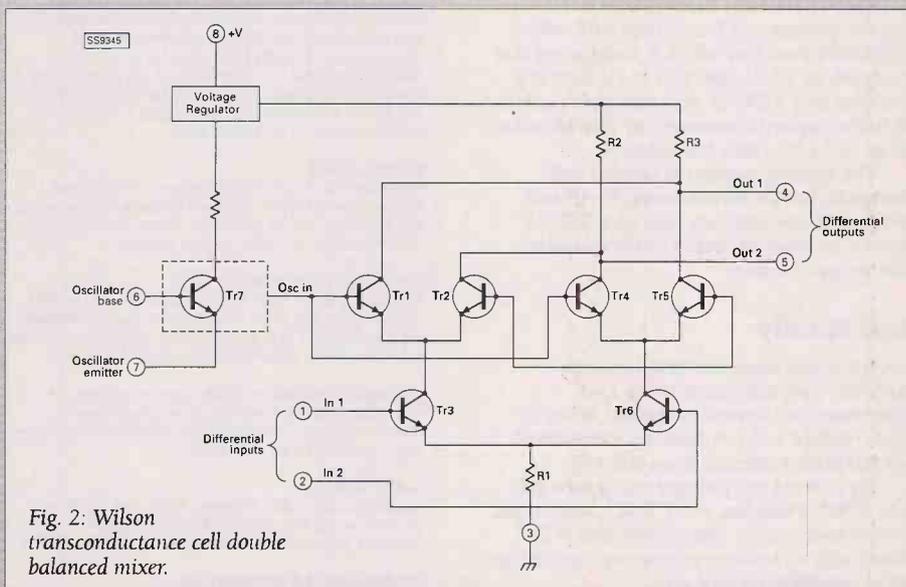


Fig. 2: Wilson transconductance cell double balanced mixer.

# The ubiquitous mixer block describ

# Projects with The Chip

signal level of -25dBm (about 3.16mW) be observed. This signal level corresponds to about 12.6mV of RF into a 50Ω load, or 68mV into the 1.5kΩ input impedance of the NE602.

## Frequency Conversion

Heterodyning occurs when two signals are mixed together in a nonlinear circuit. If the mixer circuit is linear, then no products are formed, and only the algebraic sum of the two input frequencies are seen in the output. But in nonlinear mixers, the two produce the products described by the equation above. In radio receivers, one of the frequencies is the incoming radio signal being received (RF), while the other is the local oscillator (LO) frequency.

The local oscillator (l.o.) consists of a v.h.f. n.p.n. transistor with the base connected to pin 6 of the NE602, and the emitter is connected to pin 7 (see either Figs. 1 or 2); the collector of the oscillator transistor is not available on an external pin. There is also an internal buffer amplifier which connects the oscillator transistor to the DBM circuit.

Any of the standard oscillator circuit configurations can be used with the internal oscillator, provided that access to the collector terminal is not required. Thus, Colpitts, Clapp, Hartley, Butler and other oscillator circuits can be used with the NE602 device, while the usual configurations of the Pierce and Miller oscillator circuits are not.

## DC Power Supply Connections on the NE602

The +V power supply terminal of the NE602 is pin 8, and the ground connection is pin 3; both must be used for the d.c. power

connections. The power supply range is +4.5 to +8 V d.c., with a current drain ranging from 2.4 to 2.8mA. The applied d.c. voltage between pins 3 and 8 must absolutely not exceed 9V, and less is recommended.

The +V power supply terminal (pin 8) should be bypassed to ground with a capacitor with a value of 0.01 to 0.1μF. This capacitor should be mounted as close to the body of the NE602 as is practical; short leads are required in radio frequency (r.f.) circuits.

Figure 3a shows the recommended power supply configuration for situations where the supply voltage is +4.5 to +8V. For best results, the supply voltage should be voltage regulated. Otherwise, the local oscillator frequency may not be stable, which leads to drift problems. A series resistor (100-180Ω) is placed between the +V power supply and the +V terminal on the NE602. If the d.c. power supply voltage is raised to +9V, then increase the value of the series resistance an order of magnitude to 1-15kΩ. Even so, this is not the preferred situation. When a 9V source is used, then you might want to consider one of the power supply circuits that use a voltage regulator (Figs. 3b or 3c).

If the d.c. power supply voltage is either unstable, or is above +9V, then it is highly recommended that a means of voltage regulation be provided. In Fig. 3b a Zener diode is used to regulate the NE602 +V voltage to 6.8V, even though the supply voltage ranges from +9 to +18 volts (a situation found in automotive applications). The values of the resistors depend on the values of the d.c. voltage and the Zener potential. For best results, use a 5 to 6.8V Zener diode.

An alternative voltage regulator circuit is shown in Fig. 3c. This circuit uses a three-terminal IC voltage regulator to provide +V voltage to the NE602. Because the NE602 is a very low current drain device, the lower power versions of the regulators (e.g. 78Lxx) can be used. The low-power versions also permit the NE602 to have its own regulated

power supply, even though the rest of the radio receiver uses a common d.c. power supply. Input voltages of +9V to more than +28V d.c., depending on the regulator device selected, can be used for this purpose. The version of Fig. 3d uses a 78L09 to provide +9V to the NE602, although the 78L05 and 78L06 can also be used to good effect.

## NE602 Input Circuits

The r.f. input port of the NE602 uses pins 1 and 2 to form a balanced input. As is often the case in differential amplifier r.f. mixers, the r.f. input signals are applied to the base terminals of the two current sources (Tr5 and Tr6 in the Wilson cell shown in Fig. 2). The input impedance of the NE602 is about 1.5kΩ shunted by 3pF at lower frequencies, although in the v.h.f. region the impedance drops to about 1kΩ. The normal standard impedance of r.f. circuits is 50Ω, so impedance matching is needed when the NE602 is used with other circuits or devices.

Several different r.f. input configurations are shown in Fig. 4. Even though the NE602 uses a differential input, single-ended (unbalanced) and differential (balanced) input circuits can be used with the NE602. The single-ended configuration is achieved by using one input pin for the signal, and decoupling the unused pin to ground through a capacitor (10nF-0.1μF).

In Fig. 4a we see the simplest single-ended input circuit. A capacitor coupled, untuned, unbalanced input scheme is shown here. The signal is applied to pin 1 (although pin 2 could have been used alternatively) through a capacitor, C1, that has a low impedance at the operating frequency. The signal level should be less than -25dBm, or about 68mV rms (180mV peak-to-peak). Whichever input is used, the alternate input is unused and should be bypassed to ground through a low value capacitor (0.001-0.1μF depending on frequency).

A wideband transformer coupled r.f. input

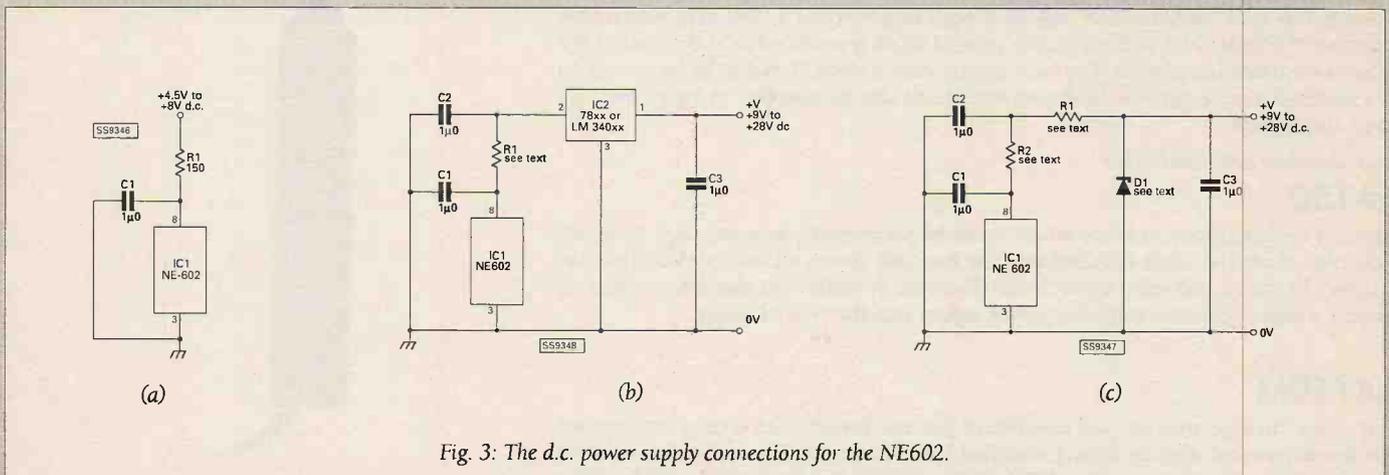
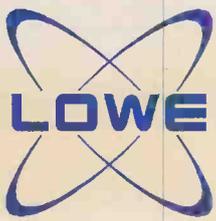


Fig. 3: The d.c. power supply connections for the NE602.

ed and explained by Joe Carr K4IPV.



# Lowe Elec

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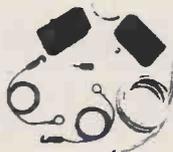
Two versions are available. The AD270 for indoor use and the AD370 for outdoor use. Both units are dipoles which means that interference picked up by the coaxial feeder is eliminated. In contrast monopole antennas tend to be much more affected by local electrical noise. The interface unit has a selectable 12db preamp built in.

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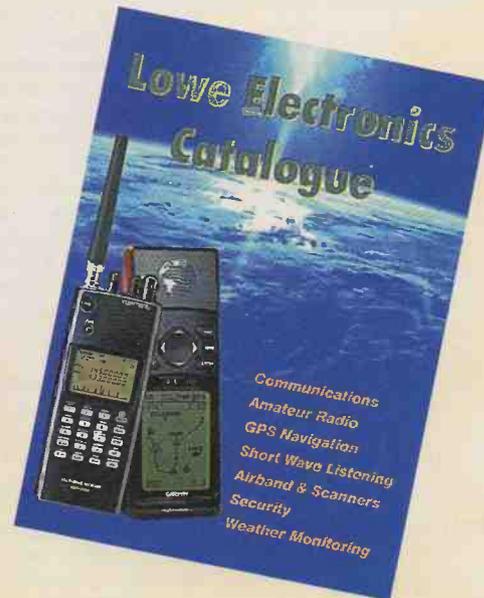


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# Designing Receiver Projects with The NE602 Chip

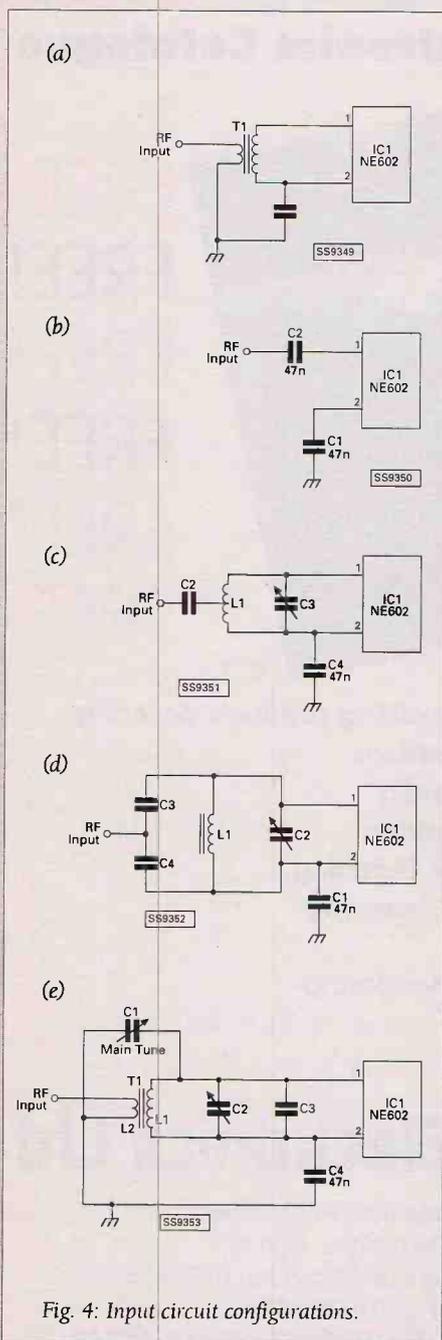


Fig. 4: Input circuit configurations.

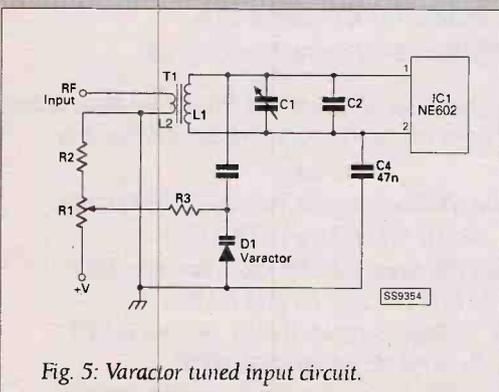


Fig. 5: Varactor tuned input circuit.

circuit is shown in **Fig. 4b**. In this configuration, a wideband r.f. transformer is connected such that the secondary is applied across pins 1 and 2 of the NE602, with the primary of the transformer connected to the signal source or antenna. The turns ratio of the transformer can be used to transform the source impedance to 1.5kΩ (the NE602 input impedance). Either conventional or toroid core transformers can be used for T1. As in the previous circuit, one input is bypassed to ground through a low reactance capacitor.

Tuned RF input circuits are shown in **Figs. 4c, 4d, 4e** and **5**. Each of these circuits performs two functions: a) it selects the desired r.f. frequency while rejecting others, and b) it matches the 1.5kΩ input impedance of the NE602 to the source or antenna system impedance (e.g. 50Ω). The circuit shown in **Fig. 4c** uses an inductor (L1) and capacitor (C1) tuned to the input frequency, as do the other circuits, but the impedance matching function is done by tapping the inductor; a d.c. blocking capacitor is used between the antenna connection and the coil. A third capacitor, C3, is used to bypass one of the inputs (pin 2) to ground.

Another version of the circuit is shown in **Fig. 4d**. It is similar in concept to the previous circuit, but uses a tapped capacitor voltage divider (C2/C3) for the impedance matching function. Resonance with the inductor is established by the combination of C1, the main tuning capacitor, in parallel with the series combination of C2 and C3:

$$C_{\text{tune}} = C1 + \frac{C2C3}{C2+C3} \dots [1]$$

The previous two circuits are designed for use when the source or antenna system impedance is less than the 1.5kΩ input impedance of the NE602. The circuit of **Fig. 4e** can be used in all three situations: input impedance lower than, higher than or equal to the NE602 input impedance, depending on the ratio of the number of turns in the primary winding (L2) to number of turns in the secondary winding (L1). The situation shown schematically in **Fig. 4e** is for the case where the source impedance is less than the input impedance of the NE602.

The secondary of the r.f. transformer (L1) resonates with a capacitance made up of C1 (main tuning), C2 (trimmer tuning or bandsread), and a fixed capacitor C3. An advantage of this circuit is that the frame of the main tuning capacitor is grounded. This feature is an advantage because most tuning capacitors are designed for grounded frame operation, so construction is easier. In addition, most of the variable frequency oscillator circuits used with the NE602 also use a grounded frame capacitor. The input circuit of **Fig. 4e** can therefore use a single dual section capacitor for single knob tuning of both r.f. input and local oscillator.

**Figure 5** shows a tuned input circuit that relies, at least in part, on a voltage

variable capacitance ('Varactor') diode for the tuning function. The total tuning capacitance that resonates transformer secondary L2 is the parallel combination of C1 (trimmer), C2 (a fixed capacitor), and the junction capacitance of Varactor diode D1. The value of capacitor C3 is normally set to be large compared with the diode capacitance so that it will have little effect on the total capacitance of the series combination C3/C<sub>D1</sub>. In other cases, however, the capacitance of C3 is set close to the capacitance of the diode so it becomes part of the resonant circuit capacitance.

A Varactor diode is tuned by varying the reverse bias voltage applied to the diode. Tuning voltage V<sub>t</sub> is set by a resistor voltage divider consisting of R1, R2 and R3. The main tuning potentiometer (R1) can be a single-turn model, but for best resolution of the tuning control use a ten or fifteen turn potentiometer. The fine tuning potentiometer can be a panel mounted model for use as a bandsread control, or a trimmer model for use as a fine adjustment of the tuning circuit (a function also shared by trimmer C1).

The voltage used for the tuning circuit (V<sub>A</sub>) must be well regulated, or the tuning will shift with variations of the voltage. Some designers use a separate three-terminal IC regulator for V<sub>A</sub>, but that is not strictly necessary. A more common situation is to use a single low-power 9V three-terminal IC voltage regulator for both the NE602 and the tuning network. However, it will only work when the diode needs no more than +9V d.c. for correct tuning of the desired frequency range. Unfortunately, many Varactor diodes require a voltage range of about +1 to +37V to cover the entire range of available capacitance.

## NE602 Output Circuits

The NE602 output circuit consists of the cross-coupled collectors of the two halves of the Gilbert transconductance cell (**Fig. 2**), and are available on pins 4 and 5. In general, it doesn't matter which of these pins is used for the output; in single-ended output configurations only one terminal is used, and the alternate output terminal is ignored. Each output terminal is connected internally to the NE602 to +V through separate 1.5kΩ resistors.

**Figure 6a** shows the wideband, high impedance (1.5kΩ) output configuration. Either pin 4 or 5 (or both) can be used. A capacitor is used to provide d.c. blocking. This capacitor should have a low reactance at the frequency of operation, so values between 1nF and 0.1μF are generally selected.

Transformer output coupling is shown in **Fig. 6b**. In this circuit, the primary of a transformer is connected between pins 4 and 5 of the NE602. For frequency converter or translator applications, the transformer could be a broadband r.f. transformer wound on either a conventional slug-tuned former or a toroid. For direct conversion autodyne receivers the transformer would be an audio transformer. The standard 1:1 transformers

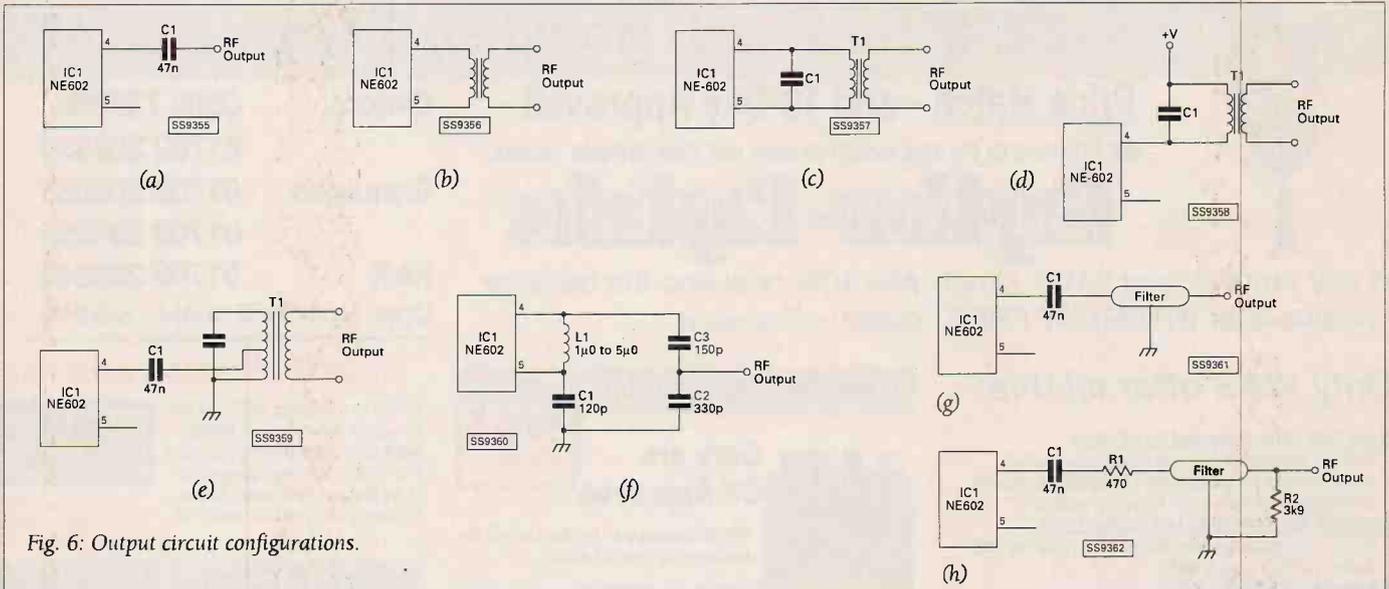


Fig. 6: Output circuit configurations.

used for audio coupling can be used. These transformers are sometimes marked as to impedance ratio rather than turns ratio (e.g. 600Ω:600Ω, or 1.5kΩ:1.5kΩ).

Frequency converters and translators are the same thing, except that the 'converter' terminology generally refers to a stage in a superhet receiver, while 'translator' is more generic. For these circuits, the broadband transformer will work, but it is probably better to use a tuned r.f./i.f. transformer for the output of the NE602. The resonant circuit will reject all but the desired frequency product; e.g. the sum or difference 'i.f.' frequency.

**Figure 6c** shows a common form of resonant output circuit for the NE602. The tuned primary of the transformer is connected across pins 4 and 5 of the NE602, while a secondary winding (which could be tuned or untuned) is used to couple signal to the following stages.

A single-ended r.f. tuned transformer output network for the NE602 is shown in **Fig. 6d**. In this coupling scheme, the output terminal of the IC is coupled to the +V d.c. power supply rail through a tuned transformer. Perhaps a better solution to the single-ended problem is the circuit of **Fig. 6e**. In this circuit, the transformer primary is

tapped for a low impedance, and the tap is connected to the NE602 output terminal through a d.c. blocking capacitor. These transformers are easily available in either 455kHz or 10.7MHz versions, and may also be made relatively easily.

Still another single-ended tuned output circuit is shown in **Fig. 6f**. In this circuit, one of the outputs is grounded for r.f. frequencies through a capacitor. Tuning is a function of the inductance of L1 and the combined series capacitance of C1, C2 and C3. By tapping the capacitance of the resonant circuit, at the junction of C2-C3, it is possible to match a lower impedance (e.g. 50Ω) to the 1.5kΩ output impedance of the NE602.

The single-ended output network of **Fig. 6g** uses a low-pass filter as the frequency selective element. This type of circuit can be used for applications such as a heterodyne signal generator in which the local oscillator frequency of the NE602 is heterodyned with the signal from another source applied to the r.f. input pins of the IC. The difference frequency is selected at the output when the low-pass filter is designed such that its cut-off frequency is between the sum and difference frequencies. Keep in mind that L-C filters are sensitive to input and output impedances.

The filter should either be designed for a 1.5kΩ input impedance and 50Ω output impedance, or a transformer be provided at either the input or output end of the filter.

In **Fig. 6h** an i.f. filter is used to select the desired output frequency. These filters are available in a variety of different frequencies and configurations, including the Collins mechanical filters that were once used extensively in high-grade communications receivers (260, 455 and 500kHz centre frequencies). Current high-grade communications receivers typically used crystal i.f. filters centered on 8.83, 9, 10.7MHz or 455kHz (with bandwidths of 100Hz to 30kHz). Even broadcast radio receivers can be found using i.f. filters. Such filters are made of piezoceramic material, and are usually centered on either 260 or 262.5kHz (a.m. car radios), 455 or 460kHz (other a.m. radios) or 10.7MHz (f.m. radios). The lower frequency versions are typically made with 4, 6 or 12kHz bandwidths, while the 10.7MHz versions have bandwidths of 150 to 300kHz (200kHz being most common).

In the circuit **Fig. 6h** it is assumed that the low-cost ceramic a.m. or f.m. filters are used (for other types, compatible resistances or capacitances are needed to make the filter work properly). The input side of the filter (FL1) in **Fig. 6h** is connected to the NE602 through a 470Ω resistor and an optional d.c. blocking capacitor (C1). The output of the filter is terminated in a 3.9kΩ resistor. The difference i.f. frequency resulting from the conversion process appears at this point.

One of the delights of the NE602 chip is that it contains an internal oscillator circuit that is already coupled to the internal double balanced mixer. The base and emitter connections to the oscillator transistor inside the NE602 are available through pins 6 and 7,

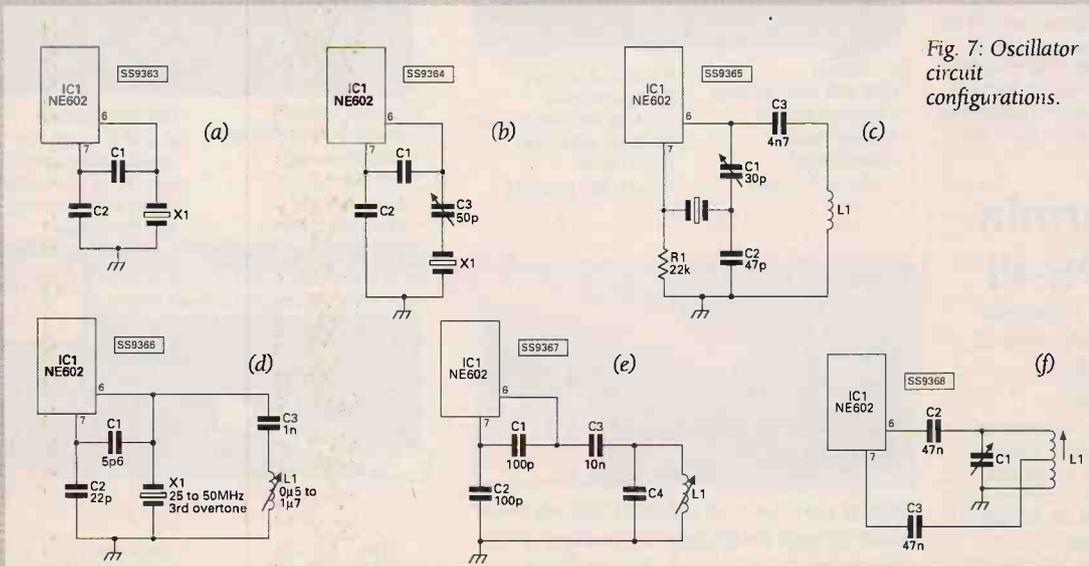


Fig. 7: Oscillator circuit configurations.

Continued on page 45

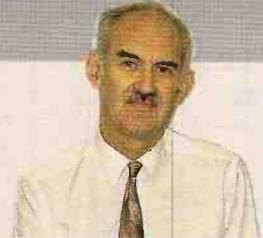


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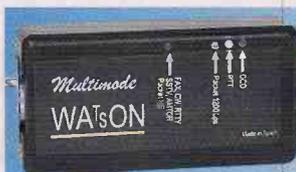
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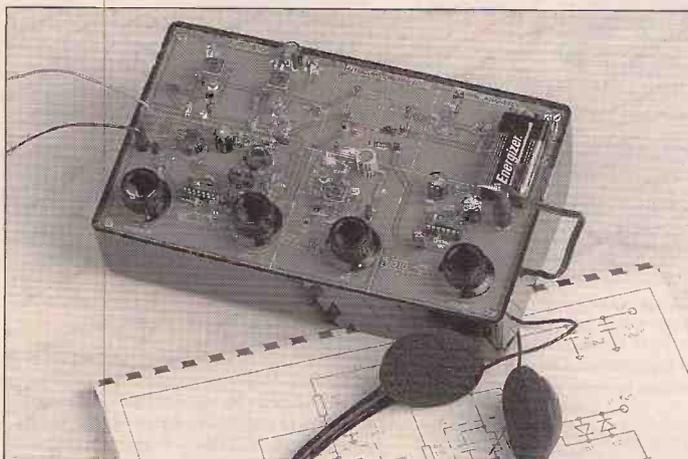
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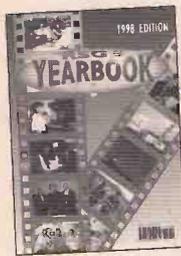
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# A Day In The Life Of A Radio Inspector

J. Edward Brown brings us more tales of Kilocycle Ken and Young Golly investigating more interference problems.

**F**ather Damien, a small brown Polynesian, in jeans, Hawaiian beach shirt, leather sandals, took Kilocycle Ken the Senior Radio Inspector and Young Golly the trainee into his old brick church, acres of empty pews, old-fashioned pulpit, the smell of incense, padlocks on the St Vincent de Paul poor boxes, a winking intrusion alarm. They conferred over the church p.a. system, a Sansui karaoke amplifier.

"Lots of knobs but no screen for the words," Young Golly said.

"I do have the rest of it, the laser discs and the screen, but the bishop wouldn't approve and I know the words," Father Damien said. "This was a gift to the church. I installed it myself. We get taxis on it, and trucks. It can be disconcerting when in full flight on a sermon I've worked on all week."

"Speakers?" Kilocycle Ken said.

"Various brands, a Celestion, a Yamaha, some hi-fi without names."

"All impedance matched?" Kilocycle Ken asked.

"Perhaps not. There are microphones on the pulpit and on the altar steps and we also use lapel microphones." Father Damien blew into a microphone. Kilocycle Ken expected to hear him start to sing, maybe like Don Ho, that Hawaiian entertainer, *The Cross-eyed Mayor of Kaunakakai* or more appropriately in this setting *The Hawaiian Wedding Song*.

It looked like a nightmare. "I don't think we can fix your problem," Kilocycle Ken said carefully. "Audio rectification happens in high r.f. fields, well documented. Ferrite rings at inputs and outputs could fix it, internal shielding, earthing, bypassing, complicated. It was so much easier in the old days, a 0.1µF. capacitor to ground cured almost anything."

...Acres of empty pews...



## Printed Pamphlet

Kilocycle Ken gave him a printed pamphlet headed *Audio Devices - Interception of Radio Signals*. "We call these the Pontius Pilate Pamphlet."

"Never a more appropriate description," Young Golly said.

"Any other problems? I see you've got a deaf aid in the confessional. Do you get

interference in that?" Kilocycle Ken asked.

"No."

"For the customer's use?" Young Golly asked.

Father Damien said, "The penitents. I still hear the voice of humans, and God, without amplification. Actually, I'm more concerned with my short wave listening problem."

"Ah," Young Golly said. "Now we are getting down to the nitty-gritty."

"It's on intermittently, day and night, but I didn't want to complain about it, I know how busy you government men must be."

## Field Strengths

Kilocycle Ken said, "We can't protect short wave bands, the field strengths are so low. But let's have a listen. If there's interference between 2 and 30MHz then it's probably on TV, maybe on the broadcast band."

"It is," Father Damien said. "It's a raspy sound, like a chain saw, peaks on 3MHz and various other frequencies. And it's on the broadcast band, and there's a wiggly band across all TV channels."

Young Golly said, "We don't get many broadcast complaints now, no broadcast licence fee so people don't feel they have to complain to get their money's worth. That doesn't apply to television."

In through the large presbytery living room with rows of old leather chairs, an old Golden Knight TV in a blonde oak cabinet.

"This room is not often used these days," Father Damien said. "There's only me and the curate, used to be a dozen priests here, but the motorways took away the houses, so the people left, and all this became an industrial area. Used to have a housekeeper, no more."

Through the kitchen. "We don't cook and eat regular meals, meat and two vegetables no more, we get a pizza down the street or fish and chips, or use the microwave oven in the crypt underneath the church, got a modern kitchen there for the groups that meet."

## Spare Rooms

They went upstairs. "So many spare rooms, the harvest is great but the labourers are few. Got a separate room for my listening?"

"The gear paid for out of the collection plate?" Young Golly muttered.

"No, my old mother left me a few dollars when she passed on, bless her soul." Father Damien made the sign of the cross.

"Shut up," Kilocycle Ken mouthed at Young Golly.

"I suppose you are a constant listener to the HCJB and those other missionary stations," Young Golly said brightly.

"Constant, no," Father Damien said. "They have a point of view, it might not be the true one, but they are worth listening to."

"You should listen to it," Kilocycle Ken growled at

Young Golly. "Do you some good."  
"I listen to the Vatican direct, get the news before anybody else."

"What about?" Young Golly asked. "New pronouncements by God?"

"Ignore him," Kilocycle Ken said. "He's got the mentality of a 12 year old altar boy."

Father Grinned.

## Altar Boy

"I used to be a altar boy," Kilocycle Ken said. "I sampled the altar wine, when the priest wasn't looking."

"All altar boys do that," Father Damien said.

On the walls, no religious pictures, no crucifix, only s.w.l. cards.

"Aerials are a problem, but I've got a long wire from the cross at the front of the church."

"Isn't that irreligious?" Young Golly asked.

"I don't think so."

"Invitation for lightning to strike?" Young Golly said. "What does the Bishop say?"

"He's never spotted it, I can hardly see it. I've tried all types of aerials, whips, those electronic aerials, but nothing beats a long length of wire and a couple of old-fashioned egg insulators. I've had that wire since I was in the seminary, a few kinks in it now, bought the insulators at Woolworths, fourpence each."

He pointed out old cards, "ZJV Suva, now that was my first verification. I can still remember the programme was music for dancing from the Grand Pacific Hotel in Suva."

"I was a good dancer in my young days," Kilocycle Ken said.

Father Damien said, "I used to listen to the Americans on the broadcast band, KFBK Sacramento was strong in the later afternoons when it was dark across the Pacific. Short wave listening takes one out of this world."

"I thought God did that," Young Golly said.

"He's being difficult today," Kilocycle Ken said.

## Different Receivers

"I've had all types of receivers, a big English Murphy with push-button band-changing, a Dutch Philips with a motorised band-change switch, now this old National, still drags in the rare ones." He swung the dial. "Nothing untoward. A far from ideal location. I've endured interference for years, I hear thermostats, electric motors, car ignition and other interference one can't do anything about, like the Russian Woodpecker over the horizon radar."

He had a computer. No interference from that. A light dimmer for the desk lamp. Nothing from that.

Father Damien said, "Next door to the church is a monumental mason making grave stones, always been there, and I've watched them polishing with electric tools and engraving, but the noise doesn't coincide with their use. There's an all night cafe, lots of taxi drivers use it, a clothing factory, a garage, but most of them are closed at night."

Young Golly said, "DXing is boring, fading stations, not entertaining."

"Maybe it's therapy," Father Damien said.

"And for your penance, listen for three hours to Radio Moscow," Young Golly said.

"That might be a penance," Father Damien said.



...Used to be an Altar boy...

"Or listen to nose flutes from Radio Tonga."

"I listen to stations in the Cook Islands, Samoa, and I can often tell my Pacific Islands people what's happening in their home islands. But short wave listening is a challenge in that search for the rare, the elusive stations with erratic schedules, rare South American stations, small independent Asian and European countries that have broken away from a larger country, whispers in the ether, one strains to hear the call sign, to know that one has bagged another new station."

"How many have you heard?" Kilocycle

Ken asked.

"Thousands, tens of thousands."

"How many angels can dance on the head of a pin?"

Young Golly asked, idly.

"And then to actually get them to acknowledge with a card that one did indeed hear the station, though of course one knew that one did, but a hard copy card is proof positive."

"Different to prayers, one never knows whether there is ever an answer," Young Golly said. "Who was that apostle who didn't believe? Doubting Thomas."

"One knows in one's heart," Father Damien said softly.

"So there," Kilocycle Ken said.

"It's a wonderful world, all that's needed is a simple receiver, although it must be admitted a complicated receiver makes it easier, but I like my old National with its plug-in coils, its 0-500 dial and calibration charts."

"You do have a digital frequency meter hooked up to it," Kilocycle Ken said.

Father Damien held up a hand. "There it goes. It comes on for a couple of minutes, then off again for several minutes, or it might just stop for hours."

## Source Found

Into the car, Sprague on, tune to the broadcast band, the QRM very loud, a quick drive down the street, past the cafe, a panel beater, died out, back again, loudest outside the church. They found the source in the basement, with a refrigerator, a tea urn and an old Toshiba microwave oven with simulated wood grain peeling plastics covering. And a Tongan woman taking a pie out.

Kilocycle Ken said, "It'll be the oven's power supply, not the magnetron, a simple half wave rectifier system and no suppression for the diode noise or switching transients, no r.f. filtering in the power leads. Can't happen now, all new ones must comply with the interference laws."

Father Damien said, "I'll get a friendly electrician to look at it. The oven is used often, by afternoon groups doing craft work, and one thing the Pacific Islanders like is frozen pizzas and meat pies. Sandwiches and tea are old hat, now it's zap a pizza with electrons. I should have thought of it."

Outside, Young Golly asked, "Will he ever get his amplifier problem fixed?"

"Probably not, but the microwave oven will be fixed."

# Toyz for Test

Optoelectronics Presents

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#### FEATURES

- Pager Style Case with belt clip
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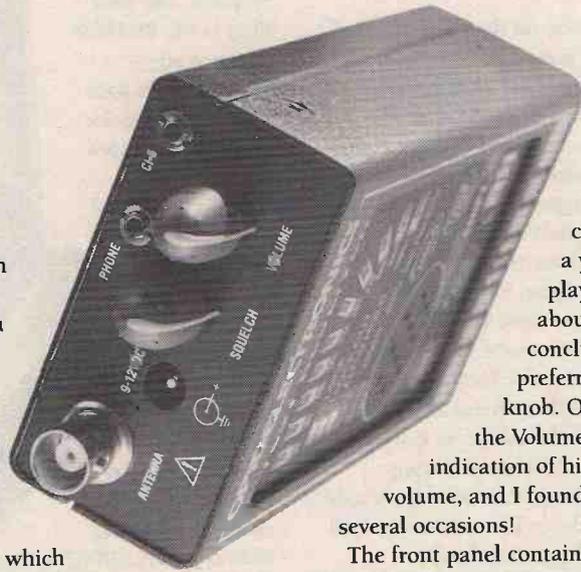
# Optoelectronics

**S**o, you've got a scanner, but you don't know which frequencies are in use in your local area. Maybe you have thought about getting a frequency counter so that you can find the active frequencies, and then you can tune your scanner to the best ones.

How about a single device which allows the best of both worlds, almost certainly costs less than the two items added together, and instantly lets you hear the signals without the need to program a scanner? Sounds too good to be true? Not any more. The Optoelectronics R11 FM Test Receiver is a magic black box which can demodulate an f.m. signal and display the general band that the frequency is transmitting within.

## Description

The Optoelectronics R11 FM Test Receiver comes in a colourful oblong box, slightly smaller than a typical scanner - about the size of a box of king-size cigarettes. All the controls are on the front panel and top panel, leaving the rear, side and bottom panels empty. The top panel contains the BNC antenna socket, the separate Squelch and Volume controls, and various sockets for power/battery charge and other connections. The 'Audio Out' socket is marked Phones and is of the 2.5mm type; I found this an odd choice, as almost every external speaker device that I have ever seen uses a 3.5mm plug. There is also another 2.5mm socket on the top panel, marked CI-5, to allow an Optoelectronics Scout to be connected to the R11. To prevent mistakes when connecting accessories, I would have expected to see these sockets being different sizes. The Squelch and



Volume controls are a curious conical shape with a yellow insert. Having played with these controls for about a week, I came to the conclusion that I would have preferred the more usual type of knob. One odd omission is that the Volume control gives no indication of high volume and low volume, and I found out the hard way on several occasions!

The front panel contains all the main operating controls, and is a wild mix of push-buttons and flashing l.e.d.s. I am not going to even attempt to describe the layout, but the photographs accompanying this review will illustrate where everything can be found. The ten Frequency Range l.e.d.s across the top are used to indicate the approximate frequency in use. Just beneath each l.e.d. is a number to indicate the lower frequency of the range covered; these are 30, 88, 108, 144, 174, 420, 470, 806, 920 and 1300+, representing 30-88MHz, 88-108MHz, 108-144MHz and so on.

After switching on, the red l.e.d.s across the top of the front panel dance backwards and forwards, searching for signals to demodulate. As soon as a signal appears, the demodulated audio comes from the small speaker on the front panel, and the relevant l.e.d. illuminates to indicate the general frequency in use. Once the signal stops, the unit starts scanning again, almost instantly. So that you can

Graham Tanner has been looking at a new device that instantly lets you hear the signals without the need to program a scanner - the Optoelectronics R11 FM Test Receiver.



## R11 FM Test Receiver

follow conversations, there is a Hold button which locks the controls and stops the R11 from re-starting scanning once the signal disappears. A single press of the Skip button starts the R11 scanning again after being on Hold.

There are five push-buttons on the front panel of the R11, and three of these have secondary functions which are activated by pressing the Shift key first. There is a small red l.e.d. next to the Shift key to indicate that it has been pressed, and that the secondary functions are available. Nowadays, there are a large number of data signals, usually with very strong signals. These are signals such as Pager transmitters and automatic data transmitters. Naturally, the R11 finds all these, and plays the audio through the speaker. As these are fixed frequencies, it is possible to force the R11 to ignore these signals. By pressing the Lock-out button

when one of these frequencies is detected, the frequency is stored internally and skipped during subsequent scanning. It only takes a few minutes to find all your local data transmitters, and to lock them out. The R11 can hold up to 1000 locked-out frequencies. To turn the R11 off, you need to press and hold the Shift button for four seconds or more. This is a curious situation, and not the most natural thing to do. Without reading the manual, you would never guess that this was the procedure.

### Accessories

As with almost all Optoelectronics products, there is a wide range of accessories available for the R11. All but one of these cost extra, and only the TA100S telescopic whip

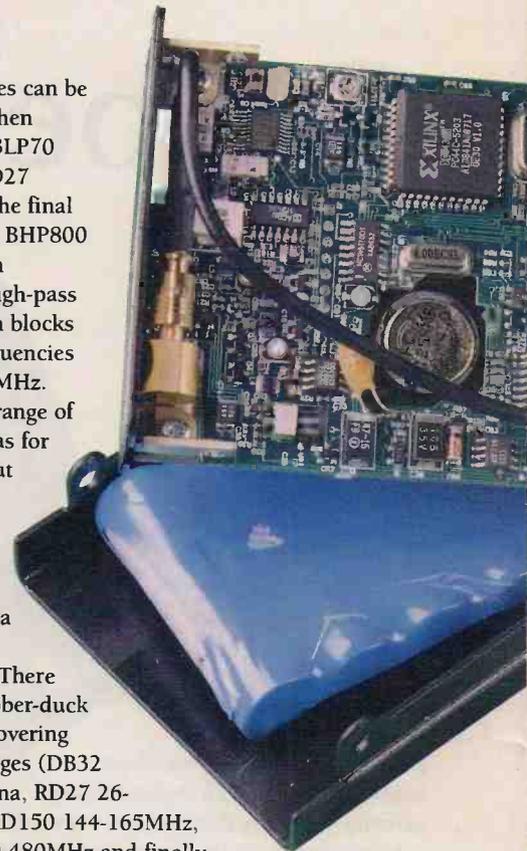
antenna comes as part of the package with the R11. The antenna socket on top of the R11 is a standard BNC socket, and all but three of the accessories are designed for this. There are three filters of various designs so that you can block out unwanted frequency ranges, and a range of antennas. The N100 is an f.m. broadcast notch filter, and blocks out signals from radio stations between 88MHz and 108MHz. During one of my test trips I was quite near to a local-radio transmitter and this caused the R11 to stop several times, so this item would be useful for you if you intend to use the R11 in similar conditions. The BLP70 is a low-pass filter tuned for 70MHz, and it severely attenuates signals above this frequency, allowing you to concentrate your scanning to the Low-band v.h.f. portion of the spectrum. Optoelectronics claim that the R11s pick-

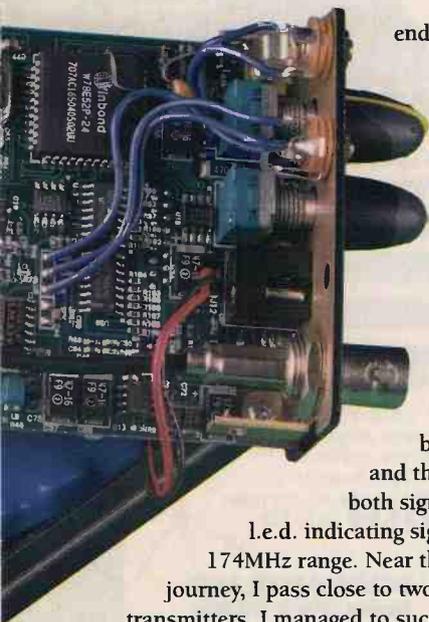
up distances can be doubled when using the BLP70 and the RD27 antenna. The final filter is the BHP800 which is an 800MHz high-pass filter which blocks out all frequencies below 800MHz. There is a range of six antennas for the R11, but in reality you can attach almost any antenna to its BNC connector. There are five rubber-duck antennas covering various ranges (DB32 mini antenna, RD27 26-150MHz, RD150 144-165MHz, RD440 440-480MHz and finally the RD800 500-1000MHz) and a single metal telescopic antenna (TA100S). To keep your R11 safe from knocks and scratches, there is the padded CC30 carry-case.

### In Use

I was handed the R11 at the Leicester Amateur Radio Show at the start of the review period. This was a deliberate move, as it would allow me to start using the unit in a busy v.h.f. and u.h.f. environment. I was already prepared with my light-weight headphones, until I discovered a minor problem - the Audio Out socket is of the 2.5mm type, and my headphones were the 3.5mm type. However, a quick look around the stands and I was able to purchase an adapter plug, and was ready to play. Basically, there is not much to control on the R11, just switch it on and let it do its thing. A quick press of the bright red ON button, and the red l.e.d.s start dancing back and forth scanning the airwaves waiting for a signal to appear. As soon as somebody transmits, the R11 homes-in on the signal, display the frequency band in use, and demodulates the signal so that the audio comes out of the speaker (or Audio Out socket). At Leicester, I was expecting to have to walk around the two halls looking for signals, but the R11 almost immediately locked-on to both the v.h.f. and u.h.f. talk-in stations. I was surprised how quiet the audio was from the small internal speaker, and I was certainly glad that I had brought by headphones.

The next test was a few days later, when I use the R11 on the way to work in my car. I drive past several paging transmitters, a waterboard data transmitter, an f.m. broadcast-band site, and also through some major road-works where I know that they use hand-held radios to communicate from one





end of the site to the other. I used a simple external magnetic-mount antenna for this test, and I was very surprised to find a few more signals than I had expected. As I approached the roadworks, the R11 came alive with signals from

both the hand-helds and the base station, with both signals lighting the 144

l.e.d. indicating signals in the 144-174MHz range. Near the end of my journey, I pass close to two sets of paging transmitters. I managed to successfully lock-out a number of frequencies by simply pressing a single button each time the R11 stopped. This one journey convinced me of the usefulness of the R11, and easily demonstrated its capabilities.

A third test saw me driving around Heathrow Airport. This is an extremely busy r.f. environment, and the R11 coped very well with multiple signals, and signals of varying strengths. There are also a number of a.m. signals here, including aircraft transmissions, and this gave me an idea for a final test. A few miles away is the Greenford ATC transmitter, which transmits air traffic controls signals in a.m. at high power. I took the R11 to within half a mile of the site, and found that the strong signals caused the R11 to detect the signals and try to demodulate them. There was some noise coming from the speaker, which corresponded with the audio from my adjacent scanner, but it was not clear enough to make out what was being said.

## Conclusion

I was very impressed with the R11, and was sad to have to send it back at the end of the review period. I found it more convenient than carrying a scanner and frequency counter, and the speed with which it sweeps the spectrum (and finds signals) is very impressive. The ability to lock-out various frequencies is very useful, and makes the R11 a delight to use once you have locked-out the pager frequencies. The publicity material for the R11 claims that it is able to detect a 5W u.h.f. signal as far away as 150m, and from my testing I found that to be just about right. I have one or two very minor dislikes about the R11 (the audio out socket and the rather odd switch-off procedure), but these are easily overcome. The audio from the in-built speaker is very quiet, and I found the R11 easier to use with headphones or an earpiece. My thanks go to Waters & Stanton Electronics, 22 Main Road, Hockley, Essex SS5 4QS. Tel: (01702) 206835 for the loan of the R11 used in this review. For those of you who have access to the Internet, Optoelectronics have a web-site with pictures and full details of the R11. Their web-address is <http://www.optoelectronics.com>



## Specifications

Frequency Range:	30MHz to 2000GHz
Modulation:	FM
Frequency Response:	50Hz to 3kHz
Auto tune time:	approx. 1s
Input:	50Ω, BNC socket
Outputs:	Internal speaker, Audio Out socket
Controls:	Volume, Squelch, Power-on, Lockout, Lockouts On/Off, Clear Lockouts, Skip Shift, Hold, Mute
Indicators l.e.d.s:	Lock, Lockouts, Auto Hold, Frequency Range
Power:	Internal NiCad battery (7.2V 600mAh, approx. 5h operation)
Size:	106(H) x 62(W) x 32mm

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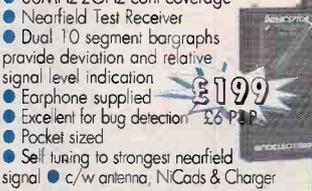
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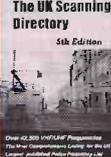


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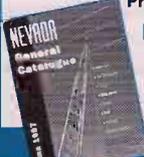
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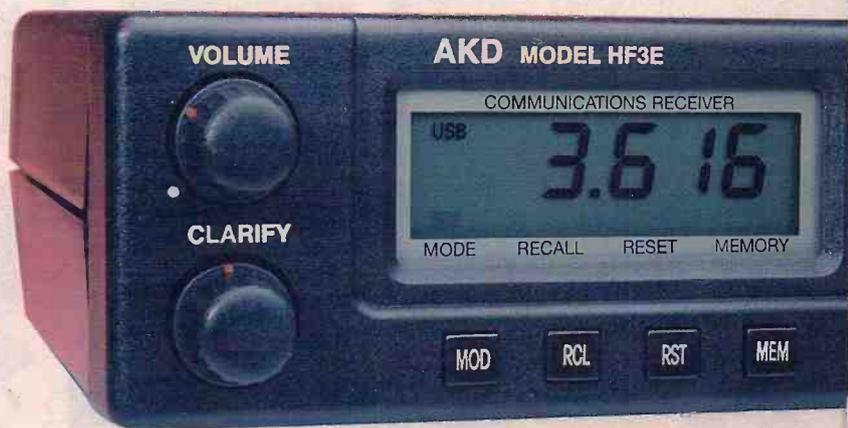
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# AKD



## Computer Control - What is it?

The AKD HF3 series of receivers is rapidly becoming one of the most heavily reviewed pieces of kit on the market. Given the excellent value for money, this shouldn't come as any surprise. In this review Mike Richards has intentionally bypassed the basic receiver and concentrated on the differences between the new HF3E and the basic model.

**S**o what's the HF3E got that the others haven't? The most important extra is the computer control package. As more listeners acquire computers so the demand to be able to remotely control the receiver increases making the HF3E a logical step forward. If you've not tried computer control of a receiver before, you may just be wondering what's so special about it - surely it can't be easier than turning a knob?

For basic tuning around a fairly narrow band to find stations, the tuning knob is often best, but when you want to jump around it can get a little tedious. This is where the computer can really start to make life easy. If, for example, you're interested in FAX reception you will find that most stations transmit the same information simultaneously on several different frequencies. The idea is to let the operator at the receive end choose the frequency that provides the best results for the given propagation conditions. The frequencies are usually spread over a very wide range so manual tuning can get really tedious. With computer control you can just type in the frequency and the receiver immediately steps to that frequency. Using this system you can dart around all over the h.f. band in just a few seconds.

The next level of sophistication is to store your favourite frequencies in computer memories which makes recall even faster. I know you can often store frequencies in the receiver's memory, but you can't add a description so you know which station is in which memory. I can assure you that without this facility it's very easy to get in a real mess.

The other facility offered by computer control is automated scanning of entire frequency ranges. The results can then be graphically displayed so you can see just where to find all the stations. Doing this manually would take an absolute age - by the time you'd finished the stations would probably have disappeared!

## What Do You Get?

The AKD HF3E comes package in the standard cardboard box which in addition to the main receiver contains a plug-top power supply, software on 3.5in disks, receiver control lead, FAX lead and a length of stranded antenna wire - all you need to get going, really.

Setting-up the basic receiver was pretty straightforward - just plug-in the power supply and connect-up an antenna! In order to use the computer control you first had to install the software. To do this you just put the disk in drive A and type 'Install' - again pretty simple stuff. The installation routine copies the files onto your hard disk where you'll need about 230Kb of free space - if you haven't got this you're in real trouble anyway!

Next, you need to connect-up the control lead between the receiver and the computer. Now this is where things get a little odd, because the control software uses your main printer port LPT1 to communicate with the receiver. There's no option on this, it's LPT1 or nothing.

Although this is inconvenient (I think just about all computer users have a printer) there are ways to run this program and still use your printer - though not both at the same time. The answer is to get yourself a parallel port data switch. These are readily available from just about all computer/radio shops and give you the facility to choose just what is connected to your printer port. Don't be tempted to be flash and get one of the electronic switches as I'm not sure that they will operate properly with this software.

Once you've sorted out the printer port arrangements, you just plug the control lead in the computer end and locate the other end in the socket on the rear panel of the receiver. Next operation is to start the software and carry-out the calibration



# Target HF3E Comm



process. A point to note here is that the control software is DOS based and cannot be operated from within Windows at all. I found this a little disappointing as most people use the Windows environment for most other tasks and it's a pain to have to jump out.

Running the software was very simple and on the first occasion an automated calibration routine is carried-out. This is designed to calibrate the signal strength indication to compensate for differing computer systems. The idea is that an HF3E connected to a variety of computers will give close to the same 'S' reading for a given signal strength. Unfortunately, the signal strength facility developed a fault on the review model so I wasn't able to fully evaluate this area.

**In Use**

Once the software is loaded and calibrated you're all set to cruise the air waves. Whilst the control lead is connected and the program is running, the receiver's display is blanked and the only controls you can use are the volume and clarifier. I must say that the response time of the program was very good indeed and you could really move around the bands very quickly. From within the main screen you could choose to type-in a frequency of your choice or you could select one of the 500 memories that were to hand. Instead of simple numeric memories, the HF3E system included the facility to add a short description (20 characters) of the station. This made station identification very easy.

In order to keep the display readable, the memories were presented in groups of 20 at a time. However, other than the facility to wipe a memory there weren't any memory management tools available.

I've found that basic memory systems can very easily get in a mess and it's handy to have some tools that will allow you to move memories around and maybe group some similar stations together. Perhaps this is something for the developers at AKD to consider. In addition to jumping around the bands, you can also use the computer control for basic tuning by pressing the U and D keys on the keyboard. This causes the receiver to tune up or down in the standard 1kHz tuning steps - at an amazing rate if you hold the keys down! This is supplemented by the

control of the receive mode - you just press 1, 2 or 3 for u.s.b., a.m. and l.s.b. If you want to get a little more sophisticated, the HF3E control software includes a spectrum analysis package. This can be set to a wide range of upper and lower frequencies and once set-up causes the receiver to rapidly scan between the two frequencies. As it scans it also displays the signal level of any signals it encounters on a graphic display. This was as very fast and effective way to examine activity in a particular band.

**Fax As Well!**

In addition to the computer control software, the HF3E comes with AKD's TARFAX software for h.f. FAX reception. I've covered this before so I won't spend much time on it here. However, I was amazed to find that you couldn't run the computer control software and the FAX systems at the same time. In fact, to change from computer control to FAX you not only had to exit the software, but you also had to remove the control lead from the printer port and connect another data lead from a flying jack socket to your computer's serial port!

**Summary**

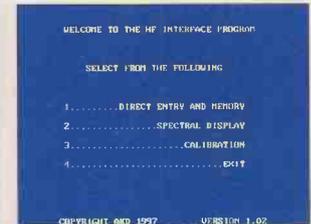
I'm afraid AKD are certainly not onto a winner with this particular combination! The receiver control software works as specified, but it really is very basic and severely limited by the lack of any memory management facilities. I thought the instructions were somewhat lacking, especially as this type of budget receiver is likely to appeal to new listeners. I

didn't like the use of the parallel port for the receiver control and in particular the requirement to disconnect the control lead when you change over to FAX reception. In fact, the whole package would look much better if the FAX was left out. I'm sure most buyers would expect a bundled package to have some

integration of the various components. This is a real shame as the HF3 receiver has opened-up the h.f. bands to a new range of listeners and a well thought-out computer control package would, I'm sure, make a popular upgrade route. The AKD HF3E costs £299.00 and can be obtained from AKD, Unit 5, Parsons Green Estate, Boulton Road, Stevenage, Herts SG1 4QG. Tel: (01438) 351710.



The main screen allowing memory selection and frequency input.



Menu Screen.



SWM

# Communications Receiver

John Wilson has been taking a look at the Lowe HF-150 - a receiver that he, himself, played a major role in getting onto the market more years ago than he cares to remember!



The  
...a

**I**n the best Parliamentary fashion I have to declare a personal interest in the HF-150 because it was I who said to John Thorpe, "John, do you think we can produce a receiver with the performance of the HF-225, but at a selling price of around £300?" After some thought, John told me that it might be possible - providing we trimmed out some of the facilities and functions. And with that assurance

we began to lay the design foundations for what was to become a very successful product, and one in which I took particular pride. However, that was a long time ago and it was with some enthusiasm that I agreed to take a second look, not only at the HF-150, but also at the range of accessory units which sprang from its loins, as it were.

The familiar little house brick - still the strongest case ever made, including the AR88 and B40 - hadn't changed at all, except for the fact that when I switched it on the dial lit up with a fiery red glow of back illumination which was not in the original design specification - in fact dial illumination was one of the things we eliminated on cost grounds. It certainly made a huge difference to the readability of the frequency display, but I was disappointed to learn that the illumination is not a standard feature but an add-on extra, and it must be the world's most expensive dial light at a less than modest £40. Frequency readout is still to 1kHz, and despite many comments that it would be nice to have at least 100Hz digits, it probably doesn't matter a hoot for most listening done with the HF-150, and it did save some production costs. I will keep mentioning costs because our main design target was that magical £300, and we came pretty close to achieving it. (£329 at its launch at the very beginning of 1992. Ed.)

**Sensitivity for 12dB SINAD**

Mode	HF-150 (dBm)	FRG-100 (dBm)
SSB	-118dBm	-124dBm
AM	-108dBm	-114dBm

**Second order intercept point measured at 13.5MHz, inputs 6.5 and 7MHz**

	(dBm)
HF-150	+35
FRG-100	+91

**Third order intercept point at 20kHz spacing**

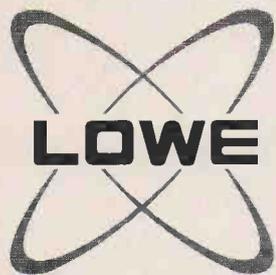
	(dBm)
HF-150	+12.5
FRG-100	+21.5

**Reciprocal mixing ratio in dBc/Hz measured at 14.058MHz**

Spacing (kHz)	HF-150 (dBc/Hz)	FRG-100 (dBc/Hz)
10	-116	-116
20	-123	-124
50	-133	-135
100	-139	-144

**Apparent Simplicity**

The HF-150 has one of the simplest front panel layouts of any receiver on the market, with the possible exception of the AKD Target HF3, but a lot of clever thought went into the apparent simplicity, and what John T. managed to make out of three push



# HF-150...

## retrospective

buttons and a volume control is quite masterly. Push the centre button marked 'Mode' and the display changes to show the mode in use. To change the mode, the other two buttons step up or down through the available modes until you have the one you need and then you need do nothing more since the display automatically reverts to frequency after about two seconds - or immediately if you touch the main tuning knob. Modes provided are a.m. (narrow), a.m., u.s.b., l.s.b. and a series of outstanding synchronous a.m. modes which demonstrate just how clever John T. could be. You can choose between a.m. sync which uses both sidebands of the incoming signal, a.m. Sync using either upper or lower sideband, or an offset filter arrangement which effectively gives you Hi-Fi audio. The synchronous detector hangs on to the signal during deep fades and is as impressive today as it was when it was originally designed.

The same three buttons are used to manage the memory stores - 60 provided, as well as fast tuning which allows you to tune the HF-150 in 100kHz steps to get around quickly, and the tuning rolls over at each end of the tuning range so you can go straight through from 30MHz to 30kHz and/or back again. The normal tuning rate is approximately 8Hz and there is the usual automatic speed up when the tuning knob is turned quickly. I did find the speed up came in too soon for my liking, and the tuning had quite a stiff feel to it which wouldn't have mattered except for the fact that when you try to use the dimple on the tuning knob the receiver slides away from you across the desk top, and you have to put one hand on top of it to hold it still.

### Test Routines

One hidden function for the three buttons is to control the built-in test routines for receiver alignment, and shows the depth of detail which went into the HF-150 design. At the time we produced the HF-150 only top end professional receivers had built in test facilities, so to have this in a £300 short wave radio was unheard of.

Looking at the rear panel of the HF-150 reveals the slide in carriers for the battery pack, the coaxial and wire antenna inputs, audio output jacks for tape recorder and external loudspeaker, the power input connector and the jack for the keypad (an extra cost option). The keypad was consistently voted as 'the best in the world' by independent reviewers, and I haven't come across anything to touch it (Ho-Ho,

there always has to be a feeble pun). I'm glad that I declared my pride in the HF-150 because in its original conception it was quite brilliant, and as an engineer I still find much to admire in it. However, as a now totally independent reviewer for *Short Wave Magazine* I have the responsibility to act as the potential purchaser of receivers and look at equipment as a user. Over the last two years I have had the pleasure of reviewing most of the current crop of receivers and as luck would have it I had the Yaesu FRG-100 and the HF-150 on the bench at the same time, which allowed me to compare two receivers which came on to the market virtually together.

### Wouldn't It Be Nice If

The HF-150 started out as a simple straightforward receiver, and in that role it succeeded very well indeed. Its success was in many ways its downfall, because it wasn't long before customers and dealers began the 'WIBNI' routine (Wouldn't It Be Nice If). Wouldn't it be nice if the HF-150 had an 'S' meter; or illumination for the readout; or readout to 100Hz instead of 1kHz; and so on and so on. John T. pointed out that if all these things were incorporated it wouldn't be an HF-150 at all, and would cost considerably more than its target price. In fact, it would become more like the HF-225, which we were already producing - so why not buy an HF-225? However, one 'WIBNI' we had to address was the one from Germany which went: "Wouldn't it be nice if the HF-150 had a better second order intercept performance", and it was this which led to the design and production of the first HF-150 add-on, the PR-150 preselector.

Second order intermodulation products are the sum and difference signals generated when two signals mix in a non-linear system, and unlike some third order products which appear close to the wanted signal and are therefore difficult to remove, second order products can be minimised by filtering before the non-linear elements. In simple receiver terms, r.f. filtering between the antenna and the first mixer will reduce second order products, and this filtering always existed in older receivers which used tuned r.f. amplifiers. However, the HF-150 doesn't have any front-end filtering at all - part of the cost cutting sacrifices, and even I gulped a bit when I measured the second order intercept point at a miserable +35dBm. For comparison, the FRG-100 tested last month

*Continued on page 38*

# COMPETITION

## Welz WS2000E Wide Band Receiver

This miniature hand-held scanner from Welz was first reviewed by Alan Gardener in the July '96 *SWM*. Now it has been upgraded and renamed the WS2000! The number of memories has been doubled to 800 channels whilst the search band and search pass memories have been increased to 20 and 90 channels respectively. The audio output power, which Alan felt was not really sufficient in the WS1000 at only 60mW, has been increased to 90mW. The r.f. sensitivity has also been improved along with the ability to handle signals from an external antenna.

Identical in physical shape, size and appearance to its predecessor, the WS1000, the basic operation is so similar to the earlier model that the review by Alan Gardener in the July '96 issue still holds good. Copies of the issue containing the review are still available, price £2.85 inc. P&P. (Please use the Order Form on page 99.)

The WS1000 started out priced at £349 - the WS2000 carries a price tag of just £269. Waters & Stanton Electronics, 22 Main Road, Hockley, Essex SS5 4QS. Tel: (01702) 206835.

Waters & Stanton Electronics have very kindly donated a Welz WS2000E scanner as the prize in a competition open to *SWM* readers.

In the November '97 issue we asked you to correctly answer Question 1. Now, to complete the competition, here is Question 2. Fill in your answers to both questions on the form below, attach the corner flashes from both parts and post to Welz Competition, *Short Wave Magazine*, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Please note that you **must** enclose **both** corner flashes to validate your entry. You may, however, use a photocopy of the Entry Form to save mutilating your copy of *SWM* too much..

### Entry Form

Answer to Question 1. ....

Answer to Question 2. ....

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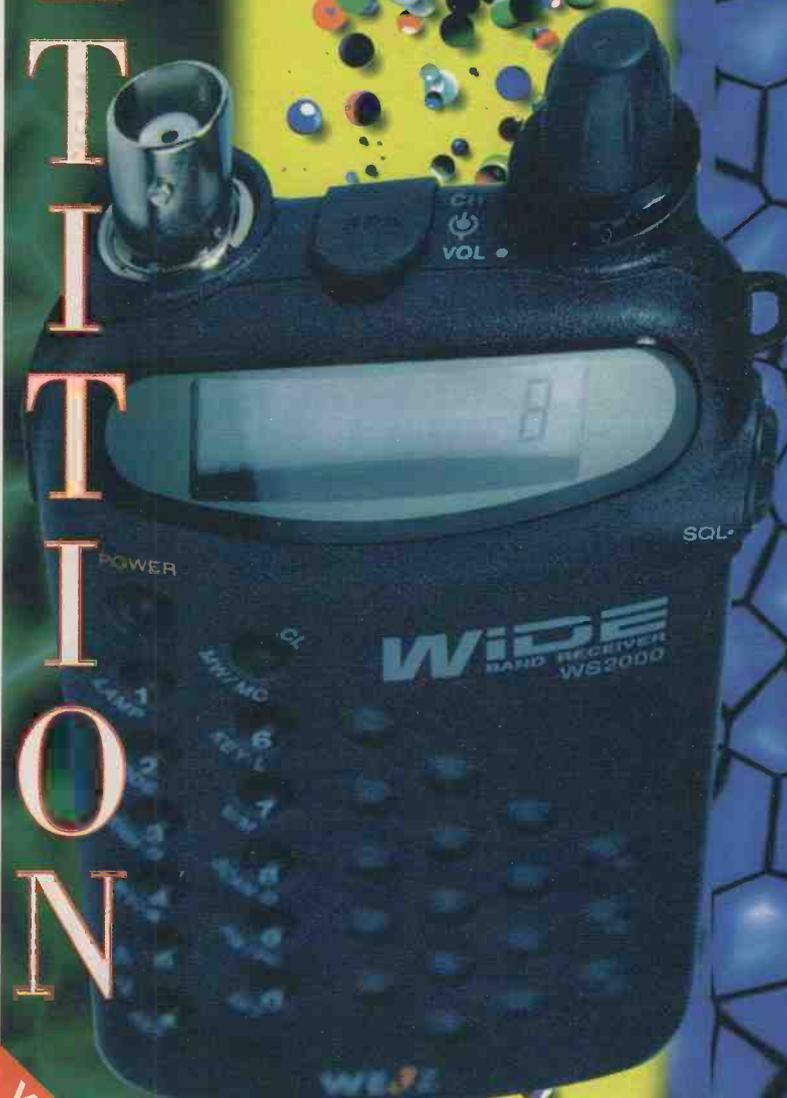
.....

.....

Postcode .....

Telephone:.....

Send your entry to: Short Wave Magazine, Welz WS2000E Competition, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.



### Question 2.

What type of r.f. connector does the WS2000E scanner use for the antenna?

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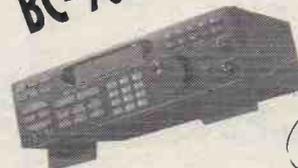
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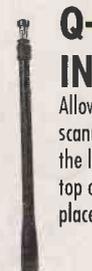
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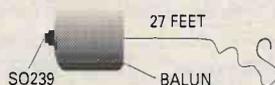


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SP-150 or the AP-150. I say 'either' because, although they are both the same unit it's a bit confusing to see 'AP-150' on the panel in front of me, but 'SP-150' in the advertisement on the back cover of *Short Wave Magazine*. Incidentally, the PR-150 was the last unit John T designed for Lowe, and the AP/SP-150 was from the hand of a different designer.

Just for the record, and in order to enable the reader to make comparisons with other receivers, particularly the FRG-100, the full r.f. measurements for the HF-150 are shown in the tables on page 32.

Clearly, both receivers have excellent low noise synthesisers but the intermodulation performance of the FRG-100 is better than the HF-150 by quite some margin.

So standing back and looking at all the receivers available today, and in particular the FRG-100, how do I rate the HF-150? Well, it still impresses me as an original concept which was that of a low(ish) priced short wave receiver, designed for good performance in a small go-anywhere enclosure, which could be thrown from a high building and still survive. The r.f. performance is pretty good, apart from the poor second order intermodulation, and I found the tuning rate speedup a bit awkward. I noticed that the mains power supply has changed to one that is smaller than the original and both the units I had powering the receiver and PR-150 during the testing ran quite hot

and began to buzz and smell after a couple of hours. I also regret the increase in price by over 27% since its introduction, when according to the rules of manufacturing the price (as in the case of the FRG-100) should have come down, or at least remained the same.

In my opinion, what really went wrong with the HF-150 was the insatiable drive to make it into something it was never intended to be, and I have to take some of the blame for that. *Mea Culpa* J.T., you were

right all along. The stark fact is that by the time you have bought the HF-150 and added the dial illumination, the preselector, the 'S' meter and the rack to put it all in you have spent something like £800, whereas if you can do without the excellent synchronous a.m. detector in the HF-150, the FRG-100 gives you everything else, with better r.f. performance for a current price of £449. It's really a no contest decision, but I will always have a place in my heart for the HF-150 and will mourn its passing. *Morituri te salutant.*

### Enter The Europa

But this isn't the end of the story, because Lowe are about to announce the *Europa* version of the HF-150 in which they have used the frequency readout information to switch in a bank of front-end filters to

managed +91dBm and the classic Collins 51S1 tops 100dBm. In real terms, signals at 6.5 and 7MHz no stronger than S9+20 (and there are lots of

them) will produce audible sprogs at 13.5MHz in the HF-150. Hardly any wonder that the German customers complained, when even Kenwood had to carry out modifications to their up-market R-5000 in order to satisfy the receiving conditions in some parts of Germany.

The PR-150 preselector was made as a general purpose unit which would go with any receiver, and it, too, was a success because almost any modern receiver with a wide open front-end can benefit from additional selectivity. Built into the HF-150 bomb proof enclosure, the PR-150 uses two tunable loosely coupled sections of bandswitched filtering, in seven bands covering 100kHz to 30MHz. Additional features include a preamplifier to make up for the losses in the filtering, switching for two antennas, a 'through' facility to bypass the filter and a method of powering the PR-150 and HF-150 from the same mains power unit. Adding the PR-150 to the HF-150 under test resulted in an improvement of the second order intercept point to a more respectable +51 dBm but reduced the third order intercept point to +9.5dBm. Every silver lining has a cloud, I guess.

The problem for the HF-150 owner was that he had to lay down more cash and end up with two units to adjust when tuning around. This situation then led to the next HF-150 'add-on' which was the rack designed to hold the HF-150 and the PR-150 in some sort of tidy arrangement. Trying to look ahead, the rack was made extendable so that the owner could stack on another box such as a speaker or antenna tuning unit. At this point the 'WIBNI' bird struck again and wanted a signal strength meter - so this was put in a box with a higher power audio amplifier and an audio peak and notch filter to become either the



Continued from page 33



improve the second order performance. I look forward to checking this version and comparing it with the original, but if these modifications mean an increase in price it will be an uphill battle to compete with the FRG-100, particularly if you still have to pay £40 for display illumination and still no 'S' meter or 100Hz readout. All that Lowe can hope for is that the FRG-100 is taken out of production just as the HF-150 *Europa* hits the street - but I can't see that happening.

### AA-150 Active Antenna

And even that isn't the end of the story because accompanying the review stack was an active antenna from RF Systems which is badged for Lowe as the AA-150. I have in the past considered active antennas as something you would use if you couldn't put up a decent length of wire, but the AA-150 changed that when I tested it. The AA-150 is a stainless steel whip about a metre long atop a chunky cylinder which contains the active preamplifier. As supplied to me, it came complete with a decent length of coaxial cable, well made mounting brackets and a power supply/coupling unit which is located near the receiver and feeds d.c. up the coaxial feeder to the preamplifier at the antenna.

I decided to compare the AA-150 with the average short wave enthusiast's antenna system - 10 metres of wire terminated in one of the many long-wire matching transformers. For the purpose of the test I mounted the AA-150 at the top of a 4m non-metallic mast, and put alongside it a MyDel long-wire balun fed from 10m of wire which drooped to 2m at the far end. I then connected the two coaxial feeds through a switch to some £50 000 worth of test receivers and measured the signals which appeared at the receiver end of the coaxial feed lines. I first scanned from 100kHz to 30MHz in 5kHz steps and plotted the results which showed that the 10m wire was producing stronger signals above 16MHz but the AA-150 was holding its own very well indeed at lower frequencies. I did a closer investigation from 50 to 500kHz and was astonished to find the AA-150 romping away, with signals being up to 30dB higher than those using the 10m wire. Rugby on 60kHz measured 52dB $\mu$ V from the AA-150 but only 21dB $\mu$ V from the wire antenna. At 252kHz it was 69dB $\mu$ V from the AA-150 and 50dB $\mu$ V from the wire.

"OK", I thought, "I know where the active antennas fail, and that is in intermodulation performance", so I measured the 13 to 16MHz range looking for second order products from the 6 to 8MHz region where I had already measured signal levels in excess of 70dB $\mu$ V. I couldn't find a trace of anything amiss, and the results from the AA-150 and 10m wire were virtually identical. I have to mention that these tests were carried out around 1800hrs, and I didn't have an



The new AA-150 Active antenna designed especially for the Lowe HF-150 receiver.



The AA-150 is powered up the coaxial feeder cable with this special adaptor.

opportunity to repeat them later in the evening when signals may have been stronger, but as far as I could see the AA-150 is a very good antenna indeed.

In the AA-150 we seem to have a very useful and attractive accessory for the short wave listener, and my hope is (since I can't find out what the retail price is going to be) that it will be priced at a sensible level. The AA-150 is one item I wouldn't mind keeping around, if only for its excellent performance below 500kHz. (The AA-150 is priced at £175 inc. VAT. Ed.)

SWM



### And So To Other Things

The news has been out for some time now that JRC have introduced their NRD-545 receiver, which will, presumably, replace the NRD-535. The most interesting feature of the NRD-545 is that it uses DSP techniques to provide continuously variable bandwidth from 10kHz down to 40Hz in 10Hz steps. There are apparently no other conventional i.f. filters used in the receiver, and as one might imagine with JRC, just about every recent feature has been included in the specification. I hope that I may be privileged to give the readers of *Short Wave Magazine* my own impressions of the NRD-545 in due course.

My old friend Gordon Bennett rang me to suggest that I may well have been right when I said last month that I didn't remember the early FRG-100 being as good as the one I reviewed. He reminded me that some six months after its introduction, and after much pressure from the US market, Yaesu Musen changed the i.f. filters and fitted much higher specification devices, so my memory didn't fail me after all. Now if I could only remember the way home...

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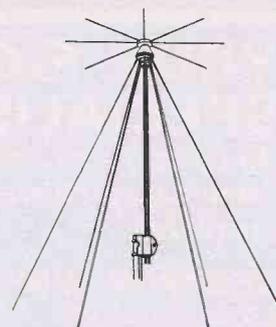
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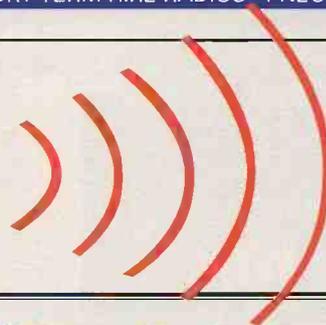
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# TALK



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# Designing Receiver Projects with The NE602 Chip

respectively. The internal oscillator can be operated at frequencies up to 200MHz. The internal mixer works to 500MHz. If higher oscillator frequencies are needed, then use an external local oscillator. An external signal can be coupled to the NE602 through pin 6, but must be limited to less than about -13.8 dBm, or 250mV across 1.5kΩ.

## NE602 Local Oscillator Circuits

There are two general methods for controlling the frequency of the l.o. in any oscillator circuit: inductor-capacitor (LC) resonant tank circuits or piezoelectric crystal resonators. We will consider both forms, but first the crystal oscillators.

**Figure 7a** shows the basic Colpitts crystal oscillator. It will operate with fundamental mode crystals on frequencies up to about 20MHz. The feedback network consists of a capacitor voltage divider (C1/C2). The values of these capacitors are critical, and should be approximately:

$$C1 = \frac{100}{\sqrt{F_{\text{MHz}}}} \quad \dots[2]$$

$$C2 = \frac{1000}{F_{\text{MHz}}} \quad \dots[3]$$

The values predicted by these equations are approximate, but work well under circumstances where external stray capacitance does not dominate the total. However, the practical truth is that capacitors come in standard values and these may not be exactly the values required by equations [2] and [3].

When the capacitor values are correct, the oscillation will be consistent. If you pull the crystal out, and then reinsert it, the oscillation will restart immediately. Alternatively, if the power is turned off and then back on again, the oscillator will always restart. If the capacitor values are incorrect, then the oscillator will either fail to run at all, or will operate intermittently. Generally, an increase in the capacitances will suffice to make operation consistent.

A problem with the circuit of **Fig. 7a** is that the crystal frequency is not controllable. The actual operating frequency of any crystal depends, in part, on the circuit capacitance seen by the crystal. The calibrated frequency is typically valid when the load capacitance is 20 or 32pF, but this can be specified to the crystal manufacturer at the time of ordering. In **Fig. 7b**, a 30 to 50pF variable capacitor is placed in series with the crystal in order to set the frequency. This trimmer capacitor can be adjusted to set the oscillation frequency to the desired frequency.

The two previous crystal oscillators operate in the fundamental mode of crystal oscillation. The resonant frequency in the fundamental mode is set by the dimensions of the slab of quartz used for the crystal; the thinner the slab, the higher the frequency. Fundamental mode crystals work reliably up to about 20MHz, but above 20MHz the slabs

become too thin for safe operation. Above about 20MHz, the thinness of the slabs of fundamental mode crystal causes them to fracture easily. An alternative is to use overtone mode crystals. The overtone frequency of a crystal is not necessarily an exact harmonic of the fundamental mode, but is close to it. The overtones tend to be close to odd integer multiples of the fundamental (3rd, 5th, 7th). Overtone crystals are marked with the appropriate overtone frequency, rather than the fundamental.

**Figures 7c** and **7e** are overtone mode crystal oscillator circuits. The circuit in **Fig. 7c** is the Butler oscillator. The overtone crystal is connected between the oscillator emitter of the NE602 (pin 7) and a capacitive voltage divider that is connected between the oscillator base (pin 6) and ground. There is also an inductor in the circuit (L1), and this inductor must resonate with C1 to the overtone frequency of crystal Xtal1. **Figure 7c** can use either 3rd or 5th overtone crystals up to about 80MHz. The circuit in **Fig. 7d** is a third overtone crystal oscillator that works from 25 to about 50MHz, and is simpler than **Fig. 7c**.

A pair of variable frequency oscillator (v.f.o.) circuits are shown in **Figs. 7e** and **7f**. The circuit in **Fig. 7e** is the Colpitts oscillator version, while **Fig. 7f** is the Hartley oscillator version. In both oscillators, the resonating element is an inductor-capacitor (LC) tuned resonant circuit. In **Fig. 7e**, however, the feedback network is a tapped capacitor voltage divider, while in **Fig. 7f** it is a tap on the resonating inductor. In both cases, a d.c. blocking capacitor to pin 6 is needed in order to prevent the oscillator from being d.c.-grounded through the resistance of the inductor.

## Voltage Tuned NE602 Oscillator Circuits

**Figure 8** shows a v.f.o. circuit in which the capacitor element of the tuned circuit is a voltage variable capacitance diode, or Varactor (D1). These diodes exhibit a junction capacitance that is a function of the reverse bias potential applied across the diode. Thus, the oscillating frequency of these circuits is a function of tuning voltage  $V_t$ .

The circuit of **Fig. 8** is a Colpitts oscillator. If the parallel resonant network (L1/D1) is replaced by a series resonant equivalent, then the oscillator is turned into a Clapp oscillator (i.e. series-tuned Colpitts).

## Short Wave Receiver Project

A simple direct conversion receiver (DCR) project is shown in **Fig. 9**. A DCR is like a superheterodyne, except that the local oscillator (l.o.) is on the same frequency as

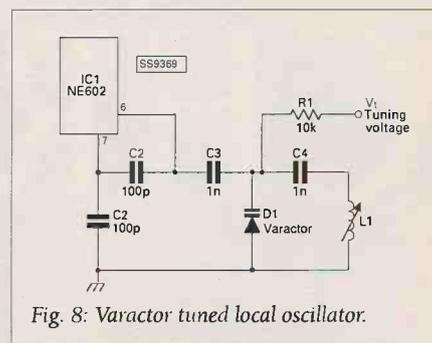


Fig. 8: Varactor tuned local oscillator.

the incoming r.f. signal. In the superheterodyne, the l.o. is offset from the r.f. by the value of the i.f. frequency. When the DCR l.o. heterodynes against an r.f. signal, the audio or other information is recovered. In a.m. reception, the l.o. is turned exactly to the r.f. and is zero-beat. In c.w. or s.s.b. reception the l.o. is offset from the r.f. by about 400 to 1000Hz for c.w., and 2800Hz for s.s.b.

The circuit in **Fig. 9** is the front-end of a general short wave receiver. To make it complete follow this circuit with a high gain audio amplifier stage such as the LM-386 device.

This circuit will work from about 5 to about 12MHz, depending on the values of the components selected. For any given setting of L1 it will tune about a 2-3MHz segment. For

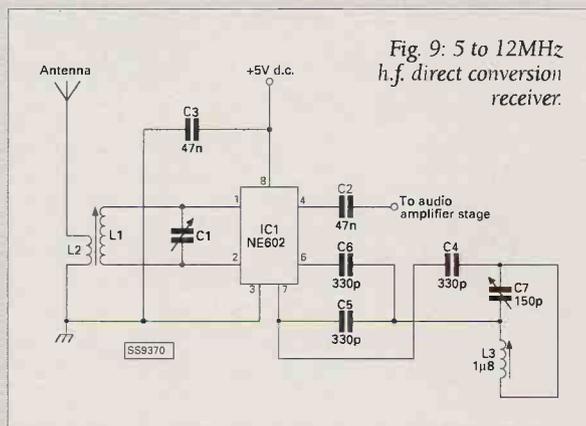


Fig. 9: 5 to 12MHz h.f. direct conversion receiver.

example, the value of inductor L3 can be changed to a higher or lower value for tuning to another frequency.

The input circuit is tuned by an r.f. transformer. One alternative is to use a 10.7MHz i.f. transformer. The resonant frequency can be decreased by connecting in parallel a small variable capacitor with the internal capacitor of the i.f. transformer. For higher frequencies, carefully crush the capacitor in the transformer, eliminating it from the circuit. The resonance is then controlled by C1. On most small 10.7MHz i.f. transformers the capacitor can be seen on the bottom of the base in a small recessed cavity.

If you want to build a larger receiver project based on the NE602 device, then check out the Ramsey Electronics SR-1 kit.

## Conclusion

The NE602 is a well-behaved and easily available r.f. chip that will function in a variety of applications from the front-end of receivers, to converters, to oscillators, to signal generators.

# CHRISTMAS SE

Dick and Kevin have been sorting through the pile of recent products to arrive at the SWM Editorial Offices. Here are a few that could well be worthy of dropping into Santa's Sack.

## Regen Receiver

Simple receiver designs have always been popular as starter projects, in particular one-valve or one-transistor super-regenerative versions. In recent times, the 'three-legged' radio ZN414 i.c. introduced over twenty years ago by Ferranti, has provided the means to build a very simple and low-cost receiver. However, this device has been withdrawn, so this route is now closed to the beginner.

With the needs of the Novice Licence students in mind, John Badger, proprietor of Badger Boards, decided that a new kit was needed. He reckoned that a simple regenerative design, with simple to wind plug-in coils and built on a printed circuit board using easily obtained components, would answer the requirements perfectly and set about designing the board and coils with the idea of supplying a low-cost kit of parts.

The kit was launched at the recent Leicester ARS with a retail price of £17.50. If you are a bone fide Novice Licence or ARE Instructor, John will let you have a 10% discount for three or more kits.

The kit contains all the parts needed to build the Regen Receiver, with the exception of a suitable box and the front panel. A suitable front panel should be ready by the time you read this and the price has been fixed at £2.65 plus £1.00 P&P, although the instructions with the kit suggest that you could design your own and a simple dial is provided to be cut out.

The receiver is built on a printed circuit board and this is a good quality glass fibre board with all holes drilled the correct size for the component leads - although on the review sample the three holes for the plastics locating pins on the phono socket were far too small. If you have access to a suitable size drill you could drill them out, otherwise cut off locating pins on the socket. The pads are all tinned and the component positions are silk screened on the non-track side of the board.

The plug-in coils are wound on short



lengths of Paxolin tube, three pieces are supplied in the kit and more can be purchased later if needed. A small drill bit was also provided, presumably to enable the necessary three holes to be drilled in the Paxolin tube for the start, tap and end of the winding to be passed through. The instructions were very sketchy on winding the coils - presumably the author expects anyone who buys the kit to be enrolled on a course with an experienced instructor to help them. Three small p.c.b.s are also provided together with three 4-way plug strips. However, no matching socket was provided to enable the coils to be plugged into the main p.c.b. Checking with John, he is including the socket and the instructions for making the coils have been elaborated.

This kit provides the novice with a useful and reasonably simple to build receiver kit. The instructions need a fair amount of work to get them to the standard needed for a kit intended to be built by a complete novice - even with the help of a qualified instructor. With these provisos, however, this kit can be recommended and the builder will learn a lot about the construction and operation of a simple receiver.

**Badger Boards, 87 Blackberry Lane, Four Oaks, Sutton Coldfield, B74 4JF. Tel: 0121-353 9326. E-mail: jbadger591@aol.com**

## Variable Response Console

Want to improve your receiver's audio? The Variable Response Console could be the answer for you. Most communications receivers have rather small loudspeakers driven by somewhat lacking audio amplifier stages. Alpha Delta Communications have come up with this unit which combines a useful set of audio stages to enable the user to enhance the performance of their receiving station.

The VRC-1 features a 90mm wide-range Pioneer loudspeaker in a tuned bass reflex enclosure. The speaker is driven by a low distortion push-pull amplifier capable of delivering at least 2W r.m.s. It is possible to disable this wonderful speaker arrangement by plugging in your headphones to the VRC. You will though still benefit from the other audio processing stages. Such as the bass boost/cut ( $\pm 12\text{dB}$ ), which features an l.e.d. bar chart calibrated in dB. Variable high frequency cut-off, again featuring a bar display - calibrated in kHz. Variable peak and notch filters, with both position and width controls.

The VRC is enclosed in a 3.6kg, black powder coated, cast alloy box, and although the casting is not the best I've seen, the overall looks are in keeping with most shacks.

Priced at £229.95 the VRC-1 is available from **Waters & Stanton PLC, 22 Main Road, Hockley Essex SS5 4QS. Tel: (01702) 206835, FAX: (01702) 205843.**



# SELECTION BOX

## BUYERS GUIDE

### Standard AX400mkII Pocket-size Scanner

Motor car manufacturers are not the only people to go in for badge engineering. The radio industry does it as well. In fact, most manufacturers have different brand names, or re-badged models, for sale in different parts of the world. If you know this then you can often manage to track down reviews of the same receiver in magazines and books from other parts of the world - or even in earlier issues of *SWM*!

The Standard AX400mkII is the manufacturer's own model of this familiar pocket-size scanner - work out what the alternative re-badged model is and you can then read the appropriate reviews.

Frequency coverage is 500kHz to 1.3GHz, a.m., n.b.f.m. and w.b.f.m. modes, 1kHz and 100Hz steps, 800 memories, 20 search bands, runs off two AA cells with a current drain of only 16mA in 'battery saver' mode. Price of the Standard AX400mkII is £229.95.

Further details can be obtained from the UK Standard importer, Martin Lynch & Son, 140-142 Northfield Avenue, Ealing, London W13 9SB. Tel: 0181-566 1120 Web pages: <http://www.martin-lynch.co.uk>



### Frequency Counter

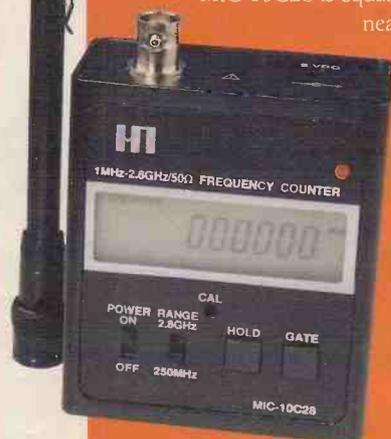
This cigarette packet sized (can I say cigarette anymore?) frequency counter, will easily slip into the pocket. The internal NiCad battery, which has a usage time of six hours per cycle can be recharged again and again. The

MIC-10C28 is equally at home in the shack or in the field as a near-field monitor or as a piece of test equipment.

The frequency coverage of the counter is cunningly hidden in the model number, i.e. 1MHz to 2.8GHz.

Supplied with a telescopic antenna with integral BNC plug, the counter features a liquid crystal display incorporating a signal level meter.

Get yours from Waters & Stanton PLC, 22 Main Road, Hockley Essex SS5 4QS Tel: (01702) 206835, FAX: (01702) 205843.



### Night Vision Scope

Why would a reader of *SWM* want to be able to see in the dark? Let's leave the answer to that one until later - after we have looked at what a night vision scope is and what it does.

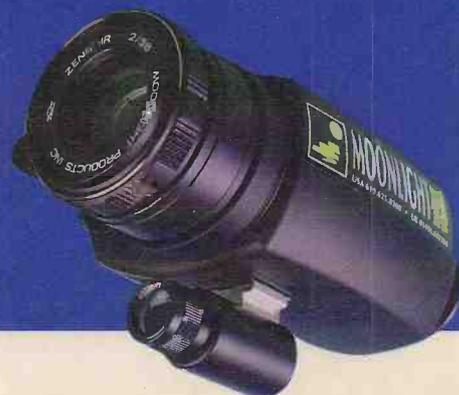
A night vision scope enables you to see in the dark - obviously ideal for people of a military persuasion and that is where the first ones found a market. For some years now surplus dealers have sold ex-army versions at rallies such as Elvaston Castle. Now, there are several consumer versions on the market and several radio dealers are stocking them.

Lowe Electronics let me have the use of one of their Moonlight NV-100 Compact scopes and I must say that I found it fascinating. I used it to look at Comet Halle-Bopp when it was around. Looking through the eyepiece of the monocular - rather like a pair of binoculars with one lens assembly missing - and pressing the on button, the world takes on a ghostly pale green colour. Instead of total darkness you can see what is going on in the field of view - ideal for those of you who study wildlife at night.

A slide-on infra red illuminator gives bright viewing in total darkness. The illuminator simply slides into a shoe, rather like a flash gun on a camera. Power for the illuminator is picked up from a contact in the centre of the shoe. Power for the scope is provided by two AA size batteries.

So, what use can it be to the average *SWM* reader? One use that springs to mind is connected with amateur radio and those who find the RSGB's National Field Day contest irresistible. These enthusiasts climb to the top of bleak windswept hills with enough radio gear to enable them to get further and contact more stations than the lot on the next hill. A night vision scope would be very handy for the person in charge of the antenna system to see exactly what is going on without needing a powerful torch.

The Moonlight NV-100 Compact night vision scope costs £299 from Lowe Electronics, Chesterfield Road, Matlock, Derbyshire DE4 5LE. Tel: (01629) 580800.



# BUYERS GUIDE

## Create CLP5130 Log Periodic Antenna

A log periodic antenna has to be the ultimate solution to the difficult search for gain, directivity and bandwidth. Although a significant investment, it is well worth the financial pain. This cannot be stressed enough though, because to extract the maximum return from your antenna investment, you'll need to add a considerable cost element by having to acquire a medium duty rotator with the ability to change antenna polarisation. The antenna installation pictured shows a Yaesu G5400B/G5600B combination.

This could be described as overkill, but think of the frustration of always listening to signals that are of the wrong polarisation, thereby throwing all that lovely (12dB) gain away.

If you are a licensed amateur the added benefit is that you can transmit on all the amateur bands that fall within the CLP5130's frequency range of 105-1300MHz.

The antenna is shipped in kit form but assembly is straightforward, merely a case of being handy with a spanner and screwdriver. The antenna comes complete with a feeder harness,

which is terminated with an in-line N-Type socket.

Whilst the assembly is rather easy, installation is somewhat more of a problem. I don't recommend climbing on your roof if you're not familiar or confident with this type of activity. You are advised to enlist the services of a professional antenna installer.

The CLP5130 is available from Waters & Stanton PLC, 22 Main Road, Hockley Essex SS5 4QS Tel: (01702) 206835, FAX: (01702) 205843, priced £169.95

## Antenna Tuning Unit

It is generally reckoned that the addition of an antenna tuning unit (a.t.u.) is the first thing that the serious listener should do to his station. Although some will build their own, many more will opt to buy a commercial version. The MyDEL ML-AT2 has been designed for use between 500kHz and 30MHz and can be used with coaxial feeders, long wire, tuned feeder and loop antennas. It can even be



used with a long wire balun as a highly efficient passive preselector.

As well as being an a.t.u. the ML-AT2 has a variable Q control which increases the selectivity to give better interference rejection and cross modulation performance.

The unit is constructed in a small steel box with the three controls - Tune, Q Control and Band - on the front and the antenna, earth and receiver connections on the back. The antenna and receiver sockets are 50Ω SO-239 sockets. A 4mm screw terminal post provides a connection for a wire antenna with a wing nut on a binding post for the corresponding earth. To make connection to a suitable scanner simple, a coaxial lead, fitted with a BNC plug at one end and a PL-259 plug at the other, is supplied.

## Passive Preselector

Similar in appearance to the ML-AT2, the MyDEL ML-2Q Passive Preselector is intended to provide the sharp tuning peak missing from the wide front-ends of modern receivers and scanners with h.f. capabilities. The preselector is a bandpass filter that can be tuned to reject unwanted signals and only pass the wanted station. Frequency coverage is from 500kHz up to 30MHz in six bands.

As well as the preselector function, the ML-2Q also has a 3dB attenuator that can be switched in or out using the slide switch on the front panel. A very useful feature, particularly if your receiver is not fitted with an attenuator.

The MyDEL ML-2Q Passive Preselector costs £49.95 while the MyDEL ML-AT2 Antenna Tuning Unit costs £59.95. Both units are supplied with a coaxial lead, fitted with a BNC plug at one end and a PL-259 plug at the other to make connection to a suitable scanner simple and can be obtained only from Martin Lynch & Son, 141 Northfields Road, London W13 9SB. Tel: 0181-566 1120.



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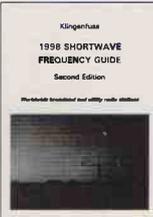
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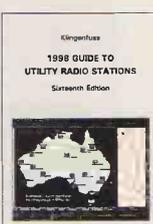


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# Radio Budapest



R.A. Connolly GI7IVX, a 1994 European winner of a competition held by Radio Budapest on the future of short wave radio, was fortunate to be invited to Hungary for a week back in 1995. Read on and find out how he got on.

**O**ne of the highlights of the trip to Hungary was the chance to visit Radio Budapest and their English Section, where I was made most welcome. Radio Budapest is located in the centre of Budapest in a large complex of buildings with a maze of corridors with offices and various studios. This complex is also home to their medium wave service, Magyar Radio and their commercial f.m. station, Radio Danubius. All three services, short wave, medium wave and f.m. have their own studio facilities and technical back-up.

## Equipment Displayed

A small selection of radio equipment is displayed in the window beside the main entrance to the newer section of the complex. Inside, a series of plaques pay tribute to those staff who lost their lives during their work on reporting the various conflicts which have affected Hungary since before the last world war.

It is in this complex that all the short wave English language programmes are researched, prepared and edited ready for broadcast by an enthusiastic and dedicated team. When I first arrived in the English Section their team was busy searching through a small mountain of English language newspapers and periodicals for items which could be the basis for a programme.

## Programmes Prepared

All programmes are prepared in advance of transmission and placed on tapes for any required editing or correction of mistakes. The last item to be included in the production is the news, which may be re-edited up until two hours before transmission.

Each language section has its own allocation of time during the day for the use of the studio facilities to produce their programmes and other tasks. On my first visit to the station the studio was being used by the English Section to transfer a previously transmitted programme from their reel to reel tape onto cassette.

The cassette was then going to be transferred onto CD-ROM by an outside company and subsequently used in schools. The studio consists of the usual sound proofed room for presenters and interviews, etc., with the technical staff and equipment on the other side of the glass.

## Transmission Slot

All programmes are either of 28 minutes or 58 minutes duration, depending on the transmission slot being 30 minutes or 60 minutes. The other two minutes are required by the transmitter site to change the direction and elevation of the antenna for the appropriate target area.

When the programme tapes, usually three, have been prepared, they are taken to another room where they are transmitted by landline to the actual

transmitter site using three tape players, which have optical devices fitted to sense the end of one tape and automatically start the next without a break. This link operation is monitored by an engineer.

Neither Radio Budapest nor its domestic service own the transmitter. These are hired from and operated by the Hungarian Telecommunications Company.

## Log Periodic

The short wave site is to the east of Budapest near Jaszbereny. The main antenna here, which is used by Radio Budapest, is a large log periodic which would make any amateur h.f. operator very envious. However, this accounts for the two minutes of the transmission block to allow for the re-alignment of the antenna for the target area.

This transmitter site is due to open a museum of radio and television equipment at the beginning of December 1995. I was privileged to be allowed to visit this museum, which was in the process of having the final exhibits installed, during my visit in mid September and I am probably their first visitor.

The museum contains radio and television transmitting exhibits, along with audio/visual display unit, studio mock-up, pictures and diagrams, and, of course, a range of vintage radio and television receivers. Included in the display was a very small 1939 radio built into a walking stick with headphones for the user, a very early 'Walkman'!

## Excellent Exhibition

This is an excellent exhibition for anyone on holiday in Hungary to visit. Unfortunately, at the moment all the exhibit descriptions are in Hungarian.

However, it may be that they will also use other languages in the future, although I had no difficulty as I had one of the Radio Budapest English Section's staff with me as an interpreter and one of the transmitter site engineers who was showing us around the museum.

Radio Budapest English Section is run by Charles Coutts, a highly active 74 year old who originally came from Scotland and despite his numerous years in Budapest never lost his Scottish humour or accent.

Charles, as head of the Section, is involved in the day to day operation of planning programme content, research and general running of the Section and presents their programme *Gatepost* for which I did an interview for during my second visit to the section.

Not only is he full of ideas on how to improve programmes, listener figures, etc., but he also has to fight the political battles of finance and convincing the powers to be of the requirement for English language broadcasts. The section seem to regard him more of a father figure than a boss and have been known to fight to retain him as Section Head. Charles is by no means the oldest in the section, the incoming mail is handled by a lady of 83!

## Reporting Staff

The reporting staff of the English Section from time to time get assignments outside Hungary to attend various conferences including women's issues and broadcasting seminars.

As a result, programmes often include important international topics apart from the domestic and cultural issues of Hungary and on many occasions Radio Budapest is able to make important contributions to these various conferences.

The Section has on file reception reports from about 10 000 listeners from around the world. All this information is kept on a manual database and only recently has it started to be transferred to a computerised one.

Radio Budapest also now has its own DX club, Radio Budapest Shortwave Club (RBSWC), the details of which were mentioned in the August 1995 issue of *SWM*. This produces its own regular news booklet, *RBSWC News*, for its members, which is edited by Lajos Horvath.

## Busy Schedule

Lajos took time out from his very busy schedule to meet me and show me around the medium wave and f.m. services. Apart from his work in the radio station and editing the *RBSWC DX News*, Lajos is also a licensed amateur.

I was surprised to learn that Radio Budapest does not receive regular copies of *Short Wave Magazine*, however, it is hoped that this will soon change as they feel it has tremendous value to them. They feel that the benefits of their Section are not just confined to the publication of broadcast schedules and the highlighting of their new short wave club, but also as an information and contact source for topics and writers on the subjects which their have a close association with. This was so much so that a large part of my interview for their *Gatepost* programme was centred around the benefits of *SWM*.

## Daily Broadcasts

Radio Budapest English service has two broadcasts daily to Europe at 1900 to 1930 and 2100 to 2130UTC and also two to North America at 0100 to

0130 and 0230 to 0300UTC. At the time of writing the frequencies were due to be changed for the winter schedules but had not finally been decided upon.

Apart from its short wave broadcasts, Radio Budapest English Section programmes can be currently heard on Eutelsat II-F3 at 2200UTC. Via World Radio Network to Europe on Astra at 2300UTC and in North America on Galaxy 5.

Programmes are also transmitted via the Internet. The station was due to arrive on-line with E-mail. Also on the offing was a new digital computer recording facilities, which should, by now, all be up and running!

## Quality Equipment

It was interesting to see the difference in quality of studio equipment throughout the three services. This ranged from the latest state-of-the-art equipment and compact disc players in the f.m. studios, through the modern up-to-date equipment of the medium wave service, to the other equipment in the short wave studios. It was also interesting to note that none of the short wave programmes were broadcast live, unlike the medium wave and f.m. services.

Programme highlights, apart from the news, include current affairs, business news, music from classical to folk and pop, arts, science, politics, culture and, of course, DX programmes. They also produce a monthly booklet called *Budapest International*, which gives their current broadcast schedules and highlights of their programmes and background information. This is available to listeners who are on their mailing list.

## My Thanks

Finally, I would like to thank the staff of Magyar Radio, Radio Danubius, and in particular the English Section of Radio Budapest for making my visit so interesting and informative. I would also like to express my thanks to the staff of the Hungarian Telecommunications Company at the short wave transmitter site for allowing me to visit their new museum prior to its official opening and wish them every success with this new venture.

For those who would like further information on Radio Budapest, English broadcasts schedules, details of their short wave club or to QSL, their address is: Radio Budapest, English Section, Brody S. u. 5-7, H1800, Budapest, Hungary.



Magyar Radio - home of Radio Budapest.

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## AR5000



AR5000 £1495 AR5000+3 £1749

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

The AR5000 strong signal handling is very good. Over the range of 500 kHz to 999 MHz this is further assisted by an automatic preselector which peaks the receiver's front end circuits for the best "on channel" sensitivity and ultimate rejection of out of band interference. Even better, you can manually over-ride the automatic preselection to peak the receiver away from the source of interference, this setting can then be stored in memory for smooth interference free scanning.

These qualities have been recognised by government departments on both sides of the Atlantic who 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.

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

- Very wide frequency coverage 10kHz - 2600MHz
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- Automatic electronic preselection of the front end
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- NCO (Numeric Controlled Oscillator) with tuning steps down to 1Hz
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- Audio and discriminator out plus tape recorder control

## ARD-2

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

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



## AR8000UK wide band hand held receiver

The **AR8000UK** provides a frequency coverage from 500 kHz to 1900 MHz without gaps in the range (actual acceptable frequency input from 100 kHz). The AR8000 combines full computer compatibility with advanced wide-band radio receiver technology. The all-mode reception provides AM, USB, LSB, CW, NFM and WFM. Step size is programmable in multiples of 50Hz for smooth tuning. The high visibility dot matrix LCD provides great detail including a signal strength bar meter, band-scope etc. **Computer control** and clone of data between two AR8000UK receivers (optional interface required).



£349

### Short Wave Column: Waiting for Baudot

Thousands of words have been written about the role of computers in our hobby. Like it or not, there has been a steady invasion of PCs into the home and into the shack. I've tried using mine to decode RTTY with great success, but:

A few years ago, this listener would move house to stay clear of PC noise, but now the situation is getting better. Not much - but it is getting better. It's a trade-off. PCs are getting quieter while AOR are making their receivers more sensitive.

By thinking ahead, you can do a lot to reduce computer noise. Always use shielded computer cables. The ribbon types are a multi-way transmitting aerial for noise. Get the aerial impedance down to 50 ohm as near to the long-wire (or whatever) as possible. Try balanced aerial systems. Use a good co-ax to deliver signals straight to the back of the set.

Make sure the RX has a **very** good RF earth and try to raise the impedance of power/speaker/comms leads with clip-on ferrites. Loads of room for experimentation here. Plastic-cased ATUs invite noise. Debate, please.

Try to arrange for the PC monitor to be as far as possible from the antenna entry point. And, if the PC is just logging a file, switch the monitor off - or set it to time-out after a few minutes in the Energy Saving set-up. Space is running out, so until next time, lets have your tips and your most listened-to RTTY/FEC/CW frequencies to [bob@aor.co.uk](mailto:bob@aor.co.uk)

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## AR7030



★★★★★ Table top receiver of the year 1996/97 - World Radio TV Handbook  
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### AR7030 - High dynamic range short wave receiver £799

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

**NEW!!! NEW!!! NEW!!!**

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



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

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

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## AR7030 'PLUS'



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

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- ✓ Enhanced RF attenuator operation for minimal intermod
- ✓ Higher spec wire aerial input transformer for minimal mixing products
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- ✓ Bourns optical encoder for the smoothest DX tuning
- ✓ Features CPU fitted, 400 memories, multi timers & alpha tag

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

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

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

## SDU5000 Spectrum Display Unit £799

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



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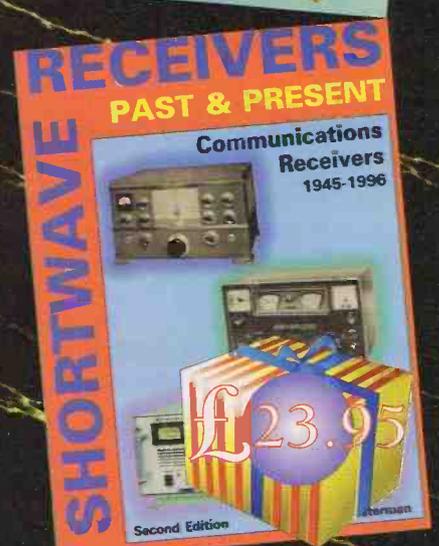
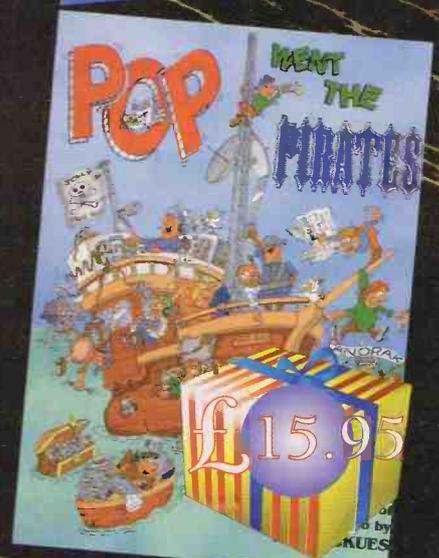
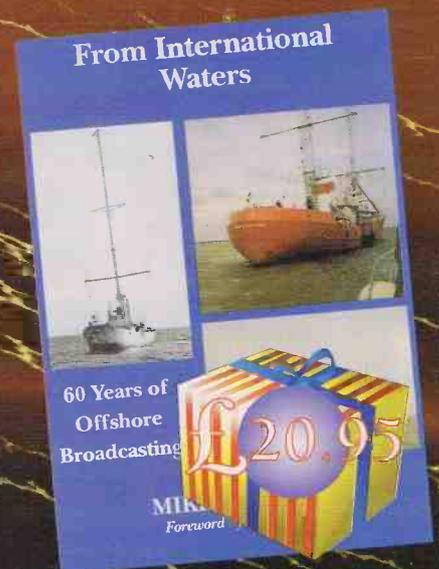
This outstanding volume is the product of 30 years painstaking research by the author, Keith Skues, who has been involved in sound broadcasting throughout the period. The informative text is fully illustrated with 230 black and white photographs, many of which have never previously been published.

Read through and find out all about the ships and forts which played such important roles in changing radio broadcasting into the format that exists today. DJs and executives of many stations, both large and small, recount their involvement in the pirate radio saga. **£15.95.**

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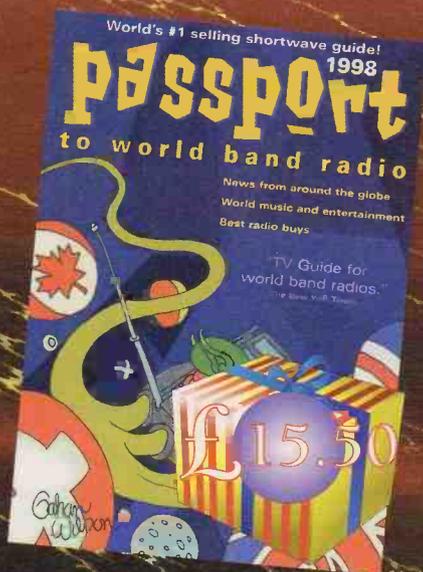
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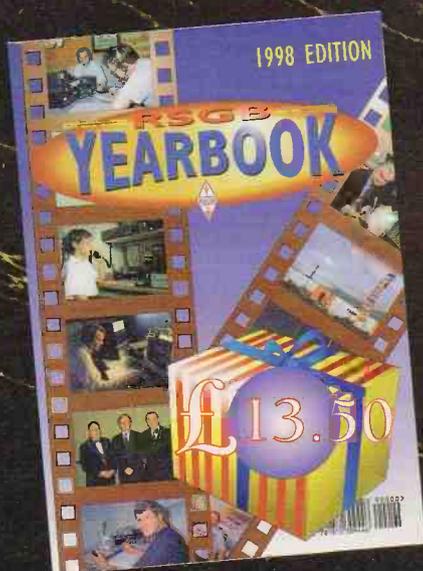
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This book is all you need to begin your personal adventure. Order now at **£15.50**.

## **RSGB Yearbook - 1998 Edition**

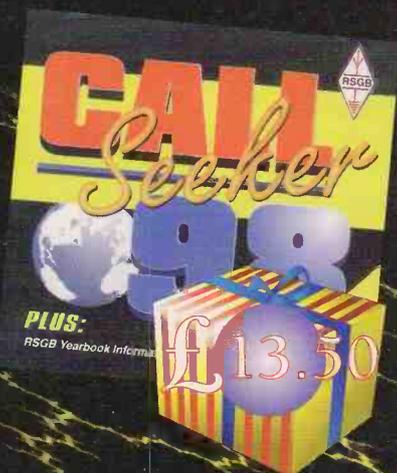
This new edition of the ever-popular RSGB Call Book and Information Directory has been further enhanced with the inclusion of even more information on amateur radio than ever before! This year, there are many new features which will be completely revised each year - hence the new name - RSGB Yearbook.

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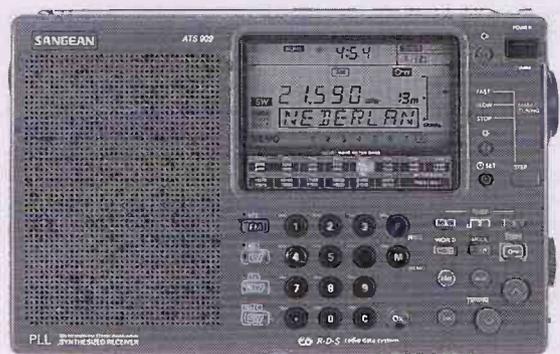
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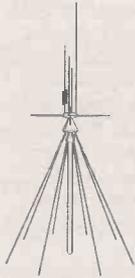
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# Amateur Bands

## Round-up

■ PAUL ESSERY GW3KFE  
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**A**t the time of starting this piece, we could be enjoying a July day rather than early-October.

In preparation for winter storms, the antennas here have had their regular check-up. Remember that **all** natural or artificial fibre ropes are affected over time by ultraviolet light.

Whilst artificial fibre ropes are stronger size for size than the natural ones, they all have different characteristics. For example, Nylon rope is *stretchy* and will increase its length by up to one third before breaking. So, Nylon is useless for guying a mast, but very useful if the end of your wire antenna is tied to a tree, when the 'stretchiness' could save you from a fallen 'skyhook'.

### Silent Keys

5WIAU, President of Western Samoa ARC, died after a fight against cancer. Phil had run the 5W1 QSL Bureau since 1971 out of his own pocket.

Another sad loss to amateur radio world-wide is that of Doug DeMaw W1FB, who passed away on September 28 at the age of 71. Doug was a world-famous technical journalist with skills in many fields.

### Forthcoming!

3A/IIYRL will be active again from Monaco into December - cards to his IIYRL home. The Libyan operation at the end of November/start of December have asked for 5A7A and have agreed to leave their equipment with 5A1A the Libyan club station. QSLs via DL3KDV.

A Phoney! 7P8BO asks for cards via W4YBO, who says he knows nothing of him.

K3LP who was AA6DC is back in UAR and around the time you see this will be A61AJ - this operation *only* to be QSLed to K3LP's home call. BY1QH is we hear now active on Top Band. If you come across the call DX1S during either Phone or c.w. leg of the CQ WW contest, it will be the Filipinas DX Society - QSLs direct to 818 Acacia Avenue, Ayala Alabang Village, 1780 Muntinlupa City, Philippines.

The chap who used to sit at the console of VS6CT indicates he will be HS/G4JMB from Bangkok into December. Jan Mayen activity is promised by JX3EX into next spring; cards via LA3EX, Terje Berg, 8099 Jan Mayen, Norway.

Finally in this section, Mathias JW5NM will be active into next summer and is operational on Top Band to boot. JW5NM cards go via LA5NM.

### Help!

From Harrogate, **Arthur Oglesby** writes to say he has been a listener since the 1930s when he built a two-valve set from *Practical Wireless*. Now Arthur has a Sony ICF-SW7600G to listen on the 14MHz band. More recently he has acquired a Yaesu FRG-100, but he says it doesn't compare with the Sony. I've written to Arthur - he enclosed an s.a.e. - suggesting that either the Yaesu receiver has a fault, or the front-end

attenuator button is depressed. However, I have no personal knowledge of either receiver, so I may be wildly adrift. If anyone, preferably in the Harrogate area, can help, please write to me and I'll pass on the word to Arthur.

### Mail

We turn next to a long letter from **Ian Macalister** of Crosshill, Maybole. Ian's letter pointed up the autumnal upturn in conditions, which this autumn seems to be being intensified by the relatively sharp upturn in solar flux after the long period since the bottom. Ian has a *huge* garden, roughly 120 by 27m, but the house is at the front of the plot, making it difficult from the antenna point of view.

At the time of writing half-wave dipoles are in use, but thoughts are turning to that old-timer - the T2FD or Tilted Terminated Folded Dipole. It'll be interesting to hear what results Ian gets. On a different subject, while writing Ian was monitoring 14.195MHz for the North Cooks expedition; on 26 September he managed to hear something in the noise, but not good enough for him to cross it off his 'Wanted' list. In August and September nothing is reported for Top Band or Eighty, but on 7MHz we find A45XJ on Masirah, UN7FK, V85HG, and XN0OX for Prince Edward Island, with QSLs to VY2OX. The business was being transacted more on 14MHz, where Ian logged AH8A, AH7A, AL0E, AL7O (the latter pair in Alaska), 5H1FS, 5H3HG, 9VIAG, 9M6PO on Spratly, HL2OPT, VR2KM, XV7TH, HR6XX (Roatan Is, IOTA NA-057), VK2TX, VK2RJ, VK3BCY, VK4JT, VK5BC, VK6ACY, VK7EK, ZL2HU, ZL3WM and 9X0A. In the afternoons, KH0I and FR5HA were good, with FW5XX, FK8GT, T32BI and the VK9WM expedition to complete this band. Going up to 18MHz TT8JWM, LU1ICI, 7K2PMJ, JE2TRG were noted into the book, while at 21MHz 9VIYC, 5H3HG again, and KK5SNO were logged.

For a long time now **Ted Trowell** on the Isle of Sheppey has been all-c.w. Sure it's a more civilised area behaviour-wise than the 'phone sections, though of course every new digital mode is dumped into this part of the band. On 3.5MHz EA9/DL2NBU, and VA3MG were booked in around 0500 UTC, while around the same time Ted went on 7MHz to knock off HJ1RR, ZL2MH, ZG2AZ, CL8VP, CP6IB, CO3AR, KP3X, 8P6DA, ZL3SF, FG/F2HE; around 1700 YC8TZR and VK8AV, and an hour later 9K2RR. 1500z was favoured for 14MHz activity, with V85SY, 7Z5OO, 9K2MU, JH4JNG, BV7WB, JA1VRY, JA7IW, BV7FD, BA1DU, 9M2EU, 4Z5AD, VU2TS, 4K8DX, SV5/SM0CMH; at 1700 ZS6QU and 9X0A, leaving 2100z for 5X1P. Moving up to 18MHz at 1100 JA9IPF was noted, at 1400 9M6NA, at 1500 5B4/G3LNS, W0NQ, 7Z5OO, 5A28 (No, it isn't a misprint!), and NC50CIA. Up again to 21MHz where at 1400z Ted picked up PY2OJ, 9VIWW, PP2DN, 9K2RR, VO1TK, and AP2AP. Finally on 24MHz, 1100 was the time for EA6/F2YT.

Now to **Colin Dean** in Barnsley, where

sideband rules OK. On 7MHz we note A41LZ, A45ZN, CN8SN, DS1BHE, DU6LN, HL3ERJ, HZ1CCA, JT1FCH, JY5HX, TK/DJ4JLM, TK/DL6NBR, UN7FZ, YC8GAV, YK1AO, ZL4BD, 4S7BRG, 9K2RA, and 9V1RH. When Colin went up to 14MHz he located AP50AF, AP50CM, A47RS, A61AD, A61AN, A71EM, HL2LPT, HS1GUW, HS1NGR, HS2CRU, HS8FZ, HS0/IK4MRH, OD5OA, TA3J, VU2NGS/50, YI1SEA, ZD7SM, Z22JE, 3V8BB, 4J8YL, 4L4CC, 4S7SW, 5H3HG, 8Q7PV, 9K2KX, 9M6HZ, and 9X0A. Unusually for Colin he had a peep at 18MHz sideband too, which disclosed A41LZ, BU0DX, JE2TRG, JY5HO, KP4DKE, TK5BF, ZB2AZ, ZS5PJW, G0XAM/MM off 3V8, 5A28, 7Z1AB, and 9K2QQ.

The recent unsigned letters turned out to have been a fit of absent-mindedness on the part of **Ted Hearn**, of Newcastle, Staffs. It happens to the best of us! Anyway, on 18MHz Ted found K6KM, OD5NJ, VE2EH, W0IKB, W2XJ, W3CF, W3GG, W6KCK, WD4REX, WY3D, 4X4FR, 5A28 and the usual smaller fry. At 21MHz CN8CK, D44AB, N2OPO, 5X1Z, TA2GC and 9HIDE were noted among the European stuff. Back to 14MHz where Ted mentions C5D1, DU4IX, D44AB, ET3MW, HS0/IK4MRH, PY2FW, TK/DJ5MX, T95A T96J, VE3DAS, XT2DR, YV5PP, ZD7BG, ZY6XC, 5B4/G3LNS, 5H3MG, 5Z4RL, 9A9R/MM, 9H1SV, 9J2DR, and 9K2GS. On 7MHz the EUs were there in strength, but on 3.5MHz Ted logged ZL1IJ, RW0QA as pearls among the swine.

Finally, our regular anonymous correspondent - this time she wants us to define what is required when hearing a station before entering it in the log. Difficult! First you have to copy the complete callsign, and be sure it's a signal from the station itself and not the guy calling him. Then you've got to allow for mis-hearing - quite often a list comes in with a station logged but given similar-sounding prefix letters; then there is the sad case of the perfectly good callsign which is logged correctly but mis-copied when writing to me. A computer print-out leaves me to delete the lesser lights, and I'm as likely to err as anyone else. Anyway, everyone's idea of what is worth logging differs from everyone else; I might not bother to log, say, an OH0 in Aland - but if you've never logged a station there, to you it is DX.

My own criteria are simple. If I think a station worth logging then I'll hang around until I have heard a complete contact and got his QSL route on my scratch-pad. If I mean to send a report, I might stick around longer to compare him with other stations from the same area, so my report is *useful* and worth a QSL. I suspect that everyone's ideas are different - any thoughts?

### Finis

That's it for this time. As usual, letters by the start of the month, addressed as always to me at PO Box 4, Newtown, Powys SY16 1ZZ.



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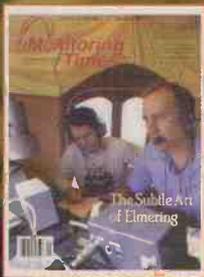
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# Satellite TV News

■ ROGER BUNNEY  
 ■ 35 GRAYLING MEAD  
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**T**he on-going saga for retrospective planning permission for my 1.2m dish was won late September. It took three months and four days yet the decision was passed at a third meeting of local planning committees in under a minute. The arrival of the enforcement officer at my door back in June resulted from an overlooking neighbour's complaint on grounds of "effects on health, lack of consideration to neighbours, number of antennas and dishes in use about the property, devaluation of property and loss of visual amenity". Certain of the 'visual amenity' seemed to be observations of aerials within my garden from his bedroom window which in my book is invasion of privacy. I queried the planning folk if such 'peeping' was a new criteria of local town and country planning law since my second dish unseen from ground level was maintained in position with bricks/breeze blocks on its stand and not on a fixed and permanent foundation - this exempted the 1.5m dish from planning regulation. The only comment of the neighbour that had relevance with planning was loss of visual amenity and since part of the dark green dish is only just visible over the 1.8m fence and is against a garage wall there were no grounds to refuse! (We're not an area of outstanding natural beauty nor a conservation area, merely a sea of brick mortgaged boxes).

Of significance to us radio and TV enthusiasts relate to my other antennas - on my house at that time were a 2-element Band 1 with rotor, a discone on an 6m mast, a wire antenna between a roof mounted 2m mast and a 3m mast on the garage, domestic antennas namely a 4-element v.h.f. and Triax u.h.f. Grid, an Astra/Sky 600mm dish - apart of course from my 1.5m dish and the 1.2m application dish. The council only nailed me because I had a second dish exceeding the 700mm 1992 DOE guidelines (soon to be 900mm). None of the other antennas above the house roof and elsewhere had any relevance or need for planning permission. It was a victory for the working class in overcoming council bureaucracy!

Despite the migration of many feeds to digital from analogue there's still lots of activity about. Exciting were the UK *Thrust* SSC land speed attempts in the Nevada desert, September 22 saw the car reach 634m.p.h. carried live via Intelsat 601 @ 27°W - subsequently the car reached higher speeds in the following days. The camera caught a glimpse of the satellite uplinking truck in a desert isolation. PAS-3R has been extremely active for Sky Sports carrying the Ryder Golf match championships with usually two transponders fired up with golfing action - and in analogue and free of subscription! On the 24th odd to note severe line pairing not unlike co-channel interference during a Tropo opening.

## Political Sighting

With the season of party political conferences upon us and indicative of the move to digital seemed the lack of party political conference feeds. I only found a couple of Intelsat K 21°W early morning GMTV inserts ex-Labour from Brighton. Moving to the Conservative offerings early October from Blackpool and only a few analogue circuits were found. And another political sighting was Eutelsat's Hot Bird 3 which after the early September launch offered 'Evaluation Tests' from 29°E - a series of promotional videos (12.383GHz V). The tests confirmed that Eutelsat's claim for their already registered slot at this spot in the sky, SES Astra have designs in using the 28°E slot for their Astra series two digital birds (Autumn '98) but with the adjacent Eutelsat slot operational at a future time would result in severe mutual interference. The situation

still has to be resolved.

From the shores of Bournemouth Bay satellite anorak **Tim McClellan** writes that he's seen the French Telecom 2B @ 5°W carrying promotional loops for the digital package 'Canal Satellite', replacing the former 'La Chaine Info' though oddly in PAL rather than an expected SECAM.

Entertainment quality French TV is enjoyed by Tim using just an 80cm dish discretely fixed in his garden into a PAL TV via a SECAM-PAL encoder.

**Dean Rogers** (Abbeywood, SE2) often watches the Telecom birds, particularly Telecom 2C @ 3°E, for sightings of sporting events. The 3°E bird carries many outside broadcast links for both the French and UK TV services and obviously without any commercial breaks. Eutelsat II F4 @ 7°E is another good sporting source though a sound in syncs decoder is necessary to stabilise picture quality. A word of warning - **John Locker** (Wirral) has monitored the EBU testing news feed carriages on this satellite in recent weeks with clear MPEG-2 though John anticipates that higher level MPEG will be utilised in due course when full digital transmission commences. This isn't good news for us satellite enthusiasts most of whom rely on analogue receivers. I intend, now that the planning trauma is over, to establish means of digital reception as time and cash allows within the next few months.

An interesting letter from **James Broughton** (Yateley, Hants) telling of his much modified horizon-horizon mount onto which he has mounted an additional motor actuator drive to adjust the dish in elevation for accurate tracking of inclined orbit satellites. The LNBs are vertically mounted one above the other which helps to counterbalance the system and to reduce weight on the motor - which also helps reduce motor noise. A slight adjustment of the inclined (elevation) actuator then allows accurate focal pointing onto the respective LNB.

## Orbital News

It's now 40 years since Sputnik-1 was launched by the Russians (October 4th 1957), within a month Sputnik-2 joined her sister in space (November 3rd) complete with a dog passenger. We've come a long way since then!

The Iridium company intend to have a fleet of over 60 small low earth orbiting satellites up and operational by Autumn '98 and to introduce a new system of mobile communications. Their mid Summer launch of five satellites on a single rocket lost one and with another 49 birds to go they're still hopeful of going on-line to announced schedule.

The St. Petersburg Channel 5 that often appears on the 41°E Gorizont has lost its independent status, having been absorbed into the Russian 'system' and will now transmit a national cultural programme from Moscow. There's no indication how the system will fund the new channel as vast



The Spanish Canale 5 card via PAS-



A scratchy CBC feed via Intelsat



Live volcanic news for Sky via PAS-3R 43°W (NTSC).



World Television News via Eutelsat 13°E digital. John Locker



A Telecom 2D 5°W programme exchange feed. John Locker



Digital test card on Eutelsat 13°E. John Locker

sums are owed by the broadcasters to the transmission centres. Another more familiar channel - the German SAT-1 - is now running at a loss with a fall-off in viewing figures, blame being put on a poor film offering.

There's a new Portuguese channel promised in the near future, financed by TV Cabo Portugal, SIC and Brazil's Globo TV. 'Portusat' will transmit both on cable and DTH with a digital channel package including three film and a local/regional news channels. And neighbouring Spanish digital network Via Digital is in discussion with the US DirecTV channel to improve channel offerings - they opened in September are intend to run over 70 channels when on-line.

Italy is wheeling out their new digital free to air TV channels Raisat-1 opening November 10 with culture/entertainment; Raisat-2 now on air with kids offerings and Raisat-3 now transmitting educational programming. State broadcaster RAI operates the new digital package. RAI also have opened 'Historia', presently transmitting a six hour block (on Raisat-1) and hopes to expand with its own self supporting channel eventually.

Bad day at Intelsat when they detected telemetry 'anomalies' from their 605 craft at 24°W. A replacement plan will soon be actioned - a new Intelsat series VIII satellite will move to 27°W to replace the presently operating 601 which in turn will move along to 34°W. At 34°W currently is 603 which will be shifted back to 24°W. The unhappy 605 bird will be "relocated to perform a new operational role".

SISLink, the UK satellite communications provider demonstrated the retainable high quality that is available with digital. Pictures from the Amsterdam IBC convention were uplinked around the world via four satellites, arriving back in Amsterdam and displayed on a monitor next to the originating picture monitor some eight hops and the World later.

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# MilAir

**A**s promised last month, this month's extended column will take an outline look at Air Defence Radar in the United Kingdom.

With the Second World War still a recent memory, Europe soon found itself poised on the edge of a yet another potential conflict. As the Russians erected the Berlin Wall and the military strength of the Eastern Block countries increased at an unprecedented rate, the perceived threat to the UK would almost certainly come by air from the North or East. Consequently, by adding to established wartime radar stations a network of Air Defence Radar Units were established around the UK coastal areas with the bulk of the sites being located along the eastern side of the country. By the late nineteen fifties this system was fully in place and was known as UKADGE, the United Kingdom Air Defence Ground Environment. Continued development of radar and radio systems developed during the war years, made this defence network one of the most advanced in the world.

The primary role of the Air Defence system was to detect unauthorised entry into UK airspace and consequently several RAF bases would have aircraft on alert, waiting to be scrambled 24 hours a day. By close co-ordination between the fighters and the radar units, Ground Controlled Interception (GCI), of the intruder would be initiated. These radar units were regularly tested by Russian aircraft, which made planned incursions into our airspace to evaluate the reaction time of the UK defences. One of my favourite aviation pictures of all time was taken during this era and was released for publication around the late seventies. This photograph depicted a pair of natural metal Lightnings, (I think from 56 Squadron), sitting off each wing tip of a Russian TU-95 Bear, whilst politely escorting it away from UK airspace. (Sigh - those were the days!)

With the demise of the Eastern Block, the removal of the Berlin Wall and the decline of the more extreme forms of communism, the last decade has seen a dramatic reduction in armed forces in both the East and West. The reduction in military power and subsequently the perceived threat, has meant that all forms of air defence in the UK have been reduced. How many aircraft remain on 24 hour alert today compared with 30 years ago is a matter for speculation, there are some who believe that the answer to that question may be none!!!

## UK Air Defence Units

Our air defence system is controlled from a network of stations known as Command and Control Centres/Reporting Posts. These units are linked together as a network and as a whole, form the Air Defence Ground Environment (ADGE). They operate a sophisticated array of radars, computers, data links and other radio and communications equipment to provide a constant synopsis of the current state of the airspace surrounding the UK. In the event of an unauthorised incursion into our airspace these stations will alert our first lines of defence. This involves not only the activation of aircraft of the RAF, (and possibly the USAF), but also the responsibility for bringing to readiness the UK air defence missile-warning systems. For air defence identification purposes, our airspace is divided into a matrix of squares, each of which are each given a unique code, similar to a map reference. These codes will then be used to identify individual areas of airspace for interception



Fig. 1: UK Air Defence Radar Sites.

purposes.

The radar units used in an UK air defence roll during the past ten years, are shown on the map, Fig. 1. They are: Ash, Benbecula, Boulmer, Buchan, Neatishead, Portreath, Saxa Vord, Staxton Wold and St. Mawgan/Portreath. Of these Boulmer, Buchan and Neatishead are currently in use as Primary Radar units called Control and Reporting Centres. The others are secondary units operating as Control and Reporting Posts, it would appear that data from these stations, can if necessary be accessed remotely from the three primary centres.

The primary mission is still air defence but with the dramatic changes that have taken place within the eastern block in the past decade, it would seem that the percentage of time allocated by operational units engaged on this task has been reduced. The UKADGE system encompasses a variety of associated airborne missions in addition to pure air defence. Low level operations and training, Air Refuelling and Air to Air co-ordination are all included within the tasks allocated to Air Defence units.

### RAF Ash

Apart from its air defence role, RAF Ash is the main research and development unit of the UKADGE system. Although it is still listed as an operational unit, it has been reported to me that it may have closed during the summer of 1997?

### RAF Benbecula

Air defence unit home of No. 71 Signals Unit. The RAF airfield here closed last year and is now operated as a civil airfield called Campbelltown. Presumably, the air defence unit is still operational?

### RAF Boulmer

UK ADR Primary Control and Reporting Centre. Opened in 1943, it became an ADR unit in the fifties. It is currently home to Nos. 75, 144 and 500 Signals Units. (Also home to 202 Squadron/A Flight, Search and Rescue Sea King HOAR.3s.

### RAF Buchan

UK ADR Primary Control and Reporting Centre. Opened in 1952 as a purpose built air defence unit. It is home to Nos. 170 and 487 Signals Units.

### RAF Neatishead

UK ADR Primary Control and Reporting Centre. Currently, home to Nos. 86 and 432 Signals Units.

### RAF Saxa Vord

Opened as a dedicated radar unit in 1957. From its remote location in the Shetland Islands, Saxa Vord has provided Britain's first line of defence from infiltrators from the Northeast. It was one of the busiest stations during the peak years of the cold war. Currently home to No 91 Signals Unit.

### RAF St. Mawgan/Portreath

Although not normally associated with the air defence

**PETER BOND**  
c/o EDITORIAL OFFICES  
BROADSTONE  
E-MAIL: milair@pwpub.demon.co.uk

roll, St. Mawgan has operated a Control and Reporting Post at Portreath since the early sixties.

### RAF Staxton Wold

Air Defence Control and Reporting Post. Currently, home of Nos. 129 and 146 Signals Units. This unit is regularly noted being remotely operated from Neatishead.

### RAF Ty-Croes

I could find little information regarding this station. Has it closed? Some of the air defence tasks carried out by this station may have passed to RAF Valley?

Even though Ash, Benbecula and Ty-Croes may possibly have closed as RAF radar stations they still seem to retain their names for certain Air Defence purposes.

## Tactical Air Designators

Communication with aircraft from the Control and Reporting centres is achieved using mainly u.h.f. frequencies, all of which, are allocated a unique channel number. These channels are called Tactical Air Designators (TADS). Until fairly recently the list of TAD frequency allocations was considered to be a high security item and it has been suggested that they were originally officially listed as NATO classified. As far as I am aware this is one level below Top Secret. During the height of the Cold War these lists were carefully guarded and were kept locked in a safe at each airfield, they then had to be signed in and out by each individual pilot. With the demise of the 'Iron Curtain', we have moved into more moderate times and there is little doubt that the classification of these lists has been reduced. Nevertheless, they are still considered to be a sensitive item and I do not intend to go into any great detail regarding the frequency/channel allocations. (Sorry). The frequencies allocated to the TADS were originally changed every one or two years, but in the modern era this practice appears to have ceased and changes are made when necessary to accommodate operational requirements.

There are currently 148 UK channels available, numbered TAD001 to TAD148. Of these, there are usually between 5 and 15 spare channels, which are not allocated with a frequency. Many of the NATO Common frequencies including the distress frequencies are believed to be allocated TADS, usually in the lower numbers. For example, NATO Common Tower frequency 257.8 was last noted as TAD002 and the NATO Common Approach frequency 362.3 was last noted as TAD005. The rest of the channels are allocated to a variety of tasks, the bulk being operated by the various Control and Reporting Centres. Some are general allocations for use by Air Defence North or South, others are dedicated to more specific tasks such as In Flight Refuelling, Air to Air or Low altitude training. There appears to be a certain amount of 'band boxing' that takes place amongst the control centres and it would seem that they can allocate frequencies to other stations from a variety of transmitter sites. Consequently, it is not uncommon to hear transmissions for more than one station on a single channel. For example, calls for Staxton may well be heard on a Neatishead frequency.

Other channels beyond 148 are available for use by air defence/GCI in other NATO countries. TADs in the range between 400 and 700 can be heard in use by aircraft and ground stations in Belgium, Holland and Germany.

Continued on page 71

# Scanning

■ JOHN GRIFFITHS  
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**T**he excellent thing about having a column in the premier radio magazine is that you can actually pick up cudgels for people and fight. Using the power of the written word to get a message straight to the heart of the matter. I also enjoy standing up - advocating, if you will - for the many out there who, for whatever reasons, cannot do that themselves. So, this month, I'm going to do some of that on behalf of the many 934MHz users out there who wrote and 'phoned in to tell me that the band is very much alive - alas, not for much longer.

Firstly, thanks to **Bill Moran G3XUM**, for the 'phone call and a wee eavesdrop on the activity in his area, up Bolton way. From what I heard there is about a hive of activity going on 934MHz, and Bill spoke very eloquently and passionately about his hobby. It wasn't just Bill who informed me that the band is far from dead - there were many others, too numerous to mention, and all saying the same thing; it's still alive.

## Government Moves

However, moves by the government to allocate the band for the dreaded mobile 'phone will see an end to the hobby completely - and with no recompense or alternative frequencies given over to those who have purchased their licenses and equipment at some cost. Bill informs me that he wrote to the RSGB but received very little by way of reply and what he got back was not encouraging. This from a Radio Society supposedly interested in maintaining freedom of the airwaves. I wonder. Maybe because it is not considered to be an amateur band - and is a Citizen's Band - would have some bearing on it but, from my point of view, that is a bit negative. Radio is radio is radio and while I'm not a fan of 27MHz CB, the actualities of losing a paid-for service seems to me to be a bit Big Brother-ish - as well as reminding me of the snobbery which exists amongst us lot as enthusiasts. What was that old saying about united we stand...? Oh, right. Divided we fall.

The encroachment of the mobile form of communications seems to be increasing, and with the loss of the 934MHz portion of the spectrum to mobile 'phones, just another nail in the coffin of freedom. That's not too strong a stand to take. You'd have thought that the taking of monies in license fees would have also earned the users some form of compensation but, alas, no. HMG stands to double gain on this one as they will not only have made money from 934MHz users in license fees and VAT on equipment but also stand to make a considerable amount from the new users. Double your money time - no losers in the

corridors of power. Is this, as I suspect it is, a bit sloppy when one considers the fact that no compensation is being offered - or is it just another way of screwing Joe Public while prostrating themselves at the altar of business?

## Mail!

Okay, the first from **'Night Owl'** - didn't you used to be a Gerry Rafferty song? - and news of interest to aviation monitors, military types. A new format aviation newsletter is about to be brought out by: **MGT Publishing, PO Box 564, Norwich NR7 8DD**. Details with an s.s.a.e. please from the above. It looks good by all accounts and I'm indebted to 'Night Owl' for the piece knowing my interest in mil air monitoring.

**Anthony Capner** of Barnstaple writes in to ask if anyone can help him with frequencies and info on West Country Ambulance. I can't as I do not keep a database here at the QTH for obvious reasons! All letters should be directed to Anthony at: **7 Hills View, Barnstaple, N. Devon EX32 8BN**.

A letter from **J. Brady** of Glasgow informs me that he built the Barlow & Hall design 'Super Scan' antenna (the Mk. I version with coverage 7 to 1.5GHz) and finds it suits his AR8000 well. He has also just built a Ramsey Kits active antenna and is reporting good results on both h.f. and v.h.f.

**DF** of Cumbria reports Scottish Control talking about something "moving around all over the place" on 12 September this year on 123.775. This frequency should be from Rhustaffish which is adjacent to Prestwick. Anyone any updates on this news?

Thanks are also due to **AP**, who was sailing the Channel one night and lost GPS, v.h.f. radio and radar when he heard a high pitched whine followed by incredible vibration aboard his boat. They returned, full status, after the vibration got intense and although he had them checked out on return, found out nothing was wrong with his equipment. He wonders if anyone can shed light on this phenomena which he says was frightening. I'm sure it was. The Channel isn't the place for breakdowns of any sort. Any monitors in that area - Southampton way - with news of electrical interference can please contact me, unusual or not. I'm also looking for theories on why electrical navigation equipment should fail *en masse* like that and then return, with no problems, shortly after...

**TT** of Tamworth tells me that some CCTV camera frequencies have been monitored on frequencies between 440.137 and 440.387MHz.

He has also noted Army - possibly 'Saturday Wargames' - on 74.650MHz. Again, he reports

overhearing some youths speaking on walkie-talkies on 49.860 and passing on details of Gatso and Radar traps in the area between each other. Perhaps this should be looked into and scanners given a break? 49MHz equipment is cheap and has a range of metres - ideal for car to car conversations with little likelihood of being monitored by the authorities.

Anyone any idea what the callsign 'Bison Ops' belongs to? Theories are that the DRA use it for jamming assessments at Pershore, Malvern or Defford. It is not air-air. Frequencies noted were around 300.95MHz, the signals appeared to be amplitude modulated. Fortune Ops were also overheard - anyone with news, write in. The correspondent also asks if anyone else heard the news about a non-USAF TAV crash off the Isle of Lewis last year. An air exclusion zone was raised to 65000 feet and a 'Reach' callsign was heard asking for routing and being refused by London Mil. Navigational position of air exclusion zone was 58.05°N 05.05°W. The date was 26th October 1996. Any info would be welcomed.

## Almost There

Not quite, but nearly, I'd like to say a huge thank you to all of those who write in on a regular basis with news, views and so forth. I'll single out three in particular - **PW**, **KA** and **Pat** - but, in fact, each of you contribute to the column. I trust all of you will continue to do so, and look forward to your contributions through the coming new year.

The last bit is left to those few upstanding members of the great unwashed who write me letters which are filled with vitriolic and murderous prose. Yes, I know who my father is and yes, I also realise that I am a fair target for your peculiar brand of opinion. Unlike you, I see the hobby as a free for all with each entitled to their opinion and as for mine...! However, don't be dissuaded from continuing to brighten my days with your eclectic and blinkered prose. Your letters are filled with a poison for which there is an antidote and I do not take your comments seriously, if at all. You do, in fact, provide me with a great deal of laughter and the firm conviction that Colonel Blimp is still alive and kicking. Some of you occupy great positions - such as **JP** - and, believe me, I love getting your hate mail! Scanner owners are not idiots or fools. Some of them would put most of you to shame on grammar, punctuation and style, let alone technical knowledge. However, don't let me put you off. Continue to write because, believe me, some of your letters make my day!

## MilAir. Continued from page 70

Beyond these allocations, TADs in the 900 series, are used by AWACS aircraft as air/ground/air control frequencies.

Having searched through many years of back issues of aviation and radio magazines, I was surprised at how little had been published regarding this subject. (Perhaps for obvious reasons). This article only touches the surface of a complex subject, but I hope some of my comments will urge some of you to put pen to

paper. Our air defence system extends much further into a comprehensive network of h.f. frequencies, data links with AWACS aircraft and extensive co-ordination with NATO armed forces. Plus of course close links with the Royal Navy who operate the Type 42 Sheffield class guided missile destroyers, whose mission includes the air defence role. I had hoped to include some more detailed information, which was promised from the MOD, but at the time of

going to press it had not arrived. Consequently, I hope to write a follow up to this article and I would welcome any information and comments regarding it's contents or accuracy and also any further current or historical information regarding UK air defence. With thanks for information to John, Ron, Gregg, Dave P, Dave W, Photavia Press and the RAF - See you next month.

# Airband

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J/5B Autocar. Christine Mlynek.

**A**lthough no-one can predict what the future holds, things that are taken for granted today suddenly disappear tomorrow. Three familiar navigation aids fall into this category.

The non-directional beacon is a simple transmitter operating roughly between the medium and long wavebands. This frequency is prone to distortion by terrain and changing propagation (e.g. sky wave interference after the absorbing D-layer vanishes at night). Working out a bearing requires direction-finding techniques to be applied by the airborne receiver. Now seen as crude, old-fashioned and prone to error.

Along came v.o.r., which I believe first really caught on in the United States in the 1950s. Despite being on v.h.f., there are still possibilities for signal distortion by terrain. The receiver knows which bearing applies because the signal varies according to direction. Hence, accuracy is in part determined by the ground station. Even this system is under threat today. Future *en-route* radio navigation, it is suggested, will rely on d.m.e. Hand-flying on instruments will become difficult, in my opinion, if this change takes place.

Many new, larger, aircraft are equipped with self-contained inertial reference systems and only receive beacons in order to confirm accurate navigation. Smaller aircraft (including those flown privately) may still fly on instruments but without any luxurious inertial systems. In this case, v.o.r. will still be needed. So, is it a case of commercial pressure dictating to the rest of us?

Instrument landings might also be undertaken by different means, the existing localiser/glide-slope system being phased out. Various options have been put forward, some, I might say, inconvenient. It appears that Microwave Landing System wasn't the success that was hoped but I'm not sure why.

Even satellite-based Global Positioning System might finally become sufficiently reliable and accurate to be accepted for navigation. I suspect, myself, that military paranoia has taken second place to commercial potential. Think of the sales (and profits for United States companies!) if military precision were to be sold in the commercial market. I'll return to this subject again next month.

## In The Air

Although my own Museum concentrates on current equipment and flying techniques, I was really pleased to see an article that **Geoff Halligey** (Bridgend) sent me. A company local to Geoff has acquired a quantity of Vampire parts and aircraft - including some from the Swiss Air Force, which was flying the type until quite recently!

Gwyn and Jacqui Jones noticed that the De Havilland Aviation company title was going spare! They bought the company name and will restore Vampires and a Sea Venom. The aircraft will then be based at Swansea Airport and fly with the Wings over Wales group.

When in Pulau Langkawi, Malaysia, **Donald Robson** spotted the elegant shape of a Fieseler FI 156 Storch (German for stork). Not sure how it got its name, but many central European towns are delighted by the stork nesting season each year. Inhabitants ensure that their houses have suitable perches for nest-building.

The aircraft of the same name doesn't need a nest but is noted for its short take-off and landing capability. Dating from pre-war, the leading edge of its wing is slotted. Some De Havilland Moth derivatives also have this feature and Handley Page were working on the technique at about the same time as Fieseler.

In more modern times, you might be familiar with the Rallye on which the slats extend and retract automatically according to airspeed. In each case, the slats alter the wing shape to increase camber and provide more lift at low speeds. At higher speed, this becomes unnecessary and indeed the slats cause unwanted drag. Hence they retract.

More on the ground than in the air, in Derbyshire in fact, is the Trent beacon (TNT, v.o.r. 115.7, d.m.e. reply 1191MHz) as found by **Brian Dawson** (Stafford). It's on the B5035 Ashbourne to Matlock road just west of Carsington Reservoir.

Brian sent in a photo of its classic appearance. Elevated on stilts is a wire grid ground-plane. On top of this, arranged in a circle,

are lots of small antenna radomes, each being an enclosure with a pointed top, supported on a short vertical pole. In the middle is a bigger vertical antenna for the d.m.e. At ground level, under the wire grid, is the equipment cabin.

## Follow-Ups

Another type of beacon is the n.d.b. and in October, **Andrew Stephenson RS174635** (London) told us that he'd acquired the airborne a.d.f. indicator that is part of the equipment needed to receive these navigation aids.

I was correct that Andrew's example was fitted to a Vickers Varsity in 1968. **Chris Dugdale** (St. Neots) confirms the aircraft's history and that this new a.d.f. equipment was fitted at that time. Its purpose was the training of navigators. The entire fit was the Marconi Sub-Miniature Radio Compass ARI 5877.

There were various indicator options, some included a rotating compass card but others just had a bearing pointer going round a fixed dial-face. Which of these have you got, Andrew? Thanks for the information, Chris, I've sent it on to Andrew.

## Information Sources

You have got Issue 7 of my *Airband Factsheet*, haven't you? No? Then send a self-addressed pre-paid envelope (to hold two A4 sheets) to the Broadstone Editorial Office (not to me!).

I do hope that **Derrick Hine** (Hampshire) takes up this offer. In 'SSB Utilities' (September,



Socata Trinidad. Christine Mlynek.

Continued on page 74



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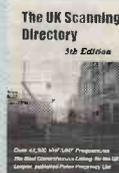
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# Airband

Continued from page 72

page 74) Derrick asks about Concorde and Graham Tanner offered the track names and h.f. channels. The Factsheet includes the only chart of Concorde tracks that I know of that's available to the enthusiast. Graham will probably have mentioned this to Derrick by now.

As for v.h.f., Concorde works the same London Airways and Heathrow frequencies as all other aircraft in the area. In summary, supersonic transport aircraft have their own routes and fly higher than sub-sonic flights. They are, however, controlled on the same frequencies as all other flights.

## Frequency & Operational News

In September, I referred to the re-instated BUZAD reporting point. I've now noticed that London (Heathrow) has a Standard Instrument Departure based on this point.

Information from the CAA. AIC 115/1997 came too late for me to tell you about Cowes Heliport, temporarily on 132.9MHz during the Whitbread Round The World Yacht Race in September. Worth filing away for future occasions.

Reports from GASIL 4 of 1997. Jersey's ATIS was mentioned in October and now I can clarify that arrival information may be received by aircraft in flight by listening to the v.o.r. 112.2MHz. Some airborne receivers have audio

filtering to discriminate the Morse ident. There will be a filter defeat button to press in order to hear the voice ATIS recording clearly. Voice occupies a wide bandwidth, Morse tones are narrow.

Jersey's departure ATIS, for reception on the aerodrome, is 129.725MHz, a direct transmission not involving a beacon.

London (Gatwick) usually has ATIS on 121.025 but was temporarily on 136.525MHz; I know not if this will become permanent.

Sheffield's new aerodrome now has d.m.e. SFH, reply on 1137MHz, and n.d.b. SMF on 333kHz which will give the propagation students a new one to chase.

Stubton Park, Lincolnshire, loses its Aerodrome Traffic Zone.

## Automatic Terminal Information Service

Known as ATIS, and mentioned in the above frequency news, it is a useful source of information. I think it essential to be able to receive it.

For example, just knowing which runway is operational will explain why aircraft are following certain routes. I always recommend against receivers that won't cover the 108-118MHz navigation band, for this reason; several ATIS broadcasts can be found by tuning-in to v.o.r. beacons in this frequency range.

The broadcast is a simple voice recording, possibly on audio tape but perhaps held digitally. Whichever, it's irrelevant to the person listening. On approach to an aerodrome, or just prior to departure, the pilot listens to that particular aerodrome's ATIS.

Each recorded update is identified by time and a letter. The first one is A for Alpha, but

when a newly updated recording is made it becomes B for Bravo. On first contact with the approach control at Broadstone Airport, the pilot will typically call, "Broadstone, Shortwave 1297 is a Boeing 757 with information Bravo."

ATIS tells you the current weather, runway in use, also any important warnings - such as the i.l.s. glideslope is unserviceable or that temporary severe weather is expected.

Weather includes wind direction (degrees magnetic from which it comes) and strength (knots), visibility (metres or kilometres) plus any significant weather such as snow showers, cloud density and height of base (feet) above ground, temperature and dew point (Celsius) and barometric pressure (hectopascals). Not to be missed!

## And Finally

Likewise, don't miss the next three deadlines (for topical information): December 8, January 5 and February 9. Replies always appear in this column and it is regretted that no direct correspondence is possible.

## Abbreviations

AIC	Aeronautical Information Circular
a.d.f.	automatic direction finder
CAA	Civil Aviation Authority
d.m.e.	distance measuring equipment
GASIL	General Aviation Safety Information Leaflet
h.f.	high frequency
i.l.s.	instrument landing system
kHz	kilohertz
MHz	megahertz
n.d.b.	non-directional beacon
v.h.f.	very high frequency
v.o.r.	very high frequency omni-directional radio range

# DX Television

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

**S**poradic-E reception continued well into September, which was quite a welcome change from recent years. By mid-September, high-pressure weather systems meant that tropospheric reception conditions were well established, the third week showing a dramatic improvement.

## Reception Reports

During the recent tropospheric lift, **Andrew Jackson** (Birkenhead) queried an encrypted programme on Channel E11 which could have been Canal Plus Belgique from the Leglisé outlet. Until recently this radiated RTBF-1 programmes. Other signals seen during tropo included Eire with TnaG programmes on E50, RTE-1 on E40 and NETWORK-2 on E43.

A rare catch has been RTL+ from the Channel E7 Dudelange transmitter in Luxembourg. This was received by **Peter Barber** (Coventry) and **Stephen Michie** (Bristol).

During the same period, a Dutch sound channel has been heard on E26 which may be the new regional TV Flevoland outlet on test. Denmark, identified by the distinctive DR-TV PM5534 test card, has been observed not only from the more usual Band III outlets but at u.h.f. on E31 from the Copenhagen mast. On the 25th, **George Garden** (Edinburgh) received Bilsdale, the last Channel 5 transmitter on test.

On the 18th, **Tom Crane** (Hawkwell, Essex) witnessed an unusual steady tropo-like signal on Channel E4 with French sound. The only plausible station that readily springs to mind is the La Dôle outlet of SSR-1, the Swiss French-language network.

**Lt. Rana Roy** (India) comments that the Sporadic-E season which has just ended has been notably better than previous years. The most recent Sporadic-E reception occurred on August 17th with Dubai on E2 at 1025 for over two hours.

## DXTV Log For September

The collective log for September has been compiled with reports from Stephen Michie, Andrew Jackson, Tom Crane and Peter Barber.

### Sporadic-E:-

- 2: Norway (NRK-1) Channel E4; Italy (RAI UNO) IA.
- 3: Sweden (SVT-1) E4; Norway E4.
- 7: Italy (RAI UNO) IB; Sweden E4; Croatia (HRT) E4; Slovenia (SLO-1) E3; Serbia (RTS-1) E3; Hungary (MTV-1) R2; Unidentified signals on Channel IC (82.25 MHz).
- 9: Sweden E4.
- 10: Norway E4 (Kongsberg); Sweden E4.
- 11: Spain (TVE-1) E2.
- 12: Italy (VIDEO-private station) E2; RAI UNO IA.
- 13: Norway E4.

### Tropospheric:-

- 8: Netherlands (NED-1) and France (Canal Plus).
- 9: Netherlands, France, Belgium (RTBF-1, BRTN TV1)
- 10: Netherlands, France, Luxembourg, Germany (ARD-1) in Band III. 15, 16 and 17th: Netherlands, France in Band III and UHF.

- 18: Netherlands, France, Belgium, Germany in Band III and UHF.
- 21: Netherlands, France, Belgium, Germany (ARD, MDR-3, ZDF) and Denmark (DR-TV and TV-2).
- 22: Netherlands, France, Belgium, Germany, Denmark and Éire
- 24: Belgium and Éire.

## FM Band Reception

Tropospheric f.m. reception was present during September with the 9th and 10th being the most rewarding days according to **Mike Gaskin** (Cornwall). On the 9th, an Italian-speaking station was heard on 106.9MHz at 1115UTC.

Very weak signals were also noted on 103.7 and 107.4MHz but nothing came up on the RDS display. The following day, the station was identified as the Radio Svizzera Italiana network (RSI) and at 0055 the RDS displayed 'CH-RETE-11'. Mike comments that Swiss f.m. stations are quite rare at his location even via Sporadic-E as they tend to get swamped by Italian stations.

Other tropo successes include RNE (Spain) on 105.00MHz, identified from an announcement.

On September 23rd, Andrew Jackson (Birkenhead) heard several German stations including 'Eins Live' on 106.4MHz, Radio SRV on 101.4, Radio SAWV on 103.3 plus several unidentified signals on 102.1, 105.6, 107.1 and 107.8MHz. On the 25th, George Garden (Edinburgh) heard ILR Lincs FM on 102.2MHz and also an unidentified German outlet on 105.5. On the 26th, a strong signal was present on 99.2MHz, playing mainly Europop music.

There was no RDS code but there was an announcement which sounded like 'Radio Adswy'. Perhaps this was a Dutch or German station?

## Arabic Signals

Middle East reception has been encountered on a regular basis in the Netherlands this summer, particularly from Channel E2 transmitters located in Syria and Iran. Two outstanding examples occurred during July.

On the 17th, Iran (E2), Syria (E2 and E3), Jordan (E3) and the Lebanon (E2 and E3) were all received between 0645 and 1130UTC. Three days later Iran (E2), Syria (E2), Saudi Arabia (Channel 3 Dhahran) and the United Arab Emirates (E3) were identified.

It is interesting to note that there are three Iranian (IRIB) networks using Channel E2. Iran and the Lebanon broadcast in SECAM colour; all the others use PAL.

## Regional TV In The Netherlands

**Gösta van der Linden** (Netherlands) has kindly sent details of new regional transmitters which DXers will be itching to receive. Many have entered service over the past few weeks, so these should provide us with a few more stations and UK viewers with a new source of co-channel interference during the next good tropo!

The details are as follows:- TV Friesland (Friesland): Irnsum E28 150kW; TV Drenthe (Drenthe): Smilde E25 250kW; TV Flevoland (Flevoland): E26 50kW (transmitter not currently

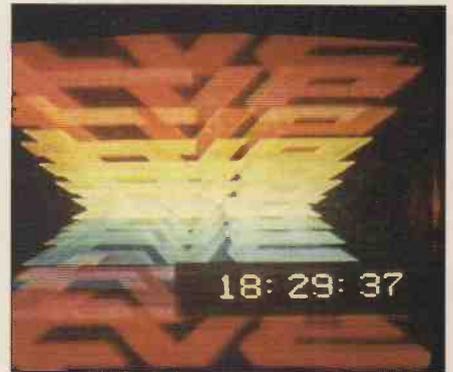


Fig. 1: Fiery opening graphics and digital clock from Spanish TV (TVE-1) in the early Eighties.



Fig. 2: Portuguese FuBK test card which occasionally displays the identification 'RTP-LISB 1'.



Fig. 3: Pakistan TV news programme snapped by Lt. Col. Rana Roy on Channel E5.

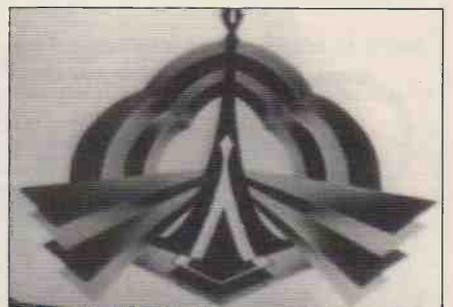


Fig. 4: Part of the Pakistan TV continuity graphics.

known); TV Oost (Overijssel): Zwollekerspel E22, Hengelo E36; TV Noord (Groningen): Hoogezeand E36 100kW; Omroep Zeeland (Zeeland): No transmitter or channel details known; TV Gelderland (Gelderland): Arnhem E58; Planned transmitters: Apeldoorn E32 100kW, Tiel E24 50kW, Ruurlo E40 50kW.

The other provinces (Noord Holland, Zuid Holland, Utrecht and Limburg) have no plans at the moment for regional TV.

### Co-channel Interference Filter

Until recently, broadcasters had to take a number of measures to combat the effects of co-channel interference at receiving sites. These included terrain shielding and antenna phasing to null interference. There is a significant advantage using some form of filter where the co-channel interference arrives from the same direction and polarisation as the wanted signal and where it is almost impossible to null-out using other methods.

Now a New Zealand company has produced a co-channel offset interference filter which deals with the problem electronically. It can be connected directly between the antenna and transposer (or receiver input) for Bands I and III reception, or at i.f. for use with a transposer on any Band I, II, III or u.h.f. channel. The i.f. filter can operate on any interfering line offset as close as 1/12 line offset. A baseband (video) version is also available.

The device is marketed by **Tennatron Industries (NZ) Ltd.**, 283 High Street, PO Box 218, Motueka, New Zealand.

### New BBC Identification Symbols

New BBC continuity graphics were introduced on October 4th at a cost of over £5 million. Naturally the licence-payer is footing the bill. The old sloping boxes surrounding the letters 'BBC' (which have proved to be more than adequate for almost 40 years!) have been straightened up and the three coloured dashes beneath have been deleted, giving the new logo a cold clinical look.

The familiar BBC 1 Globe has gone having been replaced by a selection of aerial views showing an in-flight orange and yellow 'globe' balloon. The changes are two-fold. They will make BBC 1 more appealing (or should that be appalling?) and the straightening up of the letters will cover up technical deficiencies of digital transmission when it is introduced.

The opening graphics to news programmes have also been slightly revamped. We would be interested to hear readers' comments about the new BBC Identification Symbols.

### Keep On Writing!

Please send reception reports, general information and off-screen photographs by the 1st of the month (please note the slightly earlier deadline) to:- **Garry Smith, 17 Collingham Gardens, Derby DE22 4FS, England.**



Fig. 5: Although the main test pattern is the PM5544, on rare occasions this monoscopic test card has been aired.

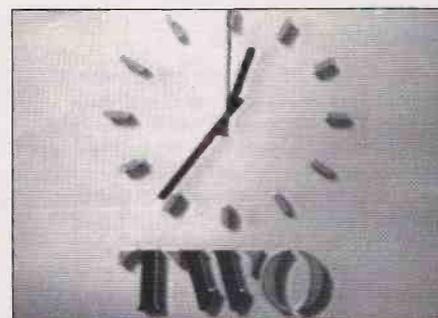
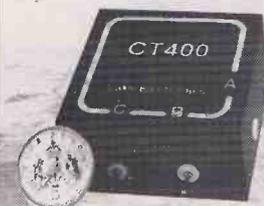


Fig. 6: This month's nostalgia spot. The digitally-generated BBC-2 Clock caption used during the late Eighties.

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DCS2	"S Meter" for signal indication on direct conversion receivers	£10.90
RA30	HF RX Rotary Attenuator 0/15/30dB for internal fitment	£3.90
SPA4	Scanner Preamp. 4 to 1300MHz wideband for discons etc.	£15.90

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CBA2	Counter Buffer (fits in DXR20 or DC2000 to feed DFD5)	£5.90
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Please add £4.00 P&P, or £1.50 P&P for electronics kits without hardware.

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73 from Dave G4KQH, Technical Manager.

# Aerial Techniques

## New Thomson Multi-standard TVs with Teletext

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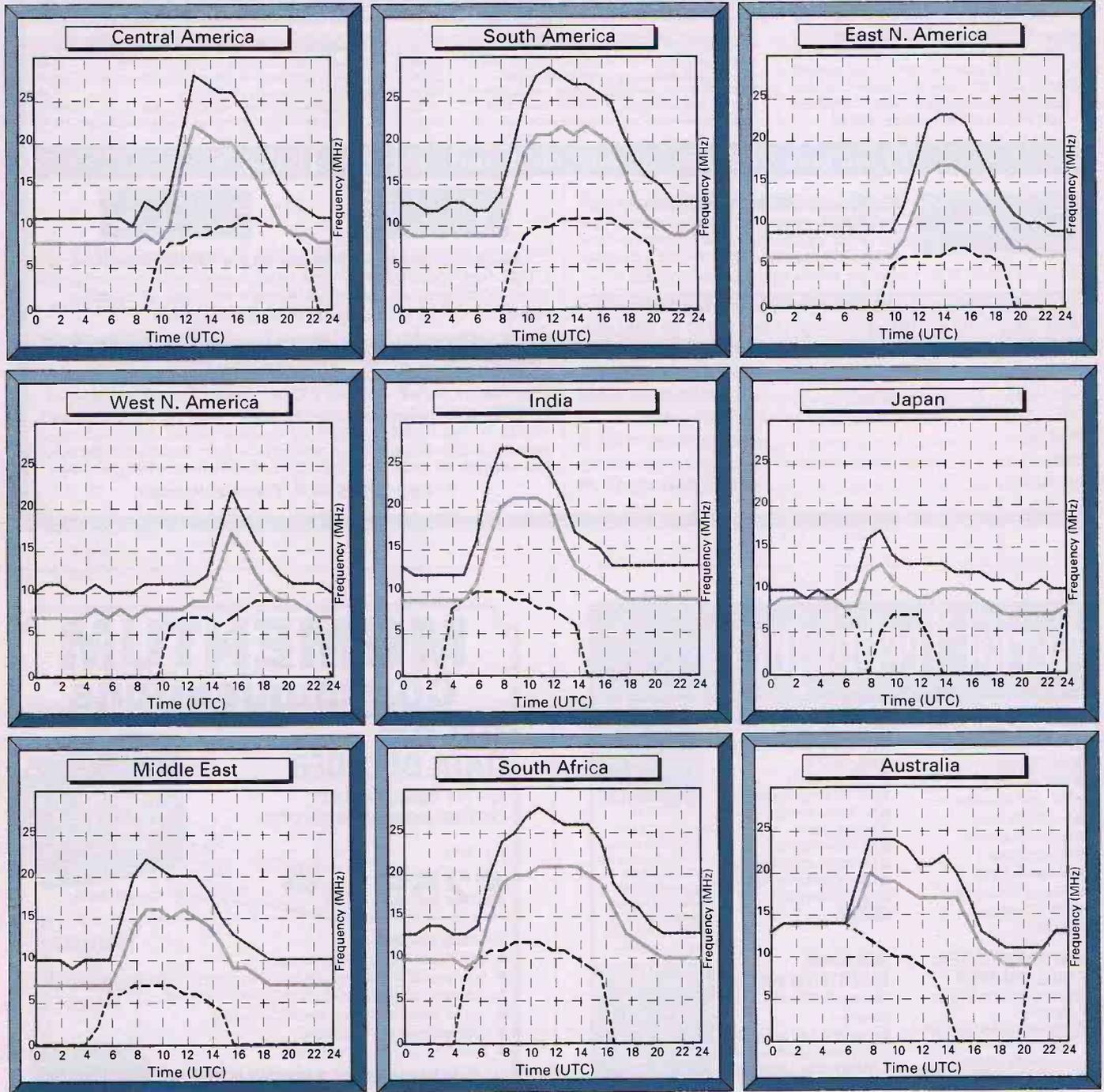
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World

# Propagation Forecasts

JACQUES D'AVIGNON  
VE3VIA

December 1997.  
Circuits to London



### How to use the Propagation Charts.

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

success below this frequency are very slim.

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

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

probability of success for the path and time.

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

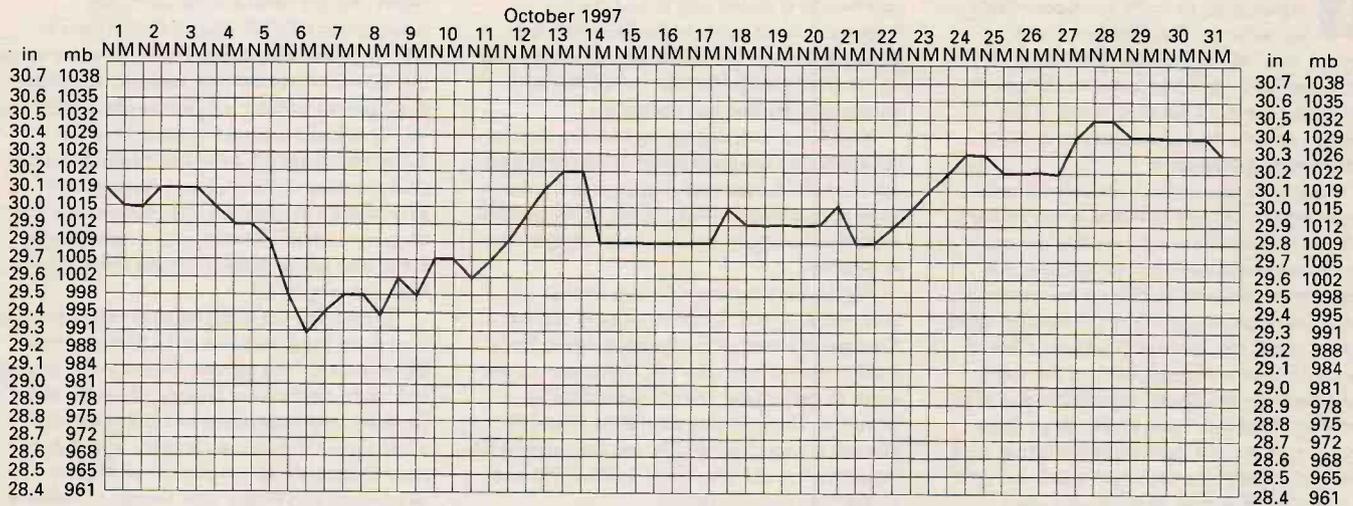
determined by the values of the intersections of the plots against frequency.

Good luck and happy listening.

# Propagation Extra

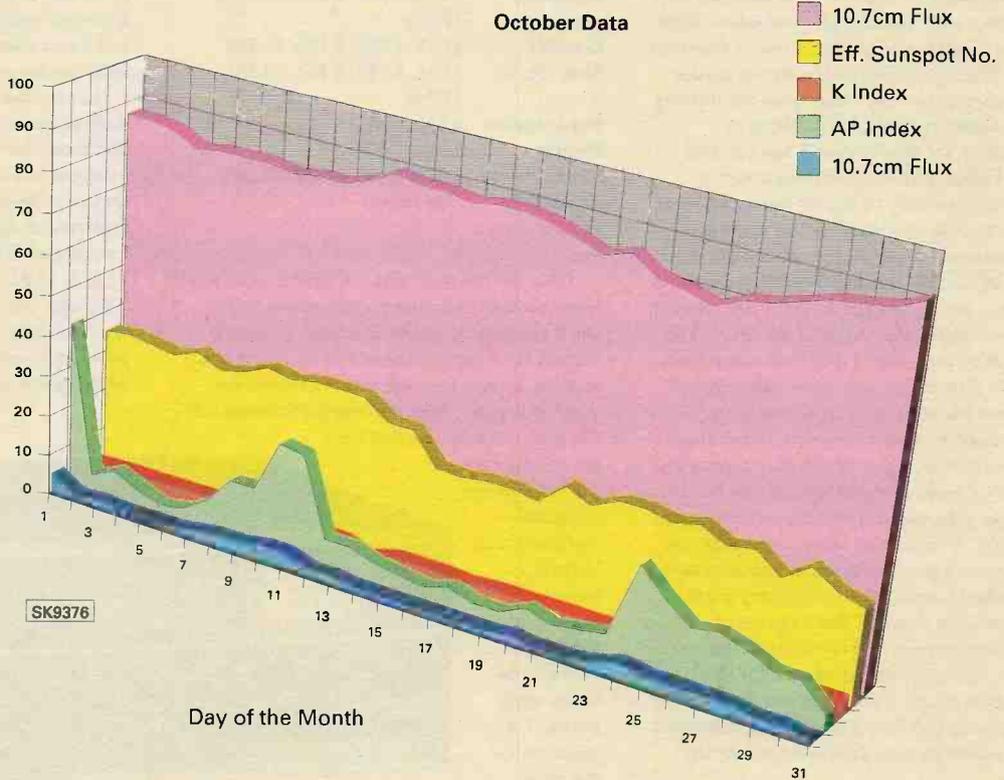
■ KEVIN NICE  
 ■ G7TZC  
 ■ SWM  
 EDITORIAL OFFICES  
 BROADSTONE

Ron Ham's barometric pressure chart, taken at Storrington, W. Sussex, October 1997.



## Guide to the Chart

The 10.7cm solar radio flux is used as an indicator of the general level of solar activity. The K and AP indices are measures of geomagnetic activity. The K index ranges from zero (very quiet) to nine (severely disturbed). K values of five or greater correspond to geomagnetic storm conditions that can relate to poor propagation conditions. The AP index ranges from 0 to 400. An AP of 30 is the threshold for geomagnetic storm conditions.



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 ■ **INTERNET:**  
**graham.tanner1@virgin.net**

**I** thought that I would take this opportunity to make some comments on the letter by **Ted Kimber** in the 'Letters Page' of the October 1997 issue of SWM. Ted asks why nobody seems to have mentioned the AOR AR3030 in any of the receiver reviews that have appeared in SWM during the past few years.

I have used one of these receivers almost since they first became available in this country. In fact, I remember seeing and using the pre-production model on the SWM stand at the Leicester Amateur Radio Show a few years ago. Ted, in his letter, lists some of the features which he likes about this receiver, but I have a few of my own favourites to add. For me, the clear green liquid crystal display is probably one of the best that I have ever seen, and its large digits make it easy to read from quite a distance. Also, I like the way that the keys have a definite 'click' to them, and that they all serve only one purpose - no confusing multi-function keys to confuse you. Ted says that his AR3030 has a forward-facing speaker; I think that this must identify his receiver as being one of the early models, as mine has got a downward-facing speaker on the underside of the case. I like the idea of having the computer interface fully installed within the receiver 'from day one', instead of having to buy one as an accessory. I would agree with Ted though - and John Wilson too - the r.f. gain control is very useful when the receiver is being overloaded by strong signals.

For some time now, I have been considering buying another receiver. I was talking to somebody about World War 2 'spy set' and suitcase radios, and we got talking about a receiver that seemed to appear from nowhere, and then literally disappear! A few years ago, there appeared on the second-hand market a number of 'anonymous grey box' type receivers, with only a small plate saying 'Mark 328'. At the time, these were referred to as the 'Mark 328 Spy Set' in all the adverts that I can remember. Certainly, their origin was never revealed, and there were no clues as to who they were manufactured by. Over the years, I have heard numerous stories about where they came from and who originally manufactured them, but I have never seen any conclusive proof for any of the stories. All that I can really remember was that they were grey in colour, and about the size of a standard house-brick - not a very good description, but that's all that I can recall.

So, now I'm searching for one of these receivers. If anyone knows of one 'for sale', please get in touch. If you have one that you no longer use, or find that it is taking-up valuable space, I would be very interested in hearing from you.

## Cuba

**Clive Bedwell** writes to say that he has recently returned from a holiday to Cuba in the Caribbean, having flown both ways with the

national Cuban carrier 'Cubana de Aviación'. He says that he is now trying to find the h.f. frequencies used by air traffic flying between Britain & Cuba in the Caribbean. Clive says that he has tried the North Atlantic HF Network frequencies, but has had no success.

Well Clive, everybody that I have spoken to has confirmed the same story - these flights **do** use the NAT frequencies, but you have to be lucky to hear them. In fact, some of my contacts were able to supply me with some sample 'logs' as evidence.

Flights from northern Europe to the destinations in the Caribbean usually use the 'Southern Routes' of the North Atlantic Track (NAT) system. From the UK, flights pass to the south of Ireland, but are still controlled by Shanwick. The area that your flight would fly through is known as NAT-A, and the relevant h.f. frequencies in use are: 3.016, 5.598, 8.906 and 13.306MHz upper sideband.

In fact, the NAT-A system comprises a number of different control centres on either side of the Atlantic. There is a collection of various frequencies used by all these stations; most are common to all the stations, but there are a few 'non-standard' ones. The stations and assigned frequencies are as follows:

<b>Canaries</b>	2.962, 6.628, 8.825, 13.306, 17.946
<b>Gander</b>	3.016, 5.598, 8.906, 13.306
<b>New York</b>	3.016, 5.598, 8.906, 13.306, 17.946
<b>Paramaribo</b>	6.533, 8.825
<b>Piarco</b>	5.598, 8.906
<b>Santa Maria</b>	3.016, 5.598, 8.906, 13.306
<b>Shanwick</b>	(see above)

all MHz u.s.b.

Clive did mention that the airline uses DC-10 aircraft leased from the French airline 'AOM' (Air Outre Mer), and he had been searching various NAT frequencies based upon the fact that the aircraft are registered in France (i.e., 'east' of the 30° West meridian). However, this distinction is only relevant for aircraft operating in the NAT tracks using the 'northern' and 'central' routes (that is, NAT-B, NAT-C and NAT-D). All flights using the NAT-A system use the same frequencies.

The airline (Cubana de Aviación) was set-up to provide flights from Europe direct to Cuba, and uses a fleet of western-built airliners, so they are equipped with western avionics, including Selcall equipment. The airline leases

two DC-10 aircraft from the French airline 'AOM'; for the record, these carry the registrations F-GTDF (Selcall FL-CM) and F-GTDG (Selcall unknown). There are times when the DC-10 aircraft are not available, so Ilyushin IL-62 aircraft (similar in layout to the British VC-10 aircraft) are used instead. They are 'borrowed' from the parent company, the main Cuban airline 'Cubana'. These Russian-built aircraft are not equipped with Selcalls, but they do carry a radio-operator as part of the flight crew, who has to spend all of the trans-Atlantic flight listening on h.f.

To help you searching for these flight on h.f., I have done some research into the scheduled flight-times for this service. Flights from Gatwick to Havana operate on Tuesday, Thursday and Saturday, with departures at 15.10, 12.00 and 13.40 (London-time) respectively. The flights from Cuba back to London are on Monday, Wednesday and Friday, with arrivals at Gatwick on the following day about two hours before the above departure times. From this, you can see that the only day when you won't hear a Cubana flight crossing the Atlantic is Sunday. For the best chance of hearing a Cubana flight on h.f. as it crosses the Atlantic, I would suggest that you start listening to the Shanwick frequencies about 30 minutes after the scheduled departure times given above. The flight will need to contact Shanwick before it enters the oceanic airspace, and this is when they will pass details of the flight routing and Selcall code. Good luck!

Just for the sake of completeness, Cubana Airlines has its own set of h.f. frequencies, so that their aircraft can keep in touch with headquarters in Havana. The callsign used by the station is 'Boyeros Cuba'. If you speak (or understand) Spanish, you could try the following frequencies: 3.007, 5.529, 5.544, 8.927, 11.226, 11.312, 13.330, 13.339, 17.934 and 21.985MHz. They also have a web site with full details of their aircraft, routes flown, and timetables - point your web-browser at <http://www.cubaweb.cu/index.html>



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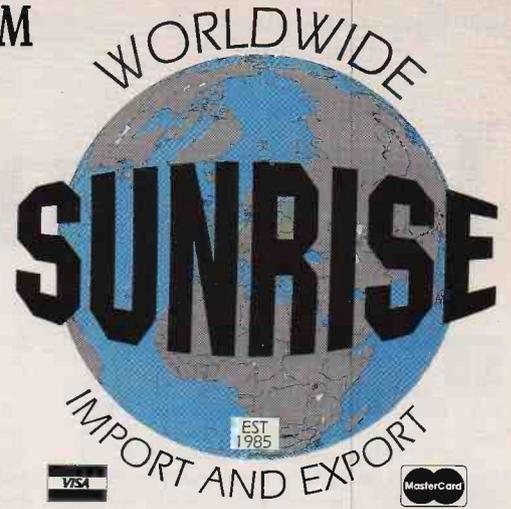
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The first high resolution image from METEOSAT-7 (EUMETSAT's new geostationary WXSAT) became available just a few days after the previous edition of 'Info' went to press in late September.

EUMETSAT announced the availability of this first image (a small JPG-format picture) on their web site, which I obtained just in time for last month's edition. **Figure 1** (a high resolution image) appeared a few days later in the new 'flashpix' format (oh no, not another format - I hear you say!). A few days earlier I had upgraded (?) my computer's operating system from Windows 95 to the new Internet Explorer 4 (platform release 2). Although this was apparently working fairly well, it would not let me download the new format image.

Consequently, I contacted EUMETSAT and explained my predicament to the Operations Team. **Sean Burns** is the Mission Operations Engineer in EUMETSAT Operations Division, and he kindly E-mailed me the image in JPEG format - for which I am very grateful.

## METEOSAT-7 Tests

During September I was one of many people experiencing some form of interference during reception of METEOSAT WEFAX. Contacting EUMETSAT operations, Sean Burns confirmed that METEOSAT-7 was transmitting METEOSAT-6 WEFAX simultaneously with METEOSAT-6, but from longitude 10°W. I set up my Yagi antenna to point to the west of METEOSAT-7, and was able to collect excellent images (from M-7) - but they still carried the METEOSAT-6 logo.

## METEOSAT Control

In order for users to receive telemetry from METEOSAT a considerable network of communications has been set up. The METEOSAT Primary Ground Station (PGS) is based at Fucino in Italy (east of Rome), in a facility owned by EUMETSAT, within a commercially operated centre serving other satellites as well. A back-up ground station is operating at Weilheim in southern Germany. The primary station handles raw image transmissions and transmits processed data to users via METEOSAT's WEFAX channels.

The system has considerable 'redundancy' built in, and no operating staff are actually required! Engineering support is available for maintenance, and normal operations are supervised by the Mission Control Centre (MCC) in Darmstadt. The two centres (PGS and MCC) are connected via two independent high speed data links, one utilising INTELSAT. Data processing is performed at the MCC, as is the 'housekeeping' monitoring of the satellite's health.

Because of the highly flexible technology, there is just one shift team of two controllers.

Routine spacecraft commands are stored in a computer at MCC and transmitted automatically, according to the schedule. Spacecraft health is displayed on colour-coded consoles and health parameters are monitored. Any parameters outside the pre-defined limits causes the sounding of an audible alarm together with the highlighting of the parameter involved. Image data is processed in real-time, line-by-line, to remove imperfections, and re-sampling is performed to rectify images to produce a standard image as from the satellite's nominal longitude.

Each image format is extracted for dissemination by the two METEOSAT channels and sent back, via the communications link, to Fucino, for uplink to the spacecraft and transmission to users. The European sectors receive priority so that retransmission is started within three minutes of the end of the image acquisition scan.

The MCC also includes an independent 'User Station Display Facility' which has its own reception equipment to monitor exactly what the users receive. Both channels are simultaneously monitored to allow immediate action to be taken if any problem occurs.

## Lannion Uplinks

Have you ever wondered about those METEOSAT 'Lannion' images from GOES? Meteo-France has a large antenna at Lannion, provided and maintained by EUMETSAT. This is used for operations with satellites other than METEOSAT. The antenna receives images directly from GOES-E (currently GOES-8) at 75°W longitude, every three hours. The images are re-formatted for transmission from METEOSAT. Images from GMS (the Japanese WXSAT) are received using conventional communications systems, and are uplinked to METEOSAT, and re-transmitted as normal images. Images from GOMS (Russian WXSAT) located at 76°E are similarly received and re-transmitted by METEOSAT. By these means, METEOSAT images provide an almost complete global monitoring system for those having basic WEFAX reception systems. EUMETSAT believes that there are over 200 PDUS systems and nearly 2000 SDUS (WEFAX) systems in operation.

## Economic Benefits of METEOSAT

A survey of European meteorological services has shown that METEOSAT provides Europe with an annual benefit of 130 million ECU (or over twice the annual expenditure on the METEOSAT Programme averaged over ten years). Tropical disturbances originating off the west coast of

Africa can be monitored during their westerly movement, and the USA hurricane forecasting agency use the information to assess the possible development of hurricanes. My thanks to EUMETSAT for providing a considerable amount of information on all operations of the METEOSAT system, from which this summary was based.

## Current WXSATs

Word from **Mike Kenny** of Satellite Engineering, Bureau of Meteorology, in Melbourne, Australia, is that the CIS satellite METEOR 3-5 will continue as the operational WXSAT. I mentioned previously that I have experienced a quality reduction in my METEOR images. **Colin Paton** and **Phillip Stemp** wrote confirming similar experiences of METEOR 3-5 images. Phillip told me of his station: the antenna is a pair of crossed-dipoles feeding his much modified Dymar 2000 p.m.r. receiver.

He has modified the frequency synthesiser to include all polar orbiting channels, and used the f.m. squelch facility on the radio (which is basically an a.m. receiver, but uses f.m. for the squelch) for demodulation. He fitted a 50kHz filter, taken from an old Pye Pocketfone PFI. Phillip suffers virtually no pager interference in spite of a pager site 1km away which gives him 6mV of signal on his 2m vertical antenna. Phillip plans to design a dedicated receiver during the winter.

## Seasonal Changes in NOAA-14 Images

The daytime images received during the autumn from NOAA-14 show the dramatically reduced solar illumination, when compared with ones obtained during summer. I kept back some NOAA images from summer night-time and daytime passes, and thought that readers who are new to the hobby might be interested to see the difference. In **Fig. 2** the summer day-time image shows the hot thermal infra-red channel on the left, and the visible-light channel on the right. The sun was near its maximum altitude at that time and this raw image shows the full range of detail. **Figure 3** was obtained 'today' and shows significantly cooler temperatures in the left channel, and lower contrast in the visible channel. No image enhancement has been done to either picture.

The visible channel (2) on the left, occupies the 0.725 to 1.0µm part of the spectrum; the 'thermal' infra-red channel (4) on the right occupies 10.5 to 11.5µm.

## Hurricane Season

This summer's hurricane season has seen a number of severe weather systems but perhaps none so devastating as hurricane *Pauline* which hit Acapulco in Mexico during early October. **Figure 4** was issued by NOAA and is a colour composite showing channels 1, 2 and 4 from NOAA-12.

Quite a bit of America's hurricane belt can be monitored by

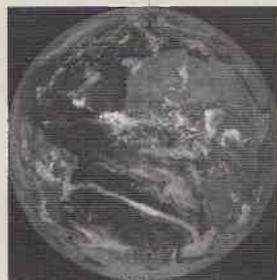


Fig. 1: METEOSAT-7 First image 24 September 1997 noon.



Fig. 2: NOAA-14 23 June 1997.



Fig. 3: NOAA-14 11 October 1997.



Fig. 4: NOAA-12 image of hurricane Pauline on 9 October, courtesy NOAA.

METEOSAT users watching the GOES-8 (E) re-transmissions (LX, LY and LZ). The DI (infra-red north Atlantic) images frequently show the remnants of hurricanes dissipating in the Atlantic.

**Internet Site Update**

The NOAA organisation operates a number of sites on the Internet for providing access to their varied programmes. Many of these are linked (albeit in a complex manner) to specialist areas of satellite and non-satellite activities. Anyone wishing to see the latest images of severe weather (such as hurricane Pauline above) can visit the site:

<http://goeshp.wwb.noaa.gov/special.html>

This is frequently updated to carry topical images, and such has been its popularity that equipment upgrades have been required to permit increased access to the site. Also available for download when I visited in mid-October were images from previous hurricanes and cyclones, and river flood images from earlier in the year.

**INSAT-2D Spacecraft Lost**

India's most advanced geostationary communications and weather satellite experienced a major power failure on Wednesday 1 October leaving the system shutdown indefinitely. Reports from the Indian Space Research Organisation (ISRO) indicate the satellite lost earth lock for the second time, preventing the system from providing telecommunication services.

The INSAT-2D spacecraft was launched four months ago onboard an Arianspace booster from the Guiana Space Centre, Kourou, French Guiana. The previous satellite - INSAT-1C - built by Ford Aerospace, was also lost a few years ago after it experienced a power failure. INSAT-2D was built by the ISRO.

The 2000kg spacecraft is controlled by the Hassan master control facility located about 150km from Bangalore, India. INSAT-2D was launched on 3 June aboard an Ariane 44L booster from the Guiana Space Centre, French Guiana, South America. (Source: Launchspace Newsline).

**WXSAT Orbital Heights**

If you check the heights of NOAA and METEOR WXSATs using a suitable satellite tracking program, you will find that NOAA-12's average orbital height is about 815km, NOAA-14 is a little higher at 850km, and METEOR 3-5 orbits at a little under 1200km - much higher than the NOAAs. Remembering that the NOAAs also include two separate spectral frequencies in each image line it follows that - all other factors being equal - METEOR WXSATs can be monitored for



Fig. 5: METEOR 3-5 image of the eastern Mediterranean from Alan



Fig. 6: METEOSAT-6 mid-day 23 September from Tim Healey.

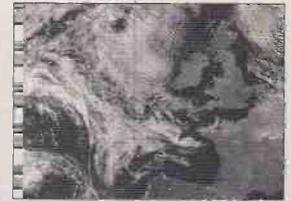


Fig. 7: NOAA-14 UK at 1409UTC on 9 September from Ray Butcher.

longer (because they are higher above your QTH) yet still provide rather better image resolution.

An illustration of the effect of this difference in orbital height is seen in Fig. 5, sent by Alan Jarvis of Cardiff. His METEOR 3-5 image shows an extreme easterly pass in which the WXSAT rose only 2.7° above his horizon! Alan identified Baghdad on the image, the river Euphrates, and the nearby lakes. The picture is the more remarkable considering that Alan's antenna is a turnstile mounted in his loft, and his altitude is only about 12m.

**Correspondence**

Stephen Legg of Fareham had a particular interest in monitoring MIR activities, especially while astronaut Michael Foale was onboard. Apparently Michael has links with Portsmouth and was involved in the raising of the Tudor ship Mary Rose. Stephen sent me a transcript of a conversation monitored on 145.985MHz (amateur radio) in which Michael talked about their busy schedule and the "fantastic view of the stars".

Tim Healey is a fellow Plymothian who now operates a METEOSAT WEFAX and polar orbiter receiving station at home. He sent in Fig. 6 which is a WEFAX image of the earth scanned at mid-day on 23 September in visible-light. Tim is evidently aware of my local media activities (I provide a free astro-information service, in the sense that the television, radio and paper do not pay for the large number of chats I provide!) and Tim asked me what tablets I take to give me the energy for it all!

**Frequencies**

- NOAA-14 transmits a.p.t. on 137.62MHz
- NOAA-12 transmits a.p.t. on 137.50MHz
- NOAAs transmit beacon data on 137.77 or 136.77MHz
- METEOR 3-5 uses 137.85MHz
- OKEAN-4 and SICH-1 use 137.40MHz
- METEOSAT-5 (geostationary) uses 1691 and 1694.5MHz for WEFAX
- GOES-8 (western horizon where receivable) uses 1691MHz for WEFAX
- MIR voice communications use 143.625MHz.

Ray Butcher of Cardiff sent in Fig. 7 which was his first WXSAT image obtained using the sound-card decoding program on his computer. The image shows Britain basking in sunshine during one of the warm, sunny days we enjoyed during September.

**Another Non-WXSAT Frequency**

Argentina's MICROSAT-1 (MuSAT-1) is operational and telemetry from it can be heard on 137.95MHz n.b.f.m. Listen for short bursts of Morse every 90 seconds. The signal is strong and easy to receive.

**In The Pipeline**

Several WXSAT hobbyists who prefer to construct as much of their equipment as possible have built antennas. Although the most popular type for WXSATs is the crossed-dipole, I have seen comments on the Internet forums concerning the QFH - quadrifilar helix antenna.

Robert Cobey GOH80 sent me details of a re-designed model built by Bill G2HCG and himself. Robert has been using this antenna with very good results. He has mounted it in the loft of his chalet bungalow and regularly receives pictures of 13-14 minutes duration, all usable, without the use of a preamp. I hope to include further information about this design in a forthcoming column.

**Launches**

NOAA-K (15) is currently scheduled for a February 1998 launch into a morning (0730) orbit. The a.p.t. frequency will probably be 137.50MHz.

**Shuttle Launch Schedule**

STS-87 Columbia is scheduled for a 19 November flight into a 28.45° inclination orbit.

STS-89 Endeavour is scheduled for a 15 January launch into the MIR orbit for a docking mission to deliver a double-module.

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

**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. This data originates from NASA.
- 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 Kepler 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 return envelope.

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## New Internet Details

I've just changed my Internet Service Provider from Pipex to BT so you need to note the new address for E-mail and for my Web site. The prime reason for the change is simply price - let's hope I don't regret it! The initial period indicates that the typical transfer speeds I'm experiencing are roughly the same as I had when I was with Pipex. Although I've changed over to BT the Pipex account doesn't actually close until February '98. However, I have already moved the Web site to the new address so you ought to update any bookmarks you keep.

## Weather On The Net

One of the common interests shared by a great many 'Decode' listeners is a fascination with the weather and the wealth of information that can be decoded from the air waves. However, several readers have also asked if this data is available over the Internet and if so where's the best place to look. This month I'll take you through some of the sites that I and some 'Decode' readers have found to be particularly useful. Just as many people are amazed at the information available on h.f., there's a staggering amount available on the Internet.

If it's satellite images that catch your interest then you will find everything from historical examples of notable weather events through to the latest European Meteosat images just an hour or two old. For the more technically minded there are a huge number of weather charts available covering all parts of the globe and everything from icebergs to upper-air data! If you really don't want to bother with your own analysis, you can even get weather charts just like those you see presented on the TV along with basic plain text reports and forecasts.

For a really direct view of life you can even access what are known as 'weather-cams'. These are literally closed circuit TV cameras that you can access via the Internet. All you actually get is an image file but most sites up-date these very

regularly so you really can see for yourself what the weather is like at the destination site. Whilst these 'weather-cams' can be found all over the place they seem to be particularly common in North America. Whilst I will list the full site URLs as I go, a particularly good way to keep up-to-date with the latest sites as they come on-line is to use one of the popular Web search engines. If it's UK based information you're after I've found that the Yellow Pages site is particularly good, all you need to do is go to <http://www.yell.co.uk> By searching with the UK preference selected you will be presented with all the Web sites with a UK relevance that include some form of weather information. The search seems to be quite fast and certainly turned-up a lot of interesting sites when I tried it out.

If you want to look further afield just don't click the UK box. One particularly interesting site is called 'WeatherNet' and can be found at <http://cirrus.sprl.umich.edu/wxnet>. This very powerful site boasts a great search engine where you can enter just a town, country or even Zip code and it will go away and search the Internet for an up-to-date weather forecast. This really powerful feature can sometimes be a bit slow, but it's generally well worth the wait. The information is presented as a simple table showing such things as temperature, humidity, cloud cover, etc. However, you can then click on the link for that particular report and get even more detail depending on the originating site. The list will also often show several reports for the same town/city and you can compare the forecasts to get perhaps a more realistic view of what's likely to happen. Another really excellent feature on this site is the extensive links to weather related software for download.

I didn't have time to try them all out but there looked to be some really interesting stuff for anyone with a keen interest in weather. If it's weather satellite images you want, it's well worth taking a look at the main Met Office Web site at <http://www.met.gov.uk> The forecasts available from this site are pretty limited and mainly restricted to textual reports. However, you can get a handy update on the current

weather conditions around the UK. But getting back to satellite pictures, the Met Office do offer the very latest infrared and visual Meteosat pictures. Generally these are taken at 0000, 0600, 1200, 1800 for IR images and 1200 for the visual image. You will normally find the images are actually updated about half an hour after the image times. The satellite pictures are presented as remarkably good quality JPEG images. Whilst you'll find Meteosat images elsewhere on the Internet, most are much poorer quality than the ones you'll find here. Another interesting place to visit for European information is the European Centre for Medium Range Weather Forecasts or ECMWF. This site is to be found at <http://www.ecmwf.int> and is particularly good as a source of 3 to 5 day weather charts - ideal if you're using the weather information to predict changes in radio propagation. If you want to overdose on UK based weather information then the Very Useful UK Weather Page (yes, that really is the right name) is a pretty good place to start. This can be found at

<http://www.maalla.demon.co.uk/UK-weather> Another surprisingly interesting site is the Jersey Met Office. They have a very colourful site that has some well chosen links to take you directly to some of the more interesting weather data sources. If you really want to impress your friends choose the cloud cover chart from this site (<http://user.super.net.uk/~jnet>). This will take you to France Met and a really excellent computer simulation of the forecast cloud cover. This is really impressive - as you can see from fig. 3. If you want to go global, Bill Clark has written with a few examples that he's found. To check out your SYNOP conversion programs you could visit

<http://ws321.uncc.edu/data/surface/syn> Here you'll find full sets of five figure weather data from all around the world in the same format as if you'd received it with a RTTY program. What's more, it updated every three hours! Another really good place is the ftp site at <ftp://www.nws.noaa.gov/fax/> - this contains a huge archive of FAX charts including the important ASXX, FSXX and FUXX charts

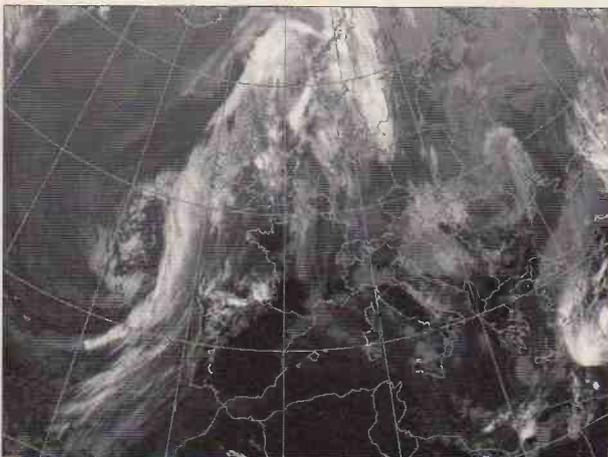


Fig. 1.

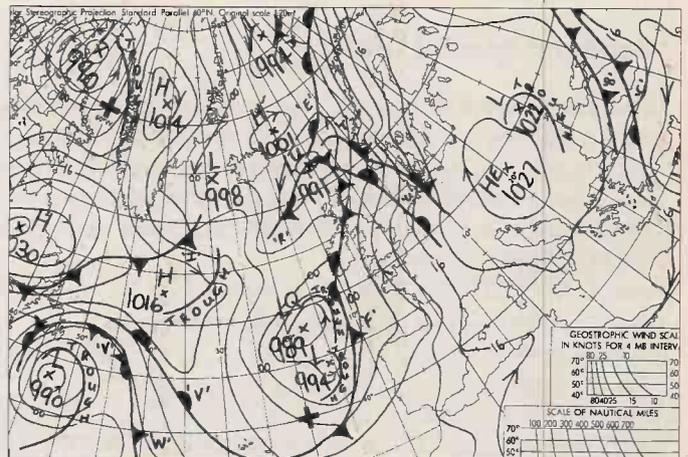


Fig. : ASXX EGRR MSLP Analysis from from MET ITOPS Bracknell, 17 October 1997 1533UTC.

Anyway that's about enough for now but please write and let me know if you are aware of any really good places for weather data.

### Proven Software

Several readers have written to me and to PDSL asking about the programs that are offered as part of my Readers' Offer. Looking back over the columns I can see I haven't really covered this for some time - so here goes!

Disk A is the one that probably sits best with Decode readers as it contains vital decoding software. *JVFAX* has become something of an industry standard for combined FAX and SSTV reception, though it's perhaps most often used for FAX. To run the program you just need a standard PC with at least a 386 processor and a VGA card. You will also need an h.f. receiver capable of resolving s.s.b. signals. To make the connection to your receiver you will also need a simple interface lead. This is known as a *JVFAX* or *HAMCOMM* lead and comprises a voltage comparator and associated components that are used to convert the audio signal from the receiver into a squared-up signal that the computer software can process.

If you're interested in home construction you will find full details with the *JVFAX* documentation. However, if you'd really rather buy a ready built unit, take a look through the adverts in *SWM* or go straight for the units from Pervisell. The good thing about these leads is that *JVFAX/HAMCOMM* has become the standard and the majority of the other programs are set-up to use the same lead. This not only keeps the cost down, but it also makes it easy to try alternative programs.

*HAMCOMM* is the major shareware program for the reception and transmission of RTTY and AMTOR modes. Again, it's an industry standard and will operate on very basic PCs. The final program on Disk A is *WXFAX3.2*. This is a very handy database of weather FAX stations and makes an ideal companion for *JVFAX*.

The second disk, Disk B, is really designed for more advanced listeners that want to experiment or maybe are well into home construction. The DSP starter programs comprise a suit of programs written by Johan Forrer. The files in the PSA directory are intended to operate with a PSA soundcard such as the once popular Orchid Soundwave 32. The programs directly interface with the card and use the on-board DSP to process and decode RTTY and Pactor signals.

The programs are fully functional but lack the

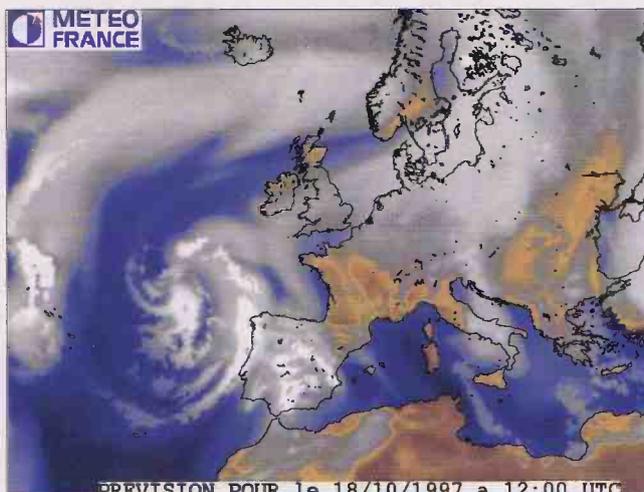


Fig. 3: From Meteo France. 18 October 1997 1200UTC.

operational frills that you might expect from a modern computing program. Moving on to the DSK directory, this contains similar software to the PSA suite but it is designed to drive a Texas DSP Starter Kit. This is a basic DSP chip with supporting hardware that features audio inputs/outputs and a data connection to the serial port of a PC. This is obviously designed for the serious experimenter, but can nevertheless be very rewarding. The final program on this disk is the Texas Device selector. Again this is for the constructor and provides a simple way to choose the right linear product from the Texas range. The program is not fully up-to-date but it still provides some useful information.

Disk C contains the excellent *NuMorse* tutor system. This is important simply because Morse code is the only data mode that you can decode without any sophisticated electronics! Whilst learning Morse may seem a little old hat in this age of information technology where every other person seems to have their own cellular 'phone!

Learning Morse can be very useful even if you don't intend to use it as a main mode of communication. If you listen around the utility stations you will find that many of them still send their callsign in Morse code from time to time. If you have learnt the basic Morse code you will find this information vital in the quest to identify stations. *NuMorse* approaches the education process in a very well structured way and includes all manner of techniques to make sure you learn all the characters at the same rate.

Another important point about the program is that it concentrates on teaching you the rhythm of the code. Once you've cracked this you will be surprised at how high a speed you can read in short bursts.

The *UltraPak* program supplied on Disk D, is really only any good if you operate using a Packet radio TNC. The program has been designed to work as an interface between the complex Packet commands and the operator to ensure the operator gets the best from the system.

Finally on Disk 5, we have the *Mscan* programs. These are later generation

FAX and SSTV programs that are packed with a host of features, but really excel when used for SSTV. An important point to note about all the programs is that they are supplied as Shareware with no payment having been made to the author. In all cases the registration fee is very reasonable, so if you are intending to use the program regularly please make sure you send the required donation to the author. When doing this please pay careful attention to the payment method requested by the author. If you don't stick with this you may find that most of the registration fee disappears in bank charges!

### Latest FAQ

From the Worldwide Utility News club comes the very latest version of their excellent *Digital Signals FAQ* compiled by Stan Scalsky and Mike Chance. The latest version (V5) can be downloaded from the WUN site (<http://www.gem.net/~berri/wun>) When I looked it was sitting in the Utility Files Archive but it may have been included in the main utility files by the time you read this. As far as I know the only way to get this is to download it from the Internet. If you know different please let me know. Incidentally the WUN is very well worth keeping an eye on as they handle lots of really useful information for the keen utility listener.

SWM

### 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 - *JVFAX 7.1*, *HAMCOMM 3.1* and *WXFAX 3.2*

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*

Don't forget to keep an eye on my Web page for all the latest hot software.

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**Y**et another year is drawing to a close - how time flies! Since the early days of "wireless" listeners have searched the bands for broadcasts from stations in distant places and it is still a very popular aspect of this hobby.

Numerous stations now occupy the bands and it is often difficult to find and identify them. The aim of this series is to act as a guide. It is based upon reports from listeners and to them I send my sincere thanks at this time. I wish them and all readers a Happy Christmas and good listening in the New Year.

## Long Wave Reports

Note: l.w. & m.w. frequencies in kHz; s.w. in MHz; Time in UTC (=GMT).

Unless otherwise stated, all logs were compiled during September.

Last month I mentioned that some listeners had received, at night, test transmissions on **189kHz**, which may have come from the new long wave station in Iceland. After hearing them at 0205UTC on July 30 **Alan Roberts** (Quebec, Canada) sent a detailed report to Rikisutvarpid (National Broadcasting Service) in Reykjavik and he has since received confirmation that they were testing at that time. They informed him that their new transmitter, which was manufactured by Harris in the USA, is capable of 300kW. It is coupled to a 412m high ex US Navy Loran mast. The station is located at Gufuskalar, on the tip of a peninsular in W.Iceland. They also mentioned that their station at Elder in E.Iceland will soon be operational on **207kHz** with 100kW to a 240m high tower. Up in Shetland, **John Slater** (Scalloway) received the **189kHz** transmission during daylight on September 15 - it rated SINPO 34343 at 0940UTC.

## Medium Wave Reports

Some of the broadcasts from m.w. stations in E.Canada and E.USA reached our shores at night during September. On the 14th **Robert Connolly** (Kilkeel, N.Ireland) logged CFRA Ottawa, ON on **580** as 22222 at 0255 and CHAM Hamilton, ON on **820** as 22222 at 0305. He also found the conditions favourable on the 22nd - CJYQ in St. John's, NF on **930** peaked 32332 at 0145; CBY Corner Brook, NF on **990** was 33333 at 0155 and VOXM St.John's, NF on **590** was 22222 at 0210.

The broadcasts from CJYQ on **930** were heard every night from the 17th, though not always positively identified, by **Brian Keyte** in Gt.Bookham. At 0258 on the 19th they rated 23232. On the 20th he logged WNRB Boston, MA on 1510 as 33323 at 0030. On the 25th VOXM was 31321 at 2335; WQEW in New York, NY on 1560 was 23232 at 2354; WTOP Washington, DC on 1500 was 23232 at 0013. On the 29th, John Slater logged CJYQ as SIO121 at 0345.

The sky waves from the All India Radio (AIR) IMW outlet at Nagpur on **1566** were received at **1954** on September 3 by **Tony Stickells** in Thornton Heath. Quite a few stations in the Middle East and N.Africa were heard after dark by UK listeners - see chart.

While searching the band for the broadcasts

from distant local radio stations **Ross Lockley** (Galashiels) noticed that ILR Signal Gold on 1170 had become Signal 2 but after midnight it sometimes carried Signal 1. He found the Classic Gold **954** & **1530** ident now used on the Hereford and Worcester outlets confusing (see report last month) because there is also a Classic Gold outlet on **1530** in Yorkshire.

## Short Wave Reports

The **25MHz (11m)** band remained unused for broadcasting during September.

A number of broadcasters were active in the **21MHz (13m)** band during September but the propagation conditions varied from day-to-day. When favourable, DW via Julich? **21.680** (Eng to S.E.Asia 0900-0950), rated 55444 at 0900 in Scalloway; UAER, Dubai **21.605** (Eng to Eur 1030-1055) SIO444 at 1030 by **Phil Townsend** in E.London; RFI via Issoudun **21.620** (Fr to E.Africa 0800-1600) 24332 at 1125 by **Rhoderick Illman** in Oxted; UAER, Dubai **21.605** (Eng to Europe 1330-1355) 54454 at 1345 by **Robert Hughes** in Liverpool; DW via Julich? **21.560** (Ger to Africa? 1400-1700?) 22222 at 1430 by Ernest Wiles in NE.Bedford; BBC via Cyprus **21.470** (Eng to E.Africa 1400-1700) 45344 at 1442 by **Eddie McKeown** in Newry; RAI Rome **21.535** (Tr [R.Uno] to Lat Amer 1345-1700, Sun only) 15531 at 1450 by **David Edwardson** in Wallsend & SIO343 at 1645 in Quebec, Canada; RFI via Issoudun? **21.580** (Fr to S.Africa 0900-1600) 23332 at 1545 in Kilkeel; WYFR via Okeechobee, USA **21.745** (Eng to Eur, Africa 1600-1750) 24111 at 1625 by **Thomas Williams** in Truro; WYFR via Okeechobee **21.525** (Eng to Eur, Africa 1600?-2200?) 25333 at 2114 by **Darren Beasley** in Bridgwater.

The conditions in the **17MHz (16m)** band also varied daily. The occupants during the morning included R.Japan via Ascension Is **17.815** (Eng, Jap to C/S.Africa 0700-0900, 0930-1000), rated 25432 at 0758 by **Tim Allison** in Middlesbrough; Voice of Russia **17.610** (Eng [WS]) SIO545 at 0810 by **Darren Coward** in Haverthwaite; R.Slovakia Int **17.570** (Eng to Australia 0830-0857) 55545 at 0845 in NE.Bedford; AIR via Bangalore **17.387** (Eng to Pacific areas 1000-1100) 35233 at 1010 in Newry; R.Austria Int via Moosbrunn **17.870** (Ger, Eng to Australia 0800-1100) 22222 at 1045 by **Chris Shorten** in Norwich; R.Pakistan, Islamabad **17.835** (Ur, Eng to Eur 0800-1120) 55444 at 1045 in Scalloway.

During the afternoon R.Cairo via Abis **17.595** (Eng to S.Asia 1215-1330) was 35333 at 1300 in Bridgwater; BBC via Ascension Is **17.830** (Eng to W/C.Africa 0730-2100) SIO333 at 1300 in E.London; Voice of Russia **17.610** (Eng [WS]) 44444 at 1330 by **Clare Pinder** in Appleby; Israel R, Jerusalem **17.545** (Heb [Home Sce rly] to W.Eur, N.America 0700-1730?) 54454 at 1355 in Liverpool; RAI via **17.780** (It [R.Uno] to America 1345-1700 Sun) 24553 at 1450 in Wallsend; Africa No.1, Gabon **17.630** (Fr to W.Africa 0700-1600) 33333 at 1535 by **Martin Dale** in Stockport; BBC via Antigua, W.Indies **17.840** (Eng to N/C.America 1400-1700) 33333 at 1550 in Kilkeel; R.Prague, Czech Rep **17.485** (Eng to M.East, E.Africa 1600-1627) 33323 at

## LONG WAVE CHART

Freq (kHz)	Station	Country	Power (kW)	Listener
153	Bechar	Algeria	1000	I*, J*
153	Donebach DLF	Germany	500	A*, B*, D, E, F, J, K*, L
153	Bod	Romania	1200	B*, I*
162	Allouis	France	2000	A, B, D, E, F, H, J, K*, L
171	Nador Medi-1	Morocco	2000	A*, E*, J*, K*
171	B'shakovo etc	Russia	1200	A*, B*, D, E*, F*, I*, L
171	Lvov	Ukraine	500	B*, I*
177	Oranienburg	Germany	750	A, C*, D, E, F, J*, L
180	Polati	Turkey	1200	H*, K*
183	SaarLouis	Germany	2000	A*, B, D, E, F, H, J, K*, L
189	Gufuskalar	W.Iceland	150	G, I*
189	Caltanissetta	Italy	10	I*, J*
198	Quargh	Algeria	1000	J*
198	Droitwich BBC	UK	500	A, B, D, H, I*, J, K*, L
207	Munich DLF	Germany	500	A*, B, D, E, F, J, K*, L
207	Azilah	Morocco	800	I*, J*, K*
216	Roumoules RMC	S.France	1400	A, B, D, E, F, H, J, K*, L
225	Raszyn Resz	Poland	?	A*, B*, D, H, I*, J*
234	Beidweiler	Luxembourg	2000	A*, B*, D, E, F, H, J, K*, L
243	Kalundborg	Denmark	300	B, C*, D, E, F, H, I*, J*, K*, L
252	Tipaza	Algeria	1500	B*, D*, E*, F*, I*, J*, K*
252	Atlantic 252	S.Ireland	500	A*, B*, D, E, F, H, J, L
261	Burg(R.Ropa)	Germany	200	A*, B*, D, E, I*
261	Taidom Moscow	Russia	2500	I*
270	Topolna	Czech Rep	1500	A*, B*, C*, D, E*, F*, I*, J, K*
279	Sasnovy	Belarus	500	A*, B*, D*, E*, I*, J*

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

### Listeners:-

- (A) Martin Dale, Stockport.
- (B) Sheila Hughes, Morden.
- (C) Eddie McKeown, Newry.
- (D) George Millmore, Wootton, IoW.
- (E) Fred Pallant, Storrington.
- (F) Vic Prier, Colyton.
- (G) John Slater, Scalloway.
- (H) Tom Smyth, Co.Fermanagh.
- (I) Tony Stickells, Thornton Heath.
- (J) Tony Stickells, while in Suvres, France.
- (K) Norman Thompson, Oadby.
- (L) Phil Townsend, E.London.

1615 by **Tony Hall** in Freshwater Bay; REE via Noblejas? **17.755** (Sp to Africa, S.America 0900-1900) 33232 at 1730 by **Vic Prier** in Colyton; VOA via Morocco **17.895** (Eng to Africa 1600-1900) 32233 at 1750 by **Bernard Curtis** in Stalbridge.

Later, R.Nederlands via Bonaire, Ned Antilles **17.605** (Eng to S/E/W.Africa 1830-2025) was 33333 at 1835 in Truro; RCI via Sackville **17.870** (Fr, Eng to Europe, Africa 1900-2100) 44333 at 1905 in Oxted; RCI via Sackville **17.820** (Fr, Eng to Europe, Africa 1900-2200) 44344 at 2000 by **Gerald Guest** in Dudley; WYFR via Okeechobee, USA **17.555** (Eng to Eur 1600-2145) 43333 at 2045 by **Sheila Hughes** in Morden; VOFC Taiwan via WYFR **17.750** (Eng to Eur 2200-2300) 54544 at 2215 by **Stan Evans** in Herstonconceux.

More reliable conditions were present in the **15MHz (19m)** band and good reception from some areas was noted. Before noon, R.Japan via Moyabi, Gabon **15.230** (Eng 0700-0800) was rated 23432 at 0715 in Oxted; R.Austria Int via Moosbrunn **15.410** (Eng to Europe, M.East 0730-0800) 25532 at 0740 in Galashiels; Monitor R.Int via KHBI N.Mariana Is **15.665** (Eng to E.Eur? 0800-0900) 33323 at 0800 in Stalbridge; Voice of Armenia, Yerevan **15.270** (Fr, Eng to Eur 0800-0900 Sun) 53433 at 0835 in Herstonconceux; R.Prague via Litomysl **15.640** (Eng to Africa 0900-0930) 25332 at 0900 in Bridgwater; BBC via Masirah Is, Oman **15.310** (Eng to S.Asia 0300-0915, 1000-1400) SIO111 at 1005 in Haverthwaite; AIR via Aligarh? **15.050** (Eng to NE.Asia 1000-1100) 43343 at 1010 in Norwich; R.Pakistan, Islamabad **15.520** (Eng to Eur 1100-

1120) 5555 at 1110 in Scalloway.

During the afternoon Voice of Turkey, Ankara **15.290** (Eng to Eur, N.America 1230-1330) was 44333 at 1235 in Morden; Voice of Vietnam, Hanoi **15.010** (Fr, Eng to Asia 1300-1400) 33233 at 1320 by **Peter Pollard** in Rugby; R.Tashkent, Uzbekistan **15.295** (Eng to Asia 1330-1400) SIO322 at 1330 in E.London; UAER, Dubai **15.395** (Eng to Eur 1330-1355) 34433 at 1330 in Middlesbrough; RCI via Sackville **15.305** (Fr to USA, Caribbean 1300-1600 Sun) 44444 at 1430 in Liverpool; R.Nederlands via Tashkent **15.585** (Eng to S.Asia 1330-1525) 44444 at 1435 in Truro; Israel R, Jerusalem **15.650** (Eng to Eur 1500-1530) 43333 at 1500 in Appleby; WWCR Nashville, USA **15.685** (Eng to N.America, Eur 1100-2200) 33333 at 1555 in Kilkeel; VOA via Botswana? **15.445** (Eng to Africa 1600-1800) 23233 at 1600 in Dudley; BBC via Skelton, UK **15.485** (Eng to Eur, Africa 0700-2130) 34333 at 1600 in Freshwater Bay; VOA via Morocco **15.410** (Eng to Africa 1600-2200) SIO222 at 1700 by **Tom Smyth** in Co.Fermanagh; WEWN via Vandiver, USA **15.745** (Eng to Eur?, Africa? 1100?-1900?) 44434 at 1700 in Colyton.

Later, WYFR via Okeechobee **15.695** (Eng to Eur, Africa 1600-1900) was 44444 at 1745 in NE.Bedford; R.Algiers Int, via Bouchaoui **15.160** (Eng to Eur, M.East, Africa 1800-1900) 44344 at 1830 by **Fred Pallant** in Storrington; RNB Brazil **15.265** (Port, Eng, Ger to Eur 1630-2020) SIO444 at 1900 by **David Hall** in Morpeth; RAE Buenos Aires, Argentina **15.345** (Eng, Fr, Ger, It, Sp to Eur, N.Africa 1900-2300) 23232 at 1934 by **Vera Brindley** in Woodhall Spa; R.Nederlands via Bonaire **15.315** (Eng to S/E/W.Africa 1830-2025) 44444 at 1943 by **Tom Winzor** in Plymouth; RCI via Sackville **15.150** (Eng to Eur, Africa 2000-2130) 44444 at 2020 in Stockport; RCI via Sackville **15.325** (Eng to Eur, Africa 2000-2129) 33333 at 2050 by **Tom MacDowell** in C.Bedford; VOFC Taiwan via WYFR **15.600** (Eng to Eur 2200-2300) 45243 at 2200 in Newry; R.Australia via Shepparton **15.510** (Eng to Pacific areas 2200-0900) 25542 at 2320 in Wallsend.

The conditions in the **13MHz (22m)** band have also been fairly reliable. In the early morning R.Australia via Shepparton **13.605** (Eng to Pacific 0000-0800) was rated 34533 at 0610 in Wallsend; R.Austria Int via Moosbrunn **13.730** (Ger, Eng, Fr, Sp to Eur 0400-1800) SIO333 at 0732 by **Francis Hearne** in N.Bristol; R.Korea via Kimjae **13.670** (Eng to Eur 0800-0900) 24322 at 0800 in NE.Bedford; R.Finland via Pori **13.645** (Eng to Eur, Australia 0800-0827) SIO545 at 0813 in Haverthwaite; SRI via Sottens? **13.685** (It, Eng, Fr, Ger, Port to Australasia 0830-1100) 55454 at 0916 in Newry.

During the afternoon R.Bulgaria via Plovdiv **13.790** (Eng to E.Asia 1200-1300) was 44433 at 1215 in Herstmonceux; AWR (KSDA) Guam **13.720** (Eng to SE.Asia 1230-1300) 34333 at 1230 in Scalloway; R.Kuwait via Kabd **13.620** (Ar to Eur, N.America 0930-1605) 54454 at 1255 in Liverpool; R.Prague, Czech Rep **13.580** (Eng to Europe, E.Africa, N.America 1300-1327) 23323 at 1300 in Dudley; SRI via Sottens? **13.635** (Eng, Fr, It, Ger to SE.Asia 1300-1445) 44444 at 1305 in Truro; UAER, Dubai **13.675** (Eng to Eur 1330-1355) SIO422 at 1330 in E.London; R.Pakistan, Islamabad **13.590** (Ar? to M.East 1600-1630) 34433 at 1615 in Kilkeel; UAER, Dubai **13.675** (Eng to Eur 1600-1640) 44433 at 1630 in Middlesbrough; VOA via Selebi-Phikwe, Botswana **13.710** (Eng to Africa 1600-2130?) 43433 at 1628 in Freshwater Bay.

Later, WHRI South Bend, USA **13.760** (Eng to E.U.S.A, Eur 1500-2057) was 44444 at 1810 in Colyton; R.Vlaanderen Int, Belgium **13.645** (Eng, Fr to Africa? 1800-1900?) 35343 at 1815 in

**LOCAL RADIO CHART**

Freq (kHz)	Station	ILR (kW)	e.m.r.p	Listener
558	Spectrum, London	I	0.80	C.G.I
585	R.Solway	B	2.00	B.G.H
603	Cheltenham R.	I	0.10	B.C.E.G.* I
603	InvictaSG Litt'lme	I	0.10	I.K
630	R.Bedfordshire(3CR)	B	0.20	B.C.E.G.I.K
630	R.Cornwall	B	2.00	B.G.I
657	R.Chwyd	B	2.00	B.G.I.K
657	R.Cornwall	B	0.50	B.G.I
666	Gemini AM, Exeter	I	0.34	B.E.G.I
666	R.York	B	0.80	B.C.G.H.K
729	BBC Essex	B	0.20	F.G.I.K
738	Hereford/Worcester	B	0.037	B.C.E.F.G.I.K
756	R.Cumbria	B	1.00	B.G.H
756	R.Maldwyn, Powys	I	0.63	C.G.I
775	BBC Essex	B	0.50	B.C.F.G.I
774	R.Kent	B	0.70	F.I.K
774	R.Leeds	B	0.50	B.C.D.G
774	Cl.Gold 774, Glos	I	0.14	B.E.I
792	Cl.Gold 792, Bedford	I	0.27	G.I.K
792	R.Foyle	B	1.00	B.G
801	R.Devon & Dorset	B	2.00	B.E.I
828	Cl.Gold 828, Luton	I	0.20	E.G.K
828	Magic 828, Leeds	I	0.12	C.D
828	Asian Netwk Sedgley	B	0.20	C.G
828	2CR CG, Bournemouth	I	0.27	E.I
828	Townland R, Ulster	I	0.80	B.G.J
837	R.Cumbria/Furness	B	1.50	B.D.G
837	Asian Netwk Leics	B	0.45	C.D.F.G.I.K
855	R.Devon & Dorset	B	1.00	I.L
855	R.Lancashire	B	1.50	B.C.D.G
855	R.Norfolk, Postwick	B	1.50	G.K
855	Sunshine 855, Ludlow	I	0.15	E.G
873	R.Norfolk, W.Lynn	B	0.30	C.G.I.K
936	Brunel CG, W.Wilts	I	0.18	E.I
936	Yks Dales R, Howes	I	1.00	B.G.H
945	Derby (Gem AM)	I	0.20	B.C.D.G.H
945	S.Coast R, Bexhill	I	0.75	F.G.I.K
954	Gemini AM, Torquay	I	0.32	G.I
954	Cl.Gold 954, H'ford	I	0.16	E.G
963	Asian Sd/Manchester	I	0.80	B.C.G
963	963 Liberty (Vival)	I	1.00	G.H.I
990	R.Aberdeen	B	1.00	G.H
990	R.Devon & Dorset	B	1.00	B.E.I
990	Big Easy Magic AM	I	0.25	C.G
990	WABC, Wolverhampton	I	0.09	C.G
999	Gem AM, Nottingham	I	0.25	C
999	Red Rose 9-99 P'stn	I	0.80	B.C.D.G.H*
999	R.Solent	B	1.00	I.K
999	Valleys R, Aberdare	I	0.300	G
1017	WABC, Shrewsbury	I	0.70	B.C.E.G.K
1026	R.Cambridgeshire	B	0.50	C.F.G.H.K
1026	Downtown, Belfast	I	1.70	B.G.J
1026	R.Jersey	B	1.00	E.I
1035	RTL Country 1035	I	1.00	C*.G.I
1035	R.Sheffield	B	1.00	C
1035	N.Sound, Aberdeen	I	0.78	B.G.H
1035	W.Sound, Ayr	I	0.32	G
1107	Moray Fth, Inverness	I	1.50	G
1116	R.Derby	B	1.20	B.C.D.G.K
1116	R.Guernsey	B	0.50	I
1116	Valleys R, Ebbw Vale	I	0.50	E.G.H
1152	Amber, Norwich	I	0.83	G.H
1152	Clyde 2, Glasgow	I	3.06	G.H.J
1152	LBC 1152	I	23.50	I
1152	Pic'ly 1152 Manch'r	I	1.50	B.C.D.*
1152	PlymSnd AM, Plymouth	I	0.32	L
1152	Xtra-AM, Birmingham	I	3.00	F
1161	R.Bedfordshire(3CR)	B	0.10	K
1161	Brunel CG, Swindon	I	0.16	B.E
1161	Big Easy Magic 1161	I	0.35	G.H*
1161	Southern Counties R	B	1.00	FI
1161	Tav AM, Dundee	I	1.40	G.H
1170	Amber SGR, Ipswich	I	0.28	G.H*
1170	GNR, Stockton	I	0.32	B.G.H
1170	SGR, Portsmouth	I	0.50	I

Freq (kHz)	Station	ILR (kW)	e.m.r.p	Listener
1170	Signal 2, Stoke-on-T	I	0.20	C.D.G.H*
1170	Swansea Snd, Swansea	I	0.58	B.E.G.H*
1170	1170AM, High Wycombe	I	0.25	F.K
1242	InvictaSG, Maidstone	I	0.32	K
1242	loW Radio, Wootton	I	0.50	I
1251	Amber SGR, Bury StEd	I	0.76	D*.G.H.J.K
1260	Marcher G, Wrexham	I	0.64	C.G.H.J
1260	SabrasSnd, Leicester	I	0.29	G.H*
1260	R.York	B	0.50	B.G
1278	Cl.Gold 1278 W.York	I	0.43	H*
1296	Radio XL, Birmingham	I	5.00	B.C.G.H.I
1305	Big Easy Magic AM	I	0.15	B.C.G
1305	Premier via ?	I	0.50	G.H.J
1305	Touch AM, Newport	I	0.20	E.G
1323	S.Coast R, Southwick	I	0.50	G.I.K
1323	SomersetSnd, Bristol	B	0.63	B.E.G
1332	Premier, Battersea	I	1.00	B.G.I
1332	Cl.Gold 1332, Pt'bo	I	0.60	G.H
1332	Wiltshire Sound	B	0.30	G.I
1359	Cl.Gold 1359, C'try	I	0.27	G
1359	R.Solent	B	0.85	I
1359	Touch AM, Cardiff	I	0.20	A* E.G
1368	R.Lincolnshire	B	2.00	G
1368	Southern Counties R	B	0.50	F.G.H.I.J.K
1368	Wiltshire Sound	B	0.10	I
1377	Asian Sd, Manchester	I	?	C.G.H*
1413	Premier via ?	I	0.50	G.H.I
1413	Yks Dales R, Skipton	I	0.10	A* B.G.H
1431	Breeze AM, Southend	I	0.35	A*.C*.F.G.H.K
1431	Cl.Gold, Reading	I	0.14	C*.F.G.H*.J
1449	R.Peterbro/Camps	B	0.15	B.G
1458	R.Cumbria	B	0.50	B.G
1458	R.Devon & Dorset	B	2.00	B.I
1458	1458 Lite AM Manch'	I	5.00	C.D.G.H
1458	R.Newcastle	B	2.00	G
1458	Sunrise, London	I	50.00	C.G.H*.I
1476	Coast Snd, Guildford	I	0.50	A*.F.G.H.I.K
1485	Cl.Gold, Newbury	I	1.00	F.H*
1485	R.Humberside (Hull)	B	1.00	G
1485	R.Merseyside	B	1.20	B.C.D.G.H.I
1485	Southern Counties R	B	1.00	G.I.K
1503	R.Stoke-on-Trent	B	1.00	B.C.F*.G.H.I*
1521	R.1521 Craigavon, NI	I	0.50	B.G.J
1521	Fame 1521, Reigate	I	0.64	C.F.G.H.I.K
1530	R.Essex	B	0.15	I.K
1530	Cl.Gold W.Yorks	I	0.74	B.C.G.H
1530	Cl.Gold Worcester	I	0.52	B.G.H.I
1548	R.Bristol	B	5.00	I
1548	Capital G, London	I	97.50	I
1548	Magic 1548, Liverpool	I	4.40	B.C.D.G.J
1548	Forth AM, Edinburgh	I	2.20	G.H
1557	R.Lancashire	B	0.25	B.C.D.F*.G.H
1557	Mellow, Clacton	I	0.8	K
1557	Cl.Gold 1557, N.hant	I	0.76	G.H
1557	S.Coast R, So'ton	I	0.50	G.H*.I
1584	R.Nottingham	B	1.00	F*.G.H
1584	R.Shropshire	B	0.50	B.C
1584	Tav, Perth	I	0.21	G.H
1602	R.Kent	B	0.25	D*.F.G.H.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) Robert Connolly, Kilkeel.
- (C) Martin Dale, Stockport.
- (D) Ted Harris, Manchester.
- (E) Francis Hearne, N.Bristol.
- (F) Sheila Hughes, Morden.
- (G) Brian Keyte, while in Strathyre.
- (H) Ross Lockley, Galashiels.
- (I) George Millmore, Wootton, loW.
- (J) Tom Smyth, Co.Fermanagh.
- (K) Phil Townsend, E.London.
- (L) Tom Winzor, Plymouth.

Bridgwater; Voice of Turkey **13.695** (Eng to Eur, USA 1830-1925) 33233 at 1830 in Appleby; RCI via Sackville **13.650** (Fr, Eng to Eur, Africa 1900-2200) 43433 at 1905 in Oxted; Monitor R.Int via WSHB Cypress Creek, USA **13.770** (Eng to Eur 1900-1958) 54444 at 1920 in Plymouth; R.Damascus, Syria **13.610** (Eng to Eur 2005-2105; to N.America 2105-2205) 33323 at 2025 in Stalbridge; WEWN Birmingham, USA **13.615** (Eng to N.America, Eur 1900-2300) 23222 at 2040 in Galashiels; R.Havana Cuba **13.715** (Eng to Eur 2030-2130) SIO444 at 2054 in Morpeth; R.Havana Cuba **13.725** (Eng [USB] to Eur 2030-2130) 22212 at 2120 in Rugby; R.Ukraine Int, Kiev **13.590** (Eng to Eur 2100-2158) SIO323 at 2130 in Co.Fermanagh; RCI via Sackville **13.670** (Eng, Fr to USA, Caribbean 2200-0300) 33333 at 2210 in Morden; WWCR Nashville, USA **13.845** (Eng to E.U.S.A 1200-0100) 33323 at 2228 in Stockport.

In the **11MHz (25m)** band R.Australia's broadcasts via Shepparton were heard on **11.880** (Eng to Pacific 0600-0830), rated 34523

at 0610 in Wallsend; **11.660** (Eng to Asia 1330-1700) 43444 at 1400 in Rugby; **11.695** (Eng to Asia 2130-2300) 23222 at 2210 in Truro. Also noted in the reports were VOA via ? **12.080** (Eng to Africa 0500-0700) 44444 at 0600 in NE.Bedford; Slovak R.Int, via Velke Kostolany **11.990** (Eng, Slov to Australia 0830-0927) SIO444 at 0842 in N.Bristol; Vatican R, Italy **11.625** (Eng to Asia, Pacific 1345-1403) SIO333 at 1345 in E.London; R.Pakistan, Islamabad **11.565** (Eng to M.East 1600-1630) 53343 at 1602 in Norwich; RFI via Gabon? **12.015** (Eng to Africa 1600-1700) 33333 at 1620 in Kilkeel; BBC via Ascension Is **11.750** (Eng to S.America 2000-0200) SIO433 at 2240 in Haverthwaite; RFI via ? **11.995** (Fr to America 2200-0158) 44444 at 0152 in C.Bedford.

Broadcasts to Europe were received from the Voice of Greece, Athens **11.645** (Gr, Eng 0600-0800), rated 44444 at 0707 in Oxted; R.Ukraine Int, Kiev **12.050** (Eng 1200-1300) 32222 at 1200 in Appleby; ISBS Reykjavik **11.402** (Ic [u.s.b.+ p.c]

MEDIUM WAVE CHART

Freq (kHz)	Station	Country	Power (kW)	Listener	Freq (kHz)	Station	Country	Power (kW)	Listener
520	Hof/Wurzburg (BR)	Germany	0.2	F*J* K*	1188	Reichenbach (MDR)	Germany	5	B* C* J*
526	Vatican R	Italy	5	J* K*	1188	Szolnok	Hungary	135	G*
531	Ain Beida	Algeria	600/300	G* J* K*	1188	San Remo	Italy	6	J*
531	Torshavn	Faeroe Is.	100	E	1197	Munich (VOA)	Germany	300	B* F* J* K*
531	Burg	Germany	20	B* F* G	1197	Vitoria (EI)	Spain	5	J*
531	RNE5 via ?	Spain	?	F* G* J* K*	1197	Virgin via ?	UK	?	B* C* G* J* K* L
531	Beromunster	Switzerland	500	B* C* D* F* G* J* K* L	1206	Bordeaux	France	100	J* K
540	Wayve	Belgium	150/50	B* C* D* F* G* J* K* L	1206	Wroclaw	Poland	200	F* J* K*
540	Solt	Hungary	2000	J* K*	1215	Kaliningrad	Russia	500	K*
540	Sidi Bennour	Morocco	600	B* F* G* J* K*	1215	COPE via ?	Spain	?	K*
540	Vitoria (EI)	Spain	10	J* K*	1215	Virgin via ?	UK	?	B* C* G* J* K* N
549	Les Trembles	Algeria	600	B* D* G* J* K*	1224	Lelystad	Holland	50	B* C* J* K*
549	Thurnau (DF)	Germany	200	B* C* D* F* G* J* K* L	1224	COPE via ?	Spain	?	B* J* K*
558	Espoo	Finland	100	B*	1233	Liege	Belgium	5	B* J* K*
558	Rostock (NDR)	Germany	20	F*	1233	Virgin via ?	UK	?	B* C* J* K
558	Guarda/Faro	Portugal	10	K*	1242	Marseille	France	150	B* F* J* K*
558	RNE5 via ?	Spain	?	B* F* G* J* K*	1242	Virgin via ?	UK	?	B* C* J* K*
559	Cima di Dentro	Switzerland	300	K*	1251	Mariacsi	Hungary	500	F* J* K*
567	Tullamore (RTE1)	Ireland (S)	500	B* C* D* E* G* J* K* L	1251	Huisberg	Netherlands	10	F* J* K
567	Bologna	Italy	20	K*	1251	Porto	Portugal	10	J*
567	RNE5 via ?	Spain	?	B* J* K*	1260	SER via ?	Spain	?	B* F* J* K*
576	Bechar	Algeria	400	K*	1260	Guilford (I)	UK	0.5	G* J* K* L
576	Muhlacker (SDR)	Germany	500	B* F* G* J* K*	1269	Neumunster (DF)	Germany	600	B* C* F* G* J* K*
576	Barcelona (RNE5)	Spain	50	B* C* G* J* K*	1269	COPE via ?	Spain	?	B* J* K*
585	Orf Wien	Austria	600	?	1278	Strasbourg	France	300	J* K
585	Paris (RF)	France	8	B* G* J* K*	1278	Dublin/Cork (RTE2)	Ireland (S)	10	B* C* E* F* G* J* K*
585	Madrid (RNE1)	Spain	200	B* F* G* J* K*	1287	RFK via ?	Czech Rep.	400	F* G* J*
585	Gafsa	Tunisia	350	J*	1287	Lerida (SER)	Spain	10	B* J* K*
585	Dumfries (BBC Scot)	UK	2	C* E* F* I	1296	Kardzali	Bulgaria	150	G*
594	Frankfurt (HR)	Germany	1000/400	B* C* F* G* J* K*	1296	Valencia (COPE)	Spain	10	B* F* J* K*
594	Oujda-1	Morocco	100	B* G* K*	1296	Orfordness (BBC)	UK	500	B* E* J* K
594	Muge	Portugal	100	B* F* G* J* K*	1305	Genova	Italy	5	K*
603	Lyon	France	300	J* K*	1305	Rzeszow	Poland	100	F* G*
603	Sevilla (RNE5)	Spain	50	B* F* G* J* K*	1305	RNE5 via ?	Spain	?	F* J* K*
603	Sousse	Tunisia	10	K*	1314	R Due via ?	Italy	?	K*
603	Newcastle (BBC)	UK	2	E* I	1314	Kvitsoy	Norway	1200	B* F* G* H* J* K
612	Athlone (RTE2)	Ireland (S)	100	B* C* D* E* G* J* K*	1314	RNE5 via ?	Spain	?	J*
612	Sebba Aloun	Morocco	300	D*	1323	Zyri (BBC)	Cyprus	200	K*
612	RNE1 via ?	Spain	10	D* F* J* K*	1323	W'brunn (V. Russia)	Germany	1000/150	B* F* J* K*
621	Wayve	Belgium	80	B* F* G* J* K*	1332	Rome	Italy	300	J* K*
621	Batra	Egypt	2000	K*	1341	Lakhsig	Hungary	300	B* J*
621	RNE1 via ?	Spain	10	J* K*	1341	Lisnagavey (BBC)	Ireland (N)	100	B* C* E* G* J* K*
621	Barcelona (OCR)	Spain	50	G*	1341	Tarrasa (SER)	Spain	2	K*
630	Vigra	Norway	100	B* F* G* K*	1350	Pecs	Hungary	10	J* K*
630	Sta. Isabel	Portugal	50	K*	1350	Cesvaine/Kuldiga	Latvia	50	F* G* J* K*
630	Tunis-Djedeida	Tunisia	600	B* F* J* K*	1359	Arganda (RNE-FS)	Spain	600	B* F* G* J* K*
639	Praha (Liberal)	Czech	1500	B* F* G* J* K*	1368	Foxdale (Manx R)	I.O.M.	20	C* E* F* G* J* K*
639	RNE1 via ?	Spain	?	B* F* G* J* K*	1377	Lille	France	300	F* G* J* K*
648	RNE1 via ?	Spain	10	B* F* G* J* K*	1386	Athens	Greece	50	F* J*
648	Orfordness (BBC)	UK	500	B* C* D* E* G* J* K* L	1386	Bolshakovo	Russia	2500	C* D* F* G* H* J* K*
657	Napoli	Italy	120	G* J* K*	1395	Flake	Albania	1000	K*
657	Madrid (RNE5)	Spain	20	B* F* G* J* K*	1395	TWR via Flake	Albania	500	F* G* J*
657	Wrexham (BBC Wales)	UK	2	B* C* E* F* J* K*	1395	Lopic	Netherlands	120/40	G* J* K* L*
666	Tindouf	Algeria	5	K*	1404	Brest	France	20	B* F* G* J* K
666	Messkirch/Rohrdorf (SWF)	Germany	150	B* C* F* G* J* K*	1413	Masirah Is (BBC)	Oman	1500	K*
666	Stikunai (R. Vilnius)	Lithuania	500	F* H*	1413	RNE5 via ?	Spain	?	F* G* J* K*
666	Seba	Portugal	135	F*	1422	Hausweiler (DF)	Germany	1200/600	B* C* F* G* J* K
666	Barcelona (SER)	Spain	50	B* J* K*	1422	Valmiera	Latvia	50	J*
675	Lopic (R10 Gold)	Holland	120	B* C* D* F* G* J* K* L	1431	Foggia	Italy	2	K*
684	Sevilla (RNE1)	Spain	500	B* F* G* J* K*	1431	Koani	Ukraine	500	F* K*
684	Avala (Beograd-1)	Yugoslavia	2000	B* F* G* J* K*	1440	Marnach (RTL)	Luxembourg	1200	B* C* F* G* J* K* M*
693	Tortosa (RNE1)	Spain	2	B* F* J* K*	1440	Dammam	Saudi Arabia	1600	F*
693	Droitwich (BBC5)	UK	150	B* C* G* J* K* L	1449	RAI via ?	Italy	?	F* G* J* K*
693	Startpoint (BBC5)	UK	50	N	1449	Bedmoss (BBC)	UK	2	E* F* J* K*
702	Flensburg (NDR)	Germany	5	B* C* F* G* J* K*	1467	Mlaic	Moldova	150	K*
702	Monte Carlo	Monaco	40	J*	1467	Monte Carlo (TWR)	Monaco	1000/400	A* B* C* F* G* J* K*
702	TWR via Monte Carlo	Monaco	300	F* G* K*	1476	Wien-Bisamberg	Austria	600	B* C* F* H* J*
702	Slovensko 1 via ?	Slovakia	?	J* K*	1485	AFN via ?	Germany	1	J*
711	Rennes 1	France	300	B* F* G* J* K* L	1485	SER via ?	Spain	?	J* K*
711	Heidelberg	Germany	5	C* J* K*	1485	Carlsiel (BBC)	UK	1	E*
711	Laayoune	Morocco	600	G* J* K*	1494	Clermont-Ferrand	France	20	J* K*
711	Murcia (COPE)	Spain	5	J* K*	1494	St. Petersburg	Russia	1000	C* F* G* J* K*
711	Nis	Yugoslavia	100/20	K*	1503	Stargard	Poland	300	B* F* K*
720	Langenberg	Germany	200	K*	1503	RNE5 via ?	Spain	?	G* J* K*
720	Lisnagavey (BBC4)	Ireland (N)	10	C* E* F* I	1512	Viermeulen	Belgium	600	A* B* C* F* G* H* J* K* L* M*
720	Norte	Portugal	100	B* F* J* K*	1521	Kosical (Cizaitel)	Slovakia	600	B*
720	Stax	Tunisia	200	J* K*	1521	Duba	Saudi Arabia	2000	F* G* J* K*
720	Lots Rd. Ldn (BBC4)	UK	0.5	B* G* J* K*	1530	Vatican R	Italy	150/450	B* C* F* G* J* K*
729	Athens	Greece	150	K*	1539	Mainflingen (ERF)	Germany	350(700)	B* C* F* G* J* K*
729	Cork (RTE1)	Ireland (S)	10	B* F* F* G* J*	1639	SER via ?	Spain	?	J* K*
729	RNE1 via ?	Spain	?	B* F* G* J* K*	1557	Nice	France	300	C* D* F* J* K*
729	Sadivat	UAE	1500	K*	1566	Nagpur	India	1000	J*
738	In Amenas	Algeria	5	K*	1566	Stax	Tunisia	1200	J* K*
738	Paris	France	4	G* J* K	1575	Genova	Italy	50	B* J* K*
738	Poznan	Poland	300	D* F* G* J*	1575	SER via ?	Spain	5	B* G* J*
738	Barcelona (RNE1)	Spain	500	B* D* F* G* J* K*	1584	SER via ?	Spain	2	B* J* K*
747	Las Palmas	Gran Canaria	20	B* J*	1593	Holtkirchen (VOA)	Germany	150	B* C* F* G* J* K*
747	Flevo (Hilv2)	Holland	400	B* C* F* G* J* K* L* M*	1593	Isfahan	Iran	100	J*
756	Braunschweig (DF)	Germany	800/200	B* C* F* G* J* K*	1602	SER via ?	Spain	?	B* K*
756	Bilbao (EI)	Spain	5	B* F* G* J* K*	1602	Vitoria (EI)	Spain	10	B* G* J*
756	Redruth (BBC)	UK	2	F* G	1611	Vatican R	Italy	15	C* J* K*
765	Sottens	Switzerland	500	B* F* G* J* K*					
774	Hrvatski R.	Croatia	50/10	K*					
774	Aris	Egypt	500	K*					
774	Bonn (MDR2)	Germany	5	C* K*					
774	Enniskillen (BBC)	Ireland (N)	1	E* F*					
774	BNE1 via ?	Spain	?	B* F* G* J* K*					
774	Plymouth (BBC)	UK	1	N					
783	Leipzig (MDR)	Germany	100	B* C* F* G* J* K*					
783	Miramar (R. Porto)	Portugal	100	B* F* G* J* K*					
783	Dammam	Saudi Arabia	100	G* J* K*					
783	Zagreb-Buje	Yugoslavia	10	J*					
792	Limoges	France	300	B* F* G* K*					
792	Lingen (NDR)	Germany	5	C* F* J*					
792	Kavala (VOA)	Greece	500	K*					
792	Sevilla (SER)	Spain	20	B* F* G* J* K*					
801	Munchen-Ismaning	Germany	300	B* C* F* G* J* K*					
801	Ajiun	Jordan	2000	J*					
801	RNE1 via ?	Spain	?	B* F* G* J* K*					
810	Madrid (SER)	Spain	20	B* F* G* J* K*	810	Madrid (SER)	Spain	20	B* F* G* J* K*
810	Westerglen (BBC Scot)	UK	100	B* C* E* G* J* K*	819	Batra	Egypt	450	J*
819	Toulouse	France	50	F*	819	Trieste	Italy	25	J* K*
819	Warsaw	Poland	300	B* G* J* K*	819	Warsaw	Poland	300	B* G* J* K*
819	S. Sebastian (EI)	Spain	5	K*	828	Hannover (NDR)	Germany	100/5	B* F* J* K*
828	Rotterdam	Holland	20	F* J* K*	828	St. Isabel	Portugal	10	K*
828	St. Isabel	Portugal	10	K*	837	Nancy	France	200	B* F* J* K*
837	COPE via ?	Spain	?	B* F* G* J* K*	837	COPE via ?	Spain	?	B* F* G* J* K*
846	Rome	Italy	540	B* G* J* K*	846	Rome	Italy	540	B* G* J* K*
855	R. Bucharest	Romania	750	K*	855	R. Bucharest	Romania	750	K*
855	RNE1 via ?	Spain	?	B* F* G* J* K*	864	Strakonice	Czech Rep.	7	J*
864	Santah	Egypt	500	G* J* K*	864	Santah	Egypt	500	G* J* K*
864	Paris	France	300	B* F* G* J* K* L	864	Paris	France	300	B* F* G* J* K* L
864	Socuellamos (RNE1)	Spain	2	G* J* K*	864	Socuellamos (RNE1)	Spain	2	G* J* K*
873	Zaragoza (AFN)	Germany	150	A* B* C* E* F* G* J* K*	873	Zaragoza (SER)	Spain	20	B* F* J* K*
873	Zaragoza (SER)	Spain	20	B* F* J* K*	882	COPE via ?	Spain	?	B* F* G* J* K*
882	COPE via ?	Spain	?	B* F* G* J* K*	882	Washford (BBC Wales)	UK	100	B* C* E* G* J* K* L
891	Algiers	Algeria	600/300	B* F* G* J* K*	891	Algiers	Algeria	600/300	B* F* G* J* K*
891	Huisberg	Netherlands	20	F* J* K*</					

1215-1300) 33333 at 1243 in Stockport; WWCN Nashville, USA **12.160** (Eng 1400-2300, also to N.America) 35323 at 1330 in Bridgewater; Israel R, Jerusalem **12.080** (Eng 1400-1430) 54444 at 1412 in Plymouth; RCI via Skelton, UK **11.935** (Eng, Fr, Russ 1330-1700) 44434 at 1435 in Liverpool; R.Jordan via Al Karanah **11.690** (Eng 1000-1630, also to E.USA) 53443 at 1455 in Herstmonceux; R.Algiers Int via Bouchaoui **11.715** (Eng 1800-1900, also to M.East) 44344 at 1815 in Storrington; AIR via Bangalore **11.620** (Eng, Hi 1745-2230) 44423 at 1820 in Colyton; Israel R, Jerusalem **11.605** (Eng 1900-1925, also to USA) 44444 at 1900 in Galashiels; R.Romania Int, Bucharest **11.940** (Eng 1900-1955) 43444 at 1901 in Woodhall Spa; R.Damascus via Adra **12.085** (Eng 2005-2105) 44333 at 2015 in Morden; REE via Noblejas, Spain **11.775** (Eng 2000-2100, also to Africa) 33323 at 2025 in Stalbridge; HCJB Quito, Ecuador **12.015** (Eng 1900-2200) SIO444 at 2027 in Morpeth; R.Kuwait via Kabd **11.990** (Eng 1800-2100, also to USA) 33333 at 2050 by Norman Thompson in Oadby; RCI via Sackville **11.690** (Eng 2000-2130, also to Africa) 44444 at 2059 in Freshwater Bay; R.Ukraine Int **12.040** (Eng 2100-2200) SIO333 at 2130 in Co.Fermanagh.

Reception over long distances was often

possible in the **9MHz (31m)** band. R.New Zealand Int on **9.795** (Eng to Pacific areas 0459-0816) was SIO333 at 0605 in Morpeth; R.Australia via Shepparton **9.580** (Eng to Pacific 0800-1300) 32222 at 0815 in Stalbridge; R.Nederlands via Bonaire, Ned.Antilles **9.820** (Eng to Pacific 0730-0925) SIO333 at 0831 in N.Bristol; R.Veritas Asia, Philippines **9.670** (Ur to Asia 1530-1555) 44454 at 1530 by John Parry in Larnaca, Cyprus; R.Australia via Shepparton **9.435** (Eng to Pacific areas 1430-2200) 44333 at 2000 in Appleby; CBC via Sackville **9.625** (Eng, Fr & others to N.Quebec 1155-0610) 34543 at 2206 in Wallsend; R.Nederlands via Bonaire, Ned.Antilles **9.845** (Eng to N.America 2330-0128) 44444 at 0128 in C.Bedford. Also noted were R.Mediterranean Int via Nador, Morocco **9.575** (Fr, Ar to N.Africa, S.Eur 0500-0100) rated SIO322 at 1600 in E.London; VOA via Gloria, Portugal **9.760** (Eng to M.East 1700-2200) 44333 at 2000 in Freshwater Bay; R.Norway Int, Oslo **9.965** (Eng to America 2200-2230, Sun only) 44333 at 2200 in Morden.

Whilst beaming to Europe AWV via Slovakia **9.440** (Eng 0700-0730) was 45344 at 0700 in Newry; WYFR via Okeechobee **9.985** (Eng 0400-0750) 33333 at 0735 in Plymouth; TWR Monte Carlo, Monaco **9.755** (Eng 0655-0850 Sun) 55555

at 0800 in NE.Bedford; SRI via Sarnen **9.535** (Eng, Ger, Fr, It 1000-1300) 44444 at 1030 in Dudley; R.Nederlands via Nauen **9.860** (Eng 1030-1225) 44444 at 1159 in Middlesbrough; BBC via Skelton **9.410** (Eng 0200-2200) 43333 at 1215 by Martin Cowin in Kirkby Stephen; R.Tirana, Albania **9.570** (Eng 1845-1900) 53433 at 1845 in Galashiels; Israel R, Jerusalem **9.435** (Eng to 1900-1925, also to N.America) SIO444 at 1900 in Co.Fermanagh; R.Romania Int, Bucharest **9.690** (Eng 1900-1955) SIO545 at 1921 in Haverthwaite; VOIRI Tehran, Iran **9.022** (Fr, Eng 1830-2027) 54444 at 1935 in Norwich; Voice of Indonesia, Jakarta **9.525** (Eng 2000-2100) 23222 at 2010 by Derek Henderson in Hartlepool; China R.Int, Beijing **9.920** (Eng 2000-2157) 44444 at 2035 in Woodhall Spa; Voice of Armenia, Yerevan **9.965** (Eng 2030-2100) 33323 at 2056 in Stockport; AIR via Delhi? **9.950** (Eng to 2045-2230) 54454 at 2112 in Liverpool; R.Bulgaria via Plovdiv **9.700** (Eng 2100-2200) 54544 at 2115 in Oadby; R.Ukraine Int, Kiev **9.550** (Eng 2100-2200) 22122 at 2118 in Rugby.

Noted in the **7MHz (41m)** band were R.Japan via Woofferton, UK **7.230** (Jap, Eng to Eur 0400-0800), rated 33433 at 0610 in Herstmonceux; Monitor R.Int via WSHB **7.535** (Eng [Various Sat/Sun] 0400-0958) SIO444 at 0615 in Morpeth; R.Prague, Czech Rep **7.345** (Eng to Eur 0700-0727) SIO444 at 0706 in N.Bristol; WYFR via Okeechobee **7.355** (Eng to Eur, Africa 0600-0800) 55545 at 0730 in NE.Bedford; R.Vlaanderen Int, Belgium **7.190** (Eng to Eur 0900-0925) 45343 at 0900 in Newry; R.Denmark via RNI **7.295** (Da to Eur, N.America 1130-1200) 55555 at 1152 in C.Bedford; R.Thailand via Udonthani **7.210** (Eng to Eur 1900-1958) SIO433 at 1900 in E.London; AIR via Aligarh? **7.410** (Hi, Eng to Eur 1745-2230) 43333 at 1912 in Plymouth; RAI Rome **7.230** (Eng to Eur 1935-1955) 33333 at 1940 in Woodhall Spa; Vatican R, Italy **7.365** (Eng to Africa 2000-2030) 54454 at 2000 in Kirkby Stephen; Voice of Greece, Athens **7.430** (Eng to Eur 2000-2012) 33433 at 2008 in Rugby; RCI via Skelton, UK **7.235** (Russ, Fr, Eng to Eur, Africa 1800-2200) 33333 at 2111 in Middlesbrough; VOA via Selebi-Phikwe, Botswana **7.415** (Eng to Africa 1900-2230) 32232 at 2150 in Oadby; R.Moldova Int **7.520** (Eng to Eur 2000-2225) 34433 at 2200 in Galashiels.

Some of the broadcasts to Europe in the **6MHz (49m)** band originate from WEWN Vandiver, USA **5.825** (Eng 2100?-1000), rated 43333 at 0600 in C.Bedford; R.Japan via Skelton **5.975** (Eng 0600-0700) 43333 at 0636 in Plymouth; R.Vlaanderen Int, Belgium **6.035** (Eng 0900-0930) 44243 at 0900 in Newry; BBC via Rampisham **5.875** (Eng 1130-1200) 55555 at 1145 in Stalbridge; Polish R, Warsaw **6.095** (Eng 1700-1755) 33333 at 1725 in Rugby; R.Slovakia Int **5.915** (Eng 1830-1900) 53344 at 1830 in Kirkby Stephen; China R.Int via ? **6.950** (Eng 2000-2157) 23233 at 2047 in Stockport; R.Vlaanderen Int, Belgium **6.035** (Eng 2100-2130) 32322 at 2100 in Galashiels; RCI via Skelton, UK **5.995** (Fr, Eng 1900-2200, also to M.East, N.Africa) heard at 2110 in Hartlepool; R.Austria Int via Moosbrunn **6.155** (Eng 2130-2200) 43344 at 2155 in Oadby.

Whilst beaming to other areas R.Australia via Shepparton **6.080** (Eng to Asia 0830-1800) was 24542 at 1702 in Wallsend; R.Nederlands via Ned.Antilles **6.165** (Eng to N.America 2330-0125) SIO333 at 2337 in N.Bristol; R.Havana Cuba **6.000** (Eng to N.America 0100-0500?) SIO444 at 0458 in Morpeth.

**TROPICAL BANDS CHART**

Freq (MHz)	Station	Country	UTC	DXer
2.310	ABC Alice Springs	Australia	1857	B
2.325	ABC Tennant Creek	Australia	1857	B
2.485	ABC Katherine	Australia	2017	B1
3.223	AIR Simla	India	1510	J,O
3.245	AIR Lucknow	India	1515	J
3.255	BBC via Meyerton	S.Africa	2018	FH
3.270	SWABC 1, Namibia	S.W.Africa	1907	A,H,I,O
3.290	Namibian BC, Windhoek	S.W.Africa	2018	A,H,I
3.300	R.Cultural	Guatemala	0330	B,H
3.306	ZBC Prog 2	Zimbabwe	1837	I,M,O
3.315	AIR Bhopal	India	1712	J,O
3.316	SLBS Goderich	Sierra Leone	1911	I
3.320	SABC (RSG) Meyerton	S.Africa	2025	A,F,I,M,O
3.325	FRCN Lagos	Nigeria	2150	O
3.330	Christian Voice	Zambia	2023	I,M,O
3.345	AIR Jaipur	India	1715	O
3.345	AIR Jammu	India	1514	J
3.365	GBC R-2	Ghana	1913	A,I,M,O
3.365	AIR Delhi	India	1716	J,O
3.380	NBC Blantyre	Malawi	2022	I
3.395	ZBC Gweru	Zimbabwe	2023	O
3.915	BBC via Kralih	Singapore	2103	A,D,H,J,Q
3.945	AIR Gorakhpur	India	0235	A
3.950	Qinghai PBS, Xining	China	2255	A
3.955	BBC via Skelton	England	0255	A,H
3.955	R.Budapest	Hungary	1904	K
3.955	Nexus, Milan	Italy	2029	D,H
3.955	Channel Africa	S.Africa	0330	H
3.965	RFI Paris	France	0400	H
3.970	R.Korea via Skelton	England	2100	D,H,K,N,Q
3.975	R.Budapest	Hungary	1959	D,E,H,I,K,Q
3.985	Nexus, Milan	Italy	0645	F,Q
3.985	China R via SRI	Switzerland	2100	D,E,K,Q
3.995	DW via Jülich	Germany	2000	A,D,E,G,H,Q
4.005	Vatican R.	Italy	2031	D,I,L
4.035	Xizang PBS, Lhasa	Tibet	2330	O
4.735	Xinjiang, Urumqi	China	2326	H,O
4.760	AIR Fort Blair	India	2325	O
4.760	TWR Manzini	Swaziland	0315	H,O
4.765	R.Integracao	Brazil	0230	A
4.765	R.Rural, Santarem	Brazil	0230	A
4.770	Centinela del Sur	Ecuador	0145	A
4.770	FRCN Kaduna	Nigeria	2024	C,F,H,I,O,Q
4.777	R.Gabon, Libreville	Gabon	2024	E,I,O
4.783	RTM Bamako	Mali	1936	A,I
4.790	Azad Kashmir R.	Pakistan	1720	A,O
4.800	CPBS 2 Beijing	China	2300	A
4.800	AIR Hyderabad	India	1710	O
4.800	LNBS Maseru	Lesotho	1920	O
4.805	R.Nac.Amazonas	Brazil	0105	A
4.815	R.diff TV Burkina	Cuagadougou	2320	A,O
4.820	R.Botswana, Gaborone	Botswana	0405	H,O
4.820	AIR Calcutta	India	1550	J
4.820	Xizang, Lhasa	Tibet	2332	O
4.830	R.Tachira	Venezuela	0330	A,B,H,O
4.832	R.Heloj	Costa Rica	0707	O
4.835	R.Tezulutlan, Coban	Guatemala	0135	A
4.835	RTM Bamako	Mali	1931	A,E,F,H,I,O
4.840	AIR Bombay	India	1713	A,O
4.845	ORTM Nouakchott	Mauritania	2305	A
4.850	R.Younde	Cameroon	2103	A,H
4.860	AIR Delhi	India	1545	J,O
4.865	PBS Lanzhou	China	2310	A,E,O

Freq (MHz)	Station	Country	UTC	DXer
4.870	R.Cotonou	Benin	2045	E,O
4.875	R.Roraima, Boa Vista	Brazil	0340	H
4.885	R.Clube do Para	Brazil	0340	A,B,H
4.885	R.Difusora Acreana	Brazil	0050	A
4.885	KBC East Sce Nairobi	Kenya	1850	O
4.890	RFI Paris	via Gabon	0358	H,O
4.890	R.Port Moresby	New Guinea	2008	I
4.895	Voz del Rio Arauca	Colombia	0140	A
4.905	R.Nat.N'djamena	Chad	2004	F,H,I,O
4.905	R. La Oroya	Peru	0145	A
4.910	R.Zambia, Lusaka	Zambia	2032	E,H,I,O
4.915	R.Anhanguera	Brazil	0710	A,O
4.915	GBC-T, Accra	Ghana	2002	A,E,I,O
4.915	KBC Cent Sce Nairobi	Kenya	2045	I
4.920	R.Quito, Quito	Ecuador	0337	B,C,H,O
4.927	RRI Jambi	Indonesia	2210	O
4.935	KBC Gen Sce Nairobi	Kenya	2002	I,O
4.935	R.Tropical, Tarapoto	Peru	0245	A
4.940	AIR Guwahati	India	0105	A
4.940	R.Abidjan	Ivory Coast	2315	A
4.945	R.Difusora	Brazil	0245	A
4.950	AIR Srinaga	India	1720	O
4.950	VOA via Sao Tome	Sao Tome	2030	I,K,Q
4.955	R.Nac. de Colombia	Colombia	0402	A,H
4.960	VOA via Sao Tome	Sao Tome	0321	E,H,O
4.975	R.Uganda, Kampala	Uganda	2017	C,E,H,I,O
4.980	Ecos del Torbes	Venezuela	0100	A,B,H,O
4.985	R.Brazil Central	Brazil	0255	A,O
4.990	FRCN Lagos	Nigeria	1851	F
5.005	R.Nepal, Kathmandu	Nepal	1605	J,O
5.009	R.TV Malagasy	Madagascar	1720	I,O
5.010	AIR Thiru puram	India	0100	O
5.020	PBS-Jiangxi Nanchang	China	2310	A
5.020	Xizang-Tb, Lhasa	China	2331	O
5.020	Li V du Sahel, Niamey	Niger	1920	H,I,O
5.025	R.Rebalde, Habana	Cuba	0202	A,O
5.025	R.Uganda, Kampala	Uganda	2016	I
5.030	AWR Latin America	Costa Rica	0346	H,O,P
5.035	R.Bangui	C.Africa	0401	A,H
5.045	R.Cultura do Para	Brazil	0200	O
5.047	R.Togo, Lome	Togo	2015	H,I,O
5.050	Haixia 1	China	2215	O
5.050	AIR Aizawi	India	0250	A,O
5.050	R.Tanzania	Tanzania	2105	I,O
5.055	RFO Cayenne(Matoury)	French Guiana	0712	A,O
5.075	Caracol Bogota	Colombia	0347	A,F,G,H,I,O
5.100	R.Liberia, Totota	Liberia	2050	O

- DXers:-  
 (A) Robert Connolly, Killeel.  
 (B) David Edwardson, Wallsend.  
 (C) David Hall, Morpeth.  
 (D) Ted Harris, Manchester.  
 (E) Sheila Hughes, Morden.  
 (F) Rhoderick Illman, Oxted.  
 (G) Tom MacDowell, C.Bedford.  
 (H) Eddie McKeown, Newry.  
 (I) Fred Pallant, Storrington.  
 (J) John Parry, Larnaca, Cyprus.  
 (K) Clare Pinder, while in Appleby.  
 (L) Peter Pollard, Rugby.  
 (M) Vic Prier, Colyton.  
 (N) Chris Shorten, Norwich.  
 (O) John Slater, Scalloway.  
 (P) Ernest Wiles, NE.Bedford.  
 (Q) Thomas Williams, Truro.



# LW Maritime Radiobeacons

■ BRIAN ODDY G3FEX  
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**T**he increasing hours of darkness during July, August and September encouraged some listeners to search the band for the sky waves from distant beacons before going to bed. Five beacons (FE on 286.5; MA 297.5; O 299.0; DA 305.7; TY 313.0) were heard for the first time by Peter Rycraft in Wickham Market - all were logged after dark. He also searched the band while on holiday in N.Scotland - see chart.

Over in Co.Down, Robert Connolly (Kilkeel) compiled his extensive list mainly at night. He heard for the first time the beacon at Cabo Caroeiro, Portugal (CV) on 287.5kHz. Several beacons were received for the first time by Victor Robb in Belfast but a few previously heard were noticeably absent.

In Birmingham, Dave Dawson found the conditions noisy during much of the quarter. He was pleased to copy Torungen, Norway (TO) on 292.0 which he had not logged since last October. Peter Pollard (Rugby) was delighted to hear after dark the Faeroes beacon (MY) quite clearly on 337.0; also Noslo (NL) on 404.0. Brian Keyte (Gt.Bookham) searched the band for the first time and he found it fascinating. Perhaps his entries in the chart will encourage others to try this aspect of our hobby!

Towards the end of July, Jorma Metso (Djurhamn, Sweden) informed me that all of the l.w. maritime radiobeacons operated by the Swedish Maritime Administration would cease operation on September 1. However, there seems to have been a delay in implementing the closure because several of them were logged in September by UK DXers - see chart.

Up in Edinburgh Kenneth Buck has been keeping a close check on the Stavanger beacon (LEC) on 319.0. He tells me that the carrier is now modulated by a keyed 400Hz audio tone and the callign has been changed to VAR, which refers to its location at Varhaug near Stavanger airport. Because it is now operating purely as an aero beacon VAR alias LEC will not be included in the SWM chart. As Kenneth points out, Norway has many maritime and aero radiobeacons in operation further North than Stavanger. The maritime ones can be easily distinguished because they radiate a keyed unmodulated carrier (c.w.), whereas the aero beacons are amplitude modulated (a.m.) with a keyed tone and the carrier is unbroken.

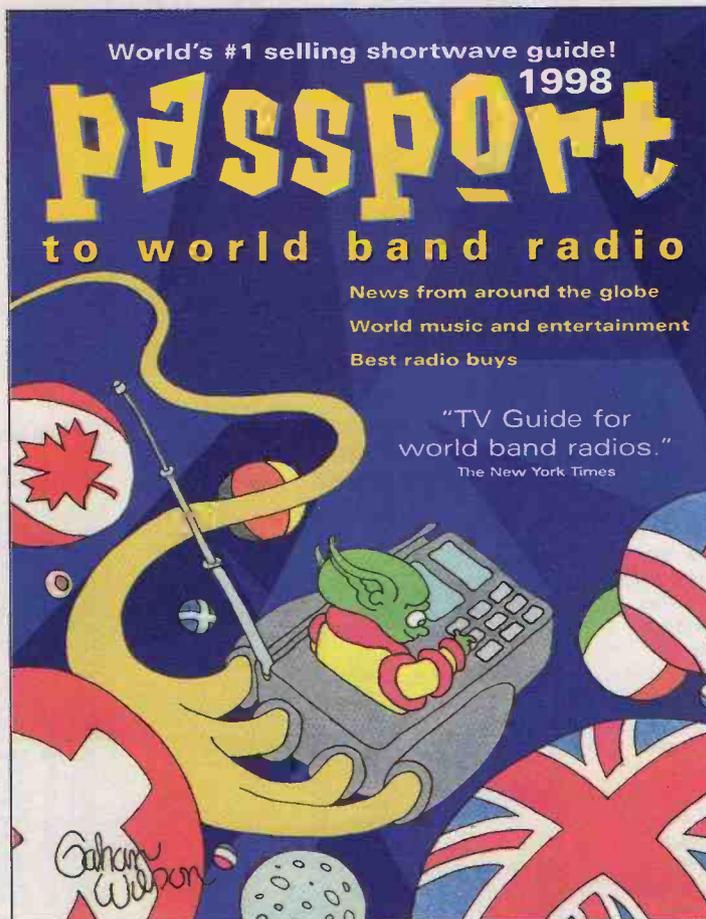
Note:  
 Entries marked # are calibration stations.  
 Entries marked \* were logged during darkness.  
 All other entries were logged during daylight or at dawn/dusk.

- DXers:  
 (A) Kenneth Buck, Edinburgh.  
 (B) Dave Clench, Worcester Park.  
 (C) Dave Clench, while at Ford.  
 (D) Robert Connolly, Kilkeel.  
 (E) Dave Dawson, Birmingham.  
 (F) John Eaton, Woking.  
 (G) Geoff Halliday, Bridgend.  
 (H) Brian Heath, Stapleton.  
 (I) Brian Kayte, Gt.Bookham.  
 (J) Larry Manderson, Colchester.  
 (K) Albert Moore, Douglas, IoM.  
 (L) Fred Pallant, Storrington.  
 (M) Clare Pinder, while in Appleby.  
 (N) Peter Pollard, Rugby.  
 (O) Victor Robb, Belfast.  
 (P) Peter Rycraft, Wickham Market.  
 (Q) Peter Rycraft, while in Sutherland.  
 (R) Tom Smyth, Co.Fermanagh.  
 (S) Philip Townsend, E.London.  
 (T) Eric Tubman, Whitstable.  
 (U) Peter Westwood, Farnham.  
 (V) John Woodcock, Basingstoke.  
 (W) Ross Workman, Shoreham-by-Sea.

## LONG WAVE MARITIME RADIOBEACON CHART

Freq (kHz)	C/S	Station Name	Location	DXer
279.0	SI	Simiutaq	Greenland	Q
283.0	KK	Kulusuk	Greenland	Q
284.5	LZ	Lizard Lt	S.Cornwall	A,C,D,E,H,I,K,L,N,O,P,S,U,V,W
284.5	MA	Cabo Machichaco	N.Spain	D,E*,H*,J*,K*,L*,N*,O*,P*,U
284.5	PR	Porkkala	Finland	H*,J*
285.0	NO	Cabo de la Nao Lt	S.Spain	D*
285.0	NP	Nieuport W.Pier	Belgium	H,I,P,S
285.0	TR	Tuskar Rock Lt	S.Ireland	A,D,E,H,I,J,K,N,O*,P*,S,U,V
286.5	AL	Almagrundet Lt	Sweden	O*,P*
286.5	BC	Baily Lt	S.Ireland	D,K,R
286.5	FE	Cap Frehel Lt	France	P*
286.5	FI	Cala Figuera	Majorca	D*,J*,N*,O*,P*,W*
286.5	FT	Cap Ferret Lt	W.France	D,E*,H*,J*,K*,L*,N*,O*,P*
286.5	NK	Inchkeith Lt	F of Forth	A,Q
286.5	PZ	Cozzo Spadaro	Sicily	D*
287.3	IB	I Berleaga	Portugal	P*
287.3	LE	Leba Rear	Poland	P*
287.5	CV	Cabo Carvoeiro Lt	Portugal	D*
287.5	DO	Rosedo Lt	France	D*,P*
287.5	FR	Faerder Lt	Norway	O*,O*,P*
287.5	MD	Cabo Mondego	Portugal	D,P*
287.5	SE	Sete Mt St Clair	S.France	P*
288.0	HH	Hoek van Holland	Holland	D,P*
288.0	KL	Skinna Lt	Norway	D*,O*,P*,Q
288.0	OH	Old Hd of Kinsale	S.Ireland	A,D*,G*,I,K,R
288.5	FI	Cabo Finisterre Lt	N.W.Spain	D,E*,H*,J*,L*,P*,W*
288.5	UD	Cabo Salou	S.Spain	O*
288.5	YM	Ymuiden Lt	Holland	O,E,H,I,J,K,L,S
289.0	BL	Butt of Lewis Lt	Is of Lewis	Q
289.0	BY	Baily Lt	S.Ireland	A,D,E*,K,O,R
289.5	KY	Kosoy Lt	Norway	I*,P*
289.5	LO	Landsort S Lt	Sweden	D*,J*
289.5	MN	Hammerodde	Denmark	A,D*,O*,P*
289.5	NP	Punta Carena	Italy	D*,J*
289.5	SN	Ile de Sein NW Lt	France	D*,H,I,P*
290.0	AV	Aveiro	Portugal	D*
290.0	FD	Fidra Lt	F of Forth	A,O*,Q,Q
290.0	MR	Montedor	Portugal	P*
290.5	DY	Duncansby Hd Lt	NE Scotland	A,D,Q
290.5	LL	Hallo Lt	Sweden	H,I,J*,O*,P*,Q
290.5	SB	S Bishop Lt	Pembroke	A,D,E*,H,I,J,K,L,N,O*,P*,S,U,V,W
290.5	VI	Cabo Villano Lt	N.Spain	D*,E*,H*,J*,L*,N*,O*,P*,U,W
291.0	OR	Orskar Lt	Sweden	P*
291.0	SM	Pt. St Mathieu	France	B*,E,I,J*,K,U
291.0	SU	Cabo San Sebastian	S.Spain	D*
291.5	SN	South Rock LV	Co.Down	A,D,E*,H,I,J*,K,N*,O,R*,S
291.9	LT	La Isleta	Canaries	D*
291.9	NA	Punta Lantailia	Canaries	D*,P*
291.9	RN	Reykjanes Lt	Iceland	Q
292.0	MT	Kapn Martin Lt	Arctic	Q
292.0	SJ	Souter Lt	Sunderland	A,D,E,H,I,J,K,M,N,O*,P*,S
292.0	TO	Torungen Lt	Norway	A,E*,J*
292.5	SM	Pt St Mathieu Lt	France	C,O,H*,N*,O*,P*,V,W
293.0	CP	St Catherine's Lt	Lo.W.	B*,C,E*,F,G*,H,I,J*,L*,N*,P*,S,U,V,W
293.0	RN	Rhinos of Islay Lt	Is of Islay	A,D,K,O,Q,R
293.0	SY	Svinoy Lt	Norway	D*,Q
293.5	RO	Cabo Silleiro Lt	N.Spain	D*,P*
294.0	KU	Kullen High Lt	Sweden	A*,D*,O*,P*
294.0	PH	Cap d'Alprech	France	A*,B*,C,D,E*,F,G*,H*,I,J,K,L*,N*,O*,S,T,U,V,W
294.5	FP	#Lymouth Fnd Lt	N.Devon	G,I
294.5	KC	#Old Hd of Kinsale	S.Ireland	D
294.5	PS	#Pt Lynas Lt	Anglesey	D,H,K,R
294.5	PT	#Souter Lt	Durham	A
295.0	DV	Djupivogur	Iceland	O*,Q
295.0	JA	Jaroslawiec	Poland	D,E*,O*
295.0	SN	Sletnes Lt	Norway	D*,Q
295.5	CB	La Corbiere Lt	Jersey Ct.	D,E*,H,I,J*,O,S,U,V,W
295.5	CR	Cap Couronne	France	D*
295.5	JA	Jaroslawiec	Poland	K*
295.5	RE	La Rochelle	France	D,P*
296.0	BH	Blavandsbuk Lt	Denmark	A,E*,H*,J*,K,L*,O*,P*,Q
296.0	GR	Goere Lt	Holland	I,J,P*
296.0	KN	Skrova Lt	Norway	O*,E*,J*,P*,Q
297.0	FG	Pt de Barfleur Lt	France	C,D*,E*,F,G*,H*,I,J,K,L*,N*,O*,P*,S,T,U,V,W
297.5	MA	Mantyluoto	Finland	P*
297.5	PS	Cabo Penas Lt	N.Spain	D*,P*,P*
298.0	GX	Ile de Groix	France	D*,E*,J*,L*,N*,O,S,U,V,W
298.0	KU	Kokoerne	Greenland	Q
298.0	TA	Cabo Gata	S.Spain	D*,P*,U*
298.5	FR	Round Is Lt	Is Scilly	A,B*,C,D,E*,H,I,J*,K,L*,N*,O*,P*,S,U,V,W
298.5	SW	Skagen	Denmark	D,Q
299.0	AD	Ameland Lt	Holland	D,I,J,N*,P*,Q
299.0	BN	Les Baleines	W.France	D*,J*,P*
299.0	O	Tarifra	S.Spain	D*,P*
299.5	NP	Nash Pt Lt	S.Wales	D,E*,H*,I,K,L*,O*,P*,U,V,W*
299.5	SK	Skomvaer Lt	Rost	D*,O*,Q
299.5	VR	Uvaer Lt	Norway	A,D*,E*,O*,P*,Q
299.5	VS	Vieste Lt	Italy	D*
300.0	MZ	Mizen Head	S.Ireland	O,I,K,L*,O*,P*,V
300.0	II	Cap d'Antifer Lt	N.France	F,P*,V

Freq (kHz)	C/S	Station Name	Location	DXer
300.5	DU	Dungeness Lt	Kent	B*,C,E,H,I,J,L*,N*,O*,P*,S,U,V,W
300.5	LA	Lista	Norway	A,D*,M,D*,O,U
301.0	CA	Pt de Creach	France	B*,C,D,E,H,I,K,L*,N*,O,S,U,V,W
301.0	ER	Eierland Lt	Holland	D*,I,P*
301.0	HA	Pt del Hank	Morocco	D*
301.1	RG	Raufarhoefn	Iceland	D*,Q
301.5	KD	Kinnards Hd Lt	NE.Scotland	A,D*,H,I,J,K,Q
301.5	L	Torre de Hercules	N.Spain	D*,J*,P*
301.5	OB	Hoburg	Sweden	D*,O*,P*
302.0	RB	Cherbourg Ft W Lt	France	B*,C,D,E,F,H,I,J,K,L*,N*,O,S,U,V,W
303.0	D	Rota	SW.Spain	D*
303.0	FB	Flamborough Hd Lt	Yorkshire	A,B*,D,E,H,I,J*,K,M,N*,O*,P*,S,U,V
303.0	FV	Falsterboev Lt	Sweden	A,D*,H*,J*,O*,P*
303.0	YE	Ile d'Yeu Main Lt	France	D,I*,J*,L*,P*,U,W*
303.5	BJ	Bjornund Lt	Norway	A,B*,D*,E*,H*,J*,L*,N*,O*,P*,Q
303.5	BR	O Baranova	Arc.Russia	J*
303.5	FN	Feistein Lt	Norway	A,P*,Q
303.5	GR	Geedser	Denmark	D*,H,I,J*
303.5	IA	Llanes Lt	N.Spain	D*,J*
303.5	OR	Punta de Llobregat	S.Spain	H*,J*
303.5	VL	Vieland Lt	Holland	D*,P*
304.0	PS	Pt Lynas Lt	Anglesey	A,O*,E*,H,I,J*,K,N*,O*,P*,R,S,U
304.0	SB	Sumburgh Hg Lt	Shetland Is	Q
304.5	MY	Cabo Mayor Lt	N.Spain	E*,J*,P*,W*
305.0	PL	Hfe Ness Lt	SE.Scotland	A,D,E*,H,I,J,K,M,N*,O,Q
305.0	GP	Ile de Giraglia Lt	Corsica	P*
305.5	AL	Pt d'Alily Lt	France	B*,C,D,E*,F*,H,I,J,K,L*,N*,O*,P*,R*,S,U,V,W
305.7	DA	Dalatangi Lt	Iceland	D*,O*,P*
306.0	YE	Ile d'Yeu Main Lt	Off Lances	A,D,E*,H,I,J*,K,M,N*,O*,P*,S,U
306.0	TN	Thvboron	Denmark	A,J*,P*,Q
306.5	KL	Kolkasragas	Latvia	O*,J*
306.5	RS	Ristna	Estonia	B*,D*,E*,I*
306.5	UT	Utsira	Norway	A,O*,E*,H,I,J*,K,N*,O*,P*,Q,V*
307.0	GL	Eagle Is Lt	Ireland	A,D,K,N*,O*,P*,R
308.0	GR	Grimsey	Iceland	P*,Q
308.0	PI	Cabo Espichel	Portugal	O*
308.0	RC	Cabo Roca	Portugal	D*,P*
308.0	RD	Roches Douvres Lt	France	D,N*,P*,V*
308.5	NZ	St Nazaire	France	B*,D*,H,I,J*,P*,U
309.0	MU	Kobenhaven	Denmark	D*
309.0	WW	Ventspils	Latvia	O*,U
309.5	BA	Punta Estaca Bares	N.Spain	D*,E*,J*,O*,P*
309.5	FH	Fruholm Lt	Norway	D*,P*,Q
309.5	MA	Marstein Lt	Norway	A,B*,D*,J*,O*,P*,Q
309.5	PB	Portland Bill Lt	Dorset	B*,C,E,H,I,K,L*,O*,P*,S,U,V,W
309.5	WE	Wangerooge Lt	N.Germany	P*
310.0	ER	Pt de Ver Lt	N.France	D*,L*,L*,S,U,V,W
310.5	AS	Castellon	Spain	D*
310.5	GV	Genova	Italy	D*
310.5	RO	Rozewie	Poland	D*
310.5	SG	Sjaellands N Lt	Denmark	D,O
311.0	GD	Girdle Ness Lt	NE.Scotland	A,D,O,Q
311.0	NF	N Foreland Lt	Kent	B*,C,E,H,I,J,K,N*,O*,P*,S,U,V,W
311.5	LP	Loop Hd Lt	S.Ireland	D,E*,K,O,R
312.0	HO	Honnholmen Lt	Norway	O*,P*,Q
312.0	OE	Oostende	Belgium	D*,E,H,I,J,N*,O*,P*,R,S,U,W
312.0	UH	Eckmuhl Lt	France	D*,P*
312.5	AK	Alkenragas	Latvia	D*,O*
312.5	BK	Baltisky	Russia	D*,O*
312.5	BT	Mys Taran Lt	Latvia	D*,O*
312.5	CS	Calais Main Lt	France	C,D,H,S,U,W
312.5	OB	Doosky	Ukraine	D*
312.5	KA	Klaipeda Rear Lt	Lithuania	D*
312.5	LB	Liepaja	Latvia	D*,O*
312.5	SR	Skardsfjara	Iceland	D*,O*,Q
312.5	VS	Cabo Estav Lt	N.Spain	C,N*,O*,P*
313.0	HA	Halten Lt	Norway	D*,J*,P*,Q
313.0	PA	Cabo de Palos Lt	S.Spain	D*,J*,P*,Q
313.0	TY	Toru Is Lt	N.Ireland	A,D,K,O*,P*,Q,R
313.5	BR	Cap Bear Lt	S.France	D*,P*
313.5	CM	Cromer Lt	Norfolk	A,B*,C,E*,H,I,J,K,N*,O*,P*,S,U,V,W
314.0	HK	Hekkingen Lt	Norway	P*,Q
314.0	PQ	Porquerolles	S.France	D
314.0	VG	Ile Vieerge Lt	France	A*,B*,D*,E*,G*,H,I,J,K,L*,N*,O*,P*,S,U,V,W
314.0	WU	Wustrow Lt	NE.Germany	O*
314.5	TL	Punta D.Penna	Italy	J*,N*,P*
315.0	ND	Nidden	Lithuania	D*
316.0	IN	Ingolshofdli Lt	Iceland	A*,D*,J*,O*,P*,Q
318.0	AS	Angsok	Greenland	Q
328.0	HB	Holstenborg	Greenland	Q
331.0	FH	Frederikshab	Greenland	Q
337.0	MY	Myggenaes	Faeroe Is	A*,J*,N*,O
343.0	SC	Scoresbysund	Greenland	Q
352.0	RBA	Rabat Sale	Morocco	D*
367.0	JV	Jakobshavn	Greenland	D*
372.0	OZN	Prins Chris's Sund	Greenland	D*,E*,H*,O*,P*,Q
381.0	AR	Akraberg	Faeroe Is	A*,B*,D*,E*,H*,I,J*,N*,O*,P*,Q,V*,W*
399.0	UP	Upemavik	Greenland	Q
404.0	NL	Noslo	Faeroe Is	A*,B*,D*,E*,G*,H*,J*,N*,O*,P*,Q,V*,W*
404.0	NS	Narssaq	Greenland	D*
414.0	FK	Fredenikshavn Bkw	Denmark	Q



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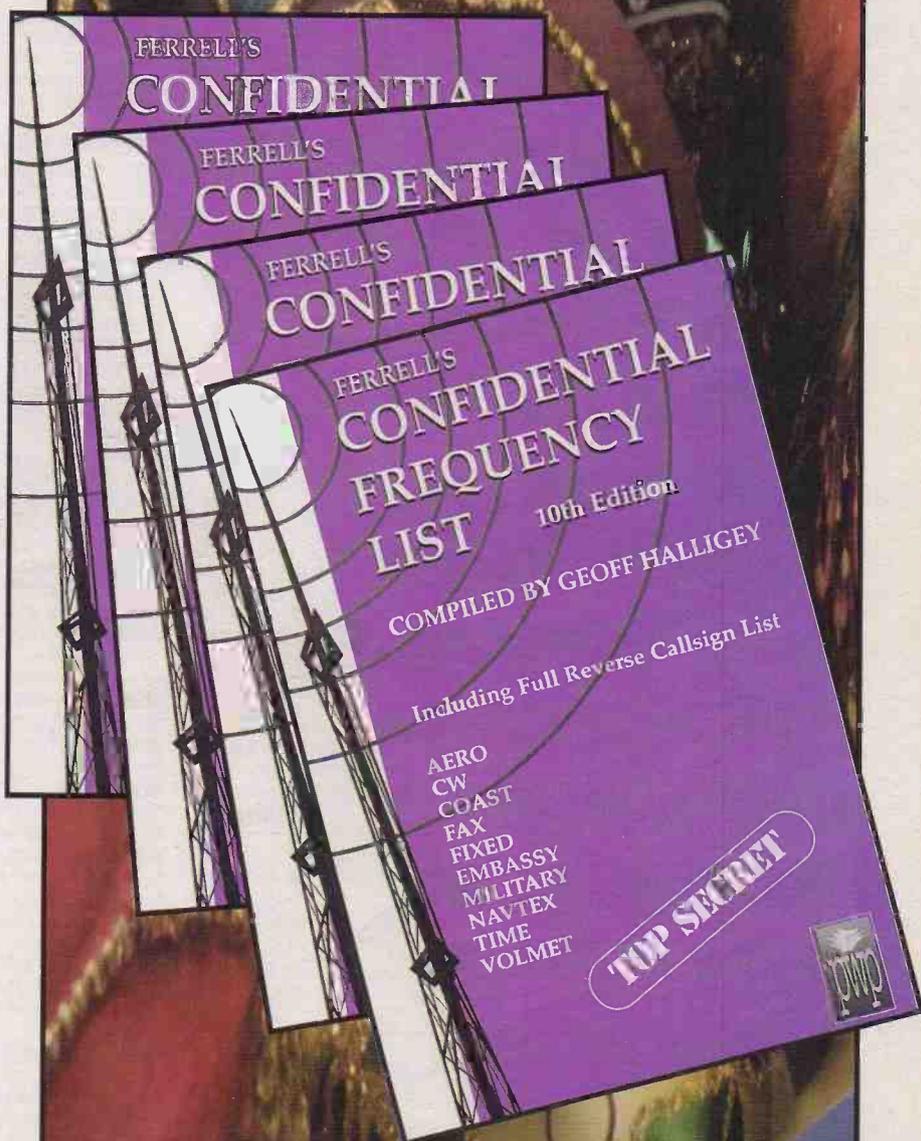
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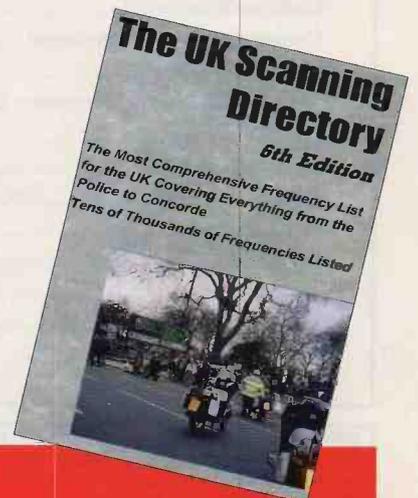
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