shortwave magazine

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see page 65

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World Radio History

October 2000 Issue

short wave magazine

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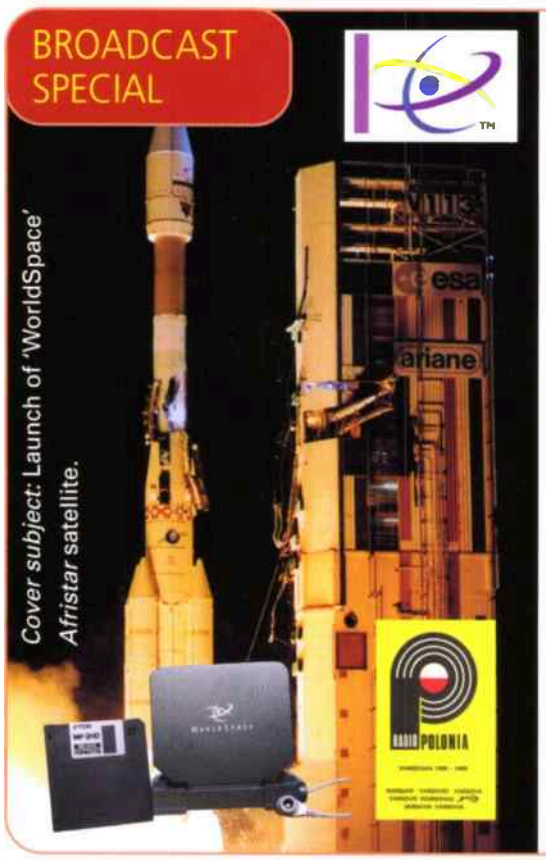
BROADCAST



Cover subject: Launch of 'WorldSpace' Afristar satellite.

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Join the *SWM* Readers E-mail forum, send an E-mail to: SWM_readers-subscribe@egroups.com

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IN SWM NOVEMBER

- **Info in Orbit Special**
- **JW on Whips & Loops**
- **AOR AR8600 Review**
- **& much more!**

*contents subject to change

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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.

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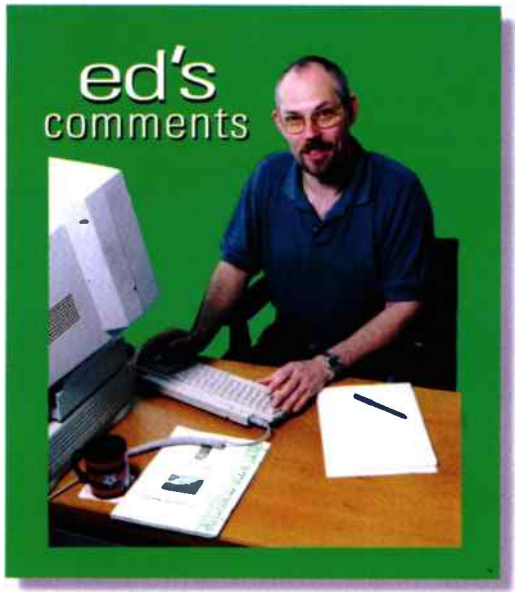
Technical Help
We regret that due to Editorial time scales, replies to technical queries cannot be given over the telephone. Any technical queries by E-mail are very unlikely to receive immediate attention either. So, if you require help with problems relating to topics covered by *SWM*, then please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



I'm back

I signed off last month by saying I was going on my holidays. That seems like a lifetime ago now with another interesting issue of *SWM* drawing to a close as I type. One element of my leave that I do recall well was a weekend of extremely varied weather under 'canvas' (nylon actually - it keeps the rain out far more effectively), with 500 other equally mad motorcyclists. A wonderful time was had by all, in spite of the alternate scorching sunshine and thunderstorms. Strange how there always seemed to be a torrent of rain every time we happened to be cooking. Would you believe that fresh rain water actually improves the flavour of the dish? It's true!

The weekend rally was located at Shaftsbury in Dorset, on the cricket green. In the adjacent 'Boys Club', that the very welcoming residents of Shaftsbury allow us to use each year for the duration of the weekend - they continue to do so even after 24 years of the rally, I noticed, pinned to a wall, a rather tattered copy of the *SWM UK Spectrum Chart* that we presented free with the *Short Wave Magazine*, July 1999 issue. It was a very well worn and sad example and had obviously seem much use in its 14 months of life. It was clearly in need of replacement. If anyone from the club is reading this, please contact me and I'll supply you with a new replacement copy.

Dedication To The Cause

A big thanks from all of us on the *SWM* team here in Broadstone go to Paul Essery. As you'll read in Paul's column on page 50, he's been far from well recently spending much time in hospital. In spite of this rather major personal inconvenience, Paul has come through with his column with next to no delay. Thanks Paul, we hope you are feeling much better now.

A similar message of thanks must go to Brian Oddy, who also has recently had rather a lot on his plate. Unfortunately, earlier this year his wife fell and broke her hip, a very serious injury. Brian has had his work cut out and has been nursing her to recovery. This extra task has been eating into his 'LM&S' compilation time. Brain, like Paul, has still managed against the odds to get his copy though with the minimum of delay. Thank you very much guys.

Farewell

This month is the time we must sadly say goodbye to Peter Shore. Peter has been a *SWM* contributor since May 1987, the second issue of this magazine to be produced by its present publishers.

Unfortunately, mounting pressures of work combined with increased commitment to hectic globe trotting duties ensures that Peter simply has no time left to contribute his expertise to our pages any longer. Many thanks Peter for all your hard work and valued contributions over the years.

Rest assured everyone, we'll still be bringing you the European outlook on the world of the broadcast industry in three month's time. Next quarter's 'Bandscan Europe' will be brought to you by its new author.

Sad Irony

I have just learned that, the famous mast, a Grade II listed structure, used at the site of the first UK radar station is to be demolished on this year's anniversary of the 'Battle of Britain'.

HM Coast Guard purchased Bawdsey Remote Radio Site (RSS), including the mast, from MOD in 1993 for use for enhancement of their radio coverage of the Suffolk coastline. The mast was constructed during the late 1930s to a height of 130m. Although over the years, this has been reduced to its present height of 100m.

The Maritime and Coast Guard Agency (MCA) has now obtained planning consent for both the demolition of the mast at Bawdsey and a replacement 60m mast.

After serious and lengthy consideration of the survey which showed the extent of steel corrosion was considerable, and after meetings with English Heritage, Suffolk Coastal District Council and health and safety executives it was concluded that the only way forward was to dismantle the structure and replace with a new 60m mast.

The MCA had carried out the requirement to have the mast inspected on a regular basis ensuring that it was safe to climb by contractors required to maintain the radio antennas. The last survey, performed in 1997, confirmed the structure was unsafe to climb and a full structural survey was immediately commissioned. At this time the MCA was advised that the structure was a Grade II Listed mast.

The survey report confirmed the structure failed to satisfy the requirements of BS5950 and was not considered adequate under current loading conditions.

Demolition will take place on 21st September and it is poignant that this particular event should be happening at a time when Battle of Britain commemorations are taking place; a period of history which was so dependant on the effectiveness of radar.

Caught My Attention

Recent traffic on the *SWM* Readers' Internet mailing list, run by yours truly, grabbed my attention and I thought I'd share it with those of you who don't have access. To join the group, and all are welcome, simply send an E-mail to **swm_readers-subscribe@egroups.com** subject and message content are not required and will be disregarded if present. One of the benefits of using the 'egroup' server to host the list is that you can read and contribute to the list from any Internet connected computer that you may have access to. So those of you who don't have the necessary hardware at home can use your local library, cyber cafe or similar to access the service.

The E-mail in question, was part of a thread that was discussing the possibilities of reception and decoding of aircraft radar transponder data (squawks) to track the aircraft and display an air traffic control type screen in our 'shacks'. It was commented by the author of the message that:

"I think somebody mentioned that at the Farnborough Air Show the National Air Traffic Service (NATS) showed a flight tracking service that they are developing which aims to give users an air traffic picture derived from genuine NATS data. This will enable them to watch almost any flight anywhere in UK airspace. It will run on a standard desktop PC with a simple download from the NATS server being all that's required to get up and running. A standard Internet connection, dial-up or dedicated, will enable the retrieval of all the aircraft tracking data needed.

In short, it will give a radar-like picture of any required airspace with all aircraft marked and updated in essentially real time. You can search for a specific flight if you wish. It will provide a visual picture to back up the ACARS information that spotters can already get and thereby enable us to know exactly where any flight actually is. When ready, it will be available at **www.flightpathuk.com**".

Interesting post! I for one look forward to this service becoming available - a demo is available for download for both Mac and PC at the above site.

Your Receivers

At last I've had a flurry of responses to my request as to what gear you are using. I hope to have the results ready for the November issue of *SWM*. To all of you that have responded, I really appreciate your effort. To those of you who haven't, go on, let me know what receivers you use...please.

73

Kevin Nice

Dear Sir
For the last couple of weeks I have been receiving a very strong and clear signal (54444) on 6.175MHz between 1700 and 1900. The only station strong enough that is listed to be broadcasting at this time of day if the Voice of Malaysia. However, I have not yet been able to pick up any call signal.

I would greatly appreciate it if any reader is able to confirm this or alternatively suggest another station broadcasting at this time. I am using a Lowe HF-150 with PR-150 a.t.u. and an AP-150 with a 20m whip antenna.

Lionel P. Clyne
Kent

*You don't mention which language you heard Lionel, but it certainly is a frequency that Voice of Malaysia have used in the past. Anyone care to comment? - **Ed.***

Dear Sir
Re: Space and disappointment in Ed's Comments in the August issue of *Short Wave Magazine.*

I wonder if people keep quiet about their equipment because it is simple and modest and they think that they may be laughed at by some of those so-called experts who can afford the latest £1000 plus receivers and an expensive antenna farm. Those so-called experts probably do less well than people with simple equipment who are dedicated to their hobby, while the latter are dedicated to the price tag of their equipment.

In my last letter to you regarding 'the other man's shack', I only gave a brief description of my equipment, so here are all the details for your survey:-

My receiver in daily use is a Redifon R551N with a R1155 being restored, my preference is for commercial or military receivers. The new receivers on sale to the hobby market are just too small with 'features' I do not want.

My antenna farm is all in the loft and consists of a Datong AD270 active dipole mounted vertically and uses 50Ω coaxial to the receiver. A horizontal square closed loop 18m overall length which uses 300Ω flat twin to the receiver. A 21m folded dipole which is again folded around the loft horizontally and with its feeder is constructed of 300Ω flat twin. They all arrive at a selector switch, the active direct, the loop via a balun, the folded dipole via a Howes CTU9 a.t.u., which allows me to select the best antenna for the time and conditions. For getting rid of whistles, etc., I use a Datong FL1 audio filter.

I hope this will help with your survey.

Vic Prier
Devon

*Vic, the point of performing the survey was to illustrate the inevitable spread of receivers in use. Station capability is not just about equipment specification or price. You just don't need to spend vast amounts on receivers, though clearly this is possible. - **Ed.***

Dear Sir
Re: the July issue of *SWM* - Trading Post section - Suffolk Club.
May I enquire, has a new phrase entered our technical vocabulary surreptitiously? Solid state I can understand, but 'hollow state' in reference to thermionic valves. Well, I wonder what JW would say? It would be interesting to read his views and those of readers.

With all due respect to the author of the advertisement - and I do wish the club every success - let's call a 'valve a valve' not a hollow state device.

N. Boyens
N. Yorkshire

*I am not aware of hollow state being a new phrase, it has been in use for many a year to the best of my knowledge. - **Ed.***

Dear Sir
Looking back over the years made me think of how radios have evolved since I built my first one valve battery radio in about 1934, a Peto Scott kit, if I remember rightly. I think my greatest excitement was first using the radio and hearing American broadcast stations and what good programs they were. No propaganda in those days. With few s.w. radio broadcast stations in those days, it was fairly easy to hear something of interest. I even heard liner *Queen Elizabeth* testing her radio before her maiden voyage.

I am now using an Icom R8500, and very good it is, better I think by far than the NRD-545 which I have used. A long wire with a.t.u. is used for h.f. as an indoor discone for v.h.f.

The modern radios are good, but don't have the excitement of the old days. Sorry if this letter is a bit disjointed, but at the age of 83 years things aren't what they used to be'.

I look forward to *SWM* each month as I have been a regular reader since the earliest editions. How the magazine has changed over the years, but I am pleased to say for the better.

J.E. Ford
Kent

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**

Dear Sir
In response to your request for details of readers radio equipment to which you seem to have had a poor response, I thought I may as well chuck in my 'two pence' worth.

I began, probably like a lot of other people, with a cheap airband receiver that was a lottery to tune to a frequency, given the size of the analogue dial. I was then given a new MVT-7100 scanner, what a difference! What really got me hooked though was when a friend gave me some back issues of *SWM* and I soon realised that there was a wealth of enjoyment to be had at a hobby I'd never even thought about before.

The first thing I did was place a regular order for *SWM* and of course it then became apparent that there was much more to this hobby than I first thought. An old computer (486) was the first purchase, followed by an AKD HF3S as funds were limited, but I find this set good for the price, and now coupled to a new up to the minute computer, FAXes, RTTY and SSTV give another dimension to the hobby of 'radio'. The HF3S with about 21m of wire tied to a tree down the garden has in the past bought SSTV pictures from Buenos Aires at about 80% clarity, so it just goes to show that if conditions are right, you don't need an all singin', all dancin' megabuck set to join in the hobby and have fun.

My final acquisition earlier this year was a Rig WXSAT receiver and down converter for Meteosat reception, together with a Timestep 600mm dish and crossed dipole for WXSAT reception. All are working fine and it's thanks to the contribution of articles to *SWM* that I now have an understanding of all these things, something which I knew nothing about just a couple of years ago.

The trouble with *SWM* is that it always makes you think you need yet more and better equipment, especially when you read the adverts, but you have to stop somewhere, at least for the time being.

I've now got a computer/radio room and every time I go in there, I'm spoilt for choice as to what to listen to or monitor next, or just work on the computer. Thanks *SWM* for introducing me to a hobby that I wish I'd know about years ago.

Derek Roberts
via E-mail

Derek, thanks for your comments.

TOP QSL

Having thought about your statement that SWM *makes you imagine that you need more and better equipment, I see your point. However, I believe that the cause of this is that as enthusiastic hobbyists, we, like participants of similar technical based interests recognise that, we can pursue additional facets of the 'spectrum' available if we continue to invest in expanding our equipment and therefore capabilities. I have already acknowledged, to Vic Prier, that a simple receiver is capable of a great deal, in the right hands. The choice of constant development of your station is one of personal choice. From personal experience though, I have to agree that it's difficult to resist the urge! - **Ed.***

IC-446S - Licence Free

Icom (UK) Ltd. recently announced the launch of their new PMR 446 licence free transceiver - the IC-446S. This new addition to the company's extensive product range is remarkable for two reasons. Firstly, it is extremely compact in size with a rather neat, foldaway antenna which makes it ideal for a wide range of applications and users. Secondly, it is a great way to stay in touch and unlike cellular telephones, its use is completely free!

The IC-446S allows instant communication between members of a group in and around buildings and over short distances - making it the perfect tool for keeping in touch with friends, family and work colleagues whilst in close proximity to them. What's more, it is water-resistant, making it ideal for rambling, trekking or for use on inland waterways and similar leisure pursuits.

The IC-446S is well designed, easy to use and very robust. Its strong body makes it ideal for outdoor activity enthusiasts. Designed with a minimum number of switches makes operation of the IC-446S quick and intuitive. The large easy to read l.c.d. shows operating information at a glance with clear status icoms, such as 'low battery', etc.

For low light conditions, the display has an auto backlight function.

Other useful operating functions include a call ring function, which allows you to send a ring tone when calling another party - similar to a mobile 'phone. Ten different ring types are available and to ensure clear communications with other radios, you can select from eight different radio channels and 38 different group codes, giving more than 300 different combinations to choose from. A Smart Ring function is also included which lets you know whether your call has got all the way through.

The IC-446S transceiver is now available for sale in two formats. It can be purchased for only £109 (list. ex. VAT). Alternatively, you can buy an accessory pack, which includes transceiver, charger and rechargeable batteries for £120 (list. ex. VAT).

More details from Icom themselves at **Sea Street, Herne Bay, Kent CT6 8LD, Tel: (01227) 741741, FAX: (01227) 741742** or visit their web site at **www.icomuk.co.uk**

Presentation Time

The **Radio Officers Association** was pleased to make a presentation to the RNLI and the Mission to Seafarers of £550 each at Sennen Cove Lifeboat Station back on Sunday 30th July 2000. Making the presentation were ROA members David Barlow and Peter Roper.

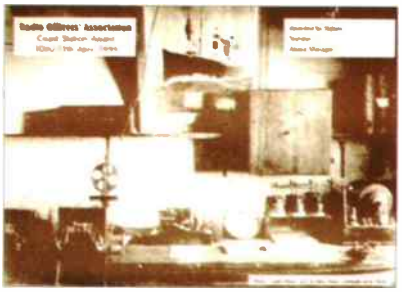
The Association, which comprises over 200 former ship and shore Radio Officers, felt that the closure of the UK Coast Stations and of Portishead Radio should not happen without some recognition being given to their work and the contribution they made to safety of life at sea.

April 1999 was designated Maritime Month on the amateur radio bands. World-wide 126 coast stations were represented, the old Commonwealth Area scheme was reconstructed with representative stations in New Zealand, Australia, Singapore, India, Mauritius, South Africa, Canada and Malta. In total, over 50,000 messages were passed and awards were sold to participating stations.

When Portishead Radio closed back in April of this year, the Association was invited by BT Maritime Radio Services to organise a unique cross band maritime/amateur event. For once in its 80 year history GKB Portishead was able to exchange greetings with radio amateurs by kind permission of the Radiocommunications Agency.

In 13 hours, over 3000 contacts were made on the Morse key. The third contact was with George Banner, who first contacted the station on a spark transmitter in 1934. Literally hundreds of ex ROs (Radio Officers) world-wide wished to bid farewell to the greatest maritime terrestrial radio station in the world. The operators were delighted that the halcyon days of radio were resurrected for the last time.

The sale of awards and the donations received from these two very special events raised the sum of £1100, which was distributed to the RNLI and the Mission to Seafarers, sea related charities, which hold great affection in the hearts of the Radio Officers.



(L to R) Peter Roper G3MII, Terry George G4AMT, David Barlow G3PLE and David Nancarrow G3RID.

Abolished - Under 14 Age Restriction!

Following recent discussions with the RSGB, it was agreed that the 14-year age restriction (to obtain a Full Amateur Radio Licence) should be completely removed. Previously, to be eligible you had to be 14 years of age or over or have held a Novice licence for a least a year. If you have obtained a pass in the RAE (and either the 5w.p.m. or 12w.p.m. Morse test for a Class A/B and A respectively), you may apply for a full licence. It is no longer a requirement to have held a novice licence for a year if you are under 14.

This initiative is part of the ongoing process to refine and improve access and facilities for amateurs. Both parties feel that (in view of the increasing technical and operational ability of youngsters today) this restriction is a particular anomaly, which ought to be discarded, and recognising that those talented youngsters should be actively encouraged and nurtured.

After all, if you are good and keen enough, you are old enough!

NSC-ARS

A new amateur radio society has been born at the National Space Science Centre in Leicester, the Amsat-UK Colloquium delegates recently reported. The **National Space Centre ARS** (NSC-ARS) has been formed by radio amateurs and experienced satellite operators around the Leicester area. It will work in partnership with the National Space Centre - a Millennium

Commercial Impact

The Icom IC-R2 communications receiver is having a real commercial impact on a new television channel called Shop! - The Value Channel. Already popular with amateur and avionics customers, the pocket receiver has been purchased by the channel's studio for Presenter Talkback. This will allow any presenter using the receiver to efficiently listen and receive instructions from the gallery if needed.

Shop! - The Value Shopping Channel is a major joint venture between two of Britain's most famous companies - Littlewoods and Granada. Launched back in November 1998, the channel produces over 50 hours of original and mainly live programming every week from its dedicated studios at Liverpool's Albert Dock. The large scheduled output means that any equipment sourced by the studio has to stand up to rigorous pounding and constant use, often up to 10 hours a day.

It was Eric Calvert, Deputy Studio Manager, who originally sourced a solution to help the presenters to listen to instructions from the gallery. Previous radio systems had been cumbersome and the reliability of the present system was deteriorating. Eric finally reached the decision to purchase a quantity of IC-R2s, which are now part of the presenter's communications belt pack. Connected to an earpiece, the IC-R2 allows controllers and producers of the channel to give clear direction, through u.h.f. channels, to its presenters.

The IC-R2 has already proved to be a big hit with the presenters at the station. Eric said 'We originally had the IC-R2 on loan to see if it would meet our requirements. However, when we gave it to one of our presenters, they thought it was so novel and unobtrusive, that he wouldn't give it back'.

More details from Icom at **Sea Street, Herne Bay, Kent CT6 8LD, Tel: (01227) 741741, FAX: (01227) 741742** or visit their web site at **www.icomuk.co.uk**

Landmark Project - to promote amateur radio and particularly radio in space exploration and radio astronomy.

This is an important time for amateur radio in space with the launch of the International Space Station modules, and very soon the Phase 3D satellite. Many astronauts of all nationalities are themselves radio amateurs, and will be operating from the ISS. The National Space Centre ARS hopes to bring these initiatives to a wider public through joint work with the National Space Science Centre.

The NSC-ARS is looking for commercial sponsors and has opened a web site to demonstrate its 'open door' philosophy. Sponsors, who may support the Society's activities, with due acknowledgement, are sought for all of the Society's work, from the all important satellite rig to printing QSL cards. Further information through visiting their web site at: **http://www.nsc-ars.fsnet.co.uk**

Break In At W&S

Unfortunate news from **Waters & Stanton PLC** - around 2230 on the 8th August, a padlock was cut off a door to an outbuilding at W&S in Main Road, Hockley, Essex, and a quantity of Spanish made INAC power supplies were stolen. Five pieces of model FC-25 and 36 pieces of model FA-25, both 25A mains power supplies, were stolen.

"The power supplies", says Jeff Stanton, "had only just arrived in the UK and had not even gone on general sale, so if any reader hears or is offered one of these for sale, they can be sure it is a stolen item".

The CID at Rayleigh Police Station, High Street, Rayleigh, Essex, will be very interested to hear of any information which would help lead to the recovery of the stolen items.

Live Football Scores

Ananova.com is offering football fans up-to-the-minute updates via their mobile 'phones with the launch of its WAP live football scores. Fans are now able to log onto the new WAP service and receive goal-by-goal updates - the time it was scored and the scorer - on all domestic league games and many international fixtures.

The new service will cover all English and Scottish matches, the European Champions League, UEFA cup matches and England Internationals. It won't matter whether you are on the train, waiting for a bus or stuck in a meeting - the latest football scores will only be a WAP call away.

Football fans who use the live football scores service will join cricket enthusiasts who have been enjoying live ball-by-ball cricket scores throughout the summer. Other services available on Ananova's WAP service include news, sport and entertainment headlines and summaries.

The Ananova WAP web site is at **http://wap.ananova.com/**

Radio Today

Radio Today - the news stand magazine of the RSGB, is to close after the October 2000 edition Since aquiring *Radio Today* some two years ago, the RSGB claims to have refocused and reshaped its strategy and achieved significant success in growing circulation. However, the increasing difficulties of getting the magazine wide exposure on the news stands has forced the Society to take the reluctant decision to close the magazine.

Cancelled Rally

Please note that the **MARS - Birmingham Radio & Computer Rally,** which was to be held on Sunday 12th November at the Stockland Green Leisure Centre has been cancelled, due to building of tennis courts on the front's car parks. The Rally will hopefully run again next year. Further information from **Norman G8BHE** on **0121-422 9787** or mobile on **(07730) 132726.**

Send your news to Zoë Shortland at the Editorial Offices

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.

October 1: The Great Lumley Amateur Radio & Electronics Society are holding their rally at the Great Lumley Community Centre, Front Street, Great Lumley, near Chester le Street, County Durham, just off the A1(M). There will be free parking, plus easy access, good, inexpensive food and drink, radio, hobbies, electronics, computer, satellite and component stalls. Bring & Buy in two sections - junk and good buys. Doors open 1100 (1030 for disabled visitors). Admission is £1, free of charge to under 14s accompanied by an adult. Talk-in. Further details on **0191-384 2803** or **0208-937 2772** or from Rally Organiser **Nancy Bone G7UUR, 49 South Street, Durham City DH1 4QP**.

October 15: The Blackwood Radio, Computer & Electronics Rally is to be held again at the Newport Centre, Newport, South Wales, which is about 2km from J25A on the M4. Opens at 1030/1100. There will be a Bring & Buy, talk-in, car parks, trade stands, special interest groups, licensed bar, catering, disabled facilities and family attractions. Further information can be obtained from **Stuart Instone GW0NPL** on **(01495) 240260/(07970) 777756** (combined telephone/FAX number) or E-mail: **fireham@aol.com**

October 15: The Hornsea Amateur Radio Club Rally will be taking place on this day. For more details on where it is and what will be there, contact **Duncan G3TLI** on **(01964) 532588**.

October 29: The Galashiels & District Amateur Radio Society are holding their Annual Radio & Computer Rally at The Volunteer Hall, St Johns Street, Galashiels, Scottish Borders, from 1100-1600. There will be traders, Bring & Buy and refreshments, etc. More details from **Jim GM7LUN** on **(01896) 850245** or E-mail: **jimk@gm7lun.freeserve.co.uk**

November 4/5: The 14th North Wales Radio & Electronics Show will be held at the North Wales Conference Centre, Llandudno. The show opens at 1000 both days and the entrance fee is £2 for adults and under 14s free when accompanied by an adult. There will be a club room and an extensive Bring & Buy. **M. Mee GW7NFY** on **(01745) 591704** (combined telephone and FAX number).

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

Bandscan Europe

It's almost exactly 11 years since the Cold War came to an end with the fall of the Berlin Wall. It is becoming increasingly difficult to remember how the West was pitched against the Soviet Bloc, with the ever present threat of nuclear war while the constant propaganda war was fought by both sides, mostly through the major short wave broadcasters like Radios Free Europe and Liberty, Radio Berlin International, Radio Moscow, and the Voice of America.

The countries of the Soviet Bloc poured the equivalent of tens of millions of dollars into trying to prevent their citizens tuning into 'the Voices', as the West's main broadcasters were known. Jamming transmitters obliterated huge portions of the short wave broadcast bands in Europe, doing their best to ensure that news broadcasts from the West did not reach the main cities of the Soviet Union and its satellite countries. In practise, the jamming transmitters were not wholly successful, causing simply difficult listening conditions in main cities, but having little or no effect in outlying districts and towns.

Now all that is a thing of the past, but my memories of the Cold War era in which I grew up were brought back to life in no uncertain terms a few weeks ago when I was given access to some documents that relate specifically to the propaganda war that was waged by the Superpowers. A good many years ago, writing in *Short Wave Magazine*'s sister publication, *Practical Wireless*, I suggested that programmes from Radio Berlin International, the voice of the then East Germany, were pure propaganda.

I received a vociferous complaint from one reader - and RBI listener - in the UK, who said that the station was not any more of a propaganda tool than was the BBC. I did not argue the case in my column, but it wasn't long before the Wall came down and the unification of Germany was completed and the remaining communist states embraced democracy.

What neither my correspondent nor I knew at the time was that the Stasi, East Germany's secret police, was active in the broadcasting arena. The papers I have just seen are copies of part of the Stasi's enormous files that covered almost every aspect of life in East Germany, and its intelligence on other countries. A couple of hundred sheets of closely-typed A4 paper, stretching from the 1960s through to the middle of 1989, are reports on the BBC, its German-language service, and many of the German Service's staff who worked in both London and West Berlin.

Of particular interest are the references to some of the BBC's contacts in Berlin who contributed to programmes or who provided background information to BBC producers. It seems that although they were regarded as trustworthy sources by BBC staff, they reported straight back to the Stasi, and the files include detailed transcripts of interviews and conversations.

There are also the names and addresses of BBC contacts in the East and West parts of Berlin (the files have thick black crossing outs of names of people still likely to be alive), and the level of detail - addresses, types of car driven, date of birth - suggests that the Stasi had a complete section devoted to monitoring the BBC and its contacts.

Under current German law, anyone can ask for a copy of their Stasi file. I suspect that I have a file since I had reasonably extensive contact with Radio Berlin International in the run up to the fall of the Wall. Other radio listeners in this country who corresponded with RBI probably also have files, too. I'm certainly going to see if I can track down mine.

In the meantime, we can look forward to a conference that the Research Group for German and Austrian Exile Studies is putting together in 2002 looking at the history of the BBC's German Service that closed in March last year. It should be a fascinating event for anyone who has even a passing interest in international politics of the past fifty years.

BBC Future

The future of BBC World Service is more secure than it's been for the past few years thanks to an increase in its funding earlier this year. World Service will receive more than £60 million additional funding over the next three years.

Much of the money will be for major capital projects, including the modernisation of short wave facilities in Singapore and Cyprus. The BBC will also develop its Internet presence in Arabic, Chinese, Hindi, Persian, Portuguese, Russian and Spanish, and ensure that its f.m. expansion guarantees outlets in 135 capital cities by 2004.

BBC World Service is embracing new technology around the world. In mid August, it started providing mobile 'phone users in Venezuela and Chile with on-demand newscasts. And World Service English, French, Swahili and Arabic programmes can now be heard on the WorldSpace satellite system beaming to Africa and the Middle East. The London-based broadcaster is also likely to launch English and Hindi broadcasts on the AsiaStar service that launched earlier this year.

Digital Radio

Digital Radio - using the Eureka 147 terrestrial system - is moving on in leaps and bounds. In Spain, services have been launched by Radio National de Espana in Madrid and Barcelona. Here in the UK, two new speech-radio services are available on the national Digital One multiplex. ITN News is a rolling news service from the respected TV news producer, while talkingMoney comes from an alliance between talkSport radio and Bloomberg.

The prices of DAB Digital Radio receivers continues to fall. At last month's Live 2000, a special offer gave visitors the opportunity to get a top-of-the-range in-car DAB radio and CD player for just £349, with a post-show price of only £399. And at the end of the month, Psion launched its uniquely-styled Wavefinder product for less than £300.

Radio Austria International is cutting its short wave operations in half following budget cuts by the government. Arabic and Esperanto programmes from Vienna will cease, while German-language programmes will be more relays of the domestic ORF service rather than specific productions for international listeners. English programmes will be co-produced with FM4, the domestic channel that has English-language news bulletins. ORF is looking to hire out spare capacity at its Moosbrunn short wave site.

Goodbye

Finally this month, two *au revoirs*. The first goodbye is to Diana Janssen, the co-presenter of Radio Netherlands' weekly *Media Network* programme. Diana is leaving the Dutch station after nine years, during which time she has worked on strategic issues for Radio Netherlands, investigated new technologies for the European Broadcasting Union, and become a familiar voice on the radio. Diana is moving to the well-known research group, Forrester Research, that reports on developments in IT, e-commerce, the Internet and related areas.

The second is to me as, after many years contributing to *Short Wave Magazine*, I'm stepping down as a columnist. I've enjoyed reporting on events in the world of broadcast radio, and being in contact with so many radio enthusiasts. I shall miss the world of magazine publishing, but after almost 20 years contributing to *Practical Wireless* and around 15 years writing for *Short Wave Magazine*, I think it's time to hang up the keyboard and give someone else the chance to keep you up-to-date with developments in international radio.

So from me, for the last time, goodbye and good listening!

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

Off The Record

This quarter I have received several reports of alternative medium wave activity, though as yet nothing on a regular basis. A station identifying as LBH Radio has the intention of doing evening tests to Europe on 1386kHz from a high power 2.5MW station in Northern Russia.

Another station reported to be using the Pipeline Radio address has been heard in Suffolk on 1395 broadcasting as Radio Mayflower. This frequency is officially used by Holland and Albania but not on a 24-hour basis, so it may be worth checking here late in the evening. I believe this is a part of the London based Radio Antares group.

Radio Caroline and other broadcasters have expressed an interest in using the 500kW Merlin Communications transmitter (ORF2) at Orfordness to broadcast to Europe on 1296kHz. This station is highly directional but has been relatively under used in recent years, with most BBC programmes being aired on (ORF1) on 648kHz. I know a Radio Caroline special is planned for 1296kHz, however this was scheduled for August 19th, alas too late by the time you read this.

I have also heard tests on this frequency with announcements in English and French mentioning digital transmission quality tests from Orfordness. So there may be something of interest on this frequency soon.

Pirates On TV

A television production company have been carrying out some research for a programme about pirate radio in the London area. The completed programme is to be shown on Carlton TV, but at the time of writing I do not have a transmission date.

Their producer, Rachel Currie, has experienced some difficulty in getting many of the m.w. pirates to contribute. They feel that to appear in such a programme would almost certainly raise their unpopularity profile within the walls of the Communications Agency, which is something they would rather not do.

In July a TV programme about the history of Sealand (Roughs Tower), a self-proclaimed state, located on an old wartime sea fort off the Essex coast was broadcast by Anglia Television. Like many readers I live well outside their transmission area, so I hope this programme is eventually broadcast over the rest of the network.

Recently Sealand has been in the news regarding their proposed entry into the Internet Service Provider business, offering a secure and confidential service without the otherwise obligatory need to provide the government security services with access facilities. Sealand insists that this rusty steel and concrete structure that was sunk on the seabed eight miles off Harwich during February 1942 is not a part of the United Kingdom.

The key figures behind the Principality of Sealand are Roy Bates and his family who ran the pop pirate station Radio Essex in 1966. This was situated on a similar fort in the Thames estuary which astonishingly enough was the UKs first local radio station and the first to provide programmes 24-hours a day.

Internet Pirates

No, I am not really suggesting one can pirate the Internet, then you never know. My experience with PCs and the Internet has come perhaps a bit late in life. A very good friend let me borrow an old computer to see how I liked it, the blessed thing kept crashing, but I did catch the bug.

My eldest son just happens to be a salesman with a high street electrical company and once he discovered my new sphere of interest I found myself embarking on a financial journey into Freeserve, printers and scanners and what seems like a thousand years worth of extended warranty. I soon started the learning curve, which even with just my mini molecule brain, was not that difficult.

I found myself E-mailing relatives in New Zealand saving me pounds in postage or 'phone charges. The Web is like having the biggest reference library right there in your living room.

What about Internet radio? Well there is more and more audio coming on line all the time as there is new software to improve 'reception'. Clearly this is not DXing, but it still possesses much of the fascination attached to listening to unfamiliar stations. I am certainly interested in finding websites that are used by pirate broadcasters even if they don't contain audio.

If you enjoy communicating with like-minded people, there are list servers, you simply join a group, many are free, like the *'SWM* Readers List'. Once accepted by the list moderator, you send E-mail messages that are electronically reproduced and sent to all subscribers, a bit like a radio repeater station. It is certainly a worthwhile extension to your radio hobby.

The only word of warning is that if you don't initially have much computer technical skill, it is worth knowing someone that does. Perhaps sometime in the future a totally glitch free computer operating system will exist.

Radio Wave Chatter

Jolly Roger Radio from Waterford in Ireland has increased its power to a reported 150W on 6.234MHz. This station operates a relay facility for other stations so listen out for other IDs on this frequency.

Radio Free London have very much reduced their transmissions on 5.805MHz so as to concentrate on their m.w. activities which now on 819kHz has a new audio processing unit. A proposed frequency change has not taken place, RFL receive some splatter from the Dutch Arrow Classic Rock station on 828 in fringe reception areas.

The Radio Caroline satellite service has been relayed on short wave at the weekends on several frequencies, I am not sure who is providing this relay.

The Caroline Sales Office at **148 Grange Road, Ramsgate**, is now selling Radio North Sea merchandise, leading one to expect them to expand into other areas of anorak memorabilia.

Offshore Echos Magazine has published an article about King Radio in 1965. Which includes a reproduced GPO internal memo suggesting that the fort from which the station operated was deserted and now would be an opportunity for the government to occupy it to prevent further broadcasting from it.

According to Oscar, writing in the *Radio Argus News*, Radio Galaxy International had a close call while broadcasting from a vehicle. The police drew up alongside and requested to know what they were doing. The operators managed to convince them they were radio amateurs and the squad car left and transmissions resumed.

Radio Argus is also advertising for new staff members, qualities required are engineering skills, good presentation, the ability to buy a round of drinks, plus a possible interest in rock music.

It is worth remembering that pirate broadcasting is an illegal activity in Britain. Two operators from an Essex station KLASS FM were imprisoned for almost six months for running an illegal transmitter that causing interference on aeronautical frequencies at Rochester Airport in Kent.

Persons convicted of pirate broadcasting offences also receive an automatic five years ban on employment with legal UK stations. I would have thought the act of preventing anyone from securing a legal job where nobody else is placed at risk would be a breach of basic human rights. There again the RA have been known to issue eight year broadcasting licences to companies that have directors with pirate broadcasting convictions.

Radio Caroline News

Engineers working on the Caroline vessel *Ross Revenge* discovered a badly rusted and decayed area of the ships hull beneath the engine room floor. They feared that by clearing this they may puncture the ships hull and sink the ship, however after an ultra sound survey of the critical area it was found to be completely safe.

Electricians are also working on the 50kW RCA transmitter, which was forcefully dismantled during a DTI raid some years ago. It is hoped to see how close it can be restored to its original condition. It has also been announced that the rebellious Irish founder of Radio Caroline, Ronan O'Rahilly, sadly lost his father recently he was 96.

Top 20 S.W. Pirates.

1	Laser Hot Hits
2	Ozone
3	Pamela/Argus
4	Free London
5	Weekend Music
6	Nova
7	Jolly Roger
8	Sierra-Sierra
9	Borderhunter
10	Caroline (relay)
11	Stella
12	Cupido
13	Lisa
14	UK Radio
15	BBMS
16	Brigitte
17	Blue Star
18	Fresh Air 2000
19	Subterranean Sounds
20	Reflections

If you think your favourite station is missing, do let me know and say why it should be included. The position in the chart is based on reports and does not suggest any particular station is better than any other. Most of the above were received during Sunday on frequencies around 3.9, 5.9, 6.2 and 7.2MHz. Ozone and BBMS are considering closing due to lack of listener response to their programming.

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

LM&S

The short wave (s.w.) information detailed herein will remain applicable until Saturday October 28, when many of the International Broadcasters are likely to alter their s.w. transmission schedules to take account of seasonal variations in propagation and local time changes.

At midnight on October 28 British Summer Time (BST) will end and all clocks in the UK will be put back one hour to display Greenwich Mean Time (GMT). However, the International Broadcasters will continue to refer to the times of their s.w. transmissions in Universal Time Co-ordinated (UTC), which for most purposes is the same as GMT. If you have a clock by your receiver set to UTC, do not alter it when the changeover from BST to GMT takes place.

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 July.

Pan pipes and a talk in Romanian, broadcast by Societatea Romana De Radiodifuziune via their 1200kW outlet at Bod on **153kHz**, were heard at 2150UTC on July 25 by **Sheila Hughes** in Morden. Their transmission rated SINPO 32222. Just to make sure that it was the Romanian language she was hearing, Sheila referred to the *World Radio TV Handbook* (*WRTH*) for a fequency and time when Radio Romania Int. broadcasts in Romanian on short wave. She says "I was fortunate enough to find just that, which I tuned in on my old Panasonic and compared the talk on 153, which I had tuned in on my little Sony". From listening to R.Romania Int. Sheila also knew that Pan pipes are very popular in that country.

The broadcasts from Atlantic 252 via their 500kW outlet at Clarkestown on **252kHz** have been attracting the attention of **Bruce Watt** in W.London. He has noticed their references to "New Atlantic 252" but it is not known here if this is an official change of name. No doubt they welcome reception reports and could clarify the situation. Send them to **Atlantic 252, Mornington House, Trim, Co.Meath, EIRE.**

Medium Wave Reports

There were no reports of m.w. transatlantic reception during July, which was not unexpected. However, some interesting logs were compiled by listeners in the UK who were prepared to search the band from dusk until late at night for the sky waves from m.w. stations in the Middle East, N.Africa, Europe and Scandinavia - see chart.

The long hours of daylight encouraged some listeners to search the band for the ground waves from distant local radio stations. During a holiday in Scotland **Brian Keyte** (Gt.Bookham) set up his receiving equipment near Strathyre and tuned around the band for an hour and a half. He picked up the broadcasts from eighteen stations, some of which may be too far away for others to receive - see chart. He says "It was too early in the evening to hear anything other than 'genuine' ground wave signals".

A visit to Peterborough provided **Martin Dale** (Stockport) with an opportunity to search the band from a different location. His findings included ILR Capital Gold via Littlebourne, Kent, on **603kHz** (0.1kW), BBC Essex via Chelmsford on **765** (0.5kW) and fifteen others - see chart.

Down on the Isle of Wight **George Millmore** (Wootton) picked up the ground waves from fifty-eight stations - see chart. He says "In my log book I have a list of sixty-two local radio stations. Of these fifty-seven can generally be heard with some sort of SIO reading. The rest can be erratic". Listeners who are less successful should bear in mind that the path between his location and many of them is largely over the sea, which results in little attenuation. Another factor is the level of electrical noise which exists in some locations - it may be sufficient to mask the weaker signals.

Sincere thanks to **A.Sheldon** (Nottingham) for sending along the details of a new m.w. local radio station in his area. Named R.Kiran, it is broadcasting on **1413kHz** from Radford, with music and information intended for Asian listeners. Reports on reception from both near and far would be very welcome here for inclusion in LM&S.

Listeners:-
(A) Simon Hockenhull, E.Bristol
(B) Sheila Hughes, Morden
(C) Eddie McKeown, Newry.
(D) George Millmore, Wootton, IoW
(E) Fred Pallant, Storrington.
(F) Tom Smyth, Co Fermanagh
(G) Phil Townsend, E.London.
(H) Bruce Watt, W.London.
(I) Fred Wilmshurst, Northampton.
(J) Tom Winzor, Plymouth.

Long Wave Chart

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

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

Short Wave Reports

In the **25MHz (11m)** band Radio France International (RFI) has continued to broadcast daily to listeners in E/C.Africa on **25.820** (Fr 0900-1300). In view of the potent signals which reach the UK most days in the **28MHz** (10m) amateur band from low power radiobeacons in S.Africa there can be little doubt that reception of the RFI broadcasts is excellent.

Reception in the UK of the transmissions from RFI is unreliable because they arrive here via back scatter and other modes. The following SINPO ratings and comments were noted during July: 15332 at 0902 by **Fred Pallant** in Storrington; 33322 at 0905 by **Bernard Curtis** in Stalbridge; 35122 at 1000 by **Eddie McKeown** in Newry during a period of high sunspot activity; 24332 at 1041 by **Rhoderick Illman** in Oxted; 25232 at 1201 by **Fred Wilmshurst** in Northampton. In E.Bristol **Simon Hockenhull** watched the signal rise from barely audible to 45544 at 1110 during a sporadic E opening to S.Europe. Only sporadic bursts of back scatter were heard from 0920-1200 on July 16 by **Vic Prier** in Colyton.

Also active in this band is Radio For Peace International (RFPI), Costa Rica on **25.930** (Eng to N.America 1200-?) but there were no reports of anyone in the UK having received their u.s.b. transmission.

Good reception from many areas has been evident in the **21MHz (13m)** band. Before noon, R.Finland via Pori **21.670** (Eng to Australia, Asia, W.Eur 0630-0645) was rated 44444 at 0640 by **David Hall** in Morpeth; RAI Rome **21.520** (It to Africa 0600-1300) 44444 at 0750 in Colyton; R.Australia via Shepparton **21.725** (Eng to Pacific areas 0200-0900) 24222 at 0752 in Newry; DW via Wertachtal **21.790** (Eng to Australia, Asia 0900-0945) 44444 at 0905 in Morden; R.Australia via Shepparton **21.820** (Eng to Asia 0900-1400) 33333 at 0920 by **Thomas Williams** in Truro; R.Pakistan **21.460** (Ur to Eur 0800?-1100, Eng 1100-1105) 54445 at 0950 in Stalbridge; R.Prague, Czech Rep **21.745** (Eng to M.East, E.Africa 1130-1200) 44444 at 1135 by **Stan Evans** in Herstmonceux; UAE Abu Dhabi **21.735** (Ar to N.Africa 0700-1600) 34433 at 1156 in Oxted.

After mid-day UAER, Dubai **21.605** (Eng to Eur 1330-1350) was rated 33233 at 1336 by **Martin Venner** in St.Austell; BBC via Cyprus **21.470** (Eng to Africa 1300-1700) SIO 555 at 1400 by **Tom Smyth** in Co.Fermanagh; BBC via Ascension Is **21.660** (Eng to Africa 1400-1700) 25343 at 1547 in Northampton; WYFR Okeechobee, USA **21.455** (Eng to Eur 1600?-?) 53443 at 1741 by **Tom Winzor** in Plymouth; R.Canada Int via Sackville **21.570** (Fr to Eur 1800-2000, 2030-2100; also to Africa 1800-1900, 2030-2100) 45444 at 2040 by **Peter Pollard** in Rugby; HCJB Quito, Ecuador **21.455** (Sp [u.s.b. + p.c.]) 25552 at 2340 by **David Edwardson** in Wallsend.

The occupants of the **18MHz (15m)** band include R.Norway Int **18.910** (Norw to Australia 0900-0929), rated 34444 at 0926 in Oxted; R.Denmark via R.Norway **18.910** (Da to Australia 0930-1000) 55444 at 0930 in Morden; R.Sweden **18.960** (Eng to N.America 1130-1200) 44444 at 1140 in Herstmonceux; R.Norway Int **18.950** (Norw to N.America 1200-1229) 34343 at 1202 in Northampton; R.Sweden **18.960** (Eng to N.America 1330?-1400?) 44434 at 1334 in St.Austell; WYFR via Okeechobee, USA **18.980** (Eng to Eur 1700?-2200?) 33343 at 2040 in Rugby.

In the **17MHz (16m)** band particularly good reception of R.New Zealand's 100kW transmission from Rangitaiki, N.Island on **17.675** (Eng to Pacific areas 1755-0705) has been reported by listeners in the UK. Typical ratings were 44343, noted at 0500 by **Gerald Guest** in Dudley and 44444 at 0610 in Morpeth.

R.Australia has also been reaching the UK well. Their transmission from Shepparton on **17.750** (Eng to Asia 0000-0500, 0600-0830, 0830-1100) was rated 35543 at 0320 in Wallsend & 44444 at 0710 in Herstmonceux. Amongst the many other broadcasters using this band during the morning were R.Austria Int via ? **17.870** (Eng to M.East 0730-0800), rated 44444 at 0741 by **Vera Brindley** in Woodhall Spa; Israel R, Jerusalem **17.545** (Heb [Home Svce relay] to Eur, N.America 0600-?) 34333 at 0953 in Oxted; R.Jordan via Al Karanah **17.680** (Eng to N.America 1000-1200) 55555 at 1000 in Morden.

After mid-day the Voice of Turkey **17.830** (Eng to Eur? 1230-1325) was rated 44333 at 1230 by **Clare Pinder** in Appleby; R.Sweden **17.505** (Eng to ? 1330?-1400?) 44444 at 1330 in Truro; R.Romania Int **17.790** (Eng to Asia, Australia 1300-1356) 44434 at 1331 in St.Austell; R.France Int via ? **17.620** (Eng to E.Africa, M.East 1400-1500) 45344 at 1402 by **Tony Hall** in Freshwater Bay, IoW; BBC via Skelton & Woofferton, UK **17.640** (Eng to Eur, Africa? 0700-1500) 55555 at 1420 in Stalbridge; Swiss R.Int via Sottens **17.670** (Eng, Ger, Fr to Asia 1400-1630) 44343 at 1443 in Newry; BBC via Ascension Is **17.830** (Eng to Africa 0800-2100) 44343 at 1550 in Northampton; WHRI via Maine, USA **17.650** (Eng to Eur, M.East, Africa 1600-2200) 34433 at 1712 in Colyton; HCJB Quito, Ecuador **17.660** (Eng to Eur 1900-2200) 22222 at 1900 in Plymouth; Israel R, Jerusalem **17.535** (Eng to Eur, N.America 1900-1930) 55455 at 1920 in Rugby; R.Canada Int via Sackville **17.820** (Fr, Eng to Eur, Africa 1800-2200) 35433 at 2040 in E.Bristol; VOA via ? **17.740** (Eng to ?) SIO 333 at 2230 in Co.Fermanagh.

R.Australia has also been reaching the UK well in the **15MHz (19m)** band. Their transmission from Shepparton on **15.415** (Eng to Asia 0100-0400, 0600-0900) was rated 33333 at 0830 in Truro and **15.240** from Shepparton (Eng to Pacific areas 0100-0900) was a potent 45444 at 0838 in Freshwater Bay, IoW.

Also mentioned in the reports were HCJB Quito, Ecuador **15.160** (Eng to Eur? 0600-0800), rated 34433 at 0600 in Dudley; R.For Peace Int, Costa Rica **15.050** (Eng to N.America?) 33333 at 0825 in Stalbridge; V of Armenia, Yerevan **15.270** (Various to Eur, M.East [Eng 0840-0900] Sun) 43333 at 0850 in Herstmonceux; R.Bulgaria **15.700** (Eng to W.Eur 1100-1200) 45343 at 1101 in Newry; WWCR Nashville, USA **15.685**

Tropical Bands Chart

Freq (MHz)	Station	Country	UTC	DXer
2.310	ABC Alice Springs	Australia	2014	G
2.325	ABC Tennant Creek	Australia	2030	G
3.230	SABC Meyerton	S.Africa	2016	E
3.240	TWR Shona	Swaziland	0335	D
3.255	BBC via Meyerton	S Africa	2014	C,D,E,G
3.270	Namibian BC,Windhoek	Namibia	2012	C,E,G
3.290	Namibian BC,Windhoek	Namibia	2014	E,G
3.300	R.Cultural	Guatemala	2113	D
3.316	SLBS Goderich	Sierra Leone	2152	C
3.320	SABC (RSG) Meyerton	S Africa	2012	C,D,E,G
3.335	CBS Taipei	Taiwan	2023	E,G
3.365	GBC R-2	Ghana	2022	D,E,G
3.380	NBC Blantyre	Malawi	2017	C,D,E,G
3.915	BBC via Kranji	Singapore	2100	B,C,D,G,H
3.955	R.Taipei via Skelton	England	1800	D,F,J,I,L
3.965	RFI Paris	France	2240	C
3.970	R.Korea via Skelton	England	2100	B,D,F,H
3.975	R.Budapest	Hungary	2130	C,D,F,H,I
3.985	Nexus, Milan	Italy	1935	I
3.995	DW via Julich	Germany	2208	C,D,K
4.005	Vatican R.	Italy	0002	D
4.760	ELWA Monrovia	Liberia	2343	D
4 770	FRCN Kaduna	Nigeria	1930	A,D,E
4.775	TWR Manzini	Swaziland	0404	A,D
4.777	R.Gabon, Libreville	Gabon	2019	E
4.783	RTM Bamako	Mali	2019	A,C,D,E
4.790	Azad Kashmir R	Pakistan	0005	D
4.800	LNBS Maseru	Lesotho	1929	D,E,G
4.815	R.diff TV Burkina	Ouagadougou	2108	A,C,D,E,G
4.820	R.Botswana, Gaberone	Botswana	2012	E
4.835	RTM Bamako	Mali	2018	C,E,I
4.845	ORTM Nouakchott	Mauritania	1928	A,C,D,E,G
4.850	R.Yaounde	Cameroon	2002	A,D,G,I
4.860	AIR Delhi	India	1906	E
4.885	R.Clube do Para	Brazil	2348	A,D
4.885	KBC East Sce Nairobi	Kenya	1905	D,E
4.890	RFI Paris	via Gabon	0401	A,D
4.895	R IPB AM C'po Grande	Brazil	0315	A
4.905	Anhanguera	Brazil	0520	A
4.905	R.Nat.N'djamena	Chad	0438	D
4.915	GBC-1, Accra	Ghana	2027	A,B,C,D,E,G,I
4.915	KBC Cent Sce Nairobi	Kenya	1946	E
4.920	R.Quito, Quito	Ecuador	2145	G
4.930	Namibian BC,Windhoek	Namibia	2005	I
4.950	VOA via Sao Tome	Sao Tome	2048	D,E,F,G,I
4.960	VOA via Sao Tome	Sao Tome	0302	D
4 965	Christian Voice	Zambia	1946	E,I
4 975	R.Uganda, Kampala	Uganda	1950	A,B,D,E,G,I
4.980	Ecos del Torbes	Venezuela	0130	A,B,D
4.985	R.Brazil Central	Brazil	2320	A,D
5.009	R.TV Malagasy	Madagascar	1948	E
5.010	AIR Thiru'puram	India	0045	D
5.020	La V du Sahel,Niamey	Niger	2020	C,E,I
5.025	R.Parakou	Benin	2232	C
5.025	R.Rebelde, Habana	Cuba	0307	D
5.025	R.Uganda, Kampala	Uganda	1856	E
5.030	AWR Latin America	Costa Rica	0306	A,D
5.035	R.Bangui	C.Africa	1932	C,E,G,I
5.047	R.Togo, Lome	Togo	2021	C,D,E,G
5.050	Guangxi FBS, Nanning	China	2105	G
5.050	R.Tanzania	Tanzania	1948	D,E,I
5.055	RFO Cayenne(Matoury)	French Guiana	0410	D
5.060	PBS Xinjiang, Urumqi	China	2356	D

DXers:-
(A) David Hall, Morpeth.
(B) Simon Hockenhull, E.Bristol.
(C) Rhoderick Illman, Dxted
(D) Eddie McKeown, Newry
(E) Frad Pallant, Storrington
(F) Clare Pinder, while in Appleby.
(G) Vic Prier, Colyton.
(H) Tom Smyth, Co.Fermanagh.
(I) Phil Townsend, E.London.
(J) Martin Venner, St. Austell.
(K) Thomas Williams, Truro.
(L) Tom Winzor, Plymouth.

(Eng to N.America, Eur 1100-2100) 43443 at 1210 in Plymouth; Israel R, Jerusalem **15.650** (Eng to Eur? 1400-1430) SIO 322 at 1400 in Co.Fermanagh; WEWN via Vandiver, USA **15.745** (Eng to Eur 1000-2200) 32222 at 1402 in St.Austell.

Later, R.Japan via Moyabi, Gabon **15.355** (Eng to Africa 1700-1800) was 22222 at 1700 in Appleby; VOIRI Tehran, Iran **15.084** (Home Sce relay) 44444 at 1800 in Colyton; Africa No.1, Gabon **15.475** (Fr to W.Africa 1600-1900) 35444 at 1838 in Storrington; All India R. via Bangalore **15.200** (Eng to W.Africa 1745-1945) 45444 at 1932 in Northampton; RCI via Sackville **15.325** (Eng to Eur, N&W.Africa 2000-2300) 24332 at 2119 in Oxted; RAE Buenos Aires, Argentina **15.345** (Sp to Eur, Africa 2200-0000) 35543 at 2203 in Wallsend; BBC via Ascension Is **15.400** (Eng to Africa 1500-2300) 44544 at 2210 in E.Bristol; R.Taipei Int via WYFR **15.600** (Eng to Eur 2200-2300) 34333 at 2228 in Woodhall Spa.

In the **13MHz (22m)** band Christian Science SWB via WSHB Cyprus Creek, USA **13.650** (Eng to Africa 0700-0800, Tues & Thurs only) was 44444 at 0736 in Woodhall Spa; R.Australia via Shepparton **13.605** (Eng to Pacific 0800-1200) 22121 at 0921 in Newry; Croatian R, Zargreb **13.830** (Cr to Pacific?) 33333 at 1005 in Truro; Swiss R.Int via Sottens **13.685** (Eng, It, Ger, Fr to Australia 0830-1030) 55544 at 1025 in Herstmonceux; R.Prague, Czech Rep. **13.580** (Eng to Eur, Asia 1300-1330) 44444 at 1320 in St.Austell; UAER, Dubai **13.675** (Eng to Eur 1330-1355) 44444 at 1330 in Morden; BBC via Rampisham, UK **13.745** (Russian Service 1400-2030) 55555 at 1415 in Stalbridge; R.Austria Int via Moosbrunn **13.730** (Eng to Eur, Africa 1630-1700) SIO 433 at 1630 in Co.Fermanagh; Vatican R, Italy **13.765** (Eng [News] to Africa) 53443 at 1743 in Plymouth; V of Vietnam, Hanoi **13.740** (Eng, Fr to Eur 1800-1900) 42433 at 1808 in Colyton; Swiss R.Int via Sottens **13.770** (It, Ar, Eng, Ger, Fr to Nr.East, Africa 1830-2130) 43444 at 2000 in Appleby; RCI via Sackville, Canada **13.650** (Eng to Eur 2000-2200) 34443 at 2100 in Dudley; RCI via Skelton, UK **13.670** (Fr, Eng to Eur, Africa 1800-2200) 23332 at 2119 in Oxted; RCI via Sackville, Canada **13.670** (Eng to USA, Mexico, Caribbean 2200-0000) 45444 at 2215 in Northampton.

Radio New Zealand may also be heard in the **11MHz (25m)** band but reception in the UK is usually inferior to that obtained in the 16m band. Their transmission to Pacific areas on **11.720** (Eng 0705-1005) was rated 33233 at 0705 in Appleby & 22222 at 0900 in Truro.

Also mentioned in the reports were World Harvest R.(WHRI) via Maine, USA **11.565** (Eng to Africa 0700-0800), rated 54444 at 0732 in Woodhall Spa; DW via Nauen **11.795** (Ger to Pacific 0800-0955) 45544 at 0855 in Northampton; R.France Int via Allouis? **11.670** (Eng to Eur 1200-1257) 44444 at 1200 in St.Austell; Polish R [R.Polonia], Warsaw **11.820** (Eng to Eur? 1200-1300) 34333 at 1235 in Morden; R.Australia via Shepparton **11.660** (Various to Asia 1430-1700) 32222 at 1520 in Stalbridge; R.Jordan via Al Karanah **11.690** (Eng to W.Eur, E.USA 1100-1730) 54433 at 1530 in Herstmonceux; R.Nederlands via Tashkent **12.075** (Eng to S.Asia 1430-1630) 34233 at 1530 in Newry.

Later, AIR via Bangalore **11.620** (Eng, Hin to Eur 1745-2230) was 45434 at 1824 in Colyton; V of Mediterranean, Malta via Russia? **12.060** (Eng to Eur, N.Africa 1900-2000) 45554 at 1909 in Wallsend; R.Kuwait via Kabd **11.990** (Eng to Eur, N.America 1800-2100) 54444 at 1933 in Plymouth; China R.Int via ? **11.790** (Eng to Eur 2000-2100) 44334 at 2010 in Dudley; R.Nederlands via Flevo **11.655** (Eng to Africa 1730-2025) 43444 at 2020 in Freshwater Bay, IoW; R.Canada Int via Skelton, UK **11.690** (Eng to Eur, Africa 2000-2100) SIO 444 at 2031 by **Francis Hearne** in N.Bristol; R.Prague, Czech Rep **11.600** (Eng to Eur, N.America? 2130-2157) SIO 423 at 2130 in Co.Fermanagh; Australia via Shepparton **11.880** (Eng to Pacific areas, N.America 1700-2200) 24432 at 2123 in Oxted; BBC via Ascension Is **12.095** (Eng to S.America 2100-0300) 35333 at 2248 in E.Bristol; R.Havana Cuba **11.705** (Eng [u.s.b] to Eur? 0100-0500) 44444 at 0355 in Morpeth.

Amongst the many broadcasters noted in the **9MHz (31m)** band during the morning were TWR Monte Carlo, Monaco **9.870** (Eng to Eur 0655-0820), rated 54444 at 0744 in Plymouth; R.Australia via Shepparton **9.710** (Eng to Pacific areas 0800-0900) 33333 at 0810 in Stalbridge; R.Vilnius, Lithuania **9.710** (Eng to Eur 0930-1000) 55544 at 0955 in Herstmonceux; R.Nederlands via Wertachtal **9.860** (Eng to Eur 1030-1225) SIO 544 at 1030 in Co.Fermanagh.

During the evening the Voice of Vietnam, Hanoi **9.730** (Eng to Eur 1800-1830) rated 42333 at 1812 in Colyton; R.Nederlands via Flevo **9.895** (Eng to Africa 1830-2025) 43344 at 1830 in Dudley; R.Australia via Shepparton **9.500** (Eng to Asia 1430-2130) 32232 at 1908 in St.Austell; VOIRI Tehran, Iran **9.022** (Eng to W.Eur 1930-2030) 44444 at 1930 in Appleby; Africa No.1, Gabon **9.580** (Fr to C.Africa 0500-2200) 33343 at 1936 in Storrington; R.Pyongyang, Korea **9.335** (Eng to Eur 1900-2000) 35222 at 1947 in Newry; R.Bulgaria **9.400** (Eng to Eur? 2100-2200?) 54434 at 2103 in Freshwater Bay, IoW; R.Sweden **9.435** (Sw, Eng to Eur 2100-2200) 55433 at 2131 in E.Bristol.

Later, AIR via Aligarh? **9.910** (Eng to Australia 2045-2230) was 44444 at 2210 in Northampton; BBC via Sackville, Canada **9.590** (Eng to N.America 2200-0000) 34333 at 2330 in Oxted; R.Nac del Paraguay **9.735** (Sp 0800-0400) 34443 at 0006 in Wallsend; V of Greece **9.420** (Gr, Eng to N.America 0000-0350) SIO 333 at 0204 in N.Bristol.

In the **7MHz (41m)** band KTBN via Salt Lake City, USA **7.510** (Eng to N.America 0000-1600) rated 33333 at 0610 in Morpeth; Voice of Nigeria, Ikorodu **7.255** (Fr to W.Africa

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

Listeners:-
(A) Martin Dale, while in Peterborough.
(B) Simon Hockenhull, E.Bristol.
(C) Sheila Hughes, Morden.
(D) Brian Keyte, while near Strathyre.
(E) George Millmore, Wootton, IoW.
(F) Clare Pinder, while in Appleby.
(G) Tom Smyth, Co.Fermanagh.
(H) Phil Townsend, E.London.
(I) Fred Wilmshurst, Northampton.
(J) Tom Winzor, Plymouth.

Local Radio Chart

Freq (kHz)	Station	ILR/BBC	e.m.r.p (kW)	Listener
558	Spectrum, London	I	0.80	A,E,I
585	R.Solway	B	2.00	D
603	Capital G,Litt'bme	I	0.10	A,E,H,I
630	R.Bedfordshire(3CR)	B	0.20	A,E,H,I
630	R.Cornwall	B	2.00	E
657	R.Clwyd	B	2.00	E,H,I
657	R.Cornwall	B	0.50	E
666	Cl.Gold 666, Exeter	I	0.34	E,I
666	R.York	B	0.80	D,H
729	BBC Essex	B	0.20	E,H,I
738	Hereford/Worcester	B	0.037	C,E,H,I
756	R.Cumbria	B	1.00	D,F
756	The Magic 756,Powys	I	0.63	E,I
765	BBC Essex	B	0.50	A,E,I
774	R.Kent	B	0.70	E,H,I
774	R.Leeds	B	0.50	F
774	Cl.Gold 774, Glos	I	0.14	E,I
792	Cl.Gold 792,Bedford	I	0.27	A,E,H,I
792	R.Foyle	B	1.00	D
801	R.Devon	B	2.00	E,G
828	Cl.Gold 828, Luton	I	0.20	A,H,I
828	2CR Cl.G Bournem'th	I	0.27	E
837	R.Cumbria/Furness	B	1.50	D
837	Asian Netwk Leics	B	0.45	A,E,H,I
855	R.Devon	B	1.00	E,J
855	R.Norfolk, Postwick	B	1.50	G*,H
855	Sunshine 855,Ludlow	I	0.15	B,I
873	R.Norfolk, W.Lynn	B	0.30	A,C,E,H,I
936	Brunel CG, W.Wilts	I	0.18	E,G*,I
936	Fresh AM, Hawes	I	1.00	D
945	Cl.Gold GEM, Derby	I	0.20	A,I
945	Capital G, Bexhill	I	0.75	E,H
954	Cl.Gold 954,Torquay	I	0.32	E
954	Cl.Gold 954, H'ford	I	0.16	B,I
963	Liberty R, Hackney	I	1.00	A,E,I
972	Liberty R, Southall	I	1.00	A,E,G,I
990	R.Devon, E.Devon	B	1.00	E
990	Cl.G, Wolverhampton	I	0.09	I
999	C.Gold GEM Nott'ham	I	0.25	I
999	Magic 9-99 P'stn	I	0.80	D
999	R.Solent	B	1.00	E,H
1017	Cl.G,WABC,Shr'shire	I	0.70	H,I
1026	R.Cambridgeshire	B	0.50	A,H,I
1026	Downtown R, Belfast	I	1.70	D,G
1026	R.Jersey	B	1.00	B,E
1035	RTL C'try(Ritz)1035	I	1.00	E,G,I
1035	West Sound AM, Ayr	I	0.32	D
1107	Moray Fth,Inverness	I	1.50	D
1116	R.Derby	B	1.20	H,I
1116	R.Guernsey	B	0.50	E
1116	Valley R, Ebbw Vale	I	0.50	B
1152	Cl.G Amber, Norwich	I	0.83	A
1152	Clyde 2, Glasgow	I	3.06	D
1152	LBC 1152 AM	I	23.50	E,G,I
1152	PlymSnd AM,Plymouth	I	0.32	J
1152	Cl.G, Birmingham	I	3.00	B,I
1161	R.Bedfordshire(3CR)	B	0.10	A,G*,H,I
1161	Brunel Cl.G,Swindon	I	0.16	E
1161	Southern Counties R	B	1.00	E
1161	Tay AM, Dundee	I	1.40	D
1170	Capital G,Portsm'th	I	0.50	E
1170	1170AM,High Wycombe	I	0.25	H,I
1242	Capital G,Maidstone	I	0.32	E,H
1251	C.G Amber,Bury StEd	I	0.76	A,H,I
1260	Brunel CG, Bristol	I	1.60	E
1260	SabrasSnd,Leicester	I	0.29	I
1296	Radio XL,Birmingham	I	5.00	B,D,E,G*,I
1305	Premier via ?	I	0.50	C,E,I
1305	Touch AM, Newport	I	0.20	E
1323	Capital G,Southwick	I	0.50	C,E,H,I
1332	Premier, Battersea	I	1.00	C,E
1332	Cl.Gold 1332,Pt'bo	I	0.60	A,I
1332	Wiltshire Sound	B	0.30	E
1359	Breeze, Chelmsford	I	0.28	C
1359	Cl.Gold 1359, C'try	I	0.27	C*,I
1359	R.Solent	B	0.85	C*,E
1368	R.Lincolnshire	B	2.00	I
1368	Southern Counties R	B	0.50	C,E,H
1368	Wiltshire Sound	B	0.10	E
1377	Asian Sd, Rochdale	I	0.10	C*
1413	R.Gloucester via ?	B	?	I
1413	Premier via ?	I	0.50	E
1413	Fresh AM, Skipton	I	0.10	D
1431	Breeze,Southend	I	0.35	H
1431	Cl.Gold, Reading	I	0.14	E,I
1449	R.Peterboro/Cambs	B	0.15	A,I
1458	R.Cumbria	B	0.50	D
1458	R.Devon	B	2.00	E
1458	Sunrise, London	I	50.00	E,I
1458	Asian Netwk Langley	B	5.00	I
1485	Cl.Gold, Newbury	I	1.00	I
1485	R.Merseyside	B	1.20	E
1485	Southern Counties R	B	1.00	E,H
1503	R.Stoke-on-Trent	B	1.00	E,G,I
1521	Breeze, Reigate	I	0.64	C,E,H,I
1530	R.Essex, Southend	B	0.15	E,H
1530	Cl.Gold Worcester	I	0.52	E,I
1548	Capital G, London	I	97.50	E
1548	Forth AM, Edinburgh	I	2.20	D
1557	R.Lancashire	B	0.25	D
1557	Cl Gold 87,N.hant	I	0.76	I
1557	Capital G, So'ton	I	0.50	E
1566	CountySnd,Guildford	I	0.50	E,H
1584	London Turkish R	I	0.20	E
1584	R.Nottingham	B	1.00	I
1584	Tay, Perth	I	0.21	D
1602	R.Kent	B	0.25	E,H

1800-1900) was 23342 at 1839 in Storrington; BBC via Thailand **7.160** (Mand to Far East 2200-2300) 24343 at 2246 in Oxted; WHRI via Maine, USA **7.580** (Eng to N.America) 33223 at 0047 in St.Austell.

A few of the broadcasts to Europe in this band come from R.Japan via Woofferton, UK **7.230** (Eng, Jap 0500-0700), rated 33233 at 0600 in Appleby; WYFR via Okeechobee, USA **7.355** (Eng 0600-0800, also to Africa) 54445 at 0610 in Stalbridge; R.Slovakia via Velke Kostolany **7.345** (Ger, Eng 1800-1900) 44434 at 1844 in Colyton; RAI Rome **7.290** (Eng 1935-1955) 34333 at 1936 in Newry; R.Minsk, Belarus **7.210** (Eng ?-2000) 43444 at 1950 in Storrington; DW via Sines? **7.130** (Eng 2000-2045) SIO 444 at 2006 in N.Bristol; R.Canada Int via Woofferton, UK **7.235** (Eng 2100-2200) 54444 at 2120 in Freshwater Bay,IoW; R.Tirana, Albania **7.130** (Eng 2130-2200) 44444 at 2130 in Morden; AIR via Bangalore **7.410** (Eng 2045-2230) 43444 at 2227 in Northampton.

Some of the many broadcasts to Europe in the **6MHz (49m)** band originate from R.Vlaanderen Int, Belgium **5.985** (Eng 0700-0730), rated SIO 433 at 0700 in Co.Fermanagh; Deutschland R, Berlin **6.005** (Ger 24hrs) 24433 at 0745 in Oxted; Deutsch Welle (DW) via Julich? **6.140** (Eng Service) SIO 444 at 0758 in N.Bristol; R.Nederlands via Julich, Germany **6.045** (Eng 1030-1225) 55555 at 1125 in Herstmonceux; R.Sweden via Horby **6.065** (Eng 1730-1800) 54444 at 1737 in Plymouth; R.Budapest, Hungary **6.025** (Eng 1900-1930) 33222 at 1900 in Appleby; Bayerischer Rundfunk, Germany **6.085** (Ger 24hrs) 55534 at 1924 in Colyton; RAI Rome **5.970** (Eng 1935-1955) 45544 at 1935 in Newry; R.Yugoslavia, Belgrade **6.100** (Eng 2100-2130) 54534 at 2058 in E.Bristol; R.Japan via Skelton, UK **6.115** (Eng 2100-2200) 32222 at 2109 in St.Austell; BBC via Rampisham, UK **6.195** (Eng 0400-0700, 1900-2300) 32222 at 2130 in Stalbridge.

Good reception was noted in the UK from VOA via Sao Tome **6.035** (Eng to W.Africa 1800-2230), rated 55544 at 2220 in Northampton; WGTG McCaysville, USA **5.085** (Eng to N.America 2200-0600) 44444 at 0355 in Morpeth; WHRI South Bend, USA **5.745** (Eng to N.America 2100?-1000) 44444 at 0535 in Morden.

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 near Strathyre
(D) Eddie McKeown, Newry
(E) George Millmore, Wootton IoW
(F) Clare Pinder, while in Appleby
(G) Tom Smyth, Co Fermanagh
(H) Phil Townsend, E London
(I) Fred Wilmshurst, Northampton
(J) Tom Winzor, Plymouth

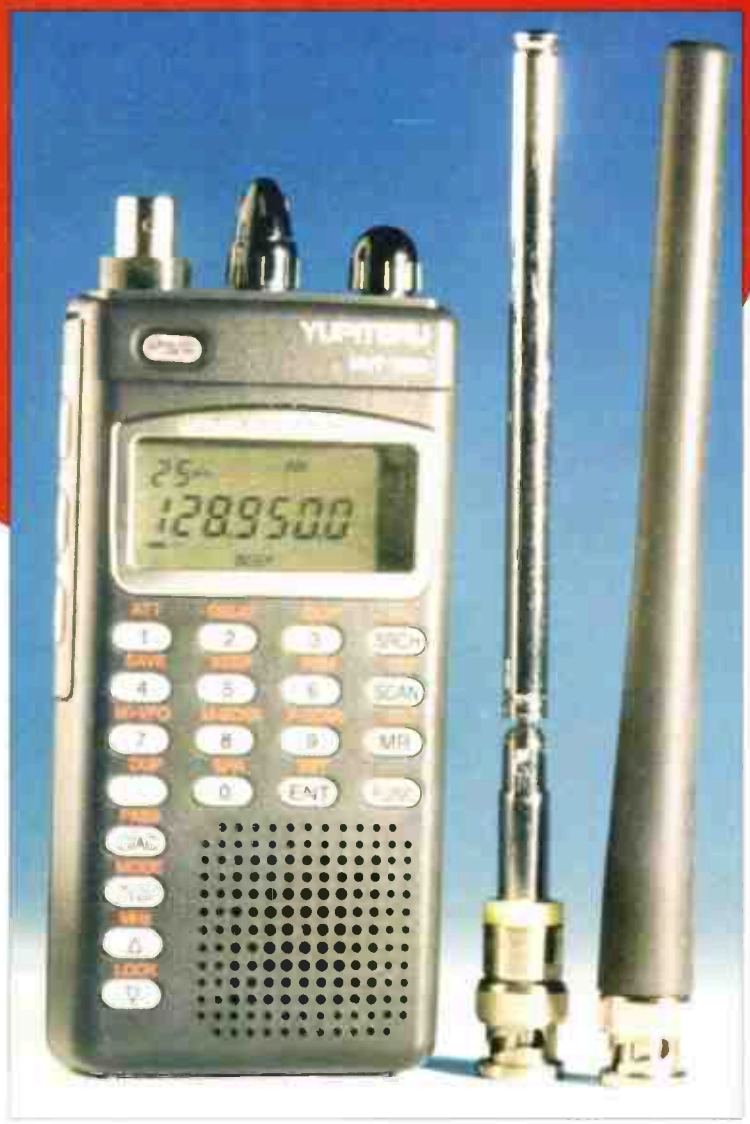
Medium Wave Chart

Freq (kHz)	Station	Country	Power (kW)	Listener
520	Hof/Wurzburg (BR)	Germany	0.2	D
531	Ain Beida	Algeria	600/300	E*
531	Torshavn	Faeroe Is.	100	C
531	Berg	Germany	20	D*,E
531	RNE5 via ?	Spain	?	E
531	Beromunster	Switzerland	500	D,G*,I*
540	Wavre	Belgium	150/50	D*,E,H,I
549	Les Trembles	Algeria	600	A*,D*,E*
549	Thumau (DLF)	Germany	200	D*,E,H,I
558	Espoo	Finland	50	D*
558	RNE5 via ?	Spain	?	A*,E*
567	Tullamore(RTE1)	Eire	500	C,D,E,G,H,I
576	Muhlacker(SDR)	Germany	500	D*,E
585	Paris(FIP)	France	8	E,H
585	Madrid(RNE1)	Spain	200	D*
585	Dumfries(BBCScot)	UK	2	C,D
594	Frankfurt(HR)	Germany	1000/400	D*,E*
594	Muge	Portugal	100	D*
603	Lyon	France	300	E
603	Sevilla(RNE5)	Spain	50	A*,D*
603	Newcastle(BBC)	UK	2	C,D*
612	Athlone(RTE2)	Eire	100	A*,C,D,E,G,I
621	Wavre	Belgium	80	E,H,I
621	Barcelona(OCR)	Spain	50	D*
630	Vigra	Norway	100	D*
630	Tunis-Djedeida	Tunisia	600	A*,D*
639	Praha(Liblice)	Czech	1500	D*
639	RNE1 via ?	Spain	?	A*,D*,E*
648	Orfordness(BBC)	UK	500	B,C,D*,E,H,I
657	Madrid(RNE5)	Spain	20	D*
657	Wrexham(BBCWales)	UK	2	A,C,D,G,I
666	MesskirchRohrd(SWF)	Germany	150	D*,I*
666	Lisboa	Portugal	135	D*
675	R10 FM	Holland	120	D*,E,H,I
684	Sevilla(RNE1)	Spain	500	D*,E*
693	Droitwich(BBC)	UK	150	E,I
693	Enniskillen(BBC)	UK	1	G
702	Flensburg(NDR)	Germany	5	D*
711	Rennes 1	France	300	D*,E,H,I
711	Laayoune	Morocco	600	E*
720	Lisnagarvey(BBC4)	N.Ireland	10	C,G
720	Lots Rd,Ldn(BBC4)	UK	0.5	E
729	Cork(RTE1)	Eire	10	C,D*,E
729	RNE1 via ?	Spain	?	D*
738	Paris	France	4	D*,E
738	Barcelona(RNE1)	Spain	500	D*,E*
747	Flevo(Hilv2)	Holland	400	D*,E,H,I*
756	Braunschweig(DLF)	Germany	800/200	D*,E*
756	Redruth(BBC)	UK	2	D
765	Sottens	Switzerland	500	D*,E*
774	Enniskillen(BBC)	N.Ireland	1	C,D,G
774	RNE1 via ?	Spain	?	D*,I*
783	Leipzig(MDR)	Germany	100	D*,E*
783	Miramar(R.Porto)	Portugal	100	E*
792	Lingen(NDR)	Germany	5	D*
792	Sevilla(SER)	Spain	20	D*,E*
792	Londonderry(BBC)	UK	1	G
801	Munchen-Ismaning	Germany	300	D*
810	Volgograd	Russia	150	E*
810	Westerglen(BBCScot)	UK	100	A*,C,D,E*,G,I*
819	S.Sebastian(EI)	Spain	5	D*
828	Rotterdam	Holland	20	D*,H
837	Nancy	France	200	D*,G*
837	COPE via ?	Spain	?	E*
846	Rome	Italy	1200	A*,D*,E*,I*
855	Berlin	Germany	100	D*
855	RNE1 via ?	Spain	?	D*,E*,I*
864	Santah	Egypt	500	D*
864	Paris	France	300	E,H
864	St.Petersburg(TWR)	Russia	?	D*
873	Frankfurt(AFN)	Germany	150	D*,E*
873	Zaragoza(SER)	Spain	20	D*
873	Enniskillen(R.UI)	UK	1	C,D,G
882	Penmon(BBCWales)	UK	10	C
882	Washford(BBCWales)	UK	100	B,D,E,G,H,I
891	Algiers	Algeria	600/300	E*
891	Hulsberg	Netherlands	20	D*
900	Milan	Italy	600	E*
909	Lisnagarvey(BBC5)	N.Ireland	10	G
909	B'mans Pk(BBC5)	UK	140	E,I
918	Domzale	Slovenia	600/100	D*
927	Wolvertem	Belgium	300	D*,E,H,I
936	Bremen	Germany	100	D*,E*
945	Toulouse	France	300	D*
954	Brno (CRo2)	Czech Rep.	200	D*,E*
954	Madrid(CI)	Spain	20	D*
963	Pori	Finland	600	D*,E*
963	Tir Chonaill	Eire	10	G
972	Hamburg(NDR)	Germany	300	D*,E*
981	Alger	Algeria	600/300	E*
990	Berlin	Germany	300	D*,E*
990	R.Bilbao(SER)	Spain	10	E*
990	Tywyn(BBC)	UK	1	D,G
999	Madrid(CDPE)	Spain	50	D*
1008	Flevo(Hilv-5)	Holland	400	D*,E,H,I
1017	Rheinsender(SWF)	Germany	600	D*,E*
1017	RNE5 via ?	Spain	?	D*,E*
1035	Lisbon(Prog3)	Portugal	120	D*
1044	Dresden(MDR)	Germany	20	D*
1044	S.Sebastian(SER)	Spain	10	D*,E*
1053	Talk Sport via ?	UK	?	D,E,I
1062	Kalundborg	Denmark	250	A*,D*,E*
1062	R.Uno via ?	Italy	?	D*
1071	Riga	Latvia	50	D*
1071	Bilbao(EI)	Spain	5	D*
1071	Talk Sport via ?	UK	?	D*
1080	SER via ?	Spain	?	D*,E*
1089	Talk Sport via ?	UK	?	D,E,G,I
1098	Nitra(Jarok)	Slovakia	1500	A*,D*,E*
1107	AFN via ?	Germany	10	D*
1107	RNE5 via ?	Spain	?	D*
1107	Talk Sport via ?	UK	?	D,E,G
1116	Bari	Italy	150	D*
1125	La Louviere	Belgium	20	D*,E*,H
1125	RNE5 via ?	Spain	?	D*
1134	Zadar(Croatian R)	Croatia	600/1200	D*,E*,I*
1143	AFN via ?	Germany	1	D*
1143	Stuttgart(AFN)	Germany	10	E*
1143	COPE via ?	Spain	2	D*
1152	RNE5 via ?	Spain	10	E*
1179	Solvesborg	Sweden	600	A*,D,E*,I*
1188	Kuurne	Belgium	5	D*,E*,H
1197	Virgin via ?	UK	?	D,E,G,I
1215	Virgin via ?	UK	?	D,E,G,I,J
1224	Lelystad	Holland	50	D*
1233	Nitra	Slovakia	40	D*
1233	Virgin via ?	UK	?	I
1242	Marseille	France	150	A*
1242	Virgin via ?	UK	?	D*
1251	Marcali	Hungary	500	D*
1251	Huisberg	Netherlands	10	D*
1260	SER via ?	Spain	?	D*
1260	Guildford (V)	UK	0.5	D*
1269	Neumunster(DLF)	Germany	600	D*,E*,I*
1278	Dublin/Cork(RTE2)	Eire	10	C,D,E*,G,I
1287	RFE via ?	Czech Rep.	?	E*
1287	Lerida(SER)	Spain	10	D*
1296	Drfordness(BBC)	UK	500	D
1305	RNE5 via ?	Spain	?	D*,E*
1314	Kvitsoy	Norway	1200	A*,B*,D,E,I*
1323	W'brunn (V.Russia)	Germany	1000/150	B*,D,I*
1332	Rome	Italy	300	D,E*
1341	Lisnagarvey(BBC)	N.Ireland	100	B*,C,E*,G,I*
1341	Tarrasa(SER)	Spain	2	B*,E*
1359	Madrid(RNE-FS)	Spain	600	B*,D*,E*
1368	Foxdale(Manx R)	Is of Man	20	A*,C,D,E*,F*,G*
1377	Lille	France	300	B,E,H,I
1386	Bolshakovo	Russia	2500	B*,D,E*
1395	TWR via Fllake	Albania	500	D
1395	Lopic	Netherlands	120/40	B,D*,E,H,I
1404	Brest	France	20	D*,E,I*
1422	Heusweiler(DLF)	Germany	1200/600	D,E*,I*
1440	Mamach(RTL)	Luxembourg	1200	D,E
1440	Damman	Saudi Arabia	1600	D*
1449	Squinzano (RAI)	Italy	50	E*
1458	Fllake	Albania	500	E*
1467	Monte Carlo(TWR)	Monaco	1000/400	D*,E*
1476	Wien-Bisamberg	Austria	600	D*,E*
1485	Carlisle(BBC)	UK	1	C
1494	Clermont-Ferrand	France	20	D*,E*
1512	Wolvertem	Belgium	300	D,E,H,I*
1521	Kosice(Cizatice)	Slovakia	600	D*,E*
1521	R Manresa(SER)	Spain	2	E*
1530	Vatican R	Italy	150/450	D,E*,I*
1539	Mainflingen(ERF)	Germany	350(700)	D,E*,I*
1539	SER via ?	Spain	?	E*
1575	Genova	Italy	50	E*
1575	SER via ?	Spain	5	D*,E*
1593	Holzkirchen(VDA)	Germany	150	D,E*
1602	Vitoria(EI)	Spain	10	D*,E*,I*

LIST OF EQUIPMENT USED - LM&S for $August, #September, *October 2000.

$ # * Vera Brindley, Woodhall Spa: Roberts R867 or Sangean ATS-803A + r.w.
\# Robert Connolly, Kilkeel: JRC NRD-525 + Timewave DSP9+ filter + Datong AD370 or Sangean ATS-803A.
$ Martin Cowin, Kirkby Stephen: Hitachi TRK-5854E or Roberts R881 + built-in whip.
$ # * Bernard Curtis, Stalbridge: Realistic DX400 + rod or r.w. in loft or Vega Selena B215 portable.
$ Martin Dale, Stockport: Grundig Satellit 3000 or Sangean ATS-803A.
* Martin Dale, while in Peterborough: Not stated.
$ # * David Edwardson, Wallsend: Trio R-600 + 22m long trap dipole.
$ # * Stan Evans, Herstmonceux: Kenwood R-2000 + Balun + 11m wire in loft.
$ Bill Griffith, W.London: JRC NRD-535 + 25m wire.
$ # * Gerald Guest, Dudley: Roberts RC818 + r.w.
$ # * David Hall, Morpeth: ADR 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 R617, R817, R876, ITT Colt.
$ Simon Hockenhull, while in Lynmouth, Devon: Roberts R617.
\# Simon Hockenhull, while in Minsterworth, Gloucester: Roberts R617.
$ # Robert Hughes, Liverpool: ADR 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.
\# Anthony Johnson, Livingston, W.Lothian: Roberts R983 or Sangean ATS-909.
$ Brian Keyte, Gt.Bookham: AOR AR7030 + loop or a.t.u. + r.w.
* Brian Keyte, while near Strathyre: ADR AR7030 + top strand of roadside fence.
$ Haleem Khan, Walsall: Not stated.
$ Conway Longworth-Dames, Brixham: Yaesu FRG-100 + r.w.
$ # * Eddie McKeown, Newry: Grundig Yacht Boy 400 or Sangean ATS-818.
$ # * George Millmore, Wootton, IoW: Racal RA17L + l.f. converter + loop or Sangean ATS-818-ACS.
$ # * Fred Pallant, Storrington: Trio R-2000 + Howes CTU8 a.t.u. + r.w.
$ # * Clair Pinder, while in Appleby: JRC NRD-525 + a.t.u. + r.w or Sony ICF-SW55.
$ # * Peter Pollard, Rugby: Sony ICF-2001D + r.w.
$ # * Vic Prier, Colyton: Redifon R551N + a.t.u. + r.w or loop in loft.
$ Harry Richards, Barton-upon-Humber: Grundig Satellit 700 + AD270 or r.w. or Grundig Yacht Boy 400 or Matsui MR4099.
$ # * Tom Smyth, Co.Fermanagh: Morphy Richards R191 or Sangean ATS-803A.
# * Phil Townsend, London: Lowe HF-225 + pre-selector + r.w. or loop.
# * Martin Venner, St.Austell: Yaesu FRG-7700 + FRT-7700 + 30m wire or Sangean ATS-818 + Global AT-1000 + 30m wire.
# * Bruce Watt, W.London: Roberts R757.
$ * Thomas Williams, Truro: Grundig 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 or Yaesu FRG-7 + Datong active antenna.

Yupiteru MVT-7300



Faris Raouf has always had a soft spot for Yupiteru scanners, in particular the MVT-7100 as it was his first 'proper' scanner. So, he was pretty excited at the prospect of reviewing Yupiteru's latest addition - the MVT-7300.

Officially this new model simply 'follows on' from the 7100 and 7200. Rumour has it that parts for the 7100 (and presumably the 7200) are getting hard to come by, however, so it may end up replacing these models completely before long. This would not be a bad thing, though, as it does almost everything the 7100 and 7200 can do, plus quite a bit more, but in a much smaller package. Some highlights include 1000 memory channels, 521kHz to 1.320GHz continuous reception range, a de-scrambler, a bug detector and 8.33kHz frequency steps.

What's In The Box?

So, if you rush out to buy one now, what do you get for your money? Well, you get the scanner itself, a telescopic antenna, a mains power supply, a belt clip, a hand strap, three AA NiCad batteries and a user manual.

Those of you who remember how appallingly badly written the original Yupiteru MVT-9000's manual was will be particularly interested to know how good, or how bad, the 7300's manual is. Unfortunately, I can't tell you, as I was supplied with a Japanese version of the scanner, which came with prototype English documentation that I can only call a 'work in progress'. Even this was reasonably clear to me, however, so I'll go out on a limb and predict that the final English manual you'll get with the proper EU version of the scanner won't be at all bad.

Turning to the scanner itself, well, it really looks great. Gone is the somewhat cheap and cheerful 'Radio Shack' look and feel of the 7100 and 7200, replaced instead with styling and construction quality closer to that of an Icom product. It is also significantly smaller than its siblings, measuring approximately 120mm high, 30mm deep, and 59mm wide as opposed to the 7100's dimensions of 153mm by 35mm by 63mm.

The scanner's top panel has a BNC antenna connector, a concentric volume and squelch control, and a separate continuously rotating control labelled 'DIAL'. The latter is used for various purposes including changing frequency, adjusting settings and altering scan and search directions.

Unfortunately, compared to the separate squelch and volume controls on the 7100, the concentric squelch and volume controls on the 7300 are a pain to use unless you have particularly small fingers. The problem is that trying to adjust the squelch often results in you accidentally also moving the volume control.

I wasn't particularly happy with the DIAL control, either. It is simply too stiff, and since it is quite short, and smoothly rounded over towards the top, you need to grip it really hard in order to turn it.

Moving on to the right side of the scanner, you'll find three small buttons mounted flush with the casing and labelled SCR/AMW, LAMP and MONI. Pressed by itself, the MONI button simply opens up the squelch. However, if you put the scanner in its Duplex mode (achieved by pressing two buttons on its front panel) pressing this same button instead instantly shifts frequency up or down according to a pre-set duplex gap table. This allows you to easily listen to many forms of duplex communications, and

Yupiteru MVT-7300

is a feature not found on the 7100 and 7200 models.

The LAMP button also has a dual role. By default, pressing it simply activates the 7300's lime-green display and button backlighting system, and pressing it again deactivates it. However, the 7300 actually has two sets of backlighting l.e.d.s, one lime green set and one red-orange set.

Pressing a button on the scanner's front panel labelled FUNC then pressing the LAMP button allows you to switch between the two options. This dual colour option arrangement is useless in practice, of course, but at least it is great for showing off to your friends.

Of all these side-mounted buttons, though, the SCR/AMW one is the most interesting. Pressing it by itself activates the 7300's built in frequency inversion de-scrambler, another feature not seen on the 7100 and 7200. Unlike the similar features found on some other scanners, however, you can't adjust this de-scrambler in any way. But although I didn't try it myself, it should still be good enough to deal with the type of voice scrambling systems you are most likely to come across.

Even more interesting, though, is the button's other function, which is to activate the 7300's Auto Memory Write facility, yet another feature not found on the 7100 and 7200. This facility is activated by pressing the FUNC button before the SCR/AMW button, and makes the 7300 automatically store any active frequencies you come across when in search mode into a specific set of memories. I'll explain about searching and memories in more detail a bit later, though, as I need to move on to the all-important front panel now.

Display & Keypad

Compared to the 7100 and 7200, the 7300's display is much easier to read, primarily because its frequency display is much bigger and bolder than that of its peers, but also because the entire display is slightly bigger too. There are few other differences, between the models, however. Both have full reception mode and step indicators, a ten-segment 'S'-meter, and various mode indicators, for example.

An additional indicator within the display not found on the 7100 or 7200 is a four-segment battery charge level indicator. This is extremely useful because it can tell you when you are running low on battery power well before you run out completely. Incidentally, unlike a number of other scanners, the 7300 will work perfectly when fitted with normal alkaline batteries if your re-chargeable ones run out. Yupiteru even claim that you can run it for up to 17 hours on a new set of batteries.

In terms of their layout, the 7300's controls are more widely spaced than those of the 7100 and 7200, making them easier to use. There is still exactly the same number of buttons, twenty in all, and they are almost exactly the same size, though. I won't list how they are marked - you can see for yourself from the pictures.

You'll also see from the pictures that all but one button has a second function listed directly above it. The exception to this rule is the FUNC button, which is actually the button that must be pressed in order to activate the other button's second functions.

Down To Business

So, what exactly can you do with the 7300? Well, the most basic operation is to directly enter a frequency within the scanner's supported continuous range of 521kHz to 1320MHz (this is slightly less than the 100kHz to 1650MHz range offered by the 7100 and 7200, but should not put too many buyers off). All you have to do to achieve this is to simply enter the frequency you want using the numeric and decimal keys, then press the ENT button.

Moving up or down in frequency from here can be achieved by rotating the DIAL control, or pressing the up or down arrow buttons on the front panel. These controls can also be used to adjust the step size if you first press the STEP button, and a full range is provided, including an 8.33kHz one.

Reception mode can be altered by pressing the FUNC button before the STEP button, and then using the DIAL or arrow keys as before. As with the 7100, the 7300 offers a.m., f.m., w.f.m., l.s.b. and u.s.b. modes, plus the n.a.m. (Narrow a.m.) mode found on the 7200, and a c.w. mode not found on either of the older models.

Very usefully, as well as all the available steps or reception modes, when selecting a step or reception mode you'll also find an option labelled AUTO. Selecting this will tell the 7300 to automatically select both the step and the reception mode it should use, based on a built-in band-plan. You can't individually activate automatic step or automatic mode selection, however - both are always active at once.

Searching

From your directly entered frequency, you can scan up and down in frequency automatically by pressing the SRCH (Search)

button and using the arrow buttons or DIAL control to change direction as required. Once a transmission strong enough to open up the squelch is located, the scanner will pause, continuing the scanning process a few seconds after the transmission ends.

If you want to store the displayed frequency at any time into one of the 1000 memory locations offered by the scanner, you simply press FUNC then SCAN to activate the MW (Memory Write) function. Doing so automatically writes the frequency to the memory location last selected or the location after the one last written to. In other words, you don't have to manually increment memory locations all the time before storing frequencies.

Of course, if need be, you can manually select which memory location you want the frequency stored in by entering a memory location number from 000 to 999 before pressing FUNC and SCAN. Storing memories found while searching can also be achieved completely automatically using the 7300's Automatic Memory Write feature, as I mentioned when talking about the three side-mounted buttons.

There was no mention of this feature in the documentation I received with the scanner, but it would appear that you cannot dictate where any active frequencies found are actually stored. Instead they seem always to get written to the last forty-nine memory locations, 950 to 999.

Another way the 7300 can help you to find interesting frequencies is via its scan facility. This allows you to continuously scan between two frequencies, the scanning process only pausing if an active frequency is found. Ten scan edge pairs are pre-programmed when you buy the scanner, but you can change these very easily.

Activating this feature is very easy too. All you have to do is press one of the numeric keys, 1 to 0 then the SRCH button to start the scanning process between edge pairs 1 to 10. There does not appear to be any way to scan through more than one edge pair at a time, though.

Interestingly, the 7300 also has a couple of other functions that are accessed via the SRCH key. By entering '11' or '12' using the numeric keys before pressing the SRCH button you can access the scanner's bug detection and TV audio reception modes. In bug detection mode, the 7300 repeatedly scans through 165 pre-set frequencies Yupiteru feels are most likely to be used by bugs as their transmission frequency and looks for a signal, thereby aiding in the detection of any bugs around you.

The TV Audio reception mode is similar, but instead of bug frequencies, the 7300 scans through what are supposedly TV audio transmission frequencies. None of these preset TV audio frequencies seem to match up to those used in the UK, though, but that's probably just because I had a Japanese model rather than an EU version.

Scanning Through Memories

Having found and stored some frequencies in memory, you can quickly scan through them in various ways. The simplest is to scan by bank, there being ten of these on the scanner representing memory locations 000 to 099, 100 to 199, 200 to 299 and so on. To do so all you have to do is enter the number of the bank you want to search through, then press the SCAN button.

Multiple banks can be searched sequentially by entering more than one bank number before pressing the SCAN button. Entering '0136' then pressing SCAN will search through banks 0,1, 3 and 6.

If you want to scan through selected memory locations you can do this too. Up to ten frequencies in each bank can be set to become program scan locations with the press of a button or two. Pressing FUNC then 9 to activate the P-SCAN (programmed scan) mode then scans through only these program scan locations. If need be, you can limit the programmed scan mode to scan through only the program scan channels you've set in whichever banks you want rather than all ten of them.

A few more features are also provided by the 7300. These include 500 search pass memories, into which you can store frequencies you want the 7300 to ignore during frequency or memory search and scan operations, a single programmable priority channel, and a mode-based memory scan facility.

SWM

In Use

The 7300 is undoubtedly very similar in terms of its features and facilities to the 7100 and 7200, and users familiar with the older models will be able to use the new one without referring to the manual to look up anything except how to use its unique features. Internally, however, the 7100/7200 and the 7300 are very different beasts, with few components in common.

Nevertheless, I found the 7300 to be almost exactly as sensitive as my 7100 when using the same antenna, in other words very good indeed for a hand scanner. Unfortunately, the 7300 also seems to be as unselective as the 7100, with spurii cropping up all over the place.

I also found that the 7300 seems to have a few more internal birdies, in other words internally generated signals that prevent reception that that frequency, than the 7100. None were at any important frequencies, however, and overall I'd give this scanner a good 7 out of 10 for its reception capabilities.

Yupiteru MVT-7300

Conclusion

Costing £289, the MVT-7300 is £40 cheaper than the MVT-7200. In my book, despite the older scanner having a slightly wider frequency range, this means the 7300 blows it out of the water in terms of value for money, style, features and portability. The situation is a little different when comparing the 7300 with the 7100, however, as the MVT-7300 is £40 dearer than the MVT-7100. If you have the extra money, though, I'd recommend going for the 7300 without hesitation.

Of course the MVT-7300 also has competition from scanners made by other manufacturers, Alinco's £295 DJ-X10 being a prime example. I've not had a chance to play with the Alinco myself, but on specification alone it would appear to have a significant edge on the Yupiteru. Still, I'm obviously a Yupi fan at heart, because if given the choice, I'd probably still go for the 7300. You, of course, may feel differently.

Thanks to **Waters & Stanton PLC** of **22 Main Road, Hockley, Essex SS5 4QS, Tel: 0500 737388** for the loan of the review unit. If you would like to find out about matching accessories for this product, please contact W&S direct.

WorldSpace Radio

Normally resident in sunny Portugal, Hugh Cocks investigates a direct broadcast radio network of geostationary satellites and looks at reception in the UK.

The WorldSpace project is intended to bring a wider choice of radio programmes to developing countries, whilst not aimed directly at Europe reception of their African satellite (*Afristar*), is possible. I first saw an advertisement for WorldSpace in the 1995 edition of the *World Radio TV Handbook* and was intrigued at the thought of receiving exotic radio stations in good sound quality directly from a satellite without the need for a large fixed satellite TV dish and receiver. A wide choice of stations are available including BBC World Service African stream, World Radio Network and many African broadcasters, no doubt more stations will appear as time goes by!

WorldSpace Satellite

The WorldSpace *Afristar* satellite is in geostationary orbit at 21.5°E, this is just to the east of the *Astra 1* satellite system at 19°E which transmits amongst other signals the Sky TV analogue signals and to the west of the *Astra 2A* broadcasting Digital Sky TV satellite at 28°E. *Afristar* was launched towards the end of 1998 and spent almost a year in a testing phase with the official start of transmissions being in October 1999. The satellite is unusual in that it is intended for just radio programmes and data traffic, not a TV transmission in sight! *Afristar* gives total coverage of Africa via three signal beams, Beam One points west and this gives considerable coverage into Western Europe up as far as the UK. Beam Three covers Southern Africa and Beam Two Eastern Africa, with coverage into the Arabian gulf and the western part of India. Using a high gain antenna, reception beyond the indicated coverage area is possible - see **Fig. 1**. The Asian equivalent of *Afristar*, *Asiastar* has recently been launched and should start transmitting to most of Asia in the next few months and next year the *Ameristar* satellite is due for launch which is intended to cover most of the Americas, both these satellites also have three transmission beams. The frequencies used by the system are from around 1453 to 1490MHz in the so called L-band, though at present, *Afristar*'s western beam uses from around 1476 to 1482MHz with signals transmitted with both right hand and left hand circular polarisation (see **Fig. 2** and **Fig. 3** of spectrum plot). Circular polarisation differs from vertical or horizontal (plane) polarisation in that the signal transmitted by the satellite rotates in a corkscrew like fashion, enabling easier positioning of the radio's receiving antenna towards the satellite, as long as the azimuth and elevation are about right (the forward pickup lobe of the antenna is very wide at around 80°) the antenna doesn't need to be aligned in a vertical or horizontal sense which wouldn't be the case if vertical or horizontal polarisation was used.

Sound Quality & Data Rates

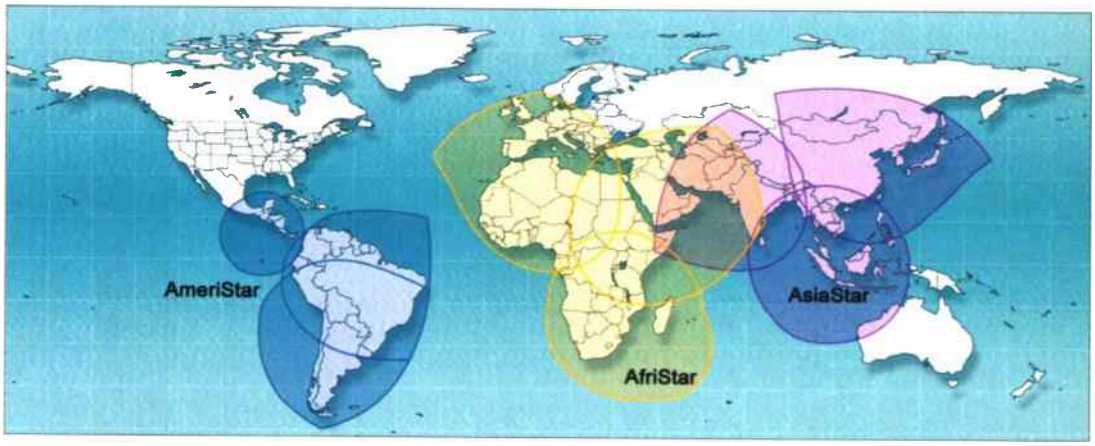
Signals from the satellite are transmitted in digital format using a WorldSpace proprietary system, by transmitting and compressing the signals digitally many radio stations can be fitted into a very small bandwidth. The bit rate on individual transmissions varies, this being set by WorldSpace and the broadcaster, no doubt the higher the rate, hence quality, the more money has to be paid to use the system. At one end of the scale most of the music channels have excellent sound quality, going to the other extreme one of the smaller African stations in particular sounds like it's been picked up off air on medium wave with some adjacent channel splatter, sent down an analogue telephone line to the up-link site and then transmits to the satellite with a very low bit rate. BBC World Service indicates that it's in stereo on the display, but in fact sounds like a mono feed. Some data channels are also conducting test transmissions via the satellite with a view to high speed Internet connection in future (this service is branded Worldscape). Before getting too excited about this prospect however I believe it will require a special card in the recipients' PC and is only going to be made available on a country by country basis once arrangements have been made with local Internet Service Providers (ISPs) regarding the terrestrial telephone return path from the subscribers' computer. It is possible that the data service may not be available to Europe at all!

Available Receivers

Four manufacturers at present produce the radios, Panasonic make a hi-fi type unit incorporating a CD player, Sharp produce a bedside clock version, JVC's offering is a modern styled 'Ghetto

Continued on page 22...

Fig. 1: WorldSpace footprints.



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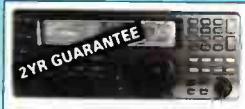
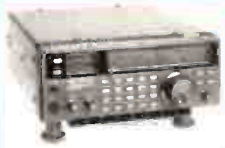


ICOM IC-8500

Next generation wideband receiver.

0.1-2GHz. (All mode)

SPECIAL OFFER £1199.95



AR5000

10kHz-2600MHz. (All mode). The professionals choice!

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ICOM PCR-1000

The PCR-1000 connects externally to your computer and offers exceptional receiver performance 0.5-1300MHz. (All mode).

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BEARCAT UBC-9000XLT

25-1300MHz wideband desktop scanner with turbo scan (AM, FM, WFM).

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This scanner covers 25-1300MHz (AM, FM, WFM).

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Never before has one hand portable offered so much.

★ Covers 530kHz-2040MHz (all mode) ★ Computer control caperbility ★ 8-33kHz steps for the new airband spacing ★ Reaction tune caperbility ★ Includes nicads charger antenna and car lead.

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Wideband hand-held scanner covers 500kHz-1650MHz. (All mode). Includes nicad car charger charger antenna. Extremely user-friendly hand-held reciever with outstanding performance unmatched by its rivals.

SPECIAL OFFER

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Soft case for 7100EU 9000 - specify.....£19.99

AOR AR8000

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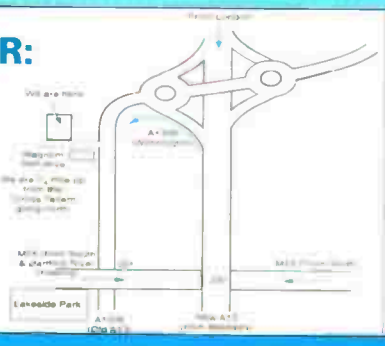

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● 0.03-60MHz (all mode). ● Synchronous AM detection ● PC control capability

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★★★★ *WRTH* gave it 4 star rating

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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.

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(Optional FM unit £35.00)

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★ 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

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SONY SW-100E

★ Miniature portable all mode SW receiver ★ Station presets for 50 frequencies ★ Single side band system ★ Synchronous detector ★ Tuning in 100Hz + 1kHz steps ★ Includes compact antenna/stereo earphones/ carrying case RRP ~~£229.95~~.

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SONY SW-30

The ideal holiday partner!
★ Fully digital world receiver ★ FM/MW/SW ★ Covers all short wave broadcast/medium wave plus FM stereo (on headphones) ★ Programmable memories ★ Digital local + world clock ★ Sleep timer + alarm function ★ 1kHz tuning for short wave ★ Auto scan ★ Short wave guide book included.
RRP £79.95.

HALF PRICE **£39.95** P&P £7.00

Once they've gone they've gone

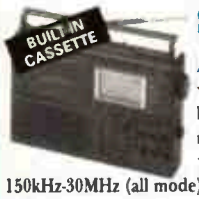
SANGEAN ATS-909

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.

SPECIAL OFFER **£129.95**
P&P £10

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

SANGEAN ATS-818 ACS



★ Portable SW receiver with built-in cassette deck ★ 54 memory presets
★ Continous coverage 150kHz-30MHz (all mode) ★ SW tuning in 1kHz steps ★ FM coverage 87.5-108MHz.

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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.

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● Barometer ● Calender ● Temp ● Auto RF synch clock from Rugby. SSP ~~£50.95~~.

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● Backlight & more
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...continued from page 18

Blaster' and Hitachi manufacture a portable receiver incorporating short wave, medium wave and f.m. bands as can be seen in **Figures 4** to **7**. This is the model (KH-WS1) of my choice as it proved to be the most practical as I do a fair amount of travelling and hauling round a ghetto blaster didn't hold much appeal! For more information on all the receivers and WorldSpace system in general, those of you with Internet access can visit the WorldSpace website at **www.worldspace.com**

Hitachi KH-WS1

Sizing up at 240 by 160 by 65mm (w x h x d), with batteries the Hitachi set weighs in at 1.9kg. Most of the WorldSpace transmissions are in stereo, but the KH-WS1 has only a mono speaker. Thoughtfully provided though are stereo line-out and headphone jack sockets, which are located on the side of the radio (**Fig. 6**) providing a facility to feed into a hi-fi system or for use with stereo headphones. Also located here is a data output port and an 'F-type' coaxial connector allowing the satellite antenna to be connected. This is achieved either via the antenna's built-in flying lead, used when the antenna is clipped onto the top of the radio, or via a coaxial extension cable. The extension cable is not supplied with the radio though the required connectors and some waterproofing tape are. The short wave and v.h.f. sections of the radio utilise a built-in telescopic rod though there's no provision for an external antenna to be connected for these bands. For medium wave an internal ferrite rod is provided. The removable satellite antenna is mounted in a plastic frame, the overall dimensions of which are 150 x 156 x 33mm (w x h x d) it can be seen in **Fig. 5**. The antenna can be clipped to the rear of the radio or used via coaxial extension cable the use of which allows the elevation of the unit. The construction of the antenna allows it to be adjusted within the plastic frame to facilitate optimum signal pickup from the satellite, an internal amplifier is contained within the antenna which takes its power via the coaxial cable from the radio allowing a fair length to be used between the antenna and the receiver without noticeable loss in signal quality. The user manual indicates up to 10m of 50Ω cable is permissible. I used 75Ω cable as this was to hand, despite being given dire warnings about using 75Ω cable as both antenna and receiver are matched for 50Ω. In practice, I found no problems at all with reception, there's no danger of damage to the radio or antenna being damaged using 75Ω cable.

Fig. 2: Spectrum display for right hand polarisation, Beam One *Afristar*.

Fig. 3: Left hand polarisation spectrum, Beam One *Afristar*. In the UK (photo taken in Portugal) the left hand polarisation is slightly weaker than the right hand beam. The level of -78dBm with a 50Ω impedance corresponds to around 28µV. The antenna will have an amplifier of possibly up to 20dB (10 times) voltage gain so the signal being received by the antenna from the satellite will be in the region of 3µV.

As signals both left hand and right hand circular polarisation are transmitted from *Afristar*, the Hitachi KH-WS1 cunningly alters the antenna supply voltage from around 2.4V to select left hand circular polarisation or 3.0V for right hand circular polarisation reception, not unlike the system used by satellite TV receivers. I wanted to see inside the plastic antenna casing to see how it worked. Removal of the back is easy but the assembly is fixed securely inside the cover with very hard to remove plastic rivets. No doubt it consists of two half wave dipoles at 90° to each other (these would be approximately 100mm long for the frequencies used) which are linked together to allow left or right hand circular polarisation, changeover being done by altering the phasing between the dipoles. I was surprised that there were no warnings in the manual about accidentally short circuiting the coaxial cable when disconnecting it from the antenna. If by chance a whisker of braid touches the inner conductor, as is all too easily done, especially if inexperienced with installing F-type plugs on to coaxial cable, then a non-functioning set would obviously result. I took extra care to avoid doing this myself but hopefully the radio has some form of d.c. short circuit current protection circuitry incorporated inside like that provided by modern satellite TV receivers. I am familiar with a certain well known make of early satellite TV receiver that would, if a prolonged coaxial short circuit was present, cause failure of the mains transformer before any fuse even thought of going open circuit. Therefore, I've always been very wary of this problem. Bear in mind if a short does accidentally occur with this Hitachi receiver, even once it's cleared you may have to switch the radio off and then on again to restore the supply to the antenna. This is due to the logic of the set, as when being placed in standby mode power supplied to the external aerial is removed. This is also the case when the conventional bands are selected.

Power requirements for the radio are provided by either four internal 'D' cells, an external 6V d.c. source or from the mains via a detachable lead. Care must be taken with the mains input though, as there is a selector switch altering the mains supply from 110 to 220V a.c. and it could accidentally be set to the wrong voltage, a label is attached to the radio warning about this possibility however and the default setting from the factory is 220V. If alkaline 'D' cells are used when going totally portable, up to 30 hours of use can be obtained

Up to ten WorldSpace channels can be memorised, together with 10 each on medium wave and f.m. The memories for short wave consist of two blocks of five as coverage is divided into two ranges, 2.3 to 7.3 and 9.5 to 26.1MHz though there are some gaps between the official broadcast bands, more on this later. The v.h.f. coverage is from 87.5 to 108MHz and medium wave from 520 to 1620kHz in 9 or 10kHz steps. The latter being required in the Americas and certain other parts of the world as opposed to the 9kHz norm in Europe, Africa and elsewhere. The American medium wave band has now been extended to 1710kHz and it was surprising to see the wider band tuning range wasn't incorporated on this set.

Satellite Reception

My initial search to find the WorldSpace signals via *Afristar* was simple, the satellite antenna clips to the back of the KH-WS1 (**Fig. 4**) it is then plugged into the F-type socket on the side of the set. After switching the radio on and pushed the 'WS/RADIO' button to select the WorldSpace band as opposed to the conventional radio bands and pointed the front of the frame antenna in the approximate direction of the satellite which, from the London area, would be an azimuth of 155° and elevation of around 28°, there must be a clear view towards the satellite though reception from inside a window normally works fine, and reception of WRN1 was there immediately! If the antenna is moved away from the direction of the satellite, eventually 'no beam' is displayed on the Hitachi KH-WS1's l.c.d. The set's antenna has a forward pickup lobe of around 80° wide, though providing the antenna is left connected the signal strength will always display a minimum of one bar out of five, this at least shows that the active antenna should be working. Obviously the antenna should be adjusted for the maximum signal strength display, once a signal is found the message 'locked' appears in the display window and if nothing has been found 'no beam' will appear. Fortunately for me and other European users, the radio defaults to *Afristar* Beam one when initially searching for signals, if you live in another footprint area a search procedure must be started. Providing you know the number of the appropriate beam press the 'mode' button followed by the 'beam' button, it needs to held until the required satellite beam (or satellite as *Asiastar* and *Ameristar* are included) is displayed and then the 'ENTER' button must be pressed. This action forces the radio to start a search on the beam selected. If you're not sure which beam or even which satellite covers your area, the radio can initiate a general search however, this is invoked by pressing the 'mode' button followed by the 'beam seek' button. All possible

Fig. 4: Front view of Hitachi receiving BBC World service. It can be seen only one service channel is available. Note that the WS indicates WorldSpace, not world service! The frame antenna can be angled down behind the radio or above as shown here, depending on which angle of the satellite relative to the receiver. The top of the set's conventional radio band switch is just visible in front of the lower right hand side of the antenna.

combinations of beams and satellites are then searched through, once a beam is found it's name will be displayed for two seconds on the KH-WS1 display and then the search will recommence. The satellite name will appear twice in the search operation as the receiver comes across both polarisations from the same beam.

Once initial set-up has been completed and you are satisfied with reception a suitable place can be found for the antenna. A likely location would be just inside a south east facing window and a coaxial extension cable can be made up to connect the antenna, in its permanent position, to the radio. Reception under certain conditions may be possible by fixing the antenna in the attic. I performed a brief test in southern UK which showed this to work well. Although when the roof tiles are wet a certain amount of signal attenuation takes place.

I noticed that in direct sunlight, the grey plastic covered antenna tended to become rather hot to touch, the instruction manual warns about prolonged exposure to sunlight. The antenna could be kept cool by placing the it in a white plastic container, signal attenuation through plastic at these frequencies is minimal. The antenna is waterproof, but if mounted permanently outside it would be best to fix it in a box which should also cover the cable connection between the flying lead and the coaxial extension cable to minimise any possibility of water ingress into the connections. I know from bitter experience that water all to easily finds its way into outside coaxial connections.

Which Stations

A current list of stations transmitted by the satellite can be seen in **Fig. 8** together with their transmitted polarisation. Bear in mind that over the course of time the station list may change, there's a lot more capacity available. Recently, for example, the French speaking service of RTL left the station list and Canal Educatif Francophone has appeared. Due to the time taken for the signals being digitally multiplexed together, up-linked to the satellite and then down-linked again I found stations in general to be three to four seconds behind the parallel terrestrial counterparts that I could receive. WorldSpace operate two up-link sites to *Afristar* in London and Johannesburg or stations have the option to use a direct link from their studios to the satellite which removes the cost of transporting their signal to either one of the two up-link facilities which can be expensive. Signal strength in Southern UK gives a four bar display out of the maximum possible of five bars on the right hand circular polarised signals, the left hand signals producing a steady three bars, moving further into the footprint in Southern Portugal produces a four to five bar output on both polarisations with the supplied antenna.

Fig. 5: Close up of WorldSpace antenna. The flying lead either connects directly into the 'F-type socket on the radio or a coaxial extension cable.

Selecting & Memorising Stations

Once a satellite has been acquired and signals have been found for the first time the various channels may be scrolled through by pushing the 'BC/FREQ UP' or 'BC/FREQ DOWN' on the radio's 4-way paddle, each station is identified in the liquid crystal display. If a station of interest is found it may be entered into memory by pressing the upper left 'Memory' button followed by one of the 0 to 9 numeral buttons, the channel is then stored in the receiver's memory in the associated memory. Each channel is referred to as a BC-Broadcaster Channel, there can be a number of Service channels or SCs transmitted on a BC, though at the moment there only seems to be one on all the channels I've picked up except on the test channel and Canal Educatif Francophone which transmit data on a second service channel. The current SC number being received within the BC is indicated beside the BCs identification, as shown in **Fig. 4** and can be selected by moving the paddle to the left and right ('SC UP' and 'SC DOWN') the receiver memories take care of remembering a particular SC within a BC, it's a shame there are only 10 memories available though. If you want to check how many SCs there are within a BC being currently received this can be done by pressing the 'Mode' button followed by the 'SC UP' or 'SC DOWN' button and the display indicates total number of Service Channels available within the BC.

Searching Stations

Many different language stations are transmitted on the WorldSpace network. If you are only interested in one particular language, a list of stations available by language can be made by the radio. The language button has to be pressed and the default language (English) is displayed, after five seconds this disappears though a 'lang' identification remains in the display window, if the 'SC UP' button is now pressed over 40 language identifications can be scrolled through. After selecting a language of interest, pressing the 'BC/FREQ UP' or 'BC/FREQ DOWN' button produces a list of stations transmitting in that language, if no stations in that particular language are available then 'no lang' is displayed. A similar facility exists for searching by programme type, pressing the 'PTY' button indicates the receiver's default to be 'NEWS', this legend disappears after five seconds leaving PTY displayed, pressing the 'SC UP' button scrolls through 15 different programme themes, for example JAZZ, POP and SPORT. Stopping on one of the list and pressing the 'BC/FREQ UP' or 'BC/FREQ DOWN' button produces a list of programmes transmitting in that theme, or if nothing is found 'No Ptype' is displayed. Being of a naturally inquisitive nature I haven't used the language/program type search facility much as the radio skips out so much of interest!

On The Move

I used the Hitachi KH-WS1 in the car. The received signal strength in southern Portugal is a higher than in the UK, there is sufficient signal, though less when the antenna is

Fig. 6: Side view of radio showing slider volume control, line-out and headphone socket and F-Type input socket from the L band antenna. The data socket is the mini DIN connector at the top.

What You Can Hear

WorldSpace Afristar Beam 1 channels

1478MHz Right Hand Circular Polarisation

BBC World Service (African stream).
WRN1 English.
WRN2 German.
Egyptian Radio, networks 1, 2 & 3 (Mainly Arabic though one network seems to be in English & French at times).
Radio Voyager (Adult Contemporary Pop Music based in the USA).
Metro East FM (Based In Kenya, aimed at Indian/Asian population).
Kenya Broadcasting Corporation (Partly in English & local languages including Swahili).
Golfe FM Benin (French, Yoruba and Fon Speaking (Yoruba & Fon are local languages).
Sud FM Senegal (French Speaking).
CNN (TV Sound).
Medi 1 Morocco (French Speaking).
Bloomberg UK (All Bloomberg, financial news channels are TV sound).
Bloomberg France.
Bloomberg Spain.
Bloomberg Italy.
Tamil Oli Radio (Aimed at Tamil Speaking expatriates in W.Africa).
LA7 Senegal (French).
Radio Espana Exterior (Spanish External Service).
Capital Radio Turkey (Pop).
Sunrise Radio (as per UK).
Test Channel (tape loop narration of tests done via Helicopter before satellite launched)*
WALF Senegal (French and Wolof Speaking, Wolof is a major regional language).
Radio 1 (Lebanese, Pop Music).
Radio France International.
Canal Educatif Francophone*.

1480.5MHz Left Hand Circular Polarisation

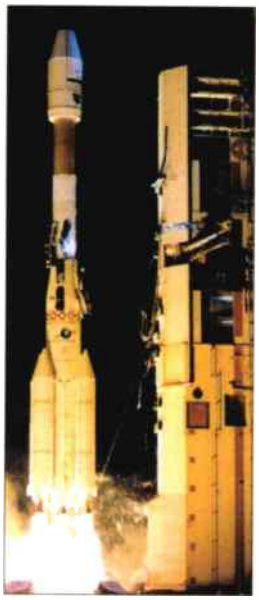
Radio France International 1.
Bob (Modern Rock).
Ultra Pop (International Pop Hits).
24 x 7 (International Dance).
Potion (Adult Contemporary).
Up Country (Country)
Riff (Jazz).
Ritmo (African Pop).
Maestro (Classical).
Earz (Programming for children).
Note, Stations Bob to Earz are 'themed' stations & produced by WorldSpace
Kaya FM 95.9 Johannesburg, South Africa (Pop Music, some news).
Africa Learning Channel.
Coded transmission.
Coded transmission.
Comet 1 data.
Comet 2A data.

Broadcast channels (BC) marked* have a second service channel (SC) transmitting data. Note that there are two 'Radio France internationals', one called Radio France International on the right hand circularly polarised signal and one called Radio France International 1 on the left hand signal.

To receive the coded transmissions you must apply with the radio serial number to a Worldspace office there is no indication on the radio display as to what these coded channels transmit.

For up-to-date channel listings on *Afristar* and other TV broadcast satellites round the world, those with Internet access should go to **www.lyngsat.com**

Fig. 7: Rear view showing mains input and 6V d.c. input sockets at the top right. The mains voltage adjustment is in the hole at the top right side of the battery compartment cover. The frame antenna slide/clip in fixing lies horizontally along the top of the radio just below the telescopic rod. The F-type antenna input socket can be seen on the left side.



mounted horizontally, due to the increased elevation angle of the satellite due to Portugal's proximity to the equator. The elevation from home is almost 10° higher than in the UK. I mounted the antenna on a roof rack cross member, fixing it securely with cable ties, the coaxial cable was fed in through the window, power being supplied by the radio's internal 'D' cells. The results were generally favourable outside built-up areas, with reception virtually all of the time. However, I did find that when in a built up area if a building blocked the antenna's view of the satellite, reception naturally enough ceased! As soon the blockage was removed, reception returned within a second. When travelling underneath overhead road signs the signals dropped out briefly when the sign impaired satellite visibility.

How strange it felt to be driving along the road listening to traffic information from KAYA FM in South Africa! I feel a better mobile antenna system might be to have two or possibly four of the same antennas at the correct elevation angle for the satellite and connected via a phasing harness. Put all these under a radome and your vehicle might start to look like the local ice-cream van however!

An effect I found driving on my local motorway was that just below the local hilltop with four channel analogue v.h.f./u.h.f. TV, assorted f.m. radio, mobile 'phone and pager transmissions the satellite stubbornly could not be received over a 1km stretch of road nearest the masts. Though there aren't any local transmissions in that frequency band, the reception black spot must be due to the amplified antenna overloading with the mass of high level local transmissions present from Band II up to the 1800MHz GSM cellular band. A point to remember is that the WorldSpace frequency range (the 1452-1492MHz L band) is allocated for digital terrestrial audio broadcasting in the future and that in some locations reception of WorldSpace will not be possible due to local interference from these signals.

Trying A Higher Gain Antenna

Reception is possible outside the published footprint areas though a higher gain antenna will be needed than the one that comes with the radio if one is way outside the published maps. A seemingly simple solution is to place the supplied antenna at the focal point of a dish and position the dish at the satellite. I tried this with a 1.2m offset dish in Southern Portugal and was rewarded with the left hand polarisation signals from Beam 2, the eastern beam of the satellite a long way from the intended coverage area. Strangely enough the right hand polarised signals could not be received, though was just detectable on the spectrum analyser display. Both these signals are about 10MHz below Beam One's output at around 1467-1472MHz. Life is never simple though and there's a complication using the supplied antenna as a feed from the dish antenna. Once the incoming signals have been reflected from the surface of the dish, their polarisation is reversed so right hand polarisation becomes left and vice versa. Unfortunately, the radio is programmed to control the receiving antenna polarity only when the antenna looks directly at the satellite, once the polarity of the signals is reversed the antenna tries to pick up the wrong polarity from the dish and almost no signal is received from the satellite due to the high rejection of reverse circular polarised signals by the flat plate antenna. I got round this problem for the test by blocking the d.c. line power going from the radio to the antenna and applying 2.4V or 3V to antenna by using a modified 'line power injector' intended for satellite TV use so I could select the polarisation independent of the radio. I wouldn't recommend this method unless you have experience in this sort of thing though. The antenna no doubt, could easily be damaged by applying too higher voltage to it. WorldSpace sell a high gain Yagi antenna and amplifiers (see their website). If you build your own antenna, it will require some pre amplification as per the supplied antenna. I guess an 'off the shelf' satellite TV 'line amplifier' might work for this application as the intermediate frequency coming from the satellite dish low noise converter is in the same range, but they are designed for the normal satellite TV line powering of between 13 and 17V, not the radio's low line voltage!

Conventional Radio Performance

The Hitachi KH-WS1 operates on the conventional radio bands by pressing the 'WS/Radio' button, bands witching between the two short wave bands, medium wave and f.m. is via a slide switch mounted on the top of the set. Short wave bands one and two are subdivided into the various conventional metre bands, for example the 31m band covers from 9.500 to 9.900MHz, this means that trying to enter the well known BBC World Service frequency on 9.410MHz produces a rather sad 'ERR' message on the display. Similarly the 25m band goes from 11.650 to 12.050MHz, so trying to enter the World Service frequency of 12.095MHz produces similar results. Rather unfortunate for me as these are normally the first two frequencies that I enter into a short wave receiver's memory, being most of the time outside the UK and I can't help but wonder why on earth the radio was designed with frequency coverage like this. The two requirements of selectivity and sensitivity appeared fairly good for a portable receiver on all bands, sensitivity on the 13m (21.450 to 21.850MHz) and 11m (25.670 to 26.1MHz), was especially good. The frequency of a signal can be directly entered after pressing the 'DIRECT' button and then stored in a memory by pressing the

'MEMORY' button followed by the number button corresponding to the location chosen. Each 'metre band' allocation can be scrolled through by pressing a button on the front panel. The 'BC/FREQ UP' and 'BC/FREQ DOWN' sections of the paddle allow the receiver to tune through the frequency ranges. Strangely, no signal strength indication is available on the conventional radio bands unlike the WorldSpace mode. Another minor gripe, is that the display panel display is not back-lit. In low light situations, it's very difficult to read the display whether in WorldSpace or conventional mode. Medium wave and f.m. performance are reasonable for a portable set, though it's best to keep in mind that the radio isn't being bought for its conventional band performance!

Other Uses For The KH-WS1's Antenna

I own an AOR AR5000 receiver, this was used in conjunction with an SDU5000 spectrum adapter to produce **Fig. 2** and **Fig. 3.** I have in the past, experimented with various dish/feed combinations to give reception of the American Forces radio feed that was until recently being transmitted via the Inmarsat satellite (*AOR-E*), in geostationary orbit around 16°W over the equator (see *page 14* SWM *September* - ***Ed.***), the frequency used was 1537MHz with right hand circular polarisation and I was keen to see if reception was at all possible using a small antenna such as this Hitachi example supplied with the KH-WS1, especially as the AFN frequency is above that used by WorldSpace, so the antenna's response might be falling off by then. The results I had were very encouraging!

Connection of the antenna to the AR5000 was very simple, I used the KH-WS1 radio was used to power the antenna as normal but I again used a two way satellite i.f. splitter with the d.c. from the WorldSpace radio to the antenna being blocked in the direction of the AOR radio so no possible short circuits or damage to the AR5000 front-end could occur. Switching between right hand and left hand polarisation was done by changing between two station preset memories with different polarisation. Moving the antenna a little to the west of the optimum position for WorldSpace reception immediately produced AFN radio, a little weak, though easily resolved, the signal is 'narrowish f.m.' with the AR5000's 30kHz filter giving best results. I found that the antenna could be set roughly midway between the two satellites to give reception of both at the same time! It says something for the AR5000's frequency accuracy that 1537.004MHz gave best reception - all of 4kHz out at 1537MHz! Placing the WorldSpace antenna at the focal point of the dish and pointing it at Inmarsat *AOR-E* produced very strong signals, though the radio had to be set to allow the antenna due to the polarisation reversal caused by reflection. Due to the forward lobe of the dish antenna being much narrower than the WorldSpace antenna alone simultaneous reception of *Afristar* and *AOR-E* was not possible. The antenna appeared to fall off in response rapidly above 1550MHz and I noticed that complete rejection of the AFN signal when the WorldSpace antenna was switched to the opposite polarity couldn't quite be achieved. In theory, almost total rejection is possible, this lack of rejection is no doubt because of the antenna being optimised for the lower WorldSpace frequency band. I guess the antenna works a little below it's intended cut-off point of 1452MHz as well, possibly there might be something out there interesting to listen to or it could be put to radio astronomy use!

WorldSpace History

1998

March - WorldSpace Chairman and CEO Noah Samara awarded Innovation Trophy by *Africa International* magazine

May - WorldSpace announces $250,000 donation and partnership with the Nelson Mandela Children's Fund

December - WorldSpace and its manufacturing partners, Hitachi, JVC, Matsushita (Panasonic) and Sanyo, unveil the world's first digital satellite receivers.

1999

January - WorldSpace names Harold "Buck" Adams, a retired US Air Force Brigadier General, its President and Chief Operating Officer. Mr. Adams brings nearly three decades of broad-based leadership experience including developing and operating entrepreneurial ventures in emerging world markets.

February - The US Government grants WorldSpace its third patent covering the receivers used in its global digital audio broadcasting system. Previous patents cover signal formatting, subscription service with encryption and broadcast signal framing and transmission techniques.

March - The WorldSpace digital satellite broadcasting system exceeds performance expectations in field testing in Africa. Testing is performed in typical operating conditions, as well as in congested urban areas, inside homes and buildings, and even in moving vehicles.

October - WorldSpace Chairman and CEO Noah Samara inaugurates WorldSpace service to Africa and the Middle East on the company's revolutionary digital satellite broadcasting system. More than 20 audio services of news, music, entertainment and educational programming are beamed to an area covering an estimated 1 billion people.

2000

March - WorldSpace successfully launches its second satellite, *AsiaStar*, which will cover most of Asia, including India, Indonesia, Phillippines and Thailand.

Obtaining A WorldSpace Receiver

Unfortunately, WorldSpace receivers are not widely available in Europe as it's not the prime target area for the service. The WorldSpace website lists a number of dealers in Africa but none here. Perhaps soon a UK dealer may be interested in stocking them. I found a radio dealer in Germany who stocks both Hitachi and JVC alternatives, their details are: **Charly Hardt, Edelhoffstrasse 70, 42857 Remscheid**. Tel: **00 49 2191 80598** Website: **www.charly-hardt.de** E-mail: **CHardt1025@aol.com** The radio costs approximately DM820 (around £265 at the current exchange rate) plus carriage. The JVC model sells for around DM100 more. In South Africa the prices are apparently a little less. Prices are expected to fall once demand picks up and this is certain to happen once *Asiastar* shortly commences transmissions, I can't see the radios being widely affordable in developing countries until this happens.

WorldSpace And How To Get It

The WorldSpace digital satellite broadcasting service is cutting-edge technology and it's making its world-wide debut in Africa.

When you look at the WorldSpace service, it's easy to break it down by beams. Each of the three beams transmitted by the WorldSpace satellites covers over 14 million square kilometres. Every WorldSpace digital satellite receiver within that beam area receives a wide variety of programming from international and regional broadcasters to unique programming created by WorldSpace.

Crystal clear, fade-free news, music, education and entertainment programs are available to more than 1 billion people in Africa and the Middle East via the WorldSpace *AfriStar* satellite. The free, multi-lingual programs can be heard on portable receivers specially designed and built for WorldSpace by Hitachi, JVC, Matsushita (Panasonic) and Sanyo.

Programming is available in English, French, Arabic, Hindi, Swahili, Tamil and Spanish.

WorldSpace-produced services available today.
24X7 (Dance) Potion (Urban)
Up Country (Country) Riff (Jazz)
Ritmo! (World Beat) Ultra Pop (Current Hits)
Bob (Modern Rock) Maestro (European Classical)
Earz (Spoken Word - youth and family)
Letters (Spoken Word - youth and family)

International, regional and local broadcasters:
Bloomberg (Int'l)
Medi 1 (Morocco)
World Radio Network (Int'l)
Kenya Broadcasting Corp. (Kenya)
CNN International (Int'l)
KayaFM (South Africa)
Capital Radio (Turkey)
Radio Asia (in Tamil & French)
Radio One (Lebanon)
Metro East FM (Kenya)
Kosmos Digitaal (South Africa)
Radio Voyager (London)
Egyptian Radio & TV Union (Egypt)
Golfe-FM (Benin)
LA 7 (Senegal)
Radio France International (Intl)
Radio Monte Carlo (Monte Carlo)
Taxi Radio (South Africa)
Ghana Broadcasting Corp. (Ghana)
Radio Sud (Senegal)
Africa Learning Channel (English)
Radio Nacional de EspaÒa (Spain)

Receivers

To ensure that the WorldSpace service is truly global and accessible to everyone, four leading consumer electronics manufacturers were asked to develop receivers. Hitachi, JVC, Panasonic and Sanyo have produced receivers that range in price from £160 to £250. If you don't have a clear view of the satellite with the patch antenna that comes with the receiver, WorldSpace has accessories to enable better signal reception.

Features: An alphanumeric display to show information such as the broadcaster's name or category of the program being received.

Presets that allow preferred channel numbers to be selected and recalled.

A program selection function that enables the receiver to scan for the type of program to be selected by language or music style.

Operation with batteries or mains.

Multimedia-capable 128-kilobit per second data port.

Detachable flat antenna with cable to allow for optimum positioning.

Built-in stereo or mono speakers.

Stereo headset output jack.

Operation in L-band to receive WorldSpace direct-to-receiver transmissions.

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Plus £7.50 Carr.
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 keypad entry. • Rechargeable batteries, AC charger and helical antenna.
Phone
Plus £8.00 Carr.
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.
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.
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
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.
IC-R2
500kHz - 1300MHz
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.
£129
Plus £7.50 Carr.
Bulk Purchase!
GARMIN GPS-12
£119.95
Plus £8.00 Carr.
Ideal for walking or driving. With 12-channel reception it locks up very fast. And with the built-in antenna it is totally shower preoof. Offers accurate positioning with selection of grids including British National Grid. Gives forward speed, compass direction, altitude, sunset/sunrise, ETA, waypoints and routes, zoom map display (user programmes points), and very accurate positioning to around 50ft. Requires 4 x AA cells (not supplied). Made by the top name in GPS, this is an absolute bargain!
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.
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
Mode:USB, LSB, CW, AM, FM, WFM.
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.
LAPTOP COMPATIBLE
£279.95
Plus £8.00 Carr.
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
GPS is now ten times more accurate!
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wsplc.com
WATSON Capture that Frequency!
10MHz - 3GHz
Hunts down Frequencies
Supplied with telescopic antenna and AC battery charger. If you are within 200 ft or so of the handheld, you should be able to read off the frequency Note it down and enter it in your scanner. It's that simple and it's pocket sized. £59.95
£9.95
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.
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.
Jumbo 12 hour radio locked clock with weather forecaster, barometer, date & time, internal temperature. Plus £2.00 Carr.
Jumbo 266mm diam wall clock 12/24 hours, day date and internal temp C or F. £34.95 Plus £2.00 Carr.
24 hour quartz clock with smaller day, date and 12 hour sweep dials. Each can be set independantly. £34.95
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
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
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
Global AT-2000
£89.95
High Quality Coax Switch
£12.95
RM-838 Radio Controlled
A radio controlled clock at a price only W & S offers! Large display with signal strngth indicator 2 programmable alarms and snooze feature £9.95
BA-928U Weather Station
£79.95
WS-Base Discone
£49.95
QS-300 Desk Stand
£13.95
QS-400
World Radio History

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* High sensitivity
* Signal strength meter
* High speed scanning & searching
* Duplex reception
* MONItor button
* Descrambler function
* Clone function
* Telescopic rod antenna
* Clock timer function
* Variable colour display
* Key illumination
* Clone function
* 8.33kHz airband spacing
* Seventeen hours of continuous use
* 12V DC/230V AC mains
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Iron Curtain Radio

The short wave bands were a fierce and noisy battleground throughout the 'Cold War'. Michael Osborn recalls listening to stations from across the Communist bloc, and how they have undergone astounding changes since 1989.

Short wave radio was once a very polluted arena where international stations from both sides of the Cold War divide tried to win the ears and minds of all listeners. As an excited newcomer to short wave, I was habitually frustrated by the mammoth signals from Radio Free Europe and Radio Moscow dominating the bands - not to mention the accompanying gridlock of jamming which smothered many lesser stations. But I was also fascinated by the clutch of voices emanating from Eastern Europe and beyond - the other side of radio's great divide.

Mightiest Station

The mightiest station was indeed Radio Moscow's World Service from the heart of the Soviet Union, which had a special service for listeners in the British Isles. The station used so many frequencies overall, that they were not individually listed until 1988.

Radio Moscow led the way in serious, sombre broadcasts, which were highly political in content. Meanwhile, another Moscow station backed up this onslaught - the grandly named Radio Peace and Progress, the 'Voice of Soviet Public Opinion', which was inevitably slanted in one direction - the official one.

Other Soviet short wave stations existed which were a little harder to pick up. Radio Vilnius and Radio Kiev from Europe were complemented by Radio Tashkent from distant central Asia, which sounded different and offered exotic local music, even if the political commentaries had a familiar ring to them.

Countries outside the Soviet Union may have projected themselves on the bands, but it was socialism all the way from Radio Polonia, Radio Prague (Czechoslovakia), Radio Budapest (Hungary), Radio Sofia (Bulgaria) and Radio Berlin International (East Germany). Often I was unnerved by a graphic item about the effects of a nuclear winter, or bored rigid by a feature about Bulgarian industrial planning.

Isolated Countries

The isolated countries of this camp were left to delight with their broadcasting eccentricities and bizarre programme content. Radio Tirana from the small, Stalinist stronghold of Albania irritated amateur operators for years by insisting on using the 40m band, and spent decades pumping out old fashioned propaganda with a rousing flourish of the Internationale.

Romania's Radio Bucharest used up its airtime singing the praises of dictator Nicolae Ceausescu and transmitting reams of impressive agricultural and economic statistics, all of it far from the truth. Meanwhile, regular presenters were denied personalities.

Socialist countries beyond the dissected continent of Europe could often be heard on the dial also. Radio Beijing from the mighty People's Republic of China broadcast to Europe. A country hugely blessed with ancient history, culture and billions of people took full advantage of this radio bounty, with cookery, music and other such programmes almost outweighing political content.

Not so their neighbour North Korea, another isolationist regime broadcasting adoring commentaries about its veteran 'Great Leader' Kim Il-Sung over Radio Pyongyang, another strange, favourite out-of-band frequencies user. I heard 6.576 and 9.345MHz the most often.

Far Removed

A piece of socialist short wave from the sunny Caribbean was never the easiest catch. Despite its revolutionary fervour, Radio Havana Cuba always sounded far removed from the dreary Europeans. Plenty of salsa rhythms during the late evening made the station a personal favourite.

A common weapon wielded from the Iron Curtain broadcasters in a bid to win more Western listeners during these years was DX or listeners' clubs. This led to a rash of short wave enthusiast shows or 'fraternal' programmes coming our way from almost every station.

Radio Berlin International's DX Club was set up in 1968, while Radio Sofia adopted an elaborate diploma system which enticed listeners to listen in, report and receive numerous QSL cards, leading ultimately to the coveted gold award. Radio Havana and Radio Beijing also held competitions with fabulous trips on offer for a little station loyalty.

Iron Curtain Collapse

Short wave radio from the Iron Curtain began its collapse before the Berlin Wall crashed to the ground in November 1989. Even Radio Moscow was moving apace with Glasnost, while Radio Polonia in Warsaw and Radio Budapest were surging ahead early as reform took hold there.

The end of the Cold War made its incredible mark upon short wave broadcasting from 1989. Hardline East Germany ceased to exist, but Radio Berlin International continued operating for another year like never before. RBI's English Section head Robin Mitchell told listeners, "We are now free to put together candid and objective reports on developments".

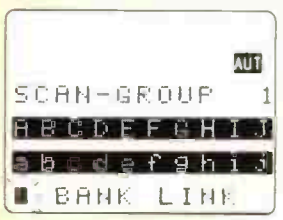
Unshackled from communist dogma, the station became very interesting to listen to and was greatly missed when it signed off for good as Germany reunified. As communism ended with peaceful protest in Czechoslovakia and Bulgaria, those stations also started on the long road to change.

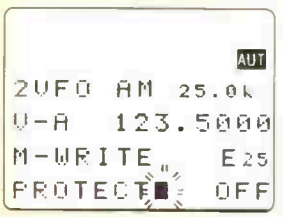
Dramatic Transformation

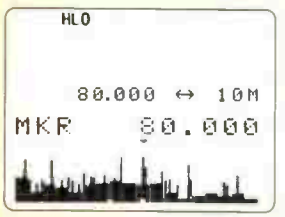
The most dramatic transformation came to Radio Bucharest, Romania. In late December 1989, the station was still broadcasting propaganda as the revolution there took shape. As Ceausescu took flight from Bucharest, the station went off air briefly, and returned with the announcement that a new government had taken over, calling themselves Radio Bucharest, Free Romania. The station was permanently renamed Radio Romania International in early 1990 and the English Section made an apology for all the lies they had previously been forced to transmit.

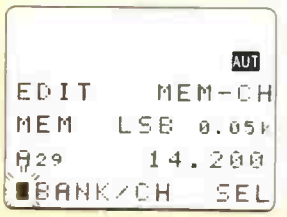
In August 1991, I tuned to Radio Moscow for the news. The station announced that Gorbachev had resigned and been replaced, which was later uncovered as a coup attempt. Socialism was in tatters and the Soviet Union ceased to exist that December. Iron Curtain radio had disappeared for good and many other stations changed their names to break with the past. Radio Moscow became the Voice of Russia, Radio Kiev adopted the name Radio Ukraine International. Even Radio Beijing, where the democracy movement had been crushed, updated its name to China Radio International.

And we have gained some new stations through the momentous changes, like Radio Slovakia International and Radio Moldova International among others. The old days of the great short wave divide are now almost a decade behind us. But Radio Hava Cuba is one old friend which remains resolutely socialist and continues to broadcast from its 'Free Territory in the Americas'. And if that is not enough, you could always try to track down the last Stalinist station and listen for "This is Radio Pyongyang..."









NEW AR8600

MOBILE - BASE - TRANS-PORTABLE

The AR8600 is an extremely versatile **all mode** receiver (**530kHz - 2040MHz**) which can be used virtually anywhere, mobile, base or trans-portable... powered from an external 12V d.c. power supply, optional d.c. lead from a 12V vehicle or from an optional internally fitted NiCad battery pack. A strong twin metal case with die cast front panel characterises the multi-purpose role. All mode receive capability is provided including Single Side Band with programmable tuning steps down to a resolution of 50Hz with the frequency established by a highly accurate Temperature Compensated Crystal Oscillator (TCXO). An RS232 port further extends the capabilities with free supporting control software available from the AOR web sites.

Although many microprocessor features have been adopted from the trendsetting AR8200 Series-2 hand portable receiver, **the AR8600 RF front-end is an all new design with preselection around VHF to ensure the highest levels of adjacent channel rejection with software spurii cancellation**. In addition to a hinged telescopic whip aerial, the AR8600 is supplied with a **detachable plug in medium wave bar aerial** which locates on the rear chassis of the receiver for localised medium wave monitoring. An additional BNC socket is mounted on the rear chassis so that **10.7MHz i.f. output** may be extracted for use with external spectrum display and vector analyser units such as the AOR SDU5500. The TCXO ensures **high stability** with **minimal internal spurii** and is usually only seen in top of the range (more expensive) models such as the AR5000 and AR7030.

The chassis is manufactured from two metal compartments, effectively a **metal chassis inside a metal cabinet...** this provides excellent screening characteristics and great robustness highlighting its multi application role. The **front panel** is also manufactured from **die-cast aluminium**. Size is 155(W) x 57(H) x 195(D) excl. projections, weight less than 2kg.

The all important **8.33 kHz airband channel step is *correctly implemented*. Computer control** is available via a standard 9-pin RS232 D-type connector on the rear chassis, just a standard RS232 cable is required for connection to a PC, the extensive RS232 command list is printed in the operating manual. In addition, **'optional internal SLOT CARDS'** (which fit into the rear chassis of the AR8600) extend the capabilities even further, five cards may be fitted with two operational simultaneously. **Supplied with:** Swivel base telescopic whip aerial, MW bar, comprehensive illustrated operating manual with RS232 listing, a.c. power supply.

AR8200 SERIES-2

NEVER BEFORE HAS ONE HAND PORTABLE OFFERED SO MUCH

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 AR8200 SERIES-2, this ensures **high stability** with **minimal internal spurii**. 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, 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 (CTCSS, tone eliminator, record / playback, external memories, voice inversion).

New Collins mechanical 300Hz filter
AR7030 & AR7030 PLUS special promotion Sept / Oct'2000

Collins Inside

The Collins name has been synonymous with high quality mechanical filters for many years and the company association with AOR is longstanding. With the boundaries of technology being pushed all the time, we are happy to announce that a new Collins mechanical 300Hz filter is now available to extend the range of available filters for use in the AR7030 short wave receiver, AR5000 & AR5000+3 wide band receiver and other units such as the AR3030.

The brief specification of the new filter is as follows:

Filter:	300 Hz mechanical
Part number:	MF300 (526-8733-010)
3dB bandwidth:	0.3kHz ± 60Hz
60dB bandwidth:	1.0 kHz maximum
Number of resonators:	7

The new MF300 is pin-compatible with the earlier MF500 filters for easy substitution and fitting. Best of all, the price is the same as the other filters in the existing range making the MF300 an ideal cost effective choice when compared to narrow CW crystal filters.

To mark the arrival of the new Collins 300Hz mechanical filter, a special promotion is being offered for all new purchases of specially produced "Collins inside" AR7030 & AR7030 PLUS short wave receivers. If you purchase a new AR7030 or AR7030 PLUS promotional set (which is available during September'00 and October'00 from participating dealers), you may have the MF300 filter pre-fitted completely free of charge, in place of the Collins 300Hz filter you may select any one Collins mechanical filter from those available:

MF300	300Hz CW filter
MF500	500Hz CW filter
MF2.5	2.5kHz SSB filter
MF4	4.0kHz narrow AM filter
MF6	6.0kHz AM filter

This will result in the AR7030 & AR7030 PLUS having five filters included in the special promotional price instead of the usual four. As an extra 'bonus', the TW7030 telescopic whip will be bundled in as part of the promotional package. The cost saving for this package based on list price is £86.95 (inc VAT). ***See the table opposite...***

The AR7030 & AR7030 PLUS are recognised internationally for their high performance and highly configurable features, this being as a result of forward thinking, innovation and attention to detail. The same careful attention is taken during the manufacture of the AR7030 & AR7030 PLUS, few mass produced units enjoy such hands-on care.

Manufacture of the printed circuit boards predominantly feature surface mount components placed by a multi-million pound automated production line, this provides high quality and repeatable results. The front panel is CNC machined to exacting standards with sub assembly being carried out by hand here in our Belper workshop ensuring close inspection and high precision.

Alignment is controlled by computer so that no point can be skipped, if the receiver fails a test, it is not possible to spuriously progress, this results in the performance of each and every set being almost identical, even in respect of signal meter calibration. The AR7030 features a TCXO (Temperature Compensated Crystal Reference) which ensures the highest stability, this reference oscillator is set up using an oven-stabilised workshop reference which is calibrated to an on-air reference.

During manufacture, the receivers are soak tested for a minimum of 48 hours and are thermally cycled as part of the synchronous AM alignment procedure (which includes temperature compensation). Final test is meticulously carried out with the receiver being tested on several signal generator determined points followed by on-air testing both from the internal speaker and headphones. Detailed records are kept for each receiver (not just by batch) and carry details of build date, notes, AGC calibration, filter bandwidths and performance parameters such as IP2 and IP3. While other manufacturers are out-working product to cost driven areas of the world, here in the UK we continue building the AR7030 with the care it deserves so that you may enjoy monitoring the world-over with the knowledge you have probably the best analogue short wave receiver ever built.

Promotional packages:-

AR7030 promotional standard receiver, 100 memories £799.00
Fitted with four filters, typical displayed bandwidths are
2.2kHz (CFJ455K14), 5.5kHz (CFW455IT), 6.5kHz (CFW455HT), 9.5kHz (CFU455G)

ADD one Collins mechanical filter free of charge (usually £74.00) **from:-**

MF300	300Hz CW filter
MF500	500Hz CW filter
MF2.5	2.5kHz SSB filter
MF4	4.0kHz narrow AM filter
MF6	6.0kHz AM filter

Free telescopic whip aerial (usually £12.95)

Promotional price ***£799.00***
You save (£74.00 + £12.95) £86.95

If required, optional NB7030 noise blanker, notch, enhanced CPU (£198.00)

AR7030 PLUS promotional receiver, 400 memories £ 949.00
Fitted with four filters, typical displayed bandwidths are
2.2kHz (CFJ455K14), 4.0kHz (CFK455J), 5.5kHz (CFW455IT), 9.5kHz (CFU455G)

ADD one Collins mechanical filter free of charge (usually £74.00) **from:-**

MF300	300Hz CW filter
MF500	500Hz CW filter
MF2.5	2.5kHz SSB filter
MF4	4.0kHz narrow AM filter
MF6	6.0kHz AM filter

Free telescopic whip aerial (usually £12.95)

Promotional price ***£949.00***
You save (£74.00 + £12.95) £86.95

If required, optional UPNB7030 noise blanker, notch, (£163.00)

The Collins filters are of course available separately, the list price is £74.00 each plus £2.00 P&P (inc VAT).

Remember, this promotion is available only via participating dealers through the months of September & October'00. The carton of the promotional AR7030 & AR7030 PLUS is clearly marked with a bright red "Collins inside" label, you choose which Collins filter is fitted - free. As a result of a choice being available, please allow a short time for orders to be passed through and processed (and for supply of further Collins filter stocks should demand for a particular type be highly requested).

Participating dealers include:

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Martin Lynch & Sons, London 0208 566 1120
Haydon Communications, Essex 01708 862524
Javiation, Bradford 01274 732146
A.R.C., Merseyside 01925 229881
Nevada Communications, Portsmouth 023 9231 3090
ASK Electronics, London 0207 637 0353
Haydon Communications, West Mids 01384 481681
Radio World, Walsall 01922 414796

AOR (UK) LTD 4E East Mill, Bridgefoot,
Belper, Derbyshire, DE56 2UA England
AOR **Tel: 01773 880788** Fax: 01773 880780
info@aoruk.com www.aoruk.com ***E&OE***

The Kitchen Cupboard Crystal Set

Could you build a radio receiver out of bits and pieces found around the house? Joe Pritchard did...read on and see how he did it.

I recently found myself wondering how radio receivers were built in the long gone pre-Maplin, pre-transistor days. One of my hobbies has always been the study of early radio, and in many early constructional articles it was expected that you might have to build your own tuning capacitors and coils, as well as cases - even resistors could be fabricated from pencil lead or other sources of carbon.

Wouldn't it be interesting, I thought, if I could try and build a radio receiver out of 'stuff' found around the house? And so the Kitchen Cupboard Crystal Set was born. I decided on a Crystal Set because there was no way I was going to be able to 'home-brew' transistors or valves - I'm good, but not that good...

I also allowed myself a luxury, I would use a crystal earpiece or a pair of high impedance headphones, but that would be it. So, all I had to do was build my own tuning capacitor, coil and detector, and I would be in business.

How The Crystal Set Works

The Crystal Set is the simplest of all radio receivers. A very basic one is shown in **Fig. 1**. The detector diode is typically a germanium device, and the signal is tuned using the coil and variable capacitor. The output of the diode is at a relatively high impedance - several thousand ohms - so the headphones or earpiece used must also be high impedance; simply plugging in your 8Ω hi-fi headphones will not work.

The most important part of this receiver, though, is a good antenna and earth. All the energy that is converted into sound by the headphones originates from the detected radio signal, so the stronger that signal is the better.

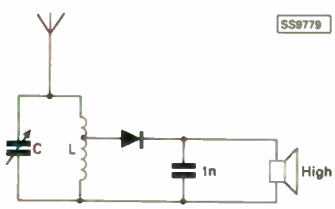


Fig. 1: A basic crystal set.

A Good Antenna & Earth System

A good antenna and earth system for a crystal set consists of a length of wire as high and as long as is practicable for the antenna and a conductor driven in to damp ground with a wire attached is used as an earth. You can get by without an earth, but you will certainly need a good antenna for this project.

I suggest taking a length of insulated wire and running it down the garden and across the bottom of the garden, forming a right angle. Don't double back on yourself, it won't give you any benefits. Try and keep the antenna insulated from things like trees and buildings.

Where you need to support the antenna use fishing line or other insulating material to provide the support. When you bring the end of the antenna into the house, take care not to trap the wire in any metal window frames, this would have the effect of earthing the antenna and effectively short circuiting the radio signal to earth.

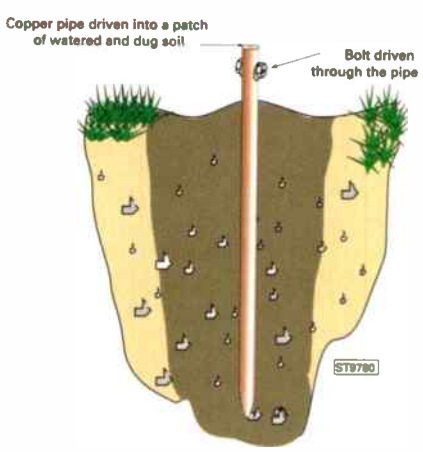


Fig. 2: A good earth connection.

The earth connection should be a length of heavy gauge wire taken as directly as possible to a conductor buried in the ground. Don't use the electrical mains earth or a gas pipe - this can be dangerous. Also, as many water pipes are nowadays made of plastic, which does not conduct electricity, connecting your earth wire to the water pipes will not help. A good earth can be made as shown in **Fig. 2**.

Winding The Tuning Coil

This is easy. I used the cardboard core of a toilet roll, though you could use any cylinder of roughly 25-40mm in diameter. Wind on to this coil former about 50 turns of enamelled copper wire, adjacent turns touching each other. Use a knife or sandpaper to clean the enamel off the ends of the wire.

Along with the tuning capacitor, the coil determines which radio signals are tuned by the receiver. You may find that you need to experiment with the number of turns on the coil, but this number of turns should allow you to hear several stations, especially after dark.

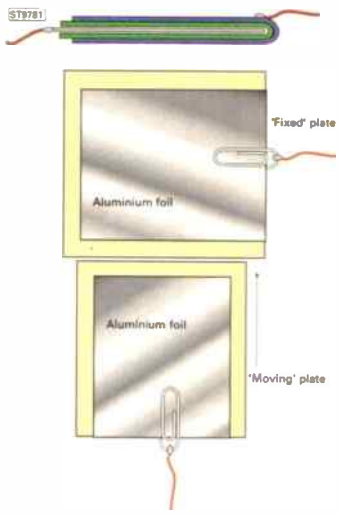


Fig. 3: The basic arrangement used for the tuning capacitor.

The Tuning Capacitor

Any capacitor basically consists of two conducting plates in close proximity insulated from each other by some insulating material - either air or some plastic material. Of course, practical tuning capacitors usually consist of a series of metal plates insulated from each other and arranged so that one set of plates can be moved relative to the other set of plates.

I decided to make a simple tuning capacitor out of two sheets of cardboard and some aluminium foil. The theory of the variable capacitor is quite simple - the capacitance is dependent upon the area of the two conducting plates that is overlapping. The more the overlap, the higher the capacitance. The relationship isn't linear. Take a look at **Fig. 3**, which shows the basic arrangement I used for my tuning capacitor.

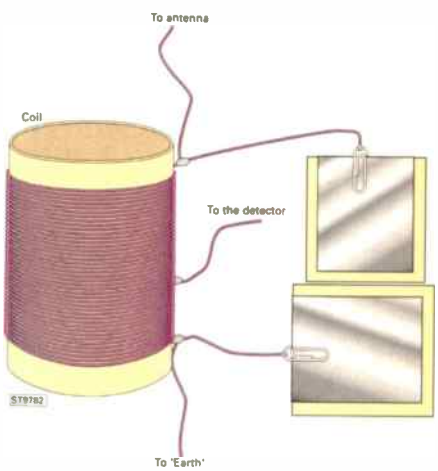


Fig. 4: How the coil and capacitor are connected.

The major problem that you will encounter with this capacitor is attaching

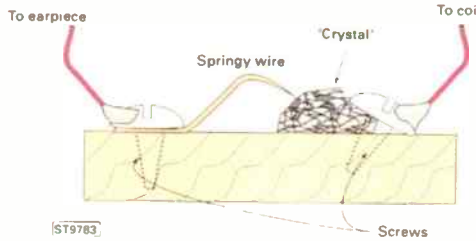


Fig. 5: The 'crystal' wired into the receiver.

the leads to the aluminium foil. Aluminium of any description is notoriously difficult to solder, and kitchen foil is virtually impossible. The best way that I found to make the connections was to use a paper clip. The wire is soldered to the clip and then the clip slid over the aluminium sheet. The thickness of the cardboard ensures that a firm connection is made.

The 'inner' part of the capacitor should be able to move freely within the 'envelope' formed by the outer part of the capacitor. The more the inner is inside the outer, the greater the capacitance of the unit.

Creating The Tuned Circuit

The coil and capacitor can be connected as shown in **Fig. 4**. Now is a good time for a further cheat, by the way. I'll describe how to make your own detector 'diode' later in this article, but for now let's make sure that the tuning assembly works by using a ready made detector.

I suggest that you get a germanium diode and hook it up as shown, along with the earpiece or headphones. Connect the antenna and earth up and vary the tuning capacitor by sliding the inner plate of the capacitor in and out of the outer plate. You should hear a few signals, especially at minimum overlap, which corresponds to minimum capacitance and the higher end of the tunable frequency range.

Once you can hear a signal or two, you may like to mark the inner of the capacitor with a marker pen to show where the loudest signals can be heard. You might also like to try changing the shape of the inner of the capacitor - for example, tapering the inner will vary the way in which the capacitance varies with the position of the inner within the outer.

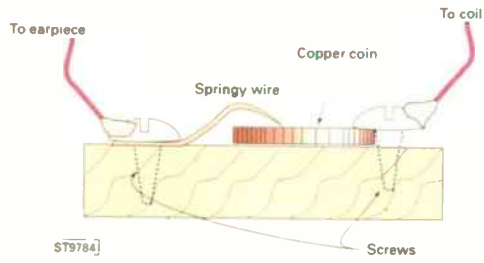
The Detector

We're now going to get really clever and basically make our own semiconductor diode. There's nothing new about this. The earliest detectors used in radio circuits were fragments of a mineral called Galena, which is crystalline Lead Sulphide. The crystal would be wired in to the receiver as shown in **Fig. 5**. The sprung wire 'whisker' is the original 'cat's whisker' which is adjusted carefully until a signal can be heard.

This type of adjustment was always very sensitive to carry out and in some circumstances even a heavy footfall nearby would disturb the contact between crystal and wire so that the detecting properties were lost. Well, if you can get hold of a piece of Galena (some souvenir shops sell it as part of 'Mineral Collections') then by all means try it out. Otherwise, here are a couple of alternatives that I've tried and found to work.

Note that this is the fiddly and frustrating part of building this receiver. The results you get will not be as good as you would get with a standard diode, but to actually get your own diode working is quite something. The signals heard will be quieter than from the diode, so adjust the variable capacitor

Fig. 6: The oxidised coin alternative detector.



to tune in a loud station before you start experimenting. Be prepared to expend a fair amount of effort here; it took me a couple of hours of work to get these home-made detectors working.

The Coke Detector

If you can find a bit of coke fuel or 'slag' from a smelter (the latter often turns up as metallic bits in building site spoil or near dumps) then you might like to try it instead of the Galena crystal. The set up is the same as shown in **Fig. 5**. Adjust the wire against the coke, trying various positions until a signal is heard. You may find that some points on the coke give louder results than others, and that even a small movement will cause loss of audio.

The Copper Detector

Copper Oxide has been used in semiconductors in the past. If you can get hold of a small piece of copper (or even a penny or two pence piece) then carefully heat the metal in a gas flame - **take great care** with this - hot metal burns people!

Let the metal start changing colour and building up a surface oxide layer, then allow it to cool. Now solder a wire to the piece of metal and again adjust the 'sprung wire'

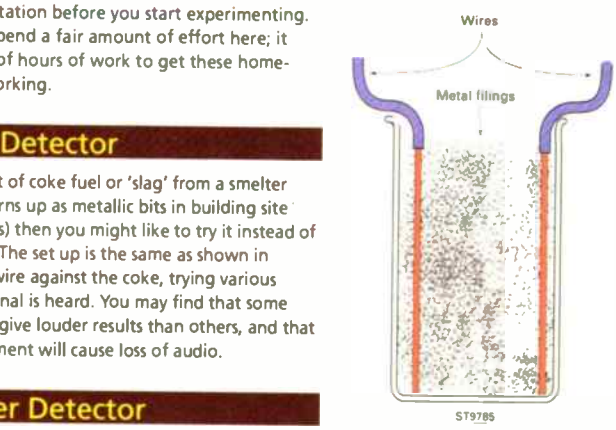
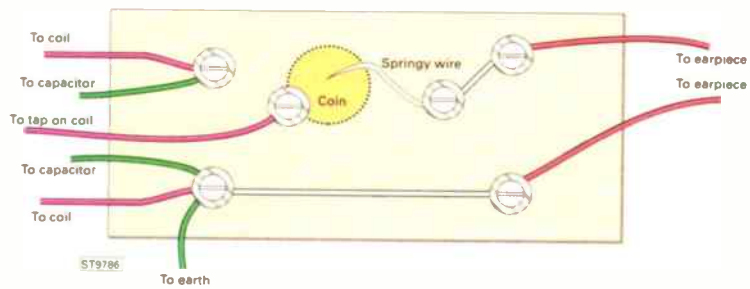


Fig. 7: Metal filings work too.



against the surface of the metal, especially around the areas where discolouration and oxide production has taken place, see **Fig. 6**. Again, adjustment of the whisker should allow a number of signals to be heard.

You might like to try other arrangements as a detector. Suffice to say that in the past finely divided metal filings have been used - **Fig. 7** - and even some electrolytic cells, where the two electrodes of the detector are separated by a conducting fluid. You'll find it a rich field for experimentation.

A possible physical layout for this receiver is shown in **Fig. 8**. I used brass screws and screw cups to link the different components together, and built the receiver on a piece of wood.

Fig. 8: A suitable physical layout for this receiver.

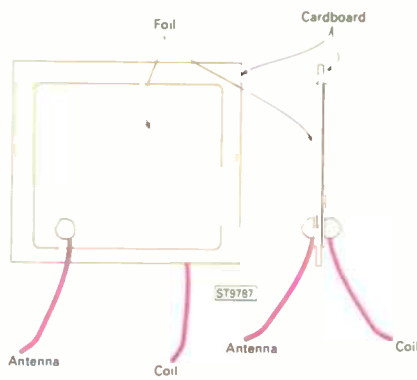


Fig. 9: A second capacitor can also be made and put between the antenna wire and the coil.

To Conclude

Building a radio almost totally from scratch is a great insight into what early radio experimenters went through to get a readable signal. You might like to consider making the construction of such a receiver a simple 'club competition', with highest marks going to the builders who've used the least number of ready made components. Let me know if anyone winds their own high impedance earpiece, by the way.

It's also a very educational project, and you'll learn a lot about how capacitance and inductance are dependent upon the physical construction of the components. Experimenting with the turns number on the coil will vary the tuned frequency range.

A second capacitor can be made and put between the antenna wire and the coil, as shown in **Fig. 9**. This allows you to improve the 'selectivity' of the receiver - the ability of the set to separate adjacent stations. There are many other experiments that can be done with this receiver. Enjoy! ◇

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- 0.03 -60MHz
- Twin PBT built-in
- PC control capability
- Synchronous AM detection

PRICE MATCH

~~£649~~ £599

JRC NRD-545

CHEQUE SPREAD

SPECIAL!

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

OPTIONAL AC SUPPLY £12

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GRUNDIG YB400

CHEQUE SPREAD

PRICE MATCH

PORTABLE SW RADIO

Best performance for price size combination 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

- 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

£120

AR 8200 Mk II

SPECIAL!

- 530kHz 204MHz
- All Mode including 8 33kHz AM
- 1000 Memories
- Plus LOTS MORE!

~~£439~~ £399.95

We carry the FULL RANGE of accessories!

LATEST model

PRICE MATCH

YAESU FRG-100

CHEQUE SPREAD

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

~~£399~~ £369

FAIRHAVEN RD-5000X

NEW UPDATED MODEL · 20kHz · 1.7GHz

CHEQUE SPREAD

IN STOCK READY TO SHIP

~~£849~~ £799

YAESU VR 500

ULTRA COMPACT RADIO

- 100kHz - 1299995MHz
- FM with FM, USB, LSB, CW, AM
- 1091 Memory channels
- Weight 220 g!
- C/w Antenna, carrystrap, Belt clip
- Optional Charger NC60

SPECIAL!

~~£249~~ £199.95

SANGEAN ATS909

CHEQUE SPREAD

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

~~£179~~ £169

SANGEAN ATS818

UNBEATABLE VALUE FOR MONEY!

SPECIAL!

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- 150kHz -29 99MHz
- 87 5MHz - 108MHz
- 54 memories
- AM/FM/SSB
- AM Wide/Narrow filter
- RF gain control

OPTIONAL MAINS ADAPTOR £9.95

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

ICOM IC-R2

- 500kHz -1310MHz
- AM/FM/WFM
- 400 memories

SPECIAL!

~~£149~~ £129

ROBERTS R861

CHEQUE SPREAD

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

FULL RANGE OF ROBERTS IN STOCK - CALL

~~£199~~ £179

SONY SW30

FULLY DIGITAL WORLD BAND SHORTWAVE FM, MW & LW PORTABLE RADIO

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GRUNDIG YACHT BOY 500

- Covers:
  - 1 6kHz-30MHz SW
  - 513kHz 1611kHz MW
  - 150kHz-353kHz LW
  - 87 5-108MHz FM STEREO
- Modes AM/FM/SSB
- Radio Data System
- 40 Station Memory
- Dual Alarm Clock
- Supplied c/w Leatherette Carrying case
- mains

SPECIAL PURCHASE

£139

JRC ST3

HEADPHONES

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

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AOR AR 5000

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IN STOCK READY TO SHIP

~~£1,595~~

PRICE MATCH

- 10kH - 2.6GHz

All mode top class receiver & scanner packed with features

AR 5000+3 ..... £1799

YAESU VR 5000

CHEQUE SPREAD

NEW

- 100kHz - 1 300MHz
- Multi mode
- Real time band scope
- Optional DSP bandpass, notch & noise reduction
- Optional filters

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WIDEBAND PREAMP

Improve the reception of your scanner!

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

Price drop

£59.95

AOR AR 3000A

SHIPPED TODAY!

CHEQUE SPREAD

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Classic receiver as used by Government, Military etc

AR 3000A+ ..... ~~£895~~ PRICE MATCH

ICOM PCR 1000

PRICE MATCH

COMPUTER RADIO SYSTEM

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

CHEQUE SPREAD

PCR OPTION DSP UNIT UT 106 ~~£89.00~~

~~£349.95~~

Palstar AM30

~~£79.95~~ £69.95

- ACTIVE ANTENNA
- SHORTWAVE PRE-AMPLIFIER
- ACTIVE ANTENNA/TUNER
- Freq: 100kHz-30MHz
- Power: 12V DC/battery supplied
- Antenna: Telescopic whip included for use as an active antenna

COMBINING 3-IN-1 UNIT

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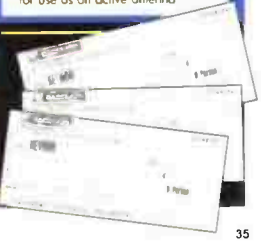

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COMING NEXT MONTH

IN THE UK'S ONLY INDEPENDENT AMATEUR RADIO MAGAZINE

REVIEWED

- **Rob Mannion G3XFD**'s been busy on the air again - this time he's been trying out the Albrecht AE485S single band 28MHz a.m./f.m./s.s.b. mobile transceiver

RESULTS TIME!

- **Neill Taylor G4HLX** rounds-up the winners of this year's *PW* QRP Contest

BACK TO BASICS

- Soldering, hints tips and basic techniques from **Rob G3XFD** as 'Radio Basics' makes a welcome return to *PW*'s pages ready for the autumn and winter season.

ANTENNAS IN ACTION

- **Tex Swann G1TEX** has an abundance of antenna ideas in his bi-monthly look at all things antenna related

Plus all your regular favourites including:

- Bargain Basement
- Carrying on the Practical Way
- Keylines
- Looking At...
- News
- Radio Scene
- Valve & Vintage
- Antenna Workshop

and much, much more!

*Contents subject to change

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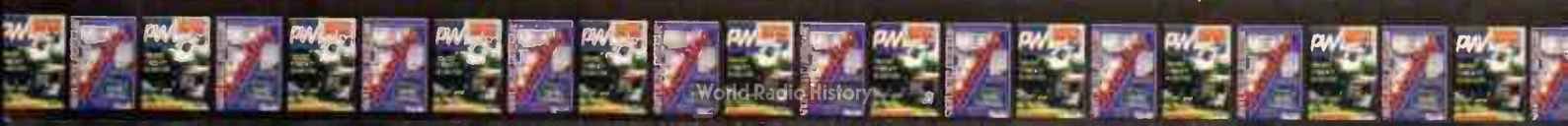


Book Profiles

This month we've gone Klingenfuss crazy, and are offering you five books and a CD-ROM, all at a knock down price - bargain. Remember, you can order your books by phone, FAX, E-mail or post.

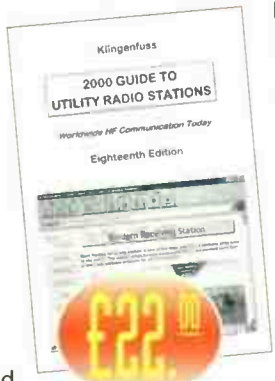
Klingenfuss Radiotelex Messages - 1st Edition

Classed as the most comprehensive, reliable and up-to-date manual in existence, *Klingenfuss Radiotelex Messages* contains world-wide aeronautical, company, diplomatic, intelligence, maritime, meteorological, military, navigation, police, press, public and secret radiocommunications on short wave. Contents include: 25 years of global radio monitoring between 1973 and 1998, Q-code, Telex code, Z-code, 136 countries, 693 stations and 1004 sample messages and screen shots with full technical details. Normally priced at £20, we can offer this book to you for just **£18**.

If you are at all interested in h.f. data reception, this book is a must - ***Ed.***

Klingenfuss 2000 Guide To Utility Radio Stations - 18th Edition

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 screenshots, 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 **£22** (normally £30).



Klingenfuss 2000 Super Frequency List (CD-ROM)

The *2000 Super Frequency List* on CD-ROM includes the latest clandestine, domestic and international short wave broadcasting schedules, plus the most up-to-date utility frequency list available world-wide. These unique databases are available in printed form also, and added again is a clearly arranged and easy to use alphabetical list of stations. The software runs under *Windows 3.1* and *Windows 95/98*, so whether you are an international radio listener, a businessman, a utility enthusiast or a tourist travelling world-wide, with just a few key strokes, you have it all! Available for **£18** (normal price £23).

Klingenfuss Radio Data Code Manual - 16th Edition

This book should find a place on the book shelves of anyone with more than a casual interest in monitoring the h.f. bands for data signals. More than 10,000 meteorological station index numbers are listed, 11,000 ICAO aeronautical station location indicators, 3400 aeronautical company designators and 1000 aircraft type designator. Plus the latest World Wide Web locations for solar and geophysical data, cryptology, intelligence and secret services information. Usually priced at £30, offered to you for **£26**.

I wouldn't be without mine - ***Ed.***

Klingenfuss 2000 Shortwave Frequency Guide - 4th Edition

The fourth edition of this frequency guide contains a new, clearly arranged alphabetical list of stations, user-friendly listings in a convenient frequency order, 10700 entries covering all broadcast stations world-wide, 11300 entries covering all utility stations world-wide and full details of the future of digital modulation broadcast techniques, all in a modern layout for easy use and quick information access. Order your 2000 copy now for **£18** (usually priced at £23).

Klingenfuss 1999/2000 Guide To World-Wide Weather Services - 19th Edition

Now in its 19th edition, 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. We can offer you the chance to purchase this book for just **£18**, instead of the usual £23.

New at ML&S

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 Dimensions	30-50mm can be fitted **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 Dimensions	30-50mm can be fitted 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 100MHz 18dB 1400MHz 16dB 2000MHz
Noise figure	1.5-2dB 100MHz 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.

NOW BACK IN STOCK!

The JRC NRD 545 Deluxe Receiver

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 DEPOSIT & 48 payments of only £57.63 p/m

Save almost £500 off the package deal & pay nothing until MARCH 2001

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

NEW YAESU VR5000

Yaesu have just announced a new base scanner. This is their first scanner

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.

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!

Yaesu VR-500

Pocket Scanner

100kHz - 1.3GHz
AM/FM/WFM/
SSB/CW
BAND SCOPE
PC PROGRAMMABLE

Only £199.95

Icom IC-R75E

AVAILABLE ON FREE FINANCE - ZERO APR
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Internationally accepted as the benchmark receiver throughout the world, the NRD-545 is still the professional's choice.

The JRC NRD-345

New Lower Price!

RRP: £699... ML&S: ONLY £369!
OR WITH PSU: £399

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

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.

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.

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AVAILABLE ON FREE FINANCE - zero apr
ONLY £49 DEPOSIT, THEN 12 x £25 p/m.
including a **FREE** MyDEL ATU AT2 **worth £69.95!**

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.

Icom ICR-2E
INCLUDING MATCHING ICOM LC-143 CARRY CASE & FREE CARRIAGE.
£149.00

New at ML&S

Garmin Street Pilot

The Street pilot is an excellent in car GPS unit with map detail down to street level. The amber backlit display is easy to read and makes the unit Ideal for navigation in unknown territory. The Street Pilot is also at home with APRS when used in conjunction with a THD7E or TMD700E. Supplied with *The UK Metro Guide* on CD Rom, an 8mb Ram module cigar Lead, PC lead and a magnetic roof mount antenna the system is all **ready to go at £595.00** including delivery to your Door.

Garmin E Map

The Garmin Emap is a hand held version of the Street Pilot and comes with Data lead,8 mb Ram Card & *UK Metro Guide* on CD Rom at **only £329.00.**

The Garmin GPS3plus

The ever popular GPS3 now has more map detail and allows upload to street level. **Available at £339.00**

Road and Recreation CD Rom available at £99.00

FINANCE EXAMPLE
All examples do not include P&P.

Cash Price	Deposit	PAID IN 6 MONTHS	APR
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OR

Cash Price	36 Payments of	Total Credit Price (T.A.P.)	APR
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	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 TRAFFIC CONTROL 7th Edition Graham Duke	112	£8.99
AIRWAVES 2000	134	£9.95
CALLSIGN 2000	168	£9.95
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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	£18.00
WEATHER REPORTS FROM RADIO SOURCES Philip Mitchell	32	£7.50
RADIO DATA CODE MANUAL 16th Edition Joerg Klingenfuss	788	£26.00
RADIOTELEX MESSAGES (25 Years of Monitoring Global Teleprinter & Data Communications 1st Edition	568	£18.00

DXTV

DXTV FOR BEGINNERS Simon Hamer	31	£3.95
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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	£18.00
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	£22.00
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RADIO LISTENERS GUIDE 2000	128	£4.95
SHORTWAVE FREQUENCY GUIDE 2000 - 4th Edition Joerg Klingenfuss	564	£18.00
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
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RADIO SCIENCE OBSERVATION Volume 1 (Inc CD-ROM) Joe Carr	414	£26.95
SHORT WAVE COMMUNICATIONS Peter Rouse GU1DKD	187	£4.50
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SHORTWAVE RECEIVERS PAST & PRESENT (NEW 3rd Edition)	450	£25.95
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Maritime

ELECTRONICS AFLOAT Tim Bartlett	92	£8.95
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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

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More Ruined Radios

As the madness of mid life looms, Bob Ellis looks back to a more comforting time from his past.

I shall be 45 this year and while I sit waiting for the next mid-life crisis to show up, it occurs to me I have lived through about four sunspot cycles. Each one had me going through hoops to get the best out of the kit I had at the time, hence all those catastrophic mods listed in these pages. Anyway, it's good therapy writing about it. I've come out now...

Some History

About this time, thirty some years ago, a grey Rover with my initials on the plate pulled away from Derby School on our first run up to The Rose and Crown. As I write this, the Rover brand is heading to be as collectible as Eddystone and the custom plate was only a coincidence.

When you take a pub, most folk think you own the place. Not so. You rent them, then go into a thirty year war with the brewery over getting any repairs done. The Crown was an ex-coaching inn with stables at the back and lots of disused rooms.

Mine was Room 2 with an off-suite olive green bathroom and a view over the stable block and the incinerator. It got the sun for about half an hour on the morning of the solstice. It was the start of a long and happy time when everything seemed so simple - just like the bloke writing this...

Mr Barlow's car radio was powered from Dad's battery-charger, memorable for its **increase charge** rheostat and a haunting cherry-red **power** indicator. The radio was in a white wooden box, a desperate attempt to silence the steady droning hum, the reason Mr Barlow got rid of it.

The vibrator p.s.u. would wake my brother Bill when we shared a room before pub life set us up in opposite wings at The Crown. A close family. It had the ECH series of valves - the radio, not the pub, running from that noisy h.t. supply.

Can't remember what I did for an antenna here, but at the pub with extensive carparks and random trees, it would have been an over-the-top long-wire. The extra stations I thought I heard were just cross-mod...

It was, after all, a car radio designed to work off a car antenna. Such was my knowledge of impedance matching, I thought bigger had to be better. Did I really try to run it off the huge mast antenna that came with the 52 Set?

Heard Athlone for the first time. Another country, another way of life. And, even then, learned from it. The tension that became 'The Troubles' was not news to me when the story broke over here. Radio 1 would have been a year away then, but I can't think what the offshore scene was doing at that time. Reception must have been 'major stations only', the poor thing so mismatched it must have been quite deaf.

... LAUGHED OUT ...

Spoiled by all this space, the engineering criterion was "get as much wire in the air as possible". Antenna length was determined by the distance from the bedroom window to 'that tree over there'. The chaps on 80m a.m. spoke of these allegedly magical '66-footers', but for me, size was everything. And you needed the height.

The pub was three storeys high and had a valley roof. This meant you could climb out there with tremendous confidence until you looked over the edge. Then the vertigo would kick in and you'd quietly hum *Nearer my God to thee* until it passed.

Ernie: "Do you have vertigo?"
Eric: "No. I only live around the corner"

Other Love

The other great love at that time was Hi-Fi. Even then, it seemed ridiculously expensive and had a certain snobbery by being priced in guineas. Units of £1.05 to you.

The Pye Concerto was the classic KT66/GZ32/ECC33/ECC35 line-up in an ultra-linear configuration. The pre-amp used ECC41s. Noisy, especially in the GRAM mode. It was profoundly microphonic, ringing out like church bells when you tapped the case.

The tuner was a QUAD, almost ignored as there was only LIGHT, THIRD and HOME on v.h.f. I knew if you were running KT series valves in the output stages, you were up there with the Big Boys. My idea of housework was to remove the valves now and again to clean them. Made them sound better. This sounds daft but reading today's audio press where you can buy a CD cleaner

Continued on page 44 ...

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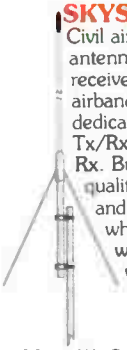

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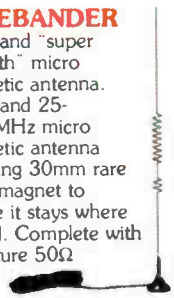

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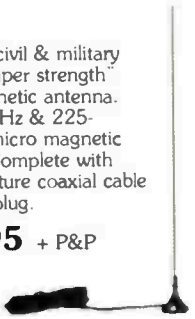

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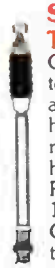

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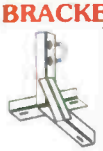

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More Ruined Radios

... continued from page 42

spray for £35, a plinth for the player to sit on, a mere £450 and special cables - sorry, interconnects - for anything up to £1000. My stupidity came in a lot cheaper.

Disaster. Broke off the locating spigot on the GZ32 valve base. Putting back incorrectly, it linked the raw a.c. h.t. over to the reservoir caps resulting in an explosion that rocked the place. It did £25 worth of damage. You may have bought your Hi-Fi in safely up-market guineas, but repairs are the work of an artisan so you are back to honest working-class pounds...

Back To Radio

Back to radio, then. After being laughed out of the Derby & District Amateur Radio Club Home-brew Competition, I thought I'd have a go at going commercial. A Codar CR70A. This radio introduced me to The '1930 Net', the Top Band natter-net on 1930kHz at 1930. With the closure of the Coastal Stations this June, it's good to hear 160m alive again.

It fitted well on my bedside table - you could almost read by the dial lamps. Was it RNI or a parallel interest in Hi-Fi that has embedded *Lucky Man* by Emerson Lake & Palmer in my memory? And to think ELP are now the theme to The Generation Game. Proof that nothing is sacred.

Did I modify the Codar? Er, the normal output stage was a Class A ECC81 but with the EZ80 rectifier usurped by silicon, it made way for a 6BW6. A wonderful 'radiogram' quality due to hideous mis-matching. Minutes of happy listening until the mains transformer burnt out...

It was replaced by a PCR Receiver. I liked this little radio. Made by Philips Lamps, it was really a domestic set made up for NAAFI Service. It was chosen because the dial lamps shone as bright as the Codar so I could carry on reading in bed. How I don't know.

Little? The PCR was about the size of a PC base unit. Small in the world of militaria.

New readers now know you are dealing with high-end engineering. It needed the best test equipment. The best you could get for £22. The 'Hartley Electromotives 13A Oscilloscope' was the toy of toys. Dual beam with only 807-class valves for gain to a 125mm tube with 3kV on the plate, it got as hot as hell. Spent most of its time monitoring audio, stuff like Walter Carlos' *Switched On Bach*, the nearest I ever got to drugs.

Don't try this at home: Use 'scope as a TV Monitor. To do this, feed c.r.t. cathode signal via Z Mod link to 'scope. Bond 'scope earth return across to a live TV chassis and take X & Y drive from the timebases. Watch *Vision On* in a 75 x100mm green/black display with a perfectly good 21in monochrome picture on the telly right next to it.

A proper radio at last? I had made a few trips to Matlock to hear the wit and wisdom of Bill Lowe, not knowing that many years later he would be my boss. My learned Chairman went on the record saying, "Eddystone receivers are like chocolate eclairs, delicious to look at but when you bite into them, there is little of substance..."

The thing was a 940 all right but when you picked it up, it didn't seem to have the rib-snapping weight I expected and a Plessey plug where we hoped to find a power lead. It had no power supply.

The p.s.u. sub-chassis was in place but there was nothing on it. This 940 was hoping to get its power from somewhere else. We lovingly made up a p.s.u. with a transformer from a Vortexion WVB tape machine, decoupled up to the eye-balls against mains and modulation hum. I remembered Eddystones are noted for their audio so lets make the most of it.

When we plugged in, nothing happened. Everything lit up but that was it. Bags of h.t., a reassuring blue glow from the stabiliser valve - but silence. It was nice to see that after all this time, not even the 'S'-Meter zero needed adjustment but it was still very quiet. A good antenna had the meter dancing about but an end-stopping signal only gave the quietest and most distorted sound known to man.

My chocolate eclair Chairman remarked I was wasting my time as every resistor will have gone high and every condenser will have gone low. Not so.

Abandoning the Company's electronic fault analysis systems for my AVO 8, I started prodding. Everything was as close to the book as parallax error and drink would allow - except for one. Not a volt to be had on the audio stage anode. And, Mr. Chairman, the anode load resistor was fine.

In this special release, the h.t. input was split. A main supply to all stages and a decoupled supply just for the audio amplifier. Why? All I had to do was fit a series 10kΩ and a 32µF stage decoupler to turn this into one of the most driveable radios I've ever had. All I did to it in four years was rub a little WD40 into the cursor support bar as the pointer carrier would squeak when you spun the tuning from one end of the scale to the other. I was cured of the need to modify everything, Doctor. Then it happened.

Very slowly, one by one, each BBC station became slightly distorted. A curious sort of distortion, some parts of the audio spectrum sounding more distorted than the rest. The Chairman's Rising Resistor problem? No - some stations sounded odd, others did not.

Bite the bullet. Write to the BBC...Why were the Domestic Services now so tiring to listen too? I had heard that audio processing was becoming big business in the States. I learned that all a.m. broadcasters are now using some form of audio processing to improve the signal-to-noise ratio. There was a time when the quality of the sound from your radio was determined by how much you were prepared to pay for it. And that Eddystone had it - the unprocessed sound of Radio 1 back in the Seventies was magic on the 940. But not any more. The 940 was good enough to spot the start of the use of OPTIMOD back in September, 1980.

That was about the last time I made a serious investment in radio. The use of audio processing on f.m. makes radio listening a chore these days. All those years of short wave educate your ears to hear more. Processing is applied for those who won't listen. As I write this, the trade press are carrying articles on processing for DAB. Enough, I think...

Reliable Radio

And the most reliable radios I've ever had? At a time when Lowes took the radio high ground, Trio launched the R11. A portable with no s.s.b., it was a broadcast-only entry-level receiver but way below JW's expectations. It is still in use today.

The original maker was Toshiba, my R11 is a world model lacking l.w., but you can't have everything. JW gave me this set as a morale-booster, but more likely it was cheaper than returning it to Japan.

The record goes to an SRX-50. On for a minimum of three hours a day, every day since 1992. I'd played with a few entry-level sets, but this idiosyncratic radio was chosen as the clock-radio to "Wake Up To Wogan".

The big radio is an AR7030. I wonder if there are any interesting mods for it. Please, keep them to yourself, but I would like to hear your radio tales to a reformed **robert.ellis@talk21.com** while I E-mail Wogan.

My learned Chairman went on the record saying, "Eddystone receivers are like chocolate eclairs, delicious to look at but when you bite into them, there is little of substance..."

BROADCAST SPECIAL BROADCAST SPECIAL BROADCAST

Radio SEAC's Transmitters

Eric Hitchcock brings us a tale of 1940s broadcasting from the Indian Ocean.

Today's radio sets are practically wireless, but in 1945, there were wires everywhere. Those of us in the army, training to be radio mechanics, were soon finding our way in search of some faulty component. Some had been doing this job in 'civvy street', others hadn't. The Royal Signals Course lasted seven months and covered electrical and radio theory, general workshop practice and hands-on radio work.

Some of the sets were used by the infantry, and others were installed in tanks. Most were transceivers, having an r.f. power output of about 25W and operating on frequencies from around 2 to 8MHz. There were also communications receivers and more powerful transmitters for headquarters' use.

Special Job

My course ended in the summer of 1945. We didn't know at the time, but the War Office had picked ten of us from similar courses for a special job. The next time we would see a No. 22 set would be in a 'government surplus' store or a museum.

Harold Priestley logging readings and Peter Burland at the console of the Marconi 100kW.

Harold Priestley tuning the final r.f. output stage of the Marconi 100kW.

The team of ten were to operate and maintain a Marconi 100kW transmitter. To give us all some experience of this we spent nine weeks at the BBC transmitting station at Skelton, on a high plateau in Cumbria. There were a number of sets, all similar to the SWB 18 we were to spend our time with in Ceylon (now Sri Lanka).

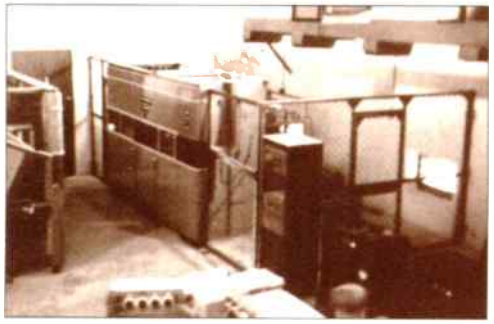
We were flown by Dakota to Palestine where we sampled the oranges we hadn't seen for years. Our air journey continued via Karachi to Poona and from there it was all by train. We spent a week or two at Mhow before going south across India to Colombo and the transmitting station of Radio SEAC (South East Asia Command).

On The Air

Upon my arrival, the station had been on the air for nearly a year, using an RCA 7.5kW transmitter. The set was installed in a large concrete building, at the other end of which was the big Marconi transmitter. This was at the testing stage, but should have been on the air several months before. Shipment and assembly of the equipment had been seriously delayed by many factors, including a dock strike in the UK.

Getting a 100kW transmitter from Chelmsford to Colombo towards the end of a global war was never going to be easy. The 7.5kW transmitter occupied the floor space of a suburban sitting room. It was self-contained, and needed just a three-phase 440V power supply and an antenna.

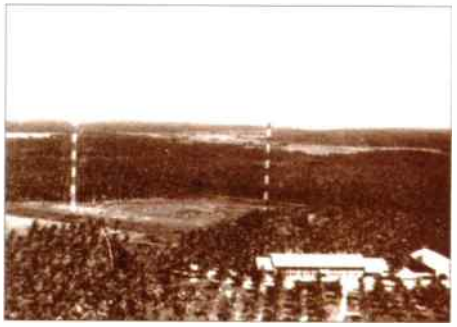
In contrast, the Marconi set needed massive ancillary equipment - 11kV d.c. had to be supplied by a transformer with a star winding output, and a mercury arc rectifier, which alone occupied an enclosure large enough to house the smaller



One of the three RCA 7.5kW transmitters.

transmitter. About 34V d.c. for the valve filaments had to be supplied by a rotary converter - a large electric motor driving a d.c. generator. Two of these (one back-up) took up another small room.

This l.t. supply had a control mechanism which caused the d.c. voltage to rise slowly from zero, to avoid damaging the solid tungsten filament rods by applying the full 34V when they were cold. To cap it all, the larger valves were water cooled, which meant that a pump room had to provide a continuous supply of cool water, which in turn required a small water cooling tower. The 7.5kW transmitter's output valves had forced air cooled fins. No criticism of the Marconi set is intended. Generating 100kW of r.f. power is likely to involve greater technical complexity.



View from an antenne tower of two other towers, with the transmitter hall and power station in the foreground.

The ancillary equipment for the big transmitter came from various suppliers and had arrived by sea over a period of months. The last thing to arrive was the ventilating plant. The transmitters produced large amounts of heat and the ambient temperature was often 97°F with 97% relative humidity.

Built By Engineers

The power house and the transmitter hall were built by the engineers of Ceylon Army Command. Erecting the antenna masts called for further specialised skills. Five masts were 90m high and another was half that height. These were 'second user' having come from radar stations in the UK. They had not arrived until the autumn of 1945. Stacked dipole antennas, of two types, were slung between the masts.

Starting to climb an antenna tower.

The highly directional arrays, for the Pacific Fleet and special broadcasts to the UK, were four bay, four stack, with reflectors. The broad beam arrays were three stack Krauss dipoles.

Rather than wait for the 100kW transmitter to be ready, the station went on the air on 25th April 1945, using an RCA 7.5kW set. The frequency used for most of the day was 15.120MHz, using a broad beam (about 70°) centred on a heading of 36°, intended for Burma and Japan.

After a brief period of testing, the 100kW took over this principal task on 8th May 1946. It was heard far and wide, although it was not really intended for the enthusiast in the Ohio State Penitentiary who sent reception reports. If, on a globe, you follow a heading of 36°, it will go through Burma, over the north Pacific ocean and cross the USA.

Once the 100kW set was on the air, the original RCA set provided a service for southern India on 6.075MHz. In parts of India this could be heard only in the evenings, as one might expect. A similar transmitter was brought into use later on 17.77MHz, directed almost due east, to the Pacific Fleet. There were three such sets eventually. A small RCA set (1.5kW) operated on 88m to provide a local service, for the south-west of Ceylon.

Lack Of Amenities

What had persuaded the government to buy an expensive transmitter for forces broadcasting towards the end of a ruinously expensive war? Following bad press publicity, Churchill had been persuaded to send someone to report on the welfare provision for the forces in the far east.

The War Cabinet was told there was a serious lack of amenities of all kinds, including radio entertainment. They accepted the report's recommendation that additional transmitters were needed for forces broadcasting, and the War Office was given the job of providing them.

After consulting the BBC, late in 1944, they decided the huge India and SEAC areas would be served best by a short wave 100kW set-up. Until then, British forces broadcasting, which had started in North Africa in 1943, had been on a more local basis, using low powered medium wave transmitters.

Using a megger to test the high grade lines used to carry the programmes from the studios.

Transmitters are useless without programmes, so the studios in Colombo must be mentioned briefly. They began as a converted washroom, but enthusiasm and hard work had turned them into an efficient unit.

Although there were occasional outside broadcasts and regular studio productions such as plays, the staple diet was record programmes of every kind, introduced by the station's presenters. Of

Continued on page 49 ...

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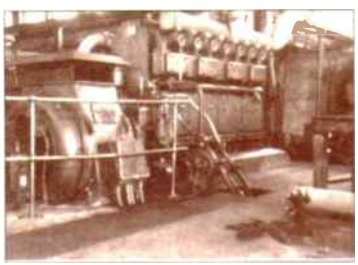
... continued from page 46

these, David Jacobs and Desmond Carrington are still entertaining us. Each day's schedule included news bulletins and other programmes, relayed from the BBC.

The four diesel alternators in the power house.

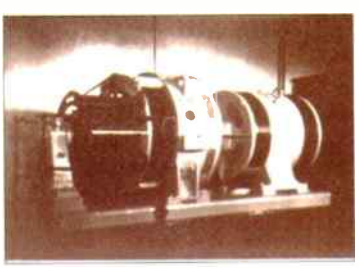
These were picked up by the station's receiving unit situated within an Army high speed Morse station 20km away. Rhombic antennas fed 'state-of-the-art' RCA AR88 receivers *(see SWM July for more info. on this classic - **Ed**)*. Complete sets of valves for these receivers can be purchased from advertisers in this magazine, so people are still using them.

The slow-motion tuning with vernier dial is well remembered by Peter Burland, the member of our team who spent most of his time on the receivers. This dial enabled him to tune back to a recorded setting and be spot on the station.



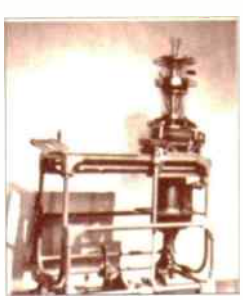
A diesel alternator.

Three AR88s were linked together, fed by three antennas spaced more than a wavelength apart. In this 'triple diversity' system the strongest signal at any moment was output. This overcame fading to a considerable extent. Peter made good use of the excellent equipment available to ensure the receiving station was always properly aligned. The BBC supplied a timetable showing which frequencies should provide the best reception at various times during the day. High grade telephone lines provided the audio frequency link between the receiving site, transmitting station and the studios.



A rotary converter providing d.c. for the valve filaments.

In the winter of 1946/47 the station relayed the test match commentaries from Australia to the BBC. The 100kW transmitter fed a narrow beam antenna, probably on 13m - the highest frequency band on which it could operate. Not surprisingly, the BBC receiving station, then at Tatsfield, in Surrey, reported a very strong signal.



A CAT 14 (cooled anode triode) valve on the trolley used to wheel it into the transmitter (used in push-pull in the r.f. output stage. Normal anode current, for the pair, 11A at 11kV).

Blighty Beam

Narrow beam antennas directed to the UK were also used on occasional 'Blighty Beam' transmissions, heard also by the station's regular listeners. These broadcasts carried record requests and dedications between SEAC and the families back home. Ordinary domestic receivers in the UK could easily pick up the transmissions, providing they had a short wave band, of course.

In India and SEAC, a shortage of suitable receivers meant that many would-be listeners had no set. The government made great efforts to provide more, but even when they arrived they were all too often unsuitable, in poor condition, or simply not working. In some cases, radio enthusiasts scrounged spare parts from the stores to construct a receiver, and provide much needed entertainment.

Although the various transmitters and the choice of antenna arrays provided some flexibility of operation, the Chief Engineer was aware that some of the target areas could not be properly covered throughout the whole of the day's transmissions.

Compromises in the choice of frequencies had to be made as additional frequencies were difficult to obtain. Ideally, he would have liked more high powered transmitters, but this would have been much too expensive. As it was, the station cost about £300,000 - equivalent to about six million today. The station was very well equipped and efficiently run.

Three RCA AR88 receivers, used in triple diversity, with broadband r.f. pre-amplifiers below.

The only serious problems arose in the power house. The diesel engines developed a fault when the Marconi set was at the testing stage. Much later, a different problem caused the 100kW set to be shut down for some time and mobile diesel generators were used to power the 7.5kW sets to keep the station on the air.

Not All Work

It was not all work and we played table tennis and snooker, went swimming and had various hobbies. Some of us pursued photography, so this article has a few pictures. Paul Sollom used to enjoy a sort of busman's holiday, by forgetting the 100kW for a while and using a modified ex-RAF T1131 running about 100W into a three element beam on 28MHz.

Lord Louis Mountbatten leaving the studios.

He kept in touch with his family in the UK. His callsign then was VS7PS and is now G3BGL. Harold Priestley G3FLR (who had the original idea for this article) remembers sitting in with him.

We each had a week long leave in the hills at Diyatalawa, and Harold was there at a time of serious flooding nearer Colombo, when telephone lines were out of action. He was called on to operate the camp's Collins transmitter, as the usual operator couldn't get back to the camp because flooding had stopped the trains.

The station, greatly extended, is used today by the Sri Lanka Broadcasting Corporation. Peter Burland revisited the station whilst on holiday five years ago. The 100kW transmitters was still working. One reason why there used to be a slogan - 'Buy British!'.

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

Amateur Bands

Having spent most of the period in hospitals, this is being written well after my deadline by special dispensation from the HQ staff, and one day after escaping...so if you spot any errors, blame them on me, or of course, you the contributors!

Before being hospitalised we had a run down to Devon, where we managed to get into the Barnstaple traffic - a place where they seem to have traffic-lights at every garden gate, and cars carrying a sticker saying 'Barnstaple - home to the Traffic Jams.' Different from my last visit, as a boy in the 1930s!

Letters

Let's make a start with the **Goodhalls**, in Holywell, Oxford, and Peter first. A brace of Gs on Top Band to start, then FR5FD, K7XD, JH2AYB, EI1DD, K1QS WX3B and AA1IZ, all on 14MHz, with 21MHz yielding the contest station prefixes, one can sum it up as 'Peter picked a bad weekend!'.

As for father Paul, he comments that the bands were very up-and-down, with for him the best times being between 0300 and 0900 local on 14MHz. An added factor in the Goodhall equation was the noise from building work nearby. 3.5MHz gave XE1YQQ, CX7OV, LU2ECZ, OZ2000; GB2LBY, noted on 7MHz was in Exmouth, and on 7MHz MM0BCR/P was on St Kilda while on 14MHz we see 5B4MT, W5REA, W4VUF, W2EJY, KB5FC, KD8JN/P4, KB9KVY, NA6F and KC2FCR. Up to 18MHz for WL7CMG working a /MM station, YJ8UU on Vanuatu, NL7KF - all of course accompanied by the shoals of smaller fry.

A letter mainly devoted to other subjects from **Wyn GW8AWT** in Manordeilo brings up the subject of summer static, which in that neck of the woods is something to be reckoned with, though little actual thunder is heard. It seems to vary from place to place - for example here we often get a rumble of thunder with not much else. Nonetheless, one does need to be sure the antenna is physically earthed when the static comes up.

Nice to hear from Anglophile M0/DL2BQD, who operated his 1W QRP rig from High Wray Farm near Ambleside in the Lake District, where he used the up-and-out configuration on 14MHz with success. I await a further letter promised for when Dieter and Rosmarie get home.

Pirates

A problem for us all to look out for. **John Collins** in Birmingham found an enormous pile-up on 7.067 one evening, with C99AT; ARRL net and other sources declared this one to be another manifestation of Slim, with a slight Russian accent. John comments that he had this one sussed as a pirate even before checking!

It's an interesting point that as we have slimmed-down operating procedures, so we seem to have reduced the level of overt piracy. Where, 35 years ago, a DXpedition might run around 60 contacts an hour, and nearly always had an alter ego somewhere else on the band, nowadays people are hitting up 180 an hour - are they just too fast for Slim? On the other hand nearly every day one hears a Slim with a phoney callsign and he usually has at least a few takers.

Back to John C. Others on 7MHz included XQ1IDM heard at 0100UTC using a four-element Yagi at eighteen metres altitude, and a little while later BT2000 from China, though reduced to RS43 by the static. Seemingly he operates on all bands but prefers 21MHz c.w. plus 3.5, 7 and 14MHz phone. Around 0200 John logged TI4CF at S9+ asking for cards via W3HNK. On a different tack altogether John mentions an interesting website at **www.sunspotcycle.com** (note 'sunspotcycle' is a single word in the address.)

On now to **Ted Trowell** on the Isle of Sheppey. Ted stuck as usual to c.w. only. He looked on 3.5MHz and found 5B4AGC; and on 7MHz at 0500 J75KG (QSLs via N2AU), at 1900 1A0KM and E4/G3WQU, rounding off with 5B4AGC again at 2100. On 10MHz Ted logged OD5PN, 9M2TO and 9J2BO at 1900, plus HF0POL a couple of hours later.

Early-bird Trowell went on 14MHz around 0600 for KG6D and at 1700 JA2ODB, 1900TF/LA7SI, YK1AH, at 2100 9K2MU, and an hour later PY5BNL. Next, 18MHz where over a cup of tea Ted nailed VQ9VK (QSLs to N1TO), 1A0KM, JW/DL3NRV, UA9CA, followed at teatime by 5N3CPR and 9M2TO.

At 2100 JA2EPW and 4S7EA completed coverage of this band. Afternoons on 21MHz were given over to AI5P/CY9, 7P8AA, HS0ZBS, ET3VSC, 4Z5AX, BY4BZB, JA3KM, LU9LC, 9J2RA (QSL to K6SLO), JA5ATN, YC0LND, 1A0KM, JF4ETK, 9V1NW, 5B4AGC, to leave room and appetite for a later session in which EA8BWP, PY2OW, CX3EU, CO8LY and DL3NM/BY7KG were collected. That leaves singletons by way of V2MDC on 24MHz and TZ6DX on Ten. All times UTC.

Coming Up

A bit short in this department due to my illness. We hear of a new station in Vietnam, in 3W3SK, who has the station in place but awaits the paper licence. He has known about amateur radio for 30 years so he's not so innocent where pile-ups are concerned. Against that the Eritrean expedition planned for September/October is a busted flush due mainly to the unstable situation there and the fact that the targeted 14-year olds are mostly already 'co-opted' into the defence forces.

Peter ON6TT is moving to Pakistan from Kosovo and hopes to be set up from Islamabad in November.

Looking forward to December N6PEQ will in Fiji in mid-December probably as 3D2CQ, and between December 20 and January 6 hopes to be on Rarotonga and South Cooks using ZK1PEQ. If you are looking for E4, keep an ear open for E4/OE1GZA who will be in and out of the country. Send QSLs to **Gunter Zwickle, PO Box 1133 Ramallah, Palestine.** F2JD will sign FM/F2JD in a while; he has been delayed but should be active by the time this reaches you.

Letters Again

Our anonymous correspondent asks this time about setting up a station. By far the most important thing to be considered is the antenna system. Basically we require it to extract as much signal as possible, pick up as little noise as possible, and to present an accurate match to the receiver on any chosen frequency.

Such an antenna may be a simple construction of wire costing a few coppers (though do cover any soldered joints with protective paint or whatever). Traps are to be avoided - they are a bit lossy when new, but as they see service the ventilation holes are used by all sorts of livestock to crawl into the dry where they then can't find the way out again, and losses mount.

Secondly, one needs to consider the indoor end - the shack. Bear in mind your personal 'handedness' For example, I am strongly right-handed so I drive the receiver with my left hand, logging holding the mike and keying with my right hand. Lucky the person who is genuinely ambidextrous!

See whether the bench top is at the right height - they are often a bit too high - and also in terms of the receiver's height above bench. Some people find it good to slope the rig backwards to obtain the best position both for controlling it and for sighting the dials - and it is **critical** to a few mm.

Finally, and perhaps most important, ventilation. The air you've just exhaled needs to be shifted away, and fresh brought in for you to inhale - the implication being that perhaps you need to consider an open window and maybe a fan as well. Of course if you get sleepy quickly you may just need sleep!

That's it for now. Letters as always either to me at **Box 4, Newtown, Powys SY16 1ZZ**, or via the E-mail address at *SWM*, to reach me by the first of the month.

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SSB Utilities

AC2K

In the July and August issues of *SWM* I wrote about the 'ATC 2000' event being held at RAF Cranwell at the end of July. The event, known by those involved as simply 'AC2K', was designed to bring together many Cadets from the Air Training Corps (ATC) and Combined Cadet Force (CCF) so that they could experience new and different aspects of 'Cadet-life'.

Over the course of the eight day event, 1800 Cadets from around the country spent varying lengths of time based at RAF Cranwell, and on day trips to London to visit the RAF Museum, to RAF Syerston for glider flying, to 'Proteus Camp' in Sherwood Forest for adventure training, and the Beckingham Ranges on the east coast for shooting practice. Back at Cranwell, a 'communications centre' was set-up with numerous radios so that the cadets 'off-site' could keep in touch with 'base camp'.

I was invited to visit the camp on 31st July, with the intention of visiting the communications centre, since this date coincided with the air-display laid-on for the Cadets, I managed to fulfill two interests in one visit.

The communications centre was actually a large tent, but the weather was kind enough so that the ends and windows were open to allow a breeze to flow through. It was certainly needed, as there were five h.f. radios, two v.h.f. radios, two u.h.f. radios and a v.h.f. low-band set borrowed from the Army. Two of the h.f. sets were busy on the amateur bands, operating as GX3ATC and M2000Y/MRF99, while one of the others was being used on the National Net frequency (5.245MHz, known as 'N1') with the ATC callsign MRF99.

It was originally hoped that various airlines would call-in to the ATC station, as they had done in previous years at the 'Royal Tournament' in London. Unfortunately, there were a few problems that prevented this from happening, mostly weather related - frequent thunderstorms meant that the station had to close down for periods.

However, there were plenty of contacts with other ATC units up and down the country on 'N1' and the other ATC frequencies; and all the while the two amateur-band stations were busy making contacts all over Europe. Adjacent to the communications centre was a veritable 'antenna farm' of masts and antennas; there were six telescopic masts supporting a G5RV and two inverted Vs for h.f. work, plus the v.h.f. and u.h.f. antennas. I was quite jealous! The Cadets were using a brand-new Kenwood TRC-80 h.f. s.s.b. Radiotelephone, with a converted Icom IC-M700UK h.f. marine-band radio as a back-up

Don't forget that you can send-off for a QSL card from the MRF99 station - details were given in the August issue.

JMC 3/00

Earlier this year I mentioned the JMC courses that were to be held throughout the year. The first and second of these have already passed by now, so there is only the third (JMC 00/3) to look forward to. These military exercises, usually in the coastal waters around Scotland, Northern Ireland and northern England, attract a wide variation of NATO aircraft, ships and submarines and this means an increase in h.f. signals from all the 'players' involved. The entire course usually lasts for two weeks, so there is plenty of opportunity to search for active frequencies, and plenty of signals to listen for.

As I mentioned above, the third exercise is fast approaching, but there has been some confusion over the dates. A trawl of the usual Internet sources reveals the following alternatives: 12.11 - 23.11 (The Military Outlook Page), 19.10 - 02.11 (Dutch Mil - 405 & 407 Sqdn deployment to Kinloss) and 23.11 - 12.12 (RAF Deployments & Exercises).

Naturally, I would expect the RAF web-page to be the most reliable source, but their listed dates seem to be quite late in the year, with limited daylight and dubious weather. Last year JMC 99/3 was brought forward to September to avoid the possibility of bad weather.

One other factor to consider is that the NATO fleet known as STANAVFORLANT has port-visits at Leith (19 October) and Plymouth (3 November) during the Autumn period, which does leave time for an exercise in between.

Does anybody have any confirmed dates (other than those mentioned above), or would care to speculate?

More RAF On HF

Some enterprising Dutch aviation enthusiasts have managed to find details of the h.f. radio settings for a RAF Tornado GR.1 based at RAF Bruggen in Germany.

For those interested, the h.f. presets for the Tornados from RAFG Bruggen are listed elsewhere on this page. There are no real surprises amongst these frequencies, they are all quite well known. The RAF obviously likes to listen to the BBC World Service - it is obviously vitally important to keep in touch with the latest news and sports results while operating away from home.

These details come from the excellent 'Dutch Mil' web-site which contains a vast amount of frequencies for various military forces and it worth visiting if this is the kind of thing that you are interested in.

SAR

Mike Jones from Wrexham writes to say that he has just erected a 20m long wire antenna and is getting good strong signals from RAF Kinloss (fading occasionally), but is having difficulty hearing the other parties. He wants to know if this is normal?

Well Mike, it certainly is normal, as the 'other parties' will be using different transmitter powers, smaller antennas, often from poor transmitting locations, and of course propagation also does its best to vary the signal strength.

The ARCC station at RAF Kinloss has access to extremely large antennas, and possibly even rotatable beam antennas such as a log-periodic. They also have the ability to use high powered transmitters. Having said all that, the effects of propagation will still have an effect upon the signal, so it is perfectly possible for one station to receive Kinloss at S9+ and another station a few miles down the road will only receive a S3 signal.

The standard UK SAR helicopter (the Westland Sea King HAR.3) has to make do with an antenna that is much less than the optimum length for efficient communications, and certainly won't be using as much power to transmit their signal. They do have the ability to climb to height, which may improve the signal characteristics, but if they are operating in the mountains the terrain will affect their signals.

The RAF Nimrod MR.2 aircraft which usually operates as an 'on-scene' command post and radio-relay aircraft (also known as 'top cover') when the incident is at sea are usually flying at several thousand feet (or more) so they have the added bonus of height to aid their signal, but they are also using a less than optimum antenna length.

The other SAR asset that you may hear is the Mountain Rescue Teams (MRT) based at various locations around the UK. These can be considered as being the real DX of the utilities/SAR world. They are using just a few watts of power, usually from either hand-held equipment or from a 'mobile' installation. Their antenna is certainly the smallest of the four, and because they almost always operate from the mountains and hills around the UK their signal is always very quiet.

If you want to test your operating skills, try listening for the MRTs as they check-in with Kinloss ARCC between 0700 and 0800 (local time) at the weekends. Probably the first time that you will realise they are operating will be when Kinloss speaks with them.

Web Watch

The following web pages relate to the subjects covered this month

Kinloss ARCC - **http://www.kinloss.raf.mod.uk/arcc/arcc.htm**

UK ATC - **http://www.cranwell.raf.mod.uk/aircadets**

Alan Gale's SAR web-site - **http://www.zen.co.uk/home/page/alan.gale/sardb.htm**

ATC Millecom - **http://www.millecom.fsnet.co.uk**

Dutch Mil - **http://www.dutchmil.com**

Kenwood TRC-80 - **http://www.rys.nl/trc80a.htm** or **http://ameradio.com/Professional/Kenwood_TRC80.htm**

RAF Bruggen Tornado GR.1 HF Radio Presets:

Designator	MHz	Station
HF01	4.540	Bruggen F/S N
HF02	4.742	QNH/AFCS S
HF03	5.714	QNH/AFCS S
HF04	6.739	QNH/AFCS N
HF05	8.190	Bruggen F/S N
HF06	9.031	QNH/AFCS N
HF07	11.205	QNH/AFCS N
HF08	13.257	Bruggen F/S S
HF09	15.031	Bruggen F/S N
HF10	19.018	QNH/AFCS S
HF11	10.000	UTC Time Signal

Manual:

MHz	Station
3.055	BBC WS Europe
6.195	BBC WS Europe
7.325	BBC WS Europe
9.410	BBC WS Europe/Mid East
11.760	BBC WS Europe
13.095	BBC WS Europe/Mid East
15.000	UTC Time Signal
15.565	BBC WS Europe
15.575	BBC WS Europe/Mid East
17.640	BBC WS Europe/Mid East

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Attention-123!

A Very Odd Pair - Family XIII

In this issue we'll concentrate on this small family which contains only two members, M29 (VDE) - which has two variants, M29A and M29B - and G4, its German language arm.

The Morse arm operates several schedules, daily, twice weekly or weekly. both M29 and G4 schedules change their frequencies monthly and starting times vary an hour between summer and winter. M29, whose schedules are more likely to change (as there are more of them), may begin at any five-minute interval within the hour, but generally prefer h+00 and h+30. G4 generally only operates one schedule, although others occasionally appear for short periods.

VDE - Canadians In Hungary?

The only Morse format in use at present is M29A, which is more complex than the voice format. Unlike G4, it uses the bogus callsign 'VDE' officially allocated to Canada. Like so much about this station, the reason for this is unknown and lies back in the mists of time, for this family were already around during Cold War days.

The call consists of 'VVV VVV DE VDE VDE VDE' sent repeatedly for five minutes at average speed. This is followed by the preamble - a pause, more VDEs, another pause and a two-figure group repeated once (purpose unknown). A second two-figure group, also repeated once, follows - this is the Group Count which is always between 10 and 40 - usually in the 20s.

After this comes a date of month group (a single or double figure repeated once - 1-31 - referring to date of first transmission of message) and a four-figure time group (repeated once). This last group refers to the time in UTC of the first sending of the message and would usually end in 00 or 30.

After a short pause the message follows consisting of paired five-figure groups, nearly always of an unique non-random nature. This string of groups ends with **AR** (end of work). Repeats are sent 30 minutes later on a frequency 100kHz higher or lower, depending on time of day.

A further pair of repeats may be sent later in the day. Short zeroes are used and the transmission mode is basic i.c.w. Messages are changed on a weekly or monthly basis.

Achtung! G4 Calling!

G4 transmissions start at any five minute interval within the hour with a repeated sequence of three rising electronic tones. This continues for five minutes when, after a pause, a woman's voice shouts as if on a parade ground, 'Achtung! Achtung!', after which the message follows in paired non-random five-figure groups, before ending with 'Ende! Ende!'. Another pause, another 'Achtung! Achtung!' and the message (with 'Ende! Ende!') is repeated. Note the complete lack of preamble, lack of callsign, and the repeat - unlike M29.

G4's long-term regular Sunday schedule has been with us for many years with two transmissions: 2005 and 2035UTC. These are now repeated every Thursday - same time and frequencies. As with M29, the 2035 repeat is sent 100kHz higher.

The frequencies change monthly along with the messages, which have always been repeated throughout the calendar month, but recently there have been a few cases of **two** messages per month. Such an increase in traffic has never been known before. Like M29, the same unique non-random message groups have been used for many years, but again quite recently, there have been transmissions where **random** groups have been sent throughout messages.

Like everything about this station, known as the Three Note Oddity, frequency usage is peculiar. A notable feature is its complete disregard for ITU frequency allocations (and callsign regulations). The family has used any frequency between 3.130 and 8.752MHz, and its repeats half an hour later always stick to the 100kHz offset rule, regardless of who may already be using the frequency.

There is no easy way to predict the regular frequency changes, but long-term monitoring has produced patterns. For example, G4 Sunday/Thursday scheduled has operated as follows:

Month	(Freqency MHz)	Offset (kHz)	Comment
Mar 99	4.520/4.420		
Apr 99	5.310/5.210	+790	
May 99	5.570/5.470	+260	
Jun 99	5.720/5.620	+150	
Jul 99	5.680/5.580	-40	
Aug 99	5.730/5.630	+50	
Sep 99	5.320/5.220	-520	
Oct 99	5.320/5.220		no change (unusual)
Nov 99	3.910/3.810	-1410	(large drop - made up for lack of change earlier)
Dec 99	3.360/3.260	-550	
Jan 00	3.440/3.340	+80	
Feb 00	3.920/3.820	+480	
Mar 00	4.520/4.420	+600	same as March '99

NB: Times of transmissions are: Summer 2005/2035, Winter 2105/2135UTC

As you can see, a month in one year may use the same frequencies in the same month of the next year, but this pattern doesn't continue year after year. Sometimes, due to the inflexible frequency use pattern, there may be other strong transmissions sharing the same channel and G4 may be swamped, usually, however, the signal is very good in this country.

What Sort Of Code Is This?

Due to the non-random nature of nearly all of the messages, the particular form of encryption used means that the messages are not sending text, i.e. sentences made up of words. All other Numbers Stations which send messages in blocks of groups are sending text, but this family is unique in this respect. Random groups only started to appear this year. Here's an example of the non-random structure (G4 Sep 98):

23 Groups
32587, 05458, 32125, 45214, 65212, 85458, 65458, 65458, 54120, 45210, 45200, 45158, 65425, 54214, 74548, 35458, 62102, 85402, 78521, 84522, 14520, 87458, 32125

Total number of figures:	23 x 5 = 115
Mean individual figure count, if random:	11.5
Actual figure counts:	0 = 7, 1 = 10, 2 = 20, 3 = 4, 5 = 29, 6 = 5, 7 = 4, 8 = 13, 9 = 0. Variation 0-29 - note that there are no 9s at all!
Paired figures:	one only (00). Average would be about 23.
Repeated groups:	32125 (x2, a popular group at this time, one message contained 5), 65458 (x2 adjacent).
Anagrams:	45214/54214, 45210/54120/14520
1st two figs:	45 (x4), 65 (x4) 32 (x3), 85 (x2), 54 (x2)
Last two:	58 (x7), 25 (x3), 14 (x2), 02 (x2)
2nd & 3rd:	54 (x7), 52 (x4), 45 (x3), 21 (x3)
3rd & 4th:	45 (x6), 21 (x3), 12 (x3), 52 (x3)

Much more analysis can be done on this message, but this is enough to show the non-randomness of the encryption.

This family is believed to originate from transmitters at a site just outside Budapest. Its frequencies indicate its operations are restricted to Europe and are routine and generally very stable. Use of German by G4 probably indicates that its target country is Germany (less likely than directing German-speaking agents/illegals elsewhere). M29A is obviously aimed at trained Morse operators somewhere in Europe. The biggest mystery is the continuing of these operations unchanged since the height of the Cold War. Interestingly, the distinctive voice used is the same as that used by the now extinct G3, East German gongs/chimes station.

Enigma Bulletin

Due to unforeseen circumstances, not least computer problems and illness, Chris Midgley's complete withdrawal from ENIGMA (having founded the group), there has been a delay in producing the next *Newsletter*. We urge any members to be patient. ENIGMA hasn't disappeared, but we would very much appreciate offers of help, especially in administrative areas. Without help we cannot maintain a detailed regular newsletter, but at least we intend to supplement these with quarterly monitoring reports.

Rest assured you letters are being read, logs collected and subscriptions received. Our booklets and back issues are still available. Until next time, good listening.

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MilAir

Our photo this month is a Belgian Air Force Alpha Jet wearing a special 11 Squadron colour scheme, arriving at Yeovilton airshow.

Victor Red

Regarding my comments about Shadow 03 calling Victor Red on 142.65, a 352 SOG Operations frequency. The aircraft was actually calling on 'VICTOR RED'. The VICTOR indicating that it was the v.h.f. frequency and the RED indicating that it was, 'In The Red' or in other words un-encrypted.

Had the two parties decided to encrypt the conversation they would have 'Gone Green'. When monitored, this sounds like the squelch being repeatedly broken but no conversation can be heard. In the same context, it is quite common for aircraft, especially the USAF, to ask for a Victor (v.h.f.) or Uniform (u.h.f.) frequency when working ATC. Thanks to **Colin**, **Steve** and **Trev**.

Holiday Freqs

Over the past couple of years I have received a number of requests for frequencies for airfields and ATC centres which are close to readers holiday destinations. In general I have not included them mainly because of concerns over enthusiasts using airband radios in certain countries who can take a very dim view of their use.

Due to several recent requests, I have had a change of heart, but not without the usual warning. Whilst the use of airband radios in some European countries, (such as the Netherlands), is as prevalent as the UK, others still maintain in some cases a draconian attitude to their use.

Even one of our closest European neighbours still operates a general anti-radio policy. Earlier this year an old friend of mine was arrested under the approach to a French military airfield, held for five hours and his AOR AR8200 confiscated, **without return**. Whilst I admit I do take a radio abroad myself, (but only to certain countries and exercising caution), I cannot recommend that you take a radio anywhere abroad - if you do, be very, very careful.

As I said, I have had a change of heart and as my database does include many overseas frequencies, I will attempt to answer requests for information whenever possible. So with the previous warning in mind, here are the frequencies requested by **Ken** and **Dave L.**

Palma De Mallorca, (Civil/Military), Tower 118.3, 118.45, 121.9, 370.025; Approach 119.15, 119.4; Radar 118.95, 337.775; Ground 121.7; ATIS 119.25. **Chania/Souda Bay** (Crete) Tower 122.1, 257.8; Approach 118.125, 362.3; Radar 121.1, 123.3, 344.0, 385.4. You should note that like Souda Bay, many European military airfields regularly use the NATO ATC Common Frequencies.

Information Snippets

The Thunderbirds were confirmed as using 141.85 whilst refuelling in the Flamboro Corridor on route from Waddington. As mentioned previously in the MilAir column, **Scampton** (EGXP) recently became licensed for Air Traffic once again using the Tower frequency 282.4.

Inbounds are controlled by Waddington Approach/Radar on 312.5 and 125.35. **Wyton** has a new Tower frequency of 245.375, 249.4 becomes the Ground frequency and 357.3 is withdrawn from use. **Belfast** Aldergrove has a new Approach frequency 124.9 which replaces 120.9. Thanks to **Andrew**, **Martin** and **Roy**.

RIAT 2000

For the first time in over a quarter of a century, (possibly since 1974?), I missed this year's IAT at Cottesmore. One thing I have noted is that there seems to have been a great deal written about all aspects of the show, especially within some newsgroups.

Thanks to several correspondents, here are the frequencies that were noted in use. Tower 121.175/370.05/410.125; Ground 119.15/336.375; Approach and Radar 130.2/130.5/312.075. Operations 133.625; ATIS 242.325; Refuelling 412.15. If you can add to these, please let me know.

Farnborough

Another show I didn't manage to get to! Just one E-mail from an anonymous reader who sends me the following frequency list. Tower 357.4/122.5/131.3; Radar and Approach 346.9/125.25/124.55/134.35; Helicopter control 132.9/134.55. Another source suggests that 130.675 was in use at the show but gives no further information, this is a frequency that is regularly allocated for temporary use at airshows. The Tower were using the following n.b.f.m. frequencies to talk to tugs and other ground vehicles, 444.3375/449.725/455.75.

Yeovilton

I did manage to make a visit to Yeovilton on the arrivals day, but to be honest, I was most disappointed. Compared to previous shows the aircraft participation was poor. Like both Mildenhall and Cottesmore there seemed to be a distinct lack of RAF aircraft present and the overseas contribution, (despite the unfulfilled promise of US Navy F-14s), was very limited. On the frequency front the only item of note was the use of 121.175 as a v.h.f. Tower frequency.

YC-15A

An E-mail from **Roy W.** asks about the picture at Mildenhall of the YC-15A in the July issue of *SWM*. He spotted quite rightly that the No. 1 engine appeared to be larger than the others. Despite checking back through a few magazines from 1977 I couldn't find any exact details but basically if memory serves me correct the larger engine was an experimental Turbofan being tested on the YC-15A.

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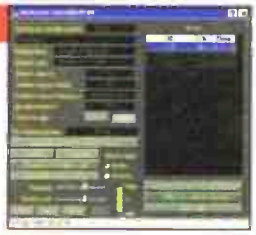

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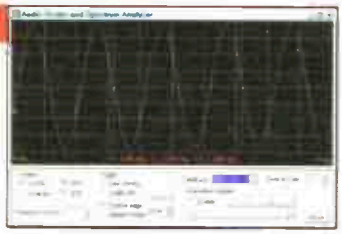

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Construction of internals	WR-1000i, WR-1550i, 3100iDSP- Internal full length ISA cards		
Construction of externals	WR-1000e, WR-1550e - 3100e - external RS232 PCMCIA (optional)		
Frequency range	0.5-1300 MHz	0.15-1500 MHz	0.15-1500 MHz
Modes	AM, SSB, 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)
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■ DAVE ROBERTS c/o *SWM* EDITORIAL OFFICES, BROADSTONE
■ E-MAIL: scanning@pwpublishing.ltd.uk

Scanning

Now it's October and here in the UK we certainly have a good chance of being on the receiving end of some fairly strong gales. So this month may be your final chance to check the antennas and feeders for security and continuity. For what it's worth, I am a great believer in silicon grease (ghastly stuff) and self amalgamating tape for any connections and so far I have not suffered too much from wind damage (ambient not gastric).

Further to the comms heard in 40MHz in South Wales which were reported in the June edition, I have had an E-mail from **Ian Julian**. Ian is a very keen v.h.f. low band DX listener who resides in New Zealand. Ian has copied comms on low band from all over the world and tells me that the signals heard in the 40MHz area, by our monitor in South Wales, may have come from a Portuguese fire department.

Ian says that there are number of Portuguese fire services operating in the 40.200 to 40.700MHz range. Channel spacing is in 20kHz steps. For anyone interested in scanning the bands from 29 to 88MHz, Ian runs a v.h.f. skip list on the Internet (for those with such access). To subscribe to this useful resource, log on to **http://www.egroups.com/subscribe/vhfskip** I try not to bang on about the Internet, but this is a most interesting source of information and certainly has relevance to those of us in the European area.

Hatfield Hamfest

I visited the Hatfield 'Hamfest' on 30th July and although the entrance fees worked out to be a bit costly, the trip was very worthwhile. A number of traders were in attendance and were doing some good deals.

I took a peek at the pre production version of the IC-R3 which was chained to the Icom stand. The bod on the stand confirmed that the radio is not yet completed and when it is, the price will be around £400. As I write, this radio seems to be like a politician's promise, but I am sure it will be available soon.

The weather at Hatfield was splendid and this ensured that the car boot/private sellers area was the most enjoyable part of the day for me. I walked round many times and wore my legs to stumps. Looking at the eclectic range of gear that was being sold by privateers illustrated that if you have a specific interest regarding what you wish to monitor, then you could get equipped very cheaply indeed.

I purchased a new marine v.h.f. Navico radio with scanning capability for a very reasonable price and if marine band was your sole interest, then you would have set yourself up very cheaply indeed. There were also 156MHz antennas for sale at a very low cost. Likewise, for anyone who is a member of the St John's Ambulance service, there were a few Pye sets operating on their frequencies.

Many scanners were for sale and some prices represented excellent value. Taking your scanner and a frequency counter along to Hatfield was amusing. People were purchasing all sorts of kit and trying it out. Buy of the day (which I missed!) was a pair of new Motorola hand-helds working on 169MHz simplex which were sold for £10. Yes a tenner...and I missed 'em.

One collector purchased a Tetra handset for £15, of course, the set will never work, but is of interest as a collector's item. Tetra for police forces has started to roll out and it will be interesting to see whether it achieves the take up rate anticipated.

The only problem with it, apart from the high cost, is that there is a very slight delay on transmissions. I mean very slight, perhaps a fifth of a second or so. Certainly not a problem for police or other land based services when involved in normal operations, but what sort of difference would it make to a firearms equipped officer when he may have to make a shoot/no shoot decision based on information received by radio. A fifth of a second is a long time then. Likewise for any air to air operations. You can travel a fair distance in a fifth of a second when you are airborne. Just a thought.

New Kit

I am not currently involved in scanning and monitoring video links, but there are those who are and in time it is an activity that I shall become involved with as I anticipate that there may be some interesting video activity in the next year or two in my area. For those who would like to become involved in this activity, there is now some kit on the market which may be of interest.

Now check this out. By the time that this article is published the G1MFG company run by, you've guessed it G1MFG (Giles), should be producing a 13cm video receiver covering from 2.2 to 2.7GHz. The receiver is not supplied in a cabinet (i.e. it's just a p.c.b. and buttons, etc.), it runs from 12-15V d.c. and takes the antenna signal in via an SMA connector and video out via a phono socket.

The set will have switchable video polarity. Suitable antennas will be available at extra cost. Fifteen ENG channels will be pre-set by the manufacturer and therefore operation should just mean bunging up an antenna, possibly installing a mast head pre-amplifier for the band, putting power into the set and plugging the output into either a monitor or the SCART socket of a TV or video input of a recorder.

For those Internet equipped, the site to peek at is **www.G1MFG.com** and if you need further information and do not have Internet info, you can call **Giles**, who makes them, on **(01489) 860318** during the evenings. He also manufactures amateur TV transmitters for 13cm band and transmitters and receivers for the 23cm band. Please only call in the evenings otherwise you will slow down production of what should be a most useful line of equipment. By the way he expects the receivers to sell for around £55 for the basic unit. Not a costly business at all.

Frequency Exchange

Now **Christopher** (from South Wales), who is a regular correspondent, writes asking whether a frequency exchange resource exists. He and many other readers do not have Internet access and he asked perhaps wondered whether I could start such a database. Well, Christopher, it is already there for us. You can write off to **Paul Wey** of **PROMA** at the address shown in my August missive. His information is the most comprehensive and topical amount of data available in the UK. No doubt about that! So please write to Paul. You will not be disappointed.

Christopher also wonders whether there is any way that people without Internet access can obtain information on how to modify v.h.f. and u.h.f. amateur equipment in order to open up the equipment to operate outside the v.h.f. and u.h.f. amateur bands. If you do not have a friend who can look on the Internet for this information, you can always write to me via *SWM* and I can find the information that you require, print it and post it on - no problem. I can understand your reluctance to equip with a computer suitable for Internet access. I mean the money could be spent on radio gear couldn't it.

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Airband

Just two more *Red Arrows* dates have been notified in time for this edition by the CAA (*AIC* 72/2000). On publication day, September 28, they're at Pangbourne and two days later, the 30th, at Hereford. Advance warning of Temporary Restricted Airspace reserved for their displays is given on a pre-recorded telephone line - **(0500) 354802** - free of charge. After about 1900 local, the message changes to information for the following day.

Information Sources

What else can you find out at minimal cost? Some royal flights are announced on the recorded message (even though Purple Airspace is no longer reserved for them). Royal engagements are listed in the Court Diary of some daily newspapers. If you see an operational aircraft in the distinctive Royal Squadron markings, you can deduce who's on it and where they're going by comparing the observed time, location and direction of the flight with the information given on the telephone recording and in the newspaper. Who needs radar?

Also free from the CAA (but provide a reply-paid self-addressed envelope to hold a 50g document of A5 size) is the leaflet *General Aviation Safety Sense 22: Radiotelephony*. This offers good background information for any of my readers, as well as pilots. You will probably spot the couple of minor misprints (if not, write in and I'll have to list them here). Apply to: **Westward Documedia Ltd., 37 Windsor Street, Cheltenham, Gloucestershire GL52 2DG.**

Mind you, if you had a copy of my *Airband Factsheet*, you'd already know that address (and many other useful ones). For a free copy, send a pre-paid self-addressed reply envelope (to hold two A4 pages) to the Broadstone Editorial Offices (**not** to me!).

I can tell **John Weir** (Edinburgh) that certain Speedbird flights are as follows. 27B: Heathrow-Hong Kong, B.747. 69: Heathrow-Philadelphia, B.777. 71L: Houston-Gatwick B.747. 77G: Gatwick-Houston B.747. 91F: Gatwick-Denver B.747. 99C: Heathrow-Toronto, B.747. My source? *Flight Routings*, updated annually and sold by our own *SWM* Book Store.

Follow-Ups

In August's 'Airband' I unintentionally opened up a controversy as to which municipal aerodrome/airport could be considered the oldest. I mentioned the claim by Barton that it held this honour. Note that the claim relates only to municipal sites, that is, owned and operated by the authority of local government.

Well, **D.G. Woods** (Egham) responded by nominating Shoreham, home of the Popular Flying Association, for the title. Construction of the terminal building started in 1934. Can anyone better this? No prizes!

Present-day Shoreham's Air/Ground, Tower and Approach are on 123.15 with a secondary Tower frequency 125.4MHz. ATIS is on 132.4MHz. Also there are a Second World War museum, visitor centre, restaurant, viewing gallery, pleasure flights and free car parking.

The leaflet that D.G.W. sent me makes the place sound really friendly. I must say that this is a model that many other aerodromes would do well to copy. It's notable that Shoreham takes the attitude that, being in public ownership, it's a public facility and visitors are welcome. Here's one local authority that recognises the benefits of its asset, without charging a fortune for car-parking, handing half of it over to a private operator or, worse still, selling the land for the construction of densely-packed houses with prices beyond the reach of needy first-time buyers. Not only commendable, it shows that it can be done. The destructive attitude seen elsewhere is really only an excuse.

Air Traffic Control

In August (page 62) I mentioned the uncertainties surrounding the opening of the new *en-route* Air Traffic Control Centre at Swanwick, Hampshire. Correctly described as an Area Control Centre, please don't muddle it up with the similar-sounding Shanwick!

Is there a slight chance of a start-up date or have I misunderstood *AIC* 75/2000? Another change is to be introduced, not that the casual observer will notice much. The minimum vertical separation above FL245 is being reduced from 2000 to 1000ft so as to increase capacity.

However, NATS is concerned that too many simultaneous changes could become unmanageable and want the reduced separation in place by mid-April 2001. The hint is that Swanwick could open any time after that. We'll have to wait and see.

I'm sceptical about the benefits of 'privatising' air traffic control, **Peter Cookson** (Manchester) is right on this point. I agree with Peter that there is presently too strong a link between the regulator, CAA, and the provider of most air traffic services, NATS, of which the CAA is joint owner. It sounds to Peter a bit like the police complaints procedure - the police regulate themselves!

I should point out, for Peter's information, that the CAA does not regulate itself to the extent that accidents are investigated independently by the Air Accidents Investigation Branch of the Department of Transport, Environment and the Regions. This latter does a thorough job and make safety recommendations, although I have noticed that the CAA does not always accept or implement those recommendations.

Assuming CAA and NATS are to be separated, I disagree with Peter that privatisation is the answer. There are other ways, such as making NATS a separate government agency. There have been so many privatisations in the last 20 years that people now see them as the inevitable reflex response to solving problems. This has stopped us from critically reviewing the many far more efficient options.

Remember, the only point of privatisation is to divert public

Piper Arrow IV. Christine Minnis

Abbreviations

AAIB	Air Accidents Investigation Branch
AIC	*Aeronautical Information Circular*
ATIS	Automatic Terminal Information Service
B.	Boeing
CAA	Civil Aviation Authority
d.m.e.	distance measuring equipment
FL	flight level
ft	feet
g	grams
i.l.s.	instrument landing system
MHz	megahertz
NATS	National Air Traffic Services
v.h.f.	very high frequency
v.o.r.	very high frequency omni-directional radio range

Continued on page 59

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

DX Television

Fig. 1: The Clock caption from Syria, received on E3 by Stephen Michie.

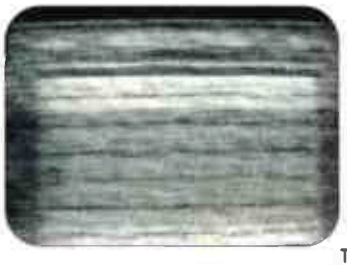

Fig. 2: Pages of text, possibly from the Koran, received by Stephen Michie. Reception is thought to have originated from Iran.

July was another terrific, well-packed month for Sporadic-E reception. The exotics simply kept on rolling in!

Arabic DX Extravaganza!

Syria E2 and Jordan E3 (with its broken oval logo) have been frequent visitors this season. Syria has also appeared on E4 and to a lesser degree on E3. A spectacular opening into the Middle East on the 10th affected many parts of the United Kingdom.

At 1610, **Peter Barclay** (Sunderland) became aware of Arabic singing on E2. In Bristol, **Stephen Michie** observed Jordan E3 at 1618, with Syria E2 and E4 identified at 1627. By 1640, **Peter Chalkley** (Luton) was monitoring Arabic signals on E3 and E4, the latter being the steadiest.

Greek or Turkish music was heard on E3 at 1650. At 1704, Peter Barclay discovered an E2 logo resembling 'UU' in the lower right-hand corner of the picture. Shortly after, **Ian Milton** (Ryton) had identified Iran from its 48.239MHz offset.

Further Reception Reports

New logos have made identification difficult at times. The Euro 2000 football, shown by many countries, only made the situation worse. Fortunately, some countries were easy to identify. Lithuanian TV always seem to show *The Teletubbies* while RAIUNO (Italy) has rather a lot of *Murder She Wrote*. Spain (TVE) appears to be obsessed with *Baywatch*!

Three new Italian private stations have been received. On the 9th at 1049 on Channel C (82.25MHz vision), **Tom Crane** (Hawkwell) noticed an identification 'TV Napoli Juke Box', while earlier in the month, on the 1st, Peter Barclay discovered a station just below Channel C. On July 29th at around 1230UTC on E2, a white logo was seen in the lower right-hand corner of the screen with 'TELE' and a figure '3' below.

At 1910 on July 10th, Stephen Michie logged Belarus on Channels R1 to R5. The R5 (93.25MHz vision) signal must have been strong to over-power the many f.m. stations, but according to Stephen, it was stronger than R1.

On the 17th, **Peter Barber** (Coventry) received a low-power relay of ORF in Austria, again on E3.

On E3 at 1728 on the 24th, Peter Barclay resolved an unidentified French-language station. There was a dark '1' logo in the lower left-hand corner with indecipherable text across the middle. This must be an unlisted station in the Middle East, or possibly Africa.

Tropospheric Reception

Simon Hockenhull (Bristol) identified Luxembourg (RTL PLUS) E7, Germany (ARD) E10 and France (F3) on L24. The latter was transmitting the PM5544 test card at 0025.

During one opening, Band I tropospheric signals were encountered by Barry Bowman (Manchester) on Channel E3. These were DR-1 (Denmark) with the *TV-Avisen* News programme and ARD (Germany) with Euro 2000 in colour.

Auroral DX

There was a good Aurora on July 15th from 2115UTC. **Tim Bucknall** (Congleton) identified NRK-1 E2 (Greipstad) at 2158, with an extremely fast and 'choppy' flutter on the video carrier. At this point the 'Powerhouse' Norwegian radio station on 1314kHz medium-wave had vanished, the first time Tim has known this station to be absent in ten years of DXing!

On July 18th, from 1730 until 1750, **Trygve Thue** (Bergen, Norway) received 'Nova News' from the Czech Republic on R1 - not from the south but from the north/north-west! Later, from 2335, RUV (Iceland) was received on E3 and E4.

Sporadic-E Log For July

Reception reports have been supplied by Stephen Michie, Simon Hockenhull, Peter Barber, Peter Barclay, Peter Chalkley, Tom Crane, **Barry Bowman**, Ian Milton and **Vincent Richardson** (Dolgarrog). Only the more productive days are shown with reception in near-chronological order. All reception times are in UTC.

Day	Log
1	Hungary (MTV-1) R1; Serbia (RTS) E3; Slovenia (SLO-1) E3; Croatia (HRT) E4; Italy (RAIUNO) A and B; Italy (TVA) A; Italy (VIDEO) E2; Albania (TVSH) C; Corsica (Canal Plus) L2; Spain (TVE-1) E2, E3 and E4; Portugal (RTP) E3; France (Canal Plus) L3; Hungary (RTL KLUB) R2; Rumania (TVR-1) R2; Ukraine (YT-1) R2; Unidentified Italian private station just below Channel C at 1747.
2	Corsica L2 and L4; Italy (RAIUNO) A and B; Lithuania (LRT) R2; Moldova (TVM) R2 and R3; Serbia E3; Croatia E4; Hungary (RTL KLUB) R2; Austria (ORF-1) E2a; Ukraine (YT-1) R2 and R3; Ukraine (YT-2) R1 and R2; Portugal E3; Spain E2, E3 and E4; Belarus (BT-1) R1 and R2; Estonia (ETV) R2; Sweden (SVT-1) E2, E3 and E4; Italy (VIDEO) E2; Italy (TVA) A; Switzerland (DRS SF-1) E2; Jordan (JTV-1) E3 at 1600; Germany (ARD) E2; Slovenia E3; Albania C; Czech Republic (NOVA) R1 and R2; France L3; Switzerland (TSR-1) E4.
3	Italy (RAIUNO) A and B; Spain E2, E3 and E4; Portugal E3; Italy (VIDEO) E2; Italy (TVA) A; Czech Republic R2; Croatia E4; Slovenia E3; Slovakia (STV-1) R2; Albania C; Hungary (RTL KLUB) R2; Lithuania R2; Belarus R1; Russia (ORT) R1; Ukraine (YT-1) R2 and R3; Germany E2.
9	Albania C; Hungary (RTL KLUB) R2; Serbia E3; Unidentified Arabic text pages E2 at 0937; Syria E2 and E4 at 0955; Germany E2; Croatia E4; Italy (VIDEO) E2; Rumania (TVR-1) R2 and R3; Italy (RAIUNO) A and B; Spain E2, E3 and E4; Unidentified Italian station 'TV Napoli' on Channel C at 1049; Switzerland E2 and E3; Hungary (RTL KLUB) R2; Portugal E3; Czech Republic R2; Austria E2a; Ukraine (YT-2) R2; Italy (VIDEO) E2; Corsica L2 and L4; Moldova R2; Lithuania R2; Norway (NRK-1) E3.
10	Italy (RAIUNO) A and B; Spain E2, E3 and E4; Portugal E3; Unidentified Arabisinging on E2 at 1610; Jordan E3; Syria E2; Unidentified Arabic stations on E3 and E4 at 1640; Unidentified station on E3 with Greek or Turkish music at 1650; Unidentified Russian-language transmitter with ethnic flute music; Unidentified Arabic station on E2 with 'UU' logo in lower-right; Iran E2 at 1715; Ukraine (YT-1) R2; Lithuania R2; Moldova R2 and R3; Slovakia (STV-1) R2; Hungary (RTL KLUB) R2; Russia (ORT) R1; Slovenia E3; Croatia E4; Belarus R1, R2, R4 and R5; Germany E2, E3 and E4; Austria E2a; Czech Republic R2; Switzerland E3; Finland (YLE-1) E4; Estonia R2; Sweden E2 and E3.
11	Jordan E3 at 0630; Slovenia E3; Germany E2; Switzerland E2 and E3; Italy (VIDEO) E2; France L3; Corsica L2 and L4; Italy (RAIUNO) A, B and C; Spain E2 and E3; Hungary (RTL KLUB) R2; Iceland (RUV) E4; Slovenia E3; Croatia E4; Sweden E2, E3 and E4; Norway E2, E3 and E4; Czech Republic R2; Serbia E3; Ukraine (YT-2) R1; Belarus R1 and R2; Lithuania R2; Russia (ORT) R3; Russia (RTR) R2; Ukraine (YT-1) R2.
13	Belarus R1 and R2; Sweden E2, E3 and E4; Norway E2 and E3; Lithuania R2; Austria E2a; Hungary (RTL KLUB) R2; Czech Republic R2; Slovenia E3; Moldova R2; Ukraine (YT-1) R2; Latvia (TV1) R3; Estonia R2; Iceland E4.
15	Ukraine (YT-1) R2; Switzerland E2; Italy (RAIUNO) A and B; Estonia R2; Lithuania R2; Sweden E2, E3 and E4; Austria (ORF-1) E4; Croatia E4; Norway E2 (Greipstad) via Auroral activity at 2158.
22	Spain E2, E3 and E4; Italy (RAIUNO) A and B; Italy (TVA) A; Lithuania R2; Moldova R2; Ukraine (YT-1) R2 and R3; France L3; Portugal E3; Slovenia E3; Corsica L2; Czech Republic R1; Hungary (RTL KLUB) R2; Rumania (TVR-1) R2.
24	Italy (TVA) A; Hungary (RTL KLUB) R2; Croatia E4; Slovenia E3; Spain E2, E3 and E4; France L3; Albania C; Italy (RAIUNO) A, B and C; Corsica L2 and L4; Sweden E2 and E3; Austria E2a and E4; Rumania (TVR-1) FuBK test card at 0953; Ukraine (YT-1) R1 and R2; Denmark (DR-TV) E3 and E4; Germany E2; Unidentified French-language station with adverts/programmes plus a dark '1' logo in lower left corner and indecipherable text across the middle on E3 at 1728; Italy (VIDEO) E2; Czech Republic R2 with 'tn' News at 1830; Belarus R2; Russia (RTR) R2; Lithuania R2; Switzerland E2 and E3; Norway E2; Moldova R2.
25	Russia (RTR) R2; Finland E3 and E4; Sweden E2, E3 and E4; Norway E2, E3 and E4; Ukraine (YT-2) R1 and R2; Ukraine (YT-2) R2; Italy (TVA) A; Italy (VIDEO) E2; Unidentified PM5544 from north-east (not ETV) R2; Estonia R2; Hungary (MTV-1) R1 with 'HIREK' News at 1856; Hungary (RTL KLUB) R2; Slovakia R2; Spain E2 and E3; Rumania (TVR-1) R2 and R3; Rumania (TVR-2) R2; Iceland E3 and E4; Albania C; Austria E2a; Italy (RAIUNO) A and B; Germany E2; Switzerland E2; Croatia E4; Slovenia E3; Serbia E3; France L3.
29	Spain E2; Portugal E3; Italy (RAIUNO) A and B; France L3; Slovenia E3; Russia (ORT) R1; Estonia R2; Belarus R1; Norway E3; Sweden E2 and E3; Italy (TVA) A; Unidentified 'TELE 3' logo E2 at 1245; Albania C; Ukraine (YT-1) R2; Ukraine (YT-2) R1; Russia (RTR) R1; Czech Republic R1 and R2; Hungary (RTL KLUB) R2; Croatia E4; Rumania (TVR-1) R3; Germany E2; Switzerland E2 and E3; Lithuania R2.
31	Czech Republic R1; Syria E2 at 0943; Hungary (MTV-1); Italy (RAIUNO) A and B; Italy (TVA) A; Spain E2; Ukraine (YT-1) R2.

Fig. 3: The Clock caption from ETV in Estonia, noted by Stephen.

FM Reports

High m.u.f.s produced f.m. band openings on many days during July. At 1900 on July 1st, Barry Bowman heard numerous Italian transmitters between 87.50 and 88.10MHz, 97.00 and 97.20MHz, 106.00 and 106.40MHz, and from 107.70Hz to 107.9MHz. These included 'Radio R Dimensione Suono' and 'Radio Luna'. By 2230 there were various Spanish stations in stereo, including Cadena SER on 88.00MHz. Some other stations were heard between 87.50 and 88.10MHz, 97.00 and 97.20MHz, and from 106.00 to 106.40MHz.

An opening on the 25th at 0650 produced Finnish stations on 87.70 and 97.70MHz. Later, during an opening into Italy and Spain, **Peter Chalkley** (Luton) heard an Arabic station on 87.9MHz, which is thought to have been Egypt.

Fig. 4: Identification caption radiated by LRT in Lithuania and received by Stephen Michie.

Fig. 5: The 'Hirek' News programme radiated by RTL Klub in Hungary.

Fig. 6: This month's forage in the popular 'Down Memory Lane' archive spot. The logo used by Southern Television in the late Fifties and early Sixties.

Service Information

Estonia: The new PM5544 test card has also been seen with the additional identification 'TALLINN' at the bottom. Also, there seems to be another version with 'ETV TALLINN' at the top and an extended, but blank, lower identification panel.

Lithuania: A standard G-204 test card is displayed followed by colour bars with an 'LRT' logo in the top-left of the screen. A new clock caption is in service.

This month's Service Information was kindly supplied by **Stephen Michie**.

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 57

Cessna Skylane. *Christine Mlynek.*

property and money into private hands. If you are looking to solve any other problem (such as funding or management structure), there are other, better ways. While we're about it, I'm of the opinion that AAIB safety recommendations should become legally binding on the CAA (with an appeal procedure, of course).

Radio Hardware

I noted the harmonic relationship between the distress frequencies (July page 64). Apparently, in the United States, there is another emergency 'guard' channel, 40.5MHz. The third harmonic of this is 121.5, as **Meg Hertz** points out. Meg suggests that 40.05 is sometimes incorrectly reported. There's also a gap in allocations around 60.75, the second harmonic of which is also 121.5 of course.

While setting the record straight, if I may briefly digress onto marine v.h.f., Meg points out that channel M2 (used in British waters for co-ordinating yacht races) is not on the widely-reported 161.625 but actually 161.425MHz. It's news to me that channels 75 and 76, adjacent to distress channel 16 in frequency, are now available for low-power use. I wonder why, when so many channels have become free now that coast stations have closed down.

Frequency & Operational News

Not really news, but slightly complicated and neatly defined on the latest half-million topographical chart, are the Scottish Flight Information Service frequencies. Very roughly, imagine the country divided into quarters. Then, the frequency for the north-east quarter is 126.25, south-east 124.55 (above FL55) and 119.875 (below), south-west 127.275 and north-west 133.675MHz.

You might like your own copy of the chart. These are sold on behalf of the CAA by **CAA Chart Sales (AFE), Unit 1A, Ringway Trading Estate, Shadowmoss Road, Manchester M22 5LH, Tel: 0161-499 0013** if you genuinely wish to enquire about prices.

Adding to last month's news about the new Athens airport, **Costas Krallis SV1XV** (Athens) tells us that 03R/21L has d.m.e. channel 48X (1009MHz reply) and that the i.l.s. ident is I ATR. On 21R/03L the ident is I ATL, localiser 110.5, glidepath 329.6, d.m.e. channel 42X (1003MHz reply). Nearby d.m.e./v.o.r.s are SAT (109.6 and channel 33X, 994MHz reply); SPA (111.6 and channel 53X, 1014MHz reply) and KRO (112.2 and channel 59X, 1020MHz reply). I quote the reply frequencies as d.m.e.s transmit continuously, with ident, on them.

Isn't it getting crowded up there? I noticed, when coming back to Gatwick recently, that we were told to call the Tower with "Callsign only". They were already expecting us, but with the volume of both departing and arriving traffic on frequency, there simply is insufficient time to reiterate all the details! This seems to go against the usual training in radio procedures but is in fact an agreed concession at certain busy airports.

Here's a final thought. Wherever you go these days, even at holiday resorts, people walk around with cellular telephones clapped to their heads. They can be a right nuisance, oblivious to everyone else, bumping into passers-by and even wandering in the road. Then, I thought, thank goodness for them. Why? Cellular phones are now ubiquitous, so no-one pays any attention if you carry a little box with a numeric keypad, liquid-crystal display and a rubber helical antenna sticking out. The average person (or airport security checker) can't tell a scanner from a 'phone! This makes it easier for the hobbyist, less questions are likely to be asked as a scanner no longer draws attention to itself.

All letters received up to August 10 have been answered. The next two deadlines (for topical information) are October 9 and November 6. Replies always appear in this column and it is regretted that **no** direct correspondence is possible.

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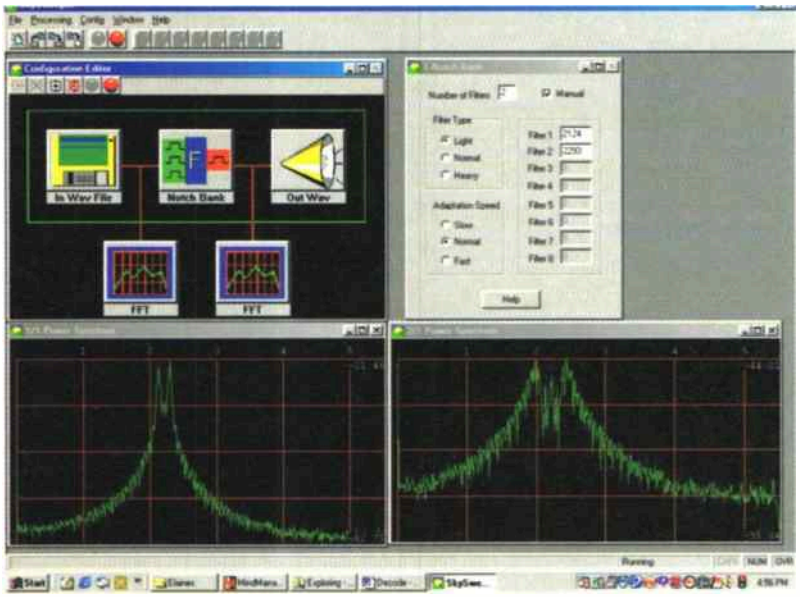
Decode

This month I'm going to spend some time taking a closer look at a program I mentioned a month or two ago - *SkySweeper*. This is very much a new entry on to the utility decoding market and this has brought with it a fresh approach to the design of a software decoder.

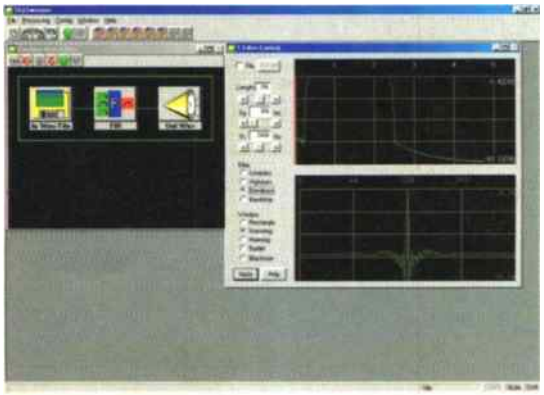
One of the most obvious differences is the use of a 'building-block' display screen to show you the current configuration. This is a novel but very practical way to visualise the decoder. Perhaps the most important difference is the extensive integration of d.s.p. (digital signals processing) techniques. Whilst you may just think this is another decoder, there's lots more under the surface that I'll try and explain here.



Layout and results for the manual notch filter - note the level difference between the two graphs.

Basic Set-Up

Let's start with the Configuration Editor, which shows, graphically, the various components you've chosen to use in your system. Just the ability to personalise the set-up is a real boon and a facility that exists in very few decoding systems.



FIR Bandpass filter design screen.

Choosing an I/P source is pretty straightforward as in most cases you will want to use the program with the live output from your radio. If you do want to take a look at a signal you've previously recorded, you have the option to choose a .wav file. You have similar choices for the output, but in most cases you will want to choose WAV, which directs the sound to your speakers via the soundcard.

If you try this basic set-up and you don't get any sound from the speakers it's probably because your record settings need adjustment. Follow these steps to put it right.

Press START - settings - Control Panel from within Windows. Now double-click the Multimedia icon followed by the Audio tab. Now click the Audio button and make sure the input you're using is checked and that the volume control is not set to 0!

You also need to make sure the Line input playback volume is set to minimum or muted. If you don't do this you will hear the direct unfiltered audio. This should get you on the air. If it doesn't, try the Windows trouble-shooters that can be found as part of the Windows Help. You also need to make sure the record level is kept under control, as any overload will cause distortion.

Digging Deeper

Once you have audio passing through the system you can start to experiment! One of my favourites is the fully customisable FIR (Finite Impulse Response) filter - don't worry about the technical description - this is an ace d.s.p. filter that you can adjust to cope with most real life filtering problems.

What makes this so good is the way you can design your own filter and see the results on the screen as you go. To try this, find the box with a + sign and a horizontal line entering and leaving. Click on this and choose filters followed by FIR - this should give you the main Filter Control menu complete with graphs. I know this looks complicated, but don't panic, it's easy really.

Here's how to use the Filter Control to build a bandpass filter with a response from 300Hz to 2.4kHz. Using the filter type buttons press Bandpass and then select the Hamming window button. Now all you need to do is enter the lower and upper frequencies of the filter in the boxes called Fp and Fs respectively. You will see that each box has a slider next to it and you can use this to set the frequency if you prefer.

The only box we haven't covered is the Length. This effectively sets the severity of the filter - try changing this and see what happens. The higher you set it the steeper the sides of the filter become, but there's a penalty with increased processor usage and a tendency to 'ring' which is shown by the lower graph. I suggest you start somewhere in the middle of the range at 256. Although this filter has been included to help tidy-up data signals, the implementation is suitable for all types of signal.

With everything set-up all you have to do is press the Green button to start the processing. Once you've achieved this initial success, feel free to experiment with the values to create all sorts of different filters. Don't forget to press the Apply button every time you make a change.

When you're using this filter to tidy-up data signals you need to keep the filter settings as mild as possible - just enough to make the signal readable should be your guideline. Whilst it's tempting to

wind-up the filter settings to really clean up the signal you will end up adding distortions from the d.s.p. process that will introduce errors into the digital signal.

If FAX is your special area of interest then you should try the Median filter, which has been designed specifically to deal with the reduction of impulsive noise in pictures. You add this in the same way as the FIR filter, but it's much simpler to use as there's just one variable to set the length. Remember to keep this as low as possible because it uses-up processor time and can harm your signal if overdone.

A filter that has limited use for data, but is exceptionally useful for speech is the Notch Bank. This excellent filter can eliminate up to eight separate whistles and render them just about inaudible. If you try and use it with a data signal you will find that the data signal goes as well! This is a really powerful filter, but if you're using it in automatic mode you need to give it time to adapt to the signal.

For the odd occasion where you encounter a single tone that's messing-up your data signal or FAX, you can use the Notch Bank's manual mode to pick-out the offending tone. I suggest you make sure you have a FFT analyser block connected to the signal line and press the green button. You should be able to see the interfering tone displayed on the FFT analyser.

Once you've found it, place your cursor over it and hold the left mouse button down. This will give a frequency read-out in the bottom left corner of the display. Make a note of the frequency and return to the Notch Bank. Click the manual box and enter the frequency you've just measured into the first of the filter boxes.

After a short delay (about four seconds on my system) you should find that the tone disappears. If there's more than one tone just repeat this exercise for each tone you want to remove. As far as the filter type boxes go, here's the effect of the three settings: Light = Stop bandwidth of 150Hz; Normal = Stop bandwidth of 80Hz and Heavy = Stop bandwidth of 70Hz.

Two other filters that you may find handy are the Noise Reducer and Equaliser. The Noise Reducer does what you would expect and reduces the general 'mush' on the signal. The only adjustment available controls the speed of response and should be set as slow as possible to avoid any adverse effects on the wanted signal.

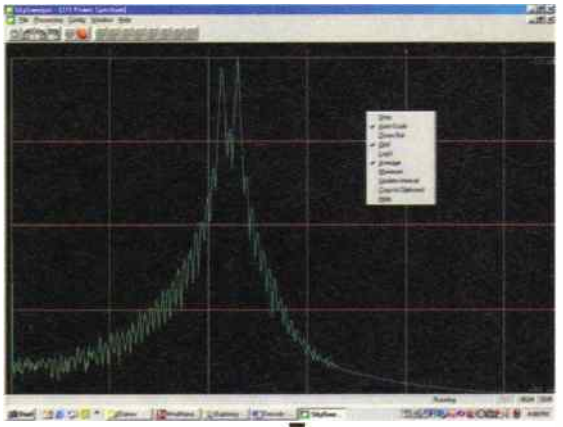
The equaliser doesn't behave like the type of equaliser you get on your Hi-Fi but primarily as an echo reducer to help take-out the echo caused by multi-path propagation.

Analysers

SkySweeper comes with an impressive array of analysis tools but the most useful for data enthusiasts is the FFT/Power Spectrum. This plots frequency along the horizontal axis and level on the vertical axis. As a result it makes an excellent tuning indicator and a really good measurement tool. If you right click on the display area you will get a set of options that can help make the display even easier to use.

The two most useful ones for utility signals are Auto Scale and Average. Auto Scale simply adjusts the horizontal and vertical scales to fit the signal and just makes everything much clearer. The average works extremely well on signals like RTTY and SITOR as you can much more easily see the peaks that correspond to the two tones in the signal.

If you want to take a close look at a part of the signal, you just left-click the mouse on the required part of the signal and draw a horizontal line that spans the part of the signal you want to view. This immediately causes the display to magnify that part of the signal. You can then take precise measurements of the signal by left clicking on any point and noting the frequency readout at the bottom left.



Detailed look at the FFT/Power Spectrum screen.

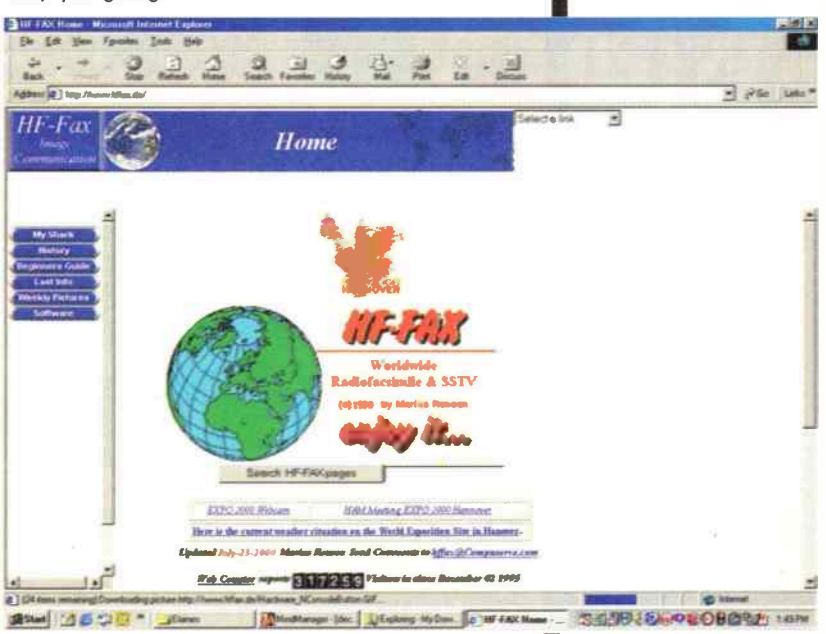
When using the Auto Scale you will note that two numbers appear on the left side of the screen. These are the measured signal level and show the maximum and minimum levels.

In a later column I'll take you through the decoding sub-systems and show you how to get the best from them. In the meantime, if you want to get a copy of *SkySweeper* here's the Web site: **http://www.skysweep.com**

HF-FAX Heaven!

I know from the letters I receive that many 'Decode' readers really enjoy FAX reception, partly because of the useful weather information that can be received, but also because of the sheer fascination of transforming a warbling noise into a picture. If you have Internet access and an interest in FAX, then you really do need to make sure you pay a visit to Marius Rensen's HF FAX Page. This can be found at: **http://www.hffax.de/**

This excellent site is packed with just about everything you need to both get you started and to keep you going.



Marius Rensen's HF FAX Page.

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REALISTIC	PRO-2026 SCANNER	£99.00
REALISTIC	PRO-26 HANDY 25-1300 (AS NEW)	£125.00
TOKYO	HT 180 80m HF SSB TRANSCEIVER	£200.00
TOKYO	HY-POWER HL 166V 6m 180w	£195.00
TONO	5000E TERMINAL + KEY BOARD	£199.00
TRIO	TR-9130 25 Multi-mode 2m	£225.00
UNIDEN	BEARCAT 860XLT SCANNER BASE	£99.00
WATSON	DPS 2012 PSU	£70.00
YAESU	FC-107 ATU	£130.00
YAESU	FC-20 Automatic ATU	£170.00
YAESU	FC-757 ATU Automatic Antenna Tuner	£175.00
YAESU	FL-110 AMP 100w HF	£120.00
YAESU	FP-757GX Power Supply	£140.00
YAESU	FRG-100	£295.00
YAESU	FRG-7700 RECEIVER	£250.00
YAESU	FRG-8800 incl CONVERTER	£325.00
YAESU	FRT-7700 ATU	£50.00
YAESU	FRV-7700 CONVERTER	£60.00
YAESU	FT-1000MP AC LATEST SERIAL No. !	£1,495.00
YAESU	FT-101ZD HF TRANSCEIVER	£275.00
YAESU	FT-101ZD MK111 FM HF TRANSCEIVER	£325.00
YAESU	FT-102 BASE TRANSCEIVER 150w	£350.00
YAESU	FT-107M 100w HF BASE	£400.00
YAESU	FT-2500M 50w 2m MOBILE	£200.00
YAESU	FT-290MK1 2M Multi-mode	£195.00
YAESU	FT-290R MK11	£275.00
YAESU	FT-3000M 70w 2m MOBILE TRANS	£225.00
YAESU	FT-50R 2/70 HANDY BOXED	£175.00
YAESU	FT-5100 DUAL BAND MOBILE TRANS 50w	£200.00
YAESU	FT-5200 DUAL BAND MOBILE TRANS 50w	£220.00
YAESU	FT-530 2/70cm HANDY	£175.00
YAESU	FT-704 MAN PACK HF MILITARY SPEC	£275.00
YAESU	FT 707 HF 100w MINT!	£225.00
YAESU	FT 726R 2/70/6M TRANSCEIVER	£599.00
YAESU	FT-730R 70cm BOXED	£120.00
YAESU	FT-747GX HF 100w MOBILE	£350.00
YAESU	FT-757GX	£395.00
YAESU	FT-757GX11	£425.00
YAESU	FT-767GX 2/70/6M HF inc ATU	£799.00
YAESU	FT-817GX HF 100w ATU AC	£575.00
YAESU	FT-77 HF MOBILE BASE TRANSCEIVER	£250.00
YAESU	FT-840 HF MOBILE BASE TRANSCEIVER	£450.00
YAESU	FT-847 HF/6/2M Trans 4m	£999.00
YAESU	FT-8500 DUAL BAND MOBILE TRANS 50w	£89.00
YAESU	FT-890 AT inc FILTER	£600.00
YAESU	FT-900AT BOXED	£895.00
YAESU	FT-920 HF/50 MHz BASE TRANSCEIVER	£925.00
YAESU	FT-920 AF HF/50 MHz BASE TRANSCEIVER	£999.00
YAESU	MD1 DESK MICROPHONE	£75.00
YAESU	VX-1R MICRO 2/70 WIDE RECEIVER	£100.00
YAESU	VX-160 HANDY SCANNER	£195.00
YAESU	FL-2025 AMP FOR FT 290R MK11	£100.00
YUPITERU	MVT-3300EU MULTI BAND RECEIVER	£100.00
YUPITERU	MVT-8000 BASE	£249.00

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■ E-MAIL: info.orbit@pwpublishing.ltd.uk ■ WEB SITE: http://www.itchycoo-park.freeserve.co.uk

Info in Orbit

Were you one of those who heard the mysterious signals on 136.77 and 137.50MHz that were reported during spring 2000? The full story is given in this column.

WXSAT Activities

What a challenge *NOAA-15* has been to NOAA (the National Oceanographic and Atmospheric Administration)! The Advanced Very High Resolution Radiometer/3 (AVHRR/3) on *NOAA-15* failed on Friday 21 July 2000, so it was put into a 'safe mode' so that the synchronisation of this instrument would not interfere with other important data being processed by the onboard MIRP (Manipulated Information Rate Processor).

On Monday 24 July 2000, engineers tried to loosen the HIRS/3 (high resolution infra-red radiation sounder, version 3) filter wheel shaft lubricant, by heating up the filter wheel shaft. Unfortunately, a strange set of circumstances happened where some of the HIRS/3 channels were calibrated incorrectly, and others had correct zero value calibration coefficients appended.

It appears that the warming of the filter wheel shaft increased the temperature of the filter wheel itself, causing incorrect earth, blackbody and space channel measurements. A combination of factors resulted in the generation of bad calibration coefficients. The HIRS/3 later returned to nominal temperatures, but the internal synchronisation was only providing ground-stations with 60% of normal data coverage.

It was also revealed that the cooling louvers on board *NOAA-15* were not wired prior to launch, so the cooling of the AVHRR/3 and HIRS/3 could not be done properly by opening these louvers. The result is that these instruments have not lasted six years as they have for *NOAA-14* and several other spacecraft.

On the evening of July 22, the Satellite Operations Control Centre (SOCC) in Suitland, Maryland, reported that the AVHRR motor current was erratic during the early problem period, averaging about 230mA, with values to nearly 250mA. Previously, the AVHRR motor current was reasonably steady at 210mA.

The engineering team and operations crews have been advised that the *NOAA-15* AVHRR scan motor should not be turned off under any circumstances, unless spacecraft (not instrument) health and safety is jeopardised.

The effect of this problem varied during July and early August. Transmissions on a.p.t. and h.r.p.t. frequencies continued, but images were often useless, although in some cases highly picturesque!

The other NOAA WXSATs (*NOAA-12* and *NOAA-14*) continued routine a.p.t. and h.r.p.t. operations as normal. *METEOR 3-5* (see **Fig. 2**) and *RESURS 01-N4* (see **Fig. 3**) have also continued normal transmissions, though picture quality from the former appears somewhat degraded.

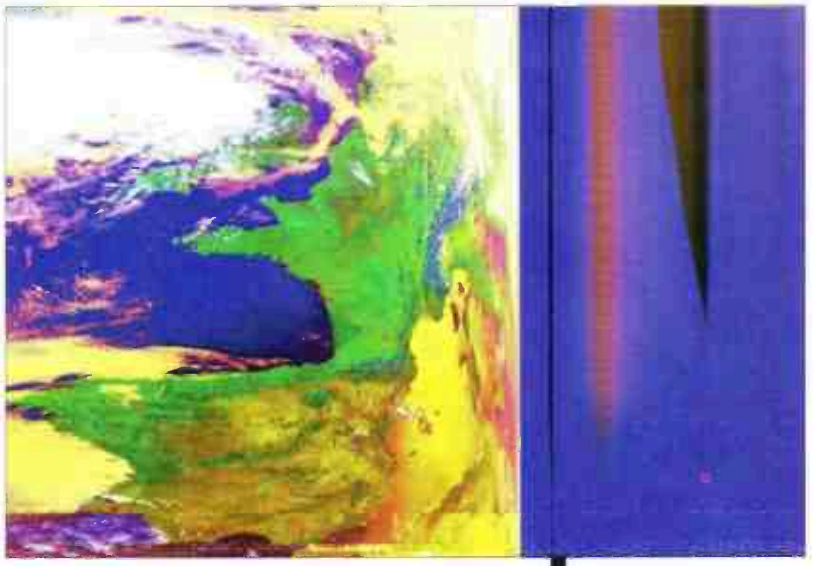

Fig. 1: *NOAA-15* h.r.p.t. image channel 2, 0818UTC 31 July, 2000.

Fig. 2: *METEOR 3-5* 1227UTC 11 August 2000.

RESURS Operations - Update From ScanEx

To find out more information about current RESURS operations, I contacted **Olga Tarakanova** of the Research and Development Centre, ScanEx. ScanEx is a private company based in Moscow, Russia, and since its formation in 1989, has developed and manufactured high technology products for applications in education, meteorology and environmental monitoring.

They define their mission: "To make satellite information more accessible in terms of price and technology". They believe that local sites (regional centres and corporations) should have direct access to satellite information on natural resources and meteorological conditions, including capabilities for archiving, further data processing and interpretation. To achieve this, ScanEx has developed Personal Ground Stations (PGSs).

Olga explained that the 8.2GHz transmitter on *RESURS O1-N3* failed, so they operate the satellite using the 465MHz transmitter since September, 1998. This frequency is not protected from industrial interference (mostly mobile 'phones), and there is practically no possibility of receiving information in industrial cities.

"But in spite of this, we put into operation four stations for reception of data from *RESURS-3* at 465MHz last summer: near Ryasan (Central Russia), near Irkutsk (Baikal region, Eastern Siberia), near Yuzhno-Sakhalinsk (Sakhalin Island, Far East of Russia), and Elista (Kalmyk Republic of Russia, South of Russia). So, we filled up our archive of coverage of a big part of Russia during summer-autumn 1999 and winter-spring 2000". There is no a.p.t. format transmission from *RESURS 01-N3*.

RESURS O1-N4 was launched on 10 July 1998, "but was failed in April, 1999" [note - I believe this refers to the 8GHz transmitter]. For the period of its operations we received information and formed the images archive".

"The Russian-Ukrainian satellite *OKEAN-O N1* was launched on 17 July 1999, and now it is on the stage of exploitation. Unfortunately, problems with orientation on the orbit periodically occur. The transmission formats of *RESURS-O1 N4* and *OKEAN-O N1* are the same, and we receive information from *OKEAN-O N1* by the same receiving station that we used for *RESURS-O1 N4* only a bit corrected the software for reception and processing information. We have already started to create the *OKEAN-O N1* data archive.

"The launching of *METEOR-3M* is planned in the third quarter of this year. It will have MSU-E scanners like *RESUR-O1* and *MSU-S* middle resolution scanner with two channels, spatial

Fig. 3: *RESURS 01-N4* 1106UTC 13 August 2000.

resolution about 250m. The format of data transmission is the same as those of *RESURS-O1 #4* and *OKEAN-O # 1*, so it will be possible to use ScanER station for reception information from *METEOR-3M*. There will not be any a.p.t. format transmissions from *METEOR-3M*".

I hope to include a specially requested high resolution image from RESURS in next month's column. In the meantime, check out the ScanEx web site at **http://www.scanex.ru**

NOAA-9 Transmissions Confirmed

Many months back, I picked up transmissions on 136.77 and 137.50MHz (non-a.p.t.) that did not coincide with any operational NOAA WXSAT. Having Kepler elements available for all the NOAA satellites, it was not difficult to quickly associate the transmissions with the orbit of *NOAA-9*.

For confirmation, I continued to monitor *NOAA-9* for several orbits, and reported the observation to the Internet WXSAT lists. There was an interesting discussion concerning the transmissions, because officially, *NOAA-9* had been switched off - and in any case, the frequencies on which transmissions were reported, did not directly match those previously used by *NOAA-9*.

In due course, NOAA sent further 'off' commands, and all went quiet. Then one day I logged the transmissions just as before. Since that time, the transmissions have still been heard, in fact, I logged them again on 3 and 11 August. **Wayne Winston**, the Direct Readout Coordinator at NOAA/NESDIS, provided the Internet lists with some background information during those weeks, so I contacted Wayne for further details. He kindly responded in some detail.

"In the final days of *NOAA-9* as an operational satellite", writes Wayne, "it was being kept on for SARSAT capabilities". [Note - this is the Search And Rescue Satellite system that receives transmissions from emergency position locators (beacons) that travellers can carry; if activated, the transmission is heard by any suitably equipped satellite, and the information concerning the location of the beacon is re-transmitted to the appropriate warning agency].

"We were down to one subpar power supply, with one battery and one regulator/charger. Because NOAA was only operating SARSAT, the satellite was optimised for very low power usage. The decommissioning of the satellite includes the equivalent of a 'Ctrl-Alt-Del' on the on-board processor, that essentially erases all the software out of RAM.

"The satellite is now 'dead' in a power-off mode. In this state it no longer has the Attitude Determination and Control System (ADACS), and with time, starts a slow tumble to eventually stabilise around the centre of gravity. That's where we find it now, in a stable tumble of about 44 seconds (which accounts for the varying signal strength that is heard).

"With the tumble, the solar array is no longer optimally pointed at the Sun either. But it does get some Sun, and is capable of generating some power - if the satellite were turned on. Now, like a desktop computer, if we were to power up the satellite and on-board computer, the computer would reset itself to some stable state, like a computer re-boot.

"But, what we think is happening is that the satellite emerges into sunlight, it is slowly tumbling and the solar array is not optimally pointed. But it does start to produce some power, and the whole system is powered up *very slowly*. The slow power up means no 'reset pulse' is generated on the computer. The beacon and a.p.t. transmitter buffers are re-set; there are many erroneous settings on other buffers.

Fig. 4: Iceland - *NOAA-15* - 9 July 0946UTC from David Taylor.

"But remember at the end of its life, it was set up to work very efficiently with a minimum of power. So now the v.h.f. transmitters come on while in sunlight, and fade during the time the satellite is in shadow.

"The first time this happened, we tried sending a series of basic commands to clear the buffers and do some hardware resets that would turn the transmitters off. It worked only temporarily. A slow power up again meant no reset pulse, and the transmitters came back to life.

Since the computer was cleared, there are no brains to the satellite. Somehow we have to figure out a way to send a series of commands at the bit level to the hardware, to turn things off. This means sending commands bit-by-bit. Even then we don't know if it will work.

"With more important things happening recently, this is on the back burner. We don't know exactly what is happening; this is all surmises, and when I sit in on these discussions, I'm not an engineer!".

My sincere thanks to Wayne for this superb explanation of the background efforts being made to switch off *NOAA-9* during the problematic times generated by *NOAA-15*.

Image Compression

Sometimes it is actually possible to squeeze a quart into a pint pot - without any spillage! When a program, such as *PROsat for Windows*, produces a WXSAT image file, it does so using its 'native' format.

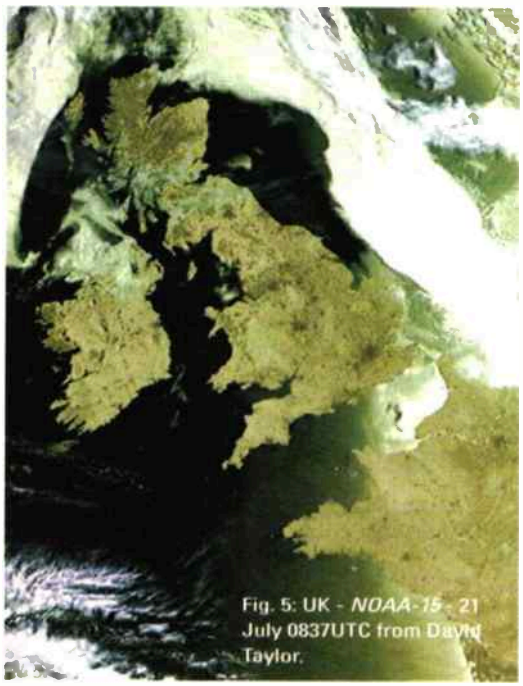

Fig. 5: UK - *NOAA-15* - 21 July 0837UTC from David Taylor.

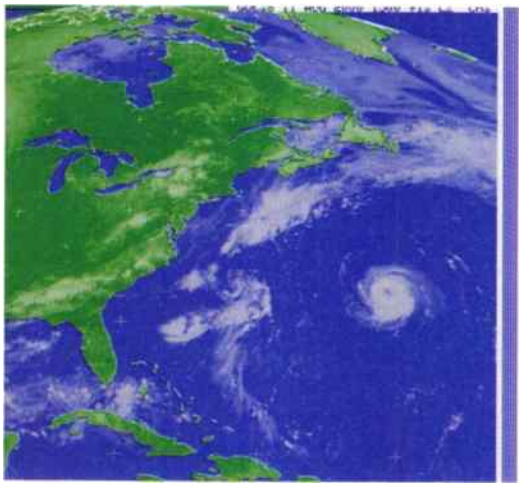

Fig. 6: North America: *Meteosat-7* WEFAX image visible-light 13 August 2000 1500UTC showing Hurricane *Alberto* - first of the season.

This stores each pixel (picture element component) in an absolute form, usually without any image compression.

The final file size depends on how much data was collected during the pass, so a full-length *METEOR 3-5* image may occupy 5Mb or more of space. Image processing programs usually offer a variety of 'formats' of which the most popular are probably JPG, BMP, and GIF amongst many. Each has its own advantages and they were designed for specific purposes, but the most common 'transfer' format is probably BMP (bitmap) format.

Programs that produce images, including *PROsat for Windows*, can usually convert the native program format into BMP; this allows the picture to be 'exported' to other software that would not otherwise know about NOA format (as used in *PROsat*). In BMP format, pixel data is retained in an uncompressed form that can be imported into most programs.

To convert a PROsat image to BMP format, select 'file' and 'export'. After naming the file and selecting a directory, a BMP graphic result is produced. This is a full resolution image file, and should be readable by any image processing program.

Once imported into a suitable program, a BMP file can be converted into a variety of alternative formats, but that invented by the Joint Photographic Experts Group - called JPG (or JPEG) - is an excellent choice. There is a common misunderstanding about JPG conversion: many people believe that such files have lost their original definition. This is not necessarily true.

A good conversion program offers a choice of compression factors. Check out one of the most popular programs - *PaintShop Pro* - and select 'file', 'save as' under 'options', you will find that you can select the degree of compression. This adjustable level of compression is the place where you decide whether an actual loss of detail can be balanced against the resulting file size.

Using a relatively low compression rate, for example around 20, little, if any, detail should be lost. The amount of compression that it is possible to achieve without loss of integrity depends on the content of the image. One that consists of large areas of black or white, with no detail, can be considerably compressed.

The software identifies similar adjacent values, and can efficiently store these values in a format requiring far less space than when raw. The final image may occupy between 80KB and 500KB depending on how much detail it contained, and how much compression you chose to force. If you are entering the competitions run on the 'rig-l' forum, you should aim for a maximum file size within 500KB - now easily achieved.

There are various ways to achieve a given size, but by successively increasing the compression factor, saving intermediate files, the desired result can be obtained. To illustrate the effectiveness of this process, note that the colour, multi-spectral BITMAP version of **Fig. 1** occupied 1.216Mb, yet the JPG equivalent, with little loss of resolution, was 85KB.

Shuttle Launch Schedule

STS-106 *Atlantis*, 8 September 2000, for ten days. 4th ISS Flight (2A.2b) - SPACEHAB module. Orbital inclination 51.6°.

STS-92 *Discovery*, 5 October 2000, for 11 days. 5th ISS Flight (3A) Payloads Z-1 Truss, PMA-3, Orbital inclination 51.6°.

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. 7: *NOAA-14* 1534UTC 11 August 2000 h.r.p.t. multi-spectral image.

Competition Winners

I received my copy of *SWM*, and the same morning received an E-mail from **David Taylor** correctly identifying the 'mystery' area (**Fig. 11**) as the stretch of the river Danube near the Romania/Yugoslavia/Bulgaria border. A few hours later **George Newport** also E-mailed me with the correct identification, as did several other readers.

Frequencies

NOAA-12 transmits a.p.t. on 137.50MHz.
NOAA-14 transmits a.p.t. on 137.62MHz.
NOAA-15 (fault condition) normally 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.

Kepler Elements - WXSATs, *MIR* & 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.

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Satellite TV News

VTR countdown clock of Lima (Peru) riots when locals protested about the government.

Live pictures out of the Reuters office window showing buildings, a fire, via *NSS-K* @ 21.5°W.

Satellite uplink from the Rockies for President Clinton's forest walkabout.

Bill Clinton thanks the military 'firemen' in their efforts at outing the widespread forest fires (live via *NSS-K*).

The US presidential election campaign is underway, here a live political speech to supporters of Al Gore.

Mid August and the USA presidential media circus is in full production run as their elections for the new president gains pace. The trans-Atlantic leases are full of the latest public meetings across the 'States, evening of August 8th, and an Al Gore meeting was carried live via the Reuters 11.462GHz-V digital lease (1730). The intensity of meetings will increase as election day approaches!

But the main event of the past few weeks was the loss of the Air France Concorde that fell out of the sky, on fire, some two minutes after a fiery take-off on July 25th, just before 1500 UK time, and with some 114 souls lost in the resulting explosion. I arrived home early from work that day (1620) and on hearing the news I quickly checked *Telecom 2C* @ 3°E as the most likely carrier for live SNG footage out of France.

In fact, already fired up as a European feeder link to a main trans-Atlantic operator (either satellite or fibre) was CNN in NTSC analogue running a 2-way live exchange with Atlanta, CNN's main HQ. The Concorde aircraft of course is both a legend and European technological prestige albeit historical - hence the interest and concern across the Americas in the disaster. CNN were up on Telecom about 45 minutes after the crash (12.644GHz-V analogue), Atlanta were pressing for live pictures and the terrestrial networks were monitored in the Paris studio.

Later *2C* carried more live analogue links into the German networks for both RTL and NTV in the road adjacent to the crash site (12.602GHz-V). Several sat-observers were also active this particular evening monitoring the reporting process from the disaster scene.

John Locker (Wirral) found that news feed uplinks were scattered. *Eutelsat 2F3* at its new 21.5° slot (it's moved from 36°E) offered both 11.056GHz-H and via the ITN Euronews core feed @ 11.096GHz-H - at this time in the clear.

The Sky Farnborough OB feed via *Intelsat 801* @ 31.5°W included Concorde crash content (10.998GHz-V) as did a digital bouquet with BBC news @ 12.535GHz-H on *Telecom 2B* @ 5°W (service id 'OCCITC2B') . *NSS-K* the main trans Atlantic carrier also downlinked Concorde news via 11.497 and 11.550GHz-H (all these SR 5632 + FEC 3/4).

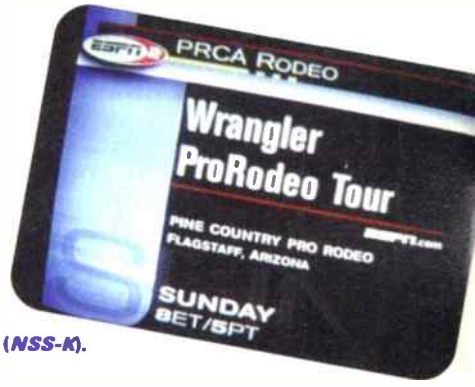
Roy Carman (Dorking) also checked across the sky and concentrating on *2F3* found the BBC linking @ 12.507GHz-H in the Telecom band ('BBC UKI 613 DSNV6') plus Sky News - 11,650GHz and an encrypted SISLink 11.630GHz - all horizontal. Roy, with his knowledge of security matters, noted that the BBC's pictures featured (unknowingly) the arrival of the French CRS - Compagne Republicla Securite, France's most fearsome police force. They're noted for appearing at all suspected acts of terrorism or acts against the state - but once the incident is declared an accident, then control is handed over to the Gendarmerie.

Eutelsat W2 @ 16°E additionally fired up @ 12.507 and 12.517GHz with more live crash site coverage. Downlinks were still carried the following day though this the aftermath with relatives visiting the crash site.

US President Clinton referred to the Concorde crash during his regular press conference at the White House on July 25th expressing his sympathy, the conference carried live - as usual - into Europe via the 'Reuters DC H-62' lease @ 11.558GHz-V (5632+3/4). Over this period Bill Clinton had been in the Middle East trying to negotiate settlement in the long on-going Jerusalem/Palestinian dispute - an agreement would have been a fine end to Bill's presidential term, but this was not to be, and he returned to admit failure at this White House conference.

August 8th and Bill Clinton is in the woods making a speech of thanks to the forces and then informally mingling with the reborn firefighters.

Reuters carried this feed over the Atlantic following the Al Gore presidential campaign reports (see above) interesting that the Reuters circuit carried the ident of the originating sat uplink from the mountains 'PEAK UPLINK SAT1'. For most readers, the Rocky Mountain states are fairly remote, but I can relate to the more domestic offerings of Meridian TV and the yachting activities of Cowes Week, that well known nautical extravaganza for the 'well healed' in the Isle of Wight.



It's rodeo time in the wild west, during the Reno Rodeo up came a promotion slide for the Arizona rodeo (*NSS-K*).

BT Broadcast Services have a contract with Meridian to provide Mon-Fri satellite uplinking into the evening magazine show *Meridian Tonight*. It's worth checking out the lower edge of Ku-band from *Intelsat 801* @ 31.5°W for regional UK feeds, for example Cowes Week inserts appeared in the clear @ 10.993GHz-V (5632+3/4) with ident on colour bars 'BT TES 43'.

ITV often use the lower part of Ku on this satellite for their OB circuits including sports inserts from other European venues (10.800-11.100GHz-V is a good hunting ground). End of July and early a.m. 'CNN THIS MORNING BERLIN' appeared several mornings around 0700 on *NSS-K* @ 11.468GHz-H (SR 6116 + FEC 3/4), the service ident of 'n-tv BERLIN' suggested the originating studio involved in a live 2-way with an unknown other studio though possibly into Atlanta.

Meridian TV's live insert into *Meridian Tonight* programme with a firemens training item, via *Intelsat 801* @ 31.5°W.

Roy Carman is a rugby fan though I wondered his thoughts to his early July sighting on 16°E (11.052GHz-V, 6111+3/4) from Zell au See...down hill roller blading was the 'sport' over tarmac roads with at least one skater taking a spill - fortunately in leathers - at 68.6kmh^{-1}! The minimum protection such as knee guards and shorts were worn and one guy clocked up +71kmh^{-1}. I feel my report of the Reno Rodeo last month was more exciting!

The sporting event that's been missing this year was the annual *Tour de France*, so often carried in high quality analogue pictures both air and land on *Telecom 2C* has appeared only occasionally on 3°E, other reports have appeared on 10°E and 31°W. The *Tour de France 2000* has been carried, when found, in digital only and certainly needing searching out!

A plain caption on a *Telecom 2B*, 8°W digital bouquet.

The move to digital is

continuous and ongoing, just a note for satellite radio anoraks, the UK 'Costcutter' supermarket chain (often found at petrol stations) has flushed it's former analogue frequency on *Astra-1E* (10.877GHz-H, audio 7.38MHz) down the plughole in favour of 28°E *Astra* digital transmission.

Another snippet of news - there's an un-named Jewish (Hebrew) TV channel been seen on 16°E recently and as reported in the Stefan Hagdorn Internet newsletter - it's been logged several times at 11.131GHz-H digital running an unusual SR 5924 + FEC 3/4, the times noted 1800-2000.

The rather 'odd' Channel 4 *Big Brother* programme has created considerable press interest, it being the English version of the popular Dutch/German epic which has been running for weeks and seen on *Astra* 19°E analogue via the RTL-2 transponder. I was alerted to an unusual programme by reader **John** from East Sussex who suggested I check out *W2* @ 16°E @ 11.304GHz-V (SR 30000 + FEC 3/4).

Indeed on tuning around, I found a discrete digital bouquet with five channels therein. Service idented as @BTV-1' thru to 'BTV-5' it was the 3rd one that provided the interest. The ident also included 'TWICH1' suggesting perhaps that Twickenham rugby had been carried before.

However, the pictures on BTV-3 found several folk wandering about, another massaging a female and others in various modes of relaxation - this was prior to the *Big Brother* series starting on-air and obviously the participants were far more relaxed! Interesting that in the same bouquet was 'Georgian Remux' on 'BTV-5', a Russian version of MTV out of the Georgian Republic.

A large bomb explosion on the Russian underground railway in Moscow - afternoon of August 8th - was thought to have bene planted by Chechnyan terrorists. Several passengers were killed. Reuters presented dramatic footage that evening over their *NSS-K* lease from 'Reuters Mowcow - RTV-2' - 11.550GHz-H, 5632+3/4.

Mid July was dominated with the ongoing loss and hunt for little Sarah Payne from Littlehampton.

The Payne family appeal was followed with an update on progress by a senior detective. This was uplinked via *2F3* and played out that evening over the UK networks. Reader **Edmund Spicer** lives near to Sarah's home and noticed the media activity at Littlehampton police station, the row of satellite trucks parked for the duration, BBC-South feeding a direct 2.5GHz microwave terrestrial link back to Rowridge, IoW.

This section led with the Concorde crash and has ended with the little girl lost. Over the years of my satellite monitoring, the Gulf War, Balkans, Lockerbie, Chechnya, Concorde, Princess Diana, Sarah Payne and similar - the problems and tragedies of mankind are covered in detail to an expecting world.

We Have Readers!

A recent sighting via the *Telecom 2B* bird @ 5°W querying a colour bar pattern with ident 'CIP Paris' has produced the answer from **Alexander Gorski**, a French film/video cameraman - and satellite enthusiast! The signal originated from the International Congress Centre of Paris (previously known as Palais Des Congres) near the Bois de Boulogne. It has a fully equipped video production facility with lines and fibre out to France Telecoms, sound stages, control rooms, etc. and previously known as 'CIP-VIDEO'. The other major pop/indoor sports venue in (East) Paris is the POPB, 'Palais Omnisports Paris Bercy' and the 'POPB' ident may appear on French test cards from time to time.

Orbital News

The French TF-1 national network is to expand into digital transmission with the formation of 'TF-1 Digital', a digital channel package comprising the existing digital offerings of LC1, Eurosport, Odyssee and Shopping Avenue and boosted with the entertainment channel TFX, a Breton language regional channel 'TV Breizh' (for Brittany) and a business news channel LC1 Finances. It's hope that the expanding digital offerings will allow TF1 to expand into terrestrial digital bouquets.

With a new BT Broadcast Services fibre optic cable installation completed between London and Paris, BT have been approaching media groups in the Paris region seeking their interests for international connection world-wide by opting into fibre connection with the BT London Teleport and bypassing the existing mainland France Telecom uplink teleports. Access into London will offer both satellite and fibre connection with the world.

A live report into Atlanta ex Berlin bureau @ 0715 one morning, the presenter awaits her cue (via *NSS-K*).

The satellite group COMSAT have signed with Max India Ltd. to form 'COMSATMAX', the first foreign satellite operator to gain the government's permission for uplinking onto non-Indian satellites from mainland India in a new Internet gateway project. Operating out of five major cities, the service starts September 2000 and will allow a rapid expansion of data and business traffic.

There are two new Indian TV channels on the 1°W Telenor digital bouquet, a UK based Indian company - Bollywood Eros Network - signed for 'B4U Movies' and 'B4U Music' channels which first aired early August. B4U Movies gives at least five Indian movies daily and the other channel offers film related music and entertainment.

Eutelsat have recently negotiated all Ku-band transponder capacity on the just launched Russian *Express A-3* sat @ 11°W, expanding commercial connex with Southern Europe, the Middle East and North Africa. In 2002 Eutelsat will slot a new sat into 40°E with C, Ku and L-Band capacity, of which Eutelsat will utilise all the 16 Ku-band transponders for developing markets in Central/Eastern Europe and across into South Asia.

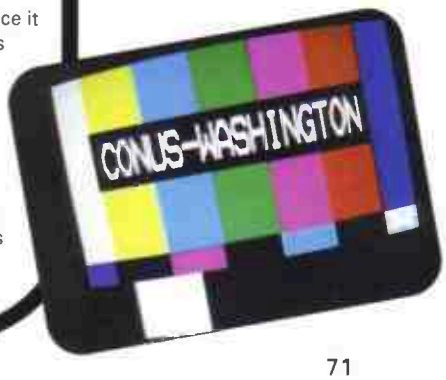
Eurasiasat-1, no connection with Eutelsat, launches end of 2000 into 42°E offering enhanced capacity for the booming Turkish media industry and ever expanding TV channel offerings. *Eurasiasat-2* is on the blocks for launch by 2003 - formally known as *Turksat-2A* and *2B*, they are being constructed by Altatel Spacebus.

Despite the high level of solar storms during July - as we approach the solar cycle maximum - and concerns of interference or damage to operational satellites, as of mid August no currently operating broadcast satellite has been zapped. The American *GOES-8* of the National Weather Service however transmitted corrupted data after a recent flare though the problem corrected itself later.

The PanAmSat *PAS-8* satellite @ 166°E will soon be transmitting a digital bouquet in Chinese to the Australasian region, the first high power TV service in the Chinese language to target that area. Programmes will be originated by the TVBI group in Hong Kong.

Not such good news from 'The Money Channel' which has found it necessary to seek additional funding of £M11 to keep the channel afloat after losses over the 1st operational year were higher than anticipated. The 24-hour channel lost over £M4 since it launched on Sky digital early 2000. Viewing figures remain low, exasperated further by minimal interest from the cable companies.

Better news from Sky Digital which reckons a subscriber 80% digital take-up bringing forward their analogue close down on *Astra-1* @ 19°E to late June 2001. Interesting to note that German channels are queuing up for analogue capacity on the vacating (by Sky) 19°E Astra fleet, the Germans intending to operate dual illumination in both analogue and digital.



One of many test patterns seen during a typical day on the active *NSS-K*.

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.

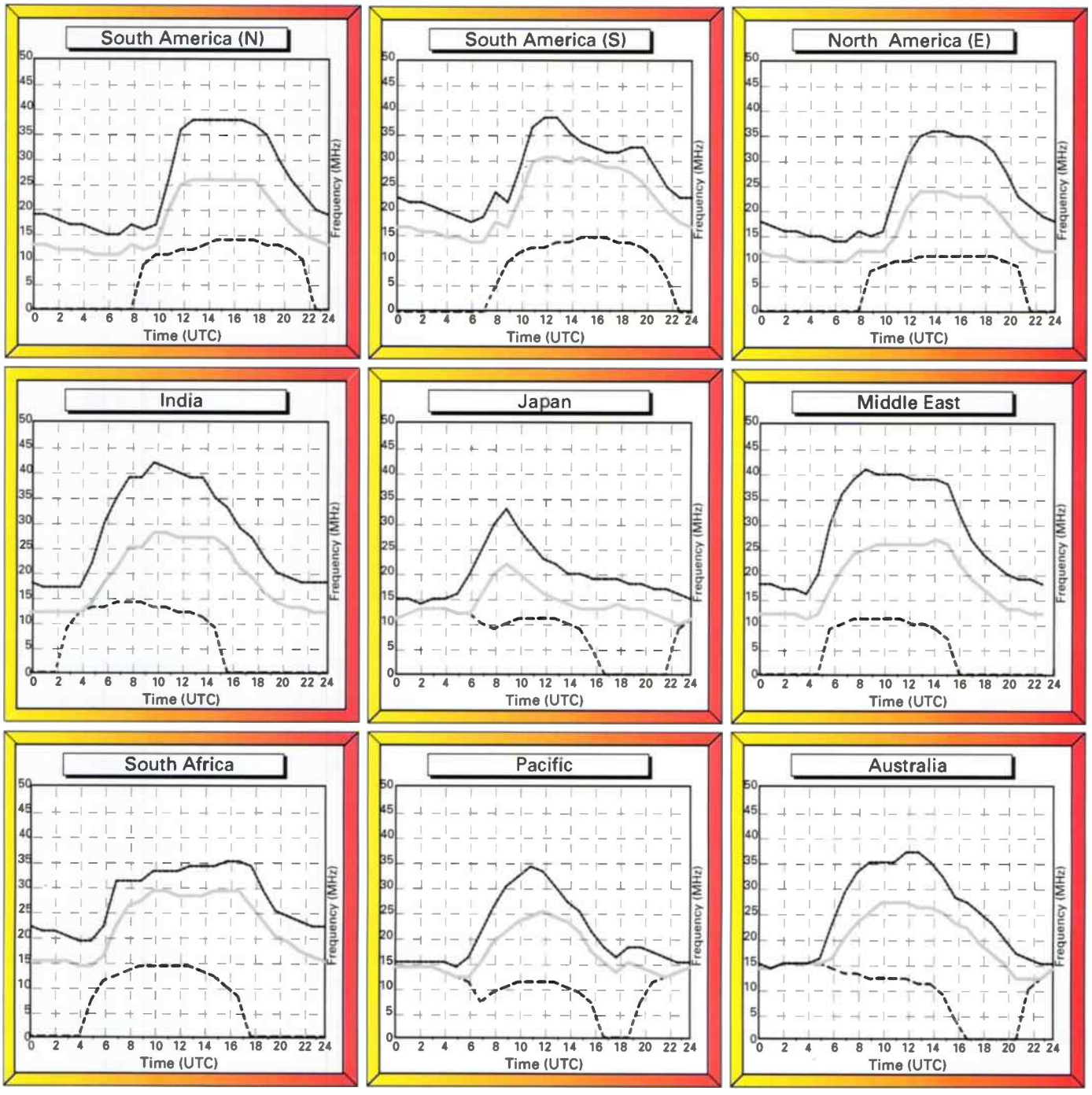
The middle line indicates the optimum working frequency (OWF) with a 90% probability of success for the particular path and time.

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.

October 2000
Circuits to London

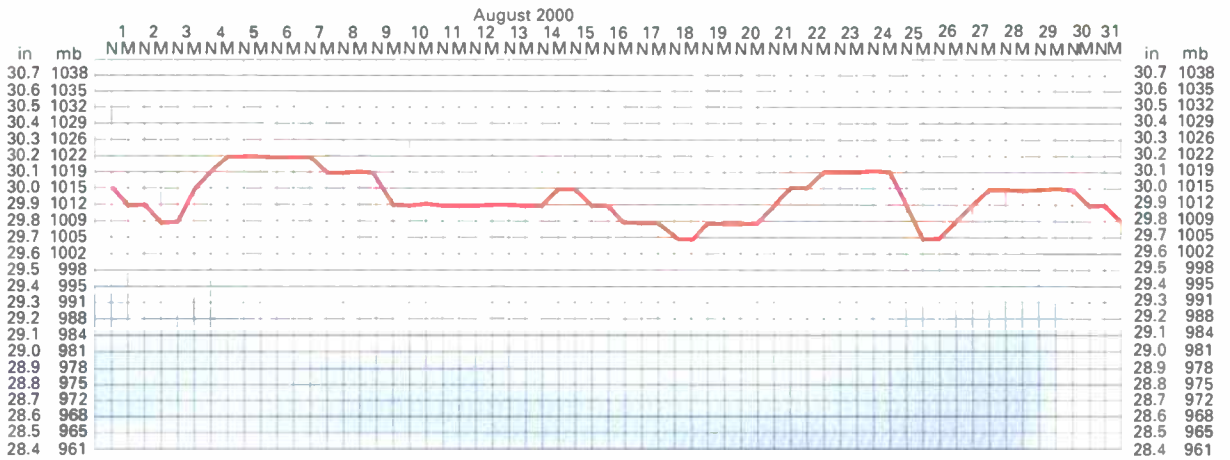


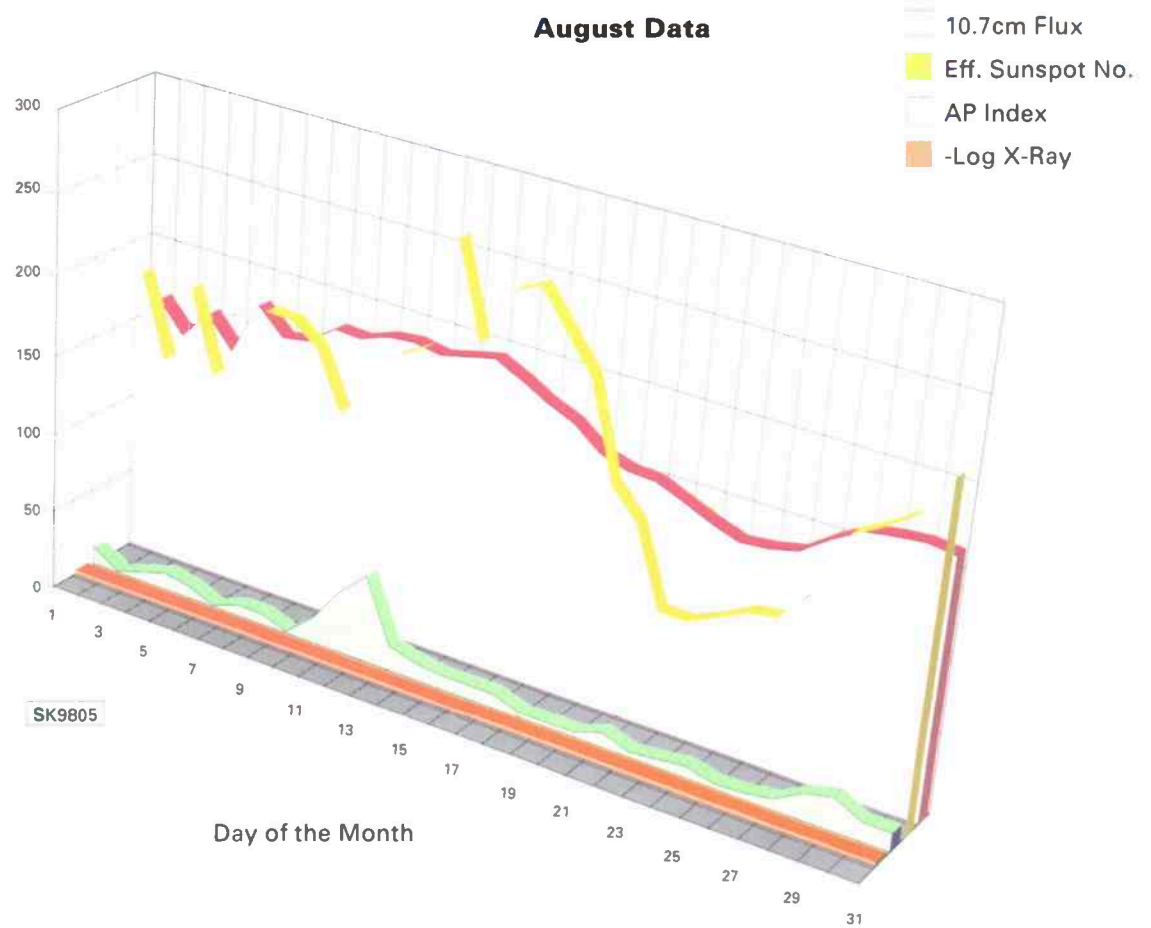
SK9804

■ 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, August 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.

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AOR AR7030 + Global AT-2000, rarely used, hearing loss forces sale, buyer collects, £350 o.n.o. Tel: Peterborough (01733) 266681.

Garmin GPS3 scrolling map, 500 memory waypoints, trackback external antenna, power, accurate to 10m, £200 o.n.o. Garmin GPS45 sat. system, multi-track reverse routes, all manuals and accessories, £75 o.n.o. Dave M1ECV, E. York. Tel: (01262) 674463 or (07710) 444921.

GEC BRT402E, good condition, £150. Kenwood R-2000, v.h.f. fitted, like new, £200. AR1000 scanner, v.g.c., book, £60. Inspect and collect or pay postage. Tel: 0208-813 9193 after 20th October 2000.

Grundig Satellit 650 professional, v.g.c., £175 UK carriage paid. Makers manual included. J. Cochrane on (01505) 702031.

Hoka Code3 Gold decoding system, £150. Howes CTU9 a.t.u., £30. Tel: (01904) 658928.

IC-R8500, mint condition, four months old, royal discone inc. cable and connectors, £600 for quick sale. Tel: Lowestoft (01502) 537385.

Icom IC-R8500 communications receiver, excellent condition, very little use, 20 months old, c/w box, receipt, mags and odd accessories, plus Scan King antenna, £800 - cash only. Tel: Rotherham (01709) 306299.

JRC NRD-345 h.f., 100kHz to 30MHz, 100 memories, a.m., s.a.m., u.s.b., l.s.b., c.w., FAX, manual, a.c. adapter, £200, cash only. Rankin, Cheshire. Tel: 0151-334 5501.

JRC NRD-525 communications receiver, mint, boxed with manual, fitted with CMH-532 RS-232 PC computer control interface with programming manual (frequency, mode, bandwidth, a.g.c., attenuator, memory channels), £500 o.n.o. Tel: Bucks (01753) 885163.

JRC NRD-535 communications receiver, as new, with Lowe modification, boxed with manual, receipts and warranty, top class receiver, £600 o.n.o. Mark on (01896) 753367.

Kenwood R-820 receiver, excellent condition plus manual, £320. Kenwood R-5000 receiver, excellent condition, boxed, plus manual, £360. Tel: Paignton (01803) 529788 after 1830.

Kenwood R-820, v.g.c. including c.w. filters and manual, £300 o.n.o. Mike on 0151-681 3209.

Lowe HF-150 h.f. receiver, 30kHz to 30MHz with keypad, Howes CTU8 a.t.u., Howes ASL5 dual bandwidth filter, Howes AAZ active h.f. antenna, the lot for, £200. Tel: (01603) 746952.

MFJ462B Multireader decoder, as new, hardly used, good condition, comes with mono 3.5mm jack plug, a.c. adapter and manual, must sell, £100. Darren, Herts. Tel: (0208) 4497446.

NRD-525 & Icom IC-R71, two classical radios in good condition, £350 each for quick sale. Plus Sony ICF-1 pocket radio, £80. Tel: Barnsley (01226) 244124.

Sony ICF-SW1000T world receiver with built-in cassette recorder, synchronous detector, s.s.b. function, 32 pre-sets, timer recording, new condition with box and instructions, £150. David, Exeter. Tel: (01392) 443223 office hours.

Timestep polar receiver, £100. APT-WEFAX interface with software, £50. Crossed dipole, £10. Lowe HF-225 receiver, £120. Few other bargains, all excellent condition. E-mail: mickforeman@cs.com or Tel: 0116-235 3915.

Wellbrook ALA1530 h.f. broadband active antenna, only six months old, plus 20m RG58 coaxial cable, reason for sale? Just lost interest! £100 - no offers. Tel: Norwich (01603) 746952.

Yaesu VR-500 mini hand-held scanner, all-mode, inc. s.s.b., purchased 18/4/2000, 1000 channels, boxed with instructions and receipt, would make excellent present, £190. C. Hughes on (01865) 714063 or mobile (07941) 511037.

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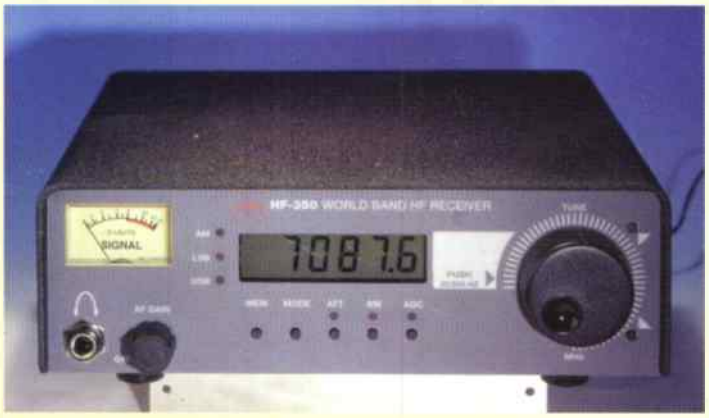

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