The SHORT WAVE Magazine

SWM

& Scanning Scene

SHACKWARE SPECIAL

JW WRESTLES WITH A HEAVYWEIGHT

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UK AIR TO AIR

March 2001 £3.25

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GRUNDIG RADIO

Satellit 800EU Millennium Receiver

The Grundig Satellit 800 EU Millennium gives you the ultimate in features, performance, convenience, and sound. It's incredibly powerful, technologically sophisticated, yet easy and intuitive to use. Whether you're an experienced Shortwave listener or a newcomer to the world of international broadcasting, this is the radio to get.

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- Excellent sensitivity and selectivity
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- You aren't limited to shortwave signals.
- Sure direct keypad digital tuning
- 70 user memory presets
- Two timer clocks keep track of time

EU version features

- 240V AC mains adaptor included
- Full UK warranty
- CE Approved

• Deluxe Headphones included FREE!

GRUNDIG
Satellit 800EU Millennium
Specifications

Frequency Range:
- 100-30,000kHz (0.1-30MHz) for AM Broadcast and Shortwave
- 87-108MHz for FM Broadcast
- 118-137MHz for Aircraft Band

Modes:
- AM, USB, LSB modes (0.1-30MHz)
- AM mode only for 118-137MHz
- WFM mode only for 87-108MHz

Tuning:
- Direct Input digital key pad combined with manual tuning

Indicators:
- Large Analog "S" Meter
- Multifunction LCD Display 6" x 3.5"
- DC Power Requirements - (6) internally mounted "D" cell (1.5V) batteries (not supplied) or 240V AC adaptor (supplied)

Weight:
- 14.5 lbs

Size:
- Width - 20.5", Height - 9", Depth - 8"

Complete with:
- 240V AC mains adptr & Deluxe Headphones

- ***Synchronous detection*** to improve the purity of shortwave and AM reception. This helps clarify fading signals and reduce interference from adjacent frequencies.
- ***AGC- Automatic Gain Control.*** The onboard microprocessor monitors signal strength, adjusting gain up or down to compensate for atmospheric and other conditions. It's like an onboard radio engineer. Choose either fast or slow AGC mode.
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- ***You aren't limited to shortwave signals.*** The Satellit 800EU Millennium is the ultimate portable AM/FM radio, too. Enjoy FM stereo with headphones. Listen to the VHF aircraft band from 118 to 137MHz. Many of the same advanced features which enhance shortwave broadcasts do the same for AM reception, too. Listen to distant AM stations at night without fading. Pick out those weak stations on adjacent frequencies.
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S - CHILD'S PLAY!

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- ***Enjoy legendary Grundig audio quality*** from the 4" built-in dynamic speaker. Adjust the sound with bass and treble controls - tailor it to your room or your taste.
- ***Enjoy FM stereo*** with the included high-quality headphones. Take the output via the line-out jack and direct it to your home or office sound system. Imagine having the BBC on your home Hi-Fi. You can also run an auxiliary speaker and have it powered by the Grundig Satellit 800EU Millennium
- ***With 70 user memory presets.*** you may not want to scan every memory position. So the Grundig Satellit 800EU Millennium lets you scan 10 memory positions at a time.
  This feature allows you to group your favourite stations: your BBC frequencies, other shortwave favourites, local AM and FM stations.
- ***Two timer clocks*** keep track of time - local and alternate. The clocks turn the radio on or off as you wish. Yes, the Grundig Satellit 800 is a fabulous radio!

GRUNDIG
YACHT BOY 400

Grundig's Yacht Boy 400 has received rave reviews from the shortwave press for combining a wealth of sophisticated features in a sleek titanium-look package that doesn't cost a fortune.

- General coverage receive (144kHz - 30MHz)
- Shortwave: 1.711 - 26.1MHz
- FM Stereo: 87.5 - 108MHz
- MW/LW
- SSB reception (both USB/LSB) (± 1kHz fine tuning)
- 40 station preset
- Fine tuning
- Narrow/Wide bandwidth
- DX/Local sensitivity
- Auto Search
- Dual alarm clock
- Sleep timer/Snooze timer
- External antenna & stereo headphone, sockets
- Audio output: 600mW
- Mains or Battery powered (with optional mains adaptor)
- Weight: 590g • Size: 198 x 120 x 37mm
- Supplied complete with
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  - External Wire Antenna • Carry strap

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The Short Wave Magazine

contents

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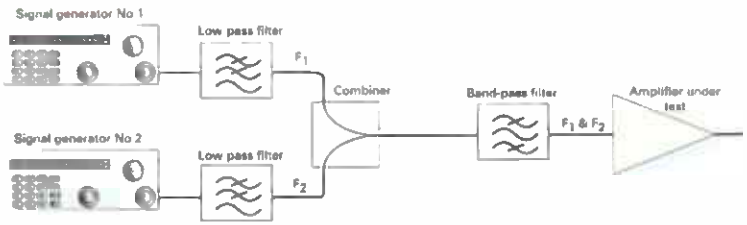

Page 17

Keith Elgin GI7SOB gives us the low-down on AAR operations, focusing on the active UK units and aircraft. A fascinating insight...read on!

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

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Check out the SWM web site www.pwpublishing.ltd.uk/swm

Join the SWM Readers' E-mail Forum - send an E-mail to swm_readers-on@yahoogroups.com

SHACKWARE SPECIAL

by Jerry Glenwright

42 SHACKWARE - THE COLUMN

In his regular column this month, Jerry discusses one of the truly forgotten machines of the early to middle 1980s - the MSX computer. And, after a house move, was overjoyed to welcome back into the fold his old Amstrad PPC640.

43 SHACKWARE SPECIAL

Back in the mid-90s, computers were very much machines which other people tinkered with for many short wave listeners, However, gradually cracks appeared in their armour and, grudgingly, one or two have made it into the shack. In this special, Jerry also covers three typical budget possibilities and creates a check-list of what you might expect to find and where.

regular columns

COMING NEXT MONTH IN SWM APRIL 2001

- **Finding Bearings On Earth**
- **Sid Star - Who's He?**
- **My Line In WWII**
- **Plus lots more!**

*contents subject to change

***SWM* stickers spotted so far:**

Falmouth USU 249
Swindon D308 LWL
Rotherham L578 FBW
Louth F52 PRT
Bournemouth R249 OFX
Largs M763 PHD

If you spot your registration, please drop a line to **SWM Sticker, PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW** telling us your name, address and vehicle details.

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Simply add the name of the person you wish to contact. For example: **kevin.nice@pwpublishing.ltd.uk**

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ed's comments

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Subscriptions are available at £33 per annum to UK addresses, £40 to Europe and £44 (Airsaver), £50 (Airmail) overseas. Subscription copies are despatched by accelerated Surface Post outside Europe. Airmail rates for overseas subscriptions can be quoted on request. Joint subscriptions to both *Short Wave Magazine* and *Practical Wireless* are available at £65 (UK) £66 (Europe) and £74 (rest of world), £85 (airmail).

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

Photocopies & Back Issues
We have a selection of back issues, covering the past three years of *SWM*. If you are looking for an article or review that you missed first time around, we can help. If we don't have the whole issue we can always supply a photocopy of the article. Back issues for *SWM* are £2.99 each and photocopies are £2.99 per article.
Binders are also available (each binder takes one volume) for £6.50 plus £1 P&P for one binder, £2 P&P for two or more, UK or overseas. Prices include VAT where appropriate.
A complete review listing for *SWM*/*PW* is also available from the Editorial Offices for £1 inc P&P.

Placing An Order
Orders for back numbers, binders and items from our Book Store should be sent to: **PW Publishing Ltd., FREEPOST, Post Sales Department, Arrowsmith Court, Station Approach, Broadstone Dorset BH18 8ZZ**, with details of your credit card or a cheque or postal order payable to PW Publishing Ltd. Cheques with overseas orders must be drawn on a London Clearing Bank and in Sterling. Credit card orders (Access, Mastercard, Eurocard, AMEX or Visa) are also welcome by telephone to Broadstone **(01202) 659930**. An answering machine will accept your order out of office hours and during busy periods in the office. You can also FAX an order, giving full details to Broadstone **(01202) 659950**. The E-mail address is **bookstore@pwpublishing.ltd.uk**

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

Spotted

As I predicted last month, I've been out and about recently the length and breadth of the country. I've had my eyes peeled as I've travelled the highways and byways of Britain and I've noted some readers with their *SWM* car sticker proudly displayed. You can find the ones I've seen, noted at the bottom of page 4. If you spot your vehicle's registration listed please make sure you get in touch via the address given.

This month I'll be in and around the Manchester area, this involves driving from Dorset, so I'll be covering a substantial chunk of the country, if you want to be spotted, and qualify for a prize, make sure that you've got your *SWM* sticker on display. I'll be noting all those I see - will I see you?

Upward & Onward

I've just had some wonderful news regarding our position with WH Smiths newsagents. The hard work of our publishers and distributors and the January CD Special issue promotion, has finally paid off with WHS now stocking *SWM* in all of their High Street shops. This is indeed excellent news for everyone. You must make sure that you shop early to ensure copies are still available! I'm told that they sell-out quite quickly. If anyone still experiences difficulty in obtaining a copy of *SWM*, from Smiths or any where else for that matter, please make sure you let me know so I can investigate.

Yahoo!

Some of you may well be away that Yahoo have recently acquired e-groups, who were the hosts of the *SWM* Readers E-mail list. During January, they implemented the change over and the domain change was accompanied by a need for a new sign-on id for those of you wishing to access the service, via the previous e-groups, now Yahoo, web site. I guess that as the process has been well managed, with self explanatory dialogues responding to old log-on names, there will have been few problems encountered by those members who've used the web interface. I must admit it came as a surprise to me as I'd had no warning (as list owner).

Even though the old address for joining and posting to the list still works, it's best to use the new URL. Anyone wishing to join the throng can subscribe by sending a request to **swm_readers-on@yahoo.com** both the subject and content of the message are ignored. I look forward to seeing you 'on the list'.

Graham Tanner

As you can read in this month's 'SSB Utilities' column, Graham has, with this issue, completed 10 years of writing for *SWM*. As a utility listener myself I very much appreciate Graham's efforts throughout the years. He has in my opinion done a sterling job both in supplying an educational column and additionally some fascinating features, I'm sure you'll all agree.

Well done Graham - here's to the next decade of your valued contributions.

WorldSpace Winners

As promised last year in the December issue of *SWM*, we have now drawn the four lucky winners of the Hitachi receivers from the Editorial hat. Very soon, the WorldSpace digital service will be heard in the homes of **Greta Heathcote**, Horncastle, Lincolnshire; **R.D. Cox**, Woodley, Berks; **John Burton**, Witney, Oxon and **F. Loy**, Ferndown, Dorset.

The KH-WS1 radios, kindly donated by Simply Radios, will soon winging their way to the four winners. Many thanks to Simply Radios for supplying the prizes and commiseration's to those of you who weren't successful this time - better luck with our future competitions.

Reader Equipment Survey

You'll be glad to know that I've finally called a halt to entries to the *SWM* equipment survey. After a shaky start, I eventually received a steady flow of information arriving at the Editorial Office. I have started to analyse the responses and I was hoping to have brought you the results this month. Unfortunately, circumstance has conspired against me. Next month however, I will feature the survey results in all their glory. Don't miss it. I'm sure it won't be what you're expecting.

Vy 73 Kevin

Dear Sir

You say you hope we like the new logo. I say that a combination of black, red and white is anything but pleasing. Surely a selection of bright, welcoming warm colours would be infinitely more preferable to these sombre colours which will tend, in my opinion, to put off prospective new customers. Time for an urgent re-think!

Richard Cooper

*Anyone else with strong views on this? - **Ed.***

Dear Sir

I read with great dismay in the last issue that Trevor Brook has lost his application for a short wave licence. I just do not believe that the people who are supposed to be (laugh) responsible for the issuing of licences can be so irresponsible. It seems funny that Sunshine Radio can transmit inane music clearly all day on short wave (another independent clone), yet Trevor is offering an education format to better us all, and is tossed aside with a flat no.

It may be that the authorities like to give the public low intellect programs just in case we get too clever for them. To really put the boot in, Merlin Radio used to broadcast on short wave (years ago?) and it was a joke, just drivel, in fact, the DJ was probably an accountant moonlighting.

I also agree with Roger Day (note in 'Off The Record') that Independent Radio is total rubbish. If we want our younger generation to be more inventive, then I don't think Radio One, Capital, Kiss, etc. are going to be very good at it, for sure it will have the opposite effect of mindless morons all singing the same tune.

Wake up Mr Blair (or whoever) and step in and sort these stations out - give Trevor Brown the chance to prove that a station like his can be very, very successful.

Morris (angry) Smith G1PIB
Kent

Dear Sir

As somebody who has long listened to a lot of radio, but who only recently became interested in it (and *SWM*) as a hobby, I would like to praise the new WorldSpace service. As many people will be aware, this is a new digital radio service, broadcast by satellite. I recently took delivery of a Hitachi KH-WS1 receiver, which combines a digital WorldSpace receiver with 'ordinary' m.w., s.w. and f.m. analogue capabilities. *(See* SWM *October 2000 for a KH-WS1 review and feature on WorldSpace - **Ed.**).*

The m.w. and f.m. facilities are of good quality, but it is the WorldSpace facilities that are superb. From a 150mm square antenna sat on a south facing inside window sill, it delivers perfect reception. I also listen to radio stations delivered by Sky and other digital and analogue satellite TV services, and the quality of WorldSpace is equal to any of these.

At the moment there are only around 15 stations that broadcast in English, plus about 20 in other languages, available in the UK, but the potential would appear to be 400. Included in those 15 however are three of the best international broadcasters, BBC Worldservice, CNN and Bloomberg, none of which are easy to receive in decent quality using ordinary receivers in the UK.

Much has been made about terrestrial DAB, but with the exception of in-car systems, it would appear likely to continue to struggle for general acceptance. The receivers are expensive (the cheapest I have seen is £299, compared with the £99 I paid for my WorldSpace and analogue Hitatchi), and the choice of stations limited to the mainstream offerings, 90% of which are available in digital quality through a Sky digibox (which already offers 36 stations plus 45 non-stop themed music offerings). What is more, the overall capacity appears limited to no more than 30 stations in any one area.

WorldSpace could offer much more, with the potential to broadcast a wide variety of interesting international stations, and with a capacity some 13 times that of DAB. Like DAB, it offers additional information facilities, plus the capability to be linked to a PC for multimedia facilities.

I would encourage readers to take a close look at WorldSpace and see what it has to offer. My own view would be that it offers us a view of the future of international broadcast radio. It may not offer the sense of adventure that traditional analogue s.w.l., but it is certainly easier on the eardrums!

Nick Harriss
Lincs

Dear Sir

I have a Roberts R-808 radio and I am keen to be able to listen to transmissions in English from Foreign broadcasting stations. Getting a copy of *Short Wave Magazine* has proved difficult! Now that I have a copy, January 2001, I have been able to contact you.

My main concern is to find the frequencies for these various stations e.g. Radio Moscow, Voice of America, etc. Is there an easy way to find this information in a magazine or from a web site? Or must I purchase a handbook, *WRTH*, which will have only a small section devoted to the information I require?

Your help would be much appreciated

Regards.

Jim Hunter

Please see 'LM&S' on page 11 and you will find a copy of Passport To World Band Radio/WRTH *invaluable - **Ed.***

Dear Sir

I've been a keen s.w.l. since the 1930s - the true home-brew era of crystal sets and one-valve receivers - hence my interest in this recent find out here in South Africa. I recently acquired a 'Horn Speaker' which a farmer had discovered in the roof of his historic barn - in the Natal Midlands (approx. 100km north of Durban).

The speaker has a large perm. magnet in the base, a volume control & 'twisted cord' connection for the receiver. It's 640mm high & the diam. of the horn is 250mm. The base has a triangular logo with the letters TMC.

Can any of your readers identify this speaker, the manufacturers and the type of receiver that normally fed it? Incidentally, at the same time, two copies of *The Wireless Constructor* (June 1926 & January 1926) turned-up! The Publishers were Radio Press - the Great grandfather of *Practical Wireless*?

My best wishes to a great magazine.

Peter Jackson
ZR1PNJ
South Africa

Is there something you want to get off your chest? Do you have a problem fellow readers can solve? If so then drop a line to the Editor at QSL, Short Wave Magazine, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.

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

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

TOP QSL

Dear Sir

Apropos Godfrey Manning's 'Airband' column in the January issue, may I suggest a simpler way of monitoring two frequencies through stereo headphones? All you need is: A two-in-one adapter 3.5mm stereo plug to 2 x 3.5mm mono sockets (Maplin code JM91Y) and two cables terminated with 3.5mm mono jack plugs.

Attach the two leads to your receivers and the other ends to the adapter. This can be plugged into a stereo amplifier or by using a stereo coupler (Maplin code JK05F), straight into your stereo headphones. You now have each receiver's output into the left and right ear respectively. Saves an awful lot of soldering.

Richard Jones
Powys

*Great tip Richard, especially for those without soldering skills. My own preference is to use a cheap Tandy mixer I picked up for small change some years ago. I use the stereo balance on the input channels to 'place' each receiver in a different position between my ears. I find I can listen to a max of four radios at once this way - **Ed.***

Communiqué

Forward Control Station

We are advised by the **101 Forward Control Club** that a special event station will be in operation from the 101 Forward Control Club and Register stand at The Land Rover World Show (Sponsored by John Craddock Ltd.) which is to be held on the 12th and 13th of May 2001.

The 101FCC station will hopefully operate under the callsign GB0LRW and will demonstrate APRS on 144.800MHz both on site with amateurs in vehicles equipped with units on the off road course and on a global level via Internet hookups. They will also be active on h.f. but frequencies have yet to be decided.

GB0LRW will be manned by amateurs from the Aylesbury Area, but anyone is welcome to try their hand. The station will operate from 0800 -1800, perhaps slightly later on the 12th. Other frequencies may be accommodated by request. For further details, E-mail: **1tonnefc@waitrose.com**

Details will be updated on: **www.users.waitrose.com/~1tonnefc/show.htm**

15th Anniversary Weekend

County Morse test teams will again be on the air during the 15th anniversary of the RSGB Morse Test Service, weekend of the **12/13th May 2001**. For ease of identification, all stations will use a special event GB0 prefix, followed by the county code suffix, e.g. the Isle of Wight will use the callsign GB0IOW and London GB0LDN. The Chief Morse Examiner will use GB0CW and the Deputy Chief Morse Examiner GB0MTS.

There will be a minimum of 27 stations active and a Morse Test 15th Anniversary certificate will be available to any amateur who makes contact with at least 10 of the GB stations. The cost of the certificate is £2.50 (cheque or postal order made out to the RSGB), $5 or six IRCs. Applications should be sent to the **Chief Morse Examiner, David Waterworth G4HNF, 116 Reading Road, Woodley, Reading, Berks RG5 3AD**. QSL cards are not required to claim the award, which is also available to listeners.

Activity will be concentrated in the 80 and 40m bands and in order to encourage newcomers to apply for the award, each team will spend some time calling slowly in the Novice c.w. section of the 80m band, above 3.560MHz. The event is not a contest and examiners will be happy to reply at any preferred calling speed. There are no restrictions on the type of Morse key used, all are welcome to call in.

Open Meeting

The **Leicestershire Repeater Group** will be holding an Open Meeting at the Greyfriars Social Club (ex EMEB Club), Aylestone Road, Leicester, on **Thursday 15th March 2001** at 2000. There will be a guest speaker from the National Space Centre Amateur Radio Club - M1NSC. Members, guests and non-members are all welcome, so why not go along and learn all about new developments at the cutting edge of technology. Contact the Chairman **John Senior G7RXS, 34 Shelley Road, Enderby, Leicester LE9 5QX, Tel: 0116-284 1517** for more information about this event.

EUCW/FISTS QRS Party

The *SWM* Newsdesk has recently heard from Keith Farthing, who informs us of a new c.w. contest, which is aimed at newcomers to Morse operating, (with a max speed of 14w.p.m.), as a contribution to the activities of the European CW association. This new contest is called 'The EU/FISTS QRS Party' and all licensed radio amateurs, especially members of EUCW clubs, are invited to take part in the now annual event.

This event provides an opportunity for EUCW club members and non-members to meet and exchange greetings with each other at a leisurely pace. At the same time, it is an opportunity to make contacts qualifying for the prestigious Worked EUCW Award. Although not a contest in the normal sense of the word, there is a contest element for those who thrive on challenge, with awards for those who score the most points and a merit award for the 'Most Readable Morse Heard' voted for by other contestants.

In this event, taking part is more important than winning, providing fun for all and an opportunity for more experienced operators to put something back in the hobby by helping and encouraging those less experienced in c.w. operating. The contest runs from 0001 on Sunday 22 April 'till 2359 on Saturday 28th April, on c.w. only.

For more information about this new c.w. contest event, please contact **Keith Farthing, Contest Manager, 86 Coldnailhurst Avenue, Braintree, Essex CM7 5PY, Tel: (01376) 347736** or E-mail **keithm0clo@hotmail.com**

Aspects Of ATV

Members of the **Bangor & DARS** meet on the 1st Wednesday of the month in The Stables, Groomsport, County Down, at 2000. Please note that this is a new venue.

On Wednesday 7 March 2001 at 2000 the Society will be hosting a talk on ATV - presented by **Tony Wise GI0UZG** - covering all aspects of ATV, including a section on the new Northern Ireland ATV repeater which will hopefully be in operation soon. This should be an interesting evening and, as always, visitors and new members are most welcome.

Also, **not to be missed**, the Society are holding their **Summer Radio Rally** on **Sunday 24 June 2001** - where there will be a good selection of radio and computer traders and an excellent Bring & Buy will be in operation. The rally will be held at the Crawfordsburn Country Club, which is near Bangor, County Down. Doors open at noon and admission is £2. Further details for the rally from **Norman GI3YMY** on **0289-146 6557** or via E-mail at **normannewell@beeb.net**

For any other information about the Society, please contact **Mike GI4XSF** on **0284-277 2383** or visit the club's website at **http://welcome.to/bdars**

NVCF 2001

The **National Vintage Communications Fair** - the main event for collectors of electrical and mechanical antiques and collectibles, is to be held this year on **Sunday 29th April 2001**, in Hall 11 at the NEC, Birmingham. Admission is £5 (tickets on the door - under 14s free). Doors open from 1030 to 1600.

This is a specialised antique fair with a difference. Features include vintage radios, crystal sets, early 1920s valve receivers, horn loudspeakers, transistors, valves, early TVs, gramophones, vintage audio, telephones, scientific instruments and much, much more.

Contact **NVCF 2001, 13 Belmont Road, Exeter, Devon EX1 2HF, Tel: (01392) 411565** for more information, or find full details on their web site at **http://www.angelfire.com/tx/sunpress/index.html**

No Licence Fee

The **Radiocommunications Agency** have announced that **with effect from 1 April 2001**, Amateur and Citizen's Band Radio Licences will be issued **free to those aged 75 years and over**. New licence applications received on or after 1 April 2001 will be issued free of charge to any person after 75 or over at the time of issue.

Existing licence holders whose licence renewal is due on or after 1 April 2001, and who are 75 years of age or over at that time, will have their licence renewed at no charge. Licences will still need to be renewed each year, but no licence fee will be required.

For Amateur Radio, the same technical qualifications, appropriate to the Amateur Licence class, will still be required for new licence applications before a licence can be issued. There are no technical qualification requirements when applying for a Citizen's Band Licence.

Starter Pack

Lake Electronics have recently announced the addition of a 'Starter' Pack to their Novice range of kits. The Novice RAE course involves

1st Birthday

On the 31st January 2000, **Frequency UK** was born. Frequency UK is an online resource for UK wide-band receiver users covering news, reviews, frequency listings and useful information for scanner users. Starting life just as an online frequency listings site for the scanner user in the UK, Frequency UK has slowly built on this and now have many areas of interest for their site visitors to peruse.

In their first year, Frequency UK have gone from a few pages to over 200 containing frequency listings by county and subject area, searchable databases, book reviews, interviews and many online articles from show reports to guides on decoding weather satellites.

Frequency UK receive regular updates from manufacturers and retailers within the industry which helps form their news page. This news page lets you know of any important dates and interesting news from the world of scanning.

Frequency UK is run as a hobby, and therefore has had no money spent on it, except for general running costs. They rely on word of mouth, search engines and, most importantly, press coverage to bring visitors to their site. For more information about Frequency UK, visit their web site online at **www.frequencyuk.co.uk** or see the *SWM* site links page.

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several practical projects requiring the use of various small components (the Novice Receiver and Amplifier, are, of course, self contained).

The 'Starter' Pack contains the other essential ingredients to complete the remaining projects, including stripboard, small bulb with holder, battery holders, plugs, a short length of coax, resistors, etc., together with generous lengths of connecting wire and solder. The pack costs just £4.60, plus £1 postage - post free if included with one or more kits.

Lake are also stocking a selection of low-priced small tools - ideal for the newcomer to the hobby - such as pliers, side cutters and a soldering iron. These are all priced individually. More details of all these, together with the complete kit range, can be obtained by sending an s.a.s.e. to Lake Electronics at **7 Middleton Close, Nuthall, Nottingham NG16 1BX, Tel: 0115-938 2509**, E-mail: **g4dvw@btinternet.com** or check out Lake's web site at **www. lake-electronics.co.uk**

Activities At Poole

The **Poole Radio Society** hold their main meetings in Lady Russell Cotes House, Bournemouth & Poole College of Further Education (The College), Constitution Hill Site, Poole, Dorset, at 1930 on the second Fridays of the month. Other activities usually take place in the nearby shack on the same site, unless mentioned.

Just a few up and coming events are: Feb 23 - Operating (work D68C) (shack), March 2 - Natter (shack), March 9 - Talk by Dr. Phil Mason, March 16 - Construction (shack), March 18 - Bournemouth Rally. Further details from **Phil Mayer** on **(01202) 700903**.

New Magazine

From time to time, we keep you updated with news about **Feba Radio**. Well, Feba now produce a new magazine, entitled ***Threshold***. To find out more, contact Feba at **Ivy Arch Road, Worthing, W. Sussex BN14 8BX.**

rallies

February 25: The Swansea ARS will be holding their 20th Amateur Radio & Computer Show in the Swansea Leisure Centre. Doors open 1030. There will be traders, a Bring & Buy, operational h.f./v.h.f. station and local groups, etc. Admission is £1.50 for adults, 50p for children. Further details from **Roger GW4HSH**, Show Secretary, on **(01792) 404422**.

March 11: The 16th Wythall Radio & Computer Rally is to take place at Wythall Park, Silver Street, Wythall, near Birmingham on the A435, just two miles from J3 on the M42. Doors open from 1000 'till 1600 and admission is just £1.50. There will be plenty of traders in three halls and a large marquee, bar and refreshment facilities on-site, plus a big Bring & Buy stand and talk-in on S22. There will also be a unique free park and ride for easy and comfortable parking. Contact **Chris G0EYO** on **0121-246 7267** evenings and weekends for more details, FAX on 0121-246 7268 or E-mail **chris@g0eyo.freeserve.co.uk**

March 17: The 8th West Wales Amateur Radio & Computer Rally will be held at Penparcau School, Aberystwyth. Doors open 1000 'till 1530 and admission is just £1. There are good parking facilities with easy access for disabled visitors and traders. There will be demonstrations on h.f., v.h.f., packet on the air, amateur radio and computer traders, Bring & Buy, clubs, special interest groups and catering facilities. Talk-in on S22. More information from **Ray GW7AGG** at home QTH or on **(01686) 628778**, FAX: **(01686) 621880** or E-mail: **enquiries@mwmg.demon.co.uk**

March 17: The South Normanton, Alfreton & District Amateur Radio Club, in association with the G-QRP Club are proud to present this new rally for 2001. 'Junction 28 QRP Convention' is to be held in the Village Hall Community Centre, Market Street, South Normanton (near Alfreton), Derbyshire. Situated just five mins from M1 junction 28 and the A38. This will be a traditional radio event (no computers) and will feature a variety of component suppliers, kit dealers, vintage and radio surplus and special interest groups. There will also be lectures during the day by leading amateur radio personalities. Hot and cold food, and drinks will be available and there will also be a licensed bar. Free parking, talk-in on S22. Doors open 1000 and admission is £1. **Duncan G4DFV** on **(01623) 465443** or visit the club's web site at **www.qsl.net/snadarc**

■ Gerry L. Dexter, c/o SWM EDITORIAL OFFICES, ARROWSMITH COURT, STATION APPROACH, BROADSTONE, DORSET BH18 8PW.
■ E-MAIL: gdexter@pwpublishing.ltd.uk

Bandscan Australia

This time I have news and information on Radio Australia and the Australian Broadcasting Corporation as well as a swag of frequencies and some reception reports.

Radio Australia

Radio Australia has resumed short wave transmission in the Khmer, Chinese and Vietnamese languages after four years off the air during a critical period for the region. Broadcasts in Indonesian and English directed to South-East Asia will follow. Details are at **http://www.abc.net.au/ra/hear/new_shortwave_services.htm**

ABC

The pain goes on for supporters of the Australian Broadcasting Corporation (ABC). New ABC managing director Jonathan Shier has pushed through large budget cuts to news and current affairs programming and to radio programming. In addition, an ABC produced long-running television science program has been axed. It is reported that these cuts will be used to fund expansion of the ABC's online presence and creation of several digital television channels. Staff and ABC supporters are concerned that these changes will destroy the in-depth coverage and analysis traditionally provided by ABC current affairs.

Australian Nobel laureate Professor Peter Doherty has been reported in the Sydney Morning Herald as saying that "it will be a national tragedy if the capacity of the ABC to offer high-quality, in-depth reporting of the arts and sciences is further compromised". Before joining the ABC Mr Shier was commercial director of the Scandinavian MTG-TV3 and before that deputy managing director for Thames Television in London.

ABC Structure

Colin G. Smith from Armagh in Northern Ireland has asked me about the structure of ABC radio. ABC radio has a number of networks, these are: Radio Australia, Radio National, News Radio, Triple J, Local Radio and ABC Classic FM. Radio Australia's role is well known to regular readers of this column. It often carries content from Radio National.

Radio National - according to the ABC web site at **http://www.abc.net.au/radio.htm** - provides "a unique service giving Australians access to the world of social, cultural, political and economic ideas". As a regular listener I can report the truth of that statement.

The Triple J network had its origins in the Sydney youth radio station 2JJJ. It is not my cup of tea - too old probably - but my nephew in his late twenties lives with Triple J. It focuses on playing contemporary Australian rock music. The network's history and philosophy are at **http://www.abc.net.au/triplej/about/triplej.htm**

News Radio is principally the vehicle to bring live coverage of Federal Parliament to the Australian people. At times when Parliament is not in session, News Radio has 24 hour news coverage including news from the BBC, Deutsche Welle and Radio Netherlands. It is heard only in the cities Adelaide on 972kHz, Brisbane 936kHz, Canberra 1440kHz, Darwin 102.5MHz FM, Hobart 729kHz, Melbourne 1026kHz, Newcastle 1458kHz, Perth 585kHz and Sydney 630kHz. Except for Darwin, these are of course a.m. services. ABC Local Radio provides news, sport, weather and local information to communities throughout metropolitan and regional Australia. Despite its name, much of Local Radio's material is networked across Australia.

ABC Classic FM plays classical and contemporary music 24-hours a day. It is broadcast through a large number of transmitters and transmitter sites. Readers who are interested can find these at **http://www.abc.net.au/classic/freq.htm**

RFDS

David Taylor G6CIF has E-mailed asking for Royal Flying Doctor Service (RFDS) frequencies. **Adrian O'Leary** has also E-mailed on the same question. Looking back over my previous columns I notice that I haven't run the RFOS short wave frequencies in this column for over four years, so the time has well and truly arrived.

Here they are: 2.792, 5.300 and 6.945MHz through VJB in Derby Western Australia (WA); 2.280, 4.030 and 6.960MHz VKL Port Hedland WA; 2.280, 4.045 and 6.890MHz VJT Carnarvon WA; 2.280, 4.010 and 6.880MHz VKJ Meekatharra WA; 2.656M, 5.360 and 6.825MHz VJQ Kalgoorlie WA; 2.360, 4.010, 6.840 and 7.975MHz VJY Darwin Northern Territory (NT); 2.020, 5.410 and 6.950MHz VJO Alice Springs NT; 2.020, 4.010, 6.890 and 8.165MHz VNZ Port Augusta South Australia; 2.020, 4.055 and 6.920MHz VJC Broken Hill New South Wales; 2.020, 4.980 and 6.845MHz VJJ Charleville Queensland (Qld); 2.020, 5.110 and 6.965MHz VJI Mount Isa Qld; and 2.020, 2.260, 5.145 and 7.465MHz VJN Cairns Qld.

ABC Short Wave

It has also been a while since I ran the ABC domestic short wave frequencies so I run them again here. There are three ABC domestic short wave transmission sites, all located in the Northern Territory: VL8A is at Alice Springs and operates on 2.310, 3.230 and 4.835MHz; VL8K is at Katherine on 2.485, 3.370 and 5.025MHz; and VL8T is at Tennant Creek on 2.325, 3.315 and 4.910MHz.

Reports

Roy Anderson from Swansea in Wales reports receiving Radio Australia on 9.500MHz at SINPO 44433 at around 2030UTC and on 11.880MHz at SINPO 42343 at 2050UTC. Roy uses a Yaesu FRG-7700 receiver with a 20m end fed antenna.

Martyn Gardiner from Portsmouth has pulled in RA on 15.240MHz at 0850UTC and also the 21.820MHz signal during the morning. Martyn says that he has heard the 11.660MHz signal in the afternoon at around 1600UTC had some interference while at the same time the 9.475MHz transmission was much clearer. He says that Radio New Zealand on 15.175MHz has come in well at 0900UTC. Readers wanting to chase Radio New Zealand can find their frequency schedule at **http://www.rnzi.com**

Adrian O'Leary who asked for RFOS information is from Cork City in Ireland. He says that he often listens to aircraft frequencies in Perth on 6.556MHz, Brisbane on 8.867MHz and also the Royal Australian Air Force calling on 8.974MHz. Adrian currently runs an AOR AR7030 Plus, Sony SW77 and SW07 and usually uses a G5RV antenna. For those *SWM* readers interested in chasing more aircraft frequencies have a look at **http://users.bytelink.com.au/atrc/nswall5.txt** or come in at **http://users.bytelink.com.au/atrc/listings.htm** for a wider choice.

Royal Flying Doctor Service

Location & Callsign	Frequencies (MHz)
Western Australia	
VJB Derby	2.792, 5.300, 6.945
VKL Port Hedland	2.280, 4.030, 6.960
VJT Carnarvon	2.280, 4.045, 6.890
VKJ Meekatharra	2.280, 4.010, 6.880
VJQ Kalgoorlie	2.656, 5.360, 6.825
Northern Territory	
VJY Darwin	2.360, 4.010, 6.840, 7.975
VJO Alice Springs	2.020, 5.410, 6.950
South Australia	
VNZ Port Augusta	2.020, 4.010, 6.890, 8.165
New South Wales	
VJC Broken Hill	2.020, 4.055, 6.920
Queensland	
VJJ Charleville	2.020, 4.980, 6.845
VJI Mount Isa	2.020, 5.110, 6.965
VJN Cairns	2.020, 2.260, 5.145, 7.465

Other News

Australian digital television began with a whimper on 1 January this year. Although there was some publicity most was adverse because digital decoder set top boxes and digital television sets are expensive and virtually unobtainable. Many commentators are advising people not to buy into the new technology at this stage. The Federal Government is offering up to $50 million (about 19 million) over five years to companies or consortia to support Australia Television broadcasts into Asia.

I welcome any news and comments. In particular I am interested in any s.w.l. information on Australian stations heard by *SWM* readers so I can chase up more details and interesting snippets from this end. My address is **PO Box 3307, Manuka, ACT 2603, Australia**. For personal replies please send two IRCs. Those with an Internet connection can get me at **greg@pcug.org.au** or **gregmbaker@hotmail.com**

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

LM&S

The change-over from Greenwich Mean Time (GMT) to British Summer Time (BST) will take place at midnight on March 24th when our clocks will be put forward by one hour. However, Universal Time Co-ordinated (UTC), the time system adopted by international short wave broadcasters, is equal to GMT and will therefore be unaffected. To avoid confusion place a clock by your receiver now and set it to UTC (= GMT). **Do not** alter it when the changeover to BST takes place. Please ensure that the times quoted in your reports for LM&S are in UTC not BST.

Quite a few of the short wave broadcasters will introduce new transmission schedules on March 25th to allow for seasonal changes in propagation. The effect of them will become clear in the months ahead and it will be interesting to see if they really do result in worthwhile improvements.

Long Wave Reports

Note: l.w. & m.w. frequencies in kHz; s.w. in MHz; Time in UTC (=GMT). Unless otherwise stated, all logs were compiled during December.

During a visit to Prague at the beginning of December **Eddie McKeown** (Newry) explored the band in the early evening. He found that BBC R 4 on **198kHz**, which is shared by Droitwich (500kW), Burghead (50kW) & Westerglen (50kW), could only be heard intermittently, [SINPO 33222 at 1816UTC] because a Russian or Turkish station dominated the frequency. On **252kHz** Tipaza, Algeria was clearly identifiable [43343 at 1800] but co-channel Atlantic 252 in Clarkestown was audible [44333 at 1700] more often than BBC R-4. As expected Topolna on **270kHz** (1500kW) was quite strong [43444 at 1820] but reception of the other stations he heard was very similar to that in Newry. However, he had to wait until his return home before he could hear Rikisutvarpid (RUV) in Reykjavik via their 300kW outlet at Gufuskalar, W.Iceland on **189kHz**, which he rated 25222 at 0056UTC.

A broadcast from RUV in Reykjavik was picked up after midnight on the 5th by **Simon Hockenhull** in E.Bristol. He heard it first via Gufuskalar on **189** at 0115 and logged it as 34443. He then tuned up the band and was surprised to find RUV was also audible via their 100kW outlet at Eidar, E.Iceland (100kW) on **207kHz**, peaking 22332 at 0119UTC. On the 29th he observed good conditions during the daytime.

On the 30th **Fred Pallant** (Storrington) searched the band from 1930 until 1950UTC and noticed co-channel interfence to DLF via Donebach, Germany on **153kHz** from Bechar, Algeria; also to DLF via Munich, Germany on **207kHz** from Azilal, Morocco - a useful indication of above average conditions.

Medium Wave Reports

Much to the disappointment of some listeners the propagation conditions at night throughout December proved to be unsuitable for m.w. transatlantic DXing. Those who searched the band for broadcasts from m.w. stations in the Middle East, N.Africa, Europe and Scandinavia compiled fairly extensive logs - see chart.

Most unusual conditions were observed during the morning of December 7 by **George Millmore** (Wootton, IoW). He says "Between 0900 & 1030UTC I logged some thirty-eight stations from outside the United Kingdom".

The sky waves from several stations in N.Africa were picked up on December 26th by **Sheila Hughes** in Morden. Those from Algeria came from Les Trembles on **549** (SINPO 43333 at 2300); Algiers on **891** (33333 at 2150); also Alger on **981** (33333 at 2155). At 2315 Sidi Bennour, Morocco on **540** rated 22222. Later, Tunis Djedeida, Tunisia on **630** was 22222 at 0005.

During the last week of December **Fred Wilmshurst** (Northampton) noticed that the broadcasts from m.w. Continental stations were coming in particularly strongly from about 1500UTC - local radio stations like Magic 756, Cl.Gold on **1017**, Cap.Gold on **1323** and Cl.Gold on **1530kHz** were virtually unreadable from then onwards.

Good conditions were also observed towards the end of the month by **Ernie Strong** in Ramsey, Cambs. During the transition from day to night he heard for the first time BBC R.Cornwall **on 630**, which became audible for about 30 minutes and rated 22322.

Short Wave Reports

A pronounced echo on some of the broadcasts in the **25MHz (11m)** band has been reported by listeners in the UK. During the peak year(s) of a sunspot cycle such effects are not uncommon because at times the propagation conditions are sufficiently favourable to enable a high powered transmission, which is beamed at a low angle to a distant area, to travel on around the world and return to the general area of the transmitter from the opposite direction - it takes about 1/7 of a second! When it reappears it may become audible in some locations as an echo on the main transmission, which can make readability very difficult.

Once again there were no reports to indicate how well the transmissions from Deutsche Welle (DW) on **25.740** (Ger to S/SE.Asia 0800?-1600?) are being received in the intended area but it is known that they can usually be received well in Australia and E.Canada. The SINPO ratings noted in some of the reports from listeners in the UK were 44434 at 0936 by **Vic Prier** in Colyton; 25422 at 1000 in Storrington; 45554 at 1000 by **Eddie McKeown** in Newry; 35433 at 1040 in E.Bristol; 44444 at 1110 by **Robert Connolly** in Kilkeel; 35433 at 1305 in Northampton.

The daily broadcasts to E/C.Africa from R.France International (RFI) on **25.820** (Fr 0900-1300) have continued and judging by the propagation of amateur radio signals to/from Africa in the **28MHz (10m)** band there can be little doubt that the reception of them there has been good. In the UK they were rated 45423 at 0942 in Colyton; 25333 at 0958 in Storrington; 45343 at 0959 in Newry; 25522 at 1045 in E.Bristol; 44444 at 1100 by **Bill Griffith** in W.London; 34443 at 1105 in Kilkeel; 35433 at 1202 in Northampton.

Broadcasts from several continents have been reaching the UK in the **21MHz (13m)** band. During the morning R.Finland via Pori **21.670** (Eng to Australia, Asia, W.Eur 0730-0800) was rated 54444 at 0730 in Morden; R.Australia via Shepparton **21.725** (Eng to Pacific areas 0200-0900) 24422 at 0812 in Colyton; R.Pakistan **21.465** (Ur, Eng to Eur) 43443 at 0849 by **Tom Winzor** in Plymouth; R.Australia via Shepparton **21.820** (Eng to Asia 0900-1400) 33333 at 0900 by **Gerald Guest** in Dudley & SIO 323 at 1200 by **Tom Smyth** in Co.Fermanagh; R.Prague, Czech Rep **21.745** (Eng to E.Africa, Asia 1000-1030) 45544 at 1004 in Newry; R.Denmark via R.Norway **21.725** (Da to S.America 1030-1100) 22222 at 1057 by **Thomas Williams** in Truro; Vatican R, Italy on **21.850** (Various to Lat.America?) 44444 at 1115 in Kilkeel.

After mid-day HCJB Quito, Ecuador **21.455** (Eng [u.s.b]) was rated 44444 at 1203 by

Long Wave Chart

Freq (kHz)	Station	Country	Power (kW)	Listener
153	Bechar	Algeria	1000	F*,H*
153	Donebach DLF	Germany	500	A,B*,D*,E*,F*,G,H,I
153	Brasov	Romania	1200	H*
162	Allouis	France	2000	B*,D*,E*,F*,G,H,I
171	Nador Medi 1	Morocco	2000	F*
171	Bolshakovo etc	Russia	1200	D*
171	Sasnovy	Belarus	1000	H*
177	Oranienburg	Germany	500	A,B*,D*,E*,F*,H,I
183	Saarlouis	Germany	2000	B,D*,E*,F*,H,I
189	Gufuskalar	W.Iceland	150	A*,C*,H*
198	Droitwich BBC	UK	500	B,D*,E*,G,H,I
207	Munich DLF	Germany	500	A,B,D*,E*,F*,G,H,I
207	Eida	E.Iceland	100	A*
207	Azilal	Morocco	800	F*,H*
216	Roumoules RMC	S.France	1400	B,D*,E*,F*,G,H,I
225	Polskie R 1	Poland	7	A,B,D*,H*,I
234	Beidweiler	Luxembourg	2000	B,D*,E*,F*,H,I
243	Kalundborg	Denmark	300	A,B,D*,E*,F*,H,I
252	Tipaza	Algeria	1500	D*,E*
252	Atlantic 252	Eire	500	D*,E*,F*,G,H,I
261	Burg R.Ropa	Germany	85	A,B*,D*,E*,F*,H,I*
261	Taldom Moscow	Russia	2500	B*
270	Topolna	Czech Rep	1500	D*,E*,F*,H
279	Sasnovy	Belarus	500	A*,B*,D*,E*,F*,H

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

Listeners:
(A) Simon Hockenhull, E.Bristol
(B) Sheila Hughes, Morden
(C) Eddie McKeown, Newry
(D) Eddie McKeown while in Prague
(E) George Millmore, Wootton, IoW
(F) Fred Pallant, Storrington
(G) Tom Smyth, Co.Fermanagh
(H) Ernie Strong, Ramsey, Cambs
(I) Fred Wilmshurst, Northampton

Tropical Bands Chart

Freq (MHz)	Station	Country	UTC	DXer
2 310	ABC Alice Springs	Australia	1850	L
3 230	R Nepal	Kathmandu	0005	A
3 241	TWR Shona	Swaziland	1830	L
3 255	BBC via Meyerton	S Africa	2021	I,J,L
3 270	Namibian BC,Windhoek	Namibia	1953	A,I,J,L
3 290	Namibian BC,Windhoek	Namibia	0355	A,I,L
3 300	R Cultural	Guatemala	0356	I
3 315	AIR Bhopal	India	1626	J,L
3 316	SLBS Goderich	Sierra Leone	2126	A,J,L
3 320	SABC (RSG) Meyerton	S.Africa	2020	A,J,L
3 335	CBS Taipei	Taiwan	2107	I,J
3 356	R Botswana	Gaberone	0041	I
3 365	GBC R-2	Ghana	2125	A,J,L
3 365	AIR Delhi	India	1830	D
3.915	BBC via Kranji	Singapore	2107	A,I,M
3 955	R,Taipei via Skelton	England	1800	C,K,L,N
3 965	RFI Paris	France	0401	I
3 975	R Budapest	Hungary	2058	G,I,L
3 975	R.Korea via Skelton	England	2200	A,I,M
3 985	Nexus, Milan	Italy	2125	A,I,L,M
3 995	DW via Julich	Germany	2230	A,G,I,L
4 005	Vatican R	Italy	0403	I
4 755	R Educ CP Grande	Brazil	0020	A
4 760	AIR Port Blair	India	0015	A
4 770	FRCN Kaduna	Nigeria	2115	A,E,I,J
4 775	AIR Imphal	India	1644	J
4 783	RTM Bamako	Mali	2026	A,I,J,L
4 790	Azad Kashmir R	Pakistan	1643	E,J
4 800	AIR Hyderabad	India	1647	J
4 815	R.Difusora Londrina	Brazil	0025	A
4 820	R Botswana, Gaberone	Botswana	2115	I,J
4 820	AIR Calcutta	India	0031	I
4 840	AIR Bombey	India	1615	A,H,I,J
4 845	ORTM Nouakchott	Mauritania	2115	A,E,F,G,I,L
4 850	R,Yaounde	Cameroon	2115	A,I
4 850	AIR Kohima	India	0025	A,L
4 860	AIR Delhi	India	1645	H,I,J,L
4 885	R.Clube do Para	Brazil	0610	G,I
4 885	R, Difusora Acreana	Brazil	0030	A
4 885	KBC East Sce Nairobi	Kenya	2028	J
4 890	RFI Paris	via Gabon	0357	I
4 890	R.Port Moresby	Pap N Guinea	2026	J
4 895	Pakistan BC	Pakistan	1650	J
4 910	Tennant Creek	Australia	2133	J
4 910	AIR Jaipur	India	0036	I,J
4 915	GBC 1, Accra	Ghana	2118	A,I,J,L
4 920	R Quito, Quito	Ecuador	0827	B
4 920	AIR Chennai	India	1639	A,I,J
4 927	RRI Jambi	Indonesia	2058	J
4 930	R Barahona	Dominican Rep	0128	E
4 935	KBC Gen Sce Nairobi	Kenya	2027	J
4 940	AIR Guwahati	India	1530	A,G,J
4 950	AIR Srinagar	India	1530	A,E,J
4 950	VOA via Sao Tome	Sao Tome	2039	D,I,J,K
4 960	VOA via Sao Tome	Sao Tome	0310	I
4 965	Christian Voice	Zambia	1653	J
4 970	PBS Xinjiang	China	0035	A
4 975	R Uganda, Kampala	Uganda	2030	D,I,J
4 980	Ecos del Torbes	Venezuela	0350	A,B,I
4 985	R.Brazil Central	Brazil	0122	E
5 005	R Nacional, Bata	Eq Guinea	2051	I,J
5 005	R Nepal Kathmandu	Nepal	1703	A,J
5 009	R TV Malagasy	Madagascar	1700	J
5 010	AIR Thiru'puram	India	0046	A,I
5 020	La V du Sahel,Niamey	Niger	1900	G,J,L
5 025	R Parakou	Benin	2131	D,J
5 025	R Rebelde, Habana	Cuba	0351	A,I
5 025	R Uganda Kampala	Uganda	2050	J
5 030	AWR Latin America	Costa Rica	0035	A
5 030	RTM Kuching	Sarawak	2101	J
5 035	R Bangui	C Africa	1906	J
5 047	R Togo, Lome	Togo	2131	I,J
5 050	Haixia 1,V of Strait	China	2058	J
5 050	AIR Aizawl	India	0040	A
5 050	R.Tanzania	Tanzania	1740	J
5 060	PBS Xinjiang, Urumqi	China	0015	A

DXers:-
(A) Robert Connolly, Kilkeel.
(B) David Edwardson, Wallsend.
(C) Stan Evans, Herstmonceux
(D) Bill Griffith W London
(E) David Hall Morpeth
(F) Simon Hockenhull, E Bristol
(G) Sheila Hughes, Morden
(H) Rhoderick Illman Oxted
(I) Eddie McKeown Newry.
(J) Fred Pallant, Storrington.
(K) Clare Pinder while in Appleby
(L) Vic Prier, Colyton
(M) Tom Smyth, Co Fermanagh
(N) Tom Winzor, Plymouth

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

Listeners:-
(A) Robert Connolly, Kilkeel
(B) Simon Hockenhull, E Bristol
(C) Sheila Hughes, Morden
(D) Brian Keyte, while at Wootton Warren, Warwicks
(E) George Millmore, Wootton IoW
(F) Tom Smyth Co Fermanagh
(G) Ernie Strong Ramsey, Cambs
(H) Fred Wilmshurst, Northampton
(I) Tom Winzor, Plymouth

Martin Venner in St.Austell; R.Portugal Int via Sines? **21.830** (Port to Brazil 1130-1500?) 45544 at 1210 in Northampton; UAER, Dubai **21.605** (Eng to Eur 1330-1350) 32333 at 1335 by **Peter Pollard** in Rugby; RAI Rome **21.520** (It [sport] to E.Africa 1345-1700 Sun) 45544 at 1402 in E.Bristol; BBC via Cyprus **21.470** (Eng to Africa 1300-1700) 44333 at 1425 by **Stan Evans** in Herstmonceux; BBC via Ascension Is **21.660** (Eng to Africa 1400-1700) 22232 at 1515 by **Robert Hughes** in Liverpool & 35543 at 1645 by **David Edwardson** in Wallsend; WYFR Okeechobee, USA **21.455** (Eng, Fr, Ger to Eur 1600-2100?) 44444 at 1615 by **Vera Brindley** in Woodhall Spa; WYFR via Okeechobee, USA **21.525** (Eng, Fr to Eur, Africa 1600-1900) 33222 at 1640 by **David Hall** in Morpeth; R.France Int via Fr.Guiana **21.645** (Sp to C.America 1800-1830) 44444 at 1815 by **Bernard Curtis** in Stalbridge.

Noted in the **18MHz (15m)** band were R.Norway Int **18.950** (Norw to E.Asia 0900-0929), rated 51442 [with echo] at 0900 in Colyton; R.Norway Int **18.950** (Norw to N.America 1200-1229) 55444 at 1210 in Northampton; R.Sweden **18.960** (Eng to N.America 1230-1300) 55555 at 1235 in Herstmonceux & 55444 at 1259 in Newry; R.Sweden, Stockholm on **18.960** (Eng, Sw to N.America 1330-1430) SIO 555 at 1330 in Co.Fermanagh; WYFR Okeechobee, USA **18.980** (Eng to Africa, Eur 1600-2200?) 44444 at 1612 in Woodhall Spa; Christian Science BC via WSHB Cypress Creek **18.910** (Fr, Eng to E/C.Africa 1700?-2000) 54445 at 1815 in Stalbridge & 44333 at 1930 in Morden.

Quite a few broadcasters are taking advantage of the propagation conditions in the **17MHz (16m)** band during the day. They include R.Romania Int **17.720** (Eng to Africa 0700-0800) rated 44333 at 0740 in Morden; R.Australia via Shepparton **17.750** (Eng to Asia 0000-0500, 0600-1100) 43333 at 0940 in Stalbridge; Israel R, Jerusalem **17.535** (Heb [Home svce relay] to N.America) 22222 at 1029 in Truro; BBC via Ascension Is **17.830** (Eng to Africa 0800-2100) 33443 at 1130 in Kilkeel & 25433 at 2000 in E.Bristol; R.Bulgaria, Sofia **17.500** (Eng to Eur 1200-1300) 44444 at 1227 in St.Austell; R.Jordan via Al Karanah **17.680** (Eng to Eur, N.America 1100-1730) 54444 at

Local Radio Chart

Freq (kHz)	Station	ILR BBC	e.m.r.p (kW)	Listener
558	Spectrum, London	I	0.80	B,D,E,G,H
585	R Solway	B	2.00	A
603	C G,Littlbrne	I	0.10	A,D,E,G,H
630	R Bedfordshire(3CR)	B	0.20	B,D,E,G,H
630	R Cornwall	B	2.00	A,E,G
657	R Clwyd	B	2.00	A,E,F,G,H
657	R,Cornwall	B	0.50	A,E
666	Cl Gold 666, Exeter	I	0.34	A,B,D,E,G,H
666	R York	B	0.80	A,C,G
729	BBC Essex	B	0.20	D,E,G,H
738	Hereford/Worcester	B	0.037	B,C,D,E,G,H
756	R Cumbria	B	1.00	A,G*
756	The Magic 756,Powys	I	0.63	A,D,G,H
765	BBC Essex	B	0.50	B,D,E,G,H
774	R Kent	B	0.70	D,E,G,H
774	Cl.Gold 774, Glos	I	0.14	D,H
792	Cl Go'd 792,Bedford	I	0.27	D,G,H
792	R Foyle	B	1.00	A,F
801	R Devon	B	2.00	A,B,D,E,G
828	Cl Gold 828, Luton	I	0.20	D,G,H
828	Magic 828, Leeds	I	0.12	A
828	Asian Netwk Sedgley	B	0.70	D
828	2CR Cl G Bournem'th	I	0.27	E
837	R Cumbria/Furness	B	1.50	A
837	Asian Netwk Leics	B	0.45	B,C,D,E,G,H
855	R Devon	B	1.00	E,I
855	R Lancashire	B	1.50	A,G
855	R Norfolk, Postwick	B	1.50	C,G
855	Sunshine 855,Ludlow	I	0.15	C,D,H
873	R Norfolk W.Lynn	B	0.30	C,D,G,H
936	Brunel CG W.Wilts	I	0.18	D,E,F*,G,H
936	Fresh AM Hawes	I	1.00	A
945	Cl Gold GEM, Derby	I	0.20	A,D,G,H
945	Capital G, Bexhill	I	0.75	A,E
954	Cl Gold 954 via ?	I	?	G
954	Cl Gold 954,Torquay	I	0.32	E
954	Cl Gold 954, H'ford	I	0.16	A,B,D,H
963	Asian Sd, E Lancs	I	0.80	A
963	Liberty R, Hackney	I	1.00	D,E,G,H
972	Liberty R Southall	I	1.00	A,B,D,F,G,H
990	R Devon, E Devon	B	1.00	A,D,E,F
990	Cl G, Wolverhampton	I	0.09	D,G,H
999	C Gold GEM Nott'hem	I	0.25	D,G,H
999	Magic 9-99 P'ston	I	0.80	A
999	R Solent	B	1.00	C*,D,F
1017	Cl G,WABC,Shr'shire	I	0.70	A,D,G,H
1026	R Cambridgeshire	B	0.50	C,D,G,H
1026	Downtown R, Belfast	I	1.70	A,F
1026	R.Jersey	B	1.00	B,E
1035	RTL C'try(Ritz)1035	I	1.00	C*,D,E,G,H
1035	R Sheffield	B	1.00	D,G
1035	N Sound 2, Aberdeen	I	0.78	A
1116	R Derby	B	1.20	A,D,G,H
1116	R Guernsey	B	0.50	E
1116	Valley R Ebbw Vale	I	0.50	B,D
1152	Cl G Amber, Norwich	I	0.83	G
1152	LBC 1152 AM	I	23.50	D,F,G,H
1152	Pic'ly 1152 Manch'r	I	1.50	A
1152	Cl G, Plymouth 1152	I	0.32	I
1152	Cl G, Birmingham	I	3.00	B,D,H
1161	R Bedfordshire(3CR)	B	0.10	D,F,G,H
1161	Brunel Cl G,Swindon	I	0.16	D
1161	Magic 1161, Goxhill	I	0.35	A
1161	Southern Counties R	B	1.00	E
1170	Cl G Amber, Ipswich	I	0.28	G
1170	Magic 1170,Stockton	I	0.32	G
1170	Capital G Portsm'th	I	0.50	A,C,E
1170	Signal 2 Stoke-on-T	I	0.20	D
1170	1170AM High Wycombe	I	0.25	C,D,H
1242	Capital G,Maidstone	I	0.32	E
1251	C G Amber,Bury StEd	I	0.76	A,G
1260	Brunel CG, Bristol	I	1.60	D,E
1260	Marcher G Wrexham	I	0.64	A
1260	Sabras Snd Leicester	I	0.29	D,G,H
1278	Cl Gold 1278 W.York	I	0.43	D,G
1295	Radio XL Birmingham	I	5.00	D,E,F*,G,H
1305	Magic AM,Barnsley	I	0.15	A
1305	Premier via ?	I	0.50	D,E,G,H
1305	Touch AM Newport	I	0.20	D,E
1323	Capital G Brighton	I	0.50	E,H
1323	Somerset Snd,Bristol	B	0.63	A,D,G
1332	Premier Battersea	I	1.00	D,F
1332	Cl Gold 1332,Pt'bo	I	0.60	A,D,G,H
1332	Wiltshire Sound	B	0.30	D,E
1359	Cl Gold 1359 C'try	I	0.27	D,G,H
1359	R Solent Bournem'th	B	0.85	E
1368	R Lincolnshire	B	2.00	G,H
1368	Southern Counties R	B	0.50	C*,E
1368	Wiltshire Sound	B	0.10	D
1413	R G'loucester via ?	B	?	D,G,H
1413	Premier via ?	I	0.50	E,G
1413	Fresh AM, Skipton	I	0.10	A
1431	Breeze,Southend	I	0.35	D,E,G
1431	Cl.Gold, Reading	I	0.14	D,E,G,H
1449	Asian Netwk Peterbo	B	0.15	A,D,G,H
1458	R Cumbria	B	0.50	A
1458	R Devon	B	2.00	A
1458	Sunrise, London	I	50.00	C*,D,E,G,H
1458	Asian Netwk Langley	B	5.00	D,G,H
1485	Cl Gold Newbury	I	1.00	D,G,H
1485	R.Humberside (Hull)	B	1.00	D,G
1485	R Merseyside	B	1.20	A,E
1485	Southern Counties R	B	1.00	E
1503	R Stoke-on Trent	B	1.00	C* D,E,F,G,H
1521	Breeze Reigate	I	0.64	D,E,G,H
1530	R.Essex, Southend	B	0.15	D,G
1530	Cl.Gold W.Yorks	I	0.74	A,D,G
1530	Cl Gold Worcester	I	0.52	D*,E,H
1548	R Bristol	B	5.00	D,E,F*
1548	Capital G, London	I	97.50	A,C*,D,E,G
1557	R Lancashire	B	0.25	A
1557	Cl.Gold 87 N'hant	I	0.76	D,G,H
1557	Capital G, So'ton	I	0.50	E
1566	CountySnd,Guildford	I	0.50	D,E
1584	London Turkish R	I	0.20	E,G
1584	R.Nottingham	B	1.00	D,G,H
1584	R.Shropshire	B	0.50	A,D
1584	Tay Perth	I	0.21	D
1602	R.Kent	B	0.25	D,E

1305 in Morpeth & 43334 at 1530 in Dudley; Vatican R, Italy **17.515** (Eng to Asia? 1345-1405) SIO 333 at 1345 in Co.Fermanagh; R.Finland via Pori **17.660** (Eng to W.Eur, N.America 1330-1400) 45444 at 1350 in Rugby; R.Sweden **17.870** (Eng to Eur, N.America 1330-1355) 55555 at 1350 in Liverpool; Voice of Turkey **17.815** (Eng to Eur 1330-1425) 55544 at 1405 in Herstmonceux; R.Sweden **17.505** (Eng to Australia 1430-1500) 54444 at 1455 in Plymouth; WHRI via Maine, USA **17.650** (Eng to Eur, M.East, Africa 1600?-2200) 45444 at 1714 in Northampton; Channel Africa via Meyerton **17.870** (Eng to W.Africa 1800-1830?) 34433 at 1810 in Colyton; R.Nederlands via Bonaire, Ned.Antilles **17.605** (Eng to C/W.Africa 1830-2030, Dut 2030-2125) 34232 at 1836 in Newry & 25443 at 2100 in Storrington; HCJB Quito, Ecuador **17.660** (Eng to Eur 1900-2200) 34333 at 1935 in Woodhall Spa.

Good reception of R.New Zealand's broadcasts in the **15MHz (19m)** band has been reported by listeners in the UK. Their 100kW transmission on **15.175** (Eng 0705-1000), which is intended for listeners in Pacific areas, was rated 54444 at 0800 in Morden & 54445 at 0910 in Stalbridge. A programme for troops in E.Timor then follows (Eng 1000-1200), which was rated 44434 at 1131 by **Rhoderick Illman** in Oxted.

R.Australia's broadcasts via Shepparton have been reaching the UK on the following frequencies: **15.240** (Eng to Pacific areas 0000-0900) rated 35343 at 0840 in Northampton; **15.415** (Eng to Asia 0100-0400, 0600-0900) 24412 at 0800 in Stalbridge.

Also mentioned in the reports were VOA via Tinian Is, Pacific on **15.150** (Eng to Korea? 0800-1000), rated 35553 at 0830 in Wallsend & SIO 444 at 0852 by **Francis Hearne** in N.Bristol; Voice of Armenia, Yerevan **15.270** (Various to Eur, M.East [Eng 0910-1000] Sun) 54554 at 0854 in W.London & 44444 at 0910 in Newry; BBC via Skelton, UK **15.485** (Eng to Eur, Africa 0600-1800) 44444 at 0935 by **Tony Hall** in Freshwater Bay, IoW; BBC via Cyprus? **15.565** (Eng to Asia? 0900-1500) 33233 at 1334 in St.Austell; R.Finland via Pori **15.400** (Eng to Eur, N.America 1330-1400) 43443 at 1350 in Herstmonceux; Swiss R.Int via Sottens **15.185** (Eng, Ger, Fr to Asia 1400-1600) 22222 at 1400 in Truro; VOA via Kavala, Greece **15.205** (Eng to M.East, S.Asia 1400-1800) SIO 333 at 1400 in Co.Fermanagh; WEWN via Vandiver, USA **15.745** (Eng to Eur 1100-2100) 44444 at 1606 in

Medium Wave Chart

Freq (kHz)	Station	Country	Power (kW)	Listener
531	Torshavn	Faeroe Is	100	A,C
531	Burg	Germany	20	D*,E,I*
531	RNE5 via ?	Spain	?	E
531	Beromunster	Switzerland	500	D*,F,H*,I*,J*
540	Wavre	Belgium	150/50	B*,D*,E,H,I*,J*
540	Sidi Bennour	Morocco	600	B*,D*,E*
549	Les Trembles	Algeria	600	B*,E*
549	Thurnau (DLF)	Germany	200	E*,I*,J*
558	Espoo	Finland	50	D*,F*
558	RNE5 via ?	Spain	?	E*
567	Tullamore(RTE1)	Eire	500	A,C,D*,E,H,I*,J*
567	RNE5 via ?	Spain	?	E*
576	Muhlacker(SDR)	Germany	500	D*,F*,I*,J*
576	Barcelona(RNE1)	Spain	50	D*,E*
585	Paris(FIP)	France	8	D*,E,I
585	Madrid(RNE1)	Spain	200	D*,E*,I*,J*
585	Dumfries(BBCScot)	UK	2	D,H
594	Frankfurt(HR)	Germany	1000/400	B*,D*,I*
594	Oujda 1	Morocco	100	B*,E*
603	Lyon	France	300	D*,E
603	Sevilla(RNE5)	Spain	50	E*
603	Newcastle(BBC)	UK	2	C,D*
612	Athlone(RTE2)	Eire	100	A,C,D*,E,H,I*,J*
612	Sebaa Aioun	Morocco	300	E*
621	Wavre	Belgium	80	A,D*,E,I*,J*
621	Barcelona(OCR)	Spain	50	D*,E*
630	Vigra	Norway	100	A*,D*
630	Tunis-Djedeida	Tunisia	600	A*,B*,E*
639	Praha(Liblice)	Czech	1500	D*,E,I*
639	RNE1 via ?	Spain	?	D*,F*
648	Orfordness(BBC)	UK	500	B*,C,D*,E,H*,I*,J*
657	Napoli	Italy	120	E*,J*
657	Madrid(RNE5)	Spain	20	D*,E*
657	Wrexham(BBCWales)	UK	2	A,C,D*,J
666	Mussinch Rohrdorf(SWF)	Germany	150	D*,J*
666	Sitkunai(R Vilnius)	Lithuania	500	D*
666	Lisboa	Portugal	135	D*
675	R10 FM	Holland	120	A,D*,E,I*,J
684	Sevilla(RNE1)	Spain	500	D*,E*,I*
693	Potenza	Italy	20	D*
693	Droitwich(BBC)	UK	150	B*,E,J
693	Enniskillen(BBC)	UK	1	H
702	Flensburg(NDR)	Germany	5	D*
702	TWR via Monte Carlo	Monaco	300	D*,E*
711	Rennes 1	France	300	A,D*,E,I*,J*
711	Murcia(COPE)	Spain	5	E*
720	Lisnagarvey(BBC4)	N Ireland	10	H
720	Norte	Portugal	100	D*
720	Sfax	Tunisia	200	F*
720	Lots Rd, Ldn(BBC4)	UK	0.5	B*,C,E
729	Cork(RTE1)	Eire	10	D*,E,H
729	RNE1 via ?	Spain	?	D*,E*
738	Paris	France	4	D*,E
738	Barcelona(RNE1)	Spain	500	D*,F*,I*,J*
747	Flevo(Hilv2)	Holland	400	A*,D*,E,I*,J*
756	Braunschweig(DLF)	Germany	800/200	D*,I*,J
756	Bilbao(EI)	Spain	5	E*,I*,J*
756	Redruth(BBC)	UK	2	D*,H
765	Sottens	Switzerland	500	A,D*,E*,J*
774	Enniskillen(BBC)	N Ireland	1	D*,H
774	RNE1 via ?	Spain	?	D*,E*,J*
783	Leipzig(MDR)	Germany	100	D*,E*,I*,J*
783	Miramar(R Porto)	Portugal	100	F*
792	Limoges	France	300	A,D*,I*
792	Lingen(NDR)	Germany	5	E*
792	Sevilla(SER)	Spain	20	E
792	Londonderry(BBC)	UK	1	H
801	Munchen-Ismaning	Germany	300	D*
801	RNE1 via ?	Spain	?	E*
810	Volgograd	Russia	150	E*
810	Madrid(SER)	Spain	20	D,E*
810	Westerglen(BBCScot)	UK	100	C,D*,E,H,I*,J*
819	Batra	Egypt	450	A*
819	S Sebastian(EI)	Spain	5	D*,E*
828	Rotterdam	Holland	20	D*,I*
837	Nancy	France	200	D*,E*,H*,I*
837	COPE via ?	Spain	?	D*,E*
846	Rome	Italy	1200	D*,E,H,I*,J*
855	RNE1 via ?	Spain	?	D*,E*,J*
864	Santah	Egypt	500	E*
864	Paris	France	300	A,D*,E,I*
864	Socuellamos(RNE1)	Spain	2	E*
873	Frankfurt(AFN)	Germany	150	D*,E*,I*
873	Zaragoza(SER)	Spain	20	E*
873	Enniskillen(R Ul)	UK	1	C,D*,H
882	COPE via ?	Spain	?	D*
882	Washford(BBCWales)	UK	100	C,D*,E,H,I*,J*
891	Algiers	Algeria	600/300	A*,B*,D*,E*,I*
900	Milan	Italy	600	D*,F*,I*
909	Lisnagarvey(BBC5)	N Ireland	10	H
909	Brmans Pk(BBC5)	UK	140	E,J
918	Domzale	Slovenia	600/100	D*,E*
918	Madrid(R Int)	Spain	20	D*
927	Wolvertem	Belgium	300	D*,E,I*,J
936	Bremen	Germany	100	D*,I*
936	Venezia	Italy	20	E*
945	Toulouse	France	300	A*,D*,E*,H,I*
954	Brno (CRo2)	Czech Rep	200	D*,E*
954	Madrid(CI)	Spain	20	E*,I*
953	Pori	Finland	600	D*,E*
963	Tir Chonaill	Eire	10	H*
972	Hamburg(NDR)	Germany	300	D*
972	RNE1 via ?	Spain	?	F*
981	Alger	Algeria	600/300	A*,B*,E*
990	Berlin	Germany	300	D*,E*,I*
999	Schwerin(RIAS)	Germany	20	D*
999	Madrid(COPE)	Spain	50	D*
1008	Flevo(Hilv-5)	Holland	400	A,B*,D*,E,I*,J*
1017	Rheinsender(SWF)	Germany	600	D*,E*,I*,J
1035	Lisbon(Prog3)	Portugal	120	D*
1044	Dresden(MDR)	Germany	20	D*,E*
1044	SER via ?	Spain	?	D*,F*
1053	Talk Sport via ?	UK	?	D*,F,H,J*,K
1062	Kalundborg	Denmark	250	A,D*,E,I*
1071	Riga	Latvia	50	E*
1071	Bilbao(EI)	Spain	5	D*,I*
1071	Talk Sport via ?	UK	?	D*
1080	SER via ?	Spain	?	D*,E*
1089	Talk Sport via ?	UK	?	D*,E,H,J*
1098	Nitra(Jarok)	Slovakia	1500	D*,E*,I*
1107	AFN via ?	Germany	10	D*
1107	Talk Sport via ?	UK	?	D*,E
1116	Pontevedra(SER)	Spain	5	D*
1125	La Louviere	Belgium	20	D*,E
1125	Deanovec	Croatia	100	A*
1125	RNE5 via ?	Spain	?	E*
1125	Llandrindod Wells	UK	1	C
1134	Zadar(Croatian R)	Croatia	600/1200	A*,D*,E*,J
1143	AFN via ?	Germany	1	D*,E*
1143	COPE via ?	Spain	2	D*,F*,J*
1152	RNE5 via ?	Spain	10	E*
1161	Ain-Salah	Algeria	5	E*
1179	Solvesborg	Sweden	600	A*,D*,E*,H,I*,J*
1188	Kuurne	Belgium	5	D*,E
1188	Szolnok	Hungary	135	F*,I*
1197	Munich(VOA)	Germany	300	D,G
1197	Virgin via ?	UK	?	D*,E,I*,J*
1206	Bordeaux	France	100	A*,D*,E,I*
1215	Virgin via ?	UK	?	D*,E,I*,J*,K
1224	Lelystad	Holland	50	D*,E*
1233	RFE via ?	Czech Rep	?	D*
1233	Nitra	Slovakia	40	I*
1233	Virgin via ?	UK	?	D*,H,J*
1242	Marseille	France	150	A*,D*
1242	Virgin via ?	UK	?	D*
1251	Marcali	Hungary	500	D*
1251	Huisberg	Netherlands	10	D*,F
1260	SER via ?	Spain	?	D*
1260	Guildford (V)	UK	0.5	D*
1269	Neumunster(DLF)	Germany	600	D*,E*,I*,J
1278	Dublin/Cork(RTE2)	Eire	10	C,D*,E*,H,I*,J*
1287	RFE via ?	Czech Rep	?	D*,E*
1287	Lerida(SER)	Spain	10	E*
1296	Orfordness(BBC)	UK	500	C*
1305	RNE5 via ?	Spain	?	D*,E*
1314	Kvitsoy	Norway	1200	A,D*,E,I*,J*
1323	Wachenbrunn(V Russia)	Germany	1000/150	D,J
1332	Rome	Italy	300	D*,E
1341	Lisnagarvey(BBC)	N Ireland	100	C,E,H,I*,J*
1341	Tarrasa(SER)	Spain	2	E*
1359	Madrid(RNE FS)	Spain	600	D*
1368	Foxdale(Manx R)	Is of Man	20	A*,C,D*,E*,H
1377	Lille	France	300	D*,E,I*,J*
1386	Bolshakovo	Russia	2500	A*,B*,D,F,I*
1395	TWR via Flake	Albania	500	D*
1395	Lopik	Netherlands	120/40	D,E,I*,J*
1404	Brest	France	20	A*,D*,E,I*,J*
1413	RNE5 via ?	Spain	?	D*
1422	Heusweiler(DLF)	Germany	1200/600	D*,E,I*,J
1440	Marnach(RTL)	Luxembourg	1200	D,E*
1440	Dammam	Saudi Arabia	1800	D*
1449	Redmoss(BBC)	UK	2	B*,D*,E*,H
1458	Flake	Albania	500	E*
1467	Monte Carlo(TWR)	Monaco	1000/400	D*,E*,I*
1476	Wien-Bisamberg	Austria	600	B*,D*,E*,I*
1494	Clermont Ferrand	France	20	D,E,I*,J*
1494	St Petersburg	Russia	1200	D*
1512	Wolvertem	Belgium	300	B,D*,E,F,I*,J*,K
1512	Jeddah	Saudi Arabia	1000	D*
1521	Kosice(Cizatice)	Slovakia	600	E*,J*
1521	R Manresa(SER)	Spain	2	E*
1530	Vatican R	Italy	150/450	B*,C,D*,E*,I*,J*
1539	Mainflingen(EHF)	Germany	350(700)	D*,E,I*,J*
1537	Nice	France	300	A*
1575	Genova	Italy	50	A*,E*,J*
1575	SER via ?	Spain	5	D*,E,J*
1593	Holzkirchen(VOA)	Germany	150	A*,D*
1602	SER via ?	Spain	?	D*
1602	Vitoria(EI)	Spain	10	D*,E*,J*
1611	Vatican R	Italy	15	C*,E*,I*

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

Listeners:-
- (A) Simon Hockenhull, E.Bristol
- (B) Sheila Hughes, Morden
- (C) Brian Keyte, while at Wootton Warren, Warwicks
- (D) Eddie McKeown, Newry
- (E) George Millmore, Wootton IoW
- (F) Clare Pinder, while in Appleby
- (G) Harry Richards, Barton on Humber
- (H) Tom Smyth, Co Fermanagh
- (I) Phil Townsend, E London.
- (J) Fred Wilmshurst, Northampton
- (K) Tom Winzor, Plymouth

Plymouth; WWCR Nashville, USA **15.685** (Eng to N.America, Eur 1100?-2100) 34333 at 1608 in Woodhall Spa; BBC via Seychelles **15.420** (Eng to E.Africa 1615-1700) 32232 at 1615 in Liverpool; Africa No.1, Gabon **15.475** (Fr to W.Africa 1600-1900) 35433 at 1651 in Storrington; BBC via Ascension Is **15.400** (Eng to Africa ?-2300) 34433 at 1912 in Rugby; Israel R, Jerusalem **15.650** (Fr?, Eng to Eur 1900-2025) 25322 at 2020 in E.Bristol; VOA via Philippines **15.290** (Eng to E.Asia 0030-0100) 34433 at 0050 in Kilkeel.

Noted in the **13MHz (22m)** band were the BBC via Rampisham, UK **13.745** (Russ 0700 0715), rated 55555 at 0700 in Stalbridge; R.Australia via Shepparton **13.605** (Eng to Pacific 0800-1200) 24212 at 1001 in Newry; R.Ukraine via Kiev **13.590** (Uk [World Service]) 44434 at 1055 in Colyton; R.Austria Int via Moosbrunn **13.730** (Various to Eur, N.America) 45554 at 1126 in Wallend; R.Canada Int via Sackville **13.655** (Eng to N.America 1300-1400) 54444 at 1310 in Morpeth; R.Austria Int via Moosbrunn **13.730** (Various to Eur, Africa) SIO 433 at 1430 in Co.Fermanagh; VOA via Sao Tome **13.600** (Special Eng to Africa 1600-1700) 34323 at 1611 in Woodhall Spa; VOA via Selebi-Phikwe, Botswana **13.710** (Eng to Africa 1600-1700, 1800-2230) 45444 at 1641 in Northampton & 44333 at 1850 in Morden; VOA via Morocco **13.640** (Eng to Eur 1900-2000) 44444 at 1930 in St.Austell; Swiss R.Int via Sottens **13.660** It, Ar, Eng, Ger, Fr to Near East, Africa 1830-2130) 22222 at 1940 in Truro; R.Nederlands via Flevo **13.700** (Eng to Africa 1830-2025) 33343 at 2005 in Liverpool; R.Canada Int via Sackville? **13.650** (Fr, Eng to Eur, Africa 2000-2200) 45434 at 2050 in Rugby; R.Havana Cuba **13.750** (Eng to Eur 2030-2130 [best on u.s.b.]) 22222 at 2030 in Plymouth & 33233 at 2100 by **Clare Pinder** in Appleby; WWCR Nashville, USA **13.845** (Eng to Africa 1400-0100) 43433 at 2245 in Kilkeel.

R.Australia and R.New Zealand often reach our shores in the **11MHz (25m)** band but their broadcasts can usually be received better in other bands. A typical rating for R.Australia via Shepparton on **11.660** (Eng to Asia 1330?-1700) was 32223 at 1615 in Stalbridge and for R.New Zealand on **11.725** (Eng to ? ?-1800) 22222 at 1745 in Truro.

Many other broadcasters use this band to reach listeners in specific target areas. Mentioned in the reports were China R.Int via ? **11.730** (Eng to S.Pacific? 0900-1057), rated 35543 at 0900 in Wallsend; R.France Int via Allouis? **11.670** (Eng to Eur 1200-1257) SIO 322 at 1200 in Co.Fermanagh & 55444 at 1210 in Herstmonceux; BBC via Woofferton, UK **12.095** (Eng to Eur, N/E.Africa 0600-1700, Eng to E.Eur, CIS 1700-2100) 55544 at 1210 in Northampton; R.Romania Int, Bucharest **11.940** (Eng to Eur 1300-1356) SIO 333 at 1308 in N.Bristol; R.Jordan via Al Karanah **11.690** (Eng to W.Eur, E.USA 1100-1400) 54444 at 1311 in Plymouth; VOA via Philippines **11.705** (Eng to E.Asia 1100-1500) 44333 at 1345 in Morpeth; WWCR Nashville, USA **12.160** (Eng to N.America, Eur 1400-2200) 44333 at 1400 in Morden; R.Nederlands via Tashkent **12.070** (Eng to S.Asia 1430-1625) 44444 at 1616 in Woodhall Spa; BBC via Rampisham, UK **11.680** (Ar to M.East 1630?-?) was 44434 at 1702 in Oxted.

Later, R.Canada Int via Skelton? **11.720** (Eng to Eur, Africa 1800-1900) was rated 35333 at 1800 in E.Bristol; AIR via Bangalore **11.620** (Eng to Eur 1745-1945) was 34233 at 1934 in Newry; Israel R, Jerusalem **11.605** (Eng to Eur, N.America 2000-2030) 44434 at 2006 in Colyton; Swiss R.Int via Julich, Germany **11.910** (It, Ar, Eng, Ger, Fr to Nr.East, Africa 1830-2130) 32222 at 2030 in Liverpool; WEWN Vandiver, USA **11.875** (Eng to N.America 2000-?) 44333 at 2057 in Rugby; R.Japan via Ascension Is **11.855** (Eng to S.Africa? 2100-2200) 44344 at 2125 in Freshwater Bay, IoW; AWR via Agat, Guam **11.975** (Chin to E.Asia 2200-2300) 34433 at 2250 in Kilkeel.

Broadcasts from many areas reach the UK in the **9MHz (31m)** band both during the day and at night. Among those noted were HCJB Quito, Ecuador **9.780** (Eng to Eur 0700-0900), rated 45554 at 0820 in Wallsend; TWR Monte Carlo, Monaco **9.870** (Eng to Eur 0755-0920) 54444 at 0856 in Plymouth; R.Vilnius, Lithuania **9.710** (Eng to Eur 0930-1000) 55555 at 0935 in Herstmonceux; R.Nederlands via Bonaire, Ned.Antilles **9.790** (Eng to Asia, Far East 0930-1125) 44243 at 1002 in Newry; R.Prague via Litomysl **9.880** (Ger to Eur 1100-1127) 44444 at 1116 in Oxted; R.Nederlands via Wertachtal **9.855** (Eng to Eur 1130-1325) 55545 at 1130 in Stalbridge; R.Australia via Shepparton **9.475** (Eng to Asia 1330-1858) 43343 at 1700 in Liverpool; Voice of Greece, Athens **9.420** (Gr, Eng to Eur 1700-?) 45434 at 1715 in E.Bristol.

Later VOA via Kavala? **9.760** (Eng to M.East 1700-2100 [via Woofferton?, UK 2100-2200]) was SIO 333 at 1837 in N.Bristol; R.Pyongyang, Korea **9.335** (Sp, Eng to Eur 1800-2000) 42322 at 1840 in Colyton; R.Australia via Shepparton **9.500** (Eng to Asia? 1900-2130?) 33333 at 1945 in Truro; R.Thailand via Udon Thani **9.535** (Eng to Eur 1900-2000) 54444 at 1950 in Freshwater Bay, IoW; V of Armenia via Kamo **9.965** (Eng to Eur, N.America 2040-2100) 44444 at 2040 in Morden; R.Canada Int via Skelton? UK **9.805** (Eng to Eur 2100-2200) 44444 at 2100 in Dudley; WWCR Nashville, USA **9.475** (Eng to Eur, Africa 2100-2300) 43334 at 2110 in Storrington; R.Cairo, Egypt **9.990** (Eng to Eur 2115-2245) 45544 at 2143 in Northampton; R.Ext.Espana (REE), Spain 9.595 (Eng 2200-2300 Sat/Sun) 44444 at 2200 in Appleby; R.Nederlands via Bonaire, Ned.Antilles **9.845** (Eng to N.America 2330-0125) 44444 at 2327 in St.Austell; Swiss R.Int via Sottens **9.985** (Ger, Eng, Fr, It to N & C.America 0030-0545) 34443 at 0100 in Kilkeel; Swiss R.Int via Montsinery, Fr.Guiana **9.905** (Ger, Fr, It, Eng to N & C.America 0030-0500) SIO 434 at 0400 in Co.Fermanagh.

Some of the broadcasts in the **7MHz (41m)** band are intended for European listeners. Those noted came from Christian Science BC via WSHB Cypress Creek, USA **7.535** (Eng, Ger 0400?-1000?), rated 54444 at 0937 in Plymouth; R.Denmark via R.Norway **7.485** (Dan 1730-1755) 45544 at 1750 in Colyton; Vatican R, Italy **7.250** (Various) 43444 at 1646 in Oxted; Voice of Russia **7.300** (Eng [WS]) 25422 at 1825 in E.Bristol; RAI Rome **7.285** (Eng [News] 1935-1955) 43333 at 1935 in Appleby; Voice of Greece, Athens **7.475** (Gr) SIO 333 at 1938 in N.Bristol; Voice of Turkey **7.125** (Eng 1930-2030) 42432 at 1941 in Newry; V of Russia **7.380** (Eng [WS]) 33333 at 2110 in Truro; R.Bulgaria, Sofia **7.500** (Eng 2000-2100) 44444 at 2000 in Dudley; R.Canada Int via Woofferton, UK **7.235** (Eng 2100-? Sun) 45544 at 2110 in Northampton; AIR via Bangalore **7.410** (Eng, Hin 1745-2230) 44444 at 2110 in Morden; China R.Int via Skelton? UK **7.170** (Eng 2200-2300) SIO544 at 2200 in Co.Fermanagh; R.Bulgaria, Sofia **7.500** (Eng 2200-2300) 44444 at 2218 in St.Austell.

Whilst beaming to other areas WHRI via Greenbush, Maine **7.435** (Eng to M.East, Africa 0500-1000) was 44434 at 0935 in Stalbridge; Voice of Nigeria, Ikorodu **7.255** (Ethnic to W.Africa) 32343 at 2123 in Storrington; VOA via Sri Lanka **7.115** (Eng to Asia? 0100-0300) 44444 at 0120 in Kilkeel; WJCR Upton, USA **7.490** (Eng to E.USA 24hrs) 33333 at 0140 in Morpeth.

The **6MHz (49m)** band carries many broadcasts for listeners in Europe. Those noted came from Deutsch Welle (DW) via Julich? **6.140** (Eng Service), rated SIO 433 at 0700 in Co.Fermanagh; Deutschland R, Berlin **6.005** (Ger 24hrs) 33443 at 0705 in Rugby; R.Nederlands via Julich, Germany **6.045** (Eng 1130-1325) 55555 at 1300 in Herstmonceux; R.Austria Int, via Moosbrunn **6.155** (Various [Eng 1430]) 54444 at 1430 in Morden; R.Vlaanderen Int, Brussels **5.910** (Dutch 1700-1730, 1800-1830; Eng 1830-1856) 43343 at 1700 in Oxted & 44343 at 1842 in Newry; R.Sweden **6.065** (Eng) 54444 at 1846 in Plymouth; R.Slovakia Int **5.915** (Eng 1930-2000) 45434 at 1935 in E.Bristol; Swiss R.Int via Vatican State, Italy **6.165** (Ger, It, Fr, Eng 1830-2030) 32222 at 2000 in Appleby; Vatican R, Rome **5.880** (Eng) 22222 at 2050 in Truro; R.Taipei via Skelton? **5.810** (Eng 2200-2300) 43344 at 2200 in Dudley; R.Budapest, Hungary **6.025** (Eng 2200-2230) 45544 at 2215 in Northampton; R.Austria Int, via Moosbrunn **5.945** (Eng 2230-2300, also to NW.Africa) SIO 333 at 2246 in N.Bristol.

Some to other areas may also be received here. They include the BBC via Sackville, Canada **6.175** (Eng to USA 2200-0500), rated 44444 at 2315 in Kilkeel; R.Exterior, Espana **6.055** (Eng to N.America 0000-0200) was 44444 at 0106 in St.Austell; WHRI South Bend, USA **5.745** (Eng to N.America 2100?-1000) 54444 at 0310 in Morpeth & 45444 at 0825 in Colyton; WEWN Birmingham, USA **5.825** (Eng to N.America 2200?-1400?) 44434 at 0920 in Stalbridge.

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

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

Interference
5 nil
4 slight
3 moderate
2 severe
1 extreme

Noise
5 nil
4 slight
3 moderate
2 severe
1 extreme

Propagation Disturbance
5 nil
4 slight
3 moderate
2 severe
1 extreme

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

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IVP on IP3

What is "IP3" and why is it Important to You? The late Joe Carr K4IPV tells all.

If your receiver is perfectly linear at all signal levels from the noise floor to burn-out point of the input coils, then you don't need to know about IP3. But guess what? Your receiver is **not** linear over all possible signal ranges. The term 'IP3' refers to the receiver's third-order intercept point. It is a direct measure of how well your receiver performs in a dynamic sense. While selectivity and sensitivity are important, on today's crowded airwaves the IP3 performance is often more critical.

The IP3 issue arises when strong signals (or a collection of strong signals) drive the front-end of the receiver into a non-linear operating region. And when a receiver is driven into non-linearity, a lot of funny things can happen. Some of them are 'funny ha-ha' while others are 'funny peculiar', but all of them are likely to reduce the usefulness of your receiver.

Intermod Hill

One such incident was seen on a hill near my home in Virginia local hams call 'Intermod Hill'. It is close by the hospital where my wife works as a Registered Nurse. On that hill are: a) Two v.h.f. broadcast radio stations (each >50kW e.r.p.), b) a m.w. broadcast station (2kW), c) an AT&T Long-Lines Department microwave relay station, d) about forty or fifty v.h.f. and u.h.f. landmobile radio transmitters or repeaters that use rented space for their antennas on the broadcast station towers, and e) the hospital's paging and security radio systems. A lot of r.f. floats around that hill! When I would wait outside in my automobile for my wife to get off work I could not use my two metre rig (drat!).

One time, I could hear a friend of mine on the 31/91 receive frequency, but he would not come back. A chap came back and told me he was on the 19/79 machine! It seems that my receiver was responding to a strong intermod that put 19/79 on my 31/91 rig!

Another time I found a problem when I worked as a biomedical equipment repairman in a university's hospital while I was in graduate school. About three o'clock in the morning a nurse in the Coronary Care Telemetry Unit called me and told me that Mr. Smith seemed to be in Mr. Jones' bed. She was not referring to kinky goings on in the sick ward, but that Mr. Smith's v.h.f. ECG telemetry signal was being picked up on both his channel and Mr. Jones' channel. The problem turned out to be a portable v.h.f. broadcast receiver at the nurses' station.

The telemetry active antenna whip extended out of the false ceiling to a point a few milimetres above the tip of the v.h.f broadcst receiver. The local oscillator in the v.h.f. receiver was radiating a strong signal into a 60dB gain active antenna, where it mixed with other ECG signals (and maybe other unheard local signals) to put a strong version of itself on the wrong channel. When I re-tuned the radio, Mr. Smith went back to his own bed!

These problems were due to Intermodulation Distortion (IMD). This problem occurs when two (or more frequencies) come together in a non-linear circuit. If the frequencies are F1 and F2, the product frequencies produced are:

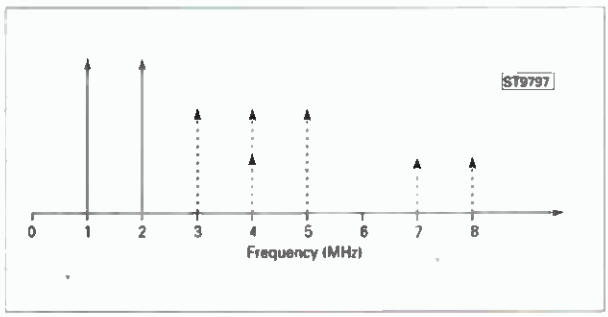


Fig. 1: Intermodulation products.

$$F_{Product} = mF1 \pm nF2$$

Where:
FProduct is the IMD product frequency
F1 and F2 are the frequencies involved
m and n are integers (0, 1, 2, 3...)

This same equation is the basis for superheterodyne receivers, but when the signals are not controlled the process can be destructive.

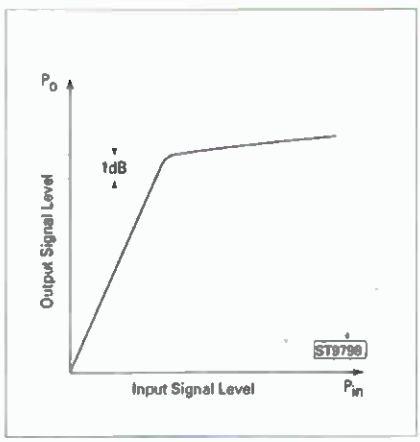


Fig. 2: The -1dB compression point.

Intermodulation Products

Understanding the dynamic performance of the receiver requires knowledge of intermodulation products (IP) and how they affect receiver operation. Whenever two signals are mixed together in a nonlinear circuit, a number of products are created according to the mF1 ± nF2 rule, where m and n are either integers or zero (0, 1, 2, 3, 4, 5...). Mixing can occur in either the mixer stage of a receiver front-end, or in the RF amplifier (or any outboard preamplifiers used ahead of the receiver) if the RF amplifier is overdriven by a strong signal.

It is also theoretically possible for corrosion on antenna connections, or even rusted antenna screw terminals to creat IPs under certain circumstances. One even hears of alleged cases where a rusty downspout on a house rain gutter caused re-radiated mixed signals.

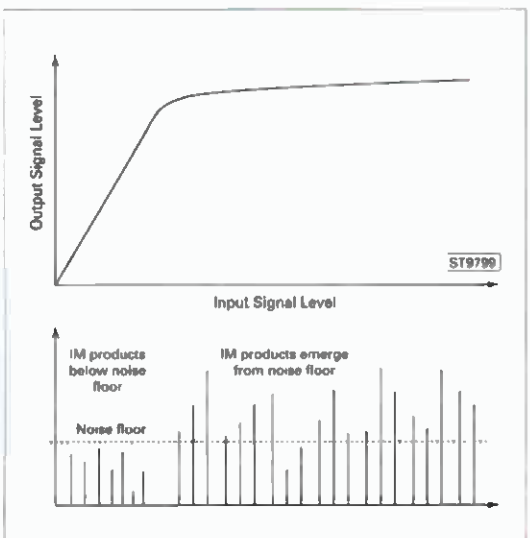


Fig. 3: Above the compression point IMD products begin to emerge from the noise floor.

The spurious IP signals are shown graphically in **Fig. 1**. The order of the product is given by the sum **(m + n)**. Given input signal frequencies of F1 and F2, the main IPs are:

IMP on IP3

Second-order:	F1 ± F2
	2F1
	2F2
Third-order:	2F1 ± F2
	2F2 ± F1
	3F1
	3F2
Fifth-order:	3F1 ± 2F2
	3F2 ± 2F1
	5F1
	5F2

When an amplifier or receiver is overdriven, the second-order content of the output signal increases as the square of the input signal level, while the third order responses increase as the cube of the input signal level.

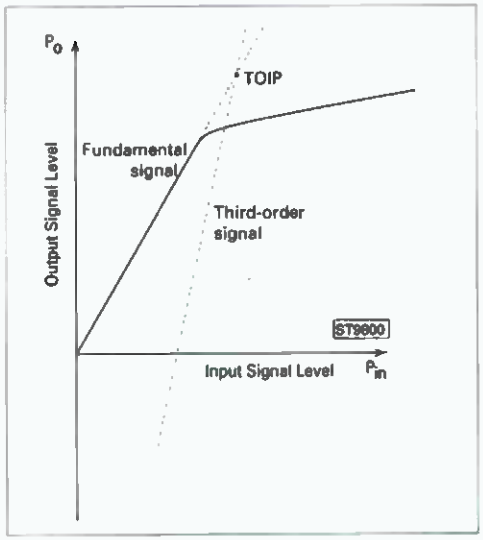


Fig. 4: Third-order intercept point.

Consider the case where two h.f. signals, F1 = 10MHz and F2 = 15MHz are mixed together. The 2nd-order IPs are 5 and 25MHz; the 3rd-order IPs are 5, 20, 35 and 40MHz; and the 5th-order IPs are 0, 25, 60 and 65MHz. If any of these are inside the passband of the receiver, then they can cause problems. One such problem is the emergence of 'phantom' signals at the IP frequencies. This effect is seen often when two strong signals (F1 and F2) exist and can affect the front-end of the receiver, and one of the IPs falls close to a desired signal frequency, F_d. If the receiver were tuned to 5MHz, for example, a spurious signal would be found from the F1-F2 pair given above.

Another example is seen from strong in-band, adjacent channel signals. Consider a case where the receiver is tuned to a station at 9.610MHz, and there are also very strong signals at 9.600 and 9.605MHz. The near (in-band) IP products are:

3rd-order:	9.595MHz (ΔF = 15kHz)
	9.610MHz (ΔF = 0kHz) [On Channel!]
5th-order:	9.590MHz (ΔF = 20kHz)
	9.615MHz (ΔF = 5kHz)

Note that one 3rd-order product is on the same frequency as the desired signal, and could easily cause interference if the amplitude is sufficiently high. Other 3rd and 5th-order products may be within the range where interference could occur, especially on receivers with wide bandwidths.

The IP orders are theoretically infinite because there are no bounds on either **m** or **n**. However, in practical terms, because each successively higher order IP is reduced in amplitude compared with its next lower order mate, only the 2nd-order, 3rd-order and 5th-order products usually assume any importance. Indeed, only the 3rd-order is normally used in receiver specifications sheets because they fall close to the RF signal frequency.

There are a large number of IMD products from just two signals applied to a non-linear medium. But consider the fact that the two-tone case used for textbook discussions is rarely encountered in actuality. A typical two-way radio installation is in a signal rich environment, so when dozens of signals are present the number of possible combinations climbs to an unmanageable extent.

The -1dB Compression Point

An amplifier produces an output signal that has a higher amplitude than the input signal. The transfer function of the amplifier (indeed, any circuit with output and input) is the ratio OUT/IN, so for the power amplification of a receiver r.f. amplifier it is P_o/P_{in} (or, in terms of voltage, V_o/V_{in}). Any real amplifier will saturate given a strong enough input signal (see **Fig. 2**). The dotted line represents the theoretical output level for all values of input signal (the slope of the line represents the gain of the amplifier). As the amplifier saturates (solid line), however, the actual gain begins to depart from the theoretical at some level of input signal (P_{in}). The -1dB compression point is that output level at which the actual gain departs from the theoretical gain by -1dB.

The -1dB compression point is important when considering either the r.f. amplifier ahead of the mixer (if any), or any outboard preamplifiers that are used. The -1dB compression point is the point at which intermodulation products begin to emerge as a serious problem. It is also the case that harmonics are generated when an amplifier goes into compression. A sine wave is a 'pure' signal because it has no harmonics (all other wave shapes have a fundamental plus harmonic frequencies). When a sine wave is distorted, however, harmonics arise. The effect of the compression phenomenon is to distort the signal by clipping the peaks, and thus raising the harmonics and intermodulation distortion products.

Third-Order Intercept Point

It can be claimed that the third-order intercept point (TOIP or IP3) is the single most important specification of a receiver's dynamic performance because it predicts the performance as regards intermodulation, cross-modulation and blocking desensitisation.

Third-order (and higher) intermodulation products (IP) are normally very weak, and don't exceed the receiver noise floor when the receiver is operating in the linear region. But as input signal levels increase, forcing the front-end of the receiver toward the saturated non-linear region, the IP emerge from the noise (**Fig. 3**) and begins to cause problems. When this happens, new spurious signals appear on the band and self-generated interference begins to arise.

A plot of the output signal against fundamental input signal can be seen in **Fig. 4**. Note the output compression effect that was seen earlier in **Fig. 2**. The dotted gain line continuing above the saturation region shows the theoretical output that would be produced if the gain did not clip. It is the nature of third-order products in the output signal to emerge from the noise at a certain input level, and increase as the cube of the input level. Thus, the slope of the third-order line

increases 3dB for every 1dB increase in the response to the fundamental signal. Although the output response of the third-order line saturates similarly to that of the fundamental signal, the gain line can be continued to a point where it intersects the gain line of the fundamental signal. This point is the third-order intercept point (TOIP or IP3).

The intermodulation products as viewed on a spectrum analyser can be seen in **Fig. 5** and **Fig. 6**. The second-order products are shown in **Fig. 5**, while the third-order difference products are shown in **Fig. 6**. One of the deadliest intermodulation products is those third-order difference products! The reason is that they may tend to fall close to, or inside, the passband of the receiver if either F1 or F2 is the desired frequency being received.

One receiver feature that can help reduce IP levels back down under the noise is the use of a front-end attenuator (input attenuator). In the presence of strong signals even a few dB of input attenuation is often enough to drop the IPs back into the noise, while afflicting the desired signals only a small amount.

Other effects that reduce the overload caused by a strong signal also help. Situations arise where the apparent third-order performance of a receiver improves dramatically when a lower gain antenna is used. This effect can be easily demonstrated using a spectrum analyser for the receiver. This instrument is a swept frequency receiver that displays an output on an oscilloscope screen that is amplitude-vs.-frequency, so a single signal shows as a spike. In one test, a strong, local v.h.f. band repeater came on the air every few seconds, and one could observe the second and third-order IPs along with the fundamental repeater signal. There were also other strong signals on the air, but just outside the band. Inserting a 6dB barrel attenuator in the input ('antenna') line eliminated the IP products, showing just the actual signals. Rotating a directional antenna away from the direction of the interfering signal will also accomplish this effect in many cases.

Preamplifiers are popular receiver accessories, but can often reduce rather than enhance performance. Two problems commonly occur (assuming the preamp is a low-noise device). The best known problem is that the preamp amplifies noise as much as signals, and while it makes the signal louder it also makes the noise louder by the same amount. Since it's the signal-to-noise ratio that is important, one does not improve the situation. Indeed, if the preamp is itself noisy, it will deteriorate the S/N ratio. The other problem is less well known, but potentially more devastating. If the increased signal levels applied to the receiver drive the receiver non-linear, then IPs begin to emerge.

When evaluating receivers, a TOIP of +5 to +20dBm is excellent performance, while up to +27dBm is relatively easily achievable, and +35dBm has been achieved with good design; anything greater than +50dBm is close to miraculous (but attainable). Receivers are still regarded as good performers in the 0 to +5dBm range, and middling performers in the -10 to 0dBm range. Anything below -10dBm is not usually acceptable. A general rule is to buy the best third-order intercept performance that you can afford, especially if there are strong signal sources in your vicinity.

Measuring IP3

There are several different methods for measuring the IMD performance of a receiver. The standard set-up is described in **Fig. 7**. Two signal generators are used to provide the two different signals required for the IMD test. Each signal generator is equipped with an adjustable attenuator, which may or may not be external to the generator. In some cases, both internal and external attenuators may be used.

Optional bandpass filters are sometimes used to clean up the signal generator output spectrum. These filters are used to suppress harmonics of the output frequency. If the signal generator has sufficiently low harmonic output, then these filters can be eliminated. Keep in mind that some filters use ferrite or powdered iron cores, so may saturate and cause IMD products of their own. The two signals are combined in a two-port hybrid. Following the hybrid is another attenuator. This attenuator supplies signal to the receiver input.

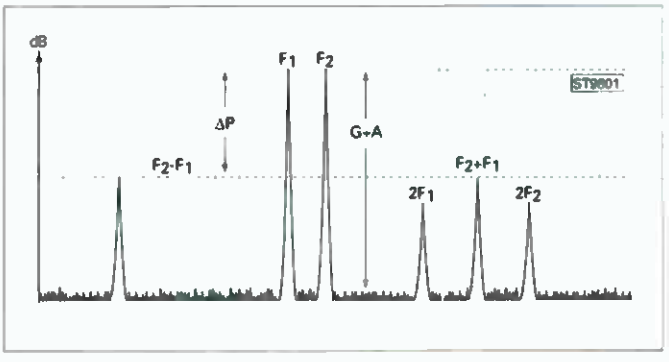


Fig. 5: Second-order products.

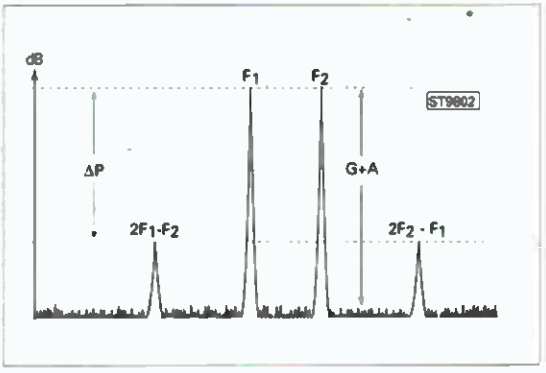
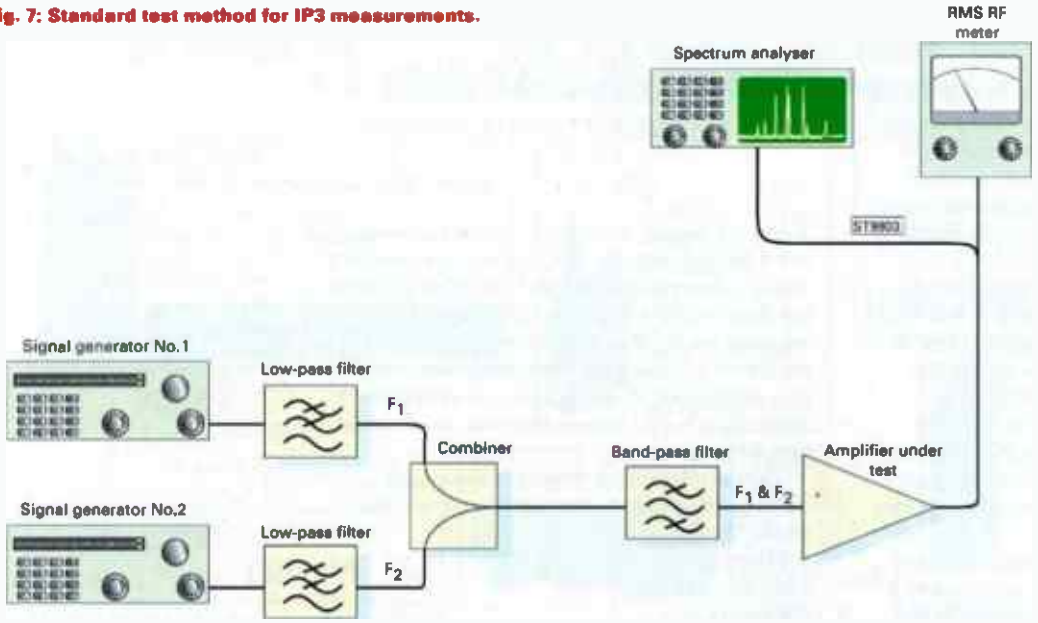


Fig. 6: Third-order products.

The output signal is monitored by any of several means. Some procedures use the audio a.c. output level, as measured by an a.c. voltmeter. In other cases, the spectrum of the audio output signal is measured using a spectrum analyser. Alternatively, one might also use a frequency selective voltmeter (a wavemeter). The latter method is out of favor because spectrum analyser prices have fallen significantly. Some people will use the receiver 'S-meter' (if it has one) to make this measurement. Still others couple the i.f. signal to an r.f./i.f. spectrum analyser. The latter method may show more information, but has the disadvantage of requiring entry inside the receiver. The other methods treat the receiver as a 'black box', so require no modification of, or entry into, the receiver. The IMD test is best run in one of the linear reception modes (s.s.b. or c.w.), but that is not always possible for instance when the receiver is f.m. only or a.m. only type.

Audio Signal Level Method. The audio output level is monitored on an audio spectrum analyser (or measured on a wavemeter). The signal levels are turned up until the IMD product being

Fig. 7: Standard test method for IP3 measurements.



investigated rises up out of the noise level.

The spectrum analyser method can be particularly useful for measuring products below the noise floor of the receiver. Recall that the noise floor is proportional to bandwidth. Typical bandwidths vary from 500Hz for c.w. receivers, to 200kHz for f.m. broadcast receivers (and more for microwave radar receivers). If the bandwidth filter on the audio spectrum analyser is set to some narrow value, such as 5 or 10Hz, then the noise is much lower, so low-level IMD problems show up better.

Signal-to-Noise Ratio Method. This approach to measuring IMD uses either an audio signal-to-noise ratio meter or a SINAD meter. The audio output is set to produce a 1kHz signal for this method. Care must be exercised to prevent excess noise contribution from the signal generator output noise. This noise is indistinguishable from receiver noise, so makes the IMD look worse. It is also possible that a.g.c. action will interfere with this test.

S-Meter Method. In this method the level of the IMD product is noted on the receiver's 'S-meter'. A reference signal is then provided that matches the 'S-meter' reading. This yields the level of the IMD product. Problems with this method include the fact that some receivers compress gain when the signal level gets to a level above S9 or S9 +10dB. It is, however, a better method than some for measuring the IMD performance of receivers with very high IMD performance.

Standard Method. The normal method for measuring the IMD performance (**Fig. 7**) is to set the signal generators to some convenient high level output (e.g. -20dBm). Select test frequencies (F1 and F2) and calculate the third-order products (2F1+F2, 2F1-F2, 2F2+F1, and 2F2-F1).

Set the receiver to a channel frequency, F1. If possible, turn off the a.g.c. or clamp it to a low value (highest receiver gain) if possible. If the receiver uses an front-end (r.f.) or i.f. attenuator, then set it to 0dB. If there is an r.f. preamplifier being used, turn if off. Adjust both the receiver tuning and F1 to the same frequency, and maximise the receiver output. Set the second signal generator to F2, a specified spacing (e.g. 20kHz) away from F1. Set both signal generators to a convenient output level such as -10dBm. Set the in-line attenuator to the highest setting (most attenuation).

Once the set-up is completed, turn off the signal generators and measure the receiver output noise level on an a.c. audio voltmeter. Turn on signal generator F1 and decrease the attenuator setting in 1dB steps until the output noise level of the receiver increases 3dB. This is the minimum discernible signal (MDS) reference level. Return the attenuator settings to maximum. Record this signal level as PIM = -10dBm - (Attenuator setting).

Tune the receiver to either of the close-in third-order product frequencies (either 2F1-F2 or 2F2-F1), while leaving the signal generators at F1 and F2 (both -10dBm output). Reduce the attenuator setting until the receiver output response at this frequency increases 3dB (the same as the reference MDS). Record this level as PA = -10dBm - (Attenuator setting).

$$IP_N = \frac{N P_A - P_{IM_N}}{N - 1}$$

Where:
IP_N is the intermod product of order N
N is the order of the intermod product
P_A and P_{IM} are signal power levels in dBm

Example:
A 162.55MHz receiver was tested using frequencies F1 = 162.55MHz and F2 = 162.57MHz. The close-in third-order products would be 2F1-F2 = 162.53MHz and 2F2-F2 = 162.59MHz.

1. The minimum discernible signal at 162.55MHz required an attenuator setting of -89dB, so P_{IM} = [-10dBM - 89dB] = -99dBm.

2. The response at 162.53MHz required 19dB of attenuation for the third-order response to equal the MDS level. So PA = [-10dBm - 19dB] = -29dBm.

Because this is a third-order response, N = 3 so:

$$IP_3 = \frac{(3 \times (-29dBm)) - (-99dBm)}{3 - 1}$$

$$IP_3 = \frac{-87dBm + 99dBm)}{2} = \frac{+12dBm}{2} = 6dBm$$

Once the P_A and P_{IM} points are found any IP can be calculated using Eq. (2).

SWM

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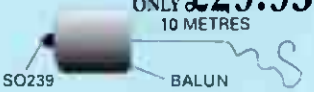

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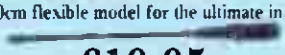

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Comments from John Griffiths

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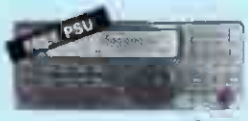

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Rohde & Schwarz EK-07

John Wilson G3PCY reinforces his test bench and risks pulled muscles with an in-depth work-out with steeped tradition. John finally enjoys near 'hi-fi' a.m. too.

In the dim grey dawn of the third day they heard it coming. Infantrymen Hewlett and Packard crouched in the wet darkness of the trench listening as it approached their position, knowing that even with their combined efforts they were unlikely to have sufficient energy resources to penetrate the machines legendary front-end protection. The 65 tons of German field grey steel lurched closer, and they finally realised that they were facing the awesome might of the Panzer Empfanger Type EK-07, the subject of stories told in hushed whispers when men discussed their deepest dread.

Perhaps a little far fetched, but when I helped the Editor lift the Rohde & Schwarz EK-07 h.f. receiver out of his car and into my measuring lab, I did realise that 65kg (not tons) of German steel was indeed the stuff of legend. Although the EK·07 has a high reputation in mainland Europe, we don't often hear much about it in the UK, so being offered the opportunity to review an example thanks to the kindness and bravery of a *Short Wave Magazine* reader was not to be refused and here it was bending my test bench, certainly the heaviest receiver ever to sit there.

Getting To Grips

Background information on the EK-07 is sketchy, and I begin by acknowledging my personal ignorance. However, this can actually be an advantage because having the handbook (in German) for the EK-07 meant that I could at least study the circuit drawings and get to grips with the design quite quickly.

I am known among friends as that man who prefers to read a circuit rather than the latest novel, but we all have our little peculiarities, and I derive enormous pleasure from spotting neat design features and clever use of electronics. According to the Rohde & Schwarz web site, the EK-07 was developed in 1958 and intended as a high performance monitoring receiver.

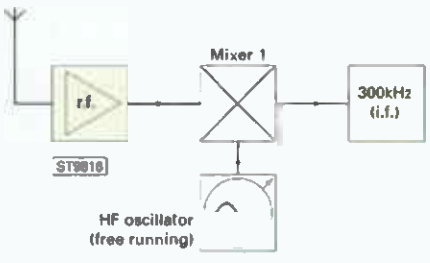


Fig. 1: EK-07 architecture for Bands 1, 2 and 3

Component dates inside the review receiver show that it was actually manufactured between 1961 and 1962. In many ways, it represents the peak of development for the 'Massive' school of design, and it's very interesting to compare the EK-07 with the new direction taken by Collins at around the same time. Study of the 51S-1 review in last month's *SWM* will give you an idea of what I mean. Comparison of 65kg with the 10kg of the 51S-1 says a lot.

At The Front

Having heaved the beast onto the test bench, I was faced with a front panel layout carrying all the controls normally found on a communications receiver from the fifties. Along the top of the panel is a slide rule dial showing one band at a time, and there are twelve bands to cover the tuning range of 500kHz to 30.1MHz. The lowest three bands cover 500kHz to 1.1MHz, 1.1 to 2.1MHz and 2.1 to 3.1MHz.

The scales are not linear from end to end, and there is no correlation between the main dial markings and the fine tuning scale placed horizontally in a little window above the main tuning knob. The remaining nine bands however all have a 3MHz span and do correlate with the fine tuning scale, so right away it is obvious that the EK-07 is doing different things on different bands, and worthy of investigation.

The main tuning knob is a joy to use, being gear driven and showing no backlash or sloppiness. Two speeds are provided, with the outer fine tune ring being large enough for very easy tuning of s.s.b. and c.w. signals, whilst the inner fast tune knob carries a 'spinner' which allows fast access from band edge to band edge.

Single Conversion

On bands 1, 2 and 3 the EK-07 operates as a single conversion receiver with an i.f. of 300kHz and a separate tuned oscillator for each range (see **Fig. 1**). On band 4, which covers 3.1 to 6.1MHz, single conversion to 300kHz is still used, whilst for bands 5 to 12 the EK-07 uses dual conversion with a first i.f. of 3.3MHz, the 300kHz now becoming the second i.f.

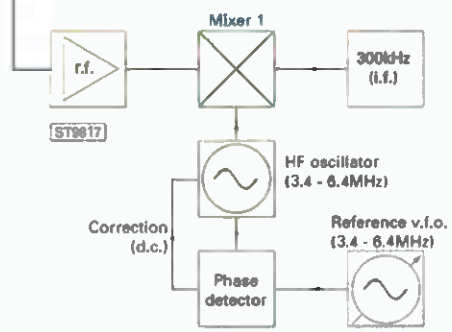
Now for the clever bit. The h.f. oscillator for band 4 needs to tune 3.4 to 6.4MHz, but instead of relying on the stability and linearity of tuned circuits inside the coil turret, the output of the oscillator is fed to a phase detector where it is directly compared with the output from a precision

reference v.f.o. covering 3.4 to 6.4MHz directly gear driven from the main tuning knob and enclosed in a solid die cast housing. This is clearly a well designed v.f.o. and manages to achieve mechanical linearity over a 3MHz range, something that even Collins didn't tackle.

The phase detector produces a d.c. output if the h.f. oscillator and reference oscillator are not in phase, and this d.c. is used to control a variable capacitance diode tuning system in the h.f. oscillator to drag it into phase coherence with the reference v.f.o. (see **Fig. 2**).

For bands 5 to 12 the respective h.f. oscillators are mixed down to the 3.4 to 6.4MHz by using harmonics of the 3MHz fundamental crystal oscillator used in the second conversion from 3.3MHz to 300kHz. For example, to tune band 7 (12.1 to 15.1MHz) the h.f. oscillator tunes 15.4 to 18.4MHz to give the first i.f. of 3.3MHz. The output of the h.f. oscillator is mixed with the fourth harmonic of 3MHz, i.e. 12MHz to give a signal of 3.4 to 6.4MHz, which you will see is the same as the high stability reference v.f.o. (see **Fig. 3**). The result of all this electrickery is that the nominally free running h.f. oscillators are kept in phase lock with the reference v.f.o. and thus tune at the same linear rate and achieve the same stability as the reference.

Fig. 2: EK-07 architecture for Band 4.



Strange Anomaly

Having worked all this out from the EK-07 circuit diagrams, I did find one strange anomaly which applied to band 5 (6.1 to 9.1MHz) in which the h.f. oscillator runs from 9.4 to 12.4MHz. Instead of being mixed with the 6MHz second harmonic of 3MHz, a double mixing system is employed using the 15MHz fifth harmonic to translate the h.f. oscillator up to the range 24.4 to 27.4MHz, followed by a further down conversion using the 21MHz seventh harmonic to finally result in the 3.4 to 6.4MHz signal for phase comparison with the reference v.f.o.

The handbook offers no explanation for this double translation so I had to scratch my head and work out a solution for myself. My hunch is that the use of a 6MHz mixer input in the conversion from 9.4 to 12.4MHz down to 3.4 to 6.4MHz might result in the 6MHz passing through to the mixer output and causing a conflict with the reference v.f.o. when it approached the 6MHz point within its tuning range. It must be related to the fact that the 6MHz falls within the reference v.f.o. tuning range, but, as Esther Rantzen used to say, "Unless you know different(ly)" Poor grammar, but you know what I mean.

Being A Classic

The tuning control drives other things apart from the h.f. oscillator, and being a 'classic' of the 1960s, it won't be a surprise to find that there is a tuned r.f. amplifier between the antenna input and the first mixer, including lots of selective tuned circuits. The r.f., mixer and h.f. oscillator tuned circuits are all mounted in a massive 12 position turret driven from the front panel by a knob which seems identical to the carriage door handles on the old British Rail 'Slam shut' doors, and which can break your wrist if you don't treat it with some respect.

The only receiver which could compete would be the Royal Navy B-21, and the sound effects are remarkably similar. The actual drive mechanism from the band change knob is reminiscent of a U-boat hydroplane drive, full of gears and chains, but it's superbly precise and very reassuring.

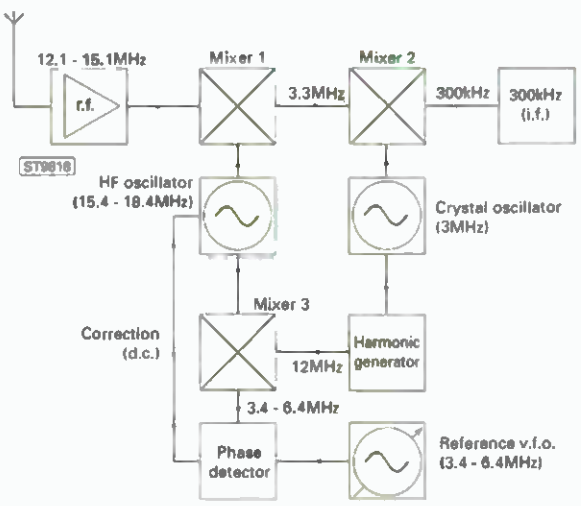
Having twelve bands in the turret means that each band has its own set of r.f. coils, and since the top nine bands tune in 3MHz slices, the tuned circuits can be optimised for this relatively small tuning range. No surprises then when you come to the second order intermodulation performance.

Other Knobs

But; there are other knobs on the front panel which need to be described. Selectivity in the EK-07 is determined by switched filtering at 300kHz, and the circuit reveals quite complex and comprehensive arrangements. In the receiver under test the bandwidths available are 12, 6, 3, 1.5kHz, 600 and 300Hz, which should be enough for most people apart from the d.s.p. addicts who want at least 100 different bandwidths before breakfast, even though it will give them indigestion.

I did find an Internet reference to another version of the EK-07 which offered 12/6/3/1kHz and 200Hz, and a review of the Kneisner & Doering KWZ-30 posted on the Radio Netherland web site by Willem Bos talked about 'professional crystal filters' in the EK-07, so there are things I don't yet know but would love to learn.

Fig. 3: A little more involved for Band 7.



I honestly can't see how a set of crystal filters could fit into the space taken up by the 300kHz tuned circuits, but I welcome correction. The Web produced a hilarious translation from German which read "In the centre of the fifties the steeped in tradition residents of Munich company Rohde & Black with the EK-07 brought a large sized heavyweight recipient out". Couldn't have put it better, particularly the "steeped in tradition" bit.

Proper Gain

Proper r.f. and a.f. gain controls are provided, with an unusual feature in that the r.f. gain control can be switched out for full a.g.c. control, added to the a.g.c. system as a pedestal or used as a fully manual r.f. gain with no a.g.c. There are three a.g.c. decay time constants; 0.1, 1 and 10 seconds, and although at first I thought that 10 seconds was going too far, later measurements and on-air use showed that it was actually well chosen and perfect for my favourite s.s.b. utility listening.

The a.g.c. system design is interesting in that it applies different levels of control to various stages throughout the receiver. Full a.g.c. is applied to the second and third i.f. amplifiers, one third a.g.c. to the first i.f. and one fifth a.g.c. to the fourth i.f., this last level being independently adjustable. Full a.g.c. is applied to the r.f. amplifier and first mixer (unusual) with diode clamps having adjustable d.c. offset voltages being used to set the actual a.g.c. threshold on each stage.

All this was very reminiscent of the complex setting-up needed in the JRC NRD-505, which, if you got it wrong, made the receiver sound most peculiar. I would hesitate to set up the EK-07 without a proper service manual, and the simple operating manual provided with the review receiver contained no service information at all.

No Side Band

The EK-07 was designed as an a.m. and c.w. receiver with no provision for s.s.b. reception, although there was a later s.s.b. adapter called the NZ-10 which presumably operated using the 300kHz i.f. output on the rear panel. However, the b.f.o. on the EK-07 is accurately calibrated and fully tunable over a 6kHz range, so s.s.b. reception is possible by setting the b.f.o. to ±1.5kHz and backing off the r.f. gain.

Audible results using this technique are perfectly acceptable, and such is the stability of the EK-07 that it will quite happily stay on an ATCC frequency for hours without needing any re-tuning. A classic adjustable noise limiter is provided, with the front panel control driving the usual twin diode clipper at the detector stage, and this works well on a.m., but creates a lot of distortion on s.s.b.

I like analogue meters on my receivers, but two of them? The right hand meter is calibrated directly in microvolts, starting at 1µV and ending at 100mV, with intermediate calibration points in logarithmic 3/10/30/100 sequence. I couldn't resist checking the accuracy of this meter and was impressed by the band to band repeatability as well as the scale accuracy which stayed within a couple of dB over its full range.

Since the r.f. gain is used as a pedestal, this means that you can back off the gain until the meter reads, say, 100µV, and then sit back knowing that you will only hear signals above this threshold. The left hand meter is something you only normally have on professional equipment of the era, and allows a user to check the current and/or voltages for every stage in the receiver.

A 29 position selector switch (imagine the cost of that as a spare part) checks everything from the h.t. supplies to the audio levels of both 15Ω and 600Ω outputs, and each current or voltage check is so arranged that if the needle falls within a red band on the scale, you know all is well. Quite took me back to my Marconi days when we had multi-point metering on everything including the office cat.

Push Buttons

Two other minor controls appear as push buttons, one to switch on a 300kHz crystal calibrator and the other to switch on the same 300kHz oscillator, but inject it into the 300kHz i.f. chain so that you

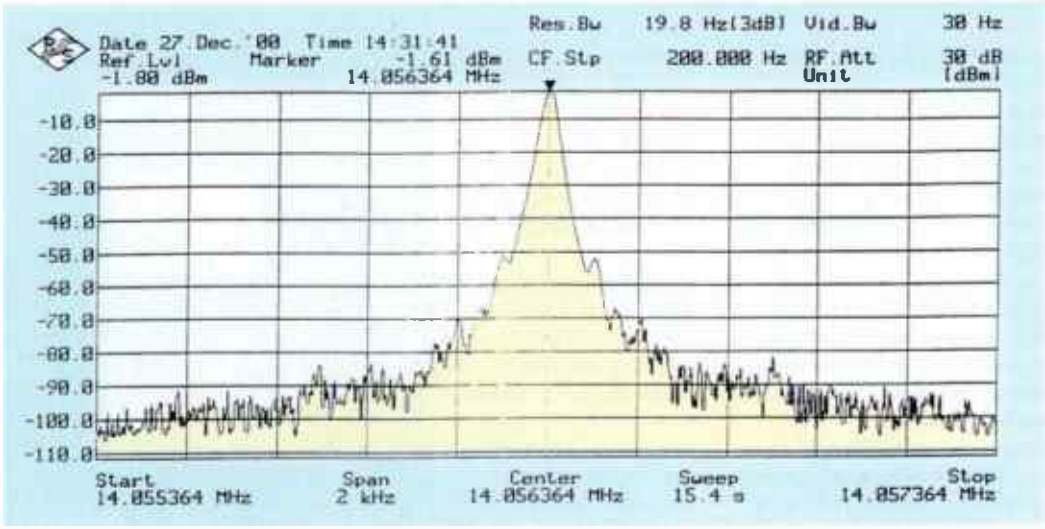
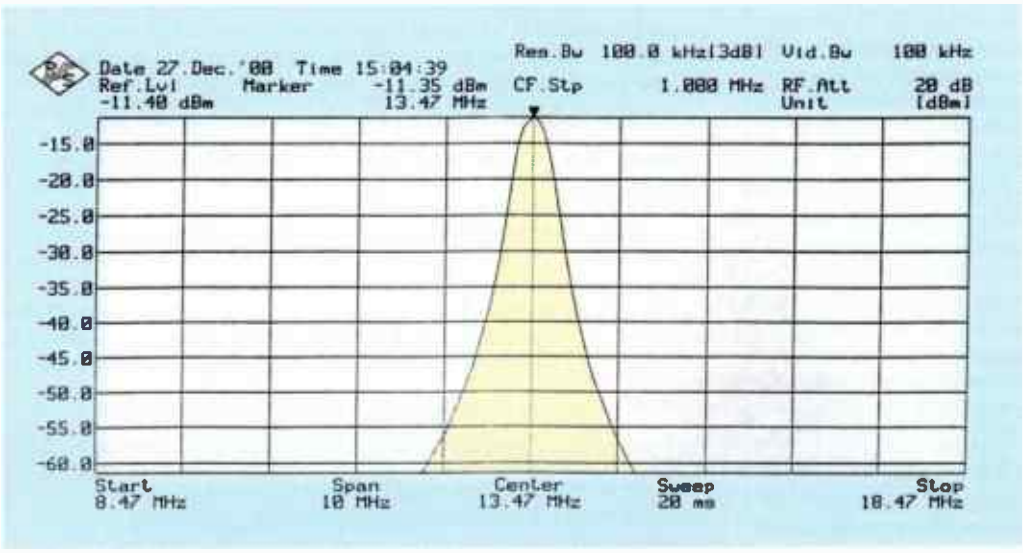


Fig. 5: EK-07D h.f. oscillator purity.

Fig. 4: EK-07D pre-selector 13.5MHz, -50dB B/W 2.46MHz.



can zero-beat the receiver to an incoming signal. Shades of WW2 and 'spotting' the receiver to your transmitter. However, I did find the zero-beat very useful when listening to medium wave a.m. using the 12kHz i.f. bandwidth when the signal meter reading was flat across the 12kHz tuning range. Why did I want to tune accurately? I'll tell you later.

Accurate Tuning

Actually, accurate tuning was not made easy by the fact that the horizontal fine tuning scale which is calibrated in 500Hz increments had no cursor line, although one is shown in all the handbook illustrations. There is also a small hole alongside the fine tuning scale which I took to be an adjustment for the cursor, but there was no screw in it as shown in the illustrations. Where had it gone? I don't know, but I soon forgot about it and estimated the frequency by aligning the scale with the centre of the viewing aperture.

The rear panel carries a full complement of connectors for everything a professional user might require. My utter dislike for the American 'phono sockets for everything' approach was heightened when I saw that Rohde & Schwarz had used proper r.f. connectors for r.f. and proper audio connectors for audio and proper 4mm sockets for everything else, including a definitely dangerous mains outlet for driving a transmitter changeover relay. This is one receiver which would not meet the current European Low Voltage Directive.

The mains power input is what I would describe as a 1940s electric kettle plug, and is again decidedly dangerous. Mind you, so is sticking your hand inside a receiver of this period, forgetting until it's too late that a 250V d.c. h.t. supply can give you a mighty wallop - even after switching off and forgetting that the h.t. electrolytics stay charged for hours. But nonetheless, the EK-07 rear panel provisions are excellent.

Internal Construction

Internal construction appears daunting at first, but careful inspection (without switching on) reveals that the receiver is constructed as individual units, with each unit plugging into a main frame carrying the inter-unit wiring. Even the front and rear panels are plugged into the main frame so that everything can be stripped down quite easily. That's OK if you are 'board changing', but taking measurements with the receiver fully assembled and working is virtually impossible. I wouldn't want to tackle a major repair on the EK-07 unless I had a lot of time and patience, and if they are available, extender cables so that I could operate each sub-unit outside the main frame.

Built like a battleship? I should say so, and I can reveal at this point that my uncle Bill Wilson was a gunner on board HMS *Rodney* during the chase of the Bismarck, and I remember him telling me that the secret of Bismarck's superiority was due to her having one main turret equipped with guns with square section barrels which could hurl a 65kg EK-07 over twenty miles. It was an EK-07 prototype which carried away the Captain and First Officer of HMS *Hood*, and a second salvo from the Bismarck's square barrels which took *Hood* to the bottom of the Atlantic. Well, part of it is true; my uncle actually was a gunner on *Rodney* and I do remember his descriptions of the Murmansk convoy runs, Bomb Alley in the Mediterranean, and the chase of the *Bismarck*.

Time To Measure

Time to measure the beast: I took measurements at frequencies from 900kHz to 29MHz and for 12dB SINAD in s.s.b./c.w. mode using the 3kHz filter bandwidth the sensitivity came out at -118dBm at all frequencies. Similar flatness occurred in a.m. using 60% modulation and the 6kHz filter setting, the sensitivity varying by about 2dB around -111dBm.

Using my standard intermodulation measurement routine gave the EK-07 a third order intercept point of -13dBm with a dynamic range of 79dB, whilst using two signals at 6.5 and 7MHz, resolving the product at 13.5MHz gave a second order intercept point of +86dBm with a dynamic range of 109dB. Bearing in mind the number of tuned circuits at the front-end of the EK-07, the second order performance has to be of this order, and it compares with the Collins S1S-1 which had a dynamic range of 114dB and second order intercept of +96dBm. **Figure 4** shows the EK-07 front-end selectivity centred on 6.5MHz with a bandwidth 50dB down only 1.34MHz wide.

Out of band intermodulation products will not concern the owner of an EK-07. Oscillator close in phase noise was not as good as the Collins receiver, but of course the EK-07 uses a tuned (albeit phase locked) oscillator whereas the S1S-1 uses crystal conversion.

Figure 5 shows the EK-07 oscillator purity measured at the local oscillator output on the receiver's rear panel. You can see evidence of 100Hz hum sidebands, and comparison with the S1S-1 first conversion oscillator purity in **Fig. 6** will show you the cleanliness of a crystal oscillator. That being said, at signal spacings greater than 20kHz the EK-07 and S1S-1 phase noise is virtually identical and both are better in this

respect than many modern synthesised receivers.

In Use

Having completed my regular measurements I sat down to actually use the EK-07, and it was whilst tuning around the medium wave to do my 900/909/918kHz checks, which of course the EK-07 passed with laughable ease, that I began to notice the quality of the a.m. audio.

When a receiver needs an external loudspeaker, I always use a single Wharfedale Programme 20 because if the audio is any good, this speaker will show it up. I simply couldn't believe how amazingly good the recovered audio from strong a.m. stations could be, and some of the French broadcasts were outstandingly impressive.

This is where the 'zero-beat' button came in useful in ensuring that the incoming signal was properly centred in the 12kHz i.f. passband of the receiver, because the filter response was so flat that the signal strength meter couldn't help. Using the rear panel sockets on the receiver I was able to check the response of the audio section and was surprised to find it flat between 3dB points of 30Hz and 12kHz.

Pursuing this further. I set up my HP 8657A generator and used the external a.m. input to produce a signal at 800kHz modulated from 20Hz to 12kHz. Now the specification for the 8657A only claims distortion figures of 1.5%, so anything approaching this after the signal had passed through the entire receiver from antenna input to loudspeaker output would be really good performance.

Modulation (Hz)	AGC Setting (s)	Measured Distortion (%)
1000	0.1	1.6
1000	1	1.45
1000	10	1.45
500	0.1	1.7
500	1	1.58
500	10	1.55
100	0.1	3.3
100	1	2.75
100	10	1.6
50	0.1	10.5
50	1	7.4
50	10	3

The darned thing produced l.f. recovered audio down to 30Hz, with the h.f. end being limited only by the constraints of the i.f. bandwidth. I can honestly say that I have never, never heard a.m. of this quality, and certainly not from a monitoring receiver. I spent an entire evening just listening to medium wave a.m. and enjoying the revelation.

A glance at the circuit and the inside of the receiver tells a lot. The output valve is a classic EL84 running in Class A with an output transformer the size of a half brick, and negative feedback around the stage using a separate cathode winding on the transformer. Aficionados of Quad II valve amplifiers will recognise the circuit configuration instantly.

Then I thought, "I wonder if I can justify my comments on a.g.c. systems causing distortion on a.m. signals" and carried out a series of a.f. distortion measurements using the same 800kHz signal, but switching between a.g.c. time constants. The results were interesting.

And that my dear Watson is the truth. Given a receiver capable of demodulating and reproducing low audio frequencies, the choice of a.g.c. decay characteristic has a marked effect on the quality of the recovered audio, and this can clearly be seen in the rapid rise in distortion at 100Hz and 50Hz using a short a.g.c. time constant. The reduction in distortion from 10.5% to 3% at 50Hz by simply lengthening the a.g.c. decay is remarkable, and believe me, it can easily be heard on a real signal.

On s.s.b. and c.w., the a.g.c. system is less than perfect but still good. Using the short 100ms time constant, by standard test burst of 150ms of signal caused a 'soft' sounding attack with almost instant recovery. The longer one second and 10 second time constants were actually better, with audio output being held to within about 3dB and the recovery characteristic being smooth and non violent.

There was evidence of some receiver overload at the start of the r.f. burst, but as in the S15-1, the receiver didn't sound peculiar and there were no unpleasant 'clicks'. Valves can take it you know, even if they do produce enough heat in the EK-07 to warrant the use of a rear mounted cooling fan - at least it keeps the bench warm from the 27 valves glowing away inside its silver plated innards.

Ugly & Heavy

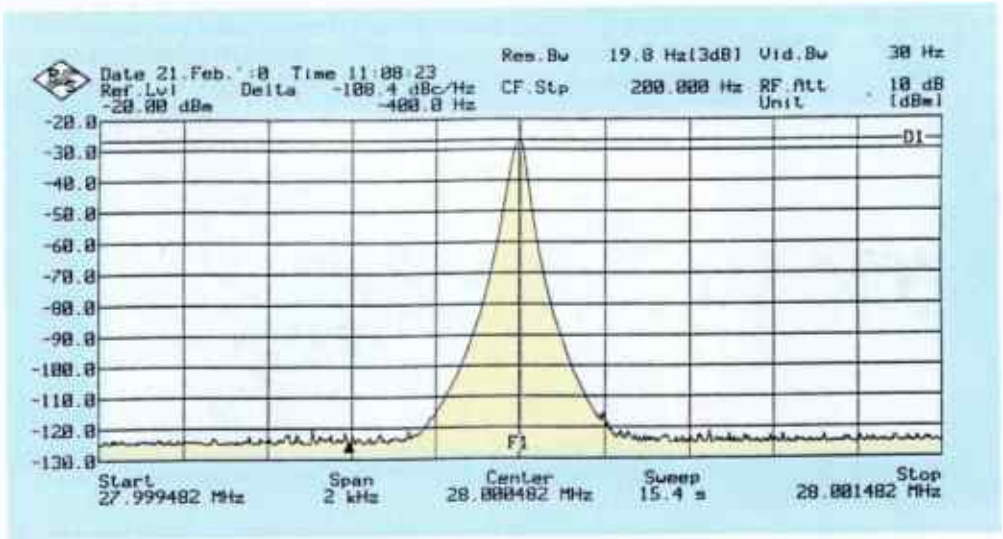
What more can I say? The EK-07 is possibly the ugliest receiver I have used, and is certainly the heaviest. It represents something of an anachronism being at the peak of development at its inception just as manufacturers like Collins were heading in a different direction. And yet, its performance is excellent, and it would be nice to have one just for broadcast a.m. listening if your receiver bench would take the weight.

Despite its internal complexity it should be relatively easy to service for anyone with valve experience, and prices for this beast seen on the Internet seem to be quite reasonable (but be careful of the cost of carriage from Germany where most of the units seem to surface). It's a 'friendly' receiver and I'm delighted to have made its acquaintance thanks to the generosity of a *Short Wave Magazine* reader.

As for being a 'Boat Anchor', this is one receiver which could have held the *Bismarck* fast in a hurricane. I love it as an obvious collector's item, and would welcome more information from anyone who has anything to tell, particularly about a version with crystal filters.

Happy listening. ***SWM***

Fig. 8: S1-S1 1st conversion oscillator close-in noise (none!).



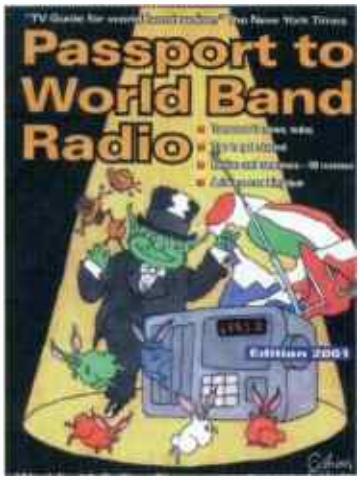
some thoughts on Station Identification Techniques -2

Reading the final part of this feature will give you the 'edge' when it comes to logging rare and unusual broadcasts, according to Michael L Ford. The best possible tool is as much practice as possible!

Circumstantial Evidence

The following methods fall into the second group referred to at the beginning of Part 1 last month. Readers who are still awake will remember that I call these methods the 'Circumstantial Evidence' methods because any of these by themselves cannot be used to prove a station's identity. Although they cannot provide unambiguous proof of identity, they do still have value, which is mainly that of reducing the number of possible candidate stations.

This useful precursor clears the way for one of the previous methods to 'crack the nut'. If identification can only be proposed as a result of one of the following methods, a logging can still be made, but it should be marked TENT (tentative) or PRES (presumed) depending on ones degree of certainty.



Signing 'On' & 'Off'

If you spend any amount of time tuning around the broadcast bands you will find that very few short wave stations transmit continuously for 24-hours. Therefore it follows that the vast majority of stations have signing on and signing off times for the transmission as a whole, and for language segments within the transmission. These times, together with other details, provide a means of deducing who a station is.

The output from all the big players, as expected, is very professionally produced and as a consequence their timekeeping is very good. Other stations, such as tropical band stations, are much less formal in their production methods and as a result timekeeping can be a bit variable. Nonetheless, they usually sign on and off at about the right time so the method still holds good.

One thing to be careful of with regards to these stations is their tendency to extend their schedules during holidays and religious festivals. If they're really in the mood to party, schedules can get extended up to 24-hours which often causes confusion. This is best avoided by expecting longer schedules at these times. Again, good station profiles will make known any tendency to extend schedules like this.

Clandestines are the usual fly in the ointment. Their production is often quite amateurish and timekeeping is often variable at best. However, this is excusable in their case because they are usually trying to dodge jammers in countries hostile to their point of view and moving the sign on and off times around is one of the weapons they use to achieve this - a case yet again for good information.

The technique with this method couldn't really be simpler - begin listening about 15 minutes before the programme is due to open or close and wait for the event. If they are already on, or already closed, at the specified time, begin listening half an hour earlier on the following day. If you still don't catch them, begin listening half an hour earlier still on the next day.

If you follow this procedure you won't have to listen for more than half an hour or so to hear the sign on or off, although it may take two or three days to catch it. If the sign on or off times agree approximately with a known good schedule and a second line of proof such as the language or transmission frequency used also tie up, you can be sufficiently certain as to who it is to make an unqualified logging.

As a final point, full schedules for the language in use are usually aired at the beginning and end of each language segment. These are particularly good times to catch these details.

Offset Frequency Operation

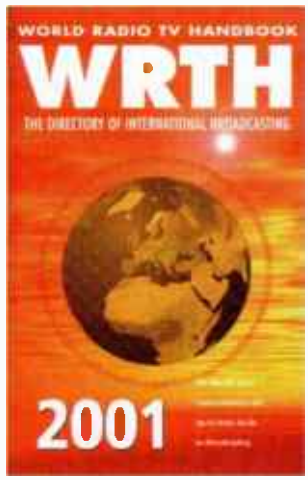
A quick tune around any of the international short wave bands will show that virtually all broadcasters are spaced 5kHz apart. This, as is probably obvious, is no accident. The 5kHz spacing was chosen by an international committee many years ago to give the best compromise between clear a.m. reception and packing density of stations within a band.

However, as always, there are few mavericks around who don't conform to the rule and transmit on an offset frequency (i.e. a frequency which is not an exact multiple of 5kHz). As a result, these stations stick out like a sore thumb and their

some thoughts on Station Identification Techniques

transmission frequency then provides a solid clue, bordering on proof of their identity.

There's very little technique involved with this method - it's simply a matter of tuning the receiver onto the carrier of the signal and measuring its frequency. The amount by which a station is off the closest multiple frequency will obviously vary from one station to another. Some are off by multiples of whole kilohertz while others are off by multiples of a tenths of kilohertz (i.e. 100Hz).



I've never seen (surely this should be heard?) a station deliberately off the 5kHz multiple by less than 100Hz, so it follows that the only requirement for this technique is a receiver capable of measuring the received frequency to within ±100Hz. Most modern receivers are capable of this.

A good example of a split frequency transmission is Radio Quito in Ecuador which transmits on 4.919MHz. No other station transmits on this frequency, so if you are hearing a Spanish speaking station with lots of Latin American music, it's a sure bet you're listening to R. Quito.

If you're interested in hearing R. Quito, they can be heard on the above frequency from about midnight to approximately an hour after sunrise. Signal strength steadily improves from around midnight, being at its best just before sunrise.

The 'Many Mentions' Rule

As I said before, all short wave stations are in business to deliver a message of some sort. With international broadcasters, which is the group to which this method mainly applies, this is typically to tell the world about their home country or to relate items of local news to expatriates working or living abroad.

An unavoidable but fortunate consequence of this is that the name of the transmitting country is likely to be mentioned more frequently than any other. Listen to see if, in the long run (typically in excess of 10 minutes), one country's name is mentioned more than any other.

Although this is a good starting point in the quest for identification, its not, of itself, enough to prove the station's identity to the point where a logging can be made. What you really need at this stage is some sort of corroborative evidence such as a parallel frequency or conformation of the language used to support your tentative identification.

When using this method there are two things you must be careful to avoid. These are: avoid reviews of international news because many countries names will be mentioned while this is being aired and this may lead the unwary into confusion. This is why you should listen for a reasonable period as explained above.

The second point is that this method will not reveal the country of origin of the transmission - which is what we want to log. As an example, Radio France International transmits some of its Africa service from Gabon in Africa. This method may reveal that it is Radio France you're listening to, but there is no way it can tell you that the transmission is coming from Gabon.

Unfortunately, not all broadcasters list the transmission sites they use for each transmission. If the transmitter site cannot be revealed, a log can still be made, but it must be prefixed with 'SITE UNID' meaning that the transmission site is unidentified.

The 'It Can't be Anybody Else' Theory

If you spend much time bandscanning around the extreme edges of the international broadcast bands, or in the spaces between them, this is a situation you will meet quite regularly. It's all too familiar - there is only one station listed for the frequency you're tuned to and you believe you're listening to it. Typical examples of the broadcasts you would find in this situation are regional Chinese stations, clandestines and American religious broadcasters.

There's no technique involved with this theory, it's simply a case of do I make a logging? Unfortunately, the 'it can't be anybody else' theory occasionally turns out to be exactly - it is somebody else. Therefore, before a logging can be made, corroborative evidence is required to support your candidate station. If this can be found, then an unqualified logging can be made otherwise the log should be marked TENT (tentative) or PRES (presumed) depending on your level of certainty.

The 'Somebody Else Has Heard It' Approach

When you are faced with a station which absolutely defies identification and you're casting around for some sort of clue, it is always useful to know what other listeners have heard on that frequency at that time. This, of course, is a situation where good information such as that found in the Broadcast Bands logging section in *SWM* - 'LM&S' - and club journals or the Internet come into their own.

The idea is that a recent and current schedule you have contains a viable candidate station where the time and frequency and other details tie up. Admittedly, this is a bit of a long shot, but it may well provide the lead you are looking for.

Even if it does pay off, a loose corroboration of this sort cannot be taken as absolute proof of identity. What you have to do, as usual, is find some corroborative evidence to confirm your suspicions. If this information cannot be found, but you're still sure about who the station is, a logging can still be made, but it must be prefixed with TENT/PRES as explained above.

Personally, I've not found this approach to work very often, but on the odd occasion it has, it's been a life saver.

Familiar Format

Have you noticed that some people always do the same thing in the same way. So much so that you can often tell exactly who is doing a particular task because they are doing that thing in that way. Life is full of patterns - so they say - the trick is can you spot them?

In the same way that some people's habits identify the person, so some short wave stations are identified by the format they use. After you have spent some time at the receiver you will find that these stations stand out like a sore thumb simply because of the format they use.

Typical examples of stations with familiar formats are the American religious stations, provincial Russian and Chinese stations and Middle Eastern

some thoughts on Station Identification Techniques

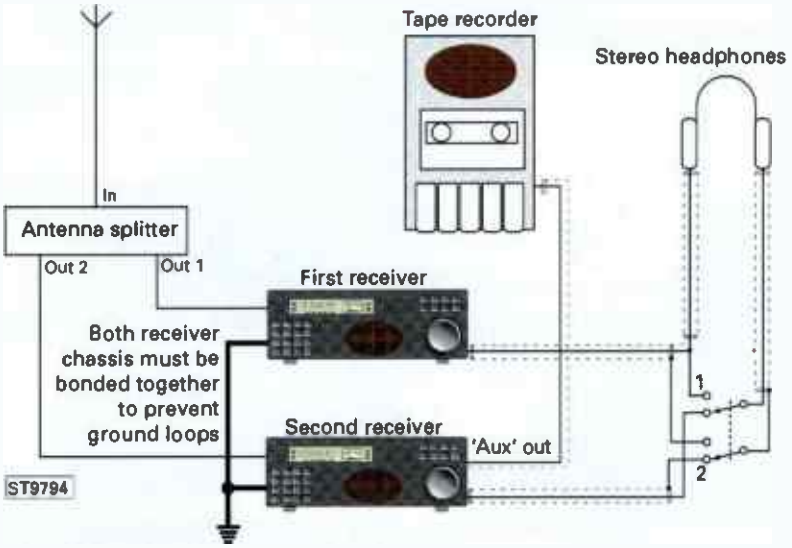


Fig. 2.2: The two receiver arrangement with tape recorder.

Clandestines. As with some other methods we've looked at, there is not a lot of technique involved - it's simply a matter of recognising who you are listening to.

This does mean however that you need plenty of practice at the receiver to be able to identify the various formats. This approach is another of those techniques which, by themselves, cannot unambiguously identify a station and corroborative information is required.

On a final note, although the 'Familiar Format' method, and indeed some of the other methods examined above, might throw up a clandestine station as a possible candidate, obtaining a positive identification is extremely difficult. The 'Parallel Frequency' method is practically guaranteed to fail because virtually all Clandestine stations operate on a single frequency - there are a few exceptions to this rule - but not many.

In the case of clandestines, your best bet is to look for signing On/Off times and link this to a recent schedule reference or logging. A bit of homework in finding out what ID to expect and the language used will also pay dividends.

General Notes

As outlined earlier, the process of station identification is generally one of removing the impossible and improbable options until only a few possibles remain. From these the station can, hopefully, be identified. And that's all there is to identification techniques *per se*.

Now I have explained these methods, I want to go on and make some general points which should make the identification process as a whole easier. These are as follows.

Receiver Set-up

The first, and arguably most obvious, step when faced with an unknown station is to set up the receiver for maximum clarity of the received signal. It's not always recognised that the best receiver set-up for bandscanning is different to the optimum set-up required for monitoring.

This is a subtle point but, with a moments thought, it can be seen that in the first case we are trying to hear a weak signal in a sea of noise and interference while in the second we are trying to home in on that signal to make it as clear as possible. The clarification process usually involves changing mode plus reducing receiver bandwidth and sensitivity to a point where, although now clearer, the signal would have been missed if we were to bandscan with this receiver setup. These points appear to be contradictory, but I assure you they are not.

For bandscanning we need a receiver set-up which does not restrict the ear's dynamic range or frequency response. This is important if you want to hear a faint broadcast signal under a loud utility channel - a situation all too common on the tropical bands for example.

To achieve this, the best receiver set-up I have found is to have the r.f. gain control set well towards maximum so that the receiver sensitivity is not reduced, a.m. mode selected so that both sidebands are audible simultaneously and a fairly wide bandwidth setting - say 6kHz but no less than 4kHz. In this situation, the volume level heard in the headphones will be controlled by the receiver's volume control - by what else you may ask - read on and see says I.

When something interesting is heard, the receiver setting frequently needs changing to improve the intelligibility of the signal, particularly if it is under a louder utility signal as in the above example. The objective of course is to remove as much of the interfering noise and interference as possible to leave the signal as clear as it can be made.

The best setting I have found for monitoring is to back off the r.f. gain control as far as possible and, at the same time, advance the volume control to compensate for the reduction in volume in the headphones. When this is done, the volume level will be approximately the same, but the band noise and interference will be reduced. This happens because backing off the r.f. gain control reduced the receiver's sensitivity thereby increasing its dynamic range.

It is this increase in dynamic range which makes the received signal stand out from the noise. The volume in the headphones will now be controlled by the r.f. gain control. With this done, u.s.b. or l.s.b. mode can be selected as needed to reject noise and interference below or above the wanted frequency.

The bandwidth should be reduced from the bandscanning level to the minimum setting consistent with either comfortable listening or best interference rejection, depending on the level of interference present. If your receiver is equipped with Pass Band Shift, Notch Filter,

Continued on page 34

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

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IC-R10E

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

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

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VR-500

This lovely little scanner from Yaesu offers superb performance.

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- Band scope Priority monitoring
- PC programmable
- Smart search feature
- Alpha numeric recall
- Size 58 x 95 x 24mm 220g

Sangean ATS-909

£149.95

FM-STEREO / MW / LW / SW PLL SYNTHESIZED RECEIVER

- AM, USB, LSB, FM
- 307 Memories
- Five tuning methods
- Auto tuning system (ATS)
- E2 Prom memory back-up
- AM RF gain control * Radio Data System (RDS)
- FM stereo via earphones * Direct one button recall
- Built-in 42 world cities time + day light saving time
- AM wide/narrow filter and FM mono stereo

UBC - 220XLT

£129.95

HANDHELD SCANNER

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

PCR-1000

ICOM

10kHz - 1300MHz

Computer controlled Receiver

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

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

LAPTOP COMPATIBLE

£295

WATSON Capture that Frequency!

10MHz - 3GHz

Hunts down Frequencies

HUNTER

Supplied with telescopic antenna and AC battery charger. If you are within 200 ft or so of the handheld, you should be able to read off the frequency. Note it down and enter it in your scanner. It's that simple and it's pocket sized. £59.95

Yupiteru MVT-7300

New Scanner

£289

- NFM, WFM, NAM, WAM, USB, LSB, CW
- 521kHz - 1320MHz
- 1,000 memory channels
- High sensitivity
- Signal strength meter
- High speed scanning & searching
- MONItor button
- Descrambler function
- Telescopic rod antenna
- Clock timer function
- Variable colour display
- Key illumination
- Clone function
- 8.33kHz airband spacing
- 12V DC/230V AC mains

WS-Desktop

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

WS-Mobile Antenna

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

SWL DX-1 HF Ant.

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

Global AT-2000

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

BETTER SHORT WAVE RECEPTION ON YOUR SCANNER !

MAKE IT PERFORM LIKE A BASE RECEIVER

The MFJ-956 will transform your short wave reception and make your scanner perform as a very respectable short wave receiver. How does it work? when you attach a long wire antenna to your scanner, it amplifies everything, mixes it together, and invents a few signals on the way! The result is lots of noise and hardly any signals. Does that sound familiar? To unlock the true potential of your scanner, you simply place the MFJ-956 between your scanner and the random length of wire. No power is required; just connect your wire antenna to the input of the MFJ-956, take the output to your scanner and adjust the controls on the MFJ unit for best reception. You will hear the noise drop away and the previously masked signals signals appear - just like magic.

BNC lead to connect MFJ-956 to your scanner BNC socket, £6.95

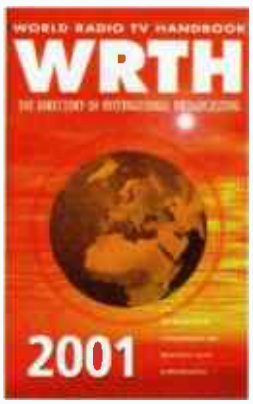
some thoughts on Station Identification Techniques

Continued from page 31

etc. these should be adjusted as required for best effect.

With the receiver set up for monitoring, it would then be left as set (provided the prevailing conditions don't change) and the transmission monitored. The worst possible situation, and the one which must be avoided at all costs, is adjusting the receiver while attempting to listen to an identification - in my experience it never works and the identification is invariably missed.

Use Of Tape Recorder



A useful station accessory is the tape recorder (or alternative form of audio recorder). Most serious amateur monitors and all professionals routinely record all they hear. The professionals usually archive their recordings and transcribe what they hear for dissemination and distribution to relevant parties.

There are several advantages for the amateur monitor in using a tape recorder with your receiver. The principal and obvious advantage is that the recording can be re-run repeatedly. This is particularly helpful if the ID heard was indistinct or somewhat unintelligible.

In addition, by taking the output of the tape recorder through an audio filter or graphic equaliser, the recording can be repeatedly re-run while the filters or equaliser is adjusted to clean up an otherwise unintelligible identification to a point where it can be understood. Also, the tape recorder will allow programme information, frequency schedules, etc. to be recorded then studied and transcribed later.

This, you will find, is much easier than trying to keep up with an announcer who gabbles out the information much faster than you can write it down. Perhaps a course in shorthand is called for - perhaps not.

Developing this theme a bit further throws up the possibility of using the tape recorder in conjunction with a second receiver. This is a very useful arrangement which comes into its own if you want to monitor a difficult signal while continuing to bandscan (monitoring in absentia you might say).

It is also useful with stations which do not identify themselves regularly and the ability to replay the recording is handy where an identification cannot be immediately detected. What you would do in practice is this. When you hear something on the primary receiver that you want to record, the signal would be tuned in on the second receiver and the tape recorder set to record.

If you want to, you can then go back to bandscanning on the primary receiver safe in the knowledge that the other programme of interest is being recorded for your later attention. **Figure 2.2** shows how the two receiver set-up can be augmented with a tape recorder.

So, what sort of tape recorder is best for this application. Until recently the absolute favourite tape recorder, the type preferred by all amateur and professional monitors alike, was the large reel-to-reel type. This gave good quality recordings and several hours of recording time on one tape.

Unfortunately, the cassette recorder did for these units by making the tape almost unobtainable. What we're left with are cassette recorders many of which, it has to be said, are reasonable for the purpose. A good choice is probably one aimed at mid priced Hi-Fi applications.

The tape recorder doesn't have to be an expensive or elaborate model, but it should be reliable and easy to use. In order to accommodate the large range of signal levels encountered, it should have the facility to manually set the recording level as opposed to those types which set it automatically.

SWM

Things To Avoid

Finally, a quick look as a very common misconception, which is this: many short wave listeners, particularly beginners, think that in order to hear more and more rare and exotic stations, more and more expensive and elaborate equipment is required. Not so!

It cannot of course be disputed that the best receiver one can afford is required plus an antenna to do it justice. Remember that very often better value for money, which in this context means better receiver performance for the money, can be obtained by buying a more up-market model second-hand. Unfortunately, what constitutes a good receiver is beyond the scope of this article, so that's all I can say at the moment.

So, if exotic hardware is not the answer, what is? The answer, mundane as it is, is good information. What you need is plenty of information such as schedules, broadcast band listings, station profiles, etc. from as many sources as possible, literally the more the merrier.

This information will need to be sifted through to weed out what is relevant to you and your interests. Pretty soon though you will quickly find the information you want and this will give you an edge when it comes to logging rare and unusual broadcasts.

And that's all there is to it - I told you it wouldn't hurt, didn't I. The good news is that now you know as much about identifying short wave stations as I do. To become really proficient in the art of identification you need to **practice** as much as possible. So reflect on what you have read and complement it by plenty of time spent at the receiver. Enjoy!

Remember, you need as much practice as possible!

UK Air-to-Air Refuelling Operations

Keith Elgin GI7SOB gives us the low-down on AAR operations, focusing on the active UK units and aircraft. A fascinating insight...read on!

Following last year's 'MilAir' Special which looked at the E-3 AWACS, I thought this time we could take a look at air-to-air refuelling (AAR) operations. This particular article will focus on the active UK units and aircraft, the areas used and a glossary of terms which will hopefully explain much of the jargon heard during a refuelling mission. The hub of USAF air-to-air refuelling operations in the UK is at RAF Mildenhall, Suffolk, and for the RAF at RAF Brize Norton, Oxfordshire.

RAF Mildenhall

The based tanker unit is the 351st Air Refuelling Squadron (ARS) which is part of the 100th Air Refuelling Wing (ARW) flying the KC-135 Stratotanker. Initially activated on the 1st June 1942 as the 100th Bombardment Group, it remained an unmanned paper group until the 27th October 1942. The unit was finally designated the 100th ARW on the 30th September 1976 and has been activated and deactivated a number of times.

The latest activation of the 100th ARW came on the 1st February 1992, this time stationed at RAF Mildenhall and today is the United States Air Force Europe (USAFE) sole air refuelling wing. The 100th ARW fly daily missions not only within UK airspace, but their area of responsibility sees them operating over much of Europe and the North Atlantic Ocean.

A 216 Sqn Tristar KC.1 from RAF Brize Norton refuelling a 56(R) Sqn Tornado F.3. *(Crown Copyright).*

In times of war, the unit can operate from forward operating bases, although during 'Operation Allied Force' they flew missions directly from their home base as the 100th Air Expeditionary Refuelling Wing/351st Air Expeditionary Refuelling Squadron.

Up until a few years ago, CONUS (Contiguous United States) based tanker units operated TDY (Temporary Duty) from Mildenhall in support of the 100th ARW, not only KC-135 variants, but also KC-10 Extenders. This gave the monitoring community the chance to hear and possibly see an interesting variety of units operating over the UK.

As the number of aircraft available to the 100th ARW increased, the supporting requirement provided by the rotational tanker deployments came to an end. Although there are still quite a few movements of CONUS based tankers at Mildenhall, these are generally passing through or possibly involved in upcoming Coronet missions.

The primary callsign for 100th ARW tankers is 'Quid', though when involved in specific missions they can adopt callsigns specific to these. For example, during the Serbian elections back in September 2000 six tankers launched from Mildenhall to Spangdahlem, Germany. The callsigns noted during departure were 'KOO 10-15', pronounced as a spoken work 'Koo'.

'KOO' is a Kosovo support callsign regularly used by the USAF, but generally associated with transport aircraft such as C-130s, etc. This movement of so many tankers should have generated a lot of discussion, but went almost completely un-noticed within the monitoring community.

A 351st ARS KC-135R refuels a B-2 Stealth Bomber on the Flamboro AR track. *(TSgt. Brad Fallin).*

The Tankers

The KC-135 is based on Boeing's model 367-80 which was later developed into the commercial 707 passenger aircraft. The primary fuel transfer method is via a flying boom which is extended from the underside of the aircraft. The boom is controlled by an operator, known as the 'boomer', stationed in the rear of the aircraft.

Using a small control column, the boomer can control the movement of the boom and operate director lights which provide positional information for the approaching receiver. This system of lights is located on the underside of the KC-135, behind the nose gear.

For receivers with fitted probes, such as US Navy or US Marine Corps aircraft, a special shuttlecock-shaped drogue is attached to and trailed behind the flying boom. There is a cargo deck above the refuelling system which can carry passengers or cargo.

A pair of French Air Force Mirage 2000Ds being refuelled by a RAF VC-10 K.4, while being watched by a pair of RAF 111 Sqn Tornado F.3s. *(Crown Copyright).*

The KC-10 is based on the McDonnell Douglas DC10. It can operate using an advanced aerial refuelling boom or a hose and drogue system allowing it to refuel a greater variety of US and allied aircraft within the same mission. With its three main wing fuel tanks and three large fuel tanks under the cargo floor, the KC-10 can carry almost twice as much fuel as the KC-135.

The boomer controls refuelling operations through a digital fly-by-wire system from the rear of the aircraft. The KC-10 can also combine the role of tanker and cargo aircraft with the ability to carry fighter support personnel and equipment overseas during deployments as well as refuelling the aircraft.

A 101 Sqn VC-10 K.3 from RAF Brize Norton refuelling a 2 Sqn Tornado GR.1A. *(Crown Copyright).*

352nd SOG

Mildenhall is also home to the 352nd Special Operations Group (SOG). Within the 352nd SOG are three Special

Air-to-Air Refuelling Operations

A close-up view of a Tornado F.3 receiving fuel from a 10 Sqn VC-10 using the new underwing refuelling pods. (Crown Copyright).

The view from the cockpit. A crew-member monitors a small TV screen as a RAF Tornado F.3 takes on fuel from a RAF Tristar. (Crown Copyright).

A close-up of the tail of a 100th Air Refuelling Wing KC-135R "the Black square with a D commemorates the 100th Bomb Wing which was based in Europe during World War II".

Operations Squadrons, the 7th, 21st and 67th SOS. The 7th SOS operate the Lockheed MC-130H Combat Talon II primarily for infiltration, re-supply or exfiltration of Special Forces. For low-level penetration of hostile airspace, the aircraft is equipped with terrain-following and terrain-avoidance radar. It also has an inertial and global positioning satellite navigation system, an air-to-air refuelling capability and a high speed antenna delivery system.

The 21st SOS fly the Sikorsky MH-S3M Pave-Low IIIE helicopter performing a similar role to that of the Combat Talon. The helicopter comes similarly equipped with radar, positioning and air-refuelling capabilities, plus a forward looking infrared sensor (FLIR). The 67th SOS fly the Lockheed MC-130P Combat Shadow and have the primary role of air-to-air refuelling in support of Special Forces helicopters.

Both the 7th and 67th SOS regularly refuel with the 100th ARW tankers although they are then the receivers. In some cases, the Combat Shadow will refuel with the KC-135 around FL110/130 (10000-13000ft), then descend for a rendezvous with the 21st SOS MH-S3Ms and refuel them at very low level, between 500 and 2000ft.

Favoured refuelling areas are off the east Anglian coast in LFA S and LFA 7 (Low Fly Areas in Norfolk and Wales). Given the type of missions flown by the 352nd SOG, communications play an important role. When working with the 100th ARW the assigned refuelling frequencies for the ARA are used. However, when working within their own group they use a dedicated communications network which also makes use of voice encryption.

One of the best frequencies to monitor is their primary h.f. operational frequency **5.2045MHz**. Communications with 'Blackhat', SOCCE (Special Operations Command & Control Element, pronounced 'Soxy') based at RAF Mildenhall, can provide details on current refuelling operations. This frequency is also used for air-to-air chatter when out of v.h.f./u.h.f. range due to the low altitudes flown. **Table 1** provides a list of other confirmed SOG frequencies.

RAF Brize Norton

RAF Brize Norton is home to 10, 101 and 216 Sqns. 10 and 101 Sqn fly the VC-10 and 216 Sqn fly the Tristar. 10 Squadron is one of the oldest flying squadrons in the RAF, formed at Farnborough, on the 1st January 1915.

Initially flying BE2C bombers, the VC-10 wasn't acquired until July 1996. The squadron's mission is to provide operationally effective, efficient and safe world-wide air transport and air-to-air refuelling in support of NATO and the UK's armed forces. 101 Squadron was formed at Farnborough on the 12th July 1917 as the Royal Flying Corps' second specialised night bomber unit, flying the FE2B (Fighter Experimental).

Following disbandment in 1982, the squadron was reformed on the 1st May 1984 at RAF Brize Norton and shortly afterwards received five VC10 K.2 and four VC10 K.3 tankers. Receipt of the VC10 K.4 variant began in June 1994. The squadron is an integral part of the UK's Air Defence Force and is also called upon to support deployments of fighter, strike attack and strategic transport aircraft world-wide.

216 Sqn was formerly 'A' Sqn, RNAS, formed at Manston on the 5th October 1917 flying Handley Page 0/100s. When the RAF was formed on the 1st April 1918 the squadron was renumbered 216 Sqn. Although never officially disbanded, the squadron was reactivated on the 1st November 1984 at RAF Brize Norton with the Tristar.

Prior to 1995 RAF tankers used alphanumeric callsigns such as '7MB24', which was not particularly useful if you were trying to identify the type of aircraft. At the beginning of 1995, however, the tanker fleet started using fixed callsigns for local AAR missions. 10 Squadron used 'Madras', 101 Squadron used 'Tartan' (although more recently this has become 'Lion') and 216 Squadron used 'Fagin'.

The first digit of the mission number is based on the day of the week, beginning on a Monday, allowing for 11-19, 21-29, etc., therefore on a Friday monitors are likely hear callsigns such as 'Lion 51' or 'Fagin 52'.

An F-117 Nighthawk refuels from a 351st Air Expeditionary Refuelling Squadron KC-135 during Operation Allied Force (TSgt. Brad Fallin).

The Tankers

There are four variants of the Vickers VC-10s in use with the RAF: C.1K, K.2, K.3 and K.4. The C.1K fulfils the military transport role carrying 120 passengers or freight and can also be adapted for air-to-air refuelling with the addition of wing-mounted refuelling pods. The K.2s are ex-civil VC-10s, and the K.3s and K.4s are ex-civil Super VC-10s although the K.4s lack the additional fuselage fuel tanks of the K.3s. All of the K variants have wing refuelling points for fighters and a centreline refuelling capability for larger aircraft.

There are also four variants of the Lockheed Tristar: K.1, KC.1, C.2 and C.2A all ex-civil airliners. The K.1 and KC.1 are used in the tanker/transport role and are capable of providing air-to-air refuelling from a pair of centreline fuselage hoses. The K.1 can carry 204 passengers and the KC.1, which has a large freight door, can carry 20 cargo pallets, 196 passengers or a combination of mixed freight and passengers. The C.2 and C.2A are dedicated transport aircraft capable of carrying 265 passengers and 16 tonnes of freight over ranges in excess of 6400kM.

Table 1: 352nd SOG Frequencies in MHz.

139.350	u.f.m.	21 SOS Ops
142.375	u.m.	Victor Secondary
142.850	u.m.	Victor Primary
149.550	u.m.	A/A
247.225	u.m.	Uniform Secondary
248.425	u.m.	7 SOS Ops
252.800	u.m.	21 SOS Ops
281.550	u.f.m.	'X-Ray' Satcom Downlink (Secure)
285.100	u.f.m.	'X-Ray' Satcom Uplink (Secure)
340.425	u.m.	Uniform Primary
372.275	u.m.	A/G

Table 2: USAF ARA Frequency Allocations in MHz.

Track	Primary	Secondary
ARA-1	315.925	299.800
ARA-2	293.525	299.800
ARA-3	258.725	299.800
ARA-4	315.925	299.800
ARA-5	290.975	299.800
ARA-6	340.700	299.800
ARA-7	312.750	299.800
ARA-8	315.925	299.800
ARA-9	299.800	299.800
ARA-10	340.700	299.800
ARA-11	293.525	299.800
ARA-12	258.725	299.800
ARA-13	315.925	299.800
ARA-14	340.700	299.800

Table 3: RAF Trail Frequencies in MHz.

303.100	TAD 041	AAR 1 Ch 1
259.075	TAD 051	AAR 2 Ch 2
295.825	TAD 057	AAR 3 Ch 3
300.975	TAD 064	AAR 4 Ch 4
258.775	TAD 070	AAR 5 Ch 5
340.925	TAD 071	AAR 6 Ch 6

Air Refuelling Areas

AAR operations conducted over UK

airspace can be roughly divided into two types. Those that take place in pre-defined air refuelling areas (ARAs), and those that take place on random tracks known as Tactical Towlines. The main users of the UK ARAs are the RAF and USAF, although it is possible to catch foreign air arms conducing refuelling operations on the odd occasion, especially during exercises.

The UK has 14 ARAs and three USAF short-notice altitude reservation tracks. ARA-1 is situated in northern Scotland and the other areas follow in a clockwise sequence around the UK, ending up with ARA-14 also in northern Scotland. The other tracks are known as Dandi, Flamboro and Spider. Spider does not appear on the official AP2 planning document, but it is very close to ARA-7 using an ARIP (Air Refuelling Initial Point) of 54°31'N 00°01'E and an ARCP (Air Refuelling Control Point) of 55°05'N 01°57'E.

A 100th ARW KC-135R just after take-off.

The others can be seen in **Fig. 1**. ARAs favoured by the USAF are ARA 7 and ARA 14 and to a lesser extent ARA 6 and ARA 8. The bulk of the RAF refuelling is conducted in ARA 5, ARA 6 and ARA 7. Typical USAF refuelling operations will be between the 100th ARW KC-135s and either 48th Fighter Wing F-15s operating from RAF Lakenheath or MC-130s of the 352nd SOG from RAF Mildenhall.

The USAF has a primary and secondary frequency allocated to each of the ARAs in the UK. They stick to these allocations quite rigidly, but there has been the very odd occasion where they have been heard operating in one ARA while using the frequency allocated to another. I have included a list of the USAF ARA frequencies in **Table 2** - note that the secondary frequency is the same throughout the ARAs.

To listen to RAF refuelling frequencies requires a little more effort as there are no dedicated refuelling frequencies used on the ARAs. Generally u.h.f. TADs (Tactical Air Designators) or even a Scottish or London Military ATC (Air Traffic Control) frequency will be used. This is not the case during deployment flights or trails as the RAF refer to them.

During such flights an assigned set of frequencies are used during AR. There are six frequencies in all and the first cell of aircraft will operate on AR Channel 1, the second cell on AR Channel 2, etc. The frequencies in question are listed in **Table 3**.

Flamboro East/West

To help facilitate USAF short-notice altitude reservations within UK airspace, an air-to-air refuelling track known as Black 2 was introduced a number of years ago. Aircraft crossing the northern part of the North Atlantic Ocean from west to east joined Black 2 East while those flying east to west joined Black 2 West. Black 2 followed established military TACAN (Tactical Air Navigation) routes.

Aircraft joining Black 2 East entered at QN9 (58°18'N 05°10'W) routing via the LUK (56°22'N 02°51'W) 335 radial at 35nm and exiting at QM8 (54°07'N 00°06'W). The joining point for Black 2 West was at CSL (52°44'N 01°21'E), routing via QM8 to the exit point at LUK.

During July 1995, Black 2 disappeared, to be replaced with a new track known as Flamboro, which, like its predecessor, was divided East and West. Unlike the ARAs, Flamboro is not used for refuelling fighter aircraft, but handles larger long-range aircraft either entering or departing UK airspace.

The only time fighter activity is noted on the track is when F-15s are used as escorts for the B-2 Stealth Bomber. The B-2 has made a number of appearances at airshows in

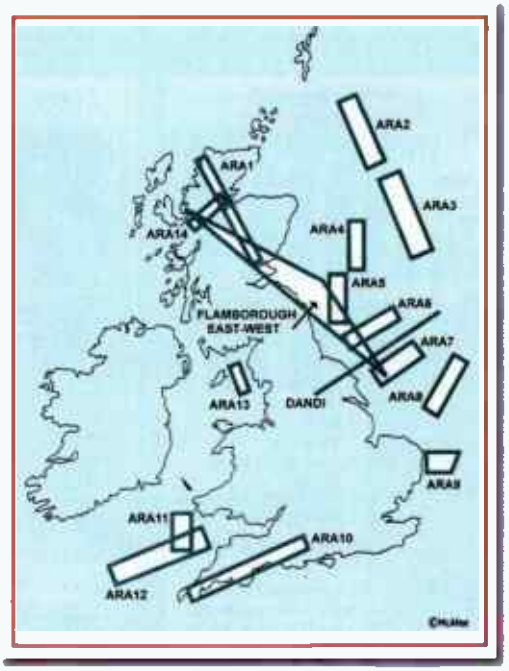


Fig. 1: The UK's 14 ARAs.

Continued on page 40...

Table 4: Flamboro Log.

Date	UTC	Boomer	Block	A/R Track	Tanker(s) c/s	Type	Receiver(s) c/s	Type	Unit	From/To
02/06/00	0809	249.775	250/270	F/West	Quid 62	KC-135	Olive 40	RC-135V	55 Wg	EGUN/KOFF
02/06/00	1135	249.775	250/270	F/West	Quid 61	KC-135	Shuck 94	E-3B	552 ACW	EGUN/KTIK
05/06/00	1009	249.775	250/270	F/West	Quid 68-69	KC-135	Doom 52+95	B-52H	2 BW	EGUN/KBAD
15/06/00	1023	249.775	250/270	F/West	Quid 75-76	KC-135	Chill 11-12	B-52H	5 BW	KMIB/KMIB
22/06/00	2242	249.775	250/270	F/East	Quid 62	KC-135	Snoop 45	RC-135V	55 Wg	KOFF/OEKJ
26/06/00	0814	249.775	250/270	F/West	Quid 61	KC-135	Snoop 46	RC-135W	55 Wg	OEKJ/KOFF
30/06/00	1320	249.775	250/270	F/West	Quid 91	KC-135	Trout 99	C-135C	412 TW	ETAR/KADW
12/07/00	1001	249.775	250/270	F/West	Quid 61	KC-135	Olive 40	RC-135W	55 Wg	EGUN/KOFF
17/07/00	0555	249.775	250/270	F/East	Quid 70-71	KC-135	Reach 100P	C-17A	437 AW	KPOB/UKLL
17/07/00	1202		220/240	F/West	Opec 76	KC-10A	Surge 76	KC-10A	305 AMW	EGUN/KWRI
17/07/00	1217	249.775	250/270	F/West	Quid 61	KC-135	Olive 40	RC-135V	55 Wg	EGUN/KOFF
18/07/00	1128		220/230	F/West	Opec 76	KC-10A	Surge 76	KC-10A	305 AMW	EGUN/KWRI
18/07/00	2118	249.775	250/270	F/East	Quid 62	KC-135	Snoop45	RC-135V	55 Wg	KOFF/OEKJ
18/07/00	2219	249.775	250/270	F/West	Quid 62	KC-135	Hawg 55	RC-135V	55 Wg	EGUN/EGUN
19/07/00	1130		220/230	F/West	Opec 76	KC-10A	Surge 76	KC-10A	305 AMW	EGUN/KWRI
20/07/00	1148	143.825	180/190	F/West	Opec 76	KC-10A	Surge 76	KC-10A	305 AMW	EGUN/KWRI
21/07/00	1132		210/220	F/West	Opec 76	KC-10A	Surge 76	KC-10A	305 AMW	EGUN/KWRI
23/07/00	1729	249.775	250/270	F/East	Quid 91	KC-135	Trout 99	C-135C	412 TW	KADW/LIRA
24/07/00	0915	249.775	200/230	F/West	Quid 21-23	KC-135	Peach 91	B-1B	116 BW	ETMN/KWRB
25/07/00	0955	249.775	250/270	F/West	Quid 69	KC-135	Cobra 70	OC-135B	55 Wg	EGUN/KADW
25/07/00	1125	249.775	250/270	F/West	Quid 69	KC-135	Snoop 46	RC-135V	55 Wg	EGUN/KOFF
26/07/00	0820	249.775	250/270	F/West	Quid 91	KC-135	Trout 99	C-135C	412 TW	UFPB/KADW
10/08/00	1447	249.775	250/270	F/West	Quid 61	KC-135	Shuck 72	E-3B	552 ACW	EGUN/BIKF
17/08/00	0859	249.775	250/270	F/West	Quid 61	KC-135	Olive 40	RC-135V	55 Wg	EGUN/KOFF
18/08/00	2227	249.775	250/270	F/West	Quid 71	KC-135	Reach 1830	C-17A	437 AW	UUWW/KADW
21/08/00	2211	343.500	250/270	F/East	Quid 61	KC-135	Snoop 45	RC-135V	55 Wg	KOFF/OEKJ
24/08/00	1031	249.775	250/270	F/West	Quid 62	KC-135	Snoop 46	RC-135V	55 Wg	OEKJ/KOFF
25/08/00	1121	249.775	250/270	F/West	Quid 65	KC-135	Trout 99	C-135C	412 TW	EGUN/KCOS
25/08/00	2243	249.775	250/270	F/East	Quid 91-92	KC-135	Buck 37	E-4B	55 Wg	KOFF/FJDG
28/08/00	1608	249.775	250/270	F/West	Quid 94+96	KC-135	Buck 37	E-4B	55 Wg	FJDG/KOFF
30/08/00	1930	249.775	250/270	F/West	Quid 91	KC-135	Reach 857T	C-5B	436 AW	HECA/KADW
02/09/00	1014	249.775	250/270	F/West	Shell 76-77	KC-135	Shuck 98	E-3B	552 ACW	EGUN/KTIK
09/09/00	1813	249.775	250/270	F/East	Quid 71-72	KC-135	Reach 1017	C-17A	437 AW/3rd AMW	KPOB/UAAA
12/09/00	1002	249.775	250/270	F/East	Quid 71	KC-135	Shuck 91	E-3B	552 ACW	KTIK/OEKJ
13/09/00	2136	249.775	250/270	F/East	Quid 62	KC-135	Snoop 45	RC-135V	55 Wg	KOFF/OEKJ
25/09/00	2227	249.775	250/270	F/East	Quid 61	KC-135	Snoop 45	RC-135V	55 Wg	KOFF/OEKJ
28/09/00	0814	297.750	250/270	F/West	Reach 45X	KC-135	Olive 40	RC-135U	55 Wg	EGUN/KOFF
28/09/00	2146	249.775	250/270	F/West	Quid 62	KC-135	Snoop 46	RC-135V/W	55 Wg	OEKJ/KOFF
12/10/00	1259	249.775	250/270	F/West	Turbo 97	KC-135	Snoop 46	RC-135	55 Wg	LGSA/KOFF
17/10/00	0346	249.775	250/270	F/East	Quid 91	KC-135	Trout 99	C-135C	412 TW	KADW/OMAM
17/10/00	2109	300.125	220/240	F/West	Reach 5034	KC-10A	Reach 1830	C-17A		HESH/KADW
19/10/00	1106	249.775	250/270	F/West	Quid 62	KC-135	Olive 40	RC-135W	55 Wg	EGUN/KOFF
20/10/00	1231	249.775	250/270	F/West	Quid 13-14	KC-135	Snoop 35	RC-135	55 Wg	EGUN/KOFF
22/10/00	0642	303.000	230/250	F/West	Reach NS2	KC-10	Reach G7	C-141B		LICZ-KDOV
27/10/00	1510	249.775	250/270	F/West	Quid 61	KC-135	Shuck 74	E-3B	552 ACW	EGUN-KTIK
06/11/00	2216	249.775	250/270	F/East	Quid 61	KC-135	Snoop 45	RC-135V	55 Wg	KOFF-OEKJ
08/11/00	0909	249.775	250/270	F/West	Quid 45	KC-135	Olive 40	RC-135W	55 Wg	EGUN-KOFF
09/11/00	1124	249.775	250/270	F/West	Quid 91	KC-135	Snoop 46	RC-135V	55 Wg	OEKJ/KOFF
13/11/00	0210	249.775	270/290	F/East	Quid 91	KC-135	Trout 99	C-135C	412 TW	KADW/LTAC
16/11/00	0942	249.775	250/270	F/West	Quid 91	KC-135	Trout 99	C-135C	412 TW	UGEE/KADW
17/11/00	1043	249.775	250/270	F/West	Quid 62	KC-135	Hawg 95	RC-135	55 Wg	EGUN/EGUN
22/11/00	1925	249.775	250/270	F/West	Quid 93+95	KC-135	Reach 112T	C-17A	437 AW	LLBG/KCHS
23/11/00	2309	249.775	250/270	F/West	Quid 99	KC-135	Trout 99	C-135C	412 TW	ETAR/KADW

WE SHIP WORLDWIDE - FAST!

Just look at our warehouse packed full of the latest radio equipment ready for despatch!

Bearcat UBC 3000XLT

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

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

NEVADA PRICE- £199.95

UBC 220XLT

CHEQUE SPREAD

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

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

NEVADA PRICE- £149.95

UBC 120XLT

CHEQUE SPREAD

Perfect for long distance reception of Aircraft, Public Services, Land Mobile and much more! OUTSTANDING VALUE FOR MONEY!

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

NEVADA PRICE- £129.95

ALINCO DJX-2000

NEW! SUPER SCANNER

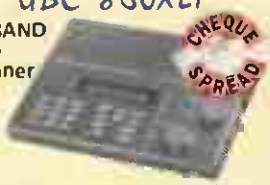
- Covers 100kHz - 2,149.99MHz
- 2000 channel memory
- Modes: AM/NFM/WFM/ LSB/USB/CW auto mode position
- Built in recorder (up to 160 mins of record time)
- Built in mic for voice recording
- Bug detector - warns of a localised transmission
- Descrambler (audio)
- CTCSS decoder built in
- Three basic modes of operation: dual VFO, memory, memory scan
- 23 fixed channel steps or programme any step from 50Hz - 500kHz
- 2 step attenuator 10dB, 20dB
- Plus lots more features!

NEVADA PRICE- £449

Bearcat UBC 860XLT

AIRBAND Base Scanner

CHEQUE SPREAD

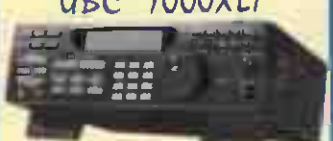


A stylish low profile base scanner with TWIN TURBO scan and search facility. Covers civil airband, marine, police, cellular plus more!

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

NEVADA PRICE- £139

UBC 9000XLT



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

NEVADA PRICE- £269

UBC 60XLT

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

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

NEVADA PRICE- £79.95

ICOM R3

NEW! REVOLUTIONARY NEW HANDHELD!

- 495kHz - 2451MHz
- 450 memories
- Modes: FM, AM, WFM, AM-TV, FM-TV
- Alpha tagging
- CTCSS with tone scan
- 2" colour TFT display
- Video audio output

SUPPLIED C/W

- *telescopic antenna*
- *belt clip*
- *charger*
- *LiION battery pack*

NEVADA PRICE- around £499

YAESU VR500

SPECIAL!

ULTRA COMPACT RADIO

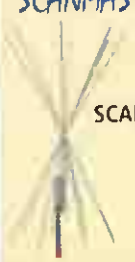
- 100kHz - 1300MHz
- FM, Wide FM, USB, LSB, CW, AM
- 1091 Memory channels
- Weight 220g
- C/w Antenna, carrystrap, Belt clip
- Optional Charger: NC60

Accessories

- FNB-59 NiCad battery pk
- NC-60 AC adaptor
- CSC-72 Soft case
- EDC-5B DC cable with cigar lighter plug
- EDC-6 DC cable
- CT-35 Cloning cable

NEVADA PRICE- ~~£244~~ £199

SCANMASTER ANTENNAS



DOUBLE DISCONE SCANMASTER DD 1300

A high performance wideband antenna

- 25-1300MHz
- Ultra wideband TX capability

NEVADA PRICE ~~£54.95~~ £34.95

SCANMASTER LP1300

The ULTIMATE Scanner Antenna! High quality 16 element beam

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

NEVADA PRICE £129.00

ICOM IC-R2

SPECIAL!

PRICE MATCH

The IC-R2 is one of the smallest radios we have ever seen. But Palm size wide band size is not everything. Packed in this receivers small package are some pretty big features.

- 500kHz -1310MHz
- AM/FM/WFM
- 400 memories for storing favourite channels plus 25 band edge memories for easy scanning between specified frequency

NEVADA PRICE- ~~£154~~ £139

GOODMANS TRACKER

2 WAY BUSINESS & PERSONAL COMMUNICATIONS SYSTEM

PAIR £99 SPECIAL OFFER!

PMR 446 LICENCE FREE RADIOS

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

FULL RANGE OF PMR 446 IN STOCK CALL FOR DETAILS

NEVADA PRICE- £99 PER PAIR

USED EQUIPMENT

ALL SAFETY TESTED & GUARANTEED FOR 3 MONTHS

NB Postage & Packing extra

SHORTWAVE RECEIVERS		
AKD TARGET	HF Receiver	125
DATONG UC1	Converter HF	59
DATONG VLF	Converter VLF	29
DRAKE SW2	HF Receiver - ex demo	399
DRAKE R8E	HF Receiver	495
GRUNDIG YB400	Shortwave Receiver (ex demo)	95
FAIRHAVEN RD-300	Wideband Receiver	599
GRUNDIG YB500	SW Portable (ex demo)	99
GRUNDIG P2000	Shortwave Receiver (ex demo)	69
ICOM [illegible]	HF Receiver	399
JRC NRD 345	HF Receiver	325
LOWE HF 150	HF Receiver	199
LOWE HF 225	HF Receiver	249
MATSUI VR-2200	Shortwave Receiver	20
REALISTIC DX394	HF [illegible]eiver	119
VECTRONICS AT100	Active Antenna (ex demo)	55
YAESU FRA-7700	Active antenna	49
SCANNING RECEIVERS		
AOR AR2000	Handheld Scanner	145
BEARCAT UBC 145 XLT	Base Scanner	50
REALISTIC PRO 57	Base Scanner	59
TRIDENT TRX 100	Handheld Scanner (ex demo)	149
YUPITERU MVT 9000 Mk II	Handheld Scanner	289
YAESU VR-500 + ADMS-3	Handheld Scanner + software	175

STOCK ARRIVING DAILY - CALL

USE YOUR CREDIT CARD FOR SAME DAY DESPATCH!

023 9231 3090

ALL GOODS SHIPPED for 24 hour delivery (UK MAINLAND ONLY) PLEASE ADD £10.00 (unless otherwise stated)

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

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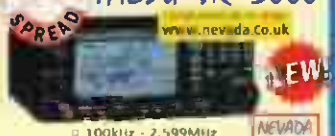
Serving the SHORTWAVE & SCANNING Enthusiast for more than 30 YEARS!

NEVADA®

YAESU VR 5000

CHEQUE SPREAD



NEW!

MOBILE WIDEBAND RECEIVER
- 100kHz - 2,599MHz
- Multi mode
- Real time band scope
- Optional DSP bandpass, notch & noise reduction
- Optional filters

NEVADA PRICE CALL!

AOR AR-8600 NEW!

CHEQUE SPREAD

- All mode wideband base
- 530kHz-2040MHz
- 33 memory banks
- Optional SD cards

OPTIONAL PSU AVAILABLE

NEVADA PRICE £699

WORLDSPACE DIGITAL SATELLITE RADIO

NEW!

Receive over 40 channels of FADE FREE DIGITAL PROGRAMS direct from satellite to this radio - *from almost anywhere in the world!*

Hitachi radio features:-

- WorldSpace satellite PLUS FM/MW/SW
- Portable, battery powered with AC adaptor
- Stereo headphone socket
- Stereo line out connectors for integration with your stereo or home theatre system
- Built in easy to aim antenna
- Decryption and narrowcast capability
- Program selection by language and category
- 10 presets and last station memory
- Clock display/timer function
- 1-line 8 character LC display
- Port for easy attachment to the WorldSpace PC card to enjoy multimedia services
- Easy to set up and operate

SPECIAL!

NEVADA PRICE- £99.95

ICOM IC-R75

CHEQUE SPREAD

The LATEST HOT Receiver from ICOM

IN STOCK! READY TO SHIP!

PRICE MATCH

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

NEVADA PRICE ~~£699~~

ICOM IC-R8500

CHEQUE SPREAD

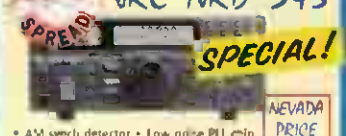
LATEST VERSION

Yes, we've got them in stock. This receiver is everything we hoped it would be, covering 100kHz - 2GHz and lots of features including computer control. Pay by 3 post dated cheques!

NEVADA PRICE ~~£1349~~ £1299

JRC NRD-345

CHEQUE SPREAD



SPECIAL!

- AM synch detector • Low noise PLL chip
- Noise blanker • Wide dynamic range
- Sensitive receiver • RS232 computer I/F
- 100 memories • Clock/Timer functions
- Including mains AC supply

NEVADA PRICE ~~£745~~ £399

YAESU FRG-100

CHEQUE SPREAD

PRICE MATCH

This receiver provides solid coverage from 50kHz to 30MHz with all mode reception of AM, SSB and CW. Supplied c/w AC mains supply

NEVADA PRICE ~~£449~~ £399

SANGEAN ATS909

CHEQUE SPREAD

ULTRA COMPACT Digital Multiband Radio with SSB

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

NEVADA PRICE ~~£200~~ £139

YUPITERU MVT 7300

NEW!

- 530kHz-1.GHz
- 1000 Memories
- 8.33kHz airband
- Plus LOTS MORE!

SEE REVIEW October 2000 SWM

CHEQUE SPREAD

NEVADA PRICE £289

SANGEAN ATS818

CHEQUE SPREAD

SPECIAL! UNBEATABLE VALUE FOR MONEY!

SW WITH SSB

OPTIONAL MAINS ADAPTOR £9.95

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

NEVADA PRICE ~~£164~~ £119

PORCHE P2000

CHEQUE SPREAD

GRUNDIG

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

radio designed by F.A. Porsche

NEVADA PRICE £89.95

ICOM PCR 1000

CHEQUE SPREAD

COMPUTER RADIO SYSTEM

PRICE MATCH

- 100kHz - 1300MHz
- ALL MODE RECEPTION
- Plus Lots More!

NEVADA PRICE £319

PCR OPTION DSP UNIT UT 106 £82.00 £2.75 p&p

MAYCOM AR108

AIRBAND

Dedicated Airband radio
- 108-180MHz
- 99 Memory channels
- Dual watch

CHEQUE SPREAD

Mains Charger £8.95

NEVADA PRICE £69.95

AOR AR8200 Mk II

CHEQUE SPREAD

LATEST model!

- 530kHz-2040MHz
- All Mode including 8.33kHz AM
- 1000 Memories
- CXO high stability oscillator
- Improved receiver
- Telescopic whip
- Higher capacity NiCads
- New black cabinet
- Plus LOTS MORE!

SPECIAL!

We carry the FULL RANGE of accessories!

NEVADA PRICE- ~~£434~~ £349.95

YUPITERU MVT 9000EU

CHEQUE SPREAD

- 531kHz - 2039MHz
- 1000 memory channels
- All modes: W-FM, FM, N-AM, AM, LSB, USB, CW
- Scanning steps: 50Hz-125kHz
- Duplex RX capability
- Fast tune facility
- Built-in ferrite rod antenna for AM

OP90 Soft Case £17.95+£2p&p

NEVADA PRICE £369

ALINCO DJ-X10

Wideband scanning receiver

- Receives 100kHz 2000MHz
- Multi Mode Reception
- 1200 Memory Channels
- Channel Scope spectrum analyser
- Channel Scope Peak Search
- Advanced scanning features
- User Friendly features
- A super sensitive receiver
- Dual VFOs
- Facilities for cloning another set

NEVADA PRICE- £295

YUPITERU MVT 7100

PRICE MATCH

Still the most popular handheld 530kHz -1650MHz

CHEQUE SPREAD

NEVADA PRICE ~~£249~~ £CALL

YUPITERU MVT 3300

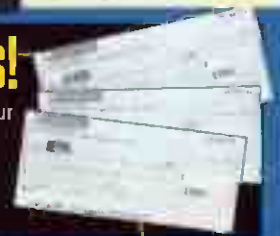
- 66 - 88MHz, 108 -170MHz 300 - 470MHz, 806 - 1000MHz
- Modes: AM/NFM
- Steps: 5, 6.25 10, 12.5, 25kHz
- memories: 200
- Band memories: 10
- Priority channels: 10
- Scan/Search speed: 30/ sec
- C/W Antenna Earpiece. Carrying Strap and built in Desk Stand

NEVADA PRICE ~~£154~~ £129

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

CHEQUE SPREAD

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



UK Air-to-Air Refuelling Operations

...continued from page 37

the UK recently, refuelling on the Flamboro track both on the inbound and outbound legs. On each occasion it has been flanked by a pair of Lakenheath-based F-15s which also required refuelling. The joining point for Flamboro East is at 57°00'N 06°00'W, routing via 56°30'N 04°00'W and exiting at 54°26'N 00°40'E.

Joining Flamboro West is at 54°26'N 00°40'E, routing via 55°31'N 00°22'W and exiting at 57°00'N 06°00'W. The primary air-to-air refuelling frequency for the track is **249.775MHz**, with a secondary of **300.125MHz**. Although not as active as the ARAs, the track does generate some interesting loggings and **Table 4** includes the traffic noted over a six month period to give readers an idea as to the amount of activity encountered.

A 100th ARW KC-135R coming in to land.

A 100th ARW KC-135R coming in to land.

Table 5 contains a glossary of terms heard during air-to-air refuelling from both RAF and USAF crews. For those of you new to refuelling communications, a couple of these terms need explaining as they have been misinterpreted by a number of people over the years. The call "2992 set" can be misconstrued as a frequency change, but has nothing to do with 2992kHz or 299.200MHz as has been posted in the past.

Aircraft flying above a height known as the transition altitude, usually about 5000 feet in the UK, use a standard altimeter setting of 1013.2 millibars. The USAF still use inches for setting altimeters and this equates to 29.92in, or 2992 for short.

A 100th ARW KC-135R departing from RAF Mildenhall "note the refuelling hose and basket trailing from the boom at the rear of the aircraft".

One of the other calls will be confirming the TACAN beacon frequency to be used. The actual word TACAN is not always mentioned and the call can simply be heard as "set 29Y" or "come up 29Y". Although in this case it is an actual u.h.f. frequency, there are no voice communications and, unless you are extremely close to the tanker or receiver, even the beacon pulses are unlikely to be heard.

A 100th ARW KC-135R coming in to land at RAF Mildenhall.

Those of you with Internet access can find out on a daily basis which ARAs are likely to be in use. This type of information is obtainable via the AIS UK Daily Navigational Warning A8 bulletin which can be found at **http://www.ais.org.uk/nav/nav.htm** under 'A8 bulletin'. If an ARA has been activated, it should appear as in the example in **Table 6**. ***SWM***

Table 6: ARA NOTAM.

AB NW's	LONDON FIR/UIR (EGTT) & CHANNEL ISLANDS CTR (United Kingdom)
AB 9113	1110-1140 FL270/150 (H1935/00) Air Refuelling Area 13 active
AC NW's	SCOTTISH FIR/UIR (EGPX) (United Kingdom) AC 9114 1830-1915 FL240/80 (J4309/00) Air Refuelling Area 14 active

Table 5: Glossary.

Air-to-Air Refuelling Area (AARA)
A defined area encompassing both a racetrack shape AAR track and its protected airspace

AAR Bracket
Designated segment of a route where AAR is planned. The bracket is defined by a refuelling start point and stop point

AARC
Air to air refueling controller

AAR Envelope
The area limits behind a boom equipped tanker within which a receiver must fly to remain in contact.

AAR Exit Point
The designated geographic point at which the refuelling track terminates

AAR Time
Planned elapsed time from ARCP to completion point.

AAR Track
A track designated for AAR

Air Refuelling Control Point (ARCP)
The planned geographic point over which the receiver(s) arrive in the observation/pre-contact position with respect to the assigned tanker

Air Refuelling Control Time (ARCT)
The planned time that the receiver and tanker will arrive over the ARCP

Air Refuelling Initial Point (ARIP)
The geographical point at which the receiver enters the refuelling track (anchor), initiates radio contact with the tanker and begins manoeuvre to RV

Altitude Reservation (ALTRV)
An area of airspace reserved for AAR with the appropriate ATC authority

Anchor Point
A defined reference point upon which an anchor refuelling track is orientated

Anchor Refuelling
AAR performed as the tanker(s) maintain a prescribed pattern which is anchored to a geographical point or fix

Base Altitude
A reference altitude at which the lead aircraft of a tanker formation (or a single aircraft for individual AAR) will fly

Bingo Fuel
A pre-calculated quantity of receiver fuel which is insufficient for the receiver to complete the mission as planned

Boom
The pipe extending below the aircraft used to transfer fuel. The boom is "flown" (controlled) into contact with the receiving aircraft.

Boom Cycling
A retraction and extension of the boom to relieve fuel pressure in the drogue adapter

Bootleggers
Non-planned receivers.

Breakaway
The command requiring an emergency separation between tanker and receiver

Brute Force Disconnect (boom only)
A disconnect obtained by the receiver moving aft to full boom extension and overriding hydraulic pressure or a mechanical interface holding the receiver's toggles in the engaged position

Chick/s
Receiver/s

Clear Astern (Pre-contact)
Radio call by the tanker clearing a receiver astern the left/centre/right assigned AAR equipment. The receiver moves to stabilise in the pre-contact position

Clear Contact (probe & drogue only)
The receiver is cleared to move forward from the pre-contact position to engage the probe in the drogue

Clear Contact Position (boom only)
The receiver is cleared to advance to the steady boom contact position

Clear Join
Radio call by the tanker clearing the receiver to join in close formation in the observation position or pre contact position for boom operations.

Clear to Leave
Radio call given by the tanker clearing the receiver to leave the tanker formation. This call is given only after the receiver has completed moving to an echelon position

Contact (probe & drogue)
A contact is made when the probe engages the drogue

Contact (boom)
Called by the boom operator and the receiver when the boom is locked in the receptacle

Disconnect (probe & drogue)
Command given by the tanker. The receiver moves smoothly back to the pre contact position

Disconnect (boom)
Command given by the tanker or receiver. When the boom is seen to be clear of the receptacle, the receiver moves smoothly back to the pre-contact position

Dry Contact
AAR engagement for aircrew proficiency during which fuel is not transferred

End AAR
A planned point or the actual position within the confines of the AAR track at which all AAR operations/requirements are complete

Go Echelon Left/Right
Radio call given by the tanker which instructs a receiver to move from the pre-contact position to echelon after refuelling is complete.

Hayrake
Homing signal in uhf band for air-air refuelling join

Judy
Radio call made by the receiver when radar contact with the tanker and taking over responsibility for closing to within visual range

Manual Boom Latching (boom)
Both receiver and tanker AAR systems in manual operation. The receiver pilot must initiate all disconnects

Manual/Emergency/Override Boom Latch.
Both receiver and tanker AAR systems Boom Latching in manual operation

MARSA
Military Assumes Responsibility for Separation of Aircraft - applies only to participating aircraft

Observation Position
The initial formation position for a receiver joining a tanker. This is echelon right for all receivers. The lead receiver should initially pull well forward to be observed and identified by the tanker pilots.

Off-load/On-load
The tanker fuel, normally established at the planning stage, assigned for off load/on load to receiver(s) during an AAR mission.

Orbit Departure Time
That time at which the tanker will depart the orbit point to effect the planned RV

Orbit Pattern
The pattern flown by the tanker at the orbit point.

Orbit Point
A geographic point along the planned AAR track where the tanker will orbit

Overrun (Rendezvous)
An overrun when the receiver passes the tanker prior to or during the tanker RV turn

Overrun (Closure)
An overrun when the receiver's closure rate prevents stabilising in the pre-contact position, or when forward movement of the receiver is considered excessive during contact or approach to contact

PDI
Pilot Director Indicator (lights)

Pre-contact Position (probe & drogue)
The stabilised formation position astern the AAR equipment (approximately 5ft directly aft of the drogue)

Pre-contact Position (boom)
The position approximately 50ft behind and slightly below the tanker boom nozzle where the receiver stabilises before being cleared to the contact position

Radio Silent
No radio transmissions between tanker and receiver except in an emergency

Rendezvous Procedure (RV)
A procedure to join the receiver with the tanker

Rendezvous Initial Point (RVIP)
A planned geographic point prior to the ARCP to which tankers and receivers time independently to effect an arrival at the RV control time. If the tanker/receiver is not already at its assigned RV FL altitude, it commences a climb/descent to that FL altitude. This point may be a designated position established at the planning or briefing stage, or as directed by the tanker/GCI/AEW controlling the RV

Reverse Flow AAR (boom only)
The transfer of fuel from receiver to tanker

RV Alpha (Anchor RV)
A procedure directed by a radar control station, whether ground based, maritime or airborne

RV Bravo
A heading based procedure which utilises air to air equipment of both tanker and receiver

RV Charlie
A heading based procedure similar to the RV Bravo which allows receivers with an Airborne Intercept (AI) radar to control the procedure once positive AI radar contact is established.

RV Delta (Point Parallel)
A procedure requiring the receiver to maintain an agreed track and the tanker to maintain the reciprocal track, offset a pre-determined distance

RV Echo
A procedure intended for use in support of combat air patrol (CAP). It is particularly useful during periods of EMCON constraints.

RV Foxtrot
A procedure normally used when the tanker and receiver operate from the same base using an accompanied/buddy climb and tailchase departure.

RV Golf (Enroute)
A procedure facilitating a join up on a common track to make a good scheduled time. The receivers may have departed either from the same or different bases. There are a number of enroute RVs

RV Control Time (RVCT)
A general term that applies to any control time to make good an RV between tanker/receiver at a specific point (ARCP, RVIP).

RV Flight Level (FL)/Altitude
The FL or altitude of the tanker during a RV procedure. Receivers are separated from the tanker by FL/altitude during the procedure, unless otherwise stated the receiver is to be 1000ft below the tanker.

RV Initial Call
When the use of radio is authorised, the tanker is to confirm RV details before starting the RV procedure

RV Point
A designated point where tanker and receiver are planned to be joined in formation (ARCP, RVIP, etc)

RV Rollout Heading
A heading reference taken by the tanker(s) on the final turn towards the RV Point.

Single Hose Procedure
A change to the refuelling procedure which is effected when a tanker, which normally operates with two AAR stores, has one store unserviceable

Soft Contact
The probe has not fully engaged in the drogue.

Spokes
The receiver has damaged the drogue

Start Point
A designated point on track where refuelling of the first receiver(s) is planned to start

Stop Point
A designated point on track where refuelling of the last receiver(s) is planned to stop

Tactical Stream
Two or more AAR cells proceeding at a pre determined spacing along identical flight paths.

Tactical Towline
AR outside of an ARA

Tango
Refuelling tanker

Texaco
Refuelling tanker.

Toboggan
Request from receiver for the tanker to start a slow descent, maintaining the refuelling airspeed. The standard rate of descent is 500ft per minute and this should be used unless tanker or receiver requests otherwise

Towline
Air-to air refuelling area

Track Offset
Used in RV Delta (Point Parallel). It is the lateral distance which the tanker is offset from the receiver track. The distance compensates for tanker turn radius and drift during the turn towards the ARCP

Trade
Receivers

Transferable Fuel
Tanker fuel available for passing to a receiver. This is the total fuel in the tanker minus the fuel the tanker requires to recover to an airfield including any and rapid diversion/weather reserves.

Transmit for DF
A 10 second carrier wave transmission unmodulated by speech which allows relative positions of tanker and receiver to be determined using uhf/df

Turn Range
In some RV procedures, the distance measured between the tanker and receiver at which point the tanker initiates the turn for the RV

Visual
Radio call from the receiver pilot confirming visual contact with the tanker

ShackWare – The Column

■ JERRY GLENWRIGHT, 56 DENBIGH ROAD, NORWICH NR2 3HH
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Hello and welcome to 'ShackWare'. As you'll see in the 'special' featured opposite, I've largely bypassed my (and many of your) favourite oldies to make space for a buyers' guide and other data relating to the PC and its many compatibles.

As the years have gone by, what started as a PC trickle became an avalanche and the avalanche is now in full flow. It's fair to say that the PC is the only choice for those s.w.l.s yet to buy a computer, offering, as it does, access to a complete range of radio-oriented hard and software. Well that's the special, but here we can indulge our interest in the largely-forgotten silicon of yesteryear! And this being the column that sits alongside the special, I'm going to do something a bit different and discuss a machine new to the 'ShackWare' column, one of the truly forgotten machines of the early to middle 1980s, the MSX computer...

Brand X

Donald John Morrison GM0LZE (E-mail; **dolan.morrison@ntlworld.com**) wrote with questions about a futuristic 'concept' machine that was (if he and others like him will forgive me for saying so) based on an idea far ahead of its time in 1984, yet a figure of fun in the computer press more or less from the day of its launch. Take it away Donald...

"Maybe you could enlighten me on my Pioneer PX7 computer which I have had for 15 years. I would like to use it for decoding, transmitting and so on but have not found any ham software suitable for it. The computer itself has an 8-bit Z80A (3.5MHz) CPU, 32K of RAM, stereo audio inputs, stereo audio outputs, video in and video out, r.f. out, RGB out, data socket, an expansion slot (for cartridges), separate keyboard, headphone socket, laser vision connection and MSX BASIC version 1.0 (copyright Microsoft 1983) which is the language that it uses.

I do know that a company called J&P Electronics sold RTTY and Morse programs for the MSX (1) standard computers circa 1988, but I can find no trace of this company. The owners' callsigns were G4OIK and G4OIL. I have only ever used this computer for video titling using software on a cartridge, so maybe it is a long shot, but I would love to use it for decoding. Any info you have would be much appreciated. By the way, when I purchased it it cost £279 (reduced from £399).The video art tablet was £89. This was in 1984".

And there, I'm afraid, is one of the main reasons why MSX was such a dismal failure during 1984/5. £399 for a Z80-based machine with little software support and far-sighted but largely unsupported I/O ports like the 'laser vision connector' is stretching it a bit even for those days of home computer hysteria! Many other reasons exist too, but to understand them we need to look at just why the Japanese decided that manufacturers should band together to offer essentially one computer with differently styled cases during 1984.

At the time, Sinclair's Spectrum was at its peak, and few bedrooms were complete without one proudly taking up desk space. A few off-the-wall types (guess who!) plumped for Oric's offering instead, especially the Atmos, with its sleek back case and delightful keyboard, and the rich and educationalists bought the Acorn BBC B in droves. Different markets, different machines, different software, different goals, but each with its large and devoted following (devoted if not large in the case of the Oric). The Japanese, until then foremost in all that was good in microelectronics, could not get a foothold in this amazing home computer boom. So they took a step back and did some lateral thinking.

A common complaint at that time was that games (it was always games!) released for the Spectrum rarely appeared for other computers whose owners would write to the computer magazines complaining bitterly. Expansion hardware was difficult to find too (or incredibly expensive in the case of the Beeb) even though virtually every machine was better equipped to make proper use of expansion devices than the Spectrum which had a bare bit of circuit board with direct access to the main address and data buss hanging out the back.

Aha! Thought Japanese manufacturers, why not band together (R&D costs would be greatly reduced) and develop a compatible computer which, while examples from individual manufacturers might have different ports or slight variations in their capabilities, would all run the same software and be able to tap into new expansion hardware. A nice idea and a sensible one too.

MSX computers featuring more or less similar specs to Donald's Pioneer outlined above were duly launched onto a UK home computer eager for machines. Most had a price somewhere between £300 and £400. A year later and they were all but being given free with a gallon of fuel!

The reasons? Price versus performance (which could best be described as lacklustre), low-quality software also at inflated prices and the sheer monotony of the range. After all, choosing a computer was supposed to be an exciting and fun affair. One in which you pored over specifications, avidly read reviews in the computer magazines, argued about your choice with friends and finally, breathless with excitement (whether 14 or 44) went along to the shop to buy.

MSX computers offered none of this excitement - after all, why would you choose one bowl of grey porridge over another? The machines sank without trace, though the standard was briefly updated and revised a couple of years later only to suffer the same fate.

Now before any MSX aficionados out there write to tick me off, please realise that this is simply a stark retelling of the facts. The MSX computers were fine machines in their own way with far better specifications in some areas than best sellers like Sinclair's computers, and with better build quality. They suffered only from being boring.

And so back to Donald and his PX7. If I'm brutally honest Donald, I have to say that it is extremely unlikely that any radio-oriented software will be found to support the computer (unlikely, but not impossible). Possibly the best action would be to adapt listings in BASIC for RTTY and c.w. decoders. Several of these have appeared over the years and some can be found on the web. Anyone with access to software or advice can, of course, pass it to Donald care of me.

Plastics Makes Perfect

Though moving house twice in six months - is an unbelievably harrowing affair which involves packing up your entire shack and wondering if it will ever reappear again in the same condition, it's not entirely without advantages. One such is that you discover bits of long lost kit you'd forgotten you ever had. In my case, this meant rediscovering an Aladdin's cave of computers, expansion cards and other computer knick-knacks in the cupboard under the stairs which had been blocked off by the fridge-freezer (I know, but our old house was very small and I did have a lot of computers to stash in it!) sometime back in 1996.

I'll talk about some of the discoveries I made in that cupboard in coming instalments, but for now, suffice it to say that I was overjoyed to welcome back into the fold my Amstrad PPC640.

This machine (and forgive me for mentioning it so soon after the last time in the November column) is one for which I receive quite a lot of mail. It's by no means a common bootsale find, but examples do appear and when they do, their quirky aesthetics, flimsy construction and - in some light - illegible screen make them less than attractive for all but the hardcore collector.

The most recent letter I featured about the Amstrad's first stab at a portable was from **Gareth Lamb** who'd found one at a boot sale and bought it - much to the disgust of his wife. However, Gareth made the right choice for, as I've been finding out all over again this weekend, the Amstrad is a marvel around the shack. Though it's plastics shell emits some noise, its l.c.d. screen doesn't (at least when compared with the average 19in 85MHz conventional monitor!). There's a full complement of ports including parallel and serial ports and, hooked up to a comparator interface, a dot matrix printer (mine's driving an old Epson FX80) and any old receiver you can find that will tune say, weather station RTTY, the machine will happily decode all day long (but do make that the external power supply is positioned somewhere with cool air circulating).

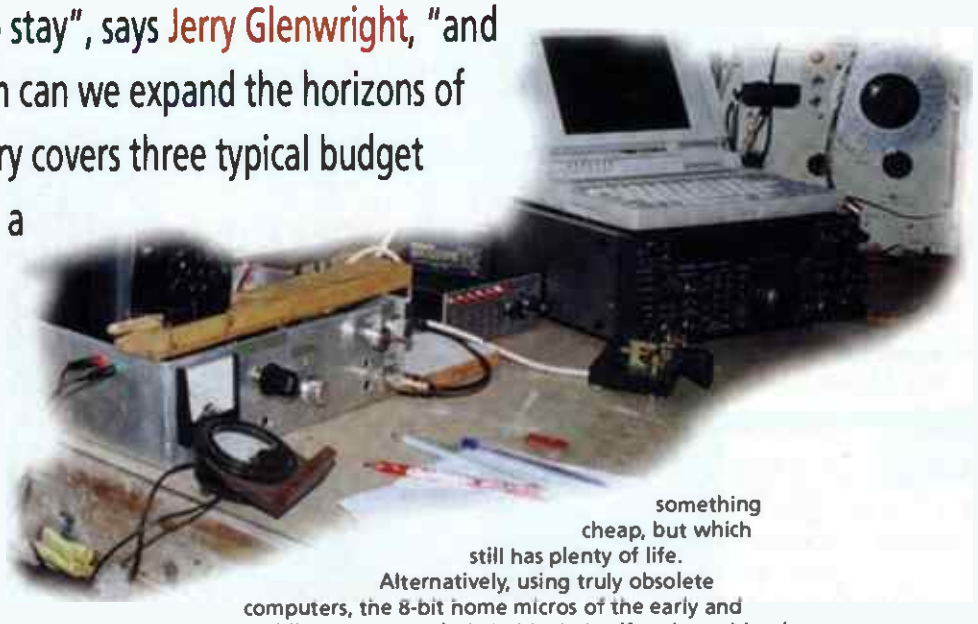
A quick search on the web turns up several sites devoted to the machine and, as it's more or less a standard PC compatible, any software intended for the PC XT/AT will work fine on the PPC. Rummaging in the box that housed mine, I discovered an interface of the same vintage from a company called Vine Computers, which enables the machine to drive a television (presumably because back then, the price of a real monitor was beyond many people's pockets). I tried out the interface with a Philips colour portable and the picture is best described as 'poor' but it worked, and adds another dimension to the PPC's abilities. I have to say though that, even at the end of the 1980s when the machine first appeared, it was never considered especially sophisticated. Something, in fact, of a joke much like the MSX machines.

And Finally

Nigel Gunn G8IFF/G0NHF/KC8NHF, a man who works at the enormously interesting Bletchley Park museum and who once lived very close to the street in which I now find myself, E-mailed to say he has circuit diagrams for the Z88 which he could put my way if I wanted them. Though I have no immediate need, they will no doubt come in useful. If any of you out there have a requirement for Z88 circuit details, then do write for a copy. Until next time, good listening.

ShackWare Special

"Computers are here to stay", says Jerry Glenwright, "and only by embracing them can we expand the horizons of our listening". Here Jerry covers three typical budget possibilities and creates a check-list of what we might expect to find and where.



Can you believe it? 'ShackWare' Special Three! When I began writing 'ShackWare' back in the mid-90s, computers were very much machines which other people tinkered with for many s.w.l.s. Gradually, cracks appeared in their armour however, and grudgingly one or two made it into the shack.

SWM realised the possibilities for the combined might of radio and computing early on and introduced the 'ShackWare' page, then a tri-monthly (that's right, just four times a year!) single page devoted to the novel notion of sitting silicon alongside receivers.

Well, we've all come a long way since then, it has to be said. Frankly, if I'm honest, with the ceaseless march of computers I think we've lost something from the hobby now that so many transmissions have been lost from the airwaves and banished to digital, computer-controlled media (a dreadful admission from someone whose task it is to write about computers!). What has become clear though is that computers won't go away and that only by embracing them, can we expand the horizons of our listening.

This year, I'll forego the paragraphs describing why you should buy a computer and what it can offer - I think we're almost all aware of the possibilities by now. And I'm going to skip the detailed history lesson too on the basis that you either know this stuff by now (I adore it and have to hold back from talking about it, but I can't assume you want to read it!) or you couldn't care less, in which case it's just so much wasted space that could be better used for providing solid buying information.

Oldies But Goodies

As many regular readers know, my particular 'bag' has always been older computers and that's been the theme of many 'ShackWare' instalments. It seemed to me eminently sensible that many s.w.l.s wouldn't want to waste cash on computers which could be better spent on receivers, antennas and accessories, so the best way to get up and running with a PC was to buy an 'obsolete' example and push it to its limits. Fortunately, in the world of computing, obsolete comes around pretty quickly, so its easy to buy something cheap, but which still has plenty of life.

Alternatively, using truly obsolete computers, the 8-bit home micros of the early and middle 1980s, is a whole hobby in itself and, combined with radio, makes for a wonderfully absorbing pastime, as you rummage around at boot sales, trying to find that obscure bit of hardware or software which will enable you to get Machine X up and running and doing something useful in the shack.

There are lots of 8-bits out there (and probably lots more in land-fill sites just waiting to be discovered and dug up), but the computer which continues to be the machine of choice for anyone who wants comprehensive support, cheap peripherals and endless software is the PC compatible.

World Domination

Originally, the IBM PC, IBM's answer to the fledgling, but soaring microcomputer market, clever third-party technology companies quickly copied IBM's computer and launched a whole raft of 'compatibles' which looked the same, ran the same software and cost hundreds (or even thousands) of pounds less.

Following a somewhat shaky start, when manufacturers such as Apple, Atari and Commodore all launched innovative rivals, the PC established itself as the machine of choice for everyone from corporations to home users, and when cut-price manufacturers began to market truly affordable PCs costing less than say, £500, in the UK, the PC became far and way the foremost computer for Britain's new legion of nerds.

The best part of two-decades on, and the story remains the same. Though Apple is fighting back with its G4 cube and gorgeous sorbet-coloured single-box computers, the PC's lead is unassailable. For s.w.l.s yet to buy a computer, the PC is the only choice.

A popular 'serious' computer from the middle period of the home computer boom, around 1985. SWM featured an excellent two-part feature detailing an interface and software to enable a PCW to control and 'program' an HF-225 receiver in the November and December 1994 issues.

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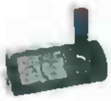
Garmin E Map

The Garmin Emap is a hand held version of the Street Pilot and comes with Data lead, 16mb Ram Card & *UK Metro Guide* on CD Rom at **only £329.00.**

The Garmin GPS3plus



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

Icom IC-R8500

Our dear friend Mr John Wilson gave this superb all band all mode receiver the thumbs up and it's hardly surprising. Icom have actually sold more of this product to HM Governments than enthusiasts. If it's good enough for 'them' it's good enough for you and me.

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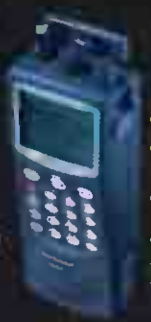

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Believe it or not this genuine Apple MacSack is worth more to collectors than the machine it contains...

If your interest is decoding the data modes for example, the PC is widely supported by commercial and shareware programmers writing innovative software which uses PC 'features' such as the soundcard to decode the exotic clicks and buzzes we all hear and would like to make sense of. Everything from ACARS to amateur Morse, maritime RTTY to weather satellites is available for decode and usually without any hardware requirement other than a 'standard' PC and a suitable receiver to tune the required bands.

What's more (and I know I say this every year...) there's really never been a better time to buy. Performance-per-pound is higher than its ever been and the technology continues to get faster, smaller and relatively cheaper all the time. But given that there's a huge number of similarly spec'ed machines out there and a thousand and one magazines all devoted to the task of getting you to buy them, how do you choose?

Your Budget

First step is to determine a budget and that will help you to decide whether to plump for a new machine or a second-hand example. Nowadays, around £1500 will buy a leading-edge PC equipped with the kind of bells and whistles that'd have a computer scientist slavering, but something less than a third of that sum will fetch a solid, usable PC with plenty of performance.

Around £100 will buy you a second-hand Pentium-based PC with a high-res colour screen, plenty of hard drive space, a reasonable memory and an all-important (for our purposes) Soundblaster-compatible sound card - pretty cheap by any standards! But let's look at those shiny new beauties first.

Anyone with any experience of the PC market quickly learns that the wise buy is the machine which just became obsolete. When the 1GHz Pentium III processor was launched around a year ago, it had a waiting list that went around the block and a price tag to match...and there were rumoured to be just five examples in the UK!

A year on, and Intel is redefining 'cutting edge' with a 1.5GHz processor and the one gig device is yesterday's news, yet it still packs an almighty punch. PCs with a 'one gig' processors at their heart can be had from any high-street or mail-order supplier by next-day delivery. In computer terms, 'obsolete' has a whole different meaning.

So, let's cover three typical budget possibilities and create a check-list of what we might expect to find under the lid as it were. With £1500 to spend, a 1.2GHz processor is well within reach. For that money, your new machine will come with around 256Mb of RAM, 40-plus Gb hard drive and a 64Mb AGP 4x graphics adapter. There'll be a SoundBlaster sound card or compatible of some description (there are so many configurations nowadays choosing is virtually impossible!) and almost all of them deliver fantastic pro-quality sound with ease.

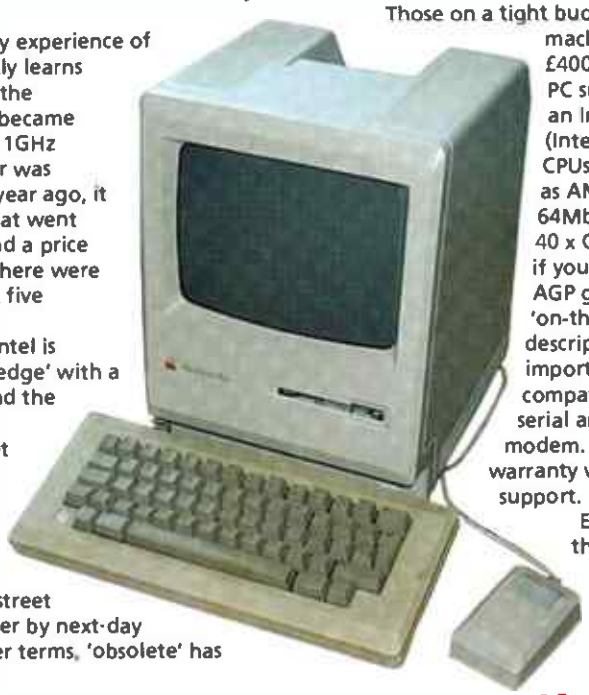
The machine will be equipped with at least two USB ports, two serial ports and a parallel port (these latter are important for backward compatibility with devices such as the comparator interface), a DVD drive, CD re-writer drive and possibly a Zip 250 too. A 19in flat-screen monitor seems to be the minimum standard now with higher-spec computers, which will provide a non-interlaced resolution not less than 1600 x 1200 and there may be a TV tuner card (these are more useful than you might think because they're multi-standard and therefore useful for the part-time TV DXer!).

Needless to say, the bog-standard V90 modem will also be firmly in place. It's a lot of high-tech hardware for the money (though don't believe the 'future-proof' sales hype - if you're a power user, you'll be looking wistfully at another machine two years from now). Oh, and demand that at least a two-year on-site warranty be included in the price.

Weighing in at the mid-price range, about £800 will get you a machine with similar specs to those listed above, but with an Intel PIII processor running at say, 800MHz. There'll be 128Mb RAM, a 30Gb hard drive, 17in monitor, 32Mb AGP graphics card, DVD and CD drives, possibly a TV card (usually combined with the graphics card), two high-speed USB ports, serial ports, a parallel port and a V90 modem.

Choose an AMD processor in place of the Intel offering and you'll leap in speed to something with the magical 1GHz rating (make no mistake, those AMD processors are fantastic bargains, but how else can processor manufacturers compete with the mighty Intel?). The three-year warranty will split something like one year on site, two years, return to base (RTB).

Those on a tight budget who insist on a new machine will find that around £400 will buy a quality-branded PC such as a Compaq featuring an Intel Celeron processor (Intel's answer to the cut-price CPUs from manufacturers such as AMD) rated at say 600MHz, 64Mb RAM, a 10Gb hard drive, 40 x CD drive, 15in monitor (17in if you drive a hard bargain), 8Mb AGP graphics card, integrated 'on-the-board' audio of some description (but with the all-important SoundBlaster compatibility), two USB ports, serial and parallel ports and a V90 modem. Insist on a two-year warranty with one-year on site support.



And the machine it contains is this lovely 'one-box' Mac, the Mac Plus. Apple knew how to build 'em in those days (the interior of the case is signed by everyone who worked on its development), though the price tag put many potential purchasers off. I bought this one new in 1990 when I first started work as a journalist. It cost me £1000 plus VAT, sported just 1Mb of RAM and had no hard drive (I bought a second-hand drive for £275 - it had cost £1750 when it was new!).

Even the least powerful of the computers outlined above will enable you to make full use of any decode software you choose to use as well as provide more

than enough power for all the other tasks PCs are routinely put to, like trawling the web, sending E-mails, writing letters, keeping club records, playing games and so on. The more powerful examples will do the same, but a bit faster.

Buyer Beware?

Possibly it's something to do with the limited scale of the UK, or maybe it's something built into our collective conscious, but even today, the British are relatively reluctant to buy via mail-order. Most of us would far rather wander into a high-street shop, see the goods before we part with the cash and leave feeling like there's somewhere to go should we have a problem. All well and good except that with PCs, buying in the high-street doesn't always make sense.

First disadvantage is that high-street shops have many overheads, all of which are absorbed by you, the buying public. Secondly, you'll be confronted by a school-leaver with a vast lexicon of hip computer slang which may or may not pressure you into making the wrong purchase, but will be irritating at the very least. Thirdly, there's absolutely no guarantee that the shop you buy from will be there even one week after you make your purchase (though in the case of well-established national chains such as Dixons/Currys, the likelihood is high I admit!).

Every year I recount the tale of how I bought my first Pentium-equipped machine from national high-street retailer Escom which promptly went bust almost immediately after taking my cash! The warranty was effectively void (though I'm sure there's probably still some kind of legal recompense, but try getting it and see what happens) and I was on my own. Fortunately, the machine powered on and is still going strong now on its third owner, and I felt able to meet and match any problems it might have had. But that might not be you. If you're new to computers, fixing them could be something of a problem.

Of course, there's no more guarantee that a mail-order company will remain in business after you've bought from it, any more than a high-street shop, it's simply that you won't pay a premium to find out!

Mail-order PCs are almost invariably better-specified than high-street offerings and they're definitely far cheaper. You won't receive offers on systems which include flat-pack desks, printer stands and the like, but you will get offers which include faster processors, bigger memories and hard drives and longer warranties.

Added 'tat' will be in the shape of a cheap and cheerful flatbed scanner or a lowish res' digital camera. The established mail-order companies have been around a long time and they've done it by offering excellent machines at rock-bottom prices along with competent service should the need arise. It's your choice, but do at least consider mail-order and have a free rummage through the legions of computer mags in your local newsagents for a suitable supplier.

Second-hand, and with somewhere between £50 and £100, you'll be able to get a perfectly usable Pentium-equipped machine rated somewhere between 133 and 166MHz, with a 2-4Gb hard drive, 16-32Mb RAM, 13in colour screen, mouse and keyboard and *Windows 95* (or possibly *Win98*). There'll be no USB ports, but there will be serial and parallel ports and you'll be able to upgrade the machine with a SoundBlaster-compatible sound card (giving access to fantastic radio-oriented software) very cheaply and easily (if the machine doesn't already have one).

Even with just £20 to spend, you can find a 486 with a VGA screen of some sort, a 500Mb hard drive, 8Mb of RAM, sound card (or cheap upgrade path) and serial and parallel ports. Check out the cardboard boxes beneath the paste tables at computer fairs (advertised in the local free press up and down the country). Bargains are available by the bucketful, you just have to search!

Amstrad's excellent Z80-based 8-bit, the CPC, this example featuring a built-in 3in disk drive.

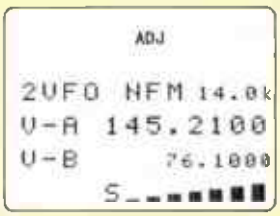
Finally, be wary of ads in free local advertising newspapers from those who offer Commodore 64s, BBC Bs and the like for £75 "...complete with cassette drive, software and power supply. Ideal for students". They might as well add "and the insane!". No doubt some sales result, but these are the truly obsolete computers that you can find (though now less frequently, admittedly) at boot sales for a pound or two.

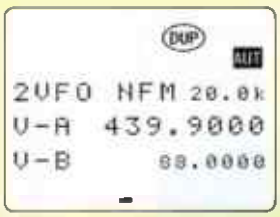
Net Gains

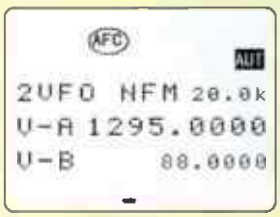
But what will your new machine do when it's not controlling your scanner or decoding WEFAX from polar orbiters? Well, there's always the Internet. In another departure from previous years, I'll refrain from providing a history of the Internet because by now, you probably couldn't have escaped it even if you wanted to. What I will say though, is that 99% of the hype is true. It is a glorious way to share information around the globe and at little (sometimes zero) cost.

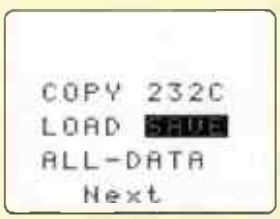
One of the 8-bit also-rans, the Einstein was a fabulously-equipped full-featured machine equal to any task but its asking price - around £500 - effectively kept it out of the running (this one cost a 'fiver', boxed, at a boot sale).

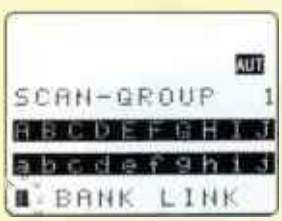
What better way to make best use of a piece of radio-oriented software for example than by contacting its author directly using E-mail and receiving a reply within hours, even though that person might be in South America, Australia or Japan, and all for the price of a local 'phone call. Or how about getting on-line to your receiver manufacturer's web site and downloading patches for its built-in software which expand its capabilities? This, virtually instantly and at little or no cost? Or downloading spec sheets and technical diagrams in PDF format?

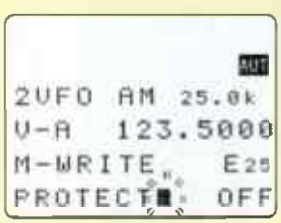


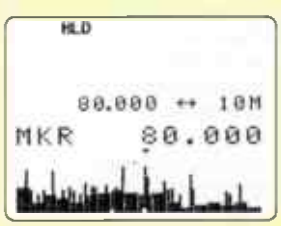


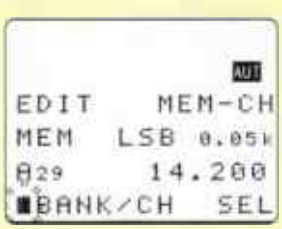












NEW AR8600

MOBILE - BASE - TRANS-PORTABLE

**High sensitivity design*

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

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

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

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

AR8200 SERIES-2

NEVER BEFORE HAS ONE HAND PORTABLE OFFERED SO MUCH

The AR8200 represented a beacon when first released, technology marches forward with the NEW AR8200 SERIES-2 keeping the innovative concept and forward thinking alive and bright. It has not been easy improving on what many thought to be the ultimate, however the NEW AR8200 SERIES-2 does provide even more with nothing taken away.

A Temperature Compensated Crystal Oscillator **(TCXO)** now forms the heart of the AR8200 SERIES-2, this ensures **high stability** with **minimal internal spurii.** Performance too has seen the AOR R&D team fine tuning the design for **best sensitivity and strong signal handling** over the extremely wide coverage of 530kHz to 2040MHz (all mode receive without gaps). The aerial has also been replaced by a **telescopic whip** on a swivel base, this ensures the best results, a medium wave bar aerial is also provided as standard. The design team have certainly been taking account of customers wishes, the keyboard ZERO key has been swapped in position with the DECIMAL to match the telephone layout, LCD illumination has been increased (for improved visibility) and following requests for longer operation between charges, the **4 x AA size NiCads have been increased in capacity,** again reflecting improvements in modern technology. The obvious change has been left for last... the **cabinet colour** has been changed from green to **black!**

The list of features is vast, tuning step sizes are programmable in all modes down to 50Hz with comprehensive step adjust and correctly implemented **8.33kHz** for the new VHF airband spacing. Connection to a computer is possible with the optional CCB200 lead/interface with free PC software available from the AOR web site. Unique optional slot cards further enhance features (CTCSS, tone eliminator, record / playback, external memories, voice inversion).

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

AR5000
True base receivers are few and far between, some have simply evolved from the hand held equivalents with little tangible improvement in performance or facilities over their smaller counterparts - *the AR5000 is not like this!*
High performance, top quality build and true wide coverage all mode receive. The "+3" version offers even more with synchronous AM, AFC and Noise Blanker. Popular with government agencies throughout the world.

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

AR5000+3 - Sync AM, AFC, NB

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

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

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

AR5000+3
- ✓ Wide frequency coverage 10 kHz - 2600 MHz
- ✓ All mode reception: USB, LSB, CW, AM, Synchronous AM, NFM, WFM with automode tuning (any mode and bandwidth on any frequency is possible)
- ✓ Automatic Frequency Control
- ✓ Noise blanker
- ✓ High stability TCXO reference, 1 Hz NCO tuning
- ✓ 1,000 memories, 10 memory banks, 20 search banks, 5 VFOs (all twice!), alpha tag, EEPROM chip storage
- ✓ Multiple IF bandwidth 3 kHz, 6 kHz, 15 kHz, 30 kHz, 110 kHz, 220 kHz with an option position for 500 Hz CW. (30 kHz is ideal for WEFAX).
- ✓ High sensitivity and excellent strong signal handling assisted by a preselected front end from 500 kHz - 1 GHz
- ✓ Extensive RS232 control list
- ✓ SDU ready with IF output for spectrum display unit

FOR FURTHER DETAILS, PLEASE VISIT YOUR DEALER, CALL FOR A LEAFLET OR VISIT THE AOR UK WEB SITE AT
WWW.AORUK.COM

FREE IMAGE TRANSFER EQUIPMENT
OFFERED TO A RECOGNISED UK AMATEUR RADIO GROUP OR CLUB

Everyone likes a bargain, here is a chance for your group or club to obtain FOUR image transfer systems **ABSOLUTELY FREE**. There are **TWO AOR AR300** TRANS-VIEW portable colour facsimile systems available, these are boxed and brand new with leads and operating manuals. They provide colour image capture via a built-in high resolution 270,000 picture-element CCD camera and display on a built-in 1.8 inch TFT monitor. Simply connect each to a suitable transceivers and two way picture transfer may be established. Although very similar in appearance to the Kenwood VCH-1, the protocols have been developed for commercial applications (so will not communicate with the Kenwood branded unit). The transfer modes are COLOUR-27 in 69 seconds and B/W-35 in 18 seconds.

In addition, there are **TWO AOR TSC100E** scan converters which provide picture communication when connected to suitable cameras & transceivers, protocols include ROBOT and AMIGA. These are ex-demonstration units but do not have leads or operating manuals... so provide an ideal project for a technically minded group or club.

The equipment will be supplied FREE OF CHARGE to the lucky group or club who can provide details of **how they may be best employed in the interests of furthering the UK amateur radio community.** To be considered for the equipment, forward a written request via snail-mail to us here at AOR UK, please do not use e-mail or fax. The closing date for application will be 31 March 2001. The following conditions apply:

1. *The equipment will be supplied on a free of charge basis but does not carry a warranty. If the equipment is not collected by hand, a charge of £10 will be made for carriage.*
2. *Applications will only be accepted from a recognised UK group & club who are known for their image transfer / data activities, preferably affiliated to the RSGB or UKRS.*
3. *The equipment may not be 'sold off' by the group or club for a period of two years.*
4. *The decision of award rests with AOR UK and is final.*
5. *No cash alternative offered, no purchase necessary.*

As the saying goes, we are just looking for a good home!

Trans. View

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Last year's innovation was free ISPs - no longer need you pay for a connection to the 'net along with the telephone charges. However, what once seemed weird and wonderful is now the norm (does anyone other than advertisers pay an ISP for its services?) and the number of ISPs in the UK alone runs into hundreds, each offers around 20Mb (sometimes as much as 100Mb) of on-line storage for your own web site, unlimited E-mail addresses and your own domain name registration and all you have to do is sign up and log.

And here you can see why the machine cost so much. A complement of ports like this was almost unknown back in the early 1980s when most computers had little more than bare circuit board hanging out the back such as...

This year's innovation is charge-free calls, though the dream of free 'phone calls for Internet access remains tantalisingly just out of reach. Some schemes are available, but many are so oversubscribed that actually getting on-line is very much pot luck.

8T offers a call charges 'free' service for which you pay £9.99 per month. The monthly subscription provides free evening and weekend calls which gives up to 500 hours of online time a month. Of course, what you must do is decide when you connect and what your local-charge band calls cost you and determine whether £9.99 works out cheaper. If it does, then plump for the BT offer, else stick with your existing free ISP. AOL offers a similar service, though I believe it costs more depending on how long you want to spend on line.

this CPC6128. Try interfacing anything sensible to these! It can be done of course, but not easily, and not without a certain amount of electronic hash clogging the ether!

As for the wherewithal to get on line, is there really any PC which is shipped without a suitable modem and software to facilitate the connection? All *Windows* PCs have a version of *Internet Explorer*, Microsoft's answer to the world's first (and most popular) web browser, *Netscape Navigator*.

V90 56K modems are the standard and they're available new very cheaply indeed (say, £20 for an internally-fitted device). If you can find earlier examples rated at say 33K, 28K or even 14K, they'll be just a few pounds, and while none of these will give blistering performance on the web come to that, nor will a V90 modem, but each will enable you to send and receive E-mails and enjoy some basic browsing.

The Truly Ancient

And so eventually we come to the truly ancient computers, yes, the 8- and 16-bit computers of the home computer boom years that I love so much, and discuss in almost every instalment of 'ShackWare' (and if my mailbag is to be believed, a surprising number of readers continue to love and use them too).

Foremost among these is still the Atari ST, a 16-bit computer equipped with a Motorola 68000 processor (which also powered the early Apple Macintosh and ensured the ST was dubbed the 'Jackintosh' after Atari's owner Jack Tramiel). There are arguably better-specified home computers of the same vintage - the Commodore Amiga and Acorn Archimedes to name two - but the ST is a thoroughly usable all-rounder. It's equipped with the *Windows*-like *GEM* interface (in fact a forerunner of *Windows*) though running an exotic OS such as *Unix* is no problem the Atari machine.

What's more, the ST provides a route to using Dave Miller's truly excellent *FaxCode*, a kind of ST-based cross between the PC's *JVFax* and *Hamcomm*. *FaxCode* uses a similar comparator-type interface which you can build at home with 30 minutes to spare. Better still, the program is shareware and costs just £6 to register - how's that for a cheap introduction to the data modes? STs can be had for around £10 too (though watch out for the aforementioned 'ideal for students' ads in the free papers!). Dave has moved on to PCs new now, but *FaxCode* is still available and has lost nothing in ability.

On the 8-bit front, both the ubiquitous Spectrum and the comprehensively-equipped BBC B can be found for a few pounds at boot sales and both enable you to tap into sublime software which came from Technical Software. FAX, RTTY, c.w. and the polar orbiters are all available to both machines, and the software and hardware can be had for a song - if you can find it. Best place to search is the Bring & Buy sales at radio rallies where old hands get rid of their unwanted stuff from yesteryear after upgrading to the latest PCs. Though this source is gradually drying up, bargains can still be found.

As for the rest, well...much depends on how much you like working with lost causes. For me, that's 100%, so I continue to mess around with all those machines I couldn't afford out of a student grant first time around in the early 1980s. Most will do something sensible in the shack, though what depends on how much ingenuity you're prepared to lavish on your acquisition!

And Finally

And so we reach the end of another 'ShackWare' Special. This one is shorter and - I hope - more to the point. I've pared away the waxing lyrical over lost causes in favour of providing you with usable buying information - but I'm always on for a letter full of questions about something you've found at a boot sale or acquired from a neighbour. Just be sure to remember the s.a.e. - I'm not *that* fond of old computers! Good listening. ***SWM***

ICOM

IC-R10 IC-R2

Get to Grips with...

the terrific twosome! - IC-R10 & IC-R2

IC-R10 Receiver

The ICOM IC-R10 handheld receiver covers 0.5MHz~1300MHz in all-modes. It also boasts a real-time bandscope function, making it easy to find busy frequencies and observe the receiving frequency band conditions. Also, the passband width of the scope is selectable. Voice-scan function (VSC) pauses scan, but only when modulated signals are received.

Other IC-R10 functions and features include;

Bank and memory functions plus new SIGNAVI function; this additional feature speeds up scanning and adds to the already impressive range of scan modes available in this power-packed ICOM handheld. Optional CS-R10 P.C. software allows you to edit and load memory data from your computer. The IC-R10 has proved that it has 'Rx appeal', so why not see for yourself just how appealing this handful can be!

IC-R2 Receiver

The IC-R2 is one of the smallest receivers around! This simple receiver is easy to operate and has a drip-resistant construction to provide protection against outdoor use

IC-R2 functions and features include;

- Wide frequency range easily receives 0.495~1309.995MHz
- Economical to run - only 2 x AA (R6) alkaline or Ni-Cd batteries needed
- Ultra-compact body 58(W)x86(H)x27(D) mm. Fits in your pocket
- Receives most AM, FM, TV broadcasting and public communications using the AM, FM and WFM modes
- 400 memories provided for storing operating frequencies and tuning steps etc. Plus, 50 channels (25 pairs), for program scan edges
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scanning scene

Not one month goes by without my receiving a note or E-mail from someone regarding v.h.f. DX reception. This aspect of the hobby can be totally fascinating as it enables scanner users with a suitable simple outside antenna to monitor public services and commercial operations from companies and utilities in other countries and continents.

Most of interest to the English speakers are the transmissions from the United States and Canada which can be regularly heard in the United Kingdom when conditions are right. I understand that this phenomenon was unknown until the Royal Navy started using u.h.f. frequencies for communication within convoys during World War II. The transmissions were in the clear, the thinking at that time being that the signals would not travel too far over the horizon.

I am told that this assumption was erroneous and that German wireless operators became aware of the signals and then sent forces to attack the Allied vessels. For those of us that have access to the Internet, there is a list server run by **Ian Julian** of New Zealand which caters for this interest. It caters for the scanner hobbyist with particular reference to the 29-50MHz plus frequencies. Contributions arrive from all over the world. Even POCSAG transmissions were recently logged from the USA. If you have the inclination to subscribe, you can do so by logging onto **http://www.egroups.com/subscribe/vhfskip**

In the January column, I put in a request for some information on frequencies that **Paul Wey** of PROMA was keen to identify. He needed to find out the users of some channels which included a couple in the Cheltenham and Gloucester area. I received an interesting mail from **Sally** who came up with the information. For anyone who visits or resides there, here is the list that Sally sent.

453.050	Unknown security service Cheltenham paired with 459.550
461.375	Virgin Cheltenham
453.800	Regent security Cheltenham paired with 460.300
453.925	Unknown security Worcester paired with 460.425
456.825	Regent security Cheltenham paired with 462.325
461.325	Regent security Cheltenham
461.365	Unknown security Worcester
461.4625	Unknown security Worcester apparently paired with 467.9625
462.050	Tesco Cheltenham
456.550	Tesco Cheltenham
456.750	Marks & Spencer Cheltenham paired with 462.250
461.325	Unknown security Gloucester

Fire Brigade

Another correspondent - **John** - this time from Lancashire, asks whether anyone has the frequency for Lancashire Fire Brigade Channel 9. Can anyone help with this? I am unable to find it in the v.h.f. listing, but wonder whether it is local nomenclature for a u.h.f. channel - any ideas anyone?

Has anyone heard anything on the f.m. bugging channels recently? I have had a few successes while monitoring their various frequencies when I have been in urban areas. I have also monitored illegal radio 'bugs' just drifting through the f.m. broadcast band.

Some years ago I was in the English Midlands and had been tasked to do a sweep for monitoring devices at an office. I had arrived about twenty minutes early and had started to sort out the equipment in the boot of the car. Having ensured that I was ready to go when the office manager returned I sat in the car and started to tune around the broadcast band on the normal radio/cassette player in the car.

You guessed it. At the bottom end of the broadcast band I could hear the normal sounds of office life being transmitted in wide f.m. from what was clearly a bottom end of the market transmitter. I was able to establish that it was in the premises next door to the one that I had been instructed to check. Nothing to do with me...so I left it right there, said nothing and presumably it's still there! So it pays to check everywhere for signals. Some frequencies for these devices are listed in the *UK Scanning Directory*, so these is no point in repeating them here.

New System

The new police radio system starts to be implemented this year with Lancashire Police due to be the first to utilise the BT Airwave version of TETRA, the digital trunked radio system approved for UK police forces. The new system allows Mobile Data Terminals to be fitted in vehicles allowing officers access to the Police National Computer, and in some cases to the police force's own command and control computer. It seems logical that some tasking will be via this medium.

Officers will also be able to dial direct into the private telephone systems and also into the public telephone network. Well as you know, you will not be able to hear any of this stuff at all on your favourite scanner as the signals will just sound like a buzz coming out of the speaker. Security of signals really is a by product of the new system, although additional end-to-end encryption can also be incorporated.

System security has obviously pleased police customers, but it may not be totally to the advantage of the police in the long term as with the current insecure radio system some members of the public who listen to transmissions, albeit illegally, gain an insight into the difficulties encountered by operational officers and this can result in a better understanding of the police force in general and can enhance public relations. So although the new system is welcome, it may serve as a double edged sword and further alienate the police from the public.

Bus Tracking

London buses are now being fitted with a system called 'Countdown' which seems to be a bus tracking system which can indicate to folks waiting in the rain when the next bus is due. From what I read, it seems that the equipment seems to use 2.3GHz to transfer the data. Does anyone know about this?

Also, does the system give buses priority at traffic lights? The ambulance service and fire brigades in some areas have some sort of priority system over traffic lights in some areas. It would be interesting to know more about this. What happens when a fire engine and an ambulance arrive at opposing junctions at the same time? Is it a total wipeout? Someone must know. I expect though, that the details must be fairly secret to stop the boy racers like me (well...old boy racers then) from getting out the soldering iron and making up one of the gadgets for themselves.

It seems that the date for a general election may well now be known. This will put more pressure on the police and other agencies who have to ensure security and safety when politicians go on the road to drum up support. This means that some erstwhile dormant frequencies may be dusted off for use. When so called VIPs are in an area simplex communications are used extensively for many differing purposes. Many of these are in 400MHz. So, should you be in the locality of such a visit, then a systematic search of the 400MHz band will yield substantial results.

Good Luck!

scanning scene

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AOR

AR5000

AR3000A

ICOM

PCR1000

PCR100

Model	Description	£ RRP inc VAT
AR5000	High performance full featured wide band all mode base receiver 10kHz - 2600 Mhz. IF selection as standard 220kHz, 110kHz, 30kHz, 15kHz, 6kHz, 3kHz (500Hz optional). Supplied with mains power supply.	£1295.00
AR5000+3	High performance base receiver with three enhanced options factory fitted: noise blanker, synchronous AM, automatic frequency control.	£1449.00
AR3000A	Unique all mode extremely wide band base-mobile receiver 100kHz - 2036mhz with no gaps. RS232 port fitted.	£699.00
AR3000A +(plus)	Customised AR3000A with switchable narrow SM & SAT filters, Tape relay, SDU ready and discriminator output.	£799.00
AR8200 Series 2	New advanced wide band all mode hand-held receiver with enhanced microprocessor facilities, slot card options available, multi-function display.	£395.00
AR8000	The New Concept. Wide band all mode hand-held receiver with many microprocessor facilities, dot matrix display and computer compatibility.	£296.00
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IC R8500	100kHz - 2GHz Continuous. All mode no gaps.1000 Memories. 4IF band widths Excellent all round for the professional listener	£1440.00
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IC-PCR1000 & PCR 100

ICOM PCR1000 - 0-1300mhz. All modes. Computer driven. On screen programming. Band scope. Instant band scope access via mouse. List of features, call for brochure.

PCR 1000 £299.00, PCR 100 £199.00 (SAME SPEC WITHOUT SSB)

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GARMIN GPSIII

Moving map features basemap, built-in European, African and Middle East to 20mi; includes lakes, rivers, cities, railways, coastlines, motorways and roads. Uploadable CD ROM, detailed map data available from MapSource CDs.

RWP **£325.00**

GARMIN STREET PILOT

Built-in international map contains motorways, major roads, lakes, rivers, streams, airports, cities, towns, coastlines. motorway exits plus waypoints.

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RWP **£545.00**

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RWP **£410.00**

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The Garmin GPS12 series products are as rugged as GPS gets. Military-tough construction and waterproof cases make these units ideal companions for any outdoor adventure. All feature a 12 channel receiver that locks onto stellites fase and stays locked on, even under extreme conditions. These units may be tough on the outside, but their operations are easy and logical.

RWP **£129.00**

ICOM YAESU KENWOOD ALINCO AOR

YUPIERU

YUPITERU MVT 9000 EU

Yupiteru's flagship model, with a range exceeding 2000mhz, a real time bandscope.

- 531 kHz - 2039 Mhz
- 1000 memory channels
- All modes: W-FM, FM, N-AM, AM, LSB, USB, CW

£329.00

- Multiple scanning steps 50Hz - 125kHz
- Alpha numeric display
- Band scope with marker function for direct access to displayed frequencies
- Duplex receive capability - hear split frequency signals easily with VFOs
- 20 search bands
- Fast tune facility gives 10 times function for quick tuning
- Built-in ferrite rod antenna for AM broadcast reception
- OP90 Soft Case

YUPITERU MVT 3300EU

An exciting new handheld packed with features - but at a price you can afford! The receiver has "breathtaking performance" ensuring this set is destined to be a number one seller

- FREQUENCY
  66 - 88MHz
  108 -170MHz
  300 - 470MHz
  806 - 1000MHz
- MODES: AM/NFM
- STEPS:
  5, 6.25, 10, 12.5, 25kHz
- MEMORIES: 200
- BAND MEMORIES: 10 (user re-programmable)
- PRIORITY CHANNELS: 10
- SCAN/SEARCH SPEED: 30 per sec
- POWER: Requires 4 x AA batteries
- SUPPLIED WITH: Antenna, Earpiece, Carrying Strap and built-in Desk Stand

YUPITERU MVT 7100 EU

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

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RRP £100.00 **£79.99**

USED EQUIPMENT PRICE LIST

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AEA	PIC 88 TNC	£80.00
ALINCO	ADI 446 70cm MOBILE 35w	£189.00
ALINCO	DJ G1 HANDY 2M WIDE RECEIVER	£129.00
ALINCO	DJ G5EY 270 WIDE BAND TRANSCEIVER	£200.00
ALINCO	DR-590 DUAL BAND MOBILE	£175.00
ALINCO	DR-605 DUAL BAND MOBILE TRANSCEIVER	£230.00
ALINCO	DX-70T 100W MOBILE / HF	£399.00
ALINCO	DX-70TH TRANSCEIVER	£475.00
ALPHA	87A FULLY AUTOMATIC AMP	£3,350.00
AMERITRON	QSK-5 2.5kw QSK SWITCH	£199.00
AOR	AR-2002 BASE SCANNER	£199.00
AOR	AR-3000A RECEIVER	£495.00
AOR	AR-5000 RECEIVER	£1,199.00
AOR	AR-7030 REMOTE CONTROL RECEIVER	£595.00
AOR	AR-8000 HANDY RECIEVER	£199.00
AOR	AR 8200 MK1 HANDY RECEIVER	£260.00
DAIWA	PS-120MK11 10amp PSU	£50.00
DAIWA	PS-304M11 20amp POWER SUPPLY	£85.00
DATONG	FL2 FILTER	£80.00
DIAMOND	GSV-3000 PSU	£100.00
DIAWA	CNW-518 2KW CROSS METER ATU	£199.00
DIAWA	ROTATOR MR 750U HEAVY DUTY	£250.00
DRAKE	DRAKE 2700 ATU 2.5KW (MINT CONDITION!)	£295.00
DRAKE	DRAKE L7 LINEAR AMP (MINT CONDITION!)	£899.00
DRAKE	R 8 RECEIVER (MINT!)	£550.00
HEATHERLITE	2M EXPLORER 2m AMPLIFIER	£399.00
ICOM	IC-207 DUAL BAND MOBILE	£210.00
ICOM	IC-229H 2M MOBILE	£120.00
ICOM	IC-251E AC 2M Multi-mode	£325.00
ICOM	IC 275H 2M 100W BASE TRANSCEIVER	£550.00
ICOM	IC-3J UHF MINI HANDY	£89.00
ICOM	IC-475E AC 25W MULTIMODE 70CM BASE	£525.00
ICOM	IC-706MK1 TRANSCEIVER	£499.00
ICOM	IC-706MK11 DSP TRANSCEIVER	£599.00
ICOM	IC-706MK11G (AS NEW!)	£799.00
ICOM	IC-725 HF MOBILE 100w	£400.00
ICOM	IC-728 HF MOBILE 100w	£425.00
ICOM	IC-729 TRANSCEIVER HF/ 50MHz	£425.00
ICOM	IC 735 HF 100W	£450.00
ICOM	IC-746 HF/50/2M 100w	£999.00
ICOM	IC-756 HF/6M BASE TRANSCEIVER	£1,050.00
ICOM	IC-W31E DUAL BAND HANDY	£175.00
ICOM	PCR 1000 PC RECEIVER SSB/FM/AM	£200.00
ICOM	PS-15 POWER SUPPLY	£100.00
ICOM	PS-55 PSU 20 amp	£120.00
ICOM	PS-85 POWER SUPPLY	£175.00
ICOM	R10 HANDY SCANNER	£199.00
ICOM	R2 HANDY RECEIVER	£110.00
ICOM	R-7000 25-2000MHz ALL MODE RECEIVER	£575.00
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ICOM	R-75 RECEIVER	£450.00
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KENWOOD	DFC 230 FREQUENCY CONTROLLER	£89.00
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KENWOOD	TR-851E 70cm Multi Mode	£325.00
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KENWOOD	TS-680 HF 6M BASE/MOBILE	£395.00
KENWOOD	TS-690 SAT TRANSCEIVER HF/6M	£695.00
KENWOOD	TS-811E 70cm MULTI MODE TRANSCEIVER	£400.00
KENWOOD	TS-850 SAT 100w HF BASE TRANSCEIVER	£850.00
KENWOOD	TS-870 DSP HF/BASE TRANSCEIVER	£999.00
KENWOOD	TS-940SAT HF BUILT IN ATU BASE	£750.00
KENWOOD	TS-950 SD DIGITAL 150W TRANSCEIVER	£1,250.00
KENWOOD	TS-950S HF 150W BASE BUILT IN ATU	£999.00
KENWOOD	TS-950SDX HF 150w TRANS (FLAG SHIP!)	£1,799.00
KENWOOD	VFO 180 VFO	£60.00
LINEAR AMP	EXPLORER AMP	£999.00
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MFJ	1278 TNC Incl SSTV	£225.00
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MFJ	MFJ-962 1.5KW ATU	£175.00
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REALISTIC	PRD-2005 25-1300MHz BASE SCANNER	£110.00
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YAESU	FT-2500M 50w 2m MOBILE	£200.00
YAESU	FT-290MK1 2M Multi-mode	£195.00
YAESU	FT-290R MK11	£275.00
YAESU	FT-3000M 70w 2m MOBILE TRANS	£225.00
YAESU	FT-480R 2M MULTIMODE	£220.00
YAESU	FT-530 2/70cm HANDY	£175.00
YAESU	FT-690MK11 6M MULTI-MODE TRANSCEIVER	£295.00
YAESU	FT-726R 2/70/6M TRANSCEIVER	£599.00
YAESU	FT-736R AC 2M/6M/70CM BASE	£799.00
YAESU	FT-736R AC 2M/70CM BASE	£599.00
YAESU	FT-757GX	£395.00
YAESU	FT-757GX11	£425.00
YAESU	FT-840 HF MOBILE-BASE TRANSCEIVER	£450.00
YAESU	FT-847 HF/6M/2M/70cm/4m	£999.00
YAESU	FT-8500 DUAL BAND MOBILE TRANS 50w	£295.00
YAESU	FT-900 HF MOBILE/BASE FACE OFF	£525.00
YAESU	FT-900AT BOXED	£695.00
YAESU	FT-901 Delux model Transceiver	£300.00
YAESU	FT-902 Delux model Transceiver	£900.00
YAESU	FT-920 AF HF- 50 MHz BASE TRANSCEIVER	£899.00
YAESU	FT-990 TRANSCEIVER AC HF BASE	£795.00
YAESU	FT-990 TRANSCEIVER DC HF BASE	£895.00
YAESU	FT-ONE BASE HF	£425.00
YAESU	FV 707DM DIGITAL VFO + MEMORIES	£99.00
YAESU	MD-1 DESK MICROPHONE (MINT!)	£80.00
YAESU	MD-100 DESK MICROPHONE	£70.00
YAESU	QUADRA AMPLIFIER HF/6M 1KW	£2,999.00
YAESU	SP-980 EXT SPEAKER	£75.00
YAESU	VX-1R MICRO 2/70 WIDE RECEIVER	£109.00
YUPITERU	MVT-125MK11 AIRBAND SCANNER	£125.00
YUPITERU	MVT-8000 BASE	£240.00

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

Maritime Beacons

Several of the listeners who searched the band at night during October, November and/or December heard some quite distant beacons but the conditions were not always favourable for DXing.

A total of thirty beacons were logged during the period by **Brian Keyte** in Gt.Bookham - see chart. A new one for him was Punta D.Maestra, Italy (ME) on **304.0kHz**, heard at 2319UTC on November 7. Also heard from that area during the night of the 7th were Punta Carena, Italy (NP) **289.5**; also Capo Sandalo, Sardinia (IP) **310.0**. He noticed that Skrova, Norway (KN) on **296.0** has a new keying format and suspects it is now being used as an aero beacon.

In Northampton **Fred Wilmshurst** found the conditions rather poor except between 2330 and 0030UTC on November 7, when the beacon at Mahon, Minorca (MH) on **292.0** and ten others were heard - see chart. He says "Other evenings produced perhaps three or four of those listed, but only the strong ones got through a lot of QRN" [electrical noise].

Good conditions were observed around 2200UTC on November 17 by **Peter Pollard** in Rugby. He heard for the first time ever Cabo de la Noa, S.Spain (NO) on **285.0** and Rota, SW.Spain (D) on **303.0**. Three beacons were especially clear - Mahon, Minorca (MH) on **292.0**; Cabo Mayor, N.Spain (MY) **304.5**; Punta Estaca Bares, N.Spain (BA) **309.5**.

Due to the re-decoration of his 'listening post' **Peter Rycraft** (Wyckham Market) had to remove his receiving equipment and was unable to search the band for a while. He says "I finally got all the gear back in place at the beginning of December and was amazed at the lack of signals on the beacon band. Plenty of noise, but very few beacons. At first I thought that I had slipped up in reconnecting the units, but everything was as it should be, and, eventually, a few bleeps penetrated the QRN and I was able to identify some callsigns". He searched the band at night during the first three weeks of December and logged eleven beacons along the coast of Spain, also Carla Figuera, Majorca (FI) on **286.5** - see chart. From the opposite direction he heard the Faeroe Is beacons at Myaggenaes (MY) on **337.0**, Akraberg Lt (AB) **381.0** and Noslo (NL) **404.0**, but the beacon at Prins Christian Sund, S.Greenland (OZN) on **372.0** was his best DX.

An interesting list was compiled by **Robert Connolly** (Kilkeel). He found the conditions very favourable between 0145 and 0230UTC on December 14, but was disappointed by the absence of quite a few beacons which he had heard regularly in the past. He says "On 312.5kHz AT, AK, DB, IL, KA & LB (the Baltic and Ukrainian chains) have not been heard here all quarter. In addition BK & BT, the other two beacons in the Baltic chain, have not been heard for the past seven weeks, although heard regularly earlier in the reporting period". Robert also mentioned the closure of two beacons which have often been detailed in the reports - Mantyluoto, Finland (MA) on **297.5**, which is being converted to radiate differential corrections for use with the Global Positioning System; also La Corbiere, Jersey (CB) on **295.5**, which suffered storm damage and it was decided not to repair it.

Whilst searching the band at night in Co.Fermanagh **Tom Smyth** was surprised by the good signal he received from the beacon at Myggenaes, Faeroe Is (MY) on **337.0** - usually it is obscured by a strong aero beacon on **335.0**. He also heard four beacons along the north coast of Spain and one at Ristna, Estonia (RS) on **307.5** - see chart.

Due to the closure of so many of the nearby beacons, reception in the UK during daylight is now very disappointing. A very welcome first report came from **Graham Hunter** in Orpington, in which he listed thirteen l.w. beacons that he had received between 1430 and 1530UTC on December 16. Unfortunately all but three proved to be aeronautical - the remainder were unidentified. His equipment, a Yaesu FT-847 plus Sony AN-1 active antenna, is obviously working well, so listening after dark for the sky waves from distant maritime radiobeacons may well be worthwhile.

When searching the band it is necessary to be able to distinguish between the maritime and the aero beacons which share the band. Full details of both are included in the latest edition of the comprehensive guide book which **Robert Connolly** (Kilkeel) first produced some time ago. If you would like an information sheet about his very popular and inexpensive guide, please send an s.a.e. to him via me at the above address.

DXers:-

(A) Robert Connolly, Kilkeel.
(B) Brian Keyte, Gt.Bookham.
(C) Fred Pallant, Storrington.
(O) Peter Pollard, Rugby.
(E) Peter Rycraft, Wickham Market.
(F) Tom Smyth, Co.Fermanagh.
(G) Fred Wilmshurst, Northampton.

Long Wave Maritime Radiobeacon Chart

Freq (kHz)	C/S	Station Name	Location	DXer
215.0	EM	Egedsminde	Greenland	A*
284.5	MA	Cabo Machichaco	NE.Spain	A,B,C*,O*,E*,F*,G*
285.0	NO	Cabo de la Nao Lt	S.Spain	B*,D*
286.5	FI	Cala Figuera	Majorca	A*,B*,D*,E*
288.5	FI	Cabo Finisterre Lt	N.W.Spain	A,B*,E*,G*
288.5	UD	Cabo Salou	S.Spain	A*
289.5	BT	Bjartangar Lt	Iceland	A*
289.5	NP	Punta Carena	Italy	A*,B*
290.5	VI	Cabo Villano Lt	N.Spain	A,B,C*,D*,E*,F*,G*
291.0	SN	Cabo San Sebastian	S.Spain	A*,B*,D*
291.9	LT	La Isleta	Canaries	A*
291.9	NA	Punta Lantailla	Canaries	A*
292.0	MH	Mahon, Minorca	Balearic Is	A*,B*,D*,G*
293.5	RO	Cabo Silleiro Lt	N.Spain	A*,E*
295.5	CB	[C] La Corbiere Lt	Jersey C.I.	A,E*
296.0	KN	Skrova Lt	Norway	B*
297.0	B	Cabo Trafalgar	SW.Spain	A*
297.5	MA	[D] Mantyluoto	Finland	A*
297.5	PS	Cabo Penas Lt	N.Spain	A,E*
298.0	TA	Cabo Gata	S.Spain	A*
298.8	HO	Hombjarg	Iceland	A*
299.0	O	Tarifa	S.Spain	A*
301.0	HA	Pt del Hank	Morocco	A*
301.5	L	Torre de Hercules	N.Spain	A*,B*,D*,E*,G*
303.0	D	Rota	SW.Spain	A*,B*,D*,E*
303.5	OR	Punta de Llobregat	S.Spain	A*,B,E*
304.0	ME	Punta D.Maestra	Italy	B*
304.5	MY	Cabo Mayor Lt	N.Spain	A,B,D*,E*,F*
305.0	KA	Klaipeda Rear Lt	Lithuania	A*,B*
305.7	OA	Dalatangi Lt	Iceland	B*
306.5	H	Hel Lt	Poland	A*,B*
307.5	RS	Ristna	Estonia	A*,B,F*,G*
309.5	BA	Punta Estaca Bares	N.Spain	A,B,D*,E*,F*,G*
309.5	OD	Odesskiy	Ukraine	B*
309.5	SW	M.Khersonesskiy	Ukraine	B*
309.5	TR	M.Tarkhankutskiy	Ukraine	B*
310.0	IP	Capo Sandalo Lt	Sardinia	B*
312.5	BK	Baltijsk	Russia	A*,B
312.5	BT	Mys Taran Lt	Russia	A*,B
312.5	KA	Mys Kyz-Aul	Ukraine	B*
313.0	PA	Cabo de Palos Lt	S.Spain	A*,D*,E*
314.5	SK	Strandhofn	Iceland	A*
314.5	TL	Punta D.Penna	Italy	A*
315.5	ND	Nida	Lithuania	A*
316.0	IN	Ingolfshofdhi Lt	Iceland	A*
337.0	MY	Myggenaes	Faeroe Is	A*,B,D*,E*,F*,G*
367.0	JV	Jakobshavn	Greenland	A*
372.0	OZN	Prins Chrts's Sund	Greenland	A*,B*,E*,G*
381.0	AB	Akraberg	Faeroe Is	A*,B,D*,E*,G*
404.0	NL	Noiso	Faeroe Is	A*,B*,D*,E*,G*

Note:

Beacons marked [C] have now been closed down.

Beacons marked [D] are now, or soon will be, radiating DGPS data.

Entries marked * were logged during darkness.

All other entries were logged during daylight or at dawn/dusk.

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

MilAir

Due to medical treatment I received before Christmas, I am not meant to be spending hours staring at a computer, (not a lot of help when you need to use a computer for business). Consequently, I have the luxury, (or pain), of dictating the column this month and possibly next month, so my apologies as it is slightly shorter than normal.

London Mil - Follow Up

Following up on my comments in the January *SWM* regarding London Military, my thanks go to **Steve F.** and **Andy L.** who both confirmed my suspicions. The frequency 255.925 appears to have definitely been heard in use on the West side of the airspace, but is only reported occasionally and consequently is almost certainly a standby frequency used for exercises, etc. (I still haven't heard it in use). Steve also reports that he has seen 245.0 listed as London Military, but I agree with his further comments that this is probably a misprint for 245.1, (The Practice Emergency Test Frequency/PETF).

Swanwick

Not directly a MilAir subject, but still a very relevant item of news. The new Air Traffic Control Centre at Swanwick has at last got an operational date. The technical handover of the building took place in December 2000 and training of controllers will take place during most of 2001. The planned date to start live Air Traffic operations is 27th January 2002. I would not anticipate that there would be a big change round of frequencies, but perhaps we will see the introduction of some 8.33kHz channels? Watch this space.

Icom R8500

Bob S. has E-mailed me regarding my report some time ago, (was it really Sept 1998?), on the Icom '8500. Basically he agrees with me that it is one of the finest radio's for airband listening and he asks the question, "for airband scanning (and primarily u.h.f. airband), have you seen any reason since that report to alter your views at all?" Well the simple answer is no and my '8500 is still in use on a daily basis.

In reality, there has actually not been that many new base receivers released in the two plus years since that original report was written. The direct competition would obviously be with the AOR AR5000 which I also mentioned briefly in that report. The AOR AR5000 is an excellent and very sensitive receiver, but I still prefer my '8500 which I personally found easier to operate. Incidentally, the problem that I had in the early days with my '8500 did not return and it has performed faultlessly since then.

This brings us to 2001 and the arrival of two new wideband radios to the UK. The AOR AR8600 which has already been reviewed in *SWM* and the Yaesu VR-5000 which is due in the UK shortly. These two radios are not in the same price range as the '8500, but will fill the important mid-range price band, they also offer the portability option which the '8500 is not ideally suited to.

Shortly to enter service with the RAF, our photo this month shows a USAF/437 AW, C-17A on approach to Mildenhall.

I am hoping to get to play with an AOR AR8600 in the near future and it is most likely that a review of the Yaesu will appear within the future pages of *SWM (you can bet on that - just as soon as they hit the uk - **Ed.**)*. Watch this space - as always we will keep you informed. (Sorry for the delay with the reply Bob).

Antennas

It was my intention to compile readers comments regarding the differing antenna set-ups that they have purchased for MilAir listening, but I have decided to 'sit on the fence' and scrap the idea. The contents of my postbag showed me very definitely that, 'opinions vary'. This seems to be a very individual subject with one person praising a particular make of antenna whilst another was not impressed.

The one generalisation I will make is that the overall consensus for v.h.f. and u.h.f. MilAir listening was that discone type antenna was preferred to other types such as a vertical stick - I have to agree with that sentiment as I currently use two discones. (I received no reports on directional antennas such as the Log periodic). What I do intend to do when time permits is to try a couple of the home-built designs that readers have sent me and I'll report back on their performance in the future.

Snippets

- Coningsby appears to have replaced its Digital ATIS frequency of 254.725 with a new frequency, 281.5.
- **Martin L** and another reader both report that in addition to the u.h.f. Tower frequency 282.4 at Scampton, the Red Arrows regularly use the NATO Common Tower frequency of 122.1MHz.
- By the time you read this, Manchester's second Runway 06R/24L should have been made operational in early February.
- An interesting callsign was noted on the 8th January and this was, DEATH 41 - 44 flight. They were believed to be four F-15s returning to Lakenheath and one source has suggested that they were from the 492 FS. This is the first time that I have seen this Lakenheath callsign reported for a long time, I am sure that it was used by based F-111s many years ago?
- After a quarter of a century, 99 Squadron are to reform at RAF Brize Norton to fly four US C-17s, (Globemaster C.1As). The aircraft will be leased for seven years and are due to be delivered between May and September 2001.

■ ROGER BUNNEY, 35 GRAYLING MEAD, FISHLAKE, ROMSEY, HANTS SO51 7RU

Satellite TV News

Christmas in the Holy Land circa 2000. The Israel versus Palestinian conflict continues, stones are thrown, bullets return, car bombs and assassination - the West Bank and Gaza Strip are places hardly on the tourist route these days. Even the Christmas Eve midnight service from Bethlehem was disrupted, the Reuters feed via *NSS-K* of the occasion (11.566GHz-H, SR 5632+FEC 3/4 - 21.5°W @ 2200GMT) suffered noise and complete loss of signal from time to time. Eventually Reuters opted out of the DB feed - fortunately an hour later the midnight service from the Vatican, Rome, produced excellent and impressive visuals of the service, the buildings and an almost lifesize crib.

The real Father Christmas accelerates away from his toy factory in snowy Lapland in his single GTX reindeer powered sleigh, news feed from Finland.

The Middle East, a tension created by the Israeli/Palestinian problem as of early January, suggests a powder keg with a flame hovering nearby! Iraq has confirmed any action by Syria against Israel will be supported with Iraqi forces entering the conflict. Checking out the 'Iraqi Space Channel' via *Arabsat 3a* @ 26°E clearly shows the military theme to the transmissions.

There are regular broadcasts by Saddam Hussein, video montages of their air force and army in action, martial music and military parades with Saddam saluting, missiles shooting down American airplanes, etc. The video compilation is full of edits and with the same pictures being repeated several times - both of the Guff War and current Israeli troubles.

The news often features radar plots of allied air force incersions into Iraqi air space, programmes showing injuries and the Iraqi military leaders at conferences. This is a build up for something. The Iraqi Space Channel can be found in analogue - 11.932GHz-Hor, audio 6.60MHz and in digital 12.034GHz-H, 27500+3/4.

Live transmission from the Shuttle *Endeavour* as it helps construct the *International Space Station*, via *NSS-K*.

Lebanon has always been an important Middle East commercial centre and also the home to various military groups and freedom fighters. The 'Al Manar' TV channel is based in Beirut and its programme carries pro-Arabic propaganda. On air throughout the 24-hours the station enjoys high technical standards and comprehensive production facilities, though the programme content tends to be aggressive and very anti-Israeli, clearly showing a dislike of the American government.

December 22 was 'Jerusalem Day' and along the main Beirut thoroughfare at midday long processions of Shiite supporters proudly walkad, trampling on the Israeli and American flags stretched across the main road. Syria also transmits a strong anti-Israeli line via *Arabsat-3a* whereas other Arabic programmers on the satellite offer a lower profile exposure to the Israeli situation.

'Al Manar' transmits digital - 11.785GHz-V, 27500+3/4 and in analogue 11.938GHz-V, audio 6.60MHz - though the analogue channel varies in frequency. Syria is digital 11.767GHz-H, 27500+3/4 and analogue via *Eutelsat W2*, 16°E, 11.569GHz-H, audio 6.65MHz. The Middle East propaganda war is an interesting subject to study, a pity that there's not an Israeli TV channel available to contrast the information being offered.

Arabsat-3a isn't all propaganda, there are many Arabic national TV channels carried including that of Yemen-TV. December programming included a local outside broadcast of a team competition - this featured local (rural) teams collecting bunches of dried reeds thrown down from terraced fields above, rushing the reeds across a ploughed stony field, constructing circular storage ricks and roofing them with branches.

Sponsored by 'Choco' wafers, cheered by onlookers, a winning team was assessed by the compere. It's interesting to see what the people and their countryside is really like in the more remote parts of the world. Full marks for an enterprising outside broadcast recording. (Yemen-TV - 11.767GHz-H, 27500+3/4).

The USA presidential election, Florida recounts beyond recounts settled and January 6 saw the Reuters *NSS-K* lease (11.462GHz-H, 5632+3/4) feature the rather prolonged election confirmation of the president/vice president. All states advised their confirmation count, though expected protests came from several state representatives over the Florida situation.

HM The Queen's Christmas Day broadcast traditionally at 1500 could have been previewed by those not wrapping the presents on Christmas Eve. Reuters transmitted the embargoed recording (for 25th broadcast) on the 24th at 1900GMT for recording into the various overseas TV stations and their re-transmission out on Christmas Day itself. (*NSS-K*, 11.566GHz-H, 5632+3/4).

On the adjacent 11.550GHz-H frequency - *NSS-K* - an impressive mid-winter carnival procession was viewed by several readers of this column - The Rose Parade from the Rose Bowl, Pasadena, California, on New Year's Day @ 1700 - featured giant floats, mechanical and animated action from colourful figures. It was an extremely long procession on a sunny, warm Californian blue sky day, contrasting to the cold, damp and grey street outside of our UK windows!

A few hours later **Cyril Willis** (Kings Lynn) watched the Vancouver v. Nashville Ice Hockey match live ex Nashville over the Globecast digital bouquet on 'K', 11.590GHz-V, 20145+3/4.

After the autumn of discontent and the fuel blockades, suddenly an outburst of fuel demonstration materialised evening of January 5th with Meridian carrying a live protesters event at a Southampton depot. This news feed was carried live into *Meridian South* output via the 'BT TES 43' SNG truck over *Intelsat 801*, 31.5°W sat using 10.988GHz-V, contrasting to another live Meridian 'BT TES 9' at the same time @ 10.974GHz-V into the SE programme - floods now at Yalding in Kent (5632+3/4).

At this same time 1800-1830 there were three other live feeds over *801*, another for Anglia TV, one for Sky Sports and a 5th for the French TF1 service from the wet pavements of

***Intelsat 801* carrying a news facility test card.**

***NSS-K* with a news uplink test transmission.**

Calhoun is a satellite facility uplinker in the 'States, via *NSS-K*.

A scratchy *Arabsat 2B* caption advising frequencies for the upcoming Djibouti Pearce Conference, C-Band analogue.

Paris - a busy hour or so. But life isn't all digital feeds. *Eutelsat W3* @ 7°E carried a real live analogue floodlit football match on December 22nd ex Italy, L'Aquilla v. Guilianova, at 2100 on 11.173GHz-H, but the audio was obviously carried in a more subtle mode as it was totally lacking in analogue presence and certainly not a 'sound in syncs' (SIS) transmission.

The BBC tend to spread their uplinking favours around often found in the *Sirius* @ 5°E, *Telecom-2* @ 5°E or *Telecom-2d* @ 5°W slots but there are a few more tricks up their sleeves. **Roy Carman** noted them on *2d* mid December using MPEG-4:2:2 on 11.690GHz- FEC 6111+FEC 3/4 - unfortunately the standard MPEG-2 isn't happy in locking up 4:2:2 digital pictures.

Roy uses an RSD 302-C1 which will lock up (intermittently) 4:2:2 and he noted the test pattern id - 'UKI 116 4:B PAL'. At the present time 4:2:2 receivers are only made for the broadcast market and command high prices, the cheapest being from NDS over £2000. Unfortunately, all the EBU news distribution feeds over *W3* @ 7°E now use 4:2:2 so a rich source of signal information now only visible to Lottery winners!

Roy also logged a *Eutelsat 2F3*, 21.5°E Sky News live feed back on December 8th from Dawlish, South Devon. Dramatic flooding across a mobile home park meant that residents were in danger and Coast Guard helicopters arrived to airlift them to safety - 11.039GHz-H (5632+3/4).

The same day (8th) *2F3* was also noted (11.692GHz-H) with mini-Euro Summit ex Nice news feeds carried over SISLink's truck 'SIS 26 UKI 57' with the generic UK news parameters of 5632+3/4. Though the SNG trucks are British owned, they maintain their UK registration/transmission numbers whilst operating and based overseas, unlike radio amateurs that require a change to their callsign if their base moves. Thus we find on December 15th a British Telecom SNG truck is uplinking out of Italy **in analogue(!)** carrying 'BT TES 30. MILANO. UKI 324'. I understand that TES is the abbreviation for 'transportable earth station' (*Eutelsat W2*, 16°E, 11.540GHz-H).

Incidentally, the above noted *2F3*, 11.039GHz-h frequency is a hot spot to check as it was used on December 21st with a news feed into Dutch TV from Inverness, Scotland, concerning the reaction of the 'locals' to the Madonna wedding and of the local craft industries (via SIS-3 UKI 28). The *2F3* sat became very active New Years Eve mainly with snowy and frozen countryside feature items and the two main day's stories were of course the Millennium Dome's closure (11.039GHz again) and the departure preparations by the *Castaways 2000* folk from the Outer Hebrides (11.639GHz).

Orbital News

The German broadcaster ARD has leased enhanced downlinking capacity on *Hot Bird 5* @ 13°E - 11.604GHz-H digital @ 27500+3/4 to extend its programming coverage into the Middle East, Eastern Europe and North Africa. The FTA 'ARD Das Erste' channel will now reach nearly 85.5 million cable/satellite homes across the European region. And Eutelsat's management board have given the go ahead to negotiate for delivery of two new satellites slotting within the 13°E position.

Hot Bird 8 and *Hot Bird 9* will provide replacement for the very early *Hot Bird* craft in this slot. In other news, Eutelsat will launch 'e-BIRD' to downlink from 25.5°E offering Internet, 2-way low power VSAT and multi-media servicing across Europe - no in-service dates were advised in their press release.

Intelsat have just inaugurated Internet, VSAT, broadband and corporate servicing for their Asian customers from the *Intelsat 804* bird at 64°E, to be further supplemented when the new APR-2 satellite comes on-stream @ 110.5°E by February 01 and later with *Intelsat 902* @ 60°E, these all operating in both C and Ku-bands.

The long term plans of Intelsat include high capacity multi-beam sats arriving in various orbital slots by 2004 offering high speed Internet services, e-business and VSAT capacity (VSAT = very small aperture terminals that allow 2-way communications via small dishes on the ground and the main orbital satellites).

The ITN owned 'Euronews' European channel, based in Lyons, will be available via Sky digital from April next, offering yet another 24-hour news channel, though with audio in six European languages. More German channels will be airing via satellite over the next year with RTL opening an 'infotainment' as yet unnamed channel by end 2001 and a Berlin based channel '1DE' offering a news/documentary and movie service during this coming year.

The noted media player Kirch is tied in with the shopping channel 'Hot Networks' and taking over the News Corporation's 'TM3' channel. Tele Munchen will launch it's satellite channel during Spring 2001, taking items from the existing 'Tele-Munchen' terrestrial channel programming. It's likely that an increasing number of German channels will appear on the *Astra* 19°E satellite fleet as English language services close, opting into digital and migrate to the 28°E *Astra* slot.

Most of the German channels are likely to be FTA (free to air) and in both analogue and digital. Both the recent launches of *Astra 2D* (28°E, Dec 20th) and *EurAsiasat-1* (42°E, Jan 10th) have been shown live ex Kourou from *ArianeSpace* via the *Astra* 19°E analogue FTA Bayerischer transponder in their *Space Night* programme. Up to late June 2000 only nine commercial satellite launches were made, but business picked up to make a 17 total at the end of September 2001, however, looks more promising.

Early December saw the Hong Kong based Star TV Asia announce a closedown of their DTH TV service within the next two to three months, taking perhaps 450,000 subscribers into darkness. Star TV have been providing both analogue and digital programming via *AsiaSat-3S* for the past 18 months, having been on the *AsiaSat-1* for the 10 previous years.

AsiaSat-3A allowed Star TV to move into the digital arena and drop analogue. But the Sky digital receiver (IRD) was only available for Hong Kong use with its 'official' 10 channels and the arrival of digital meant that high rise flat SMATV systems could fitted with Pace receivers as could individual households, bypass the official Star TV receivers and buy their service from the Thailand based 'Thaicom UBC' offering 30+ channels rather than the 'official' Hong Kong 10 channel line-up. In addition, the Star TV IRD has no modem for interactive TV participation and consequently they were on a trip to commercial oblivion - and they're closing down.

The two well established Polish TV channels of 'Polsat' have been taken off the Wizja 13°E digital bouquet and have been replaced with RTL-7 programming. Polsat will be creating its own digital bouquet in the near future with certain of the current FTA programming then encrypting.

Shi'ite freedom fighters proudly march through the main streets in Beirut, a live OB via Al Manar TV, via *Arabsat 3A*.

Shi'ite procession marching over the American and Israeli flags, live via *Arabsat 3A*.

Yemen TV and the compere inspects the 'reed-ricks' in a construction competition, via *Arabsat-3A*.

The *Astra 2D* satellite sits atop the Ariane rocket awaiting launch, live broadcast ex Kourou, via *Astra* 19°E analogue.

One of the very few seasonal greetings seen over the Christmas period, via *Intelsat 801*.

Unfortunately, parts of the live broadcast Bethlehem Christmas midnight service were lost, via *NSS-K*.

■ GODFREY MANNING G4GLM, C/O THE GODFREY MANNING AIRCRAFT MUSEUM, 63 THE DRIVE, EDGWARE, MIDDLESEX HA8 8PS

Airband

Here's another reader offer. I have some aeronautical documents available for free, first-come, first-served. Make sure that your self-addressed envelope is big and strong enough and carries sufficient stamps (or send IRCs). Before you all write at once, though, I must point out that there are hardly any charts this time and it's mainly routine information, magazines, etc. No correspondence will be entered into. While stocks last.

Why not earn your free goodies by including a letter that asks an aeronautical question or imparts some useful information that will benefit all readers?

Receiver Hardware

Known to you as one of *SWM*'s DXTV expert duo, **Garry Smith** (Derby) asks why some scanners lock on to apparent carriers on certain frequencies (such as 136MHz). My first thought is that this is the old band edge. Does the scanner try to wrap back round to 108 or 118MHz at this point? If so, this could be poor synthesiser performance. Alternatively, is there actually an interfering signal there? Try a second, different make, scanner in the same environment.

To what length should Garry cut a ground plane antenna? The exact length won't matter that much as small mismatches in the receiving system will lose surprisingly little signal. However, I calculate that 108MHz requires 660mm (quarter wave), 127MHz at 56cm is 15% different from this, 137MHz at 520mm is 7% removed from the 127MHz value. These errors are not enough to matter very much. The actual band centre is 122.5MHz (580mm).

A ground plane consists of the aforementioned quarter-wave vertical over a cross-shaped grounded element in the horizontal plane. Intrinsically, impedance is about 30Ω. A better match to 50Ω coaxial cable can be achieved by slanting the ground radials down at about 45° and making them perhaps 5% longer than the quarter-wave calculation suggests.

In any case, this antenna is most sensitive to low-angle signals, although aircraft seen at high angles tend to be nearby (with strong signals) anyway. So you see, for a broadband receiving antenna which isn't really a 50Ω match to start with, precise element lengths won't matter.

Another antenna idea from **Michael Hill** (Brackley) is to scale the 'Slim Jim' *(well known in amateur radio circles - a design published by sister magazine* PW, *in April 1978 - design details are also available in* More Out Of Thin Air *from the* SWM *Book Store - **Ed.**)* in the ratio 145:122.5 thus increasing its size by about 18% compared to the 2m version. Even a simple wire construction, supported by bamboo cane and mounted in the loft, is successful.

I expect that a ready-made 2m version would give reasonable results, in fact, as the size isn't that much different. Outdoor antennas are usually even better if you can manage it. Thanks for your Christmas Quiz entry, Michael.

The Yupiteru MVT-9000 is favoured by **Peter Martin** (Cheltenham) but he finds the revised owner's guide by **Rich Wells N2MCA** - on the Internet **http://www.strongsignals.net/** - is helpful when operating the set. Why can't manufacturers write instructions that can be understood?

As I mentioned in January, many sets round the entered frequency to the nearest multiple of the channel step size which is often the wrong thing to do! Then the manufacturer offers an 'offset' function to counteract this error and pretends it's a bonus!

Anyway, without having an 8.33kHz step size, the offset does at least mean that these new channels can still be accessed directly. However, I imagine that you can't scan sequential channels. However, you could store known channels in memory and just scan between those. Adjacent channel rejection depends on how good the set's filtering is. Peter mentions Brest 128.505 (actual frequency on scanner is 128.5000), 129.005 (129.0000) and 133.480 (133.4750MHz).

As you see, the real frequency isn't exactly what the controller says. I've put a list of these on the *SWM* web site, see Web Watch, or you can have the same list (readable by a web browser) if you send me an IBM-formatted floppy with all the necessary to return it to you by post. If you've no computer, simply write in with the particular frequencies you need and I'll list them here.

You Write

Glad to know that this column reaches the Republic of South Africa and reader **John Chamen**. Local news press cuttings sent by John report that 42 Air School have just had their reunion, being an RAF unit that located to Port Elizabeth during the War to train pilots where the enemy couldn't interfere. I'm not related to Bob Manning, the organiser. Sorry to hear of the loss of Colonel Nel under whom John served. Also, what kind of organ is in the Feather Market? Hope it's repaired soon.

Information Sources

If you can access the Internet then information from JF Kennedy Airport (New York), including air traffic control audio, is on **www.jfk.com** but I don't know how you select the particular frequency of interest. The *Flight Path UK* facility that paints real-time UK radar displays on your computer screen is now at **http://212.240.135.5/** but a charge may be introduced for this service.

Going to any displays this year? Chris and I are thinking of the PFA Rally and perhaps a trip to Old Warden (the Shuttleworth Collection) so let me know your plans if you want to arrange to meet up.

In the next section I refer to the *AIP*. It's quite expensive on paper, unless your local flying club or aerodrome lets you have a sneaky look at theirs. More economical for those with computer access is the CD-ROM version and I explain how to get this on my *Airband Factsheet*. This latter is free if you send a reply-paid self-addressed envelope (to hold two A4 pages) to the Broadstone editorial office (**not** to me!).


Godfrey & Roger Preston aboard G-[illegible], Christ[illegible]

Continued on page 64

Abbreviations

AIC	*Aeronautical Information Circular*
AIP	*Aeronautical Information Publication*
ATIS	Automatic Terminal Information Service
CAA	Civil Aviation Authority
CD-ROM	Compact Disc - Read Only Memory
cm	centimetres
d.m.e.	distance measuring equipment
FL	flight level
ft	feet
GASIL	*General Aviation Safety Information Leaflet*
IBM	International Business Machines
ICAO	International Civil Aviation Organisation
i.l.s.	instrument landing system
kHz	kilohertz
m	metres
MHz	megahertz
n.d.b.	non-directional beacon
PFA	Popular Flying Association
SID	Standard Instrument Departure
STAR	Standard Terminal Arrival Route
TACAN	TACtical Air Navigation
UIR	Upper Information Region

Web Watch

8.33kHz Channels
www.pwpublishing.ltd.uk/swm/frequencyinfo/channel833.html

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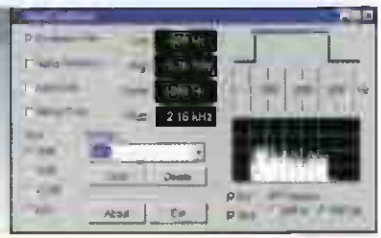

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Model Name/Number	WR-1000	WR-1500	WR-3100
Construction of internals	WR-1000i/WR 1500i 3100iDSP Internal full length ISA cards		
Construction of externals	WR 1000e/WR 1500e 3100e external RS232/PCMCIA (optional)		
Frequency range	0.5-1300 MHz	0.15-1500 MHz	0.15-1500 MHz
Modes	AM,SSB/CW,FM N,FM W	AM,LSB,USB,CW,FM-N,FM-W	AM,LSB,USB,CW,FM-N,FM-W
Tuning step size	100 Hz (5 Hz BFO)	100 Hz (1 Hz for SSB and CW)	100 Hz (1 Hz for SSB and CW)
IF bandwidths	6 kHz (AM/SSB), 17 kHz (FM-N), 230 kHz (W)	2.5 kHz(SSB CW), 9 kHz (AM) 17 kHz (FM-N), 230 kHz (W)	2.5 kHz(SSB/CW), 9 kHz (AM) 17 kHz (FM-N), 230 kHz (W)
Receiver type	PLL based triple-conv. superhet		
Scanning speed	10 ch/sec (AM), 50 ch/sec (FM)		
Audio output on card	200mW	200mW	200mW
Max on one motherboard	8 cards	8 cards	3-8 cards (pse ask)
Dynamic range	65 dB	65 dB	85dB
IF shift (passband tuning)	no	±2 kHz	±2 kHz
DSP in hardware	no - use optional DS software		YES (ISA card ONLY)
IRQ required	no	no	yes (for ISA card)
Spectrum Scope	yes	yes	yes
Trunker	yes	yes	yes
Publishes software API	yes	yes	yes (also DSP)
Internal ISA card	£299 inc vat	£369 inc vat	£1169.13 inc
External unit	£359 inc vat	£429 inc vat	£1169.13 inc (hardware DSP only internal)

PCMCIA Adapter (external): £69.00 inc when bought with [illegible]

PPS NiMH 12v Battery Pack and Charger: £99 inc when purchased with [illegible] unit (otherwise £139 inc)

The WiNRADiO Digital Suite: £74.99 inc when purchased with a WiNRADiO receiver (otherwise £[illegible])

To receive your completely free (no obligation) info pack and WiNRADiO software emulation demo disk all you have to do is get on the internet and go to our website at http://www.broadercasting.com. If you don't yet have easy access to the internet then by all means feel free to telephone us or send a fax.

Please send all your enquiries to: info@broadercasting.com or Telephone: 0800 0746 263 or +44 (0)1245 348000 - Fax: +44 (0)1245 287057
Broadercasting Communication Systems, Unit B, Chelford Court, Robjohns Road, Chelmsford, Essex, CM1 3AG, United Kingdom

Airband

Continued from page 62

Godfrey enjoys the sights at the PFA Rally, Wroughton. *Christine Mlynek.*

Frequency & Operational News

I previously mentioned that 123.45MHz is available for pilots to liaise with each other in North Atlantic airspace. Now I see in *The Log* (December 2000 page 4) that this is to be allocated internationally and calls on the frequency should state that they are on 'Interpilot' channel.

Now information from CAA sources including *AIP* amendments (via **Martin Sutton**) and *GASIL* 6 of 2000. Jersey has new procedures: LERAK SID, Jersey 1U and 1V STARs. Luton's new STARs are LOREL 2C and 1S. Oxford's only ATIS is 136.225, the departure information on 121.75MHz having been withdrawn. Stansted Clearance Delivery is now on 121.95 (was 125.55MHz) and there are new STARs LOREL 2C and 1S. Write in if you want me to publish any of the above procedures in full.

Manchester has new runway 06R/24L and i.l.s./d.m.e. IRR for 06R (111.55 localiser, 332.75 glidepath, 1139MHz d.m.e. reply). Communications frequencies (all MHz) have been expanded. Tower is already on 118.625 and monitors 121.5, now 119.525 is added. To existing Ground 121.85 is added 125.375. The old ATIS 128.175 is now for arrival information, new 121.975 serving departures. If out of radio range, both ATIS messages can be heard by telephoning **0161-499 2324**.

New gliding or parachuting, etc. sites are at Cockle Park, Northumberland; Eyers Field, Gallows Hill; Nostell Priory, West Yorkshire and Redlands, Wiltshire. Has any reader visited any of these sites? Please report in!

Talla n.d.b. (TLA, 363kHz) is withdrawn. In the south-east of England, new reporting points are NILON (on L610), SENLO, TERKO (on B29) and UMBUR. If you want exact co-ordinates for these, write in. UL620 (previously UR12) is no longer available eastbound between Midhurst and Clacton, the alternative is UR123.

Re-designations of airways are as follows. (U)B1 become (U)L975 between LIFFY and Ottringham and (U)Y70 from Ottringham to BLUFA. Also, UR4 between Pole Hill and Ottringham becomes part of UY70.

Who says that military enthusiasts won't find anything of interest in the *AIP*? Page ENR 6-3-5-2 is a chart of the entire UK Upper Airspace Military TACAN Route System and the Benbecula TACAN (BEZ) is withdrawn, Route TB1 now starting at the QQ1 point near Campbeltown. Off the east coast, Routes TR1 and TB6 now meet at point MC16 on the UIR boundary, Route TR3 terminating at Coltishall CSL TACAN.

Not that the average enthusiast will notice much difference, but reduced vertical separation is being introduced. Flights may now operate 1000ft apart between FL290 and 410, whereas previously a 2000ft gap was required. *AIC* 111/2000 warns that the closer spacing could increase the frequency of nuisance wake turbulence encounters. Although not causing loss of control, they could be uncomfortable for passengers. My advice, as always, is to keep your seatbelt fastened at all times that you are sitting, even when in the cruise.

You might perhaps like to cruise to the new Athens airport where, so **Costas Krallis SV1XV** tells me, the ICAO locator is LGAS. My sources also list LGAC as Athens City and LGAT as Athens Central. ATIS is on 136.125; Approach 118.0, 118.3, 118.475 and 119.1; Athens Control (presumably Area Control Centre, not the airport) is on 132.8MHz.

All letters received up to January 10 have been answered except for one from **D.G. Woods** which will appear next month. The next three deadlines (for topical information) are March 12, April 9 and May 4. Replies always appear in this column and it is regretted that no direct correspondence is possible.

If you would like a copy of the *Airband Factsheet*, please send a reply-paid, self-addressed envelope (to hold two A4 pages) to: **Airband Factsheet, SWM, PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.**

■ **KEITH HAMER & GARRY SMITH, 17 COLLINGHAM GARDENS, DERBY DE22**

DX Television

F2-layer reception continued with examples of impressive DX reception from the middle of December and over the Festive Season. A few Meteor-Shower pings and a hint of tropospheric enhancement from Belgium and France on the 18th and 26th made it clear how depressing the winter would be without F2 reception!

F2 Reception Reports

Unidentified Channel E2 pictures with severe multi-path distortion were resolved during an opening around 1320UTC on the 8th by **Simon Hockenhull** (Bristol).

On the 16th from 0955, both Simon and **Ian Milton** (Ryton) noticed F2 activity on Channel R1 with two Russian ORT signals from unknown transmitters on 49.746 and 49.7392MHz.

On the 17th from 0755, Ian monitored unidentified E2 signals on 48.25026, 48.26574 and 48.23962MHz.

High m.u.f.s were encountered on the 18th and 19th with transatlantic 50MHz activity in progress by early afternoon. Unfortunately, TV signals on Channel A2 (55.25MHz) failed to materialise despite activity on this frequency earlier on the 19th at 0901 when **Stephen Michie** (Bristol) resolved an E3 station with some form of identification in the lower left of the screen. Vividly clear pictures from Syria were present on E2 at the time. From 0912, Channel R1 became active. During the opening **Peter Barber** (Coventry) spotted an Arabic station on E3 (48.245MHz) with an elliptical logo in the top-left corner of the screen, similar to that of JTV Jordan.

Peter saw it again on the 23rd. On the same morning, Ian Milton identified Syria, Iran and possibly Dubai, all on E2 between 0830 and 1145. Between 1020 and 1320, Simon Hockenhull received what appeared to be Iran on E2.

An unusual-sounding Channel R1 video carrier with zero offset, heard by several enthusiasts, has been described as 'chirpy' by Ian Milton. One unstable carrier has been identified as Khabar TV, a privately owned service operating throughout Kazakhstan where several R1 transmitters are known to be operating. Ian noted this one at 1100 on the 23rd. An empty sync bar on E2, seen during the same opening, is thought to have originated in Dubai. Its frequency offset was zero. Identified signals were IRIB-2 (Iran) and the Syrian second network from Homs.

There were reports of TVGE (Equatorial Guinea) showing a colour-bar pattern during the morning of the 24th.

Geminids Meteor-Shower

David Hamilton (Cumnock, Ayrshire) is using two four-element vertical quads for Band I reception fed into a Roadstar TVM-1003 and NEC 5000. Meteor-Shower (MS) reception became dramatic after dark on the 11th, 15th and 16th with 'pings' of video every few seconds lasting well into the evening. Stephen Michie found the 14th productive throughout the day with Denmark and Sweden identified on Channel E3.

Simon Hockenhull successfully logs MS DX using indoor antennas comprising a Band I loop, carefully positioned in the attic to null out local interference and a VF-100 eight-element antenna covering Bands I, II and III. His receiver is a D-100 converter with i.f. bandwidth reduction feeding a Goodmans C520 colour receiver for display.

Christmas Capers

Stephen Michie reports odd goings-on at the BBC when a test card was inadvertently shown instead of the weather pictures. Although shown only briefly, Stephen noticed the identification 'BBC SCOTLAND' in the top-left and 'INVERNESS' in the lower-right. The test card was reminiscent of the old tuning signal of the Fifties and Sixties. Does anyone have a video recording of this? Meanwhile, local 'BBC-1 West' Christmas graphics commenced on the 19th with two versions of the Christmas balloon in normal and wide-screen formats. The normal version was shown only once.

Storm Damage

It is frightening how quickly the bad weather takes its toll. Just when you are hoping to tune into something exotic, disaster strikes! **Martin Dale** (Stockport) has discovered water leaking from his coaxial down-lead. This is not an isolated incident. In domestic installations, the connection box cover on the antenna can become detached thus allowing water to penetrate the cable and eventually seep out of the coaxial plug! In installations where a mast-head amplifier is fitted, always ensure that a drip loop is provided where the cable from the antenna enters the unit otherwise it can fill with water until it drains via the down-lead.

Meanwhile, **George Paterson** (London) had to retrieve his antenna installation from a neighbour's roof after storm damage. In such cases, it may be worth checking your home insurance policy. Sometimes antenna installations, even if these are not ordinary domestic ones, are covered.

FM Reports

The *Geminids* Meteor-Shower was amazingly active on the 13th and 14th. **Ian Menzies** (Aberdeen) comments that some of the bursts were so sustained that they created a patchy Sporadic-E effect. From Edinburgh, **George Garden** advises that Joy FM has appeared on 87.5MHz, broadcasting pop music in the style of Radio Caroline. Kingdom FM has also come on-air blocking RNA FM Arbroath on 87.7MHz. Sadly, Castle FM and Fresh Air (student radio on approximately 87MHz) were only temporary stations and have disappeared from the dial. Moving south, on the 21st, **Tim Bucknall** (Congleton) discovered a new Radio Wales transmitter operating on 95.3MHz, possibly Blaen-Plwyf.

Turkish Delight

Iain Menzies (Aberdeen) recently spent a holiday in Turkey armed with a portable TV receiver. While it would be a good DX site for Bands I and III, u.h.f. was choc-a-bloc up to Channel E40 with TRT networks 1 to 4 from at least three transmitters. There is only one Band I transmitter listed in Turkey and that is Bagisli E3 in the east of the country with 5kW e.r.p. Many years ago, a network of high-power E2, E3 and E4 transmitters was planned but it was never sanctioned.

Swiss Text Message

Godfrey Manning ('Airband' column) advises that the Swiss text page, shown in **Fig. 2** of the December 2000 issue, refers to the Kursk Russian nuclear submarine disaster last summer.

TV Down-Under

Nick Brown (Rugby) has recently returned from Sydney in Australia observing the TV scene, among other things. Round the clock TV has been the norm for many years now, so test cards are just a memory. Programmes generally seem to be typically Eighties or even Seventies style rather than the wall-to-wall filth and rubbish inflicted upon viewers in the United Kingdom. Nick mentions the commercial breaks: an End of Part One caption is normally shown, but at the end of the adverts the programme returns without warning.

In Cairns, TV antennas seemed to be pointing everywhere, although transmitters were well hidden. Interestingly, Nick saw very few Band I antennas on his travels.

Fig. 5: The BBC-1 Christmas Identification Symbol in 2000 featuring Santa distributing gifts from his hot-air balloon.

Fig. 6: This month's wander 'Down Memory Lane'. The logo used by Thames Television in the Eighties.

Service Information

More observations from Stephen Michie about test transmissions of former USSR countries are as follows:-

Estonia: The test transmission sequence is as follows:- The 'TALLINN' PM5544 test card followed by the 'ETV TALLINN' (top) modified PM5544 with the extended lower identification block blacked out. At around 1300UTC, the FuBK test card is shown with shortened identification 'ETV TALLINN', then during the last half-hour of tests a digital clock is shown before returning to the FuBK.

Ukraine: YT-1 follows the old Soviet practice of switching off the transmitter after a very short airing of the G-204 test card. Vilnius also does this.

Incidentally, during the last Sporadic-E season, Nick Brown (Rugby) noticed a G-204 test card on Channel R2 with some form of identification across the centre.

Keep On Writing!

Please send your DXTV, slow-scan TV and f.m. reception reports, news, off-screen photographs and information to arrive by the first of the month to:- **Garry Smith, 17 Collingham Gardens, Derby DE22 4FS.** We can also use off-air pictures stored as JPG files on PC disks and good-quality video recordings. You can also contact the authors at the following E-mail address: **Keith@test-cards.fsnet.co.uk.** DXTV and archive TV enthusiasts may be interested in browsing through their website at **www.test-cards.fsnet.co.uk.** Updated information and new photographs are being added at regular intervals.

Fig. 1: News programme from ARD (Das Erste) in Germany.

Fig. 2: The News opening sequence from Ceská Televize (Czech Republic).

Fig. 3: Czech newsreader announcing the strike by staff at Ceská Televize in December 2000.

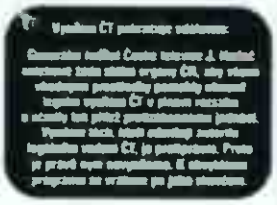

Fig. 4: Programmes from the TV service in the Czech Republic were replaced by this caption due to strike action following the controversial political appointment of a new Director General at Ceská Televize. The strike continued into January 2001.

DXTV Log For December

Our thanks to Simon Hockenhull, Stephen Michie and Ian Milton for reception reports featured in this month's log.

8 Meteor-Shower reception at 0723: Denmark (DR-TV) with PM5534.F2 reception: Unidentified E2 at 1320 with severe multi-path distortion.
11 Sporadic-E: Italy (RAI Uno) A at 1123; Italy (TVA) A at 1149.
13 Spain (TVE-1) E3 at 0910.
14 MS: Denmark E3; Sweden E3; Unidentified E3. F2 reception: Unidentified E2 on 48.235 and 48.245MHz.
15 F2: Unidentified E2 on 48.235 and 48.245MHz.
16 F2: Russia (DRT) R1 (two transmitters).
17 F2: Unidentified E2 (three transmitters).
18 Tropospheric reception: France (Canal Plus) L5; Belgium E8 (RTBF-1) and E10 (VRT TV1).
19 F2 from 0900: Syria (SYR-2) E2; Unidentified R1; Unidentified Arabic E3, tentatively Syria and Jordan (JTV).
20 MS at 0845: Sweden (SVT-1) E3 with PM5534.
23 F2: Syria E2; Iran (IRIB-2) E2; Unidentified Arabic E2, possibly Dubai; Kazakhstan (Khabar TV) R1; Unidentified E3. MS at 0911: Unidentified E3.

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SSB Utilities

The Last 10 Years

This column marks something of a milestone for me, as it is the 100th 'SSB Utilities' column that I have written for *Short Wave Magazine*. So, this month I thought that I would take a brief look at the way that things have changed over the past 10 years, and mention some of the highlights.

This column was started by the late Peter Rouse in the January 1991 issue. This turned out to be a rather opportune moment, as it appeared just a few weeks before the start of the Gulf War (16th/17th January 1991), and the very first column was devoted to a long list of Gulf related frequencies. The column was very well received by the readers and many letters and logs were received (not like now - hint!), and Peter was able to compile a companion book to the column which was launched at the 1991 Leicester Amateur Radio Show.

I met Peter for the first time and spoke with him for quite some time at that show. We had been communicating by letter for several months, so we felt that we knew each other very well, even though we had never met. I sent Peter many letters with news, logs and snippets of information, and he replied with questions asking for clarification on some of the items I had mentioned. During 1991 Peter managed to cover a diverse range of topics, from space-flight, to military, marine, to numbers stations and 'spy broadcasts' - even calling me an 'armchair spy' in one column.

I was most surprised to be asked to compile the 'SSB Utilities' column for the first six months of 1992 while Peter was in hospital. As my interests are mainly military, the columns that I wrote in 1992 were almost exclusively related to the use of s.s.b. by the military in one form or another. Peter was back in the 'hot seat' for the remainder of 1992, and in November 1992 we both appeared on the 'PW' stand at the Leicester Amateur Radio Show answering readers questions, handing out frequency lists, and generally getting in the way of the orderly running of the stand!

Peter Rouse continued with the column for the first half of 1993, and then 'retired' due to ill-health, and I was asked to continue the column - and I have been here ever since! Time certainly flies when you are enjoying yourself.

Ten years ago the only real source of information for listeners was the printed word - books, manuals and official documentation where available. Therefore, a column such as this was quite well received because it gave the casual listener somewhere to ask questions about the hobby, see what other listeners knew about subjects, and to see what others were hearing.

In those days, it was quite easy to pass on information to readers, as most months there were streams of letters asking for details about callsigns, or frequencies, or users, or dates and times of operations - the list seemed endless. During the last five years the power of the Internet has really taken-off, and for those with access it has opened their powers of investigation. Nowadays, it is possible to enter some seemingly quite obscure word or fact into a search-engine, and to be presented with literally thousands of web-sites which may have the answers that you are looking for .

It is possible to join various 'groups' where loggings are shared, cyber-friendships are set-up and people from around the world with similar interests are able to share their thoughts, ideas and information with others. Quite often this results in other 'groups' concerned with a narrower range of interests, and quite often another series of web-sites about that subject.

The power of the Internet, and computer communications in general, now allows us to 'meet' others in cyberspace and share information in real-time. During Shuttle launches there are a number of listeners in the USA, UK and the rest of Europe who band together to listen on h.f., v.h.f. and u.h.f. to all the stations involved. By joining together like this it is possible to cover more ground - more people means more frequencies can be listened to.

During the mid 1990s when the situation in Iraq flared up again, the Internet was full of people trying to find out what was happening, while listeners had been tracking the build-up and events in the region. In the Balkans during the latter half of the 1990s, NATO flexed its muscles, and the Internet was full of people asking what was happening and where should they listen. Regular listeners already knew what was happening, where and when to listen, and who all the 'major players' were.

Ten years ago there were many more marine stations than these days - stations have either shut completely, or been merged with others, or are now controlled remotely. Changes in the rules regarding marine communications have mostly done away with the need for dedicated Radio-Officers, and more communication is now done silently and automatically by machines.

As the years go by more and more stations are closing, and it is quite a sad thing to hear the final nights of operations as vessels and other marine stations call-in using c.w. to say 'farewell' to their colleagues. Military stations are coming and going all the time, and there have also been some remarkable changes in the set-up of the vast military networks of stations and frequencies. For example, the once mighty USAF global network is now moving the same way as many marine stations - being controlled remotely from a central location.

It is very difficult to predict the future or the way that things will change in the next six months, one month, one week or even one day. Sometime during 2001 the last RAF aircraft in Germany will return to the UK, and I expect that this will see the end of the RAF Germany stations in the 'Architect' broadcast, except for occasions when they return for exercises. The RAF is steadily taking-on its new fleet of C-130J Hercules, so there are 25 new RAF SELCAL codes to investigate; and some of their original C-130s have already been returned to Lockheed in the USA. Also with the RAF, by the late Summer they should have taken delivery of their four new C-17A 'Globemaster III' aircraft for a new Squadron to be formed at RAF Brize Norton.

It is an unfortunate fact that wars and conflicts will spring-up in the most unlikely and unexpected places. These events usually generate a lot of h.f. traffic in one form or another, so any conflicts in the next 10 years will be worth listening to, just as they were worth listening to during the past 10 years.

I still get letters asking for more items about marine and maritime use of h.f. s.s.b., but unfortunately nobody ever sends me any usable information. I have avoided running long lists of stations that other people have heard, as it makes some readers more frustrated that they have missed so much, so when I have received copies of marine logs from readers, they are carefully filed for later use rather than appearing in this column.

Most readers will have noticed that I tend to concentrate upon aeronautical topics - because that is where my main interest lies - but this does tend to be a topic about which I receive most letters and E-mails. Most of what I cover in this column can be found from patient research through various books, or even using the Internet, but as many people claim that they do not have access to the information, I am happy to present it here.

Now, on with the next 10 years.

This Month

During December I spent a lot of time listening to the travels of US President Bill Clinton, as he flew to Ireland and the UK. I was up early on the day of his arrival in Dublin, and heard the last contact with Shanwick OACC. One day later when 'Air Force 1' flew from Belfast to London, and then shortly afterwards on to Birmingham, I listened on h.f. and v.h.f. to the aircraft, and also to the IHF 'Orderwire' signals.

On the third day President Clinton returned to the USA direct from Birmingham, and I heard 'Air Force 1' and several of the other support aircraft working Shanwick OACC as they crossed the Atlantic. For this trip to Europe the support aircraft was C-137 '27000' (which used to be 'Air Force 1' until the 1990s) using the callsign 'SAM 27000', while the support E-4 aircraft used the callsign 'Fergy 38'. In an unusual move, the E-4 was stationed at Ramstein AB in Germany instead of the expected RAF Mildenhall, Suffolk.

Last month I mentioned the CCF radio contest held at the start of December. On Christmas day I listened to the results of the contest being broadcast on CCF frequencies. I also discovered that the next CCF radio contest (called 'Easter Bonnet') will be held on the weekend of 10th/11th March 2001. As most of you will be reading this towards the end of February, I hope that some of you will put these dates in your diary, and will be listening on 5.343MHz.

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Decode

Decoding The Weather

Micky Kincaid E-mailed me asking for help with a problem linking *MMTTY* with the latest version of *Digital Atmosphere*. Although he has been impressed with the capabilities of both programs, he's not been able to process the data files that he's received using *MMTTY*.

***SkySweeper* Recording set-up.**

To help sort the problem he sent me a sample of his data file so I could try it for myself. A quick test on the latest version, *Digital Atmosphere 2000*, showed that the data really didn't work. The next stage was to take a look at the data file using a simple text editor like *Windows Notepad*. There's an extract so you can see the problem in **Fig. 1.**

Well, have you guessed it? There is just one vital error - all the five digit groups have been converted into letters. So why should this be? It is caused by one of the settings in the *MMTY* program known as Unshift-on-Space. If you cast your mind back to one of my tutorials on RTTY you will remember that RTTY uses a very simple 5-unit code to represent the text and numbers of a message.

One of the problems with the code is that the use of five digits means there are not enough combinations to cover the full range of alphanumeric characters. The solution used in RTTY is to give each five-digit combination two potential meanings. Switching between these two options is done using a pair of special characters, one to switch to letters and the other to switch to figures.

Whilst this is a relatively neat solution, there is a knock-on problem that occurs when the signal is subjected to interference. You can bet your boots that the shift character will be the one that's lost in the noise. If you loose a shift character, all the following characters are corrupted and come out as, either all letters, or all figures until the next shift character is received. This can make a real mess of a message just for the sake of losing one character.

One of the solutions to this shortcoming was to force the decoder to revert to letters every time a space was received. Whilst this worked extremely well for handling messages that were sent in plain text, it makes a real mess if the message contains groups of figures and spaces like our weather data! Fortunately, this is very easy to solve.

If you have the latest version of *MMTTY* (version 1.6E) you will find a button titled UOS - 2nd one down on the left-hand side. You need to set this so that it is released, not pressed. Now you can receive your weather data to the log file with confidence and *Digital Atmosphere* will decode and display the data. Just so that you know what the data should look like, it's properly formatted in **Fig. 2.**

If you would like to have a go at decoding your own data off-air it really is quite easy to do. All you need is *Digital Atmosphere* and a RTTY program that can save the received information to a text or log file. Arguably the best RTTY only program around is *MMTTY*, which includes some very accurate tuning aids as well as the facility to save to a log file. Whichever program you use, don't forget to disable the Unshift-on-Space!

If you have any problems with *Digital Atmosphere* it may well be worth taking look at their FAQ, which can be found on their web site. To get your copies of these programs pay a visit to the following sites: **http://www.weathergraphics.com** and **http://www.geocities.com/mmtty_rtty/**

Fig. 1.

```
NNNN
ZCZC 535
SMVX45 EDZW 091200
BBXX
44008 POQWQ OORPT UPYOR RYXXX XPEPO QPPRU RPPWP TEPPY OQQTP WWWPP
00067 QQPPR UPPWQ EEE OQWQQV
44011 POQWQ OORQQ UPYYY RYXXX XPEQC QPPWO RPPPO TWPPI OQQTP WWWPP
00059 QPUPT UPPWU EEE OQWQEV
44025 POQWQ OORPE UPUEW RYXXX XEEQP QPPPT RPPTO TEPQE OQQTP WWWPP
00047 QPTPE UPPQY EEE OQWQWV
44007 POQWQ OORET UPUPQ RYXXX XPQPO QQPPE WQPWU RPPRR TYPQW OQQTP
22200 PPPTO QPEPQ UPPPY EEE OQWQQV
PFIJ 09120 OORTI UPTOT RQXOQ OPIPU QPPPP WQPQE RPPEE TUPEW UEIUU
IOXXX WWWQW PWPQW WPTPQ EQOXX RQQPY IQPPTV
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214
SMMC02 GMMC 170600
AAXX 17064
60060 32456 41803 10155 20125 40193 5/001 84500 333 20142 30015 84616 95300=
60105 32960 61004 10065 20054 40228 52006 86030 333 20060 86358=
60106 32965 01803 10053 20046 40250 53002 333 20024=
60107 32460 62002 10124 20091 40215 53002 86800 333 20104 82816 85626 95310=
60127 32560 70000 10073 20068 39630 40240 53004 878// 333 20069 84820 84626=
60141 32458 62006 10061 20050 39543 40235 53004 86600 333 20033 86710 95460 95890=
```

Fig. 2.

Buying *Digital Atmosphere*

Bill Clark contacted me recently asking for help to find a UK agent for *Digital Atmosphere*. Whilst this program is readily available via the Internet, many readers are still cautious of spending via the Internet and would rather deal with a UK company. I checked-out the WeatherGraphics site and, whilst they show a UK agent, the URL just leads to some photos with no mention of how to make contact or place an order.

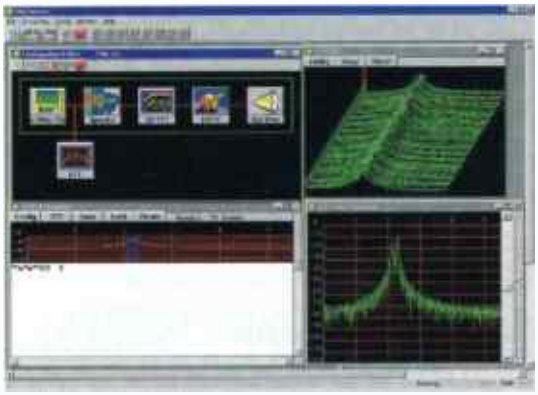
I've E-mailed the WeatherGraphics team and they have now deleted the link and at the time of writing were considering looking for a new agent. If you would prefer to buy from the UK, I suggest you keep a close eye on their web page.

SkySweeper Demo

I've had one or two E-mails from readers asking how they can try out the decoding side of this excellent program using the demo version. If you haven't already taken a look at this program, you ought to give it a try as it certainly puts a different slant on the way you decode signals.

Whilst many of the functions are fully operational in the demo version, you cannot decode any of the data signals in real-time. This limitation is put in place to encourage users to buy the full version. However, there is still a way that you can test the decoder with your own off-air signals. The trick is to record the signals to a .WAV file and then use *SkySweeper* to decode the .WAV file. There are lots of different ways to make a recording and I'll take you through a couple of options.

The first is to use the recorder that's built into *SkySweeper* itself. To use this, start with a new set-up by choosing 'File',



***SkySweeper* set-up for receiving RTTY.**

***MMTTY* Unshift on Space Button.**

'New 'from the menu. This should give you a very simple configuration with just two boxes, an input module and an output module. Next choose the - + - symbol and step down the menu to 'Others' then choose 'REC'. This will add the record module as I've shown in the column.

If you now press 'Rec' you will be asked to choose the file name and destination. One point to note here - don't forget to add the .wav extension to the name you give it or you won't be able to play it back. The default recording mode is 16-bit mono with a sample rate of 11,025Hz.

If you'd rather use a separate and, less memory hungry, recording program then you need look no further than *RECALL*, which is now at version 2.4a. I reviewed this excellent program a year or two ago and its improved significantly since then. The program is very compact at just 700Kb and can be used to record just about anything via the soundcard. As well as being easy to use, it also features variable recording quality so that you can make sure you don't eat-up huge amounts of precious disk space.

I have found that the best setting for radio data signals is 8000 sample rate and mono 8-bit recording via the 'line-in'. When choosing sample rates the rule of thumb is to make sure the sample rate is twice the highest frequency you want to record. That makes 8000Hz sample rate pretty safe. At this rate, the recorded audio takes-up around 458Kb per minute.

If you get in a muddle, the supplied help file is very good. As well as using this program is help test *SkySweeper*, its also very useful for logging other data signals as it has a built-in timer so you can get it to record a FAX or data signal automatically in the middle of the night or when you're out enjoying yourself!

Frequency List

Just to brighten-up the long winter evenings, I thought I'd include an extract from the latest **Day Watson** Complex Frequency List. All the frequencies listed have been logged over the past six months so they are all well up-to-date and should give you an opportunity to have a go with some of the more exotic modes.

Even if you don't have a decoder it can still be interesting to use one of the freely available analysis tool such as *Spectrogram* to take a look at the signals parameters. If you want to get hold of the latest version (5.1) of *Spectrogram* pay a visit to:

http://www.monumental.com/rshorne/gram.html

Alternatively, you can find an up-to-date link on my web page.

Frequency	Mode	Call	Station
2.1875	DSC//100/E/170	—	GMDSS Alert Channel
2.2500	MIL.STD 188 141A	OWC	DAF 7 LOC
3.6672	ARQ/E//46 2/E/170	—	UNID
3.8585	ARQ/E//85.7/E/170	—	GAF? LOC?
4.2075	DSC//100/E/170	—	GMDSS Alert Channel
4.7980	ARQ/E//85 7/E/170	—	GAF? LOC?
5.0712	ARQ/E//46 2/E/170	—	UNID
5.0715	ARQ/E//46 2/E/170	—	UNID
5.2840	ARQ/E//85 7/E/170	—	German AF 7
5.2980	MIL.STD 188-141A	4mp	UNID
5.7975	ARQ/E//72/E/400	—	UNID
6.3120	DSC//100/E/170	—	GMDSS Alert Channel
6 6432	ARQ/E//192/E/170	—	FF UNID
6.9291	ARQ/E//184.6/E/400	—	FF UNID
7.5857	ARQ/E3//192/E/400	—	FF Dzaoudzi ?
7 6140	ARQ/E//184.6/E/400	—	FF UNID ?
7.6427	ARQ/342//200/E/400		FF Paris ?
7 6442	ARQ/342//200/-/400	—	FF Djibouti ?
7 7600	35C//50/R/1000	—	Arkhangelsk ME7
8.1050	ARQ/E//185.7/I/400	—	FF Paris
8 1260	ARQ/E3//72/E/400	—	FF UNID
8 4015	35C//50/N/170	UDAR	Ship *Ufan*
8.4025	35C//50/N/170	V3RZ2	Ship *Salua*
8 4145	DSC//100/E/170	—	GMDSS Alert Channel
8 6800	35C//50/R/170	UD8	Khotmsk RADIO 7
8.7090	ARQ/RS//228/E/170	—	UNID
8 7090	ARQ/RS//228/E/170	—	UNID
9 0250	MIL STD 188-141A	cro	USAF (RAF) Croughton
9.0797	ARQ/E3//100/E/400	rfqp	FF Djibouti
9.2590	FEC/A//192/E/400	rfgw	MFA Paris
9 2591	ARQ/E//184.6/E/170	—	FF UNID
9.9077	ARQ/342//200/E/400	rffxoce	FF Paris
10 2113	PACT//	—	UNID
10 2270	ARQ/E//48/1/850	—	UNID
10.2813	ARQ/E3//192/I/400	rfligos	FF Cayenne
10 2847	ARQ/E3//192/E/400	rftjd	FF Libreville
10 9822	ARQ/342//200/E/400	—	FF Sarajevo ?
10.9862	ARQ/342//200/E/400	—	FF Sarajevo ?
10 9917	ARQ/342//200/E/400	rffvay	FF Sarajevo
11 0800	ARABIC//50/R/85	YKP28	SANA Damascus
11.1570	MIL STD 188 141A	s49	Swedish Emb Jeddah
11 2000	MIL STD 188-141A	milole	Gabon Rhwys Milole
11 4152	ARQ/342//200/E/400	rflt	FF Paris
11.4167	ARQ/342//200/E/400	—	FF Sarajevo ?
11.4830	FEC/A//192/E/400	p8r	MFA Paris
12 1632	ARQ/POL//100/E/250	—	Polish Emb Islamabbed
12.1800	MIL STD 188 141A	01	Algerian MOI?
12.2190	ARQ/RS//240/E/-	—	MFA Rome
13 0500	35C//50/R/170	UDK2	Murmansk Radio
13.3692	ARQ/342//200/E/400	rffvay	FF Sarajevo
13.4420	MIL STD 188 141A	055	UNID
13.4579	TWINPLEX//100/E/-	OZU25	MFA Copenhagen
13.4665	ARQ/RS//240/E/	—	UNID
13.4797	ARQ/342//200/E/400	—	FF Paris ?
13.4869	TWINPLEX//100/E/-	OZU25	MFA Copenhagen
13.5516	FEC/A//192/E/400	rfgw	MFA Paris
13.8467	ARQ/E3//100/E/170	rfvi	FF Le Port
13.8867	ARQ/E3//192/E/400	—	FF Paris ?
14.2000	MIL.STD 188 141A	1000	UNID
14 4220	MIL.STD 188-141A	rbt	Algerian Emb Rebat
14.4617	ARQ/E3//192/E/400	—	FF UNID
14.4817	ARQ/E3//48/E/400	rftj	FF Dakar
14 4857	ARQ/E3//192/E/400	rfllg	FF Cayenne
14.5500	MIL.STD 188-141A	o2	Algerian Moi No1
14.6750	ARABIC//50/N/425	—	Jana Tripoli
14.6987	ARQ/E3//200/E/400	—	FF Ndjamena
14 6267	ARQ/E3//192/E/400	rflt	FF Ft De France
14.6707	ARQ/E3//192/E/400	—	FF UNID 7
14.7183	ARQ/E3//100/E/400	—	FF UNID ?
14 7183	ARQ/E3//192/E/1400	rfhi	FF Noumea
14.9240	ARQ/E3//192/E/400	rftj	FF Dakar
14.9267	ARQ/E3//192/E/400	rftj	FF Dakar
15.0600	MIL STD 188-141A	a45	Swedish Emb Ankara
15.9465	TWINPLEX//100/E/-	EAE220	MFA Madrid
15.9730	ARQ/POL//100/E/1250	SNN299	MFA Warsaw
16.0977	ARQ/E3//100/E/400	rfvi	FF La Port
16.1477	ARQ/E3//200/E/400	—	FF UNID 7
16.1932	ARQ/342//200/E/400	rfqp	FF Djibouti 7
16.8010	35C//50/R/170	—	Ship *Yrimskorsles* ?
17.4140	FEC/A//192/E/400	rfgw	MFA Paris
17.4227	ARQ/E3//200/E/400	rffvaea	FF Alyasa
17.5509	ARQ/E3//192/E/400	rftj	FF Dakar
18.0426	ARQ/E3//192/E/400	rftjd	FF Libreville
18.1834	COQ/8/26.7/I/-	—	MFA Algiers
18.1856	MIL.STD 188-141A	a73	Swedish Emb Lagos
18.2087	ARQ/E3//200/3/400	—	FF Dhahren 7
18.2937	ARQ/E3//200/E/400	—	FF Paris?
18.2937	ARQ/E3//200/E/400	—	FF Paris
18.2967	ARQ/E3//100/E/400	rfqp	FF Djibouti
18.4445	ARQ/E//184 6/I/400	—	FF Nagoura ?
18 5133	ARQ/E3//192/E/400	—	FF UNID 7
18 5139	TWINPLEX//100/E/-	—	MFA Copenhagen 7
18.5501	FEC/ROU//184 6/R/400	v5g	MFA Bucharaat
18 5637	ARQ/E3//192/E/400	rftj	FF Dakar
18 7570	FEC/A//192/E/400	rfgw	MFA Paris
19.0487	ARQ/E3//192/E/400	—	FF Paris 7
19 1017	ARQ/E3//192/E/400	—	FF Ft De France
19 1400	MIL.STD 188-141A	nkt	Algerian Emb Nouakchott
19 1457	ARQ/E3//200/E/400	rftj	FF Dakar
19 2047	ARQ/E3//192/E/400	rflt	FF Ft De France
19.2252	ARQ/E3//200/E/400	—	FF UNID 7
19 3852	ARQ/342//200/E/400	rfqp	FF Djibouti
19 5118	TWINPLEX//100/E/-	—	UNID
19.5440	FEC/A//192/E/850	p8c	French Emb Beirut
19 8500	FEC/A//192/E/850	w3s	French Emb Islamabbed
19 7245	35C//50/R/170	UIW	Kelimingrad Radio
20.0455	PACT//	WPC	Pin Oak Gladstone
20 1799	ARQ/E3//100/E/400	—	FF Paris
20 6433	PACT//100/-/200	—	UNID
20 5550	ARQ/E//184.6/I/400	—	FF Paris
20.6310	MIL STD 188 141A	off	USAF Offutt
20 6337	ARQ/E3//100/E/400	rfvi	FF Le Port
20.6980	MIL.STD 188 141A	s51	Swedish Emb Teheran
20 6980	MIL STD 188 141A	s53	Swedish Emb Amman
20 8452	ARQ/342//200/E/400	—	FF Paris ?
20.8652	ARQ/342//200/E/400	—	FF Paris 7
21.8379	TWINPLEX//100/E/-	DZU25	MFA Copenhagen
21.8677	ARQ/E3//200/E/400	—	FF UNID ?
21.8680	ARQ/POL//100/E/170	SNN299	MFA Warsaw
21.9740	FEC/A//144/E/850	TAD	MFA Ankara
22.0035	35C//50/R/170	UIW	Kelimingrad Radio
22.0520	38C//50/R/170	UMV	Murmansk Radio 7
22.0186	TWINPLEX//100/E/-	EAE220	MFA Madrid
23.5260	MIL.STD 188-141A	s92	Swedish Emb Monegue
24.0277	ARQ/E3//192/E/400	rflt	FF Ft De France 7
24 3700	FEC/A//192/E/400	RFGW	MFA Paris
24.5390	ARQ/RS//240/E/-	—	MFA Rome
25.0400	FEC/A//192/E.400	rfgw	MFA Paris

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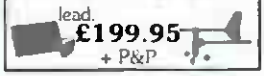

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Propagation Forecasts

How to use the Propagation Charts

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

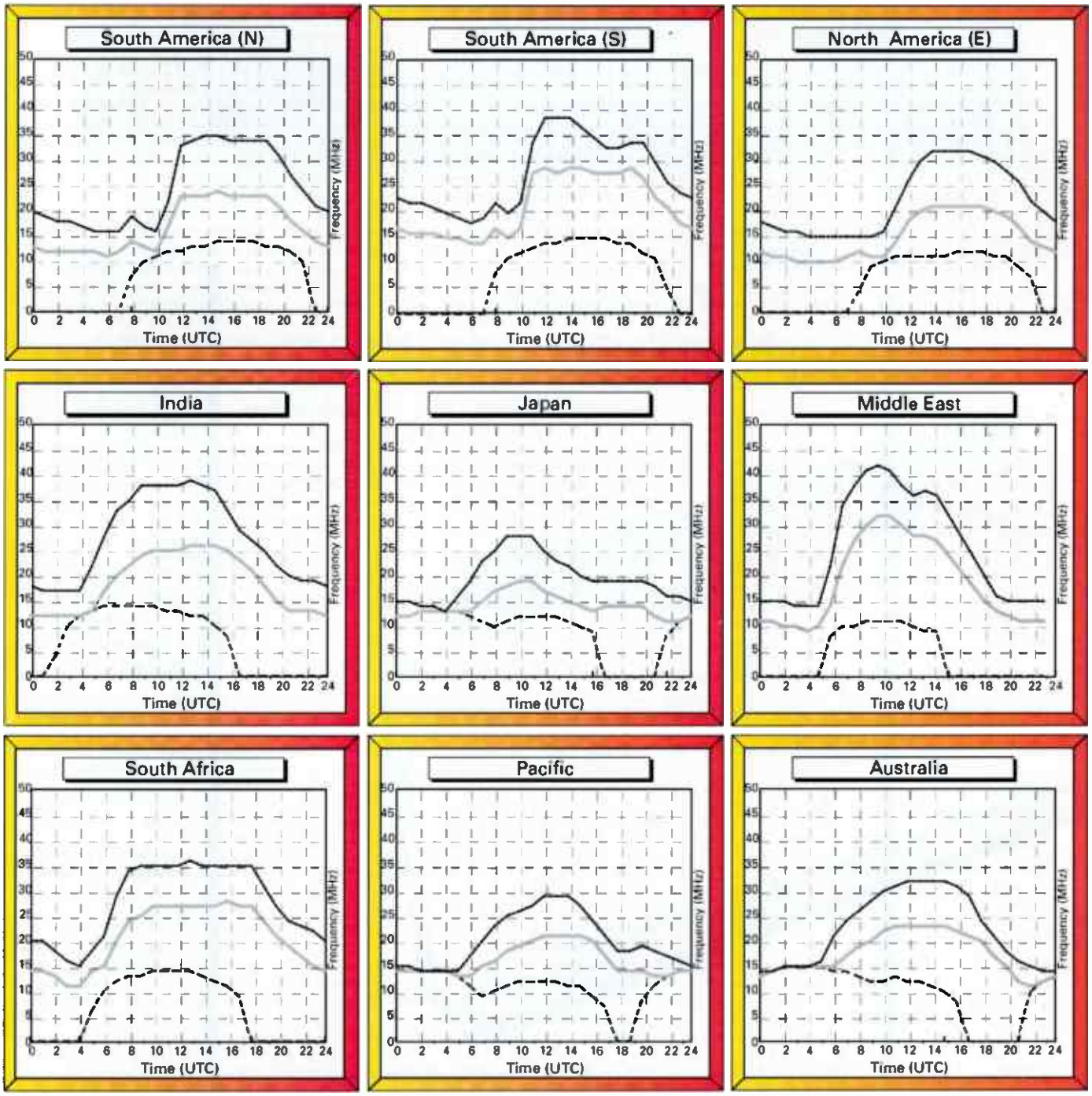
The middle line indicates the optimum working frequency (OWF) with a 90% probability of success for the particular path and time.

Lastly, the upper dashed line represents the maximum usable frequency (MUF), a 50% probability of success for the path and time.

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

Good luck and happy listening.

March 2001
Circuits to London

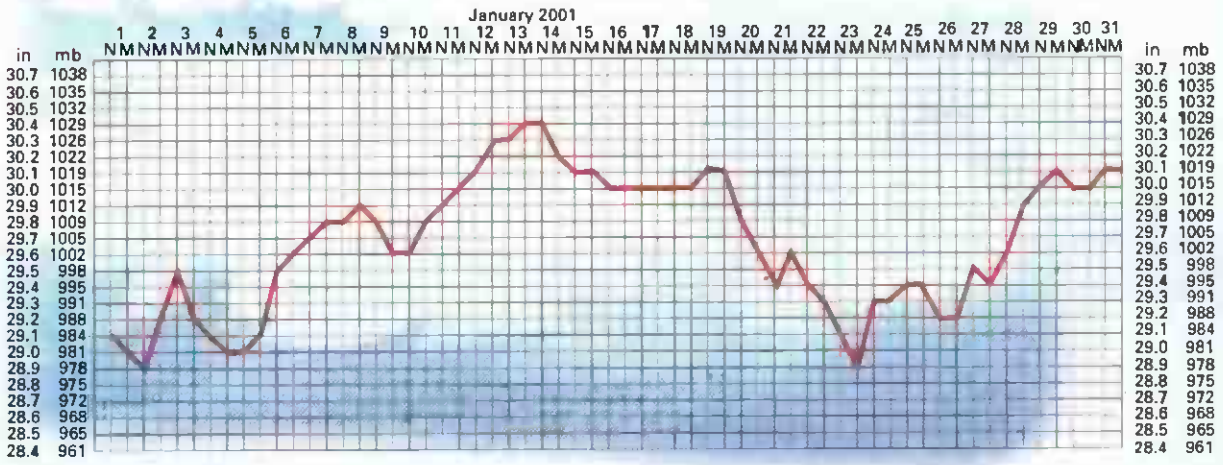


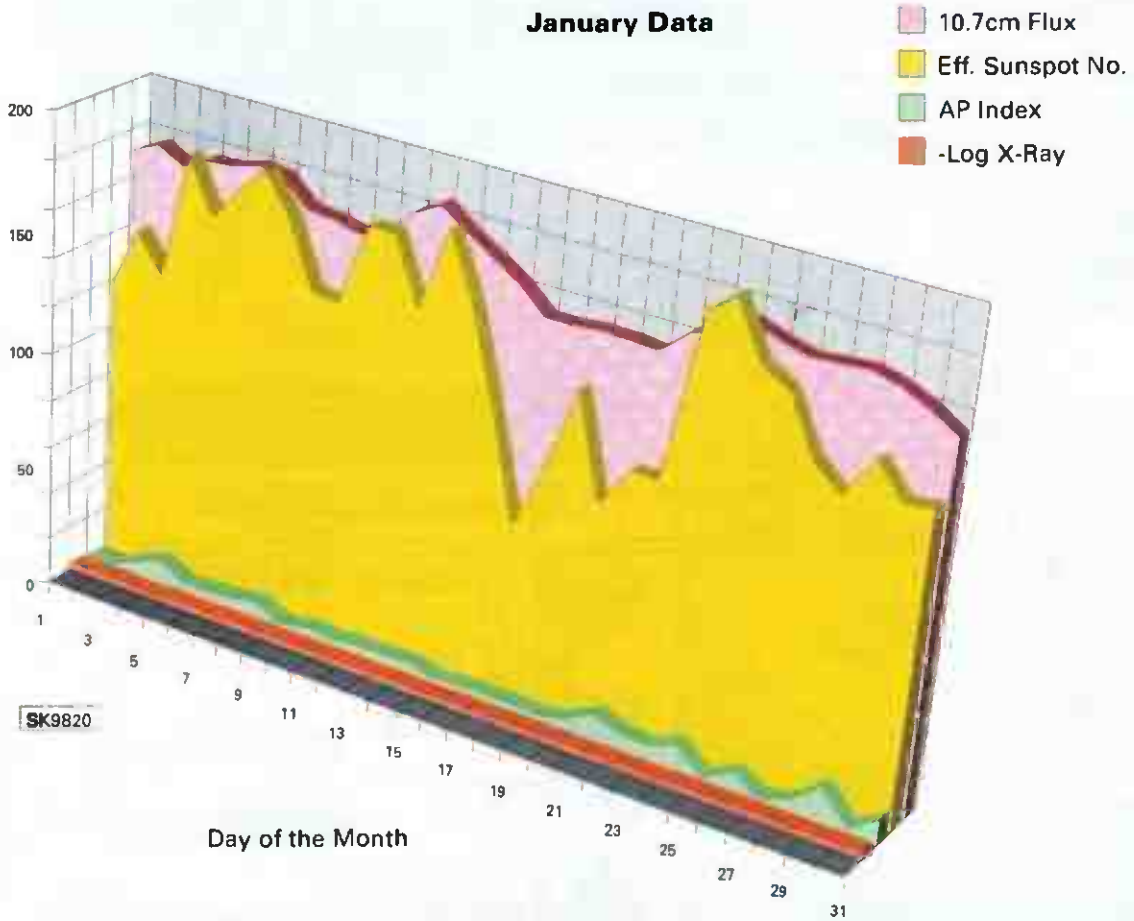
SK9819

KEVIN NICE G7TZC, SWM EDITORIAL OFFICES, BROADSTONE ■ E-MAIL: kevin@pwpublishing.ltd.uk

Propagation Extra

Ron Ham's barometric pressure chart, taken at Storrington, W. Sussex, January 2001.





guide to the chart

The 10.7cm solar radio flux is used as an indicator of the general level of solar activity.

The K and AP indices are measures of geomagnetic activity.

The K index ranges from zero (very quiet) to nine (severely disturbed).

K values of five or greater correspond to geomagnetic storm conditions that can relate to poor propagation conditions.

The AP index ranges from 0 to 400. An AP of 30 is the threshold for geomagnetic storm conditions.

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Info in Orbit

This month I reflect on NOAA's recent public information exchange on the future transition from WEFAX (low resolution analogue images) to LRIT (the digital version). Just one representative of British interests attended the conference. As well as readers' images, I take a look at a typical NOAA pass to see just how much imagery we get for US tax-payers' money!

Fig. 1: The AVHRR instrument (courtesy NOAA).

NOAA Imagery - All The Channels

The images that we receive and decode in our homes, from NOAA WXSATs, are produced in real-time by an orbiting telescope system that constantly looks at the ground below the satellite. The telescope's mirror is 0.20m diameter - a size that any amateur astronomer would be more than happy to use! This telescope forms the heart of the WXSAT's imaging system - the latter known as the *Advanced Very High Resolution Radiometer - AVHRR/3*. The term radiometer refers to the system's capacity to measure temperatures in the thermal images produced by some of the channels.

The instrument is a six channel imaging radiometer which detects energy in the visible and infra-red portions of the spectrum. It monitors reflected energy in these channels to observe vegetation, clouds, lakes, shorelines, snow, aerosols and ice. It also determines radiation energy from the temperature of the land, water, and sea surface, as well as the clouds above them.

The instrument has a small instantaneous field-of-view that provides a nominal spatial resolution of 1.1km at nadir - the point below the satellite. A rotating elliptical scan mirror, scanning a full 360° rotation, provides the cross-track scan, at an orientation perpendicular to the spacecraft's orbit track. The speed of rotation of the scan mirror - six revolutions per second - is selected so that adjacent scan lines are contiguous at the nadir position. Complete strip maps of the earth from pole to pole are obtained as the spacecraft travels in orbit at approximately 833km altitude.

Because of spectral and gain improvements to the solar visible channels, the unit provides improved low light energy detection - compared with previous scanners. A sixth channel was added, designated 3A, at 1.6µm for improved snow, ice, and cloud discrimination. Channel 3A is time shared with the previous 3.7µm channel, now designated 3B, to provide five channels of continuous data. An external sun shield and an internal baffle were added to reduce sunlight impingement into the instrument's optical cavity and detectors.

Spectral Range

Channel	Wavelength (µm)
1	0.58 - 0.68
2	0.725 - 1.0
3A	1.58 - 1.64
3B	3.55 - 3.93
4	10.3 - 11.3
5	11.5 - 12.5

Figures 2 to 6 were produced by reception of the pass on my Timestep h.r.p.t. system; the raw data was then processed using David Taylor's HRPT reader. Noting that David does not have an h.r.p.t. system, but has written his software using supplied raw data from others, his program is an exceptional piece of work, and I summarised its operation in the 'WXSAT Special' edition in November 2000.

Figure 7 shows the a.p.t. composite image that I received during the pass from which **Figs. 2 to 6** were also obtained. This is a raw image without enhancement, and shows the infra-red channel on the left, and the change from visible-light to channel 3 infra-red as the spacecraft reaches northern twilight. The h.r.p.t. equivalent produces a night-time blank image, as seen in the upper sections of the visible-light channels. **Figure 8** is the full a.p.t. infra-red image for comparison with the h.r.p.t. images.

The analogue data output from the sensors is digitised on board the satellite at a rate of 39,936

Figs. 2 to 6: channels 1 through 5 - (visible and infra-red) from the *NOAA-14* pass at 1557UTC on 10 January 2001.

samples per second per channel. Each sample step corresponds to a small angle of scanner rotation, and at this sampling rate, a total of 2048 samples are obtained per channel per Earth scan, spanning an angle of ±55.4° from the nadir.

All six spectral channels of the AVHRR/3 measure energy from the same spot on the earth at the same time. They are also calibrated so that the signal amplitude in each channel is a measure of the scene radiance. Although the AVHRR/3 has six channels, only five are transmitted to the ground at any one time. The radiometers are designed to operate within specification for a period of three years in orbit.

The production of the reduced resolution a.p.t. signal is made by using every third scan line from the AVHRR. The line is then corrected geometrically for distortions that vary with altitude. At this stage, the signal is still digital. It is converted to a 2080Hz bandwidth analogue signal, amplitude modulated onto a 2.4kHz carrier, and finally bandwidth limited to 4160Hz in preparation for transmission by the v.h.f. transmitters. This is the signal that a conventional WXSAT antenna/receiver tunes to, and ultimately produces our a.p.t. image.

Current WXSATs

RESURS 01-N4 surprised us by ceasing a.p.t. transmissions during January. Perhaps they will resume within a few weeks. *NOAA-15* remains in a fault condition, with h.r.p.t. imagery being transmitted unsynchronised. *NOAA-16* has provided extremely good quality h.r.p.t., but an apparently faulty r.f. switch has so far prevented continued transmission of a.p.t. - a real loss to many users around the world.

NOAA-12 and *NOAA-14* are currently providing reliable a.p.t. *METEOR 3-5* was replaced by *METEOR 2-21* for a few weeks during its orbital drift through the twilight zone. The consequence is a frequency change from 137.30 to 137.40MHz.

The often quiet Russian oceanographic satellite *OKEAN-O* resumed active operations during December, resulting in those who maintain constant watch, recording near-daily transmissions. RIG committee member **Les Hamilton** sent **Fig. 9**, a recording made on 8 December 2000. It is a clear image showing the eastern part of the Mediterranean sea. Careful examination of the image shows that the numbers are reversed, and when you note that *OKEAN-O* was travelling south-bound, the time stamp - the lead numbers showing 0788, 0789, 0790 and so on - are counting backwards. I am not aware of the reason for this curious fact, but maybe we will discover why in time.

Fig. 7 and 8: The a.p.t. equivalent from the *NOAA-14* 1600UTC pass on 10 January 2001.

Les points out that during cold snaps, infra-red images from both *NOAA-14* and *NOAA-12* are superb, showing amazing detail, especially the overnight and early morning passes, when the land is at its coldest. He suggests that no-one should make the mistake of assuming that because the visible channel is almost non-existent at this time of the year, that there is no point in imaging.

Peter Hawkes of Smestow, South Staffs, sent an image received from RESURS on 30 December showing a snow covered Britain. Peter used an Icom PCR1000 receiver fed by a home-made QFH antenna without pre-amp.

Cedric Roberts has been doing some 'post-pass analysis' with *NOAA-16* thermal imagery using his Dartcom system. A near-clear image of the UK provided the opportunity for Cedric to prepare a thermal radiation colour profile of the 1301UTC pass, coloured in degree intervals from -20° to 0°C and shows the radiation temperatures over the snowfields. Unfortunately it was not possible to include the palette with the image.

Kevin Hughes of Tamworth recorded winter's arrival in Tamworth via an early morning *NOAA-12* image.

NOAA's WEFAX/EMWIN User's Workshop

NOAA convened a 'Users Workshop' for all users of the US GOES WEFAX transmission service on 15 November 2000 at Washington, DC, Silver Spring, Maryland. Although this was primarily an American concern, the changes to WEFAX are likely to be reflected by the European community. The National Environmental Satellite, Data and Information Service (NESDIS) has accepted the Low Rate Information Transmission (LRIT) Global Specification as the new digital standard to replace current analogue WEFAX data transmissions. This meeting provided WEFAX users and equipment manufacturers with information on NESDIS' plans for implementing LRIT, emphasising the impact on current service and receiving stations.

From information provided by **Marlin O. Perkins**, GOES DCS Manager, some sixty or more people attended the meeting, including officials from various NOAA departments. Mr Perkins explained that the purpose of the workshop was to share information, create a dialogue on the issues of LRIT, and obtain responses on the impact of the LRIT implementation. The three main areas of concern are: the LRIT transition period, the cost of a user receiving station, and the changes and effects of the EMWIN service - the latter being a data stream from the GOES WXSATs.

Fig. 9: *OKEAN-O* 0915UTC on 8 December 2000 from Les Hamilton.

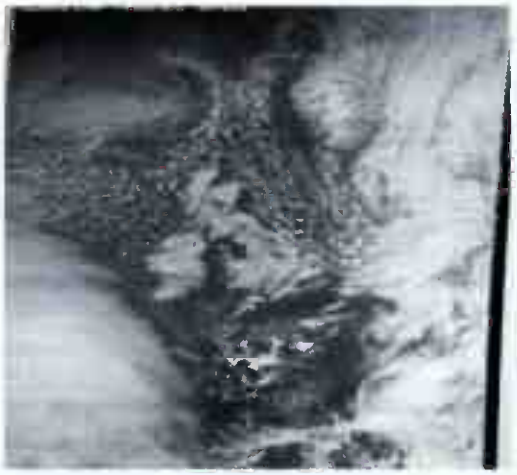

Fig. 10: *RESURS 01 N4* image 1133UTC 30 December 2000.

NESDIS is in the process of purchasing a new series of satellites: *GOES-N, -O, -P, -Q*, with similar instrumentation as the current series. The new series of GOES spacecraft will support the new LRIT digital service. The first two spacecraft, *GOES-N* and *-O*, are in the hardware development and integration phase. Beginning with *GOES-N*, NESDIS will only support LRIT transmissions and provide a separate transponder for EMWIN. The completed *GOES-N* spacecraft is scheduled to be available for launch in October 2002 and GOES-O in April 2004.

The discussion document indicates that the user community was represented by the World Meteorological Organisation (WMO), and **Dave Cawley** represented the Remote Imaging Group (RIG). Dave is also well known for his involvement in Timestep. The WMO voiced concerns about the implementation and transition of the LRIT format. Issues raised as primary concerns from the user community included the costs and nature of receiving equipment, for instance, hardware requirements: the dish size should be comparable with WEFAX specifications, and signal processing should be via inexpensive chip sets. "The cost of the receiving equipment should not be significant". Extensive information on NESDIS' ongoing hardware developments was presented.

David Cawley presented a discussion document. He commented on the impact that LRIT would have on existing WEFAX users. Dave described the implications of the LRIT transition period, and the cost of receive stations, and the impact on schools and other novice users. The transition period for implementing the new service is very short, and requires all existing WEFAX users to immediately plan for the purchase of new, costly units. He expressed his view that the new digital system is too expensive and the cost of the units would create a deficit in the scientific and technical disciplines in the school systems afforded by the WEFAX systems. Those schools that cannot afford the cost of the new system will most surely use the Internet as the primary source of weather data. He felt this expensive means of acquiring this digital data stream will certainly exclude a lot of people and schools' systems.

Dave added that he represented the UK's Remote Imaging Group (RIG), a band of happy experimenters who build weather satellite reception systems for recreation. Starting from a photocopied handout, RIG now produces a full colour quarterly journal. He suggested that there are probably 10,000 under-represented users of GOES WEFAX who are going to have a hard, or simply impossible time changing to the new digital services. "The existing system of f.m. transmission is simple and efficient. There are f.m. receivers available everywhere. There is not a single digital receiver in the consumer marketplace right now. The existing WEFAX service is very easy to set up, to troubleshoot and to optimise. A digital signal is not. The expense will put a lot of people off too".

"In a nutshell", Dave continued, "we should consider the needs of this, the largest community. We should make considerable allowance for a smooth and lengthy transition. And the most radical, we should consider if it is not too late to piggyback a WEFAX transmission onto the digital satellites. However, on behalf of this user community, I would like to thank NOAA for all the fun and education we have derived from them so far".

NOAA responded that their review of US industry CCSDS capabilities led to their projection that LRIT user stations could be built for less than US$5000. NOAA will make available the LRIT user station specifications or design by June 2001.

The future transition from analogue to digital WXSAT data is still being defined. As new information is made available by the national organisations and by the manufacturers, it will be published in this column.

Kepler Elements - WXSATs & *ISS*

If you want a computer disk file containing recent elements for the WXSATs, AMSATs and others of general interest, together with a large file holding elements for thousands of satellites, please enclose 50p with a PC-formatted disk and stamped envelope to me, at the address at the head of the column. A print-out is included that identifies NASA catalogue numbers for the WXSATs. The disk file is ideal for automatic updating of tracking software.

Fig. 11: *NOAA-16* 1301UTC 30 December 2000 from Cedric Roberts.

Fig. 12: *NOAA-12* 0520UTC 28 December 2000 from Kevin Hughes.

Shuttle Launch Schedule

The majority of Shuttle launches are devoted to the construction of the *International Space Station*, which will continue for some years.

STS-102 *Discovery* is scheduled for launch on 1 March, 2001 at 0940 Eastern Standard Time. This is flight 5A.1 lasting 11 days, with orbital inclination 51.6°.

Frequencies

NOAA-12 transmits a.p.t. on 137.50MHz.
NOAA-14 transmits a.p.t. on 137.62MHz.
NOAA-15 and *NOAA-15* are in fault conditions.
NOAAs transmit beacon data on 137.77 or 136.77MHz.
METEOR 3-5 uses 137.30MHz.
METEOR 2-21 uses 137.40MHz (when replacing *METEOR 3-5*).
OKEAN-O, OKEAN-4 and *SICH-1* use 137.40MHz for brief transmissions.
RESURS 01#4 (usually) transmits a.p.t. on 137.85MHz.
METEOSAT-7 (geostationary) uses 1691 and 1694.5MHz for WEFAX.
GOES-8 (western horizon) uses 1691MHz for WEFAX.

Book Profiles

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Book Profiles

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

Amateur Bands

The first column written in the new century, and the first since I finished my six years representing Wales on RSGB Council. One thing learnt, that those who were so keen to see one nominated and voted in would turn out to be the very ones who later complain the most! Each individual amateur and s.w.l. is firmly convinced they have the only opinion held within the hobby, so when the evidence says otherwise and RSGB (or indeed UKRS) dare to go by the evidence, many people object - mostly non-members to boot!

Here & There

The essentials of a listening post are questioned. For me, a decent receiver, the best possible antenna, a log-book and a comfortable pair of headphones are all that is essential in the shack, though of course there are lots of 'trimmings' such as a second receiver, and a logging program, plus of course reference books listing for example the DXCC countries. For each of us, the choice of the trimmings will be different. 'Shack' can itself mean different places. One recalls a set-up on a turn in the stairway, and another one in a cupboard under the stairs - though the op's backside stuck out into the bedroom.

We've talked enough about receivers over the past couple of months, so now let's look at antennas, remembering the size of the average garden.

The ideal is a monoband beam of three or more elements for each of the h.f. bands 7-28MHz, plus something good for 1.8 and 3.5MHz. For the beams, you'd need a rotator and tower, plus sleeping pills for any stormy night. A 'tribander' beam contains lossy elements such as traps which degrade with age, and in any case, some neighbour is bound to complain of the 'eyesore'!

That I suppose, leaves us with wire antennas. We start by looking at a Great Circle world map - the one which makes continents into funny shapes, but gives accurate distance and direction. Anywhere in UK, we find Eurasia to the East, N.America to the West, and most of the rest to the South. Northerlies are OX, OY and TF, which are within range of a bit of wet string anyway. So, we could be satisfied with a dipole for 14MHz firing E-W (i.e. the ends pointing N-S) and perhaps another dipole - say on 21MHz with the ends pointing E-W so it fires N-S.

As for height, we want to be a half wave or multiples above ground - not, please **not**, a quarter-wave! For the other bands, we may tie the feeder legs together and feed as an end-fed wire against a good ground. Please remember that 'good ground' means just that, time on improving the earthing is useful. Antenna systems only have losses! Finally, look at the antenna tuner - some of the commercial ones are quite lossy too.

Events

Without prior warning, 3Y0C showed up from Bouvet operated by N4BQW. Against that, the multi-national P5 operation scheduled for January was negated by the authorities.

Letters

First **Paul Goodhall**, and the welcome news that young **Peter**'s eye operation was a success, though it will be a while before we know about the right eye. On the downside, after one of the December gales, the mast broke, dumping the antenna itself into the river Cherwell, whence Paul recovered it only with his XYL's aid. And, at the time he wrote, the land had turned white, but at least the wind had dropped!

Looking now at the Goodhall logs, they are, sensibly, consolidated into one. We notice one ploy which could be adopted by other listeners - 9Y4AT was logged working 28 different stations in succession, sure, some were dross, but some were well worth catching. BA4RF was another to follow round, snapping up the rarities attracted by the even rarer one. In this log, such prefixes as VK, JA 4X4 and similar seem to fall into the category of 'hardly worth logging'!

Philip Davies in Market Drayton goes back to a chance reference in a column years ago to my interest in railways. Philip has just bought Herring's book on *Classic Steam Locomotives* - I read it myself over Christmas, thanks to our local library and I agree with him that it is good. Philip has been collecting old magazines, he mentions the first report he ever made, to the *Short Wave Listener* in September 1952. The Radio Quarterly came out twice and Philip has the first one. I had both, but they 'went west' in a house move.

Another one to rate a question is **E. Trowell** of Sheerness who reported to *Short Wave Magazine* in January 1939 and a *Wireless World* for October 1913 containing an article on 'the Future of Wireless Telegraphy' by a Mr Marconi. Radio-wise, Philip had a ball in the ARRL 28MHz contests, and, having noted a wide-open but empty band, wonders what the anti-contest wallahs do when there isn't a contest to complain about?

Philip logged all 40 states, seven Canadian provinces and 72 DXCC countries. As for year 2000, it produced a couple of all-time new ones in 4W6GH East Timor and A52A Bhutan. Other nice ones logged included FK8GM New Caledonia, FO5NL French Polynesia, FW5ZL Wallis & Futuna Is, S79DL Seychelles, VP6BR Pitcairn Is, ZD9ZM Tristan Da Cunha, 8Q7XX Maldives, while the commoner ones included AI6A Mojave Desert, KC4AAA South Polar Base, not forgetting the BYLARA expedition to Les Minquiers and GZ7V from Shetland.

Our next letter comes from Sheerness way, and is signed by **Ted Trowell**. Ted notes FM5GU/l on Top Band and JY9NX on Eighty. 7MHz turned up 9M2TO, CO56VB, JR2CQS, 7X4AN and CN8YR, while 10MHz yielded EA8/DJ3XD and 14MHz gave YV1NX and 21MHz J3/G3TBK. On 24MHz we see YV6AZC and WA6TLA. Finally, 28MHz for ET3VSC, V51AS, VP5Q, VP5DX and N6ZZ - as usual nowadays all c.w.

From Barnsley we have the regular letter from **Colin Dean**. On 18MHz he found C6AIE, FS/W2JJ and TA3ET. Up a band to 21MHz and here Colin noted EK8WY, EP3SMH, ET3AA, FG5GI, JW0HR, TA3ET, UN7AR, VU2DK, YB0GN, YB0LBK and 8R1AK, which left 28MHz to provide for AP2JZB, A41LZ, CP6XE, CX5BW, C6AIE, FR5DX, JW0HR, J28VS, NP4Z, OD5NJ, PJ5/UA1ACX, P43P, TA3ET, TI2CC, TI2JJP, T77M, UN7CC, VD2NS, VP5/N0WBV, VU2DK, V44NK, YB0ABB, ZF2AH, 3B8CF, 3B8GL, 4T4DJW (= OA), 8P9JW, 8R1AK, 9K2ZZ and 9Y4TD.

Finally, I'm quite sure more of you read the column than contribute. However, I would very much like to hear how to make the column more generally interesting. A letter on the subject would be great, but a telephone call would help - after all, if you don't tell me what is good bad or indifferent, how can we improve? The number is **(01686) 628958**, after lunch.

That's All

That's all for this time - letters please to Box 4, Newtown SY16 1ZZ to arrive by the first of the month.

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- Priority function
- Individual power/volume and
- Tuning dial
- Channel pass function on memoty

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IC-R2

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