shortwave magazine

SCANNING SPECIAL

Ten Pages of Scanning This Month

The Law & You

Scanning & The Press

Buyers' Guide

Dream Scanner

plus

Legal Communications

Interception -

Discover Echelon Inside

In My Experience

The Ultimate AM Receiver?

JW's wish is granted -

we found him an AR88 to scrutinise

JULY 2000 £2.99

SIMPLY THE BEST RADIO MAGAZINE!

The new ALINCO DJ-X2

micro-sized go anywhere scanner is small enough to fit comfortably into a shirt pocket and yet its in-built speaker gives amazing clarity of audio from the sensitive receiver. Take it with you to airshows, boat shows, on holiday - its discrete size enabling reception just about anywhere, without attracting unwanted attention.

Its easy to use, with a host of optional accessories and enough power for the most demanding user.

For airband enthusiasts the Alinco DJ-X2 has the new 8.33kHz Civil Airband Channels.

This has to be 'THE SCANNER' of year 2000!

NEW! WITH 8.33kHz CHANNEL SPACING FOR CIVIL AIRBAND

Flying

FEATURES

- Receives: 522kHz - 999.995MHz AM WFM NFM
- Selectable scan modes
- Audio descrambler
- Bug detector - *detects presence and frequency of bug giving audible warning*
- Selectable internal / external antenna
- Internal or external supply
- Program Search banks
- Illuminated backlight display
- 2 performance modes *easy and expert*
- RX attenuator
- Auto power off mode
- Priority channel monitoring
- Squelch control
- Volume control

SPECIFICATIONS:

- ***IF:*** 1st 248.45MHz 2nd 38.85MHz, 3rd 450KHz
- ***Frequency range:*** 522kHz - 999.995MHz
- ***Sensitivity***
  FM 30-770MHz: -6dB u
  FM 770MHz: -2.5dB u
  WFM 11dB u
  AM 0.5-1.62MHz: 15dB u
  AM 1.62MHz: 3dB u
- ***Steps***
  5, 6.26, 8.33, 10, 12.5, 15, 20, 25, 30, 50, 100, Auto
- ***Modes:*** AM WFM NFM
- ***Memories:*** 700
- ***Antenna Connector:*** SMA
- ***Power output audio:*** max 30mW (32 ohms)
- ***Power supply:*** 4.5V DC
- ***Weight:*** 85g
- ***Size:*** 58W x 90H x 15Dmm

Optional Accessories

£239.95

£6 p&p

YUPITERU MVT 7100EU

Probably the most popular high end Scanner. It's easy to use and can receive just about anything going!

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

PRICE MATCH

~~£229.95~~

- OP51 Soft Case .....£17.95 + £2 p&p

We are proud to be authorised by YUPITERU JAPAN *to distribute their SCANNERS in the United Kingdom*

AR 108

Palm sized Airband & VHF Scanner

A new dedicated handheld scanning receiver that has been optimised to give powerful long distance reception of Civil Airband and VHF. It is compact and small enough to fit comfortably in a top pocket.

Features include:

- Frequency:
  Airband 108 - 136.975MHz
  VHF Band 136 - 180MHz
- Modes: AM or FM
- Memories: 99
- Selective Channel Steps: 5, 10, 12.5, 15, 25, 1MHz
- Dual Watch Function
- Key Lock
- Battery Save Function
- Battery Voltage Indicator
- Supplied C/W Earphone, Belt Clip, Carrying Strap

£69.95

£6 p&p

Options:

- Mains Chargers £8.95

NEVADA® DISTRIBUTION DIVISION

ORDER HOTLINE 023 9231 3090

- FAX: 023 9231 3091
- E-MAIL: info@nevada.co.uk
- WEBSITE: http://www.nevada.co.uk

High - the new Alinco DJ-X2

MICRO SIZED SCANNER

ALINCO

DJ-X10E

Wideband scanning receiver

- *Receives* 100kHz - 2000MHz
- *Multi Mode Reception* AM - WFM - NFM - SSB - CW
- *1200 Memory Channels*
- *Channel Scope spectrum analyser* that allows monitoring of 40 channels
- *Channel Scope Peak Search*
- *Advanced Scanning features*

Programmed Scan (up to 10 groups)	*VFO search*
Programmed Memory Scan	*Dual VFO search*
Any Memory Scan	*Band encursion scan*
Mode Scan (not found on many scanners!)	*Priority scan*
	Any channel ship scan

- *User Friendly features* Help messages - Personalised Channel names - Memory cloning - Auto memory write scan - Beginner/Expert Mode - Memory Tune Mode

DJ-X10E includes FREE

- **MAINS DROP IN CHARGER** For easy and convenient use
- **NICAD BATTERY PACK** 4.8V DC 700mAH NiCad battery pack
- **BELT CLIP**
- **CARRYING STRAP**
- **FLEXIBLE LOW PROFILE ANTENNA**

- *Large Clear Illuminated Display*
- *Timer Functions with auto on/off facility*
- *Battery Save Facility*
- *Squelch Control*
- *Stylish cabinet with large speaker*
- *A super sensitive receiver*
- *Dual VFOs*
- *Facilities for cloning another set*
- *Built-in 24 hour clock*
- *Display - Contrast - Control*
- *Low battery alarm*
- *Switchable Attenuator*
- *Selectable control Beep tone*
- *Keypad lock control*

£295

£8 p&p

SPECIFICATIONS

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

OPTIONAL EXTRAS

EBP-33N	Small size 650mAH NiCad	£39.95
EBP-34N	Long life 1200mAH NiCad	£49.95
ESC-29	Standard Soft Case	£14.95
EBC-6	Mobile Mounting Bracket	£12.95
EME-6	Earphone	£10.95

We are one of Europe's largest Scanner Specialists

UK Distributors for Alinco & Yupiteru products

• Unit 1 • Fitzherbert Spur • Farlington • Portsmouth • Hants • PO6 1TT

WE • SUPPLY • DEALERS • THROUGHOUT • THE • WORLD •

DEALERS!

for further details contact our TRADE DEPARTMENT

Phone: Intl: +44 (0)23 9231 3095

Fax: Intl: +44 (0)23 9231 3091

July 2000 Issue

short wave magazine

contents

Vol. 58 Issue 07 July 2000
ISSN 0037-4261
ON SALE JUNE 22
Next issue on sale July 27

SCANNING SPECIAL

Ten Pages of Scanning This Month

Author's Info
See Page 42 for Author's Contact Details.

COVER SUBJECT:
It may be sixty years old, but it's still one hell of a radio, the AR88D.

COMING NEXT MONTH IN *SWM* AUGUST ISSUE

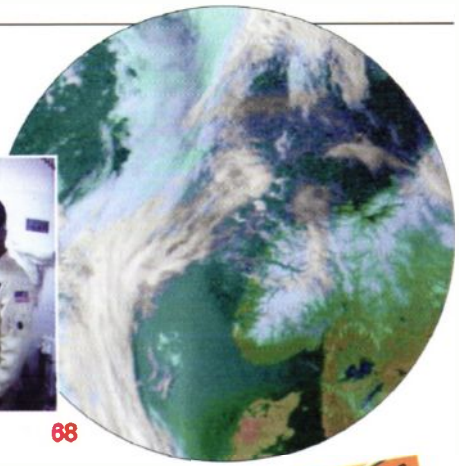
- Another valved classic receiver from JW - read and learn.
- RIAT 2000 preview.
- Inmarsat reception.

features

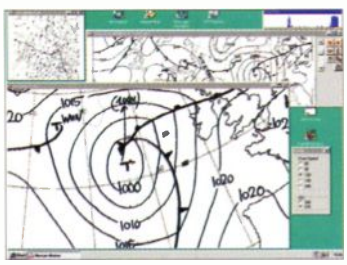
regular columns

52

58



68



54

15

36

EDITOR:
Kevin Nice, G7TZC, BRS95787

NEWS AND PRODUCTION EDITOR:
Zoë Shortland

ART DIRECTOR:
Steve Hunt

ART EDITOR:
John Kitching

EDITORIAL ADDRESS:
Arrowsmith Court, Station Approach,
Broadstone,
Dorset BH18 8PW
Telephone: (01202) 659910
Facsimile: (01202) 659950

If you wish to send E-mail to anyone at *SWM* then our Internet domain name is:
pwpublishing.ltd.uk
Simply add the name of the person you wish to contact.
For example:
kevin.nice@pwpublishing.ltd.uk

BOOKS, BACK ISSUES & SUBSCRIPTIONS (ALL ORDERS)
(01202) 659930
(Out-of-hours service by answering machine)

ADVERTISEMENT DEPARTMENT
(Broadstone)
ADVERTISING SALES:
Chris Steadman MBIM

ADVERTISEMENT TYPESETTING & PRODUCTION:
Peter Eldrett
Telephone: (01202) 659920
Facsimile: (01202) 659950

ADVERTISEMENT MANAGER:
Roger Hall G4TNT
PO Box 948, London SW6 2DS
Telephone: 020-7731 6222
Facsimile: 020-7384 1031
Mobile: (07885) 851385

SWM Services

Subscriptions
Subscriptions are available at £33 per annum to UK addresses, £40 in Europe and £44 (Airsaver), £50 (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 £55 (UK) £68 (Europe) and £74 (rest of world), £85 (airmail).

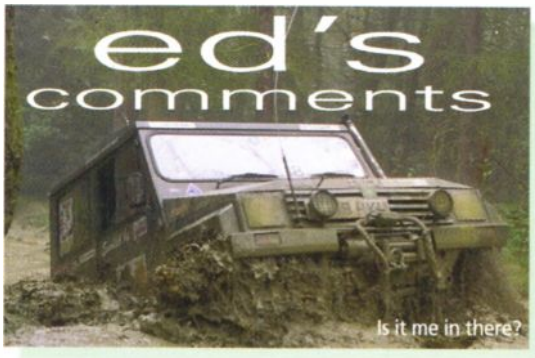
Components For *SWM* Projects
In general all components used in constructing *SWM* projects are available from a variety of component suppliers. Where special, or difficult to obtain, components are specified, a supplier will be quoted in the article. The printed circuit boards for *SWM* projects are available from the *SWM* PCB Service, **KANGA PRODUCTS, Sandford Works, Cobden Street, Long Eaton, Nottingham NG10 1BL. Tel: 0115 - 967 0918. Fax: 0870 - 056 8608.**

Photocopies & 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 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 for *SWM* are £2.99 each and photocopies are £2 per article.
Binders are also available (each binder takes one volume) for £6.50 plus £1 P&P for one binder, £2 P&P for two or more, UK or overseas. Prices include VAT where appropriate.
A complete review listing for *SWM/PW* is also available from the Editorial Offices for £1 inc P&P.

Placing An Order
Orders for back numbers, binders and items from our Book Store 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, AMEX 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**.
The E-mail address is **bookstore@pwpublishing.ltd.uk**

Technical Help
We regret that due to Editorial time scales, replies to technical queries cannot be given over the telephone. Any technical queries by E-mail are very unlikely to receive immediate attention either. So, if you require help with problems relating to topics covered by *SWM*, then please write to the Editorial Offices, we will do our best to help and reply by mail.

ed's comments



Hello everyone and welcome to our scanning special issue of *SWM*. I'm sure you'll find it fascinating. Dave Roberts has done a terrific job of putting together some really interesting reading for us. Please let me have any comments, you can 'phone, FAX, E-mail or write, I'll be glad to hear from you.

Collins 95S-1A

I've had several readers contact me regarding the price of the wonderful 95S-1A that JW reviewed last month. I must publicly say thanks to its owner for the loan, you know who you are and it was a very generous act, thanks.

I too was interested in just how much Rockwell Collins were asking, so I got them to formally quote me for supply. The result, well it's actually cheaper than I expected at $7999 plus duty, carriage and VAT, but it's still sadly way out of my league. I wonder how many *SWM* readers will buy one though? My guess is more than one! Incidently I wouldn't be at all surprised if there are current 95S-1A owners/users who read these pages on a regular basis.

PMR446

A while ago I mentioned the use of PMR446 at an off-road motor sport event run by the AWDC, that I attended on Salisbury Plain. Last weekend I visited the first ever *Formula Off-Road* event to be run in the UK. 1000HP Icelandic off-roaders on a motocross course is something to be seen!

Anyway, there was even more activity at this event, lots of p.m.r. hand-helds being used by the organisers too. I had an E-mail from Scott R. Havens, AB2V from Tampa Bay in sunny Florida, USA, in which he comments that my observations, "reminded me of my own experience with our Family Radio Service (FRS). As you may know, FRS is similar to PMR446; it's limited to 14 channels in the 462 and 467MHz ranges, at a power level of 500mW, and with no licensing requirements.

When I first bought FRS equipment a couple of years ago, the channels were so dead that I sometimes wondered if my receivers were working at all. Now, thanks to an aggressive marketing campaign, FRS has finally begun to catch on. I think the turning point was last Christmas, when nearly every department store, pharmacy, and computer store was advertising FRS radios as a possible gift item. Several families in my neighbourhood bought them, and ever since, I've been hearing signals on a regular basis.

Even in my suburban area, there is still more dead air than activity. Mostly what I hear is people talking from car to car as they pass by on the highway, parents keeping tabs on their children, and kids making a horrendous racket (but thoroughly enjoying themselves in the process!). As you've seen, however, once you get to a crowded event, amusement park, shopping mall, etc., the number of stations increases dramatically and the channels really start jumping. That's why I wouldn't even consider a radio without CTCSS capability.

I'm not sure how 'old' the PMR446 service is in the UK, but if the American FRS is any indication of things to come (and if manufacturers really try to market their equipment to the general public), I'm sure you'll see a change in activity levels soon".

Well Scott, I"m sure you're correct and PMR446 will definitely catch on.

Frequency Lists

I've been moaned at by a contributor to the *SWM* readers mailing list for not publicising an excellent web site containing lots of frequency info. It certainly is well worth a look, if you've got web access that is.

The URL you need is
www.geocities.com/CapeCanaveral/Launchpad/8243/spectrum.html

To quote *MegHz*, "What a brilliant web site, I could spend hours there. It's amazing that it never gets a mention in any of the mags...". Well 'Meg', now this one has.

SWM Readers List

And speaking of the list. Good news for that very E-mail forum, run by me especially for *SWM* readers. The list has moved to a server with a permanent connection to the Internet. All those of you that were subscribed to the old server have been automatically moved to the new one, as you'll have noticed by now. Anyone wishing to subscribe and join in the exchange of ideas and news, need to send an E-mail to **SWM_readers-subscribe@egroups.com** and once you've joined messages for distribution are posted to **SWM_readers@egroups.com** There are several improvements to the service as a result of the move and these are:
On-line archive via web pages.
Sign-up by web or E-mail.
Faster turn-around of postings.
A group file area to allow pictures to be shared with the list.

The URL to the list web page is
http://www.egroups.com/group/SWM_readers
I hope that those of you that use the list will continue to enjoy the [SWM_Reader] list in its new form.

New HF Receiver!

After a long period in the h.f. receiver doldrums, I'm glad to announce that there is a new radio about to hit the market, for more news and a review of this new receiver don't miss next month's *SWM*, and read the definitive review from JW.

Solar Flares

On Tuesday 6th June, (I'm writing this on the 8th), three major flares on the sun (an M-class and 2 X-class) were positioned such that the shock waves impacted the earth. While we have seen several X-class flares this solar cycle, none have been positioned in the centre of the sun to impact us this directly.

The next few days, starting Thursday evening, will be very exciting as the shock wave from these three flares reaches us, triggering some major geomagnetic storms and possible auroral activity into the centre of the USA. How strong of an effect we'll experience will become more obvious as the shock wave gets closer and satellites measure its passage.

If it triggers an extremely severe geomagnetic storm, then power grid failures and damage to satellites are possible too.

For h.f. users, the bands will be pretty much trashed for the duration of these geomagnetic storms, from around late Thursday into the weekend. Also h.f. blackout conditions may occur.

Well, there was almost a blackout reported on Tuesday afternoon, we'll just have to see what other effects are noted in the next few days.

For more detailed information before the next issue of *SWM* see **www.sec.noaa.gov/today.html** and we might get something on the *SWM* web site now it's in-house.

So whatever the frequency, happy listening.

Kevin

Dear Sir
I have read the letter from Ian Johnson describing the connection of an earth to his scanner to improve the reception and the fitting of a choke in series with that earth connection. The logic used shows a misunderstanding of the function of an earth in the reception of r.f. signals.

The receiver input signal is produced by the current flowing into its antenna input connector, through its input impedance then via the body of the scanner to earth. All of this is simply explained by Ohms Law. When the impedance between the body of the scanner and earth is smallest the current will be at its maximum and visa versa.

The input to the scanner will contain both signal and noise. If a noisy earth is used then this will inject noise into the scanner because a current will flow through to the antenna. By connecting a choke in series with the earth then both the wanted signal picked up by the antenna and the unwanted signal produced by the noisy earth will be equally reduced, net benefit, nil.

The above explanation assumes a whip or short wire antenna connected to the antenna connector, no overloading in the scanner and ignores resonance effects.

Donald Plummer
Beauly, near Inverness

Dear Sir
Remember the MK14?
I was interested to read Tony Hall's note about the Nascom One which he felt had been unfairly excluded from your 'Old Computers' article...I agree that it was a fine machine, but I had (and still have) the more affordable Science Of Cambridge (later Sinclair) MK14 based on the now defunct National 8060, or SC/MP.

Like the later ZX80 and ZX81 it brought computing within the grasp of people who could not have imagined owning one and taught me programming skills which have been very useful in later life. Mine still works too. There is a useful website devoted to the MK14 at **http://members.aol.com/mk14emu/index.htm** It even includes an MK14 emulator for DOS, so if you were one of the people who used to own one but threw it out or gave it away, fear not... you can still experience the Joy Of Hex :-)

Graham Galbraith M0ADR
graham.galbraith@virgin.net

Dear Sir
There are several radio based Internet newsgroups that are readily available nowadays, and people like myself (novices) frequently 'pick the brains' of the more knowledgeable. The newsgroups that are essentially 'UK' based frequently refer the person to *SWM* for more information.

I think it would be fair to say that some of the most frequently asked questions are "Which radio/scanner/antenna should I buy?", questions that cannot be answered accurately without knowledge of what is required from said radio/scanner/antenna. To be fair, most of the answers supplied within the newsgroups are usually concise without being too technical, but some are the opposite, and without sounding to be critical, some of the articles in *SWM* can fall into the latter category.

What would be the Editor's view to a series of articles on not what makes a good purchase, but "What a novice should be looking for in their prospective purchase". I am sure that I am not alone in saying that the technical specifications of many items advertised or reviewed are, to the novice, gobbledegook.

For example, a recent review of a receiver states: Sensitivity a.m.: -97dBm for 10dB S+N/N ratio below 30MHz in 6.4kHz bandwidth, & -101dBm above 30MHz. Is that good? Would a better receiver have higher or lower dBm figures?

Another radio advertises the fact that the i.f. bandwidth can be controlled from 10kHz down to 40Hz. The same radio also has a notch filter, and the d.s.p. implementation starts at i.f. frequencies. Confused? I am! I don't even know what a d.s.p. is! (It's not a political party is it ...or is that the SDP?).

An Active Antenna is advertised as "40kHz to 40MHz at full performance, 40MHz-108MHz 2.3dB gain". Again, is this good? or should you be looking for 1.3dB gain or 3.3dB gain? Why do some receivers which cover the same range cost £200 and some nearer to £2000?

The same principles can apply to scanners, radios, or whatever, so may I request a little sympathy for the ignorant amongst us. We often hear that the hobby is dying - so keeping it confusing won't help that problem, whereas impartial advice at the outset can save people money and keep them interested.

Apart from that, whatever happened to 'All at Sea'? Thanks for your time - and yes I do subscribe to the magazine!

Mike Brown
via E-mail

*Mike, there is such a series in the 'pipeline', so keep your eyes peeled. 'All At Sea' is no more, for the time being. - **Ed.***

Dear Sir
Pirates on HF
In the April edition of *Practical Wireless*, there was a letter from Stuart Jones, concerning callsigns on 6.6MHz. The stations heard are part of a world-wide net, working on various frequencies.

Two or three of these pirates ate situated not a million miles from your editorial offices, a drive along the A31, in a north easterly direction would probably bring you fairly close to a couple of them.

One of these operators maintains that he is a considerate operator not interfering with anyone, this whilst transmitting on 6.640MHz, which is the frequency allocated to New York ACC, other frequencies allocated to New York are 6.577 and 6.586MHz. Another frequency on which these pirates cause problems is 13.927MHz, a United States MARS frequency.

The frequencies used by the pirates are becoming somewhat congested, so much so that there are arguments as to which group that particular frequency belongs to. For instance, French SSTV on 6.650MHz insisting that the frequency is theirs, and UK operators taking exception to this.

Relevant authorities do not seem to take the problem very seriously, unless pirate transmissions cause interference to domestic televisions, and then, only after a member of the public makes a complaint, is there action taken. The maximum fine of £5000 is very rarely incurred. Average fines are in the region of a couple of hundred pounds.

P. Tasker
Plymouth

Dear Sir
Mr G.E.R. Denman's letter in the May issue is surely misguided in suggesting that *SWM* should not review 'very obscure receivers'. Firstly I take issue with the suggestion that the receivers quoted are 'obscure'. Perhaps to him, but not to others. Details of many new professional receivers can be found in *Jane's Military Communications* (available at many public reference libraries), on the Internet and in Fred Osterman's excellent book *Shortwave Receivers Past & Present, (available from the* SWM *Book Store - **Ed.**)*. Of course, such equipment is expensive. It's like buying a Rolls - if you need to think about the price, you cannot afford it!

Secondly, it is the cost and rarity element that makes such equipment much more interesting than a boring bog standard black box. Would Mr Denman prefer to read a review of a Ford or the latest Bentley? The interest is often in the unattainable - why else do glossy magazines for impossibly expensive luxury yachts sell so well?

Thirdly, he asks John Wilson to make comparisons with other receivers and to describe how the equipment receives signals. I question whether we are reading the same reviews! John goes out of his way in each review to set out the technical data, to compare the receiver against others, for example his own Collins 51S-1 and other receivers recently reviewed and he illustrates the differences with data, spectrum graphs and his own user impressions. He also specifically compares how the receiver copes with three live signals on 900, 909 and 918kHz. I have done that test myself and it really is instructive. It is also a lot quicker than the tedium of measuring intercepts, blocking sensitivity and a.g.c. response.

Always remember that at the end of the day, there are two vital qualities in a receiver - the sound that reaches the ears and operability. Whether the latest products from professional manufacturers are suitable for the casual listener is another matter. Practically all modern receivers are designed for remote and computer control and have few operator knobs other than banks of buttons.

I know it sounds reactionary, but I often derive greater pleasure and sometimes receive better sounding signals using my old RA17L with a sideband converter than with a modern black box. If it becomes too easy, we might as well give up radio and move to the Internet.

Michael O'Beirne G8MOB
Surrey

What more is there to say? Except that I guess I'd better organise an RA17L for John to 'comment' on in a future edition of SWM. *- **Ed.***

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 at QSL, *Short Wave Magazine*, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.

THE BEST LETTER WILL RECEIVE A £20 VOUCHER TO SPEND ON ANY SWM SERVICE.

You can also submit your letters by E-mail to: **qsl@pwpublishing.ltd.uk**

Send your news to Zoë Shortland at the Editorial Offices

Your News

Don't forget to keep sending me information on your new products, (with photographs), as soon as details are released, together with any information on Open Days, Special Offers, New Catalogues, RAE courses and general items of news. Remember, mentions are free, so don't delay, send off your news to Zoë today!

Broadcasts In English - Summer 2000 Edition

The Summer 2000 edition of *Broadcasts In English* is now available from the British DX Club. This 32-page A5 booklet was compiled by BDXC's general editor Tony Rogers. It includes all currently known external-service broadcasts in English on short wave and medium wave for the A-00 (Summer 2000) schedule period.

The guide is in time order throughout and covers all target areas. It also includes the summer listing of the main DX and media programme times.

Price for the booklet is: UK - £1.50; Europe - 4 International Reply Coupons or $3 US; Rest of World - 5 International Reply Coupons or $4 US and is obtainable from the **British DX Club, 126 Bargery Road, Catford, London SE6 2LR**. E-mail enquires to: **secretary@bdxc.org.uk** or check the BDXC-UK web site at **http://www.bdxc.org.uk**

CRI & WRN Strengthen Co-operation

China Radio International and **World Radio Network** (WRN) strengthened their relationship with a symbolic ribbon-cutting ceremony at WRN's London headquarters back on 25th April 2000. A high-level CRI delegation was in the UK on a fact-finding mission and was invited by WRN to meet staff, visit WRN's extensive Technical Operations Centre and discuss areas of further co-operation.

The two organisations signed a collaboration agreement in Beijing in August 1999 and have been working closely together to bring CRI programming to a wider international audience. English and German language programmes from CRI are now broadcast on three of WRN's international radio networks; WRN1 Europe, WRN1 North America and EuroMax Deutsch.

The CRI programming on WRN1 Europe is available in 4.5 million homes in UK and Ireland and 25 million homes throughout Europe via the *Astra 2A* digital satellite. Furthermore, CRI's daily one hour news and current affairs programme in English is broadcast across London on Spectrum Radio 558 AM. The CRI programme is downlinked from satellite at WRN's Technical Operations Centre in central London and relayed to Spectrum 558 AM for broadcast.

Heading the CRI delegation was Mr Wang Qinwen, CRI's Deputy Director and included Mr Ji Guogang, Director of CRI Financial Department, Mr Mei Xueping, Senior Engineer of CRI Technical Department and Mr Li Feng, Senior Member of CRI Administrative Office. The meeting was also attended by His Excellency Mr Ma Zhengang, Ambassador of the People's Republic of China to the United Kingdom.

In a speech to welcome the guests, Mr Karl Miosga, WRN's Managing Director, underlined the reason for the close CRI/WRN working relationship, "since we signed a collaborative agreement with CRI, we have been working together to increase the audience for CRI broadcasts and thus increase the knowledge of China, its culture and the developments that are occurring within the country".

After Mr Miosga, Mr Wang Qinwen and His Excellency Mr Ma Zhengang participated in the ribbon-cutting ceremony, the delegates toured WRN's Technical Operations Centre. The visit was rounded off with a lunch in the WRN boardroom with representatives from Spectrum 558 AM, the Xinhua News Agency and London Correspondents from Chinese newspapers.

Ribbon cutting ceremony at WRN's Technical Operations Centre, L-R: His Excellency Mr Ma Zhengang, Ambassador of the People's Republic of China to the UK, Mr Karl Miosga, WRN's Managing Director and Mr Wang Qinwen, CRI's Deputy Director.

Novice & RAE Courses

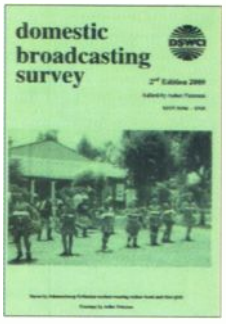
The **Bexley College** are planning to deliver the City & Guilds Amateur Radio Course (RAE) from 12 September 2000. The course will run for an academic year, finishing in May 2001 with students able to sit the May 2001 RAE. Morse is taught for the remainder of the year until July.

If you are interested, contact the **Guidance & Admissions Centre** on **(01322) 404000/404001**, leave your name, address and telephone number and an enrolment form will be mailed out to you during the summer break.

The **Radio Society of Harrow** will be starting a Novice course for anybody wanting to sit the Radio Amateur Novice Licence on Monday 18th September. For further information, please contact **Don Lamb G0ACK** on **0208-845 9575**.

The **East Cleveland Amateur Radio Club** are holding an RAE course on Friday evenings in the committee room of the New Marske Institute Club, Gurney Road, New Marske, near Redcar. Enrolment will be on 8th September 2000. Further details from **Alistair G4OLK** on **(01642) 475671**.

DBS-2



The *SWM* Newsdesk has recently had a press release from the **Danish Short Wave Club Int.** who have just published the 2000 edition of its annual *Domestic Broadcasting Survey 2* (DBS-2) as its second year, which includes their Tropical Bands Survey for the 28th year in a row. The Domestic Broadcasting Survey covers all active stations broadcasting to a domestic audience or relaying such broadcasts to expatriates abroad and in the s.w. spectrum of 2.2 - 30MHz. In this issue, active clandestine stations are also included for the first time.

For more information, contact the **DSWC, c/o Bent Nielsen, Egekrogen 14, DK 3500 Vaerloese, Denmark, E-mail: anker.petersen@get2net.dk** or **bentndx.elinh@post.tele.dk**

Sapphire Award

The **World Association of Christian Radio Amateurs and Listeners** (WACRAL) have announced an additional attraction for the holders of their Millennium Award. Entitled the *Sapphire Millennium Award*, their attractive new certificate is available to all members and non members who contact or receive a further thirty licensed members of the Association during the year 2000 (total 90).

Geoff Grundy G4YJW, Awards Manager for WACRAL, reports a steady flow of successful applications since the scheme was launched in January. He will be pleased to provide full details of their latest awards programme and can be contacted at: **47 Northiam Road, Eastbourne, E. Sussex BN20 8LP** or E-mail: **geoff@g4yjw.freeserve.co.uk**

High Power, High Gain

Mitsubishi Electric is announcing the introduction of the MGFS48V and MGFL48V L and S band push-pull IMFETs for amplifier applications. The 12V operational devices are ideal for wireless local loop, base stations, radio links and other communications applications where high power, high efficiency and high linear gain are paramount.

The GaAs power f.e.t.s are both 60W devices and come hermetically sealed in metal ceramic packaging for high reliability. MGFS48V2527 produces typically 60W output power over the 2.5-2.7GHz bandwidth, with a high power gain rated at typically 10dB and a high power added efficiency of typically 40%.

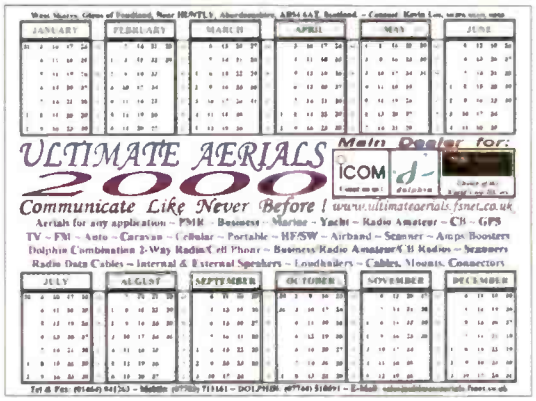
MGFL48V1920 is for 1.9-2GHz applications and produces typically 60W output power, with a high power gain of typically 11.5dB and a high power added efficiency of typically 45%. The push-pull type GaAs f.e.t.s are rated at -20V gate to drain and -10V gate to source voltages. Channel temperature during operation is around 175°C and the devices can be stored at temperatures ranging from -65 to +175°C.

More information from **Mitsubishi Electric Europe BV, Semiconductors, Travellers Lane, Hatfield, Herts AL10 8XB, Tel: (01707) 276100, FAX: (01707) 278997** or visit their web site at: **http://www.mitsubishichips.com**

Mitsubishi launches high power, high gain MGFS48V and MGFL48V push-pull IMFETs.

New Company

Ultimate Aerials is a new company that has recently started trading in the North, North East and North West of Scotland and are currently based near Huntly. They are now offering a local source for antennas, radios, scanners and accessories.



Ultimate Aerials has won the Main Dealerships for Yaesu and Icom radio equipment and the Dolphin Network Mobile Phone system. Supplying a wide range of Amateur Radio, CB, Club, Leisure and Business equipment, they are keeping their costs competitive by offering a mail order service and not currently setting up show premises.

Further information on the range of products and services can be obtained from Ultimate Aerials on **(01464) 841263** or by visiting their web site at **http://www.ultimateaerials.fsnet.co.uk**

Send your news to Zoë Shortland at the Editorial Offices

Radio & TVDX News

It's official! The Australian chs. A0, A1, A2 will have all closed down by 9 September 2008 with their incumbants moved onto greener pastures in Band 3 or u.h.f. and converted *en route* into digital.

Our old friend TV-12, the Isle of Wight RSL-TV station, has announced that the Luccombe relay will open by the end of June and Ventnor/extreme South Wight by the end of August. Their Chichester transmitter and studio will also be operational by Autumn 2000.

Sky TV News will also be carried by TV-12 at the following times: 0700-0800; 1200-1300; 1700-1800 and again at 2200. QVC is also carried late night with offering from Bloomberg at other times when local programming isn't carried. TV-12 operates on ch.E54 horizontal from Rowridge and is well received on the nearby mainland - a good TVDX catch.

The Spanish government have allowed the opening of two new commercial TV digital channels, the licences running for 10 years. This will bring a total of five commercial private channels operational (already Canal+, Antena 3 TV and Tele 5) in addition to the national RTVE state players La Primera and La 2. The existing private broadcasters have all had their licences extended for 10 years - conditional on them adopting parallel digital transmissions within the next two years.

Whereas the move into digital audio broadcasting (DAB) in the UK has been to open dedicated Band 3 frequencies requiring a special antenna and very expensive DAB receiver, the Americans have gone down another road. They have evolved a system that allows the digital programming to ride piggy back alongside the normal analogue f.m. transmissions in the existing Band 2 spectrum.

Known as 'IBOC' (in band on-channel) transmission, the digital info. sits each side of the 200kHz channel. Two versions of this technique are operational and the FCC are to assess the current variations with a view to opening DAB mid 2002.

BT have been awarded the contract to provide the new PSRCP project - Public Safety Radio Communications Project. This is the largest TETRA contract ever awarded totalling £2.5 billion. The digital integrated voice/data service will install through to 2004 in the 380-400MHz band providing comprehensive and 'interlocking' communication between all emergency services including coastal rescue services.

First tests will start September 2000 with the police first using the service. The Lancashire Ambulance service will also be participating. Progressively nine police forces will go TETRA in 2001, 13 in 2002, 14 and the last five in successive years. BT will subcontract installation to both Motorola and TRW.

Hand-helds and other units will be available from Nokia, Marconi, Simoco *et al.* 'Core services' including voice, 'messaging and a bearer data service giving access to the Police National Computer (PNC) will be provided to all forces. These core services also utilise the inherent security of digital operation which overcomes the eavesdropping problems associated with analogue'. Scanner users please note! For more information, check out the TETRA website at **www.tetramou.com**

Finally, an interesting report in the BDXC (Holland) that details F2/TE reception during good F2 conditions in February. **Ian Roberts** (J'Burg) received TV signals from Germany, Portugal, Switzerland, Madrid, Homs (Syria), Iran and Hungary on either chs. E2 or ch.R1. All three German ch.E2 transmitters were received and the m.u.f. is thought to have reached 55MHz.

rallies

Attention Please!

Would you like to have your Rally publicised? If so, all you have to do is put together as much information as possible about the Rally, i.e. date, location, times, who to contact, etc. and send it to the Editorial Offices.

June 25: The Bangor & DARS (Northern Ireland) are holding their Summer Radio & Computer Rally at the Clandeboye Lodge Hotel, Bangor. There will be a good selection of traders attending, plus there is the always excellent Bring & Buy, with the addition of a new computer section. Doors open 12 noon and admission is just £2. Further details from the club Web site at **http://welcome.to/bdars** or from **Mark MI1DRU** on **0289-058 6515** or E-mail: **mildru@amrad.net**

June 25: The Longleat Rally will be taking place at Longleat House near Warminster, Wiltshire, with all the usual attractions. Please contact **Ron Ford G4GTD** on **0117-985 6253**.

July 8: The Cornish Radio Amateur Club are holding their 37th Cornish Mobile Rally at Penair School, Truro. More details from **Ken Tarry G0FIC** on **(01209) 821073** or E-mail: **ken@jtarry.freeserve.co.uk**

July 9: The 11th York Radio Rally will be held in the Knavesmire Building, York Racecourse, York. Doors will open at 1030 and admission is £2 - children accompanied by an adult will be admitted free. Ample free parking, Amateur Radio, electronics and computers, Morse tests and repeater groups, refreshments and a licensed bar, plus talk-in on S22. Further details from **Pat Trask G0DRF** on **(01904) 628036**.

July 9: The Sussex Amateur Radio and Computer Fair is celebrating its 20th annual event with refurbished facilities at the Brighton Race Course where the new owners have spent over £3million on improving the Grandstand and Exhibition halls, including the refreshment and bar areas. Doors are open from 0930-1600 with all the usual traders and club stands with the very popular Bring & Buy hall. Entrance fee will be £2.50 with free on-site parking. For further information, please 'phone **(01424) 428064**.

July 16: The McMichael Rally and Car Boot Sale takes place at the Haymill Youth Community Centre, 112 Burnham Lane, Slough. This is its regular venue, close to J7 on the M4. This is Berkshire's premier event with many traders present and the ever popular car boot sale, it makes it a good rally to visit. Various local radio clubs and organisations also have stands at the rally. Bar, food and refreshments will also be available. Talk-in on S22 (145.550MHz). Rally opens at 0930 and admission is just £1.50. Further information from **Dave Chislett G4XDU** on **(01628) 625720**, E-mail: **g4xdu@amsat.org** or for trade enquiries and bookings, contact **Min Standon G0JMS** on **0118-972 3504**, E-mail: **mins@mstanden.freeserve.co.uk** You can also visit the McMichael 2000 web site at **http://come.to/mmr99**

■ Peter Shore, c/o *SWM* EDITORIAL OFFICES, ARROWSMITH COURT, STATION APPROACH, BROADSTONE, DORSET BH18 8PW.
■ E-MAIL: peter.shore@pwpublishing.ltd.uk

Bandscan Europe

I reported in the last 'Bandscan Europe' column that digital radio is starting to take off here in the UK. On 10th June, CE Digital, the group formed by Capital Radio and EMAP Radio, launched its digital radio services in London, Birmingham and Manchester, and by the end of the month, London's digital 'early adopters' gained another raft of services when Switchdigital went on the air.

Two new national digital radio services joined the Digital One multiplex in the first half of the year. Oneword is the new spoken-word station that broadcasts plays, books and comedy programming. Primetime is an easy listening service produced by SAGA Radio, a division of the company that provides services from insurance to holidays for over 55s.

The digital landscape in radio is certainly changing, and Digital One is working hard to ensure a supply of low cost DAB Digital Radio receivers in the UK marketplace. Look out this summer for in-car radio sets at just under £300. For more information, call the Digital One helpline on **0207-518 2620**, or if you've got access to the Internet, log on to **www.ukdigitalradio.com**

Land Of Analogue

Back in the land of analogue radio, long wave is still a force to be reckoned with. Regular readers may remember that I've been telling the story over the past year or two of how a group of Dutch radio operators want to launch a long wave service called Delta Radio. Delta plans to beam music programmes to the UK.

At one stage, environmental objectors forced the station's plans to move into the water - literally building the enormous long wave transmitting masts in international waters off the Dutch coast. There were enormous technical challenges, such as how to feed the hundreds of kilowatts needed to run a long wave radio station out under the North Sea with safety and reliability.

Now, however, it seems that the station may be able to locate on-shore. It has submitted an application to build the long wave transmitter and antenna at Kootwijk, an old short wave station. One major British transmission company with experience of long wave broadcasting is reportedly short-listed as the builder of the transmitting facility.

Station News

In neighbouring Luxembourg, there is still no news about the state of the English-service that was planned by Briton Eric Wiltshire. It's been almost a year since the plans were announced, and nothing concrete has been heard about the relaunch of Luxie 208.

In May, the media in Serbia suffered a crackdown. On Wednesday 17th, Yugoslav police raided Studio B television in Belgrade and forced it off the air. Studio B was the last major television station not loyal to the Serbian government, and the Serbian authorities closed it because they claim it had illegally called for the violent overthrow of the government.

Studio B's editor-in-chief denied this claim. As a result of Studio B's closure, Radio B2-92 was forced off the air. B2-92 is the successor to the formerly independent Radio B92 that was taken over the Serbian authorities in April 1999 and B2-92 had been using a Studio B radio frequency. The radio operation got back on the air via satellite and the Internet, although it is unclear whether they have regained terrestrial transmission.

Back in April, Fahri Musliu, a Belgrade-based ethnic Albanian freelance reporter for the Voice of America's Albanian service was detained for around two and a half-hours by Belgrade police. The authorities claimed that Mr Musliu had failed to pay taxes.

Russia's deputy minister for mass media, Andrei Romanchenko, has claimed that Prague-based Radio Liberty is hostile to the Russian state. Radio Liberty, which is funded by the United States government, broadcasts in Russian and other languages of the former Soviet Union. During the Cold War, Radio Liberty and its sister organisation, Radio Free Europe, beamed propaganda and alternative programming to countries in the Soviet Bloc.

Thomas Dine, RFE/RL's president, rejected the charges, although he recognised that the views of Mr Romanchenko seemed to reflect the views of new Russian president, Vladimir Putin. The day after Mr Dine had spoken, the head of Russia's press ministry said that Romanchenko was expressing 'his own private point of view'.

Talking of propaganda services, there are two little-known services funded by Britain's Foreign and Commonwealth Office that promotes the views of the UK around the world. British Satellite News provides TV footage on a free-of-charge 'agency' basis to TV stations world-wide, while the London Radio Service produces news and feature material that is available for radio stations to use across the world.

Both services have been produced under contract by APTN for the past three years, and earlier this year, tenders were invited for the next three-year contract. During the final stage of presentations to the Foreign Office, APTN withdrew from the bidding process, saying that it no longer wished to produce the service as it potentially harmed APTN's image as an independent news agency. This left four bidders: Phoenix, a new company formed by former APTN Director Steve Turner; Worldwide Television, Media Link, and United News and Media. In the end, the FCO awarded the BSN contract to Worldwide Television and the LRS contract to Media Link. The new contracts start in the autumn.

The role of international radio broadcasting at times of crisis cannot be underestimated. As the border war continues to rage between Ethiopia and Eritrea, Deutsche Welle has increased broadcasts in Amharic. It has extended its daily one-hour programme by fifteen minutes to incorporate information about international aid organisations active in Ethiopia. Deutsche Welle says that it is the most listened-to foreign broadcaster in Ethiopia, with around four million people tuning in at least once a week.

At the same time, the Voice of America has added an hour of Amharic at weekends, with programmes in Tigrigna and Oromiffa for 15-minutes each, Monday to Friday. Frequencies for this hour-long transmission at 1800 are 11.69MHz from Kavala, Greece; 13.74MHz from Sri Lanka and 15.525MHz from Botswana.

New Look

BBC World Service launched a new-look Internet site to coincide with the introduction of new programme streams for its global English output. Check out **www.bbc.co.uk/worldservice** - there's even a guide to what's on now and what programme is coming next, that I've found incredibly useful.

Finally, Italians are claiming that high power radio transmitters are bad for the health. Authorities in Pomezia, a suburb of Rome, have issued a warrant forcing two m.w. transmitters on 846 and 1332kHz off the air. These are operated by state broadcaster RAI, and are used for shipping bulletins and the pan-European *Notturno Italiano* multi-lingual service. RAI has appealed against the local Mayor's action, saying that the claims are unfounded.

Almost simultaneously, Vatican Radio's transmitters are said to be harmful. An article in Britain's *Daily Telegraph* says that the transmitting station at Santa Maria di Galera, in a northern suburb of Rome, is causing cancer among local residents. Doctors in the area found an incidence of cancerous tumours at 30% above the national average.

We'll report on how these stories develop - but in the meantime, don't worry. No one's ever claimed that *listening* to the radio is bad for you! Until next time in *Bandscan Europe*, good listening.

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

LM&S

Once again the holiday season is here and many listeners will be packing their bags and heading for their chosen location. Exploring a new location can be a very interesting and rewarding experience. Equally enjoyable will be revisiting favourite places and meeting old friends if you prefer to return to familiar haunts.

It may be worthwhile to search the broadcast bands with a small portable receiver during the evening, so don't forget to take one with you! If you care to make a note of the broadcasts you hear and send the details to me I will be pleased to include some of them in LM&S. Please be sure to quote times in Universal Time Co-ordinated (UTC =GMT).

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 April.

A broadcast in Italian by Radiotelevisione Italiana (RAI) via their 10kW outlet at Caltanissetta, Italy, on **189kHz** was picked up at 2055UTC on April 30 by **Fred Pallant** in Storrington. Reception was very poor owing to 'splatter' from Saarlouis, Germany (2000kW) on **183kHz**.

Rikisutvarpid (RUV) in Reykjavik also have an outlet on **189kHz** - it is located at Gufuskalar, W.Iceland. **Thomas Williams** (Truro) heard it for the first time at 2305UTC on April 23. He listened again at 2305 on the 25th and heard a discussion. He says "I thought first the language was Dutch, then Spanish but the speakers are slow with a lilt something like the Welsh". On the 29th he logged their transmission at 2330UTC as SINPO 22111.

During a visit to the North West coast of Scotland **Brian Keyte** (Gt.Bookham) found he could receive the broadcasts from RUV in Reykjavik via their outlets at Gufuskalar on **189** and Eider, E.Iceland (100kW) on **207** during most of the day on an ordinary car radio plus whip antenna, with only a little splatter from BBC R4 on **198kHz**. No doubt the long clear sea paths result in little attenuation of the ground waves from these stations.

Medium Wave Reports

There were no reports of broadcasts from m.w. stations in E.Canada and E.USA reaching the UK at night during April. However, the sky waves from some of the many of the m.w. stations in the Middle East, N.Africa, Europe and Scandinavia did arrive here after dark - see chart.

The ground waves from some local radio stations were received in quite distant places during daylight - see chart. While searching the band in Northampton **Fred Wilmshurst** noticed that RTL Country on **1035kHz** were using the ident 'Ritz 1035 AM'.

Short Wave Reports

We are now in the peak year of the present solar cycle and many listeners are not prepared to venture into the **25MHz (11m)** band. Radio France International (RFI) is still broadcasting daily on **25.820** to listeners in E/C.Africa (Fr 0900-1300) but there were no reports to indicate how well their transmission is being received in the intended area. It has reached the UK via back scatter and other modes and was rated 44333 at 0900 by **Vic Prier** in Colyton; 32222 at 0905 by **Bernard Curtis** in Stalbridge; 35233 at 1000 by **Eddie McKeown** in Newry; 25522 at 1045 by **Simon Hockenhull** in E.Bristol; 34333 at 1100 by **Rhoderick Illman** in Oxted; 35333 at 1205 in Northampton.

The latest report fron **Alan Roberts** (Quebec, Canada) indicates that Radio For Peace International (RFPI), Costa Rica is still active on **25.930**. On May 9 he rated their u.s.b. transmission (Eng to Americas 1200-?) 34333 at 1800UTC, so listeners in the UK may well find it worthwhile to monitor that frequency. He has been receiving RFI well on **25.820**. At 1230UTC on May 9 their transmission rated 43444.

Quite a few broadcasters beam their transmissions in the **21MHz (13m)** band to listeners in selected areas but they can often be received well in other areas too. Mentioned in the reports were R.Finland via Pori **21.670** (Eng to Australia, Asia, W.Eur 0630-0645), rated 55544 at 0645 by **Stan Evans** in Herstmonceux; V of Russia **21.790** (Eng [WS]) 43334 at 0840 in Stalbridge; R.Australia via Shepparton **21.725** (Eng to Pacific areas 0200-0900) 22222 at 0858 in Truro; R.Australia via Shepparton **21.820** (Eng to Asia 0900-1400) 24222 at 0903 by **Tony Hall** in Freshwater Bay, IoW; DW via Wertachtal **21.790** (Eng to Australia, Asia 0900-0945) 44333 at 0915 by **Sheila Hughes** in Morden; DW via ? **21.680** (Eng to Oceania? 0900-0950) 35433 at 0941 in Northampton; R.Austria Int, Moosbrunn **21.765** (Ger, Eng to Australia 0930-1000) 33343 at 0950 by **Robert Hughes** in Liverpool; R.Norway Int **21.755** (Norw to S.America 1000-1027) 34434 at 1000 in Oxted; BBC via Cyprus **21.470** (Eng to Africa 1300-1700) 44344 at 1313 in Newry; UAE Abu Dhabi **21.735** (Ar to N.Africa 0700-1600) 44444 at 1450 by **David Hall** in Morpeth; WYFR Okeechobee, USA **21.455** (Eng to Eur 1600?-?) 54444 at 1753 by **Tom Winzor** in Plymouth; R.Nederlands via Bonaire, Ned.Antilles **21.590** (Eng to C/W.Africa 1830-2025) 35433 at 2015 in E.Bristol.

The narrow **18MHz (15m)** band, which is intended for s.s.b. broadcasting in the future, is being used by a few broadcasters with a.m. transmissions at present. They include R.Denmark via R.Norway **18.950** (Da to M.East? 0830-0855), rated 32423 at 0830 in Colyton; R.Norway **18.950** (Norw to N.America 1200-1230) 35444 at 1222 in Northampton; R.Sweden **18.960** (Eng to N.America 1230-1300?) 45444 at 1242 in Plymouth; Christian Science BC via WSHB Cypress Creek **18.910** (Fr, Eng to E/C.Africa 1600-2000) 34232 at 1808 in Newry.

Good reception over long distances has been noted in the **17MHz (16m)** band by some listeners in the UK. The most distant transmission comes from R.New Zealand on **17.675** (Eng to Pacific areas 1755-0705), rated 44333 at 0614 in Morpeth. R.Australia's broadcast to Asia via Shepparton on **17.750** (Eng 0000-0500, 0600-0830, 0830-1100) has also been received well. It was logged as a potent 45554 at 0615 by **David Edwardson** in Wallsend & 44444 at 0918 in Truro.

Long Wave Chart

Freq (kHz)	Station	Country	Power (kW)	Listener
153	Bechar	Algeria	1000	F,H*
153	Donebach DLF	Germany	500	A,B*,D*,E,F,H,I,K
153	Bod	Romania	1200	B*,H*
162	Allouis	France	2000	B,D*,E,F,G,H,I,K*
171	Nador Medi-1	Morocco	2000	H
171	B'shakovo etc	Russia	1200	B*,D*,E,F
171	Lvov	Ukraine	500	B*
171	Sasnovy	Belarus	1000	H*
177	Oranienburg	Germany	500	D*,E,F,H,I,K
183	Saarlouis	Germany	2000	D*,E,F,G,H,I,K*
189	Gufuskalar	W.Iceland	150	A*,D*,C,H*,J*
189	Caltanissetta	Italy	10	F
198	Droitwich BBC	UK	500	B,D,E,G,H,I,K
207	Munich DLF	Germany	500	A,B*,D*,E,F,H,I,K*
207	Eidar	E.Iceland	100	A*,C
207	Azilal	Morocco	800	F,H*
207	Kiev	Ukraine	500	H*
216	Roumoules RMC	S.France	1400	A,D*,E,F,G,H,I,K*
225	Polskie R-1	Poland	?	A,B,D*,F,H,K*
234	Beidweiler	Luxembourg	2000	D*,E,F,G,H*,I,K*
243	Kalundborg	Denmark	300	A,B,D*,E,F,H,I,K*
252	Tipaza	Algeria	1500	B*,F,H*
252	Atlantic 252	Eire	500	B*,D,E,F,G,H*,I,K
261	Burg(R.Ropa)	Germany	85	D*,E,F,H,I,K*
270	Topolna	Czech Rep	1500	A*,B*,D*,E,F,H,I
279	Sasnovy	Belarus	500	B*,D*,E,F,H*

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

Listeners:-

(A)	Simon Hockenhull, E.Bristol.
(B)	Sheila Hughes, Morden.
(C)	Brian Keyte, while at Rhue by Ullapool.
(D)	Eddie McKeown, Newry.
(E)	George Millmore, Wootton, IoW.
(F)	Fred Pallant, Storrington.
(G)	Tom Smyth, Co.Fermanagh.
(H)	Ernie Strong, Ramsey, Cambs.
(I)	Phil Townsend, E.London.
(J)	Thomas Williams, Truro.
(K)	Fred Wilmshurst, Northampton.

Continued on page 11

Also received here during the morning were the BBC via Ascension Is **17.830** (Eng to Africa 0800-2100) 54434 at 0835 in Stalbridge; R.Pakistan, Islamabad **17.835** (Ur 0800?-1100, Eng 1100-1105 to Eur) 43343 at 1100 in Liverpool; R.Bulgaria, Sofia **17.500** (Eng to Eur 1100-1200) 33333 at 1115 in Plymouth; R.Jordan via Al Karanah **17.680** (Eng to N.America 1000?-1200) 54433 at 1145 in Herstmonceux; Israel R, Jerusalem **17.545** (Heb [Home Svce relay] to Eur, N.America 0600-1900) 43344 at 1155 in Liverpool.

After mid-day RCI via Sackville, Canada **17.820** (Eng to USA, Mexico, Caribbean 1100-1400) was rated 34222 at 1234 in Newry; DW via Wertachtal, Germany **17.595** (Eng to Africa 1600-1645) was 23342 at 1600 in Storrington; R.Romania Int **17.735** (Eng to W.Eur 1700-1800) 44444 at 1708 by **Martin Dale** in Stockport; Channel Africa via Meyerton **17.860** (Eng to W.Africa 1700-1730) 44444 at 1723 by **Vera Brindley** in Woodhall Spa; WHRI via Maine, USA **17.650** (Eng to Eur, M.East, Africa 1600-2300) 23322 at 1730 in Colyton; BBC via Ascension Is **17.830** (Eng to Africa 0800-2100) 55444 at 1809 in Freshwater Bay, IoW; R.Nederlands via Bonaire, Ned.Antilles **17.605** (Eng to Africa 1830-2025) 34423 at 1845 in Oxted; HCJB Quito, Ecuador **17.660** (Eng to Eur 1900-2200) 34433 at 1900 by **Gerald Guest** in Dudley; R.Canada Int via Sackville **17.870** (Eng to Eur, Africa 2000-2200) 55545 at 2020 in E.Bristol; R.Canada Int via Sackville **17.820** (Fr, Eng to Eur, Africa 1800-2200) 44444 at 2035 in Morden; WYFR Okeechobee, USA **17.845** (Eng to Eur? 2000?-2200?) 35343 at 2035 in Northampton.

R.New Zealand's broadcast to Pacific areas in the **15MHz (19m)** band has been received by some listeners in the UK. Their 100kW transmission on **15.115** (Eng 0705-1005) was rated 44333 at 0710 in Morpeth & 33333 at 0920 in Truro. A special broadcast to NZ Troops in E.Timor then follows on **15.115** (1005-1205 daily).

R.Australia has also been reaching the UK in the early morning on the following frequencies: **15.415** from Shepparton (Eng to Asia 0100-0400, 0600-0900), rated 35533 at 0610 in E.Bristol; **15.515** from Shepparton (Eng SW/SC.Pacific, N.America 0200-0900), 35553 at 0611 in Wallsend; **15.240** from Shepparton (Eng to Pacific areas 0000-0800), 44444 at 0810 in Herstmonceux.

Also noted during the morning were HCJB Quito, Ecuador **15.160** (Eng to Eur? 0600-0800) 44444 at 0600 in Dudley; BBC via Ascension Is **15.400** (Eng to Africa 0700-1130) SIO 444 at 0700 by **Tom Smyth** in Co.Fermanagh; KTWR Guam **15.330** (Eng to Pacific 0800-1000) 33222 at 0800 in Morden; BBC via Cyprus **15.575** (Eng to E.Eur?, M.East? 0900-1500) 34433 at 0905 in Northampton; Swiss R.Int via Julich, Germany **15.315** (Eng, Ger, Fr, It to SW.Eur 1000-1230) 34222 at 1000 in Newry; R.Bulgaria **15.700** (Eng to W.Eur 1100-1200) 43443 at 1117 in Plymouth; HCJB Quito, Ecuador **15.115** (Eng to Eur? 1100-1600?) 34333 at 1127 in Oxted.

Later, the V of Greece, Athens **15.630** (Gr, Eng to Eur, N.America 1600?-1700) was 44344 at 1621 in Colyton; VOA via Philippines **15.255** (Eng to E.Asia 1700-1800) 33333 at 1700 in Woodhall Spa; VOIRI Tehran, Iran **15.084** (Home Sce relay) 54444 at 1910 in Liverpool; RCI via Sackville **15.325** (Eng to Eur, N&W.Africa 2000-2300) 45444 at 2041 in Freshwater Bay, IoW; R.Taipei Int via WYFR **15.600** (Eng to Eur 2200-2300) 33333 at 2220 in Stalbridge.

In the **13MHz (22m)** band Swiss R.Int via Sottens **13.685** (Eng, It, Ger, Fr to Australia 0830-1030) was rated 33333 at 0835 in Truro; R.Denmark via R.Norway Int **13.800** (Dan to Eur, Canaries 1130-1200) 44344 at 1143 in Oxted; R.Austria Int via Moosbrunn **13.730** (Eng, Ger to Eur 1230-1400) 54444 at 1238 in Plymouth; R.Prague, Czech Rep. **13.580** (Eng to Eur, Asia 1300-1330) 44243 at 1303 in Newry; R.Kuwait via Kabd **13.620** (Ar to Eur, N.America 0930-1605) 54454 at 1520 in Liverpool; R.Austria Int via Moosbrunn **13.730** (Eng to Eur, Africa 1630-1700) 44444 at 1639 in Stockport; Croatian R, Zargreb **13.830** (Cr to Eur, N.America) 42433 at 1746 in Colyton; R.Nederlands via Flevo **13.700** (Eng to Africa 1830-2025) 45544 at 1838 in Northampton; R.Damascus, Syria **13.610** (Eng to Eur 2005-2105) 33322 at 2045 in Morden; RCI via Sackville, Canada **13.670** (Eng to USA, Mexico, Caribbean 2230-0000) 35433 at 2245 in E.Bristol.

There is a high level of activity in the **11MHz (25m)** band throughout the day. The occupants include World Harvest R via ? **11.565** (Eng to ?), rated 22222 at 0840 in Truro; R.Japan via Skelton, UK **11.710** (Jap, Eng to Eur 0800-1000, [also via Woofferton, UK Russ 1100-1200]) 44434 at 0918 in Oxted; R.France Int via Allouis? **11.670** (Eng to Eur 1200-1257) 33333 at 1200 in Plymouth. After mid-day, Polish R [R.Polonia], Warsaw **11.820** (Eng to Eur? 1200?-1300?) was 44343 at 1215 in Northampton; BBC via Woofferton, UK **12.095** (Eng to Eur, N/E.Africa 0600-1700) 44444 at 1312 in Freshwater Bay, IoW; R.Jordan via Al Karanah **11.690** (Eng to W.Eur, E.USA 1300-1730) 53443 at 1510 in Herstmonceux; R.Australia via Shepparton **11.660** (Various to Asia 1430-1700) 44444 at 1525 in Morpeth.

Later, they include R.Nederlands via Flevo **11.655** (Eng to Africa 1730-2025), rated 44444 at 1750 in Woodhall Spa; AIR via Bangalore **11.620** (Eng, Hin to Eur 1745-2230) 45434 at 1824 in Colyton; V of Mediterranean, Malta via Russia? **12.060** (Eng to Eur, N.Africa 1900-2000) 34443 at 1900 in Newry; R.Kuwait via Kabd **11.990** (Eng to Eur, N.America 1800-2100) 54434 at 1935 in Stalbridge; VOIRI Iran **11.670** (Eng to Eur 1900-2000) 54555 at 1950 in Liverpool; BBC via

Local Radio Chart

Freq (kHz)	Station	ILR BBC	e.m.r.p (kW)	Listener
558	Spectrum, London	I	0.80	A,H,J,L
603	Capital G,Litt'brne	I	0.10	H,J,K,L
630	R.Bedfordshire(3CR)	B	0.20	A,E,H,J,K,L
630	R.Cornwall	B	2.00	H
657	R.Clwyd	B	2.00	H,J,K
657	R.Cornwall	B	0.50	H
666	Cl.Gold 666, Exeter	I	0.34	H,J,L
666	R.York	B	0.80	A,G*,J,K
729	BBC Essex	B	0.20	H,J,K,L
738	Hereford/Worcester	B	0.037	A,C,H,J,K,L
756	R.Cumbria	B	1.00	F,G*,J
756	The Magic 756,Powys	I	0.63	A,H,J,L
765	BBC Essex	B	0.50	E*,H,J,L
774	R.Kent	B	0.70	H,J,K,L
774	R.Leeds	B	0.50	A
774	Cl.Gold 774, Glos	I	0.14	A,H,L
792	Cl.Gold 792,Bedford	I	0.27	H,J,K,L
792	R.Foyle	B	1.00	F,I
801	R.Devon	B	2.00	C,G*,H,J
828	Cl.Gold 828, Luton	I	0.20	J,K,L
828	Cl.G 828 Bournem'th	I	0.27	H
837	R.Cumbria/Furness	B	1.50	F
837	Asian Netwk Leics	B	0.45	A,H,J,L
855	R.Devon	B	1.00	H
855	R.Lancashire	B	1.50	A,G*
855	R.Norfolk, Postwick	B	1.50	J,K
855	Sunshine 855,Ludlow	I	0.15	A,L
873	R.Norfolk, W.Lynn	B	0.30	A,H,J,K,L
936	Brunel CG, W.Wilts	I	0.18	B,H,J,L
936	Fresh AM, Hawes	I	1.00	A,F
945	Cl.Gold GEM, Derby	I	0.20	A,F,J,L
945	Capital G, Bexhill	I	0.75	H,J,K
954	Cl.Gold 954 via ?	I	?	J
954	Cl.Gold 954,Torquay	I	0.32	H
954	Cl.Gold 954, H'ford	I	0.16	A,B,C,L
963	Asian Sd, E.Lancs	I	0.80	A
963	Liberty R, Hackney	I	1.00	F,H,J,L
972	Liberty R, Southall	I	1.00	F,H,J,L
990	R.Aberdeen	B	1.00	F
990	R.Devon, E.Devon	B	1.00	C,H
990	Magic AM,Doncaster	I	0.25	J
990	Cl.G, Wolverhampton	I	0.09	A,J,L
999	C.Gold GEM Nott'ham	I	0.25	J,L
999	Magic 9-99 P'stn	I	0.80	F
999	R.Solent	B	1.00	C,H,K
999	Valley R, Aberdare	I	0.300	C
1017	Cl.G,WABC,Shr'shire	I	0.70	A,B,E*,J,K,L
1026	R.Cambridgeshire	B	0.50	A,E,J,K,L
1026	Downtown R, Belfast	I	1.70	F,I
1026	R.Jersey	B	1.00	C,H
1035	RTL Country 1035	I	1.00	E,G*,H,J,L
1035	R.Sheffield	B	1.00	A,J
1035	N.Sound 2, Aberdeen	I	0.78	F
1035	West Sound AM, Ayr	I	0.32	F
1107	Moray Fth,Inverness	I	1.50	F
1116	R.Derby	B	1.20	A,F,J,K,L
1116	R.Guernsey	B	0.50	H
1116	Valley R, Ebbw Vale	I	0.50	C,F
1152	Cl.G Amber, Norwich	I	0.83	J
1152	Clyde 2, Glasgow	I	3.06	F
1152	LBC 1152 AM	I	23.50	H,J,L
1152	Pic'ly 1152,Manch'r	I	1.50	A
1152	Cl.G, Birmingham	I	3.00	L
1161	R.Bedfordshire(3CR)	B	0.10	J,K,L
1161	Brunel Cl.G,Swindon	I	0.16	H
1161	Southern Counties R	B	1.00	H
1161	Tay AM, Dundee	I	1.40	F
1170	Cl.G Amber, Ipswich	I	0.28	J
1170	Magic 1170,Stockton	I	0.32	F
1170	Capital G,Portsm'th	I	0.50	H
1170	Signal 2,Stoke-on-T	I	0.20	A
1170	1170AM,High Wycombe	I	0.25	L
1242	Capital G,Maidstone	I	0.32	E*,H,K
1251	C.G Amber,Bury StEd	I	0.76	F,J,K,L
1260	Brunel CG, Bristol	I	1.60	H,I
1260	Marcher G, Wrexham	I	0.64	A,F
1260	SabrasSnd,Leicester	I	0.29	A,J,L
1278	Cl.Gold 1278 W.York	I	0.43	A,J
1296	Radio XL,Birmingham	I	5.00	A,H,J,I,L
1305	Premier via ?	I	0.50	F,H,J,L
1305	Touch AM, Newport	I	0.20	H
1323	Capital G,Southwick	I	0.50	H,K,L
1323	SomersetSnd,Bristol	B	0.63	B,F
1332	Premier, Battersea	I	1.00	H
1332	Cl.Gold 1332,Pr'bo	I	0.60	A,F,J,L
1332	Wiltshire Sound	B	0.30	F,H
1359	Breeze, Chelmsford	I	0.28	E
1359	Cl.Gold 1359, C'try	I	0.27	A,J,L
1359	R.Solent	B	0.85	H
1368	R.Lincolnshire	B	2.00	J,L
1368	Southern Counties R	B	0.50	E*,H,K
1368	Wiltshire Sound	B	0.10	B,H
1377	Asian Sd, Rochdale	I	0.10	A
1413	R.Gloucester via ?	B	?	B,C,F,J*,L
1413	Premier via ?	I	0.50	F,H,J
1413	Fresh AM, Skipton	I	0.10	F,J
1431	Breeze,Southend	I	0.35	J,K
1431	Cl.Gold, Reading	I	0.14	H,I,L
1449	R.Peterboro/Cambs	B	0.15	H,J,L
1458	R.Cumbria	B	0.50	F
1458	R.Devon	B	2.00	H
1458	1458 Lite AM Manch'	I	5.00	A
1458	R.Newcastle	B	2.00	F
1458	Sunrise, London	I	50.00	H,J,L
1458	Asian Netwk Langley	B	5.00	J,L
1485	Cl.Gold, Newbury	I	1.00	C,L
1485	R.Humberside (Hull)	B	1.00	J*
1485	R.Merseyside	B	1.20	H,I
1485	Southern Counties R	B	1.00	H,K
1503	R.Stoke-on-Trent	B	1.00	A,F,H,J,L
1521	Breeze, Reigate	I	0.64	E,F,H,J*,K,L
1530	R.Essex, Southend	B	0.15	H,J,K
1530	Cl.Gold W.Yorks	I	0.74	A,J
1530	Cl.Gold Worcester	I	0.52	H,L
1548	Capital G, London	I	97.50	H,J
1548	Magic1548,Liverpool	I	4.40	I
1548	Forth AM, Edinburgh	I	2.20	F
1557	R.Lancashire	B	0.25	F
1557	Cl.Gold 1557,N.hant	I	0.76	J,K,L
1557	Capital G, So'ton	I	0.50	H
1566	CountySnd,Guildford	I	0.50	E*,F,H,K
1584	London Turkish R	I	0.20	H,J
1584	Tay, Perth	I	0.21	F
1602	R.Kent	B	0.25	F,H,J,K

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

Listeners:-

(A)	Martin Dale, Stockport.
(B)	Francis Hearne, N.Bristol.
(C)	Simon Hockenhull, E.Bristol.
(E)	Sheila Hughes, Morden.
(F)	Brian Keyte, while at Rhue by Ullapool.
(G)	Eddie McKeown, Newry.
(H)	George Millmore, Wootton, IoW.
(I)	Tom Smyth, Co.Fermanagh.
(J)	Ernie Strong, Ramsey, Cambs.
(K)	Phil Townsend, E.London.
(L)	Fred Wilmshurst, Northampton.

Woofferton, UK **12.095** (Eng to Asia 1700-2100) 43333 at 2015 in Morden; R.Bulgaria **11.700** (Eng to Eur 2100-2200) SIO 444 at 2109 by Francis Hearne in N.Bristol; WWCR Nashville, USA **12.160** (Eng to N.America, Eur 1400-2200) SIO434 at 2200 in Co.Fermanagh; BBC via Ascension Is **12.095** (Eng to S.America 2100-0300) rated 25322 at 0045 in E.Bristol; BBC via Cyprus **12.095** (Eng to E.Africa? 0300-0400) 22222 at 0315 by **Bill Griffith** while in New York.

There is much to interest the listener in the **9MHz (31m)** band too! During the morning R.Nederlands via Bonaire, Ned.Antilles **9.795** (Eng to Asia, Far East 0930-1125) rated 43334 at 0940 in Stalbridge; AWR via ? **9.610** (Eng to Eur? 0930-1000) 44344 at 0955 in Freshwater Bay, IoW; R.Nederlands via Wertachtal **9.860** (Eng to Eur 1030-1225) 54444 at 1150 in Plymouth; R.Vlaanderen Int, Belgium **9.925** (Eng to Eur 1130-1200) 55544 at 1150 in Northampton.

During the evening VOA via Kavala **9.760** (Eng to M.East? 1700-2100) was SIO 333 at 1700 in Co.Fermanagh; BBC via Kranji, Singapore **9.740** (Eng to Australia? 1800-2200) 23222 at 1825 in Colyton; R.Pyongyang, Korea **9.335** (Eng to Eur 1900-2000) 44334 at 1900 in Dudley; R.Nederlands via Flevo **9.895** (Eng to Africa 1830-2025) 55555 at 1930 in Liverpool; R.Australia via Shepparton **9.500** (Eng to Asia 1430-2130) 24343 at 1941 in Storrington; V of Armenia via Kamo **9.965** (Eng to Eur 1955-2015) 43443 at 1955 in Morden; China R.Int via ? **9.440** (Eng to Eur 2000-2100) 44333 at 2037 in Oxted; R.Bulgaria **9.400** (? to ? ?-?) 33443 at 2049 in Stockport.

Later, VOA via Thailand? **9.535** (Eng to ? 2100-2200) was 32333 at 2151 in Woodhall Spa; R.Cairo, Egypt **9.990** (Eng to Eur 2115-2245) 35343 at 2211 in Newry; R.Nac del Paraguay **9.735** (Sp 0800-0400) 24543 at 2255 in Wallsend; BBC via Skelton & Woofferton, UK **9.410** (Eng to ? 0300-0700) 33333 at 0310 in New York; Swiss R.Int via Sottens **9.885** (Ger, Eng, Sp, Fr, It to N & C.America 0030-0545) 44444 at 0438 by **John Parry** in Larnaca, Cyprus.

Some of the broadcasts to Europe in the **7MHz (41m)** band were mentioned in the reports: R.Japan via Woofferton, UK **7.230** (Jap, Eng 0500-0700) was rated 55544 at 0550 in Herstmonceux; V of the Mediterranean,

Medium Wave Chart

Freq (kHz)	Station	Country	Power (kW)	Listener
520	Hof/Wurzburg (BR)	Germany	0.2	D*,E
526	Vatican R.	Italy	5	G*
531	Torshavn	Faeroe Is.	100	C
531	RNE5 via ?	Spain	?	D*,E,G*
531	Beromunster	Switzerland	500	F*,G*,J*
540	Wavre	Belgium	150/50	D*,E,G,H,I*,J
540	Sidi Bennour	Morocco	600	A*,E*,G*
549	Les Trembles	Algeria	600	A*,E*,G*
549	Thurnau (DLF)	Germany	200	D*,E,G*,H,J
558	Espoo	Finland	50	D*,G*
558	RNE5 via ?	Spain	?	D*,E*,G*
567	Tullamore(RTE1)	Eire	500	C,D*,E,F,G*,H,J,K*
567	RNE5 via ?	Spain	?	G*
576	Muhlacker(SDR)	Germany	500	G*,J*
576	Riga	Latvia	500	G*
576	Barcelona(RNE5)	Spain	50	D*,G*
585	Paris(FIP)	France	8	E,G,H
585	Madrid(RNE1)	Spain	200	A*,D*,E*,F*,G*,J*
585	Dumfries(BBCScot)	UK	2	C,D*
594	Frankfurt(HR)	Germany	1000/400	D*,E*,G*,J*
594	Oujda-1	Morocco	100	E*,G*
594	Muge	Portugal	100	G*
603	Lyon	France	300	E
603	Sevilla(RNE5)	Spain	50	A*,E*,G*
603	Newcastle(BBC)	UK	2	A*,C,D*,G
612	Athlone(RTE2)	Eire	100	C,D*,E,F,G,H,J*
612	Sebaa Aioun	Morocco	300	E*
612	RNE1 via ?	Spain	10	G*
621	Wavre	Belgium	80	D*,E,G,H,J
621	Batra	Egypt	2000	G*
621	RNE1 via ?	Spain	10	G*
621	Barcelona(DCR)	Spain	50	D*,E*
630	Vigra	Norway	100	D*,G*
630	Tunis-Djedeida	Tunisia	600	D*,E*,G*
639	Praha(Liblice)	Czech	1500	D*
639	RNE1 via ?	Spain	?	A*,D*,E*,G*,J
648	Orfordness(BBC)	UK	500	C,D*,E,F*,G*,H,J
648	Kharkiv	Ukraine	150	G*
657	Napoli	Italy	120	D*,E*
657	Madrid(RNE5)	Spain	20	E*,G*
657	Wrexham(BBCWales)	UK	2	C,D*,G,J*
666	MesskirchRohrd(SWF)	Germany	150	J*
666	Sitkunai(R.Vilnius)	Lithuania	500	G*
666	Lisboa	Portugal	135	E*,G*
675	R10 FM	Holland	120	D*,E,G*,H,J*
684	Sevilla(RNE1)	Spain	500	A*,D*,E*,G*,J*
693	Droitwich(BBC)	UK	150	E,G,J
693	Enniskillen(BBC)	UK	1	F
702	Flensburg(NDR)	Germany	5	D*,E*
702	TWR via Monte Carlo	Monaco	300	A*,E*,G*
702	Presov	Slovakia	200	G*
711	Rennes 1	France	300	A,D*,E,H,J
711	Laayoune	Morocco	600	E*,G*
711	Murcia(COPE)	Spain	5	G*
720	Langenberg	Germany	200	G*
720	Lisnagarvey(BBC4)	N.Ireland	10	C,E*
720	Lots Rd,Ldn(BBC4)	UK	0.5	E,F*,G*
729	Cork(RTE1)	Eire	10	D*,E,F,G
729	RNE1 via ?	Spain	?	D*,E*,G*,J*
738	Paris	France	4	E
738	Barcelona(RNE1)	Spain	500	A*,D*,E*,G*,J*
747	Flevo(Hilv2)	Holland	400	D,E,G*,H,J
756	Braunschweig(DLF)	Germany	800/200	D*,E*,G*,J*
756	Bilbao(EI)	Spain	5	E*,G*
756	Redruth(BBC)	UK	2	A*,D*,F*
765	Sottens	Switzerland	500	D*,E*
774	Enniskillen(BBC)	N.Ireland	1	C,D*,F
774	RNE1 via ?	Spain	?	D*,E*,J*
783	Leipzig(MDR)	Germany	100	A,D*,E*,G*,J*
783	Miramar(R.Porto)	Portugal	100	E*
792	Limoges	France	300	D*
792	Sevilla(SER)	Spain	20	D*,E*
792	Londonderry(BBC)	UK	1	F
801	Munchen-Ismaning	Germany	300	D*,E*,G*
801	RNE1 via ?	Spain	?	E*,G*
810	Madrid(SER)	Spain	20	D*,G*
810	Westerglen(BBCScot)	UK	100	D*,E*,F,G*,J
819	Batra	Egypt	450	A*,D*,G*
819	S.Sebastian(EI)	Spain	5	E*,G*
828	Rotterdam	Holland	20	D*
837	Nancy	France	200	D*,F*
837	COPE via ?	Spain	?	D*,E*,G*
846	Rome	Italy	1200	A*,F*,J*
846	Noginsk	Russia	150	D*
855	RNE1 via ?	Spain	?	A*,D*,E*,G*,J*
864	Santah	Egypt	500	D*,E*,G*
864	Paris	France	300	E,G,H
873	Frankfurt(AFN)	Germany	150	A,C,D*,E*,J*
873	Zaragoza(SER)	Spain	20	D*,E*
873	Enniskillen(R.UI)	UK	1	C,D*,F
882	COPE via ?	Spain	?	D*,E*,G*
882	Washford(BBCWales)	UK	100	C,D*,E,G*,H,J
891	Algiers	Algeria	600/300	A*,E*,G*
891	Hulsberg	Netherlands	20	D*
900	Brno(CRo2)	Czech Rep	25	D*,E*
900	Milan	Italy	600	A*,D*,E*,G*
900	COPE via ?	Spain	?	G*
909	Lisnagarvey(BBC5)	N.Ireland	10	F
909	B'mans Pk(BBC5)	UK	140	E,G,J
918	Oomzale	Slovenia	600/100	D*,E*,G*
918	Madrid(R.Int)	Spain	20	G*
927	Wolvertem	Belgium	300	D*,E,F,G,H,J*
936	Bremen	Germany	100	D*,E*
936	Venezia	Italy	20	E*
936	RNE5 via ?	Spain	?	G*
945	Toulouse	France	300	D*
954	Brno (CRo2)	Czech Rep.	200	D*,E*,G*
954	Madrid(CI)	Spain	20	D*,E*,G*
963	Pori	Finland	600	D*,E*,G*
963	Tir Chonaill	Eire	10	F*
963	Tunis-Djedeida	Tunisia	200	G*
972	Hamburg(NDR)	Germany	300	D*,E*,G*
981	Alger	Algeria	600/300	E*,G*
990	Berlin	Germany	300	D*,G*,J*
990	R.Bilbao(SER)	Spain	10	D*,E*
990	Redmoss(BBC)	UK	1	D*
990	Tywyn(BBC)	UK	1	C,F
999	Schwerin (RIAS)	Germany	20	D*
999	Madrid(COPE)	Spain	50	D*,G*,J*
1008	SER via ?	Canaries/Spain	?	G*
1008	Flevo(Hilv-5)	Holland	400	B*,D*,E,G,H,J*
1017	Rheinsender(SWF)	Germany	600	B*,D*,E*,F,G,J*
1017	RNE5 via ?	Spain	?	B*
1026	SER via ?	Spain	?	E*
1035	Lisbon(Prog3)	Portugal	120	D*
1044	Dresden(MDR)	Germany	20	D*,G*
1044	SER via ?	Spain	?	B*
1044	S.Sebastian(SER)	Spain	10	D*,E*,G*
1053	Talk Sport via ?	UK	?	B,D*,E,F,G,J
1062	Kalundborg	Denmark	250	D*,E*,G*,H,J*
1062	R.Uno via ?	Italy	?	B*,D*
1071	Cairo	Egypt	100	G*
1071	Riga	Latvia	50	E*
1071	Bilbao(EI)	Spain	5	B,D*,G*,J*
1071	Talk Sport via ?	UK	?	B,D*,G
1080	SER via ?	Spain	?	B*,D*,E*,G*
1089	Talk Sport via ?	UK	?	B*,D*,E,F,G,J
1098	Nitra(Jarok)	Slovakia	1500	B*,D*,E*,G*
1098	RNE5 via ?	Spain	?	B*
1107	AFN via ?	Germany	10	D*
1107	Talk Sport via ?	UK	?	D*,E,G
1125	La Louviere	Belgium	20	D*
1125	El Beida	Libya	500	G*
1125	RNE5 via ?	Spain	?	E*,G*
1125	Llandrindod Wells	UK	1	F
1134	Zadar(Croatian R)	Croatia	600/1200	D*,E*,J*
1134	COPE via ?	Spain	2	G*
1143	AFN via ?	Germany	1	C,D*,G*
1143	COPE via ?	Spain	2	D*,E*,G*
1161	Ain-Salah	Algeria	5	E*
1179	SER via ?	Spain	?	G*
1179	Solvesborg	Sweden	600	D*,E*,J*
1188	Kuurne	Belgium	5	D*,E*,G*,H
1188	Reichenbach(MDR)	Germany	5	G*
1197	Munich(VOA)	Germany	300	D*
1197	Virgin via ?	UK	?	D*,E,F,G,J
1215	Virgin via ?	UK	?	D*,E,F,G,J
1224	Lelystad	Holland	50	D*,E*,G*
1224	COPE via ?	Spain	?	G*
1233	RFE via ?	Czech Rep.	?	D*
1233	Virgin via ?	UK	?	D*,F,G,J
1242	Marseille	France	150	A*,D*
1242	Virgin via ?	UK	?	D*,F,G
1251	Marcali	Hungary	500	D*,G*
1251	Huisberg	Netherlands	10	D*,E*
1260	SER via ?	Spain	?	D*
1260	Guildford (V)	UK	0.5	C,D*
1269	Neumunster(DLF)	Germany	600	D*,E*,G*,J*
1269	COPE via ?	Spain	?	G*
1278	Dublin/Cork(RTE2)	Eire	10	A*,C,D*,E*,F*,G*,H,J*
1287	RFE via ?	Czech Rep.	?	D*,E*,J*
1287	Lerida(SER)	Spain	10	D*,E*
1296	Valencia(COPE)	Spain	10	E*,G*
1296	Orfordness(BBC)	UK	500	A*,D*,F*,G*
1305	RNE5 via ?	Spain	?	D*,E*,G*
1314	Kvitsoy	Norway	1200	A*,D*,E*,G*,J*
1323	W'brunn (V.Russia)	Germany	1000/150	A*,D*,J*
1332	Rome	Italy	300	D*,E*,G*
1341	Lisnagarvey(BBC)	N.Ireland	100	C,E*,F,G*,J*
1341	Tarrasa(SER)	Spain	2	E*
1350	Cesvaine/Kuldiga	Latvia	50	E*,G
1359	Madrid(RNE-FS)	Spain	600	D*,G*
1368	Foxdale(Manx R)	Is of Man	20	B*,C,E*,F
1377	Lille	France	300	D*,E,H
1386	Ahwaz	Iran	400	D*
1386	Bolshakovo	Russia	2500	A*,B*,E*,G*
1395	Fllake	Albania	1000	G*
1395	Lopic	Netherlands	120/40	D*,E,F*,G,H,J*
1404	Brest	France	20	A*,D*,E,F*,J*
1413	RNE5 via ?	Spain	?	D*,G*
1422	Heusweiler(DLF)	Germany	1200/600	D*,E*,G*,J*
1440	Marnach(RTL)	Luxembourg	1200	E,G*
1440	Damman	Saudi Arabia	1600	D*
1449	Squinzano (RAI)	Italy	50	E*
1449	Redmoss(BBC)	UK	2	A*,C,D*,E*,F
1458	Fllake	Albania	500	G*
1467	Monte Carlo(TWR)	Monaco	1000/400	D*,E*,G*
1476	Wien-Bisamberg	Austria	600	D*,G*
1485	SER via ?	Spain	?	G*
1485	Carlisle(BBC)	UK	1	C
1494	Clermont-Ferrand	France	20	D*
1494	St.Petersburg	Russia	1200	D*,E*
1512	Wolvertem	Belgium	300	D*,E,G,H,J*
1512	Jeddah	Saudi Arabia	1000	D*
1521	Kosice(Cizatice)	Slovakia	600	D*,E*
1521	Duba	Saudi Arabia	2000	G*
1521	R.Manresa(SER)	Spain	2	E*
1530	Vatican R	Italy	150/450	A*,B*,D*,E*,G*,J*
1539	Mainflingen(ERF)	Germany	350(700)	D*,E*,F,G*,J*
1539	SER via ?	Spain	?	G*
1557	Nice	France	300	D*
1566	Bandarabbas	Iran	100	G*
1575	Genova	Italy	50	A*,E*,G*
1575	SER via ?	Spain	5	D*,G*
1584	SER via ?	Spain	2	E*,G*
1593	Holzkirchen(VOA)	Germany	150	D*,E*,F*
1593	Polonne	Ukraine	1	G*
1602	SER via ?	Spain	?	D*,E*,G*,J*
1602	Vitoria(EI)	Spain	10	D*,E*,G*,J*
1611	Vatican R	Italy	15	C

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

Listeners:-

(A) Simon Hockenhull, E.Bristol.
(B) Sheila Hughes, Morden.
(C) Brian Keyte, while at Rhue by Ullapool.
(D) Eddie McKeown, Newry.
(E) George Millmore, Wootton IoW.
(F) Tom Smyth, Co.Fermanagh
(G) Ernie Strong, Ramsey, Cambs.
(H) Phil Townsend, E.London.
(I) Thomas Williams, Truro.
(J) Fred Wilmshurst, Northampton.
(K) Tom Winzor, Plymouth.

Tropical Bands Chart

Freq (MHz)	Station	Country	UTC	DXer
3.240	TWR Shona	Swaziland	1857	G,H
3.255	BBC via Meyerton	S.Africa	1856	G,H
3.270	Namibian BC,Windhoek	Namibia	1856	F,G,H,J
3.290	Namibian BC,Windhoek	Namibia	1900	H,J
3.316	SLBS Goderich	Sierra Leone	2005	H
3.320	SABC (RSG) Meyerton	S.Africa	1858	H
3.335	CBS Taipei	Taiwan	2004	H,I
3.345	AIR Jaipur	India	1630	I
3.365	GBC R-2	Ghana	2003	F,G,H
3.380	NBC Blantyre	Malawi	1938	H
3.955	BBC via Skelton	England	2200	M
3.955	R.Taipei via Skelton	England	1904	A,F,G,J,L
3.970	R.Korea via Skelton	England	2100	K,L
3.975	R.Budapest	Hungary	2130	D,E,F,G,J,K,L,M,N
3.985	Nexus, Milan	Italy	1837	F,G,L,N
3.995	DW via Julich	Germany	2145	G,L,M,N
4.005	Vatican R.	Italy	0334	G
4.760	ELWA Monrovia	Liberia	0209	G
4.770	FRCN Kaduna	Nigeria	2042	G,H,L,N
4.783	RTM Bamako	Mali	1943	H
4.790	Azad Kashmir R.	Pakistan	0022	G,J
4.800	LNBS Maseru	Lesotho	0210	G,J
4.820	R.Botswana, Gaberone	Botswana	0211	G
4.820	La Voz Evangelica	Honduras	0610	C
4.830	R.Tachira	Venezuela	0211	C,G
4.835	RTM Bamako	Mali	2009	B,C,E,F,G,H,J,L,N
4.840	AIR Bombay	India	0023	G
4.845	ORTM Nouakchott	Mauritania	1952	G,H,J
4.850	R.Yaounde	Cameroon	2009	G,H,L,N
4.860	AIR Delhi	India	1654	H
4.865	R.Missoes, Amazonia	Brazil	0620	C
4.875	R.Roraima, Boa Vista	Brazil	0337	G
4.885	R.Clube do Para	Brazil	0213	C,G
4.885	KBC East Sce Nairobi	Kenya	1844	F,G,H
4.890	RFI Paris	via Gabon	0358	G
4.905	Anhanguera	Brazil	0625	C
4.905	R.Nat.N'djamena	Chad	0438	G
4.915	GBC-1, Accra	Ghana	2016	B,G,H,N
4.915	KBC Cent Sce Nairobi	Kenya	1806	H
4.920	R.Quito, Quito	Ecuador	0627	C
4.920	AIR Chennai	India	0026	G
4.930	Namibian BC,Windhoek	Namibia	0217	G
4.950	AIR Srinagar	India	0027	G
4.950	VOA via Sao Tome	Sao Tome	2030	G,H,L
4.955	R.Nac. de Colombia	Colombia	0219	C,G
4.965	Christian Voice	Zambia	1951	F,H
4.975	R.Uganda, Kampala	Uganda	2000	E,G,H,J,L
4.980	Ecos del Torbes	Venezuela	0220	C,G
4.985	R.Brazil Central	Brazil	0221	G
5.010	AIR Thiru'puram	India	0028	G
5.025	R.Uganda, Kampala	Uganda	1819	F,H
5.035	R.Bangui	C.Africa	2037	H
5.047	R.Togo, Lome	Togo	2015	G,H,N
5.050	R.Tanzania	Tanzania	1812	G,H
5.055	RFO Cayenne(Matoury)	French Guiana	0223	G
5.100	R.Liberia, Totota	Liberia	2012	H

DXers:-

(A) Bernard Curtis, Stalbridge.
(B) David Edwardson, Wallsend.
(C) David Hall, Morpeth.
(D) Simon Hockenhull, E.Bristol.
(E) Robert Hughes, Liverpool.
(F) Rhoderick Illman, Oxted.
(G) Eddie McKeown, Newry.
(H) Fred Pallant, Storrington.
(I) John Parry, Larnaca, Cyprus.
(J) Vic Prier, Colyton.
(K) Tom Smyth, Co.Fermanagh.
(L) Phil Townsend, E.London.
(M) Thomas Williams, Truro.
(N) Fred Wilmshurst, Northampton.

Malta via Russia? **7.150** (Eng 0600-0630) 55455 at 0615 in Newry; WYFR via Okeechobee, USA **7.355** (Eng 0600-0800, also to Africa) 54444 at 0731 in Plymouth; R.Slovakia Int **7.345** (Eng 1630-1657) 43333 at 1633 in Stockport; R.Polonia (Polish R), Warsaw **7.285** (Eng 1700-1800) 43333 at 1725 in Morden; AIR via Bangalore **7.410** (Eng 1745-1945) 32333 at 1830 in Colyton; Sudwestfunk via Rohrdorf **7.265** (Ger 24hrs) 44454 at 1830 in Liverpool; Voice of Greece, Athens **7.475** (Eng, Gr 1900-1930) 45444 at 1905 in Northampton; R.Norway Int **7.485** (Norw 2000-2030) 44444 at 2010 in Oxted; R.Yugoslavia **7.230** (Eng 2200-2230) 32222 at 2220 in Stalbridge.

Also noted were KTBN via Salt Lake City, USA **7.510** (Eng to N.America 0000-1600), rated 43333 at 0515 in Morpeth; V of Nigeria, Ikorodu **7.255** (Eng to W.Africa 1900-2100?) - drum intro to news in Eng heard at 1858 in Storrington but was marred by adjacent channel interference from 1900.

Some of the many broadcasters using the **6MHz (49m)** band to reach listeners in Europe were noted in the reports: R.Vlaanderen Int, Belgium **5.985** (Eng 0700-0730) was rated 44232 at 0700 in Newry; Deutschland R, Berlin **6.005** (Ger 24hrs) 44444 at 0850 in Oxted; Deutsche Welle (DW) via Julich? **6.140** (Eng Service) 33333 at 1115 in Stalbridge; R.Nederlands via Julich, Germany **6.045** (Eng 1030-1225) 55544 at 1210 in Herstmonceux; R.Slovakia Int **5.920** (Eng 1630-1657) 43333 at 1633 in Stockport; Bayerischer Rundfunk, Germany **6.085** (Ger 24hrs) 44444 at 1817 in Colyton; Swiss R.Int via Julich, Germany **6.110** (Ger, It, Fr, Eng 1730-1930) 54545 at 1900 in E.Bristol; R.Korea Int via Kimjae **6.480** (Various [also to N.Africa]) 33222 at 1935 in Liverpool; R.Vlaanderen Int, Brussels **5.960** (Eng 1930-1956) SIO 222 at 1941 in N.Bristol; RAI Rome **5.970** (Eng 1935-1955) 55544 at 1952 in Northampton; R.Canada Int via Skelton, UK **5.995** (Fr, Eng 1900-2200) 44333 at 2000 in Dudley; R.Japan via Skelton, UK **6.155** (Eng 2100-2200) 43443 at 2100 in Morden; VOA via Kavala **6.040** (Eng to M.East? 2100-2200) SIO 333 at 2130 in Co.Fermanagh.

Also mentioned in the reports were WHRI South Bend, USA **5.745** (Eng to N.America 2100?-1000), rated 55555 at 0300 in Morpeth; BBC via Sackville, Canada **6.175** (Eng to USA 2200-0500) 54554 at 0445 in New York; WEWN Birmingham, USA **5.825** (Eng to N.America 2200-0900?) 22222 at 0842 in Plymouth.

The SINPO code is used for broadcast station reports, here is an explanation of the code.

Signal Strength
5 excellent
4 good
3 fair
2 poor
1 barely audible

Interference
5 nil
4 slight
3 moderate
2 severe
1 extreme

Noise
5 nil
4 slight
3 moderate
2 severe
1 extreme

Propagation
5 nil
4 slight
3 moderate
2 severe
1 extreme

Overall Merit
5 excellent
4 good
3 fair
2 poor
1 unusable

List Of Equipment Used

LM&S for $ May, # June, * July 2000.

$ # * Vera Brindley, Woodhall Spa: Roberts R-867 or Sangean ATS-803A + r.w.
$ # Michael Casey, Manchester: Roberts RC-828 + Howes CTU9 a.t.u. + MFJ d.s.p. Filter + 60m & 49m loops in loft.
$ # Robert Connolly, Kilkeel: JRC NRD-525 + Timewave DSP9+ filter + Datong AD370 or Sangean ATS-803A.
# Martin Cowin, Kirkby Stephen: Hitachi TRK-5854E or Roberts R-881 + built-in whip.
$ # * Bernard Curtis, Stalbridge: Realistic DX-400 + rod or loop.
# * Martin Dale, Stockport: Grundig Satellit 3000 or Sangean ATS-803A + r.w.
# * David Edwardson, Wallsend: Trio R-600 + 2.5m x 2.5m fixed loop or 22m long trap dipole.
$ # * Stan Evans, Herstmonceux: Kenwood R-2000 + Balun + 11m wire in loft.
$ # Martin Goodey, St.Mary's, Isles of Scilly: AOR AR7030 + 25m wire.
$ Bill Griffith (W.London), while in Canberra, Australia: Sony ICF-SW55 + 5m wire.
$ Bill Griffith (W.London), while in Los Angeles, USA: Sony ICF-SW55 + 5m wire.
* Bill Griffith (W.London), while in New York, USA: Sony ICF-SW55 + 3m wire.
$ # * Gerald Guest, Dudley: Roberts RC-818 + r.w.
$ # * David Hall, Morpeth: AOR AR7030 + Global AT-2000 + 13m wire.
$ # * Tony Hall, Freshwater Bay, IoW: Yaesu FRG-7 + 13m wire or RF.B45
$ # * Francis Hearne, N.Bristol: Sharp WQT370 + r.w.
$ # * Simon Hockenhull, E.Bristol: Roberts R-617, R-817 or R-876.
$ * Robert Hughes, Liverpool: AOR AR7030 + 15m indoor wire or Drake R8E + RF Systems MTA on roof.
$ # * Sheila Hughes, Morden: Sony ICF-7600DS; Vega 206 + loop; Panasonic DR48 + 15m invert L.
$ # * Rhoderick Illman, Oxted: Kenwood R-5000 + r.w. or AN-1, Sony ICF-7600DS.
$ # Brian Keyte, Gt.Bookham: AOR AR7030 + loop or a.t.u. + r.w.
* Brian Keyte, while at Rhue, Scotland: AOR AR7030 + loop or a.t.u. + 200m top strand of roadside fence.
$ # * Eddie McKeown, Newry: Grundig Yacht Boy 400 or Sangean ATS-818.
$ # * George Millmore, Wootton, IoW: Racal RA-17L + loop or Sangean ATS-818-ACS.
$ # * Fred Pallant, Storrington: Trio R-2000 + Howes CTU8 a.t.u. + r.w.
$ # * John Parry, Larnaca, Cyprus: Realistic DX-394 or Yaesu FT-767 + r.w.
$ # Clare Pinder, while in Appleby: JRC NRD-525 + a.t.u. + r.w.
$ Clare Pinder, while in Glasgow: Sony ICF-SW55.
$ # * Vic Prier, Colyton: Redifon R-551N + a.t.u. + r.w. or loop in loft.
$ Philip Rambaut, Macclesfield: Int.Marine Radio R.700M or ITT Mackay Marine Radio 3031 + r.w.
$ # Harry Richards, Barton-upon-Humber: Grundig Satellit 700 + AD270 or r.w. or Grundig Yacht Boy 400 or Matsui MR4099.
* Alan Roberts, Quebec, Canada: Lowe HF-225 + 11m vertical dipole.
$ # * Tom Smyth, Co.Fermanagh: Sangean ATS-803A or Morphy Richards R191.
$ # * Ernie Strong, Ramsey (Cambs): Yaesu FRG-8800 + a.t.u. + 30m wire.
# * Phil Townsend, London: Lowe HF-225 + preselector + r.w. or loop.
$ # * Thomas Williams, Truro: Gundig Yacht Boy 206 or Sharp 5454 + r.w.
$ # * Fred Wilmshurst, Northampton: Icom IC-R70 + Global AT-1000 + r.w. in loft.
$ # * Tom Winzor, Plymouth: Kenwood R-2000 + Datong active antenna.

■ **ANDY CADIER, 28 ROMNEY AVENUE, FOLKESTONE, KENT CT20 3QJ**
■ **E-MAIL:** off.the.record@pwpublishing.ltd.uk

Off The Record

Has DAB (Digital Audio Broadcasting) become obsolete before its really even started? For some time now I have been seeking people's opinion on the future of radio broadcasting. Initially, my thoughts were that DAB would attract all the largest radio companies allowing them to dominate the market and make it difficult for smaller broadcasters to survive in such a competitive market. However, as time has ticked by and communications technology has rapidly moved ahead, it is becoming apparent that DAB may not be the big advance it was intended to be.

At first I thought this line of thought to be somewhat over pessimistic looking at the time, money and effort that is being sunk into DAB. It is mainly the bigger broadcasters that are involved in pioneering digital radio, as they have most to gain.

The radio manufacturers on the other hand are still sitting on the fence, scared stiff of mass-producing DAB radios, even if they could make them affordable, then to find a very poor market for them. Unlike TV there is, as yet, no shut-off date for analogue radio and the internationally recognised broadcast bands will clearly live on for many years to come, so there is no artificial incentive to move to DAB.

Even if the government did force British stations to vacate m.w. and f.m. to encourage listeners to go digital, this would create a void which would be filled with foreign stations and possibly pirates. The large commercial concerns would like Britain to abandon analogue radio broadcasting by 2015, however, any decision would be political rather than technical.

The Prime Minister has done a lot to publicise the Internet with comments like "Great Britain Dot Com", and this is very likely to become the new source of radio entertainment, both at home and in your car. With free wireless digital telephone technology, potential listeners would be able to choose from thousands of radio stations broadcasting anywhere in the world via the Internet. This will be cheaper and offer more choice than DAB as anyone with a website could in effect run a radio station.

The audio quality would be poorer than DAB, but you would need to be listening in a very quiet and acoustically friendly environment to really notice. You may well have fond memories of Betamax video recorders, eight track tape players and those square antenna satellite receivers, all once in common use and now totally obsolete. Even some radio professionals now regard DAB as a step backwards. I also notice that one new DAB receiver still includes the f.m. band, well at £800 perhaps it should.

Another source of radio is the increasing numbers of stations offered by the digital TV satellite channels and cable companies which are all set to expand along with wide screen digital TV. The outcome of all this is that everyone will fairly soon have an unprecedented access to world-wide broadcasting, something that in the past was only available to we short wave listeners.

Radio North Sea

As I write this I am listening to the Harwich Radio North Sea RSL. I think it offers a slightly better portrayal of the original station than last year's event that exclusively replicated the programmes of 1970. Reception seems a little weaker this time, perhaps due to the different location.

Several readers contacted me regarding the station's frequency that was amended shortly before going on air. They had hoped to use 1566kHz, but that frequency was given to County Sound at Guildford who apparently moved there from 1476kHz at the beginning of April.

Among all the *SWM* readers that were straining their ears to hear RNI was Godfrey G4GLM, *SWM*'s aeronautical correspondent. He, like many others, found the frequency overwhelmed by distant European stations. A medium wave directional loop antenna seems to be the answer. I wonder if there is a fairly simple d.i.y. circuit diagram that even I could follow? *Andy, you've only to check the back issues of* SWM *and you'll find lots of directional antennas suitable for m.w. reception for instance* - ***Ed.***

What's Happening?

Radio Free London have been forced to curtail their short wave broadcasts on 5.805MHz due to a spate of damage to their equipment. The transmitter runs on an un-manned site, which curiously has been tampered with, but nothing actually stolen. Their m.w. site has also suffered similar problems, however a supply of sufficient spares has kept the service functioning on reduced power.

Radio Caroline have been billed for their near disaster on Christmas Eve when their ship the *Ross Revenge* broke a mooring, narrowly missing other expensive vessels and getting beached on a sandbank in the river Medway. The *Ross* was undamaged, however the rescue and towing charges amount to almost £10,000 less than had been anticipated. You can obtain further information from their website **www.radiocaroline.co.uk** They also have a supporters club at **426 Archway Road, Highgate, London N64JH**. At present, Radio Caroline is on the air from 1800 Friday evening through to 2300 Sunday night on channel 35 of the 'Astra' Satellite.

Shops that play background music to their customers have recently come under the spotlight. A chain of British furniture stores have removed 200 radio tuners from their shops public address systems to prevent staff playing local radio programmes or any other copyright material over them. Phonographic performance fees have to be paid for these applications. However, shops that have in-house radio stations that receive their music via satellite from Holland pay the Dutch public performance fees that are considerably cheaper than in the UK.

Sadly the man the Pop Pirates loved to hate, the creator of Radio One died during February. Robin Scott was 79 and had worked for the BBC since the middle of the war when he was involved in the BBC French Service. In actual fact his real name was Scutt, however his French colleagues had difficulties with that name so he changed it to Scott. He was the key figure behind the launch of BBC Radio 1 in 1967 and remained there for two years before replacing David Attenborough as controller of BBC 2 Television.

Local Kentish station Medway FM has been taken over by DMG, a company backed by the *Daily Mail* newspaper, this is yet another casualty of recently launched independent stations selling out to the highest bidder.

Spectrum Audit Says Yes

A study carried out for the Radiocommunications Agency in London and Leeds discovered that more f.m. frequencies are available for further expansion in broadcasting. The report reveals that there is space in London for a number of community radio stations and in Leeds there is space for a station that could serve a million people. This must come as good news for small stations that have been denied licences due to claims that no frequencies were available.

One of these is Thames-side station The River who welcome this report as they have actually performed a frequency survey themselves in order to help facilitate their application. The stations founder Ian McGregor says, "I look forward to seeing the details, but it seems this report potentially contains the news our listeners and advertisers are waiting for". The Radio Authority confirmed that there is still an enormous demand for large and small analogue licences.

New Pirate

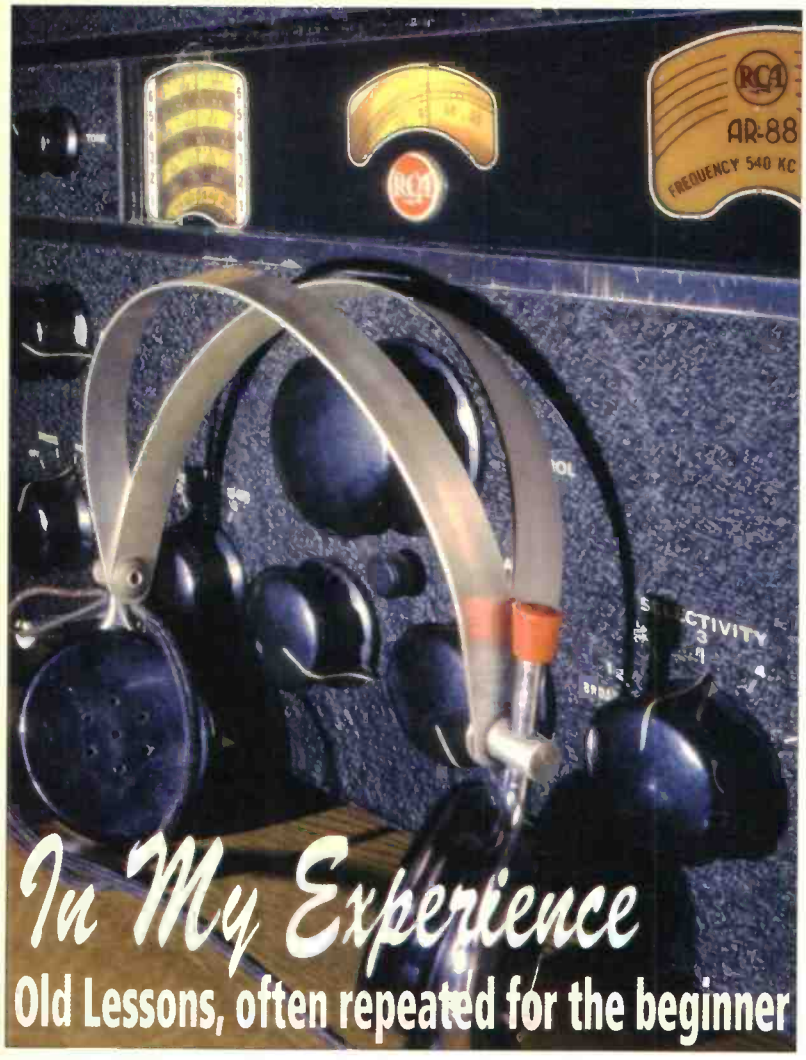
A new pirate on short wave is Radio Geronimo, which takes its name from a station that broadcast via Radio Monte Carlo during 1969 on (205m) 1446kHz. The original Geronimo was rather short lived due to reception difficulties, let's hope this one has better luck.

More Radio News

The Dutch Delta long wave radio project that had intended broadcasting on 171kHz from an antenna site located in the sea off the coast of Holland would appear to be sunk. France has objected to the unapproved power and location of the station and are keen to protect their frequency of 162kHz. The Dutch radio company are now talking about using a directional l.w. antenna directed at the UK to protect the French frequency. They have to be joking?
Also in Holland pirate broadcasting has been de-criminalized, it is now a civil offence where communications officials can impose a fixed fine, a bit like parking tickets.

Paul Rustling, a key figure behind the proposed Isle of Man long wave station, is still bogged down with antenna planning permission problems. People living close to the intended site have voiced health concerns at being exposed to such high signal levels. Until this problem is resolved construction cannot commence, previously I understand they had hoped to be on air for Christmas 2000.

Folkestone Hospital Radio will be running an RSL from 26 August to 3 September to help celebrate the Shepway Festival, which includes a council sponsored Air Show on the sea front. Yours truly will be hosting the Breakfast Show on Silver 2000 on 95.1 f.m. Further details are on the website **www.silversound.co.uk** including pictures!



In My Experience

Old Lessons, often repeated for the beginner

John Wilson G3PCY experiences waves of nostalgia with his first love - the RCA AR88D.

The more I research the history of the AR88 receiver, the more I realise that British radio enthusiasts in the period after WW2 were very fortunate to have access to one of the finest general coverage receivers the world had known. The accessibility of the AR88 was due to the fact that it seems to have been produced (according to other historians) specifically for the British government as part of the American support for them during the war, and as a consequence, few examples appear in the United States even today, whilst we in the UK can still obtain working receivers at affordable prices.

It's a tribute to the excellence of the design and engineering of the AR88 that even after more than sixty years, a good example can still astonish by its performance. I have been fortunate in having had just such a good example in my care recently, and I feel no loss of admiration for this classic receiver, even when compared to the latest whizz-bang offerings on the current market.

Drawbacks?, there are several, which I will cover later, but once again here is a receiver I shall be sorry to lose when it is returned to its owner.

The Mighty Beast

For you youngsters who may not have seen the mighty beast, the AR88D is designed to fit into a nineteen inch rack, the front panel being eleven inches high and the front to back depth also being nineteen inches. The bare receiver weighs one hundred pounds, but when fitted into the usual desk top cabinet, the weight rises to a nice comfortable hundredweight (51kg).

You can forget the idea of flat pack self assembly desks if you own an AR88D; this baby needs more than 12mm chipboard to support it. It was at the moment I tried to lift the review AR88D off the floor on to my own workbench that I suddenly realised my elderly skeleton was no longer capable of doing this kind of thing and had to call for help (I'm seeing the osteopath next week). Be sure to take a strong friend with you if you perchance purchase one of these receivers.

However, when installed in front of me I began to experience waves of nostalgia as I once again marvelled at the beautiful symmetry of the front panel and felt my fingers hovering around the mushroom profile of the main tuning knob - I couldn't resist it; I took hold of the knob and spun it as hard as I could, then sat back and watched the main dial silkily spin across the spectrum using the stored energy in the flywheel behind the panel.

I was transported back in time to about 1950 when I saw my first AR88D installed in the station of G2FMU, with his hand made matching transmitter driver unit alongside it. They always say your first love is the best, and the AR88D was certainly mine.

Control Layout

As I have said, the front panel control layout is symmetrical, with all controls being easy to find and even easier to use. The photographs will show you the centrally placed tuning knob sitting at the perfect height above the desk top, and driving the main frequency readout (analogue) dial to the upper left, and the vernier dial immediately above the knob.

The frequency range of the AR88D from 535kHz to 32MHz is split into six bands: 0.535 to 1.6MHz, 1.57 to 4.55MHz, 4.45 to 12.15MHz, 11.9 to 16.6MHz, 16.1 to 22.7MHz and 22 to 32MHz. The other AR88 you may come across is the AR88LF which uses a different i.f. of 735kHz and tunes 73 to 205kHz, 195 to 550kHz, misses out the medium wave and then starts again at 1.48MHz to tune to 30.5MHz (not to 32MHz).

Each band on the tuning dial is very clearly marked, and an additional logging scale is provided which, in conjunction with the vernier dial above the tuning knob, allows accurate re-set to any given frequency. Because the entire tuning system is driven through a precision mechanical gearbox, the log and vernier scales remain in perfect alignment, provided that the gearbox on your own receiver has not been completely worn out by sixty years of continuous abuse - I have to say I've never found one in bad condition.

The vernier dial has 100 divisions with half division marking and the main logging scale 22, making it possible to reset to better than 1 in 4400 - usually more than accurate for normal use. The rather obvious opening in the panel which matches the main tuning dial but is blanked off by a maker's name plate was intended for a signal strength meter, but such was the hurried nature of the supply contract that meters were never fitted by RCA (as far as I know), and a paragraph in the handbook illustrates the position as follows:-

"Tuning Meter. The necessary wires for connecting a tuning meter in the cathode circuit of

the first i.f. tube have been included in the cable wiring. If and when meters become available, it will be a simple operation to install a tuning meter. A 5mA meter with zero deflection to the right is required".

Does anyone out there know if RCA ever supplied meters? Interestingly, the tuning meter paragraph does not appear in my (undated and Canadian) handbook for the AR88LF, but is in all the handbooks I have seen for the AR88D, including the handbook (American) from my own library which has a bound-in addendum sheet dated 26th November 1943.

Along the bottom of the panel from left to right are the on/off and mode switch, the tuning range bandswitch, the r.f. and a.f. gain controls, the selectivity switch and the a.g.c./noise limiter switch. Above this row are the antenna trimmer and b.f.o. frequency adjust controls and finally the audio tone and noise limiter threshold controls.

Single Side Band?

No multi-mode operation in the AR88, you either receive a.m. or switch on the b.f.o. and receive c.w. In 1943, s.s.b. was not an option, although as an historical aside it's worth recalling that s.s.b. was in use on transatlantic telephone circuits in 1923. However, if you drive an AR88, you need to practice the technique of reducing the r.f. gain to zero, increasing the a.f. gain to maximum, switching on the b.f.o. and adjusting the b.f.o. frequency to one side or other of the i.f. passband and then 'riding the knob' of the r.f. gain control so as to get intelligible speech out of the loudspeaker. Harder to describe than to achieve, this technique actually works well and at least gives those idle hands something to do.

Reception of a.m. broadcasts is a revelation after the strange sounding audio produced by some d.s.p. equipped receivers, and the somewhat round shouldered response of the i.f. filtering lends a vintage mellow character to the audio which just makes you want to carry on listening. Tuning across a busy broadcast band makes you realise that each station is appearing and disappearing smoothly and in regular procession which faithful followers of mine will now know comes about by having a spectrally pure conversion system in the receiver.

Clean Output

The local oscillator of the AR88D produces about 1W of r.f. from a classic Colpitts circuit using a 6J5 triode, and because the oscillator is always running on a fundamental frequency and loafing along well within it's operating parameters, the output is exceptionally clean as can be seen in **Fig. 1**. That low noise purity is why you get a smooth 'creaminess' as you tune through an a.m. signal.

No 'monkey chatter' in this ancient mariner of a receiver, and it just laughs at my 900/909/918kHz test on the medium wave which has sometimes exposed unfortunate failings in more recent receivers. On the other hand, I have to agree that finding an s.s.b. utility channel on an AR88D is a lengthy and frustrating pastime, so I'm not entirely blind to its failings as a modern receiver.

Selectivity in the AR88D is provided by having three i.f. amplifier stages embracing a total of twelve tuned circuits at 455kHz (735kHz in the AR88LF) and a single crystal filter. The crystal filter is not tunable from the front panel as in the case of receivers like the HRO, so keen c.w. operators would miss the 'single signal' razor sharp peaks and notches, but the design and alignment of the crystal filter is such that the resultant bandwidth is more or less symmetrical.

However, there was a version of the receiver designated CR88 in which the a.f. and r.f. gain control knobs were smaller, and nestling in between them is an even smaller knob which does indeed give crystal 'phasing' control. A recognition point for the CR88, apart from the crystal phasing control, is that the front panel was painted in plain grey rather than the normal black crackle finish. I personally think that the grey panel looked awful, but you may disagree.

Selectivity Settings

There are five selectivity settings having nominal 6dB bandwidths of 13kHz, 7kHz, 3kHz, 1.5kHz and 400Hz. The AR88LF bandwidths are slightly wider, probably due to the higher i.f. used in the l.f. version. If the passband plots in the manual are to believed, the shape factor for the 7kHz nominal bandwidth is about 2.5 to 1, which is pretty good even by today's standards, and perceived wisdom from experienced operators of the AR88D was that normal listening would be done in selectivity switch position 2, which is the 7kHz bandwidth. Certainly I have always used this as the normal listening bandwidth and it works well.

On the three selectivity settings where the crystal filter is used, the shape factor deteriorates, but the nose selectivity is still perfect for classic c.w. reception. For s.s.b. use, the nominal 3kHz bandwidth is best (switch position 3), but the 60dB skirt bandwidth of 11kHz is wide when compared to a modern multi element crystal or mechanical filter. (But the resolved audio is lovely).

Front-end selectivity is superb, because the AR88D uses two tuned r.f. amplifiers ahead of the mixer, and thus has three sets of gang tuned

"They always say your first love is the best, and the AR88D was certainly mine"

The original matching loudspeaker.

AR88 Review

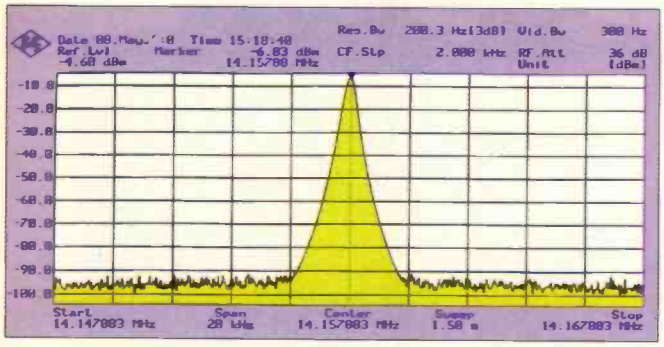


Fig. 1: AR88 local oscillator spectral purity.

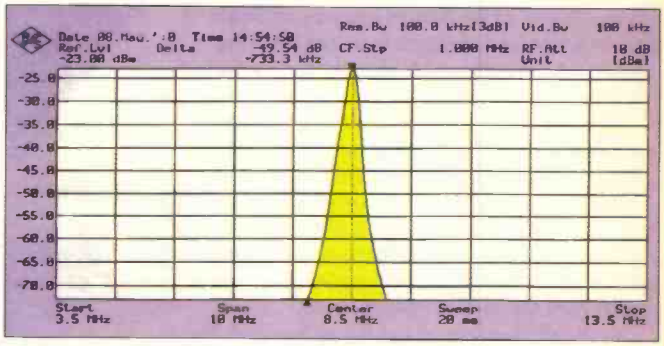


Fig. 3: AR88 pre-selector response 8.5MHz, -50dB bandwidth <1.5MHz.

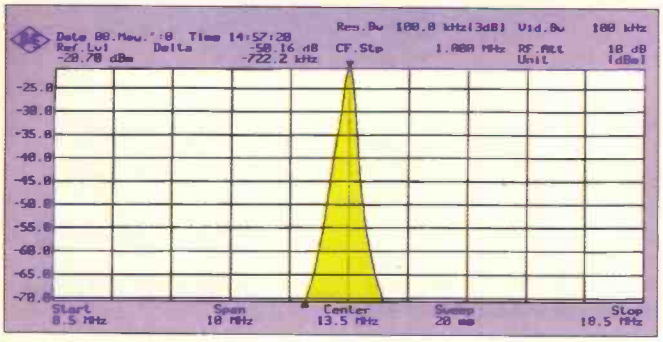


Fig. 2: AR88 pre-selector response 13.5MHz, -50dB bandwidth <1.5MHz.

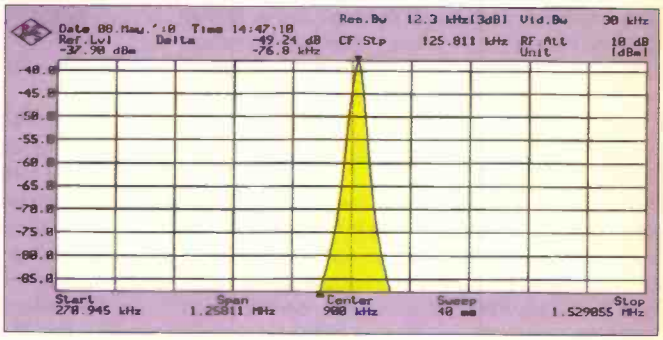


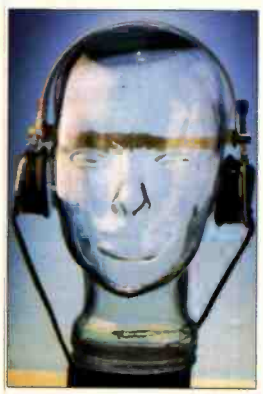
Fig. 4: AR88 pre-selector response 900kHz, 50dB bandwidth 150kHz.

circuits between the antenna and mixer stage. I took the opportunity of plotting the preselection performance because I wanted to see how it compared with my recent investigations and the results are a revelation.

Figure 2 shows the front-end bandwidth at 13.5MHz, **Fig. 3** at 8.5MHz and **Fig. 4** is taken at a centre frequency of 900kHz with a -50dB bandwidth of only 150kHz. It's no wonder that my standard test for second order intermodulation performance produced an astonishingly good result which I will give further down the review. As far as medium wave performance goes, the AR88D has to be amongst the best receivers you could wish to use for DXing - bear this in mind if that is your particular interest.

One more point about the front-end of the AR88D is that the receiver is virtually designed with the hobby user in mind by the provision of an antenna trimmer for getting the first tuned circuits into perfect alignment with different antennas, and the ability to work with a single end-fed wire as an antenna; in fact the manual states "For general use it is recommended that a straight wire antenna between 25 and 50 feet long should be used". Isn't that what most of us can erect?

The AR88D is one of those receivers which will produce good results from a wet finger poked on to the antenna terminal, and actually caused me some difficulty when measuring sensitivity because the signals received on the short pigtail at the transition between coaxial cable and the AR88D antenna terminals was receiving signals which were louder than the less than 1µV coming from my generator.



Matching SG Brown 'Type F' cans.

"It's a tribute to the excellence of the design and engineering of the AR88 that even after more than sixty years, a good example can still astonish by its performance"

Back End

At the back-end of the AR88D, audio is provided by a single 6K6 (6V6 in the AR88-LF) running in Class A with an output transformer large and heavy enough to be used as an offensive missile in an anarchists' street battle. Using the matching loudspeaker, which was thoughtfully provided by the lucky owner of the receiver I was reviewing, there was more than enough audio to generate complaints from the neighbours (actually from my wife who was in the house some 50 metres away from my lab).

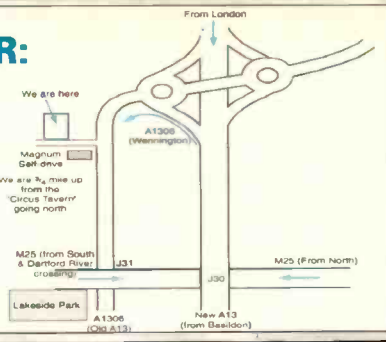
Driving a little Wharfedale Denton bookshelf speaker produced very smooth audio indeed, and quite stopped me returning to the formal measurements for some time. I recall Sam G2BBH using what he always referred to as a Rice/Kellog loudspeaker on his HRO when operating on Top Band a.m. and marvelling at the easy on the ear quality it produced, particularly when listening to G4GM.

Here's a test for you budding historians - the Rice/Kellog is not a joke nor is it a crunchy breakfast cereal, so why don't you do a little research and tell me what you find out. Here endeth the history lesson, so on to the modern measurements.

Continued on page 22...

SHOWROOM & MAIL ORDER:

Unit 1, Thurrock Commercial Park,
Purfleet Industrial Estate, London Rd,
Nr. Aveley, Essex RM15 4YD
TEL: 01708 862524
FAX: 01708 868441
Open Mon - Fri 8am - 4.30pm.
Sat 8am - 1.00pm



W. MIDLANDS SHOWROOM

Unit 1, Canal View Ind. Est.,
Brettel Lane,
Brierley Hill
W. Mids. DY5 3LQ
Open Mon-Fri 9.30-5pm.
Sat 9.30-2pm
NO MAIL ORDER TO MIDLANDS BRANCH

GARMIN STREET PILOT UK

The Street Pilot UK package includes dash mount, 8MB datacard, PC interface cable, 12V adaptor, UK metroguide map souce CD.

£549.00

Garmin Street Pilot mono	Special offer.....£419.00
Garmin Street Pilot colour	Special offer.....£549.00
Carry case for Street Pilot	Only.....£14.99
8 meg-mem + mapsource CD	Only.....£139.95
16 meg-mem + mapsource CD	Only.....£169.95
Mapsource CD	Only.....£79.95

GARMIN GPSIII PLUS

Powered by AA cells or 13.8V, this compact navigational system gives detailed maps of the UK and Europe. Supplied with data lead and free on-board maps.

SALE PRICE **£329.95**

Garmin GPS 12 Navigator	Special offer.....£129.95
Garmin ETREX	Special offer.....£99.95
Garmin E-map	Special offer.....£169.95
Active Magmount antenna	Only.....£39.95
Cigar power lead	Only.....£20.00

REALISTIC DX-394

Send SAE for renew

★ Superb performance SW receiver ★ 0.2-30MHz (all mode) ★ Selectable tuning steps (down to 100Hz) ★ 240 or 12V ★ Digital S-meter ★ Attenuator ★ Key pad entry ★ 160 memories ★ Clock/timer ★ Noise blanker ★ Limit scan ★ Tape output

Was £199.00

SPECIAL OFFER **£149.95**

YAESU FRG-100

This is a high performance communications receiver providing general coverage reception in CW, SSB, AM and FM modes from 50kHz- 30MHz. Micro processor control of major functions permit ease of operation and features that both new and seasoned short wave listeners will appreciate, at an affordable price.

ONLY **£349.95**

(Optional FM unit £35.00)

ICOM IC-R75

The short wave receiver for the true enthusiast.

- 0.03-60MHz (all mode).
- Synchronous AM detection
- PC control capability

Buy one this month and we'll give you a free DSP unit & power supply worth over £100.00

★★★★ *WRTH* gave it 4 star rating

OUR PRICE **£625.00**

ICOM PCR-1000

Amazing front end performance

Bring another world to your computer. The PCR-1000 connects externally to your computer and offers exceptional receiver performance. 0.5-1300MHz (all mode). Includes SSB.

~~£349.00.~~

2 YEAR GUARANTEE

UK's LOWEST PRICE

£249.00

UT-106 Optional DSP unit £79.95

SANGEAN ATS-909

A superb performance portable/base synthesized world receiver with true SSB and 40Hz tunning for ultra clean reception. The same radio is sold under the Roberts name at nearly twice the price. Other features include RDS facility, 306 memories and FM stereo through headphones. The ATS-909 represents superb value for money.

ONLY **£129.95**

Optional deluxe stereo/mono headphones for short wave portables.....only £7.99 P&P £2

MOTOROLA TA-200

★ Typically up to 3Km range dependent upon terrain ★ Large, easy to read LCD screen with user-friendly icons ★ You choose who to talk to and select from 300 channel settings ★ Rugged and stylish design - choose from yellow or blue ★ One button operation - easy for adults and children to use, simply push to talk.

ONLY

£69.95

or 2 for £129.00

OPTOELECTRONICS SCOUT MKII

10MHz-1.4GHz frequency counter with reaction tune caperbility. Includes nicads, charger & antenna.

ONLY **£319.95**

Free case & DB32 antenna worth £45.00

Opto CD-100.....Special offer £349.95

BA-888

ELECTRONIC BAROMETER/CLOCK.

- Temp/weather/forecast/ pressure barometric trend
- 24hr bargraph
- 12/24hr clock & alarm
- Humidity
- Table/wall mount

£69.95 P&P £4

JM-838

JUMBO WALL/DESK CLOCK.

- Wide screen/2" digit time display
- Barometer
- Calender
- Temp
- Auto RF synch clock from Rugby

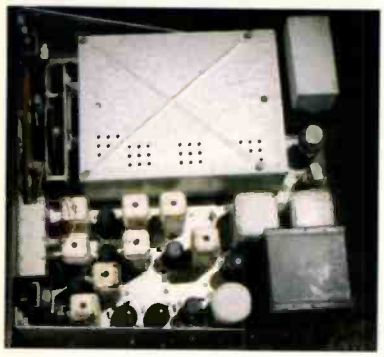
£59.95 P&P £4

AR88 Review

...continued from page 18

Sensitivity Measurements

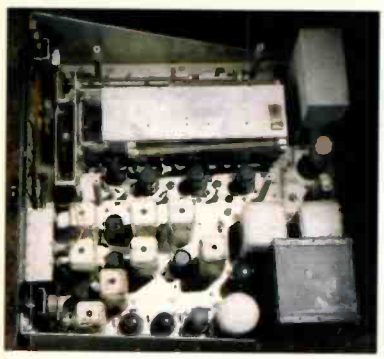
My sensitivity measurements are based on signal required (in dBm) for 12dB SINAD. For the AR88D performance I used the selectivity set to position 2, which means that the crystal filter was not in circuit. I first of all used a.m. with 60% modulation at 1kHz and then checked s.s.b. which came out 6dB more sensitive than a.m. at all frequencies. The audio tone control was set to mid position.



Not bad for nearly sixty years old, is it?

Frequency (MHz)	Sensitivtiy dBm (12dB Sinad)
0.909	105
2.0	116
4.0	115
6.0	115
8.0	116
10.0	115
14.0	111
16.0	110
17.0	113
20.0	112
23.0	114
27.0	116
30.0	115

Which you will agree is very much an up-to-date performance from a sixty year old receiver. When it came to third order intercept point based on a measured noise floor of -130dBm, the AR88D was reasonable for its age with a dynamic range of 73dB and an intercept point of -20dBm; not much to write home about you may say, but second order measurements at my standard frequencies of 6.5/7MHz showed a dynamic range of 106dB and a second order intercept point of +83dBm. Now all repeat after me; "Proper preselection produces perfect performance".



As for oscillator purity as shown in the reciprocal mixing measurements, the AR88D was virtually identical to the Harris RF-590A and better than the Plessey PRS2280. With an i.f. bandwidth of 7kHz, I couldn't carry out a measurement at 5kHz spacing, but with -118dBc/Hz at 10kHz falling to -157dBc/Hz at 100kHz, the AR88D is actually better than last month's Collins 95S-1. Is it any wonder that experienced operators know that the AR88 is a low noise performer?

The Down Side

As I said earlier, if your particular interest is in listening to dozens of fixed frequency s.s.b. or data channels on h.f., then the AR88D is not for you because getting on to an exact frequency when the signal is not present can be almost impossible.

This example of the AR88 was bought some 30 years ago in its shipping crate un-used!

Frequency stability is not as good as a typical synthesiser, and you have to remember to switch on the receiver at least half an hour before using it so as to let it achieve some measure of thermal stability. That being said, I didn't have too much trouble in keeping the 1kHz audio centred in the notch of my HP audio analyser when doing the s.s.b. measurements.

The sheer weight of the receiver is a bit daunting, as is the potential problem of maintenance should anything go wrong and you have to find a repair man who knows anything about vintage equipment. A quick test to check such a person's ability is to ask him to explain why the HT feed for the first audio stage appears to be feed via a 100mΩ resistor. If he is an AR88 man he will tell you that the suffix 'M' as used in the circuit means Kilohms, not Megohms, but I do know unsuspecting folk who changed resistors in their AR88s because they didn't appreciate this little anomaly.

Adjacent channel selectivity is not up to today's requirements for amateur radio use, although I listened on 20 metres with the review receiver and had no obvious problems. For c.w., should you be able to use it, the AR88 is very good indeed because you have a fully tunable b.f.o. and manual gain control.

Plus Points

Now I'm sitting here wondering what other drawbacks I can list, but honestly that's about the lot. The plus points for having an AR88 so overwhelm the minus that I think I'd better go out and find one for my own collection.

Owning a good sixty year old AR88D is rather like owning a good ten year old Bentley car. Just sitting in front of that spacious control panel, basking in the gentle warmth from the innards and rolling your fingers around the silky smooth tuning control, the desk lit only by the yellow glow from the back-lit windows and bathed in the mellow audio from a good loudspeaker can be a truly sybaritic experience.

Whatever you use for day to day competitive listening, if you have never owned an AR88D you have missed a wonderful experience, and no radio listening enthusiast should go to that great receiver in the sky without being able to say "I remember owning an AR88". I may sound over enthusiastic, but it really is that good.

Happy Listening

"If you have never owned an AR88D you have missed a wonderful experience"

Short Wave Magazine, July 2000

■ DAVE ROBERTS c/o *SWM* EDITORIAL OFFICES, BROADSTONE
■ E-MAIL: scanning@pwpublishing.ltd.uk

Scanning

When you buy a motor car you, quite reasonably, assume that all the main controls will be pretty much in the same place in every vehicle. The pedals will all be in the same order, depending on whether the vehicle is an auto or manual transmission. There will be a steering wheel in front of you...you get my drift.

Now, equate this with radio equipment, especially with complex gear such as radio scanners or scanner/transceivers. These days even some models have volume control on an up/down switch. I recently received an E-mail from **Jay** who is considering selling his Yupiteru MVT-7100 because the instruction book that he received with the set does not make much sense.

Jay has a degree in English and is by no means daft. It's just that the owner's manual supplied with his set does not make too much sense. Some of the '7100s have very good instruction books supplied, but it does seem that some sets are a bit lacking in that department.

Going back many years I purchased a second-hand Regency scanner from Garex. The instruction manual was so bad that Pete Longhurst of Garex had written another one in English which made good sense.

I don't know how Jay is getting on with his radio at the moment, but I do have access to a manual for this set that makes good sense which came from Waters and Stanton so they may be able to assist you. I believe that manufacturers have got a lot better in the literature department, but it seems that there still may be some more work to be done as some instructions can be quite hilarious.

Interesting Transmissions

Moving on from the May *SWM* Scanning column where I mentioned the rescue services, there is a lot of fun to be had listening to the v.h.f./u.h.f. marine bands. This also applies if you live inland.

I have heard many interesting transmissions on the v.h.f. band even when I used to live in central England, as with an antenna that is high enough you are quite likely to hear the odd coastal station and vessel. Also remember that inland waterways are common in the UK and that some small boats have marine band kit aboard and use it frequently, the River Thames being an extreme example of this.

If you live near the coast or any tidal navigable river you will hear masses of traffic on this band. Also, large seagoing vessels may have a u.h.f. on-board system to talk with the crew. Cruise vessels obviously need such a system as passenger safety necessitates crew communication.

One large cruising company issue hand-helds with four channels fitted. Examining one of these radios will establish that channels one and two are on 457.525 and 457.550 receive with their transmit frequencies 10MHz higher. Channels three and four are 457.575 and 467.575, but are simplex.

In this region, there are many companies' u.h.f. systems. Just before the collapse of the Soviet Union I was sat on the side of a sea loch in the North of Scotland, with an old pair of WWII Zeiss binoculars, watching a large Russian 'trawler' which was laden with antennas. I was listening to their shipboard comms on 457MHz on an old AR800 scanner, which I still use, it was a lovely day. They were looking at me through their binoculars and actually talking about me on their u.h.f. sets. I gave them a big wave and pointed to the scanner, then they realised...

Talking of the north...in Scotland, travel to the islands in the west is via the ferry company, Caledonian MacBrayne. You will see that the crew are using hand-held sets. The frequency used is 157.550 and on occasions this may be paired with 162.150.

Obviously there will be many other companies using company frequencies in marine band and there is a mass to listen to, so don't get all sad because digital maritime radio is on the way together with GMDSS. There will be f.m. marine transmissions for a long time yet.

TETRA

Sorry to harp on about TETRA, but if you live in the Lancashire area it seems that your police force and fire brigade will be going to the new TETRA standard within a month of you reading this article. Although the ambulance service in the area have just acquired a new analogue system, they will also participate in the new scheme.

With all the new digital systems coming on-line one must wonder whether there is much future in the scanning game. Police users in particular have been very keen to embrace TETRA due to the ease with which their day to day comms have been overheard.

With different TETRA standards being offered, it seems that 'scannists' may be in for a lean old time unless receiver manufacturers can tempt us with some other fare. Commercial systems will also move to digital standards and together with mobile data terminals in vehicles one can only wonder what the future holds for the hobbyist.

It will follow that at some time there will be receivers available that allow monitoring of some digital radio communications, but this may be a long way off. I know that this all sounds fairly depressing, but there is no need to despair yet.

For some time there will be a need in varying circumstances for analogue communications in the v.h.f./u.h.f. spectrum so we can continue for a while yet. Also, as anyone who has used digitally encrypted stand alone gear knows, it is by no means infallible.

I remember one occasion that we were using such equipment within two hundred yards of each other and we had to turn off the encryption and go in the clear just to hear each other. So for the sharp 'scannist' there may well be interesting stuff to hear for some years yet.

Accessories

Just a quick word about accessories. How often have you thought that you would like to listen to some action while on foot or in the bus but just feel a trifle conspicuous with the handy clamped to your ear with the local radio users booming out. Well, why don't you make like those people who sit on buses with their heads rocking like zombies while plugged into personal stereos.

Just buy or acquire some cheapie personal stereo earphones, strip off the plug, join the two inner cores and the two outers together and solder the inners to the inner terminal of a 3.5mm jack plug and the outers to the outer of the plug and bung it into the scanner. There you are. Now you can rock with the best of them.

For using the handy scanner in the vehicle pop on a small magmount antenna, plug the power into the cigar lighter. But I hear you cry that the puny speaker will not overcome the sound of the exhaust blowing. No problem. Just look out for one of those cassette gadgets that is sold as an adapter to enable portable CD players to be used through the vehicle's sound system. They cost about a fiver. Strip off the stereo plug as per the personal headphones and again replace with a 3.5mm mono plug. Insert into car cassette player, turn on scanner and player and away you go.

The only problem with this method is that the car's cassette motor is running all the time. A mate of mine has used this system for years but then he gets company cars and all repairs are not his worry.

That's it for another month. Don't forget to let me know of any news or interesting snippets that you hear. All can be treated with utmost confidence.

The Law And You!

You may be thinking this is a 'heavy' title, but as Dave Roberts has pointed out before, scanning any transmission is fraught with legal difficulties and really is an activity not to be entered into unless you are fully aware of possible minefields in which you may find yourself innocently hiking around.

It wasn't until the early seventies that hobbyist's scanners came on the market and even then the cost of these radios was somewhat prohibitive. I remember that the Bearcat range of scanners seemed tremendously expensive to me. The people who owned such scanners (and I was not one of them) generally used then to listen to aircraft and the police u.h.f. schemes. At this time the v.h.f. police networks were in the v.h.f. P2 band, which was audible on a broadcast v.h.f. receiver so no scanner was needed.

The police called their u.h.f. systems 'personal radio' and although this term referred to the fact that each officer had a portable set, many took this to mean that the system could not be overheard. Communications security, as you can imagine, was darn near non-existent.

As time went on and domestic and hobby electronics became less expensive in real terms, usage of the hobby gear increased. Until these wonderful toys were in more widespread use the authorities were not too concerned. Basically they were not aware that criminals, or hobbyists for that matter, were listening into police, official or commercial systems.

Anything Heard

Then came a spate of events which brought the attention of the authorities to the fact that anything said on any radio anywhere can be heard unless it is encrypted. Police were coming across criminals who were listening to police systems and security company radios as part of their business. Arrests were made at the scene of burglaries where as part of the baddies outfit there would be a scanner.

It was usually found that the scanner had either been shoplifted from the local Tandy shop or had been stolen when a car or house was broken into. Often these sets were not accompanied by their instruction manual, so it was found that some of the frequencies entered were not exactly too useful, but often they had the local police frequencies listed.

Also, taxi companies in some towns were in dispute over business and in some locations so called 'taxi wars' erupted. Usually these punch ups started when one radio cab company would dispatch a driver to pick up a fare from the local market only to find a driver from a rival outfit had beaten him to it and was waltzing off down the High Street in the trusty Sierra with Mrs Thatcher and her shopping from the Co-Op.

This became quite a sport in one large town and it wasn't unusual to call a cab and have a whole convoy of them turn up armed with CB radios and scanners all eager for your custom. All because they were listening to each other's calls.

Legislation Called For

In a small dusty office with grimy windows a bewhiskered civil servant sat on his one legged stool. He, of course, knew that the legislation already existed in the shape of the Wireless Telegraphy Act 1949. He pointed out to all the politicians and jobsworths hollering for action that they could use the Act in the meantime and he would sort out something to keep them even happier in the long run.

All this nonsense eventually resulted in sections of laws being pertinent to the perceived threat from scannists. In addition to the W.T. Act 1949 which has several sections and parts relevant to this issue, there was also The Telecommunications Act 1984 (Sec. 79), The Interception of Communications Act 1985 (Sec 1) and The Wireless Telegraphy Apparatus (Receivers) (Exemption) Regulations 1989.

Now wake up....I'll try and explain. It means you can use a scanner. What you are legally allowed to listen to is another matter. Under section 5(b) (i) of the Act an offence is committed if you listen to a message which you have not been authorised to receive. This means that if you listen to anything other than licensed radio amateurs and authorised broadcasters you commit an offence under the act.

You may cry, "What about PMR446 and other non licensed radios?". If someone is directing a message to you on that system - and you are listening on a Short Range Business Radio or PMR446 set, then obviously the transmissions are meant for you. If you were found listening to these systems on a scanner it would appear that the offence is committed.

Remember you are **not** supposed to listen to CB transmissions unless you are listening on a legal CB radio and have a licence. Anything else is a not allowed. No, you are not allowed to listen to aircraft or marine bands on your scanner despite there being posted frequency information at airshows.

Just by listening to anything other than legal broadcast radio or licensed amateurs on your scanner, you commit an offence. If you listen to transmissions on your own p.m.r. scheme on a scanner - no offence. Worse to come. If you heard something that you are not authorised to receive and then told your mate/ wife/colleague about it you commit another offence under the act.

If you listen to a transmission which forms any part of a public telecommunications system, e.g. cellphone, cordless 'phone or other mobile 'phone or any 'phone connected to the 'phone system, then you commit an offence under the Interception of Communications Act as well as the offence under the W.T. Act.

Also if you are suspected of committing any of these offences then the Telecommunications Act 1984 permits seizure of any scanner you possess. The court can also order forfeiture of any such equipment should you be convicted of any offence of this nature. Penalties can include fines of even jail for some offences under these acts which can be viewed as being of the same severity as illegally tapping 'phones, etc.

What Now?

Should you be belting down the road in your Escort with the handy scanner Velcro fitted to the dash and the little magmount of the roof with the audio belting out of the stereo speakers (courtesy of the adapter mentioned in this month's 'Scanning' column) and you see a road block ahead or are stopped by the police - what now?

Well, it is a good thing not to commit offences in the first place. That having been said, should you have inadvertently have a frequency or two loaded in the thing, it may be helpful to know what the authorities may need to prove.

Firstly, it seems likely that they will ask you who owns the equipment. They will wish to know the date and location that the equipment was first used and when and where it was last used. If the scanner is fitted in the vehicle they will want to know who fitted it, where and when. They will likely want to establish whether unauthorised frequencies can be received on the radio by manual tuning or by pre-programmed channels.

By this time they will have seized your radio, given you a receipt and a few sleepless nights. Later you will be interviewed and asked who programmed the frequencies in the radio, where it was acquired, the date of purchase if bought and how much you paid for it. They will have all the radio's details themselves by now as it will have probably been examined by the Radio Investigation Service or a police technical unit.

The authorities will have to prove that not only have they found unauthorised frequencies in the set, but also that they were in the set when it was in your possession and that the frequencies have not been entered while it was in theirs. Authorities should be advised that they should ensure that they are able to corroborate their evidence that the set has not been tampered with after seizure.

That's pretty much all there is to it. I have a scanner fitted in my car. It is an old 16 channel pre programmed radio and has some amateur frequencies loaded in it - that's the lot.

...Small, Dusty Office...

Be Legal & Be Discrete

A few years ago the authorities would hold massive stop-fests on major roads. Present at these events would be the police and vehicle examiners to look for vehicle offences, the Custom and Excise who would look primarily into the diesel tanks to check for agricultural (pink) fuel in the tanks and officers from the Radio Communications Agency who would be on the lookout for illegal CB radio, scanners and the illegal 6MHz h.f. radio operators who plague that section of the airways and have done for decades. Nowadays there will be immigration officials who will be on the lookout for lorry loads of illegal immigrants.

The short message in all this is be legal and be discrete. The official who examines your scanner is not likely to know whether your radio has only amateur frequencies in it and is likely to seize first and sort it out later by which time you will have been greatly inconvenienced. The police cannot be expected to have any knowledge of radio and unless you have an amateur licence they will be highly suspicious of any communications set in your vehicle.

As an example of this, I was speaking with a sergeant from a large South Midlands police force. This chap was in a responsible position in the communications department of his force and did not know whether his force used a.m. or f.m. radios and did not have a clue what on earth frequencies were. So, don't expect most officers to match your level of knowledge.

Discretion is therefore most important. Apart from concealing the set in your vehicle, which isn't a bad idea anyhow in view of spiralling levels of car crime, you may wish to consider making a small antenna from aero modelling or piano wire and either mounting it in or on your vehicle.

One official agency had discrete transmitting antennas of this type mounted in small bases (such as BNC or SMA) but installed on the rear parcel shelf of the car. As such, they were virtually impossible to see. I have also seen various surplus covert antennas for sale at rallies. This can be an enjoyable part of the hobby in itself. Your imagination is your only limit in this respect. So do not despair.

Three Main Facilities

It must be said that in my opinion, there are three main facilities that governments don't like their electret to have access to. 1) Firearms, 2) Communications and 3) Information. Item 1 has been largely dealt with as most firearms have been banned or are about to be. Item 2 is now under control of government with the advent of cellphones and the building of the new intelligence centre to monitor E-mail, etc. at Thames House, London. It is also quite possible that the government will try and introduce legislation to curb amateur radio use and restrict frequencies available. Finally, item 3 - information includes radio monitoring which is already illegal and will soon become technically more challenging.

Also, remember there is no point in attempting to argue finer points of law with the authorities. Do not forget that they employ high cost lawyers paid from your taxes. You have to pay for defence yourself. Be legal - be discrete. Enjoy yourself.

Scanner Users And The Press

It's Not All Bad News

Remember the 'Squidgygate' and 'Camillagate' stories? Dave Roberts explains how some past events are connected by information coming in from scanner users listening to frequencies that are illegal to monitor.

How we all remember the press headlines a few years ago when the retired bank employee and scanner hobbyist informed the press that he had heard the, by now infamous, 'Squidgygate' cellphone conversation between the late Princess of Wales and a male friend. No sooner had the information been released to the world when there was the 'Camillagate' taped 'phone conversation between the Prince of Wales and Mrs Parker-Bowles.

Both these revelations were aired in the press in great detail and the person or persons who eavesdropped on the conversations were always referred to as 'radio hams'. This shows just how much the average reporter or journalist knows about the subject or cares about the truth.

I recently received a letter from a retired prison officer who, since having more time on his hands ('scuse the phrase guv'), has taken up short wave listening and scanning as a worthwhile hobby. He wrote he was surprised to hear cellphone conversations on his scanner (yes, analogue systems are still in use) and he wonders, "Just how much crime can be laid at the door of scanning in the wrong hands?".

Clearly criminals that use radio information are just using another tool available to them and would, no doubt, be committing crime whether they had a scanner or not, but the point is certainly valid. There is, however, a flip side to this particular coin. There have been, for many years, individual scanner users who represent the other side of the equation.

Rave Parties

In the mid eighties there was a sudden interest in so called 'rave parties'. These pay parties were arranged in advance by entrepreneurs who sold tickets for the events. Although your memory may have faded with regard to these jollies, just to remind you, this is what would happen. A field would be hired from a farmer and then a large marquee would appear, possibly a funfair would arrive on the site together with a large number of heavies that were styled as 'security guards'. Hot dog vans would appear having been charged an extortionate amount to be at the venue and other vendors would arrive as if beamed down on to the field.

Then customers would arrive paying up to £30 or so to attend a festival of music played on massive sound systems. This all sounds like a good hoot until you realise that there were no safety or sanitary arrangements in place and that quite a lot of the money spent at the do was, in fact, spent on illegal mind altering substances.

To witness such a party was to view a great amount of young people stoned out of their heads jumping up and down on bouncy inflatable castles and hollering sort of in time to music. When this trend started, the police felt that they had a responsibility to a least try and make such events as safe as possible and to police them in whatever way they could.

Although flyers were printed as adverts for these pay parties and were distributed to potential party goers, the security of those running the events was fairly tight. They did not want the authorities to know where the action was due to occur so that the police and planning authorities, health and safety, etc., would not step in and stop the rave.

The police were at a loss. But radio dealt them a winning hand in the guise of scanner enthusiasts. Many scanner users had, over the years, established personal contacts with either police officers or officers of other authorities. Basically this means that they had got matey with them in the pub.

The scannists, in many areas, helped the authorities by informing them of where and when the pay parties were due to take place together with other information regarding drug dealing and other criminal matters. This was on a day to day basis.

The authorities did not ask where the information was coming from, but it was obvious that the analogue cellphone system could quite easily be overheard and people tended to think that mobile and portable 'phones were as secure as their normal telephone, when in fact the opposite was true.

As a result of the information provided to the authorities the police had advance warning of literally scores of pay party locations, organisers, times and dates. In many cases, the police allowed these illegal events to go ahead but were able to provide a police presence in attempt to deter drug dealing and other offences and also to minimise traffic disruption. Certainly a very large proportion of the information coming in was due to right thinking scanner users. You never hear of these people do you...

In addition to the pay party scene, there is the constant trade in illegal drugs. In many similar sets of circumstances offenders have been arrested and convicted, literally caught in the act, due to information provided by scanner users listening to frequencies that they should not be monitoring. Who could blame them?

Conversation Overhead

On another occasion a radio hobbyist overheard a telephone conversation on his radio which involved a national newspaper's reporter conspiring with the wife of a prisoner to supply drugs to her husband while on a prison visit. The reporter arranged to supply the wife with a miniature camera that she would smuggle to her husband.

Now you may be wondering what the point in all this was. The reporter made it quite clear in his conversation with the

woman that the plan was to pay her to give the drugs and camera to her husband who would then share the cannabis with the prisoner with whom he was sharing a cell. The husband would then photograph the other man using cannabis in prison.

The husband's cellmate was an offender who came from a well known family and was in receipt of much media attention at that time and the whole game was intended to splash headlines that this vulnerable man was using drugs while in jail and to have photographs of him using the drug in the cell on the front page of that particular national daily paper, thus making the woman and her jailbird husband some money.

Thanks to the scanner hobbyist, the prison authorities were alerted, the tape was played to them and they transferred the woman's husband to another jail many miles away that night. The actions of that radio listener, sadly now deceased, saved a vulnerable prisoner being exploited for gain and also saved a deal of embarrassment to the prison authorities and Home Office. Just another case of a discrete and reasoned use of the scanner.

Sad Occasion

On another even more sad occasion I remember that scanner users and amateur operators got together to try to locate the location of a radio amateur talking on a repeater to a friend. The amateur was very distressed and was speaking on the two metre band of harming himself. The man was located by the listeners and amateurs, but by this time it was too late and he was found dead in his car in the countryside.

On yet another occasion information, and a tape, was received by the authorities of an impending burglary of an armoury. The plan was for the offenders to burgle the armoury, steal a large number of weapons and then commence a series of armed robberies of jewellers premises. Thanks to the scanner user who reported that one the plan was thwarted before it began and all the baddies were arrested and convicted. That, I believe, was an occasion where the use of the scanner had actually saved lives and immeasurable distress. There is no doubt that without that initial information their plan would have been likely to succeed as there were other factors, which obviously it would be wrong to mention, that would have increased their chances of getting away with it.

The above cases were not, by any means, detected just as a result of cellphone monitoring.

Not Just A Scanner

The radio hobby does not just begin and end with scanning or s.s.b. utility monitoring or aviation listening or data decoding or amateur band reception. As Dave Roberts explains, all these interests are interdependent and all equally important.

Although radio scanning is generally seen to be the reception of voice modulated radio signals from 30MHz and higher, using a frequency sweeping receiver, the subject of scanning cannot be viewed as a stand alone item. Many hobbyists will use a radio scanner as part of another hobby.

The prime example of this are the many people that monitor the military and civil air bands as an integral part of their aviation interest, but to whom radio represents only a part of their pastime. They photograph aircraft or collect aviation memorabilia or even fly aircraft themselves professionally or recreationally.

Many scanners are fitted in aircraft operators offices or flying clubs where they trundle away as part of the background office sounds and are rarely, if ever, switched off. Some emergency service offices have a scanner on the shelf monitoring their own channels. This is true of many police aviation units that use scanners to monitor the police channels in their area to anticipate the deployment of their aircraft.

From the hobbyists' perspective it may be that an individual has a special interest, the enjoyment of which is enhanced by the inclusion of a radio scanner as part of their equipment. A prime example is the keen yachtsman or boater who will have a scanner on marine bands churning through the v.h.f. and u.h.f. marine sections.

It is quite possible that, as with the aviation enthusiast, there may also be an h.f. radio lurking on the shelf. In the yachtsman's case this may be tuned to 2.182 or to 5.680, or other rescue frequency, or to one of the amateur radio h.f. marine nets which operate daily giving useful and often life-saving information to small boats at sea. Keen boatmen may well be advised to visit some of the amateur radio rallies as recently I have seen quite a lot of marine v.h.f. radio gear going for extremely reasonable prices.

Emergency Services

Some people may have a very keen interest in the emergency services. Although this may partly manifest itself in monitoring their transmissions (an activity desperately illegal) it may also include collecting old or surplus equipment from the fire, ambulance or police services, some of which may be radio gear or other electronic equipment.

Remember some people actually

Some people may have a very keen interest in the emergency services

FIRST IN Amateur Radio

Waters & Stanton PLC

Fax:01702 205843
Enquires:01702 206835
01702 204965

22 Main Road, Hockley, Essex, SS5 4QS

For the very best Bargains & Secondhand Listings,
Visit: Our large Web Site wsplc.com

Retail Mon-Sat 9.00 - 5.30pm
Secure e-mail order: Via our web site
General e-mail: Info@wsplc.demon.co.uk.

Orders only
Freephone 0500 73 73 88
All OFFERS subject to availability

MasterCard VISA

ISO 9002 REGISTERED FIRM

New 2000 sq. ft. Showroom

3000 Products On Display

Now Open

It's BIG Very BIG

No clutter or cramped surroundings
Air conditioned with plenty of seating
50 radios on permant demonstration
New customer car park at front

We've created the UK's most spacious amateur radio showroom, with comfortable surroundings and plenty of space to sit down and try any radio of your choice. There are no compromises. Imagine sitting in comfort, with coffee and tea on call, and being able to play with whatever rig takes your fancy. Experience the widest range of accessories ever displayed. Browse through an amazing variety of items dedicated to radio communicatoions.There's only one truly dedicated Ham Store!

Scancat Has Arrived!

Direct From USA

Adds Features
Views Spectrum
Creates Logs
Keyboard Entry

Virtual Receiver

Spectrum Scope

Control your radio from your PC. With virtual receiver (illustrated) your handheld becomes a base station receiver. Supports all data port receivers from AOR, Icom, Yaesu, Kenwood and some Bearcat. And you get the following exciting features.

- Unlimited memories
- Spectrum scope
- 100 scan bands
- CTCSS & DCS mode
- Direct keyboard entry
- Logging File
- Personal data base
- Access import
- Voice recording (SE version only)

Plus £6.00 Carr.

Scancat Gold	£99.95
Scancat Gold SE	£159.95

Programmes for PC Windows
Send for details

The latest version of this software is now available for immediate shipment.

AOR-3000A Receiver 100kHz - 2036MHz

The AOR-3000A goes on and on. It offers a wide frequency range at a very competitive price. Features include USB, LSB, CW, AM, FM * Fast 50 channels per sec search, * GaAsFET RF amplifier * Wide range of tuning steps from 50Hz * RS-232 port * 400 memory channels * Built-in clock * Channel pass feature * Back illumination * Rear whip antenna etc. Ask for leaflet.

£699 Plus £7.50 Carr.

NEW

30kHz - 30MHz NASA HF-4E Receiver

Computer Compatible FREE Software Disk

£199 Plus £6.00 Carr.

This new receiver covers 30kHz to 30MHz and is designed for SSB, CW and AM reception. A much improved version of the Target HF-3, it is fitted with 2.6kHz SSB filter, advanced mixer design, backlighted display, active active antenna facility, and computer output. Included in the package is a software disk and 12V AC mains adapter Optional self-powered active antenna £59.95

IC-R75 Receiver 30kHz - 60MHz

ICOM

FREE AC PSU & DSP Unit

The IC-R75 has received rave reviews in the Amateur Radio Press. It's a very serious short wave receiver with coverage right up to the exciting 6m Ham Band. Features include USB, LSB, CW, AM, FM * 101 Memories * Super High Dynamic Range * Synchronous AM detection * Twin Pass band Tuning * Digital Signal Processing * Automatic Notch Filter * 101 Alphanumeric Memories * RF Gain/Squelch * Clock * Numeric keypad * Attenuator * 2-level Pre-Amp * Scanning.

£629 Plus £7.50 Carr.

UBC-3000XLT

25MHz - 1.3GHz

It has 400 channel memories, Automatic store and automatic sorting, Ultra fast scan rate, LCD backlight, 300ch per sec. scan rate, Data skip function, Supplied with AC adapter/charger and AA ni-cads.

£199.95 Plus £6.00 Carr.

YAESU Choice of the World's top DX'ers

VR-500

100KHz - 1300MHz

A true all-mode scanner offering great performance on VHF and UHF as well as the short wave bands with SSB coverage. 1000 memories, alphanumeric display, band scope, and PC programmable option.

Phone Plus £6.00 Carr.

YAESU Choice of the World's top DX'ers

FRG-100 Receiver

50kHz - 30MHz

£389 Plus £7.50 Carr.

The FRG-100 has stood the test of time. It offers full coverage of the short wave bands plus long wave and medium wave. It features, * USB, LSB, AM, CW, * 50 memories * 2 stage attenuator * Noise Blanker * Band Scanning * Memory Scanning * Dual Speed AGC * High and low impedance antenna inputs * Programmable steps from 10Hz - 1kHz * Optional Narrow Filters, PSU and FM board * BFO reverse for CW * Twin Clocks. Ask for leaflet.

ATS-818 Short -Wave Portable

NEW

£129.95 Plus £6.00 Carr.

SSB AM & Broadcast

A compact portable station that will pull in signals from around the world. SSB reception will let you hear radio amateurs and aircraft from the far corners of the world. There are 54 memories in which to store your favourite stations. Power is via 6 AA cells (not supplied).

0kHz - 32MHz AOR-7030 Receiver

Needing little introduction, this receiver has become a classic of design. Features USB, LSB, CW, AM, FM, * 100 Memories * Dual VFOs * Resolution to 10Hz * Clock and Timer * Variable Bandwidth * Wide Dynamic Range * Seamless Tuning using Single Loop DDS * Clear LCD Readout * Infrared Remote Controller * AC Power Supply. Send for leaflet.

Phone Plus £7.50 Carr.

Fairhaven RD-500VX 20kHz - 1.75GHz

Phone Plus £7.50 Carr.

This very wide range receiver offers a complete listener station in one package. Features include USB, LSB, CW, AM, FM, Video out * 5Hz step accuracy * Over 13,000 memories with 20 Alphanumeric Characters * Noise Blanker * Text Search * Pass Band Tuning * Stereo CW Reception * Notch & Peak Filter etc.

We Will Match or BEAT Competitor's Prices On genuine UK Stock

wsplc.com Go

Yupiteru MVT-9000EU Mk2

100kHz - 1.99GHz

Phone Plus £7.50 Carr.

Latest Mk2 Version

Here's your chance to purchase the latest scanning receiver from Yupiteru at an unbelievable price. Covering the complete radio spectrum from long wave to UHF, you have a complete station in your pocket. Features include NFM, WFM, NAM, WAM, LSB, USB, CW, * 7 Frequency steps * 1,000 Memories in 20 banks * 500 Pass memories * 10 Priority channels, * Band Scope display * Duplex receive function lets you hear both sides of the conversation * Fast tune function, * Built-in AM antenna * Dual frequency display * Fast key-pad entry. * Rechargeable batteries, AC charger and helical antenna.

Phone Plus £8.00 Carr.

Yupiteru MVT-7100EU

100kHz - 1.65GHz

Probably the best value for money, it has stood the test of time and is very sensitive. Offers USB, LSB, CW, AM, FM, WFM, * 1,000 memories * 500 Pass channels * 12 Tuning steps * Fast scan speed * Rechargeable batteries, AC charger and telescopic antenna.

£179 Plus £6.00 Carr.

Yupiteru MVT-7000EX

100kHz - 1.3GHz

The ideal scanner for those who are mainly interested in VHF and UHF listening. Features include, FM, WFM, AM reception * 200 memories in 10 banks * 20 steps per sec scanning * 6 Tuning steps * Good sensitivity * Supplied with rechargeable ni-cads and AC charger.Telescopic antenna included.

AOR-8200

500kHz - 2040MHz

This wide range scanner is fitted with a data port for computer control. Features include USB. LSB, CW, FM, WFM * Programmable steps * 1000 memories in 20 banks * Alphanumeric display * Built-in AM antenna * 8.33kHz steps for air band * Rechargeable ni-cads, AC charger and helical antenna.

Phone Plus £8.00 Carr.

£249 Plus £7.50 Carr.

IC-R10E

500kHz - 1300MHz

USB, LSB, CW, AM, FM, WFM * 1,000 Memories * Bandscope * Noise Blanker * Wide range of tuning steps * alphanumeric Display * Real Time Band Scope * Voice scan feature * Data output port * Programmable scanning * Ni-cad pack, AC charger and helical antenna.

£129 Plus £7.50 Carr.

IC-R2

500kHz - 1309MHz

This palm size handy offers great performance. Offers FM, WFM and AM * Auto squelch * 400 Memories * 11 Tuning steps * CTCSS decode * Duplex monitoring feature * PC Programmable * Built-in attenuator * Priority watch * Needs 2 x AA cells (extra). Antenna included.

ICOM New ICR-3E Scanner WITH TV RECEPTION!

Phone

* NSTC/PAL TV Receive.
* Wideband AM & FM Receive (No SSB)
* 496 KHz - 2450 MHz frequency coverage.
* Memory: Extensive Storage.
* Display: Detailed data control display.
* Dual Receive.
* AC charger and batteries included.

Icom have launched a new scanner with a built-in TV receiver. So when there is nothing to listen to, you can watch the pictures. You will need to be in a good signal area to get best results.

UBC - 220XLT Handheld Scanner

£119.95 Plus £8.00 Carr.

Ideal for general listening, this scanner covers all the major bands from 66MHz - 956MHz AM and FM. 200 memories and a very fast scanning speed make this a very attractive buy. You also get the flexible short antenna, AC charger and batteries.Very popular with Airband listeners.

Double Your Life!! NiMH Cells

These Nexcell Ni-MH cells have around twice the capacity of ni-cads and no memory effect. The AA size are 1350mAh. Ideal for handhelds and digital cameras. As supplied to the police.

4 x AA cells	£9.95
4 x AAA cells	£9.95
Charger for above	£9.95

Carriage £2 maximum. Quantity discounts - phone.

ICOM PCR-1000 Computer controlled Receiver 10kHz - 1300MHz

Mode:USB, LSB, CW, AM, FM, WFM.

£279.95 Plus £6.00 Carr.

Connect this up to your PC and enjoy high quality reception with an amazing station data base and memory log. Can be used remotely from PC. Requires PC not included.

Hoka Gold-3 Decoding Software

THE SECRET'S OUT!

We are now the UK distributors. As used by governments, it can decode just about any form of data transmission on HF and VHF. Simply connect between PC and Rx audio. Can be loaded on any number of PCs. This is very advanced programme. £349.95 Plus £2.00 Carr.

NEW Route Finder (Europe) Software

£9.95 Plus £2.00 Carr.

* Optimum route between start location and destination in seconds
* Details the distance and time for a planned route
* Covers 26,798 locations and 328,982 miles of road
* Provides two levels of route information
* Provides five levels of map detail
* Includes a ZOOM facility on the map section

FB1 - 9 Skin Coloured Earpiece

£9.95 Plus £2.00 Carr.

The FBI-9 is a brand new design that is skin coloured to make it far less obvious when worn. The cable and cable exits will take a strain of 12kg so it won't break in commercial applications.

W-LWB MkII Long Wire Balun

Just attach any length of wire and feed back to radio with coax cable. Reduces interference and improves matching to receiver. £22.95 Plus £2.00 Carr.

High Quality Coax Switch

Enjoy the benefit of selecting two antennas or feeding two receivers at the flick of a switch. Rated up to 600MHz and almost half the price of competitive models. Superb solid construction. Handles 1kW HF, 500W UHF. SO-239 sockets. £12.95 Plus £2.00 Carr.

WS-Desktop

The answer to those who want to improve the scanner performance using an indoor antenna. Covers 25 - 1300MHz and includes coax cable terminated with BNC plug. £49.95 Plus £7.50 Carr.

WS-Mobile Antenna

Just 0.9m high with magnetic base and 4m cable terminated with BNC plug. Covers 25 - 1300MHz and is the ideal choice for scanner users. £24.95 Plus £7.50 Carr.

SWL DX-1 HF Ant.

Covers 1.5 - 30Mhz and is 50m long. With 10m feeder wire back to receiver. An ideal general purpose antenna. £25.95 Plus £6.00 Carr.

Global AT-2000

The classic wire antenna tuner for short wave listening. Covering 1.8 - 30MHz, it includes our exclusive Q-switch, which improves front-end selectivity. Just connect a random length of wire and connect a coax cable from ATU back to receiver. £89.95 Plus £6.00 Carr.

Angler HF/UHF Antenna

Ideal for scanners, this antenna is 14m long and covers the range 100kHz - 1300MHz. It includes coax cable terminated with BNC plug. £19.95 Plus £2.00 Carr.

QS-300 Desk Stand

Designed for all handheld scanners. Your scanner sits on the adjustbale holder and a short BNC cable runs to an SO-239 socket, ready for you to plug your extenal antenna into. A really smart device. £13.95 Plus £2.00 Carr.

WS-Base Discone

The classic antenna covering 25Mhz to 1300MHz. Ideal for all scanners. Height is 1.2m. Just connect coax cable to the SO-239 socket. Suitable for indoor or outdoor use. £49.95 Plus £2.00 Carr.

Leather-Look Holder

This leather-look holder is machine stitched and will take your medium sized scanner or handy and offers you wallet storage space with a separate zipped compartment and dividers. Includes belt loop and carry strap. £9.95 Plus £2.00 Carr.

QS-400

This new mount clips on to the dash grill. The sprung fingers, and bottom support, secures any size of handheld firmly in place. Features quick release grip for easy removal of handheld and also includes angle adjustment. £9.95 Plus £2.00 Carr.

collect fire engines, ambulances and police vehicles. A gentleman contacted Dave Hicks who owns the Museum of Pye Telecom and said that he was restoring a Morris 100 police car from the 1960s and wondered whether Dave could assist with some period radio gear.

Dave had the right Pye radio for the job and the chap asked him whether he could fix it so that it would receive police messages. David politely explained the situation but fitted the car radio with receive crystals for the 2m amateur repeaters and converted the Pye set to receive on amateur v.h.f. so that at least the fellow had some sound coming out of the speaker in the car. The vehicle now does the rounds of county shows and exhibitions as part of the local police display in that area. Result - everybody happy.

Other Interests

People that have an interest in military matters will probably listen to their local army base on low v.h.f. as well as monitoring the h.f. bands in attempt to learn more of troop deployments. These listeners are often likely to be ex-army types themselves. POCSAG pager traffic may be monitored for further information as to what any particular group or individual is up to.

Those that are interested in the space programme will probably want to listen to the cosmonauts on the recently reoccupied *MIR* space station on 145.985 amateur bands but will also want to hear them on the downlink frequency (whatever that is these days). The same listeners will want to monitor the space shuttle downlink frequencies when possible and otherwise they may be listening to WA3NAN - the amateur station from the Goddard Space Centre that rebroadcasts shuttle audio when possible if a mission is flying. Also they will have the option of listening to Cape Radio on h.f. for the booster recovery and range safety nets.

The short wave broadcast DXer widens his or her knowledge of world affairs without having the constraint of only hearing the British point of view.

Integrated Hobby

The point of this ramble is to underline the fact that the radio hobby is inseparable from it's parts. The interest does not just begin and end with scanning, or s.s.b. utility monitoring or aviation listening or data decoding or amateur band reception. All these interests are interdependent.

The amateur operator has an interest in other modes and parts of the radio spectrum. The aviation enthusiast will monitor h.f. and v.h.f. otherwise he or she will be missing out on a raft of information. The emergency services monitor is also likely to be a POCSAG user and possibly an aviation listener at v.h.f. to hear air ambulance or police aviation deployments. This has to be an integrated hobby.

Amateur radio operators must support all forms of the radio hobby because all radio communication is an extension of their interest. In Australia and New Zealand amateurs are losing part of their u.h.f. allocation. In Canada the government has prepared legislation that will make possession of digital radio scanners an offence if a licence is not in force. Now they are not going to be issuing licences and digital scanners have not even been invented yet.

These three countries are part of the British Commonwealth and have been largely populated with people from the UK. Much of their legislation is formed with the assistance and advice of the UK government. To look at some of the things happening there may well be to see the future of radio as hobby here.

Radio Traffic Monitored

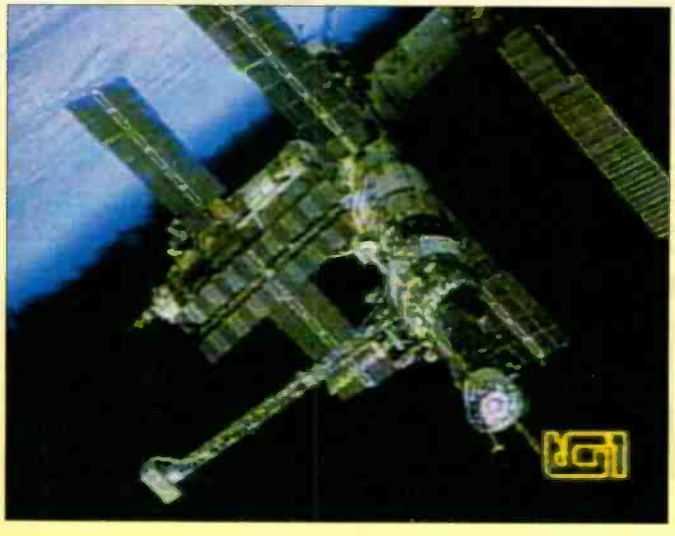
There is no doubt that government of any persuasion within Britain does not like to have it's radio traffic monitored. It is not too keen to have large chunks of the radio frequency spectrum being allocated to people who do not pay millions of pounds for the privilege. Government would rather charge millions to mobile 'phone companies for the frequencies and then take VAT on all our calls and line rental.

Anyone who has an interest in radio communication as a listener, amateur or CB operator should be aware that we are sitting on a resource that avaricious Ministers would like to turn into financial statistics. The hobby radio fraternity must pretty well stick together and support each others interests within the overall radio camp.

We only have to look at what happened to target shooting sports in Britain. The demise of the shooting hobby was in no small means due to the fragmentation, snobbishness and self interest within their sport. Shooters felt unable to present a united opposition to daft government plans. Now the only people who shoot with up-to-date pistols and rifles here are criminals.

Radio, by it's nature, is a unifying force and as hobbyists we must share our interests and remain inclusive because, otherwise, we could end up being restricted to PMR446 communication or broadcast radio.

Sorry...ranting mode is off now.



***MIR* in orbit.**
(Courtesy NASA).

Buyers Guide

Scanning equipment has become a whole lot cheaper, but that doesn't make too much difference if your funds are stretched. Dave Roberts looks at the pros and cons of buying new or second-hand.

As I write this, petrol prices are headed for £4 per gallon. Taxation is spiralling and there is less money available to purchase the radio equipment advertised in the adverts in *SWM* and *Practical Wireless*. Like most of us, I find that it would be very easy to spend a fortune on the latest equipment but somehow always seem to lack the necessary funds. In real terms, scanning equipment has become a whole lot cheaper but that doesn't make too much difference if funds are stretched.

There are other options. You could always buy second-hand. I agree that this method of acquiring radio gear may seem fraught with danger and you certainly have to be most careful what you buy and who you buy it from and, of course, how much you pay, but nevertheless there are some good buys to be had.

First Rule

The first rule must be to know what it is that you want to buy. This sounds daft, I know, but radio manufacturers have constantly attempted to upgrade and modernise their product lines and this has left a plethora of radio equipment in circulation which is not immediately identifiable. I mean, should you see an advert offering a Yaesu FRG-9600, would you know what it was and whether that piece of gear would suit you?

I have seen one of these radios advertised recently at what seemed a reasonable price and provided that the set is in good condition it would suit many receiving applications. The radio, of course, covers between 60 and 905MHz without any gaps. Step sizes are programmable and the set was very well made indeed.

This might sound just what you are looking for, but the main drawback with this model is that it only has 100 channels. With equipment of this age you are bound to find that some points of the specification will not be as comprehensive as more modern radios. This may be more apparent when it comes to database management.

Another fine, but old, scanning receiver which I have also seen advertised for sale by private vendors is the JIL SX-400. This set was made mainly for professional use, but a large number of them found their way into private users' hands. A very well made set but one which only covers from 26 to 520MHz. There are no gaps in coverage but potential purchasers should be aware that it only has 20 channels.

The redeeming feature is that the radio offers the option of computer control which would enhance the channels available but would, of course, tie up a computer. In the hand-held receiver range there are even more 'out-of-date but still in service' scanners which come on to the market regularly.

Perhaps the most prevalent of these is the AR1000 radio which must have sold in tens of thousands. They also have their drawbacks. I have never found selectivity that great and even though scanners by their nature cannot be all things to all men, I find them a bit deaf even by scanner standards. Still I have owned one since they were first sold and it still works. So I must not complain.

Another excellent little, and very old, radio is the old AR800E. A 20 channel scanner with some gaps like the Grand Canyon but still functional as a handy. If you do decide to purchase an older hand-held scanner do not necessarily be put off by the fact that many of them have built-in battery packs. The NiCad pack in my old AR800E has been replaced three times (I have owned it since 1985 having bought it second-hand). These battery packs are still available from specialist battery suppliers at reasonable cost. The AR800E is, by the way, much more sensitive than the later AR1000.

Never Been Better

The range of equipment for sale, whether new or second-hand, has never been better. My first v.h.f. radio receiver was an old wartime Hallicrafters S27 receiver which covered from about 25 to 143MHz and to scan the bands meant literally tuning the dial. Weight was it's main drawback and the S27 together with an old Marconi CR100 h.f. receiver almost brought down the ceiling in my old cottage in Oxfordshire. Then they had to go.

We have, however, come on a long way since then and now looking at the specification of radio equipment which was for sale even in the nineteen eighties will show that a tremendous amount of amateur v.h.f./u.h.f. radio equipment was expandable to receive a very long way out of amateur band. At the Donnington Show last year I saw on the 'Bring & Buy' counter a Standard C520 or C528 radio. They are both the same set and were supplied as 2m and 70cm amateur band radios. These sets are keypad reprogrammable and can give coverage from 127 to 175MHz v.h.f. and

in the u.h.f. range coverage of large parts of 300, 400, 800 and 900MHz are possible. This is, of course, n.b.f.m. only. It can be programmed to have 40 channels and has CTCSS scan if the CTCSS board is fitted. The set on the 'Bring & Buy' was going for about £50 and seemed to work.

Looking again at hand-held radios, the Alinco DJG5 hand-held radio offers very good out-of-band reception as does the Yaesu FT-51R. Turning to larger sets for mobile or base use then there is always the ADI146 2m radio which will give very good high band v.h.f. coverage when it had been expanded including, of course, marine band.

These ADI radios are now hitting the second-hand market at very reasonable prices and if you just wanted a scanner for high band v.h.f. and 2m then this radio will do you just fine. Expansion really is a piece of cake if you have an amateur licence allowing operation on 2m then you have a cheap scanner/transceiver.

When buying you just can't be too careful. I have bought second-hand kit on a few occasions and so far I have been lucky. If you know the vendor then he will often allow you to take the equipment away and try it prior to purchase. This is obviously the very best way to do business (from the purchaser's point of view) but is not always possible.

Buying from the readers ads sections in magazines can be fraught with danger but generally people who are out to sell through those columns are hobbyists and tend to turn out to be decent sorts of folks. I have purchased second-hand gear through adverts in *SWM* and *PW* on several occasions and have never had any duff gear tucked into me so far.

Words Of Advice

A few simple words of advice. Look at the vendor and the sort of person that he or she is. I know that this sounds a bit off, but remember it's your precious money that is at stake here. If you don't like the look of the person or you think that they are hiding something or if they appear to be some sort of unofficial trader trying to do a few deals then my advice would be to walk away.

If the seller does not appear to share your interest in the hobby or when you arrive to view the equipment you find that he has car stereos and videos or second-hand TVs for sale as well, then I would be off down the road leaving a cloud of dust and small pebbles and no money. If you buy from a genuine vendor who shares your interest in radio then they will be able to tell you how they acquired the radio, it's performance and why they are getting shot of it. Make sure that you do try the set and all it's functions before you part with any money.

Don't forget that some sets that may search, scan and seemingly appear to perform well may have lost sensitivity due to having been in close proximity to high r.f. So if you can, when you are viewing have a few frequencies jotted down for that area and load 'em up and make sure that the radio does not have the hearing ability of a letterbox.

If buying from a dealer, then you will pay more for your second-hand set but the dealer will often have more technical info' for the radio and there will be some sort of guarantee offered with it. Also, most dealers are quite prepared to let you sit in the shop and play with the gear for a while prior to purchase.

I remember sitting in the Lynch store for about an hour programming a second-hand set and checking it out. They were more than happy for me to sit there punching buttons and took absolutely no notice of me at all as I mucked about with the thing. I have it here and it's still working.

So the short message here is don't be constrained in your purchase. Don't reject the idea of buying transmitter/receivers if the receiver specification is what you are looking for. Research older type sets, see which radios will suit your purpose and then you can scan the adverts with confidence. Check out the seller and the gear carefully and if you are not happy, leave well alone. There are always scanners for sale elsewhere.

Your Dream Scanner

Can fantasy become reality? Dave Roberts considers what would be the ultimate scanner.

I've found the perfect woman,
I could not ask for more,
She's deaf and dumb and oversexed,
and owns a liquor store.

So goes the little ditty, popular about ten years ago. Well, now that the personal circumstances have been settled, what about the radio side of things? What would we like to see in a scanner. My neighbour, Geoff, and I have had a few yarns about this over the years and apart from the obvious comment that we really need to get out more, it would be interesting what your thoughts are on the subject.

OK let's start in the realms of pure fantasy. We all need scanners that will instantly decode TETRA, TETRAPOL, MASC, all other forms of encryption, oh, and frequency hopping sequences too. The only attempt that has been made so far is that one manufacturer offers audio inversion decoding.

So, Mr Yaesu, Mr Icom and Messrs. Kenwood, AOR and Alinco - listen up. That is what we really need and unless you guys come up with something in the next few years you will find that your futures may lie in the electric toothbrush market.

Back To Reality

Looking at the whole package this radio is going to have to be small enough to run in the car but big enough to have buttons that are large enough and separated from each other so that pudgy fingers built like bunches of ripe bananas don't hit about three buttons in one go. The set is going to have to be capable of computer control but is not going to need a computer permanently hooked up to it to get the best out of it.

Talking of computers, many of us use the beastly things and if there is one thing that is a real annoyance it's to have the scanner stopping on sproggies created by the computer. (We must assume that this perfect scanner has no internal sprogs of it's own), so let's have a set with really good screening because the computers always seem to cause problems on the most important frequencies, don't they?

Filtering on this radio will be of the finest quality so that when it's scanning around in an area, we don't get to hear darn pagers all over the place. Well, not unless we are monitoring those frequencies and displaying the decoded POCSAG and FLEX paging or other data on the built-in TFT colour display anyway.

Now, we don't want to get the manufacturers too sweaty so, fellers, we are talking scanner here not h.f. radio. 30MHz to 4GHz will do nicely. That good range will ensure that any interesting video can be sent to that fine screen of yours and displayed in gorgeous crisp colour. Well there is a fair bit of interesting video at about 2.5GHz isn't there and it would be a shame to miss it. Of course, when we are all suffering from information overload we can relax with *Coronation Street* or the *Teletubbies*.

Search & Scan

This dream radio will have just the very best search and scan facilities ever. Searching will become a dream with there being the facility for separate squelch levels for each search bank. Of course, there will be separate step sizes for each search bank, likewise each search bank will be able to have one of the three antenna sockets allocated to it. Horses for courses you know.

There will be auto loading to an allocated special memory bank on a mode basis, i.e., a.m./w.b.f.m./n.b.f.m. in the voice mode and data/video modes will be saved to a data memory bank. Oh and no duplicate frequencies for each mode please. A nice lockout button is a must as is a channel void option.

Once we have saved all the frequencies, we want to be able to edit them and add alpha-numeric tags for the display. We will need to shift them around within and between banks. We shall need to view them on an all up basis or by scrolling on this super screen.

There should be a sub display so that the last frequency or channel active could be displayed, even though the scan or search has resumed. Mr Manufacturer, just you try and take your eyes off the v.d.u. when you are working to grab a peek at the scanner display to see what that frequency was. Damn near impossible isn't it - you just never get there in time.

Say ten search memories should be allocated as a background search facility which could be run without stopping the scan (most useful for locating some two frequency simplex conversations) and of course in addition to line output sockets there will have to be a constantly running digital audio store. A 'What did he say?' button to play back the last five or ten seconds of audio. This facility is already incorporated in some emergency service control rooms so why not in this super scanner.

Scan speeds will be variable and fast. CTCSS will be fitted. Seeing as this radio will be the standard intermediate scanner for some years (until the all singing digi' decode radio is on sale) there will have to be a trunk tracking feature built in, capable of dealing with all known forms of trunking systems, not just Motorola.

Military Standard

Construction of this gadget will be to a military standard and the thing will be pretty much shower proof. The controls, as mentioned previously, will be of a reasonable size, and there will be plenty of them, because Mr Manufacturer, users do not want to be scrolling through a menu list looking for the panel light control when they think they are missing some action.

Oh yes, that brings me to lighting. Please a completely lit panel. This is important because my neighbour Geoff gets really annoyed when this is mentioned. He has a couple of scanners and it bugs him that on his feature rich Yupiteru MVT-7100 he still has to hold the display light button. He is not normally aggressive I assure you. Why don't all scanners have as S-meter? Some have the displays that show adjacent channel usage, etc., but all scanners should have a meter.

Geoff also says we need audio processing to enable MilAir to be a little easier on the ear, this must be controllable from the front panel, of course. Also on the front, is where the infra red panel will be. The remote control and remote cordless headphones will need this won't they. There must also be line output and

NEVADA® GROWING BIGGE

Bearcat UBC 120XLT

Perfect for long distance reception of Aircraft, Public Services, Land Mobile and much more! Outstanding value for money!

- 66 - 512 MHz (with gaps)
- AM/FM/WFM
- 100 memory channels
- TURBO SCAN 100 Channel/Second
- TURBO SEARCH 300 St/Second
- Data Skip facility
- 10 Priority Channels
- Programmable Search
- Channel Lockout Key

£99.95 £8 p&p

Bearcat UBC 9000XLT

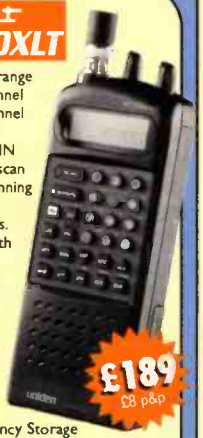
High Performance Base Scanner

£249 £8 p&p

- 25 - 1300 MHz (with Gaps)
- 500 memory channels
- VFO Control
- Selectable Attenuator
- Selectable Delay
- Selectable Mode AM/FM
- TURBO SCAN 100 Channel/Sec
- TURBO SEARCH 300 St/Second
- Alpha Numeric Display
- Automatic Store
- Frequency Transfer
- Auto Tape Record
- Data Skip facility
- Programmable Search

CHEQUE SPREAD

Bearcat UBC 3000XLT



Uniden's top of the range scanner has 400 channel near continuous channel coverage from 25 to 1300MHz. New TWIN TURBO search and scan allow high speed scanning or searching to give lightning quick results. The set is packed with new features:

- 25 - 550, 760 - 1300 MHz
- AM/FM/WFM
- 400 memory Ch
- TURBO SCAN 100 Ch/Second
- TURBO SEARCH 300 St/Second
- Automatic Frequency Storage
- Selectable Attenuator
- Automatic Frequency Sorting
- Data Skip
- Delay Key ● Channel Count Key
- Supplied complete with earphone, case, belt clip, charger and rubber duck antenna

£189 £8 p&p

AR 8200 (SERIES 2)

- 530kHz-204MHz
- All Mode inc 8.33kHz AM
- 1000 Memories
- Plus LOTS MORE!

PRICE MATCH

LATEST model!

We carry the FULL RANGE of accessories!

~~£439~~ **£399** £8 p&p

CHEQUE SPREAD

CT8200	...CTCSS £69.90
EM8200	..External memory £59.90
RU8200	..Record/Play Back £59.90
TE8200	...Tone eliminator £39.90
VI8200	...Voice inverter £59.90
CC8200	..Computer lead + free PC Windows software & protocol listing on CD-ROM £79.90
OS8200	..ACC Connector + free end lead..... £14.90
RT8200	...Reaction tune lead for Opto Scout . £24.90
CR8200	...Tape interface & Lead £39.90
CO8200	..Clone data lead £39.00
SC8200P	.Leatherette padded soft case £19.95

Bearcat UBC 220XLT

Uniden has built its reputation on reliability, ease of use and quality of reception with its most popular model, the 220XLT. Ideal for Aircraft, Public Service & UHF Communications.

- 66 - 956 MHz (with gaps)
- AM/FM
- 200 memories
- TURBO SCAN 100 Ch/Second
- TURBO SEARCH 300 St/Second
- Data Skip facility
- 10 Priority Channels
- Memory Backup
- Supplied complete with earphone, belt clip, charger and rubber duck antenna

£119.95 £8 p&p

CHEQUE SPREAD

UBC 860XLT

AIRBAND Base Scanner

CHEQUE SPREAD

A stylish low profile base scanner with TWIN TURBO scan and search facility. Covers civil airband, marine, police, cellular plus more!

£129.95 £6 p&p

- 66-88, 108-174, 406-512, 806-956MHz
- 100 mems ● Turbo Scan - 300 steps/sec

Bearcat ACCESSORIES

BC005	....CTCSS Board (UBC 9000XLT)	£49.95
BP70	.....NiCad Pack (UBC 70XLT)	£13.95
BP220	....Replacement Battery (UBC 220/120XLT)	£19.95
BP205	....NiCad Pack (UBC 100/200XLT)	£34.95
BP2500	..NiCad Pack (UBC 2500/3000XLT)	£35.95
LC120	....Soft Case (UBC 220XLT)	£19.95
RD9	.....Cigar Adaptor Lead (UBC 220XLT)	£13.95

Please add £3.75 p&p on all accessories

Bearcat UBC 60XLT

A brand new low cost scanner that covers MARINE, POLICE, LAND MOBILE *and more!*

- 66 - 512 MHz (with gaps)
- 30 memories
- Channel or Frequency display
- Priority Channel
- Channel Lockout
- Scan Delay

£79.95 £8 p&p

USED EQUIPMENT

No Postage & Packing extra

ALL SAFETY TESTED & GUARANTEED FOR 3 MONTHS

SHORTWAVE RECEIVERS		
AKD TARGET	HF3 S..Boxed - as new	129
DRAKE	SW2.....HF RX AM/SSB - ex demo	399
GRUNDIG	YB500.....SW Portable - ex demo	99
SONY ICF	SW100E...Shortwave Portable	129
ICOM	R75.....HF to 60Mhz + UT102	625
ICOM	R-7000.....Wide coverage Base RX	499
ICOM	IC R-7100.....Wideband Base Receiver	599
ICOM	ICR-72.....HF Receiver	399
JRC	535.....Quality HF RX Base	799
KENWOOD	R5000...HF+fitted VHF module choice from	599
SCANNING RECEIVERS		
AOR	AR2700.....Handheld Scanner	149
BEARCAT	UBC860XLT...Base Scanner	105
COMMTEL	510.....Handheld Scanner	145
ICOM	IC-R1.....Handheld Scanner	159
ICOM	PCR1000.....Computer based scanner + UT106	225
REALISTIC	PRO 2026 ..Patrolman	120
TRIDENT	TRx100XLT...Wideband Scanner, ex demo	159
YUPITERU	MVT5000.....Handheld Scanner	95
YUPITERU	MVT9000....Top of the Range Handheld Scanner	249
YUPITERU	VT125 II.....Handheld Scanner	249
SCANMASTER	SP55....Switchable Preamps ..... last few at	49

STOCK ARRIVING DAILY - CALL

PALSTAR EFW DELUXE SW ANTENNA

A deluxe SW antenna using super flexweave wire and an Isolating balun for even coax feed & low noise/static pickup. ● 500kHz - 30MHz ● (Max) 20mtrs long

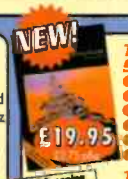
£59.95 £4.75 p&p

PALSTAR DXI SW ANTENNA

Standard enamelled copper wire antenna up to 50 metres long with 10 metres of single feed wire. May be adjusted to suit garden.

● (Max) 50mtrs long **£25.95** £4.75 p&p

NEW!



£19.95

THE ULTIMATE SCANNING GUIDE

- 640 pages
- Over 60,000 Frequency entries
- 30-986MHz ● Scanner reviews
- Articles on Airband & Marine
- FREE fully searchable CD-ROM
- Listing by freq & fixed/mobile pairs

£19.50

THE UK SCANNING DIRECTORY over 600 pages!

Covering 25MHz to 1.8GHz. Explicit listings of Civil & Military aviation, maritime, Army, Navy, DSS snoopers, Police & their helicopters, eye-in-the-sky links, prisons, telephones + lots more!

SCANMASTER Antennas

DOUBLE DISCONE SCANMASTER DD 1300

A high performance wideband antenna

- 25-1300MHz

SPECIAL OFFER!

~~£59.95~~ **£39.95** £6.00 p&p

SCANMASTER LP1300

The ULTIMATE Scanner Antenna! High quality 16 element beam

- 105 - 1300MHz
- Gain 11 - 13 dBi
- 'N' Type connection
- 500W TX

£129.00 £8.00 p&p

GOODMANS TRACKER

2 WAY BUSINESS & PERSONAL COMMUNICATIONS SYSTEM

NEW!

SPECIAL OFFER!

PAIR **£99** £8 p&p

PMR 446 LICENCE FREE RADIOS!

Now you can keep in touch with -

NO LICENCE FEE
NO CALL CHARGES
NO LINE RENTAL
Typical range: up to 3km

COMPLETE PACK
- PAIR TRACKER RADIOS
- DROP IN CHARGER
- NiCad BATTERIES

ALINCO DJ-SR1

PMR 446

NEW LOW PRICE!

CHEQUE SPREAD

£89.95 EACH £8 p&p

SPECIAL OFFER

SPECIAL TWIN PACK
- 2 X DJ-SR1 + NiCads
- 1 x Drop in Charger

£199 - pair!

Lightweight and small enough to fit in a shirt pocket! It has the performance to achieve max range on the new PMR 446 allocation with outstanding clarity on both received & transmitted signals.

- 8 channels
- 39 CTCSS codes/ch
- 20 memories
- Memory scan
- Battery level indicator
- Switchable hi/low pwr
- Speaker/Mic jack
- Monitor (open squelch) key
- Selectable pwr output

MasterCard VISA DELTA

USE YOUR CREDIT CARD FOR SAME DAY DESPATCH!

023 9231 3090

e-mail: info@nevada.co.uk • website: www.nevada.co.uk

NEW OPENING HOURS
MON - FRI 9.30 - 5.30
CLOSED ALL DAY SATURDAY

• Unit 1 • Fitzherbert Spur • Farlington • Portsmouth • PO6 1TT

R-BY BEING BETTER!

USE YOUR CREDIT CARD FOR SAME DAY DESPATCH!

SERVING THE SHORTWAVE & SCANNING ENTHUSIAST for more than 30 YEARS!

Price match
CALL -
WE MATCH PRICES ON THE SPOT!
PART EX -
BEST PRICES OFFERED!

ROBERTS R9914
PLL Digital World Band Radio

NEW!

£99.95 £6 p&p

- LW/MW/FM/SW
- 45 presets
- SSB reception
- Tuning 1kHz steps
- Direct keypad + rotary tuning
- Clock/alarm functions
- AC adaptor

ICOM IC-R2

PRICE MATCH

- 500kHz -1310MHz
- AM/FM/WFM
- 400 memories
- 10dB Attenuation
- Uses 2 AA Batteries (not supplied)
- Auto Squelch
- Tone Squelch for quiet operation
- Optional software available for cloning

~~£179~~ £149 £6 p&p

FAIRHAVEN RD-5000X

NEW UPDATED MODEL - 20kHz - 1.7GHz

IN STOCK READY TO SHIP

~~£849~~ £799 £8 p&p

GRUNDIG YB400

NEW LOW PRICE!

"Best performance for price size category, and among the choicest portables of any size, at any price."
"The 400's FM performance is right up there with the very best among world band radios."
Passport to World Band Radio

PORTABLE SW RADIO

- General coverage receive (144kHz - 30MHz)
- SW: 1.711-26.1MHz
- FM Stereo: 87.5-108MHz
- MW/LW
- SSB reception (both USB/LSB) (± 1kHz fine tuning)
- 40 station preset
- Fine tuning
- Dual alarm clock
- Narrow/Wide bandwidth
- DX/Local sensitivity
- Auto Search
- Sleep timer
- Snooze timer
- Mains or Battery powered (with optional mains adaptor)
- Supplied c/w
  - SW Handbook
  - Carrying case
  - Ext Wire Antenna
  - Carry Strap

£99.95 £6 p&p

ROBERTS R861

~~£199~~ £179 £6 p&p

Synthesised Receiver
FM Stereo/MW/LW/SW PLL

- 307 memories
- ATS auto scan
- E2 PROM for mem.
- FM stereo via earphones
- 29 pages SW stations memory
- 8 characters for editing station name

YAESU FRG-100

PRICE MATCH

This receiver provides solid coverage from 50kHz to 30MHz with all mode reception of AM, SSB and CW. The set requires 12V DC.

~~£429~~ £399 £8 p&p

ICOM IC-R8500

PRICE MATCH

YES, we've got them IN STOCK! This receiver is everything we hoped it would be, covering 100kHz - 2GHz and lots of features including computer control. PAY BY 3 POST DATED CHEQUES!

~~£1599.99~~ £1599.99 £8 p&p

ROBERTS R881

£79.95 £6 p&p

- FM/MW/SW
- 45 Station Pre-sets
- Automatic preset system
- Direct keyboard tuning
- Alarm/timer
- 12/24 hr clock
- Keylock
- FM thru earphones
- Carry pouch

ICOM PCR 1000

PRICE MATCH

- 100kHz - 1300MHz
- ALL MODE RECEPTION
- PLUS LOTS MORE!

PCR OPTION DSP UNIT UT 106 £82.00

~~£399.95~~ £349.95 £8 p&p

SANGEAN ATS909

PRICE MATCH

ULTRA COMPACT Digital Multiband Radio with SSB

- Covers: FM Stereo MW/LW/SW
- 307 memories
- Auto Tune System
- RDS (Radio Data System)
- Plus LOTS MORE!

OPTIONAL MAINS ADAPTOR £9.95

~~£199~~ £169 £8 p&p

GRUNDIG PORSCHE P2000

A stylish radio designed by F.A. Porsche

- FM Stereo
- AM/FM/MW 13 SW bands from 2.3MHz-26.1MHz
- 20 station presets
- Auto search
- Clock, alarm, sleep function, world times
- Supplied c/w leather cover & in-ear stereo headphones
- Mains or Battery (Optional AC adaptor)

£89.95 £6 p&p

ROBERTS R809

£100 £6 p&p

- PLL multi-band digital preset stereo world radio
- 5 tuning methods & 54 preset stations
- Dual time display
- Clock/alarm
- Complete with soft carrying pouch
- Cont. AM coverage 150kHz - 29 999MHz

JRC NRD-545

TOP OF THE RANGE WITH DSP

PRICE MATCH

- LSB/USB/CW/RTTY/AM
- 100kHz - 30MHz
- Noise Reduction
- Notch Filter

~~£1,499~~ £1,399 £8 p&p

VHF CONVERTER 30 - 2000MHz £299

SANGEAN ATS818

SW WITH SSB

UNBEATABLE VALUE FOR MONEY!

SPECIAL!

~~£129~~ £99 £8 p&p

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

OPTIONAL MAINS ADAPTOR £9.95

GRUNDIG OCEAN BOY

- 3 Band FM/MW/LW
- RDS Radio Data System
- Radio text
- EON traffic system
- 30 presets
- Last station memory
- Local/DX sensitivity
- Clock with features
- Mains or Battery

£59.95 £6 p&p

JRC ST3

HEADPHONES

A real quality pair of headphones designed for the discerning shortwave and communications enthusiasts

£69.95 £4.95 p&p

AOR AR 5000

CHEQUE SPREAD

IN STOCK READY TO SHIP

~~£1,445~~ £1,395 £8 p&p

- 10kH - 2.6GHz

All mode top class receiver and scanner packed with features

AOR AR 5000+3

CHEQUE SPREAD

IN STOCK READY TO SHIP

~~£1,495~~ £1,399 £8 p&p

- 10kH - 2.6GHz

The Plus 3 has factory fitted options, noise blanker, synchronous AM & automatic frequency control pre-installed

YAESU VR500

ULTRA COMPACT RADIO

- 100kHz - 1299995MHz
- FM, Wide FM, USB, LSB, CW, AM
- 1091 Memory channels
- Direct keypad frequency entry
- 60 Ch Bandscope
- RF squelch system
- Clone capability
- Menu customisation
- Weighs only 220 grammes!
- Supplied with Antenna, Carrying Strap, Belt Clip
- Optional Charger: NC60

£299 £8 p&p

SCANMASTER SP55

WIDEBAND PREAMP

Improve the reception of your scanner!

- 24 - 1500MHz
- Variable gain (-3dB to +20)
- 3 bandpass filters
- Battery or 12V operation

NEW LOW PRICE

£59.95 £4.75 p&p

AOR AR 3000A

SHIPPED TODAY!

CHEQUE SPREAD

~~£799~~ £749 £6 p&p

- 100kH - 2036MHz

Classic receiver as used by Government, Military etc

AR 3000A+ ..... ~~£899~~ £799

AOR AR 7030

SHIPPED TODAY!

~~£799~~ £749 £6 p&p

- 0kH - 32MHz

High dynamic range short wave receiver
HAD MANY RAVE REVIEWS WORLDWIDE!

AR 7030+ ..... ~~£949~~ £849

AKD HF3 S

CHEQUE SPREAD

SHORTWAVE RECEIVER 30kHz - 30MHz

£159.95 £8 p&p

Palstar AM30

Active Antenna/Preamp

£69.95 £6 p&p

- ACTIVE ANTENNA
- SHORTWAVE PRE-AMPLIFIER
- ACTIVE ANTENNA/TUNER

COMBINED 3-IN-1 UNIT

- Freq: 100kHz-30MHz
- Power: 12V DC/battery (supplied)
- Antenna: Telescopic whip included for use as an active antenna

ITS EASY TO PAY - Pay by three post dated cheques!

CHEQUE SPREAD

- Simply divide the price into 3 equal payments. (ON ANY ITEM OVER £100)
- Write 3 cheques dated in consecutive months starting with today's date.
- Write your telephone No, cheque card No & expiry date on the back of each cheque.
- Post them to us, enclosing your name & address & we will (subject to status) send your goods immediately.

Book Profiles

This month we have a selection of books and CD-ROMs for you to choose from. Browse below and place your order today. Remember, you can order your books by 'phone, FAX, E-mail or post.

Klingenfuss 1999/2000 Guide To World-Wide Weather Services

Classed as the most comprehensive, reliable and up-to-date manual in existence, the *1999/2000 Guide To World-Wide Weather Services* covers Internet location, NAVTEX stations, Radiofax stations, Radiotelex stations, Meteorological data, Satellite images, weather charts, plus hundreds of sample charts, images and web pages. All for **£23.00**.

Klingenfuss 2000 Guide To Utility Radio Stations

Now in its 18th edition, this is one of the most comprehensive, reliable and up-to-date manual containing 11200 frequencies, 1900 stations, meteo radiofax, radiotelex and NAVTEX schedules, digital data decoding sceenshots, abbreviations, codes, frequency allocations and radio regulations. With 8900 changes since the previous edition, you'd best get yourself up-to-date and order your copy now for **£30.00**.

Flight Routings 2000

This 14th edition has been completely revised, with information received from airports and the airlines themselves. *Flight Routings 2000* is the ideal companion for airband listeners to quickly obtain the flight details of approx. 240 airlines - scheduled, charter, freight, etc., flying to and from British and Irish airports world-wide. Also included are details of many overflights between Europe, Canada and the USA. Order your copy now for just **£7.95**.

Passport To Web Radio

Web radio is where f.m./a.m. stations from America and around the world now hang out. All you need is your PC and *Passport To Web Radio*. User friendly, *Passport* tells everything you need to know to enjoy the world of web radio. From how to get started, to news from hometowns everywhere, sports and every kind of music. **£14.99**.

Personal Computers In The Ham Shack

Whether you're a computer whiz or you've just bought your first machine, you'll want to keep this book close at hand. *Personal Computers In The Ham Shack* explores the many ways you can enhance your enjoyment of your favourite hobby with your other favourite hobby, computers. By reading this book you'll learn how to: choose an operating system and the computer accessories that are right for you, log and contest with easy to use software, test new antennas, use the Internet and lots more. **£11.50**.

The 2000 Super Frequency List On CD-ROM

The first CD-ROM world-wide that includes the latest clandestine, domestic and international short wave broadcasting schedules, plus the most up-to-date utility frequency list available world-wide. This superb software runs under *Windows 3.1* and *Windows 95/98*. Whether you are an international radio listener, a businessman or a tourist travelling world-wide, this is the way - just a few keystrokes and you can have it all! **£23.00**.

Joint International & North American Call Book 2000 CD-ROM

This 2000 callbook on CD-ROM has many revised features including: more than 1,550,000 calls and more than 35000 E-mail addresses; new maps for many countries in Africa; new option to run directly from your hard drive; **edit** feature allowing users to input up-to-date information; bearing and distance included for most calls; print address labels or envelopes; over 54,000 QSL Managers; pinpoint on the maps, the location of each call retrieved; search information data by call, colourful maps of most of the world. The Radio Amateur Callbook/CD-ROM contains both North American and International listings. Listings can be found quickly by name, location and call letters - even when the information is incomplete. The most accurate and extensive CD-ROM can be yours for **£30**.

PW UK & Eire Callsign Directory

Do you want the most up-to-date UK and Irish Radio Amateur callsign database in your shack? It's all here on *PW*'s first Callsign CD-ROM. You can browse by callsign, name or postcode to find the address you need, and when you have found it, you can print out a postal label. In addition to the callsign database, you'll also get a special 132-page electronic interactive magazine on CD-ROM. There are pages of amateur radio and related information including international callsign prefixes, frequency band data from 136kHz to 10GHz, v.h.f. and u.h.f. repeaters, beacons on h.f. and v.h.f./microwaves and lots of other band data. There is also a complete index of the articles that have appeared in *PW* from 1993 right up to December 1999. Along with a complete review list and current Book Service listing. **£7.50**.

Shortwave Eavesdropper CD-ROM

This Windows compatible CD-ROM is a revolutionary way of monitoring short wave utility stations. Not only does it list tens of thousands of stations world-wide, but also enables you to build your own database of stations which will work in conjunction with this CD-ROM. This CD-ROM gives you instant access to over 32,000 frequencies, over 42,000 callsigns, both ITU and tactical, extensive lists of aircraft and ARQ SELCAL codes, audio samples of data modes and much more. **£16.50**.

The ARRL Handbook CD - 2000

Many radio operators, engineers and technicians have found the *ARRL Handbook* an indispensable reference - now its available in a convenient, easy-to-use CD-ROM format. In addition to the complete text and all of the illustrations from the printed 2000 *ARRL Handbook*, this CD-ROM includes all of the *Handbook* 'template packages' with PC-board etching patterns and other useful information. Also included are *DOS* and *Windows* utility programs for filter design, transmission line analysis and more. **£33.00**.

The books listed have been selected as being of special interest to our readers. They are supplied direct to your door. Many titles are overseas in origin.

SWM Book Store

LISTENING GUIDES

Airband

	Pages	Price
Abc AIRBAND RADIO GUIDE 4th Edition	96	£7.99
Abc BRITISH AIRPORTS (6th Edition) A. Wright	112	£8.99
Abc CIVIL AIRLINER RECOGNITION 6th Edition. Peter R. March	128	£9.99
AIR BAND RADIO HANDBOOK 6th Edition. David J. Smith.	192	£9.99
AIR TRAFFIC CONTROL 7th Edition. Graham Duke	112	£8.99
AIRWAVES 2000	134	£9.95
CALLSIGN 2000	168	£9.95
FLIGHT ROUTINGS 1999. Williams	160	£7.95
NORTH ATLANTIC FLIGHT COMMUNICATIONS 2nd Edition (Inc. software)	172	£16.50
UNDERSTANDING ACARS 3rd Edition. Aircraft Communications Addressing and Reporting System. Ed Flynn.	80	£9.95
WORLD AIRLINE FLEET & SELCAL DIRECTORY	300	£16.00
WORLDWIDE AERONAUTICAL COMMUNICATIONS FREQUENCY DIRECTORY 2nd Edition. Robert E. Evans.	260	£19.95

Datamodes

FAX & RTTY WEATHER REPORTS. Philip Mitchell	88	£11.50
KLINGENFUSS 1999/2000 GUIDE TO WORLD-WIDE WEATHER SERVICES 19th Edition Joerg Klingenfuss	436	£23.00
WEATHER REPORTS FROM RADIO SOURCES. Philip Mitchell	32	£7.50
RADIO DATA CODE MANUAL. 16th Edition. Joerg Klingenfuss	788	£30.00
RADIOTELEX MESSAGES (25 Years of Monitoring Global Teleprinter & Data Communications. 1st Edition	568	£20.00

DXTV

DXTV FOR BEGINNERS. Simon Hamer.	31	£3.95
GUIDE TO DXTV. Keith Hamer & Garry Smith.	36	£3.95
GUIDE TO WORLDWIDE TV TEST CARDS	60	£4.95
MASTS - PRACTICAL IDEAS FOR THE DXER. Hamer/Smith	36	£4.95
THIS IS BBC TV - FIRST 30YRS OF TV GRAPHICS. Keith Hamer & Garry Smith.	38	£4.95
THE FIRST 30 YEARS OF BBC-2. Keith Hamer & Garry Smith	60	£4.95

Frequency Guides

2000 SUPER FREQUENCY LIST on CDROM. Joerg Klingenfuss	n/a	£23.00
FERRELL'S CONFIDENTIAL FREQUENCY LIST NEW 11th Edition.	450	£19.95
GLOBAL RADIO GUIDE 2000	32	£3.95
GUIDE TO UTILITY RADIO STATIONS 2000. 18th Edition. Joerg Klingenfuss	580	£30.00
PASSPORT TO WORLD BAND RADIO 2000.	528	£15.50
RADIO LISTENERS GUIDE 2000	128	£4.95
SHORTWAVE FREQUENCY GUIDE 2000. Joerg Klingenfuss	564	£23.00
SHORTWAVE INTERNATIONAL FREQUENCY GUIDE	176	£12.95
WORLD RADIO TV HANDBOOK 2000.	640	£19.95

General

BUYING A USED SHORT WAVE RECEIVER NEW 4th Edition. F. Osterman	78	£5.95
GETTING ON TRACK WITH APRS. Stan Horzepa WA1LOU	165	£11.50
POP WENT THE PIRATES. Keith Skues	568	£16.95
RADIO COMMUNICATIONS HANDBOOK. New 7th Edition. Dick Biddulph/Chris Lorek	580	£28.00
RADIO SCIENCE OBSERVATION Volume 1 (Inc. CD-ROM). Joe Carr	414	£26.95
SHORT WAVE COMMUNICATIONS. Peter Rouse GU1DKD.	187	£4.50
SHORT WAVE EAVESDROPPER CD-ROM	n/a	£16.50
SHORT WAVE RADIO LISTENING FOR BEGINNERS	174	£14.95
SHORTWAVE RECEIVERS PAST & PRESENT (NEW 3rd Edition)	450	£25.95
SHORTWAVE LISTENER'S GUIDE. Ian Poole	192	£15.95
THE COMPLETE SHORT WAVE LISTENER'S HANDBOOK New 5th Edition Andrew Yoder.	410	£19.95

Maritime

ELECTRONICS AFLOAT. Tim Bartlett	92	£8.95
GMDSS FOR SMALL CRAFT. Alan Clemmetsen	94	£11.95
RADAR FOR SMALL CRAFT. Tim Bartlett	96	£11.95
SCANNING THE MARITIME BANDS. 2nd Edition.	158	£9.75
SHORTWAVE MARITIME COMMUNICATIONS. B.E. Richardson	195	£16.50
THE VHF GMDSS HANDBOOK, New Edition, Michael Gale	64	£8.95
WATCHERS OF THE WAVES. Brian Faulkner	118	£13.50

Satellite

AN INTRODUCTION TO SATELLITE COMMUNICATIONS BP326.F.A. Wilson	230	£5.95
ARRL SATELLITE ANTHOLOGY 5th Edition.	150	£11.50
NEWNES GUIDE TO SATELLITE TV. Derek Stephenson.	371	£19.95
SATELLITE HANDBOOK (ARRL) New Edition Martin Davidoff K2UBC.	370	£15.50
SATELLITE PROJECTS HANDBOOK. Lawrence Harris.	174	£14.99
SATELLITE TELEVISION. A layman's guide. Peter Pearson.	73	£1.00
WEATHER SATELLITE HANDBOOK. 5th Edition. Dr Ralph E. Taggart WB8DQT.	192	£15.50

Scanning

AN INTRODUCTION TO SCANNERS AND SCANNING BP311. I.D. Poole.	152	£4.99
SCANNER BUSTERS 2. D.C. Poole.	100	£6.00
SCANNERS 2 INTERNATIONAL. Peter Rouse GU1DKD.	261	£12.95
SCANNERS 3 PUTTING SCANNERS INTO PRACTICE. 4th Revision. Peter Rouse.	271	£10.95
SCANNERS 4 SCANNING INTO THE FUTURE. Bill Robertson	245	£10.95
SCANNING SECRETS. Mark Francis.	280	£16.95
UK SCANNING DIRECTORY New 7th Edition	604	£19.50
ULTIMATE SCANNING GUIDE. Richard Allport.	640	£19.99

AMATEUR RADIO

Amateur Television

AN INTRODUCTION TO AMATEUR TELEVISION. Mike Wooding G6IQM & Trevor Brown G8CJS.	156	£5.00
THE AMATEUR TV COMPENDIUM. Mike Wooding G6IQM	104	£3.50

Antennas & Transmission Lines

25 SIMPLE AMATEUR BAND AERIALS BP125. E.M. Noll.	63	£1.95
25 SIMPLE INDOOR AND WINDOW AERIALS BP136. E.M. Noll.	50	£1.75
25 SIMPLE TROPICAL AND MW BAND AERIALS BP145. E.M. Noll.	54	£1.75
ANTENNA IMPEDANCE MATCHING (ARRL). Wilfred N. Caron.	195	£15.50
ANTENNA TOOLKIT (Inc. CD-ROM). Joseph J. Carr.	214	£25.00
ARRL ANTENNA BOOK 18th Edition	732	£24.00
ARRL ANTENNA BOOK ON CD-ROM	n/a	O/P
ARRL ANTENNA COMPENDIUM Volume One.	176	£10.50
ARRL ANTENNA COMPENDIUM Volume Two.	208	£10.50
ARRL ANTENNA COMPENDIUM Volume Three. Edited by Jerry Hall K1TD.	236	£11.50
ARRL ANTENNA COMPENDIUM Volume Four.	204	£16.50
ARRL ANTENNA COMPENDIUM Volume Five.	200	£16.50
ARRL ANTENNA COMPENDIUM Volume Six (inc CDROM)	200	£18.50
BEAM ANTENNA HANDBOOK. W.I. Orr W6SAI & S.D. Cowan W2LX.	268	£8.95
BUILDING & USING BALUNS. Jerry Sevick.	125	£18.95
CUBICAL QUAD ANTENNAS 3rd Edition. William Orr W6SAI and Stuart Cowan W2LX.	110	£8.95
EXPERIMENTAL ANTENNA TOPICS BP278. H.C. Wright.	70	£3.50
G-QRP CLUB ANTENNA HANDBOOK. Compiled and edited by P. Linsley G3PDL & T. Nicholson KA9WRI/GW0LNQ.	155	O/P
HF ANTENNA COLLECTION (RSGB). Edited by Erwin David G4LQI.	233	£9.99
HF ANTENNAS FOR ALL LOCATIONS (RSGB) . Les Moxon G6XN	322	£7.99
MORE OUT OF THIN AIR (PWP).	112	£6.95
"ON4UN'S" LOW BAND DXING (ARRL). J Devoldere	330	£23.00
PHYSICAL DESIGN OF YAGI ANTENNAS (ARRL)	270	£15.50
PRACTICAL ANTENNAS FOR NOVICES. John Heys G3BDQ.	52	£6.30
PRACTICAL ANTENNA HANDBOOK 3rd Edition. (inc. software) Joseph J. Carr.	580	£33.45
PRACTICAL WIRE ANTENNAS RSGB. John Heys G3BDQ.	100	£8.95
RADIO ANTENNAS & PROPAGATION. William Gosling	260	£19.99
RADIO AMATEUR ANTENNA HANDBOOK. W.I. Orr W6SAI & S.D. Cowan W2LX.	188	£8.95
RECEIVING ANTENNA HANDBOOK. Joe Carr	189	£17.50
SIMPLE, LOW-COST WIRE ANTENNAS FOR RADIO AMATEURS.	224	£8.95
THE RIGHT ANTENNA. How To Select & Install Antennas For Entertainment & Communication Devices. 2nd Edition. Alvis J. Evans	78	£16.95
THE TRUTH ABOUT CB ANTENNAS. (Orr & Cowan) W.I. Orr W6SAI & S.D. Cowan W2LX.	188	£8.95
VERTICAL ANTENNAS. W.I. Orr W6SAI & S.D. Cowan W2LX.	192	£8.95
VERTICAL ANTENNA CLASSICS (ARRL). R Schetsen	123	£11.50
W1FB'S ANTENNA NOTEBOOK (ARRL). Doug DeMaw W1FB.	123	£8.00
WIRE ANTENNA CLASSICS (ARRL)	144	£11.50
YOUR ANTENNA COMPANION. Paul Danzer	130	£7.50

Beginners (inc RAE)

AN INTRODUCTION TO AMATEUR RADIO - New Edition. Ian Poole G3YWX	150	£4.99
BASIC RADIO PRINCIPLES & TECHNOLOGY. Ian Poole G3YWX	262	£14.99
BASIC RADIO & ELECTRONIC CALCULATIONS. Ray Petri G0OAT	160	£13.95
AN RAE STUDENTS NOTEBOOK. Bob Griffiths G7NHB	76	£6.95
PRACTICAL RECEIVERS FOR BEGINNERS (RSGB). John Case GW4HWR.	165	£14.50
PRACTICAL TRANSMITTERS FOR NOVICES. John Case GW4HWR.	126	£12.50
RADIO AMATEURS EXAMINATION/END OF COURSE TEST PAPERS. Ray Petri G0OAT.	104	£13.95
RAE MANUAL (RSGB). New Revised Edition.	127	£15.00
THE NOVICE LICENCE STUDENT'S NOTEBOOK. John Case GW4HWR.	124	£6.00
THE NOVICE RADIO AMATEURS EXAMINATION HANDBOOK (BP375) Ian Poole G3YWX	150	£4.95
THE RADIO AMATEURS' QUESTION & ANSWER REFERENCE MANUAL. Fifth Edition. Ray Petri G0OAT.	208	£13.95
TRAINING FOR THE NOVICE LICENCE A MANUAL FOR THE INSTRUCTOR (RSGB) John Case GW4HWR.	101	£6.75
YOUR FIRST AMATEUR STATION. (RSGB) Colin Redwood G6MXL	120	£5.75

Callbooks

JOINT INTERNATIONAL & NORTH AMERICAN CALLBOOK (CD-ROM)	n/a	£30.00
PW UK & EIRE AMATEUR CALLSIGN (CD-ROM)	n/a	£7.50
RSGB YEARBOOK 2000 EDITION	432	£15.00

Computing

AN INTRODUCTION TO THE WORLDWIDE WEB FOR PC AND MAC USERS. (BP390) D.C & O. Bishop	148	£6.99
ELECTRONIC PROJECTS FOR YOUR PC BP320. R.A. Penfold.	102	£3.99
GETTING THE MOST FROM YOUR PC HARD DISK BP280	90	£3.95
HOW TO EXPAND & UPGRADE YOUR PC BP450 R. A. Penfold.	170	£6.99
INTERFACING PCs AND COMPATIBLES BP272. R. A. Penfold.	86	£4.99
MS-OFFICE ONE STEP AT A TIME (BP402).	77	£5.95
NEWNES COMPUTER ENGINEER'S POCKET BOOK Third Edition. Michael Tooley.	256	£12.95
PERSONAL COMPUTERS IN THE HAM SHACK (ARRL).	284	£11.50
THE INTERNET AND WORLD WIDE WEB EXPLAINED. J. Shelley.	130	£5.95
WINDOWS '98 ASSISTANT (BP454) I. Sinclair.	160	£6.99
WINDOWS '98 EXPLAINED (BP456). N. Kantaris & P. Oliver.	160	£6.99
WINDOWS '98 - HARD DISK & FILE MANAGEMENT. (BP455) J. Gatendy.	160	£6.99

EMC

ARRL RFI BOOK (Practical Cures For Radio Frequency Interference)	316	£15.50
INTERFERENCE HANDBOOK. William R. Nelson WA6FQG.	250	£9.50
RSGB GUIDE TO EMC. 2nd Edition. Robin Page-Jones G3JWI	204	£18.50

Historical

100 RADIO HOOK UPS. 2nd Edition (reprinted)	48	£3.35
1934 OFFICIAL SHORT WAVE RADIO MANUAL. Edited by Hugo Gernsback.	260	£11.85
COLLECTOR'S GUIDE TO TRANSISTOR RADIOS (2nd Edition). Marty & Sue Bunis	320	£16.95
COMMUNICATIONS RECEIVERS - THE VACUUM TUBE ERA. R.S. Moore	141	£17.95
GUIDE TO OLD RADIOS, POINTERS, PICTURES, PRICES. David & Betty Johnson	278	£19.95
HENLEYS 222 RADIO CIRCUIT DIAGRAMS (1924)	271	£9.45
HOW TO BUILD THE TWINPLEX REGENERATIVE RECEIVER. Lindsay	63	£5.75
HOW TO BUILD YOUR FIRST VACUUM TUBE REGENERATIVE RECEIVER. T.J. Lindsay	127	£7.30
HOW TO BUILD YOUR RADIO RECEIVER (A4) (Popular Radio Handbook No. 1)	100	£6.95
HOW TO MAKE A NEUTRODYNE RECEIVER. Webb	63	£5.00
OLD TIME RADIOS - RESTORATION & REPAIR. J. Carr.	256	£20.95
SECRETS OF HOMEBUILT REGENERATIVE RECEIVERS (Rockey)	127	£7.95
SEEING BY WIRELESS - THE STORY OF BAIRD TELEVISION. Ray Herbert	27	£4.95
THOSE GREAT OLD HANDBOOK RECEIVERS (1929 + 1934)	94	£6.95
TRANSISTOR RADIO! - A COLLECTOR'S ENCYCLOPEDIA & PRICE GUIDE. David & Robert Lane	170	£19.95

STOP PRESS!

SEE THE NEW 'SHOPPING BASKET' ML&S WEB SITE AND

ML&S Appointed Official UK distributor for JRC Ham products.

Continuing the success of ML&S for short wave & Scanning equipment in the U.K., we are proud to announce our appointment by JRC U.K. Ltd. All products purchased from ML&S will therefore be backed by the UK importer.

Internationally accepted as the benchmark receiver throughout the world, the NRD-545 is still the professional's choice.

Specifications

- Frequency Range .1 - 29.9999MHz
- Type of reception USB, LSB, CW, RTTY, AM, FM, WFM (When CHE-199 installed)
- Memories 1000 channels
- Receiving system Triple superhetrodyne
- Image rejection 70dB or more
- IF rejection 70dB or more
- Dimensions 330W x 130H x 285D (mm)
- Weight Approx. 7.5kg

Features

- Digital Signal Processing by One-Chip DSP
- Wide Band 30-2000MHz
- Converter option (CHE-199)
- Remote control by PC

The JRC NRD 545 Deluxe Receiver

Save almost £500 off the package deal & pay nothing until October 2000

RRP £1699 ML&S £1299
Also available on finance, NO DEPOSIT & 48 payments of only £39.53 p/m

Special Package Deal

A new NRD-545 with matching Deluxe Speaker NVA-319 & optional VHF/UHF converter CHE-199 allowing coverage on AM/FM/WBFM up to 2000MHz.

Total RRP £2197.00 ML&S £1649.
Also available on finance, NO DEPOSI
& 48 payments of only £57.63 p/m

NEW Icom ICR-3e

It seems Icom have done it again, with the far eastern release of the worlds first handheld scanner receiver, with something extra special to keep you interested even if the waves are dead: a fully functional, built-in multi mode colour TV! This breathtaking achievement has had everyone at Northfield Avenue gasping all day, and we haven't even seen a full spec yet! however, we've managed to gather the following tidbits from our friends at Icom...

- PAL TV
  Receive: audio and video at full scan rate!
- Wideband Scanner Receiver
- .495KHz - 2450MHz Frequency coverage.
- Full Range of accessories
- Dual Receive.

coming soon!!

Yaesu VR-500 Pocket Scanner

100kHz - 1.3GHz
AM/FM/WFM/SSB/CW
BAND SCOPE
PC PROGRAMMABLE
CALL FOR BEST PRICE

FREE
MODEL AT-2 Antenna Tuner
worth £69.95

Icom IC-R75E

AVAILABLE ON FREE FINANCE - ZERO APR
ONLY £99 DEPOSIT, THEN 12 x £50 p/m.

NEW YAESU VR5000

Yaesu have just announced a new base scanner. This is their first scanner since the legendary FRG9600 and looks to become another benchmark.

Features include:

- 12 volt operation
- 100kHz - 25999.9998MHz frequency range
- Operating modes are CW, LSB, USB, AM, AM-N, WAM, FMN AND WFM
- Real Time Band Scope
- 2000 memories
- World Clock
- Case size is 180w x 70 h x 203 deep. (Weight approx 1.9kg).

Options include:

- DSP Bandpass, Notch and Noise Reduction Filters
- Digital Voice Recorders

CALL NOW FOR THE LATEST UPDATE.

MARTIN LYNCH & SONS
140-142 NORTHFIELD AVENUE, EALING, LONDON W13 9SB

TEL: 0208 566 1120 **FAX: 0208 566 1207**

Martin Lynch can also offer finance terms up to 48 months with no deposit. We welcome your part exchange against any

SAVE EXTRA POUNDS!! www.hamradio.co.uk

New at ML&S

The JRC NRD-345

Whilst JRC offer the ultimate receiver in the shape of the NRD-545, for those of you who can't quite convince yourself, the NRD-345 makes a low cost alternative. Simple to use and built to the same standards as its big brother, take a closer look at the 345 and of course the price!

- .1 - 30MHz Coverage
- AM/CW/SSB/Fax
- AM Synchronous Detection
- One Chip DDS-1C Digital Synthesizer
- Noise Blanker
- High Sensitivity & wide dynamic range

RRP £699 ML&S £399

Also available of finance, NO DEPOSIT & 24 payments of £20.31 p/m.

NEW AOR AR-8600

At last the long-awaited base version of the AOR8200. While the operation and logic of this unit are the same as the AOR8200 the AOR8600 front end is re-designed to cope with base antennae. This radio will be at home in the car or on the desk top. Coverage is 500kHz - 2040MHz.

Options include computer control, Plug-in memory module for 400 memories, CTCSS decode, Record Chip for 20 seconds of audio, Tone Eliminator and Voice Inverter.

PRICE TO BE ANNOUNCED

AOR AR-5000A
RRP £1395.00
NO DEPOSIT,
THEN 36 x £51.85 p/m.

AOR AR-5000+3
The AR-5000+3 including AFC, Synchronous AM & noise blanker.
RRP £1699 NO DEPOSIT,
THEN 36 X £58.54 p/m.

Buy any radio on finance from this advert and claim a FREE copy of the new Ultimate Scanning Directory worth £19.95!

AOR AR-3000A
RRP £699.00
NO DEPOSIT,
THEN 36 x £25.98 p/m.

AOR AR-3000A plus
RRP £819.00
NO DEPOSIT,
THEN 36 x £30.44 p/m.

Icom PCR-1000
FREE MyDEL AT2!
RRP £349.
DSP UT-106 at only £59.95.
AVAILABLE ON FREE FINANCE - ZERO APR ONLY £49 DEPOSIT, THEN 12 x £25 p/m. including a FREE MyDEL ATU AT2 worth £69.95!

Icom ICR-2E
Including matching Icom LC-143 carry case & FREE carriage.
£149.00

AOR AR-8200 MkII
Now with higher power NiCads, TXCXO, New Black Cabinet and other enhancements.
In stock in limited numbers at £419.00
No deposit and 36 x £15.57 p/m.

dressler active antennas

The full range of dressler antennas are now available from ML&S.

ARA 40

Technical performance

Frequency range	40kHz-40MHz at full performance 40MHz-108MHz 2.3dB gain
Output impedance	50-75 ohm coaxial
Connector to Rx	PL comes as the standard. Other standards can be fitted upon request
Gain	5dB +/-0.2dBs
Intercept Point	+45dBm IP 3rd order (10MHz/12V)
DC power supply	11.5-13 volt DC at 70mA typ. (230V mains adaptor for 12V DC is supplied with the antenna)
Mast diameter	30-50mm can be fitted
Dimensions	**ARA40** 115cm total length with glassfibre whip. Antenna tube 40mm x 140mm **ARA40 TEL** 125cm total length with telescopic whip extended. 45cm minimum length. Antenna tube 40mm x 140mm
	Ideal for portable radio

£139

ARA 60

Technical performance

Frequency range	40kHz-60MHz (full performance) 60-120MHz 2-3dB less gain
Output impedance	50-75 ohm coaxial
Connector to Rx	PL type delivered as standard. Other standards can be fitted on request
Gain	10dB +/-0.2dBs
Intercept Point	+50dBm IP 3rd order (10MHz/12V)
DC power supply	11.5-13 volt DC at 80mA typ. (230V/12V DC stabilised mains adaptor is supplied with the antenna)
Mast diameter	30-50mm can be fitted
Dimensions	115cm total length. Antenna tube 50mm x 160mm
	Ideal for base stations

£169

ARA 2000

Technical performance

Frequency range	50-2000MHz
Output impedance	50-75 ohms coaxial
Gain	19dB -1000MHz 18dB -1400MHz 16dB -2000MHz
Noise figure	1.5-2dB -1000MHz 1.8-2.5dB -1500MHz 2.5-4dB -2000MHz
3rd order IP	+35dB typical
Output impedance	50-75 ohms coaxial
Connector standards	N type connector at the antenna. BNC male connector to the receiver
Power supply	12V DC at 160mA DC. Power supply for 230V AC is delivered comes with the antenna
Dimensions	Length 450mm. Diameter 90mm
Weight	2kg
Accessories	Mains wall plug adaptor (230V A/12V DC). Interface unit (remote supply unit) 12m coaxial cable and mast mounting clamps

£169

This outstanding range is ideal for use with all base station receivers, the ICR-8500, AR-5000, PCR-1000, NRD-545, FRG-100 & more! Beautifully constructed and designed in Germany - we are pleased to be appointed for this range of products.

FINANCE EXAMPLE

All examples do not include P&P.

Cash Price	Deposit	PAID IN 6 MONTHS	APR
£299	NiL	£299	0%

OR

Cash Price	36 Payments of	Total Credit Price (T.A.P.)	APR
£299	£12.98	£467.28	26.9%

Written quotations available on request

Web site: www.hamradio.co.uk e-mail: sales@MLandS.co.uk

OPEN SEVEN DAYS A WEEK - MON - SAT 9.30 - 6.00, SUNDAYS 10.00 - 4.00

new (or used!) product, provided its clean and in good working order. Call the Sales Desk today. APR: 26.9%. Payment protection is also available up to 36 months. All units are brand new and boxed and offered with full manufacturers RTB warranty. All prices quoted for cash/cheque or Switch/Delta card. No additional charges for credit cards. Martin Lynch is a licensed credit broker. Full written details are available on request. Finance is subject to status. E&OE. £10 p&p on all major items.

	Pages	Price
VISION BY RADIO (1925) (Jenkin)	140	£7.85
DOUBLE TESLA-OUDIN COIL	24	£3.95
RADIO TESLA - THE SECRET'S OF TESLA'S RADIO AND WIRELESS POWER	36	£5.30
TESLA COIL	24	£3.95
TESLA - THE LOST INVENTIONS	32	£4.75
TESLA - THE TRUE WIRELESS	16	£3.95
THE MAN WHO INVENTED THE TWENTIETH CENTURY: NIKOLA TESLA, FORGOTTEN GENIUS OF ELECTRICITY	245	£12.99
THE TESLA HIGH FREQUENCY COIL (1910)	120	£6.95

Crystal Set Books (Xtal Set Society)

THE XTAL SET SOCIETY NEWSLETTER. Volume 1 & 2 Combined. Phil Anderson W0XI	96	£14.00
THE CRYSTAL SET HANDBOOK & VOL. 3 XTAL SET SOCIETY NEWSLETTER. Phil Anderson W0XI	134	£8.00
THE XTAL SET SOCIETY NEWSLETTER. Volume 4. Phil Anderson W0XI	88	£7.00
CRYSTAL SETS. The Xtal Set Society Newsletter, Volume 5. Phil Anderson W0XI	88	£7.00
CRYSTAL SET BUILDING & MORE (Vol 6 & 7 of Xtal Set Society Newsletter)	168	£11.00
CRYSTAL RADIO HISTORY, FUNDAMENTALS AND DESIGN. P.A. Kinzie	122	£8.00
CRYSTAL SET PROJECTS - 15 RADIO PROJECTS YOU CAN BUILD. Phil Anderson	160	£10.00
CRYSTAL SET LOOPERS, A3 TUBER & MORE. Volume 8 Xtal Set Society Newsletter	128	£10.50

Maps & Log Books

AMATEUR RADIO LOGBOOK (RSGB)	50	£3.75
AMATEUR RADIO WORLD ATLAS (A4 SIZE)	20	£8.00
GREAT CIRCLE MAP 600mm x 600mm	n/a	£1.50
NORTH ATLANTIC ROUTE CHART	740 x 520mm	£9.00
QTH LOCATOR MAP OF EUROPE. New Edition	1080 x 680mm	£7.00
RADIO AMATEURS MAP OF THE WORLD. New Edition	980 x 680mm	£7.00
RECEIVING STATION LOG BOOK (RSGB)	60	£3.75
RSGB 1998 PREFIX GUIDE	32	£6.95

Morse

SECRETS OF LEARNING MORSE CODE Mark Francis	84	£6.95

Microwaves

AN INTRODUCTION TO MICROWAVES (BP312). F.A. Wilson	134	£3.95
ARRL UHF/MICROWAVE EXPERIMENTER'S MANUAL. Various Authors.	446	£15.50
ARRL UHF/MICROWAVE PROJECT MANUAL VOL 2.	160	£11.50
ARRL UHF/MICROWAVES PROJECT MANUAL (ARRL).	352	£15.50
MICROWAVE & WIRELESS COMMUNICATIONS TECHNOLOGY. Joseph J. Carr	436	£35.00
MICROWAVE HANDBOOK - COMPONENTS & OPERATING VOL 1 (RSGB)	110	£12.00
MICROWAVE HANDBOOK - CONSTRUCTION & TESTING VOL 2 (RSGB)	120	£18.50
MICROWAVE HANDBOOK - BANDS & EQUIPMENT VOL 3 (RSGB)	140	£18.50

Operating & Handbooks

ALL ABOUT HAM RADIO. Harry Helms	290	£16.50
ARRL HANDBOOK 2000 76th Edition	380	£24.00
ARRL HANDBOOK 2000 ON CDROM	n/a	£33.00
ARRL OPERATING MANUAL NEW EDITION	420	£18.50
ARRL RADIO BUYERS SOURCEBOOK VOL1 1 (QST Reviews 1981-1991)	280	£11.50
ARRL RADIO BUYERS SOURCEBOOK VOL1 2 (QST Reviews 1991-1993)	240	£11.50
ARRL VHF/UHF RADIO BUYER'S SOURCEBOOK	120	£11.50
COMPLETE DX'ER. Bob Locher.	204	£9.50
DISCOVERING DXING (2nd Edition). John Zondlo	90	£7.50
HAM RADIO MADE EASY (ARRL). Steve Ford	204	£11.50
HINTS AND KINKS FOR THE RADIO AMATEUR. Edited by Charles L. Hutchinson and David Newkirk.	129	£9.50
LOW PROFILE AMATEUR RADIO (ARRL). Jim Kearman KR1S	124	£7.50
SETTING UP AN AMATEUR RADIO STATION BP300. I.D. Poole.	81	£3.95
TRANSMITTER HUNTING - RADIO DIRECTION FINDING SIMPLIFIED. Joseph D. Moell & Thomas N. Curlee	325	£24.95

Packet

HF DIGITAL COMPANION. Steve Ford	120	£7.50
NOS INTRO: TCP/IP OVER PACKET RADIO. Ian Wade G3NRW	356	£11.50
PACKET RADIO PRIMER (RSGB). Dave Comber G8UYZ & Martyn Corft G8NZU	266	£8.95
PACKET, SPEED & MORE SPEED APPLICATIONS (ARRL)	148	£10.50
PRACTICAL PACKET RADIO. Stan Horzepa	140	£10.50
YOUR PACKET COMPANION. Steve Ford WB8IMY.	170	£7.50

Propagation

AN INTRODUCTION TO RADIO WAVE PROPAGATION BP293. J.G. Lee.	116	£3.95
YOUR GUIDE TO PROPAGATION (RSGB) Ian Poole	88	£6.95

QRP

ARRL LOWER POWER COMMUNICATIONS - THE ART & SCIENCE OF QRP. Richard Arland K7SZ	204	£11.50
QRP POWER (ARRL)	188	£11.50
G-QRP CLUB CIRCUIT HANDBOOK. Edited by Rev. G. Dobbs G3RJV	96	£9.00
INTRODUCING QRP. Dick Pascoe G0BPS	48	£6.95
W1FB's QRP NOTEBOOK (ARRL). 2nd Edition. Doug DeMaw W1FB	175	£8.00

Test Equipment

AN INTRODUCTION TO THE ELECTROMAGNETIC WAVE BP315. F.A. Wilson.	122	£4.95
BUILD YOUR OWN TEST EQUIPMENT. Davidson	285	£19.95
GETTING THE MOST FROM YOUR MULTIMETER BP239. R.A. Penfold.	102	£2.95
HANDS-ON GUIDE TO OSCILLOSCOPES. Barry Ross.	228	£20.95
HOW TO USE OSCILLOSCOPES & OTHER TEST EQUIPMENT BP267. R.A. Penfold.	104	£3.50
MORE ADVANCED USES OF THE MULTIMETER BP265. R.A. Penfold.	96	£2.95
OSCILLOSCOPES - HOW TO USE THEM/HOW THEY WORK. 4th edition. Ian Hickman	259	£17.99
TEST EQUIPMENT CONSTRUCTION BP248. R.A. Penfold.	104	£3.99
TEST EQUIPMENT FOR THE RADIO AMATEUR. Clive Smith G4FZH	170	£10.95

VHF

ALL ABOUT VHF AMATEUR RADIO. W. I. Orr W6SAI.	163	£8.95
VHF/UHF HANDBOOK (RSGB). Dick Biddulph G8PDS	180	£22.00
YOUR MOBILE COMPANION. Roger Butch	190	£8.50
YOUR VHF COMPANION. Steve Ford	230	£7.50

ELECTRONICS

General

BEGINNERS GUIDE TO MODERN ELECTRONIC COMPONENTS BP285	166	£4.99
CIRCUIT SOURCE BOOK 1 - BP321. R.A. Penfold.	182	£4.95
CIRCUIT SOURCE BOOK 2 - BP322. R.A. Penfold.	214	£4.95
DIGITAL ELECTRONICS (CD-ROM). Mike Tooley	n/a	£45.00
ELECTRONIC PROJECT BUILDING FOR BEGINNERS. R. Penfold. (BP392)	110	£4.95
ENCYCLOPEDIA OF ELECTRONIC CIRCUITS Vol. 7	1128	£32.95
FAULT FINDING ELECTRONIC PROJECTS BP391	133	£4.99
GETTING STARTED IN PRACTICAL ELECTRONICS BP345. Owen Bishop.	198	£4.95
HOW ELECTRONIC THINGS WORK ... AND WHAT TO DO WHEN THEY DON'T, Goodman.	390	£16.95
HOW TO TEST ALMOST EVERYTHING ELECTRONIC	326	£16.95
LADDER CRYSTAL FILTERS. John Pivnichny N2DCH	134	£14.95
NEWNES AUDIO AND HI-FI ENGINEER'S POCKET BOOK 3rd Edition. Vivian Capel	210	£14.95
PARTS GALLERY & ELECTRONICS CIRCUITS & COMPONENTS (CD-ROM). Mike Tooley	n/a	£35.00
PICTUTOR (CD-ROM). John Decker	n/a	£45.00
POWER SUPPLY PROJECTS BP76. R.A. Penfold.	89	£3.99
PRACTICAL DIGITAL ELECTRONICS FOR TECHNICIANS. Will Kimber	262	£12.99
PRACTICAL ELECTRONIC FILTERS BP299. Owen Bishop.	89	£4.95
PRACTICAL ELECTRONICS HANDBOOK. Ian Sinclair.	439	£14.95
PRACTICAL OSCILLATOR CIRCUITS BP393. A. Flind.	136	£4.99
RADIO ENGINEERS FACTFINDER FOR WINDOWS (Floppy Disk) John Davies	n/a	£18.00
RADIO FREQUENCY TRANSISTORS, PRINCIPLES & PRACTICAL APPLICATIONS Dye/Granberg (Motorola). Hardback	235	£39.95
SCROGGIES - FOUNDATIONS OF WIRELESS & ELECTRONICS. 11th Edition	292	£19.99
TECHNICAL TOPICS SCRAPBOOK (RSGB). 1990-94. Pat Hawker	310	£13.50
THE ART OF SOLDERING BP324. R. Brewster	84	£3.99
UNDERSTANDING BASIC ELECTRONICS (ARRL).	314	£15.50
UNDERSTANDING DIGITAL TECHNOLOGY. F. Wilson. (BP376)	110	£4.95
W1FB's DESIGN NOTEBOOK (ARRL). Doug DeMaw W1FB.	195	£8.00

Data

ARRL ELECTRONICS DATA BOOK. Doug DeMaw W1FB.	260	£8.95
ELECTRONIC HOBBYIST DATA BOOK BP396. R.A. Penfold.	242	£5.95
LF SOURCE BOOK (RSGB) 2nd Edition. Peter Dodd	130	£8.00
PRACTICAL ELECTRONIC DESIGN DATA BP316. Owen Bishop.	327	£5.99
PRACTICAL RF HANDBOOK (2nd Edition). Ian Hickman.	302	£19.99
RF CIRCUIT DESIGNS. Chris Bowick.	176	£18.99
SECRETS OF RF CIRCUIT DESIGN. New Edition (Hardback) Joseph Carr	405	£41.95
SOLID STATE DESIGN FOR THE RADIO AMATEUR (ARRL) Les Hayward W7ZOI & Doug DeMaw W1FB	256	£11.50
SPREAD SPECTRUM SOURCE BOOK	320	£15.50
TOWERS INTERNATIONAL MOSPOWER & OTHER FET SELECTOR	140	£19.95
TOWERS INTERNATIONAL TRANSISTOR SELECTOR - UPDATE 5	476	£24.95
TRANSISTOR DATA TABLES (BP401)	178	£5.95

Projects

33 SIMPLE WEEKEND PROJECTS/CQ	68	£7.95
35 OPTO-DISPLAY TERMINAL BLOCK PROJECTS BP140	104	£4.99
BUILD YOUR OWN INTELLIGENT AMATEUR RADIO TRANSCEIVER. Randy L. Henderson.	350	£25.95
COIL DESIGN & CONSTRUCTION MANUAL BP160. B.B. Babani	106	£3.95
HOW TO DESIGN & MAKE YOUR OWN PCBs BP121. R.A. Penfold	66	£3.99
MORE ADVANCED POWER SUPPLY PROJECTS BP192. R.A. Penfold	92	£2.95
POWER SUPPLY PROJECTS (A collection of innovative and practical design projects). Newnes	170	£10.95
PROJECTS FOR RADIO AMATEURS & SWLs BP304. R.A. Penfold.	92	£3.95
RADIO RECEIVER PROJECTS YOU CAN BUILD.	312	£20.95
SIMPLE SHORT WAVE RECEIVER CONSTRUCTION BP275. R.A. Penfold	88	£3.95

Valves/Tubes

ELECTRON TUBE LOCATOR. George H. Fathauer	350	£21.95
ESSENTIAL CHARACTERISTICS (TUBES & TRANSISTORS) (Original publishers General Electric) Re-published by Antique Electronic Supply (Arizona)	475	£10.50
HANDBOOK OF RADIO, TV, INDUSTRIAL & TRANSMITTING TUBE & VALVE EQUIVALENTS	60	£2.95
RADIO VALVE GUIDE BOOK VOL 1	54	£2.95
RADIO VALVE GUIDE BOOK VOL 2	42	£2.95
RADIO VALVE GUIDE BOOK VOL 3	40	£2.95
RADIO VALVE GUIDE BOOK VOL 4	48	£2.95
RADIO VALVE GUIDE BOOK VOL 5	44	£2.95
MASTER INDEX TO VALVE TYPES, BOOKS 1-5	40	£1.50
RCA RECEIVING TUBE MANUAL (Original Publishers Radio Corporation Of America). Re-published by Antique Electronic Supply (Arizona)	384	£10.50
RCA TRANSMITTING TUBES (Original Publisher Radio Corporation of America) Re-published by Antique Electronic Supply (Arizona).	318	£10.50
TUBE SUBSTITUTION HANDBOOK.	150	£15.50
VALVE AMPLIFIERS. Morgan Jones.	374	£25.00
VALVE & TRANSISTOR AUDIO AMPLIFIERS. John Lindsay Hood	310	£19.95

external speaker sockets on the front please, who wants to grovel round the back of the set to hook it up to a computer sound card or tape recorder - thanks...

The back of the radio...not the most attractive bit, but this is where most of the connections will hang out, but not all of them. The two antenna sockets will be there as will the power input of course.

There will be a discriminator output here to allow more detailed data processing by computer if required. There will be a video or r.f. output socket in case the TFT screen is not big enough for some of us who have slightly less than 20/20 vision, so then we can plug in a bigger monitor.

Looking Good

Now to the styling...somehow this radio is going to have to look good. It's going to have to appeal to the customer group that look for this type of consumer electronic item. Do you designers want to go for the military look, or the explorer/prospector market. Do you want to look sporty or give the set the civil service look?

The set must not have anything like **scanner** or **wide band radio receiver** written on it. This just means trouble trying to get in and out of some countries with a radio of this type in your hand baggage. Trust me I know.

Now this radio should have a good tough transport case with it. Not just two moulded chunks of expanded polystyreme sheathed in thin cardboard but a proper transport case tough enough to be lugged on public transport and survive. The case will have to be weatherproof and must be devoid of manufacturers markings that indicate that it is worth stealing.

The case can contain the scanner, the multi-standard power supply, a small deployable antenna, spare fuses for the power leads and any other accessories with which the radio is supplied. Plus, a bit of extra room for a pen or two and a small notepad.

...Be right with you - just testing the er, scanner...

Also, there will be a good quality plastic wallet to contain the comprehensive handbook, purpose written for the country in which the set is sold, with clear concise instructions and diagrams of the functions and display examples. There must also be a crib card which explains basic and commonly used commands and controls.

Anything Forgotten?

Now this fine radio may need a few extra functions and facilities but I reckon I've covered most of the important stuff. What have I forgotten? Please let me know, and until the scanner manufacturers get to design a radio that decodes anything it can hear I think that this set or something like it would be fairly popular.

The difficulty is that with radio systems going more and more to digital standards the time has come when we really must consider whether there will be a scanning hobby in a few years. The emergency services and many many other p.m.r. users are going to TETRA or other digital systems.

The marine bands are moving into the digital era and there are strong rumours that airband and military air could head that way. Unless the designers and manufacturers come up with some answers in the future, sales in the hobby radio market are going to take a big dive and so are some large companies.

Oh Well

Oh just thought of another essential item for the ultimate scanner. Draught Bass from a small tap on the front...Thank you.

SWM Author Info To provide you with a ready reference here are the contact details of all our regular authors.

Airband
Godfrey Manning G4GLM, c/o The Godfrey Manning Aircraft Museum, 63 The Drive, Edgware, Middlesex HA8 8PS

Amateur Bands
Paul Essery GW3KFE, PO Box 4, Newtown, Powys SY16 1ZZ.

Attention 123!
Enigma, 17-21 Chapel Street, Bradford, West Yorkshire BD1 5DT. E-mail: enigma@pwpublishing.ltd.uk

Bandscan America
Gerry Dexter, c/o *SWM* Editorial Offices. E-mail: gdexter@pwpublishing.ltd.uk

Bandscan Australia
Greg Baker, PO Box 3307, Manuka, ACT2603, Australia. E-mail: greg.baker@pwpublishing.ltd.uk

Bandscan Europe
Peter Shore, c/o *SWM* Editorial Offices. E-mail: peter.shore@pwpublishing.ltd.uk

Decode
Mike Richards G4WNC, PO Box 1863, Ringwood, Hamp-shire BH24 3XD. E-mail: decode@pwpublishing.ltd.uk

DXTV
Keith Hamer and Garry Smith, 17 Collingham Gardens, Derby DE2 4FS

Info In Orbit
Lawrence Harris, 5 Burnham Park Road, Peverell, Plymouth, Devon PL3 5QB. E-mail: info.orbit@pwpublishing.ltd.uk

LM&S and Maritime Beacons
Brian Oddy G3FEX, Three Corners, Merryfield Way, Storrington, West Sussex RH20 4NS.

MilAir
Peter Bond, c/o *SWM* Editorial Offices. E-mail: milair@pwpublishing.ltd.uk

Off The Record
Andy Cadier, 28 Romney Avenue, Folkstone, Kent CT20 3QJ E-mail: off.the.record@pwpublishing.ltd.uk

Propagation
Jacques d'Avignon VE3VIA E-mail: jacques@pwpublishing.ltd.uk

Satellite TV News
Roger Bunney, 35 Grayling Mead, Fishlake, Romsey, Hampshire SO51 7RU.

Scanning
Dave Roberts, c/o *SWM* Editorial Offices. E-mail: scanning@pwpublishing.ltd.uk

ShackWare
Jerry Glenwright, 23 Downland Avenue, Southwick, West Sussex BN42 4RF. E-mail: shackware@pwpublishing.ltd.uk

SSB Utilities
Graham Tanner, 64 Attlee Road, Hayes, Middlesex UB4 9JE. E-mail: ssb.utils@pwpublishing.ltd.uk

World Wide Radio Guide
Paul Beam, c/o *SWM* Editorial Offices. E-mail: wwrg@pwpublishing.ltd.uk

Echelon Exposed

John Locker reports on the world of communications interception by security services. Read and worry.

On 15th July 1999 the sleepy village of Capenhurst, Cheshire, had its moment of glory. It was on that day that the media exposed the existence of a secret government monitoring station, which had, for ten years, been intercepting telecommunications between the UK and the Republic of Ireland.

Had it not been for the fact that HMG had put the recently closed complex on the open market, with a price tag in the region of £20m, the general public may never have found out about the secrets the grain silo lookalike held!

Probing questions posed by investigative journalist Duncan Campbell revealed the truth. Jane Woodhead, Liverpool *Daily Post* staff writer takes up the story....

> *"Mr Campbell said he believed the floors and windows had all been aligned and the building had been set up with the purpose of intercepting communications. The 13 storey tower was built in 1989 and only closed earlier this year. It contained advanced electronic equipment and three floors of aerial galleries. It is alleged that FAXes, E-mails, telexes and data communications were automatically sorted by computers and their contents were then scanned for key words and subjects of interest".*
>
> *Daily Post* 'Developers spy an opportunity' July 17th 1999.

No Surprise

This information came as no surprise to me as for the previous six months I had been carrying out my own research into the activities of various agencies who monitor communications across the UK. The days of the overall clad 'operative' sitting at the side of the road in his red and white striped GPO tent are long gone. These days, snooping is far more hi-tech.

The rumour was that members of the European Parliament were investigating the issue of secret monitoring, and sure enough, I uncovered a startling report, prepared for them, which had been drawn up in response to their growing concern over the misuse of Communication interception techniques.

The working group, **The Scientific Technical Options Assessment (STOA)** panel, is headed by Dick Holdsworth, MEP, and based in Luxemburg.

The STOA panel requested the preparation of an in depth report into the *"State of the art in communications intelligence (COMINT) of automated processing for intelligence purposes of intercepted broadband multilanguage leased or common carrier systems, and its applicability to COMINT targeting and selection, including speech recognition".*

The resulting document, authored coincidentally by Duncan Campbell, describes in great detail the history and background of communications monitoring on a global basis, but more importantly centres on the activities of the US National Security Agency (NSA) in the UK.

What that means to you and me, is that someone, somewhere, may be listening to our 'phone calls or reading our FAXes and E-mails, without our consent! This all may seem somewhat paranoid, however the events of recent months involving the exposure of the Capenhurst listening post only serve to strengthen fears about the possible misuse of intercepted communications.

The massive top secret listening station in the quiet Nidderdale district of Yorkshire, Menwith Hill, has been monitoring you and I for years. So sophisticated are the techniques in use by the NSA and GCHQ, that the capture procedure is undetectable and almost totally automated!

Using a unique system, code named 'Echelon', thousands of simultaneous communications can be monitored. Even the most time consuming mode for the eavesdroppers, the spoken word, is close to being cracked with the advent of speech and word recognition programmes.

The Dictionary

At the centre of Echelon lies 'The Dictionary', a database of key words, names and organisations which various agencies wish to target. No-one can question the need to monitor communications for possible security and terrorist reasons, but where do the agencies draw the line?

As far as the information gathered by the UK listening posts is concerned, most of it is 'filtered' and then transmitted back to NSA headquarters in Fort Meade, USA, using their own secure circuits. There, anything which is construed as being of interest to the UK security services is siphoned back to GCHQ in the UK.

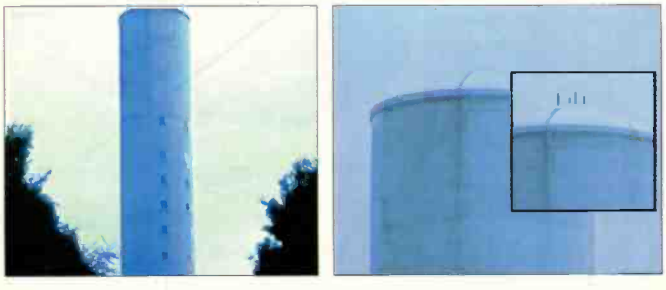
As part of his investigation, Campbell makes reference in the report to a number of industrial contracts, which were mysteriously clinched by US organisations, even though European bidders thought they had it 'in the bag'. Could the NSA be harvesting information for economic purposes?

In this special feature, I bring you extracts from the publication *Development of Surveillance Technology and Risk of Abuse of Economic Information.*

It should be noted that what follows is from a working document for the STOA panel. The content does not necessarily represent the views of the European parliament.

The history of the special relationship between the UK and the USA goes back more than fifty years. This is how Campbell introduces the concept of 'UKUSA'.

> *The UKUSA Alliance*
>
> *The United States SIGINT System (USSS) consists of the National Security Agency (NSA), military support units collectively called the central Security Service and parts of the CIA and other organisations. Following wartime collaboration, in 1947, the UK and the US made a secret agreement to continue to conduct collaborative COMINT (Communications Intelligence) activities.*
>
> *Three other English speaking Nations, Canada, Australia and New Zealand joined the UKUSA agreement as 'Second Parties'. The UKUSA agreement was not acknowledged publicly until March 1999, when the Australian government confirmed that its SIGINT organisation, Defence Signals Directorate (DSD), does co-operate with counterpart signals intelligence organisations overseas under the UKUSA relationship. The UKUSA agreement shares facilities, tasks and product between participating governments.*
>
> *Although UKUSA COMINT agency staffs and budgets have shrunk following the end of the Cold War, they have reaffirmed their requirements for access to all the world's communications. Addressing NSA staff on his departure in 1992, then NSA director Admiral William Studeman described how "the demands for increased global access are growing". The "business area" of "global access" was, he said, one of "two hopefully strong, legs upon which NSA must stand" in the next century.*



The grain silo like listening post in the sleepy Cheshire village of Capenhurst, exposed by investigative journalist Duncan Campbell.
Credit: Andrew Locker.

Continued on page 46...

AOR® AR8200 SERIES-2

NEVER BEFORE HAS ONE HAND PORTABLE OFFERED SO MUCH

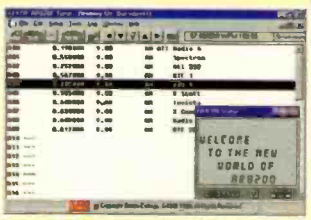
NEW

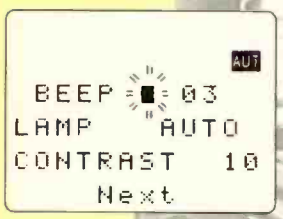
The AR8200 represented a beacon when first released, technology marches forward with the NEW *AR8200 SERIES-2* keeping the innovative concept and forward thinking alive and bright. It has not been easy improving on what many thought to be the ultimate, however the NEW *AR8200 SERIES-2* does provide even more with nothing taken away. A Temperature Compensated Crystal Oscillator (**TCXO**) now forms the heart of the NEW *AR8200 SERIES-2*, this ensures **high stability** with **minimal internal spurii**... the TCXO replaces a crystal reference as commonly employed in other receivers and is usually only seen in top of the range (more expensive) table-top models such as the AR5000 and AR7030. Performance too has seen the AOR R&D team fine tuning the design for **best sensitivity and strong signal handling** over the extremely wide coverage of 530kHz to 2040MHz (all mode receive without gaps).

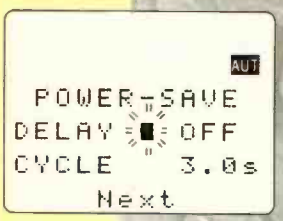
The aerial has also been replaced by a **telescopic whip** on a swivel base, this ensures the best results, a medium wave bar aerial is also provided as standard. The design team have certainly been taking account of customers wishes, the keyboard ZERO key has been swapped in position with the DECIMAL to match the telephone layout, LCD illumination has been increased (for improved visibility) and following requests for longer operation between charges, the **4 x AA size NiCads have been increased in capacity**, again reflecting improvements in modern technology. The obvious change has been left for last... the **cabinet colour** has been changed from green to **black**!

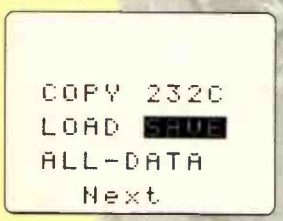
The list of features is vast, large multi-section backlit LCD, side mounted navigation keys and rotary tuning control, alpha-numeric text comments for memory channels, banks and search. The all mode receive features Wide, Standard and Narrow AM with Wide FM, Narrow FM and Super Narrow FM bandwidths provided, tuning step sizes are programmable in all modes down to 50Hz with comprehensive step adjust and correctly implemented 8.33kHz for the new VHF airband spacing.

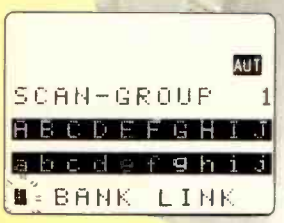
Connection to a computer is possible with the optional CC8200 lead/interface with free PC software available from the AOR web site. Unique optional slot cards further enhance features offering CTCSS, Tone Eliminator, Record / Playback, Voice Inverter, External Memories (backup for 4000). Other options include the RT8200 for 'reaction tune' with the Opto Scout and other compatible devices, clone lead, soft case, option lead, record interface. Even the operating manual reflects the careful design being 140 pages of ENGLISH language with plenty of illustrations.

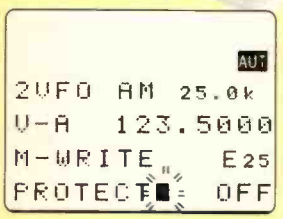


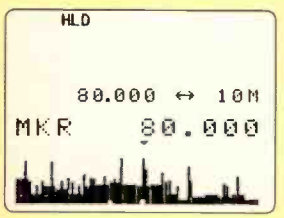


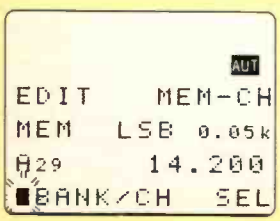


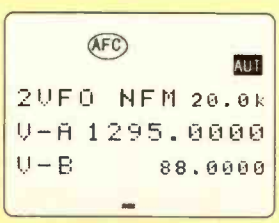


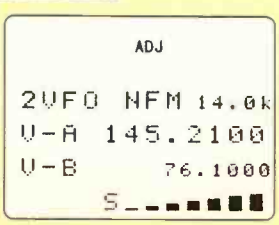












★★★★☆ AR5000+3 awarded four starts by both the authoritative Passport To World Band Radio and World Radio & TV Handbook

AR5000
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!*
High performance, top quality build and true wide coverage all mode receive. The "+3" version offers even more with synchronous AM, AFC and Noise Blanker. Popular with government agencies throughout the world.

AR5000c
When making critical measurements, the frequency coherence is very important whether a single or multiple unit is employed. This involves the use of a single reference for all oscillators employed throughout the receiver. The AR5000C now provides this commercially required capability. The "C" version may be provided to order in either the standard AR5000 format or with two of the +3 additions of AFC and NB. If you are a commercial operator with this application in mind, please request the separate specification leaflet for the AR5000C.

AR5000+3 - Sync AM, AFC, NB

The "+3" version offers even more with synchronous AM (upper side band, lower side band and double side band with excellent lock range), AFC (Automatic Frequency Control for accurately tracking moving transmissions or unusual band plans) and Noise Blanker.

Passport to World Band Radio'99.
"Front-end selectivity, image rejection, IF rejection, weak-signal sensitivity, AGC threshold and frequency stability all superior".
"Unlike virtually every other receiver we have tested over the past 21 years, the frequency readout is unfailingly accurate to the nearest Hertz. This should make the AR5000+3 of exceptional interest to broadcast engineers".

World Radio TV Handbook'99.
Speaking of the AR5000+3 in conclusion... "Compared with the ICOM ICR-8500 it offers considerably more features, better strong-signal handling, wider coverage and decidedly superior filters".

AR5000+3

- ✓ Wide frequency coverage 10 kHz - 2600 MHz
- ✓ All mode reception: USB, LSB, CW, AM, Synchronous AM, NFM, WFM with automode tuning (any mode and bandwidth on any frequency is possible)
- ✓ Automatic Frequency Control
- ✓ Noise blanker
- ✓ High stability TCXO reference, 1 Hz NCO tuning
- ✓ 1,000 memories, 10 memory banks, 20 search banks, 5 VFOs (all twice!), alpha tag, EEPROM chip storage
- ✓ Multiple IF bandwidth 3 kHz, 6 kHz, 15 kHz, 30 kHz, 110 kHz, 220 kHz with an option position for 500 Hz CW. (30 kHz is ideal for WEFAX).
- ✓ High sensitivity and excellent strong signal handling assisted by a preselected front end from 500 kHz - 1 GHz
- ✓ Extensive RS232 control list
- ✓ SDU ready with IF output for spectrum display unit

FOR FURTHER DETAILS, PLEASE VISIT YOUR DEALER, CALL FOR A LEAFLET OR VISIT THE AOR UK WEB SITE AT
www.aoruk.com

AR7030 / AR7030 PLUS

The highly acclaimed AR7030 continues to gain respect from top DX'ers. Just recently there have been a number of very positive reports following expeditions to various parts of the world, each time the operators have been amazed by the performance provided by such a compact and reasonably priced radio when compared to larger commercial units. Excellent strong signal handling, low noise local oscillator (producing extremely low reciprocal mixing figures) and excellent audio fidelity demonstrates the attention to detail carried through design and into manufacture... the analogue circuits of the AR7030 exhibit none of the strange AGC and poor audio characteristics found in other 'higher priced' DSP competitors. Many feel that the AR7030 is the best short wave analogue receiver ever. Receiver of the Year 1996/97 *WRTH*, 5-star award and editors choice *Passport to World Band Radio* for several successive years. Designed and built in the UK as a collaborative project between internationally acclaimed designer John Thorpe and AOR.

John Wilson (author of the *SWM* series "Commercially Speaking" "In My Experience" etc) often makes comparative references between high priced commercial receivers and the AR7030 demonstrating the foresight and high technology features provided by the AR7030, unique in the consumer market. Examples include:

Collins 95S-1A *SWM* June'2000 P24: speaking of excellent AGC characteristics ..."I will take the opportunity to mention that John Thorpe designed this type of characteristic into the AR7030, so you happy owners will know one more reason for the '7030 sounding so nice."

Collins 95S-1A *SWM* June'2000 P24: speaking of independent squelch for each memory channel and attention to detail: ..."This is the first time I have seen this on a receiver of this type, although I will again stick my neck out and remind you that the feature was designed into the AR7030, and since the handbook for the 95S-1A suggests that it was produced long after the AR7030, one has to wonder who thought of it first - John Thorpe or Rockwell Collins?"

Collins HF-2050 *SWM* March'2000 P32: speaking of on-air close-in selectivity: ..."The Radio Milan signal at 900kHz is clearly visible some 30dB down on the BBC, and also visible is the signal 9kHz higher then 909kHz at 918kHz. I tuned to this with the HF-2050 and found that I could not resolve it. Just to prove the point, and because I have succumbed to having an AR7030 around at all times, I went to 918kHz with the '7030 and found that the signal was easily readable, although the HF-2050 still couldn't make anything of it. No wonder AOR always get top ratings in *Passport to World Band Radio*."

ARD2

ARD2 portable ACARS & NAVTEX decoder & display unit, can be operated from internal batteries or external d.c. supply. An RS232 port expands capabilities, free supporting software is available from the AOR internet web site.

Echelon Exposed

...continued from page 43

So, it transpires that for more than half a century, the UK has been party to a top secret agreement between the USA and other former commonwealth countries, but how does that affect us?

Well, the North of England in particular has played an important part in the illicit monitoring of telephone communications. Here the report describes how the intelligence network operates.

In the post cold war era, COMINT interception has been constrained by recognisable industrial features, including the requirement to match budgets and capabilities to customer requirements. The multi-step process by means of which communications intelligence is sought, collected, processed and passed on is similar for all countries, and is often described as the 'intelligence cycle'. The steps of the intelligence cycle correspond to distinct organisational and technical features of COMINT production. Thus for example the administration of NSA's largest field station in the world, at Menwith Hill in England and responsible for operating over 250 classified projects, is divided into three directorates: OP, operations and plans; CP, Collection processing and EP, Exploitation and Production.

So with the framework in place I was interested to know how the process was put into practice and how the information was collected. It seems that no means of communication is safe, there are 'leaks' in all the pipes.

Campbell researched the various modes, and more to the point, the methods of interception. Here are his findings.

Intercepting International Communications

It is a matter of record that foreign communications to and from, or passing through the United Kingdom and the United States have been intercepted for more than 80 years. Then and since, most International communications links have been operated by international carriers, who are usually individual national PTTs or private companies. In either case, capacity on the communications system is leased to individual national or International telecommunications undertakings. For this reason Communications Intelligence (COMINT) organisations use the term ILC (International Leased Carrier) to describe such collection

High Frequency Radio

Save for direct landline connections between geographically contiguous nations, high frequency (h.f.) radio systems, were the most common means of international telecommunications prior to 1960, and were in use for ILC, diplomatic and military purposes. An important characteristic of h.f. radio signals is that they are reflected from the ionosphere and from the earth's surface, providing ranges of thousands of miles. This enables both reception and interception.

High frequency radio signals are relatively easy to intercept, requiring only a suitable area of land in, ideally, a quiet radio environment. From 1945 until the early 1980s, both NSA and GCHQ operated h.f. radio interception systems tasked to collect European ILC communications in Scotland.

The most advanced type of h.f. monitoring system deployed during this period for Comint purposes was a large circular antenna array known as AN/FLR-9. AN/FLR-9 antennas are more than 400m in diameter. They can simultaneously intercept and determine the bearing of signals from as many directions and on as many frequencies as may be desired. In 1964, AN/FLR-9 receiving systems were installed at San Vito dei Mormanni, Italy; Chicksands, England and Karamursel, Turkey.

In August 1966, NSA transferred ILC collection activities from its Scottish site at Kirknewton, to Menwith Hill in England. Ten years later, this activity was again transferred to Chicksands.

During the 1970s, British COMINT units on Cyprus were tasked to collect h.f. communications of allied NATO nations, including Greece and Turkey. The interception took place at a British army unit at Ayios Nikolaos, eastern Cyprus. In the United States in 1975, investigations by a US Congressional Committee revealed that NSA was collecting diplomatic messages sent to and from Washington from an army COMINT site at Vint Hills Farm, Virginia. The targets of this station included the United Kingdom.

Microwave Radio Relay

Microwave radio was introduced in the 1950s to provide high capacity intercity communications for telephony, telegraphy and, later, television. Microwave radio relay communications utilise low power transmitters and parabolic dish antennas placed on towers in high positions such as on hilltops or tall buildings. The antennas are usually 1-3m in diameter. Because of the curvature of the earth, relay stations are generally required every 30-50km.

Long distance microwave radio relay links may require dozens of intermediate stations to receive and re-transmit communications. Each subsequent receiving station picks up only a tiny fraction of the original transmitted signal, the remainder passes over the horizon and on into space where satellites can collect it. These principles were exploited during the 1960s to provide COMINT collection from space. The nature of microwave 'spillage' means that the best position for such satellites is not above the chosen target, but up to 80° of longitude away.

Submarines like USS *Halibut* were used in the top secret operation Ivy Bells, tapping Soviet sub sea cables.
Credit: US Navy.

The first US COMINT satellite, CANYON, was launched in August 1968, followed soon by a second. The satellites were controlled from a ground station at Bad Aibling, Germany. In order to provide permanent coverage of selected targets, Canyon satellites were placed close to geostationary orbits. However, the orbits were not exact, causing the satellites to change position and obtain more data on ground targets. Seven Canyon satellites were launched between 1978 and 1987.

The success of Canyon led to the design and deployment of a new class of COMINT satellites, CHALET. The ground station chosen for the Chalet series was Menwith Hill, England. Under NSA project P-285, US companies were contracted to install and assist in operating the satellite downlinks (RUNWAY) and ground processing system (SILKWORTH). The first two Chalet satellites were launched in June 1979 and October 1979. After the name of the first satellite appeared in the press, they were renamed VORTEX. When the name VORTEX was published in 1987, the satellites were renamed MERCURY.

The expanded mission given to Menwith Hill after 1985 included MERCURY collection from the Middle east. The station received an award for support to US Naval operations in the Persian Gulf from 1987 to 1988. In 1991, a further award was given for support of the Iraqi war operations, Desert Storm and Desert Shield. Menwith Hill is now the major US site for COMINT collection against its major ally, Israel. Its staff includes linguists trained in Hebrew, Arabic and Farsi as well as European languages. Menwith Hill has recently been expanded to include ground links for a new network of SIGINT satellites launched in 1994 and 1995 (RUTLEY). The name of the new satellites remains unknown.

The CIA developed a second class of SIGINT satellite with complementary capabilities over the period from 1967 to 1985. Initially known as RHYOLITE and later AQUACADE, these satellites were operated from a remote ground station in central Australia, Pine Gap. Using a large parabolic antenna which unfolded in space, Rhyolite intercepted lower frequency signals in the v.h.f. and u.h.f. bands.

Larger, most recent satellites of this type have been named MAGNUM and then ORION. Their targets include telemetry, v.h.f. radio, cellular mobile 'phones, paging signals and mobile data links.

My own research indicates that the satellites used in the interception of microwave and terrestrial transmissions are of the generic 'trumpet' design. Large circular arrays, which are deployed and expanded once the spacecraft is in its orbital slot. The data is collected and stored onboard, then downlinked to the listening station using a 24GHz narrow beam antenna.

Continued on page 48...

Echelon Exposed

...continued from page 46...

Now, whilst radio signals floating around in the ether may seem like fair game, I had always thought that undersea cables sitting on the ocean floor were probably the most secure, however, that idea was shattered when I read about Operation 'Ivy Bells'.

Subsea Cables

Submarine telephone cables provided the first major reliable high capacity international communications systems. Early systems were limited to a few hundred simultaneous telephone channels. The most modern optical fibre systems carry up to 5 Gigabits per second of digital information. This is broadly equivalent to about 60,000 simultaneous channels.

Submarine cables now play a dominant role in international telecommunications, since - in contrast to the limited bandwidth available for space systems - optical media offer seemingly unlimited capacity. Save where cables terminate in countries where telecommunications operators provide COMINT access (such as the UK and the US), submarine cables appear intrinsically secure because of the nature of the ocean environment.

In October 1971, this security was shown not to exist. A US submarine, Halibut, visited the Sea of Okhotsk of the Eastern USSR and recorded communications passing on a military cable to the Khamchatka Peninsular. Halibut was equipped with a deep diving chamber, fully in view on the submarines stern. The chamber was described by the US Navy as a 'deep submergence rescue vehicle'. The truth was that the 'rescue vehicle' was welded immovably to the submarine. Once submerged deep sea divers exited the submarine and wrapped tapping coils around the cable..

Having proved the principle, USS Halibut returned in 1972 and laid a high capacity recording pod next to the cable. The technique involved no physical damage and was unlikely to have been readily detectable.

The Okhotsk cable tapping operation continued for ten years, involving routine trips by three different specially equipped submarines to collect old pods and lay new ones, sometimes more than one pod at a time.

New targets were added in 1979. That summer a newly converted submarine called USS Parche travelled from San Francisco under the North Pole to the Barents Sea, and laid a new cable tap near Murmansk. Its crew received a presidential citation for their achievement.

The Okhotsk cable tap ended in 1982 after its location was compromised by a former NSA employee who sold information about the tap, codenamed IVY BELLS, to the Soviet Union. One of the IVY BELLS pods is now on display in the Moscow Museum of the former KGB.

The cable tap in the Barents Sea continued in operation, undetected, until tapping stopped in 1992.

USS Parche continues in operation to the present day, but the precise targets of its missions remain unknown. The Clinton administration evidently places high value on its achievements. Every year from 1994 to 1997, the submarine crew has been highly commended. The United States is the only naval power known to have deployed deep-sea technology for this purpose.

The next section was of particular interest to me, as it deals with communications satellites. For some time it has been known that analogue telephone circuits on certain International geostationary satellites can be monitored. They utilise the FDM system (Frequency Division Multiplex) and using a basic short wave receiver to scan the video baseband output from the transponder, literally thousands of circuits can be located between 1 and 10MHz in s.s.b. mode.

Indeed it was *Tele-Satellite International Magazine*'s editor Christian Mass who first came up with the technique back in the late 1980s. Some years later, Duncan Campbell himself got into hot water by demonstrating Christian's method of interception, on commercial television. He showed how, using nothing more than a standard satellite TV system and h.f. receiver, the telephone calls could be monitored.

These days, most satellite 'phone circuits are digital and safe from the inquisitive ears of enthusiasts, (but not Uncle Sam!). There are, however, still some Middle East circuits which remain analogue. Let's take a look at how the professionals listen in!

A new breed of satellite mobile 'phone is set to give the NSA something of a headache giving users access to communications from anywhere in the world, their microwave 'spillage' will be harder to intercept owing to the nature of their orbit. Here the report explains...

New network operators have constructed mobile 'phone systems providing unbroken global coverage using satellites in low or medium level earth orbits. These systems are sometimes called satellite personal communications systems (SPCS). Because each satellite covers only a small area and moves fast, large numbers of satellites are needed to provide continuous global coverage. The satellites can relay signals directly between themselves, or to ground stations.

The first such system to be completed, Iridium, uses 66 satellites and started operations in 1998.

Iridium appears to have created particular difficulties for communications intelligence agencies, since the signals down from the Iridium and similar networks can only be received in a small area, which may be anywhere on the earth's surface.

Communications Satellites

Microwave radio signals are not reflected from the ionosphere and pass directly into space. This property has been exploited both to provide global communications, and, conversely, to intercept such communications in space and on land.

The largest constellation of communications satellites (COMSATs) is operated by the International Telecommunications Satellite organisation (Intelsat), an international treaty organisation.

To provide permanent communications from point to point or for broadcasting purposes, communications satellites are placed into so-called 'geostationary ' orbits such that, to the earth based observer, they appear to maintain the same position in the sky.

The first geostationary Intelsat satellites were orbited in 1967...Satellite technology developed rapidly. The fourth generation of Intelsat satellites, introduced in 1971, provided capacity for 4,000 simultaneous telephone channels and were capable of handling all forms of communications simultaneously- telephone, telex, telegraph, television, data and facsimile.

In 1999, Intelsat operated 19 satellites of its 5th to 8th generations. The latest generation can handle the equivalent to 90,000 simultaneous calls.

Systematic collection of COMSAT ILC communications began in 1971. Two ground stations were built for this purpose. The first at Morwenstow, Cornwall, England, had two 30m antennas. One intercepted communications from the Atlantic Ocean Intelsat, the other the Indian Ocean Intelsat.

The second Intelsat interception station was at Yakima, Washington in the North western United States. NSA's 'Yakima Research Station' intercepted communications passing through the Pacific Ocean Intelsat satellite.

ILC interception capability against western run communications satellites remained at this level until the late 1970s, when a second site at Sugar Grove, West Virginia was added to the network.

By 1980 its three satellite antenna had been re-assigned to the US Naval Security Group and were used for COMSAT interception.

Large scale expansion of the ILC satellite interception system took place between 1985 and 1995, in conjunction with the enlargement of the Echelon processing system. New stations were constructed in . the United States, Canada, Australia and New Zealand.

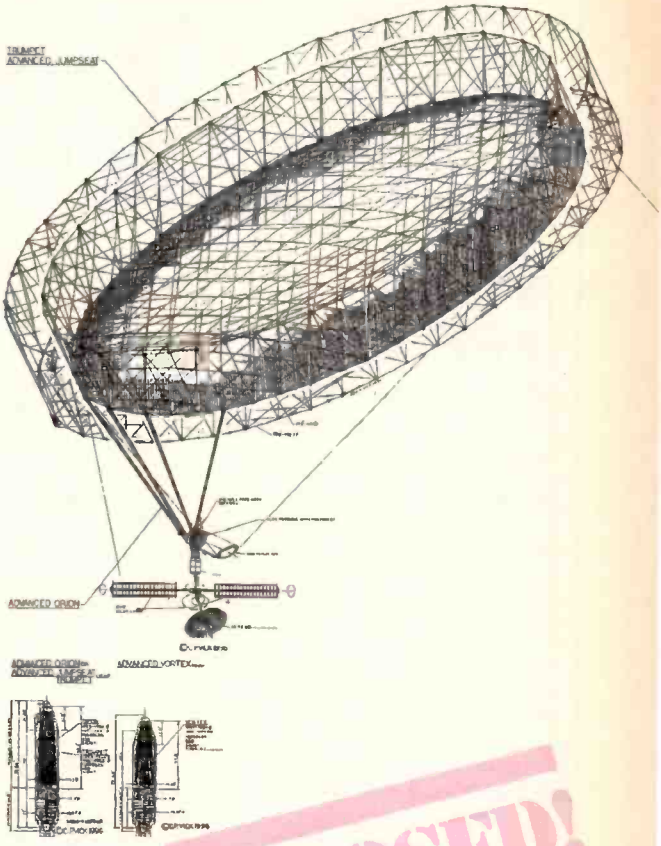
Capacity at Yakima, Morwenstow and Sugar Grove was expanded and continues to expand.

Based on a simple count of the number of antennas currently installed at each COMSAT interception or satellite Signals Intelligence (SIGINT) station, it appears that the UKUSA nations are between them currently operating at least 120 satellite based collection systems.

With the recent collapse of the Iridium system, the NSA will be breathing a sigh of relief, even if only shortlived, until a new generation of satellite 'phones arrives on the scene. It's ironic that Iridium's most endearing feature was that of security!

But what of the Internet, at one time, thought by some to be one of the most secure methods of transferring encrypted data....well

unfortunately, the NSA got their first. If you thought that Internet encryption devices were secure, think again. According to Campbell, the NSA have had a 'back door'' since the early days!



From the 1940s to date, NSA has undermined the effectiveness of cryptographic systems made or used in Europe.

The most important target of NSA activity was a prominent Swiss manufacturing company, Crypto AG. Crypto AG established a strong position as a supplier of code and cypher systems after the second world war.

Many governments would not trust products offered for sale by major powers. In contrast, Swiss companies in this sector benefited from Switzerland's neutrality and image of integrity. NSA arranged to rig encryption systems sold by Crypto AG, enabling UKUSA agencies to read the coded diplomatic and military traffic of more than 130 countries. NSA's covert intervention was arranged through the company's owner and founder Boris Hagelin, and involved periodic visits to Switzerland by US 'consultants' working for NSA. One was Nora L MacKabee, a career NSA employee.

A US newspaper obtained copies of confidential Crypto AG documents recording Ms MacKabee's attendance at discussion meetings in 1975 to design a new Crypto AG machine.

The purpose of NSA's interventions were to ensure that while its coding systems should appear secure to other cryptologists, it was not secure.

Each time a machine was used, its users would select a long numerical key, changed periodically. Naturally users wished to select their own keys, unknown to NSA.

If Crypto AG's machines were to appear strong to outside testers, then its coding system should work, and actually be strong.

NSA's solution to this apparent conundrum was to design the machine so that it broadcast the key it was using to listeners. To prevent other listeners recognising what was happening, the key too had also to be sent in code - a different code known only to NSA.

Thus, every time NSA or GCHQ intercepted a message sent using these machines, they would first use their own coded part of the message, called the 'hilfsinformationen' (help information field) and extract the key the target was using. They could then read the message itself as fast or even faster than the intended recipient!

The same technique was re-used in 1995, when NSA became concerned about cryptographic security systems being built into Internet and E-mail software by Microsoft, Netscape and Lotus .

The companies agreed to adapt their software to reduce the level of security provided to users outside the United states.

In the case of Lotus Notes, which includes a secure E-mail system, the built-in cryptographic system uses a 64-bit encryption key. This provides a medium level of security, which might at present only be broken by NSA in months or years.

Lotus built in an NSA 'help information' trapdoor to its notes system, as the Swedish government discovered to its embarrassment in 1997.

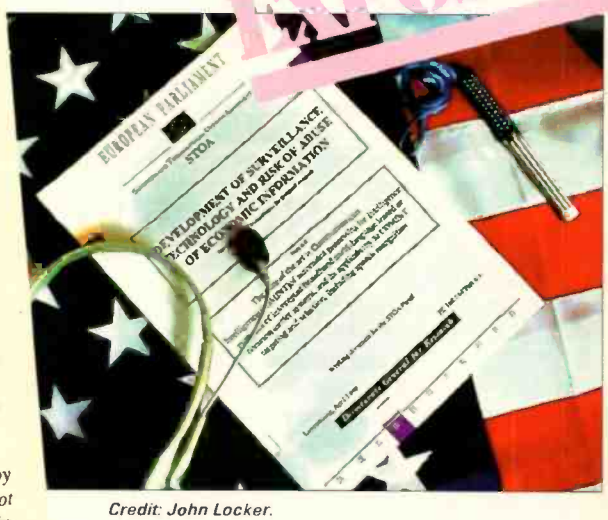
By then the system was in daily use for confidential mail by Swedish Mps, 15,000 tax agency staff and 400,000 to 500,000 citizens.

Lotus Notes incorporates a 'workfactor reduction field' (WRF) into all E-mails sent by non US users of the system. Like its predecessor the Crypto AG "help information field" this device reduces Nsas difficulty in reading European and other E-mail from an almost intractable problem to a few seconds work.

The WRF is encoded, using a 'public key' system which can only be read by NSA. Lotus, a subsidiary of IBM, admits this, the company told Svenska Dagbladet: "The difference between the American Notes version and the export version lies in degrees of encryption. We deliver 64-bit keys to all customers, but 24-bits of those in the version that we deliver outside the United states are deposited with the American Government".

Similar arrangements are built into all export versions of the web 'browsers' manufactured by Microsoft and Netscape. Each uses a standard 128-bit key. In the export version this key is not reduced in length. Instead 88-bits of the key are broadcast with each message, 40-bits remain secret.

It follows that almost every computer in Europe has a built-in standard feature, an NSA workfactor reduction system to enable NSA (alone) to break the users codes and read secure messages.



Credit: John Locker.

No-one is safe from the ears and eyes of Uncle Sam, no matter what mode of communication used, and a visit to the NSA website didn't exactly ease my mind. There in black and white is outlined their mission...

"NSA employs the country's premier codemakers and codebreakers. It is said to be the largest employer of mathematicians in the United States and perhaps the world. Its mathematicians contribute directly to the two missions of the Agency: designing cipher systems that will protect the integrity of US information systems **and searching for weaknesses in adversaries' systems and codes".**

It strikes me that the term adversaries may need clarification. Now that the 'Cold War' is over, perhaps the agency is looking elsewhere to practice its interception techniques.

So, there we are, next time you pick up the 'phone, send that FAX or E-mail, you may wish to pause a while and ponder, just who is going to be monitoring your darkest secrets!

Paranoid? Me? Never!

Reference: For your own copy of this report, in PDF form, recently updated by Duncan Campbell, log onto **http://www.europarl.eu.int/dg4/stoa/en/default.htm**

Credit: *With thanks to The European Parliament, Mr Dick Holdsworth, Head of STOA unit and Marcelo Sosa of the STOA programme for permission to take extracts from the STOA report PE 168.184/part 4/4 and to Duncan Campbell - IPTV Ltd. - Edinburgh - Author of the report.*

SWM

ASK ELECTRONICS LTD

248/250 TOTTENHAM COURT ROAD
LONDON W1P 9AD
Tel: 0171-637 0353/0590
Fax: 0171-637 2690

PLEASE MAKE ALL CHEQUES PAYABLE TO: ASK ELECTRONICS
All products are subject to a posting & packaging charge

YOUR SONY SPECIALIST

All products covered by a total manufacturers guarantee

NEW FROM SONY

ICF-SW1000T *RRP £449*.....ASK price **£360.00**
As reviewed in Short Wave Magazine April '96 issue
ICF-SW77 150-29995kHz, usb/lsb cw, 160 mem-ories & labelling facility, 5 event timer, world timer *RRP £429.95*.....ASK price **£330.00**
ICF-SW07 New inc PSU & ANLP-1 antenna .....ASK price **£250.00**
ICF-SW55 *RRP £299.95*.....ASK price **£225.00**
ICF-SW100E *RRP £219.95*.....ASK price **£145.00**
ICF-SW100S Includes AN-100 & dual voltage mains adaptor.....**£199.95**
ICF-SW7600G *RRP £199.95*.....ASK price **£120.00**
ICF-SW30 *RRP £79.95*.....ASK price **£69.95**
ICF-SW10 *RRP £49.95*.....ASK price **£39.95**
ICF-SW40 *RRP £119.95*.....ASK price **£84.95**
AN1 Active SW antenna *RRP £74.95* .ASK price **£59.95**
AN-71 Wire antenna **£7.99**
AN-100 Active antenna for ICF-SW100 or ICF-SW7600G.....**£49.95**
AN-102 Compact active antenna.....**£59.95**
AN-71 antenna **£59.95**

ROBERTS

R-862 .....**£30.00**
R-881 .....**£70.00**
R-809 .....**£90.00**
R-876 .....**£115.00**
R-827 .....**£140.00**
R-861 .....**£175.00**
RC-828.....**£189.00**

GRUNDIG

Yacht Boy 500 ..**£79.95**
Yacht Boy 400 ..**£89.95**

We also stock a range of books for frequency scanning

SANGEAN

ATS-909 .....**£160.00**
ATS-818ACS ..**£165.00**
ATS-818 .....**£120.00**
ATS-808.....**£85.00**
ATS-606 .....**£105.00**
ATS-404.....**£60.00**
ATS-305.....**£60.00**

GARMIN GPS SYSTEMS

Street Pilot UK - in car navigation system with street level mapping includes Atlantic international database, UK Metroguide Mapsource CD, 8mb datacard, PC interface and cigar lighter adaptor, dashboard mount.....**£Phone**
Street Pilot - as above but no Metroguide and datacard.....**£Phone**
Street Pilot Colour Map UK - as Street Pilot UK but colour.....**£Phone**
Street Pilot Colour Map - as Street Pilot but colour .....**£Phone**
EMAP UK - as Street Pilot UK but hand-held and no cigar lighter adaptor.....**£Phone**
EMAP - as Street Pilot but no cigar lighter adaptor.....**£Phone**
GPS III plus - car or portable GPS with Atlantic international database, display switch able from landscape to portrait, removable antenna, accepts down loaded map data from various map source CDs .....**£Phone**
GPS 12 Map - as above except display is not switchable .....**£Phone**
GPS III Plus - European city point data switchable display .....**£Phone**
GPS 12CX - hand-held GPS with colour display, city point data .**£Phone**
GPS 12XL - hand-held GPS with city point data.....**£Phone**
GPS 12 - hand-held GPS .....**£Phone**
Etrex - smallest hand-held GPS.....**£Phone**
GPS 48 - includes city point and marine database.....**£Phone**

MAP SOURCE CD'S, DATA CARD AND A FULL RANGE OF GARMIN ACCESSORIES IN STOCK

SCANNERS & TRANCEIVERS

YUPITERU

MVT-9000MkII 100kHz-1.99GHz, all mode **£319.95**
MVT-7100 100kHz-1.65GHz all mode **£195.00**
VT-225 Civil and military air band receiver.....**£199.95**
VT-125 Civil airband receiver **£159.95**
MVT-8000 Base/mobile receiver, 200kHz-1.3GHz..**£294.95**

ICOM

IC-R2 500kHz-1300MHz, AM, FM, WFM, 400 ch, hand-held communications receiver.....**£135.00**
IC-R10 100kHz-1300MHz, all mode, 1000 channels hand-held communicatins receiver.....**£270.00**
IC-PCR100 100kHz-1300MHz, AM, FM, WFM, PC communications receiver.....**£185.00**
IC-PCR1000 100kHz-1300MHz, all mode PC communications receiver **£325.00**
IC-R75 30kHz-60MHz, AMS, AM, FM, USB, LSB, RTTY, CW.....**£645.00**

AOR

AR7030 High quality short wave receiver with remote control.....**£675.00**
AR7030 Plus an enhanced version of the above..**£750.00**
AR5000 10kHz-2600MHz all mode receiver **£1295.00**
AR5000+ An enhanced version of the above **£1460.00**
AR3000A 100kHz-2036MHz all mode **£695.00**
AR3000A+ An enhanced version of the above.....**£780.00**
AR8000 Handy 530kHz-1900MHz all mode **£289.95**
AR8200 Handy 530kHz-2040MHz all mode **£340.00**
ARD2 ACARS and Navtex decoder and display.....**£295.00**
SDU5000 Spectrum display unit SRP £799 now only.....**£480.00**
SDU5500 New version of SDU5000 including PSU.....**£770.00**

ALL AOR ACCESSORIES ARE AVAILABLE

YEASU

VR-500 Compact handy 500kHz-1300MHz all mode ...**£???.??**

License free transceivers

FOR COMMERCIAL AND LEISURE USE
Motorola TA200.....**£130.00** for 2
TA288 .....**£190.00** for 2, rechargeable battery included
Handiepro .....**£320.00** for 2, rechargeable battery included
Icom IC-F4SR.....**£160.00** (PMR-446 or SRBR)
Kenwood TK-361.....**£160.00** (PMR-446 or SRBR)
Cobra PMR-250.....**£115.00** (rechargeable battery included)
PMR-300 .....**£125.00** (rechargeable battery & vibracall)
Multicom PRO.....**£115.00**

For the best prices give us a call on: 0171-637 0353

PAUL ESSERY GW3KFE, PO BOX 4, NEWTOWN, POWYS SY16 1ZZ

Amateur Bands

Problems!

My XYL **UR5CMM** wandered into the garden on some domestic errand and returned to announce that "the end-fed doesn't look right"! Bare wire was touching brickwork, also a joint, (soldered and sealed) looked sickly. The 'good' seal had let water, and hence electrolytic corrosion, in. The brickwork problem occurred simply because in re-erecting the tribander, I'd pulled the end-fed a bit tighter and so brought the wire onto the brickwork.

Both the TS-440S and the v.h.f. 9130 defected on me and nowadays the nearest place for service is Castle Electronics at Halfpenny Green airport - over 96km away! But the trip gave UR5CMM a practice drive in the car and we were rewarded by seeing the Goodyear 'blimp' unmoor and depart.

Events

First, Korean Slim - the station signing HM0DX - gives a PO Box in Chongjin, but Asian stations find their beams looking towards northern JA1 and OH2BH also reckons he doesn't sound too real. J6/K3L in October '99 was another one and AP2/WA2WYR anytime after 1992. Finally, TK6PX - F8PX says this is Corsica Slim.

Chesterfield Island, TX0DX is now a DXCC entity and cards for QSOs on or after March 23 are OK - but the DXCC desk want them held until October 1.

By the time you get this, 70 Yemen will have come and gone, as will VK9 Willis Island and A5 Bhutan. An interesting special in August will be EM500E throughout August - 500th anniversary of the Kazak Glorian in Ukraine.

Activity from PY0S, St Peter & St Paul Archipelago is postponed again, by the Brazilian Navy, this time until July. Longer-term ones are Jan Mayen, where JX7DFA will be there for 8 or 12 months and D2BB for a year. Cards for the latter to W3HNK.

Letters

Good luck to all our RAE-candidate readers. Our anonymous correspondent is one, and puzzled. If we can't predict the number of spots on the sun tomorrow, how can we confidently talk about an 11-year cycle? This puzzles RAE students every year.

Toss a penny. We can't predict which way it'll come down. However, if we toss the coin many times, the coin will land 'heads' or 'tails' about equally. We might see five or six successive heads (or tails) at any time. If such come in the first eight throws, we've got a very biased sample - but over a million, the balance is hardly affected. And, of course, whatever the last throw gave us is no guide whatsoever to what the next will be.

History says we have something like an eleven-year cycle, but we can't even say when the top of a cycle happens save by 'smoothing' the data, giving us the answer six months later! 'Predictions' are intelligent guesses. Sunspots have been known for a very long time, but reliable measurements only cover about 300 years past. Over that time, cycles have varied between seven and fifteen years, with an average of a hair over eleven.

Next **GW8AWT** in Llandeilo, on the 'small garden' problem mentioned in the February piece. When in Cowes, Wyn started with a four-bolt pipe-flange mounted on a sheet of lead earthed and concreted in place near the house wall. A 2m length of 1.5in BSP pipe was screwed into this and then **two** well copper-greased elbows permitted fitting an 8m length which could fold down within the garden. A pulley was fitted to the wall, suitably cross-braced. At the far end, the clothes-line pole sprouted a tapered wooden top and a whip mounted horizontally. That put 20m of antenna in a zig-zag into 8m of garden, and very effective it was too!

In Birmingham, **John Collins** preferred 40 between 1400 and 1800. He notes GM0EEY on Seil Island, GB5RO (IOTA EU009), MM0BPP/P on Valley island, GM4PMK on Mull, GI0GDF on Rathlin (EU 122, GB2RN on HMS *Belfast*, SM7DLZ/P on EU130, IV3UHL/P (EU130), while a late session produced FY5FY at 0120 plus SM10BI on Gotland at 0130.

We turn now to **Colin Dean** in Barnsley. Colin starts on 28MHz with A61AJ, BD5RT, BQ9P, BV4AOH, BV4VE, CE0ZR, CP6XE, E41/OK1DTP, FH5/TU5AX, FK8HC, J39JQ, KH2/JE1HJE, KP2A, KP2F, KP2/W7MH, OA4EI, PT0F, PZ1FK, P40FV, ST2SP, TT8JLB, TX0DX, VK1MJ, VP5V, VR2MY, V47KP, XX9TRR, ZD7VC, 3B8CF, 3V8BT, 5A1A, 5A23PA, 6K5RFO (= an HL), 7O1YGF, 8R1AK, 9E1C (= an ET), 9G5ZW and 9J2FR.

At 21MHz we see AP2HA, BD5RT, BQ9P, BV4AOH, BV2UB, BV4VE, BY5QE, CE0Z/OH3JF, DS2-3-5, ET3KV, HL2-5, JT1BG, KH2MG, KL7JM, K7GQ/MM in the Red Sea, NH2E, R1ANZ, S21YG, TR8VP, TX0DX, UA0FCD, VE2ACP in Zone 2, assorted VKs, VQ9NL, VR2BJE, XX9TRR, a gaggle of YBs, ZD7MY, 1B1/VE5GML, 3V8BT, 4F2KWT for a DU, 4J3M, 5H9IR, 5R8GN, 9M2/JA4DPL, 9M6XTT and 9V1CP.

Finally, on the 17m band, we see AP2AGJ, BQ9P (Pratas Is), BX5AA, HZ1AB, JA4/8, JY5HD, PA3DJT/MM in the Red Sea and YM4ED who was a TA 'special'.

Now for some c.w. **Ted Trowell** went on 10MHz for 5B4/UA9YAB, OY3QN, HF0POL and to 14MHz for K7OQ and BV4AH. At 18MHz JR4GPA, VU2CC, V31JZ, JA4FKX and J79KS went in the log, while on 21MHz 7O1YGF, Z21GC, PY1BVY, KP4TF, R1ANF (45th Russian Antarctic Expedition), E29DX and 7Q7TB. 24MHz produced 5H3RK, YV6AZC, PZ5RA, leaving the big crop for 28MHz, by way of 9M2TO, JA8HIO, L47HN, L47AWP, 9M2AX, ZP6CW, FR5FD, V51AS, FG5FR, PP5JN, VP6BR, BQ9P, PY2ZDX, ZS1ZI, JW/DL3NRV, 5B4/G0UHK, CO8TW, LV8DW, 6D2X, 3CA/K0CO, ZP5KO, PY2OW and ZV1IR.

Holywell in Oxford is home for the Goodhalls. XYL **Allison** presented **Paul** with a nice new R8500 receiver. Paul hopes next time she'll buy a tower and a beam - for 2001's birthday and Christmas - but I wouldn't bet money on it!

Seriously, Paul's list includes all the harder bits of N and S America including VEs, JAs, VK0MM, ZLs, 8J1RLK, 9G5MD, RA9UR, 9E1C, 9K2GS, A41KJ, V44KBP, HS0/IK4MRH, H44PT, 8R1AK, R1ANZ, 5A1A, ZS31ER, (Elephant Rock island), HP1BYS, BQ9P (Pratas Is), VR2JK, EP2MKO, FK8HVM and of course the usual Europeans they were working.

As for young **Peter**, he and Paul 'had a good bash' during the Easter holidays, and time was spent using the *Getcw* program in preparation for NFD. A point arises here - computers send perfect Morse, but human operators don't! Seriously, practice taking hand-sent Morse until you find you are up to speed, using the computer as just one of several sources.

Locally, we have an elderly candidate who seemed unable to get reception up to speed until we organised three different 'fists' to send Morse to him and a bit of competition with another candidate. If you intend taking the Morse test in due course, write in longhand, **not** capital letters - it's quicker.

As Morse examiners, one sees so many unreadable scripts - letter I or number 1, 6 or G and so on. Our chap alerted us by mistaking them while reading-back over the air. In time of course you'll store it in the 'disk' between the ears and only write down what goes in the log or a reminder to answer a question.

On the sending side, I find it helps to support the elbow so only the wrist does the moving. Awkward at first but it does help. The other thing is to record your sending on tape, and play it back a day or two later, when all the faults will be obvious. A good c.w. operator is known by his 'fist'.

Aim at slow but decently-shaped characters first, speed will come with practice. To make the key 'stay put' I scrounged a piece of 'Slip-not' from our local occupational therapy department. Sit the key on that and stop worrying about the surface beneath it - **and** the key won't budge. No 'walking' keys here since I discovered this stuff!

QRT

Deadline, as always, the first of the month, to Box 4, Newtown SY16 1ZZ. *Au Revoir!*

■ **PETER BOND c/o EDITORIAL OFFICES, BROADSTONE**
■ **E-MAIL:** milair@pwpublishing.ltd.uk

MilAir

I am still in nostalgia mode so this month's photo shows the prototype YC-15A practising its display on the Friday before Mildenhall show 1977. (Photo taken from Pollards Lane). Thanks this month to **Dave M**, **Martin**, **Pete C**, **Pete L**, **Brian** and **Nathan**.

MilAir Information

The cold Winter and a very wet April have passed us by to be replaced by a warm May, (so far), and consequently the beginning of a new Airshow season. As I write this, Mildenhall Air Fete is just over a week away with hopefully the prospect of some interesting aircraft and some fine weather. Thanks to those of you who have been in contact recently, a quiet-ish Spring has not exactly seen my post bag bulging, so don't forget to send in all those snippets of MilAir information you pick up in your travels.

The dividing line between an aircraft spotter and MilAir enthusiast is sometimes thin as they are very closely linked. Whilst I am grateful for all correspondence, I would politely ask those of you who send me detailed lists of aircraft and their serials to send them to the aircraft enthusiasts magazines as they are much more suitable for their editorial content. I would just re-iterate that I just do not have time to answer letters personally, so please do not send in stamp addressed envelopes, it just makes me feel guilty! - thanks.

Aerobatic Teams

With the show season approaching, **David L.** has dropped me a line asking about the frequencies in use by the major Aerobatic Teams. I have done a quick check through those noted in the past couple of years and they are as follows: Red Arrows 243.45 is the primary frequency and was heard in use during numerous displays in 1999. 242.2 is also reported as a secondary, but I did not hear it last year and I wonder if it is still used?

The Army Air Corp Eagles, I heard them use 136.975 at two displays in 1999, but 135.975 has also been noted. This is a Dishforth AAC Operations frequency so that would tie in as a likely candidate. 380.2 was used as a Eagles u.h.f. frequency during 1998, but I have had no reports since?

The Falcons Parachute team use 255.1, no v.h.f. frequency has been monitored recently. Patrouille de France 143.1 and 242.65 were both heard last year, also I have one report of 141.825 also being used.

The Frecce Tricolori used 307.8 last year, I also have a record of 263.25 and 381.0 being used in the past but no recent reports. Lastly, the Patrouille Suisse have been using 288.55, and the Battle of Britain Memorial Flight regularly use 120.8.

Research Projects

Staying on the Airshow theme, **Ken Hughes** has recently written to me, he has recently retired at 55, (lucky chap), and consequently has a bit of spare time on his hands. He is currently working on completing two long term projects, both of which he expects to be published in the Spring of 2001.

Having lived within 48km of Mildenhall for most of his working life, he has been a regular visitor to the airfield and is now compiling a book which will detail the history of airshows at Mildenhall. He has collated extensive information from 1975 to date and limited information from 1969 - 1974, so he would very much like to hear from anyone who could help with information prior to 1975 and especially from the 50s or 60s.

The book will contain stories about events and incidents at each show, complete aircraft participant listings and for the past 20 years, frequencies and callsigns where known.

The second project which Ken is working on is a history of the Military Airband in the UK since World War II. This will tell an evolving story of all aspects of the subject, including the frequency bands in use and the radio equipment used by both ground stations and the aircraft. He has so far collated a limited amount of information, much of it once again from 1975 onwards, and he would like to hear from anyone who can help with any information prior to 1975 and with any radio/equipment information, post 1975.

Alternatively, if anyone can suggest sources of information then that would be equally helpful. It sounds like an interesting project - all correspondence via me at *SWM*.

Frequency Focus

Catching up with some queries, snippets of information and other items regarding frequencies and callsigns all noted during the last few months. A pair of Tornado F.3s, callsign APOLLO, were noted calling Tonic Ops, (stud 16), at Coningsby on 369.05. It was during high pressure and they were heard from the top of the South Downs at Ditchling Beacon in Sussex! A pair of F-15Cs from the 1st Fighter Wing visited Lakenheath during February using the callsigns DALLAS 01/02.

From the 1st March, Royal Air Force 101 Squadron have been using the callsign LION as their primary callsign for their VC-10s. The old primary callsign TARTAN was used occasionally alongside LION during March, but since April it has not been noted and has either been withdrawn or relegated to a standby/occasional status.

On the 16th March a new, (to me), AWACS frequency was reported in use as 255.925. My correspondent stated that the AWACS, callsign MAGIC 88, used the frequency twice and on the second occasion definitely called the other party as LONDON MILITARY? Was this just a mistake, (most likely), or is it a discrete London frequency that has not been reported, (unlikely). Can anyone shed light on what this frequency is used for?

Lastly back to Mildenhall, one of the local MilAir readers reports that by early May almost all of the Ground Operations radios using frequencies in the 406-420MHz range have been digitised and all the voice channels are now encoded. I presume this is some form of trunked system - can anyone enlighten me? I am off to the Air Fete in a few days so I will report back next month with hopefully some frequencies, callsigns and photographs, (and a suntan?).

ICOM

IC-R75

Revealing a Remarkable Receiver

Icom are proud to announce their latest radio receiver - the IC-R75. This dedicated HF+50 MHz, all-mode unit has frequency coverage stretching from 30kHz to 60MHz in USB, LSB, CW, RTTY, AM, FM and S-AM. In addition to an extremely sensitive receiver, the twin PBT, 2-level pre-amp, selectable Auto-Gain Control (AGC) and noise blanker help to capture and clean up DX signals, whilst the RF attenuator reduces interference from strong local stations. The IC-R75 also has a Synchronous AM detection circuit to prevent audio distortion while receiving AM broadcasts.

A comprehensive range of features can be found in this extremely compact radio, measuring only 241(W) x 94(H) x 229(D) mm. These small dimensions give complete installation flexibility however you choose to operate, as a base or mobile.

The user-friendly front panel has a large, clear, alphanumeric LCD display. This shows the frequency or '6+2' character channel name. The panel also has a numeric keypad to allow direct frequency entry or memory channel selection. The SQL control may also be configured to adjust RF gain and/or squelch threshold. The large, front-mounted speaker provides clear audio, even at the maximum level of 2 watts.

Other features include a bar graph-style, digital signal meter, 99 memory channels, 2 programmable scan edges, an internal clock with ON/OFF timer functions and three speed-selectable scan functions; (program scan, memory scan and priority scan).

This superb receiver is designed to suit a range of market sectors from the demanding 'decoder' to the interested SWL. The IC-R75 incorporates Icom's leading edge technology and offers a range of features that make it exceptional in many ways. It sets a new standard for performance and value, and will become a popular choice for SWL's everywhere.

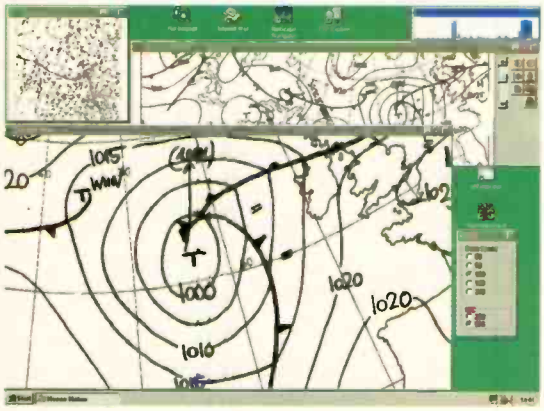
Icom (UK) Ltd. Sea Street Herne Bay Kent CT6 8LD. Telephone: 01227 741741. Fax: 01227 741742.
URL: www.icomuk.co.uk E-mail: info@icomuk.co.uk

Count on us!

■ MIKE RICHARDS G4WNC, PO BOX 1863, RINGWOOD, HANTS BH24 3XD
■ E-MAIL: decode@pwpublishing.ltd.uk ■ Web: http://www.btinternet.com/~mikespage

Decode

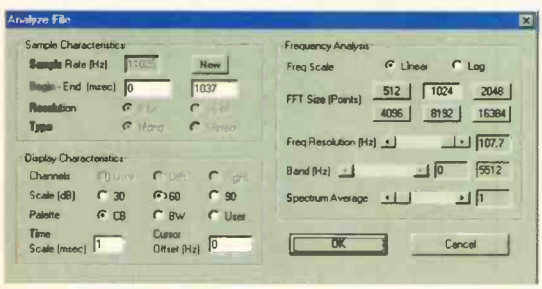
Let's start with the first of a few items of new software to brighten-up your utility decoding. The first, which is not so new but nevertheless important, is the latest update to the ever popular *Mscan Meteo*. The latest release takes it to version 1.07 and the most important addition is the inclusion of Soundcard support. This means that you just need the software and audio lead to start h.f. FAX decoding.



The New Mscan *Meteo*.

This is by no means the first program to offer this, but it is still a very useful addition that brings the program bang up-to-date. The great thing about this option is that it makes h.f. FAX decoding very simple and readily available to anyone with an s.s.b. receiver and a modern PC. The soundcard interface makes full use of the soundcard's facilities to produce high quality images without having to buy the special interface that was required with earlier versions.

If you already have a registered copy of *Mscan Meteo*, don't worry, the update to include soundcard support is available free of charge. If you've not yet tried this program, then you'll be delighted to know that there's a 'Lite' version of the program available for free download from the *Mscan* Web site.



***Spectrogram* File Analysis Parameters.**

Other goodies in the new version include improved image rotation, which is claimed to be 25 times faster. There's also an additional bandpass filter that's used with the soundcard to improve noise suppression. Finally, there's a manual stop button and an additional IOC of 267 for those that want to try Meteosat reception.

***Spectrogram* Input Scan Parameters.**

All in all it looks like a pretty useful upgrade and well worth a try. To get the trial/Lite version pay a visit to:
http://mscan.com/download/mm10d1.zip and **http://mscan.com/download/mm10d2.zip** If you already have a registered version, your free update can be downloaded at:
http://mscan.com/download/mm107u.zip

A visit to the main Mscan Web site - **http://mscan.com/mscan/meteo.html** - will give you full pricing details plus contact information for the UK agents.

More ALE!

Following-on from my May article on Automatic Link Establishment (ALE) decoding software, **George Wooley** has E-mailed with details of a very comprehensive site for those of you that want to monitor the USAF ALE links. You will recall in that article that I showed an example of an ALE message using a report from a C17. George has provided more detail as shown here:

96-001/008 McDonnell Douglas C-17A Lot VIII Globemaster III c/n P-33/40
002 is Spirit of the Air Force
005 is Spirit of John Levitow.
006 is Spirit of Berlin
007 is Spirit of America's Veterans
008 is Spirit of the Total Force

If you want to get at the full range of US serial numbers, you need to visit Jim Baugher's site which can be found at:
http://home.att.net/~jbauger/usafserials.html If you come across any other interesting ALE sites please drop me a line with the details.

A number of listeners have reported coming across what sounds just like a RTTY signal which can't be decoded. Don't worry, this is very common as there are lots of signals around that sound for all the world like RTTY. There are usually a few clues within the signal to help you quickly decide not to waste time trying to resolve it.

The two most important clues are the shift and the baud rate. With the many tools available these days it is quite easy to measure these characteristics, even if you don't have a sophisticated decoder. By far the most valuable tool for this operation is a spectrogram tool. This gives a graphic display and usually provides a facility to freeze a section of the signal so you can take a few measurements.

Probably the easiest program to use is *Spectrogram*, which is currently at version 5.1.6 and is available from their Web site at **http://www.monumental.com/rshorne/Programs/gram50.zip** This latest version includes a stack of improvements including:

- Complete user control over colour scale
- Increased sensitivity to low-level signals
- New 1/3 octave processing option
- Adjustable frequency-amplitude calibration
- Automatic record triggering by signal level
- Single spectrum plot capability at any spectrogram point
- Scanning improvements allowing image printing and saving
- Capability to save images as either JPEG or bitmap files
- Cursor offset and adjustable display update for radio amateurs

- Voice pitch detection for singing instruction
- Improved data logging
- Completely updated Help File

If you're new to this type of analysis, I'll offer some help, as the *Spectrogram* default settings won't deliver the type of display I've shown in the column. I suggest you start with something fairly simple like a RTTY signal of known shift and speed. A good example would be Hamburg Meteo on 4.583MHz, which sends 24hrs RTTY using a shift of 400Hz and a speed of 50baud.

For the sake of this example I'll assume you're using *Windows 98* and the latest version of *Spectrogram*, though much of what I suggest will work with older systems. First of all you need to connect a screened lead between the audio output of your receiver and your computer soundcard. The best connections to use are from the 'line-out' or 'record-out' on the receiver to the 'line-in' on the soundcard. I say this because this gives you a relatively steady signal level that won't be effected by changes to the volume control. With this done you need to double-click on the volume control icon in the bottom right hand corner of the screen.

As most people run with SoundBlaster or equivalent cards, you should get a set of sliders shown on the screen. You need to find the record control and use the Show menu option to make sure you can select the recording source. Once you have this you need to tick the line-in as the recording source.

You can now close this down and run the *Spectrogram* program. You will probably find that you are presented with the Scan Input screen. If not, cancel the screen you have and go to the File menu and select Scan Input.

Now you need to set the parameters as follows: Sample Rate: 11K, Resolution: 8bit, Type: Mono, Display Type: Scroll, Scale: 60dB, Palette: CB, Time Scale (msec): 1, Cursor Offset: 0, Freq Scale: Linear, FFT Size (points) 1024, Freq Resolution (Hz): far right 107.7, Band (Hz) 250 to 3006, Spectrum Average: 1, Pitch Detector: Off, Recording Enable: Off.

I know it sounds complicated, but it's really quite easy to do. With all these settings complete you can press 'ok' and the program will start analysing everything coming in through the 'line-in'. Whilst this is all very pretty, what you really need to be able to do next is to record and store a sample of the signal so that you can freeze it and take a few measurements.

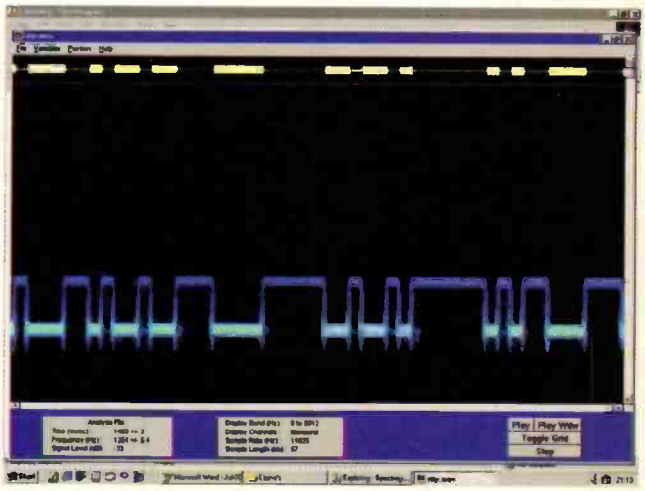
To do this, go back to the File menu and select Scan Input again. Move down to the bottom right-hand corner of the screen and in the Recording Enable section click the On button. You will then be presented with the usual Windows file save menu where you can choose a file name and a destination.

I would highly recommend you set-up a special directory for these files so you can easily find them again and delete them when you have finished. With all this done, the program will again start analysing everything that comes in via the Line input.

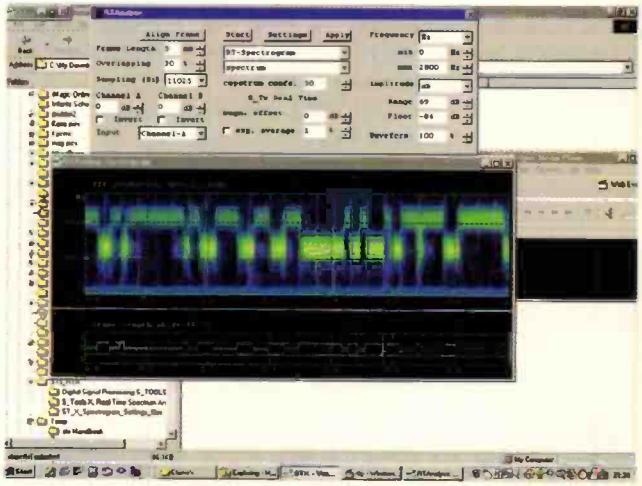
Once you're happy that you have a good signal just hit save to start recording and stop when you're done. Using a sample rate of 11kHz mono provides a very economic method of recording data signals consuming disk space at just 330Kb per minute.

With your data signal captured to disk you can now use the Analyse File option to examine your recording. Make sure you use the same settings as you used to make the recording. You can now press Stop to freeze the display at any point you like.

If you now move the cursor over the screen you will see the details of the signal under the cursor displayed in the box in the lower left corner. To measure the shift place the cursor on the upper and lower horizontal lines in the signal and note the difference between the two frequency readings - this is the shift.



***Spectrogram* RTTY Signal Analysis.**



***S_Tools X* for *Windows 95/NT*.**

Calculating the baud rate is a little more complicated, but still quite quick. First you need to take a careful look at the shape of the signal and locate the narrowest vertical section. If you've got it right, this should be a single bit in the signal stream.

All you now have to do is note the time difference between the left and right hand sides of the section. If you've got it right and this is a 50-baud signal, the difference should be 20ms. To convert this in Baud rate you need to divide the result into 1000, e.g. Baud Rate = 1000/20 = 50. As soon as you're confident you understand the technique you can apply it to just about any data signal.

Advanced Analysis

For those of you that like to try new tools and software I've come across a powerful new analysis systems on the web. *S_Tools X* for *Windows 95/NT* is produced by the Acoustic Research Department of Austrian Academy of Science. The program offers a very wide range of precision analysis options and is freely available for the Academy's web site at: **http://www.kfsoeaw.ac.at** I'll provide some more detail on how to get the best from the package in a later column.

■ GRAHAM TANNER, 64 ATTLEE ROAD, HAYES, MIDDLESEX UB4 9JE
■ E-MAIL: ssb.utils@pwpublishing.ltd.uk

SSB Utilities

ATC 2000

Most readers of this column will probably remember that last year's Royal Tournament at Earls Court in central London was the last one. For s.s.b. utility enthusiasts, this event was quite popular as the UK Air Training Corps (ATC) manned their h.f. network and made contact with both civil and military aircraft flying in and around the UK and Europe. Last year, they even issued QSL cards to s.w.l.s who were able to provide details of the contacts they heard. While listening to their communications I was quite surprised just how many air crew said that they were ex-ATC members, and many commented about the sad demise of this event.

The Royal Tournament has been replaced by an event known as the Royal Military Tattoo 2000 that is being held on Horseguards' Parade in central London between 10th and 15th July. This location is quite well-known, as it is the location of the Trooping the Colours ceremony held during June each year. The ATC will not be running their h.f. station from this event, but another event further 'up country' during the month of July will provide an alternative for listeners.

A two-week event has been organised for late July at RAF Cranwell in Lincolnshire, and it is open to all ATC units from the UK. It is known as ATC 2000, but the exact dates are not known by me as I compile this column (although the last two weeks of July seem to be the most likely). The Cadets will be able to participate in all the normal cadet activities, allowing individual cadets and Squadrons to experience those activities that they do not normally have the opportunity.

One of those activities is the chance to operate on the ATC h.f. network, and this will be of interest to h.f. listeners. As with the Royal Tournament in London the cadets are hoping to contact as many military and civil aircraft on their h.f. network frequencies, and a number of airlines have been contacted to make sure that flight crews are aware of the event.

The Royal Tournament was a bit limited in its operating times, as the cadets could only operate their station while the Tournament was open, limiting them to 1300 to 2000, but the ATC 2000 event will allow them to operate for longer periods. I can't imagine that it will be a full 24-hour operation at ATC 2000, but I would certainly expect their h.f. network to be active from about 0800 each day. Other problems with the Royal Tournament set-up were QRM caused by signals from the amateur radio special-events station and QRN from the air-conditioning units on the roof near to the ATC antennas. Obviously, these will not be problems at RAF Cranwell.

In the past I have mentioned the ATC h.f. network many times, but I have never given their exact frequencies. On several occasions I have also mentioned a specific range of frequencies where their network could be found. Those of you with the *Eavesdropping on the British Military* book will already be aware of their frequencies, but not their new designators. However, I am now able to reveal some of their frequencies and designators. This should mean that most listeners will have the opportunity to hear the communications from ATC 2000 in July, and that you should also be able to QSL the h.f. station at RAF Cranwell.

So, for the first time in *SWM*, here are the Air Training Corps h.f. network frequency allocations:

Designator	MHz
November 1	5.245
November 2	4.925
November 3	5.088

All the channels are u.s.b. The November designator indicates that they are National Network Channels; in fact, there are another three series of channels and frequencies in the Lima series (lower frequencies), the Hotel series (higher frequencies), and the Oscar series. Almost all the ATC h.f. activity is on the three frequencies given above, so whether you are listening to the ATC 2000 event or their regular weekly Nets on Sunday mornings or weekday evenings, these are the frequencies that you need.

For those of you with access to the Internet and also members of the *SWM* Readers list, I will try to give you all some advance warning of the ATC 2000 event nearer the time.

Aero List

I often receive requests for lists of h.f. frequencies used by various airlines around the world. The larger airlines are quite easy to find, but most of the smaller ones are quite difficult to locate; either they use non-aeronautical band frequencies, or they seldom use h.f.

I have recently been in contact with a listener in Finland who compiles a list of aeronautical h.f. frequencies of airlines from all over the world, and he has agreed to me mentioning his list in *SWM*.

Risto Hirvonen in Finland has been collecting and compiling LDOC frequency information for many years, and has been answering questions about these on the WUN list for quite some time. He works in the airline industry, and has used his contacts to find out a lot of elusive information. His *Aerolist* is available from his web-page in two formats, either as an ASCII text file, or as an Excel spreadsheet.

The *Aerolist* is simply a list of h.f. aeronautical frequencies from 2 to 30MHz with lists of users and station for each frequency. The beauty of having such a list as a computer file is the ability to quickly search for information, whether you need to find a user for a frequency, or a frequency for a user.

Web Watch

Risto Hirvonenís *Aerolist* - **http://www.ute-monitor.org/aerolist/**
Oceanic tracks (an example) - **http://simflight.com/fsportugal/satco/nats.htm**
Oceanic tracks (an explanation) - **http://espania.com/aspa/bibliot/mnps.htm**
Shanwick OACC (unofficial site) - **http://www.webie.com/irishav/shanwick.htm**
Oceanic track broadcast - **http://aerowinx.com/html/natracks.html**

Shanwick

Roy Baskett wrote to ask if it is possible get information on the tracks allocated to aircraft crossing the Atlantic each day? He specifically wants to get the information from the Internet, and asks if Shanwick has a web-site where this information might be available.

Well Roy, this was mentioned last year in this column, and probably the best site for this is the web-site of the Irish Aviation Society (see 'Web Watch' above for URL details). Their site contains a number of interesting pages relating to the Shanwick OACC, and also a link to a web-page that include track information. I did check this page while compiling this column, and the information was not up-to-date, but the page listing track information does carry a disclaimer to the effect that it may not be updated every day.

Jamming

The subject of Jamming just seems to run and run. This month I received an E-mail from **Charlie** (who omitted to tell me where he was in the UK) who commented on the item about SAR and jamming (*SWM*, April 2000 issue, page 68), and that maybe I have a problem with my radio; both he and a friend have experienced similar problems. Charlie says that both he and a friend have tuned their radios to 5.680 but have not heard and interference or warbling; they have found some form of interference which they have narrowed down to their choice of radio. Charlie asks if I am using an Icom R71E receiver, and if so he offers to fix the warbling for me!

Well Charlie, there are plenty of listeners out there who have heard the jamming, buzzing, warbling and interference, and it is definitely not a problem with my radio. I have several reports from up and down the country, and even from overseas. These listeners and contacts are using a wide range of receivers and transceivers from a number of different manufacturers, so the jamming is not limited to one make of radio. At the risk of boring those who have heard me mention this before, I use an AOR AR3030 h.f. receiver which I have had since they first appeared in this country.

Charlie does quite correctly point out an error on my part when I mentioned that the BT site at Daventry is home to the MSF service and Atomic-Clock. As Charlie and several others pointed out, the Atomic-Clock system is at the National Physics laboratory in London, and the signal is sent by land-line to Daventry where it is transmitted to its audience. In my defence, my original text does say that the newspaper article said that BT site was home to an atomic-clock, so I feel justified in passing the blame back to the original newspaper (I just wish that I'd checked my facts a bit better).

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

Satellite TV News

'Dishes in the Mist', Perayangste 'The Hill of Hidden Paradise', West Sikkim, North India.

A segmented C-Band (4GHz) dish being assembled at the Dali Buddhist Monastery, Darjeeling, West Bengal, India.

The C-Band dish installed at the Nirvana Hotel, Pokhara, Nepal.

NTL uplink onto *Eutelsat W2* @ 16°E.

The Israeli uplink station from Bezeq via Eutelsat 16°E.

Part of the Passover celebration held in Jerusalem.

Israel, perhaps of all Middle East countries, commands more respect and interest, a vivid religious history around which much of our present society sets a standard, in recent times conflict - even with the British, the Six Day War and current ongoing friction over the Golan Heights and Palestine. A victimised race - Hitler's policies in WW2 - and resulting from that oppression a country that is now fiercely protective of its own - example the Ugandan hostage drama with Idi Amin.

I recall the haunting callsign of the Kol Yisrael s.w. service in the 60s on 9.009MHz in my s.w.l. days. It's a rare sighting on satellite, there's no easily accessible source of Israeli TV, odd since every Arabic state and protectorate seems to have its service downlinking somewhere. Even Sharjah TV is available via 13°E on a small dish, Sharjah - a well known RAF desert staging post in the post war British Empire.

And my sighting of 'BEZEQ TVRO' was to me an excitement. Bezeq is the main Israeli uplinking teleport and April 17th around 2000 whilst cruising over the GHz wastes of *Eutelsat W2*, 16°E searching for any itinerent NTL downlinks, I found Israel! In fact, the picture content was confusing.

The picture comprised of a large number of Jewish gentlemen in a large 'traditional' hall in a state of celebration, singing and some dancing. The centre of the festivities appeared to be an elderly gent with a large white beard. Most were wearing long black coats and large round furry hats. At one point, all processed out into the Jerusalem street and eventually returned to more celebration. No commentary, but the service ident confirmed the country.

Curious, I found on an Internet Jewish website an E-mail invite to 'Ask a Rabbi' over any aspect of Jewish life. The answer returned a few days later, the celebration was to mark the Passover - it being held between Palm Sunday and Easter. Essential data - 11.131GHz-H, SR 5632; FEC 3/4; VPID 4194; APID 4195.

Another race that is suffering modern racial persecution are the Kurds, though they can represent their views and suffering through satellite TV. Test transmissions from KURDSAT have been monitored around the 11.011-11.015GHz-H, SR 5632+3/4 on *Eutelsat 2F3* @ 36°E with a recent ident as 'Service 1'. Programming is biased towards a propaganda aspect of the Kurd problem, the news items often illustrated with very smudgy VHS newsreel.

In programme gaps there seems a fascination - as with many of the mainstream Arabic broadcasters - with running water, mountain streams, rivers, sea, etc. offering continuous video playout of water scenes. One morning broadcast - they appear to be on-air continuously - featured a funeral of a seemingly important person, a massive crowd gathered on a hillside, closeups of the coffin, the grave and last rites.

For Middle Eastern watchers, it's worth tapping in 12.654GHz-H; SR 27500; FEC 3/4 and you'll find an interesting selection of TV stations in the 'Arabsat Bouquet' on the 13°E *Hot Bird* slot, all providing noise free reception on an 800/900mm offset dish. Jordan, Kuwait, Saudi, Sudan, Oman, Sharjah, Iraq, Qatar, Libya are all available, though taking the 26°E Arabsat downlinks will provide the rest of the Arabic world.

Kuwait, Saudi and Jordan offer excellent quality pictures - you can even catch the JRTV PM5534 test card late at night, but often the quality on both the Iraqi Space Channel and Libya leaves much to be improved with distorted sound and murky pictures respectively! If trouble is brewing, then Iraq often goes to Mr. Saddan recorded speeches with sabre rattling army video playouts between.

Libya also features military and civil unrest in its news bulletins. Many offer English language programming at times. Sharjah TV recently featured unique hand-held video camera pictures of the Islamic Ramadan in Mecca within the circulating crowd of pilgrims and with close-up pictures of pilgrims touching the Holy stone.

Mike Evans, a well known TVDXer in past years and now operating an Eclipse satellite receiver and 1.2m prime focus dish in Suffolk, laments the reduction in analogue activity - there's still analogue about, mainly in domestic programming, but there's been a mass defection to digital transmission for outside broadcast, news and corporate feeds and we've followed the trend. It's made sat-zapping much more difficult and we obviously miss many signals, but we're still catching the flavour of the month.

I caught Spain's Guadalajara teleport late April with an analogue PM5534 test card testing on *Hispasat-1C* @ 11.578GHz-V. A few days earlier the new *Sirius-3* @ 5°E was on analogue tests and 11.995GHz-H carried colour bars and the 'SIRIUS 3' inlaid ident.

An aircraft hi-jacking attempt was seen April 22nd at 1330 with pictures of a parked Quantas airliner at an airfield corner in a heat haze, guards around and pictures via *2F3* @ 36°E, 11.683GHz-H (5632+3/4, PIDS 358/256) and the service ident 'IMAGEUNLTD1 UKI425'. Normal aircraft movements continued on the unknown airfield. No newspaper reports were seen of this event and a mystery why UK SNG serial numbered equipment, i.e. 'UKI425' was in use. No audio other than natural effects, the signal cut transmission at 1300 - the mystery remains!

With more orbital hardware destined for the 36°E slot (see news following) it's likely that more sightings will be featured from this slot. During April, 36°E was very busy as ever. The continuous UK rain caused heartache for the Rugby League Cup Final, this year moved from Twickenham to Murrayfield, Edinburgh. And so we find the good ship 'UKI-234 Low Delay 8MB' feeding back into BBC Network sports reports on the state of the waterlogged ground.

The next day, April 28th, another BBC crew 'UKI-534 BBC DSNG' appeared and yet more reports from the sodden turf! A few months ago we were logging 'UKI-234' in the guise of an analogue BBC SNG truck, often on *Telecom 2C* @ 3°E, now it's been digitised and back on air. One frequently seen analogue friendly SNG truck was our old friend UKI-149 and hopefully that too will re-appear on our screens...

'The Racing Channel' is a subscription channel carried by Sky, yet early May over several days horse race coverage was carried in the afternoons in the clear on *2F3*. However, the uplinking operation was frequency hopping. On the 3rd 'SIS14 UKI-33' downlinked at 11.062GHz-H; the 4th 11.621GHz-H and the 5th 11.055GHz-H. The latter 'UKI-257' had been wheeled into action, all digital of course with the well worn 5632+3/4.

Unfortunately, I must report that SISLink have opted into 'encryption' for most of their programme circuits, often originating the circuit and rehearsals in the clear and then opting into scrambled mode. And it was on election day, May 5th, that several OB circuits were obviously active on *2F3* but all 'encrypted'.

A couple that were in the clear - 'RTV UKI-511 SKY NEWS' covering the Inner London Election as was 'ITN 9MHZ'. An early evening election report with a sunny Tower Bridge backdrop - 11.079GHz-H was perhaps the 'prettiest' shot of the whole election (my own sightings ended at that point as I was actually working as an election count assistant that evening - times are hard, money scarce!).

Romsey became a political hot potato over this period as we were electing a new MP following the untimely death of Michael Colvin (covered two issues ago). Two satellite trucks were in use with live reports for the BBC and Sky. The next morning as the sun rose over Romsey, the BBC SNG truck arrived in the Market Place, under the shadow of the Abbey, lifted it's telescopic mast (with its off-air terrestrial u.h.f. Yagi), aligned it's dish onto 36°E, but the downlink was too weak at home to lock up (11.098GHz-H) on my RSD receiver!

The NASA *Atlantis* Shuttle flight didn't 'make it' on April

25th with unfavourable wind postponing it until a later day, but full coverage of the non-event was monitored on the *NSS-K* 21.5°W bird via the Globecast bouquet - 11.590GHz-V; SR 20145; FEC 3/4 -taking a feed from NASA TV output. In fact, viewers saw the scaling down for the day and discharge of the nitrogen tanks, the crew exiting and precautions to prevent dust ingress into the vehicle. The sound channel commentary ended and the radio comms between main control and the shuttle launch site engineers was carried.

The Globecast crew were active, same bird, but the previous day on the new 11.590GHz-V frequency, SR/FEC as above, this time carrying a test pattern from Venezuela - 'Uplink-1 Venevision' with inlaid time/date detail. No programme material was carried.

Checking out a tip that the 'Vision of Resistance' is transmitting on *Hot Bird*, 13°E at 12.597GHz-V (SR 27500; FEC 3/4) I found that signals were present on this frequency. In sequence there is MBC; Service 2 'BET International coming soon' caption; 'NITV'*; 'CNNI' (encrypted); 'Euronews' with news programming in English; the French 'Canal Rural', down on the farm programme; 'JSTV-1', encrypted'; 'JSTV-2', pictures of animals, birds, street scenes but no audio. * 'NITV' appears to be the 'Vision of Resistance' as noted above.

Programme language is mostly Eastern, Arabic and another and still using an Arabic type script. At 2000 a news broadcast produced the 'NI TV' logo, certainly not Arabic, but another language unknown but suggesting the Caspian Sea region! May 10th and monitoring the channel seemed to be very basic TV presentation, invited 'phone-ins and a few commercials with an English caption ident 'National Iranian TV'. The picture quality isn't wonderful, rather smudgy resembling VHS.

NITV' has also been sighted by **Roy Carman** (Dorking) via *Telstar-12*, 15°W within an eight channel package - 11.534GHz-H with an unusual SR 15000+3/4. Iranian news feeds also appear on *Hot Bird*, 10.922GHz-H ex Tehran, a rare catch (SR 29900+3/4).

Whereas Arabic TV programming appears over numerous satellites - most easily received *Eutelsat W2* 16°E and *Hot Bird* 13°E, the most comprehensive selection is found on the *Arabsat* slot @ 26°E (both analogue and digital) and *NileSat* 7°W. The latter can be difficult to locate and a 1m dish would be advisable both for signal gain and interference protection from other closely positioned satellites. Unfortunately, *Amos* @ 4°W has two spot beams into Central/Eastern Europe and the East Med onto Tel Aviv and consequently UK reception is marginal at best.

The lower end of *Telecom 2C*, 3°E Telecom band is very productive for sports feeds. On one evening, April 30th, Roy logged no less than five sporting events in progress - 12.530, 12.548, 12.558, 12.564, 12.596 with rugby, pony trap trotting (2), 'encrypted' and also Euronews (12.596-H, SR 6111+3/4). A rather Middle Eastern flavour this month...

And finally, a nice little DX catch. Checking across the C-Band output of *Arabsat 2B* @ 30.5°E late evening of May 11 I came across African dancing (4.076GHz-RHC) and switching in Threshhold Extension (TE) lifted up the very noisy picture to reveal the stage with dancing, behind a large hanging backdrop with 'Somalia Peace Conference'. A small ident log 'RTD' in one corner remained and at dance cessation up came a slide view captioned 'Dhammaad' showing docks at night and transmissions then cut. Unable to locate Dhammaad in my atlas, I eventually found 'RTD' in the *WRTVH* as Radiodiffusion-Television Djibouti, the neighbouring country to Somalia.

Orbital News

It really looks like bad news for the Iridium LEO (low earth orbiting) fleet of 66 satellites as the telecomms press reports that Motorola are now making plans to de-orbit the fleet to burn them up in the Earth's upper layers. They had hoped to quickly gain subscribers for the global mobile 'phone network, but after many months, only 55,000 has signed compared to the +1 million hoped for. With two other LEO projects (Globalstar and ICO) well advanced in the pipeline, things aren't looking too good.

The European Broadcasting Union (EBU) have now successfully tested their Basic Interoperable Scrambaaling System (BISS) which when adopted by manufacturers will allow simplified programme and news distribution across boundaries without the problem of incompatible DVB encryption systems in use by different broadcasters. The ITU should give the BISS its blessing late 2000.

The year 2000 will offer another Olympic Games spectacular, this time in Sydney, Australia, and the EBU have already leased capacity on *Intelsat 804* (64°E) and *Intelsat 704* (66°E) for the carriage of 40,000 total programme hours Olympic action. Within this capacity, the EBU will carry at least 25 full time channels feeding over 30 European broadcasters and of course all transmissions will be MPEG-2 digital. The EBU are working in conjunction with Telstra, a telecomms group very active in SE Asia and the Pacific Basin.

The 36°E slot will become even more active when the newly launched Eutelsat *SESAT* satellite is positioned following the successful launch out of Baikonur Cosmodrome April 17 last. *SEAS* is now operational with 18 Ku-band transponders mainly targeting the European/Russian/Middle East land mass plus a steerable spot beam aimed into India.

Six of the 18 transponders can be switched into the steerable beam mode and both widebeam and spot beam are able to 'talk' to each other allowing ease of communication from Europe into India for example. *SESAT* will be joined shortly by *Eutelsat W4* increasing still further capacity at 36°E - *W4* will launch ex Cape Canaveral mid May.

The Luxembourg owners of the Astra satellite fleet SES have confirmed the leasing of 6 x 72MHz bandwith transponders on the Feb 2001 launching Eutelsat *Eurobird* which will slot at 28.5°E, closely adjacent to the Astra 28.2°E slot. SES will take a 12 year lease on the 11.20-11.45GHz downlinking transponders to enhance the Astra coverage of Western Europe and particularly the UK.

This news is welcome since the hoped for late May launch of the SES *Astra 2B* satellite has been delayed until late July, this caused by late delivery of the bird into the Ariane launch site at Kourou.

'Star Wars' across the Indian skies with the programming group 'ZEE TV' taking on arch rivals Star-TV. Zee have wheeled out 'Zee Movies' and 'Zee English' on March 15th last to attack the Indian pay-tv market, currently dominated by 'Star Movies' and 'Star World'.

New kid on the block will be CNNI who are launching a South Asian network via *PAS-4* digital across India, Bangladesh, Pakistan and nearby countries. This will be the 5th CNN regional variation, currently transmitting a European, US, Pacific Basin and Latin American service. The South Asian service opens July 1st.

Viasat have now wheeled out their new digital package 'Viasat Digital', later than the anticipated date and will retain their analogue D2MAC channels on-air via *Sirius* 3°E capacity until June 2001. The new digital service will downlink on 11.977GHz-V (TV1000; Cinema; ZTV; VH-1) and 12.054GHz-V (several Scandinavian channels + MTV, BBC World, etc.) and encrypt using Viaccess technology. Another hopeful to hit the digital waves is the Amsterdam, Holland, regional TV station 'AT-5' which is seeking carriage via Astra 19°E capacity once Dutch legislation allows it to transmit other than locally on cable.

More channel activity for the UK with 'The Baby Channel' intending to launch Spring 2001 transmitting 0800-midnight with most programme UK produced. And culture for the masses when 'Artsworld' also opens autumn 2000, a Jeremy Isaacs inspired offering that will focus on music, the arts, books, antiques and a few high quality stage shows and films not previously seen on UK television. Artsworld will transmit for six hours daily.

The C-Band spectrum of 3.2-3.4GHz is under threat by the Australian 'Channel 7' TV group who are seeking to exploit the previously reserved satellite spectrum for terrestrial transmission of broadband TV, data and Internet interactivity. And in NZ 'Television New Zealand' are also seeking approval to use parts of the 12GHz downlinking band for terrestrial use.

***NSS-K* @ 21.5°W carried this uplink ex Venezuela via the Globecast digital bouquet.**

The *Atlantis* Shuttle flight was aborted 25th April and the ground crew then carefully helped the crew emerge from the space rocket - via *NSS-K*.

Another facility company based in New York.

Analogue tests from *Sirius-3* @ 5°E.

And more analogue, this time via *Hispasat-1C* @ 30°W.

WiNRADiO®

TAKiNG THE EUROPEAN RADiO MARKET BY STORM

FREEPHONE 0800 0746263 TO PLACE A CREDiTCARD ORDER

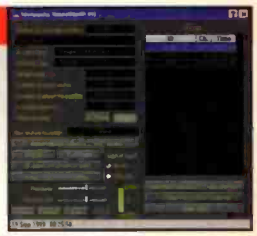
*Receive a FREE Mini-Cone Antenna With Every WR-3100 order!**

JOiN THE TRUNKED RADIO REVOLUTION WITH YOUR WiNRADiO RECEiVER!

1. Enjoy multiple, major trunk tracking modes
2. Automatic traffic following & sophisticated control panel
3. Take comfort in the automatic volume control
4. Single & dual receiver modes
5. Convenient inbuilt electronic logger and database
6. Comes complete with an inbuilt traffic recorder
7. Full XRS™ - compliant technology

The WiNRADiO Trunking Option*
Trunking systems are used by public safety, transportation, business, law enforcement, government, military and other organisations. This software includes major trunking modes: Motorola SmartNet® and MPT1327.

ONLY £81.07 inc vat

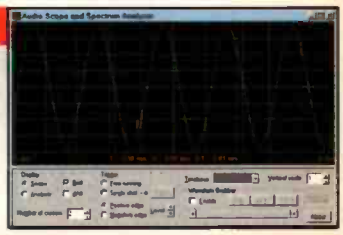


TAKE A LOOK AT WiNRADiO's DIGITAL SUITE

1. WEFAX / HF Fax
2. Packet Radio for HF and VHF
3. Aircraft Addressing and Reporting System (ACARS)
4. Audio Oscilloscope, real time Spectrum Analyzer with calibration cursors
5. Squelch-controlled AF Recorder
6. DTMF, CTSS decode and analyse

The DSP applet provided with the WR3100i spectrum monitor ISA card (£995+VAT) allows continuous control of audio bandwidth and other signal conditioning functions.

ONLY £81.07 inc vat
(requires SoundBlaster 16 compatible sound card)



WiNRADiO® PC RECEIVERS

Available as either an internal ISA card that slips inside your PC, or as an external (portable) unit. WiNRADiO combines the power of your PC with the very latest in synthesised receivers.

YOU CAN USE WiNRADiO™ SCANNiNG PC COMMUNiCATION RECEiVERS FOR:
Broadcast, media monitoring, professional & amateur radio communications, scanning, spot frequency, whole spectrum monitoring, instrumentation surveillance and recording.

If you're after the ultimate receiver-in-a-PC with full DSP then smile and say, "Hello" to the new **WR3100i-DSP** with its hardware for real-time recording, signal conditioning and decoding applications. It's all you need.

NEW EXTERNAL MODELS

EXTERNAL WiNRADiO™
We are now able to offer you a complete range of stand-alone WiNRADiO comms systems:

- **WR1000e - £359 INC VAT**
- **WR1550e - £429 INC VAT**
- **WR3100e - £1169 INC VAT**

Each stand-alone unit connects to your PC through either the basic RS232, or through an optional PCMCIA adapter (for high speed control).
The units are powered through either your existing 12v supply, or through an (optional) NiMH rechargeable 12v battery pack.

"It's software is excellent.. more versatile and less idiosyncratic than that of the Icom IC-PCR1000"
WRTH 1999 Review

"Five stars for its mechanical design"
WRTH 1999 Review

"Most Innovative Receiver"
WRTH 1998 Awards

Model Name/Number	WR-1000i & WR-1000e	WR-1550i & WR-1550e	WR-3100i & WR-3100e
Construction of internals	WR-1000i/WR-1550i-3100iDSP- Internal full length ISA cards		
Construction of externals	WR-1000e/WR-1550e - 3100e - external RS232/PCMCIA (optional)		
Frequency range	0.5-1300 MHz	0.15-1500 MHz	0.15-1500 MHz
Modes	AM,SSB/CW,FM-N,FM-W	AM,LSB,USB,CW,FM-N,FM-W	AM,LSB,USB,CW,FM-N,FM-W
Tuning resolution	100 Hz (5 Hz BFO)	10 Hz (1Hz for SSB and CW)	10 Hz (1Hz for SSB and CW)
IF bandwidths	6 kHz (AM/SSB), 17 kHz (FM-N), 230 kHz (W)	2.5 kHz(SSB/CW), 6 kHz (AM) 17 kHz (FM-N), 230 kHz (W)	2.5 kHz(SSB/CW), 6 kHz (AM) 17 kHz (FM-N), 230 kHz (W)
Receiver type	PLL-based triple-conv. superhet		
Scanning speed	10 ch/sec (AM), 50 ch/sec (FM)		
Audio output on card	200mW	200mW	200mW
Max on one motherboard	8 cards	8 cards	6-8 cards (please ask)
Dynamic range	65 dB	70 dB	85dB
IF shift (passband tuning)	no	±2 kHz	±2 kHz
DSP in hardware	no - use optional DS software		YES (ISA card ONLY)
IRQ required	no	no	yes (for ISA card)
Spectrum Scope	yes	yes	yes
Visitune	yes	yes	yes
Published software API	yes	yes	yes (also DSP)
Internal ISA cards	£299 inc vat	£369 inc vat	£1169.13 inc
External units	£359 inc vat	£429 inc vat	£1169.13 inc (hardware DSP only internal)

PCMCIA Adapter (external):	£69.00 inc vat when bought with 'e' series unit (otherwise: £99 inc vat)
PPS NiMH 12v Battery Pack & Chrgr:	£99 inc vat when purchased with 'e' series unit (otherwise: £139 inc vat)
The WiNRADiO Digital Suite:	£74.99 inc vat when purchased with a WiNRADiO receiver (otherwise: £81.05 inc vat)

For your free (no obligation) info pack & WiNRADiO demo disk go to: http://www.broadercasting.com. If you don't have access to the internet then by all means feel free to phone/fax us. *Trunked radio transmissions should only be received & decoded with permission of the originator of the transmission.

Please send all your enquiries to: info@broadercasting.com or Telephone: 0800 0746 263 or +44 (0)1245 348000 - Fax: +44 (0)1245 287057
Broadercasting Communication Systems, Unit B, Chelford Court, Robjohns Road, Chelmsford, Essex, CM1 3AG, United Kingdom

■ JERRY GLENWRIGHT, 23 DOWNLAND AVENUE, SOUTHWICK, WEST SUSSEX BN42 4RF
■ E-MAIL: shackware@pwpublishing.ltd.uk

ShackWare

Hello once again and welcome to 'ShackWare' - no need for an explanation, I'm sure you all know what this column's about by now! Thanks for all your letters and kind words this time around and so without further ado, let's press on to some interesting letters detailing PCs old and new(ish).

Mailbag

Remarkably, the ubiquitous PC has been with us for around 20 years now in various guises. Introduced as IBM's spoiler for a market it considered short-lived and unworthy of interest, the PC caught on in spectacular fashion and helped to establish the microcomputer as a sensible alternative to larger machines.

In fact, the minicomputer, the machine of choice for corporate IT buyers, went into an almost immediate decline and today, the only place you'll see them is in museums - or my shack where until recently you could have run a fingertip over a Systime 19020 mini - and now I'm looking for another minicomputer, any ideas please write (but don't tell my wife!).

When the UK's own big-time box-shifter Alan Sugar and Amstrad muscled in on the PC market prices came crashing down and today, the PC is firmly established as the home user's favourite.

Perhaps even more remarkable however, is the PC's incredible longevity. Whereas there are still lots of Spectrums, BBC Bs and the like around, many (if not most) of them are probably gathering dust in the cupboard under stairs. Not so old PCs.

The good old 386 is still a very useful and usable machine. The 286 can be put to many uses around the shack and even the humble 8088/86 will enable you to climb aboard the decode train using software that's being used today in Pentium-class machines!

Admittedly, decoding with an 8086-equipped machine will be a seat-of-the-pants experience, but it can be done and quite effectively if you're willing to experiment. The 286, alongside a reasonable RAM quotient (even 4Mb) and a 70Mb hard drive will give many s.w.l.s all they'd ever need computer-wise, and step up to the brute force of a 386-based PC and you'll have processing power to spare! OK, I'm joking slightly, but the 386 is still a powerfully competent machine.

As indeed, many ShackWare readers are discovering. One such is **W.M. Watts 2E1GPR** of Marlborough, Wiltshire. Mr Watts writes "My computer is a 386/20MHz which is old but I think it will be all right and I am still learning how to use it".

Mr Watts would like to get into decoding. He read about *JVFAX* and *Hamcomm* in this column and wonders if I can supply a circuit diagram for the necessary interface and whether "...the demodulator interface for *JVFAX* and *Hamcomm* advertised on page 81 of the same issue is the same interface?".

I can give you a circuit diagram but there's not really any need because a suitable diagram appears in the on-disk documentation that comes with either program. This circuit is known as the 'comparator' interface and is little more than a few diodes and an op-amp.

If memory serves (it's ages since I built mine!), the op-amp specified is a 741 type but there are faster devices available which will help to give you a slight edge when using an older and slower machine. The commercially-available interface no doubt sports a faster op-amp as standard and, at around £16, represents good value for money if you're not overly skilled with the soldering iron.

Both *JVFAX* and *Hamcomm* work very well indeed with a 386 PC though you might need to experiment with *JVFAX*'s settings if your machine is equipped with a relatively slow ESDE hard drive (likely). The program saves data to the hard drive as it's being received. A slow hard drive can make the save process just that little bit too long with the result that the sync is lost and the picture is skewed. The trick is to reduce the number of concurrent save operations.

John Boult G4LOM of Seaham, County Durham, is struggling with an even older beast. He writes "I have a Compaq Portable II equipped with an 80286 microprocessor, a 5.25in disk drive and a 9in monitor. Unfortunately, I don't have the start-up disks 'User Diagnostics' and 'User Programs' which I believe are necessary to boot the machine".

That Compaq Portable II was a very desirable computer indeed when it first made an appearance around fifteen years ago, though back then it came with a list price of $3879! And I'm not entirely convinced that 'portable' is the right way to describe what is little more than a suitcase with a TV shoehorned into it! Try getting that out on your lap on the crowded commuter from Victoria and see how many friends you'd make - 'Luggable' is probably a better description.

Mind you, so many people liked Compaq's PC compatibles that the company became the first computer manufacturer ever to outsell IBM's own PC - a quite remarkable achievement at the time.

Of course, faced with a problem like this one, the first thing I do is get onto the Internet and have a good rummage around. Almost invariably there'll be someone, somewhere, who has an interest in just the model of computer that you're looking to support and who can supply (via FTP downloads) all the diagnostic and other disks. And yes, there were lots of sites devoted to Compaq's early portable, some with excellent information though none that I could find with downloadable disk images.

One of the better sites however was the Obsolete Computer Museum at **www.obsoletecomputermuseum.org/compaq.html** which features lots of pictures, a detailed specification for the machine and links to other support sites including **www.mdsbattery.co.uk/mdsold/im0214.htm** which sells the correct lithium battery to keep the Compaq's internal clock and system back-up running.

However, from the info. picked up at the various Compaq fan sites I feel sure that a simple DOS boot disk (i.e. one which has system files such as COMMAND.COM on it) will be perfectly adequate to boot the machine and then use it productively. I'm not aware that Compaq ever made 'weirdies' with strange boot-up requirements (unlike manufactures such as Apricot which always seemed to require strange software to get them running!). The Compaq sports a standard Intel 286 processor, standard Shugart-bus floppy, and standard PC-compatible BIOS so there shouldn't be a problem.

Hopefully the DOS 3.3 floppy I sent to John will do the trick and his machine will now be ready to go to work. That said, anyone out there with the original Compaq disks please get in touch and maybe we can make copies for John?

Web Watch

Visit Obsolete Computer Museum at **www.obsoletecomputermuseum.org/compaq.html**

www.mdsbattery.co.uk/mdsold/ im0214.htm sells the correct lithium battery to keep the Compaq's internal clock and system back-up running.

Contact Morgan Computers at **www.morgancomputers.co.uk**

Libretto Liberated!

And now from the ancient-but-usable to the relatively recent and really wonderful. About a year ago I spent the greater part of almost every instalment of 'ShackWare' raving about the Toshiba Libretto, a truly pocket-sized Pentium-based PC sporting an 850Mb hard drive, 16Mb RAM and a breathtaking TFT colour l.c.d. SVGA screen.

This computer finally filled a desire of mine to create a pocket decode station that I could take and use anywhere and it's fair to say that I probably bored my readers rigid singing its praises over many months!

Well, I've resisted for a while, but when an interesting letter from **Les Borthwick** of Hawick, Scottish Borders, fell through the letterbox (a lovely part of the world by the way) it was welcome back, Libretto!

"Would the Toshiba Libretto work with *JVFAX* and *Hamcomm* coupled to a Grundig Yacht Boy 400 or Sony ICF7600G, or would I have to purchase a full-sized computer?" asks Les. "I am very much a novice when it comes to decoding although I have been a short wave listener for many years. I would like to be able to decode SSTV, RTTY and c.w. Would I require a separate interface unit and do you know of a company that supplies these units? And is the Libretto still available?".

The Lib is perfectly suited to decoding using either program and a standard comparator interface - I know, because mine does it all the time! In fact, the Lib has an advantage over desktop machines in that the major source of electronic hash from the monitor is removed completely, the l.c.d. screen is positively silent, r.f.-wise.

Though equipped with a relatively slow P75 processor, the Lib is easy to modify using a technique known as 'overclocking'. By opening its case and making a few simple mods, mine now runs at 100MHz and it's possible to overclock all the way to 166MHz. Not fast compared with today's behemoths I agree, but plenty fast for a machine that sits in the palm of the hand!

Unfortunately, the Libretto 50 doesn't have a sound input port so although there's a standard SoundBlaster-compatible sound card for output inside the Lib, you can't use it with the latest crop of decode programs which dispense with an interface and use the PC's sound card. Instead, signals are input via a standard comparator interface - home-brewed or commercially available. You can, however, make another small mod. to install a sound input port. It's a bit 'noisy', but it works adequately.

As for a supplier, the Libretto 50 can often be had from surplus and end-of-line dealers such as **Morgan Computers** (which produces an excellent monthly 'flyer' full of old bargains). Contact Morgan on **(0870) 1204920**, or see the company's web site at **www.morgancomputers.co.uk** Buy one, Les, and I guarantee you won't be disappointed.

And with that, it's goodbye from me and good listening until next time.

RADIOWORLD

(WEST MIDLANDS)

42 BROOK LANE
GREAT WYRLEY, WALSALL
WEST MIDLANDS WS6 6BQ
WE ARE 5 MINS AWAY FROM J11 M6

SALES & SERVICE TEL: 01922 414796
FAX: 01922 417829

SERVING THE WEST MIDLANDS!

Email: radio.world.world@virgin.net
Visit our website at http://freespace.virgin.net/radio.world

TELEPHONE SALES ON: 01 922 41 47 96

Ask for Dave (G1LBE)
Open Mon-Fri 9.30 - 6.00pm. Sat 9.30 - 4.00pm

WEB SITE
http://freespace.virgin.net/radio.world
E-mail
radio.world@virgin.net

There is NO CHARGE for using credit cards

WANTED USED EQUIPMENT
PX WELCOME
BEST PRICES PAID!

AOR

AR5000

AR3000A

ICOM

PCR1000

PCR100

Model	Description	£ RRP inc VAT
AR5000	High performance full featured wide band all mode base receiver 10kHz - 2600 Mhz. IF selection as standard 220kHz, 110kHz, 30kHz, 15kHz, 6kHz, 3kHz (500Hz optional). Supplied with mains power supply.	£1228.00
AR5000+3	High performance base receiver with three enhanced options factory fitted: noise blanker, synchronous AM, automatic frequency control.	£1445.00
AR3000A	Unique all mode extremely wide band base-mobile receiver 100kHz - 2036mhz with no gaps. RS232 port fitted.	£679.00
AR3000A +(plus)	Customised AR3000A with switchable narrow SM & SAT filters, Tape relay, SDU ready and discriminator output.	£764.00
AR8200	New advanced wide band all mode hand-held receiver with enhanced microprocessor facilities, slot card options available, multi-function display.	£339.00
AR8000	The New Concept. Wide band all mode hand-held receiver with many microprocessor facilities, dot matrix display and computer compatibility.	£296.00
ICOM R2	0.1300mhz Handie. Fits in the palm of your hand. AM/FM, FM Narrow - 450 memory channels	£139.00
IC R8500	100kHz - 2GHz Continuous. All mode no gaps.1000 Memories. 4IF band widths Excellent all round for the professional listener	£1440.00
IC-R75E	0-60MHz. High Stability receiver circuit 100 DB Dynamic range. Twin bandpass Tuning. Optional digital processor. Best selling receiver	£629.00

IC-PCR1000 & PCR 100
ICOM PCR1000 - 0-1300mhz. All modes. Computer driven. On screen programming. Band scope. Instant band scope access via mouse. List of features, call for brochure.
PCR 1000 £299.00, PCR 100 £199.00 (SAME SPEC WITHOUT SSB)

THIS IS JUST A SMALL SELECTION OF OUR STOCK!!!

FINANCE NOW AVAILABLE. PHONE DAVE FOR DETAILS!

GARMIN GPS (GLOBAL POSITIONING SYSTEMS) & ACCESSORIES

PHONE FOR DETAILS

GPS-12 GPS receiver (no external antenna) 12 parallel	124.95
GPS-12XL GPS receiver c/w carry case 4 x AA alkaline batteries 12 parallel	189.95
GPS-12CX GPS receiver Europe city point database 4 colour screen	259.95
GPS-11PLUS GPS receiver rotatable screen c/w velcro mount 12 parallel	215.95
GPS-111 GPS receiver c/w velcro mounted international base map 12 parallel	289.95
GPS-48XL GPS receiver good for marine use 12 parallel	249.95
GA-26 Active low profile antenna c/w 8' cable BNC mag/suction for 2/2+/3/45	54.95
GA-27 Active low profile antenna c/w 8' cable MCX mag/suction for 12XL.40	54.95
GA-28 Active low profile antenna c/w 30' cable BNC for GPS-2/2+.3.45XL	79.95
010-10121-00 MCX to BNC adaptor for GPS-12XL/40/	14.95
010-10117-00 Carrying case for GPS-2/2+/3/12/12XL38/40	9.95
010-10051-00 PC4X/6X software & PC interface cable 2/2+/3/12/12XL/38/40/45XL	69.95
101-10048-00 Adjustable swivel/surface mount for GPS-12/12XL/38/40/45XL	17.95
101-10111-00 Dash/surface mount for GPS-2/2+/3	17.95
101-10122-00 Bicycle/handlebar mount kit for GPS-2/2+/3	11.95
010-10156-00 Swivel mount bracket for GPS-2/2+/3	13.95

We also stock all makes of antennas:- **Cushcraft, Diamond, Sirio, Watson, Pro-Am, etc.**

ICOM YAESU KENWOOD ALINCO AOR

YUPITERU

YUPITERU MVT 9000 EU

Yupiteru's flagship model, with a range exceeding 2000mhz, a real time bandscope.

- 531 kHz - 2039 Mhz
- 1000 memory channels
- All modes: W-FM, FM, N-AM, AM, LSB, USB, CW
- Multiple scanning steps 50Hz - 125kHz
- Alpha numeric display
- Band scope with marker function for direct access to displayed frequencies
- Duplex receive capability - hear split frequency signals easily with VFOs
- 20 search bands
- Fast tune facility gives 10 times function for quick tuning
- Built-in ferrite rod antenna for AM broadcast reception
- OP90 Soft Case

YUPITERU MVT 3300EU

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

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

YUPITERU MVT 7100 EU

Probably the most popular high end Scanner. It's easy to use and can receive just about anything going!

- 530kHz - 1650mhz
- AM/FM/WFM/SSB/CW
- 1000 Memories
- C/W N/Cads & charger
- OP51 Soft Case £17.95 + £2 p&p

£££...phone for details

USED EQUIPMENT PRICE LIST

MAKE	MODEL	PRICE
AEA	PIC 232 MBX TERMINAL	£169.00
ALINCO	DR-140 2M FM	£159.00
ALINCO	DR-MO6 SX 6M FM	£159.00
ALINCO	DR-M06 6M	£180.00
ALINCO	DX-70T 6M HF	£499.00
AOR	AR-3000 BASE SCANNER	£395.00
DRAKE	SW8 RECIEVER WORLD BAND	£275.00
ICOM	PS-15 PSU 20 amp	£120.00
ICOM	AT-150 AUTO ATU FOR THE IC-735	£175.00
ICOM	IC-X21ET DUAL BANDER 23/70CM HANDIE	£225.00
ICOM	IC-T8E 2 m 70m & 6m HANDIE	£230.00
ICOM	PCR-1000 PLUS DSP	£285.00
ICOM	AT-500 ATU	£295.00
ICOM	IC735 General Coverage	£425.00
ICOM	IC-725 TRANSCEIVER PLUS FM	£450.00
ICOM	IC-735 TRANSCEIVER	£450.00
ICOM	IC-275E 25W MULTI/MODE	£550.00
ICOM	IC 706 Mk1	£599.00
ICOM	IC-737 BASE TRANS, INC TUNER 0-30MHz	£600.00
ICOM	IC-275H 100W 2M MULTI MODE	£650.00
ICOM	IC-706MK 11 DSP TRANSCEIVER	£650.00
ICOM	IC -821 DUAL BAND BASE	£750.00
ICOM	IC-2KL AMP + PSU 0-30MHz SOLID STATE	£895.00
ICOM	IC-746 HF/VHF	£999.00
ICOM	IC-970H P/S WIDE RECEIVE 900MHZ	£1,495.00
KANTRONICS	KPC-4 DUAL PORT TNC	£130.00
KANTRONICS	KAM PLUS TNC	£220.00
KENWOOD	AT-230 ANTENNA TUNER 0-30Mhz	£140.00
KENWOOD	TH-G71 LATEST DUAL BAND HANDIE	£200.00
KENWOOD	V7E DUAL BANDER	£350.00
KENWOOD	TM-V7E 2 AND 70 DUAL BAND TRANS	£395.00
KENWOOD	TS-811E TRANSCEIVER 70cm BASE / AC	£395.00
KENWOOD	TS-140S HF/0-30MHz TRANSCEIVER	£400.00
KENWOOD	TM-255E 2M MULTI MODE	£500.00
KENWOOD	TS-440 SAT TRANSCEIVER	£525.00
KENWOOD	TS-850 TRANSCEIVER 0-30MHz	£695.00
KENWOOD	TS-690SAT TRANSCEIVER HF +50MHz	£725.00
KENWOOD	TS-690 AT HF/50MHz	£725.00
KENWOOD	TL-922 HF AMP	£850.00
KENWOOD	TS-850SAT TRANSCEIVER 0-30MHz	£895.00
KENWOOD	TS-790 BASE DUAL BAND	£900.00
KENWOOD	TS-870 SAT 0-30 DSP	£1,200.00
KENWOOD	TS-950SDX 2 YEARS AS NEW	£2,250.00
MFJ	784B DSP FILTER	£140.00
MFJ	784 TUNABLE DSP FILTER	£150.00
NETSET	PRO-2032 BASE SCANNER	£95.00
REALISTIC	DX-394 AS NEW HF	£90.00
REALISTIC	PRO-2045 BASE SCANNER	£120.00
SGC	230 SMART TUNER	£200.00
SGC	2020 10W MULTI MODE HF	£325.00
UNIVERSAL	M-8000 TERMINAL	£500.00
WELZ	SD 400 SWR METER	£49.95
YAESU	SP-8 SPEAKER for 1000MP etc	£80.00
YAESU	FT-10 HANDIE 2M	£100.00
YAESU	FT-11 HANDIE 2M	£100.00
YAESU	FT-10 2M HANDIE	£125.00
YAESU	FT-11 2M HANDIE	£140.00
YAESU	FC-20 ATU FOR FT-847	£175.00
YAESU	FC-757 AUTO ATU	£175.00
YAESU	FT-2700RH DUAL BAND TRANSCEIVER	£175.00
YAESU	FT 290R 2m Multi Mode	£195.00
YAESU	FT-790R 70CM TRANSCEIVER	£200.00
YAESU	FT-3000M 2 METER 70W	£200.00
YAESU	FT-8000R DUAL BANDER	£225.00
YAESU	FT-51R DUAL BAND HANDIE	£249.00
YAESU	FT-8100R DUAL BANDER	£250.00
YAESU	FT-8100 USED	£275.00
YAESU	FT-6200 DUAL BANDER 23/70 CM	£295.00
YAESU	G 1000SDX ROTATOR	£295.00
YAESU	FT 290R MK11 INC AMPLIFIER 25WATTS	£325.00
YAESU	FT 8500 Dual Band	£325.00
YAESU	FRG-100 MINT CONDITION WITH PSU	£350.00
YAESU	FRG-100 FM KEY PAD	£350.00
YAESU	FT-747 TRANSCEIVER	£350.00
YAESU	FT-757GXMK11 TRANSCEIVER	£450.00
YAESU	FT-840 0-30MHz TRANSCEIVER	£495.00
YAESU	FT 840	£500.00
YAESU	FT 890 HF Gen "as new"	£600.00
YAESU	FT-736 2/70 AC TRANSCEIVER	£695.00
YAESU	FT-990AC	£895.00
YAESU	FT-920 AF TRANSCEIVER	£999.00
YAESU	FT-1000 MP DC AS NEW	£1,400.00
YAESU	FT-1000MP AC	£1,500.00
YAESU	FT-757GXMK1 TRANSCEIVER	£400.00
YUPITERU	MTV-9000 AM/FM/USB/LSB/CW SCANNER	£245.00

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

Airband

Immediately on publication of this issue, events are expected to take place at (in June) Waddington (22-25), Cranfield PFA Rally (23-25) and Weston Beach, Southampton, *Seawings 2000* (24) also involving Lee-on-Solent. Before travelling to an event, make sure that it's still on!

I hope to go to Cranfield but there's no time to make arrangements for meeting readers! If you're there, I suggest putting out a public address announcement for me, early afternoon. Frequencies will be: hard runway 130.675, grass runway 134.925, arrival ATIS 122.85, departure ATIS 121.875MHz (see *AIC* 18/2000 from the CAA).

One clue as to the planning of a major event is Temporary Restricted Airspace. Dial the free number **(0500) 354802** after 1900 local the night before and the recorded message will list any restrictions. If the Red Arrows are performing, they are usually mentioned.

Unfortunately, some details of events are announced too late for me to forewarn you in this column. During the Mildenhall Air Fête (May), overflying aircraft contacted Lakenheath 128.9 or 264.675MHz, note this for future reference. At North Weald, the Air/Ground frequency 123.525 becomes ATIS and 121.175MHz is Tower during events, as happened at the Aerofair in June (*AIC* 11/2000).

Abbreviations

ACARS	Aircraft Communications Addressing And Reporting System
AIC	*Aeronautical Information Circular*
AIP	*Aeronautical Information Publication*
ATIS	Automatic Terminal Information Service
BNC	Bayonet/Baby Neill Concelman
CAA	Civil Aviation Authority
CD-ROM	Compact Disc - Read Only Memory
f.m.	frequency modulation
GASIL	*General Aviation Safety Information Leaflet*
GHz	gigahertz
h.f.	high frequency
kHz	kilohertz
MHz	megahertz
STAR	Standard Terminal Arrival Route
u.h.f.	ultra high frequency
v.h.f.	very high frequency
W	watts

Luton Visitors

Chris and I recently revisited Luton Airport after a long absence. What a change! Where spectators once stood is now a cutting leading into a tunnel beneath the taxiway from Main Apron. The old spectators' building has been given over to easyJet as their offices. Now I know that this company has a huge share of movements at Luton, but you would have thought that such an important airline could have arranged its own buildings.

Presumably easyJet have an h.f. network as an inverted-V wire antenna has appeared over the building. Strange how similar in construction it is in comparison with typical amateur band antennas.

The trouble is that spectators now have nowhere! They still turn up, of course, but my suggestion is that they will become a nuisance unless proper provision is made. Mind you, the high cost of even the short-term car-park will deter many.

Emergency

Despite all these years studying the subject, it only occurred to me recently that the u.h.f. distress frequency (243) is the second harmonic of the v.h.f. one (121.5MHz). I must be getting slow on the uptake in my old age. Perhaps the idea is to protect the u.h.f. channel from second harmonics. The only ones that pose a threat are from 121.5, itself only intermittently used (I'm pleased to say!). Also, it would have been easy in earlier times for a single transmitter to cover both frequencies by harmonic multiplication, in the same way as the original h.f. amateur bands go up in harmonic multiples.

Our marine colleagues have Channel 16 (156.8MHz f.m.) as their distress (and calling) v.h.f. allocation. Air-sea rescue helicopters are also equipped with this. The adjacent channels (75 and 76, 25kHz spacing) are 156.775 and 156.825MHz and type-approved marine equipment is incapable of operating on these. They are the guard bands, preventing adjacent-channel interference from affecting Channel 16. For good measure, the next channels removed a further 25kHz either side (15 and 17, 156.75 and 156.85MHz) are restricted to low power (1W instead of 25W).

Cap-10. *Christine Mlynek.*

Receiver Hardware

What do you get the person who has two scanners? A second antenna? Not always a practical proposition! There might be good reason for operating both sets at once, for example, both the marine and air bands might be active when co-ordinating a rescue at sea, as suggested above.

If only one antenna is available, it is necessary to divide its incoming signal equally between the two receivers, not to disturb the characteristic impedance of the system, and to isolate the two receivers so that they don't hear each other's internal oscillators. Certainly, expensive power-splitter devices are on the market and it is also possible to make your own.

My attention was caught by a cheap little device at a rally. Intended for feeding a satellite dish to multiple receivers, it was broadband enough to work at v.h.f. too. Unfortunately, the satellite industry has standardised on F-type connectors and most scanners are BNC equipped. With the necessary adapters and leads, it seemed to work quite well despite placing some attenuation in the signal path.

As this was a rally one-off special, I wasn't going to mention it. Then I saw a similar device in the latest Maplin Electronics catalogue (usually available through larger newsagents). Catalogue number BM90X splits one antenna to two receivers (or *vice-versa*) over the range 5MHz to 2GHz. Cheaper than some other offerings, even when you add the cost of three F-type to BNC adapters (catalogue number FE87U).

Why would someone connect two antennas to one scanner? For broader coverage, for example a specialised narrowband v.h.f. antenna and another for u.h.f. serving a single wide-band scanner.

If you do try this device, I stress that it will be experimental depending on individual circumstances. Do let me know how you get on.

ACARS

This system exchanges short bursts of data between aircraft and ground on v.h.f. It means that an aircraft can report its airborne time automatically so that the company's operations department know if flights are running to schedule. The standard European frequencies on which such data is allowed are 131.45, 131.525, 131.725 and 136.9MHz but **Paul Fineman** (22 Wagtail Way, Orpington, Kent BR5 3NB) claims to have found 134.9 and 135.05 as well. Could these be new allocations?

Paul would like to compare notes with other readers' experiences of ACARS, please write direct to him and **not** via me if interested. He's also on E-mail (**paulfineman@hotmail.com**).

Please note my policy, though, of insisting on a conventional address as an alternative to E-mail. Not everyone wants, has, or can afford a computer and an E-mail account. I can see tendencies even now towards a

Continued on page 66

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

DX Television

April was another bad month for DX reception with only Meteor-Shower snatches to save the day. There was an upturn in conditions towards the end of the month with a Sporadic-E opening signalling the start of the new season.

Reception Reports

Auroral activity on the 6th gave a spectacular visual display across the northern horizon from around 2100. The Northern Lights were observed in the south of England by **Simon Hockenhull** (Bristol) and **Roger Bunney** (Romsey), but there was little evidence of reception in Band I. F2 activity seems to have dwindled with the m.u.f. barely clearing 30MHz, according to Simon.

A Sporadic-E opening was witnessed on the 28th by **Peter Barber** (Coventry). At 1352 a circus appeared on Channel IA (53.760MHz) from RAIUNO, identified by the logo in the lower right of the screen. Later, an opening to Spain occurred with a feature film and adverts from TVE-1 on Channel E3.

The Mendip transmitter and its dependants were off-air on the 3rd which freed several u.h.f. frequencies. **Stephen Michie** (Bristol) took advantage of the situation and was able to log all Sandy Heath channels. Normally, the Siston relay occupies three of these channels except 27. All Hannington channels were receivable as the Bristol Kings Weston relay was also off-air. When Mendip returned, the teletext displayed the BBC South region, rather than BBC West.

Slow-Scan TV

George Dowding (Birmingham) writes: "I am 75 years old and a very keen s.w.l. since the mid-thirties, having read *SWM* since the early fifties when it was the old format. First, a little on how I became involved with SSTV. I lost my hearing in one ear some 30 years ago, so s.w.l.s will imagine the more I turn up the sound, the worse the noise. I was about to give up s.w.l. when I came across a very informative article in a magazine dated April 1996 by John Cramond GM4NHI. Although there seems to be very little reading material available entirely devoted to the subject, the following publications may be of interest:- *Short Wave Listeners' Guide* (by Ian Poole with only a short item about SSTV); *Newnes Radio Amateur & Listeners' Data Handbook* (this includes a little more about SSTV); *Beyond The Broadcast Bands* (Richard Wilmot CW3RRI. This is very informative and a 'must' for the beginner)".

For receiving SSTV signals, a good communications receiver is advisable, covering the h.f. bands up to 30MHz and, if possible, 2m (144MHz), as there is some SSTV on this frequency. George uses an Icom R8500 receiver and also a Yaesu FRG-100.

A PC is required, at least 486 and running *Window 95/98* for best results. A demodulator is required which is connected between the line input of the PC and the audio output of the receiver. The demodulator can be obtained from Pervisell Ltd. as advertised in *SWM*, but if one has a sound card this can give better results.

After a number of years of s.w.l. inactivity, **Paul Crankshaw GM7VXR** (Troon) has finally discovered software for his Apple Mac. Unlike the PC, which requires an interface, the radio receiver output is plugged straight into the computer. The software Paul is using is *Multimode* and can be downloaded from **http:/www.blackcatsystems.com/software/multimode.html**

The shareware programme costs $89 to be registered, but it is fully operational, free of charge, although it closes down approximately every 30 minutes. Paul has received SSTV on 14.230, 21.340 and 28.680MHz. Some of Paul's 'exotic' catches are featured this month.

Hungarian FM Local Radio

Lázlo Kozári (Hungary) has sent details of local radio stations, some of which populate the former OIRT f.m. band. These may be worth keeping an ear open for during the Sporadic-E season. These as follows:-

MHz	W		
66.11	100	GYÖNGYÖS	Saturnus Radio
67.52	50	SZOMBATHELY	Local Radio-Szombathely.
67.88	50	VESZTPRÉM	Rádio Jam am/Radio Frankonia pm
68.99	50	VÁC	Intact-Studio Radio Vdc.
69.00	50	ZALAEGERSZEG	Gócsej Rádio
70.88	50	NYIREGYHÁZA	Jonatán Rádio am/PB Rádio pm
71.63	50	BUDAPEST	Rádio 11
72.41	100	DEBRECEN	Hajdusági Rádio/Szola Radio

In addition, there is a new local f.m. station operating in East Budapest. It is on 69.83MHz and is called RÁKOSMENTI. Its t.r.p. is 150 to 250W.

More On DAB

The DAB debate continues! **Owen Partridge** (Brentwood) suggests that DAB should stand for 'Dead And Buried' but the broadcasters are persevering with it, it seems. There are two main obstacles as far as the general public is concerned, the first being cost. With a cheap and cheerful analogue f.m. radio costing as little as £6, how can DAB ever hope to match this?

Secondly, the 96kbit/s signal is compressed audio and is technically incompatible with other compression systems such as the Mini-disc and MPEG-3 formats. This means that you cannot record DAB broadcasts with either system without the results being very disappointing. Even if a digital link between receiver and Mini-disc or MPEG-3 is used, the problem remains. If a receiver is required as part of a home system, then uncompressed digital radio is broadcast via Sky satellite.

From purely a listening point of view, **George Garden** (Edinburgh) had a DAB

Fig. 1: SSTV reception by Paul Crankshaw of 9A3TB from Zadak in Croatia.

Fig. 2: Paul's reception of SSTV amateur CN8KD operating in Rabat.

Fig. 3: CU3ET from the Azores, received by SSTV enthusiast Paul Crankshaw.

DXTV Log For April

This month's compilation of reception reports has been supplied by Stephen Michie and Peter Barber. All times are shown are in UTC. Abbreviations: MS = Meteor-Shower propagation, SpE = Sporadic-E.

Day	Log
2	0738 E3 Unidentified programmes via MS.
4	Tropospheric reception: UK TV and f.m. signals.
5	Tropospheric reception: UK TV and f.m. signals; 0944 IA RAIUNO (Italy) programme via MS.
10	0732 E3 NRK (Norway) or SVT-1 (Sweden) PM5534 test card via MS.
13	0732 E3 Unidentified programmes via MS.
14	0707 Unidentified programmes via MS.
15	0749 E3 Unidentified cartoons via MS.
18	0715 E3 DR-TV (Denmark) PM5534 via MS.
21	0943 Unidentified programme via MS; 0854 IB RAIUNO programme via MS.
22	0743 E3 Unidentified cartoon via MS (also at 0745); E2 Unidentified programmes via MS.
26	0656 E3 DR-TV PM5534 via MS (also at 0727).
28	0929 E3 Unidentified programmes via MS; 1333-1350 IA RAIUNO programmes via SpE; 1516-1620 E3 TVE-1 (Spain) programmes via SpE.

Fig. 4: News programme broadcast by the state-owned TV service in Egypt.

demonstration via the Arcam Alpha 10 Digital Radio Tuner and was quite impressed. The digital signals came from Kirk O' Shotts (the old BBC-1 405-line Channel B3 transmitter). Its e.r.p. is 10kW and this seems to be the maximum output used for digital broadcasts. Scotland has only this transmitter listed in the *Radio Listeners' Guide* 1999 Edition, although the 2000 Edition also lists Craigkelly, but without e.r.p. details.

Fig. 5: Weather forecast from the TV service in Syria with the L-shaped 'Syria' identification in the lower left-hand corner of the screen.

Anyone Remember Twizzle?

In the April issue we featured the ITA tuning caption used in the London area. In those far-off 'good old days' of television, the test card was shown until almost 5pm. **Godfrey Manning G4GLM** (*SWM* 'Airband' Column) has written to say that he certainly remembers the caption and recalls the announcer proudly stating 'This is the Independent Television Authority broadcasting from Croydon on Channel 9'.

Godfrey also recalls a children's programme about a little boy with a space rocket called 'Sparky' (the boy, not the rocket) and another show for younger viewers called 'Twizzle'. This apparently had a catchy song which included the lyric 'Bink, bonk, the nails go in, then I had a nut, then I had a screw'. It seems that Twizzle was a toy mender. Does anyone else remember 'Twizzle' or even 'Torchy' (the 'Little Battery Boy') with Pom Pom the poodle who liked chocolate sauce? And, of course, there were Snip and Snap to entertain us on Sunday afternoons. None of this has anything at all to do with DXTV, but it's all fascinating TV nostalgia! Not that *we* remember any of it, of course!

Service Information

Hungary: All v.h.f. TV transmitters will remain in operation until at least 2002, according to Lázslo Kozári (Hungary). The Channel R1 Nagykanizsa transmitter (MTV-1) is still on-air and is located on Ujudvar Hill (201m). The RTL KLUB commercial TV broadcasts on Channel R2 originate from Pecs/Misina-Teto (534m). There are many transmitters at u.h.f. operating in parallel with v.h.f. outlets.

Latvia: Gösta van der Linden (Netherlands) has sent a list of TV transmitters (all horizontally polarised) using channels in Bands I and II. These are as follows:-

Channel R1:	Kuldiga 10kW (LVT-2).
Channel R2:	Sabile 10W (LVT-2), Vilanu 10W (VILANU TV), Preili 15W (LNT),Ogre 100W (OGRES), Kraslava 8W (KRASLAVA TV).
Channel R3:	Riga 150kW (LVT-1). New TV transmitters: R22: Aluksne 10kW (LVT-1), R33: Jelgava 120kW (ZENGOLES TV), R43: Riga 5.6kW (TV RIGA).

Fig. 6: In this month's 'Down Memory Lane' nostalgia corner we feature the logo used by Rediffusion in London during the late Fifties.

Keep On Writing!

Please send your DXTV, slow-scan TV and f.m. reception reports, news, off-screen photographs and information to arrive by the first of the month to:- Garry Smith, 17 Collingham Gardens, Derby DE22 4FS. We can also use off-air pictures stored as JPG files on PC disks and good-quality video recordings.

Airband

Continued from page 64

divided society: those with and those without such electronic means. Personally, I can also see that an enthusiastic computer owner might still eschew E-mail because of the fear of viruses and other security risks. Conventional communication is still good and cheap within the UK, long may it last - it's served us well so far!

Paul wants to know the location of some reporting points and, as he obviously has access to a computer, might be interested to know that this sort of information is on the *AIP* on disc, page ENR 4-3 (see below). All reporting points are made-up names consisting of five upper-case letters (it suits flight-planning computers, apparently!).

HAZEL is on airway R8 near Basingstoke. TIGER is on T420 between the Biggin Hill beacon and the coast. TIMBA is on Gatwick STAR procedures between the airport and Beachy Head. SANDY is on A2 and London STARs between Lydd and Dover.

Frequency & Operational News

GASIL 2 of 2000 from the CAA lists Liverpool's new ATIS as 124.325MHz.

Martin Sutton (CAA) kindly sends the *AIP* amendments which show a new airway, UY92 (conditional route) running along the Severn Estuary from NOSDA (new reporting point also on UG1) via BUNCE, TAMEL (also new), to EXMOR (also on UA25). I only summarise here, but if you need more detail then please write in and I'll print the information in the next available issue.

Will any future 'privatisation' of the air traffic control system have operational consequences? A respectable body of opinion fears that it will and, if you share this view, a letter to John Prescott at the Department of the Environment, Transport and the Regions is suggested by an actual air traffic controller. Thanks to **Mike Riach** (Kendal) who forwarded an E-mail that this controller has promulgated.

Air traffic control charges are currently directed to the operator either through the three-letter flight number (e.g. BAW for British Airways) or the aircraft registration. Makes profit-taking sound easy. However, lessons from recent rail crashes come to mind when safety is debated. Would a 49% holding, retained by the Government, be enough to ensure the safety of air traffic control?

Information Sources

You don't need to struggle to keep up with UK aeronautical information as the *AIP* has now been released on CD-ROM. There are 13 issues per year (every 28 days) and the annual subscription is £88.13 including postage and VAT. That's one disadvantage, cost, but it's much cheaper than the old paper version and *AIC*s are included on the disc, thus saving a separate subscription if you are interested in them too.

Also, of course, it's no good unless you have a computer. If you want to order, the CAA sales agent is Westward Documedia whose address is on *Airband Factsheet*. To get that, send a pre-paid self-addressed envelope (to hold two A4 sheets and marked '*Airband Factsheet* Request') to the Broadstone editorial offices (**not to me!**).

Next month I shall answer letters from **Rodney Hale** and **E. Satyan**. All other letters received up to May 10 have been answered. The next three deadlines (for topical information) are July 10, August 7 and September 12. Replies always appear in this column and it is regretted that **no** direct correspondence is possible.

Beech Staggerwing. *Christine Mlynek.*

■ LAWRENCE HARRIS, 5 BURNHAM PARK ROAD, PEVERELL, PLYMOUTH, DEVON PL3 5QB
■ E-MAIL: info.orbit@pwpublishing.ltd.uk ■ WEB SITE: http://www.itchycoo-park.freeserve.co.uk

Info in Orbit

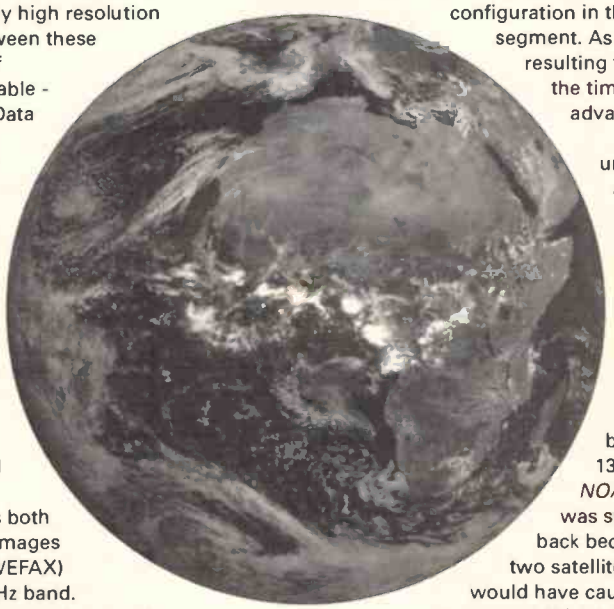


Fig. 1: PDUS unencrypted AV format image - *METEOSAT-7* 18 April 1158UTC.

Most days of the week I view the pictures from GOES-east and GOES-west using my high resolution PDUS system. In between these images, a selection of encrypted - non-viewable - METEOSAT Primary Data images is displayed. GOES images always have some dramatic features, maybe a typhoon, tornado or just bad weather over the Pacific, and I never tire of looking at them.

Newer readers could be puzzled by the statement 'encrypted - non-viewable', so I should mention that METEOSAT transmits both high resolution (PD) images and low resolution (WEFAX) images in the 1690MHz band. WEFAX images are free-to-air to receive, but PD images are almost all encrypted and therefore non-viewable without a decoder.

A EUMETSAT decoder costs about 700ECUs and an additional interface unit for your computer is required. Just occasionally, things go wrong at EUMETSAT. When this happens, they temporarily stop encrypting PD images, allowing us to see full resolution pictures of Britain and Europe.

During April, encryption temporarily ceased, so I quickly fired up my PDUS system. Image after image came in, clear as a bell.

Figure 1 shows the highest resolution, full disc visible-light image transmitted, known as AV format. It is normally encrypted, yet is the only such image produced each day.

Fig. 2: *RESURS 01-N4* image 10 May 1057UTC.

Unusually, the images remained unencrypted for about three days. I contacted EUMETSAT to find out the nature of the problem that was allowing us to view the images properly. "EUMETSAT only ever halts encryption when technical problems with the ground segment cause us to switch from nominal operations to emergency operations. In this instance, the output lasted for several days. Such emergency circumstances can, unfortunately, not be predicted. EUMETSAT does not have any intentions to alter its current data policy with respect to the encryption of HRI data. I am glad that you were able to enjoy the additional HRI data while it lasted".

A further response from a different spokesperson was received a few days later: "In response to your E-mail you sent to 'wxsat' - I would like to explain that the dissemination of unencrypted Meteosat formats is usually caused by the activation of a backup configuration in the EUMETSAT ground segment. As these instances are often resulting from failures of equipment the times cannot be announced in advance".

Is it not an irony that only under 'problem' conditions are we permitted to view the images produced by METEOSAT - a satellite paid for by European tax-payers?

Current WXSATs

All praise to NOAA! To avoid the v.h.f. conflict between transmissions on 137.50MHz from *NOAA-12* and *NOAA-15*, a.p.t from *NOAA-12* was switched off some months back because footprints from the two satellites began to overlap, and would have caused interference. Re-activation of *NOAA-12*'s a.p.t. was scheduled for mid-September, by which time the footprints were estimated to be sufficiently separated.

Meanwhile, high resolution transmissions continued because they are not affected in the same way. An E-mail in the 'wxsat-l' forum pointed out that the footprints had actually separated by around 10 May, and asked whether NOAA might consider bringing the date forward. Within a few hours, NOAA replied with the announcement that *NOAA-12*'s a.p.t. transmissions would resume on 17 May. Who could ask for more?

Images from *RESURS 01-N4* have been somewhat variable recently, at least as far as reception here has been concerned. Signal strength was originally consistently high, leading to good images, mostly interference-free for me.

Just a few weeks ago, I noticed that reception had degraded, and this was also reported by others on the Internet WXSAT lists. Without noticing the exact date, images recently appear to have returned to normal - as shown in this contrast expanded image - see **Fig. 2**. The following pass, received at 1235UTC, was also good, indicating a consistent signal.

METEOR 3-5 has also provided a variable quality image, at least as received by me. Line jitter spoiled some images, but, again as noted by correspondents to the Internet forums, quality suddenly improved. Close study of current images - see **Fig. 3** - shows little evidence of problems. The fog that enveloped the southern coastal regions on the evening of 13 May is clearly seen in this picture.

Correspondence

A letter from **Erwin Jung** of Dumfries dated January was inadvertently covered with some of the large magazines that I receive from various organisations, and discovered in May - sorry Erwin! He has an interest in satellite television and noticed an advert for a German METEOSAT decoding system called the Grundig MST 100.

The unit receives METEOSAT WEFAX on a 550mm dish and displays the images on a television. Erwin expressed surprise at my not having mentioned the unit before - this is because this is the first time that I have heard of it, and perhaps it is mostly advertised in Germany.

I suspect that many potential users of METEOSAT WEFAX could well be unfamiliar with non-UK producers of WEFAX/a.p.t hardware. *Short Wave Magazine* carries regular advertisements from precisely one UK supplier.

Fig. 3: *METEOR 3-5* 1058UTC 14 May.

George Newport regularly provides images for this column. The early afternoon pass at 1356UTC on 29 April - see **Fig. 4** - shows Britain approaching the end of another record breaking episode of monthly rain - this time April. As seen in this image, much of Europe remained under sunny skies during our daily downpours!

Frank Flanagan lives in Wexford, Ireland, and having been a reader of *SWM* for many years with an interest in scanning, recently delved into WXSAT monitoring. He found WX decoding fascinating, to the extent that he purchased a PC in February, and then a PCR1000 in March. This left Frank 'financially depleted' and without an antenna.

Les Hamilton (software 'guru' on the committee of the *Remote Imaging Group*) came to Frank's rescue, sending him a diagram for a quadrifilar helix antenna (QFH) made out of electrical conduit. It cost £12 to make, including the RG-58 feed to the PCR1000. Even without mounting this on the roof, Frank has received some "half-decent images from the clothes-line"!

Surrounded by houses on all sides, Frank sent an image - see **Fig. 5** - "to give a bit of encouragement to any other beginners contemplating building their own QFH". Coincidentally, Frank's picture is from the pass that followed George's. Comparison of the two shows cloud features having moved marginally during the period between the two orbits of *NOAA-14*.

A few days after George sent **Fig. 4**, he was monitoring a westerly pass of *NOAA-15* during its travels over Greenland and wondered whether the iceberg indicated in the picture, was breaking off. This is an interesting observation that is carried out in earnest by America's Operational Significant Event Imagery Support Team (OSEI) - **http://www.osei.noaa.gov/** - that monitors a variety of events, including breaking icebergs. They recently re-styled their web site and have stopped using frames in order to provide more space to show their products.

Maps have also been added to facilitate identification of regions. In mid-May they issued an E-mail noting that three massive icebergs had broken from the Ronne Ice Shelf in the Weddell Sea - see **Fig. 7**. The picture is a multi-channel colour composite, high resolution image of about 1.1km resolution, recorded by *NOAA-14* on 7 May.

Beginning In WXSAT Reception

Looking at some recent correspondence convinced me that a piece on getting started should be provided a little more often than I usually do. A writer from Dudley in the West Midlands told me of his list of purchases that he had believed would get him into direct satellite reception, before he came across *Short Wave Magazine*.

He originally used his radios and scanner to receive transmissions from Bracknell, and these were decoded via a soundcard on his computer. These terrestrial broadcasts of selected WXSAT pictures are obtained at a UK ground station and transmitted from Bracknell. The antenna used for reception from Bracknell, need be little more than a random length wire.

The magazine that our writer had read (not *SWM*!) apparently claimed that pictures from the satellites themselves could be obtained by simply upgrading the antenna. He therefore bought a Qtek WSK2000137MHz antenna (I confess to not being familiar with this brand) but still found himself unable to receive any images using his PRO-26 scanner. It seems that he then bought another computer to get on the Internet (ouch!).

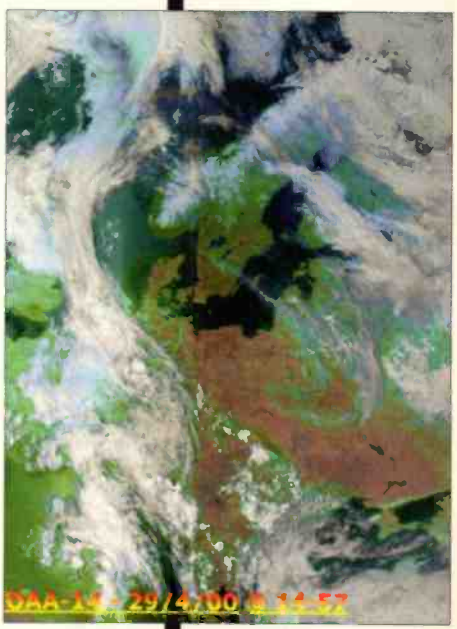


Fig. 4: *NOAA-14* 29 April early afternoon pass.

Fig. 5: *NOAA-14* 29 April late afternoon pass from Frank Flanagan.

First, the Internet. I have been providing courses on the Internet for about five years, and if there is one thing that I have learnt from those who attend, it is that the information given by computer sellers is frequently outrageously inaccurate. Perhaps in an effort to sell more machines, a common claim is made that one requires a high speed Pentium, huge hard drive and oodles of RAM.

In practice, the main requirements are sufficient RAM to run the *Windows* operating system (OS) - say *Windows 95* - comfortably (perhaps 32Mb) and a modem. *Windows 95* has sufficient features to make Internet connection a relatively easy process - though later versions are even better.

Older operating systems (*DOS* and *Windows 3.1*) can still be used to make a connection, but they are more cumbersome to set up. Processor speed is not usually a factor unless you are using a 'win-type' modem. These are modems that parasitically use the processor for data transfer instead of being fitted with

Fig. 6: *NOAA-15* 2 May from George Newport.

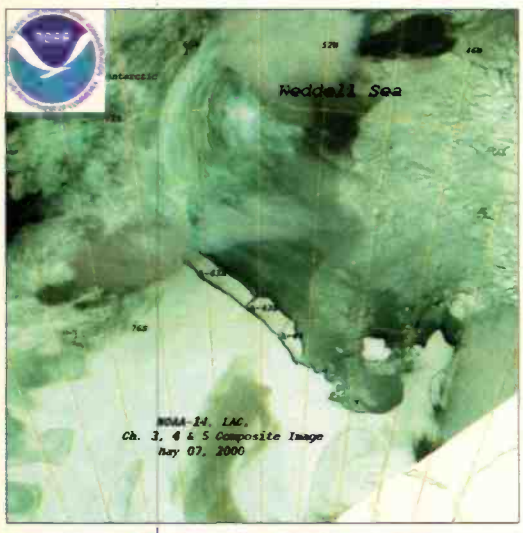


Fig. 7: Ice in the Antarctic - *NOAA-14* image courtesy America's National Ice Centre and OSEI team.

their own! This makes such modems cheap and therefore seemingly attractive if you are not aware of their performance limits.

I recently set up a friend's 486 computer (32Mb RAM and *Windows 95*) with an Internet connection to Freeserve. During the weekend he can still visit all the WXSAT sites and spend an hour online for less than 60p!

HRPT Reaches Peverell

On Tuesday 9 May I received my first high resolution picture telemetry (h.r.p.t.) image from *NOAA-14*. Some teething problems caused the loss of this first image, so **Fig. 8** shows the picture captured later, and retained. How come h.r.p.t.? It was an unexpected situation that provided an opportunity to get into this field.

My first WXSAT reception was the clip-clop of a.p.t. from *NOAA-9* back in the mid-1980s. A few more bits and pieces and WEFAX reception was added. Shortly before EUMETSAT announced encryption, I acquired a PDUS system - the final frontier was crossed when I ordered the h.r.p.t. hardware. From this month onwards, each edition can carry images from the four image formats - a.p.t., h.r.p.t., WEFAX and PD.

My current project is to produce a reception profile for the tracking dish. It is positioned on the south side of my back yard where it has the best 'horizon'. To describe its reception as 'limited' would be perhaps reasonable! The house is aligned north-west/south-east and the dish can receive south-through-east, with complete cut-off areas in the north, east and south-west, apart from other limitations. I was quite surprised to see Sicily!

I am writing a complete review of the whole system, including the tracking facility, for inclusion in the Special that is scheduled for publication in autumn.

CD-ROMs Of Satellite Images

As part of its mission to promote the use of satellite data, the British National Space Centre has produced two CD-ROMs, one containing educational material about satellite imagery. The material includes 14 sections of images that can be 'zoomed' to high detail, from satellite sensors including NOAA AVHRR - the sensors that produce h.r.p.t. and a.p.t. data, and from DMSP and some other imaging satellites.

For anyone who teaches any of the associated sciences, or for those interested in finding out more about the data, these CDs contain a wealth of information - and are free. The CDs are available from BNSC and can be requested by E-mail: **Wouk2000@dti.gsi.gov.uk** or via the web at: **http://www.bnsc.gov.uk**

Their postal address is: **'Window on the UK2000', c/o Earth Observation, BNSC, 151 Buckingham Palace Road, London SW1W 9SS.**

Shuttle Launch Schedule

STS-106 *Atlantis* launch 19 August for the ISS fourth flight (2A.2b) into 51.6° inclination orbit passing over Britain.

STS-92 *Discovery* launch 21 September for the fifth ISS flight.

A comprehensive listing of all Shuttle flights and payloads, together with associated information, is available from me at the address at the head of the column, as the *Shuttle Pack*. Please include £1.50 and stamped s.a.e. for the A4 booklet.

Fig. 8: High resolution picture transmission (h.r.p.t.) image received in Plymouth on 9 May at 1523UTC.

Kepler Elements - WXSATs, MIR and Shuttle

If you want a computer disk file containing recent elements for the WXSATs, AMSATs and others of general interest, together with a large file holding elements for thousands of satellites please enclose 50p with a PC-formatted disk and stamped envelope. A print-out is included that identifies NASA catalogue numbers for the WXSATs. The disk file is ideal for automatic updating of tracking software.

Frequencies

NOAA-14 transmits a.p.t. on 137.62MHz.
NOAA-15 transmits a.p.t. on 137.50MHz.
NOAAs transmit beacon data on 137.77 or 136.77MHz.
METEOR 3-5 uses 137.30MHz.
OKEAN-4 and *SICH-1* use 137.40MHz for brief transmissions.
RESURS 01#4 transmits a.p.t. on 137.85MHz.
METEOSAT-7 (geostationary) uses 1691 and 1694.5MHz for WEFAX.
GOES-8 (western horizon) uses 1691MHz for WEFAX.

■ JACQUES D'AVIGNON VE3VIA ■ E-MAIL: jacques@pwpublishing.ltd.uk

Propagation Forecasts

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.

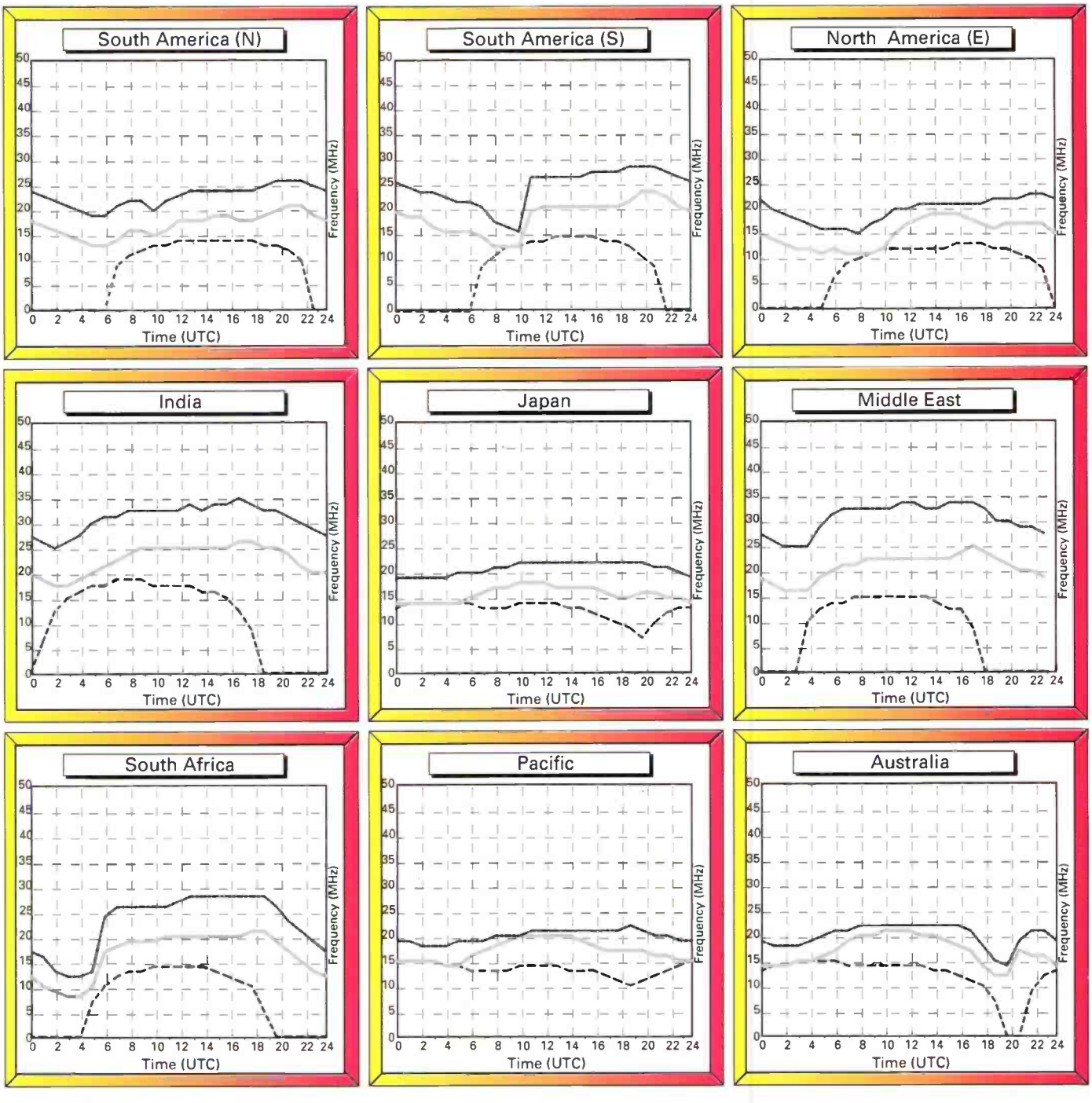
The middle line indicates the optimum working frequency (OWF) with a 90% probability of success for the particular path and time.

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.

July 2000
Circuits to London

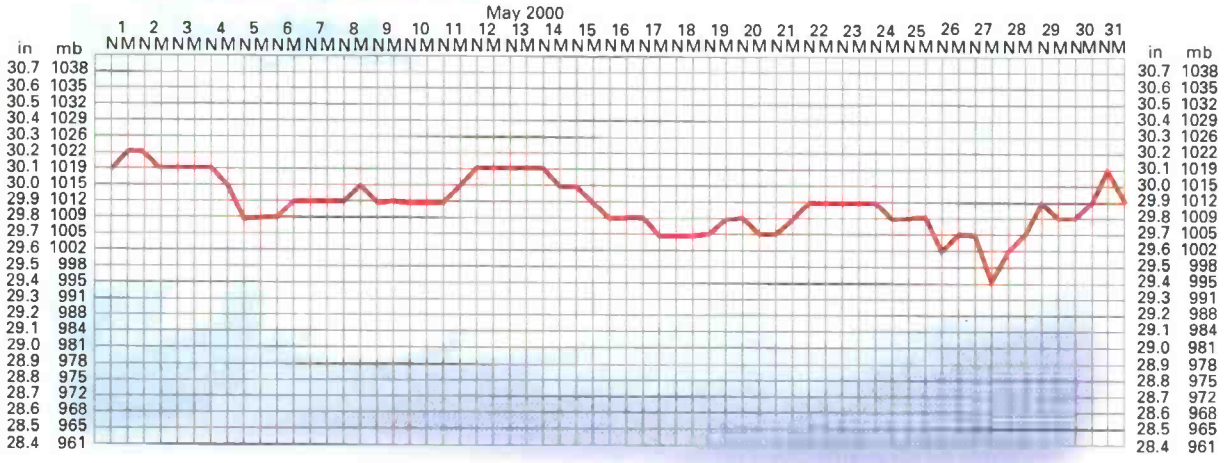


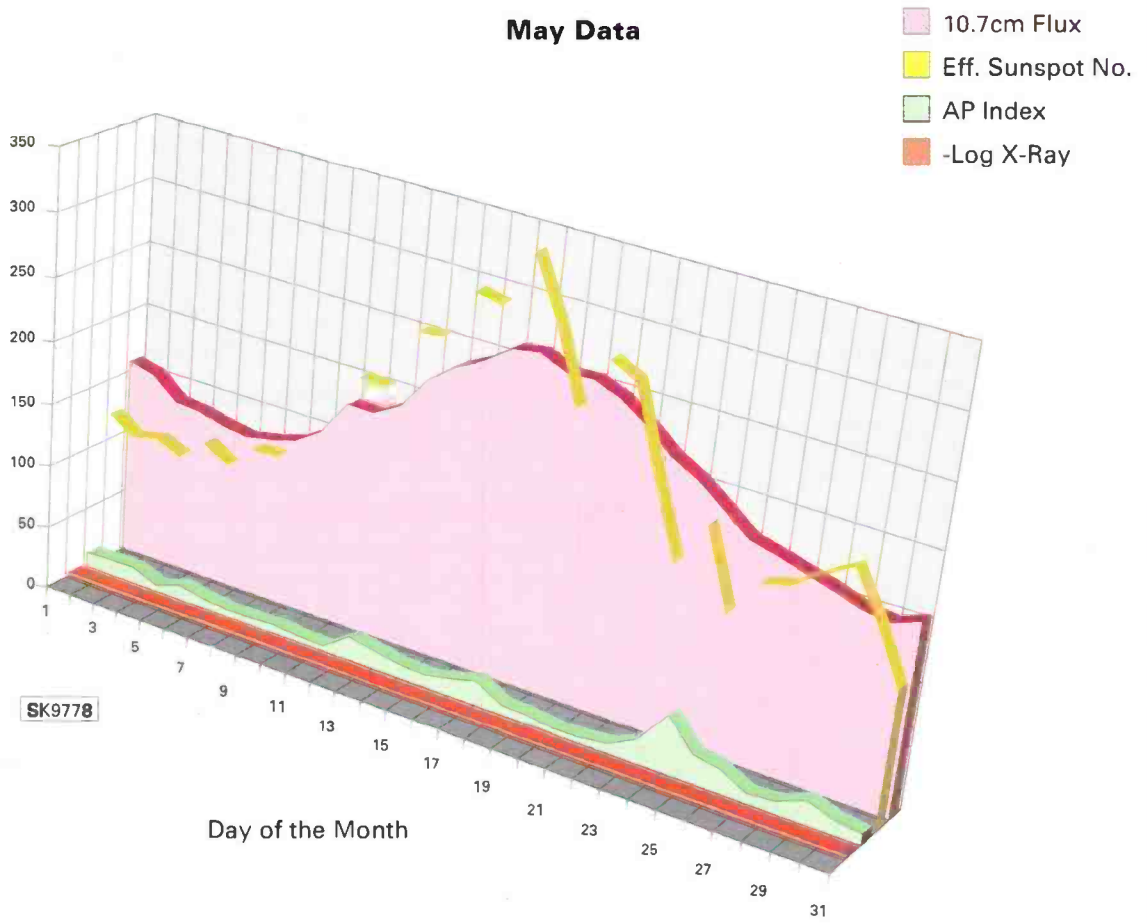
SK9777

■ KEVIN NICE G7TZC, SWM EDITORIAL OFFICES, BROADSTONE ■ E-MAIL: kevin@pwpublishing.ltd.uk

Propagation Extra

Ron Ham's barometric pressure chart, taken at Storrington, W. Sussex, May 2000.





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.

LOOK! NEW LOW PRICES: SUBSCRIBERS FREE, £4.00 NON-SUBSCRIBERS

Trading Post

Please write your advert **clearly** in **BLOCK CAPITALS** up to a maximum of 30 words, plus 12 words for your contact details, and send it together with your payment of £4 (**subscribers free!**) to **Trading Post, *Short Wave Magazine*, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.** You can also E-mail your Trading Post advertisements to: **tp@pwpublishing.ltd.uk** (if you don't want to include your credit card details with your E-mail, just 'phone us on (01202) 659910).
If an order form is not provided due to space constraints, a form from a previous issue can be used as long as the cornerflash or subscriber number is attached as proof of purchase of the magazine.
Adverts appear on a first come first served basis. All queries on **(01202) 659910**.
We **cannot** accept advertisements from traders, or for equipment which is illegal to possess, use or which cannot be licensed in the UK. Please note that *SWM* are in no way liable for any loss incurred as a result of buying or selling via 'Trading Post'. Please note cancellations cannot be accepted.

For Sale

Antenna selector - Howes AS48, £25, Howes a.t.u. CTU9, £35. Scanner, 100 channels, 66-965MHz, £135. All above with manuals, boxed, as new, and half new price. Tel: Warwicks (01926) 854556.

AOR AR3030, 30kHz to 30MHz all-mode receiver, boxed, p.s.u. and manual, £400 o.n.o. Tel: Reading 0118-972 2743.

AOR AR3030, used as second receiver, 30kHz to 30MHz, all-mode, £225. Sangean ATS-818 portable, £50. Might exchange both for laptop. A. Bell M1EIA, Biggin Hill, Kent. Tel: (01959) 575113.

Eddystone 1650 professional radio, digital, auto scan, sweep, 100 channel mem, six filters, optional pre-selector fitted, offers. Trio R-1000, v.g.c., £160. HF-225 Europa, keypad, a.m.s., f.m., like new, £250. AOR AR1000 hand-held, v.g.c.,1000 memories, £80. Tel: West London 0208-813 9193.

Global AT-2000 deluxe s.w. a.t.u., hardly used, excellent condition, £60 inc. P&P. Gordon on (01540) 662112.

JRC NRD-525 general coverage communications receiver, mint, in box, with manual, £450 o.n.o. FRG-9600 with h.f. adapter, manual, £250 o.n.o. G1PVU, Somerset. Tel: (01458) 447019.

JRC NRD-535 receiver, absolutely immaculate, boxed, used briefly, also Global antenna coupler AT-1000, Datong antenna AD370 and 3-way coax antenna switch, £650 the lot (buyer collects). Tel: Devon (01884) 277505.

JRC NRD-535 receiver, ECSS + genuine 1kHz filter, £675. Uniden UBC9000XLT scanner, £150. Both mint, original packing, accessories, manuals, circuits, little used. Ray, Surrey. Tel: (01883) 343838 anytime.

JRC NRD-535D receiver, plus NVA-319 speaker, boxed, manuals, as new condition, £700. Kenwood R-820 receiver, manual, excellent condition, £320. Global AT-2000 a.t.u., boxed, as new, £60. Tel: Paignton (01803) 529788 after 1900.

Kenwood R-5000 h.f. receiver, immaculate, demo on site, £400 o.n.o. Tel: Soton (01489) 790934 or (07803) 597761 daytime.

Lowe HF-225 receiver, £175. Sangean ATS-803, £35. Band I/III DX antenna, £25. DXTV converter, £30. Easy Reader RTTY converter with monitor, £65. Tel: Staffs (01827) 287214.

Lowe Modemaster v 2.0, discs, manual and computer connection, £40. Also available free to purchaser, Laser 386 computer with Windows 3.1, keyboard, mouse, buyer collects. John Davies, Cheshire. Tel: (01829) 250284.

MVT-7100EU, mint condition, boxed, £150 o.n.o. A.J. Bee, 46 Thornby Avenue, Kenilworth, Warwickshire CV8 2DY.

Sangean ATS-818, l.w., m.w., s.w., l.s.b., u.s.b., 45 memories, f.m. stereo, p.s.u., manual, £50 cash only. Rankin, Wirral. Tel: 0151-334 5501.

Sony 7in spool stereo tape recorder, three speed 1⅞, 3¾, 7½, model TC366, £54. Tel: Ledbury (01531) 636404.

Sony ICF-2001D, good condition, best portable, £200 o.n.o. Also Sony ICF1, good small radio, boxed, £100 o.n.o. John on (01226) 244124.

Top band part of Cushcraft R7000 add on, quite unused, with packing unopened, decided not to make my Cushcraft antenna, too high, £80 o.v.n.o. John on (01226) 244124.

Yaesu FRG-100 short wave receiver with p.s.u. and manual, £100. Howes receiving type antenna tuning unit CTU8 and manual, £25. Both in good condition. Fred, Norfolk. Tel: (01508) 538561.

Yaesu FRG-7 h.f. receiver, analogue, a.m., u.s.b., l.s.b., c.w., also new a.t.u., £120. Also demodulator, *JVFAX*, decodes ACARS, SSTV, POCSAG, Skyspy, FAX, etc., £20. Frank on (01608) 662488.

Wanted

CTCSS unit for Rexon RL102 v.h.f. hand-held transceiver, part no. RTN100. Steve G7CAF, QTHR. Tel: (01524) 416711 or (07773) 607409.

Eddystone 888A, ARD EA12, top prices if in mint condition, also Icom EX-627 antenna switch and Icom SP20 speaker, also any Eddystone loud speaker and S-meter units. Steve G8EBM, QTHR or (01335) 360755 or E-mail:g8ebm@compuserve.com

National NC190, manual, circuit diagrams, any information on this receiver, photocopies would be okay. Ray, Canterbury. Tel: (01227) 792448 after 1900.

Newly formed Suffolk Club requires a Top Band transmitter-hollow state (valve) or transistorised as teaching aid, circuit diagram/notes would be very useful, postage refunded. Please write or send to: V/L Club (Bungay), 85 Hill Side Road West, Suffolk NR35 1RH.

Tech. manual for JRC NRD92/3 receiver, not the operator manual, also any electroniques valve coils, G2DAF receiver bits, KVG filters, 7360 valves, any ITT valve receivers, w.h.y.? Thanks. Pat G3YKF on (01743) 884858 (home) or (01743) 260243 (work).

ORDER FORM

PLEASE WRITE IN BLOCK CAPITALS

I enclose Cheque/P.O. for £.....(£4.00)
Made payable to *PW Publishing Ltd.*

Please insert this advertisement IN THE NEXT AVAILABLE ISSUE OF SHORT WAVE MAGAZINE

Name .....
Address.....
.....
.....
.....
Post Code .....
Credit Card Details
Card Number

Switch Delta MasterCard Visa

Signature.....
Expiry date of card.....
Subscription Number
(on mailer label).....

FOR SALE/WANTED/EXCHANGE maximum 30 words

	(30)		

CONTACT DETAILS maximum 12 words

			(12)

SWM JULY '00 TP

SUBSCRIPTION RATES

SHORT WAVE MAGAZINE - 6 MONTHS

❑ £17.50 (UK)

SHORT WAVE MAGAZINE - 1 YEAR

❑ £33.00 (UK) ❑ £40.00 (Europe)

❑ £44.00 (Rest of World Airsaver) ❑ £50.00 (Rest of World Airmail)

SPECIAL JOINT SUBSCRIPTION WITH PRACTICAL WIRELESS (1 YEAR)

❑ **£55.00 (UK)** ❑ **£68.00 (Europe Airmail)**

❑ **£74.00 (Rest of World Airsaver)**

❑ **£85.00 (Rest of World Airmail)**

Please start my subscription with the.....issue.

MONITORING TIMES - 1 Year (12 issues)

❑ **£38 (UK)** ❑ **£43 (Europe Airmail)**

❑ **£49 (Rest of World Airmail)**

BINDERS

❑ Please send me .....*SWM* Binders at **£6.50** .....**£**

Postal charges: £1.25 for one, £2.50 for two or more (overseas surface)

FREE P&P if you order two or more (UK only) .....**£**

❑ Please send me the following books

.....**£**

.....**£**

.....**£**

Postal charges.

UK: £1.25 for one item,
£2.50 for two or more items. .....**£**

Overseas: £2.50 for one item, £4.00 for two items,
then add an additional 50p per item.....**£**

NEW FASTER NEXT DAY SERVICE (UK)
(For orders received before noon) £4.50 .....**£**

GRAND TOTAL .....**£**

Order Form

FOR ALL MAIL ORDER PURCHASES IN *SHORT WAVE MAGAZINE*

You can now order on-line.

*See **www.pwpublishing.ltd.uk/books/** for more information*

Back issues at £2.99 inc. P&P.
Phone, FAX or E-mail for availability

TELEPHONE ORDERS TAKEN ON (01202) 659930
between the hours of 9.00am - 5.00pm. Outside these hours your order will be recorded on an answerphone

FAX ORDERS TAKEN ON (01202) 659950
Or please fill in the details ticking the relevant boxes, a photocopy will be acceptable to save you cutting your treasured copy!

To: PW Publishing Ltd., FREEPOST, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.

PAYMENT DETAILS

Name.....

Address .....

.....

.....**Postcode** .....

Telephone No.....

I enclose cheque/PO (Payable to PW Publishing Ltd.) **£**

Or
Charge to my MasterCard/Visa/Switch/AMEX Card the amount of **£**

Card No. ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Valid from.....to.....

Issue No:.....Tel: .....

Signature .....

Orders are normally despatched by return of post but please allow 28 days for delivery. Prices correct at time of going to press. **Please note:** all payments must be made in Sterling. Cash not accepted.

TELEPHONE ORDERS TAKEN ON (01202) 659930
FAX ORDERS TAKEN ON (01202) 659950

Index to advertisers

PUBLISHED on the fourth Thursday of each month by PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Printed in England by Southernprint (Web Offset), Factory Road, Upton Industrial Estate, Poole, Dorset BH16 5SN. Tel: (01202) 622226. Distributed by Seymour, 86 Newman Street, London W1P 3LD. Tel: 0171-396 8000, Fax: 0171-396 8002, Web: **http://www.seymour.co.uk.** Sole Agents for Australia and New Zealand – Gordon and Gotch (Asia) Ltd.; South Africa – Central News Agency Ltd. Subscriptions INLAND £33, EUROPE £40, REST OF WORLD (Airsaver) £44, REST OF WORLD (Airmail) £50 payable to SHORT WAVE MAGAZINE, Subscription Department, PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. SHORT WAVE MAGAZINE is sold subject to the following conditions, namely that it shall not without the written consent of the publishers first having been given, be lent, re-sold, hired out or otherwise disposed of by way of trade at more than the recommended selling price shown on the cover and that it shall not be lent, re-sold, hired out or otherwise disposed of in a mutilated condition or in any unauthorised cover by way of Trade, or affixed to or as part of any publication or advertising, literary or pictorial matter whatsoever.

ROBERTS

Sound for Generations

The New R9914 from Roberts

PLL digital world band radio – ideal for BBC WORLD SERVICE

- LW/MW/FM/SW wavebands
- 45 station presets
- SSB for reception of single sideband and CW transmissions
- Direct keypad tuning
- Rotary tuning
- Station tuning in 1kHz steps
- Dual conversion for improved SW image rejection
- Digital clock
- Alarm/time functions
- Key lock
- FM stereo via earphones
- Soft carry pouch
- Complete with AC adaptor

BY APPOINTMENT TO
HER MAJESTY THE QUEEN
SUPPLIERS & MANUFACTURERS
OF RADIO AND TELEVISION
ROBERTS RADIO LIMITED

BY APPOINTMENT
H.M. QUEEN ELIZABETH
THE QUEEN MOTHER
RADIO MANUFACTURERS
ROBERTS RADIO LIMITED

BY APPOINTMENT
H.R.H. THE PRINCE OF WALES
MANUFACTURERS & SUPPLIERS OF
RADIO RECEIVERS
ROBERTS RADIO LIMITED

ROBERTS RADIO LIMITED

PO Box 130, Mexborough, South Yorkshire S64 8YT

Tel: +44 (0) 1709 571722 Fax: +44 (0) 1709 571255 Website: www.robertsradio.co.uk

LOWE ELECTRONICS LTD

Here at Lowe Electronics we've been advising people on monitoring the airbands for over thirty years. That kind of makes us unique as we believe no other company can match our expertise in this field. Just take a look at some of the products we offer the airband enthusiast and if that's not enough, send off for our free catalogue packed full of more goodies, or check out our website!

JRC NRD545

A superlative short-wave receiver, designed to fulfil the needs of professional monitoring stations, the NRD545 is equally at home with the serious hobby listener.

The DSP implementation starts at IF frequencies so don't confuse this with lesser DSP receivers that simply process the recovered audio. You can therefore control the IF bandwidth from 10kHz down to just 40Hz allowing total control for AM, SSB, CW or data signals, really helping to reduce interference. Heterodynes and noise can also be removed and the notch filter will automatically track changes in the frequency of the interfering tone. As you would expect from a top-flight receiver, computer control is fully integrated and there are 1000 memory channels, with memory and and programmable scan features.

SPECIAL OFFER
Genuine UK Stock.
Full Manufacturers Warranty.

Ordering Information
Product Code: NRD545

Lowe Price £1195

Carriage: £10.00 by Courier

NRD345

The NRD345 continues to be a popular option for listeners with a keen eye (and ear!) for quality. Easy to use and with great specification, the NRD345 is a great choice if you have a limited budget but want the best. Terms available.

- Frequency range 100kHz to 30MHz
- Dynamic range 100dB, 500kHz bandwidth
- Image rejection 70dB
- RS232 interface
- Modes AM, CW, SSB, Synchronous AM
- Noise blanker
- Clock & timer functions

Ordering Information
Product Code: NRD345

Lowe Price £399

Carriage: £10.00 by Courier

GPS3PLUS

New from Garmin, the GPS3Plus. This is Garmin's first GPS designed for vehicle mounting. The new improved basemaps contain much more detail than before and just wait till you see what you can do with Germin's MapSource CD-ROM maps! From these you can upload map sections into your GPS3P for even more detail and routeplanning. This will revolutionise your travel!

Ordering Information
Product Code: GPS3P

Lowe Price £349.00

Carriage: £10.00 by Courier

MVT7100

In our view...simply the best!

This is the scanner of choice for many of our serious users. If a radio is tranmitting and you are close enough you will hear it on the MVT7100. Superb for monitoring military and civil airband channels - also allows you to listen to ground crews and base security. Its shortwave coverage with SSB offers opportunities for monitoring Shanwick and the trans-Atlantic routes!

- LSB/USB/AM/WBFM/NBFM Reception
- 1000 memory channels
- High sensitivity
- Signal Strength Meter
- Illuminated keypad
- High speed search & scan functions
- User friendly
- Battery save function
- Priority function
- Individual power/volume and
- Tuning dial
- Channel pass function on memory

Ordering Information
Product Code: MVT7100

Lowe Price £199.00

Carriage: £10.00 by Courier

IC-R2

Our lowest priced full coverage scanner also happens to be our smallest! The frequency coverage is from 0.495MHz to 1309.995MHz with NO GAPS making it ideal for monitoring military airband channels.

Ordering Information
Product Code: IC-R2E

Lowe Price £149.00

Carriage: £10.00 by Courier

Lowe Electronics Ltd
Chesterfield Road
Matlock
Derbyshire
DE4 5LE

Tel: (01629) 580800
Fax: (01629) 580020

E-mail: info@lowe.co.uk
www.lowe.co.uk

Send us four first-class stamps for our latest full colour catalogue, full of receivers, antennas, books, accessories, nightvision and GPS receivers and more!