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shortwave magazine

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Cover Subject

The AOR SDU-5000, teamed up with the AR-3000A Plus, makes for a very interesting combination indeed - as Mike Richards found out.



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Good Listening

SWM SERVICES

Subscriptions

Subscriptions are available at £22 per annum to UK addresses, £25 in Europe and £27 overseas. Subscription copies are despatched by accelerated Surface Post outside Europe. Airmail rates for overseas subscriptions can be quoted on request. Joint subscriptions to both *Short Wave Magazine* and *Practical Wireless* are available at £39(UK) £42 (Europe) and £45 (rest of world).

Components for SWM Projects

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

The printed circuit boards for SWM projects are available from the SWM PCB Service, Badger Boards, 87 Blackberry Lane, Four Oaks, Sutton Coldfield B74 4JF. Tel: 021-353 9326.

Back Numbers and Binders

Limited stocks of most issues of SWM for the past five years are available at £2.00 each including P&P to addresses at home and overseas (by surface mail).

Binders, each taking one volume are available for £5.50 plus £1 P&P for one binder, £2 P&P for two or more, UK or overseas. Please state the year and volume number for which the binder is required. Prices include VAT where appropriate.

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

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

editorial



By now you will have realised that the cover price of your favourite magazine has gone up. It is now almost two years since we were last forced to increase the cover price - a move that we are always reluctant to make. However, the cost of paper has risen by some six percent recently with another similar increase imminent. The size of the magazine has increased from 80 pages to a regular 96 pages including covers and this means more for you to read.

You can beat the increase, though! How? Simply by taking out a subscription. For the next three months Kathy has agreed to hold subscriptions at the old rate, home and overseas. Also, she has negotiated for SWM subscriptions to be available on the Card Charge system. This means that, once you have agreed to pay your annual subscription charges by this system, we will be able to debit your credit card with the right amount. There are safeguards built into the system and you can cancel your subscription in writing. Use the special coupon on page 87. Overseas subscribers should find this service very useful.

For those of you who are already subscribers, we will accept your renewal by Card Charge now, only debiting your credit card - at the old rate, of course - when your subscription becomes due for renewal. Thereafter renewals will be automatic at the rates then in force.

Moneysavers

In the centre of this issue you will find a 4-page pull-out section. Six dealers have co-operated with me to provide you with the Seasonal Discount Vouchers - I hope that you will be able to make use of them. It only remains for me to wish you all the best for 1995.

letters

IF YOU HAVE ANY POINTS OF VIEW THAT YOU WANT TO AIR PLEASE WRITE TO THE EDITOR. IF YOUR LETTER US PUBLISHED YOU WILL RECEIVE A £5 VOUCHER TO SPEND ON ANY SWM SERVICE

Dear Sir

I have only just started getting into scanners and also have just bought my first one. After reading some magazines on the subject I must admit that *Short Wave Magazine* by far comes out on top, keep up the good work.

I would also be interested to know if there are any scanning guides for the Irish Republic, as nobody I have spoken to seems to know.

**Paul Hoey
Co. Donegal
Ireland**

Unfortunately none of us in the Editorial Offices are aware of any either, perhaps our readers can help?

Dear Sir

Oh! how I echo the feelings of E. R. Billiald of Nottingham as stated in the December edition.

I agree entirely with his description of the Granby Halls, one visit is enough and never again. There are others just as bad as there are others that are better.

The best rally that I have attended is Bristol. This one is

well run and has the benefit of the old railway station as built by Isambard Kingdom Brunel.

Picketts Lock is good for the number of exhibitors, but barely passes muster for catering, surroundings and general ambience.

The best location during 1994 was Longleat, but unfortunately the sheep had been there the day before.

Dear Sir

I wonder if it would be possible to ask for information on terminal programs for the ERA Microreader from other readers through the pages of *Short Wave Magazine*.

The problem I have is that, although I have the Microreader hooked up to an upgraded AMIGA computer and I am able to read print from the monitor, I am unable to make a hard copy through the printer or save the information to disk.

I have contacted the list of software suppliers as published in the February 1991 edition of *Short Wave Magazine*, which has been to no avail as everything these days seems to be geared towards PCs.

**I. M. Knox
Fareham
Hants**

Keep publishing the best magazine ever.

**C. F. Goodall
Hazleton
Gloucestershire**

Everyone to their own - Personally, I think that IKB's original train shed would be far better with broad gauge tracks between the platforms - preferably with trains still running on them!

letters

Dear Sir

I always look forward to receiving my copy of *Short Wave Magazine* and was delighted to find that the various charts on Mr Brian Oddy's Long, Medium and Short Waves columns were highlighted in 'shaded' pink. This makes the columns so much easier to scan. I know that these columns have been highlighted in colour in previous issues, but I do not think the colour has been graded and this seems to make all the difference.

On reading the advertisement on page 44 entitled 'A Great Christmas Present' for SWM binders, I realise that I need one for my 1995 issues of *Short Wave*

Magazine, but may I mention that, unlike your quote 'Tidy up your listening station, get rid of those piles of magazines that your WIFE is always complaining about', my husband says it should read, 'Get rid of those piles of magazines that your HUSBAND is always complaining about!'

**Clare Pinder
Appleby
Cumbria**

The idea of the two tone effect on tables was our Art Department's solution to the difficulty in reading compact tables - I'm pleased you think that it works. It's also nice to know that we are considered to be a unisex magazine.

Dear Sir

Well, congrats on your fine magazine, which I receive every month along with *Practical Wireless*. I have purchased many good items from your advertisers.

One supplier that stands out is Pervisell Ltd. I had a copy of JVFAX from Mike Richard's 'Decode' column awhile back and of course was unable to receive anything without an interface, so I faxed this company and just before closing that day they faxed me back with all the particulars of their demodulator with prices, etc.

I went out and got my money order in sterling to get it into the post the same day. I came home and faxed my order and by the weekend I had the demodulator here working. They must have shipped it well before they received my money. Now, that's what I call service!

I read a lot of grumbles in the letters to the Ed, so I just thought you may show that you indeed have some of the most friendly dealers in your magazine. Pervisell also have helped me to get more out of the JVFAX program too!

Keep up the good work.

**Brian Lowe VE3TJE
Ontario
Canada**

It's nice to know that we can keep our readers satisfied, even at long distance.

Dear Sir

Through the pages of *Short Wave Magazine*, I should like to contact any radio amateurs who are also interested in motorcycling, whether they run mobile on two wheels or not.

I have started a 'register' of motorcycling radio amateurs throughout the UK. The main purpose is the exchange of technical information regarding motorcycle mobile installations, problems encountered and their resolution. Hopefully, this information will be available for others who would like to add to their enjoyment of amateur radio and motorcycling by combining the two.

I now have 11 listed, including myself, but feel there must be many others throughout the country who have tried motorcycle mobile, or are currently doing so.

I am a member of MARC, the Motorcycling Amateur Radio Club based in California (their first overseas member), President: Ray Davis KD6FHN. They provide comms. assistance at many events, be they charity of emergency, in much the same way as RAYNET does over here. There is also a technical forum.

The register, if there is sufficient interest, will probably be named something like UKMARR - United Kingdom Motorcycling Amateur Radio Register.

Unfortunately, I shall only be able to get the ball rolling over the next few months, as we should be emigrating to VK mid '95. However, I intend to start a similar thing in Australia, and would like to keep in contact with other 'motorcycle mobilers' here.

**Graham Wright G4FUJ
(QTHR)**

Cheltenham

Dear Sir

As a Special Events Group we receive many hundreds of direct reports each year from short wave listeners. It is our policy to encourage reports from listeners and we always reply to every card or letter received, either direct or via the Bureau.

Unfortunately, we are receiving an increasing number of direct cards that are very time consuming to process, and many newcomers to the hobby must wonder why they do not receive a reply from some Special Event Stations.

During 1994 we received 395 direct cards from UK listeners. Just over half of these (205) were a pleasure to process, with complete and accurate information necessary to enable us to quickly identify the reported contact. Perhaps a breakdown of the remaining problem cards will help the listener to understand the difficulties encountered by organisers of Special Event Stations.

A staggering 40% were using British Summer Time on their reports, in spite of GMT/UTC printed on the card. This may seem a minor point to the s.w.l., but when the GB station has worked in excess of 60 stations per hour, this involves a search back through three pages of log to confirm the report. Please remember that official radio logbooks (including amateur radio) are required to use GMT/UTC.

Some 20% did not indicate a callsign that our Special Event Station was in contact with at the time of the report. Without this information all details contained on the report could have been taken from pre-event publicity in the *Short Wave Magazine*, and our QSL would not be valid for any awards. Listeners often complete a box marked with 'QSO WITH' by writing 'Special Event Station'.

Another 10% of listeners sending direct reports did not enclose a stamped addressed return envelope,

and 10% just attached a stamp to the corner of their QSL card. To reply direct to these reports is costly and to address envelopes is very time consuming.

The remaining cards had an assortment of mistakes, including the date often written as 'Saturday' (the event in question ran for 28 days), some with no frequency or mode listed (we operate four stations simultaneously s.s.b., c.w., v.h.f., u.h.f.) and listeners sending cards for other GB stations. The worst examples were letters on the lines of 'I heard your GB station last weekend, please send a QSL card and include two blank ones for my friends'.

We always encourage our young Novice members to operate our GB stations. However, many s.w.l.s, enthusiastic at hearing a Novice on the h.f. bands for the first time, send a card for the Special Event (which is customary) but additionally send a separate card to the young Novice requesting a personal '2E' QSL card in return. Although the youngsters appreciate these cards, please be aware that under no circumstances can they issue a Novice QSL card for contacts made on the bands for which they are not licensed, whilst they are operating under GB or GX call privileges.

The previous paragraphs are not in anyway intended as criticism, but as a guide for newcomers. We do, of course, receive many accurate reports and listeners often enclose letters which are always read with great interest and passed along to the operator concerned for a personal reply.

Please keep your cards and letters coming. We will continue to reply to all reports, but attention to the above points will enable us to reply so much quicker and increase your overall return rate.

**Roy Clayton G4SSH
Chairman of Scarborough
Special Events Group
Scarborough**

letters

Dear Sir

I was very interested in the comments made in the 'Letters' in the November issue of your magazine on UTC and ways of giving dates.

I fail to see why the French should be 'blamed' for UTC. I believe that when Nuclear Time was established, scientists dropped GMT claiming it was inaccurate. Universal Time Co-ordinated is the name they came up with to replace Greenwich Mean Time.

Perhaps some red faces rejected the most natural ordering of the more logical 'Co-ordinated Universal Nuclear Time' because of the resultant abbreviation!

Another issue raised by your reader Bill Mitchell concerns the ordering of day, month and year in giving dates. I am also often confused by the American system and believe it to be illogical. In this country we usually give information

ranking items from the smallest element to the largest. Our dates appear as day, month and year and our addresses proceed from the name of the recipient to the city and the country.

Chinese addresses, like many others, start with the name of the country or province and conclude with the name of the recipient. Likewise the Chinese give dates beginning with the year, followed by the month with the day last.

To my mind 1994/11/13 = 13/11/1994 and both versions are acceptable. The position of the year indicates which system is in use and eliminates confusion. The American usage is an unhappy marriage of the two systems.

**Richard Howard
Northampton**

*Hmmm ... 94/10/11 = 11/10/94
- unless you are American
when it becomes 10/11/94 -
the ambiguity is still there!*

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

Dear Sir

I feel that Mr Walker's letter in December's issue of *SWM* criticising the performance of the Yupiteru MVT7100 was a little harsh. Whilst I appreciate that his letter raises some valid points, it seems that Mr Walker has lost sight of the fact that Yupiteru released the MVT7100 as a hand-held wide band receiver and so to judge it as anything other than a hand-held receiver is somewhat unjust.

Connecting a receiver of this nature to a main station antenna and expecting it to perform in the way that a base station receiver would is a little like filling your Mini 850 with Methanol and expecting it to perform like a top fuel drag car. It just won't happen!

The receiver is designed to be used with its own antenna and when it's used in this way it matches, if not surpasses, the performance of most other hand-helds on the market. I don't think any receiver such as this is particularly good when it comes to strong signal handling, hence the inclusion of an 'in built' attenuator.

I am surprised that, after forty years in the hobby, Mr Walker allowed himself to prejudge the unit's h.f. performance by using the photograph on the promotional brochure which shows the MVT7100 receiving a full scale signal on 40m using its own whip.

Surely his own experience should have told him that this was a little bit of advertisers license. Unfortunately, promotional literature sometimes has a tendency to mislead whether intentionally or not.

I admit that using the receiver on the h.f. bands, with its own whip, is pretty fruitless and connecting it to a long wire or other such antenna just makes matters worse. However, add a home-brew a.t.u. into the equation plus selective use of the 'in built' attenuator and you get a totally different picture.

I have listened to numerous h.f. stations this way, amateur, broadcast and utility and at the time of writing this letter, I am monitoring Edinburgh rescue on 5860kHz. I have also received a couple of reception reports from listeners using the MVT7100.

Before purchasing my MVT7100 I spent a considerable amount of time at AOR in Worksworth, tuning the receiver using different antennas, comparing it to other units in the shop and getting the opinions of the sales staff. I was told at the time that it was unlikely to perform at its best on a large antenna.

All I can advise is that if you are considering spending this amount of cash on any piece of equipment, satisfy yourself that it will do what you're expecting of it before you part with the cash. Any showroom worth its salt will let you put it through its paces if they are confident of the products they are selling.

**Chris Carrington (G-20365/G01YZ)
Chellaston
Derby**

Well these two letters just go to show that are always two sides to the story. We often receive phone calls here at the Editorial Offices from readers who are looking for advice as to what is the 'best receiver' to buy, the advice consistently given is that there is no such thing as a 'best receiver', only one which suits their listening

needs most. Wide band receivers have a lot to offer their owners, as long as they are well versed in the techniques required - mind you that true for any receiver or for that matter any piece of equipment. Wide band receivers are not the solution to every listening scenario, but then what receiver is?

Dear Sir

I was interested to read the letter from Andrew Walker in *SWM* December '94 issue and the problems associated with unmarked signal on the h.f. (short wave) band.

Having recently purchased an AR8000, I also experienced the image and other problems on the h.f. band. AOR admit the problems, and their answer is a short piece of wire antenna.

Whilst this cuts down the unwanted, it also cuts the wanted signal. I am, however, well pleased with the performance and facilities provided on v.h.f. and above.

As these receivers are bandpass filter, followed by a mixer front end, they stand no chance at h.f. of discriminating from broadcast and commercial signals at frequencies removed from that being tuned. This posed an interesting challenge for experimentation.

There being adequate gain within the receiver, selectivity

in front of the unit was necessary. An a.t.u. being an impedance matching device with little selectivity is no help. And, having discovered the idea of low level r.f. stage as too complicated, it was decided to devise a variable pre-selector.

Basically, an r.f. stage without amplification, but with variable coupling. The unit is now running with creditable results. The unwanted signals have all but disappeared. This to the extent that had AOR provide an s.s.b. filter with a better shape factor and shielded the microprocessor, there would be some very clean signal at low input levels.

The current variable pre-selector covers 3-15MHz into a 14ft base loaded vertical, this combination works well on amateur and s.s.b. utility. If there is enough interest, I am quite willing to publish the construction data.

**Ian Walker G3RNX
Tewkesbury
Glos**

Elaine Richards
PO Box 1863,
Ringwood,
Hants BH24 3XD.

junior listener

I've had an interesting letter from Des Reed that raises a number of points. He's got an old FRG-7 receiver that has expanded his listening to more than just the airband these days. It is worth contacting someone like South Midlands Communications as they may have a copy of the manual they can copy for you. Alternatively, does anyone have an FRG-7 manual that can be passed onto Des, drop me a line.

You may also be interested to know that *Practical Wireless* did a series of modifications to the FRG-7 in a series of articles written by the late Peter Rouse GU1DKD back in the early 1980s. Called 'Modifying the FRG-7' (August, October and November 1984) it looked at such things as modifying the bandwidth, power supply, fine tuning, filtering and adding an f.m. adapter. I'm sure that the Editorial Office would be able to supply photocopies of these articles if you contact them for the latest prices.

The next point Des raises is about the SINPO code. Most listeners use it one way or

confuse the station at the other end, especially if they don't understand your report very well.

- S - Signal Strength
- I - Interference (man-made)
- N - Noise (Natural, e.g. atmospheric, etc)
- P - Propagation disturbance
- O - Overall Merit

Your report should be written as: SINPO 55555 or just 55555 (or whatever other rating you give the signal. PLEASE BE HONEST, don't say 55555 just because you think they want to hear that - the broadcast station doesn't, they want an honest report. If the signal was noisy, then tell them.

Each letter, or characteristic, has a grade between 1 and 5. So, let's go through them.

This can be anywhere between the transmitter and receiver. Propagation disturbance is primarily fading, so tell them how much their signal was being affected by the conditions at the time. Was it a steady signal or was it fading in and out. The final characteristic is overall merit and only you can say how good the signal was.

The final part of Des's letter was about propagation - a BIG subject. Des wanted to know what is propagation and how do you measure it. Well, I'd need a column somewhat bigger than this to explain everything, so I decided to 'borrow' a couple of paragraphs from one of *Short Wave Magazine's* books - *Short Wave Communications*

bounce back, hit the earth, bounce up again, bounce again and so forth. The bit that it bounces off is known as the ionosphere which we are now going to think of as chicken mesh....

"Remember we said that the lower the frequency the longer the wave length? Now think of h.f. signals as being fairly big physically and v.h.f. signals as being small. Let's go a stage further and imagine we have a handful of stones. The big stones are h.f. signals, the small ones v.h.f. signals and the ionosphere is made of chicken mesh (electronically it can be considered that way). If we throw our handful of stones at the chicken mesh, two things happen: The big stones bounce back and the

	S	I	N	P	O
5	Excellent	None	None	None	Excellent
4	Good	Slight	Slight	Slight	Good
3	Fair	Moderate	Moderate	Moderate	Fair
2	Poor	Severe	Severe	Severe	Poor
1	Barely audible	Extreme	Extreme	Extreme	Unusable



another, but how may really know what it means. There are several codes around, RST, SINPO, SIO and listeners own versions too! It seems that the SINPO code is the one that has become standard with broadcast stations and so it's one you should be aware of. It has a standard format and you should stick to that, don't try and be original - it could

Now, signal strength is fairly obvious, how strong was the signal (that doesn't mean how loud you had the radio turned up either!). The next characteristic is interference, of the man-made variety, such as ignition noise, electric motors usually local to you not the transmitting station. Next is Noise, of the natural variety, such as static, lightning, etc.

by Peter Rouse.

"Propagation is how a signal gets from one place to another. Why can you not hear New York's Kennedy airport on v.h.f. and why can you hear an amateur running low power on h.f.?"

"The answer is that depending on the frequency the signal will travel a long way or hardly any distance at all. There are essentially two ways in which a signal travels; along the ground from one point to another or up into the air where it may or may not bounce back to earth. The first instance is known as 'ground wave' and the second as 'sky wave'. In order to receive signals from around the other side of the world, or at least over considerable distances, we must rely on the sky wave bouncing back. In fact, in some instances, a signal can go up,

little ones go through. So you now have a simple idea of why lower frequency signals bounce back providing world-wide communications but the smaller ones do not."

For the listener the best way to 'measure' propagation is to assess the signal against known standards such as beacons. It takes a while to build up the information on what signals from which part of the world are audible under certain conditions, but for some that's part of the fun.

I hope this explains a bit more. Obviously the book goes on to explain more, see the Book Service pages 83-86 for details on the current price and availability.

Finally

Hopefully, just enough room to tell you that the ISWL booklet *Guide to English Language Short Wave Broadcasts to Europe (Winter Schedules 1994/1995)* is now available. It costs just £1.50 from: ISWL, 10 Clyde Crescent, Wharton, Winsford, Cheshire CW7 3LA.

Raising Money

The Worked All Britain Awards Group have sent details of the listeners who have gained the WAB Lifeboat Award:

G. Ridgeway, E. Ridgeway, D. Foster, T. Peterson, D. Smith, F.M. King, G. Hudson, H. Etherington, D.W. Alexander, Biem C. Lap, R. Lewery, L.J. McKenzie, J.W. Honbold, F. whitehorn, D.J. Ridley, A. Davies, J.C. Nicholls, P. Bartlett, R. Guest, A. Harvey, A. Gutteridge, C.W. Bunn, A. Tideswell, T.P. Edwards, D. Howes, R. Akhurst, ONL 4003. Well done to all who took part, you raised £1000 for the RNLI.

National Transmitter News

New BBC FM Transmitters

November 16 Chard, Somerset. This new station brings good stereo f.m. radio reception to about 12000 people in the area around Chard, Tatworth, and Combe St. Nicholas. The transmitter is located about 3km east of the town of Chard. It entered service after a period of test transmissions which began on thursday August 25.

The transmission stations frequencies are as follows, Radio 1 98.5MHz, Radio 2 88.9MHz, Radio 3 91.1MHz and Radio 4 93.3MHz. This station uses a **vertically** polarised antenna.

Television Relay Stations

November 17, Caradon Hill, Liskeard, Cornwall and its low powered relay stations are now equipped to broadcast BBC2 television programmes with stereo sound, using the BBC-developed NICAM 728 digital system. This system uses an additional transmitted signal, which is quite separate from the normal (mono) TV sound signal. The Nicam service on BBC1 started on April 28 this year. The television transmissions from the Caradon Hill station serve over 500000 people throughout most of the central and east Cornwall and west and northeast Devon.

October 7 Braunton, Devon a new relay station opened provided jointly by the BBC and the ITC. The station is located on a 20m mast near Braunton Down Quarry and brings good television and teletext reception to approximately 500 people in parts of Ash Road, North Down Road, Silvan Drive, Hazel Avenue and Boode Road, Braunton. Outside this area, reception of the new relay is not recommended.

Station Details

Channels:	BBC 1	39
	BBC 2	45
	ITV (Westcountry)	49
	Channel 4	42

Antenna Group:	B
Polarisation:	Horizontal
Effective Radiated Power:	2W, to the N & W only

November 9 Hurstbourne Tarrant, Hampshire. The new relay is located on a 17m mast adjacent to Dolomans Lane, lbthorpe to bring good television and teletext reception to about 590 residents in Hurstbourne Tarrant and lbthorpe. The station has been built jointly by NTL and the BBC.

Station Details

Channels:	BBC 1(South)	22
	BBC 2	28
	ITV (Meridian)	32
	Channel 4	25

Antenna Group:	A
Polarisation:	Vertical
Effective Radiated Power:	10W, to the N & E only

Reception advice is available from either:

BBC Engineering Information
White City, 201 Wood Lane
London W12 7TS

Telephone: 0181-752 5040
or

ITC Engineering Information
Kings Worthy Court, Kings Worthy
Winchester, Hampshire SO23 7QA
Telephone: (01962) 848647

Martin Lynch Open Day

Well-known trader, Martin Lynch, tried his hardest to bring Northfields Road, Ealing to a grinding halt when he held another of his popular Open Days. Your Editor - with Peggy, of course - called in on his way to the Bridgend Rally and, having managed to park, seemingly nearer to Heathrow than Northfields, spent an enjoyable couple of hours in the crush. Food and drink flowed freely and I would imagine that Martin's bank manager has a big smile on his face. This photograph shows part of the shop during a relatively quiet period.

Throughout the day a 'free' draw raised over £220 for the Children in Need Appeal.



Austin Forsyth G6FO back in 1946 when the Offices were located in Victoria Street.

VIP

One of the crowd at Martin Lynch's Open Day recently was Norman Joly G3FNJ. He introduced himself to your Editor as having been a member of the *Short Wave Magazine* Editorial Team under

Live '94 Raffle Winner

One of the winners of the Raffle at Live '94 was A.C. Rowe G6AVP, seen here receiving his prize of a KPC3 Packet TNC from Dick Ganderton, Editor of *Short Wave Magazine* outside Martin Lynch's shop.



Readers Buy Books and Win!

More winners in our monthly Book Service £50 draw. The October draw was won by Mr. H. Macpherson of Edinburgh, whilst the November prize went to Mr C. Gaskell of Cheltenham. Well done both. **Don't forget you too can win if you buy one or more publication from the UK's largest selection of radio books.**

Hear 1995 Camel Trophy Event

The call sign for this years event will be V31RD, and not V32D as stated in the December issue of *SWM*. The station will be active from May 7 until June 10 on the following bands. 1.8 - 28MHz, 50MHz and 144MHz.

Look out for more coverage of the event in future editions of *SWM*.

Radio and TV DX News

News from the USA confirms that the CIA 'TV Marti' continues to transmit an extended programme service into Cuba from the tethered aerostat at 10000 feet above Key West (Cudoe Key). Using ch.A13 (NTSC) news and information programmes are transmitted 0730-1300UTC and are linked down from Washington via Intelsat 601 tradr.14 in C Band. Jamming in Havana lead to the TV signals being directed away from the capital and towards Cojimar. Short wave broadcasts use 6.120, 6.030, 9.615, 9.525, 11.730, 11.740, 11.910 and 11.950MHz at various times throughout the 24 hours. A 100kW medium wave outlet (previously 50kW) is also on-air at 1180kHz.

The Palestinian TV service in the Gaza Strip has still not gone onto full power and currently operates a temporary low power transmitter. The PBC claim that Israel have been reluctant to release a v.h.f. channel as signed in the peace agreement between Israel and the PLO. Initially the PBC - Palestinian Broadcasting Corporation will cover both Gaza City and Jericho, extending to the whole region mid 1995 with a further 5 high power transmitters.

A new private national TV channel 'Tempo' will go on-air early 1996 in Bulgaria offering mainly imported programming initially with local sports and news will be added later. MTV will also be

radiated over the Tempo network. The government has issued 32 private broadcasting licences in the past 2 years - 'Nova TV' is currently on air in Sofia and a new private TV station 'Seven Days' opens January 1995.

Flemish broadcaster VTM has been given the OK to open a new channel 'VTM-2' on February 1, 1995. The channel is biased towards programming for a young male audience and to counter rival programming from a soon to air Dutch pan European channel - 'VT4'.

The Norwegians will open a new commercial channel 'TV+' in April 1995 offering a general entertainment format. Meanwhile national broadcaster NRK is also opening a new TV channel 'TV2' during 1995 which will allow NRK to develop increased film and documentary strands, something that just the single channel will not allow.

A Chinese version of an MTV operation has opened in Shanghai offering music videos throughout an 18 hour broadcast day. The TV channel is operated by the Shanghai Oriental Broadcast Station and the Shanghai Cable TV Station.

RSB-TV, a private TV channel has just opened in Latvia's capital town, Riga. Currently operating for 6 hours daily, it is hoped to increase to 18 hours by Summer 1995.

news

RA to Name Banned Operators

The Radiocommunications Agency has recently announced that details of the revocation of amateur and CB radio licences issued under the *Wireless Telegraphy Act 1949*, will be published in future, where it has been deemed appropriate.

Until this announcement this information relating to licensees has been regarded as confidential. This has resulted in the Agency appearing too lenient with offenders.

SWM Columnist Elected as RSGB Zonal Member

As we go to press, it has just been announced that our *Amateur Bands Round-up* columnist, Paul Essery GW3KFE, has been elected as RSGB Zone E Council Member for 1995. We all wish Paul good luck with this appointment.



Uniden Return to UK

Uniden, are expanding their operation into Europe and have chosen the UK as a marketing base.

Uniden employ in excess of 10000 worldwide and have a turnover approaching US\$1 billion. The company has become a market leader in Scanners, Cordless Telephones and Satellite Receivers, as well as having a significant share of the Cellular Telephone, p.m.r. and Pager markets.

Uniden have introduced three new hand-held scanning receivers and to market and distribute these receivers they have appointed exclusive rights to Nevada of Portsmouth and Sharmans of Manchester. For further information contact: **Paul Meadows, Uniden UK Ltd., 35 Curzon Street, London W1Y 7AE. Tel: 0171-495 6222, Fax: 0171-495 5676.**

Listen With Grandad

by Leon Balen & David Leverett



I see Grandad's spaced out again - wonder what he's dreaming about?

RAE and Morse Courses

Intensive Short Course
Arnold and Carlton College,
Mapperly Nottingham. Course commences January 13 and runs weekly Thursday evening. Duration is 11 weeks, leading to May examination. For further information Tel: **0115-938 2509.**

Morse Course

Newbury College will be running a Mode Code class to prepare candidate for the RSGB 12 wpm morse test. It will commence January 13, running 1800-1930. For further details Tel: **(01635) 37000/35353** quoting course 99208B or contact **Ray Oliver G3NDS, Tel: (01672) 870892.**

LISTENING TO

The NRD-535 *With A Subtle Difference*

The NRD-535 is a fine receiver, and fully confirms the JRC leadership in this particular field. However, even the best can be improved in specific areas; and after lengthy evaluation of the NRD-535 we decided that there were worthwhile improvements which we at Lowe, with our knowledge and specialist expertise, could introduce to the more discerning listener - for it is the true 'listener' who will appreciate what we have done.

First we thought that the audio from the NRD-535 was not totally easy on the ear, and detailed investigation showed that the audio response had been 'tailored' to suit the rather round shouldered response of the IF filtering. So, we went back to the IF filters and specified a higher performance SSB crystal filter with a 6dB bandwidth of 2.4kHz and a typical shape factor of 1.8:1; with less than 1dB passband ripple. For AM, we fit a more expensive filter with a 6dB passband of 5.7kHz and a shape factor of 1.5:1. The response of these new filters is very flat within the passband, with steep symmetrical sides giving excellent adjacent channel rejection. The use of these more expensive filters allowed us to flatten the audio response of the receiver giving a much clearer sound quality and a real improvement in intelligibility both on communications and broadcast stations.

We have noticed in the past that the audio output power from most modern receivers is barely adequate for driving a good loudspeaker, and since we now had top quality audio from the NRD-535, we designed and fitted a completely new audio power amplifier with enough power (3W at 5% distortion) to enable the user to sit back and enjoy that quality to the full.

The use of synchronous AM demodulation and/or ECSS is an established feature of many newer receivers, and fitting the optional CMF-78 ECSS board to the NRD-535 provides the user with the potential to recover good audio from signals which are subject to selective fading.

However, we noticed a tendency for the ECSS to unlock during deep fades and then fail to re-lock after the fade. We now have a series of detailed modifications to the ECSS unit which removes this tendency and also improves the recovered audio.

The Lowe Electronics modification pack definitely makes a good receiver into an outstanding receiver. When we sent a sample of our modified NRD-535 to Jonathan Marks at Radio Nederland, he confirmed that the results were quite remarkable and said so in no uncertain terms. We think that you will agree.

Naturally, these modifications cost a little more, but to complete the whole package we also pre-age the master reference oscillator in the receiver, check out the alignment and issue an individual test certificate with each one. And because we are proud of our work we add a discreet badge to the front panel to tell you that you own a receiver with a difference.

The 'Lowe' NRD-535. *We make a good receiver into an outstanding receiver.*

- New high specification IF crystal filter for SSB
- New high specification IF filter for AM
- New calculated audio bandwidth 'flattening'
- New higher power audio output system
- New tighter specification ECSS system
- Pre-ageing and 'burn-in' of master oscillator
- Individual test certificate for each receiver



NRD-535	£1549
CMF78	£279
CFL243W	£415
Modifications (<i>fitted at time of purchase</i>)	£117

BERKSHIRE

3 Weavers Walk
Northbrook Street
Newbury
Tel: (01635) 522122

NORTH EAST

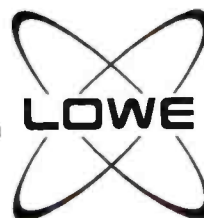
Mitford House
Newcastle Int. Airport
Newcastle Upon Tyne
Tel: (01661) 860418

SCOTLAND

Cumbernauld Airport
Cumbernauld
Strathclyde
Tel: (01236) 721004

WALES & WEST

79/81 Gloucester Rd
Patchway
Bristol
Tel: 0117-931 5263



Low
Chesterfield Road

THE WORLD

THE MAGNETIC LONGWIRE BALUN Successful Listening Starts Here . . .

All the experts agree – the secret of successful listening starts at the antenna. Skimp on the antenna and you might as well not bother! For years many of us struggled with longwires and a.t.u.s, getting increasingly frustrated at the growing level of interference generated by household wiring and appliances. Then along came the MLB – half the price of my a.t.u., but promising to do twice as much – match my longwire to 50 Ohms AND cure my interference problem. So, I tried one – a week later my three a.t.u.s were up for sale – most of the domestic interference gone and fewer knobs to twiddle!

The MLB has made a real difference to my listening – and to the hundreds of customers I've recommended them to since. The MLB is exceptional value at £45, and correctly installed I'm sure it will make a difference to yours.

Just available is the MLB ISOLATOR. When used in conjunction with the MLB, this new addition to the range will provide you with a convenient terminal to attach an earth wire and totally isolate the earth connection of the aerial from the earth connection between the mains supply and the receiver – another hiding place for noise.

Ring today for full information on these and other interesting products that we know will help you to get more out of your listening!



DSP Noise Reduction Products From JPS Communications!

JPS Communications specialises in low cost *Digital Signal Processors* - the hi-tech way to filter out noise and heterodynes and what's more, they'll work with anything from your home-brewed short wave receiver to the latest all-singing, all-dancing receivers and scanners on any band you care to mention!

NIR10

Noise/interference reduction unit.

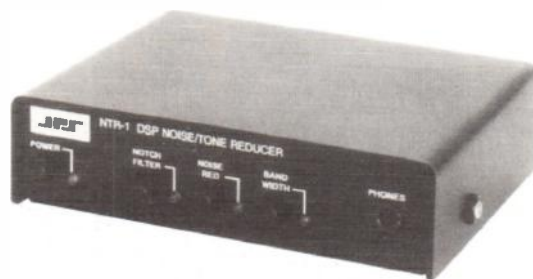


The NIR10 allows reception of difficult to read signals. NIR mode helps to reduce or even eliminate heterodynes, white or ignition noise, RTTY interference and power line noise. PEAK function reduces white noise interference. NOTCH FILTER mode removes multiple heterodynes and acts in 3 milliseconds! BANDPASS mode has a continuously adjustable centre frequency.

Just **£399** Carriage £10.

NTR1

Wide band noise and tone remover.



The NTR1 provides wideband operation for AM or FM reception and narrow band operation for SSB, CW or Data reception. State-of-the-art DSP rapidly removes multiple tones.

Just **£199** Carriage £10.

All JPS DSP filters require a 12V power supply to run from the mains but it needs to be fairly beefy. Run it from your shack supply or from our dedicated 1Amp PSU available at £29.95.

SOUTH EAST

Communications Hse.
Chatham Road
Sandling, Maidstone
Tel: (01622) 692773

YORKSHIRE

34 New Briggate
Leeds
North Yorkshire
Tel: 0113-245 2657

SOUTH WEST

117 Beaumont Road
St. Judes
Plymouth
Tel: (01752) 257224

EAST ANGLIA

152 High Street
Chesterton
Cambridge
Tel: (01223) 311230

ve Electronics

Matlock, Derbyshire DE4 5LE Tel: (01629) 580800 Fax: (01629) 580020

rallies

January 22: Oldham Amateur Radio Club are holding their mobile rally at the Queen Elizabeth Hall, Civic Centre, West Street, Oldham, Lancs. Doors open at 11am, 10.30am for disabled visitors. The event features many traders with a variety of items and a Bring & Buy. Talk-in on S22 via GB4ORC. Refreshments will be available from 11.30am. There will be a Mobile Contact Prize and certificate for the furthest mobile contact with an operator on his way to attend the rally, up to 2pm. Free programme draw and parking. 0161-652 4164 or (01706) 846143.

January 28: The Lancastrian Radio & Computer Rally is being held at the University of Lancaster. There will be all the usual traders, refreshments, a bar and Bring & Buy. There is excellent access to this rally, five minutes from either Junction 33 or 34 on the M6. Admission is £1. Doors open at 10.30am for the disabled and 11am for everyone else. Further details from Sue on (01524) 64239.

February 5: The South Essex ARS Radio Rally is being held at The Paddocks, Long Road, Canvey Island, Essex. (The Paddocks is located at the end of the A130). Doors open at 10.30am. Bring & Buy, trade stands and home-made refreshments are available. Talk-in on S22. Admission is £1. Free car parking. Roger GOLT0 on (01268) 693786 or Ken on (01268) 755350.

February 12: The 4th Northern Cross Rally is being held at Rodillian School on the A61 between Leeds and Wakefield (near Jn. M1/M62). Doors open at 11am (10.30am for disabled visitors and Bring & Buy). £1 entry. There will be the usual dealers and groups, a bar and refreshments plus a Morse test on demand with two passport photos. Talk-in on 144 and 430MHz. Dave Gray on 0113-282 7883.

February 19: The RSGB VHF Convention is being held at Sandown Park Exhibition Centre. Further details can be obtained from G3MUV on (01277) 225563.

February 25: The 10th Rainham Radio Rally is to be held at the Rainham School for Girls, Derwent Way, Rainham, Gillingham, Kent ME8 0BX. It is very easy to find from Jn. 4 of the M2 motorway the A278 or from the A2 from Rainham. Doors open at 10.00am, 9.30am for disabled visitors. There will be the usual trade stands, plus a few new ones selling computers. Many special interest groups will be represented, ie. RAYNET, RNARS, Packet, KRGroup and Kent TV Group. There is also a talk-in on S22 via GB4RRR, a Bring & Buy, licensed bar, and snacks and refreshments also available with somewhere to sit and eat. Admission is £1, children under 14 free. Further info. from Martin G7JBO on (01634) 365980 any reasonable time.

***March 11/12:** The London Amateur Radio & Computer Show will be held at Lee Valley Leisure Centre, Picketts Lock Lane, Edmonton, London N9. Doors open at 10am to 5pm each day. There will be a trade show, lectures, Bring & Buy, on-demand Morse tests, disabled facilities, bars, restaurants, special interest groups and ample free parking. For further information you can contact Steve White G3ZVW on 0181-882 5125.

March 12: Wythall Radio Club will be holding their annual Radio Rally at Wythall Park, Silver Street, Wythall (near Birmingham, on the A435, just two miles from Junction 3 on the M42). Doors open at 10.30am to 4pm. There will be the usual traders in three halls, a marquee, a bar and refreshments and a Bring & Buy stall run by the club. Talk-in on S22. Admission only £1. Chris G0EYO on 0121-430 7267.

***March 19:** The Norbreck Radio Rally, Amateur Radio, Electronics & Computing Exhibition is being held at Norbreck Castle Hotel, Exhibition Centre, Queens Promenade, North Shore, Blackpool. There will be extended free car parking and free shuttle service. Novice Licence details and practical demonstrations, a Bring & Buy stall, talk-in on S22 and lots more. Admission is £1.50, over 65s £1 and under 14s free. Doors open at 11am to 5pm. Disabled entry through ramped entrance, 10.45am. More info from Peter Denton G6CGF on 0151-630 5790.

If you're travelling a long distance to a rally, it could be worth phoning the contact number to check all is well, before setting off. The Editorial staff of SWM cannot be held responsible for information on Rallies, as this is supplied by the organisers and is published in good faith as a service to readers. If you have any queries about a particular event, please contact the organisers direct.

Editor

AVON

Bristol International RC: Tuesdays, 8pm. The Fighting Cocks Public House, Hengrove. All visitors are welcome. The club has been formed so that all radio enthusiasts, whether they be Licensed Amateurs, s.w.l.s or CBers can get together and have a good natter and do things that you do in radio clubs. PO Box 28, Bristol BS99 1GL.

South Bristol ARC: Wednesdays. Whitchurch Folkhouse Assoc., Bridge Farm House, East Dundry Rd, Whitchurch. December 21 - 'Hair of the dog' by Jean GOAWX, 29th - Greetings to old friends, January 4 - CW activity evening, 11th - Police 'Don't be a victim of crime & save money' by PC Chisholm, 18th - Bring & Buy and car boot sale, 25th - Photographic equipment evening. For more information ring (01275) 834282 on a Wednesday evening.

DERBYSHIRE

Derby & DARS: Wednesdays, 7.30pm. 119 Green Lane, Derby. December 21 - Christmas party in club room. Mrs Hayley Winfield, 2 Hiits Cottages, Crich, Matlock, Derbyshire DE4 5DD. (01773) 856904.

DEVON

Plymouth RC: Tuesdays, 7.30pm. The Royal Fleet Club, Devonport, Plymouth. January 10 - Talk on home security, 17th - Natter night, talk on your first QSO by Dave G3VNG. F. P. Russell on (01752) 563222.

Torbay ARS: Fridays, 7.30pm. ECC Social Club, Highweek, Newton Abbot. January 20 - Contest entries/construction night. Peter G4UTO. (01803) 864528.

FIFE

Dundee ARC: Tuesdays, 7pm. College of Further Education, Graham Street, Dundee. January 10 - Construction night, 17th - Lecture on local commercial radio - Radio Tay, 24th - Construction night. GM4FSB, 30 Albert Crescent, Newport-on-Tay, Fife DD6 8DT.

GREATER LONDON

Crystal Palace & DRC: 3rd Saturdays, 7.30pm. All Saints Church Parish Rooms, Beulah Hill, London SE19. January 21 - Aerial demonstration. Wilf G3DSC on 0181-699 5732 or Bob on (01737) 552170.

Edgeware & DRS: Thursdays, 8pm. Watling Community Centre, 145 Orange Hill Road, Burnt Oak. January 12 - AGM. Rod Bishop. 0181-204 1868.

Southgate ARC: 2nd & 4th Thursdays, 7.30pm. The Pavilion, Winchmore Hill Cricket Club, Firs Lane, Winchmore Hill, London N21 3ER. January 12 - Receiving weather satellite pictures by Keith

Club Secretaries:

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

Holland G3MCD, 26th - London Amateur Radio & Computer Show team briefing and strategy plus club radio on the air.

HAMPSHIRE

Horndean & DARC: 1st Thursdays, 7.30pm. Horndean Community School, Barton Cross, Horndean. January 5 - The video signal by Stephen Harding G4JGS. S. Swain (01705) 472846.

HEREFORD & WORCESTER

Bromsgrove ARS: 2nd & 4th Tuesdays. Lickey End Social Club, Alcester Road, Burcot, Bromsgrove. January 10 - Night on the air, 24th - Talk on amateur radio observation service. Barry Taylor. (01527) 542266.

HERTFORDSHIRE

Hoddesdon RC: Alternate Thursdays, 8pm. Conservative Club, Rye Road, Hoddesdon. December 22 - Christmas social evening with buffet, all welcome. John G7OCI. (01920) 466639.

KENT

Bromley & DARS: 3rd Tuesdays, 7.30pm. The Victory Social Club, Kechill Gardens, Hayes. January 17 - AGM. A Messenger. 0181-777 0420

NORFOLK

Norfolk ARC: Wednesdays, 7.30pm. Formal and informal meetings at The Norman Centre, Bignold Road, Off Drayton Road between 'Asda' and Three Mile Cross Roundabout, Norwich. January 4 - Weather and propagation by Jim Bacon G3YLA, 11th - Night on the air, construction QRP, Morse practice, 18th - Know your radio - club quiz by Peter Ives G3ASQ, 25th - Night on the air, construction QRP, Morse practice. Mike G4EOL. (01603) 789792.

NOTTINGHAMSHIRE

Mansfield ARS: 2nd Mondays, 7.30pm. The Polish Catholic Club, off Windmill Lane, Woodhouse Road, Mansfield. January 9 - Sherwood Forest and other awards. Howard G1JGY. (01623) 423697.

South Notts ARC: Fridays, 7pm. Highbank Community Centre or Fairham Community College, Farnborough Road, Clifton Estate, Nottingham. January 6 - AGM, 13th - Construction plus on air h.f. and v.h.f., 20th - Talk on h.f. contesting by Chris Burbanks G3SJJ. Julie Brown G0SOU. (0115) 9211069.

OXFORD

Oxford & DARS: 2nd and 4th Wednesdays, 7.45pm. The North Oxford Grove House Club. Terry Hastings G0CFN. (01865) 863526.

SHROPSHIRE

Salop ARS: Thursdays, 8pm. Oak Hotel, Shrewsbury. January 12 - Airband and aircraft by John

G0GTN, 19th - RAE tuition and workshop evening, 26th - DX cluster GB7MDX, talk by G4UJS. Ian Davies G7SBD, QTHR. (01743) 463711.

SOMERSET

Yeovil ARC: Thursdays, 7.30pm. The Red Cross Centre, 72 Grove Avenue, Yeovil. January 5 - Talk on Yagi antenna designs by G3ZXX, 12th - Surplus equipment sale, 19th - Film and talk on Robotics by G5JJ, 26th - Club station on air and committee meeting. Cedric White, QTHR. (01258) 473845.

SUFFOLK

Haverhill & DRC: 2nd Mondays, 7.30pm. Samuel Ward Upper School, Chalkstone Way, Haverhill. January 9 - Club junk sale. Rob Proctor G4PZW. (01440) 704637.

Sudbury & DRA:

1st & 3rd Tuesdays, Wells Hall, Old School, Great Cornard, Five Bells Public House, Bures Road, Great Cornard. December 20 - Natter and noggin night. Tony Harman G8LTY. (01787) 313212

WARWICKSHIRE

Stratford-upon-Avon & DRS: 2nd & 4th Mondays, 7.30pm. Home Guard Club, Main Street, Tiddington, Stratford-upon-Avon. December 25 - Xmas greetings on the air. Mr A Beasley G0CXJ. (01608) 682495.

WEST MIDLANDS

Sandwell ARC: The Broadway, Warley. RAE class on Monday nights, Morse class on Wednesday nights and RAE Novice class on Thursday nights. Three operating shacks, h.f./v.h.f./u.h.f., Phone, c.w., RTTY, AMTOR, Packet, all bands. Talks, outings, contest and demonstrations. For further information please ring 0121-552 4619/0121-552 4902.

WEST YORKSHIRE

Denby Dale ARS: Wednesdays, 8.30pm. Pie Hall, Wakefield Road, Denby Dale, West Yorkshire. January 4 - Transatlantic on 2m by Roy G30TE, 18th - Components evening by Martyn G3ZXZ. Denby Dale ARS also provides RAE, Morse and Novice RAE classes and is a registered City & Guilds examinations centre for both the RAE and Novice RAE exams. Further details from the examinations secretary Brenda G40TE on (01484) 424776 or secretary Kevin G1FYS on (01484) 547553 for club activities.

WILTSHIRE

Trowbridge & DARC: 3rd Wednesday, 8pm. The Southwick Village Hall, Southwick, Trowbridge. December 21 - Christmas natter night, January 18 - AGM. Ian G0GRI. (01225) 864698.

It's Not What You Have...

There is a certain amount of sport in the daily drive to work.

Robert Ellis explains why.



Drive it right and you'll be surprised.

Rolling gently along the winding lanes between Idridgehay, a name for Scrabble players to bear in mind, and Cromford, I would be aware of the rear-view mirror filling up with BMW. This would wait for the least likely chance to pass and then do so, waving a cheery greeting before vanishing into the morning mist.

By the time we got to Matlock, my Bavarian friend was only three cars ahead. It seemed a lot of effort for so little gain, somehow.

Thirty years have passed since Dad, trying to keep the radio away from the kids, screwed it to the ceiling. In that time I think I've seen 'em all. Ex-service radios like The No. 19, 52 and 62 Sets, the hernia inducing R107, AR88 and RA17 up to today's Icoms, Kenwoods and, to borrow from the beer advert, the reassuringly expensive Racal. For each, in its time, was a great performer. Today, price and performance are tightly linked - you will get what you pay for, so let's leave the high ground and wallow below. Cheap radios can be fun.

For around forty quid, you enter another world. A world of limited frequency coverage, missing broadcast bands and no s.s.b. At the time of writing, this sunspot cycle is at its bottom, some broadcasters going for a mid-season change to lower frequencies in the hope of a usable signal. This means their efforts can now be heard by those of use who drop off the radio world at 15.5MHz.

Emotive Filters

Reception is very variable and will be for a few years yet. When it is good, it's very good, so you don't really need extreme sensitivity. When it's bad, it's bad, rapid selective fading reducing all but the very best receivers to a low common denominator in terms of listening for entertainment.

Better s.s.b. will come to the cheap and cheerful end of the market, but if this is your *forté* you are best going for a base station with a decent antenna.

Filters seem an emotive subject. Down here we should be grateful we've got one. It will be middle-ranking

in selectivity in an effort to be all things to all men, it's quality a reflection of the component buyer's skill. Can he get enough at the right price to be sure of reasonable performance throughout the product life?

In any event in the presence of very strong signals it will leak, allowing one of the joys of reduced selectivity, glorious audio quality as can be got from Virgin Radio on 1215kHz or Atlantic 252. It's only fair we should ask our little radio to pick up only the major broadcasters. DX we can leave to the big boys.

Image rejection produces more emotion. The single conversion radio for the financially challenged will have an i.f. around 460kHz, so it will produce heaps of images where the big boys can hear aeroplanes and ships. We have no s.s.b., so no problem. We also know in our hearts that the BBC does not use 8.5MHz.

Battery life is very important to the traveller. If you go to places where battery is teamed with assault, they may be hard to get. The best thing is a dial-and-pointer set as the

battery is then running only one, maybe two, oscillator transistors. In the digital synthesised radio, the battery is running hundreds of things, the price we pay for the convenience of key entry, memories and little glowing numbers. If possible, use the radio whenever you can get a mains power supply. Not only is it two hundred times cheaper than batteries to run, but the mains connection gives a capacitance reference to earth, helping with perceived sensitivity no end.

So, now I've made the case for simple enjoyment of the simple receiver, let's see what the wild waves are saying.

Korea on 6.560MHz, China on 7.780MHz and good old Australia on 1375kHz and even a clock to tell me that it's time to close. The race, it seems, is not only to the swift, or BMW owners.

The opinions expressed are those of the author. The radio used for the observations is the Lowe SRX 50, for which the bailiffs will probably be round for in the morning.

...It's How You Use It

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THE UK'S NO1 INDEPENDENT
RETAILER FOR ALL YOUR
RECEIVER REQUIREMENTS
Established 1958

HF RECEIVERS



KENWOOD R-5000 Carr D
100kHz-30MHz..... OUR PRICE **£899**

ICOM R-71E Carr D
100kHz-30MHz..... OUR PRICE **£985**

ICOM R-72DC Carr D
100kHz-30MHz..... OUR PRICE **£749**

ICOM R-100 Carr C
500kHz-1.8GHz..... OUR PRICE **£565**

AOR AR3030 Carr D
30kHz-30MHz..... OUR PRICE **£659**

YAESU FRG-100 Carr D
50kHz-30MHz



OUR PRICE **£479**

FREE PA11C mains power adaptor
FREE FF5 150-500kHz low pass filter

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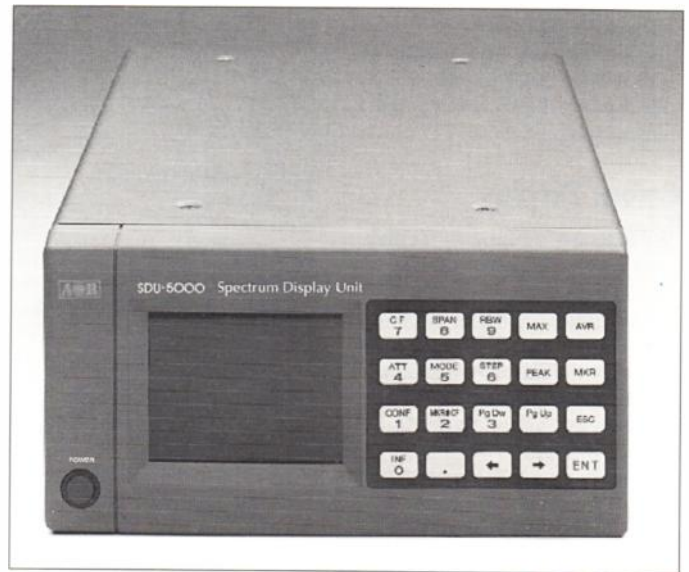
AOR**Spectrum Display Unit****EXCLUSIVE**

If you're seriously into scanning then the new SDU-5000 Spectrum Display Unit from AOR could be just what you need. Mike Richards takes the opportunity to check out the first unit to arrive in the UK.

The new SDU-5000 is a sophisticated spectrum display unit that features some special links with the AR3000A top-of-the-range scanner. In addition to providing frequency analysis and measurement options, the SDU-5000 is a great tool for quickly seeking out new frequencies. When combined with the AR3000A the result is a wide coverage spectrum monitor with a frequency range of 100kHz to 2036MHz! The model in question was received hot-foot from Canada and only had draft copies of the user manuals.

Interfacing

Although the SDU-5000 really comes into its own when used with the AR3000A receiver, it can be used with any receiver fitted with a suitable 10.7MHz i.f. output. The i.f. input is fed to a standard BNC connector mounted on the rear panel. In order to work successfully the i.f. feed from the receiver will need a bandwidth of ± 5 MHz. Power requirements of 12V d.c. at around 800mA were catered for using an external power unit that was supplied with the



SDU-5000. You could, of course, use the shack supply if you wanted, as the SDU-5000 utilised a standard coaxial power socket.

The control connection to the AR3000A was done using a standard 9-way to 25-way D connector lead. In the review model all the necessary leads were supplied with the SDU-5000 making the interfacing very quick and easy. Those of you who employ computer control of the AR3000A receiver will have to sacrifice that facility whilst using the SDU-5000 as it needs access to the receiver's REMOTE port. This is not really a problem as you can control the main features of the AR3000A through the front panel of the SDU-5000.

Changing between computer control and SDU-5000 control is probably best done using one of the popular 2-way computer switch boxes that are readily available for around £20. This appeared to work fine in the review set-up but, to be sure the link is sound, you need to re-select the AR3000A using the SDU-5000's configuration menu. This is very quick to do thanks to the simple menu system.

Computer Control

All the front panel features of the SDU-5000 could be externally controlled using the built-in serial port. This employed a standard 9-pin D connector and used eight bit data at a speed of 9600 baud with X-on/X-off software flow control. This makes interfacing very easy as you can use a simple three wire connection (data in, data out and ground). Because the SDU-5000 is so new, there was no computer control software available in time for the review and the only details available were a set of temporary notes. Having studied these notes, it was clear that the SDU-5000 computer port would allow full control of all parameters. All the front panel key operations could be duplicated along with options to download data from the SDU-5000. The first of these enabled the download of all the current settings as shown by the INF command. You could also download the frequency and signal strength of all signals within the SDU-5000's current span. The final option was to download the data associated with the current



marker position.

The ease of interfacing should make it comparatively easy to produce a computer control package that will provide even more features than the basic SDU-5000 itself. A computer controlled spectrum monitor could easily be left to analyse a spectrum and build-up a picture of all the active frequencies. These could subsequently be downloaded to the AR3000A for more specific monitoring. I'm sure AOR will be quick to put together a suitably impressive control program.

Colour Display

The SDU-5000's built-in display used a 77.5mm HQM simple matrix colour liquid crystal display unit capable of showing up to 16 colours. The resolution of this unit was quoted as 192 x 210 dots and proved to be perfectly adequate. For best results you had to view the display head-on, but it was readable over a wide viewing angle. The brightness of the display could be altered to suit local lighting conditions by a screwdriver adjustment through the side panel. This was a bit cumbersome, but you shouldn't need to alter this very often. Finding a suitable location for the SDU-5000 was a little more troublesome because it has a vertical front panel in contrast to the conveniently angled display of the AR3000A receiver. The SDU-5000 really needs a tilt bar on the base to allow it to be tipped-up for easier viewing. An alternative set-up would be to mount the SDU-5000 on an eye level shelf.

The only aspect of the display that caused me any trouble was the red cross that showed the frequency marker position. This appeared rather faint to me, but this may just be due to my red/green colour blindness!

If you prefer a larger display, the SDU-5000 included a separate video output that could be connected to a standard video monitor. This output supplied a nominal 1V p-p composite signal in either NTSC or PAL format. This was great for showing-off the impressive spectrum display. You could also use this output

Specification

Input Frequency:	10.7MHz
Sweep Width:	1kHz to 10MHz (1kHz steps)
Frequency Accuracy:	±600Hz
Resolution:	Switchable 5/30kHz
Reference Level:	-10dBm (low gain), -40dBm (high gain)
Dynamic Range:	>50dB
Level Accuracy:	Linearity ±2dB (within -40dB from reference level) Band Ripple ±3dB at 10.7MHz ±5MHz Temperature ±6dB from 0 to +40C
Marker Mode:	Direct readout of frequency and level Peak level Averaging (2 to 32 times sampling, adjustable)
Display Mode:	Line draw Area draw (paint)
Composite video out:	1 V p-p NTSC/PAL switchable
Display Type:	77.5mm HQM simple matrix colour (16 colours)
LCD Resolution:	192 x 210 dot
Screen Refresh:	500ms
Power Requirements:	12V d.c. ±5% at 800mA
Back-up:	from primary 12V d.c.
Dimensions:	94 (H) x 188 (W) x 250 (D) mm
Weight:	<568g

to record the display using a normal video recorder.

Basic Operation

With the receiver connected and powered-up, operation proved to be very straightforward and logical. One of the first actions is to check the configuration which is done using the INF key on the membrane keypad. This gave a display of all the SDU-5000's operational parameters. You can also use the CFG key to select the receiver type, r.f. gain and display mode. The selection of receiver type was just a case of selecting whether or not an AR3000 was connected.

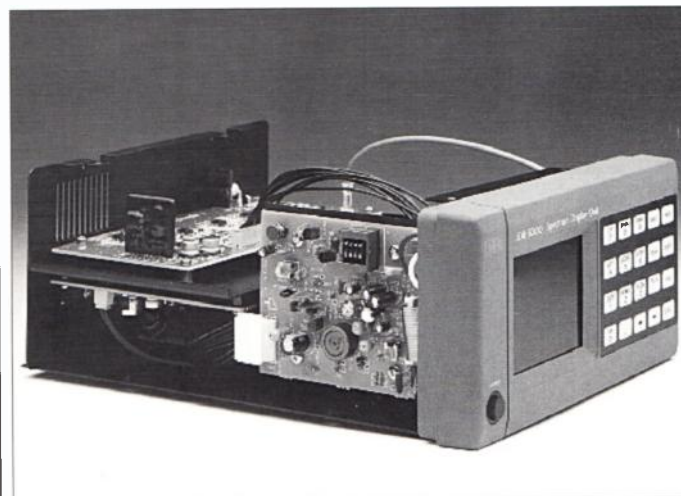
Selection of the r.f. gain was used to set the full scale reading of the display to either -10 or -40dBm. As the display had a dynamic range of 50dB the two gain options resulted in display thresholds of -60 or -90dBm respectively. This was a well chosen range as signals outside this were generally too noisy to be of use. The choice of display modes was really down to personal preference the options being to either shown a line trace or to fill-in the lower part of the display rather like a bar chart.

One of the most important aspects of the SDU-5000 was the comprehensive adjustment of the display span. This could be adjusted in 1kHz increments

from just 1kHz through to 10MHz. The adjustment was very simple needing a single press of the SPAN key followed by the required span in kilohertz. The ability to see signals over such a wide range makes the SDU-5000 a very powerful search tool. Once you have identified a target band of frequencies you can then adjust the span frequency to effectively zoom in and pick out more detail. Closely related to the span frequency is the setting of the receive bandwidth. The SDU-5000 has two options of 5kHz or a wide 30kHz. Whilst the narrow setting provides more detail it has the disadvantage of slowing the display response. To give you an example, with a span of 10MHz the SDU-5000 is able to complete one sweep of the display in just over 1 second. Switching to the narrow 5kHz setting reduces this to about 6 seconds. The narrow bandwidth really comes into its own when you zoom in and reduce the span to 100kHz or less as the SDU-5000 then achieves a sweep time of under 1 second.

Once you've spotted a few transmissions of interest, you can use the marker function to measure the frequency and check the signal level. Starting the marker needed just a single press of the MKR button and the current frequency and signal strength of the marker was shown on the screen along with a red cross showing the position of the marker. Measuring the required signal was then just a case of moving the marker to the required point on the display using the arrow keys. The display was continually updated, so you could quickly latch on to intermittent transmissions. When using a receiver other than an AR3000, the marker frequency was shown in kHz relative to the 10.7MHz centre frequency of the display, whilst the signal strength was shown in dBm. This could easily be transposed to the actual tuned frequency of the receiver.

One other very useful feature of the main keypad was the provision of an escape (ESC) key. This provided a quick and simple get-out for those occasions when you hit a wrong key!



The display itself included three processing options to increase the units overall versatility. The first of these caused the display to record only the maximum value of any signals within its passband. By enabling this option the display would gradually build-up a picture of all the active frequencies and effectively freeze all the intermittent transmissions. This is very handy for identifying local p.m.r. frequencies. The second option changes the display to an averaging algorithm that could be set to average the received signal over between 2 to 32 display sweeps. Using this facility you could quickly identify continuously active frequencies such as air band VOLMET signals whilst suppressing all but the busiest intermittent signals. The final peak option was specifically designed to aid the identification of the strongest signals in the pass-band. When this option is started the marker appears and is automatically set to the strongest frequency in the pass band. The arrow keys can then be used to move the marker sequentially between the active signals in order of signal strength. This is a great option for logging active frequencies in a new band or checking out a known band for new stations.

Flying AR3000!

The SDU-5000 is an extremely useful accessory for any receiver, but when you link it with the AR3000A it really begins to fly. For a start, you are no longer stuck with 10.7MHz as the centre frequency of the display and having to calculate the real frequency of displayed signals. The display centre frequency becomes the current frequency of the AR3000A. When you set a new centre frequency with the display keypad, the AR3000A automatically follows too. Just this feature alone transforms the usefulness of the SDU-5000. Closely allied to this is the PgUp and PgDn buttons. These increase or decrease the centre frequency by half the display scan width. Again, this is really well thought out as by scrolling through the bands in this way

you have continuous frequency coverage without having to keep punching in new centre frequencies. The final frequency selection option was to use the arrow keys to increase or decrease the centre frequency in discrete steps. These steps could also be set via the SDU-5000.

Just to complete the picture all the functions that use the display marker show the real frequency instead of the offset from the centre. This really makes operation very efficient and was so simple the manual was almost superfluous.

In addition to the direct frequency control and display, the SDU-5000 interface enabled the setting of a number of the AR-3000A's receive parameters. Mode selection was done via an on-screen menu, as was setting the AR3000A's internal attenuator on or off.

In order to connect the SDU-5000 to the AR3000 or 3000A, the receiver will need a minor modification to give a 10.7MHz i.f. output and a.g.c. switch. This modification can be completed by AOR or one of their authorised dealers.

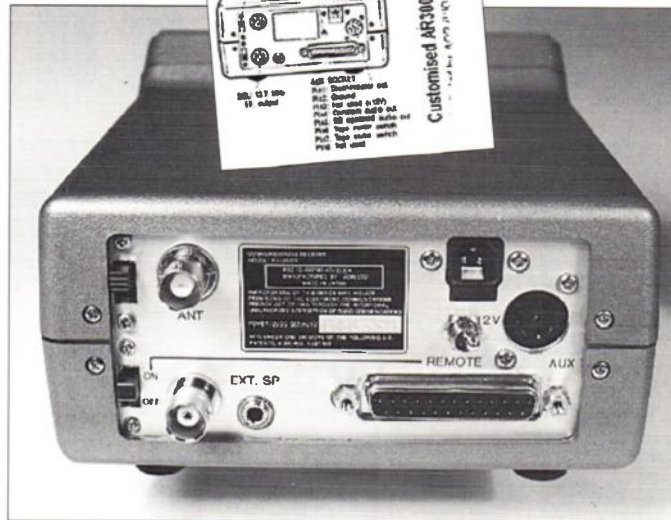
On-The-Air

Using the combined SDU-5000 and AR-3000A to search the bands was a real joy and potentially addictive. Instead of endless searches that always seem to miss the signal you're looking for, all is revealed in great clarity on the display. If we take the air band as an example, you can just punch-in the centre frequency of the section you want to monitor, set the span width to 10MHz

and watch the display to see all the various transmissions come and go. If you spot an interesting looking signal you can then activate the marker and move it so that it sits on top of the signal and displays the frequency and signal strength. If you want to listen to that signal all you have to do is press the MKR>CF (marker to centre frequency) key and the AR-3000A is automatically set to that frequency along with the display centre frequency. Using this system you can very quickly identify all the active frequencies in the band. Having the frequency and signal strength shown is a great help to identifying those signals that are worth receiving.

If you're primarily looking for local signals, the PEAK facility was particularly helpful as you could very quickly step through and record the strongest signals. The only missing feature that I thought would have been useful was a single key press to return to the last used centre frequency. This would allow you to select a band jump to a potentially interesting frequency and then return to the previously chosen centre frequency. This would make systematic searching of a band a little easier. Even if this is not provided on the main SDU-5000, it ought to be easy to implement in a computer control package.

The AVE (average) function was also very effective and was best for seeking out steady transmissions amongst a range of noise and intermittent signals. Even on very busy frequencies like the short wave broadcast or utility bands the



AR3000A Plus - modified for use with the SDU 5000.

SDU-5000's average function delivered a clear indication of all the steady signals.

The SDU-5000's display was remarkably free of spurious signals and the only persistent offender was a -78dBm blip at 455kHz.

Summary

As you've probably gathered by now, I very much enjoyed reviewing the SDU-5000 and AR-3000A. Although the display unit is an extremely useful accessory with any suitable receiver, when it joins forces with the AR-3000A, it steps into another league. The SDU-5000's strongest point is the way it simplifies the location and identification of intermittent transmissions. As this applies to the majority of v.h.f./u.h.f. signals its potential is enormous. The only minor downsides were the lack of a tilt-stand and the inconvenience of having to manually switch between computer control of the AR-3000A and SDU-5000. The SDU-5000 costs **£699** inclusive of VAT and is available from **AOR (UK) Ltd., Adam Bede High Tech Centre, Derby Road, Wirksworth, Derbyshire DE4 4BG, Tel: (01629) 825926** or their dealer network. The modification to the AR-3000 is free when an SDU-5000 is purchased direct from AOR, or £39.95 if carried out separately. My thanks to AOR for the loan of the review model.

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The One-Chip Panoramic Adapter

You have a receiver, a.t.u. and a copy of WRTH. What else does the serious listener need? The answer is - according to Bill Wilson - a panoramic adapter. Here he shows you how to build your own.

Just what is a panoramic receiver or panoramic adapter? And what does it do? A panoramic c.r.t. display of the m.w. band is shown in Fig. 1. Each vertical spike represents a broadcast signal, with the height of each spike being relative to the signal strength of the transmission. In Fig. 2 only the centre portion is being viewed, while in Fig. 3 the sweep control has been reduced to zoom in on just a few signals. All the clues are there - if you have a copy of the *Guide to Broadcasting Stations* - to pinpoint very accurately the writer's QTH in the UK!

Surprisingly few listeners or amateurs even know of the existence of the panoramic adapter. But it is, arguably, the most useful accessory, after a g.d.o., for any enthusiast interested in receivers or in r.f. generally. Once hooked up to your receiver

and a basic oscilloscope, the adapter continually shows the panorama of signals above and below the one to which your receiver is tuned. As the receiver is tuned, this panoramic presentation slides along the tube face in sympathy - with the tuned signal always in the centre of screen, thereby one can observe activity in a whole band at any moment in time, or even look at a 'dead' band for signs of activity without continually tuning the receiver up and down the band. A scanner will of course also do this but because it will take a finite time to scan any section of the spectrum, it can still miss brief transmissions. The panoramic adapter's presentation is, of course, continuous and instantaneous. As a piece of test equipment it is superb, all manner of receiver shortcomings can be instantly brought to light. All in all, it's a most useful device.

Navigational Device

To the best of my knowledge, the panoramic receiver was invented in the early thirties by

a Marcel Wallace, initially as a navigational device to compare distance of a ship or aircraft from two or more known radio stations of identical power and on slightly different frequencies but geographically separated. This was done by observing and comparing their simultaneous signal strengths on a cathode ray display. If the heights of both signals were identical, the receiver would obviously be somewhere on a path equidistant from both transmitters. This would clearly work only on i.f./v.l.f., where selective fading would not be a problem.

Dr. Wallace later devised the panoramic *adapter* which could be connected to a conventional superhet to permit a visual spectrum display, and, along with the Hallicrafters company, coined the term 'Panadapter'. Under this guise it was much used by the military in WW2 for general surveillance and countermeasures and one can still come across, from this era, the occasional APA-10, APA-38, ALA-2 (for use with the APR-1 and APR-4 search receivers), and the RDC which was a modified Hallicrafters S27 v.h.f.

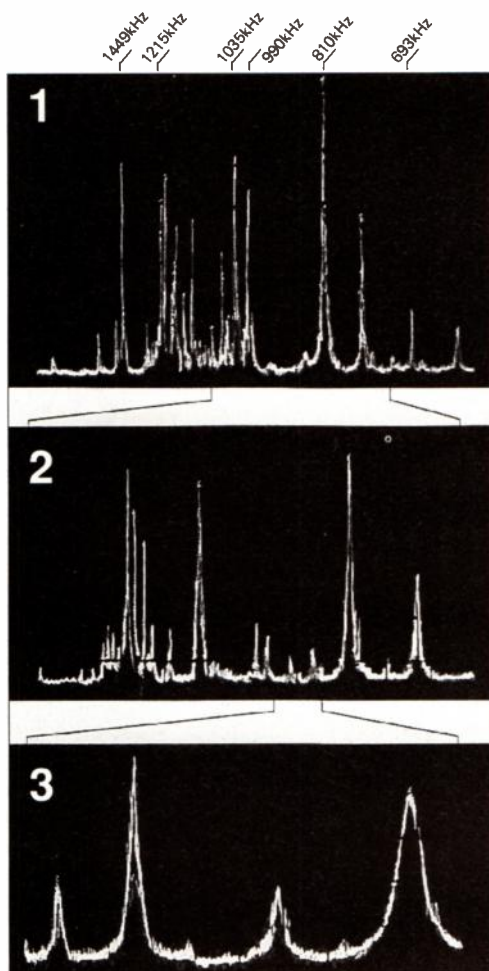
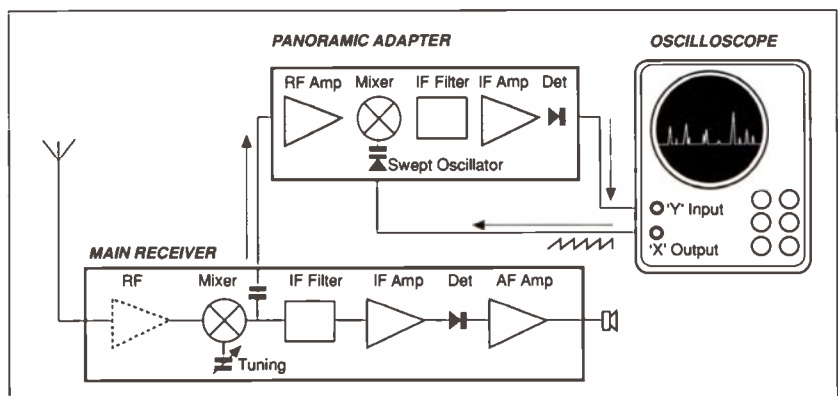


Fig. 1: Panoramic display of the m.w. band.
 Fig. 2: Centre portion of the display in Fig. 1.
 Fig. 3: Zoomed in on just a few signals.

Fig. 4: Block diagram of the panoramic adapter and receiver set-up.



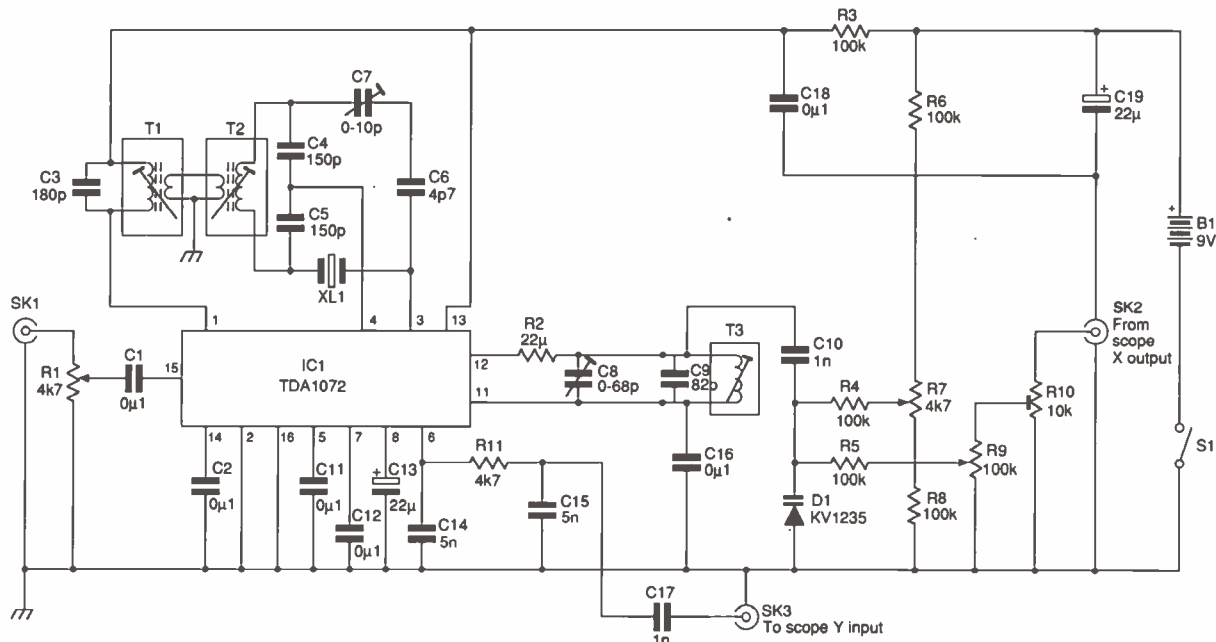


Fig. 5: Circuit diagram of the 'One-Chip' panoramic adapter.

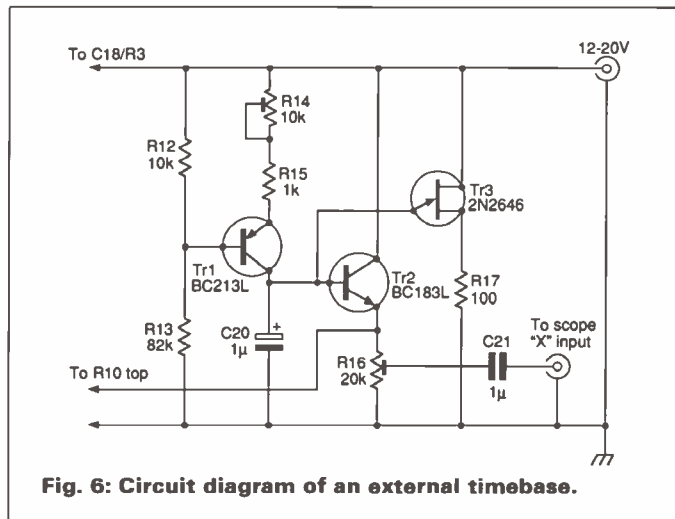


Fig. 6: Circuit diagram of an external timebase.

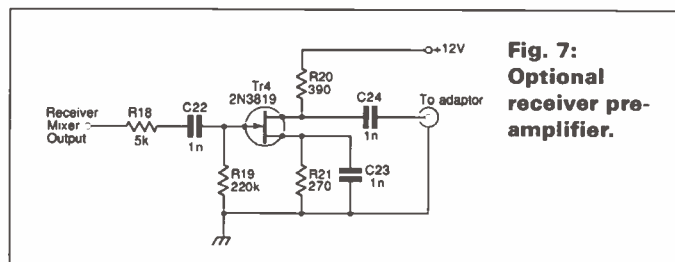


Fig. 7: Optional receiver pre-amplifier.

receiver with a motor driven, dynamically balanced, three-gang, split-stator tuning capacitor (rotating continuously at 15Hz) with a cam on the motor triggering the sweep circuits in the associated oscilloscope!

But all this was in the dark ages before the days of Varicaps...

Real Time

Once connected to the station receiver, the adapter enables one to listen in a much more understanding way to all that is going on; receiver defects such as images, intermodulation in the front end, oscillator harmonics introducing spurious signals, all of which may seem perfectly legitimate by ear alone, are instantly revealed. One can observe fading, drift

and transmitter faults such as overmodulation, and as the adapter is, in effect, a very selective receiver continually scanning the output of the receiver's front end and displaying the result in 'real time', whole chunks of the spectrum can be checked for new transmissions, however brief, and for general band occupancy.

Even in the past, panoramic adapters have been pretty complex devices and very, very expensive (nowadays, you'll need to mortgage your house to buy a current professional panadapter) - after all they are really a simplified form of spectrum analyser, and the mind boggles at the cost of these! The modest one presented here is designed to be used with an existing oscilloscope and can be built in a couple of

evenings. Yet the performance is hardly compromised. Only one connection is required to your receiver and the adapter will probably never be disconnected once the advantages are sampled.

The block diagram of the receiver/adaptor set-up is shown in Fig. 4. It can be seen that the adaptor is quite simply a conventional receiver, except that its oscillator is swept continuously by the oscilloscope's timebase to enable it to scan the i.f. output of the station receiver. The detected output is then presented to the 'scope's 'X' input for display. No input tuned circuit is necessary in the adaptor as this is automatically provided by the tuned circuit at the mixer output of the station receiver.

However, this version is only really suitable for use with receivers which have a first i.f. which is fairly low, i.e.; 455, 1400, 1600 or 1750kHz. I'm afraid it's hard luck if you have a Lowe HF125, Sangean ATS-803 or similar receiver with i.f.s in the 50MHz region. But this drawback can be overcome with an somewhat different

approach and the 'Three-Chip' panoramic adapter, which can even cope with the 600MHz i.f. of the PRO2004/2005/2006/2035 scanners, may be published later if there is enough interest.

As the adapter 'looks' at the spectrum of signals present in the receiver's mixer before the i.f. selectivity gets down to work, it is clear that the broader the receiver's front end selectivity, the wider will be the band of frequencies that the adapter can display. In general, the higher the i.f. of the receiver, the fewer r.f. tuned circuits it will have, the broader the r.f. selectivity will be and therefore more suited for use with panoramic display. So the frequency to which the receiver is tuned, and its r.f. selectivity, are further factors in determining how much of the spectrum can be viewed.

To take an example, imagine one of the 'classic' communications receivers like the HRO, CR200, BRT400, etc., tuned to, say, 200kHz; the two r.f. stages and mixer tuned circuits confer an almost nil r.f.

Continued on page 23

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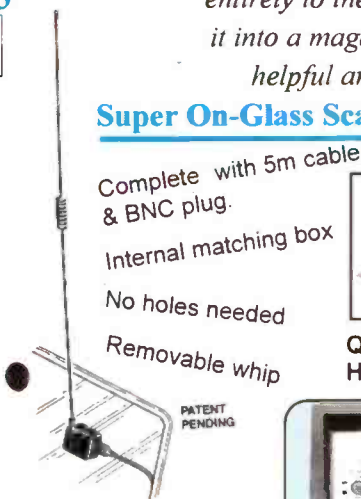
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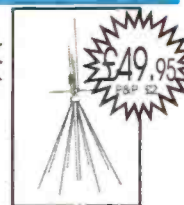


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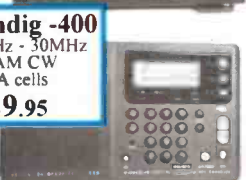


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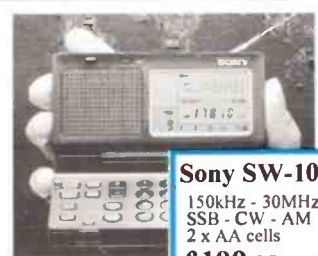
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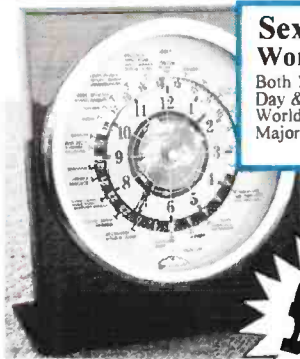


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bandwidth at the output of the mixer. But tune the same receiver to 30MHz and the r.f. bandwidth will now be many hundreds of kilohertz or even a few megahertz - that's why, with a conventional superhet, the images get worse on the higher frequencies.

The modern retrograde trend to receivers with broadband input stages (and i.f. in the v.h.f. region) makes the use of panoramic adapters seem very attractive because these sets have no signal frequency tuned circuits - only bandpass circuits - in the front end to limit the size of the band being swept so that with the appropriate adapter (*not the 'One-Chip'*) connected to the receiver's v.h.f. i.f., one can view huge chunks of the spectrum at a glance. For use with these sets the adapter would obviously have to work at v.h.f. and consequently becomes somewhat more complex.

Looking at the circuit of the adapter (**Fig. 5**) maybe a thought is rearing its ugly head: superhet receiver? crystal filter? What test equipment is required to align the device? The answer is - nil. We have, after all, a built-in wobulator, so all that is needed is your general coverage receiver, and, of course, an oscilloscope with an 'X' output, in order to display the results. The oscilloscope used need only be the most basic. If you are using it to drive the adapter, it may be found that the X output is unnecessarily high to suit the tuning diode, but R10 in the adapter can be used to reduce this to a more civilised level.

If your 'scope does not have a timebase output, a timebase generator that will drive both the adapter and any oscilloscope with an 'X' input socket is shown in **Fig. 6**. The output is taken from the top of R16 to drive the adapter, while the 10kΩ preset, R14, will determine the sweep speed.

The present design (**Fig. 5**) is based on the TDA1072 receiver integrated circuit. This particularly well-behaved i.c., though designed for broadcast receiver use, seems exceptionally well suited to this project, having more than adequate gain, a very 'clean' mixer and an easy-to-use two-terminal oscillator. The detector

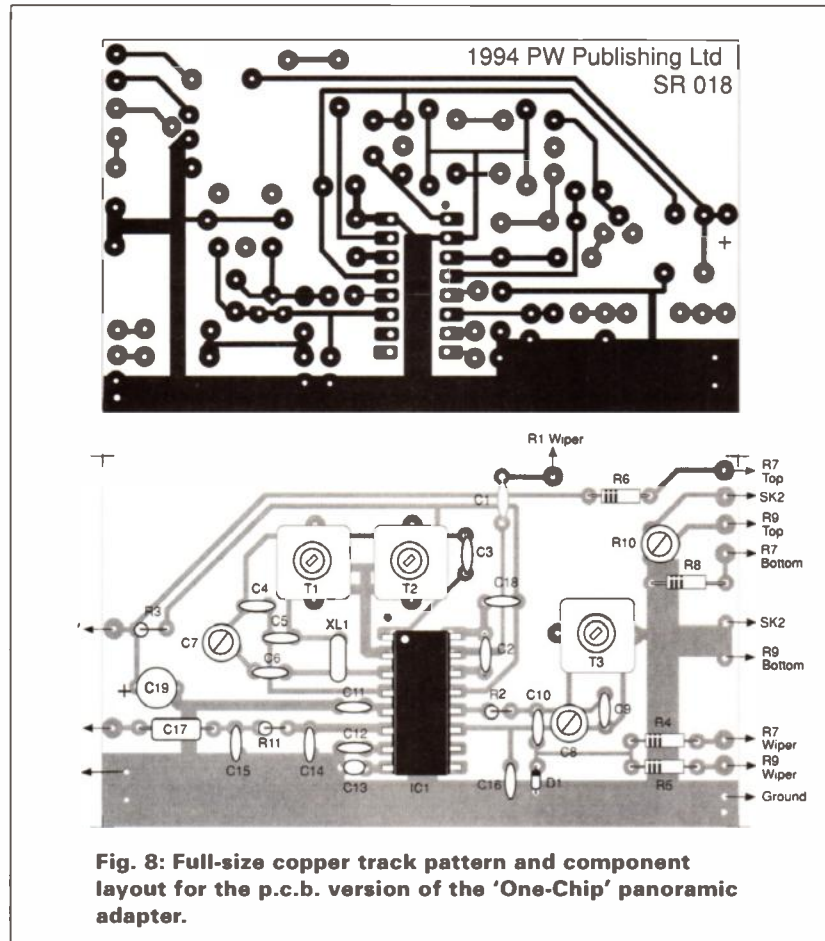


Fig. 8: Full-size copper track pattern and component layout for the p.c.b. version of the 'One-Chip' panoramic adapter.

is integrated in the chip but this poses no problem in this application. The i.f. filtering is the classic (archaic?) crystal filter, the frequency being anywhere in the range 2-2.5MHz. The i.f. section of the TDA1072 is particularly sensitive, so it is important that the completed adapter be housed in a screened enclosure, especially if, like the author, you live near a broadcasting station. A suggested p.c.b. construction is shown in **Fig. 8**, although the prototype was built using Veroboard.

Before alignment, first dismember your receiver and locate its mixer output pin whether this is an anode, collector, drain or i.c. pin. To this point connect a 4.7kΩ resistor and a 10nF capacitor in series. The free end of the capacitor is taken, via a screened cable, to a suitable socket (phono, BNC or coaxial) on the rear of the set, or the

Fig. 9: A series of 'rapid-fire' shots of an RTTY signal as seen on the panoramic adapter's screen.

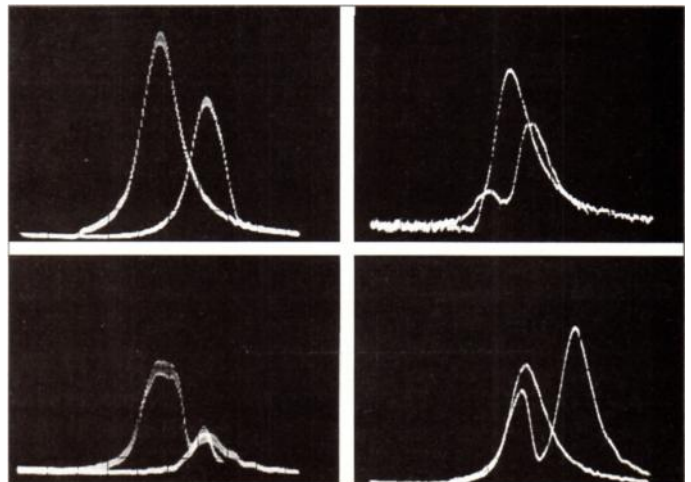
cable can simply be fed through any convenient opening in the receiver's case and terminated with a free phono/coaxial socket. If you are using a valved receiver make sure the capacitor is at least rated for 250V working.

These components serve to isolate the receiver from any damping effects the adapter might have. You may prefer to fit a small isolating buffer/amplifier stage (**Fig. 7**) right next to the RX mixer, but this should not really be necessary.

is alright for analysing one signal, but can hardly be used in the true 'panoramic' mode.

Alignment

Initially, don't connect the adapter to the receiver. Apply power to the adapter, set the gain and sweep controls to maximum and the 'centre' control halfway. Plug the output of the adapter into the 'X' input of the scope. Once connected up, adjust the timebase of the scope (or R14 if you are using the separate



As a further refinement while your RX is disembowelled it is worth disabling the a.g.c. line to any r.f. stage(s), if this is a simple job. This measure will ensure that the c.r.t. vertical presentation will not reduce due to a.g.c. action whenever the receiver is tuned to a strong signal.

Your receiver may be one with an 'i.f. output' connector on the rear panel. Don't be tempted to use this for connecting the adapter, even though the socket is almost certainly intended for this purpose, as this is generally at the output end of the i.f. amplifier, and will only permit viewing of the filtered i.f., which

timebase generator to drive the adapter) so that the spot traces a horizontal line on the screen - just fast enough to avoid the separate sweeps being visible.

Now to adjust the adapter's local oscillator. Add the frequencies of the i.f. of your receiver and that of the adapter - for the purpose of the alignment description we will assume that the receiver's i.f. is 455kHz and the adapter to have a 2MHz crystal filter. Connect a length of wire to your RX to act as a poor antenna and lay it near the TDA 1072 in the adapter. Tune the receiver to this frequency (2.455MHz) and, with C8 at half capacity, adjust T3 until a hideous pulsed noise can be heard in the receiver's output. This is the adapter's oscillator sweeping, and T3 may have to be adjusted slightly to bring it in to tune. Gradually reduce the sweep control R10, following it, if necessary, with the core of T3, not the receiver, until at the minimum setting of the sweep control the noise is no longer spread over the dial but is now just a plain c.w. carrier on 2.455MHz, it may have a residual wobble on it but this is of no consequence. Now leave T3 alone and set the sweep control midway. Connect the input of the adapter to the RX output socket that you have previously installed and initially set all gain controls to maximum (scope, adapter and receiver). Connect your normal antenna to the receiver and park the receiver on some strong signal, say in the 6 or

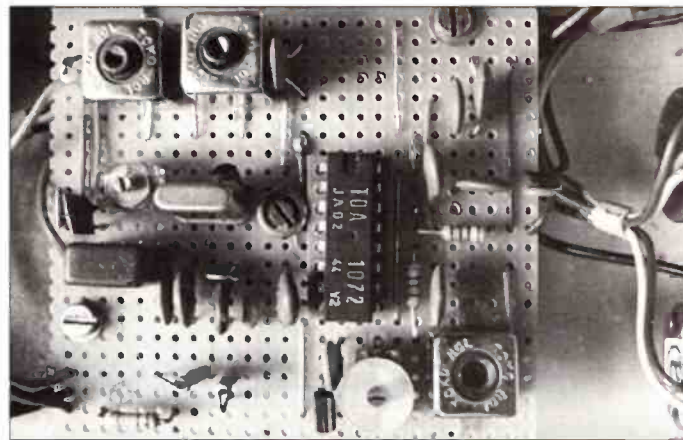


Fig. 10: 'Veroboard' prototype of the adapter.

9.5MHz band.

A mass of signals should be visible as misshapen lumps on the scope baseline, and, as the receiver is tuned, they will slide across the tube face. This will give initial confidence that the system is going to work. At this stage T1 & T2 can be trimmed roughly to give a taller presentation on the scope.

Retune the receiver to a strong steady signal and reduce the sweep control until only a few signals appear on the scope. It should now be possible to identify the lump which corresponds to the received signal by observing the modulation and comparing this with the audio from the receiver. It may be necessary to tweak T3 slightly to find the corresponding peak.

During the following steps the gain of the scope and/or that of the adapter will almost certainly need to be reduced to keep the signals within the height of the tube.

essential to use an insulated trimming tool to avoid any spurious pick-up. The signal observed is the i.f. response of the adapter's crystal filter and it is worth taking some time at this stage to get the sharpest possible response by repeating these steps until no further improvement is seen. The filter adjustment is complete and T1, T2 and C7 should be left strictly alone.

Still observing the test signal, reduce the sweep still further, carefully adjusting C8 so that the spike stays in the same lateral position on the

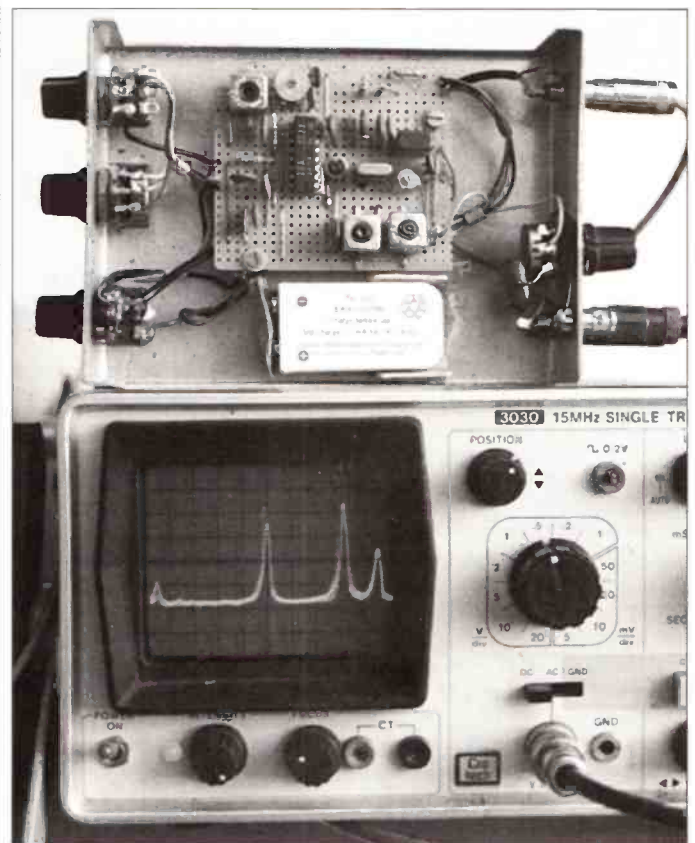


Fig. 12: In use topless.

The crystal filter is now aligned by tuning the receiver to any steady signal that can be observed, say a local m.w. station, or better still, the output of a crystal calibrator, and T1 and T2 cores peaked for maximum deflection (height) on the scope. Trimmer C7 is next adjusted for the narrowest shape of the spike. As C7 is adjusted, a notch will appear on one side of the spike and move across to the other side. Simply adjust the trimmer for the best sharpness and symmetry of signal. Both terminals of C7 are 'live' so it is

screen whatever position the sweep control is in.

Alignment is now complete and the 'centre' control R7 can be used to reposition the centre frequency by a few kilohertz. The 'sweep limit' control, R10, may be set (with R9 at maximum) to restrict the sweep limit to the maximum one is likely to use).

The resolution obtained is very dependent on the sweep speed. Too fast will smear the spikes into each other due to the fact that the crystal filter simply does not have time to respond to one signal before the next sweep arrives on the doorstep. Too slow a sweep speed and the resolution will

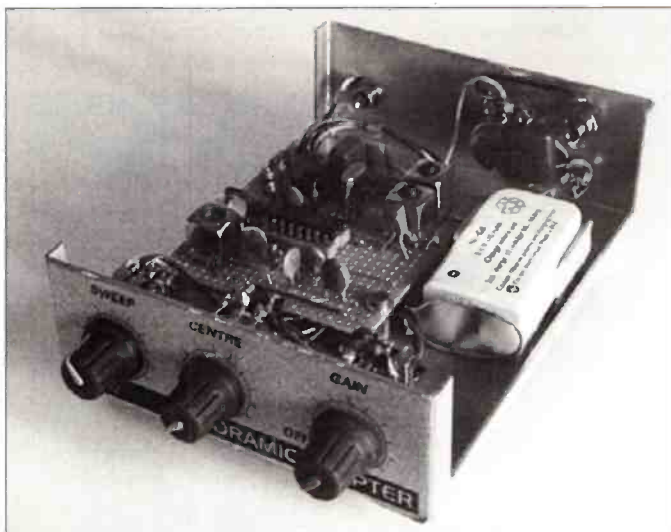


Fig. 11: The cased prototype.

be excellent but tube flicker becomes annoying. Perhaps about 25-30Hz is best.

At this stage you will be taking time off to look over the bands, identifying different modes; a.m. varying the height of the spikes with the modulation sidebands being quite apparent; f.m. showing up as a sideways buzz; s.s.b. appearing just as instantaneous audio, but the most fascinating of all is RTTY. If the sweep is reduced to show just one teletype signal almost filling the width of the screen, the 'mark' and 'space' signals can each be clearly seen, but what is quite remarkable from the propagation point of view is that these signals - unless the transmitter is very close by - fade quite independently of each other - despite the fact that they originate from the same transmitter and are only hertz apart. A series of shots in rapid sequence from an RTTY signal is shown in Fig. 9. This graphically demonstrates the effects of multi-path propagation - the ionosphere is very far from being a steady mirror fixed above the earth!

Images

Sometimes you will find when tuning across the bands that some spikes move in the opposite direction to normal. These are images produced by poor r.f. selectivity in your receiver - and this defect can be found in any low i.f. receiver. Spikes which move across the screen at twice the speed of the others are caused by oscillator harmonics in your receiver beating with genuine signals on a much higher frequency than those you are trying to receive. Again, like images, their true nature can only be shown up with a panoramic adapter, as far as your receiver's audio is concerned, they cannot be distinguished from the genuine signals.

About 30 years ago I built my first panadapter. It took weeks of work and the glow from its thirteen valves almost outshone the faint presentation from a very tired ex-WD VCR239 c.r.t. If I had foreseen that one could get a much better performance from just a mere handful of

components, I probably wouldn't have bothered.



Fig. 13: The complete set-up.

YOU WILL NEED

Resistors

Carbon film, 5%, 0.25W

22Ω	2	R2,3
4.7kΩ	1	R11
100kΩ	4	R4,5,6,8

Potentiometers

Carbon track, 1/4in shaft

4.7kΩ	1	R1 (with switch)
4.7kΩ	1	R7
47kΩ	1	R9

Preset horizontal mounting

10kΩ	1	R10
------	---	-----

Capacitors

Min. ceramic plate

4.7pF	1	C6
82pF	1	C9 (455kHz adapter only)
150pF	2	C4,5
180pF	1	C3
1nF	1	C10
5nF	2	C14,15
0.1μF	6	C1,2,11,12,16,18

Polyester film

1μF	1	C17
-----	---	-----

Electrolytic p.c.b. type

22μF	2	C13,19
------	---	--------

Min. film trimmers

10pF	1	C7
65pF	1	C8

Semiconductors

Diodes

KV1235	1	D1
--------	---	----

Integrated circuits

TDA1072	1	IC1
---------	---	-----

Wound components

Toko sub-min. i.f. transformers

KANK3333R	2	T1,2
KANK3337R	1	T3

Miscellaneous

Crystal (see text); Printed circuit board; Suitable case; Battery connector (PP3 type); Battery, 9V; Knobs; Sockets (see text).

Abbreviations

a.g.c.	automatic gain control
a.m.	amplitude modulation
a.t.u.	antenna tuning unit
BNC	coaxial connector type
c.r.t.	cathode ray tube
c.w.	continuous wave (Morse)
f.m.	frequency modulation
g.d.o.	grid dip oscillator
Hz	hertz
i.f.	intermediate frequency
kHz	kilohertz
kΩ	kilohms
l.f.	low frequency
m.w.	medium wave
MHz	megahertz
nF	nanoifarads
p.c.b.	printed circuit board
pF	picofarads
QTH	location of station
r.f.	radio frequency
RTTY	Radio TeleType
RX	receiver
s.s.b.	single sideband
v.h.f.	very high frequency
v.l.f.	very low frequency
WD	War Department



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CTX80	80M DRP CW Inc. crystal	£15.50
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MTX20	20M 10W CW Inc. crystal	£29.90
HTX10	10 & 15M SSB Exciter 50mW	£49.90
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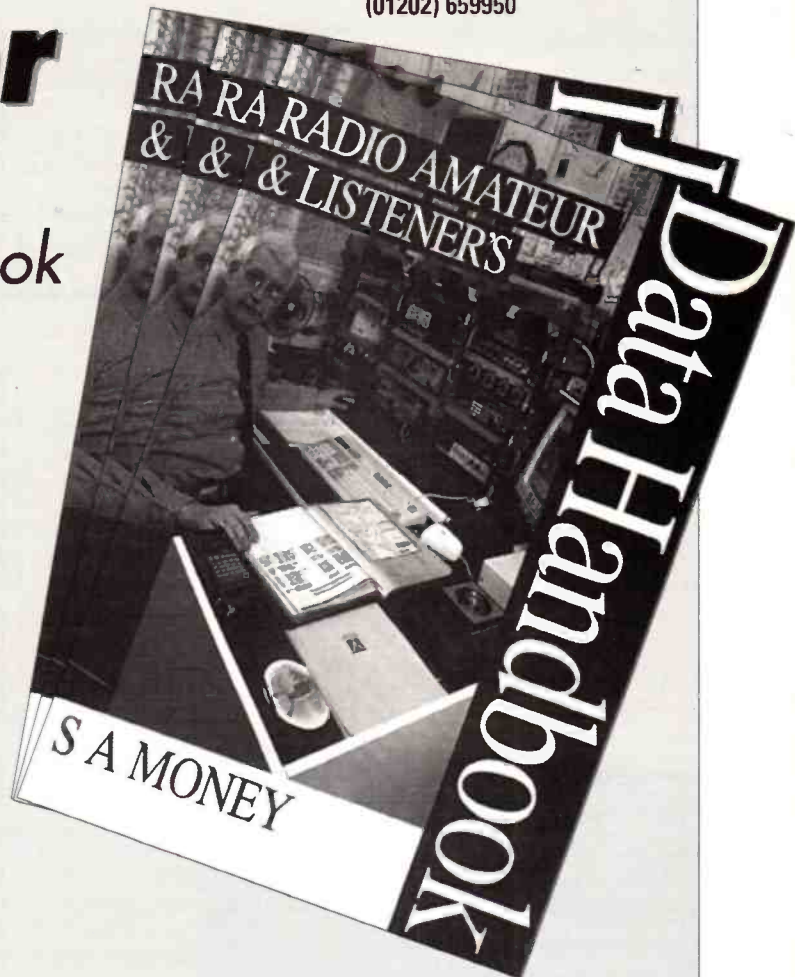
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The End Of An Era

An era in Australian short wave broadcasting came to an end just a year ago when two of Australia's best known, short wave transmitters closed down. Adrian Peterson looks at the story behind VLQ and VLM in Brisbane and VLW in Perth.

The closure of VLQ and VLM in Brisbane, Queensland and VLW in Perth, Western Australia, brought to an end an era in home service short wave broadcasting that goes back to the days of World War II. Both stations were also used for brief periods of time in the overseas short wave service of Radio Australia.

Actually, throughout the years, Australia's ABC has operated short wave transmitters for home service coverage from a total of seven different mainland locations. The four early bases are now all off the air, and only the three more recent stations in the Northern Territory still remain active.

So let's take a last lingering look at these two recently retired radio stations.

Network from Radio Netherlands, announced in November '93 that VLQ in Brisbane would be closing at the end of the year. With it, too, he thought, would also come the closure of the Waneroo station, VLW in Western Australia. Subsequent information has confirmed the accuracy of these statements.

If you travel along the main northern highway, you will see the Bald Hills Radio Station with its transmitter building located quite close to the highway, just 20km out of Brisbane. The first short wave transmission from this location took place on February 17 1943, using a new 10kW transmitter. This unit was allocated the recycled VLQ call from the Pennant Hills Radio Station, which had just been closed. The Q in VLQ stands for Queensland.

The purpose of the short wave installation at Bald Hills was to give a reliable radio coverage to distant country dwellers in the far flung and isolated areas of Queensland and, to a certain extent, in the vastness of the Northern Territory as well. Programming was taken from the two medium wave stations in Brisbane, 4QG and 4QR, with an emphasis on regional coverage from the country network.

However, because of the skip distance evident in the coverage from this short wave transmitter, another unit was installed six years later. This service, experimental at first, was designed to cover nearer country areas, NW and SE of Brisbane. Thus, it was that on September 7 1949 the second callsign VLM came onto the air at the Bald Hills location. The

first transmitter was a temporary low-powered unit of 200 watts, which was replaced by a permanent 10kW unit on January 25 1951.

In 1968 an additional 10kW unit was installed at Bald Hills, replacing the original VLQ, which was an old water cooled cage type transmitter. The old unit was now relegated to stand by services.

The VLQ transmitter was used without a callsign by Radio Australia for a period of five years, from 1971 to 1976. These broadcasts were beamed towards Papua New Guinea in English and Pidgin.

The short wave antenna system at Bald Hills consisted of a two half-wave folded dipoles with reflectors at 310° for coverage of the outback. In addition, there were two rhombics at 340° for use in the Radio Australia service beamed to Papua New Guinea.

According to 'Media Network' as quoted in *DX Post* from Australia, station VLQ-VLM closed on December 6.

Waneroo Radio Station

The Waneroo radio station goes back to the days before World War II. It is located some 24km NW of Perth and it was originally intended to be a large medium wave installation for Australia's ABC network. The first transmitter, a 5kW unit for medium wave 6WF was installed in 1932.

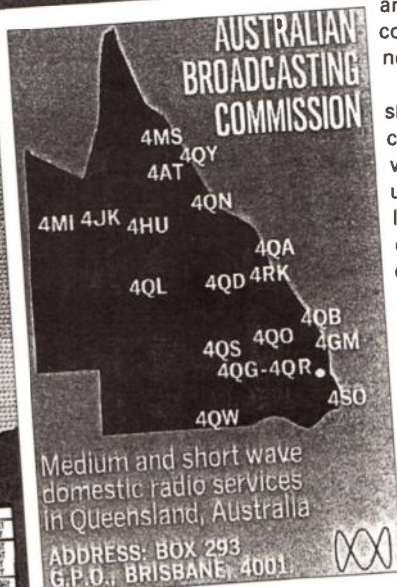
Then in 1939, the other ABC medium wave station, 6WN was transferred from its city location atop the GPO building and installed at Waneroo. Simultaneously, a new 2kW short wave transmitter was also installed at Waneroo for coverage of Western Australia's vast outback areas.

Some of the QSL cards collected by the author have seen better days - it's too late to replace them now, but you might get some useful information from them if you look hard!



Bald Hills Radio Station

Quite suddenly and unexpectedly, Jonathan Marks in his renowned DX program, *Media*



Short Wave Stations Still On The Air In Australia

Location	State	Call	No	kW	Date	Comments
Shepparton	Vic	RA	6	100	1944	New antennas installed
Darwin	NT	RA	5	250	1968	Recently enlarged
Carnarvon	WA	RA	3	HP	1975	Originally temporary
Brandon	Q	RA	3	10	1989	Pacific coverage
Alice Springs	NT	VL8A	1	50	1986	Also Aboriginal programming
Tennant Creek	NT	VL8T	1	50	1986	Also Aboriginal programming
Katherine	NT	VL8K	1	50	1986	Also Aboriginal programming

The first test broadcast from this new short wave transmitter took place on October 18 1939 under the callsign VLW with the W representing Western Australia. Initial test programming was taken from the two medium wave transmitters, 6WF and 6WN, now installed at the same location.

When the European phase of World War II began in September 1939, the small 2kW transmitter at Waneroo was diverted for service as part of the short wave network of 'Australia Calling', the forerunner of Radio Australia. The first test broadcast under 'Australia Calling' took place on January 24 1940, and it was beamed towards Africa. Subsequent broadcasts during the next year were beamed towards Indonesia. The era for the usage of this facility by Radio Australia ended in 1945 when the well-known Shepparton base was

commissioned.

Ten years later, a new 10kW transmitter was installed at Waneroo and it took to the air as VLX on April 19 1949. This unit likewise was established to give supplementary coverage to outback dwellers in distant areas of Western Australia.

A rebuilding programme began at Waneroo in 1959 and the whole station was totally rebuilt, with new transmitter and new antennas. Three new short wave transmitters were installed, two at 10kW and one at 50kW. These were phased into regular service, with the last transmitter, the new VLX, being commissioned in 1962. Subsequently, at the beginning of 1969, the two services, VLW and VLX were amalgamated under one callsign VLW.

For a second era, a period of 10 years from 1963 to 1973, VLW was again used in the external services of Radio Australia for broadcasts beamed towards Africa. No

callsigns were used for these transmissions, though reception reports were verified with QSL cards indicating Waneroo.

According to a QSL just received from VLW in Perth, Western Australia, this short wave service was terminated on December 14 1993.

Earlier Bases Closed

Other short wave bases in Australia that were closed in bygone years were located at Liverpool, Lyndhurst and Pennant Hills. For a few months back in 1975, test broadcasts were made from a communication station located at Gngangara in Western Australia. These tests were made to ascertain the viability of establishing a short wave station at Carnarvon following the disabling of the Darwin station by Cyclone Tracy. The ABC's short wave facility in Pt. Moresby, VLT and VLK was

transferred to the Papua New Guinea government in December 1973, two years after independence.

There are currently seven short wave stations on the air in Australia and these are located in the states of Victoria, Queensland, Northern Territory and Western Australia. A total of 20 transmitters is in active service with programming from either the ABC HS network or Radio Australia.

According to ABC management in Australia, the regional short wave services located at Bald Hills and Waneroo had become redundant because a satellite service now covers the same areas. I wonder what they will do with the six old transmitters that gave such good reliable service for so long? One is rated at 50kW and five are rated at 10kW. ■

Two Short Wave Stations Just Closed

Location	State	Call	kW	Date	Comments
Bald Hills	Q	VLQ	10	17-02-43	Cage type, water cooled STC
		VLM	0.2	07-09-49	Temporary transmitter
		VLM	10	25-01-51	New STC transmitter
		VLQ	10	1968	New transmitter
		VLQ/VLM		06-12-93	Short wave service closed
Waneroo	WA	VLW	2	18-10-39	New transmitter
		VLX	10	19-04-49	New transmitter
		VLW	10	1960	New transmitter
		VLX	10	1961	New transmitter
		VLX	50	1962	New transmitter
		VLX		01-01-69	VLX call amalgamated into VLW
		VLW		14-12-93	VLW service closed

Australia's Silent Short Wave Stations

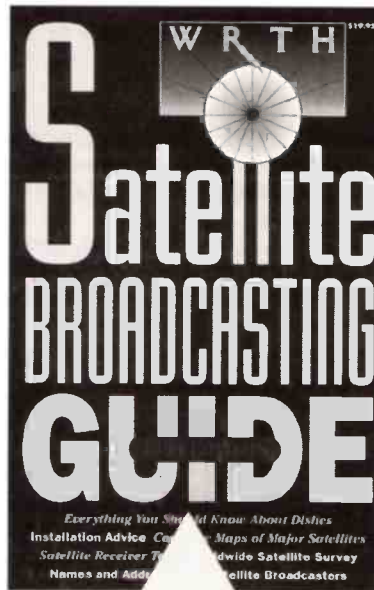
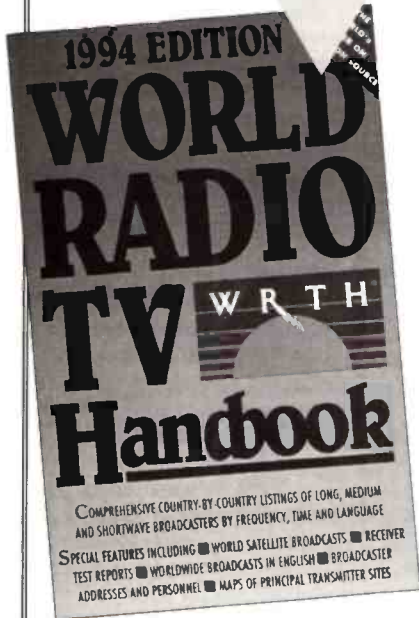
Location	State	Calls	kW	Dates	Comments
Pennant Hills	NSW	VK2ME VLQ VLN	10	1927-1955	Owned by AWA
Lyndhurst	Vic	VLR VLG VLH VNG	10	1928-1987	ABC & RA
Waneroo	WA	VLW VLX	10	1939-1993	ABC & RA
Bald Hills	Q	VLQ VLM	10	1943-1993	ABC & RA
Liverpool	NSW	VLI	2	1948-1953	ABC HS only
Pt. Moresby	PNG	VLT VLK	10	1948-1973	Independence
Gngangara	WA	RA	7.5	1975	Tests only

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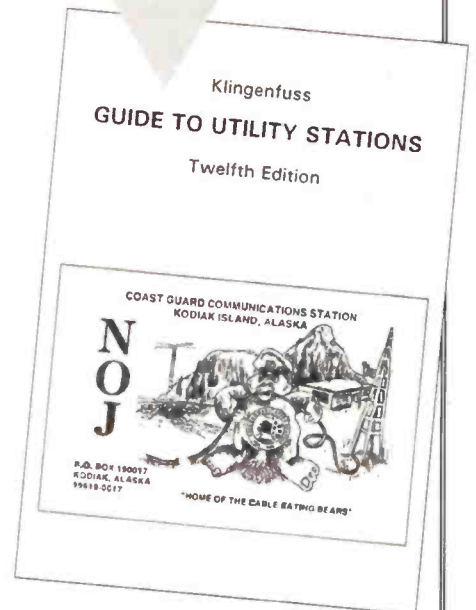


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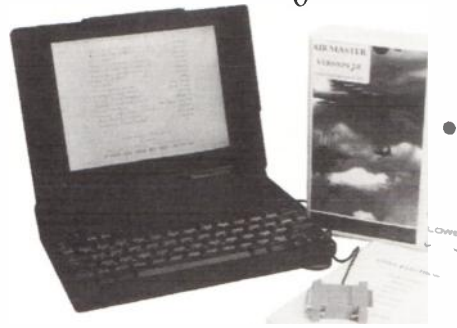
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Basic Propagation in Practice

In another of his short tutorials, Paul Essery GW3KFE, offers some sound advice on basic propagation.

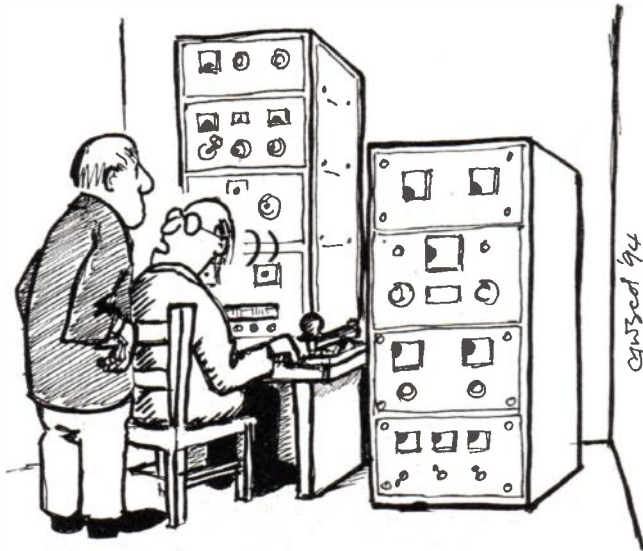
Propagation is to a large extent about people, oddly enough! Think about it awhile. Perhaps you have a beam and it is pointed in the direction of that exotic or rare country you are looking for. More, there seems to be propagation, since nearby countries are audible. But of Country X, not a peep. Why?

There are all sorts of reasons, but almost all are human ones! For example, you have been listening for say, Pitcairn Island VR6. Now, VR6 is heard in the UK at times when there is propagation; VR6 is heard when they have enough spare fuel for the generator after allowing for so much delay in the arrival of the supply ship; VR6 is heard when the operators are **a.** awake, **b.** not at work and **c.** when some more important activity isn't intruding into operating time. Finally, of course, you have to allow for the time difference and whether Nature is going to obstruct things.

So far, so good!

Sink Your Prejudices

Clearly, there are going to be umpteen hours in the day when, for any of these reasons, you won't hear VR6. Maybe there are a couple of hours a day when there is propagation and activity from VR6. If it so



Follow him around...

happens that during the time of this 'window' to VR6, you are safely tucked-up in bed and asleep, then your chances of hearing VR6 has fallen to zero!

Even now, we haven't by any means exhausted your problems! Imagine that the VR6 operators favour 14MHz while you prefer 21MHz. Unless you are game to sink your prejudices and go to 14MHz, you won't find them. Again, perhaps the only VR6 operator is 'c.w. only' and you are s.s.b. orientated. Again the choice is clear - go without or learn Morse!

Study Your Log

If your antenna doesn't put a lobe in to VR6, or if the VR6 aims his antenna in some other direction, tough again. However, most of the problems disappear if - and only if - you are game to be flexible.

Most homes have computers nowadays. If you keep a log, then you can extract from it, over the years, an

enormous amount of information on the best times to look, on any given band, for any given place, how this information varies band by band and season by season.

Thanks to the log keeping of the late G2DC we have been able to compile a set of tables in this sort of fashion. They cover the main bands of interest and are divided into four seasons centred upon the equinoxes, the shortest day and the longest day respectively. As the tables were compiled over a complete cycle, you may take them as being pretty close, but do be aware that you may possibly hear, say a station in Oceania at some different time to that shown. What the tables show is a likeliest time.

If you have a computer running CP/M, or an IBM clone running DOS, W6EL does a program called MINIPROP that predicts, given two places, a date and a sunspot number, when propagation may be expected between the places.

Exceptions!

Clearly, we can say to you there should be propagation to Country X at a specified time; but to be sure, if the band is dead at the specified time there won't be propagation. While we can predict a trend in the sunspots through a cycle, and predict the effect of seasonal factors, we can't predict that a solar flare will occur at just the right time to erase propagation to Country X when we have chosen to listen. Given this reservation, what about the rest?

First, Top Band. This is something of a 'special' in that the peak of the activity tends to occur at around dawn for stations at the eastern end of the path, and skeds are often set up to that end. If you are seriously into Top Band, we strongly recommend you get to know someone who is a dab hand on this band, and then arrange to 'follow him around.' Do be aware though that most of the DX activity is on c.w., and oriented essentially E-W of UK, so an antenna that puts out good N-S lobes isn't much use! As for the WARC bands, it is suggested you won't go too far wrong if you interpolate from the nearest bands.

The Human Factor

At the beginning of an opening, signals will be weak, rising to their peak, and then gradually falling away; therefore you may usefully expect the telephony signals around the peak, while c.w. should be copyable throughout the opening. Also, of course, when propagation is north-south it often indicates the band is just opening or just closing.

All this is, of course, subject to the human factors already discussed!

Tame Your Antenna

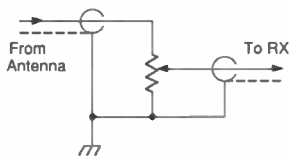


Fig. 1: A potentiometer inserted in the feedline is a basic attenuator.

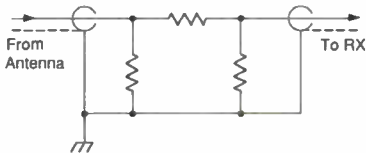


Fig. 2: A pi-network uses three resistors to provide the desired level of attenuation and maintain the impedance match between the antenna and receiver.

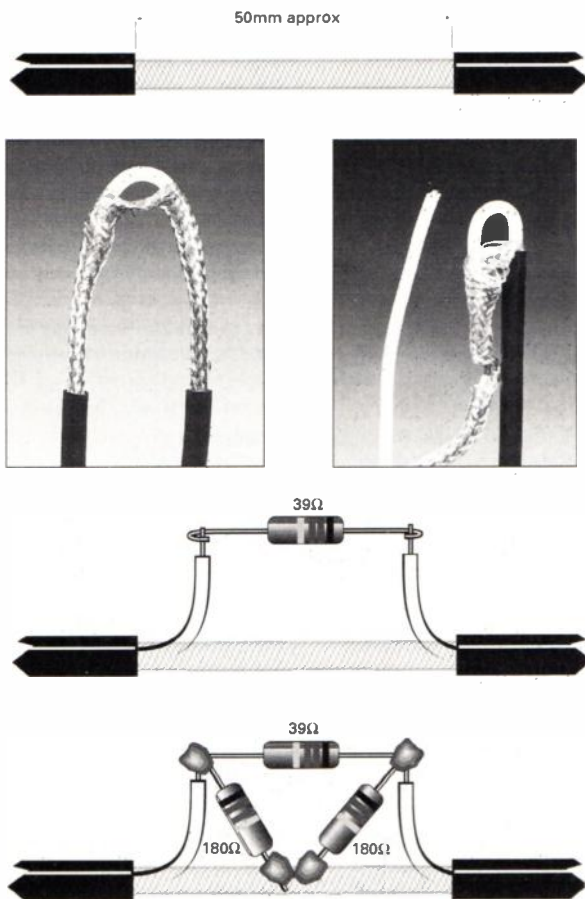


Fig. 3: Step-by-step method of making individual attenuators.

Reception of Radio France Internationale's 1400UTC English transmission on 17.650MHz was poor here in Canada until I connected an outdoor antenna to my Sangean ATS-803A. And I couldn't even hear Radio Nigeria's 4.770MHz broadcast at 0430UTC without an outdoor antenna. The problem with an outdoor antenna, however, is that it not only brings in the weak signals you couldn't hear before, but it also boosts the level of the big, high-power stations. While outdoor antennas have both positive and negative attributes, some of the negative aspects can be controlled with attenuators.

There are numerous reasons why a short wave listener would erect an outdoor antenna despite its shortcomings. An outdoor antenna can extend your listening time since it brings extra signals into your receiver during those periods when propagation from an area is just picking up or when signals are dying out for the day. For example, one morning I heard Radio Australia's 9.850MHz transmission until 1415UTC with the 803A's built-in telescopic antenna. With an outdoor dipole, I was able to extend that time to 1500UTC. In addition, the added signal strength can minimise the effects of fading. Radio Moscow's 15.225MHz broadcast at 1445UTC experienced heavy fading until I connected an outdoor antenna. The extra signal strength meant that when fading was heaviest the signal was still strong enough to keep the receiver's audio output level at maximum. Some antennas exhibit directional properties which can be a real advantage. And, you can select from designs which feature single band or multiband operation.

Not all the characteristics of outdoor antennas are beneficial however. For example, the extra signal strength on already strong signals will cause the

a.g.c. (automatic gain control) to reduce receiver gain and a weaker signal will not be amplified sufficiently. This effect is known as desensitisation.

Sometimes a strong signal causes overloading problems. As a result, spurious signals appear, even though the strong signal may be elsewhere in the band or even outside the band.

And finally, a strong signal will cause the receiver to lock too soon while in the scanning mode. For example, when connected to a simple half-wave dipole, my 803A stopped scanning on 6.170MHz even though the BBC World Service actually transmits on 6.175MHz. Once I put the receiver back into the scan mode, the receiver then locked on 6.175MHz and with another push of the scanning button it locked on 6.180MHz.

Sometimes the antenna will boost the noise level to the point that the scanner circuit locks onto noise every 5kHz! The manual r.f. gain control can help—if the receiver has one. However, in the case of my 3λ/2 collinear antenna cut for the 13m band, the receiver audio output was still maximum on some signals even when the r.f. gain control was turned right down!

It would of course be nice to have the best of both worlds: an antenna with gain to bring in the weak stations and freedom from receiver desensitisation, overload and incorrect scanner lock. And you can.

A simple solution is to use an attenuator. As the name implies, the device decreases the signal level. The obvious question is: Why build an antenna to bring in extra signals and then build a device to decrease the signal? There are two reasons. First, an outdoor antenna can capture so much signal that even with the attenuator connected there will be more signal coming into the receiver than there would be with just the built-in antenna. Second, with the attenuator disconnected you

enna

Today's receivers are so sensitive that you can hear almost any signal you want - provided you have a good outdoor antenna. However, this can give serious overloading problems. Philip Gebhardt VE3ACK explains how easy it is to tame the big signals from an outdoor antenna.

can use the antenna's maximum gain to pull in weak stations.

The ideal attenuator would be built in a metal box, have several selectable levels of attenuation and have a switch to bypass the device if no attenuation were necessary.

However, not all of us have the necessary tools to do the job nor do we all have access to the metal boxes, rotary switches and panel mounted sockets necessary to complete such a project.

The attenuators described here are built right into a section of RG-58 (50Ω) feedline. They work well and can be inserted or removed quickly enough to make them practical.

Fig. 1 shows a simple attenuator. Its main drawbacks are that the attenuation level is uncalibrated and that it is not possible to maintain the impedance match between the receiver and antenna. The value of the potentiometer can be anywhere from 200Ω to 10kΩ. I tried the circuit with a 5kΩ potentiometer. A knob was a necessity since whenever I touched the shaft, I injected signal into the receiver. The circuit works, but the amount of attenuation is limited. And there are better circuits.

A typical pi-network attenuator is shown in **Fig. 2**. Properly designed, this attenuator will provide a specific amount of attenuation and will maintain the impedance match between the antenna and the receiver.

The concept is quite simple. R2 and R3 (along with the 50Ω receiver input) form a voltage divider which is connected directly across the feedline. The signal voltage across R3 and hence applied to the receiver input is less than the total voltage supplied by the feedline. By selecting appropriate values for R2 and R3, you can provide any value of attenuation necessary. With R2 and R3 connected across the feedline, the 50Ω feedline will 'see' an impedance value other than the 50Ω load it wants. R1 simply re-establishes the 50Ω

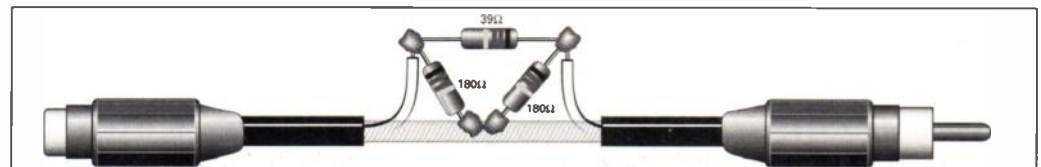


Fig. 4: Phono plugs allow insertion or removal of an attenuator in a matter of seconds.

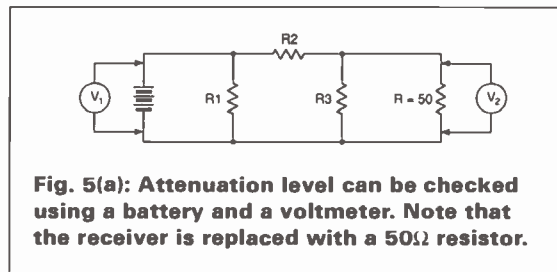


Fig. 5(a): Attenuation level can be checked using a battery and a voltmeter. Note that the receiver is replaced with a 50Ω resistor.

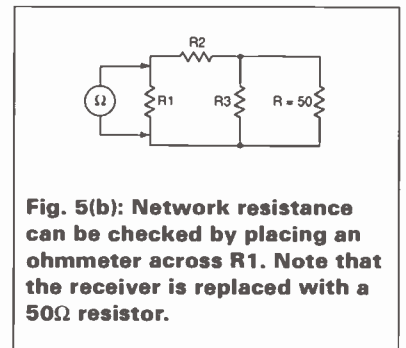


Fig. 5(b): Network resistance can be checked by placing an ohmmeter across R1. Note that the receiver is replaced with a 50Ω resistor.

impedance the feedline needs in order to transfer maximum signal.

Notice that R1 and R3 are equal. This makes the attenuator symmetrical which means it can be inserted in the feedline with either R3 or R1 at the receiver end.

Table 1 lists values for R1, R2 and R3 for specific values of attenuation. The values in **Table 1** are calculated values. For short wave listening, precise attenuation and exact impedance match are not critical. Therefore, the nearest standard resistor value to the calculated value will be acceptable. Suggested values appear in brackets.

A 6dB attenuator reduces the signal by a factor of 2. For example, if the input signal

from the antenna into a 6dB attenuator is 24μV, then the signal out of the attenuator would be 12μV. A 12dB attenuator reduces the signal by a factor of 4. A 24μV input signal would provide a 6μV signal to the receiver. And an 18dB attenuator reduces the signal by a factor of 8. The same 24μV input signal would produce a 3μV output. These attenuators will work from the broadcast band through the tropical bands and up through all the worldband frequencies. How they are made is shown in **Fig. 3**.

The resistance values given in **Table 1** will yield devices with sufficient accuracy for our purposes. Connectors on both ends of the attenuator are the same type as used on the

feedline from the antenna. To insert the attenuator, use a coupler between the feedline and attenuator connectors and plug the other end of the attenuator directly into the antenna jack on your receiver. The drawing **Fig. 4** shows how the system looks with an attenuator in place. I used phono plugs on the antenna feedline and the attenuators because they push on and pull off very quickly. However, what you use will be determined by the type of antenna jack your receiver has.

Fig. 5 shows how to check the attenuation and resistance of the devices, in case you're so inclined. If you do test the units, note that the receiver is replaced with a 50Ω resistor. This is necessary because the checks are being made with direct current rather than a radio signal. My 6dB attenuator, for example, is actually a 5.6dB attenuator.

While the primary reasons for using an attenuator are to reduce overloading problems and to stop false locking of the scanner circuit, there are other things you can try as well.

If you construct three attenuators - 6, 12 and 18dB - you can assess the effectiveness of your outdoor antenna. Using your receiver's built-in antenna, tune in a

Attenuation (dB)	Reduction Factor	R1, R3 (Ω)	R2 (Ω)
6	2	150 (150)	37.5 (39)
12	4	83 (82)	93.6 (91)
18	8	64.25 (62)	196.8 (200)

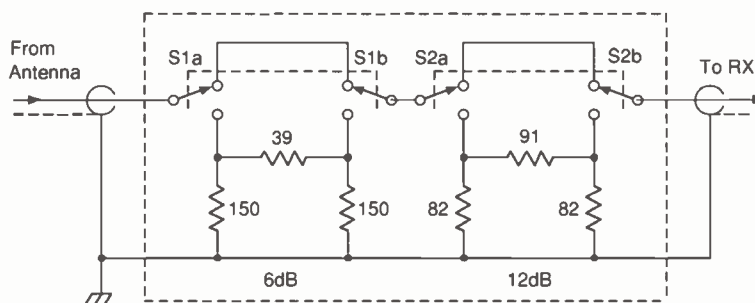
Table 1. Resistor values for pi-network attenuator for use with RG-58 (50Ω) feedline. Resistor values shown in brackets are closest standard values to the calculated values. Formulae for calculating these and other values appear in the text.

station with a moderate signal, that is, one that doesn't give a maximum reading on the signal strength indicator. Next, switch to the outdoor antenna and insert the 6dB attenuator in the feedline. If the signal is still stronger than the strength with the built-in antenna, replace the 6dB attenuator with the 12dB version. If that doesn't bring the signal down, try the 18dB device.

If the signal levels from the built-in antenna and the outdoor antenna are comparable with 6dB of attenuation, then you know that the outdoor antenna provides twice as much input signal as the built-in antenna. If it takes 12dB of attenuation to achieve the same signal level, then there is 4 times as much signal from the outdoor antenna. Of course, if 6dB is not enough attenuation, but 12dB is too much, then the outdoor antenna is providing between two and four times as much signal.

You can also use the attenuators to picture band conditions. Scan the band in question with the outdoor antenna connected, but no attenuation. Record the number of stations you hear. Now insert the 6dB attenuator, scan the band again and record how many stations you hear. Repeat the procedure with the 12 and 18dB devices. This will give you an idea of how many weak stations are among those you hear, how many are moderate and how many are strong. If you do this throughout the day, you can get a basic profile of band performance on a daily basis. If you take readings once a day periodically over several months - or several years, if you're really ambitious - you can

Fig. 6: Switched circuits not only allow the attenuator unit to be inserted in the feedline permanently, but you can use fewer networks to achieve the same attenuation.



observe the changes in propagation over a long period of time.

Attenuators can be ganged. For example, a 6dB attenuator and an 12dB attenuator in series provide a total of 18dB of attenuation. And indeed, that's how devices built in metal cases are usually designed. With these simple devices however, constructing a separate 18dB attenuator minimises the length of coaxial cable that is cut and exposed. This in turn reduces the chance that the attenuator will act like a small antenna and pick up signals. With the design outlined in Fig. 3, there was no detectable signal pickup by the attenuator leads.

If you do decide to gang attenuators, Table 2 shows the attenuation you can attain by combining individual units.

If you do have the tools and parts to build your attenuator in a metal box, Fig. 6 shows the schematic diagram of a unit which provides 0, 6, 12 or 18dB of attenuation. S1 and S2 are d.p.d.t. miniature switches.

For those who wish to design circuits to obtain levels of attenuation other than 6, 12 and 18dB, the formulae are:

$$R1 = R3 = 50 (F+1)/(F-1)$$

$$\text{and}$$

$$R2 = 50 \times (F-1) \times R1/(50+R1)$$

'F' in the above formulas refers to the factor by which

you want to reduce the incoming signal. As mentioned previously, a 6dB attenuator will reduce the signal by a factor of 2, a 12dB attenuator reduces by a factor of 4 and an 18dB attenuator reduces by a factor of 8. Maintaining this pattern, the next attenuator would reduce the signal by a factor of 16. However, you can reduce the signal by any factor you wish. Also, keep in mind that you can 'manufacture' resistors if you can't find the value you need. In a 9.5dB attenuator (F=3), the value of R2 is 66Ω. If you can't find a 68Ω resistor (the closest standard value), you can use two 33Ω resistors in parallel. Whenever you have an option however, use a single resistor.

Attenuators won't solve all your problems, but they can provide you with some advantages as well as some information about your receiver, antenna and worldband radio that you otherwise might not know.

Attenuation			Total attenuation
6	12	18	dB
✓			6
	✓		12
		✓	18
✓	✓		18
✓		✓	24
	✓	✓	30
✓	✓	✓	36

Table 2. Total attenuation when individual attenuators are ganged.
✓ indicates which attenuators are used in the combinations.

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The AR8000 UK combines the portability of a compact hand held design with the versatility of an advanced microprocessor which drives a dot matrix LCD and offers connection to a computer via the optional CU8232 interface unit. The AR8000 UK has truly broken the mould of conventional radio receiver design.

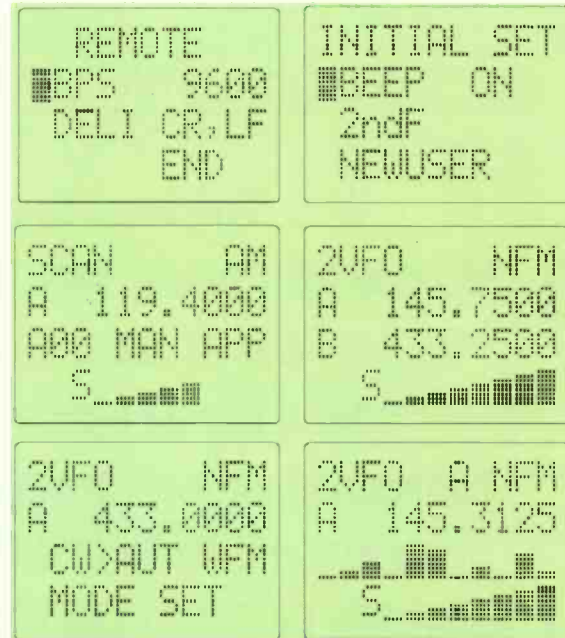
The AR8000 UK is a highly sensitive hand held receiver boasting a very wide frequency coverage of 500 kHz to 1900 MHz without gaps in the range (actual acceptable frequency input from 100 kHz). Step size is programmable in multiples of 50Hz for smooth tuning. The all-mode reception provides AM, USB, LSB, CW, NFM and WFM. An independent ± 2.0 kHz SSB filter is fitted as standard and the USB/LSB modes use true carrier re-insertion with correctly calibrated frequency read-out (not offset by 1.5 kHz). A custom manufactured ferrite bar aerial is neatly internally installed at the top of the receiver's cabinet to enhance receive performance when listening in population centres to Medium Wave services or when commentary is provided at airshows and motor sport events.

The high visibility LCD is of a new dot matrix format comprising of four lines of display so many new facilities may be provided and displayed at the same time, these include a signal strength bar meter and a band-scope showing band occupancy. Two VFO frequencies may be displayed on the LCD simultaneously, one providing a stand-by frequency available for quick transfer. When frequencies are entered, ALPHANUMERIC comments may be stored along with frequency, mode & attenuator status simplifying the job or recalling and identifying memory channels.

The optional CU8232 interface is supplied with two ribbon cables which connect to the AR8000 UK via a small socket located in the battery compartment (see illustrations). The CU8232 simply connects to the serial port of a computer via a standard serial cable (not supplied) in either 9 or 25 pin format as adapters are provided with the CU8232. The 50 page operating manual provided with the CU8232 carries information on setting up WINDOWS terminal plus the necessary information to allow programs to be compiled.

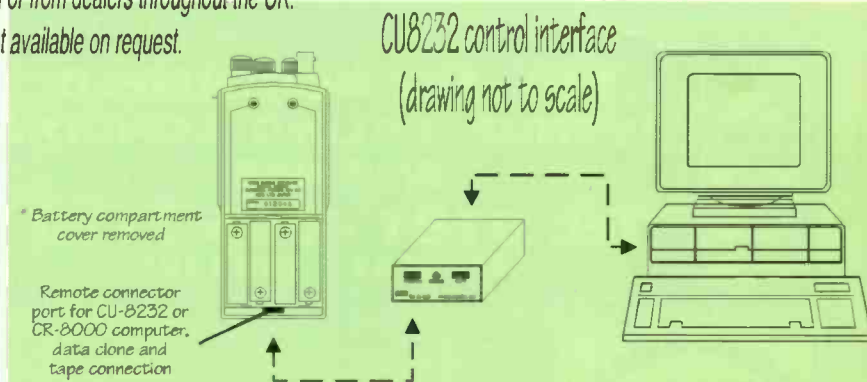
Two AOR software packages are under development for the AR8000 UK. The first is a DOS program which will provide memory upload, download and manipulation. The second will be a WINDOWS control package for frequency, mode, attenuator, memories etc. Optional WINDOWS modules are planned for a data base and eventually a map whereby frequencies may be accessed by clicking the mouse on the map and menus.

Available directly from AOR or from dealers throughout the UK.
Detailed leaflet available on request.



Prices £ Sterling including VAT (P&P shown in brackets)

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Be a RadioScience Observer Part 3

Using Radio Receivers To Make Scientific Observations

In the previous two installments of this series we looked at both h.f. and v.l.f. radio observations that seek out solar events, and their effects on radio propagation, as well as natural radio signals from Jupiter. In this installment, Joseph J. Carr, B.Sc., MSEE looks at natural radio signals called 'whistlers', as well as things one can do when a rare solar eclipse event occurs.

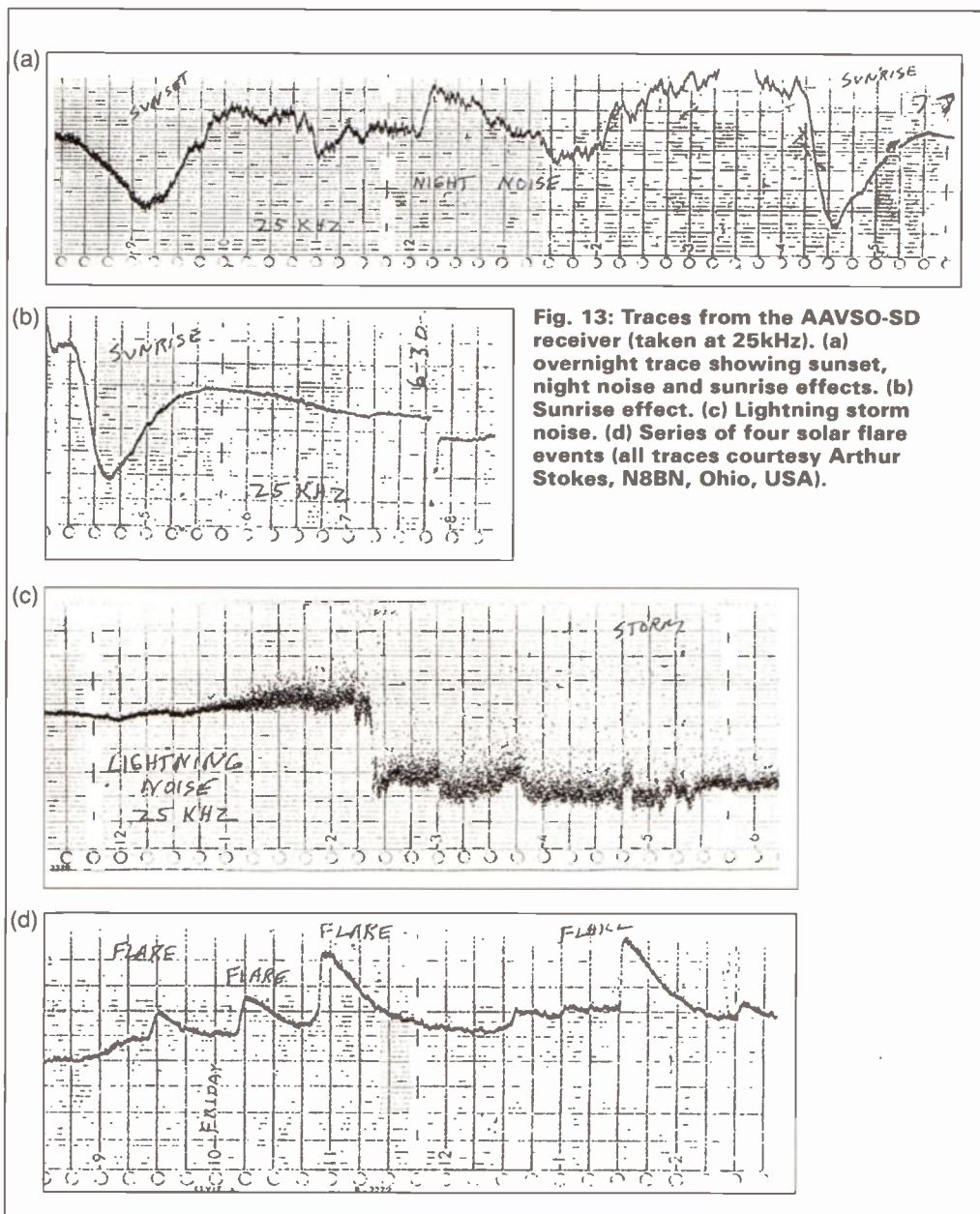


Fig. 13: Traces from the AAVSO-SD receiver (taken at 25kHz). (a) overnight trace showing sunset, night noise and sunrise effects. (b) Sunrise effect. (c) Lightning storm noise. (d) Series of four solar flare events (all traces courtesy Arthur Stokes, N8BN, Ohio, USA).

SID-Hunting Results

So now we have a small receiver capable of tuning the various stations found in the lower end of the v.l.f. region. So what do we look for? Some traces provided to the author through the kindness of Art Stokes are shown in **Figs. 13a** to **13d**. SID hunters typically adjust their receiver around noon to early afternoon to produce a mid-scale deflection on the meter and/or recorder (or the equivalent for A/D converter users). At sunset (**Fig. 13a**) the signal level will usually decrease rather rapidly, over an hour or so. The 'night noise' phenomenon will begin to appear soon thereafter, and continue until dawn.

At sunrise, the 'dawn effect' is seen, i.e. a sudden decrease in night noise, followed by a recovery to typical daylight behaviour (a second 'dawn effect' is shown in **Fig. 13b**). Both signals were recorded at 25kHz. The 'S-shaped' dawn effect is used by SID receiver builders to see if their receivers are really working.

The effect of lightning on the signal is shown in **Fig. 13c**. Again, the noise was recorded near 25kHz. Lightning is a fast rise-time atmospheric electrical arc, so it produces a rich electromagnetic interference spectrum. Anyone listening to the a.m. l.f./m.w. broadcast bands can hear the crackle of lightning as a thunderstorm approaches. The energy of the lightning-generated signal is concentrated in the 1 to 100kHz region, with harmonics showing up well into the lower h.f. region.

Solar flares, which cause sudden ionospheric disturbances (SIDs) cause an effect such as shown in **Fig. 13d**. A group of four flares in a row are detected here over a period of about five-six hours. Note that each event consists of

a sudden rise of signal level (as opposed to the drop typically seen in the h.f. region), followed by a long decay tail that appears to roll-off exponentially back to the normal signal level.

Whistler Hunting

'Whistlers' and 'spherics' are natural radio signals that create eerie sounding tones that descend through several octaves from about 10kHz to sub-audio frequencies. But they are not sound (i.e. acoustical) waves, but rather are electromagnetic (i.e. radio) waves, so human ears cannot detect them (despite their being within the range of human hearing).

One of the legends of Whistler hunting is that they were first noted during World War I when the German physicist Barkhausen was attempting to snoop on Allied telephone conversations by using ground electrodes and a high gain amplifier. Field telephones in the era used a single wire, with the Earth being used as the return circuit. Barkhausen theorised that he would be able to intercept the ground currents of those phones and thereby intercept

Allied conversations. During his early 'signals intelligence' experiments, Barkhausen noticed a large number of strange whistling tones, including the characteristic tone that falls exponentially from around 10kHz to a few hundred hertz.

Several different types of signal are observed. A spheric is an abrupt descending tone lasting up to a couple hundred milliseconds, while a whistler has a longer tail-off (several seconds). These signals are most common at night or just before dawn, and tend to peak in frequency of occurrence in the 40° to 55° of latitude regions of the Earth (although are heard all over). Tweaks are 'pings' or pure tones that are believed to be caused by spherics that echo in the Earth/D-layer waveguide duct. Hiss is 'white noise' ranging from 2 to about 30kHz, and is sometimes associated with auroral activity. The Dawn Chorus is a group of 1 - 5kHz tones that are likened to a bunch of birds chirping.

Because of their frequency, these natural radio signals are found in the bottom end of the Very Low Frequency (v.l.f.) band. A special radio receiver is needed to detect whistlers; the

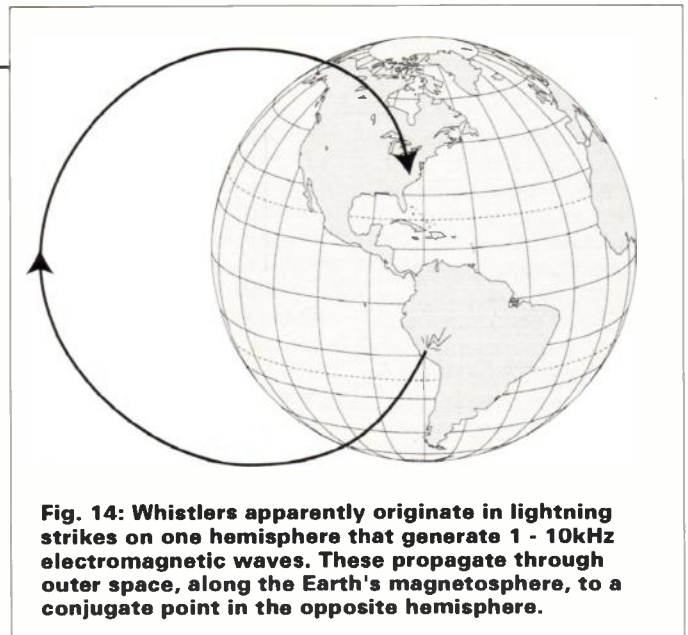


Fig. 14: Whistlers apparently originate in lightning strikes on one hemisphere that generate 1 - 10kHz electromagnetic waves. These propagate through outer space, along the Earth's magnetosphere, to a conjugate point in the opposite hemisphere.

output of the whistler receiver can be recorded on ordinary audio cassette tape players.

The most likely theory of the origin of whistlers is lightning strikes at great distances. When a lightning bolt occurs, it generates a very fast rise time electrical pulse, which in turn creates an electromagnetic radio pulse ('current in motion,' and all that). It is the nature of fast rise time pulse signals to be composed of a Fourier series of frequencies consisting of a fundamental sine wave frequency and many hundreds of sine and cosine harmonics. It is these signals that you hear

as popping and crackling ('static') sounds in your medium or short wave radio set when lightning occurs in a nearby thunderstorm. When the pulse signal travels a very long distance, however, the velocity of propagation is different for the various frequencies making up the pulse, so the highest frequencies arrive a split second or so before the lowest frequencies; the result is a sliding tone. Whistlers are believed to travel the Earth's magnetosphere over long distances from one hemisphere to the other (see Fig. 14).

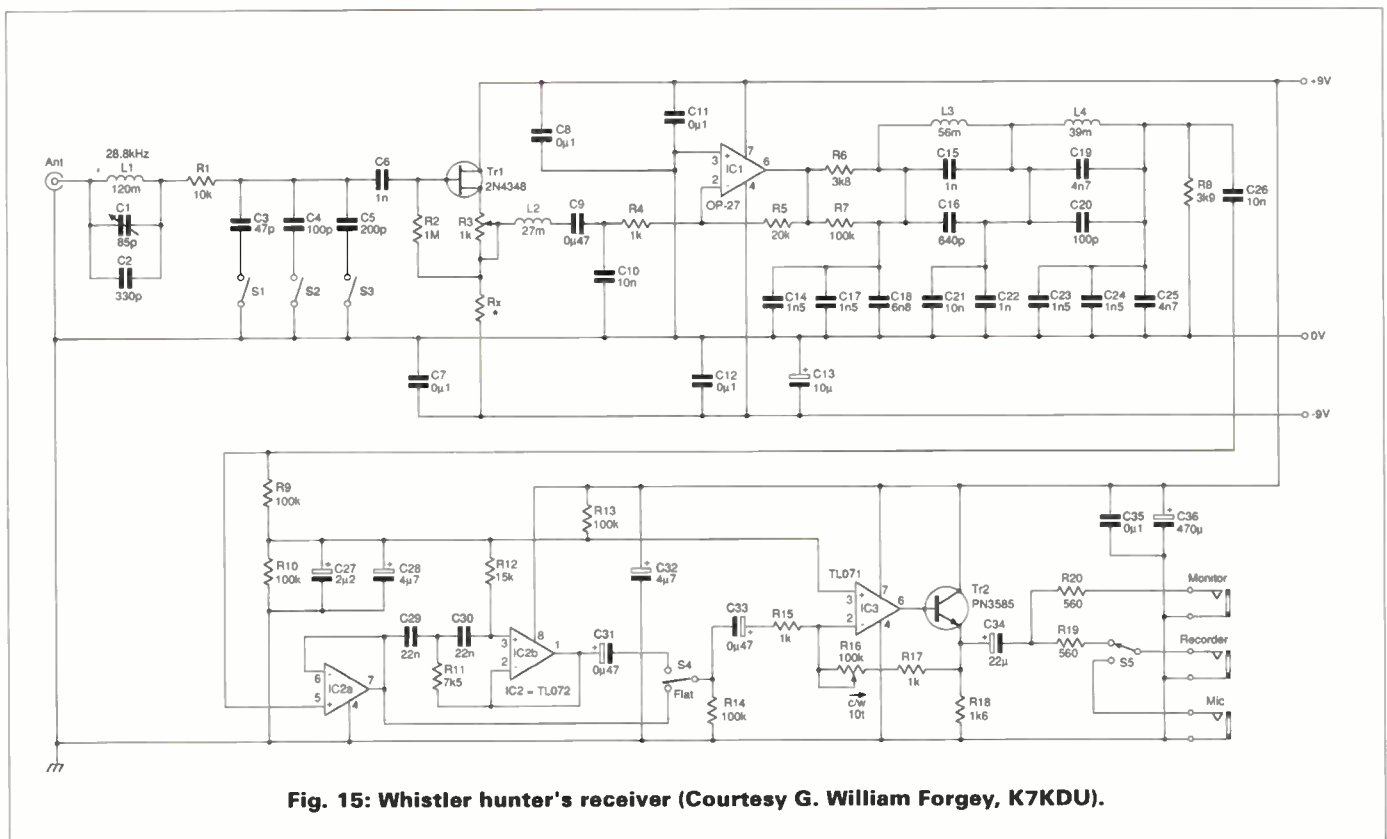


Fig. 15: Whistler hunter's receiver (Courtesy G. William Forgey, K7KDU).

The theory behind whistlers, advice on how to collect whistlers, and details on home made and kit-built whistler radio receivers can be found in *A Whistler Hunter's Guide* by Michael Mideke (see References section). Mideke also sells a voice-annotated cassette tape of actual whistlers that can be used to train yourself in identifying what is heard.

A Whistler Hunter's Receiver

The circuit shown in Fig. 15 is for a whistler receiver designed by G. William Forgey (K7KDU), who kindly granted permission to reproduce his design here.

The input stage is a 2N4348 junction field effect transistor (j.f.e.t.) stage that has a gain control in the source circuit. The gate circuit for the input stage consists of a low-pass filter made from a 10kΩ resistor, plus a bank of switchable 47, 100 and 200pF capacitors. These eliminate the effects of strong local medium wave broadcast stations. Also in the gate input circuit is a parallel resonant trap to eliminate a 24.8kHz signal that is present in much of the USA. This circuit can be deleted for those who don't face such signals, or altered to tune out different signals that are faced by you. The rest of the circuit consists of gain stages and filtering to limit the frequency

response to the 1 to 10kHz range favoured by whistler hunters.

The final stage of the whistler receiver drives a monitor amplifier and a cassette recorder. Many whistler hunters use a stereo cassette recorder. They record the whistler on one channel, and a time station signal (or voice time annotation) on the other channel.

Rural Areas

Whistler hunting is best done in rural areas away from overhead power lines. Mideke (see references) recommends about 1000m as the minimum distance to power mains lines. Otherwise, the harmonic

energy of the power lines will interfere with the whistler hunting. However, Mideke's articles show the use of a single whip antenna, and these antennas are notoriously sensitive to the electrical fields generated by local power mains. A shielded loop antenna is not sensitive to the electric field, but rather picks up the magnetic field of the electromagnetic wave. hunters of v.l.f. SID often use the shielded loop near power lines. K7KDU reported to me by letter the successful use of such loops in whistler hunting by a colleague.

The printed circuit track pattern and component layout for the whistler hunter receiver is shown in Fig. 16.

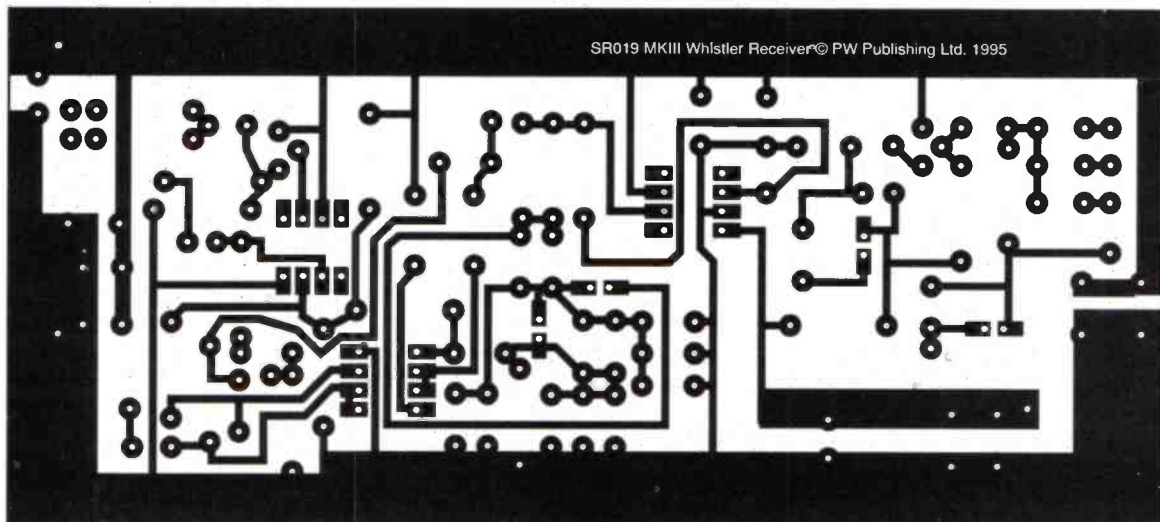
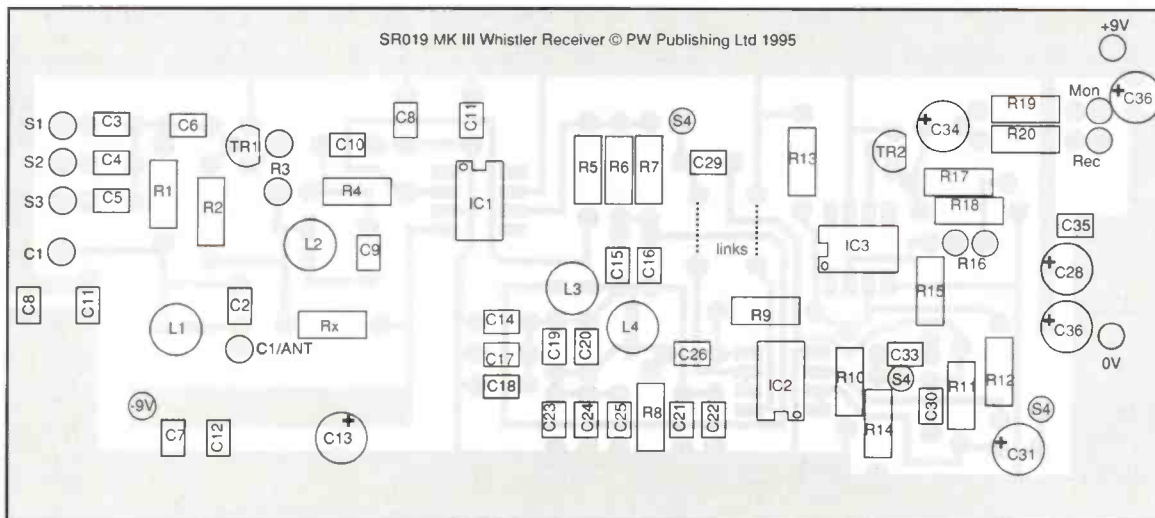


Fig. 16: Full size copper track pattern and component layout for the circuit in Fig. 15.



Solar Eclipse Experiments

Solar eclipses are spectacular astronomical events in which the Moon passes between the Earth and Sun, temporarily blocking the Sun's rays from reaching Earth. For a few minutes, the swath of the Earth along the eclipse path is bathed in darkness. A total eclipse occurs when the perceived diameter of the Moon is such that the Sun is totally covered, except for the corona. An annular eclipse occurs when the apparent diameter of the Moon is smaller than the Sun, leaving a ring of light hanging in the sky. Radio propagation is affected by the solar eclipse because, for a brief period of time, the source of energy that causes ionisation is interrupted so the average electron (e^-) density changes. The e^- density in the F-layer determines the MUF, while the e^- density in the D-layer determines the LUF.

A review of the amateur radio literature shows that a number of formal experiments and observations have been performed over the years. Following is a review of some of the American literature, which is most accessible to me.

Schellenbach (1970) describes observations made on the 7MHz amateur band during the eclipse of 7 March 1970. He erected a 1 λ horizontally polarised wire antenna that had four main lobes spaced at 54° from the wire. The antenna was erected at a height of $\lambda/2$ in order to place an elevation lobe at about +30° in order to optimise D-layer observations. Schellenbach observed a 25kHz portion of the 7MHz band, working stations and observing signal level changes as the eclipse passed over the land.

Another observation of the 1979 eclipse was reported by Kennedy *et al.* (1972). This experiment was performed on the 3.5MHz amateur band, using c.w. emissions. Stations 190km apart arranged to use identical special transmitter keys that would produce a 2 second signal on 3.570MHz every four seconds; the two stations alternating sending signals to each other. The receivers of the stations had the automatic gain control (a.g.c.) function turned off.

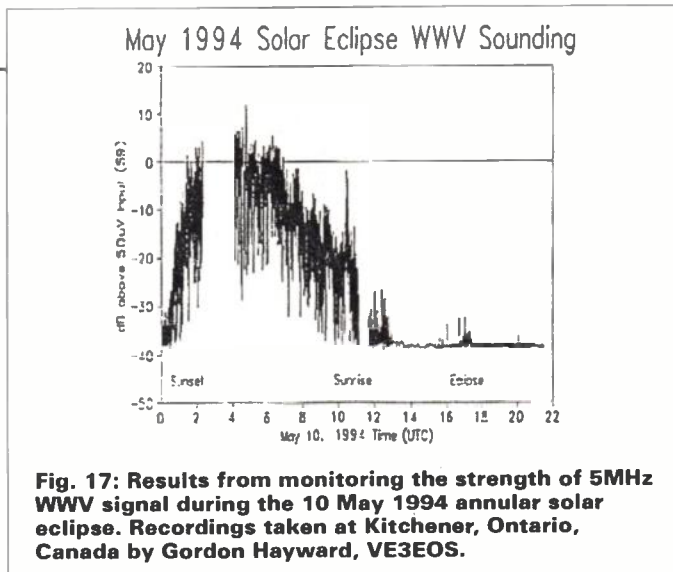


Fig. 17: Results from monitoring the strength of 5MHz WWV signal during the 10 May 1994 annular solar eclipse. Recordings taken at Kitchener, Ontario, Canada by Gordon Hayward, VE3EOS.

Output levels were measured with an a.c. multimeter connected across the speaker connections. As a precaution against ground wave contamination of the data, the antennas of the two stations were oriented end-to-end, so ground wave signals would be off the nulls of the antennas. The data collected consisted of groups of ten, two-second transmissions, spaced four seconds apart, at intervals of one to two minutes. The ten pulses in any one group were averaged, and the averages of the groups were compared. A maximum signal change of 17dB was noted. The two stations took data for a week prior to the eclipse in order to establish a normalised data set.

Amateur Advantage

Menzel (1976) discusses potential observations of the effects of the eclipse of 23 October 1976 on propagation in the upper h.f. region, i.e. the 14 through 28MHz amateur radio bands. It was noted by Menzel that during the period of the eclipse there would be a brief return to night time propagation conditions for communications paths along, and either side of, the eclipse totality path. This same type of observation is open to short wave listeners (s.w.l.s) as well as licensed radio amateurs. The amateur operators have a definite advantage, however, because they can schedule contacts with stations in the regions of interest, and don't have to await stations of opportunity to appear. Like Kennedy, Menzel recommends that amateur operators set up schedules for a week prior to the eclipse, at the same time of

day, in order to establish a baseline of signal level averages. Otherwise, the measurements made on the day of the eclipse would be less usable.

Corona Radiation

Johnston and Johnston (1979) performed radiosolar observations of the 26 February 1979 eclipse that crossed the northwestern United States and the western provinces of Canada. They were part of an experiment that used the 3.5MHz band. A set of twelve stations participated, six transmitting in rotation on a 2 minute schedule, and six monitoring the others. The transmitting stations sent a 5 second identification (callsign), followed by a 2 second quiet period to establish ambient noise level, and then held the key down for 12 seconds to establish signal levels. Receiver S-meter readings were used to establish levels. They observed the effects for three hours, keeping time records in universal co-ordinate time (UTC) through radio station WWV transmissions.

An alternative to using amateur transmitting stations was reported by Smith (1979). He used observations of WWV and several 50kW m.w. broadcast band stations to study the propagation effects of the eclipse.

Lewis (1979), in a report preceding the 1979 eclipse, reported on his own literature search. He reported that a Canadian team of scientists at Fort Churchill, MB observed the 20 July 1963 eclipse. In that event, 94% of the solar disk was covered. The Canadians used sounding rockets sent to

an altitude of 200km to measure electron density, temperature, ultraviolet and X-radiation. They found that the e^- density in the D-layer dropped proportionally to the percentage of the solar disk eclipsed, starting within approximately 3 minutes. In the E and F1 layers, however, it was found that the decrease in e^- densities decreased by it was not proportional to the percentage of eclipse. The team believes that this nonlinearity is due to the fact that X-radiation is emitted largely by the Sun's corona, which is not eclipsed. Such radiation is largely attenuated by the time it reaches the D-layer, so the effects in that region are more linear.

A group at Urbana, IL, USA, used a 2.66MHz ionosonde instrument to observe a 60 percent eclipse on 10 July 1972. They noted a large decrease in e^- at distances of 75-80km.

Australian researchers observed the eclipse of 23 October 1976 (see also Menzel 1976, above). The Australian observations measured the angle of arrival of 2.5MHz signals from a station 69km away. They noticed a "...pronounced oscillating tilt" of the E-layer at 100km, which lasted some 40 minutes.

Eclipse Effects

On 10 May 1994 an annular eclipse was visible over large parts of North America and Europe. Responding to one of my columns in an amateur radio magazine, Gordon Hayward (VE3EOS), of Kitchener, Ontario, recorded the effects of the eclipse on the 5MHz WWV signal (Fort Collins, CO). That signal was selected because it is reliable, well controlled, and is on a frequency that is quite susceptible to D-layer ionisation. He used a Model ATR5 receiver, a valved design made in 1942. The voltage from the S-meter circuit was connected to a computer data logger set to take a sample every 10 seconds over the entire period. VE3EOS calibrated the receiver S-meter using an external signal generator, and found that a reading of S9 corresponded to a 50 μ V signal level. The receiver was allowed to warm

up for several hours before recordings were made in order to stabilise the tuning circuits. Hayward's antenna was a 7.5m wire running north-south about 2m off the ground.

The results reported by Gordon Hayward are shown in **Fig. 17**. He recorded for nearly 24 hours, including sunset and sunrise that day, in order to have a means of comparison with the eclipse data. A total of 7711 readings were taken. Note that the WWV signal level increases markedly after sunset

as D-layer absorption declines. Several hours after sunset, when the D-layer has disappeared altogether, the signal strength of 5MHz WWV has increased nearly 38dB.

The 10 May 1994 annular eclipse produced a rise of signal level of about 4dB. The peak occurred at 1700UTC, which corresponds to the time when the ground path 'footprint' of the eclipse was between Kitchener and Fort Collins.

Conclusion

In this series we have discussed a number of different amateur science activities that one can do with little more than a radio receiver, or in some cases, amateur radio equipment. A lot goes on in the atmosphere and on the airwaves, especially when they interact.

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A Christmas Message

Everyone at PW Publishing Ltd.
would like to wish all our readers,
advertisers and contributors a very
**Happy Christmas and a prosperous
New Year.**

All the money saved this year by not sending individual
Christmas cards will be donated to appropriate charities.



Picture donated by Craig Dyball.

LOWE COMPETITION

Final Part



WIN

a Lowe HF-225 Europa

as reviewed in the September 94 issue of SWM.

The Editor's decision is final,
and no correspondence will be entered into.

This is the final part of our exciting 'Win a Lowe HF-225 Europa Receiver' competition.

Lowe Electronics, the makers of the Europa, have kindly donated the actual receiver that we reviewed in the September 1994 issue of *Short Wave Magazine* as the main prize for this four-part competition. *Short Wave Magazine* will also give a 12 month subscription to SWM to each of the three runners up.

To enter this exciting competition all you have to do is to correctly answer the four questions that have been asked in this issue and the preceding three issues. You **must** write each answer on the special Answer Coupon cut out of the relevant issue - **photocopies will not be acceptable**. Attach the three Answer Coupons to the entry form on this page and write your answer to Question 4 in the Answer 4 box. Cut out and send the completed form to *Short Wave Magazine*, Lowe Europa Competition, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. The closing date for entries to be received at Broadstone is Friday, 3 February 1995. The Editor's decision is final and no correspondence will be entered into. The winners' names will be published in the March 1995 issue of *Short Wave Magazine*.

If you do not have any of the issues with Questions 1, 2 or 3 - October, November and December '94 - we can supply these from the Editorial Offices at £2 each, including postage. Remember, you **must** use the Answer Coupons from each of the four issues - **photocopies will not be acceptable**.

Good Luck!

Question 4:

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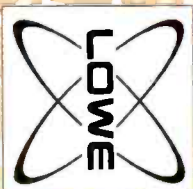
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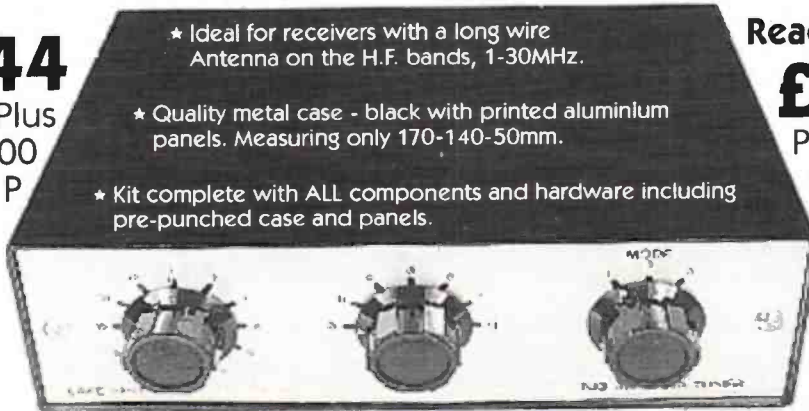
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Reflections

First, may I wish you all a very merry Christmas and a happy and prosperous New Year. Thanks also for your letters during the past year that I have enjoyed reading and for your reports that have enabled me to place some really interesting happenings on record.

Tropospheric

Pride of place this month goes to that big tropospheric opening in mid-October when v.h.f. radio and u.h.f. television signals 'bounced' between the Channel Islands and Scandinavia, Ireland and Germany and various other points *en-route*. A few frosts, foggy nights and mornings, bright sunny days and high atmospheric pressure were the necessary ingredients that contributed toward creating this event.

Obviously there were local variations around the UK, but it appears that the disturbance began around the 12th when the atmospheric pressure was high at 30.6in (1036mb) in the north and 30.4in (1029mb) in the south. "The spell 12-13th seemed to be the climax, supporting the oft-held view that the decaying phase of a high pressure system gives the best propagation," said **Richard Gosnell** from Swindon. I have barograph charts showing this to be true many times over the past 32 years, Richard. In Sussex, the barometer remained high throughout the 13th and declined on the 14th and 15th. The fall meant that the prevailing high pressure system was on the move and, consequently, the troposphere went through many changes in its natural structure.

This opening was referred to under the heading 'Weather Sets

Off TV Chaos' in the *Daily Mirror* on the 15th. The report said that the worst hit area was the south where viewers also received French and Dutch programmes.

Interference

I heard inter-station 'twerbles' and co-channel programmes on our domestic portables, with their own antennas, on the 12th and 13th. During the evening of the 14th, the opening was so intense that some Band II radio signals were completely absorbed. For instance, twice in less than an hour the normally strong signal of BBC Radio 2 was taken right out for a few minutes and then gradually restored.

"The BBC weather forecasts explained the link between the high pressure and the interference," wrote **Richard Wood** from Redditch. While this opening was in progress he logged his first signals in Band III and heard stations from France, Germany and Holland in Band II. Richard's television catch included pictures from Belgium, France and Germany in Band III and BBC1 and S4C from Wales in the u.h.f. band.

"October 11 was one of the best tropospheric openings received here," wrote **George Garden** from Edinburgh. "During that evening," said George, "the BBC weather reporters stated that many TV pictures were subject to interference". Due to the abnormal weather conditions, George received strong colour pictures from the Bilsdale transmitter of Tyne Tees TV, BBC2 from Sandale and, for the first time, BBC1 from Caldbeck.

Band III was good for Richard Gosnell. On the 12th he watched

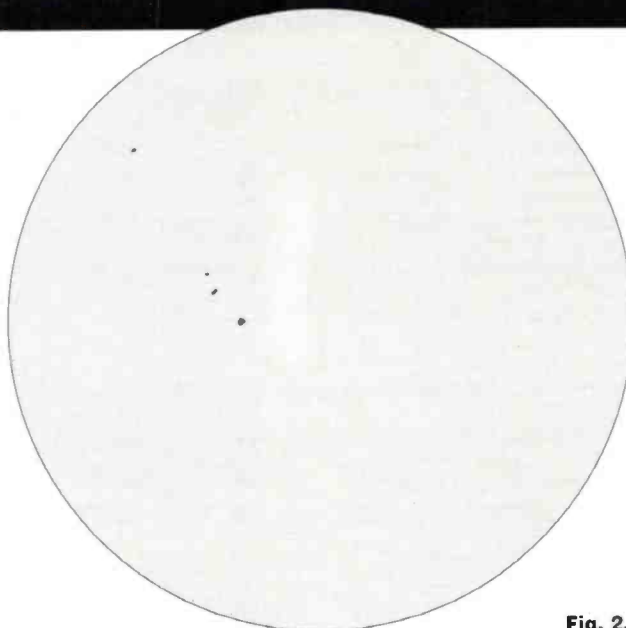


Fig. 2.

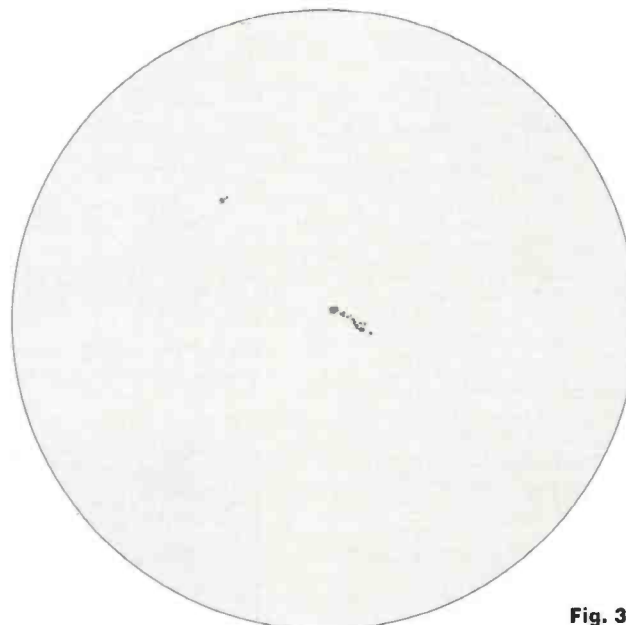
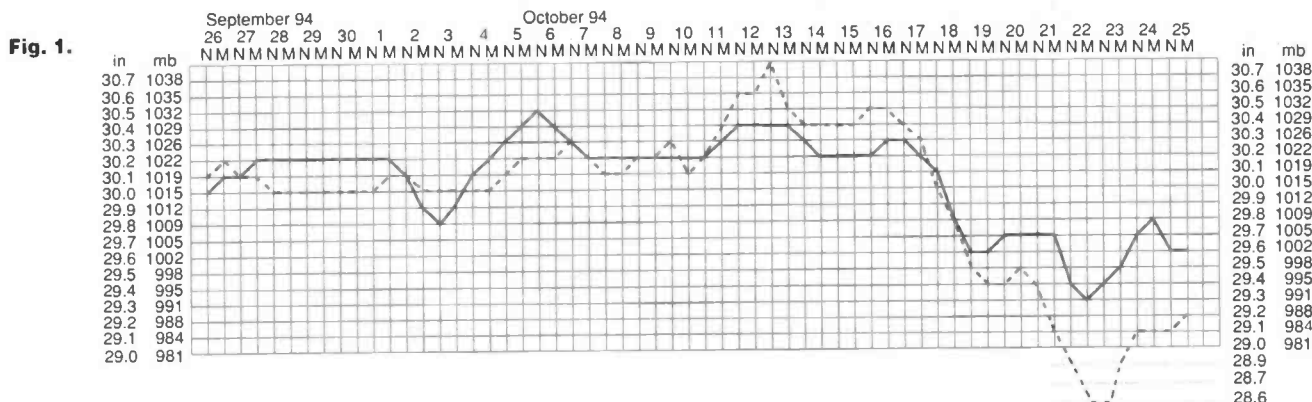


Fig. 3.

programmes from Belgium and Holland on Chs.E8 and E10 respectively. At about 2044 on the 13th, he received a studio-quality colour picture from the station at Torfhaus on Ch. E10. As the opening finally waned on the 15th, he heard three French f.m. stations in Band II on 105.5, 106 & 106.5MHz.

"It was the best v.h.f. f.m. 'lift'

that I have managed to 'connect with' in over 7 years," wrote **Leo Barr** (Sunderland) on October 27. As soon as Leo heard a TV announcer apologise to viewers for interference he knew it was time to check the f.m. broadcast band. For most of the 13th it was a case of log and identify stations until eventually there were too many European stations to cope



with. However, he identified transmissions from Belgium, Denmark, France, Germany, Holland, Norway, Scotland and Sweden. "Many local stations in the UK disappeared under the European signals," remarked Leo.

From the 12th to the 15th, **Richard Bell** (Melton Mowbray) received pictures, in the u.h.f. band from the BBC and IBA in the south and east via the Crystal Palace and Sandy Heath transmitters respectively. He also identified stations via the transmitters at Hannington, Sudbury and Sutton Coldfield. During the event Richard logged captions and test-cards and watched a variety of programmes, including *Journal*, *Lotto*, *Neighbours* and *2 point 4 Children*, from Belgium (BRT TV1) and Holland (NED3).

"The last few days have been really spectacular here for long distance television," wrote **Clive Grey** (West Kirby) on October 16. Like many others, Clive found that normal viewing was virtually wrecked during the event. He found that almost every channel in the u.h.f. band was taken up with some sort of signal. His haul of DX included Central South News, football and BBC2 from Ridge Hill, adverts, CH4 and BBC2 from Sutton Coldfield, CH4 from Hannington and Midhurst and Meridian Focus and football from Midhurst on the 12th.

Next day, he added BBC and IBA programmes from the transmitters at Divis (with adverts for Belfast stores), Crystal Palace, Hannington, Mendip, Midhurst, Ridge Hill, Rowridge and Sutton Coldfield. Late on the 13th he saw a real battle for Ch. 21 between the signals from Divis and Rowridge.

"Wednesday 13th was a very good day for DXing. German stations came through in dozens, with many stations sharing the same [Band II] frequencies," said **Arthur Grainger** from Carstairs Junction. Some he could not identify, but among those he did were Radio Hamburg (103.6MHz - RDS), WDR1 (106.7MHz - RDS & Radiotext) and very strong signals from the British Forces Broadcasting Service on 96.6MHz.

Weather

While on holiday in Banchory in early October **David Glenday** (Argyll) had grim weather. Two days of snow, frosty nights and no DXTV to compensate him.

"October was a very dry month up until the 20th when a low pressure system moved in giving frequent heavy showers for the next few days," said Arthur Grainger. Arthur's barometer readings, dotted trace **Fig. 1**, show the atmospheric pressure steady to begin with, then

peaking really high at 30.7 (1039mb) on the 13th and descending to the depths of 28.6 on the 22nd. The readings for the solid trace in **Fig. 1** were taken at noon and midnight from my own barograph. This makes a good comparison because my records are from the opposite end of the UK to Arthur's.

In October, I recorded 4.54in of rain compared with 7.25in for the same period in 1993. The majority of this fell during the second half of the month with amounts of 1.10in on the 22nd, 0.78in on the 25th and 31st and 0.60in on the 29th and 30th. The relative humidity on the 29th and

31st was 80% and 84% on the 30th. Thunder accompanied the rain on the 22nd and 25th.

TV Tests

Recently, Richard Bell purchased a Casio Mini TV that he uses with its own rod antenna for mobile DXing. In certain parts of Melton he can pick up perfect pictures from Belmont, Sandy Heath, Sutton Coldfield and, in places, Emley Moor. I saw one of these sets a few years ago, Richard, and was very impressed by its sensitivity.

Because David Glenday's home in Argyll lies under the

transatlantic aircraft routes he did some experiments in attempting to receive TV signals via aircraft reflection. His early tests show that signals could be received from Black Hill when the aircraft was about 10° above the horizon. "Pics were fluttery and lasted about 10 seconds," said David.

Solar

I had a 'stop press' from **Ron Livesey** (Edinburgh) on October 10 saying, "first part of October aurorally and magnetically active". Maybe this has something to do with the sunspots observed by **Patrick Moore** (Selsey) on his projection screen, **Fig. 2**, at 0900 on the 6th. He also sent me a drawing, **Fig. 3**, of the sunspot string, near the central meridian, taken from his screen at 1050 on the 17th. At his observatory in Bristol, **Ted Waring** counted three sunspots on his screen on the 4th, nine on the 7th, 14 on the 13th and ten on the 20th.

SSTV

During October, **John Scott** (Glasgow) had an interesting haul of slow scan television pictures. He copied signals from KL7J, **Fig. 4**, near Anchorage in Alaska on the 14MHz band, the Scouts' special event stations (JOTA - Jamboree On The Air) GB4FM, **Fig. 5**, GB4PBS and GX3CNX on the 3.5 and 7MHz bands and, during a local slow-scan net on 144.5MHz, from GM0BRJ, GM3ULP, GM3WYL, GM4JYZ and GM8HGT. "They were all having a good time receiving and transmitting pictures," said John.

He told me that KL7J was sending pictures to UA3ATT at 1044 on the 15th when John copied his signal, but, by 1055 it had almost faded out. There are signs of break-up, John, on **Fig. 4**. This may have been caused by the prevailing sunspot activity on the upper regions of the ionosphere, see **Fig. 3**. John also logged calling captions from stations in Germany, **Fig. 6**, and the UK and general images from England, Sweden and Wales.

On the 7th, John took his computer to the West of Scotland ARC to give a talk about the history and techniques of SSTV including a 'live' demonstration. The club provided a v.h.f. receiver and the pictures were transmitted across the town, for the occasion, by GM8HGT. Just after 2100 the familiar slow-scan 'twittering' came through the speaker and a picture of a house appeared on the screen. "Everybody enjoyed the demo," said John and it showed another avenue in radio.



Fig. 4: SSTV from Anchorage, Alaska.



Fig. 5: SSTV from Scouts' JOTA Special Event Station GB4FM in Durham.



Fig. 6: SSTV from DL9FAA, Germany.



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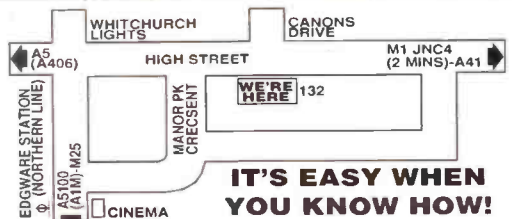
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HF Sideband

A few months back I wrote about the various kinds of antenna systems used on aircraft for h.f. communications. This prompted an interesting letter from **Bill Wilson** in Aberdeen, which included a useful diagram of all the antenna locations on a Boeing 747-400 'Jumbo Jet'. As you can see from the diagram on this page, the h.f. antenna is in fact built within the leading edge of the tail unit.

Books

It is not too often that I have the opportunity to write about new books that are ideal for s.s.b. utility listeners, but a book has just appeared that answers a lot of questions about the British military and the way it communicates. *Eavesdropping on the British Military* by Michael Cannon is a new 166 page book that covers radio communications in the v.l.f., l.f., h.f., v.h.f., u.h.f. and s.h.f. bands. Much of the information has been published before, either in carefully disguised articles, or in articles that did not fully cover any given topic. Now, all the information and frequencies have been combined into one volume.

The book is divided into six chapters (and nine appendices); the first four concern the RAF, while the last two cover the RN and the Army. Each chapter explains in detail how each Services communication systems work, what it is used for, and lists the frequencies used; the frequency information is not 100% complete in all cases, but there is enough information to give a idea of exactly where to look. In many cases, callsign information is listed where known, and examples of typical communications are given. There are a few spelling mistakes, and a number of examples where

proof reading would have picked-up errors (e.g., RAF Benson is listed as being in entirely the wrong county).

These comments aside, the book is an excellent read, and everybody is certain to find something new in its pages. The book is available from Nevada Communications, Portsmouth, and costs £17.50.

Questions

Len Wooley from Cornwall writes asking about some stations that he heard on 6.655MHz l.s.b. during October. There were four stations heard, callsigns used were 'MA42', 'NP5', 'WT1' and 'RT23', and three of the four were operating 'mobile' - one of them was travelling at 70m.p.h. on the motorway! Len wants to know who they were, and what they were doing.

Well, Len, you have found some English operators who are illegally using frequencies assigned to other users. All over Europe there are a large number of illegal operators, usually using modified amateur radio equipment, to contact other illegal operators. This particular operation

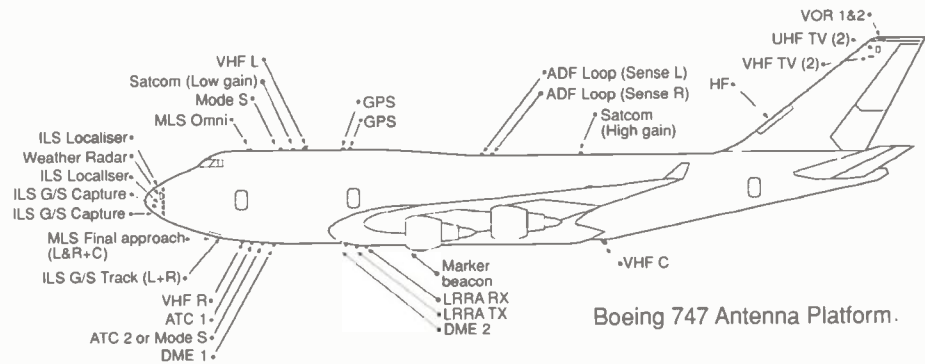
is treated like another Citizens Band, but obviously the equipment used is much more expensive.

Although the operators sound quite professional at times, they are completely illegal, and have been known to cause interference to aircraft, who are the authorised primary user of this particular frequency range (6.525 - 6.765MHz). The illegal operations take place generally between 6.600 and 6.700MHz, and has been referred to as the 'Echo Charlie band' (does anyone know why?). Over the past few years, the operators have become more active, and there is even a packet station operating on 6.677MHz (has anyone ever managed to decode the packets?). It's a great shame about all the interference that they cause, as there are some excellent 'authorised' stations operating in this band, including several Pacific and Asian VOLMET stations that are not usually heard too well in the UK on these frequencies.

Ian Charteris writes from London, asking for more information on a pair of aircraft that he heard

working Shanwick on 5.598MHz. He reports hearing two aircraft using the callsigns 'Quick 71' and 'Quick 72', that were flying in a large loop from the south-western approaches, over the Bay of Biscay, and to a point north of the Azores. Well, Ian, I'm certain that those callsigns must have been 'Quid 71' and 'Quid 72', so the aircraft would have been USAF KC-135 tanker aircraft operating from RAF Mildenhall.

Since Ian heard these aircraft during early October, they would have been involved in refuelling aircraft en-route to the Gulf, following the large movement of Iraqi forces. It is very difficult to find out exactly what was being refuelled, but when the aircraft were given permission to 'block 190/210', this is the height (5750-6360m) where the actual refuelling would take place. Sometimes Shanwick will tell the tanker aircraft the position of the aircraft to be refuelled, so that they can co-ordinate their contact, but this helps you to identify the type of aircraft receiving the fuel.



Boeing 747 Antenna Platform.

Traffic log (frequency in MHz, all u.s.b. unless indicated)

- 2.246 Aberdeen Coastguard working *Star Spiker*, which was towing a ship that was taking-in water.
- 5.245 Air Training Corps net controlled by station MRC01, and involving stations MRC28, MRC26, MRH19, MRC16, MRL76 and MRS53-Mobile 1. Does anyone have a listing of where these stations are based?
- 5.616 Hydra 91 & 92 (a pair of USAF B-1B bombers) working Shanwick as they passed 15W en-route back to the USA. This pair of aircraft were in fact operating on a non-stop 'round-robin' flight direct from the USA, doing some simulated attacks on ranges in Holland, and then returning back to the USA.
- 6.993 SAM 973 working Andrews Metro for weather at Andrews at 0200Z.
- 10.805 Stockholm LDOC working Iberia 6631 with a phone-patch to Iberia Ops in Madrid that was conducted in Spanish.
- 11.217 Incirlik working Andrews. At 1820Z they changed to 'Channel Alpha', that turned out to be 11.243MHz. This was about the time that Pres. Clinton was in the Middle East, so there may be a connection between the two events.
- 11.244 'Bookshelf' working 'Rachel 1'. 'Bookshelf' should be one of the aircraft monitoring events in the former Yugoslavia, as mentioned in previous columns.
- 11.2705 Magic 55 (a NATO E-3 AWACS aircraft) working DHN 66 (Geilenkirchen, Germany) requesting a fire-truck to meet the aircraft on landing, to hose-down a crew-member who was making his last flight!
- 17.995 Canforce 23 working Trenton CFB.

Amateur Bands Round-up

Listening to the Amateurs

It was nice to meet some of you at the RSGB stand at Llandudno, and I will now tell you a tale. There was, believe it or not, a guy walking around the show wearing a larger-than-usual badge saying he was 'G2RSA.' He has also been heard on the air using c.w. When challenged he claimed 'Look in the Callbook.' To the best of my knowledge such a callsign has never been issued in UK, and it certainly isn't in the 1995 RSGB Callbook. A Pirate, and a cheeky one too!

Letters

Let's make a start with **Harry Richards**, in Barton-on-Humber. Harry turned his rig on during the last weekend, and found 14MHz jumping with signals, all of course in the big contest. Harry thus retired hurt to Top Band where he noted 2W0AFA. The calls beginning with 2 are UK Novice licensees; in England the prefix is 2E, in Wales 2W, and so on. Like the main licence there is a division into A and B; the A licensees use the number 0 as in the case Harry mentions, but the B novices who do not have a Morse test pass would sign, for example 2E1XYZ or 2W1XYZ. As for the region between 1600 and 2300kHz, that is only 'amateur territory' between the limits 1.8-2.0MHz, and even then shared with other things, such as the Coast Radio stations. The rest is used by various other services.

Still with Top Band, a cheerful letter from Bodmin tells us that **Gordon Robertson** offers loggings of ZL2JR, ZL2SQ and K1ZM all in the mornings, along with 5T5JC and an assortment of Europeans in the evenings. It is interesting to have a report of such DX on this band as it is about the most difficult thing to do. Basically, the darkness path only covers both ends of a G-ZL path for a few days in the year; furthermore, one finds that it is easiest in the far south-west, and fades away until in East Anglia for instance, the theoretical opening is only for a few minutes, and in the North Sea we would be talking theoretical impossibilities.

Skeds

Anyone who has listened for and heard such long-distant signals on the band will be aware of the way they rise up out of the noise, come to a strong peak and fade back down into the mud again. That is why two-way contacts tend to be to pre-arranged skeds; if you know your

man is on a specified frequency, you can hook him as he comes out of the mud and leave room for someone else. Gordon does use the other bands, and he mentions 6V1S in Senegal and BV2FI both on 21MHz; SU2MT, VP8CPC, ZS6AOO all 14MHz, VP8CQO and VK9NS (Norfolk Island) on 7MHz, and finally WBOPWA and HZ1AB both on 3.5MHz. Some of the 'small fry' left out are such things as ZL, VK and W on 1.8, 3.5 and 7MHz heard almost every morning.

A nice letter from **Len Hickman** in Newport, Isle of Wight, who has done an upgrade so that he now has a Yaesu FRG-100, a Timewave DSP9 audio filter, and a Global antenna tuner. Len reckons this is quite an improvement on the old Kenwood R-1000. On the downside, the antenna is a piece of stranded wire running round the house and down the garden. Len mentions the problems of listening to the satellite signals on 29.431MHz. The satellite passes over Europe at regular intervals, but the essential difficulty is simply that not every pass goes directly overhead, and so the time the bird is audible, between Acquisition of Satellite (AOS) and loss of satellite will vary. If it only just rises above the horizon, it will only be audible for a few moments; on an overhead pass for a longer period. In the latter case, there is an additional complication, namely the 'Doppler effect', which means that as it approaches you its frequency appears to be different from that when the satellite has passed overhead and is heading away from you. You notice it if you stand near a fast road and listen to a car approaching and leaving you. I suggest joining AMSAT-UK and getting the details from this source.

Scaffold Pole

On a different tack, Len winds up by noting he has logged 135 countries in his first year back, and he wonders how this compares. That's a bit like asking 'How long is a piece of string?' - it depends so much on how many hours you put into your listening. A very active listener may knock up above 200, while a less active one may only find fewer than 100.

The scaffold pole at the end of the garden holds up the far end of **Frank Lennon's** antenna in Hyde, Cheshire. Not surprisingly Frank wonders about possibly using it as a vertical. The way to tackle this is firstly to sit the bottom on an insulator - some people have used a glass

bottle successfully - and then to feed the bottom through coaxial cable; the shield of the cable is then connected to some ground wires or buried radials. It would be a help to organise some sort of tuner at the bottom of the pole, and match it. If a separate match is used for each band, and carefully set up, you could then use relays to remote-switch from band to band.

There are two problems to be watched. First, the top of the pole will need to be watertight, or rain will soon fill the bottle, and secondly, sealing the end of the cable against moisture.

Frank's log contains, on Top Band, various Europeans and RK6AXS, while on 7MHz he found 9K2MU, VY2BIQ, VE2EE and the Sand Box Net, VE3POS, VE2YY and TI4CF. A switch to 14MHz yielded NN7L, W6FOJ, PJ7/WB5ASP, HK4BGW, W6JVA, KB6SX, VE7GF, Y1WAC, 5N4DLP, VK6WC and K9QAM. Up to 18MHz for a brace of JAs and VQ9HJ/MM some in the Chagos Archipelago. At 21MHz, Frank found KX3Q and TG9GI, and a couple of queries. The first one, VR6VX is from Pitcairn, and the second one VA3HT probably from Canada.

Unusual Antenna

Another one to return to the fold after a break is **Adrian Rees** who lives near Chester. Adrian has an unusual antenna, comprising, on one side of the feed-point, a half-wave on 3.6MHz, and on t'other side a 14MHz quarter-wave. This is fed through about 7 metres of 300Ω ribbon to a balanced-input tuner, and from there to the receiving set-up that includes an h.f. converter to an FRG-9600. An IBM PS2/30 computer carries Hamcomm, JVFAX, and the Log-EQF programs. Much of Adrian's time has been spent listening to the Ukrainian mailbox UT7FP on 14.0852. On sideband, I note 9H3DSG/JA, 9H4ED on 14 MHz, JA3PRN, on 21MHz, and on 7MHz G3HZJ and G4ALF/MM. GOELZ was noted on 144MHz f.m., and the rest of the signals were on RTTY or AMTOR. As he is up to 97 confirmed, Adrian needs the QSL route for 8R1TT - anyone with the gen please pass to him at 15A Park Avenue, Saughall, Nr Chester CH1 6DY.

The home of **Tony Capon** is in Lindfield, Sussex where he is beginning to adorn the scenery with dipoles. At the time of writing, he had made a 14/21/28MHz dipole in the loft, fed through a pre-amp to the

receiver. Nearly always you will find that an antenna in the loft needs serious 'pruning' to bring it to resonance; and of course if the receiver is in good order the use of a pre-amp is not required. Switching it in will add gain at the front, but will also reduce the dynamic range of the overall system, which you don't want. On 3.5MHz Tony found VK6FCT, VK6APZ, VE2ZV, KP4OKE, W6BCQ, VE3YJ, W8LAQ, C31SD, JW0C, VE2SKV, EA8BYR and lots of Europeans, while on 7MHz YV5EUX, CE8EKK, YV3BX, EO5OEY for a Ukrainian 'special' VK2ANG, JL1UJG, EA9KB, Y1AD and ZL2HTW. The 14MHz band produced S52A, ZS1GRM, VE1OR, C53HG, KN4UG, 4N7AL, 5Z4PL, WA2SBS, VK2RV, while 18MHz gave 4X4FR, WT4K/MM, W3FFX and KD4AL. Down to 21MHz and 3DA/SP2JKX, 5N34SIK, TA2BT, ZS6MT, CX3CC, VP8BKT, ZP6XR, 9H3BTS, ZS6UI, K7HI and A22EX. A first session on 24MHz gave 4X4FS, CR9WAG and EA8EBY; finally on 28MHz Tony found ZS1J and S83H.

Work is the curse of the listening classes, complains **Geoff Crowley** in Aberdeen - though to be sure the new callsign has led him into bad ways as well! The log shows Top Band from G0CEW, ON4AEK, G3PDQ, G4ABZ; on 3.5MHz Geoff caught NX1G, VE2ZZ, W1WEF, W2IRY, W2YQN, ZH/K1XV, JR6PM, N6BV and VK3EW. Turning to 7MHz Geoff snapped up IK/DK7UY/1POY, ZL3ACC, ZL6DJ, LU1DH. Cranking up again to 14MHz the log shows VK2ANO, K7KER, VK2WS, HS0ZBI, HS3DF/1, DU9RG, 9K2ZZ, PY1AQ, K9CLO, HS0ZBJ, 9V1ZP, N0VWW, U57CQ running low power, W4GXT, HS1NR, KA3CSR, OS6MT a special covering the anniversary of Belgian Liberation, AB4AK, phone-patching. On 18MHz ZA1B, and on 21MHz ZP5ML, PT2PNJ, ZP6CC, UR0EF, VP8BKT, TA2IY, JI6KVR/P, W9AHQ, 4S7EF, K4LE. That leaves us 24MHz for TA2ZY and GD3AHD, while on 28MHz CT1EWX and, for real DX GMOBHC in Bridge of Don.

So there it is for another month. Send your letters - news, views, questions - to the address at the head of the page, to arrive by the start of the month as usual. This time, of course, in addition Christmas and New Year Greetings to you all.

Satellite TV News

The Latest from the Clarke Belt

This magazine certainly has one enthusiastic North American reader, which became evident with a late afternoon 'phone call from **Chris Rendle**, living in London, Ontario, Canada on November 13 last. Chris rang to tell of his current reception of a 625-line signal using PAL colour showing a rugby match between Bradford Northern and an Australian team. Canada, of course, uses NTSC 525-lines and the signal was therefore in monochrome with (initially) a rolling picture needing the field hold adjustment. Locked up 'in sync' a field fold-over was evident at the top of frame. The rugby match was passing across America at C Band via transponder 9 of Telstar 401 at 97°W - the first time that Chris has seen such an unusual outside broadcast feed - at least using 625-lines. Equipment in use was only a 2m dish with a relatively high noise 65K LNA (Low Noise Amplifier). Currently we tend to regard C Band LNAs now of only 25K noise so Chris is doing well. C Band covers 3.60-4.20GHz.

Just a few days earlier **Fred Hartley** (Hayes) dropped a line with a list of recent satellite sightings in Ku band including that on Telecom 1C, a French satellite slotting at 3°E. Not too active with pictures, Fred logged SNG feeds on trdr.1 - 12.522GHz vertical and audio 5.80MHz. There are only 6 trdr. on this bird and it's worth checking out for activity - often the BBC World Service Arabic TV service can be seen for up to 8 hours daily feeding output via 1C into the Orbit playout centre at Rome - check out the usual 12.648GHz vertical though the trdr. of the day does vary.

In recent days, the BBC Arabic offering has moved once more and now resides on Eutelsat II F1, certainly an itinerant channel! Previously Eutelsat I F4 at 25°E carried the BBC Arabic feed but this ageing bird suffers from the inclined orbit syndrome requiring inclined orbit tracking for optimised reception quality. That's why for us lesser mortals trying reception of say the nag racing feeds during the afternoon find that the signals are so variable. Fred also noted the German elections back on October 16 and unusually carried via Intelsat 603 at 34°W 10.964GHz vertical and audio 6.60MHz. Unusual in that a relatively quiet Intelsat transponder be used by Germany when both Kopernikus 2 at 28°E and 3 at 33°E are in orbit relatively quiet - both owned by Germany. Kopernikus 1 at 23°E is busy with various internal German programme

feeds.

The Far East/Pacific Rim area is expanding in satellite terms very rapidly and with changes/additions by the week. **Alan Smith** in sunny Thailand comments that the 128-148°E sky segment contains Stationar 15 128°E; Rimsat 130; Apstar 138; Stationar 7 140; an unknown bird with ATN and Raja TV 142.5; Stationar unknown 145°E - it carries a Russian programme and a further unknown 148°E.

TNT cartoons hit the airwaves via the Indonesian Palapa B2P 113°E satellite in the clear but encrypted via Apstar 1. Bandula Gunasekera (Colombo, Sri Lanka) also confirms Apstar activity at 130°E with Indian programmes such as Asianet, Sun TV and Udaya TV, the latter both Tamil sources. A little confusion with reception at about 134°E that Bandula thinks is Apstar 1, he's seen on this bird CNNI; Reuters Hong Kong; Television Hong Kong and one other unknown channel. Interference from the Ekran u.h.f. satellite operating in Ch. 56 has forced the terrestrial ETV channel on Sri Lanka to adopt channel E35/37, perhaps this is the first ever time of satellite TV signals causing terrestrial TV interference!

The Ekran satellite is now transmitting 'NAM TV', another Tamil TV service, covering the Indian sub-continent and much of SE Asia. The programmes are sourced in Berlin and uplinked via Moscow onto Ekran, the same studio also produces the European Tamil TV service which is relayed via Eutelsat capacity. The intention is to make the Tamil TV service truly international with expansion into Australasia, America and Africa. Bandula has read the transponder rental for Ekran is 5.4 million \$US over three years.

Satellite exponent **John Locker** reports and with some excitement the 'wobbly Gorizont' at 14°W is soon to be replaced, apparently by the upgraded Express 1 satellite recently launched and is (as I write) being moved from its post launch slot at 70°W to 14°W, taking over Gorizont service soon after. John says that there are 2 Ku band transponders - 11.525 and 11.565GHz - apart from the 10 C Band trdr. loading that will offer considerable potential for sat zappers.

The Express series will feature stabilised in-orbit station keeping unlike the dated unbalanced Gorizont warhorse - similar to upgrading from a 2 stroke BSA Bantam to a Suzuki 4 stroke motor bike! The 'wobbly Gorizont' as referred to above relates to the

unbalanced inclined orbit movement of the Russian birds, the problem gradually increasing as the satellite matures and grows old!

Yet more post from the overseas mailbag - **Bob Wilkinson** in Saudi advises that there is a dish and equipment ban on satellite equipment in the kingdom though no attempts are made to restrict existing dish installations. The 'Arab News' of Friday March 11 last advises that the Council of Ministers meeting at Makkah confirmed Decision 128 that makes the Information Ministry responsible for a cable reception scheme across the kingdom to ensure that 'foreign television telecasts through international space channels' matching its (Saudi) religious and social values; prohibiting the import of dishes and receivers - or the local manufacture of same, or operating a local terrestrial service for distribution of said programmes; prohibiting offering scrambled or subscription satellite programmes from space. Fines up to SR500,000 will result and confiscation of equipment will result if the rulings as above are broken.

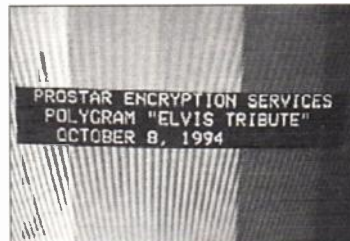
In practice, Bob says that the price of satellite receiving gear doubled overnight and that no attempts are being made to restrict existing satellite viewing. In effect Decision 128 is an attempt to censor foreign programming within Saudi.

The Spanish Hispasat satellite slotting at 30°W carried the Spanish 'Grand Premio National' horse race November 13 at 11.670GHz in clear PAL with impressively strong signals here in the South UK - audio at 6.60MHz was intermittent and of poor quality suggesting that the intended viewers were bookie shops, certainly no friendly continuous commentary - only race effects. One reader has seen a clear PAL football feed via Intelsat 601 at 27°W of a local (rural) UK match between Kidderminster and Gateshead carried on a BT trdr 11,135GHz horizontal with commentary for the cable service 'Wire TV', audio at 6.60MHz, other regional football offering are now often carried mid-week - another example of the wide and varied signals found in the Clarke Belt.

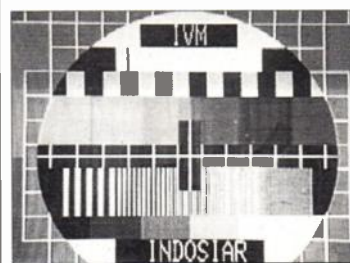
What the outside broadcast live from the New York street, UK evening of November 15 was for, distributing across Europe on an EBU leased 7°E transponder (using sound in syncs unfortunately) has yet to be explained. The event of some hours featured a locked off shot showing traffic, pedestrians and occasionally several well



Test pattern with routing circuits as detailed for Western Europe.



'Elvis Presley' tribute feed from the 'States again Intelsat K.



Indonesian test card via Palapa B2P 113°E.



'Raj-TV', a new Indian service via 142°E.



An SNG feed into the UK during the recent boil up between Iraq and Kuwait.



Andrew Sykes (Kings Lynn) 900mm 'Channel Master' dish with silent motor drive - after noise problems with a earlier standard dish drive neighbours are now sleeping well at night!

dressed folk discussing 'something' - their comments lost to us lesser mortals with SIS decoders.

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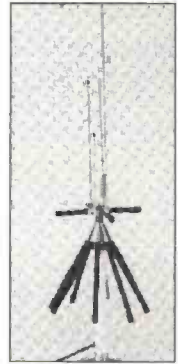


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37.000-224.995	5.0kHz	n.f.m.
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Scanning

I'm going straight in this month and deal with a postcard that I received from **P.R. Johnson** of Hastings who has touched a chord in me and prompted me to research an area I have found to be quite bereft of information. Pete asks if I can produce a table or list of all SAR stations around the UK coast and on the European coastal borders with the ability to intervene and co-opt with UK services, and to include details of equipment, callsigns and so forth. Not an easy task, I admit - but one that I've found could prove to be definitive if handled correctly.

I'll try to answer what I've already looked at and conclude with an ambitious plan that will be of benefit to anyone interested in SAR in the broadest terms. Hopefully, this could lead to addressing an area currently under-subscribed.

I know that I can get information on the lifeboat stations both from official sources and the Lifeboat Enthusiasts' Society. Both would be able to provide comprehensive details on boat classes and comms fits. Likewise, HM Coastguard could be approached in the same way. Continental sources could be accessed by the three above - but then we shift into realms of uncertain ground. Many private rescue services operate here and on the continent and access to them could be more difficult. Again, operators offshore operate their own SAR declared areas that would also be of interest. We can then break them down further and delve into stand-by vessels, declared SAR facilities, non-declared and so on....quite heavy!

With regard to other services, fire brigades and police forces, paramedic and ambulance services also play an inherent part in any SAR scenario as do elements of the military - RAF MRTs, Royal Navy stations both cross-train with civilian SAR organisations - and, as you've already guessed, this is turning out to be something pretty seminal on the issue! Certainly beyond the scope of the column!

What do I plan? How about a book? Obviously it needs assimilating of data from a wide variety of sources, from existing and other areas. It would need to be constantly updated, with both hard and soft data - and would, I estimate, take a good while to sort out. Then there has to be an on-going dialogue to ensure that information is current and not out of date. Lastly, there has to be a publisher involved - and a market! My own view is that we would need to look to an area that is already quite specialist but which

also has an on-going interest for peripheral readers - aircraft enthusiasts, lifeboat and coastguard followers - even the professionals themselves. Quite a task!

However, I'm game - providing the interest is there! So, if you want to see something of interest to all of us as radio enthusiasts, with a good grounding in the work of everyone involved within the broadbase SAR framework - get writing with what you know! I'll D-Base the lot, collate and sift it and do some research of my own. The end result may well be something we can all refer to.

Frequencies now. The Sheffield Supertram has been nobbled on the following frequencies (MHz):

202.2125
203.0125
203.0625
194.2125
195.0125
195.0625

There was no emissions mode but it would almost certainly be n.f.m. at that height. Thanks to **T. Ford** of Sheffield for that. Callsign used is 'Tramway'.

News for owners of the AOR AR-3000A and AR-3000 receivers. AOR are now offering mods to these already excellent sets. The broadsheet that I've got lists ten mods available, and all menu priced. You can now receive WEFAX, add a narrow a.m. filter, SDU-5000 Spectrum display, 10.7MHz i.f. output, 45MHz i.f. output, S-meter, tape out facility, computer port, discriminator output, encoder change, remote switch and TXCO - which, when weighed up, means that you will enhance the spread of the receiver tremendously. For 'anoraks', I suspect this serious selection of mods will further upgrade an already serious bit of kit and put you up with the pro's when it comes to reception. Details from: AOR World Radio Centre, Adam Bede High Tech Centre, Derby Road, Wirksworth, Derbys DE4 4BG, Tel: (01629) 825926.

Looking at the selection on offer makes me quite dizzy - and envious! The AOR series are pretty well tried sets with an immaculate pedigree. Any further and endorsed mods will only put the set higher up on the pedestal of excellence. If anyone goes through with the complete mod menu or just one, will you write and report on how differently the set behaved.

For those who do not have an AR-3000A but would like one, completely modified, then AOR are

offering one at a reasonable price of £949.00 including VAT, free carriage in UK and Eire. They will also consider trading in your old one. If you can afford it, why not?

Some serious legal news now regarding scanners - in the past I've encouraged each of us to be careful and cannot reiterate that enough. If you thought it was a joke then think again. **Colin Clark** of Watford wrote to me outlining a recent court case in which he was fined £1500 in fines and costs for having a scanner tuned to 106MHz - which is in Band II v.h.f. - and not switched on. Read that again. Colin was stopped by police and DTI officials and did not deny he had been listening to a pirate broadcast, although the set was switched off. A first offence, Colin moans about the severity of the charge when laid against another case that day in which a youth was given a conditional discharge for carrying an 8in knife.

The implications of this are horrific - and should serve, once more, to remind **all of us** that radio listening is subject to the full weight of the law. In this case it was a pirate station. Imagine the scenario if you were caught with police or military frequencies in your memory banks whilst out on an airfield perimeter or within a mile of a police HQ. Once more, **this is serious stuff** so be warned! You may be flippant and think it will never happen to you - now you know it is possible. What's more, does happen.

SAR Fs now from a reader in Eire. If you have an interest in these, then this is where you will find them.

156.375 Ch.67 Main SAR use.

156.800 Ch. 16 Emergency Channel, calling, urgency and distress.

156.500 Ch.10 Dun Laoghaire Port.

156.450 Ch.9 Dublin Port. Callsigns heard and identified are as follows.

ALPHA - Alouette 3 type Helio.

DELTA - Dauphin type Helio.

CHARLIE - Casa 235 Type Fixed wing on Fishery Protection, etc.

All callsigns will be alpha-numeric.

HF SAR and CASA comms on 5708kHz / 5375 Secondary / 5769.5 Third. u.s.b. mode. Uses ARQ but voice can be used.

Can anyone answer the following request for me? Aircraft SATCOMM to/ from a/c's or sats around 1550MHz. Scanner in use AOR AR-8000 - what would be the best antenna to use to receive these transmissions? Is there someone out there who can ping this one?

Another interesting cutting sent in from Dorset by **John Bugler** concerns the use of Orange Pagers by the Police at the recent Tory Party Conference. This is a secure mode - as you'd expect - but John raises an interesting question that I felt deserved a mention. If most comms go to secure links, then surely we can move towards getting our hobby more open through lessening of current legislation. I'd even go so far as to suggest that this would be ideal, given the previously mentioned court case. After all, we cannot decode definite secure systems with existing equipment. What do you think?

A request, again from Eire - and an unidentified reader in Cork City - asks that further information on scanning be brought in from around the world. I'll go along with that. I do get mail from Canada with interesting frequencies in it but never thought it may appeal to a wider readership. I have mentioned my interest in SAR OPs - both here in the UK and Eire but also world-wide, too. I'll open that to everyone - on whatever basis you think should be covered. As an aside, I'd also ask if anyone knows the legal ramifications of taking a scanner abroad to the USA? I know, when I used to fly UK/Europe that all I was required to do was switch it on for the benefit of the Customs and Security people. If you know for definite, please pass on the information.

Lastly, a letter from **Kevin Jones** of Mid-Glamorgan. Kevin is an Auxiliary Coastguard, very into v.h.f. and h.f. SAR Comms, keeping a watch on 2.182 and 5.680MHz and Ch.16 v.h.f. Recruitment for extra Auxiliary officers is a bit of a problem, however, and if you're living in this area and interested in getting to know how you could serve the community and get involved in aspects of SAR, why not ring Kevin on (01656) 862195 if you live in the Porthcawl area? It's a very worthwhile opportunity - and the social life is brilliant!

On that note I'll zip it up. If you've any comments, frequencies or items of note to relate then do get in touch with me. It's always good to hear from you.

All that's left is to wish you all a very merry Christmas and a happy New Year.

73s for now and catch you down the log in '95.

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Airband

Mayday! I need the circuit diagram and any other details for a National NC-77X valved h.f. communications receiver. I'm trying to make this simple receiver work - but it refuses. If I can beg/borrow/buy/copy your manual, let me know; of course I'll pay expenses.

On the subject of real Maydays, I scrambled up the Rescue Co-ordination Centres last month in the 'Search and Rescue' section. The two Rescue Co-ordination Centres are at Edinburgh (North) and Plymouth (South) and mainly co-ordinate the military air-sea rescue response. Falmouth, on the other hand, is one of six Maritime Rescue Co-ordination Centres run by HM Coastguard. Advice to radio amateurs is not to attempt to answer a Mayday call. Remember that this could be outside the terms of the amateur licence, although there are some maritime mobile amateur stations. Instead, telephone a report to the Falmouth centre on (01326) 317575.

Christmas Quiz

Doesn't the year come round fast? Not particularly fast is the aeroplane in the photo. That high wing, tail-drag configuration suggests that it would be best at short field performance. What is it? Identity won't be too difficult, so to qualify your entry for the competition, I'm going to be fussy. I want the full manufacturer's name, the type number, and the type's name in its native language. Then translate that name into English. A random process will select the winner if there is more than one correct entry, my decision is final and no correspondence will be entered into. Replies to reach me by the February deadline please.

Airborne Radio

Combined with the last Christmas quiz, many of you asked for the typical radio fit found in modern aircraft. Most airliners carry two v.h.f. transceivers, each one capable of transmitting/receiving in the communications band and simultaneously receiving in the navigation band. The Trident had three sets, so as to reliably receive the i.l.s. during automatic landing. Two a.d.f. sets are fitted so as to receive n.d.b.s and there will be one or two transponders for secondary radar. Long-distance communications (mandatory over remote areas) is by one or two h.f. transceivers. Cloud/collision radar is

invariably fitted but Doppler, Decca, microwave landing system and global positioning system are relatively uncommon. Light aircraft usually carry a sub-set of any of the above, from just a v.h.f. communications set (or even no radio at all!) to the complete outfit.

The v.h.f. transceivers are invariably synthesised and will only tune in fixed channel steps (50kHz navigation, 25kHz communication). Older equipment has the frequency displayed on rotating drums, new equipment has i.c.d. or i.e.d. displays. In either case, a MHz and kHz knob must each be turned to tune the frequency and there is no keypad. The transponder code is also set and displayed by these methods; the a.d.f. might also be, but could also be continuously tuned by a conventional dial. I'll conclude this topic in a future issue.

Information Sources

Do you want photos of aircraft equipment, instruments, etc? So far - three in favour, *nem con*, so such pictures will appear later in the year. Meantime, **W.J. Hibberd** (Bridgend) has found a series of video tapes in which pilots demonstrate the workings of their instruments during a real flight. Types covered so far include Airbus 320 and Boeings 737, 747, 757 and 767 (with extended-range operations). Each tape lasts just over an hour and is obtainable from Intelligent Television and Video, Central Chambers, 77-78 Westborough, Scarborough, North Yorkshire YO11 1TP. Check the latest price of course, but I do feel that at over £20 each they are expensive - with a restricted market, the purchaser has little choice though. Perhaps a rich relative would put one in your Christmas stocking? Where can **A.J. Brightman**



(Leighton Buzzard) find advertisements for second-hand radios? The obvious answer is here in this magazine and its sibling *Practical Wireless*. There are other specialist radio publications (look on the shelves of any large newsagent). Membership of the Radio Society of Great Britain (Lambda House, Cranborne Road, Potters Bar, Hertfordshire EN6 3JE) includes a subscription to *Radio Communication* as a benefit and although there is a vast number of personal advertisements each month, they mainly offer transmitting type equipment. You could also place a 'Wanted' ad in any of these sources. Finally, you'd be surprised what you can find in *Exchange & Mart*, again sold by newsagents (or your local 'free ads' paper - Ed).

Have you thought of contacting a local dealer? If you're lucky, the second-hand or ex-demonstration equipment might come with a short-term guarantee. When you've chosen your likely purchase, try it first! If the vendor won't let you do this then suspect a problem and go elsewhere. Make sure the set comes with a manual and try to confirm that it is not still subject to a hire purchase agreement.

I ask readers to note that all replies are via this column, not by direct correspondence.

Many modern airliners are fitted with ACARS, a system that automatically transmits engine and other engineering data back to the operating company base. The link is on v.h.f., but satellites are needed to cover remote areas such as the Pacific. So far, the system is for

private use of the airlines but there is already the suggestion that it could also carry air traffic control messages to and from the aircraft. Because the aircraft reports its position over the data link, a computer can take this information and plot the positions of participating flights wherever they are in the world. **David Craig** (Lightwater), himself a pilot, was impressed by a demonstration of this at Farnborough '94. Connection to the Société International de Télécommunications Aéronautiques (SITA) network and the necessary commercial software make this too expensive a system for hobbyists.

Interested listeners may be interested to read the mini review of the Lowes Airmasterr - an ACARS decoder - that appears in Decode this month -Ed.

Your Experiences

Keith Anderson (Isle of Wight) was a wireless operator on Lancasters. During one sortie over the North Sea, the mid-upper gunner fired off a round to test his weapon. The radio went dead - the bullet had hit the long wire antenna that was stretched along the top of the fuselage. The gunner wouldn't have been able to repeat that feat deliberately, even in order to win a bet! The other h.f. antenna at the time was trailed from the rear of the aircraft. Forgetting to wind it back in prior to landing meant that it would be eaten by a tree on final approach - and the cost, half-a-crown (the price of three pints of beer), would have been deducted from the operator's pay!

Richard Gosnell (Swindon) could see the behaviour of the airflow over the top of the wing on a trip across the north Atlantic. Conditions of lighting and humidity were just right for shock waves to be seen as a bunch of dark lines that moved in a 'wobbling' pattern. Because air has to flow faster over the top of the wing than beneath it, the flow speed can become supersonic even during subsonic flight. I deduce that you were not in an Airbus. These aircraft often have supercritical wings that optimise maximum top surface flow speed without actually causing the air to go supersonic. This is believed to be

Abbreviations

a.d.f.	automatic direction finder
a.t.i.s.	automatic terminal information service
CAA	Civil Aviation Authority
GASIL	General Aviation Safety Information Leaflet
h.f.	high frequency
i.l.s.	instrument landing system
kHz	kilohertz
LATCC	London Area & Terminal Control Centre
l.c.d.	liquid crystal display
l.e.d.	light emitting diode
MHz	megahertz
n.d.b.	non-directional beacon
u.h.f.	ultra high frequency
v.h.f.	very high frequency
VOLMET	VOLume METeorological report

more efficient. Thanks for the offer of photos of aerodynamic features, but at the moment I've got sufficient pictures already in stock to last several months!

Disappointingly, the Eurofighter was nowhere to be seen when Richard was staying near Warton Aerodrome. I can confirm for you, Richard, that Warton does participate in the Lower Airspace Radar Service on 124.45MHz. In recent issues I've discussed the way in which weather patterns can enhance the distances over which v.h.f./u.h.f. signals are propagated. Richard noted this happening during a recent spell of high-pressure conditions. Although a.t.i.s. broadcasts could possibly be monitored as propagation markers, they are not always on the air and depend on the operational hours of the aerodrome from which they originate.

Weather

Talking about the weather, **A.G. Robertson** (Perth, Australia) asks the purpose of VOLMET broadcasts. The trouble with flying, especially long-range, is that weather at your destination can turn nasty while you're still *en route*. A weather report, obtained when nearing the destination, is helpful in deciding if a landing would be possible. If conditions have deteriorated below minimum then a diversion to the

nominated alternate (note the spelling in actual usage) would be necessary. Obtaining the alternate's weather is also important, of course! The decision has to be taken at such a time that fuel reserves won't drop too low for safety.

The temperature is quoted at ground level, in the shade, in an area with good ventilation and away from the influence of heat reflected by man-made objects. Dew point, always less than or equal to outside air temperature, is the temperature to which the air may fall and still be just able to contain the present proportion of water vapour that is dissolved within it. Air is considered to be a gas phase solution. However, once cooled to the dew point, relative humidity reaches 100% and moisture could start to condense out as fog. All these measurements apply at ground level at the aerodrome because it is here that visibility (with or without fog) matters when trying to locate the runway for landing. VOLMETs of interest to A.G.R. include Singapore (6.676 and 11.387) and Tokyo/Honolulu (sharing 2.863, 6.679, 8.828 and 13.282MHz).

Frequency and Operational News

In the October *GASIL* the CAA describe airspace changes around Bournemouth (Hurn) and Southampton. A new Solent Control



(EGTC-94-5) Christen Eagle with appropriate registration.

Christine Mlynek.

Area replaces Southampton Control Area and there are other smaller revisions to controlled airspace including airway R41. Solent and Southampton Approach: 120.225, Bournemouth Approach: 119.625MHz.

Here's this month's instalment of **Graham Tanner's** (Harlington) list of planned LATCC frequency changes: 121.325 is replaced by 120.475 and 134.7 is replaced by 125.475MHz.

As noted by **Len Woolley** (Bude), Concorde's North Atlantic passage is controlled on the usual frequencies for this area. Len has the advantage of being able to see some of the inbound flights if the sky is

clear; supersonic routes are constant, unlike the Organised Track System which changes twice a day according to the actual wind over the Atlantic. Len lists the following: London Airways 126.075 and 132.8; Shannon Airways 135.225 and 135.6; Shanwick/Gander Oceanic 5.649, 8.864 and 8.879MHz.

The next three deadlines (for topical information) are January 13, February 10 and March 16. Replies always appear in this column and it is regretted that no direct correspondence is possible. Genuinely urgent information/enquiries: 0181-958 5113 (before 2130 local please).

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Bandscan

Europe

Radio Moscow is no more! This does not mean that hundreds of short wave frequencies have magically cleared overnight. Instead the station has changed its name to the Voice of Russia. Stationery leaving the station still bears the name Radio Moscow, but on air announcements give the new identification.

The English service has for the first time, to the best of my knowledge, sent out a meaningful frequency guide to listeners. Instead of showing vague metre bands, the European schedule has exact frequency details for the eight hour long blocks that the station beams towards the continent. For example, at 2100, the Voice of Russia advertises:

13.67	9.89	9.795	9.75	9.55
7.40	7.38	7.35	7.33	7.30
7.23	7.205	7.18	7.17	7.15
6.055	5.995	5.975	5.965	5.92 & 5.905MHz on short wave
			1548	1494 & 1386kHz on medium wave

Consistently good reception of the Moscow based station must be possible with such extensive use of the bands!

In the past few months, Radio Moscow has lost 11 languages, reducing its output to just 35 different tongues from well over 60 during the height of the Cold War.

Not many people realise that the British government provides radio material to stations around the world that might want to get the UK view of world affairs. I had forgotten about the existence of the Central Office of Information's London Radio Service until an article in the *New Statesman* & *Society* magazine caught my eye recently.

Call 0171-261 9342 (or +44 171-261 9342 from outside Britain) and you can hear a feed of the news from London. Try comparing it with the output of the BBC's World Service to see whether the stories and news agenda are similar.

Holland FM

If you are in striking distance of the Netherlands (as the radio waves travel), tune to 1224kHz medium wave and you will hear a station broadcasting, quite legally, from the former pirate ship *MV Communicator*. The ship was home to *Laser 558* that transmitted from off the Essex coast into Britain some years ago. Now Holland FM, a new Dutch station, is on the air from the refurbished ship, moored at the IJsselmeer.

At Radio Netherlands in Hilversum, 50 staff were made redundant following the closure of French and Portuguese language services. In the midst of this gloomy news comes better tidings for listeners to the station in the UK. The station is hiring two hours of time on the Kaliningrad transmitter used by the Voice of Russia on 1386kHz medium wave at 2130UTC. And there is news that the station plans to use Deutsche Welle's transmitter at Nauen in the eastern part of Germany at 1130UTC on 7.14MHz.

Better News

There is better news further south in Berne where Swiss Radio International's income has been

guaranteed following a government decision to increase the cost of the TV licence. However, this means that central government financial support to the external broadcaster is being cut, leaving the Swiss Broadcasting Corporation to find ways to maintain funding level for its international operations.

Azeri and Uzbek

The BBC launched two new language services at the end of November. It now broadcasts in Azeri and Uzbek for the first time. Azeri is on the air at 1900 for thirty minutes on 5.995, 9.575 & 11.925MHz and Uzbek at 1700,

again for half an hour, on 6.095, 9.585 & 11.925MHz.

If the media scene in the far north east of Europe excites you, then a new weekly programme from YLE Radio Finland will be of interest. *Media Roundup* is on the air each Thursday in the station's English services and features news about TV, radio and the press in Finland. Tune in at

1930-2000 on 11.755, 9.73 & 6.12MHz and at 2230-2300 on either 963 or 558kHz medium wave.

West to Norway where the country's external services is back on medium wave after an absence of a couple of years. The transmitter on 1314kHz at Kvitøy carries Radio Norway International in Norwegian Monday to Saturday and English on Sunday at 1900.

A Look Ahead

Finally, a look ahead at what the year might offer radio listeners in Europe. There is the prospect of Digital Audio Broadcasting in Britain, France, Germany and Sweden, with a European DAB Day at the Berlin Funkausstellung on September 5. DAB offers CD quality radio to portable and mobile receivers, without the problems of multi-path interference that can so badly mar f.m. reception in cars for example.

Using the old Band III 405-line TV channels, the BBC is already transmitting tests from four transmitters in the M25 area before the launch of an introductory service in September. The one drawback at present? No receivers, as the European manufacturing industry has not got its act together to meet the summer start. But undoubtedly

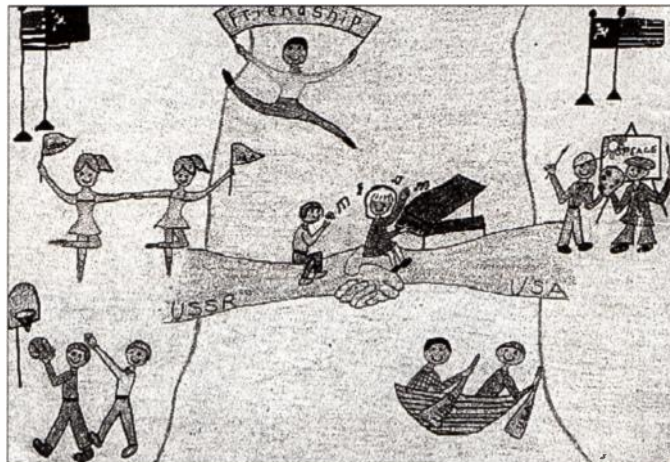
sets will come onto the market before long, although be prepared for high prices, just as CDs were very expensive when the technology was introduced about ten years ago. But many experts are describing DAB as the 'future of radio' and the biggest advance since the introduction of f.m. back in the 1950s.

Transmitter Exchanges

Look out for more short wave transmitter exchanges between broadcasters in Europe and other parts of the world - soon it is going to become difficult to work out where the signal you are listening to is coming from! Details, as ever, in the pages of *Short Wave Magazine*. Changes are likely in the line up of languages and programmes from broadcasters in the eastern part of Europe as finance problems continue and priorities change.

It looks as though 1995 will be as interesting and unpredictable a year as ever in broadcasting in this area of the world. Keep an eye on Bandscan Europe for the latest developments. Happy New Year!

“soon it is going to become difficult to work out where the signal is coming from”



Pre Glasnost Radio Moscow QSL.

Off The Record

Monitoring the Pirates

Last quarter I asked readers to send me information on their favourite short wave pirate station with a view to doing a little report on each. It has become evident that many DXers log the transmission when they hear an identification, but don't really listen to the programme content. This could have something to do with the fact that there are peak times on Sundays when many pirate stations are broadcasting simultaneously. Here is some background information on some of the most frequently heard stations, for legal reasons I am unable to publish the frequencies, dates, times and mailing addresses of unlicensed stations.

Laser Hot Hits is operated by radio enthusiasts as a listeners' service, this is a non-profit making operation and carries no advertising. A wide variety of music is aired, with an emphasis on rock, disc-jockeys choose their own music and operate Citronics turntables and Goodmans compact disc players. The station replies to all mail and are happy to receive reception reports. Transmissions from the London area have, in the past, been received on both the f.m. and s.w. bands. Radio East Coast Commercial has an interesting *Free Radio and DX* news programme presented by Norman Nelson, this show is broadcast monthly and also features rock music through the ages.

Sky High DXing?

In October's 'Off The Record' I stated that it was an interesting experience to use a Walkman f.m. radio in an aircraft to monitor stations as you fly above. Godfrey Manning, *SWMs* Airband columnist, dropped me a line saying it is strongly recommended that passengers do not operate electronic equipment, particularly radio receivers whilst airborne. He continues, "There have been documented cases of low-powered consumer devices interfering with on-board navigation equipment. The automatic direction finder is the most likely navigational aid to be affected and, as it has no in-built failure warning, this problem can be insidious".

Personally I find it quite incredible that you can buy all kinds of radios and electronic equipment in the duty free departure lounge shopping area without being informed of their being any hazard if used aboard an aircraft. These items are also sold aboard the actual airliners themselves in their Skyshops, yet it would seem their use in the air could place the entire flight in jeopardy.

British Airways informed me that laptop computers, computer games, personal hi-fi equipment and video cameras could all be used aboard their aircraft. The use of devices that are designed to transmit like walkie-talkies, radio controlled models and cellular telephones were not permitted.

Britannia Airways of Luton told me that if the cabin crew caught you listening to a radio receiver you would be asked to switch it off. So I would suggest that before you start scanning or computing at thirty thousand feet do check with the cabin staff first, incidentally your chances may be enhanced if you just happen to have a First Class ticket!

Odds and Ends

The pirate radio magazine *Offshore Echo's* are shortly to celebrate their 20th birthday, a special 100th edition of their publication is planned and will be free to existing subscribers. Issue 99, which is available now, includes an interview with Canadian DJ Don Allen. He spent several years with Radio Caroline North and Radio North Sea International with his *Big Wide Wonderful World of Daffy Don Allen Show*. Don now presents country and western programmes for RTE Radio 3 in Ireland.

Two other former pirate radio DJs are battling for supremacy in Kent, ex-Caroline DJ Johnny Lewis has recently taken over the breakfast slot on Invicta Supergold, while his shipmate Peter Philips (real name Graham Cooke) is hosting a somewhat similar programme on BBC Radio Kent.

Lazer 558 Goes Dutch

The Communicator, the vessel once used by the pirate radio station Laser 558, has been re-equipped and is now moored near Enkhuizen in Holland. The ship, previously called *Guardline Seeker*, had been laid-up at Lisbon harbour in Portugal for several years, but has been purchased for use as a medium wave relay station for Dutch satellite station Holland FM. By the time you read this it should actually be on air with a power of 22kW on 1224kHz, this frequency is also used in the UK for low power relays of Virgin 1215.

It is intended to use the ship as a radio museum as the Dutch still remember the significant part offshore pirate radio played in their broadcasting history. The famous Radio Veronica ship *The Norderney* is still in use as a floating nightclub, while the Veronica organisation itself

has extensive interests in the Dutch broadcasting industry, including shares in Holland FM.

Airborne Broadcasting

Gerry Dexter, *SWMs* Bandscan America columnist, recently reported that the US government had been broadcasting to the island of Haiti from a military C-140 transport aircraft. Transmissions of Radio Democracy were on both the m.w. and f.m. bands. I understand the USAF have run similar airborne broadcasting stations in areas of conflict including during the Vietnam war.

Ronan O'Rahilly, Radio Caroline's Managing Director, once proposed to have 'Caroline TV', transmitted from two Super Constellation airliners. Publicity sent to the media at the time, June 1970, said that the aircraft would take turns, circling elliptically over the North Sea at 25000ft and be based at a foreign airport. Programmes were to be on air in colour on the 625-line u.h.f. band, daily from 6pm to midnight. This somewhat doubtful project received much publicity in the press but never actually got off the ground, or should I say runway.

Fined For Listening!

Pirate fan **Colin Clark** sent me a cutting from the Harrow Observer indicating he had been fined £1000 and ordered to pay a further £500 investigation and prosecution costs by Harrow magistrates. He was stopped in his car by police and radio investigation officers who found his scanner switched off but tuned to



a local f.m. pirate station, which at the time was subject to their investigations. He admitted listening to the pirate station but considered that operating a radio receiver in a dedicated broadcast band was not really an offence, let alone one that would incur a substantial fine.

Over the years I have exchanged letters on the subject of pirate radio with the DTI, The Radio Authority and The Radiocommunications Agency, neither of these have ever suggested that listening to pirates could be illegal. During the middle 60s an estimated 25 million people listened to the so-called pop pirates operated from ships and structures at sea. The question of prosecuting listeners for receiving unauthorised stations under the *1949 Wireless Telegraphy Act* was considered by the communications agency, (then GPO) but was ruled out as unenforceable and politically unacceptable. However the proven use of a scanner to monitor police frequencies, in order to thwart an impending raid, must surely amount to a conspiracy rather than be a breach of any ancient Telegraphy Act.

Richard Gosnell in Swindon, Wiltshire, says that during a period of incredibly good reception at the beginning of October he received Girls FM from London, some 80 miles away, he managed to confirm reception by calling them on their mobile phone. He suspects they may have been a pirate as they were operating above 106MHz, which is

not yet available for legal UK stations. I wonder if any other readers have had similar surprises whilst tuning around the f.m. broadcast band recently?

Short Wave Pirates Chart

Short Wave Pirates Chart	Monitors
Barones	E
Moonlight	C,F
Reflections	A,C,E,F
Starshine	A
Meteor	A,C
Holland FM (relay)	A,B
Titanic	A,B,D,E
Blackbeard	A,D,E,F
Jolly Roger	A,B,C,D,E,F
Lazer Hot Hits	A,D
Britain	A,D,E
East Coast Commercial	A,D,E
Pandora	A
Crazy Wave Radio	A,F
Magic Spell	A,C,F
Orion	D
Free Radio Holland	A,B,C,D
XTC	A,B,D,E
Ozone	D,E
Live Wire	A,B,E
Angel	A,B,C,D,E,F
WINKR	A,B,C,D,E,F
East Coast Holland	E
Dublin	A,B,C,E
IRRS	A,C,F

- A: Free Radio Monitoring, Halesowen, W. Midlands.
- B: Bob Marsh, Bexleyheath, Kent.
- C: Ian Turner, Deal, Kent.
- D: David Williams, Southampton, Hampshire.
- E: Rab O'Fokei, Sunderland, Tyne & Wear
- F: Ron Dryburgh, Ware, Hertfordshire

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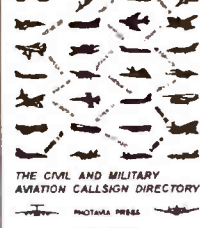
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73 from Dave G4KQH, Technical Manager.

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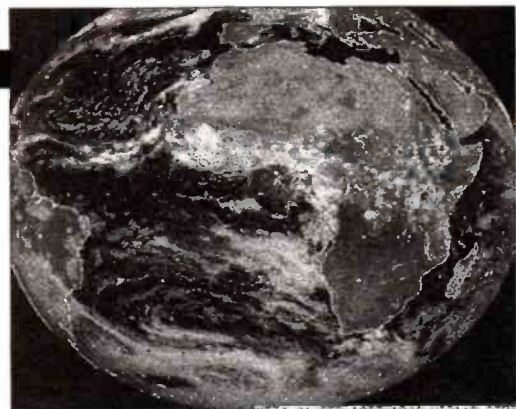


Fig 1.

Interest in monitoring weather satellites (WXSATS) seems to be increasing - judging by the huge number of requests received from people wishing to obtain monthly print-outs of Kepler elements from me. When I first started monitoring satellites in an amateur capacity, I logged so many that I could not quickly identify, that I decided to contact people who were more experienced in the science of orbital analysis. This led to my need for getting Keplers. I now maintain a large collection of satellite elements, so if you have difficulty in obtaining these - check the last few paragraphs!

Although this column specialises in WXSAT events, I do receive many requests for details about Shuttle manifests (launch schedules) and space matters in general, so I am hoping that the Editor will permit me to include such information in the column this month!

Current WXSATS

Despite the announcement on a computer Bulletin Board System (BBS) that the American NOAA-10 WXSAT was scheduled to be permanently switched off in October, we continued to receive normal transmissions - at least up to mid-November! To my surprise, NOAA-11 has been left transmitting, despite the absence of detail in its a.p.t. (image) data. I doubt whether its high resolution picture data (from which a.p.t. is derived) is operational either.

After many weeks with METEOR 3-5 transmitting imagery (sunlight passes only), we finally saw METEOR 2-21 switched back on, around November 12. It continues to provide poor signal strength, as seen during previous operational activity some months back.

OKEAN-4

The Commonwealth of Independent States (CIS - Russian) oceanographic satellite OKEAN-4 (apparently

officially called OKEAN 1-07) provided semi-regular a.p.t. transmissions on 137.40MHz for the first few days of its life - following launch in early October. A letter from **Dennis West** of Winslow, listed each pass logged during an 11-day period. This confirmed that easterly passes (where the satellite is over the CIS), often provided an image, usually of short duration.

To monitor OKEAN passes, you need to leave your receiver tuned to 137.40MHz, fitted with a cassette tape under receiver SQUELCH control, or, alternatively, obtain a set of pass predictions from your satellite tracking program - write to me if you need one!

OKEAN-4 (or 1-07) is designed to cover the world's oceans in a three-day phase, with particular attention given to the Arctic and Antarctic land masses. The CIS uses the Arctic for routing ships along Siberia's northern shores, so a knowledge of current weather conditions is crucial. Because of high power usage of radar and sounders, the satellite cannot remain continuously transmitting - hence the sporadic nature of its telemetry.

GOMS

The CIS geostationary operational meteorological satellite (GOMS), was finally launched on October 31. Also known as Elektro, it was built by VNIIElektroMekhaniki, and launched by the Proton launcher. The satellite design incorporates two digital and two facsimile (WEFAX) channels. Launch was originally planned for the late eighties.

By November 2, Elektro was in orbit at almost 36 000km (geostationary), over longitude 88° east. It is drifting about 1.4° west per day. Receiving imagery will not be easy, but we can expect test transmissions during its drift to about 76° east. My location makes reception unlikely, so I am particularly interested to hear from anyone who collects any data.

Future Launches

The currently scheduled date for launch of the next NOAA WXSAT, NOAA-J, is December 4 - so, assuming launch is not delayed, we could be monitoring it by the time you read this! You may recall that NOAA-13, launched during 1993, failed a few days after attaining a successful orbit. The cause was subsequently identified as probably due to an inadvertent short circuit across the battery, preventing it being charged by the solar cells. A supporting bolt had apparently been slightly too long, causing the electrical short, possibly during the vibration of launch.

GOES-7 Problems

During November, one of the American geostationary WXSATS, GOES-7 experienced a problem with its proton sensor, affecting low-energy measurements. GOES-7 has been America's primary spacecraft for solar and near-Earth space environment measurements. It collects various types of environmental data, such as x-rays, proton flux, electron and magnetometer data, amongst other measurements. There are 11 proton channels on GOES-7, each measuring proton flux in various energy ranges.

GOES-7 has provided years of reliable space data, and continues to be the primary spacecraft for solar X-ray and high-energy electron data. The newly launched GOES-8 spacecraft recently became fully operational for receiving weather imagery, and is now used by the Space Environment Laboratory for monitoring solar X-ray data, but it has not yet been placed into full use for solar and geophysical data collection.

Letters and Pictures

So many pictures - so little space! An Italian correspondent, whose name I can only identify as **Casoni**, sent **Fig. 1**, a METEOSAT-4 whole-disc image from September 1992, with added artificial colour.

Roger Ray of Telford continues to receive WXSAT images and enhance, then photograph them. Roger used software to join the C1D (visible-light image of eastern Atlantic ocean) and C2D (Spain and western Europe) formats from METEOSAT-4 to give **Fig. 2**, a combined image showing the wide expanse of the Atlantic ocean. Dated late October 1993, Roger added colour to enhance the image.

Despite already having a fairly comprehensive set-up, Roger has been trying out the JVFAX program, recently having taken delivery of an interface. Some months back, my feature on JVFAX mentioned the need for an interface to allow connection of WXSAT audio input to the computer. Roger tells me he is impressed with both the interface and the software. My review of the JVFAX hardware interface from Martelec appeared last month.

Brian Dudman of Harrow sent **Fig. 3**, a NOAA picture from August, showing a very sunny Europe. Mark Pepper sent in **Fig. 4** another combined image, made using four formats from the Japanese GMS-4 WXSAT. These infra-red images are re-transmitted by METEOSAT-5 using slots labelled GMS-A through D. Noting that Australia looks rather light, we can assume that this originated during local night, when the land was cool.

Tim Healey recently spent some time in a Plymouth hospital, where his copy of *SWM* went all around floor 9 before he could retrieve it! He sent **Fig. 5** showing a hot north Africa, taken in mid-May this year. The image is the thermal D2 format from METEOSAT-5.

Circuit Crystals

A sad tale of woe came from a Redhill reader who had difficulty using his Circuit receiver to receive WXSAT pictures. Most unfortunately, he had just one crystal in his receiver - for 137.62MHz. He had been testing it on NOAA-11! As mentioned in previous editions of this column - NOAA-11 is bust! No image detail - only empty frames. He wrote asking where he could obtain new crystals to allow monitoring of the other WXSATS. These can be obtained from QuartsLab Marketing Ltd: Tel: (01322) 330830.

Several people who have been

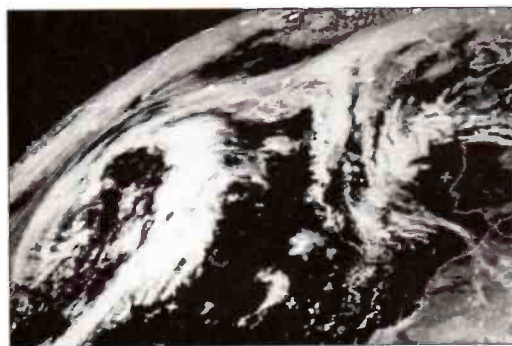


Fig. 2.

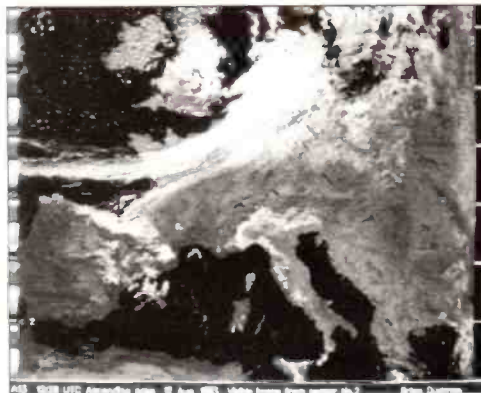


Fig. 3.

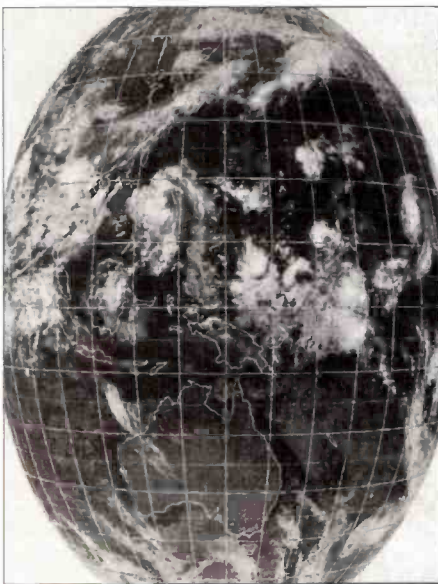


Fig. 4.

Cornell's reflector software.

He began experimentally re-broadcasting the NASA Television downlink over the Internet, using the CU-SeeMe software, in March 1994. Since then he has set up and assisted with transmission of numerous space shuttle missions and NASA-related conferences to other countries. Currently, Lewis is the only NASA Center that offers this service.

Through Lewis' involvement, classrooms around the world can now view live NASA shuttle missions and other programming. Receiving the programme requires only a Mac or PC with a connection to the Internet.

Lewis News is the official newsletter of the NASA Lewis Research Center, in Cleveland, Ohio. For those wishing to experiment with this service, detailed information on accessing CU-SeeMe is available in the World Wide Web via URL:

http://netgopher.lerc.nasa.gov/NA_SA_Select/NASA_Select.html

previously mentioned in editions of 'Info' have found their services subsequently in demand. One such volunteer was **Geoffrey Chance** of Redruth, who has been booked to give a talk to the computer section of the Cornish Radio Amateur Club. A few days ago, my local friend **Frank Russell** admitted to being a committee member of Plymouth Radio Club, as he dropped in to arrange for me to give a talk!

NASA Select Television

Last January, NASA's television system, NASA Select, was reconfigured to transmit on a different satellite transponder. Transmissions are now carried on Spacenet-2, transponder 5, located at 69° west with horizontal polarisation. The transmission is on 3880.0MHz, with audio on 6.8MHz. Spacenet-2's location is fairly low over our western horizon, but should be receivable. I would be interested to know whether anyone has obtained or built suitable hardware for receiving the channel.

NASA Select is an agency-wide TV-audio system offering a wide range of programming, including coverage of Space Shuttle flights and other NASA mission activities. Unless noted, all programming carried on NASA Select may be taped for rebroadcast and other uses.

Shuttle Monitoring via Internet

Normal reception of a Shuttle launch broadcast requires a satellite dish and receiver to monitor NASA Select Television - not easily received in Britain - as mentioned. This is likely to change soon. Those with access to the Internet computer network should soon be able to watch it - virtually live.

In a recent edition of *Lewis News*, writer Doreen Zudell explains that the American Lewis company receive NASA TV video and audio signals from a satellite link operated by Goddard Space Flight Centre. Michael Baldizzi of Telecommunications and Networking Branch, Services Division, comments that to get out to the Internet, the satellite downlink received at Lewis is packeted using software on a Macintosh computer. It is then relayed to a Sun computer running

Bulletin Board Systems

Most readers will be familiar with, if not actually possess, a modem. These allow connection to the telephone line of your computer, enabling direct communication for information transfer between remote computers. For readers interested in collecting Kepler elements, files and data related to space matters, there are four BBSs with varying facilities.

Dartcom - a board carrying mostly old in-house data and Dartcom upgrades. Provides an updated Kepler elements file at the start of each month. Tel: (0182) 288249.

RIG - The Remote Imaging Group operates a BBS containing recent Kepler elements and a good selection of programs and files available for members to download. Tel: (01945) 85666 - poor quality line.

Starbase1 - (my favourite!) A BBS devoted to astronomy and space matters. It has messaging areas, so you can leave one for me if you wish. Kepler element files are available, as are thousands of space-related files and NASA images. Tel: 0171-7033593, and 0171-7016914.

Timestep - operate a BBS usually containing the latest Kepler elements for the WXSATs. Tel: (01440) 820002.

Forthcoming Shuttle Launches

NASA has published an update on Shuttle launches scheduled for the next several years - my listing goes into the next century! Actual launch dates are set at Flight Readiness Reviews, held some two weeks before each launch. Due to re-arrangement of launch dates, Shuttle numbers are often out of sequence.

STS-63 (*Discovery*) is scheduled

for launch on 2 February 1995. Cargo includes ODERACS (Orbital Debris Radar Calibration Spheres), and SPTN (Shuttle Pointed Autonomous Research Tool for Astronomy - also known as SPARTAN).

STS-67 (*Endeavour*) is scheduled for launch on 23 February 1995, carrying the ASTRO-2 (Ultraviolet Astronomy) package.

The full listing is available from me as a computer print-out. Please enclose one extra stamp with your s.a.e. towards the cost of collection and printing.

Try These Frequencies:

You probably have a scanner to receive satellite transmissions in the 137MHz band. If you have never tried monitoring other satellites, the Christmas holidays should provide some time to escape from reality into the world of the esoteric! Try monitoring the following frequencies:

TRANSIT 5BN5, launched in 1964 into a near-polar orbit, transmits telemetry on 136.65MHz. This may be the oldest satellite that you hear.

X3 (PROSPERO), launched into near-polar orbit in 1971 (one of my old friends!), can sometimes be heard on 137.56MHz.

MIR (the manned CIS space station) launched in 1986, uses both 143.625MHz and 145.550MHz. Voice communications are frequently heard on the former frequency.

MOS-1A and 1B, launched in 1987, occasionally transmits on 136.11MHz.

INFORMATOR-1, launched in 1991, transmits on 145.815MHz - a similar frequency to the amateur radio satellite UoSAT-2.

MAGION-3, launched in 1991, transmits on 137.85MHz, a frequency often used by CIS WXSATs. When both coincide, some image degradation will be seen.

Tuning to the 150MHz Band

COSMOS 2123 transmits on 150.0 and 400MHz.

NADEZHDA-3 also transmits on the same frequencies.

NADEZHDA-4 transmits on 150.00 and 400.00MHz.

COSMOS 2184 transmits on 149.91 and 399.76MHz.

COSMOS 2218 transmits on 149.94 and 399.84MHz.

COSMOS 2230 transmits on 150.00 and 400.00MHz.

COSMOS 2233 transmits on 150.03 and 400.08MHz.

COSMOS 2239 transmits on 149.97 and 399.84MHz.

COSMOS 2266 transmits on 149.97 and 399.84MHz.

COSMOS 2279 transmits on 149.94 and 399.84MHz.

All these satellites are in near-polar orbits and transmit distinctive signals. I hear them regularly, using my WXSAT receiver and a discone or WXSAT antenna. Occasionally, one will be inactivated, to be replaced by another.

WXSAT Recordings?

Two or three years ago I provided cassette tapes of WXSAT signals to help newcomers set-up their equipment. I still get such requests so here is a repeat offer. Just send a tape, with pre-paid package, and two extra stamps to offset the time involved, and I will provide either NOAA or METEOR a.p.t. as you wish.

Kepler Elements

Different options are available.

1: For a print-out of the latest WXSAT elements, send a stamped addressed envelope and separate, extra stamp (or International Reply Coupon for foreign readers). All WXSATs plus MIR are included, together with transmission frequencies if operating. This data originates from NASA.

2: I now send monthly Kepler print-outs to many people. To join the list please send a 'subscription' of £1 (plus four stamped self-addressed envelopes) for four editions.

3: You can receive a computer disk file containing recent elements for the WXSATs, and a large ASCII file holding hundreds (or thousands) of satellites elements. A print-out is included, identifying NASA catalogue numbers for the WXSATs, Amateur Radio satellites, and others of general interest, in both launch and object format - ideal for computer data retrieval. This is constantly updated. Please enclose cash, a cheque, or PO for £2 with your PC-formatted disk and s.a.e.

Happy Christmas - Peaceful New Year

This column is published just before Christmas so I would like, once more, to thank those many correspondents who have provided such fascinating letters, superb pictures, and kind comments.

Frequencies

NOAA-9 a.p.t. on 137.62MHz; NOAA-11 fault (137.62MHz until switched off); NOAA's 10 (until switched off), 12 on 137.50MHz; NOAA beacons on 136.77 and 137.77MHz; METEORs use 137.30, 137.40 and 137.85MHz and OKEAN-4 may use 137.40MHz occasionally.



Fig 5.

Timestep

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Further publications available are our unique *Modulation Type CDs*, *Guide to Utility Radio Stations*, and *RTTY Code Manual* (12th ed.), and *Air and Meteo Code Manual* (14th ed.). We have published our international radio books for 25 years. They are in daily use with equipment manufacturers, monitoring services, radio amateurs, SW listeners and telecom companies worldwide. Please ask for our free catalogue, including recommendations from all over the world. For recent book reviews see *SW Magazine* 10/93 p. 60, and *RSGB's RadCom* 6/93. All books are published in the handy 17 x 24 cm format, and are of course written in English.

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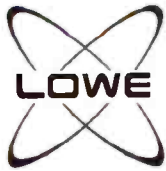
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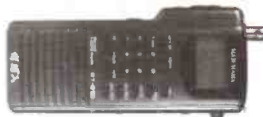
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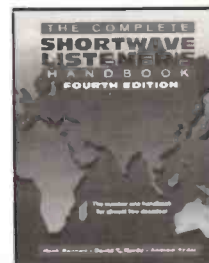
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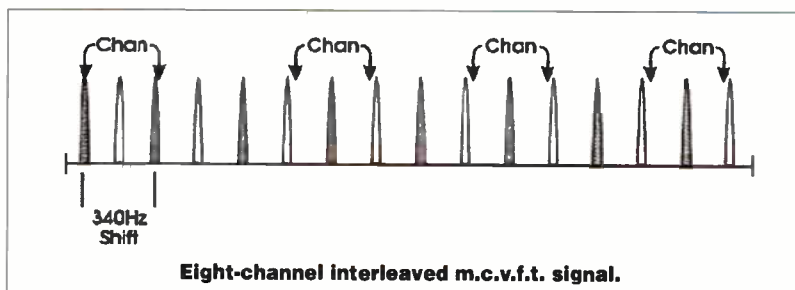
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Decode

All the Data Modes



Several of you enjoyed the iceberg pic in the November Decode so I'm on the look out for more. If you have any examples of humorous FAXs or messages, please send me a copy. You never know, I might even be able to rustle up a prize or two for the best examples.

PC Emulators

Keith Artherton of Fakenham has written with a common problem that I'll try to answer here. Keith runs an Amiga 500 with a Power PC board running at 11MHz. He's had no luck with his decoding and wonders if I can help. The problem is most likely to be incompatibility between JVFX/HAMCOMM and his PC emulator. For those that are unfamiliar with the term, an emulator is a software or hardware package that can be added to a non-PC computer (Amiga, Atari, etc.). The object being to let you use programs that were originally written for the PC. Whilst these often work quite successfully with standard commercial packages such word processors, spreadsheets, etc., they rarely, if ever, give full PC compatibility. Programs like HAMCOMM and JVFX don't work because they operate directly on the PC's hardware. The commercial packages, on the other hand, contact the PC's hardware via a set of standard software routines that are built-in to the PC. By using these standard routines the software suppliers can be sure their programs will look and operate correctly on computers from different manufacturers.

Unfortunately, these routines don't provide the sort of access needed to carry out the complex decoding used by JVFX and HAMCOMM. If you know of an emulation that provides full IBM PC hardware and software compatibility and can run these programs, please drop me a line with the details.

Air Master

One of the new releases at the Leicester Show was the Air Master package from Lowe Electronics. As the name suggests, it's mainly of interest to air band enthusiasts but, as it's a decoding system, it's worth a mention here.

The package comes in what has become a standard format for Lowe software systems. This comprised a plastics covered, hard backed folder containing the disk, decoder interface and the manual. The

software was contained on a single 3.5in 720Kb disk with its own installation routine. This automatically transferred the files onto your hard disk and created an appropriate sub-directory. Once installed, the program and its associated files occupied around 500Kb of disk space. In order to run Air Master you will need a PC/XT or better computer with an EGA or VGA monitor. As with the other Lowe decoding systems, Air Master used a simple hardware decoder that was mounted inside a 25-way D-connector. The connection to the receiver external speaker or line-out socket being made by a flying lead fitted with a standard 3.5mm jack. Air Master can operate with any COM port between 1 and 4 but you still need to be careful to avoid clashes.

To complete the set-up you will also need a scanner or other receiver capable of receiving the only active ACARS frequency which is 131.725MHz. This shouldn't be a problem as most listeners with an interest in aeronautical radio will already be set-up with such a receiver.

Once Air Master has been installed and connected-up, operation is very straightforward. However, I would recommend reading Richard McLachlan's article in the December *SWM* to give you a good introduction to the workings of the ACARS system. The supplied manual was very comprehensive, giving lots of detail on the various message types and abbreviations. There was also good guidance on interpreting the ACARS messages.

Once the program is running you are presented with a clean screen except for a menu bar along the top and a status bar at the bottom. Selecting a menu item produced the familiar drop down menu with a number of options. When you are tuned into 131.725MHz you can choose a logging option in addition to displaying the messages on screen. The logging can either be to the printer or a disk file. The most popular option will probably be to use the disk file so that the data can be edited and reviewed at a later date. As messages start to arrive, Air Master presents the operator with the time and date of the message followed by the ACARS mode and aircraft registration. Included here is the flight number and the message content. The message itself is in a coded format, so you will need to analyse this in more detail using the information tables contained in the manual.

Although this is potentially very

time consuming, the fact that the aircraft and flight numbers are clearly identified means you can restrict this work to only those flights of particular interest. Analysing the content of the message demands a certain amount of technical knowledge and patience. You also need to appreciate that you will not be able to make sense of every message. This is because they often contain complex technical data such as engine performance readings, etc.

The Air Master package was certainly a neat way to receive these messages and is likely to be a useful supplement for aircraft enthusiasts. Air Master costs £89.95 and is available from Lowe Electronics, Chesterfield Road, Matlock, Derbyshire DE4 5LE. Tel: (01629) 580800. My thanks to Lowe Electronics, for supplying the review copy.

Internet Computers

Following on from last month's piece about Internet. You'll find that one of the great points about the 'Net is its open structure. This means that it can be accessed and used by any computer with a serial port, basic comms software and a modem. Once on the 'Net you'll find vast quantities of public domain software for a wide range of systems. So far I've located sources for the following: Amiga, Archimedes, PC, Unix, Atari ST, and Mac. Once you're on, you can use simple file transfer programs to download more sophisticated tools to make search and retrieval more efficient. If you've got any tips for other computer types please drop me a line.

Modem Choices

If you're thinking of connecting up to the 'Net, the first thing you'll need is a decent modem. With so many different types on the market, I thought it might be useful to at least relate my experiences. One of the most important points to consider when buying a new modem is its operating speed. Not only does this keep the phone bill under control, but it makes the 'Net much easier to use.

One of the useful spin offs from the increasing use of on-line communications, is a highly competitive market with resultant low prices. Having started with a 2400baud modem and had to upgrade, I would not recommend starting with anything less than a 14.4kbaud modem. It's also well

worth getting one with built-in data compression as this provides an even higher through-put of data. Whilst many modems featuring this range of modes cost from around £400 upwards, there are some excellent value for money units about that offer similar performance, but without any of the frills. These are intended primarily for domestic use, rather than the year-in year out operation demanded by professional operators. My own choice was to go for the US Robotics Sportster 14.4 that is heavily discounted and can be picked-up for around £150 inclusive. In addition to 14.4kbaud operation, this unit supports standard data compression.

If you start looking for a modem you will also have to decide whether to use an internal or an external modem. Whilst the internal modem slots conveniently into an expansion port on the computer, there are a couple of drawbacks. The first is that there are no status lights to show what the modem is up to. This is particularly important when it comes to clearing down the phone line! The other more significant problem concerns serial ports and interrupts. If you already have a serial mouse an internal modem will tie-up a second serial port. This could then cause you problems when it comes to finding a port for your decoder. My preferred option is to use an external modem and use a switch box to select the appropriate modem or decoder. This avoids all the problems with interrupt clashes.

VFT via RTTY?

Many of you with simple decoding systems may look enviously at those with the facilities to decode some of the more complex modes. However, there is a way you can use your basic RTTY system to resolve v.f.t. Let's start with a brief description of this mode, so you can see how to resolve these systems yourself.

The correct name for this mode is Multi-Channel Voice Frequency Telegraph (m.c.v.f.t.). Not surprisingly, this is shortened to the commonly used v.f.t. The name is in fact very appropriate as it describes the mode very well. The voice frequency bit means it occupies the standard speech communications spectrum of 300Hz to around 3.4kHz. Within this band are placed several fairly standard RTTY signals. If we use the common British military system as an example, you will often find eight RTTY channels squeezed into the speech band. Each of these signals is allocated a segment of the

speech band and operates with a shift of just 340Hz. Now all this would be fine if each of the channels were just laid out one next to the other, but sadly this is not the case. Just to make life a little more complex, and to make sure all the channels fit in the speech band, each channel straddles the other. The best way to show this is with a diagram and you should find one accompanying this feature.

Now that you have some idea how the signal is set-up we can look at a way to receive it using a standard RTTY system. Before I start I will offer a word of warning. Because these stations carry military traffic, you will find that many of the channels send encrypted data. This can rather spoil the fun and make it difficult to decide whether or not you have your decoder set up properly.

So for those of you that want to have a go, here's what you have to do. First you need to find a suitable signal - a good starting point is MKD on 8.155MHz. If the station is operational, (usually OK in the evenings) you should hear a muddle of closely spaced RTTY signals as you tune across this frequency. Now you need to prepare your decoding system. First set the shift to 340Hz and set the mode to RTTY or Baudot at 75baud. If you've got an audio filter in your set-up, it can be put to very good use to tidy up the signal. It's also very useful if your decoder has a spectrum analyser display like the one in HAMCOMM. This type of display is invaluable for optimising the tuning and filter settings. What you're trying to do is eliminate everything except the two tones appropriate to channel you're monitoring. Once you've completed the set-up you should keep a note of the settings for future reference. You can now select any channel in the v.f.t. signal by just altering the receiver tuning. What you're doing is sliding the v.f.t. signal through the narrow bandwidth of your decoding system and plucking out the individual channels. If you want to get really clever you can try using a notch filter to take out any adjacent channel tones that may be confusing your decoder.

If you have any tips for improving reception please let me know.

Special Offers

Over the past year I have built-up a series of FactPacks and software systems designed to help utility listeners get the most from the hobby. It also provides a way of extending the column into areas I couldn't hope to cover in a regular two page slot. The following list shows the range of items available. As this is strictly a part-time operation please be patient with my replies - I try to turn everything around within a week but this isn't always possible.

FactPack 3 - Starting-Out guides the new utility listener through the various decisions that have to be made regarding the choice of receiver, decoder, antenna and

popular accessories. In addition to basic set-ups, the guide covers the more advanced station for those that prefer to start further up the market.

FactPack 4 - HAMCOMM/JVFX Primer has been written to provide a step-by-step introduction to receiving your first RTTY and FAX signal using these popular programs. The FactPack covers installing the software as well as hints on how to set the configuration to match your computer and receiver.

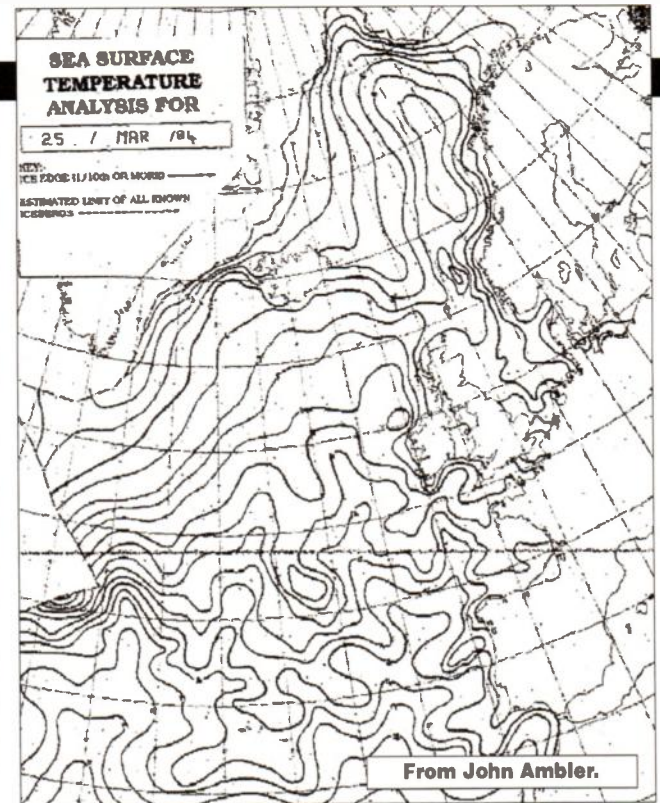
Other offers available are: JVFX 7, HAMCOMM 3, Day Watson Beginners List, Decode List, Complex Modes List, FactPack 1 Interference, FactPack 2 Decoding Accessories (details as per Nov Decode).

To receive any of these offers just send a self addressed sticky label plus 50p per item or £1.50 for 4, £2.00 for 5, £2.50 for 6 or £3.00 for 7 or 8 items. If you're ordering JVFX or HAMCOMM you will also need to send a blank formatted 720Kb disk for each program or just one 1.4Mb disk.

Digital Sound

Nell Shelley of Birmingham asks if it's possible to use the sound card on a modern computer to record radio signals. It's not a bad idea, but unfortunately digital sound recording consumes memory at an alarming rate. This is due to the way in which sound is converted into a digital format. The process used is called sampling and is achieved by taking a snap-shot of the signal voltage and converting that into a number. It's this number that is then stored by the computer. As you can imagine, taking the occasional voltage reading is not going to give a very good representation of the audio signal.

There are two factors that have to be controlled very closely - accuracy and sample rate. In most systems you usually have the choice of using 8 or 16-bit readings. The difference between the two is quality - 16-bit is the same as that used in CD systems, whilst 8-bit is roughly equivalent to an audio cassette system. There are usually several



options for the sample rate, ranging from 11kHz through to 44.1kHz. As with the measurement accuracy, the higher the sample rate, the better the quality.

For utility work, we only need to use the lowest quality which, in a SoundBlaster system, would be 8-bit measurement with an 11.025kHz sampling rate. In simple terms this means an 8-bit accuracy reading is taken 11025 times per second! This is where the memory consumption really starts, as this equates to using memory at a rate of around 10.7kb per second. In other words a 1.44Mb floppy disk could just about hold 2.25 minutes of audio signal! If your sound board supports lower sampling rates, you could extend this time slightly by reducing the sample rate to 8kHz. I hope you can now see why utility listeners rarely use the PC in place of the humble cassette recorder!

Frequency List

This month's offering of frequencies comes courtesy of **John**

Whitehead, Geoff Allgood, Martin van Duinen, Guy Denman, Day Watson, Peter Thompson and Robert Hall.

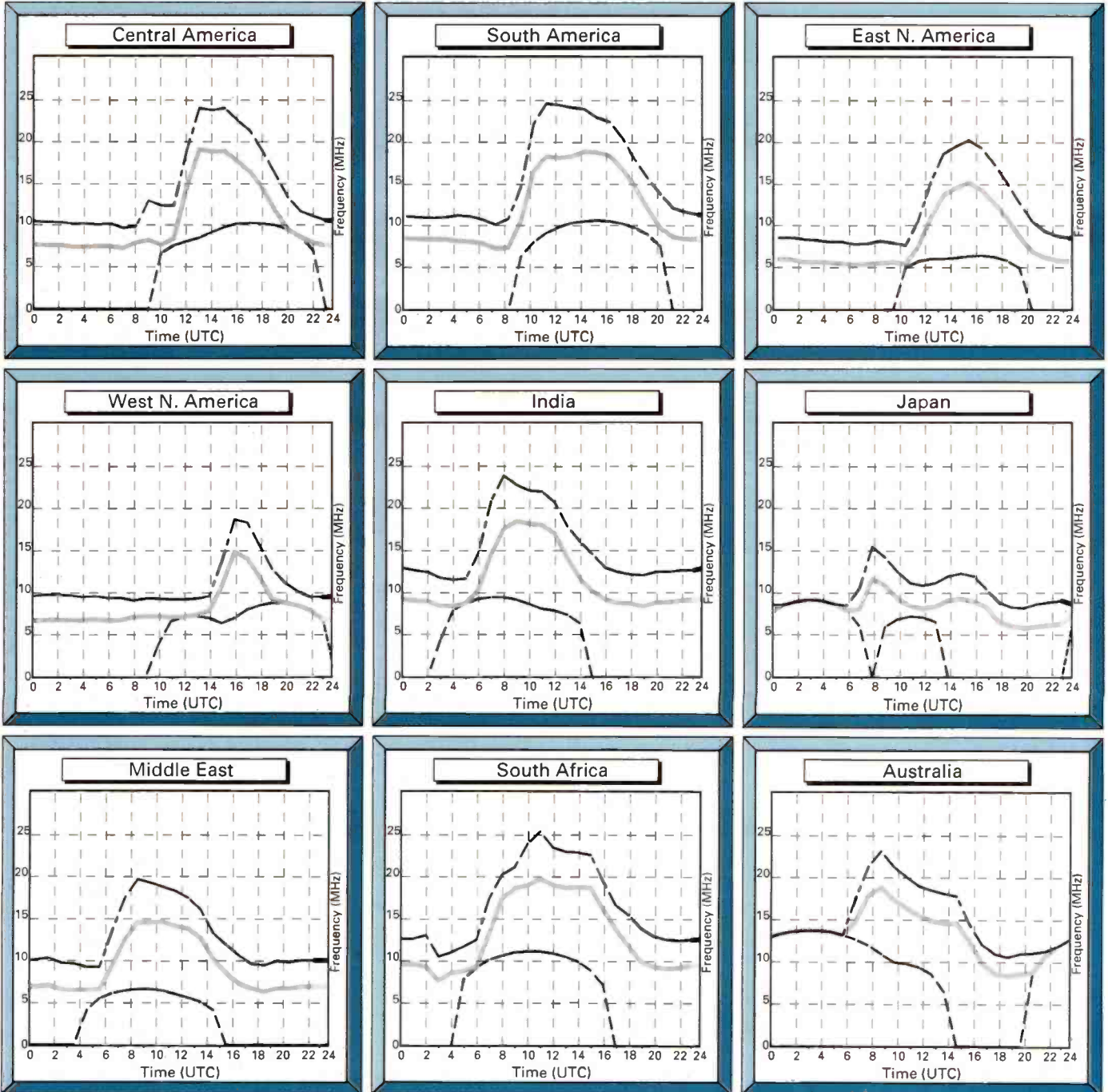
Good Wishes

Yet another year over and a new one just waiting around the corner it's time to both reflect on the past and prepare for exciting times to come. This last year has been about the busiest so far for Decode, what with all the special offers and a great response from readers. Still it's been very rewarding and you all get a big vote of thanks from me for keeping the column alive by supplying a constant feed of interesting letters and questions. I'd also like to add a very special thank you to all the regular contributors. Next year will, I'm sure, prove to be just as exciting, with new software and hardware to make decoding both easier and more affordable.

518	FEC	100	170	-	0850	Cullercoats NAVTEX
4462	FEC100	100	170	-	0700	WLO Mobitw Alabama
4489	RTTY	50	400	-	0740	Bracknell Met
6347	Picc12	-	-	-	1145	Coded msgs
6495	RTTY	75	400	-	0110	CFH Halifax
8020	RTTY	50	400	-	1845	KCNA press
8521	CW	-	-	FFL	2105	St Lys ship-shore
9797	RTTY	50	400	YOJ	0900	Rompres
10420	Coq-8	-	-	-	1530	French t/c
11536	RTTY	50	400	-	1300	KCNA French press
12158	Picc33	-	-	-	1410	Idle
13966	PactorIII	200	200	-	1005	ICRC Geneva
14482	ARQ-E3	50	400	RFTJ	1741	FF
14573	RTTY	50	400	-	1757	JANA Tripoli
15462	RTTY	50	400	-	0805	JANA Tripoli
16208	Picc12	-	-	-	1300	Coded msgs
16277	Picc6	-	-	-	1510	Coded msgs
16302	RTTY	75	400	-	1419	TANJUG press
16341	Picc33	-	-	-	1315	Idle
16804	FEC	100	170	9VG	1338	Singapore Radio
16816	FEC	100	170	ZSC	1622	Port Elizabeth
16832	FEC	100	170	LGB	1600	Rogoland radio
18176	RTTY	50	400	STK	1406	Khartoum Air
22550	Picc6	-	-	-	2255	Coded msgs

World Propagation Forecasts January

Circuits to London



How to use the Propagation Charts

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

success below this frequency are very slim.

The bold 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.

LM&S

Long, Medium and Short Waves

Welcome to a whole New Year of enjoyable listening in the broadcast bands! As regular readers will know, the information in this series is based upon actual reception by listeners in the UK and other countries. To them I send my sincere thanks for their support in the past and seek their continued support in the days to come.

If you would like to join the regular contributors and send along a report on your latest reception, please post it to me at the above address.

Good listening and Happy New Year!

Long Wave Reports

Note: l.w. & m.w. frequencies in kHz; s.w. in MHz; Time in UTC (=GMT). Unless stated, all logs compiled in the four week period ending October 30.

The sky waves from the RAI 10kW transmitter at Caltanissetta, Italy on 189kHz were received around 2125UTC on October 2 by **Roy Merrall** in Dunstable. At times they peaked SIO243. They were also received by **Fred Pallant** in Storrington at 2030 on October 30, but they were very weak.

Whilst checking the band on October 20 Roy tuned his receiver to one side of the carrier from the Polish reserve transmitter at Raszyn on 225 and heard at 2040 what was fairly obviously Turkish style music/song from the co-channel 600kW transmitter located at Van, Turkey.

Medium Wave Reports

The reception at night of m.w. transatlantic signals during October was reported by two listeners. **Harry Richards** (Barton-on-Humber) picked up the broadcasts from CJYQ in St.John's on 930 on three nights. At 0055 on the 9th they rated SINPO 23332 and a clear iden was obtained. They were received before midnight on the 14th and peaked 33222 at 2334. In the early hours of the 19th they were heard again, but the conditions were less favourable. At 0028 they were 23232.

Harry also received the broadcasts from WSSH in Boston, on 1510. At 0105 on the 15th he logged them as 23222. Their signal was fairly consistent during a phone-in on the 18th, rating 23232 at 0041. WTOP in Washington on 1500 was heard in the early hours of the 29th. Their signal peaked 23232 at 0116.

The broadcasts from CJYQ on 930, which are often used by UK DXers as a pointer to propagation conditions, were also received by **Robert Connolly** in Kilkeel. He logged them as 32332 at 0035. Later, he heard CKVO in Clarenville on 710. Their signal peaked 22222 at 0105.

The sky waves from several stations

in the Middle East also reached the UK after dark. **George Millmore** (Wootton, IoW) found the strength of the signals from that area well above average. For the first time he heard the UAE 600kW transmission from Dubai on 125.1, rated SIO222. A broadcast from Jordan via Al Karanah (1000kW) on 1494 was heard at 0043 by Roy Merrall on October 16. Several UK listeners picked up the broadcasts in Arabic from Saudi Arabia. Their 1600kW outlet at Dammam on 1440 was logged by **John Eaton** in Woking as 34523 at 2224.

Some of the stations in N.Africa were also noted in the reports. Three in Algeria were heard in the evening by **Alec Griffiths** in Inverness: Alger on 891 at 1815, Ain Beida on 531 at 2012 and Les Trembles on 549 at 2015. The ERTT 600kW transmission from Tunis-Djedeida, Tunisia on 630 was rated 21411 at 2112 by **Eddie McKeown** in Newry. Their 1200kW outlet at Slax on 1566 was logged by **Sheila Hughes** in Morden as 22222 at 2210. Santah, Egypt (500kW) on 864 was heard for the first time by George Millmore.

Short Wave Reports

The propagation conditions in the 13, 16 & 19m bands varied from day-to-day during October and no reliance could be placed on receiving any particular broadcast. Quite often they closed early in the evening. More reliable conditions were evident in the 22 & 25m bands. Reception was rather better than expected in the 31, 41 & 49m bands, especially over East/West paths.

Because the propagation conditions in the **25MHz (11m)** band are so unpredictable it is no longer being used by international broadcasters.

Although conditions in the **21MHz (13m)** band vary daily, it is being used by quite a few broadcasters. Their transmissions are beamed to specific areas but many can be heard in the UK when the conditions are favourable. The most distant to reach our shores come from R.Australia via Darwin on 21.725 (Eng to Asia 0630-1100). An improvement in the reception of them has often been noted during the morning. Typical ratings were 25532 at 0935 by **David Edwardson** in Wallsend, 33233 at 1000 by **Bernard Curtis** in Stalbridge, 35444 at 1015 by **Michael Griffin** in Ross-on-Wye and 44444 at 1038 by **Martin Dale** in Stockport.

Also received here before noon were UAER, Abu Dhabi 21.630 (Ar to N.Africa, Eu 0730?-1455) 44333 at 0749 by **Leo Barr** in Sunderland; R.Japan via Moyabi 21.640 (Jap to Eu, M.East 0830?-0900) SIO444 at 0834 by **Bill Clark** in Rotherham; Slovak R.Int via Rimavska Sobota 21.705 (Eng to

Long Wave Chart

Freq kHz	Station	Country	Power (kW)	Listener
153	Bechar	Algeria	1000	H*
153	Donebach	Germany	500	A,B*,C*,D,E,G,H,I,K
162	Allouis	France	2000	A,B*,D,E,G,H,I,J*,K
171	Nador Medi-1	Morocco	2000	C*,H*
171	Kaliningrad	Russia	1000	A,B*,D*,E,G,I,K*
177	Oranienburg	Germany	750	A,C*,E,G,H*,I*,K*
183	Saarlouis	Germany	2000	A,D,E,G,H,I,J,K
189	Caltanissetta	Italy	10	F*,H*
198	Droitwich BBC	UK	500	A,B*,D,E,G,I,J,K
207	Munich	Germany	500	A*,C*,E,G,H,I,J*,K*
207	Azilal	Morocco	800	C*
216	Roumoules RMC	S France	1400	A,C*,D,E,G,H,I,J*,K*
216	Oslo	Norway	200	H*
225	Raszyn Resv	Poland	?	A*,C*,D*,G,H*,I,K*
225	Van TRT-1	Turkey	600	F*
234	Beidweiler	Luxembourg	2000	A,B*,D,E,G,H,I,J,K
243	Kalundborg	Denmark	300	A,B*,D*,E,G,H,I,K
243	Alma-Ata	Kazakhstan	500	F*
252	Tipaza	Algeria	1500	A*,D*,G*,I*,K*
252	Atlantic 252	S.Ireland	500	A,B*,D*,E,G,H,I,J,K
261	Burg(R.Ropa)	Germany	200	A*,C*,D*,E,G,H,I*,K*
261	Taldom Moscow	Russia	2000	H*,K*
270	Topolna	Slovak Rep	1500	A*,D*,G,H*,I,J*,K*
279	Minsk	Belarus	500	A*,D*,I*,K*

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

Listeners:

A. Martin Dale, Stockport.
B. Alec Griffiths, Inverness.
C. Simon Hockenull, E Bristol
D. Sheila Hughes, Morden.
E. Eddie McKeown, Newry.

F. Roy Merrall, Dunstable
G. George Millmore, Wootton, IoW.
H. Fred Pallant, Storrington.
I. Bill Rowley, Colchester.
J. Tom Smyth, Co.Fermanagh.
K. Andrew Stokes, Leicester.

Aust 0830-0857) SIO444 at 0835 by **John O'Halloran** in Harrogate; BSKSA Saudi Arabia 21.495 (Ar [Holy Koran] to SE.Asia 0900-1200) 44444 at 0920 by **Rhoderick Ilman** in Oxted; DW via Julich? 21.680 (Eng to SE.Asia 0900-0950) 14311 at 0940 in Sunderland; R.Nederlands via Flevo? 21.505 (Eng, Du? to Asia, Far East 0930-1125) 22222 at 0955 by **Peter Pollard** in Rugby; R.Ukraine Int 21.800 (Uk WS 0900-1700?) 33333 at 1000 in Rugby; R.Portugal Int via Sines 21.655 (Port to Brazil? 1000-1200) 44433 at 1030 in Kilkeel; UAER, Dubai 21.605 (Eng to Eu 1030-1055) 35333 at 1048 by **Vera Brindley** in Woodhall Spa; RFI via Issoudun 21.620 (Fr to E.Africa 0700?-1555) 33222 at 1105 by **Darren Beasley** in Bridgwater.

After mid-day HCJB Ecuador 21.455 (Eng, u.s.b. + p.c.) was 24232 at 1241 in Barton-on-Humber; UAER, Dubai on 21.605 (Eng to Eu 1330-1355) 45444 at 1330 by **Simon Hockenull** in E.Bristol; BBC via Ascension Is 21.660 (Eng to W/E/S.Africa 1100-1700) 23222 at 1403 in Woking; R.Portugal Int via Sines 21.515 (Port to M.East, India? 1400-1600) 34233 at 1539 in Newry; WYFR via Okeechobee 21.525 (Eng, Ar, Fr, Ger, Port to W.Africa 1600-2045?) 34343 at 1600 in Storrington & 21.745 (Eng to Eu 1600-1645) SIO444 at 1645 by **Kenneth Buck** in Edinburgh; Monitor R.Int via WSHB 21.640 (Eng to E.Africa 1600-1850?) 44434 at 1650 in Morden.

The **18MHz (15m)** band (18.900-19.020MHz) was allocated by the 1992 WARC for single sideband broadcasting in the future, but it is already being used by WEWN in Birmingham for an amplitude modulated transmission on 18.930 (Sp to S.Am 1400-2100?). It was rated 33333 at 1639 by **Andrew Stokes** in Leicester and 24332 at 1951 in Oxted.

Conditions in the **17MHz (16m)** band have been unreliable. Sometimes R.Australia's broadcast to Asia via Carnarvon on 17.715 (Eng 0200-0400, 0500-0900) has reached the UK. In Wallsend it was logged as

25532 at 0730. Also heard here in the morning were AWR via Slovakia? 17.630 (Eng to Africa? 0900-0957) 44544 at 0915 in Ross-on-Wye; Monitor R.Int via KHBI Saipan 17.555 (Eng to NE.Asia 0900-1000) 43344 at 0930 in Rugby; Channel Africa via Meyertron 17.810 (Eng to E.Africa 1000-1100) SIO222 at 1000 by **Tom Smyth** in Co.Fermanagh; AIR Delhi 17.387 (Eng to Pacific areas 1000-1100) 24232 at 1001 in Newry & via ? 17.895 (Eng to NE.Asia 1000-1100) 22222 at 1030 in Kilkeel; R.Pakistan, Islamabad 17.900 (Eng to Eu 1100-1120) 34543 at 1115 in Bridgwater.

During the afternoon Africa No.1, Gabon 17.630 (Fr to W.Africa 0700-1600) was 45444 at 1225 in Woking; Voice of Greece, Athens 17.520 (Gr to C.Africa? 1300-1350) was logged as SIO211 at 1300 by **Philip Rambaut** in Macclesfield; HCJB Quito 17.890 Eng to N/S.Am 1130-1600) as 23332 at 1325 by **George Tebbitts** in Penmaenmawr; WEWN, Birmingham 17.510 (Ar to M.East, N.Africa 1500-1600) SIO222 at 1500 in Harrogate; Egyptian R, via Abu Zaabal 17.670 (Home Sce rty to N.Africa, S.Eu 1300-1900) 33443 at 1614 in Storrington; VOA via Tangier 17.895 (Eng to Africa 1630-1900?) SIO333 at 1625 in Rotherham; World Wide Country R, Nashville 17.525 (Eng to Eu 1700-?) 44444 at 1705 in Morden.

Later, WYFR Okeechobee 17.760 (Eng to Eu 1800?-2000) was SIO344 at 1935 in Edinburgh; R.Nederlands via Bonaire? 17.605 (Eng to W.Africa 1830-2025) 44434 at 1937 in Woodhall Spa; R.For Peace Int, Costa Rica 17.905 (Eng [u.s.b.]) heard at 1951 in Dunstable.

The conditions in the **15MHz (19m)** band have also been unreliable. When favourable, R.New Zealand's signals to Pacific areas have reached the UK. Their transmission from Rangataiki on 15.115 (Eng 2051-0715) was SIO211 at 2100 in Macclesfield.

Many other broadcasters are active in this band. Among those noted in the morning were R.Finland via Pori 15.330 (Eng to E.Asia, Aust

Medium Wave Chart

Freq kHz	Station	Country	Power (kW)	Listener	Freq kHz	Station	Country	Power (kW)	Listener	Freq kHz	Station	Country	Power (kW)	Listener
531	Ain Beida	Algeria	600	A*.D*.E*.M*.S*	873	Frankfurt(AFN)	Germany	150	C*.D*.F*.K*.M*.P*.S*	1287	Lerida(SER)	Spain	10	M*
531	Torshavn	Faeroe Is.	100	R	873	Zaragoza(SER)	Spain	20	A*.K*.M*.P*.S*	1296	Valencia(COPE)	Spain	10	A*.C*.K*.M*.P*.S*
531	Leipzig	Germany	100	E*.K*.M*.P*.S*	882	COPE via ?	Spain	?	A*.C*.G*.K*.M*	1296	Orfordness(BBC)	UK	500	C.I.M*.P
531	RNE5 via ?	Spain	?	A*.K*.M	882	Washford(BBCWales)	UK	100	C.D.E*.G.I.M.PQ*.S	1305	Rzeszow	Poland	100	K*.M*.P*.R*
531	Beromunster	Switzerland	500	H*	891	Algiers	Algeria	600/300	A*.C*.D*.E*	1305	RNE5 via ?	Spain	?	K*.M*
540	Wavre	Belgium	150/50	A*.E*.J.K*.M.P.R.S	891	Huisberg	Netherlands	20	I.K*.M*.P*.S*	1314	Kvitsoy	Norway	1200	*.E*.J.K*.M*.P*.S*
540	Soit	Hungary	2000	E*.K*.P*	900	Milan	Italy	600	A*.K*.M*.P*.S*	1323	Wachenbrunn(RMWS)	Germany	1000/150	A*.C.R*.S*
540	Sidi Bennour	Morocco	600	A*.M*	900	COPE via ?	Spain	?	K*	1332	Rome	Italy	300	A*.K*.M*.P*
549	Les Trembles	Algeria	600	A*.D*.E*.M*.S*	900	Quaravayt	Saudi Arabia	1000	M*	1341	Lisnagarvey(BBC)	Ireland (N)	100	C.E*.F*.G*.M*.P*.S*
549	Thurmau (DLF)	Germany	200	C*.I.K*.M.P.S*	909	B'mans Pk(BBC5)	UK	140	E*.M.P.R.S*	1341	Tarrasa(SER)	Spain	2	G*
558	Espoo	Finland	100	A*.E*	909	M'side Edgel(BBC5)	UK	200	C	1350	Nancy(NICE)	France	100	C.E*.K*.M*.S*
558	Rostock(NDR)	Germany	20	K*	918	Plesivec(Sloven nR)	Yugoslavia	600/100	A*.C*.M*.P*	1359	Arganda (RNE-FS)	Spain	600	A*.M*.R*
558	Tirgu Jiu	Romania	200	M*	918	Madrid(R.Int)	Spain	?	A*.K*.M*	1368	Foxdale(Manx R)	IoM	20	C.E*.M*.P*.R*
558	RNE5 via ?	Spain	?	A*.K*.M*.P*.S*	927	Wolvertem	Belgium	300	C.E*.J.K*.M.P.S	1377	Lille	France	300	I.K*.M.P.S
567	Berlin	Germany	100	K*.M*	936	Bremen	Germany	100	I.K*.M*.S*	1386	Athens	Greece	50	L*
567	Tullamore(RTE1)	Ireland (S)	500	A*.C.E*.F.G.	936	Venezia	Italy	20	E*.M*.R*	1386	Bolshakov	Russia	2500	A*.E*.M*
567	RNE5 via ?	Spain	?	M*.P*	936	RNE5 via ?	Spain	?	A*.K*	1386	R.Ned via B'shakovo	Russia	2500	B*.J*.K*.P*
576	Muhacker(SDR)	Germany	500	E*.K*.M.S*	945	Toulouse	France	300	C*.K*.M*.R*	1395	Lushnje(Tirana)	Albania	1000	A*.B*.G*.K*.M*.S*
576	Riga	Latvia	500	M*	954	Brno(Dobrochov)	Czech Rep.	200	M*	1404	Brest	France	20	A*.K*.M.P*.S*
576	Barcelona(RNE5)	Spain	50	A*.K*.M*.P*.S*	954	Madrid(Cl)	Spain	20	A*.C*.M*.P*.S*	1413	RNE5 via ?	Spain	?	A*.M*.P*.R*.S*
585	Drf Wien	Austria	600	M*	963	Pori	Finland	600	A*.C*.E*.K*.M*.P*.R*.S*	1422	Alger	Algeria	50/25	A*.L*
585	Paris(FIP)	France	8	I.K*.M	963	Paris	France	8	M*	1422	Heusweiler(SR)	Germany	1200/600	C.E*.G*.I.K*.M*.P.S
585	Madrid(RNE1)	Spain	200	A*.C*.K*.M*.P*.S*	963	Tir Chonail	Ireland (S)	10	M*	1431	Nikolayev	Ukraine	400	K*
585	Dumfries(BBCScot)	UK	2	E*.R*	972	Hamburg(NDR)	Germany	300	A*.E*.K*.M*.R*.S*	1440	Marnach(RTL)	Luxembourg	1200	E*.I.M.O.P.S
594	Frankfurt(HR)	Germany	1000/400	C*.E*.K*.M*.P*.S*	972	RNE1 via ?	Spain	?	A*.K*.M*	1440	Damman	Saudi Arabia	1600	A*.D*.K*.D*
594	Oujda-1	Morocco	100	A*.M*	972	Nikolayev	Ukraine	500	P*	1449	Berlin	Germany	5	K*
594	Muge	Portugal	100	K*.M*.S*	981	Alger	Algeria	600/300	A*.D*.K*.M*.P*.S*	1449	Squinzano	Italy	50	D*.M*
603	Lyon	France	300	D*.K*	981	Megara	Greece	200	A*	1449	Redmoss(BBC)	UK	2	K*
603	Sevilla(RNE5)	Spain	50	A*.C*.M*.R*	990	Berlin	Germany	300	M*	1458	Lushnje(Tirana)	Albania	500	P*.S*
603	Newcastle(BBC)	UK	2	C	990	Ribbaol(SER)	Spain	10	A*.C*.K*.M*.P*.S*	1467	Monte Carlo(TWR)	Monaco	1000/400	K*.M*.P*.S*
612	Athlone(RTE2)	Ireland (S)	100	C.E*.F.G*.M.P.S*	990	Redmoss(BBC)	UK	1	K*	1476	Wien-Bisamberg	Austria	600	A*.C*.E*.K*.M*.P*.S*
612	RNE1 via ?	Spain	10	A*.M*.P*	999	Tyrryl(BBC)	UK	1	F*	1485	SER via ?	Spain	?	A*.C*.M*.P*.R*.S*
621	Wavre	Belgium	80	A*.I.K*.M.P.S	999	Schwerin (RIAS)	Germany	20	A*	1494	Clermont-Ferrand	France	20	M*
621	Barcelona(OCR)	Spain	50	A*.K*.M*	999	Madrid(COPE)	Spain	50	C*.K*	1494	Al Karanah	Jordan	1000	L*
630	Vigra	Norway	100	A*.E*.H*.K*.M*	1008	Las Palmas(SER)	Gran Canaria	?	K*.M*	1494	St.Petersburg	Russia	1000	A*.E*.G*.M*.P*
630	Tunis-Djedeida	Tunisia	600	A*.K*.M*	1008	Flevo(Hilv-5)	Holland	400	C*.I.K*.M.P.S	1503	Stargard	Poland	300	K*
639	Praha(Libice)	Czech	1500	A*.C*.E*.K*.M*.P*.S*	1017	Rheinsender(SWF)	Germany	600	C*.E*.K*.M*.P*.R*.S*	1512	Wolvertem	Belgium	600	C.E*.I.K*.M.N*.P.S*
639	RNE1 via ?	Spain	?	M*.P*.S*	1017	RNE5 via ?	Spain	?	A*.K*.M*	1512	Jeddah	Saudi Arabia	1000	L*
648	RNE1 via ?	Spain	10	A*.M*	1026	Grz-Dobl	Austria	100	A*.C*.M*.S*	1521	Kosice(Cizatec)	Slovakia	600	C*.K*.L*.M*.P*.S*
648	Orfordness(BBC)	UK	500	C*.I.M.P.S*	1026	SER via ?	Spain	?	M*	1521	Duba	Saudi Arabia	2000	A*.L*
657	Neubrandenburg(NDR)	Germany	250	K*.M*	1035	Tallinn	Estonia	500	M*	1521	Kazan(R.Moscow)	Russia	20	L*
657	Madrid(RNE5)	Spain	20	A*.K*.M*.P*.S*	1035	Lisbon(Prog3)	Portugal	120	A*.C*.K*.M*	1530	Vatican R	Italy	150/450	A*.E*.G.K*.M*.P*.R*.S*
657	Wrexham(BBCWales)	UK	2	G.I.K*.S	1044	Dresden	Germany	250	K*	1539	Mainfingen(DLF)	Germany	700	C*.E*.K*.M*.P*.S*
666	Bodensees dr(SWF)	Germany	300/180	A*.K*.R*	1044	S Sebastian(SER)	Spain	10	A*.C*.K*.M*.S*	1557	Nice	France	300	P*
666	Lisboa	Portugal	135	A*.K*.M*.P*	1053	Tanger	Morocco	600	A*	1566	Nagpur	India	1000	L*
666	Barcelona(COPE)	Spain	10	A*	1053	Iasi	Romania	1000	F*.K*.M*	1566	Cheju(FEBC)	Korea	250/100	L*
675	Marseille	France	600	A*.M*	1053	Zaragoza(COPE)	Spain	10	A*.C*.M*.S*	1566	Covilha	Portugal	1	L*
675	Lopid(R10 Gold)	Holland	120	A*.C.E*.H*.I.	1062	Kalundborg	Denmark	250	A*.E*.F*.G*.K*.M*.P*.S*	1566	Slax	Tunisia	1200	A*.G*.M*.P*.S*
684	Sevilla(RNE1)	Spain	500	A*.C*.K*.M*.P*.S*	1062	Cagliari	Italy	25	L*	1566	Odessa	Ukraine	7	L*
684	Availa(Beograd-1)	Yugoslavia	2000	A*.D*.K*.M*.P*	1062	Norte	Portugal	100	P*	1575	Genova	Italy	50	A*.M*
693	Burghhead(BBC5)	UK	50	E*	1071	Brest	France	20	A*.K*.M	1575	SER via ?	Spain	5	A*.M*.S*
693	Droitwich(BBC5)	UK	150	C.I.M.P.S	1071	France-Inter	France	?	C	1584	SER via ?	Spain	2	A*.M*.P*
702	Flensburg(NDR)	Germany	5	I.K*	1071	Lille	France	40	F*.I.S	1593	Holzkirchen(RFE)	Germany	150	K*.L*.M*
702	Zamorla(RNE1)	Spain	10	A*.M*.P*.S*	1071	Riga	Latvia	50	M*	1593	Baneasa	Romania	14	L*.M*
711	Rennes 1	France	300	C*.F.L.K*.M.P.S*	1071	Bilbao(EI)	Spain	5	A*.K*.M*	1593	Dniopetrovsk	Ukraine	5	L*
711	Laayoune	Morocco	600	A*.M*	1080	Katowice	Poland	1500	A*.E*.F*.M*.P*.S*	1602	SER via ?	Spain	?	A*.R*
711	Murcia(COPE)	Spain	5	M*	1080	SER via ?	Spain	?	A*.K*.M*.P*	1602	Vitoria(EI)	Spain	10	A*.M*
720	Langenberg	Germany	200	I.L*	1089	Durres	Albania	150	G*.L*.P*					
720	Lisnagarvey(BBC4)	Ireland (N)	100	D*.E*.M.S*	1089	Krasnodar	Russia	300	A*.F*.G*.P*.S*					
720	Norte	Portugal	100	A*.K*.M*.P*	1098	Nitra(Jarok)	Slovakia	1500	M.P.S*					
720	Lds Rd.Ldn(BBC4)	UK	0.5	M.P.S*	1098	RNE5 via ?	Spain	?	A*.C*.M*					
729	Cork(RTE1)	Ireland (S)	10	E*.M*.R	1107	AFN via ?	Germany	10	G*.K*.S*					
729	RNE1 via ?	Spain	?	A*.E*.K*.M*.P*.S*	1107	RNE5 via ?	Spain	?	A*.C*.G*.K*.M*.P*.S*					
738	Paris	France	4	I.K*.M	1116	Bari	Italy	150	A*.M*.P*.R*					
738	Poznan	Poland	300	K*.M*	1116	Pontevedral(SER)	Spain	5	K*					
738	Barcelona(RNE1)	Spain	500	A*.E*.K*.M*.P*.R*.S*	1125	La Louviere	Belgium	20	K*.M*					
747	Flevo(Hilv2)	Holland	400	A*.C.E*.I.K*.M*.P.S	1125	Deanovec	Croatia	100	M*					
747	Cadiz(RNE5)	Spain	10	K*.M*	1125	RNE5 via ?	Spain	?	A*.C*.M*.S*					
756	Braunschweig(DLF)	Germany	800/200	E*.I.K*.M*.P*.S*	1134	Zadar(Croatian R)	Yugoslavia	600/1200	A*.C*.K*.M*.P*					
756	Bilbao(EI)	Spain	5	K*.M*	1134	COPE via ?	Spain	2	A*.C*.M*.S*					
756	Redrutn(BBC)	UK	2	M*	1143	Stuttgart(AFN)	Germany	10	A*.E*.K*.M					
756	Sottens	Switzerland	500	A*.C*.D*.K*.M*.P*.S*	1143	Messina	Italy	6	M*.P*					
774	Abis	Egypt	500	A*	1143	COPE via ?	Spain	2	A*.K*.M*					
774	Enniskillen(BBC)	Ireland (N)	1	E*.R*	1152	RNE5 via ?	Spain	10	A*.K*.S*					
774	RNE1 via ?	Spain	?	A*.C*.K*.M*.P*.S*	1161	Strasbourg(Flnt)	France	200	A*.C*.K*.M*.S*					
783	Burg	Germany	1000	C*.K*.M*.P*.S*	1161	S Sebastian(EI)	Spain	50	K*					
783	Miramar(R.Porto)	Portugal	100	K*.M*	1170	Vila Real	Portugal	10	L*					
783	Dammam	Saudi Arabia	100	A*.M*	1170	Beli Kriz	Slovenia	300	L*					
792	Limoges	France	300	K*.M.S*	1179	SER via ?	Spain	?	G*					
792	Lingen(NDR)	Germany	5	M*	1179	Solvestra	Sweden	600	A*.C.E*.G*.K*.M*.O*.P*.S*					
792	Sevilla(SER)	Spain	20	A*.K*.M*.P*	1188	Kuurne	Belgium	5	A*.K*.M.P.S*					
801	Munchen-Ismaning	Germany	300	D.K*.M*.S*	1188	Szolnok	Hungary	135	L*.M*					
801	St.Petersburg	Russia	1000	M*	1197	Munich(VOA)	Germany	300	K*					
801	RNE1 via ?	Spain	?	A*.C*.K*.M*.P*.S*	1197	Virgin via ?	UK	?	E*.I.M.P.S					
810	Madrid(SER)	Spain	20	A*.M*.P*.S*	1206	Bordeaux	France	100	K*					
810	Burghhead(BBC5)	UK	100	E*.R*	1206	Wroclaw	Poland	200	K*.M*.P*.S*					
810	Westerglen(BBCScot)	UK	100	C.D.F*.M*.P*.Q*.S*	1215	Virgin via ?	UK	?	C.E*.I.M.O.P.R.S					
819	Batra	Egypt	450	A*.M*	1224	Vidin	Bulgaria	500	M*.S*					
819	Toulouse	France	50	K*.M.P*	1224	Virgin via ?	UK	?	I.P.R*					
819	Warsaw	Poland	300	K*.M*.P*	1233	Liege	Bel							

Local Radio Chart

Freq kHz	Station	ILR BBC	e.m.r.p (kW)	Listener	Freq kHz	Station	ILR BBC	e.m.r.p (kW)	Listener
558	Spectrum R	I	7.50	A,H,I,J,K,N	1170	Swansea Sound	I	0.58	L*
585	R.Solway	B	2.00	J	1242	Invicta Snd (Coast)	I	0.32	H,L*
603	Cheltenham (CD603)	I	?	A,D*,J,N	1242	Isle of Wight R	I	0.50	I
603	Invicta SG (Coast)	I	0.10	G*,H,I,K	1251	Saxon R (SGR)	I	0.76	H,K,L,M*
630	R.Bedfordshire (3CR)	B	0.20	A,D,H,I,J,K,N	1260	Brunel R (Cl.Gold)	I	1.60	I
630	R.Cornwall	B	2.00	I	1260	Marcher Snd (Gold)	I	0.64	A,C,L*
657	R.Clwdd	B	2.00	I,J	1260	Sunrise R	I	0.29	C,K,N
657	R.Cornwall	B	0.50	I	1260	R.York	B	0.50	C
666	DevonAir R	I	0.34	I,M*	1278	Bradford (Gt.Yks)	I	0.43	I,J,L*
666	R.York	B	0.80	A,F,J,K,N	1305	Barnsley (Gt.Yks)	I	0.15	A,J,L*,N
729	BBC Essex	B	0.20	H,I,J,K,N	1305	Red Dragon (Touch)	I	0.20	I
738	Hereford/Worcester	B	0.037	A,I,J,N	1323	R.Bristol (Som.Snd)	B	0.63	A,L*
756	R.Cumbria	B	1.00	C	1323	Brighton (SCR)	I	0.50	B*,I,K,L
756	R.Maldwyn	I	0.63	A,I,J	1332	Hereward R (WGMs)	I	0.60	A,C,F,H,J,K,L,N
765	BBC Essex	B	0.50	A,H,I,J,K,L*,N	1332	Wiltshire Sound	B	0.30	F,I
774	R.Kent	B	0.70	H,J,K	1359	Essex R (BreezeAM)	I	0.28	H,K
774	R.Leeds	B	0.50	A,J	1359	Mercia Snd (Xtra-AM)	I	0.27	J,N
774	Gloucester (3CSG)	I	0.14	I,N	1359	R.Solent	B	0.85	I
792	Chiltern (S.Gold)	I	0.27	A,B,H,I,J,K,M,N	1368	R.Lincolnshire	B	2.00	J,K,M,N
801	R.Devon & Dorset	B	2.00	E,I	1368	Southern Counties R	B	0.50	I
828	Chiltern (S.Gold)	I	0.20	B,N	1368	Wiltshire Sound	B	0.10	I
828	R.Aire (Magic828)	I	0.12	A	1413	Sunrise R	I	0.125	I
828	2CR (Cl.Gold)	I	0.27	I	1431	Essex R (BreezeAM)	I	0.35	A,C,H,K,N
837	R.Cumbria/Furness	B	1.50	L*	1431	R.210 (Cl.Gold)	I	0.14	A,I
837	R.Leicester	B	0.45	A,F,I,J,K,N	1449	R.Peterboro/Cambs	B	0.15	F,I,K,L*,M*,N
855	R.Devon & Dorset	B	1.00	I	1458	Fortune	I	5.00	A,C
855	R.Lancashire	B	1.50	A,J	1458	Sunrise R	I	50.00	A*,C,H,I,K,M*
855	R.Norfolk	B	1.50	F,H,K,N	1476	Guildford (M.Xtra)	I	0.50	A,C,I,K
855	Sunshine R	I	0.15	N	1485	R.Humberside	B	1.00	J,K
873	R.Norfolk	B	0.30	A,F,I,K,N	1485	R.Merseyside	B	1.20	A,C,J
936	Brunel R (Cl.Gold)	I	0.18	I,L*	1485	Southern Counties R	B	1.00	C,H,I,K,N
945	R.Trent (Gem AM)	I	0.20	A,C*,I,J,K,L*,N	1503	R.Stoke-on-Trent	B	1.00	A,C,I,K,N
954	DevonAir (Cl.Gld)	I	0.32	I,M*	1521	Reigate (M.Xtra)	I	0.64	A,C,I,K
954	R.Wyvern (WYVN)	I	0.16	A,I,K,N	1530	Huddersfld (Gt.Yks)	I	0.74	A,C
990	WABC (Nice & Easy)	I	0.09	A,J	1530	R.Essex	B	0.15	H,I,K
990	R.Devon & Dorset	B	1.00	I	1530	R.Wyvern (WYVN)	I	0.52	C,J,N
990	Hallam R (Gt.Yks)	I	0.25	A,K	1548	Capital R (Cap G)	I	97.50	I,K
999	R.Solent	B	1.00	I	1548	R.Bristol	B	5.00	L*,N
999	R.Trent (Gem AM)	I	0.25	K,N	1548	Liverpool (City G)	I	4.40	A,J,M*
999	Red Rose (Gold)	I	0.80	A,C	1548	R.Forth (Max AM)	I	2.20	C,K*
1017	Beacon R (WABC)	I	0.70	A,I,J,L*	1557	Chiltern R (Gold)	I	0.76	A*,C,J,N
1026	Downtown R	I	1.70	C,M	1557	Southampton (SCR)	I	0.50	I
1026	R.Cambridgeshire	B	0.50	A,F,H,K,N*	1557	R.Lancashire	B	0.25	A,C
1026	R.Jersey	B	1.00	E,I	1557	Tending (Mellow)	I	?	C*,H,K
1035	Country 1035	I	?	I,K	1584	Kettering (KCBC)	I	0.04	C,K,N
1035	R.Sheffield	B	1.00	A,M,N	1584	R.Notttingham	B	1.00	I,J,N
1035	West Sound R	I	0.32	C	1584	R.Shropshire	B	0.50	I
1107	Moray Firth R	I	1.50	C,L	1584	R.Tay	I	0.21	C
1116	R.Derby	B	1.20	A,C,H,J,K,L*	1602	R.Kent	B	0.25	C,H,I,K,N
1116	R.Guernsey	B	0.50	I					
1152	BRMB (Xtra-AM)	I	3.00	N					
1152	LBC (L.Talkback R)	I	23.50	H,I,K,M*					
1152	Piccadilly R (Gold)	I	1.50	A,J					
1152	R.Broadland	I	0.83	A,H,K					
1152	R.Clyde (Clyde 2)	I	3.06	C					
1161	R.Bedfordshire (3CR)	B	0.10	K,L,N					
1161	Southern Counties R	B	1.00	I,K,L*					
1161	R.Tay	I	1.40	C					
1161	Humberside (Gt.Yks)	I	0.35	A					
1170	Hi Wycombe 1170AM	I	?	B,F					
1170	Portsmouth (SCR)	I	0.12	I					
1170	R.Orwell (SGR)	I	0.28	H,K,L					
1170	Signal R (S.Gold)	I	0.20	A,J,N					

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

Listeners:

A: Martin Dale, Stockport.
 B: John Eaton, Woking.
 C: Arthur Grainger, Carstairs Junction.
 D: Francis Heame, N.Bristol.
 E: Simon Hockenhuell, E.Bristol.
 F: Sheila Hughes, Morden.
 G: Rhoderick Illman, Oxted.

H: Peter Kay, near Felixstowe.
 I: George Millmore, Wootton, IoW.
 J: Philip Rambaut, Macclesfield.
 K: Bill Rowley, Colchester.
 L: John Sadler, Bishops Cleeve.
 M: Tom Smyth, Co.Fermanagh.
 N: Andrew Stokes, Leicester.

15.240 (Eng to Africa 1600-1700) SIO322 at 1600 in Dunstable; WEWN Birmingham 15.695 (Eng to Eu? 1600-1658) 54545 at 1600 in Penmaenmawr; LJB via Sabrata, Libya 15.415 (Various ?-1715?) 45554 at 1601 in Leicester; WINB Red Lion, 15.715 (Eng to Africa, Eu 1600-1900) SIO322 at 1610 in Rotherham; HCJB Quito 15.490 (Eng to Eu 1700-2000) rated 35333 at 1700 by **Roy Patrick** in Derby.

During the evening RNB Brasilia, Brazil 15.265 (Eng, Ger to Eu 1800-2020) was SIO323 at 1900 in Co.Fermanagh; R.Nederlands via Bonaire? 15.315 (Eng to W.Africa 1830?-2025) 34433 at 1932 in Oxted; KTBN Salt Lake City 15.590 (Eng to N.Am 1600-0100) 44434 at 1940 in Morden; BBC via Ascension IS 15.400 (Eng to Africa 1500-2300) 35444 at 1950 in Storrington; RAE Buenos Aires, Argentina 15.345 (Eng, It, Fr, Ger, Sp to Eu, Africa 1800-2300) 24542 at 2002 in Wallsend; WWCR Nashville 15.685 (Eng to Eu 1200-2215?) 32222 at 2130 in Stalbridge.

The broadcasters using the **13MHz (22m)** band in the daytime include R.Australia via Darwin 13.605 (Eng to Asia 0900-1000, 1100-1200) SIO233 at 0920 in Edinburgh and

43333 at 1105 in Killeel; R.Austria Int via Moosbrunn 13.730 (Ger, Eng, Fr, Sp to Eu 0400-1800) 45534 at 1030 in Ross-on-Wye; UAER, Dubai 13.675 (Eng to Eu 1030-1100) 24542 at 1035 in Wallsend; SRI via Sottens? 13.635 (Eng, Fr, It, Ger to SE/Asia 1300-1500) 55455 at 1320 in Leicester; R.Tashkent, Uzbekistan 13.785 (Eng to S.Asia 1330-1358) heard at 1330 in Derby; WYFR via Okeechobee 13.695 (Fr to Canada 1100-1300, Eng to N.Am 1300-1400) 35323 at 1358 in Woodhall Spa; R.Pakistan, Islamabad 13.590 (Eng to M.East 1600-1630) 34222 at 1615 in Bridgwater; DW via Cyclops 13.790 (Eng to S.Asia 1600-1650) SIO434 at 1615 in Harrogate; UAER, Dubai 13.675 (Eng to Eu 1600-1640) SIO433 at 1620 in Rotherham; WWCR Nashville 13.845 (Eng to E.USA 1200-0200) 45444 at 1630 in Woking.

Later, VOA via Selebi-Phikwe 13.710 (Eng to Africa 1630-2130?) was 24333 at 1905 in Barton-on-Humber; WHRI South Bend 13.760 (Eng to E.USA, Eu 1700-0000) 53544 at 2100 in Stirling; RCI via Sackville? 13.690 (Eng to Eu 2100-2200?) 22444 at 2130 in Appleby; Monitor R.Int via WSHB 13.770 (Eng to Eu 2200-?) 35333 at 2148 in Barton-on-Humber.

Good reception from many areas has been noted in the **11MHz (25m)** band by listeners in the UK. R.Australia's broadcast to S.Asia via Carnarvon on 11.660 (Eng 1430-1800) has often reached the UK. It was logged as 33343 at 1430 in Ross-on-Wye. Later, 11.695 from Shepparton (Eng to Pacific areas 1700-2030) was 44333 at 2000 in Morden.

Also heard here in the daytime were Slovak R.Int, via Velke Kostolany 11.990 (Eng to Aust 0830-0857) 33443 at 0853 in Oxted; R.Ukraine Int 11.705 (Uk WS 0900-1500?) 44444 at 0900 in Rugby; R.Finland via Pori 11.755 (Fin, Sw, Fr, Ger to Eu 1000-1100) 43344 at 1030 in Stockport; R.Romania Int, Bucharest 11.940 (Eng to Eu 1300-1400) 55555 at 1323 in Leicester; Voice of the Mediterranean, Malta 11.925 (Eng, Ar to N.Africa 1400-1600) 44444 at 1430 in Newry; FEBC Boucau, Philippines 11.995 (Eng to India, SE.Asia 1300-1600) 44444 at 1450 in Ross-on-Wye; R.Pakistan, Islamabad 11.570 (Eng to M.East 1600-1630) SIO454 at 1601 in Edinburgh; Vatican R, Italy 11.625 (Fr, Eng to Africa 1700-1800?) SIO222 at 1700 in Co.Fermanagh.

In the evening ISBS Reykjavik 11.402 (lc [u.s.b.+ p.c.] to Eu 1855-

1930) was 34453 at 1859 in Wallsend; R.Thailand, Bangkok 11.855 (Eng to SE.Asia? 1900?-2000) 34222 at 1930 in Bridgwater; R.Romania Int, Bucharest 11.940 (Eng to Eu 1900-1955) 44444 at 1930 in Woodhall Spa; R.Globo, Rio de Janeiro 11.805 (Port 0900-0330) 34443 at 2000 in Stirling; R.Kuwait via Kabd 11.990 (Eng to Eu 1800-2100) SIO433 at 2000 in Harrogate; R.Nac da Amazonia, Brazil 11.780 (Port 0900-0200) SIO322 at 2100 in Macclesfield; RCI via Sackville? 11.945 (Eng to Eu 2100-2300) 55555 at 2100 in Appleby; R.Japan via Moyabi 11.925 (Eng to Eu 2100-2155) 53333 at 2115 in Penmaenmawr; AIR via Bangalore 11.920 (Hi, Eng to Eu 1745-2230) 43333 at 2135 in Stalbridge.

Sometimes R.New Zealand's **9MHz (31m)** broadcast to Pacific areas has reached the UK! Their 100kW transmission from Rangataiki, on 9.700 (Eng 0759-1206) peaked SIO222 at 0815 in Macclesfield, SIO233 at 0910 in Dunstable and SIO333 at 1045 in Edinburgh. R.Australia has also been heard here while beaming to Pacific areas from Shepparton on 9.710 (Eng 0730-0900), but their signal was often weak. In Oxted it rated 21331 at 0800. Later, their broadcast to Asia via Darwin 9.610 (Eng 1100-1430) was SIO233 at 1115 in Harrogate. Much better reception was noted from Carnarvon on 9.770 (Eng to Asia 1430-1630) - rated 43343 at 1616 in Newry.

Also received here were SRI via Schwarzenburg? 9.885 (Eng, Fr, Ger, It to Far East, SE.Asia 1100-1300) 44554 at 1114 in Bridgwater; R.Mediterranee Int via Nardor 9.575 (Fr, Ar to N.Africa, S.Eu 0500-0100) 34354 at 1326 in Leicester; VOA via Tinang 9.760 (Eng to S.Asia 1400-1700) 33323 at 1558 in Rugby; BBC via Kranji 9.740 (Eng to S/E.Asia 0900-2200) 33222 at 2145 in Stalbridge; UAER, Abu Dhabi 9.770 (Eng to NW.USA 2200-0000) SIO444 at 2200 in Edinburgh; R.Nacional del Paraguay 9.735 (Sp 0800-0400) 24542 at 2230 in Wallsend.

Programmes for European listeners were noted from HCJB Quito 9.420 (Eng 0700-0830), rated 44444 at 0700 by **Laurence Mason** in Hassocks; R.Norway Int, Oslo 9.590 (Eng 1300-1400) 55555 at 1300 in Appleby; R.Jordan via Al Karanah 9.560 (Ar, Eng 1500-1730) 33344 at 1704 in Stockport; R.Romania Int, Bucharest 9.690 (Eng 1900-1957) 55544 at 1900 in Stirling; R.Bulgaria, Sofia 9.700 (Eng 1900-2000) SIO222 at 1900 in Co.Fermanagh & Eng to Eu 2200-2300 SIO322 at 2245 by Francis Heame in N.Bristol; VOIRI Tehran, Iran 9.022 (Eng 1930-2030) SIO322 at 1930 in Rotherham; Voice of Russia 9.550 (Eng WS) SIO333 at 2000 by **Julian Wood** in Elgin; Monitor R.Int via WSHB 9.355 (Eng 2000-2100) 44333 at 2030 in Morden; China R.Int, Beijing 9.920 (Eng 2000-2155) 44444 at 2100 in Penmaenmawr; AIR via Delhi? 9.950 (Eng 2045-2230) 55444 at 2105 in Ross-on-Wye.

In the **7MHz (41m)** band KTBN via Salt Lake City 7.510 (Eng to N.Am 0000-1600) was 13231 at 0925 in Rugby; R.Australia via Carnarvon 7.260 (Eng to S.Asia 1430-2100) 22232 at 1715 in Woodhall Spa; Voice of Zaire, Kinshasa 7.100 (Fr, Sw 24hrs) 33343 at 1951 in Oxted; Vatican R, Italy 7.355 (Eng to Africa 2000-2028) 44333 at

2000 in Morden; VOA via Selebi Phikwe 7.415 (Eng to Africa 1900?-2200?) SIO323 at 2100 in Co.Fermanagh.

Broadcasts to Europe in this band were noted from R.Japan via Skelton 7.230 (Jap, Eng 0500-0800) SIO333 at 0703 in Rotherham; WEWN Birmingham 7.465 (Eng 0900?-1200, also to USA) SIO444 at 0900 in Harrogate; Sudwestfunk via Rohrdorf 7.265 (Ger 24hrs) 54455 at 1100 in Stockport; R.Prague, Czech Rep 7.345 (Eng 1130-1157) 54545 at 1130 in Penmaenmawr; R.Norway Int, Oslo 7.120 (Eng 1800-1830) 54444 at 1800 in Appleby; Polish R, Warsaw 7.285 (Eng 1800-1855) 54533 at 1830 in Stirling; AIR via Aligarh? 7.412 (Hi, Eng 1745-2230) SIO444 at 1850 in Edinburgh; R.Bulgaria, Sofia 7.305 (Eng 1900?-2000) 52553 at 1953 in Bridgwater; R.Budapest, Hungary 7.220 (Eng to Eu 2000-2030) 42322 at 2003 in Newry.

There are many more broadcasts to Europe in the **6MHz (49m)** band. Some originate from HCJB Quito 6.205 (Eng 0700-0830) 44444 at 0700 in Hassocks; SRI via Lenk 6.165 (Eng 0700-0730) SIO444 at 0715 in N.Bristol; WWCN Nashville 5.935 (Eng 0200-1200) 23132 at 0920 in Rugby; R.Vlaanderen Int, Belgium 6.035 (Ger, Eng 0930-1030) 44333 at 0950 in Stalbridge; SRI via Lenk 6.165 (Eng 1100-1130) 44444 at 1105 in Penmaenmawr; RTL via Junglinster 6.090 (Fr 24hrs) 55545 at 1108 in Barton-on-Humber; Polish R, Warsaw 6.135 (Eng 1300-1355) SIO212 at 1300

Quarterly List Of Equipment Used LM&S for \$November, #December'94, *January'95.

- \$* Leo Barr, Sunderland: Roberts RC-B18 or Sony ICF SW-7600 + loop or r.w.
- \$* Darren Beasley, Bridgwater: Yaesu FRG-100 + loop or a.t.u. + 15m wire
- \$* Leslie Biss, Knaresborough: Trio R-600 + indoor trap dipole + balun.
- # Clive Boutell, Dovercourt: Trio R-600 + a.t.u. + half size 5RV or loop.
- \$* Vera Brindley, Woodhall Spa: Sangean ATS-803A or Sangean SW-60 + r.w.
- \$* Kenneth Buck, Edinburgh: Lowe HF-225 + s.w. loop or r.w. in loft.
- \$* Bill Clark, Rotherham: Sony ICF-2001D + whip or r.w.
- \$* Robert Connolly, Kilkeel: Trio R-1000 + Sony AN-1.
- \$* Geoff Crowley, Aberdeen: Yaesu FRG-100 + a.t.u. + half size 5RV.
- \$* Bernard Curtis, Stalbridge: Tatung TMR-702 + whip or loop.
- \$* Martin Dale, Stockport: Codar CR-70A + Howes a.t.u. + 23m wire.
- \$* Ron Damp, Worthing: Racal RA17, Sangean ATS-803A + loop or a.t.u. + r.w.
- \$* James Duckworth, Barnet: Sony ICF-2001D + 5m wire.
- \$* John Eaton, Woking: Lowe HF-225 + 23m wire.
- \$* David Edwardson, WallSEND: Trio R-600 + inverted V trap dipole.
- \$* Peter Gordon-Smith, Kingstn, Moray: Icom R-72 + a.t.u. + dipole or inverted V dipole.
- \$* Arthur Grainger, Carstairs Junction: Pioneer F-502RDS tuner + loop.
- \$* Michael Griffin, Ross-on-Wye: Lowe HF-225 + 10m wire.
- # Bill Griffith, W.London: JRC NRD-535 + 25m wire.
- # Bill Griffith, Portugal & Corsica: Sony ICF-2002 + AN-1.
- * Alec Griffiths, Inverness: Steepletone or Vega + r.w. or dipole.
- # PGuruprasad, Vellore, India: Sony ICF-7600DA + whip.
- \$* Gerry Haynes, Bushey Heath: Kenwood R-5000 + Mag Balun + 40m wire.
- \$* Gerry Haynes, Talgarth: Kenwood R-5000 + Kiwa loop.
- \$* Francis Hearne, N.Bristol: Sharp WQ7370.
- \$* Simon Hockenhill, E.Bristol: Roberts R-810, ITT Colt, Bush TR-130.
- \$* Sheila Hughes, Morden: Sony ICF-7600DS + loop; Panasonic DR-48 + 15m wire.
- \$* Rhoderick Illman, Oxted: Kenwood R-5000 + AN-1 or Mag Balun + 19m wire.
- * Peter Kay, Felixstowe: Sony ICF-2001D.
- \$* Tony King, Swindon: Panasonic DR-49 + indoor mag-mount CB antenna.
- \$* Ross Lockley, Stirling: Realistic DX-300 + 50m dipole or Global AT-1000 + 20m wire.
- \$* Laurence Mason, Hassocks: Roberts 801 or Grundig Yacht Boy 400.
- \$* Eddie McKeown, Newry: Tatung TMR-7602.
- \$* Roy Merrall, Dunstable: Kenwood R-5000 + 40m wire.
- \$* George Millmore, Wootton, IOW: Sangean ATS-803A or Racal RA17L + loop.
- \$* Denis Mulkeen, Kiltimagh, Eire: Sangean ATS-803A + 10m wire.
- \$* John O'Halloran, Harrogate: Yaesu FRG-100 + Inverted V dipole.
- # Sergei Olejnik, Kalush, Ukraine: Ishim-003 + 70m wire.
- \$* Fred Pallant, Storrington: Trio R-2000 + r.w. in loft.
- \$* Roy Patrick, Derby: Lowe HF-125 + 22m wire.
- * Peter Perkins, Hemel Hempstead: Kenwood R-5000 + a.t.u. + 17m wire + NTR-1.
- \$* Clair Pinder, Appleby: JRC NRD-525 + Yaesu FRT-7700 + 16m wire.
- \$* Peter Pollard, Rugby: Sony ICF-2001D + AN-1 or r.w.
- # Martin Price, Shrewsbury: Lowe HF-150 + AD-270 or r.w. or Matsui MR-4099.
- \$* Aleksandar Radulovic, Burton-on-Trent: Grundig Yacht Boy 206.
- \$* Philip Rambaut, Macclesfield: Int.Marine Radio R.700M + r.w.
- \$* Harry Richards, Barton-on-Humber: Grundig Satellit 700 + AD270 or r.w. or Grundig Yacht Boy or Matsui MR-4099.
- \$* Alan Roberts, Quebec, Canada: Lowe HF-225 + 11m dipole.
- \$* Bill Rowley, Colchester: Selena B210.
- \$* John Sadler, Bishops Stortford: Panasonic DR-26 + a.t.u. + r.w.
- \$* Eric Shaw, Chester: Lowe HF-225 + 7m wire.
- \$* Chris Shorten, Norwich: Matsui MR-4099 + 10m wire.
- \$* Tom Smyth, Co.Fermanagh: Sangean ATS-803A or Morphy Richards R191 + whip.
- # John Stevens, Largs: Hammarlund HQ-180 or Icom R-70 + loop or r.w.
- \$* Andrew Stokes, Leicester: Lowe HF-150 + 15m wire.
- \$* George Tebbitts, Penmaenmawr: Blaupunkt radiogram (1938) + r.w.
- # Phil Townsend, London: Lowe HF-225 + loop or a.t.u. + r.w.
- \$* John Wells, E.Grimstead: RCA AR-880 + Loop.
- \$* Julian Wood, Elgin: Kenwood R-2000 + Yaesu FRT-7700 a.t.u. + 5m wire.

in Co.Fermanagh & Eng 2030-2125 33333 at 2055 in Morden; R.Sweden via Horby? 6.065 (Eng 1715-1745) 55545 at 1740 in Ross-on-Wye; R.Austria Int, via Moosbrunn 6.155 (Ger, Eng, Fr, Sp 0400-2300) 43433 at 1941 in Oxted; R.Budapest, Hungary 6.110 (Eng 2000-2030) 42432 at 2002 in Newry; R.Pyongyang, Korea 6.576 (Eng 2000-2050, also to M.East, Africa) 44433 at 2044 in Bridgwater; R.Prague,

Czech Rep 5.930 (Eng 2100-2127) 34333 at 2100 in Stirling; RCI via Skelton 5.995 (Eng 2100?-2300) 33333 at 2100 in Appleby.

Two BBC relay stations were heard by listeners in the UK: Lesotho 6.190 (Eng to W/E.Africa 1830-2115) rated SIO333 at 2020 in Harrogate; Antigua 5.975 (Eng to C/S.Am 2100-0600) 33433 at 2355 in E.Bristol.

Tropical Bands Chart

Freq MHz	Station	Country	UTC	DXer	Freq MHz	Station	Country	UTC	DXer
2.310	ABC Alice Springs	Australia	1701	G,H,P	4.835	R.Tezulutlan, Coban	Guatemala	0243	C,K
2.325	ABC Tennant Creek	Australia	1702	G,H,P	4.835	RTM Bamako	Mali	2016	C,D,F,K,N,PU
2.485	ABC Katherine	Australia	1704	G,H,P	4.840	AIR Bombay	India	1712	F,G,H,N,P,S
2.850	KCBS Pyongyang	N.Korea	2020	G	4.845	RTM Kuala Lumpur	Malaysia	1441	H
3.205	AIR Lucknow	India	1647	H	4.845	ORTM Nouakchott	Mauritania	2017	D,F,K,N,P
3.220	CPBS 1, Beijing	China	1643	G,H	4.850	R.Yaounde	Cameroon	2135	D,K,P,S
3.220	R.HCJB Quito	Ecuador	0430	C	4.860	AIR Kingsway(Feeder)	India	1903	H,N,O,P
3.220	R.Kara, Lome	Togo	1946	C,H,P	4.865	PBS Lanzhou	China	2219	C,F,H,PU
3.223	AIR Simla	India	1653	H	4.865	L.V. del Cinaruco	Colombia	0115	C
3.230	R.Sol de Los Andes	Peru	0005	C	4.870	R.Cotonou	Benin	2135	C,D,K,N,P,S
3.230	SABC Oranje Meyerton	S.Africa	0034	S	4.875	R.Roraima, Boa Vista	Brazil	0020	C
3.232	RRI Bukittinggi	Indonesia	1645	H	4.879	R.Bangladesh	Bangladesh	1547	H
3.240	TWR Shona	Swaziland	1828	H	4.880	R.Nac.Espejo, Quito	Ecuador	0115	C
3.245	R.Clube Varginha	Brazil	0034	S	4.885	R.Clube do Para	Brazil	0247	C,K
3.245	AIR Lucknow	India	1710	H,P	4.885	R.Difusora Acreana	Brazil	0020	C
3.250	RRI Banjarmasin	Indonesia	1621	L	4.885	KBC East Sce Nairobi	Kenya	1827	A,K,N,P
3.250	R.Pyongyang	N.Korea	1729	L	4.890	RFI Paris	via Gabon	0358	C,K
3.255	BBC via Maseru	Lesotho	1956	H,N	4.895	Voz del Rio Arauca	Colombia	0020	C,K
3.270	SWABC 1, Namibia	SW.Africa	1924	C,H,P,S	4.895	Pakistan BC	Pakistan	1658	H
3.277	AIR Srinagar	India	1712	H,P	4.900	SLBC Colombo	Sri Lanka	1725	H,L,P
3.290	SWABC 2, Namibia	SW.Africa	1703	C,H	4.905	R.Relogio, Rio	Brazil	2351	U
3.300	R.Cultural	Guatemala	0235	K	4.905	R.Nat.N.djamena	Chad	2020	C,D,G,K
3.315	AIR Bhopal	India	1713	C,G,H,P,S					D,P,S
3.316	SLBS Goderich	Sierra Leone	2036	N	4.910	AIR Jaipur	India	1625	H,N,P
3.320	R.France Int. via ?	France?	1915	H,L,N	4.910	R.Zambia, Lusaka	Zambia	2020	H,N
3.320	Pyongyang	N.Korea	2201	G,K	4.915	R.Difusora, Macapa	Brazil	0020	C
3.325	FRCN Lagos	Nigeria	0433	C,K	4.915	GBC-1, Accra	Ghana	2021	C,N,D,P,S,U
3.335	CBS Taipei	Taiwan	2037	D,G,H,N,PR	4.920	AIR Madras	India	1704	H
3.345	AIR Jaipur	India	0045	C,G	4.925	R.Difusora, Taubate	Brazil	0025	C
3.355	AIR Kurseong	India	1646	H,P	4.927	RRI Jambi	Indonesia	2330	P
3.356	R.Botswana	Gabaron	2132	N,P	4.935	KBC Gen Sce Nairobi	Kenya	1827	G,N,P
3.359	RTV Malagasy	Madagascar	1816	H,P	4.940	R.Abidjan	Ivory Coast	2257	U
3.365	R.Rebelle, La Julia	Cuba	0440	C	4.945	R.Nac. Porto Velho	Brazil	0020	C
3.365	GBC R-2	Ghana	2035	C,G,N,O,P,S	4.950	R.Nacional, Muluwos	Angola	1758	H,N
3.365	AIR Delhi	India	1653	H,P,S	4.950	RTM Kuching, Sarawak	Malaysia	0005	P
3.375	R.Nacional S.Gabriel	Brazil	2335	C	4.960	R.Cima	Dominion Rep.	0135	L
3.377	R.Nacional, Muluwos	Angola	1756	H,N	4.965	R.Alvorada	Brazil	0025	C
3.380	R.Malawi	Malawi	1917	H,N	4.970	PBS Xinjiang	China	1616	C,H
3.395	RRI Tanjungkarang	Indonesia	1652	L	4.975	R.Uganda, Kampala	Uganda	2023	N,S
3.395	BBC via Meyerton	S.Africa	1658	L	4.980	PBS Xinjiang, Urumqi	China	1550	C,H
3.915	BBC via Kranji	Singapore	1712	D,E,H,K,N,P	4.980	Ecos del Torbes	Venezuela	2322	C.F.G.I,K
3.940	PBS Hubei Wuhan	China	2242	L					N,O,P,R,S,U
3.945	AIR Gorakhpur	India	1523	H	4.985	R.Brazil Central	Brazil	0020	C,K,P
3.945	Vatican Radio	Italy	2104	D	4.990	AIR Ext.Service	India	0015	C
3.950	Qinghai PBS, Xining	China	2334	L	4.990	FRCN Lagos	Nigeria	2128	C,F,K,N,S
3.955	BBC via Skelton	England	2100	C,D,G,M,T,U	5.005	R.Nacional, Bata	Eq.Guinea	1958	F,H,K,N,D,P,S
3.955	Channel Africa	S.Africa	0400	L	5.005	R.Nepal, Kathmandu	Nepal	1623	C,H,N,P
3.965	RFI Paris	France	2259	D,K,J,S,U	5.009	R.Madagasikara	Madagascar	1702	N
3.970	RFE Munich	Germany	1834	D,K,L	5.010	R.Garoua	Cameroon	2030	N
3.975	BBC via Skelton	England	2200	C	5.010	AIR Thiru'puram	India	0025	C
3.975	R.Korea via Skelton	England	2000	K	5.015	R.Brazil Tropical	Brazil	0030	C
3.975	R.Budapest	Hungary	2007	K	5.020	PBS-Jiangxi Nanchang	China	0010	G,H,P
3.980	VOA via Munich	Germany	1840	B,C,D,L,S,U	5.020	La V du Sahel, Niamey	Niger	2030	C,D,F,H
3.985	China R via SRI	Switzerland	2205	C,D,O,S,U					N,P,S,U
3.985	SRI Beromunster	Switzerland	2006	C,K,M,S,T	5.020	SLBC Tamil Home Sce.	Sri-Lanka	1714	H
3.995	DW via Julich	Germany	2101	C,D,E,K,S,U	5.021	Hanoi	Vietnam	2219	H
4.003	RRI Padang	Indonesia	1630	P	5.025	ABC Katherine	Australia	2135	P
4.035	Xizang PBS, Lhasa	Tibet	0033	S	5.025	R.Parakou	Benin	2030	C,N,P
4.500	Xinjiang BS, Urumqi	China	2350	F,G	5.025	R.d'Transamazonica	Brazil	2242	C
4.735	Xinjiang, Urumqi	China	1602	G,H,K,P,R,S	5.025	R.Rebelle, Habana	Cuba	0400	K
4.750	Xizang BS, Lhasa	Tibet	2355	C	5.025	R.Uganda, Kampala	Uganda	2031	D,K,N
4.755	R.Educ CP Grande	Brazil	0015	C	5.030	R.Catolica, Quito	Ecuador	0030	C
4.760	Yunnan PBS, Kunming	China	2232	H	5.035	R.Aporecida	Brazil	2245	C,P
4.760	AIR Port Blair	India	1615	C,H,L	5.035	R.Bangui	C.Africa	2032	C,F,K,N,P
4.760	ELWA Monrovia	Liberia	1825	D,H,L,N	5.040	Voz del Upano, Macas	Ecuador	2325	C,K,S
4.760	TWR Manzini	Swaziland	0335	I,L	5.045	R.Cultura do Para	Brazil	0125	C,K,P
4.765	R.Integracao	Brazil	0450	C	5.047	R.Togo, Lome	Togo	2038	C,D,F,K,N,PU
4.765	R.Rural, Santarem	Brazil	0411	F	5.050	GFBC Nanning	China	1501	H
4.765	Brazzaville	R.Rep.Congo	2000	C,D,F,K,N,P,S	5.050	Voice of the Strait	China	2158	L
4.765	RRI Medan	Indonesia	1635	L	5.050	Voz de Yopal, Yopal	Colombia	0254	K
4.770	FRCN Kaduna	Nigeria	2004	K,N	5.050	R.Tanzania	Tanzania	2031	K,N
4.775	AIR Guwahati	India	1427	H,L	5.055	RFO Cayenne(Matoury)	Fr. Guiana	0515	C
4.775	TWR Manzini	Swaziland	1637	L	5.060	PBS Xinjiang, Urumqi	China	0020	C,H,K,P
4.777	R.Gabon, Libreville	Gabon	2014	C,N,U	5.060	Sist d'Eng Progreso	Ecuador	0054	S
4.783	RTM Bamako	Mali	1924	C,F,K,P	5.065	R.Candip, Bunia	Zaire	0510	C
4.785	Ecos del Combeima	Colombia	0239	K	5.075	Caracal Bogata	Colombia	0025	A,C,D,K,R
4.785	R.Tanzania	Tanzania	0230	C					
4.790	Azad Kashmir R.	Pakistan	1658	H					
4.790	R.Atlantida	Peru	0010	C					
4.790	TWR Manzini	Swaziland	1821	H,K,L,P					
4.800	CPBS 2 Beijing	China	1546	H,P					
4.800	AIR Hyderabad	India	1701	F,H					
4.800	LNBS Lesotho	Maseru	2015	F,H,N,P,S					
4.805	R.Nac.Amazonas	Brazil	0020	C,P,S					
4.810	R.San Martin Tara	Peru	2355	C,K					
4.810	SABC Meyerton	S.Africa	0105	D,P,S					
4.815	R.Difusora, Londrina	Brazil	0020	C					
4.815	R.diff TV Burkina	Ouagadougou	2128	F,K,N,P					
4.820	E.Prov Huila	Angola	0250	I					
4.820	La Voz Evangelica	Honduras	0107	F,K,S					
4.820	Xizang, Lhasa	Tibet	2352	P					
4.830	R.Botswana, Gaborone	Botswana	2016	N,S					
4.830	R.Tachira	Venezuela	0001	C,G,I,K					

- DXers:**
- A. Leo Barr, Sunderland.
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 - B. Vera Brindley, Woodhall Spa.
 - P. Peter Perkins, Hemel Hempstead.
 - C. Robert Connolly, Kilkeel.
 - D. Geoff Crowley, Aberdeen.
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 - F. John Eaton, Woking.
 - G. David Edwardson, WallSEND.
 - H. P. Gordon Smith, Kingstn, Moray.
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 - J. Rhoderick Illman, Oxted.
 - K. Eddie McKeown, Newry.
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 - M. John O'Halloran, Harrogate.
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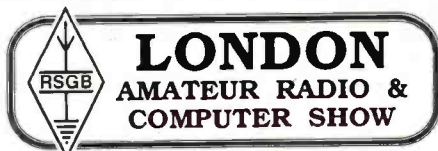
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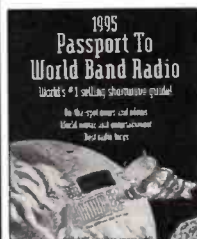
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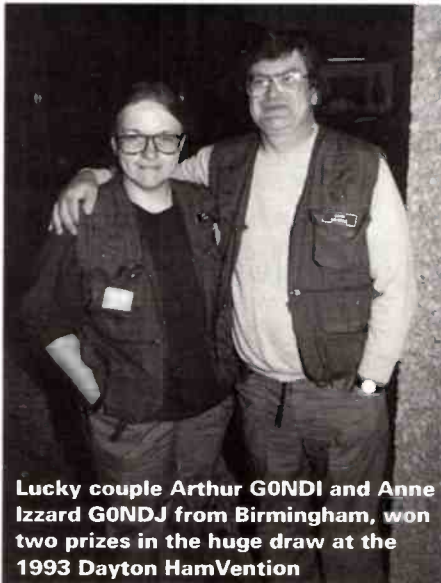
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The annual *PW* trip to the Dayton HamVention has established itself as the highlight of the year for me. I look forward to flying to the USA every year, meeting all our old friends and making new ones every time. So, why don't you join us on the 1995 HamVention holiday.....it's a marvellous experience and I'll enjoy your company.

As this is our 'Leicester Show' issue of *PW* I thought it would be a good idea to invite readers to come and chat to me about the Dayton HamVention Holiday during the show on Stand 3 in the Exhibition Hall. So, if you're attending the show I'd be delighted to talk to you about the trip. Alternatively, if you prefer, I would be pleased to talk to you on the telephone between **1 and 2pm** on **(0202) 659910**.

The 1995 HamVention Holiday departs from Gatwick on Tuesday April 25 and we'll fly direct to Cincinnati in the USA for £650 per person (based on two people sharing a room). We'll be staying at the Holiday Inn in Englewood, Dayton for six nights and return home from Cincinnati on Monday 1st, arriving home on Tuesday 2 May. The price includes entrance tickets to the three day HamVention and an excursion to the world famous Air Force Museum (other optional excursions available).

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Although I'm leading the *PW* party again and look forward to chatting to you, as with the successful 1994 holiday, the 1995 trip is being organised by the professional tour operators Gulliver's Groups & Incentives. Andy Garside is looking after our arrangements and he's looking forward to your enquiry for the full itinerary and booking form.

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Wavecom W4010 (V.5), professional grade decoder/analyser, 27 data modes, four analyser modes, boxed, as new, full manual, alignment procedures, includes monitor and all leads, cost £2366 new (see SWM Nov '94, page 71 'ASK-FU'), £750. Tel: Middlesex 0181-570 5603.

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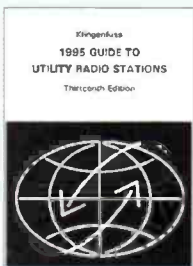
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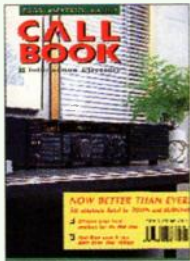
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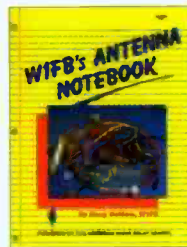
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